

Kent Street Traffic Study

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Executive Summary

To support increased GO train speeds in Guelph as part of the Regional Express Rail (RER) project, the traffic impacts from converting Kent Street to one-way operation and from closing the Dublin Street level crossing were investigated. Traffic operations were modelled for the opening year, five-year horizon, and ten-year horizon for both scenarios, and compared to future background conditions to identify the transportation impacts of each scenario.

It was found that converting Kent Street to one-way westbound operation and the closure of Dublin Street at the rail crossing are both feasible.

Conversion of Kent Street to one-way operation would have minimal traffic impacts to the road network in the study area, but might increase travel speeds on Kent Street. Maintaining on-street parking on one side of the street would help to effectively narrow the road and reduce potential for higher speeds.

Closing Dublin Street at the rail crossing will increase travel volumes on Glasgow Street, Yorkshire Street, and Norfolk Street. The following mitigation measures/strategies were identified to alleviate the effects of this closure:

- Signalization of the intersection of Yorkshire Street and Waterloo Avenue to facilitate north-south travel along Yorkshire Street, a collector road.
- Minor adjustments to traffic signal timings along Norfolk Street to facilitate travel for vehicles diverted from Dublin Street along that corridor.
- Closure of the Dublin Street crossing will affect approximately 250 daily active transportation movements. These active transportation users can cross the rail corridor either via Glasgow Street, 200 m to the west, or Norfolk Street, 200 m to the east of the existing Dublin Street crossing.
- The provision of wayfinding signage in advance of the closed Dublin Street crossing to direct active road users to alternative routes across the rail corridor is recommended in this network scenario.

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1. Introduction

As part its Regional Express Rail (RER) project, Metrolinx is transforming the existing GO rail system from a commuter service to a rapid transit service. As part of this project, 30-minute GO service will be provided from Kitchener to Union Station in the morning and from Union Station to Kitchener in the afternoon/evening. This change will involve providing more frequent service and at higher speeds along the Kitchener rail corridor and through the City of Guelph.

Metrolinx is considering a number of measures that when implemented will help improve transit service along the rail corridor during this transition. The measures being considered to support the increase of train speeds through the City of Guelph and to improve safety, including improvements at or near the Dublin Street level crossing, located approximately 0.5 km west of the downtown station, are shown below:

- Conversion of Kent Street to one-way westbound operation between Northumberland Street and Glasgow Street South.
 - ◆ This will simplify the placements of warning signage at the Kent Street intersection with Dublin Street and the Dublin Street crossing.
- Permanent closure of the Dublin Street level crossing.
 - ◆ This will allow for a fully protected railway through the intersection, in support of the increase in train speeds through Guelph and more frequent train service.
 - ◆ Closure of the Dublin Street level crossing would also rectify the substandard proximity of the adjacent roadway (Kent Street) with the rail corridor and the level crossing at Dublin Street.

Hatch Corporation was retained by Metrolinx to review the traffic impacts associated with these possible network changes as part of their overall assessment and evaluation. The review was conducted in accordance with the City of Guelph Traffic Impact Study guidelines and within study parameters provided through consultation with the City of Guelph. The following sections summarize the results of this review.

2. Study Area

While it is anticipated that traffic pattern changes will occur as a result of the conversion of Kent Street from two-way operation to one-way westbound operation, the effects will likely be felt over a relatively small area between Northumberland Street and Waterloo Avenue and between Norfolk Street/Gordon Street and Glasgow Street. Effects from a permanent closure of the level crossing at Dublin Street may be felt over a larger area extending farther to the north to Paisley Street and to the west to Yorkshire Street. Accordingly, for the purposes of the traffic impact assessment, a study area that is bounded by Paisley Street to the north, Norfolk Street/Gordon Street to the east, Waterloo Avenue to the south, and Yorkshire Street South to the west will be used to capture possible traffic pattern changes, effects to emergency access and to pedestrian, cyclist and transit movement under either of the two

network scenarios. At the request of the City of Guelph, the rail crossing at Alma Street has also been reviewed in this report.

The study area, including key intersections and rail crossings, is shown in Figure 2-1.

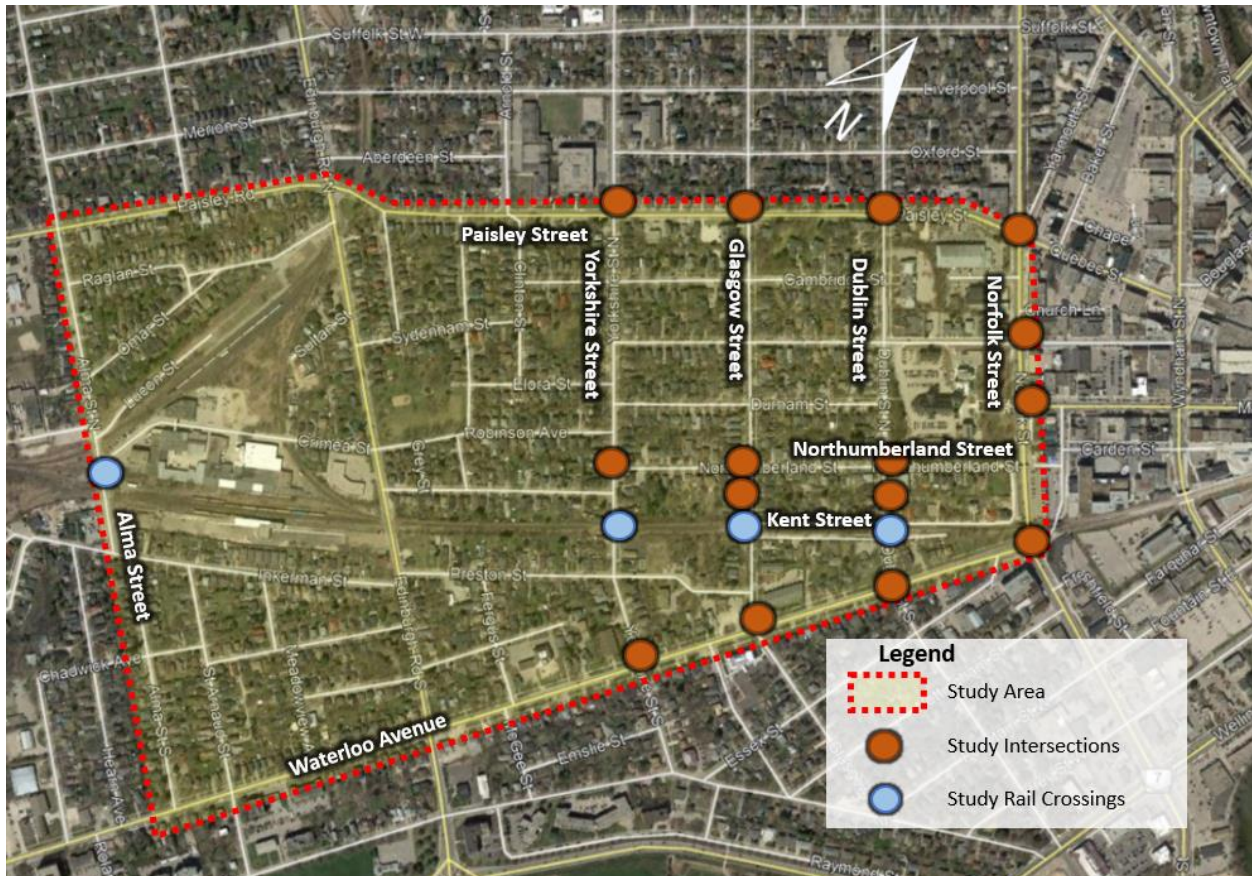


Figure 2-1: Study Area

3. Methodology

To analyze existing traffic conditions and the traffic impacts of the proposed modifications to the road network, a capacity and level of service operational analysis was completed for key signalized and unsignalized intersections within the study area using Synchro 10 traffic analysis software. This software implements methodologies defined in the Highway Capacity Manual (HCM).

Capacity is assessed based on the volume-to-capacity (v/c) ratio, which is the ratio of demand flow rate to the available capacity at the intersection. The v/c ratio provides an estimate of capacity sufficiency based on the specific geometry and control design of an intersection. A v/c ratio equal to or greater than 1.0 indicates that a lane group, an approach or the overall intersection is operating at effective capacity and that congestion is present.

Operations are defined by the concept of Level of Service (LOS). LOS is a key measure of effectiveness for both signalized and unsignalized intersections and is based on the average

stopped delay per vehicle, in seconds. It is a qualitative measure of the ability of the intersection (or individual movement) to accommodate traffic volumes. For signalized intersections, the LOS presented is for the intersection as a whole, and for unsignalized intersections, it is the LOS of the most critical movement. LOS criteria as defined in the HCM are summarized in Table 3-1.

Table 3-1: Level of Service Definitions

Level of Service (LOS)	Signalized Intersection Control Delay per Vehicle (s/veh)	Unsignalized Intersection Control Delay per Vehicle (s/veh)
A (FREE FLOW)	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E (CAPACITY)	> 55 and ≤ 80	> 35 and ≤ 50
F (FORCED FLOW)	> 80	> 50

To analyze the impact of the proposed modifications to active transportation and transit, in the study area, the continuity and accessibility of the active transportation network was evaluated.

Suitable mitigative measures to ameliorate the impacts to traffic, active transportation, or transit are also proposed as necessary to ensure the integrity of the transportation network in the study area following implementation of any proposed modifications to the road network to support higher-speed train operation and more frequent service on the GO Kitchener line.

4. Existing Conditions

This section summarizes the conditions of the existing transportation system in the vicinity of the proposed road modifications.

4.1 Existing Traffic Conditions

Land use in the study area includes mature single-family residential areas with some institutional areas, including the Church of Our Lady Immaculate, located between Cork and Norfolk Streets, approximately 250 m north of Kent Street; Guelph Civic Museum located south of Cork Street between Dublin Street and Norfolk Street; Central Public School, located north of Cork Street on the east side of Dublin Street; and St. James the Apostle Church located at Glasgow St. and Paisley St. Traffic volumes in the study area are relatively low, except along Norfolk Street, which in conjunction with Gordon Street provides the main north-south corridor through the downtown core of the City of Guelph.

4.1.1 Existing Road Network

The existing road network within the study area shown on Figure 2-1 consists of arterial roads and local roads, as outlined in the City of Guelph Official Plan (City of Guelph, 2018).

Table 4-1 describes the classification of the main roads in the study area:

Table 4-1: Road Classification

Road	Classification
Paisley Street	Arterial
Northumberland Street	Local
Kent Street	Local
Waterloo Avenue	Arterial
Glasgow Street	Local
Dublin Street	Local
Norfolk Street	Arterial
Alma Street	Local
Yorkshire Street	Collector

4.1.1.1 *Paisley Street*

Paisley Street is a two-lane street running east-west through the study area. The road has an urban cross section with curb and gutter. It has sidewalks on both sides of the street. Paisley Street is identified as a cycling route, having on-street cycling lanes except between Dublin Street North and Glasgow Street North within the study area.

Paisley Street provides access to residential properties on both sides of the street. On-street parking is generally not allowed, except on the north side of Paisley Street between Dublin Street North and Norfolk Street.

4.1.1.2 *Northumberland Street*

Northumberland Street is a two-lane street running east-west through the study area, with a section that runs north-south parallel to Norfolk Street extending from a pedestrian bridge over Norfolk Street to Kent Street. The road has an urban cross section with curb and gutter. It has sidewalks on both sides of the street.

Northumberland Street provides access to residential properties on both sides of the street. On-street parking is allowed on the south side of the street. On-street parking is being reviewed on the east side of Northumberland Street between Kent Street and the pedestrian bridge over Norfolk Street, to limit weekday parking to two hours between 8:00 A.M. and 6:00 P.M.

4.1.1.3 *Kent Street*

Kent Street is a pair of narrow (5 – 5.5m) two-way streets that run east-west through the study area, parallel to the existing railway tracks, with one on the north side of the tracks and one on the south. Each street has one lane in each direction. Kent Street north of the tracks has curb and gutter, with sidewalk on the north side of the street only. Kent Street south of the tracks has no curb or gutter, with sidewalk on the south side of the street only.

Kent Street north of the tracks provides access to residences on the north side of the street, with the south side abutting onto the rail tracks. On-street parking is permitted on the north side of Kent Street north of the tracks and east of Dublin Street North. Kent Street south of the tracks provides access to some residences on the south side of the street, with parking permitted on the south side during the nighttime (2:00 A.M. to 6:00 A.M.).

4.1.1.4 *Waterloo Avenue*

Waterloo Avenue has one lane in each direction and runs east-west through the study area. It has an urban cross section with sidewalks on both sides of the street. Waterloo Avenue is identified as a cycling route, with bicycle lanes on both sides of the street.

Waterloo Avenue provides access to residential properties on both sides of the street. On-street parking is permitted at non-peak times on the south side of the street between Yorkshire Street South and Dublin Street South within the study area.

4.1.1.5 *Glasgow Street*

Glasgow Street has one lane in each direction and runs north-south through the study area. It has an urban cross section with sidewalks on both sides of the street.

Glasgow Street provides access to residential properties on both sides of the street. On-street parking is permitted on the east side of the street except between 2:00 A.M. and 6:00 A.M. Glasgow Street North has a level crossing south of Kent Street, with automatic gates and flashing lights.

4.1.1.6 *Dublin Street*

Dublin Street is a two-lane street running north-south through the study area. It has an urban cross section, with curb and gutter. There are sidewalks on both sides of the road. The posted speed limit is 30 km/h in the vicinity of Central Public School and increases to 50 km/h south of Durham Street (one block north of Northumberland Street).

Dublin Street provides access mainly to residential properties on both sides of the street. On-street parking is permitted adjacent to Central Public School on the east side of Dublin Street North on weekdays, intended for student pick-up and drop-off only. On-street parking is also permitted at non-peak times on the west side between Northumberland Street and Kent Street and on the east side, south of Kent Street. Existing on-street parking on Dublin Street is currently being reviewed: the City is considering either removing daytime parking (8:00 A.M. to 6:00 P.M.) on weekdays on the west side of Dublin Street North between Durham Street and Kent Street, or limiting daytime weekday parking to two hours.

Dublin Street has a level crossing of the rail corridor south of Kent Street, with automatic gates and flashing lights.

4.1.1.7 *Norfolk Street*

Norfolk Street has two lanes in each direction, running north-south through the study area. It has an urban cross section with curb and gutter. There are sidewalks on both sides of the street except between Macdonell Street and Waterloo Avenue / Gordon Street where it is located only on the west side. The speed limit is 50 km/h. Norfolk Street is designated as a cycling route, and has bike lanes on both sides of the street.

Norfolk Street provides access to industrial and commercial land uses on both sides of the street. Some on-street parking is permitted on Norfolk Street on the east side, between Cork Street East and Macdonell Street.

4.1.1.8 *Yorkshire Street*

Yorkshire Street has one lane in each direction, running north-south through the study area. It has an urban cross section with curb and gutter. There are sidewalks on both sides of the street except between Durham Street and the rail crossing, where there is a sidewalk only on the west side. The speed limit is 50 km/h. Yorkshire Street is identified as a cycling route with a wide curb lane on a local street.

Yorkshire Street provides access to residential land uses on both sides of the street. Some on-street parking is permitted on the west side of Yorkshire Street.

Yorkshire Street has a level crossing of the rail corridor south of Foster Avenue, with automatic gates and flashing lights.

4.1.1.9 *Alma Street*

Alma Street has one lane in each direction, running north-south through the study area. It has an urban cross section with curb and gutter. It provides access across the rail corridor to an elementary school (Paisley Road Public School) 200 m north of the tracks. In the vicinity of the rail crossing, there is a sidewalk on the east side of the street. The speed limit is 50 km/h. Alma Street is identified as a cycling route with a wide curb lane on a local street.

In the vicinity of the rail crossing, Alma Street provides access to industrial land uses on both sides of the street. No on-street parking is permitted in the vicinity of the rail crossing.

Alma Street has two rail crossings between Inkerman Street and Lucan Street. The south crossing is the main GO rail corridor and is protected with automatic gates and flashing lights. The north crossing is protected only with approach signage.

4.1.1.10 *Traffic Signals and Pedestrian Signals*

The majority of intersections in the study area are unsignalized. Intersections with traffic signals or pedestrian crossings in the study area are listed below.

- Along Yorkshire Street:
 - ◆ Traffic signal at intersection of Paisley Street and Yorkshire Street
 - ◆ Pedestrian signal at the intersection of Waterloo Avenue and Yorkshire Street
- Along Glasgow Street:
 - ◆ No traffic signals or pedestrian signals on this corridor in the study area.
- Along Dublin Street:
 - ◆ Traffic signal at intersection of Paisley Street and Dublin Street
 - ◆ Pedestrian signal at the intersection of Waterloo Avenue and Dublin Street
- Along Norfolk Street:
 - ◆ Traffic signal at intersection of Norfolk Street/Yarmouth Street and Paisley Street/Quebec Street
 - ◆ Traffic signal at Norfolk Street and Macdonell Street

- ♦ Traffic signal at Norfolk Street/Gordon Street and Waterloo Avenue/Wilson Street

4.1.2 Existing Traffic Operations

4.1.2.1 Traffic Data

Turning Movement Count (TMC) information at each of the key intersections identified in the study area were collected by Spectrum Traffic. The traffic volume data was collected in the A.M. and P.M. peak hours.

Sketch 1 in Appendix A (Supplementary Traffic Figures) of this Report shows the existing lane configurations. Sketches 2, 3, and 4 in Appendix A illustrate the collected traffic volumes, truck percentages, and peak hour factors for existing conditions. These traffic volumes, as illustrated in Figure 3, were reviewed for consistency along the study area. Collected TMCs are summarized in Table 4-2 below, and included in Appendix B.

Current signal timing reports for the signalized intersections were provided by the City of Guelph, and are included in Appendix C.

Table 4-2: Turning Movement Counts Collected

#	Intersection Location	Date Collected	A.M. Peak Hour	P.M. Peak Hour
1	Paisley Street at Yorkshire Street	Tuesday, October 2 nd , 2018	8:15 A.M. – 9:15 A.M.	4:30 P.M. – 5:30 P.M.
2	Yorkshire Street at Northumberland Street	Tuesday, October 2 nd , 2018	8:15 A.M. – 9:15 A.M.	4:45 P.M. – 5:45 P.M.
3	Yorkshire Street at Waterloo Avenue	Tuesday, October 2 nd , 2018	8:15 A.M. – 9:15 A.M.	4:15 P.M. – 5:15 P.M.
4	Paisley Street at Glasgow Street North	Tuesday, October 2 nd , 2018	8:15 A.M. – 9:15 A.M.	4:30 P.M. – 5:30 P.M.
5	Glasgow Street North at Northumberland Street	Tuesday, October 2 nd , 2018	8:15 A.M. – 9:15 A.M.	4:45 P.M. – 5:45 P.M.
6	Glasgow Street North at Kent Street (north of rail crossing)	Thursday, October 4 th , 2018	8:00 A.M. – 9:00 A.M.	4:30 P.M. – 5:30 P.M.
7	Waterloo Avenue at Glasgow Street	Tuesday, October 2 nd , 2018	8:15 A.M. – 9:15 A.M.	4:15 P.M. – 5:15 P.M.
8	Paisley Street at Dublin Street North	Tuesday, October 2 nd , 2018	8:15 A.M. – 9:15 A.M.	4:30 P.M. – 5:30 P.M.
9	Dublin Street North at Northumberland Street	Tuesday, October 2 nd , 2018	8:00 A.M. – 9:00 A.M.	4:30 P.M. – 5:30 P.M.
10	Dublin Street North at Kent Street (north of rail crossing)	Tuesday, October 2 nd , 2018	8:00 A.M. – 9:00 A.M.	4:30 P.M. – 5:30 P.M.
11	Waterloo Avenue at Dublin Street	Tuesday, October 2 nd , 2018	8:15 A.M. – 9:15 A.M.	4:30 P.M. – 5:30 P.M.
12	Paisley Street/Quebec Street at Norfolk Street/Yarmouth Street	Tuesday, October 2 nd , 2018	8:15 A.M. – 9:15 A.M.	4:30 P.M. – 5:30 P.M.
13	Norfolk Street at Cork Street	Tuesday, October 2 nd , 2018	8:15 A.M. – 9:15 A.M.	4:30 P.M. – 5:30 P.M.
14	Norfolk Street at Macdonell Street	Tuesday, October 2 nd , 2018	8:15 A.M. – 9:15 A.M.	4:45 P.M. – 5:45 P.M.
15	Norfolk Street/Gordon Street at Waterloo Avenue/Wilson Street	Tuesday, October 2 nd , 2018	8:15 A.M. – 9:15 A.M.	4:45 P.M. – 5:45 P.M.

7-day Automatic Traffic Recorder (ATR) volume counts between Saturday, September 29th, 2018 and Friday, October 5th, 2018 and pedestrian counts between Sunday, September 30th,

2018 and Monday, October 1st, 2018 were also collected by Spectrum Traffic at the Alma Street rail crossing, Yorkshire Street rail crossing, Glasgow Street rail crossing, and Dublin Street rail crossing. The 7-day vehicle ATR counts were collected over 24 hours of the day, whereas pedestrian ATRs were collected between 8:00 A.M. and 4:00 P.M. on Sunday, September 30th, and between 7:00 A.M. and 7:00 P.M. on Monday, October 1st.

Table 4-3 summarizes the 7-day average daily traffic volume (and approximate AADT¹) on each of Alma Street, Yorkshire Street, Glasgow Street, and Dublin Street.

Table 4-3: Average daily traffic volumes at rail crossings in the study area

Location	Alma Street	Yorkshire Street	Glasgow Street	Dublin Street
Average Daily Traffic Volume	1,952	1,413	907	1,976

Table 4-4 summarizes the pedestrian volumes at rail crossings in the study area.

Table 4-4: Pedestrian volumes at rail crossings in the study area

Date	Location	Alma Street	Yorkshire Street	Glasgow Street	Dublin Street
Sunday, September 30 th , 2018	Total Volume	105 (8:00 A.M. – 4:00 P.M.)	99 (8:00 A.M. – 4:00 P.M.)	103 (8:00 A.M. – 4:00 P.M.)	138 (8:00 A.M. – 4:00 P.M.)
	Peak Hour Volume	31 (2:00 P.M. – 3:00 P.M.)	34 (2:30 P.M. – 3:30 P.M.)	21 (1:30 P.M. – 2:30 P.M.)	35 (1:45 P.M. – 2:45 P.M.)
Monday, October 1 st , 2018	Total Volume	540 (7:00 A.M. – 7:00 P.M.)	170 (7:00 A.M. – 7:00 P.M.)	109 (7:00 A.M. – 7:00 P.M.)	238 (7:00 A.M. – 7:00 P.M.)
	Peak Hour Volume	214 (11:30 A.M. – 12:30 P.M.)	39 (3:00 P.M. – 4:00 P.M.)	21 (4:45 P.M. – 5:45 P.M.)	35 (8:00 A.M. – 9:00 A.M.)

In addition to the above volume counts, 1-day, 24-hour Automatic Traffic Recorder (ATR) speed counts within the study area were collected by Spectrum Traffic on Tuesday, October 2nd, 2018 at the following locations:

- At Yorkshire Street between Cork Street and Elora Street; and
- At Dublin Street between Cork Street and Durham Street

¹ In this report, the ADT (average daily traffic) for a data collection period is used to approximate AADT (average annual daily traffic).

Table 4-5 summarizes the speeds of vehicles in the study area.

Table 4-5: Vehicle Travel Speeds in the Study Area

Parameter	Yorkshire Street	Dublin Street
Average speed	43 km/h	44 km/h
85 th percentile speed	52 km/h	52 km/h
Percentage of vehicles operating within 10 km/h of the speed limit (50 km/h)	54%	68%
Percentage of vehicles operating more than 10 km/h above the speed limit	7%	4%

With 85th percentile speeds less than 55 km/h, a traffic review under the City Traffic Calming Policy is not met (City of Guelph, 2006). However, with 4% of vehicles on Dublin Street and 7% of vehicles on Yorkshire street operating at speeds greater than 10 km/h above the speed limit, consideration of traffic calming strategies may be useful on the north-south corridors in the study area.

4.1.2.2 *Traffic Operations Analysis*

Traffic volumes were reviewed for consistency and adjusted to represent a balanced road network where appropriate. The traffic volumes used for the analysis of existing conditions are illustrated in Sketch 5 of Appendix A. The results of the Synchro analysis are summarized in Table 4-6, which shows overall intersection operations and critical movements for each intersection under existing conditions. Full results for background conditions are presented in the associated Synchro worksheets included in Appendix D.

Traffic conditions in the study area are generally good, with nearly all movements operating with a v/c of less than 0.85, and a LOS of D or better, with most movements performing at LOS C or better. The exception is the southbound movement at the intersection of Paisley Street and Yorkshire Street, which operates at LOS E in the A.M. peak hour. Intersections along Norfolk Street, in the downtown core of Guelph, also tend to operate with slightly higher delays than intersections elsewhere in the study area.

Table 4-6: Traffic Operations under Existing Conditions (2018)

Intersection	Movement	A.M. Peak Hour				P.M. Peak Hour			
		LOS	Delay(s)	V/C	95 th Queue (m)	LOS	Delay(s)	V/C	95 th Queue (m)
Signalized Intersections									
Yorkshire Street and Paisley Street	Overall	C	25.8	0.72	-	B	14.2	0.46	-
	SBLTR	E	61.9	0.93	66.5	B	27.7	0.39	20.7
Dublin Street and Paisley Street	Overall	B	11.9	0.50	-	B	11.6	0.48	-
Norfolk Street/Paisley Street at Quebec Street/Yarmouth Street	Overall	C	24.6	0.63	-	C	24.1	0.66	-
Norfolk Street and Macdonell Street	Overall	B	17.1	0.54	-	C	23.2	0.58	-
Gordon Street/Norfolk Street and Waterloo Avenue/Wilson Street	Overall	B	15.2	0.54	-	B	11.9	0.49	-
Unsignalized Intersections									
Yorkshire Street and Northumberland Street	Overall	No critical movements				No critical movements			
Yorkshire Street and Waterloo Avenue	Overall	No critical movements				No critical movements			
Glasgow Street and Paisley Street	Overall	No critical movements				No critical movements			
Glasgow Street and Northumberland Street	Overall	No critical movements				No critical movements			
Glasgow Street and Kent Street	Overall	No critical movements				No critical movements			
Glasgow Street and Waterloo Avenue	Overall	No critical movements				No critical movements			
Dublin Street and Northumberland Street	Overall	No critical movements				No critical movements			
Dublin Street and Kent Street	Overall	No critical movements				No critical movements			
Dublin Street and Waterloo Avenue	Overall	No critical movements				No critical movements			
Norfolk Street and Cork Street	Overall	No critical movements				No critical movements			

- Note: 1. Traffic operations table displays critical movements for signalized and unsignalized intersections.
2. "Critical movement" refers to the worst performing movements at the intersection. For signalized and unsignalized intersections, critical movements are those with a v/c ratio exceeding 0.85 for shared/turning movements, v/c ratio exceeding 0.90 for exclusive movements, LOS E or F, or where queues exceed available storage.
3. Acronyms representing movements can be interpreted as a conjunction of the movement direction and turning direction, such that the letters EB, WB, NB, and SB correspond to an eastbound, westbound, northbound, or southbound movement, respectively. The subsequent letters L, T, and R correspond to a left, through, or right movement respectively. Shared lanes are designated by a combination of the letters L, T, R at the end of the acronym. For example, EBLTR corresponds to an eastbound left/through/right lane.

4.2 Existing Transit Services

The Guelph Transit Commission operates the following bus routes in the vicinity of the study area:

- The 9 Waterloo bus route operates in an east-west direction, between Guelph Central Station and Elmira Road South.
 - ♦ The route has the following stops within the study area:
 - An eastbound and westbound stop on Waterloo Avenue at Dublin Street
 - An eastbound and westbound stop at Waterloo Avenue at Glasgow Street
 - A westbound stop at Waterloo Avenue at Fergus Street
 - A westbound stop at Waterloo Avenue at Edinburgh Street
 - An eastbound stop on Waterloo Avenue at Saint Arnaud Street
 - An eastbound stop on Waterloo Avenue at McGee Street
 - ♦ On weekdays, the route operates between 5:45 A.M. and 1:00 A.M., with a peak frequency of two buses per hour.
- The 10 Imperial bus route operates in an east-west direction, between Guelph Central Station and Imperial Road North.
 - ♦ The route has the following stops within the study area:
 - An eastbound and westbound stop on Paisley Street at Norfolk Street
 - An eastbound and westbound stop on Paisley Street at Glasgow Street
 - An eastbound and westbound stop on Paisley Street at Yorkshire Street
 - A westbound stop on Paisley Street at Harrison Street
 - An eastbound and westbound stop on Paisley Street at Edinburgh Street
 - An eastbound and westbound stop on Paisley Street at Alma Street
 - An eastbound and a westbound stop at Paisley Street between Dublin Street North and Norfolk Street.
 - ♦ On weekdays, the route operates between 5:45 A.M. and 1:00 A.M., with a peak frequency of three buses per hour.
- The 11 Willow West bus route operates primarily in an east-west direction, between Guelph Central Station and Silvercreek Parkway North.
 - ♦ On weekdays, the route operates between 5:45 A.M. and 1:00 A.M., with a peak frequency of two buses per hour.
 - ♦ The route has the following stops within the study area:
 - A northbound stop on Norfolk Street at Cork Street

- An eastbound stop on Paisley Street at Yorkshire Street
- An eastbound stop on Paisley Street at Glasgow Street
- An eastbound stop on Paisley Street at Norfolk Street
- The 20 Northwest Industrial bus route operates primarily in an east-west direction, between Guelph Central Station and Governors Road.
 - ♦ On weekdays, the route operates between 5:45 A.M. and 1:00 A.M., with a peak frequency of two buses per hour.
 - ♦ The route has the following stops within the study area:
 - An eastbound stop on Paisley Street at Yorkshire Street
 - An eastbound stop on Paisley Street at Glasgow Street
 - An eastbound stop on Paisley Street at Norfolk Street
- The 41 Downtown-University Express bus route operates in a north-south direction on Norfolk Street in the study area, between Guelph Central Station and University of Guelph.
 - ♦ The route is an express route with no stops in the study area.
 - ♦ On weekdays, the route operates between 5:45 A.M. and 1:00 A.M., with a peak frequency of six buses per hour.
- The 99 Mainline bus route operates in a north-south direction, between Smartcentre Guelph Platform and Clair Road at Gordon Street.
 - ♦ On weekdays, the route operates between 5:45 A.M. and 1:00 A.M., with a peak frequency of six buses per hour.
 - ♦ The route has the following stops within the study area:
 - ♦ A northbound and southbound stop on Norfolk Street at Cork Street.

In addition to the above local bus routes, Metrolinx also operates eight trains a day at Guelph Central Station between Kitchener GO Station and Union GO Station, which travel along the rail corridor passing through the study area:

- Four trains between 5:30 A.M. and 8:00 A.M. towards Union Station (arriving at Union Station between 7:00 A.M. and 9:30 A.M.)
- Four trains between 6:00 P.M. and 8:30 P.M. towards Kitchener GO Station (leaving Union Station between 4:30 P.M. and 7:00 P.M.)

4.3 Active Transportation Conditions

The pedestrian facility network in the study area is comprehensive, with almost all streets in the study area having a sidewalk on both sides of the road, except for Kent Street, sections of Alma Street, sections of Yorkshire Street and sections of Norfolk Street, which still has a sidewalk on one side of the street. Furthermore, there is a pedestrian bridge over Norfolk Street connecting to Northumberland Street.

The cycling network in the study area is also comprehensive, with major streets (Norfolk Street, Waterloo Avenue, and Paisley Street) all having cycle lanes to increase separation between cyclists and automobiles and improve cyclist comfort. Yorkshire Street and Alma Street are also designated as cycling routes with wide curb lanes.

Major generators of pedestrian activity in the study area include:

- The Guelph Civic Museum (on Cork Street, west of Norfolk Street)
- Central Public School (on Dublin Street, north of Cork Street)
- Guelph Collegiate Vocational Institute (on Paisley Street, west of Yorkshire Street)
- Paisley Road Public School (on Paisley Street, west of Alma Street)
- The Church of Our Lady Immaculate (on Cork street, west of Norfolk Street)

4.4 Collision History

A five-year collision history for the study area was provided by the City of Guelph. Table 4-7 summarizes the number of observed collisions at each intersection and rail crossing in the study area. In addition, the number of all mid-block collisions on Kent Street are summarized.

Most intersections in the study area experienced ten or fewer collisions over the past five years, with the exception of intersections on Norfolk Street. The higher incidence of collisions on Norfolk Street likely reflects the high traffic volumes on that corridor. There was only one collision at the rail crossings in the study area: at Alma Street. Only two mid-block collisions were reported on Kent Street.

Table 4-7: Collisions between 2013 and 2018

Location	Number of observed collisions
Rail Crossings	
Alma Street at the rail crossing	1
Yorkshire Street at the rail crossing	0
Glasgow Street at the rail crossing	0
Dublin Street at the rail crossing	0
Intersections	
Yorkshire Street at Paisley Street	9
Yorkshire Street at Northumberland Street	0
Yorkshire Street at Waterloo Avenue	7
Glasgow Street at Paisley Street	5
Glasgow Street at Northumberland Street	0
Glasgow Street at Kent Street	0
Glasgow Street at Waterloo Avenue	1
Dublin Street at Paisley Street	8
Dublin Street at Northumberland Street	0
Dublin Street at Kent Street	0
Dublin Street at Waterloo Avenue	8
Paisley Street/Quebec Street at Norfolk Street/Yarmouth Street	27
Norfolk Street at Cork Street	10
Norfolk Street at Macdonell Street	21
Norfolk Street/Gordon Street at Waterloo Avenue/Wilson Street	37
Road Segments	
Kent Street between Glasgow Street and Northumberland Street	2

Note: 1. Collisions were counted if they occurred within 20 m of a rail crossing.

4.5 Field Review

A field visit was conducted on Thursday, October 25th, 2018 to verify existing conditions, including transportation infrastructure transportation facilities, and traffic operations in the study area. The following observations were made:

- Minimal queues were present at most intersections in the A.M. and the P.M. peak hours.
- In the A.M. peak hour, the southbound movement at the intersection of Yorkshire Street and Paisley Street is operating at capacity due to heavy southbound volumes from Guelph Collegiate Vocational Institute, just north of the intersection, to the extent that the exit from the school parking lot is obstructed by queuing vehicles.
- The northbound movement at the intersection of Waterloo Avenue/Wilson Street at Norfolk Street/Gordon Street and Norfolk Street at Macdonell Street experiences some queuing due to lane closures during construction, but queues generally clear within a cycle.

Traffic operations in the field were found to be sufficiently similar to those modelled in Synchro.

A travel time survey was also performed as part of the field review. One run was made for each of the northbound and southbound corridors in the study area, with all northbound runs starting from the intersection of Dublin Street at Waterloo Avenue and ending at Paisley

Street, and all southbound runs starting from the intersection of Paisley Street at Dublin Street and ending at Waterloo Avenue. The travel time routes are shown in Figure 4-1.



Figure 4-1: Detour Routes

Travel times and control delays were measured separately. The following travel times and control delays were measured in the field:

Table 4-8: Traffic Times under Existing Conditions (2018)

Parameter			Yorkshire	Glasgow	Dublin	Norfolk
A.M. Peak Hour	Northbound	Travel	0:01:30	0:01:23	0:01:00	0:00:53
		Control	0:00:42	0:00:43	0:00:13	0:02:01
		Total	0:02:12	0:02:06	0:01:13	0:02:54
	Southbound	Travel	0:01:26	0:01:24	0:00:50	0:00:55
		Control	0:00:28	0:00:40	0:00:42	0:01:13
		Total	0:01:54	0:02:04	0:01:32	0:02:08
P.M. Peak Hour	Northbound	Travel	0:01:39	0:01:19	0:00:50	0:01:08
		Control	0:00:15	0:00:23	0:00:14	0:01:34
		Total	0:01:54	0:01:42	0:01:04	0:02:42
	Southbound	Travel	0:01:33	0:01:23	0:00:48	0:01:10
		Control	0:00:26	0:00:21	0:00:47	0:01:34
		Total	0:01:59	0:01:44	0:01:35	0:02:44
Average northbound travel time			0:01:35	0:01:21	0:00:55	0:01:00
Average northbound control time			0:00:29	0:00:33	0:00:13	0:01:47
Average northbound total time			0:02:03	0:01:54	0:01:08	0:02:48
Average southbound travel time			0:01:30	0:01:23	0:00:49	0:01:02
Average southbound control time			0:00:27	0:00:31	0:00:44	0:01:23
Average southbound total time			0:01:57	0:01:54	0:01:34	0:02:26

Travel times (excluding control time) along all routes are generally between one and two minutes long, with travel times along Dublin Street being the shortest, due to the shorter travel distance. Control times vary, being less than a minute for the routes on Yorkshire Street, Glasgow Street, and Dublin Street, and averaging about one and a half minutes on Norfolk Street. Consequently, total travel times through the study area (including control delay) are generally between one minute and two minutes for all routes, except Norfolk Street. Total travel times at Norfolk Street are longer because of the control delay at the multiple signalized intersections between Paisley Street and Waterloo Avenue.

5. Background Future Conditions

5.1 Traffic Conditions

5.1.1 Determining Future Background Traffic Conditions

The future background traffic conditions were analyzed by considering any major land use or transportation system changes that have occurred or are anticipated to occur in the study area between the 2018 base year and the planning horizons of 2021, 2026, and 2031. The horizon years were selected to reflect an opening year of 2021 and to capture any incremental changes to transportation conditions in five-year increments thereafter. This section summarizes any such adjacent planned developments and road network upgrades in the study area to help derive appropriate traffic growth rates for the planning horizons in this study.

5.1.1.1 Road Network Upgrades

There are no known road network upgrades in the study area. However, it is known that on-street parking studies are being considered to add parking to Kent Street, Dublin Street, and Northumberland Street in the study area (City of Guelph, 2018a):

- New two-hour parking from 8:00 A.M. to 6:00 P.M. on weekdays on the east side of Dublin Street between Kent Street and Durham Street
- Restricting on-street parking on the north side of Kent Street between Dublin Street North and Glasgow Street.
- New on-street parking on the east side of Northumberland Street between Kent Street and the pedestrian bridge over Norfolk Street.

5.1.1.2 Future Developments

Table 5-1 describes the active development applications in the vicinity of the study area (City of Guelph, 2018b):

Table 5-1: Active Development Applications

Address File #	Application Summary	Application Status
<u>89 Beechwood Avenue</u> <i>Zoning Amendment</i> <i>File Number ZC1706</i>	Application to permit the development of 34 residential townhouse units, revised to 23 residential townhouse units.	Under review.
<u>75 Dublin Street North</u> <i>Official Plan Amendment and</i> <i>Zoning Amendment</i> <i>File Number OP1603, OP 1706,</i> <i>ZC1612A</i>	Application to permit a site-specific rezoning for a proposed residential apartment building.	Under review.
<u>1 Carden Street</u> <i>Zoning Amendment</i> <i>File Number ZC1803</i>	Zoning By-law amendment to address service animals.	Under review

89 Beechwood Avenue and 75 Dublin Street North are anticipated to generate additional trips through the study area as follows:

- 89 Beechwood Avenue (Salvini Consulting, 2018)
 - ◆ 11 trips during the A.M. peak hour
 - ◆ 14 trips during the P.M. peak hour
- 75 Dublin Street North (Paradigm Transportation Solutions, 2017)
 - ◆ 11 trips during the A.M. peak hour
 - ◆ 13 trips during the P.M. peak hour.

Neither development has been approved yet, construction has not yet begun, and a date of completion is not known. However, as the number of trips generated during peak hours by either development is quite low, the trips can be assumed to be accounted for in the background growth of traffic in the study area.

The Wilson Street Parkade, located at the northeast corner of Waterloo Avenue and Gordon Street, is expected to open in 2019. The Wilson Street Parkade will consist of over 400

parking spaces. To support the traffic generated by the Wilson Street Parkade, the following transportation infrastructure changes will occur:

- Wilson Street will remain two-way between Northumberland Street and Norfolk Street, and be converted to one-way southbound movement south of Northumberland Street.
- Northbound and southbound bicycle lanes will be added to Wilson Street south of Northumberland Street.
- Additional parallel parking will be added to Wilson Street between Macdonell street and Northumberland Street
- The existing northbound right-turn lane on Gordon Street will be removed and replaced with parallel parking.
- The existing Norfolk Street footbridge between Northumberland street and the north of the new parkade will be replaced.

Volumes generated by the parkade, as analyzed in Scenario 6 of the Wilson Street Parking Structure Transportation Impact Study (Paradigm Transportation Solutions, 2016) have been added to the analysis of background conditions.

5.1.1.3 *Background Traffic Growth*

Guelph has experienced a population growth of roughly 7.7% between 2011 and 2016, a growth rate of approximately 1.5% per annum (Statistics Canada, 2016; City of Guelph, 2010). The study area is located within a mature area with predominantly residential land uses. The area west of Norfolk Street between Waterloo Avenue and Paisley Street in the study area has been identified as an urban growth centre with a future target density of 150 persons and jobs per hectare to support transit station development (City of Guelph, 2010).

Consistent with the Transportation Impact Study conducted for the Wilson Street Parking Structure (Paradigm Transportation Solutions, 2016), a background growth rate of 1.8% was applied to existing traffic volumes between 2018 and 2026, and a background growth rate of 1.5% was applied to traffic volumes from 2026 onwards, for the analysis of background future conditions.

This is supported by a comparison of historical traffic volumes provided by the City with traffic volumes collected in 2018 in the study area, on the streets of Alma Street, Yorkshire Street, Glasgow Street, and Dublin Street.

Table 5-2: Background Growth Rate Calculations based on ATR Data

Location	Year	AADT	Growth Rate (relative to 2018)	Notes
Alma Street	2018	1952	-	Measured over 7 days at the rail crossing
	2011	2354	-2.6%	Measured over 7 days between Raglan and Omar
	2003	2420	-1.4%	Measured over 7 days between Raglan and Omar
Yorkshire Street	2018	1413	-	Measured over 7 days at the rail crossing
	2005	2099	-3.0%	Measured over 3 weekdays between Cambridge Street and Cork Street
	2003	1834	-1.7%	Measured over 7 days at Preston Street
Glasgow Street	2018	907	-	Measured over 7 days at the rail crossing
	2011	1113	-2.9%	Measured over 7 days on between Cork Street and Durham Street
Dublin Street	2018	1976	-	Measured over 7 days at the rail crossing
	2016	1348	21.1%	Measured over 7 days opposite from Central Public School
	2014	1408	8.8%	Measured over 2 weekdays opposite Central Public School
Average growth rate for all sites			2.6%	

Note: 1. In this report, the ADT (average daily traffic) for a data collection period is used to approximate AADT (average annual daily traffic).

Comparison of traffic volumes on various north-south corridors in the study area between 2003 and 2018 reveal that traffic volumes have remained relatively stable on most corridors. On Alma Street, Yorkshire Street, and Glasgow Street, traffic volumes have actually decreased, except on Dublin Street, where traffic volumes have increased. However, the total north-south volumes on all corridors has remained relatively stable in the study area, meaning that the higher growth rate on Dublin Street may be a reflection of changes in north-south travel patterns in the study area due to changes in parking restrictions or new traffic signals prior to 2018. The higher growth rate on Dublin Street may also have been induced by increases in cut-through traffic seeking to avoid travel delays on Yorkshire Street or Norfolk Street. Thus, the assumed growth rate of 1.8% between 2018 and 2026, and 1.5% after 2026 is believed to be a conservative assumption.

5.1.2 Background Traffic Operations

Implementation of road network changes to support GO train speed increases are expected to take place in 2021. The traffic volumes used for the analysis of background conditions are illustrated in Sketch 6, 7, and 8 in Appendix A of this Report. Critical movements identified by the Synchro analysis are summarized in Table 5-3. Full results in the associated Synchro worksheets are included in Appendix E of this Report.

Table 5-3: Background Opening Year Traffic Operations

Intersection	Movement	A.M. Peak Hour				P.M. Peak Hour			
		LOS	Delay(s)	V/C	95 th Queue (m)	LOS	Delay(s)	V/C	95 th Queue (m)
Signalized Intersections									
Yorkshire Street and Paisley Street	Overall	C	29.1	0.78	-	B	14.8	0.49	-
	SBLTR	E	72.9	0.98	73.2	C	27.9	0.42	21.8
Dublin Street and Paisley Street	Overall	B	12.2	0.52	-	B	12.0	0.52	-
Norfolk Street/Paisley Street at Quebec Street/Yarmouth Street	Overall	C	27.2	0.70	-	C	25.4	0.74	-
Norfolk Street and Macdonell Street	Overall	B	19.4	0.63	-	C	25.4	0.65	-
Gordon Street/Norfolk Street and Waterloo Avenue/Wilson Street	Overall	B	17.5	0.66	-	B	13.1	0.58	-
	EBL	D	53.3	0.89	66.9	-	-	-	-
Unsignalized Intersections									
Yorkshire Street and Northumberland Street	Overall	No critical movements				No critical movements			
Yorkshire Street and Waterloo Avenue	Overall	No critical movements				No critical movements			
Glasgow Street and Paisley Street	Overall	Critical movements only				No critical movements			
	NBLTR	E	40.9	0.55	22.6	-	-	-	-
Glasgow Street and Northumberland Street	Overall	No critical movements				No critical movements			
Glasgow Street and Kent Street	Overall	No critical movements				No critical movements			
Glasgow Street and Waterloo Avenue	Overall	No critical movements				No critical movements			
Dublin Street and Northumberland Street	Overall	No critical movements				No critical movements			
Dublin Street and Kent Street	Overall	No critical movements				No critical movements			
Dublin Street and Waterloo Avenue	Overall	Critical movements only				Critical movements only			
	NBLTR	E	46.9	0.70	35.3	F	50.1	0.78	45.9
Norfolk Street and Cork Street	Overall	No critical movements				No critical movements			

- Note: 1. Traffic operations table displays critical movements for signalized and unsignalized intersections.
2. "Critical movement" refers to the worst performing movements at the intersection. For signalized and unsignalized intersections, critical movements are those with a v/c ratio exceeding 0.85 for shared/turning movements, v/c ratio exceeding 0.90 for exclusive movements, LOS E or F, or where queues exceed available storage.
3. Acronyms representing movements can be interpreted as a conjunction of the movement direction and turning direction, such that the letters EB, WB, NB, and SB correspond to an eastbound, westbound, northbound, or southbound movement, respectively. The subsequent letters L, T, and R correspond to a left, through, or right movement respectively. Shared lanes are designated by a combination of the letters L, T, R at the end of the acronym. For example, EBLTR corresponds to an eastbound left/through/right lane.

Table 5-4: Background 2026 Traffic Operations

Intersection	Movement	A.M. Peak Hour				P.M. Peak Hour			
		LOS	Delay(s)	V/C	95 th Queue (m)	LOS	Delay(s)	V/C	95 th Queue (m)
Signalized Intersections									
Yorkshire Street and Paisley Street	Overall	D	38.2	0.86	-	B	15.5	0.54	-
	SBLTR	F	107.4	1.09	83.5	C	28.2	0.46	23.9
Dublin Street and Paisley Street	Overall	B	13.1	0.59	-	B	12.7	0.57	-
Norfolk Street/Paisley Street at Quebec Street/Yarmouth Street	Overall	C	31.5	0.79	-	C	28.8	0.82	-
	NBT	-	-	-	-	C	23.8	0.87	182.0
	SBTR	D	38.3	0.90	198.6	-	-	-	-
Norfolk Street and Macdonell Street	Overall	C	21.1	0.69	-	C	27.2	0.71	-
	SBL	-	-	-	-	E	56.1	0.76	48.4
Gordon Street/Norfolk Street and Waterloo Avenue/Wilson Street	Overall	B	19.2	0.73	-	B	13.9	0.66	-
	EBL	E	58.7	0.92	79.4	-	-	-	-
Unsignalized Intersections									
Yorkshire Street and Northumberland Street	Overall	No critical movements				No critical movements			
Yorkshire Street and Waterloo Avenue	Overall	Critical movements only				No critical movements			
	SBLTR	E	46.2	0.73	39.1	-	-	-	-
Glasgow Street and Paisley Street	Overall	Critical movements only				No critical movements			
	NBLTR	F	60.1	0.70	32.6	-	-	-	-
	SBLTR	E	38.2	0.57	24.3	-	-	-	-
Glasgow Street and Northumberland Street	Overall	No critical movements				No critical movements			
Glasgow Street and Kent Street	Overall	No critical movements				No critical movements			
Glasgow Street and Waterloo Avenue	Overall	No critical movements				No critical movements			
Dublin Street and Northumberland Street	Overall	No critical movements				No critical movements			
Dublin Street and Kent Street	Overall	No critical movements				No critical movements			
Dublin Street and Waterloo Avenue	Overall	Critical movements only				Critical movements only			
	NBLTR	F	80.2	0.88	53.6	F	87.7	0.96	68.4
	SBLTR	E	45.3	0.61	27.0	-	-	-	-
Norfolk Street and Cork Street	Overall	No critical movements				Critical movements only			
	WBLTR	-	-	-	-	E	38.3	0.53	21.0

- Note:**
1. Traffic operations table displays critical movements for signalized and unsignalized intersections.
 2. "Critical movement" refers to the worst performing movements at the intersection. For signalized and unsignalized intersections, critical movements are those with a v/c ratio exceeding 0.85 for shared/turning movements, v/c ratio exceeding 0.90 for exclusive movements, LOS E or F, or where queues exceed available storage.
 3. Acronyms representing movements can be interpreted as a conjunction of the movement direction and turning direction, such that the letters EB, WB, NB, and SB correspond to an eastbound, westbound, northbound, or southbound movement, respectively. The subsequent letters L, T, and R correspond to a left, through, or right movement respectively. Shared lanes are designated by a combination of the letters L, T, R at the end of the acronym. For example, EBLTR corresponds to an eastbound left/through/right lane.

Table 5-5: Background 2031 Traffic Operations

Intersection	Movement	A.M. Peak Hour				P.M. Peak Hour			
		LOS	Delay(s)	V/C	95 th Queue (m)	LOS	Delay(s)	V/C	95 th Queue (m)
Signalized Intersections									
Yorkshire Street and Paisley Street	Overall	D	49.2	0.92	-	B	16.3	0.59	-
	SBLTR	F	149.4	1.21	93.5	-	-	-	-
Dublin Street and Paisley Street	Overall	B	13.9	0.64	-	B	13.5	0.62	-
Norfolk Street/Paisley Street at Quebec Street/Yarmouth Street	Overall	D	36.5	0.86	-	D	35.9	0.90	-
	NBT	-	-	-	-	C	31.9	0.94	190.5
	SBTR	D	51.4	0.98	219.8	D	45.5	0.93	174.5
Norfolk Street and Macdonell Street	Overall	C	22.9	0.73	-	C	29.6	0.76	-
	NBR	C	27.5	0.87	94.9	C	29.7	0.86	100.5
	SBL	-	-	-	-	E	60.8	0.82	48.9
Gordon Street/Norfolk Street and Waterloo Avenue/Wilson Street	Overall	C	22.7	0.80	-	B	16.5	0.72	-
	EBL	E	66.0	0.96	88.1	-	-	-	-
Unsignalized Intersections									
Yorkshire Street and Northumberland Street	Overall	No critical movements				No critical movements			
Yorkshire Street and Waterloo Avenue	Overall	Critical movements only				Critical movements only			
	SBLTR	F	74.0	0.88	55.6	E	39.2	0.58	25.3
Glasgow Street and Paisley Street	Overall	Critical movements only				No critical movements			
	NBLTR	F	95.7	0.86	45.1	-	-	-	-
	SBLTR	F	51.8	0.69	33.5	-	-	-	-
Glasgow Street and Northumberland Street	Overall	No critical movements				No critical movements			
Glasgow Street and Kent Street	Overall	No critical movements				No critical movements			
Glasgow Street and Waterloo Avenue	Overall	No critical movements				No critical movements			
Dublin Street and Northumberland Street	Overall	No critical movements				No critical movements			
Dublin Street and Kent Street	Overall	No critical movements				No critical movements			
Dublin Street and Waterloo Avenue	Overall	Critical movements only				Critical movements only			
	NBLTR	F	138.4	1.08	74.8	F	149.0	1.15	94.4
	SBLTR	F	78.5	0.81	42.1	E	48.0	0.69	34.2
Norfolk Street and Cork Street	Overall	Critical movements only				Critical movements only			
	EBLTR	E	43.3	0.49	18.3	-	-	-	-
	WBLTR	E	41.3	0.48	17.7	E	39.9	0.56	23.1

- Note: 1. Traffic operations table displays critical movements for signalized and unsignalized intersections.
2. "Critical movement" refers to the worst performing movements at the intersection. For signalized and unsignalized intersections, critical movements are those with a v/c ratio exceeding 0.85 for shared/turning movements, v/c ratio exceeding 0.90 for exclusive movements, LOS E or F, or where queues exceed available storage.
3. Acronyms representing movements can be interpreted as a conjunction of the movement direction and turning direction, such that the letters EB, WB, NB, and SB correspond to an eastbound, westbound, northbound, or southbound movement, respectively. The subsequent letters L, T, and R correspond to a left, through, or right movement respectively. Shared lanes are designated by a combination of the letters L, T, R at the end of the acronym. For example, EBLTR corresponds to an eastbound left/through/right lane.

The analysis of background operations indicates that delays may be expected at the following intersections and movements:

- Yorkshire Street and Paisley Street
 - ◆ Existing delays at the southbound movement in the A.M. peak hour are anticipated to exacerbate over time due to heavy demand at the southbound movement.
- Norfolk Street/Paisley Street at Quebec Street/Yarmouth Street
 - ◆ The southbound through/right movement is expected to approach capacity by 2026 in the A.M. peak hour, and by 2031 in the P.M. peak hour.
 - ◆ During the P.M. peak hour, the northbound through movement is expected to approach capacity by 2026.
- Norfolk Street and Macdonell Street
 - ◆ During the A.M. and P.M. peak hours, the northbound right movement is expected to approach capacity by 2031.
 - ◆ During the P.M. peak hour, the southbound left movement is anticipated to approach capacity by 2026.
- Gordon Street/Norfolk Street and Waterloo Avenue/Wilson Street
 - ◆ The eastbound left movement is expected to approach capacity by 2021 in the A.M. peak hour.
- Yorkshire Street and Waterloo Avenue
 - ◆ During the A.M. and P.M. peak hours, the southbound movement is anticipated to experience delays by 2031.
- Glasgow Street and Paisley Street
 - ◆ During the A.M. peak hour, the northbound and southbound movements are anticipated to experience delays by 2031.
- Dublin Street and Waterloo Avenue
 - ◆ During the A.M. peak hour, the northbound and southbound movements are anticipated to experience delays by 2031.
- Norfolk Street and Cork Street
 - ◆ During the A.M. peak hour, the northbound and southbound movements are anticipated to experience delays by 2031.

5.2 Active Transportation Conditions

The following improvement to the active transportation network within the study area is proposed in the Guelph Cycling Master Plan (City of Guelph, 2012):

- Sharrows on Paisley Street between Glasgow Street and Dublin Street

5.3 Transit Conditions

The Guelph Transit Growth Strategy and Plan and Mobility Services Review (City of Guelph, 2010) describes the City of Guelph's long-term transit development strategy, including within the study area:

- Norwich Street is identified as part of a future Transit Priority Corridor between Guelph Central Station and the University of Guelph, with future express service and HOV lanes.

In addition, Metrolinx has proposed the following passenger rail service schedule improvements at Guelph Central Station:

- By January 2019, one extra train between Kitchener Station and Union Station;
- By September 2019, three extra mid-day trains between Kitchener Station and Union Station;
- By 2021, 90-minute off-peak service between Kitchener Station and Union Station;
- By 2022, 60-minute off-peak service between Kitchener Station and Union Station; and
- By 2024, 30-minute service, all day between Kitchener Station and Union Station.

The following assumptions were also made in regard to the above proposed rail service improvements:

- The rail corridor will not be double-tracked at Guelph Central Station.
- The A.M. peak period will include trains arriving or departing at Union Station between start of service at 6:00 A.M. and 9:30 A.M.
 - ♦ Trains stopping at Guelph Central Station during the A.M. peak period will be eastbound trains en route to Union Station.
- The P.M. peak period will include trains arriving or departing at Union Station between 3:30 P.M. and 7:30 P.M.
 - ♦ Trains stopping at Guelph Central Station during the P.M. peak period will be westbound trains en route to Kitchener GO Station.
- The off-peak period will include trains arriving or departing at Union Station between 9:30 A.M. and 3:30 P.M., and between 7:30 P.M. and 12:00 A.M.
 - ♦ Trains stopping at Guelph Central Station during the off-peak period will be alternately eastbound trains en route to Union GO Station, and westbound trains en route to Kitchener GO Station, i.e. 30-minute off-peak service at Guelph Central Station with a single track would refer to service levels entailing one eastbound train and one westbound train per hour. However, if the corridor is fully double tracked

between Kitchener GO Station and Union Station, 30-minute off-peak service would refer to service levels entailing two eastbound trains and two westbound trains per hour.

Thus, the following future weekday train frequency was assumed:

- 9 trains per day by January 2019;
- 12 trains per day by September 2019;
- 15 trains per day by 2021;
- 17 trains per day by 2022; and
- 37 trains per day by 2024.

6. Transportation Impact Assessment

6.1 Rail Crossings

To assess the adequacy of the existing rail crossings, the following aspects of the five existing grade crossings in the study area were analyzed. The two rail crossings on Alma Street were analyzed separately.

6.1.1 Sightlines

Clear sightline areas at grade crossings are required so that train operators and vehicle drivers can both perceive upcoming conflicts at the rail crossing, particularly in cases where no gate exists. Sightline requirements at grade crossings must be in place at existing crossings by November 28th, 2021 (Transport Canada, 2017).

Clear sightline areas would be required for both stopped and moving vehicles, as illustrated in Figure 6-1 and Figure 6-2.

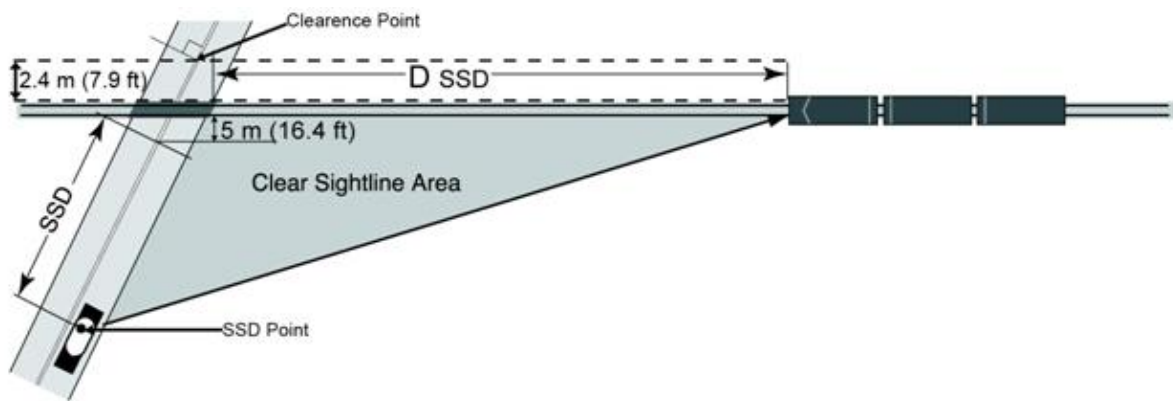


Figure 6-1: Clear sightline area for a moving vehicle (Transport Canada, 2017).

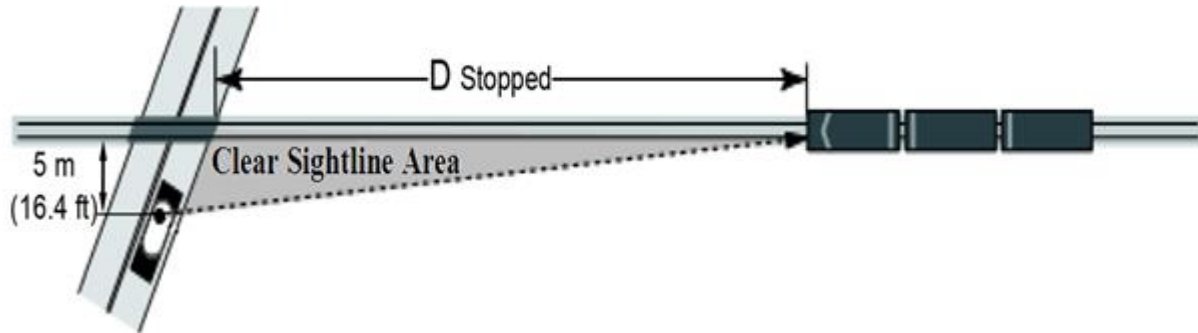


Figure 6-2: Clear sightline area for a stopped vehicle (Transport Canada, 2017).

Crossings with a warning system with gates must have the warning system visible throughout the Stopping Sight Distance (SSD). Crossings with a warning system without gates must have clear sightlines visible from the “stop” position of the vehicle, and the warning system must be visible throughout the SSD. The dimensions of the clear sightline areas required for each rail crossing were calculated in Table 6-1, and discussed further in this section.

Intersections close to the rail crossing (i.e. at Kent Street at Dublin Street and at Kent Street at Glasgow Street) were assessed to determine whether or not the existing daylighting triangles were sufficient. Daylighting triangles were assessed as per City of Guelph standards for corner lots, where a sightline triangle with a minimum length of 9 m per side is required, and no object in the sight triangle may exceed 0.8 m in height (City of Guelph, 2018c).

Table 6-1: Crossing Sightline Calculations

Parameter	Location					Notes
	Alma Street (north crossing)	Alma Street (south crossing)	Yorkshire Street	Glasgow Street	Dublin Street	
Inputs						
Design vehicle	Passenger Car (5.6 m length)	Passenger Car (5.6 m length)	Passenger Car (5.6 m length)	Passenger Car (5.6 m length)	Passenger Car (5.6 m length)	Determined based on ATR data
Road crossing design speed	50 km/h	50 km/h	50 km/h	50 km/h	50 km/h	Assumed based on posted speed of 50 km/h and urban environment
Road grade	0%	0%	0%	0%	0%	Assumed
Stopping sight distance	65 m	65 m	65 m	65 m	65 m	
Grade crossing clearance distance	12 m	21 m	11 m	12 m	22 m	
Train speed	10 mph	10 mph	10 mph	10 mph	10 mph	
Warning system type	Sign	Sign and gate	Sign and gate	Sign and gate	Sign and gate	
Pedestrian, cyclist, and persons using assistive devices travel speed	1.22 m/s	1.22 m/s	1.22 m/s	1.22 m/s	1.22 m/s	Assumed
Outputs						
T _{SSD}	7.4 seconds	Not required when warning system has gate	Not required when warning system has gate	Not required when warning system has gate	Not required when warning system has gate	
D _{SSD}	33 m					
s	18 m	27 m	17 m	18 m	28 m	Distance travelled during acceleration
t	4.8 seconds	6.0 seconds	4.7 seconds	4.8 seconds	6.1 seconds	Time during acceleration
T _d	6.8 seconds	8 seconds	6.7 seconds	6.8 seconds	8.1 seconds	Design vehicle departure time
T _p	9.8 seconds	17.2 seconds	9.0 seconds	9.8 seconds	18.0 seconds	Departure time for pedestrians, cyclists, and persons using assistive devices
T _{stopped}	9.8 seconds	17.2 seconds	9.0 seconds	9.8 seconds	18.0 seconds	Greater of T _d or T _p
D _{Stopped}	44 m	77 m	40 m	44 m	80 m	

6.1.1.1 Alma Street

The Alma Street rail crossing consists of two crossings separated by the intersection of Alma Street at Crimea Street. The south crossing is across the Metrolinx Kitchener GO corridor, and the north crossing is across a CN rail corridor. The north crossing is signed with flashing lights, but has no gate. The south crossing is signed, has flashing lights, and a gate. The grade is generally flat across both level crossings. There is a sidewalk across the east side of the crossing, but without a gate.

Sightlines to the north and south crossings on Alma Street are partially obscured by utility boxes and vegetation, as shown in Figure 6-3 and Figure 6-4.

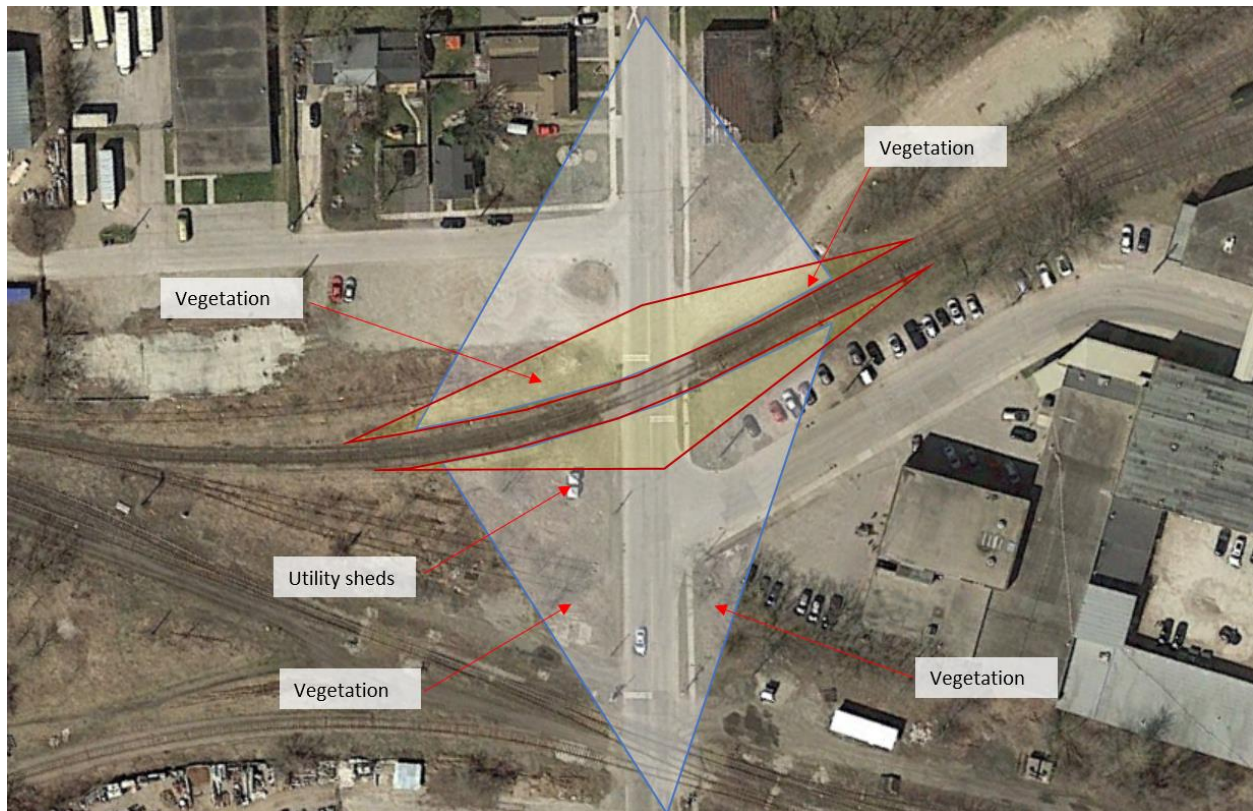


Figure 6-3: Clear sightline areas for the north Alma Street crossing (sightline area for a stopped vehicle is shown in yellow, and sightline area for a moving vehicle is shown in blue.)

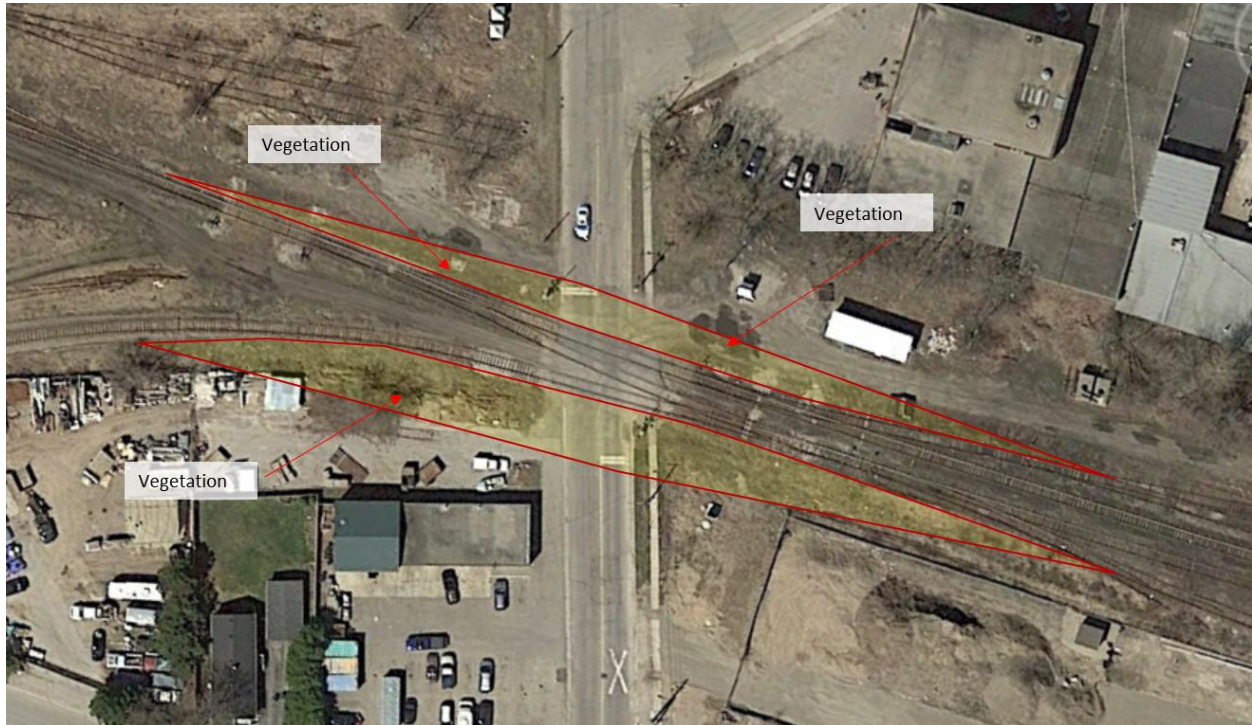


Figure 6-4: Clear sightline areas for the south Alma Street crossing.

Speed reduction signage may be useful in reducing vehicle speed to compensate for obstructed sightlines at this crossing. Gates for the north crossing may also be useful in protecting travellers at the crossing. Pedestrian gates and fencing can also be helpful in restricting access to the tracks during a train crossing. Maintenance to ensure that vegetation does not obstruct sightlines around the tracks should be performed. Utility sheds in the vicinity of the north Alma Street crossing may also be relocated to improve sightlines.

6.1.1.2 Yorkshire Street

The Yorkshire Street crossing is signed with flashing lights, and has gates. The northbound and southbound approaches to the crossing both have an uphill grade. Signage in advance of the northbound approach of the crossing announces a speed reduction to 30 km/h in the vicinity of the crossing. There is a sidewalk on both the east and west sides of the crossing, but no gate is provided.

The northbound view of the crossing is obstructed by vegetation. Further speed reduction signage in advance of the southbound approach to the crossing may be beneficial in reducing vehicle speed to compensate for obstructed sightlines at this crossing. Pedestrian gates and fencing can also be helpful in restricting access to the tracks during a train crossing.

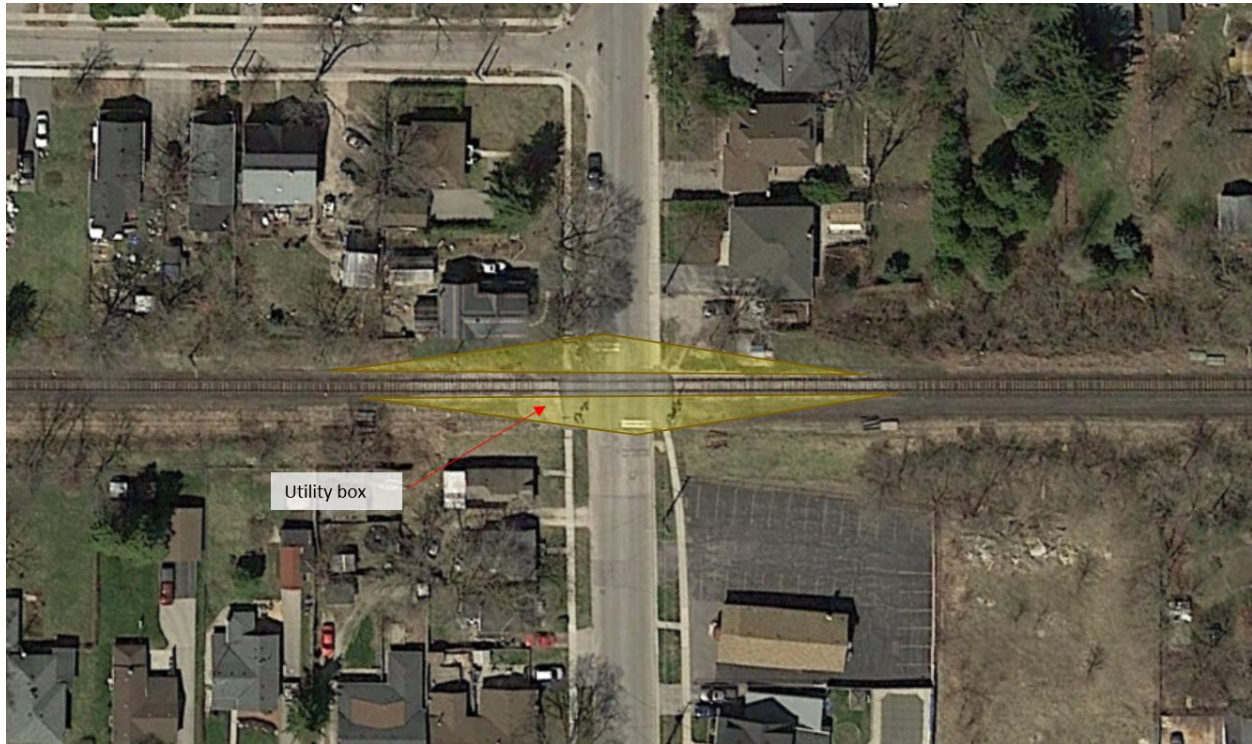


Figure 6-5: Clear sightline areas for the Yorkshire Street crossing.

6.1.1.3 *Glasgow Street*

The Glasgow Street crossing is signed with flashing lights, and has gates. The northbound and southbound approaches to the crossing both have an uphill grade. There is a sidewalk on both the east and west sides of the crossing, but no gate is provided.

The sightlines on the north side of the crossing are partially obstructed by vegetation and a utility box, as shown in Figure 6-6.



Figure 6-6: Clear sightline areas at the Glasgow Street crossing.

Maintenance to ensure that vegetation does not obstruct sightlines around the tracks should be performed. Utility structures in the vicinity of the crossing may also be relocated to improve sightlines. Pedestrian gates and fencing can also be helpful in restricting access to the tracks during a train crossing.

The southeast corner of the intersection of Kent Street and Glasgow Street (south of the rail crossing) has its sightline triangle obscured by vegetation. However, sightlines from the minor streets for turns towards the railway tracks are unobscured.

6.1.1.4 Dublin Street

The Dublin Street crossing is signed with flashing lights, and has gates. The northbound and southbound approaches to the crossing both have an uphill grade. There is a sidewalk on both the east and west sides of the crossing, but no gate is provided.

Sightlines in the vicinity of the crossing are obscured by vegetation and structures, as shown in Figure 6-7.



Figure 6-7: Clear sightline areas for the Dublin Street crossing.

Maintenance to ensure that vegetation does not obstruct sightlines around the tracks should be performed. Pedestrian gates and fencing can also be helpful in restricting access to the tracks during a train crossing. On-street parking on Kent Street north of the crossing should also be restricted in an area within 30 m of Dublin Street to prevent obstruction of sightlines.

Furthermore, vegetation on the northwest and northeast corners of the intersection of Dublin Street at Kent Street (north of the tracks) obscures the daylight triangles, as does vegetation on the southeast and southwest corner of Dublin Street at Kent Street (south of the tracks). However, sightlines from the minor streets for turns towards the railway tracks are unobscured.

6.1.2 Exposure Index

The exposure index is the product of daily traffic volumes and train volumes. Many agencies consider an exposure index of 200,000 as the threshold for the provision of grade separation based on user volumes. Table 6-2 shows the calculations for exposure index for each of the grade crossings in the study area. Calculations for the exposure index of the Alma Street north crossing were not made because the existing and future daily train volume along the rail corridor at that crossing was not known, however, it is assumed that the train volume at that crossing will not exceed that of the Alma Street south crossing. Calculations were based on the traffic volumes measured in the ATRs and known improvements to GO rail service at Guelph Central Station (Section 5.3)

Table 6-2: Exposure Index Calculations for Background Conditions

Parameter		Location				
		Alma Street (north crossing)	Alma Street (south crossing)	Yorkshire Street	Glasgow Street	Dublin Street
2018	AADT	2,000	2,000	1,400	900	2,000
	Daily train volume	-	8	8	8	8
	Exposure index	-	16,000	11,200	7,200	16,000
2021	AADT	2,100	2,100	1,500	1,000	2,100
	Daily train volume	-	21	21	21	21
	Exposure index	-	31,500	22,500	15,000	31,500
2026	AADT	2,300	2,300	1,600	1,000	2,300
	Daily train volume	-	25	25	25	25
	Exposure index	-	85,100	59,200	37,000	85,100
2031	AADT	2,400	2,400	1,800	1,100	2,500
	Daily train volume	-	37	37	37	37
	Exposure index	-	88,800	66,600	40,700	92,500

None of the above existing grade crossings merit a grade-separated crossing by 2031 based on the exposure index (a product of vehicle volume and train volume). Even if 15-minute one-way peak-period service is provided at Guelph Central Station, a grade-separated crossing will not be required at any of the existing grade crossings in the study area. It is anticipated that a grade separation will not be required unless two-way, all-day 30-minute service or all-day one-way 15-minute service is provided between Guelph Central Station and Kitchener GO Station/Union Station after 2031.

It is noted that the exposure index only takes into account the exposure of vehicles to rail activity based on vehicle and train volumes, and does not consider pedestrian volumes in its assessment. There is no clear guideline on how pedestrian flows are assessed when considering rail crossings for grade separation. Crossings with pedestrian flows are examined on a case-by-case basis.

6.2 Conversion of Kent Street to One-Way Operation

Conversion of Kent Street to one-way westbound operation will divert eastbound traffic that would ordinarily use Kent Street north to Northumberland Street. Eastbound traffic volumes on Kent Street between Dublin Street and Glasgow Street are low (less than 10 eastbound vehicles per hour during the A.M. and P.M. peak hours). It was assumed that any vehicles that might ordinarily travel eastbound on Kent Street would instead travel westbound on Kent Street via a diversion on Northumberland Street and/or Glasgow Street.

6.2.1 Detour Scenario

Traffic operations in the study area following conversion of Kent Street to one-way westbound operation will have minimal effect on traffic operations in the study area in the opening year, 5-year horizon, and 10-year horizon, as shown in Table 6-3, Table 6-4, and Table 6-5, respectively. Volumes for the above detour scheme for the opening year, five-year horizon, and ten-year horizon are illustrated in Sketches 9, 10, and 11 of Appendix A. Full results in the associated Synchro worksheets are included in Appendix F of this Report.

Table 6-3: Traffic Operations following Conversion of Kent Street to One-Way Operation in the Opening Year

Intersection	Movement	A.M. Peak Hour				P.M. Peak Hour			
		LOS	Delay(s)	V/C	95 th Queue (m)	LOS	Delay(s)	V/C	95 th Queue (m)
Signalized Intersections									
Yorkshire Street and Paisley Street	Overall	C	29.1	0.78	-	B	14.8	0.49	-
	SBLTR	E	72.9	0.98	73.2	C	27.9	0.42	21.8
Dublin Street and Paisley Street	Overall	B	12.2	0.52	-	B	12.0	0.52	-
Norfolk Street/Paisley Street at Quebec Street/Yarmouth Street	Overall	C	27.2	0.70	-	C	25.4	0.74	-
Norfolk Street and Macdonell Street	Overall	B	19.4	0.63	-	C	25.4	0.65	-
Gordon Street/Norfolk Street and Waterloo Avenue/Wilson Street	Overall	B	17.5	0.66	-	B	13.1	0.58	-
	EBL	D	53.3	0.89	66.9	-	-	-	-
Unsignalized Intersections									
Yorkshire Street and Northumberland Street	Overall	No critical movements				No critical movements			
Yorkshire Street and Waterloo Avenue	Overall	No critical movements				No critical movements			
Glasgow Street and Paisley Street	Overall	Critical movements only				No critical movements			
	NBLTR	E	40.9	0.55	22.6	-	-	-	-
Glasgow Street and Northumberland Street	Overall	No critical movements				No critical movements			
Glasgow Street and Kent Street	Overall	No critical movements				No critical movements			
Glasgow Street and Waterloo Avenue	Overall	No critical movements				No critical movements			
Dublin Street and Northumberland Street	Overall	No critical movements				No critical movements			
Dublin Street and Kent Street	Overall	No critical movements				No critical movements			
Dublin Street and Waterloo Avenue	Overall	Critical movements only				Critical movements only			
	NBLTR	E	47.7	0.70	35.7	F	50.3	0.78	46.0
Norfolk Street and Cork Street	Overall	No critical movements				No critical movements			

- Note: 1. Traffic operations table displays critical movements for signalized and unsignalized intersections.
2. "Critical movement" refers to the worst performing movements at the intersection. For signalized and unsignalized intersections, critical movements are those with a v/c ratio exceeding 0.85 for shared/turning movements, v/c ratio exceeding 0.90 for exclusive movements, LOS E or F, or where queues exceed available storage.
3. Acronyms representing movements can be interpreted as a conjunction of the movement direction and turning direction, such that the letters EB, WB, NB, and SB correspond to an eastbound, westbound, northbound, or southbound movement, respectively. The subsequent letters L, T, and R correspond to a left, through, or right movement respectively. Shared lanes are designated by a combination of the letters L, T, R at the end of the acronym. For example, EBLTR corresponds to an eastbound left/through/right lane.

Table 6-4: Traffic Operations following Conversion of Kent Street to One-Way Operation in the Five-Year Horizon

Intersection	Movement	A.M. Peak Hour				P.M. Peak Hour			
		LOS	Delay(s)	V/C	95 th Queue (m)	LOS	Delay(s)	V/C	95 th Queue (m)
Signalized Intersections									
Yorkshire Street and Paisley Street	Overall	D	38.2	0.86	-	B	15.5	0.54	-
	SBLTR	F	107.4	1.09	83.5	C	28.2	0.46	23.9
Dublin Street and Paisley Street	Overall	B	13.1	0.59	-	B	12.7	0.57	-
Norfolk Street/Paisley Street at Quebec Street/Yarmouth Street	Overall	C	31.5	0.79	-	C	28.8	0.82	-
	NBT	-	-	-	-	C	23.8	0.87	182.0
	SBTR	D	38.3	0.90	198.6	-	-	-	-
Norfolk Street and Macdonell Street	Overall	C	21.1	0.69	-	C	27.2	0.71	-
	SBL	-	-	-	-	E	56.1	0.76	48.4
Gordon Street/Norfolk Street and Waterloo Avenue/Wilson Street	Overall	B	19.2	0.73	-	B	13.9	0.66	-
	EBL	E	58.7	0.92	79.4	-	-	-	-
Unsignalized Intersections									
Yorkshire Street and Northumberland Street	Overall	No critical movements				No critical movements			
Yorkshire Street and Waterloo Avenue	Overall	Critical movements only				No critical movements			
	SBLTR	E	46.2	0.73	39.1	-	-	-	-
Glasgow Street and Paisley Street	Overall	Critical movements only				No critical movements			
	NBLTR	F	60.1	0.70	32.6	-	-	-	-
	SBLTR	E	38.2	0.57	24.3	-	-	-	-
Glasgow Street and Northumberland Street	Overall	No critical movements				No critical movements			
Glasgow Street and Kent Street	Overall	No critical movements				No critical movements			
Glasgow Street and Waterloo Avenue	Overall	No critical movements				No critical movements			
Dublin Street and Northumberland Street	Overall	No critical movements				No critical movements			
Dublin Street and Kent Street	Overall	No critical movements				No critical movements			
Dublin Street and Waterloo Avenue	Overall	Critical movements only				Critical movements only			
	NBLTR	F	82.7	0.89	54.5	F	88.1	0.96	68.6
	SBLTR	E	39.1	0.55	22.8	-	-	-	-
Norfolk Street and Cork Street	Overall	No critical movements				Critical movements only			
	WBLTR	-	-	-	-	E	38.3	0.53	21.0

- Note: 1. Traffic operations table displays critical movements for signalized and unsignalized intersections.
2. "Critical movement" refers to the worst performing movements at the intersection. For signalized and unsignalized intersections, critical movements are those with a v/c ratio exceeding 0.85 for shared/turning movements, v/c ratio exceeding 0.90 for exclusive movements, LOS E or F, or where queues exceed available storage.
3. Acronyms representing movements can be interpreted as a conjunction of the movement direction and turning direction, such that the letters EB, WB, NB, and SB correspond to an eastbound, westbound, northbound, or southbound movement, respectively. The subsequent letters L, T, and R correspond to a left, through, or right movement respectively. Shared lanes are designated by a combination of the letters L, T, R at the end of the acronym. For example, EBLTR corresponds to an eastbound left/through/right lane.

Table 6-5: Traffic Operations following Conversion of Kent Street to One-Way Operation in the Ten-Year Horizon

Intersection	Movement	A.M. Peak Hour				P.M. Peak Hour			
		LOS	Delay(s)	V/C	95 th Queue (m)	LOS	Delay(s)	V/C	95 th Queue (m)
Signalized Intersections									
Yorkshire Street and Paisley Street	Overall	D	49.2	0.92	-	B	16.3	0.59	-
	SBLTR	F	149.4	1.21	93.5	-	-	-	-
Dublin Street and Paisley Street	Overall	B	13.9	0.64	-	B	13.5	0.62	-
Norfolk Street/Paisley Street at Quebec Street/Yarmouth Street	Overall	D	36.5	0.86	-	D	35.9	0.90	-
	NBT	-	-	-	-	C	31.9	0.94	190.5
	SBTR	D	51.4	0.98	219.8	D	45.5	0.93	174.5
Norfolk Street and Macdonell Street	Overall	C	22.9	0.73	-	C	29.6	0.76	-
	NBR	C	27.5	0.87	94.9	C	29.7	0.86	100.5
	SBL	-	-	-	-	E	60.8	0.82	48.9
Gordon Street/Norfolk Street and Waterloo Avenue/Wilson Street	Overall	C	22.7	0.80	-	B	16.5	0.72	-
	EBL	E	66.0	0.96	88.1	-	-	-	-
Unsignalized Intersections									
Yorkshire Street and Northumberland Street	Overall	No critical movements				No critical movements			
Yorkshire Street and Waterloo Avenue	Overall	Critical movements only				Critical movements only			
	SBLTR	F	74.0	0.88	55.6	E	39.2	0.58	25.3
Glasgow Street and Paisley Street	Overall	Critical movements only				No critical movements			
	NBLTR	F	95.7	0.86	45.1	-	-	-	-
	SBLTR	F	51.8	0.69	33.5	-	-	-	-
Glasgow Street and Northumberland Street	Overall	No critical movements				No critical movements			
Glasgow Street and Kent Street	Overall	No critical movements				No critical movements			
Glasgow Street and Waterloo Avenue	Overall	No critical movements				No critical movements			
Dublin Street and Northumberland Street	Overall	No critical movements				No critical movements			
Dublin Street and Kent Street	Overall	No critical movements				No critical movements			
Dublin Street and Waterloo Avenue	Overall	Critical movements only				Critical movements only			
	NBLTR	F	143.0	1.09	75.9	F	149.7	1.15	94.6
	SBLTR	F	63.6	0.73	35.6	E	46.0	0.67	32.8
Norfolk Street and Cork Street	Overall	Critical movements only				Critical movements only			
	EBLTR	E	43.3	0.49	18.3	-	-	-	-
	WBLTR	E	41.3	0.48	17.7	E	39.9	0.56	23.1

- Note: 1. Traffic operations table displays critical movements for signalized and unsignalized intersections.
2. "Critical movement" refers to the worst performing movements at the intersection. For signalized and unsignalized intersections, critical movements are those with a v/c ratio exceeding 0.85 for shared/turning movements, v/c ratio exceeding 0.90 for exclusive movements, LOS E or F, or where queues exceed available storage.
3. Acronyms representing movements can be interpreted as a conjunction of the movement direction and turning direction, such that the letters EB, WB, NB, and SB correspond to an eastbound, westbound, northbound, or southbound movement, respectively. The subsequent letters L, T, and R correspond to a left, through, or right movement respectively. Shared lanes are designated by a combination of the letters L, T, R at the end of the acronym. For example, EBLTR corresponds to an eastbound left/through/right lane.

As with the background conditions, congestion will be expected at some of the unsignalized intersections in the study area by 2031, due to background growth of conflicting major-street traffic volumes. A signal warrant analysis was completed for those unsignalized intersections to determine if signalization would be warranted at any of the intersections following the conversion of Kent Street to one-way westbound operation.

- Yorkshire Street and Waterloo Avenue
 - ♦ A traffic signal was not found to be warranted at this intersection by 2031, though Justification 3 is nearly fulfilled, with Justification 1B at 65% compliance. Small variations in background traffic growth by 2031 may lead to either fulfillment of Justification 2 or Justification 3 of the signal warrant analysis.
- Glasgow Street and Paisley Street
 - ♦ A traffic signal was not found to be warranted at this intersection by 2031.
- Dublin Street and Waterloo Avenue
 - ♦ A traffic signal was not found to be warranted by 2031, however, Justification 1 was found to be 90% fulfilled, and Justification 2 to be 76% fulfilled. Small variations in background traffic growth by 2031 may lead to either fulfillment of Justification 1 or Justification 3 (where Justification 1 and 2 are both at least 80% fulfilled) of the signal warrant analysis.
- Norfolk Street and Cork Street
 - ♦ A traffic signal was not found to be warranted at this intersection by 2031.

Traffic signals were not found to be warranted at any of the unsignalized intersections in the study area in 2031 following conversion of Kent Street to one-way traffic operation, but the intersections of Yorkshire Street and Waterloo Avenue, and Dublin Street and Waterloo Avenue were found to come close to warranting traffic signals. Of the two intersections, Waterloo Avenue at Dublin Street has higher minor-street traffic volumes even though Yorkshire Street is a collector road. Signalization of one or both of those intersections would be useful in facilitating north-south travel through the study area and alleviate congestion. The full signal warrant analysis worksheets can be found in Appendix H.

It is noted that on-street parking present on Kent Street east of Dublin Street currently restricts two-way vehicle speed and movement, providing a natural traffic calming effect. Conversion of Kent Street to one-way operation may increase vehicle speeds along Kent Street. However, conversion of Kent Street to one-way operation may provide additional room to permit on-street parking on Kent Street west of Dublin Street, in areas where on-street parking would not obstruct the sightlines at the rail crossing, as discussed in Section 6.1.1.4.

Pedestrian activity in the study area will not be affected by the conversion of Kent Street to one-way operation. Cyclist travel will be slightly affected by the conversion of Kent Street to one-way operation, as cyclists who might normally travel eastbound on Kent Street will need to detour via Glasgow Street and Northumberland Street. However, the detour for cyclists is short, being less than one minute long.

Transit service in the study area will also not be affected by the conversion of Kent Street to one-way operation, because there are no transit routes on Kent Street.

Emergency service access to properties in the study area will not be affected by the conversion of Kent Street to one-way operation.

6.2.2 **Summary**

Converting Kent Street to one-way westbound operation will not have an impact to traffic operations in the study area due to the low number of eastbound vehicles on Kent Street. Under existing conditions, on-street parking narrows the available travel width and provides traffic calming, but one-way operation may negate this benefit which may lead to increased vehicle speeds along Kent Street.

6.3 **Closure of the Dublin Street Level Crossing**

Closure of the Dublin Street North level crossing will redirect traffic from Dublin Street to Glasgow Street, Yorkshire Street and Norfolk/Gordon Street, increasing traffic volumes on these corridors.

Dublin Street provides access to residential properties, Central Public School, and the Church of Our Lady Immaculate in the vicinity of the proposed road closure. Dublin Street also serves a substantial volume of north-south cut-through traffic, travelling between Wellington Street in the south and London Road in the north. Although the Central Public School and the Church of Our Lady Immaculate are major destinations along Dublin Street in the study area, it was assumed that only a small proportion of vehicles on Dublin Street during the peak hours are destined to either facility, as weekday services at the Church of Our Lady Immaculate begin at 7:30 A.M. prior to the weekday A.M. peak hour, and the low capacity of ten vehicles at the pick-up drop-off area of the Central Public School.

6.3.1 **Initial Travel Diversion Assumption Scenario**

The following initial assumptions were made when analyzing the travel patterns in the study area following the closure of the Dublin Street level crossing in the 2021 analysis year.

There are three alternative north-south corridors through the study area:

- Norfolk Street
 - ♦ Norfolk Street is a four-lane arterial providing access to the Guelph downtown core. It has multiple signals between Paisley Street and Waterloo Avenue in the study area, which increase capacity along the corridor, but can also lead to increased control delay along the route relative to other corridors.
- Glasgow Street
 - ♦ Glasgow Street is a two-lane local road providing access to local properties. It has no signals in the study area. Glasgow Street is narrow with on-street parking permitted, and poor sightlines at the intersection of Glasgow Street and Paisley Street, due to steep grades and retaining walls, rendering it somewhat unsuitable as a detour route.

- Yorkshire Street
 - ♦ Yorkshire Street is a two-lane collector road with on-street parking permitted. It is signalized at the intersection of Paisley Street and Yorkshire Street, and has a pedestrian crossing at the intersection of Yorkshire Street and Waterloo Avenue.

Based on the attributes of the three available detour routes, the following distribution of diverted vehicles from the closure of the Dublin Street crossing was assumed:

- Northbound vehicles will continue to travel north by turning on Waterloo Avenue south of the proposed road closure and continuing north on Yorkshire Street, Glasgow Street, or Norfolk Street.
 - ♦ 40% of northbound vehicles are assumed to detour onto Norfolk Street. Norfolk street is the closest detour route for vehicles travelling on Dublin Street, and analysis of background conditions shows that Norfolk Street has capacity for additional north-south travel. However, travellers on Dublin Street likely choose their route partially out of preference for less-busy routes, thus it is assumed that the majority of travellers on Dublin Street will elect for other detour routes.
 - ♦ 40% of northbound vehicles are assumed to detour via Yorkshire Street. Yorkshire Street has a greater capacity for north-south travel as the intersection of Paisley Street and Yorkshire Street, on the north side of the study area, is signalized, whereas Glasgow Street has no signalized intersections within the study area (excluding pedestrian crossings).
 - ♦ The remainder of northbound vehicles (20%) are assumed to detour via Glasgow Street.
- Southbound vehicles will continue to travel south by turning on Paisley Street north of the proposed road closure and continuing southbound on Yorkshire Street, Glasgow Street, or Norfolk Street.
 - ♦ The proportions of southbound vehicles using Yorkshire Street, Glasgow Street, and Norfolk Street are assumed to be identical to that of the northbound vehicles.
- Vehicles accessing Central Public School or the Church of Our Lady Immaculate will continue to be able to do so via local streets from either Yorkshire Street, Glasgow Street, or Norfolk Street.

Traffic operations in the study area in 2021 are shown below. Sketch 12 of Appendix A shows the traffic volumes used for this analysis. Full results in the associated Synchro worksheets are included in Appendix G of this Report.

Table 6-6: Traffic Operations following Closure of Dublin Street at Rail Crossing in the Opening Year

Intersection	Movement	A.M. Peak Hour				P.M. Peak Hour			
		LOS	Delay(s)	V/C	95 th Queue (m)	LOS	Delay(s)	V/C	95 th Queue (m)
Signalized Intersections									
Yorkshire Street and Paisley Street	Overall	C	34.9	0.82	-	B	16.5	0.55	-
	SBLTR	F	97.4	1.06	76.9	-	-	-	-
Dublin Street and Paisley Street	Overall	A	9.1	0.49	-	A	8.0	0.44	-
Norfolk Street/Paisley Street at Quebec Street/Yarmouth Street	Overall	C	28.4	0.68	-	C	25.4	0.77	-
	NBT	-	-	-	-	C	22.4	0.85	181.0
Norfolk Street and Macdonell Street	Overall	B	19.7	0.66	-	C	25.9	0.69	-
Gordon Street/Norfolk Street and Waterloo Avenue/Wilson Street	Overall	C	25.5	0.73	-	B	17.6	0.66	-
	EBL	F	80.2	1.01	96.8	-	-	-	-
Unsignalized Intersections									
Yorkshire Street and Northumberland Street	Overall	No critical movements				No critical movements			
Yorkshire Street and Waterloo Avenue	Overall	Critical movements only				No critical movements			
	SBLTR	F	81.5	1.04	81.5	-	-	-	-
Glasgow Street and Paisley Street	Overall	Critical movements only				Critical movements only			
	NBLTR	E	47.7	0.60	25.6	E	35.6	0.50	19.2
Glasgow Street and Northumberland Street	Overall	No critical movements				No critical movements			
Glasgow Street and Kent Street	Overall	No critical movements				No critical movements			
Glasgow Street and Waterloo Avenue	Overall	No critical movements				No critical movements			
Dublin Street and Northumberland Street	Overall	No critical movements				No critical movements			
Dublin Street and Kent Street	Overall	No critical movements				No critical movements			
Dublin Street and Waterloo Avenue	Overall	No critical movements				No critical movements			
Norfolk Street and Cork Street	Overall	No critical movements				No critical movements			

- Note: 1. Traffic operations table displays critical movements for signalized and unsignalized intersections.
2. "Critical movement" refers to the worst performing movements at the intersection. For signalized and unsignalized intersections, critical movements are those with a v/c ratio exceeding 0.85 for shared/turning movements, v/c ratio exceeding 0.90 for exclusive movements, LOS E or F, or where queues exceed available storage.
3. Acronyms representing movements can be interpreted as a conjunction of the movement direction and turning direction, such that the letters EB, WB, NB, and SB correspond to an eastbound, westbound, northbound, or southbound movement, respectively. The subsequent letters L, T, and R correspond to a left, through, or right movement respectively. Shared lanes are designated by a combination of the letters L, T, R at the end of the acronym. For example, EBLTR corresponds to an eastbound left/through/right lane.

By 2021, detours around the road closure at Dublin Street will increase congestion at the following unsignalized intersections:

- Glasgow Street and Paisley Street
- Yorkshire Street and Waterloo Avenue

Thus, the detour scheme proposed above (with 40% of detouring traffic on Norfolk Street, 40% on Yorkshire Street, and 20% on Yorkshire Street) is not feasible, due to limited capacity for north-south travel on Glasgow Street and Yorkshire Street. It would be possible to reroute additional vehicles on Norfolk Street, however, travellers show a preference for using Dublin Street as a quieter north-south corridor than Norfolk Street under existing conditions.

6.3.2 ***Alternate Detour Scenario with Potential Intersection Signalization***

To better accommodate northbound and southbound volumes in the study area, a need for signalization along one of the corridors of Glasgow Street or Yorkshire Street was identified. This would entail signalization at the intersection of the corridor with either or both of Paisley Street and Waterloo Avenue to facilitate north-south travel. Yorkshire Street is better suited for signalization than Glasgow Street for the following reasons:

- Yorkshire Street already has signalized intersections in the study area which includes the intersection of Yorkshire Street and Paisley Street, and a pedestrian signal at the intersection of Yorkshire Street and Waterloo Avenue, while Glasgow Street has no traffic signals within the study area.
- Yorkshire Street carries higher northbound and southbound volumes than Glasgow Street.
- Yorkshire Street is identified as a collector road in the Guelph Transportation Master Plan, whereas Glasgow Street is identified as a local street.
- The intersection of Yorkshire Street and Waterloo Avenue experienced 7 collisions between 2013 and 2018, whereas the intersection of Glasgow Street at Paisley Street experienced 5 in the same timeframe.

If the intersection of Yorkshire Street and Waterloo Avenue is signalized, the intersection capacity will increase, and accordingly, the volume of vehicles detouring on Yorkshire Street will likely increase. Thus, the following alternate detour scheme was proposed:

- 40% of vehicles detouring on Norfolk Street
- 50% of vehicles detouring on Yorkshire Street
- 10% of vehicles detouring on Glasgow Street

Volumes for the above detour scheme for the opening year, five-year horizon, and ten-year horizon are illustrated in Sketches 13, 14, and 15 of Appendix A. The resultant traffic operations for the opening year, five-year horizon, and ten-year horizon are shown in Table 6-7, Table 6-8, Table 6-9 below. For comparison of intersection operations before and after signalization, the intersection of Yorkshire Street and Paisley Street was analyzed as an

unsignalized intersection. Traffic operations in the study area in 2021 are shown below. Full results in the associated Synchro worksheets are included in Appendix G of this Report.

Table 6-7: Traffic Operations following Closure of Dublin Street at Rail Crossing in the Opening Year with the Alternative Detour Scheme

Intersection	Movement	A.M. Peak Hour				P.M. Peak Hour			
		LOS	Delay(s)	V/C	95 th Queue (m)	LOS	Delay(s)	V/C	95 th Queue (m)
Signalized Intersections									
Yorkshire Street and Paisley Street	Overall	D	37.3	0.81	-	B	16.5	0.55	-
	SBLTR	F	103.8	1.08	77.6	-	-	-	-
Dublin Street and Paisley Street	Overall	A	9.1	0.49	-	A	8.0	0.44	-
Norfolk Street/Paisley Street at Quebec Street/Yarmouth Street	Overall	C	28.4	0.68	-	C	25.4	0.77	-
	NBT	-	-	-	-	C	22.4	0.85	181.0
Norfolk Street and Macdonell Street	Overall	B	19.7	0.66	-	C	25.9	0.69	-
Gordon Street/Norfolk Street and Waterloo Avenue/Wilson Street	Overall	C	25.5	0.73	-	B	17.6	0.66	-
	EBL	F	80.2	1.01	96.8	-	-	-	-
Unsignalized Intersections									
Yorkshire Street and Northumberland Street	Overall	No critical movements				No critical movements			
Yorkshire Street and Waterloo Avenue	Overall	No critical movements				No critical movements			
	SBLTR	F	120.7	1.08	90.0	-	-	-	-
Glasgow Street and Paisley Street	Overall	No critical movements				No critical movements			
Glasgow Street and Northumberland Street	Overall	No critical movements				No critical movements			
Glasgow Street and Kent Street	Overall	No critical movements				No critical movements			
Glasgow Street and Waterloo Avenue	Overall	No critical movements				No critical movements			
Dublin Street and Northumberland Street	Overall	No critical movements				No critical movements			
Dublin Street and Kent Street	Overall	No critical movements				No critical movements			
Dublin Street and Waterloo Avenue	Overall	No critical movements				No critical movements			
Norfolk Street and Cork Street	Overall	No critical movements				No critical movements			

- Note: 1. Traffic operations table displays critical movements for signalized and unsignalized intersections.
2. "Critical movement" refers to the worst performing movements at the intersection. For signalized and unsignalized intersections, critical movements are those with a v/c ratio exceeding 0.85 for shared/turning movements, v/c ratio exceeding 0.90 for exclusive movements, LOS E or F, or where queues exceed available storage.
3. Acronyms representing movements can be interpreted as a conjunction of the movement direction and turning direction, such that the letters EB, WB, NB, and SB correspond to an eastbound, westbound, northbound, or southbound movement, respectively. The subsequent letters L, T, and R correspond to a left, through, or right movement respectively. Shared lanes are designated by a combination of the letters L, T, R at the end of the acronym. For example, EBLTR corresponds to an eastbound left/through/right lane.

Table 6-8: Traffic Operations following Closure of Dublin Street at Rail Crossing in the Five-Year Horizon with the Alternate Detour Scheme

Intersection	Movement	A.M. Peak Hour				P.M. Peak Hour			
		LOS	Delay(s)	V/C	95 th Queue (m)	LOS	Delay(s)	V/C	95 th Queue (m)
Signalized Intersections									
Yorkshire Street and Paisley Street	Overall	D	50.6	0.91	-	B	18.7	0.65	-
	SBLTR	F	154.9	1.22	88.4	-	-	-	-
Dublin Street and Paisley Street	Overall	A	9.6	0.54	-	A	8.4	0.48	-
Norfolk Street/Paisley Street at Quebec Street/Yarmouth Street	Overall	C	31.5	0.76	-	C	29.5	0.85	-
	NBT	-	-	-	-	C	30.0	0.94	188.9
	SBTR	D	37.6	0.90	198.6	-	-	-	-
Norfolk Street and Macdonell Street	Overall	C	21.8	0.72	-	C	28.0	0.75	-
	NBR	C	25.8	0.88	86.8	C	28.8	0.87	102.9
Gordon Street/Norfolk Street and Waterloo Avenue/Wilson Street	Overall	C	31.2	0.81	-	B	19.2	0.74	-
	EBL	F	107.6	1.10	109.2	D	53.4	0.87	70.7
Unsignalized Intersections									
Yorkshire Street and Northumberland Street	Overall	No critical movements				No critical movements			
Yorkshire Street and Waterloo Avenue	Overall	Critical movements only				Critical movements only			
	SBLTR	F	246.8	1.40	137.1	E	38.6	0.67	38.6
Glasgow Street and Paisley Street	Overall	Critical movements only				No critical movements			
	NBLTR	E	48.3	0.63	27.9	-	-	-	-
Glasgow Street and Northumberland Street	Overall	No critical movements				No critical movements			
Glasgow Street and Kent Street	Overall	No critical movements				No critical movements			
Glasgow Street and Waterloo Avenue	Overall	No critical movements				No critical movements			
Dublin Street and Northumberland Street	Overall	No critical movements				No critical movements			
Dublin Street and Kent Street	Overall	No critical movements				No critical movements			
Dublin Street and Waterloo Avenue	Overall	No critical movements				No critical movements			
Norfolk Street and Cork Street	Overall	No critical movements				Critical movements only			
	WBLTR	-	-	-	-	E	36.5	0.51	20.1

- Note: 1. Traffic operations table displays critical movements for signalized and unsignalized intersections.
2. "Critical movement" refers to the worst performing movements at the intersection. For signalized and unsignalized intersections, critical movements are those with a v/c ratio exceeding 0.85 for shared/turning movements, v/c ratio exceeding 0.90 for exclusive movements, LOS E or F, or where queues exceed available storage.
3. Acronyms representing movements can be interpreted as a conjunction of the movement direction and turning direction, such that the letters EB, WB, NB, and SB correspond to an eastbound, westbound, northbound, or southbound movement, respectively. The subsequent letters L, T, and R correspond to a left, through, or right movement respectively. Shared lanes are designated by a combination of the letters L, T, R at the end of the acronym. For example, EBLTR corresponds to an eastbound left/through/right lane.

Table 6-9: Traffic Operations following Closure of Dublin Street at Rail Crossing in the Ten-Year Horizon with the Alternate Detour Scheme

Intersection	Movement	A.M. Peak Hour				P.M. Peak Hour			
		LOS	Delay(s)	V/C	95 th Queue (m)	LOS	Delay(s)	V/C	95 th Queue (m)
Signalized Intersections									
Yorkshire Street and Paisley Street	Overall	D	49.2	0.92	-	B	16.3	0.59	-
	SBLTR	F	149.4	1.21	93.5	-	-	-	-
Dublin Street and Paisley Street	Overall	B	13.9	0.64	-	B	13.5	0.62	-
Norfolk Street/Paisley Street at Quebec Street/Yarmouth Street	Overall	D	36.5	0.86	-	D	35.9	0.90	-
	NBT	-	-	-	-	C	31.9	0.94	190.5
	SBTR	D	51.4	0.98	219.8	D	45.5	0.93	174.5
Norfolk Street and Macdonell Street	Overall	C	22.9	0.73	-	C	29.6	0.76	-
	NBR	C	27.5	0.87	94.9	C	29.7	0.86	100.5
	SBL	D	46.0	0.84	51.2	E	60.8	0.82	48.9
Gordon Street/Norfolk Street and Waterloo Avenue/Wilson Street	Overall	C	22.7	0.80	-	B	16.5	0.72	-
	EBL	E	66.0	0.96	88.1	-	-	-	-
Unsignalized Intersections									
Yorkshire Street and Northumberland Street	Overall	No critical movements				No critical movements			
Yorkshire Street and Waterloo Avenue	Overall	Critical movements only				Critical movements only			
	SBLTR	F	74.0	0.88	55.6	E	39.2	0.58	25.3
Glasgow Street and Paisley Street	Overall	Critical movements only				No critical movements			
	NBLTR	F	95.7	0.86	45.1	-	-	-	-
	SBLTR	F	51.8	0.69	33.5	-	-	-	-
Glasgow Street and Northumberland Street	Overall	No critical movements				No critical movements			
Glasgow Street and Kent Street	Overall	No critical movements				No critical movements			
Glasgow Street and Waterloo Avenue	Overall	No critical movements				No critical movements			
Dublin Street and Northumberland Street	Overall	No critical movements				No critical movements			
Dublin Street and Kent Street	Overall	No critical movements				No critical movements			
Dublin Street and Waterloo Avenue	Overall	Critical movements only				Critical movements only			
	NBLTR	F	138.4	1.08	74.8	F	149.0	1.15	94.4
	SBLTR	F	78.5	0.81	42.1	E	48.0	0.69	34.2
Norfolk Street and Cork Street	Overall	Critical movements only				Critical movements only			
	EBLTR	E	43.3	0.49	18.3	-	-	-	-
	WBLTR	E	41.3	0.48	17.7	E	39.9	0.56	23.1

- Note: 1. Traffic operations table displays critical movements for signalized and unsignalized intersections.
2. "Critical movement" refers to the worst performing movements at the intersection. For signalized and unsignalized intersections, critical movements are those with a v/c ratio exceeding 0.85 for shared/turning movements, v/c ratio exceeding 0.90 for exclusive movements, LOS E or F, or where queues exceed available storage.
3. Acronyms representing movements can be interpreted as a conjunction of the movement direction and turning direction, such that the letters EB, WB, NB, and SB correspond to an eastbound, westbound, northbound, or southbound movement, respectively. The subsequent letters L, T, and R correspond to a left, through, or right movement respectively. Shared lanes are designated by a combination of the letters L, T, R at the end of the acronym. For example, EBLTR corresponds to an eastbound left/through/right lane.

The closure of Dublin Street at the rail crossing will have some potential effects to traffic operations in the study area due to diverted traffic volumes. The most significant effects were identified through the following criteria:

- A movement which was previously operating at LOS D or better under background conditions begins operating at LOS E or F under total conditions; or
- A movement which was previously operating with a v/c less than 0.85 for shared/turning movements or less than 0.90 for exclusive movements begins to exceed those thresholds, respectively.
- Queues begin to exceed the available turning lane storage.

Effects to traffic operations as a result of the closure of Dublin Street at the rail crossing are described below, by year and by intersection.

- By 2021, the following effects to traffic operations may begin to be experienced:
 - ◆ Yorkshire Street and Paisley Street
 - Additional delay at the southbound movement in the A.M. peak hour due to additional conflicting traffic at the northbound movement, diverted from Dublin Street.
 - ◆ Norfolk Street/Paisley Street Quebec Street/Yarmouth Street
 - Volume approaching capacity at the northbound through movement in the P.M. peak hour due to additional demand at the northbound movement, though delays at the movement are anticipated remain acceptable at LOS D or better to at least 2031.
 - ◆ Gordon Street/Norfolk Street and Waterloo Avenue/Wilson Street
 - Additional delay at the eastbound left movement in the A.M. peak hour due to additional demand at the eastbound left movement.
 - ◆ Yorkshire Street and Waterloo Avenue
 - Additional delay at the southbound movement in the A.M. peak hour due to additional demand at the southbound movement.
- By 2026, the following additional effects to traffic operations may begin to be experienced:
 - ◆ Norfolk Street and Macdonell Street
 - Volume approaching capacity in the northbound right movement in the A.M. and P.M. peak hour due to additional demand at the northbound movements, though delay remains acceptable at LOS C or better to at least 2031.
 - ◆ Gordon Street/Norfolk Street and Waterloo Avenue/Wilson Street

- Volume approaching capacity in the eastbound left movement in the P.M. peak hour due to additional demand at the eastbound left movement, though delays remain acceptable at LOS D.
- By 2031, the following additional effects to traffic operations may begin to be experienced:
 - ♦ Yorkshire Street and Paisley Street
 - Volume approaching capacity at the intersection of Yorkshire Street and Paisley Street in the A.M. peak hour due to increased demand at the northbound movement, though delay remains acceptable at LOS D.
 - ♦ Gordon Street/Norfolk Street and Waterloo Avenue/Wilson Street
 - Additional delay at the eastbound left movement in the P.M. peak hour due to additional demand at the eastbound left movement.

Delays at other movements stem from background traffic growth, but are not lengthened by traffic volumes diverted by the closure of Dublin Street.

The exposure index at each rail crossing, previously discussed in Section 6.1.2, was also recalculated for the opening year, five-year horizon, and ten-year horizon to reflect the change in traffic patterns following the closure of Dublin Street.

Table 6-10: Exposure Index Calculations for Closure of Dublin Street at Rail Crossing

Parameter		Location				
		Alma Street (north crossing)	Alma Street (south crossing)	Yorkshire Street	Glasgow Street	Dublin Street
2018	AADT	2,000	2,000	1,400	900	2,000
	Daily train volume	-	8	8	8	8
	Exposure index	-	16,000	11,200	7,200	16,000
2021	AADT	2,100	2,100	2,300	1,200	0
	Daily train volume	-	21	21	21	21
	Exposure index	-	31,500	48,300	25,200	0
2026	AADT	2,300	2,300	2,500	1,200	0
	Daily train volume	-	25	25	25	25
	Exposure index	-	85,100	62,500	30,000	0
2031	AADT	2,400	2,400	2,800	1,400	0
	Daily train volume	-	37	37	37	37
	Exposure index	-	88,800	103,600	51,800	0

Increases of traffic volumes on Yorkshire Street and Glasgow Street following the closure of Dublin Street at the grade crossing are not sufficient at any of the above existing grade crossings to merit a grade-separated crossing by 2031 based on the exposure index (cross product of vehicle volume and train volume). Even if 15-minute one-way peak-period service is provided at Guelph Central Station, a grade-separated crossing will not be required at any of the existing grade crossings in the study area based on the exposure index criteria. It is anticipated that a grade separation will not be required unless two-way, all-day 30-minute service or all-day one-way 15-minute service is provided between Guelph Central Station and Kitchener GO Station/Union Station after 2031.

Transit services will not be affected by the closure of Dublin Street at the rail crossing, because there are no transit routes on Dublin Street. Any school buses operating on Dublin Street will continue to be able to access all residences in the study area, and can cross the rail corridor on Yorkshire Street, Glasgow Street, or Norfolk Street.

Pedestrian and cyclist travel may be affected by the closure of Dublin Street at the rail crossing. If a pedestrian/cyclist rail crossing is not provided over the rail corridor, the closest crossings would be at Norfolk Street, 200 m to the east, and Glasgow Street, 200 m to the west. Either of these crossings represents a two to three-minute diversion by foot. It is anticipated that 80% of these pedestrians will detour to Glasgow Street, with the remainder using Norfolk Street, since most foot traffic is anticipated to be local traffic, and Glasgow Street provides better access to local streets, and Norfolk Street is separated from Northumberland Street and Kent Street by a retaining wall. Table 6-11 summarizes pedestrian volumes at each rail crossing under existing conditions, and anticipated weekday pedestrian volumes at each rail crossing after the closure of Dublin Street.²

Table 6-11: Pedestrian Volumes at Rail Crossings

Scenario	Location	Alma Street	Yorkshire Street	Glasgow Street	Dublin Street
Existing conditions	Total Volume	540 (7:00 A.M. – 7:00 P.M.)	170 (7:00 A.M. – 7:00 P.M.)	109 (7:00 A.M. – 7:00 P.M.)	238 (7:00 A.M. – 7:00 P.M.)
	Peak Hour Volume	214 (11:30 A.M. – 12:30 P.M.)	39 (3:00 P.M. – 4:00 P.M.)	21 (4:45 P.M. – 5:45 P.M.)	35 (8:00 A.M. – 9:00 A.M.)
Conditions after closure of Dublin Street at rail crossing	Total Volume	540	170	299	-
	Peak Hour Volume	214	39	49	-

Maintaining an active transportation crossing at Dublin Street across the rail corridor is preferred to maintain pedestrian and cyclist connectivity. However, if an active transportation crossing is not maintained, the provision of wayfinding signage in advance of the closed Dublin Street crossing to advise of alternative active transportation routes is recommended.

The closest fire station to the site of the proposed closure is at 50 Wyndham Street South, approximately 0.7 km east of Dublin Street at the rail corridor. Emergency services will not be significantly affected by the closure of Dublin Street at the rail crossing, because property access on Dublin Street will be maintained, and alternate north-south routes through the study area exist at Yorkshire Street, Glasgow Street, and Norfolk Street.

² Less than ten cyclists per day were observed at each of Glasgow Street and Dublin Street during data collection.

6.3.3 Mitigation Strategies

Strategies to ameliorate delays that may occur as a result of the closure of Dublin Street at the rail crossing are discussed in this section. Strategies were identified for intersections where operations for a movement are anticipated to worsen from LOS A to LOS D in background conditions to LOS E or LOS F under total conditions. Strategies to increase capacity at movements where the v/c ratio exceeds 0.85 for shared/turning movements and 0.90 for exclusive movements were not identified for movements where the movement is anticipated to operate at LOS D or better, as those movements are deemed to operate with acceptable levels of delay. Mitigation strategies were also not identified for delays pre-existing in background conditions, unless those delays were worsened under total conditions.

Delays in the network effected by diverted traffic from Dublin Street at signalized intersections can be mitigated through the following adjustments in signal timings³:

- Increased delay southbound at the intersection of Yorkshire Street and Paisley Street in the A.M. peak hour can be mitigated by increasing the length of the northbound and southbound phases.
- Increased delay at the eastbound left movement at the intersection of Gordon Street/Norfolk Street and Waterloo Avenue/Wilson Street in the A.M. and P.M. peak hour can be mitigated by increasing the length of the eastbound and westbound phases.
 - ♦ Alternately, an eastbound left-turn phase can be provided to accommodate increased volumes at the eastbound left-turn movement.⁴

For delays induced at the unsignalized intersection of Yorkshire Street at Waterloo Avenue, a signal warrant analysis was completed. It was found that a signal will be warranted in 2031, based on Justification 3, however, the intersection will come close to fulfilling Justification 3 in the years 2021 and 2026. Small changes in off-peak travel volumes in 2021 and 2026 may result in the fulfillment of the traffic signal warrant. Thus, based on the classification of Yorkshire Street as a collector road, and the need for a lower-volume north-south corridor through the study area as an alternative to Norfolk Street, signalization of the intersection of Yorkshire Street and Waterloo Avenue was identified to facilitate north-south travel through the study area. The full signal warrant analysis worksheets can be found in Appendix H.

The traffic operations resulting from the above mitigation strategies are summarized in Table 6-12 through Table 6-17 below.

³ These changes to signal phasing are based on maintaining the existing signal cycle length.

⁴ Tables showing before-and-after effects of mitigation strategies show only the result of increasing the length of the eastbound and westbound phases, rather than provision of an eastbound left-turn phase.

Table 6-12: A.M. Peak Hour Operations following Dublin Street Closure in the Opening Year, before and after mitigation strategies.

Intersection	Movement	Before Mitigation				After Mitigation			
		LOS	Delay(s)	V/C	95 th Queue (m)	LOS	Delay(s)	V/C	95 th Queue (m)
Yorkshire Street and Paisley Street	Overall	D	37.3	0.81	-	C	23.0	0.80	-
	EBLTR	B	15.4	0.70	67.8	B	19.6	0.76	90.2
	WBLTR	B	17.5	0.43	62.7	A	9.5	0.47	31.1
	NBLTR	C	32.4	0.72	47.2	B	19.4	0.58	25.1
	SBLTR	F	103.8	1.08	77.6	D	46.8	0.88	52.3
Gordon Street/Norfolk Street and Waterloo Avenue/Wilson Street	Overall	C	25.5	0.73	-	C	22.0	0.74	-
	EBL	F	80.2	1.01	96.8	D	43.5	0.87	72.8
	EBR	C	24.3	0.19	15.9	C	21.0	0.14	10.8
	WBLTR	C	23.2	0.06	9.8	C	20.2	0.05	8.2
	NBT	B	12.2	0.55	44.5	B	15.6	0.61	57.0
	SBTR	B	12.2	0.54	37.6	B	17.9	0.60	61.6
Yorkshire Street and Waterloo Avenue	Overall	Unsignalized Intersection				B	16.6	0.63	-
	EBLTR	A	2.9	0.11	2.7	B	15.0	0.65	64.6
	WBLTR	A	0.6	0.01	0.3	A	9.5	0.60	27.4
	NBLTR	C	17.4	0.25	7.5	C	20.5	0.10	5.2
	SBLTR	F	120.7	1.08	90.0	C	26.0	0.60	6.5

Table 6-13: P.M. Peak Hour Operations following Dublin Street Closure in the Opening Year, before and after mitigation strategies.

Intersection	Movement	Before Mitigation				After Mitigation			
		LOS	Delay(s)	V/C	95 th Queue (m)	LOS	Delay(s)	V/C	95 th Queue (m)
Yorkshire Street and Waterloo Avenue	Overall	Unsignalized Intersection				B	13.4	0.41	-
	EBLTR	A	3.0	0.09	2.3	B	10.2	0.44	37.7
	WBLTR	A	0.2	0.01	0.1	B	10.6	0.49	46.1
	NBLTR	C	20.8	0.19	5.3	C	21.7	0.08	6.8
	SBLTR	D	28.2	0.55	23.8	C	25.5	0.23	9.1

Table 6-14: A.M. Peak Hour Operations following Dublin Street Closure in the Five-Year Horizon, before and after mitigation strategies.

Intersection	Movement	Before Mitigation				After Mitigation			
		LOS	Delay(s)	V/C	95 th Queue (m)	LOS	Delay(s)	V/C	95 th Queue (m)
Yorkshire Street and Paisley Street	Overall	D	50.6	0.91	-	C	27.7	0.89	-
	EBLTR	B	18.3	0.78	79.2	C	28.8	0.88	110.6
	WBLTR	B	18.1	0.48	67.7	B	11.5	0.55	34.5
	NBLTR	D	39.4	0.80	58.3	B	18.5	0.58	28.4
	SBLTR	F	154.9	1.22	88.4	D	50.6	0.91	67.3
Gordon Street/Norfolk Street and Waterloo Avenue/Wilson Street	Overall	C	31.2	0.81	-	C	24.6	0.83	-
	EBL	F	107.6	1.10	109.2	D	46.4	0.90	81.2
	EBR	C	24.7	0.23	18.7	C	20.2	0.18	13.0
	WBLTR	C	23.2	0.06	9.8	B	19.1	0.05	8.2
	NBT	B	13.4	0.62	48.7	B	19.5	0.73	64.4
	SBTR	B	12.8	0.59	40.8	C	20.1	0.68	71.0
	Overall	Unsignalized Intersection				B	18.3	0.70	-
	EBLTR	A	3.0	0.12	3.1	B	16.9	0.71	73.4
	WBLTR	A	0.7	0.02	0.4	A	9.9	0.34	30.5
	NBLTR	C	19.6	0.30	9.6	C	20.6	0.11	5.5
	SBLTR	F	246.8	1.40	137.1	C	28.9	0.68	8.3

Table 6-15: P.M. Peak Hour Operations following Dublin Street Closure in the Five-Year Horizon, before and after mitigation strategies.

Intersection	Movement	Before Mitigation				After Mitigation			
		LOS	Delay(s)	V/C	95 th Queue (m)	LOS	Delay(s)	V/C	95 th Queue (m)
Yorkshire Street and Waterloo Avenue	Overall	Unsignalized Intersection				B	13.8	0.45	-
	EBLTR	A	3.2	0.11	2.7	B	10.9	0.48	41.9
	WBLTR	A	0.2	0.01	0.2	B	11.2	0.53	51.4
	NBLTR	C	23.5	0.23	23.5	C	21.8	0.09	7.1
	SBLTR	E	38.6	0.67	38.6	C	25.2	0.26	9.8

Table 6-16: A.M. Peak Hour Operations following Dublin Street Closure in the Ten-Year Horizon, before and after mitigation strategies.

Intersection	Movement	Before Mitigation				After Mitigation			
		LOS	Delay(s)	V/C	95 th Queue (m)	LOS	Delay(s)	V/C	95 th Queue (m)
Yorkshire Street and Paisley Street	Overall	E	66.0	0.97	-	C	34.6	0.95	-
	EBLTR	C	20.2	0.81	94.8	D	43.6	0.97	142.9
	WBLTR	B	18.6	0.52	72.9	B	14.1	0.63	38.8
	NBLTR	D	53.1	0.90	67.1	B	18.5	0.60	30.3
	SBLTR	F	209.9	1.35	98.6	D	53.3	0.93	74.5
Gordon Street/Norfolk Street and Waterloo Avenue/Wilson Street	Overall	D	37.1	0.89	-	C	28.3	0.91	-
	EBL	F	136.0	1.18	119.7	D	50.0	0.93	88.7
	EBR	C	24.9	0.26	21.2	B	19.6	0.20	14.8
	WBLTR	C	23.2	0.06	9.8	B	18.3	0.05	8.2
	NBT	B	15.0	0.69	52.8	C	25.7	0.84	79.3
	SBTR	B	13.6	0.63	49.5	C	22.7	0.76	87.4
	Overall	Unsignalized Intersection				C	28.3	0.76	-
	EBLTR	A	3.2	0.13	3.5	B	19.7	0.78	83.9
	WBLTR	A	0.6	0.20	0.4	B	10.2	0.36	33.2
	NBLTR	C	22.0	0.35	11.7	C	20.6	0.12	5.5
	SBLTR	F	380.4	1.71	176.2	C	31.2	0.73	10.2

Table 6-17: P.M. Peak Hour Operations following Dublin Street Closure in the Ten-Year Horizon, before and after mitigation strategies.

Intersection	Movement	Before Mitigation				After Mitigation			
		LOS	Delay(s)	V/C	95 th Queue (m)	LOS	Delay(s)	V/C	95 th Queue (m)
Gordon Street/Norfolk Street and Waterloo Avenue/Wilson Street	Overall	C	21.1	0.81	-	C	21.1	0.81	-
	EBL	E	57.7	0.90	78.9	D	46.3	0.84	64.1
	EBR	C	25.1	0.14	10.9	C	24.0	0.14	9.8
	WBLTR	C	26.1	0.25	27.4	C	24.7	0.23	23.9
	NBT	B	15.2	0.73	57.1	B	16.9	0.76	78.0
	SBTR	B	14.1	0.61	72.0	B	16.3	0.64	60.8
	Overall	Unsignalized Intersection				B	14.4	0.49	-
	EBLTR	A	B	11.7	0.53	46.9	19.7	0.78	83.9
	WBLTR	A	B	11.9	0.58	57.5	10.2	0.36	33.2
	NBLTR	D	C	21.9	0.10	7.6	20.6	0.12	5.5
	SBLTR	F	C	25.1	0.31	11.0	31.2	0.73	10.2

Signal warrant analysis was also conducted for the unsignalized intersections in the study area with movements operating at LOS E or F, regardless of whether or not the closure of Dublin Street at the rail crossing is anticipated to have any effect to traffic operations at the intersection. These locations included:

- Glasgow Street and Paisley Street
- Norfolk Street and Cork Street

Neither of the above unsignalized intersections were found to warrant traffic signals by 2031. The full signal warrant analysis worksheets can be found in Appendix H. To avoid delay at

unsignalized intersections, travellers at the intersection of Glasgow Street and Paisley Street will have the options of taking alternate routes at the signalized intersections of Paisley Street at Dublin Street, and Paisley Street at Yorkshire Street. Travellers at the intersection of Norfolk Street and Cork Street can also take alternative east-west routes via Quebec Street or Macdonell Street.

In addition to the above intersection modifications, traffic calming measures including vertical deflection measures such as speed tables or humps may be useful in reducing travel speeds on Yorkshire Street, where 7% of vehicles were observed to travel at speeds in excess of 20 km/h above the speed limit (as discussed in Section 4.1.2.1). Traffic speeds were not measured on Glasgow Street or Norfolk Street, however, the heavy traffic volumes, urban character, and close intersection spacing on Norfolk Street, and the narrow street width and on-street parking on Glasgow Street, may serve to deter speeding on those corridors.

Travel times along each of Yorkshire Street, Glasgow Street, and Norfolk Street following the closure of Dublin Street at the rail crossing, and the implementation of the above mitigation strategies, are anticipated to be comparable to that of Dublin Street prior to its closure at the rail crossing. Travel times were calculated using the average delay for each movement as calculated in Synchro and using the average northbound and southbound travel times observed during the field review, as described in Section 4.4. Travel times for each route in each analysis year are summarized in Table 6-18.

Table 6-18: Anticipated Future Travel Times for North-South Corridors in the Study Area

Time Period and Route			Yorkshire Street	Glasgow Street	Dublin Street (before closure)	Norfolk Street
2021	Northbound	A.M. Peak Hour	0:02:21	0:01:43	0:02:13	0:02:53
		P.M. Peak Hour	0:02:32	0:02:02	0:02:16	0:02:38
	Southbound	A.M. Peak Hour	0:02:12	0:02:09	0:01:47	0:02:35
		P.M. Peak Hour	0:02:20	0:02:14	0:01:40	0:02:41
2026	Northbound	A.M. Peak Hour	0:02:22	0:02:00	0:02:48	0:02:55
		P.M. Peak Hour	0:02:43	0:02:13	0:02:55	0:03:18
	Southbound	A.M. Peak Hour	0:02:17	0:02:20	0:02:02	0:02:38
		P.M. Peak Hour	0:02:23	0:02:07	0:01:48	0:02:45
2031	Northbound	A.M. Peak Hour	0:02:26	0:02:05	0:03:48	0:03:04
		P.M. Peak Hour	0:02:53	0:02:23	0:03:58	0:02:45
	Southbound	A.M. Peak Hour	0:02:23	0:02:27	0:02:35	0:02:43
		P.M. Peak Hour	0:02:26	0:02:23	0:02:03	0:02:50

6.3.4 Summary

Closure of Dublin Street at the rail crossing will increase traffic volumes on the nearby north-south corridors of Yorkshire Street, Glasgow Street, and Norfolk Street. Signalization of the intersection of Yorkshire Street and Waterloo Avenue by 2021 was identified as a measure to facilitate north-south travel along Yorkshire Street, a collector road. Elsewhere in the study area, minor adjustments to signal timing can be made to better accommodate the traffic volumes diverted from Dublin Street. This review identified that approximately 250 northbound and southbound pedestrian and cyclist movements would be affected by the closure of the crossing. However the existing grid street network provides alternate crossings at Glasgow Street, 200m to the west of Dublin Street, and at Norfolk Street, 200m to the east.

Provision of wayfinding signage in advance of the closed Dublin Street crossing to advise active road users of alternative routes across the rail corridor is recommended.

7. Conclusions

To support increased GO train speeds in Guelph as part of the Regional Express Rail (RER) project, the traffic impacts from converting Kent Street to one-way operation and from closing the Dublin Street level crossing were investigated. Traffic operations were modelled for the opening year, five-year horizon, and ten-year horizon for both scenarios, and compared to future background conditions to identify the transportation impacts of each scenario. It was found that converting Kent Street to one-way westbound operation and the closure of Dublin Street at the rail crossing are both feasible.

1. Conversion of Kent Street to One-Way Westbound Operation

Conversion of Kent Street to one-way operation would have minimal traffic impacts to the road network in the study area, but might increase travel speeds on Kent Street. Maintaining on-street parking on one side of the street would help to effectively narrow the road and reduce potential for higher speeds.

2. Closure of the Dublin Street South Level Crossing

Closing Dublin Street at the rail crossing will increase travel volumes on Glasgow Street, Yorkshire Street, and Norfolk Street. The following mitigation measures/strategies were identified:

- Signalization of the intersection of Yorkshire Street and Waterloo Avenue to facilitate north-south travel along Yorkshire Street, a collector road.
- Minor adjustments to traffic signal timings along Norfolk Street to facilitate travel for vehicles diverted from Dublin Street along that corridor.
- Closure of the Dublin Street crossing will affect approximately 250 daily active transportation movements. These active transportation users can detour across the rail corridor either via Glasgow Street, 200 m to the west, or Norfolk Street, 200 m to the east. The provision of wayfinding signage in advance of the closed Dublin Street crossing to advise active road users of alternative routes across the rail corridor is recommended.

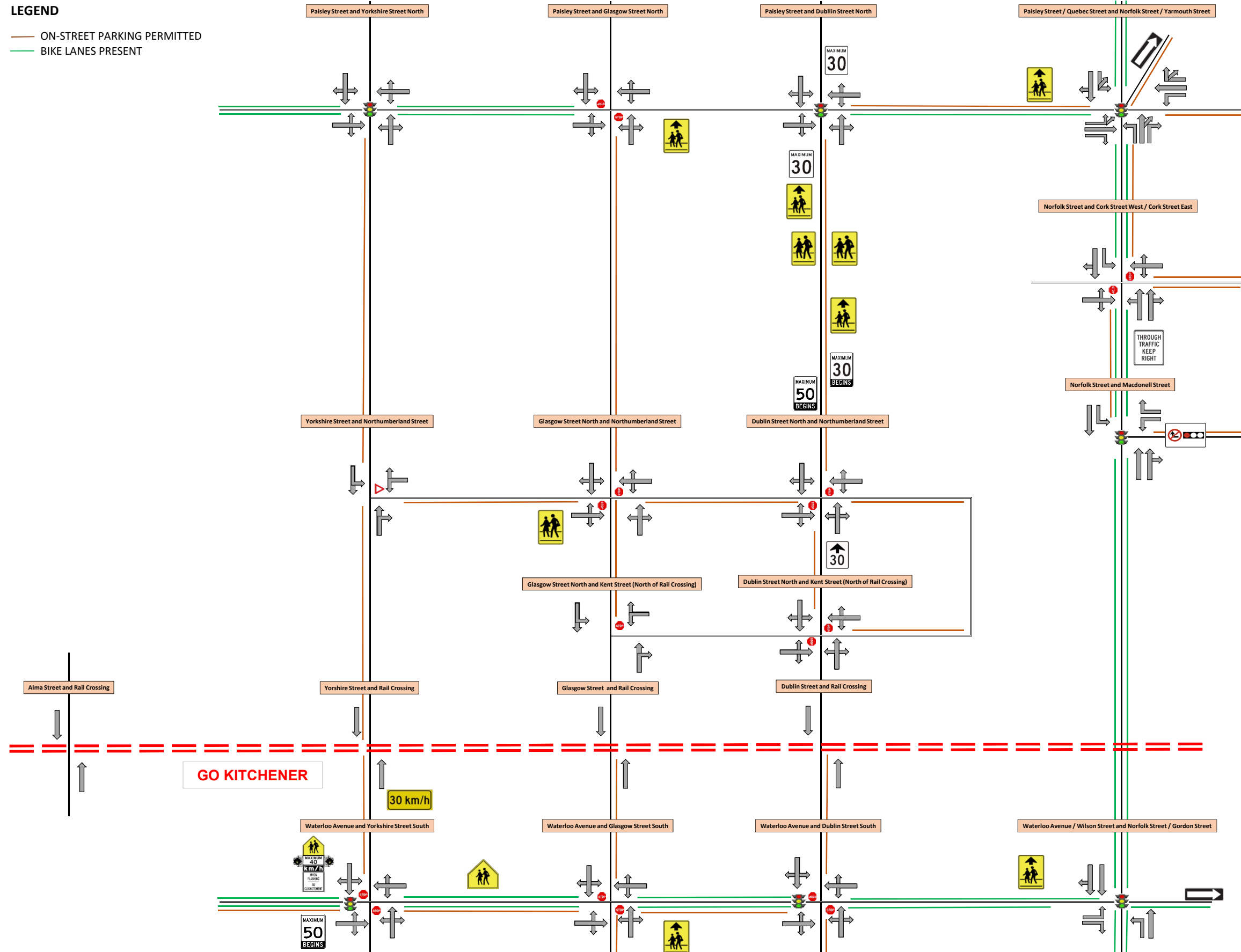
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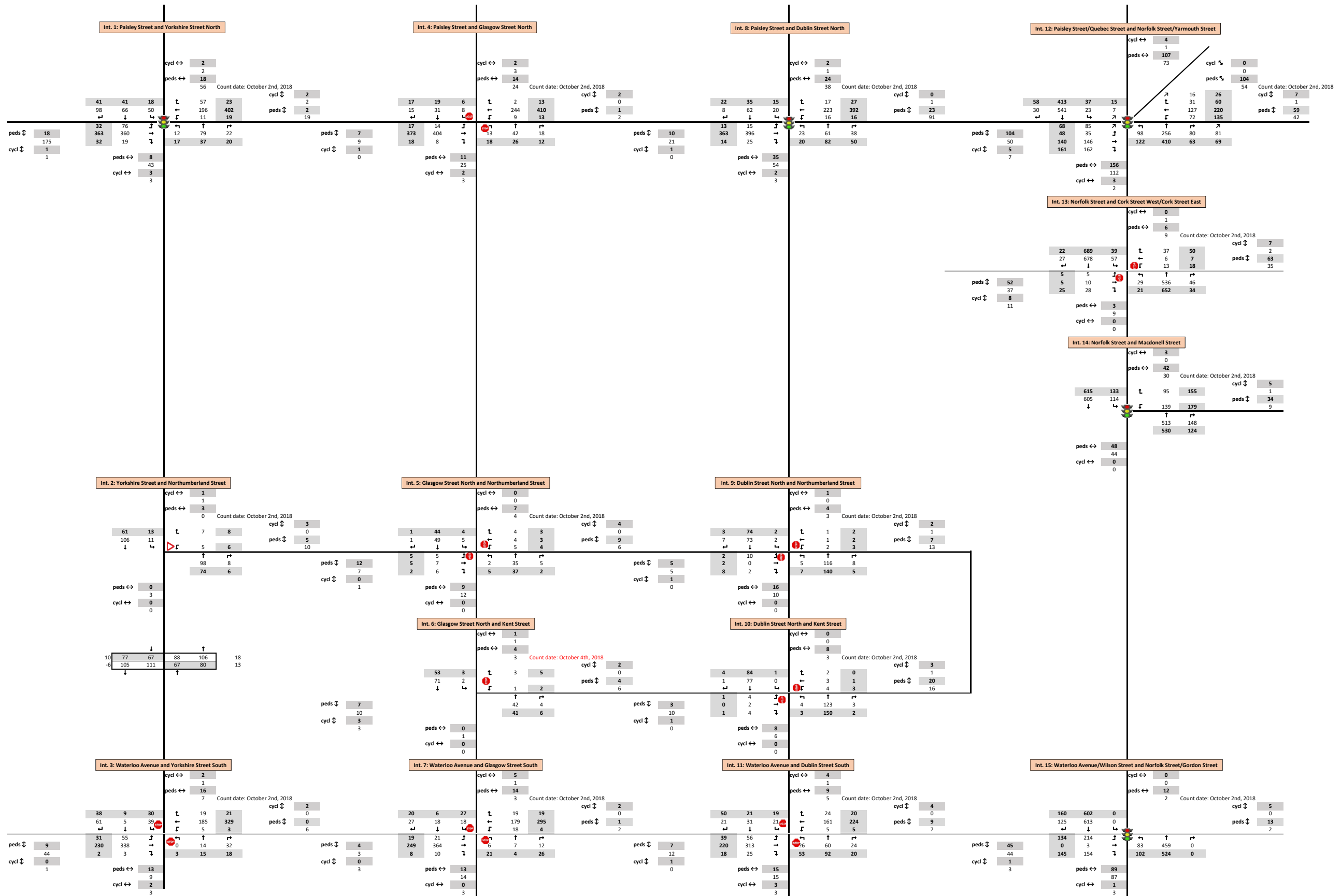
Appendix A: Supplementary Traffic Figures

LEGEND

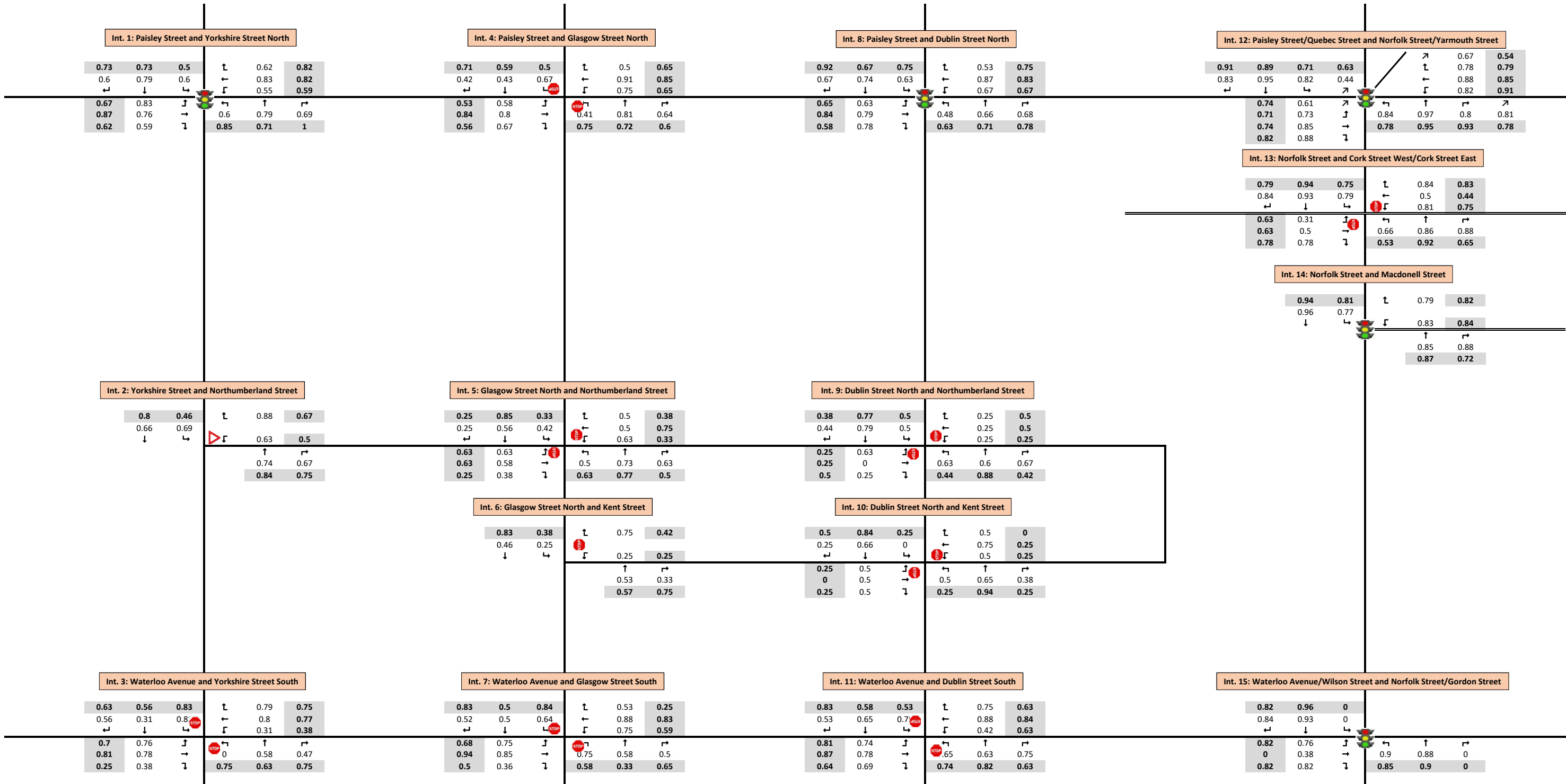
- ON-STREET PARKING PERMITTED
- BIKE LANES PRESENT



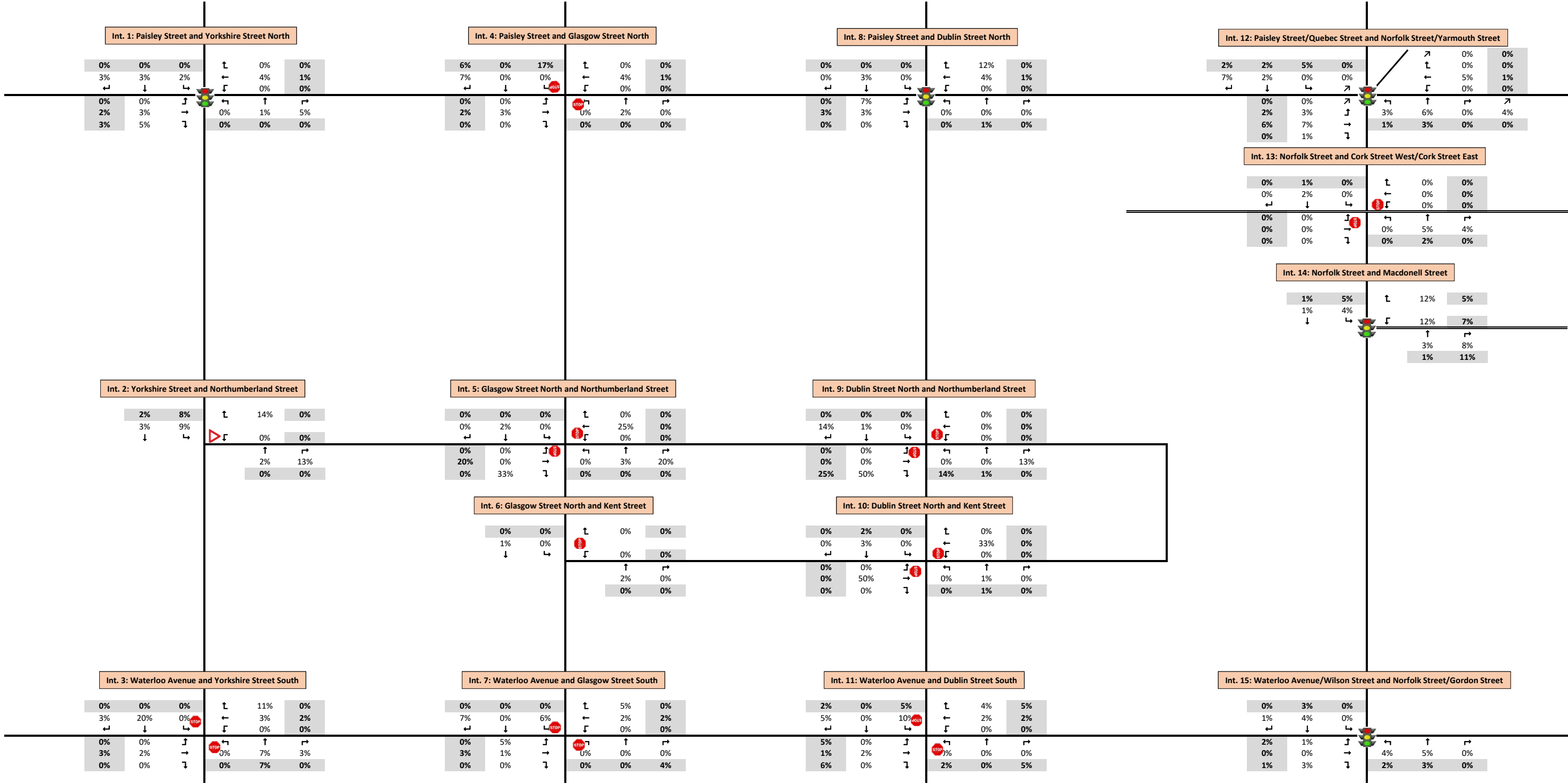
Sketch 1: Existing lane configuration



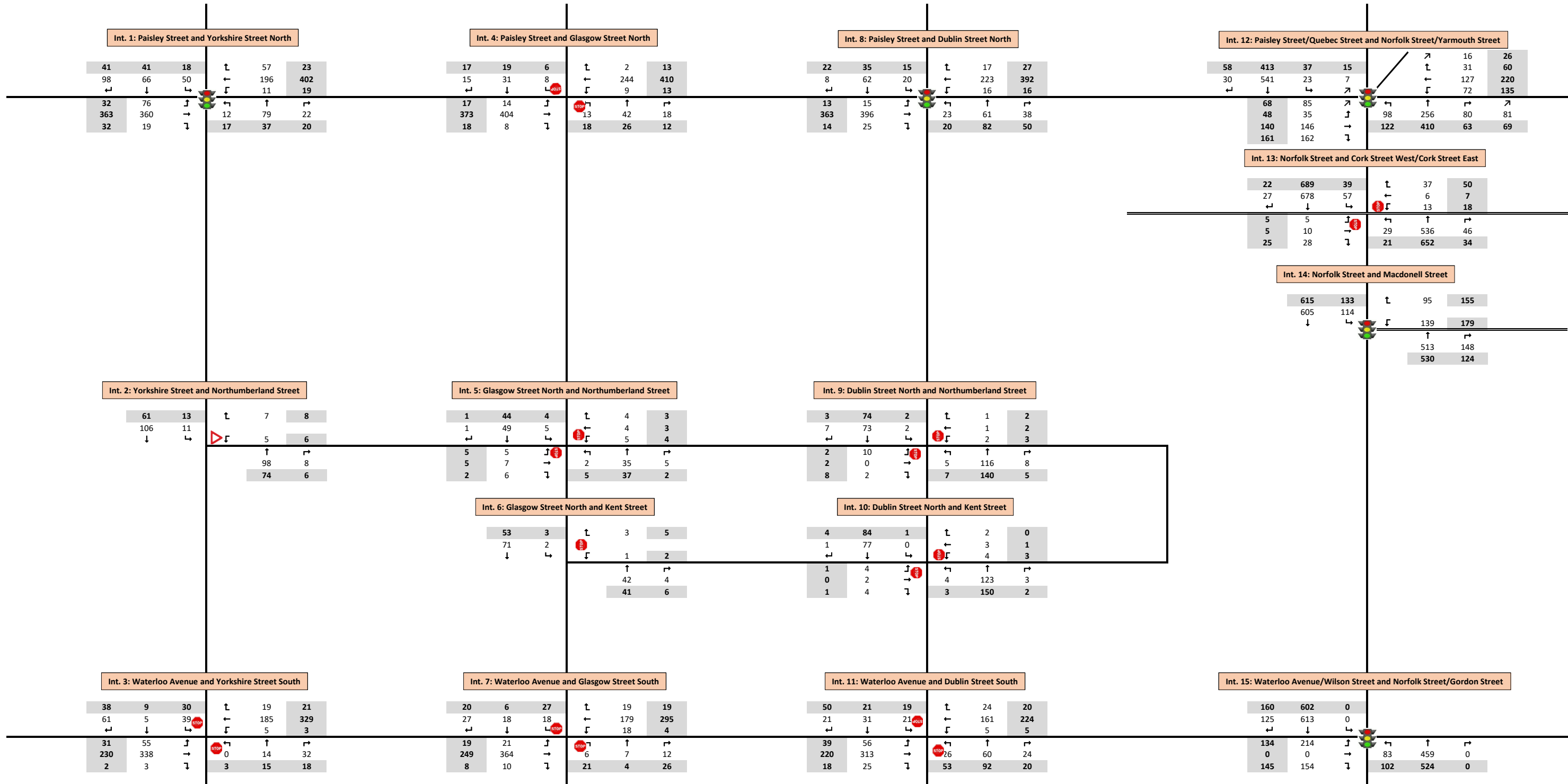
Sketch 2: Raw turning movement counts



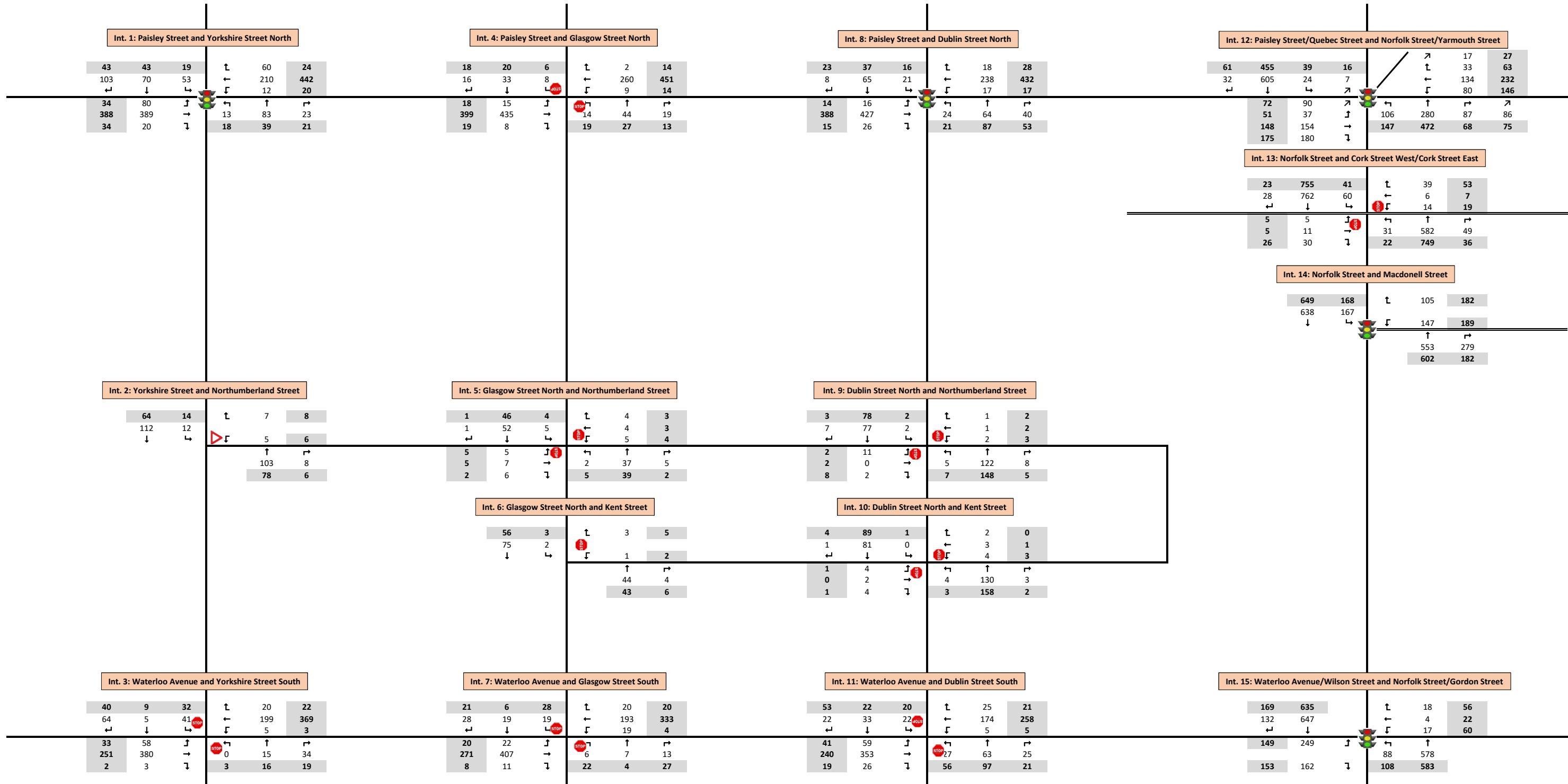
Sketch 3: Peak hour factors



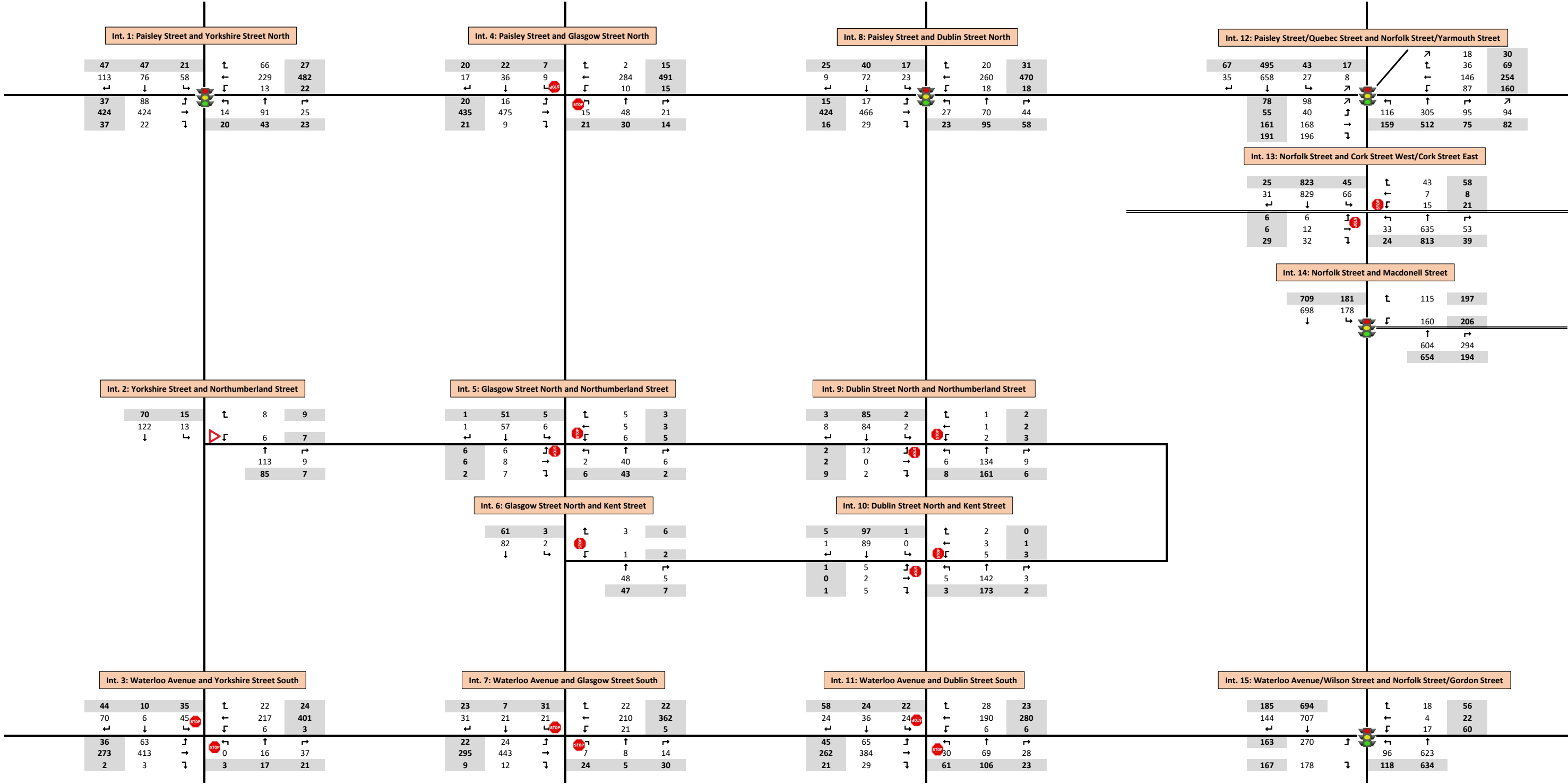
Sketch 4: Truck percentages



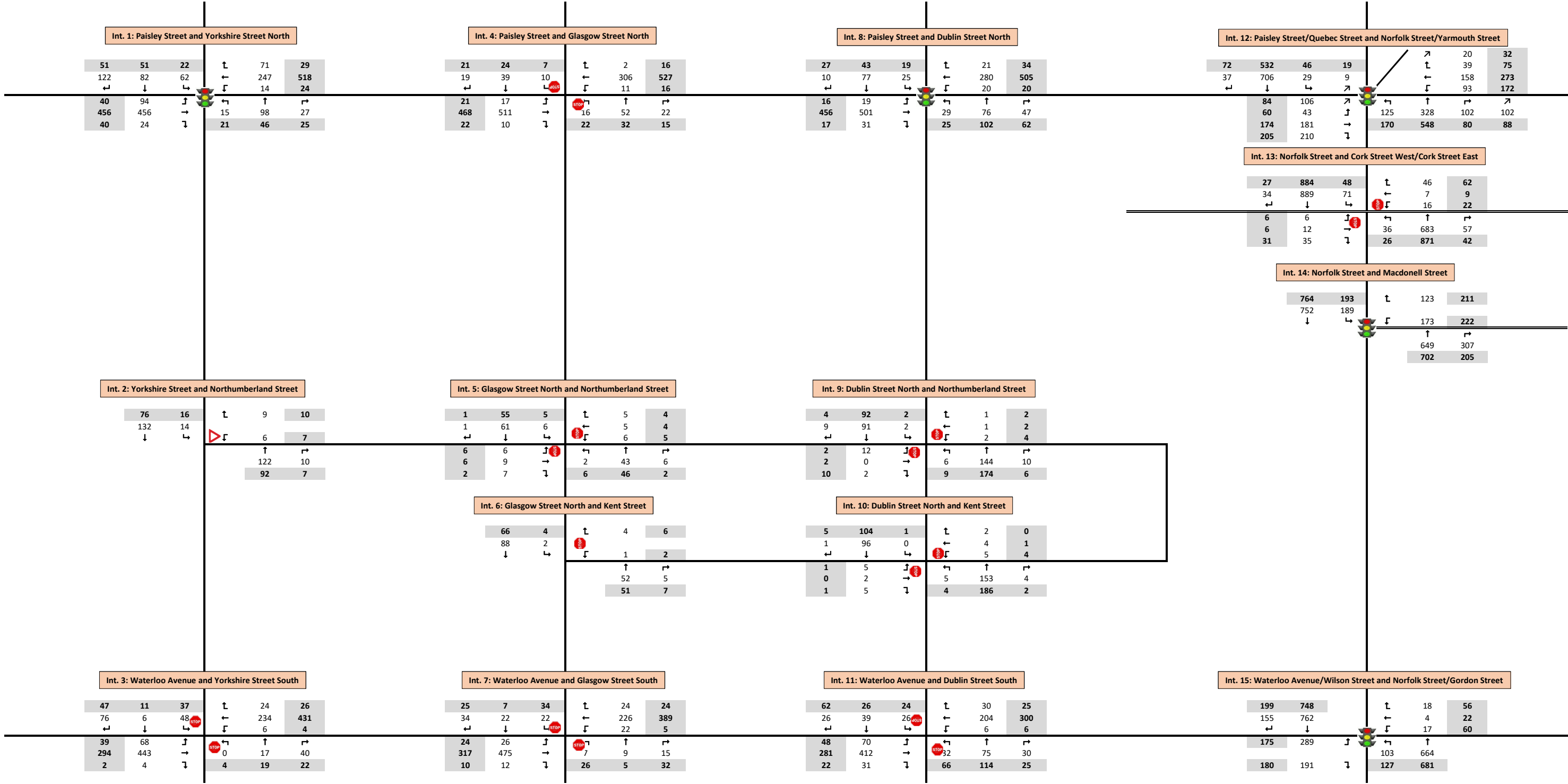
Sketch 5: 2018 Balanced traffic volumes



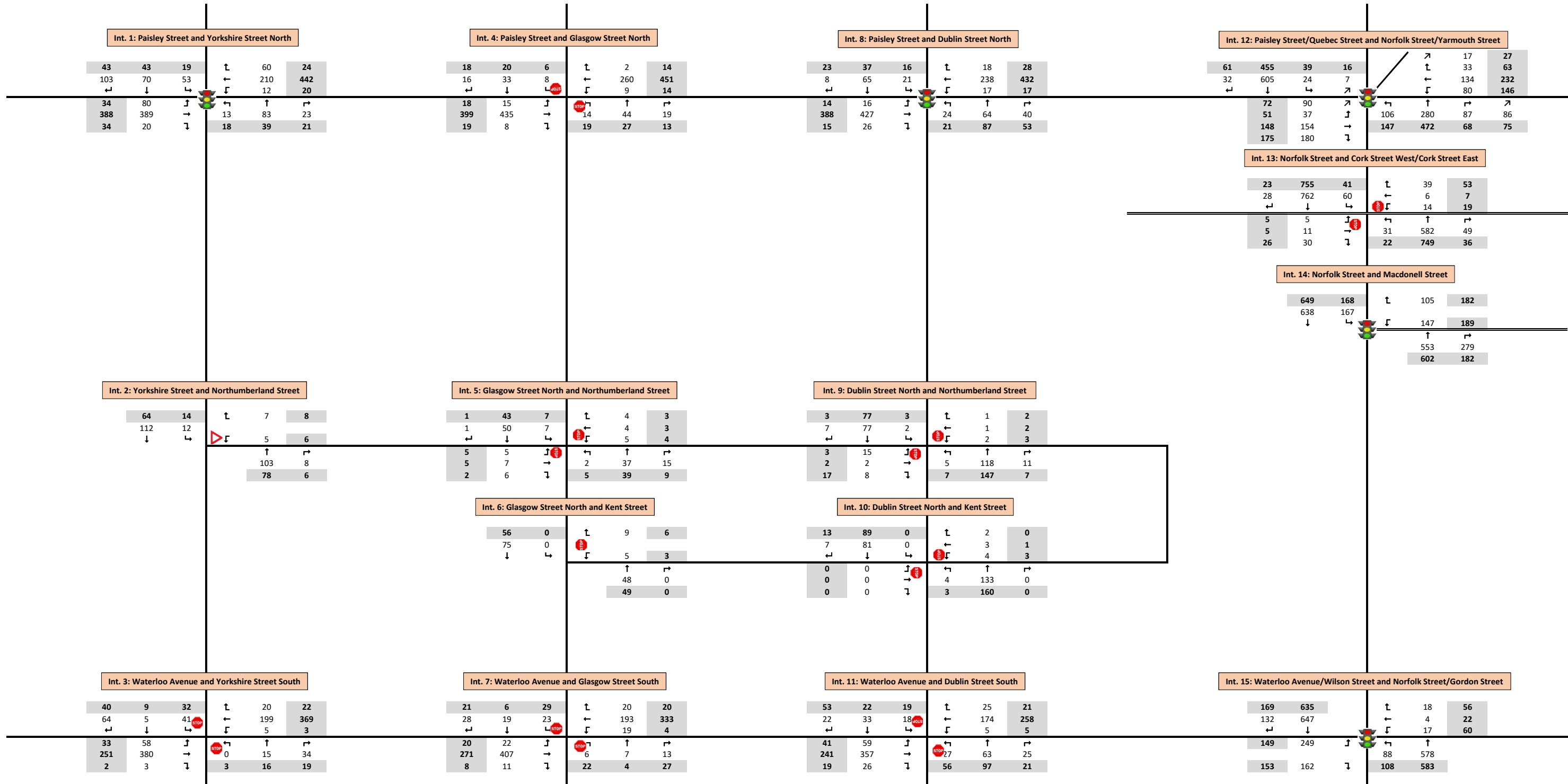
Sketch 6: 2021 Background traffic volumes



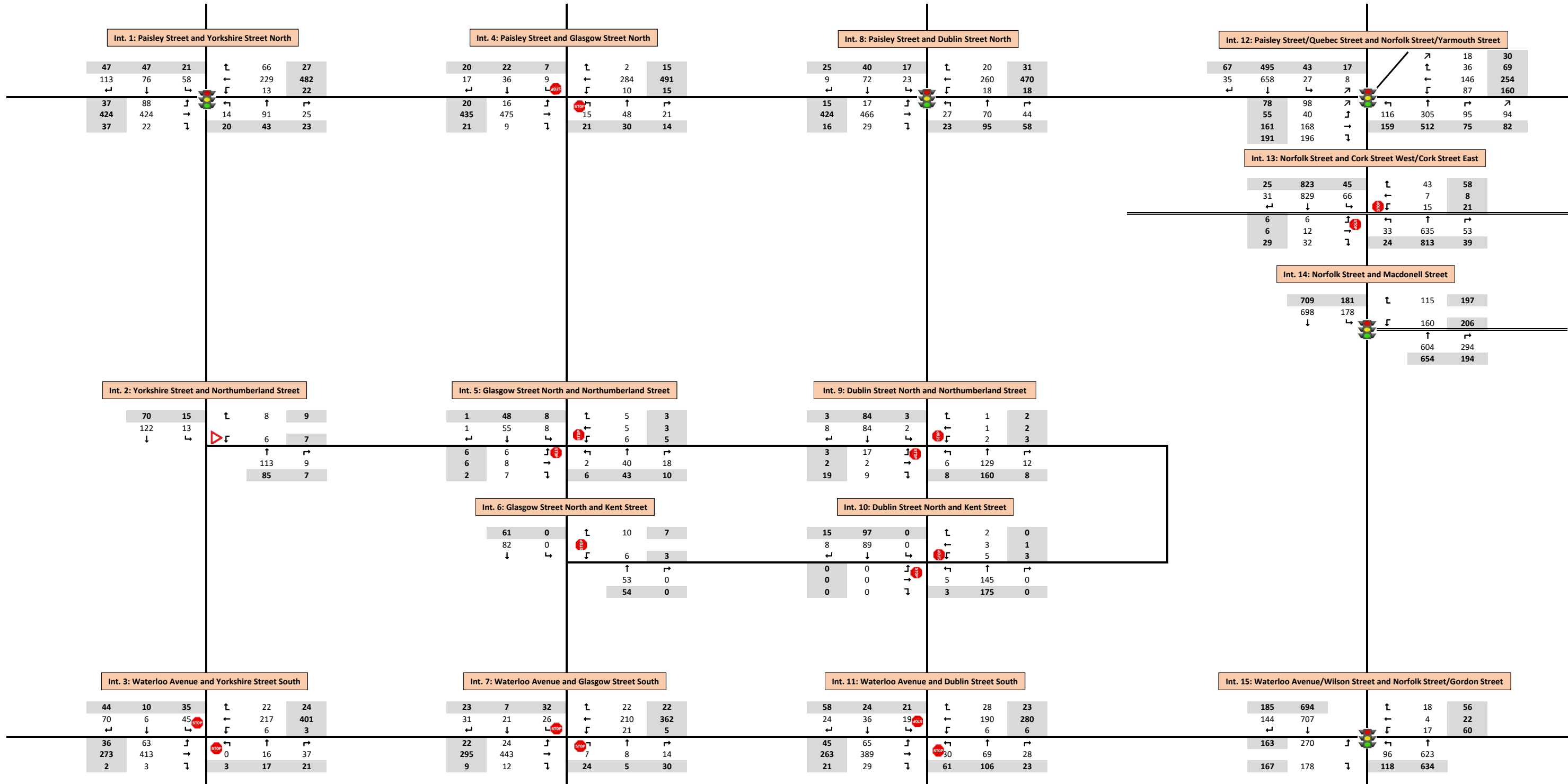
Sketch 7: 2026 Background traffic volumes



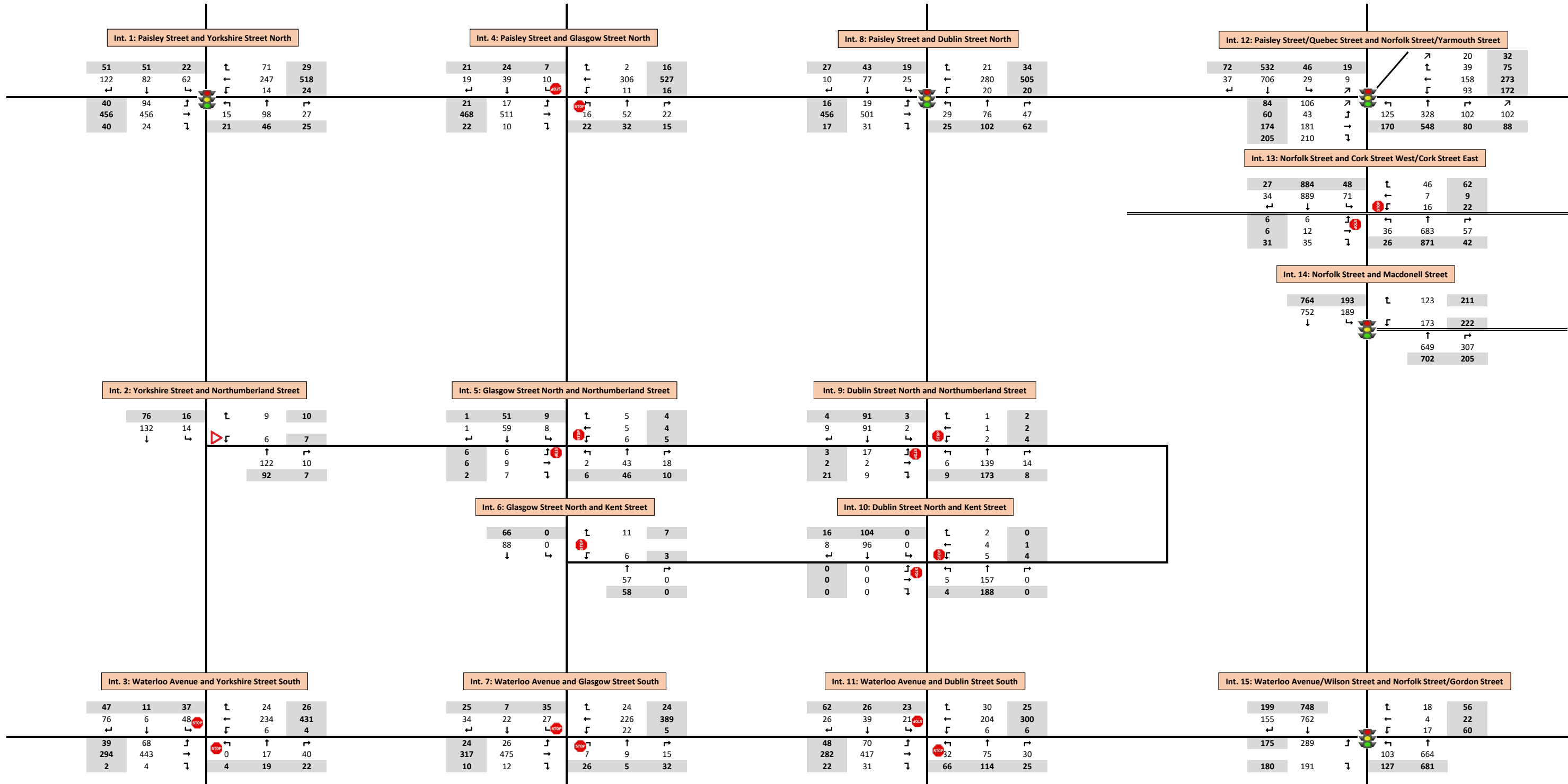
Sketch 8: 2031 Background traffic volumes



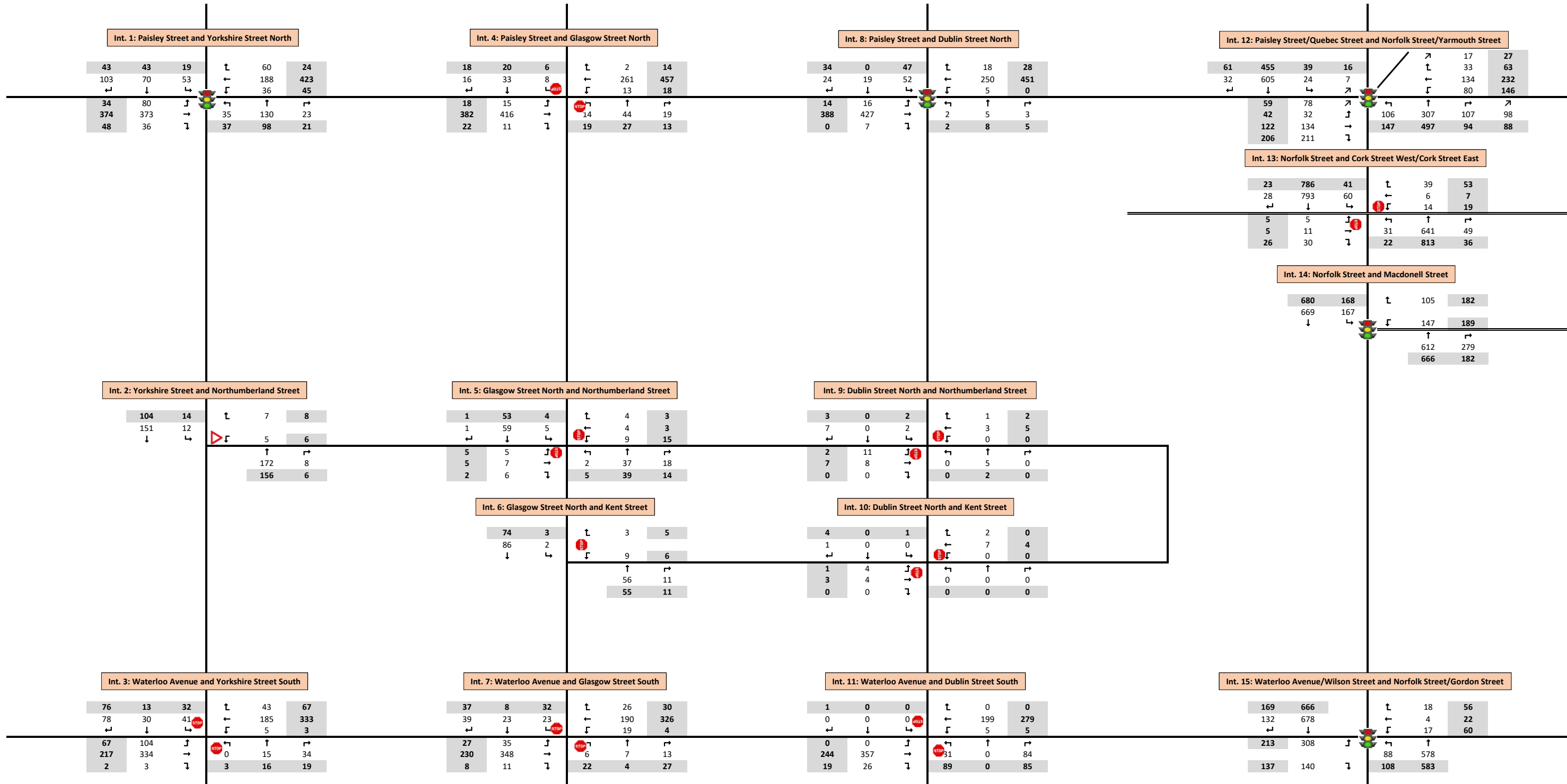
Sketch 9: 2021 Traffic volumes following conversion of Kent Street to one-way operation



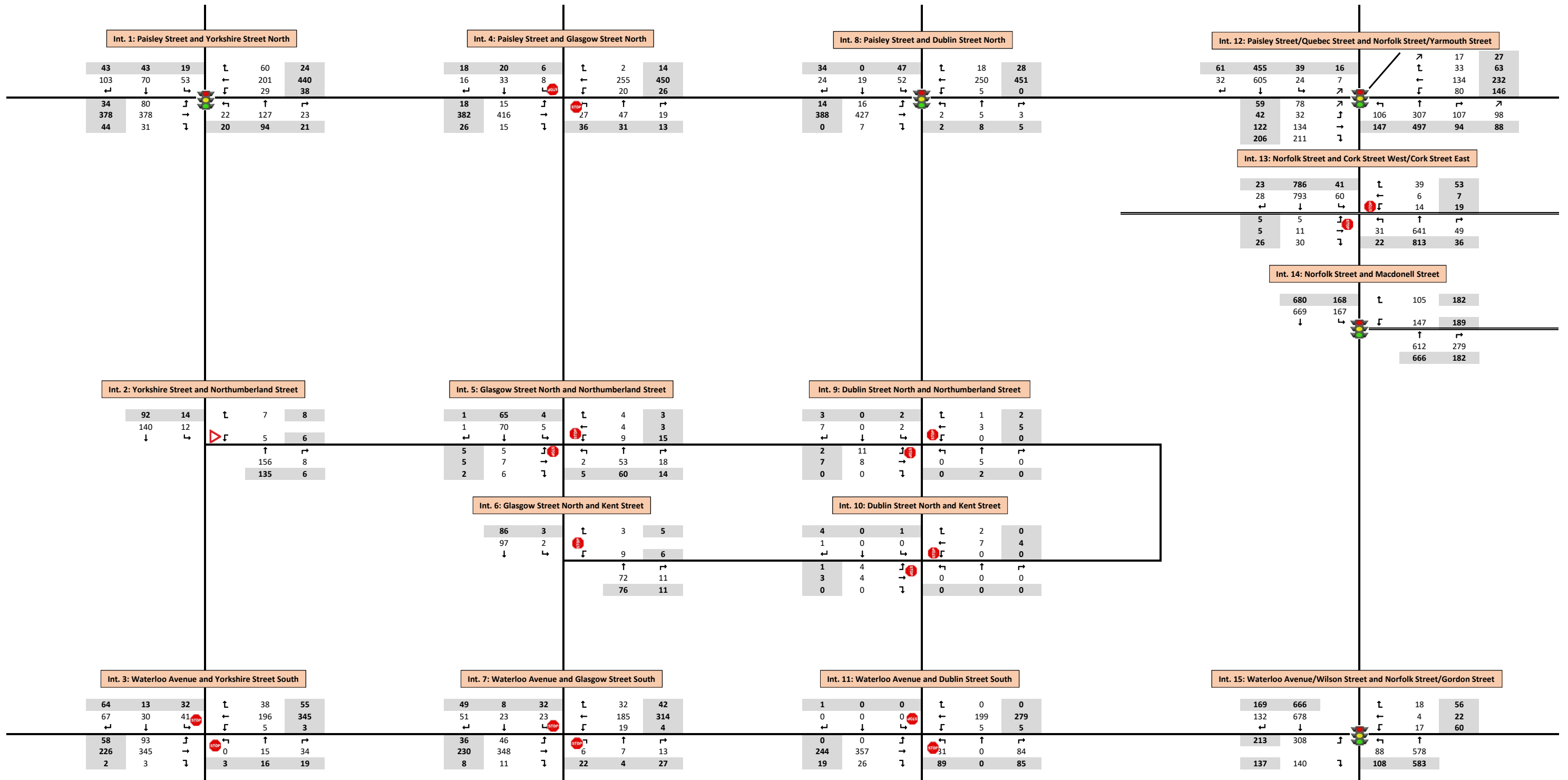
Sketch 10: 2026 Traffic volumes following conversion of Kent Street to one-way operation



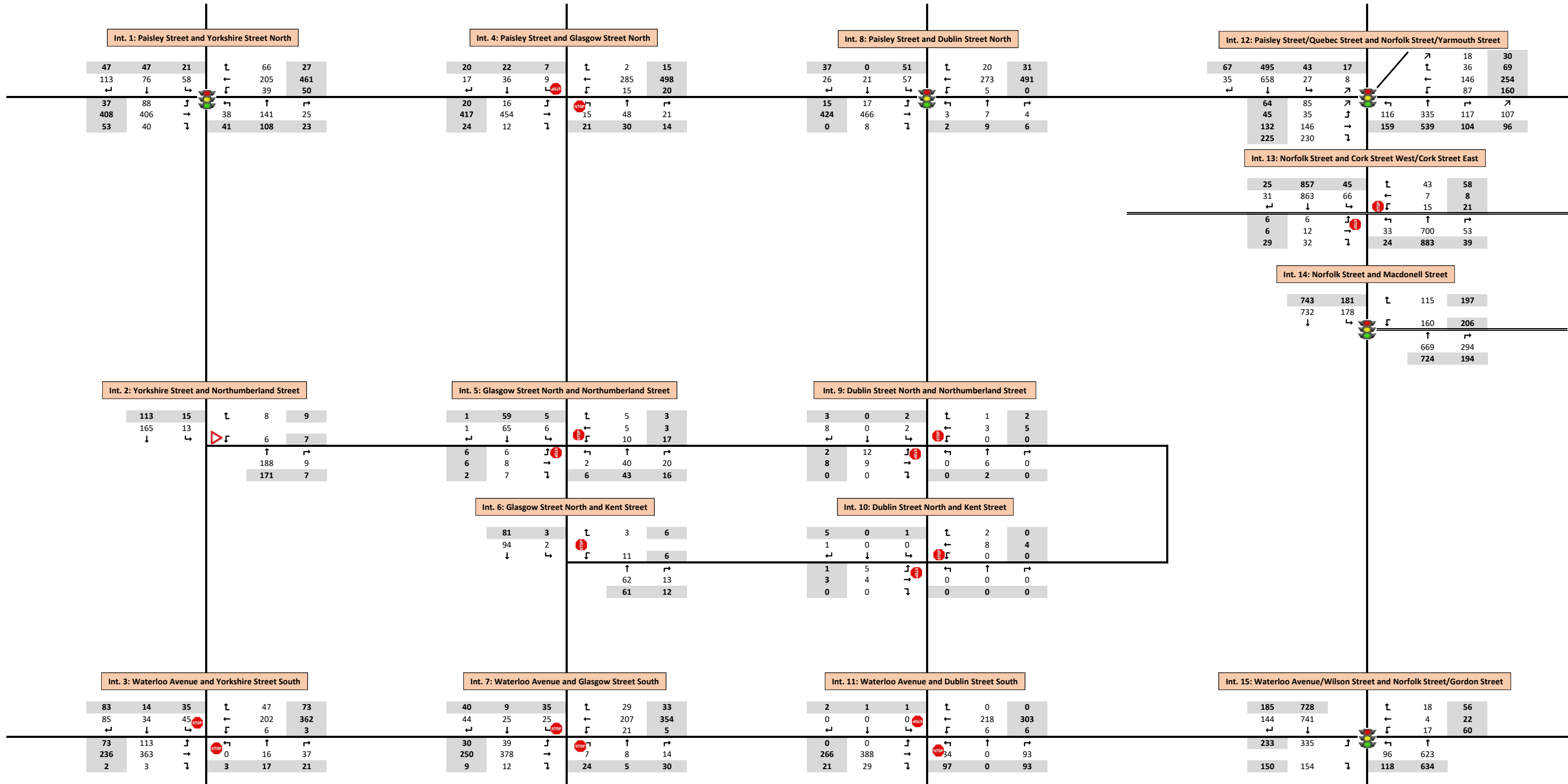
Sketch 11: 2031 Traffic volumes following conversion of Kent Street to one-way operation



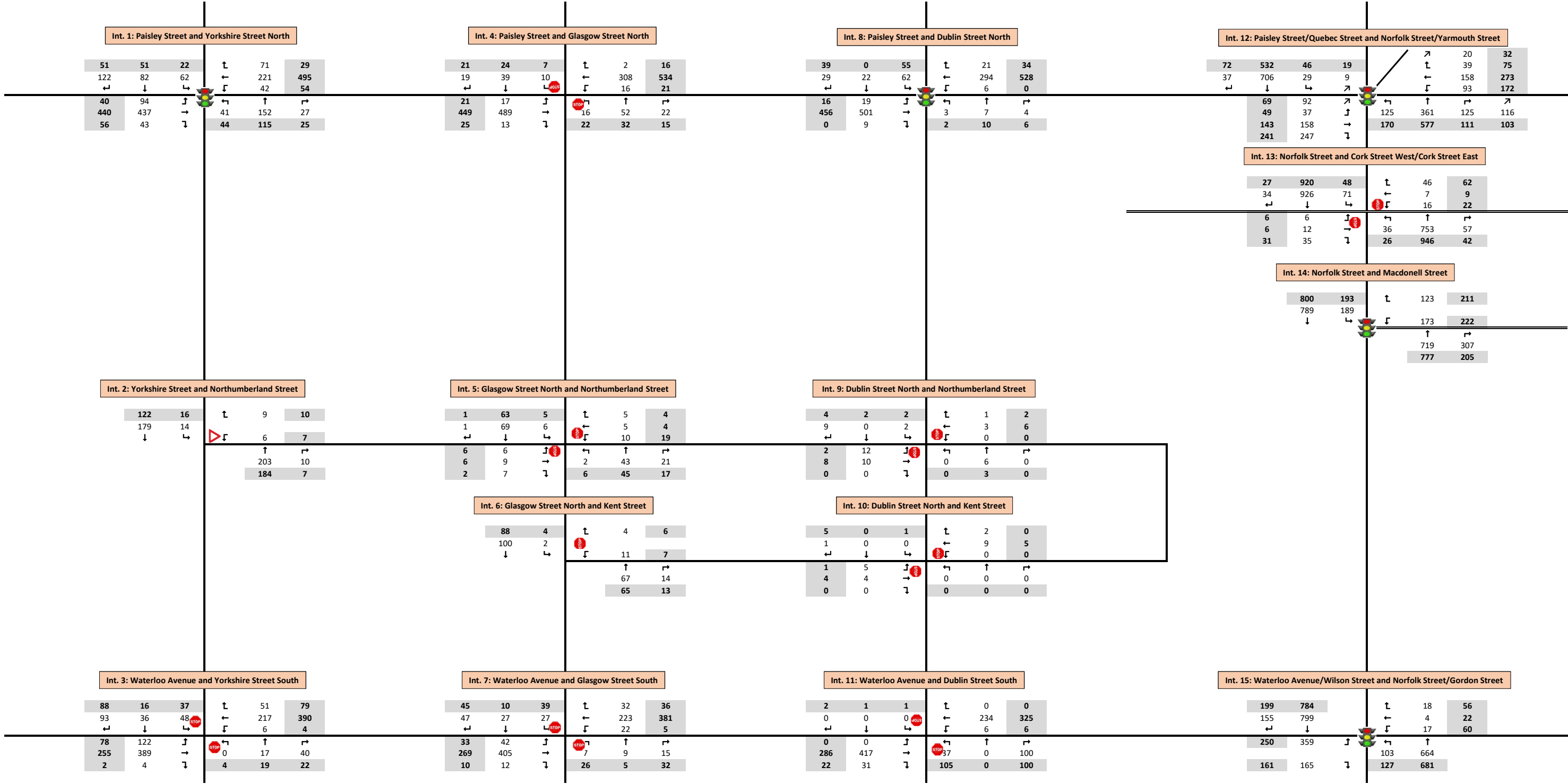
Sketch 12: 2021 Traffic volumes following closure of Dublin Street at rail crossing



Sketch 13: 2021 Traffic volumes following closure of Dublin Street at rail crossing (new distribution)



Sketch 14: 2026 Traffic volumes following closure of Dublin Street at rail crossing



Sketch 15: 2031 Traffic volumes following closure of Dublin Street at rail crossing

Appendix B: Traffic Volume Data



Turning Movement Count (1 . PAISLEY ST & YORKSHIRE ST N)

Start Time	N Approach YORKSHIRE ST N						E Approach PAISLEY ST						S Approach YORKSHIRE ST N						W Approach PAISLEY ST						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total			
07:00:00	11	2	4	0	0	17	4	22	1	0	1	27	7	0	1	0	0	8	1	33	7	0	0	41	93		
07:15:00	6	2	2	0	0	10	3	27	0	0	1	30	2	3	0	0	1	5	2	54	3	0	1	59	104		
07:30:00	3	5	2	0	4	10	4	38	3	0	1	45	2	4	3	0	0	9	1	56	3	0	3	60	124		
07:45:00	13	5	3	0	2	21	9	46	3	0	1	58	6	7	2	0	2	15	1	62	9	0	1	72	166	487	
08:00:00	10	4	3	0	6	17	3	51	3	0	2	57	7	11	1	0	2	19	6	61	10	0	19	77	170	564	
08:15:00	21	12	7	0	10	40	12	59	1	0	6	72	2	22	4	0	6	28	4	90	22	0	32	116	256	716	
08:30:00	26	18	21	0	17	65	16	48	4	0	5	68	5	25	5	0	13	35	5	78	22	0	30	105	273	865	
08:45:00	41	21	18	0	25	80	23	49	1	0	7	73	8	22	3	0	16	33	8	118	23	0	98	149	335	1034	
09:00:00	10	15	4	0	4	29	6	40	5	0	1	51	7	10	0	0	8	17	2	74	9	0	15	85	182	1046	
09:15:00	9	3	2	0	1	14	4	43	0	0	1	47	7	5	2	0	0	14	2	52	6	0	3	60	135	925	
09:30:00	9	6	1	0	1	16	3	45	2	0	0	50	1	7	0	0	2	8	3	54	4	0	2	61	135	787	
09:45:00	3	4	1	0	2	8	3	46	3	0	2	52	5	6	3	0	1	14	5	64	4	0	3	73	147	599	
BREAK																											
11:00:00	2	6	5	0	2	13	4	69	2	0	1	75	5	2	3	0	1	10	0	43	0	0	3	43	141		
11:15:00	5	14	3	0	3	22	9	57	1	0	1	67	4	11	1	0	2	16	5	65	5	0	34	75	180		
11:30:00	10	5	0	0	27	15	6	64	0	0	11	70	3	2	5	0	2	10	4	70	8	0	21	82	177		
11:45:00	3	14	3	0	10	20	3	55	4	0	5	62	1	3	3	0	0	7	4	74	8	0	7	86	175	673	
12:00:00	11	6	8	0	6	25	13	81	0	0	0	94	3	5	2	0	6	10	2	72	4	0	8	78	207	739	
12:15:00	6	6	3	0	9	15	5	70	5	0	1	80	0	10	4	0	7	14	5	77	4	0	36	86	195	754	
12:30:00	8	8	7	0	12	23	5	69	3	0	4	77	1	8	1	0	7	10	3	69	13	0	20	85	195	772	
12:45:00	3	6	3	0	3	12	4	60	1	0	1	65	5	7	0	0	1	12	6	80	6	0	1	92	181	778	
BREAK																											
16:00:00	11	11	3	0	0	25	2	103	3	0	4	108	4	8	1	0	3	13	7	72	13	0	3	92	238		
16:15:00	11	5	5	0	6	21	5	96	3	0	1	104	9	9	6	0	5	24	2	81	6	0	4	89	238		
16:30:00	10	12	4	0	7	26	4	122	8	0	1	134	5	6	4	0	1	15	7	82	6	0	6	95	270		
16:45:00	10	5	3	0	5	18	7	101	4	0	1	112	5	13	3	0	3	21	6	88	6	0	2	100	251	997	
17:00:00	14	14	2	0	6	30	7	103	4	0	0	114	5	10	5	0	1	20	6	89	12	0	8	107	271	1030	
17:15:00	7	10	9	0	0	26	5	76	3	0	0	84	5	8	5	0	3	18	13	104	8	0	2	125	253	1045	
17:30:00	7	8	2	0	2	17	2	83	6	0	2	91	10	11	3	0	2	24	1	91	6	0	3	98	230	1005	
17:45:00	8	5	4	0	4	17	6	63	2	0	0	71	6	3	1	0	1	10	5	74	11	0	2	90	188	942	
18:00:00	1	5	3	0	4	9	4	69	4	0	2	77	2	3	3	0	5	8	8	93	5	0	2	106	200	871	



18:15:00	11	3	3	0	2	17	6	74	2	0	3	82	9	3	7	0	2	19	5	68	2	0	5	75	193	811
18:30:00	3	0	3	0	5	6	2	77	4	0	3	83	1	3	2	0	1	6	0	67	11	0	8	78	173	754
18:45:00	6	6	1	0	0	13	4	57	1	0	0	62	4	6	1	0	3	11	2	75	5	0	1	82	168	734
Grand Total	309	246	142	0	185	697	193	2063	86	0	69	2342	146	253	84	0	107	483	131	2330	261	0	383	2722	6244	-
Approach%	44.3%	35.3%	20.4%	0%	-	8.2%	88.1%	3.7%	0%	-	30.2%	52.4%	17.4%	0%	-	4.8%	85.6%	9.6%	0%	-	-	-	-	-	-	
Totals %	4.9%	3.9%	2.3%	0%	11.2%	3.1%	33%	1.4%	0%	37.5%	2.3%	4.1%	1.3%	0%	7.7%	2.1%	37.3%	4.2%	0%	43.6%	-	-	-	-	-	
Heavy	7	6	3	0	-	2	47	2	0	-	2	2	2	0	-	7	69	3	0	-	-	-	-	-	-	
Heavy %	2.3%	2.4%	2.1%	0%	-	1%	2.3%	2.3%	0%	-	1.4%	0.8%	2.4%	0%	-	5.3%	3%	1.1%	0%	-	-	-	-	-	-	
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Peak Hour: 08:15 AM - 09:15 AM Weather:

Start Time	N Approach YORKSHIRE ST N						E Approach PAISLEY ST						S Approach YORKSHIRE ST N						W Approach PAISLEY ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:15:00	21	12	7	0	10	40	12	59	1	0	6	72	2	22	4	0	6	28	4	90	22	0	32	116	256
08:30:00	26	18	21	0	17	65	16	48	4	0	5	68	5	25	5	0	13	35	5	78	22	0	30	105	273
08:45:00	41	21	18	0	25	80	23	49	1	0	7	73	8	22	3	0	16	33	8	118	23	0	98	149	335
09:00:00	10	15	4	0	4	29	6	40	5	0	1	51	7	10	0	0	8	17	2	74	9	0	15	85	182
Grand Total	98	66	50	0	56	214	57	196	11	0	19	264	22	79	12	0	43	113	19	360	76	0	175	455	1046
Approach%	45.8%	30.8%	23.4%	0%	-	-	21.6%	74.2%	4.2%	0%	-	-	19.5%	69.9%	10.6%	0%	-	-	4.2%	79.1%	16.7%	0%	-	-	-
Totals %	9.4%	6.3%	4.8%	0%	20.5%	-	5.4%	18.7%	1.1%	0%	-	25.2%	2.1%	7.6%	1.1%	0%	-	10.8%	1.8%	34.4%	7.3%	0%	-	43.5%	-
PHF	0.6	0.79	0.6	0	0.67	-	0.62	0.83	0.55	0	-	0.9	0.69	0.79	0.6	0	-	0.81	0.59	0.76	0.83	0	-	0.76	-
Heavy	3	2	1	0	-	6	0	8	0	0	-	8	1	1	0	0	-	2	1	11	0	0	-	12	-
Heavy %	3.1%	3%	2%	0%	2.8%	-	0%	4.1%	0%	0%	-	3%	4.5%	1.3%	0%	0%	-	1.8%	5.3%	3.1%	0%	0%	-	2.6%	-
Lights	95	63	49	0	-	207	56	187	11	0	-	254	21	76	12	0	-	109	18	346	76	0	-	440	-
Lights %	96.9%	95.5%	98%	0%	96.7%	-	98.2%	95.4%	100%	0%	-	96.2%	95.5%	96.2%	100%	0%	-	96.5%	94.7%	96.1%	100%	0%	-	96.7%	-
Single-Unit Trucks	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	-
Single-Unit Trucks %	0%	0%	0%	0%	0%	0%	0%	0.5%	0%	0%	0%	0.4%	0%	1.3%	0%	0%	0%	0.9%	0%	0%	0%	0%	0%	0%	-
Buses	3	2	1	0	0	6	0	7	0	0	0	7	1	0	0	0	0	1	1	11	0	0	0	12	-
Buses %	3.1%	3%	2%	0%	2.8%	-	0%	3.6%	0%	0%	0%	2.7%	4.5%	0%	0%	0%	0%	0.9%	5.3%	3.1%	0%	0%	0%	2.6%	-
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Articulated Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Bicycles on Road	0	1	0	0	0	1	1	1	0	0	0	2	0	2	0	0	0	2	0	3	0	0	0	3	-
Bicycles on Road %	0%	1.5%	0%	0%	0.5%	0.5%	1.8%	0.5%	0%	0%	0%	0.8%	0%	2.5%	0%	0%	0%	1.8%	0%	0.8%	0%	0%	0%	0.7%	-
Pedestrians	-	-	-	-	56	-	-	-	-	-	19	-	-	-	-	-	43	-	-	-	-	-	175	-	-
Pedestrians%	-	-	-	-	19.1%	-	-	-	-	-	6.5%	-	-	-	-	-	14.7%	-	-	-	-	-	59.7%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



Peak Hour: 12:00 PM - 01:00 PM Weather:

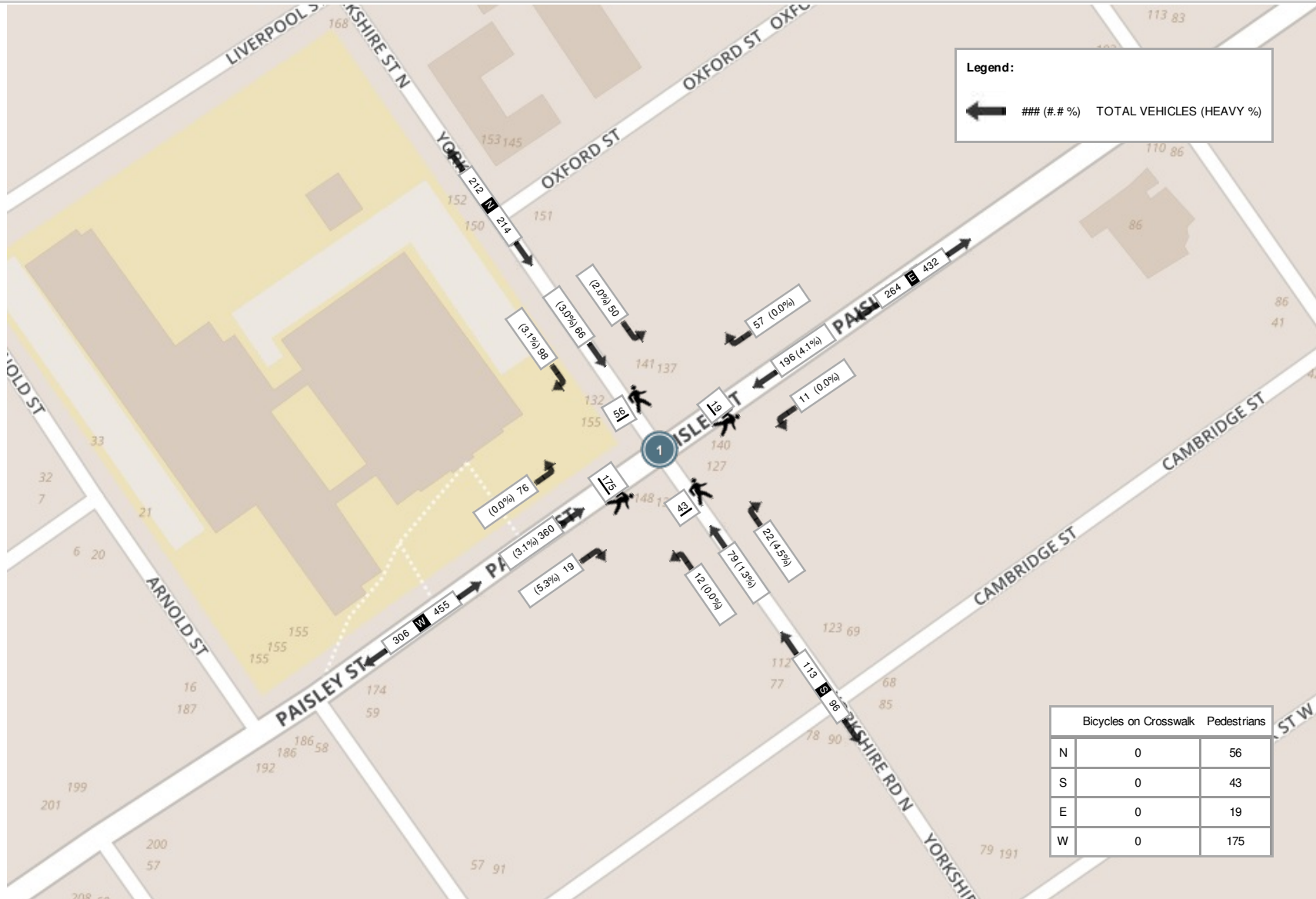
Start Time	N Approach YORKSHIRE ST N						E Approach PAISLEY ST						S Approach YORKSHIRE ST N						W Approach PAISLEY ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
12:00:00	11	6	8	0	6	25	13	81	0	0	0	94	3	5	2	0	6	10	2	72	4	0	8	78	207
12:15:00	6	6	3	0	9	15	5	70	5	0	1	80	0	10	4	0	7	14	5	77	4	0	36	86	195
12:30:00	8	8	7	0	12	23	5	69	3	0	4	77	1	8	1	0	7	10	3	69	13	0	20	85	195
12:45:00	3	6	3	0	3	12	4	60	1	0	1	65	5	7	0	0	1	12	6	80	6	0	1	92	181
Grand Total	28	26	21	0	30	75	27	280	9	0	6	316	9	30	7	0	21	46	16	298	27	0	65	341	778
Approach%	37.3%	34.7%	28%	0%	-	-	8.5%	88.6%	2.8%	0%	-	-	19.6%	65.2%	15.2%	0%	-	-	4.7%	87.4%	7.9%	0%	-	-	-
Totals %	3.6%	3.3%	2.7%	0%	9.6%	9.6%	3.5%	36%	1.2%	0%	40.6%	40.6%	1.2%	3.9%	0.9%	0%	5.9%	5.9%	2.1%	38.3%	3.5%	0%	43.8%	43.8%	-
PHF	0.64	0.81	0.66	0	0.75	0.75	0.52	0.86	0.45	0	0.84	0.84	0.45	0.75	0.44	0	0.82	0.82	0.67	0.93	0.52	0	0.93	0.93	-
Heavy	1	0	0	0	1	1	0	3	0	0	3	3	0	0	0	0	0	0	0	11	1	0	12	12	-
Heavy %	3.6%	0%	0%	0%	1.3%	1.3%	0%	1.1%	0%	0%	0.9%	0.9%	0%	0%	0%	0%	0%	0%	0%	3.7%	3.7%	0%	3.5%	3.5%	-
Lights	27	24	21	0	72	72	26	272	9	0	307	307	9	28	7	0	44	44	16	286	26	0	328	328	-
Lights %	96.4%	92.3%	100%	0%	96%	96%	96.3%	97.1%	100%	0%	97.2%	97.2%	100%	93.3%	100%	0%	95.7%	95.7%	100%	96%	96.3%	0%	96.2%	96.2%	-
Single-Unit Trucks	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	3	0	0	3	3	-
Single-Unit Trucks %	0%	0%	0%	0%	0%	0%	0%	0.4%	0%	0%	0.3%	0.3%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0.9%	0.9%	-
Buses	1	0	0	0	1	1	0	2	0	0	2	2	0	0	0	0	0	0	0	8	1	0	9	9	-
Buses %	3.6%	0%	0%	0%	1.3%	1.3%	0%	0.7%	0%	0%	0.6%	0.6%	0%	0%	0%	0%	0%	0%	0%	2.7%	3.7%	0%	2.6%	2.6%	-
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Articulated Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Bicycles on Road	0	2	0	0	2	2	1	5	0	0	6	6	0	2	0	0	2	2	0	1	0	0	1	1	-
Bicycles on Road %	0%	7.7%	0%	0%	2.7%	2.7%	3.7%	1.8%	0%	0%	1.9%	1.9%	0%	6.7%	0%	0%	4.3%	4.3%	0%	0.3%	0%	0%	0.3%	0.3%	-
Pedestrians	-	-	-	-	30	-	-	-	-	-	6	-	-	-	-	-	21	-	-	-	-	-	65	-	-
Pedestrians%	-	-	-	-	24.6%	-	-	-	-	-	4.9%	-	-	-	-	-	17.2%	-	-	-	-	-	53.3%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



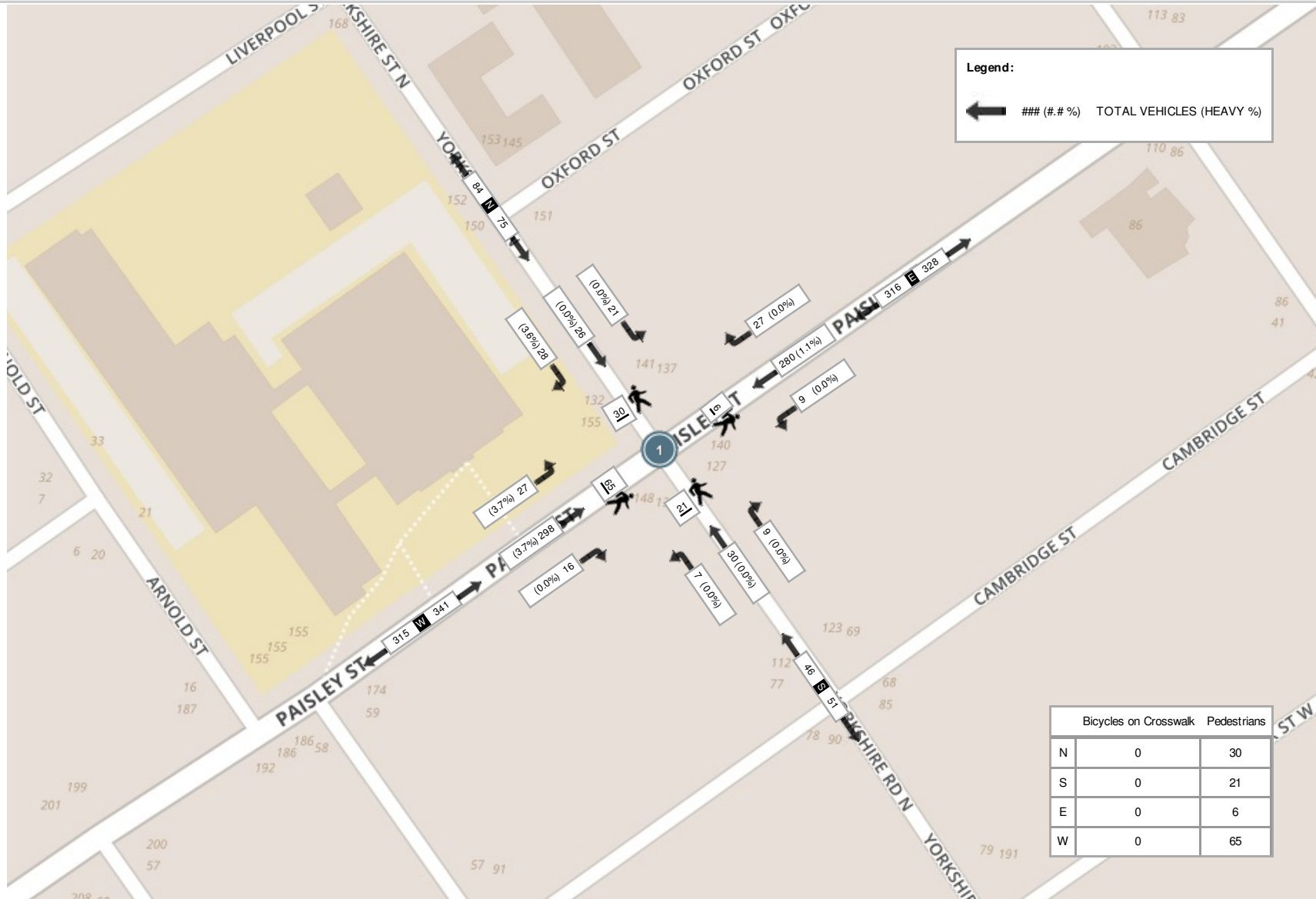
Peak Hour: 04:30 PM - 05:30 PM Weather:

Start Time	N Approach YORKSHIRE ST N						E Approach PAISLEY ST						S Approach YORKSHIRE ST N						W Approach PAISLEY ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	10	12	4	0	7	26	4	122	8	0	1	134	5	6	4	0	1	15	7	82	6	0	6	95	270
16:45:00	10	5	3	0	5	18	7	101	4	0	1	112	5	13	3	0	3	21	6	88	6	0	2	100	251
17:00:00	14	14	2	0	6	30	7	103	4	0	0	114	5	10	5	0	1	20	6	89	12	0	8	107	271
17:15:00	7	10	9	0	0	26	5	76	3	0	0	84	5	8	5	0	3	18	13	104	8	0	2	125	253
Grand Total	41	41	18	0	18	100	23	402	19	0	2	444	20	37	17	0	8	74	32	363	32	0	18	427	1045
Approach%	41%	41%	18%	0%	-	-	5.2%	90.5%	4.3%	0%	-	-	27%	50%	23%	0%	-	-	7.5%	85%	7.5%	0%	-	-	-
Totals %	3.9%	3.9%	1.7%	0%	-	9.6%	2.2%	38.5%	1.8%	0%	-	42.5%	1.9%	3.5%	1.6%	0%	-	7.1%	3.1%	34.7%	3.1%	0%	-	40.9%	-
PHF	0.73	0.73	0.5	0	-	0.83	0.82	0.82	0.59	0	-	0.83	1	0.71	0.85	0	-	0.88	0.62	0.87	0.67	0	-	0.85	-
Heavy	0	0	0	0	-	0	0	4	0	0	-	4	0	0	0	0	-	0	1	8	0	0	-	9	-
Heavy %	0%	0%	0%	0%	-	0%	0%	1%	0%	0%	-	0.9%	0%	0%	0%	0%	-	0%	3.1%	2.2%	0%	0%	-	2.1%	-
Lights	41	40	18	0	-	99	23	396	19	0	-	438	19	36	17	0	-	72	30	353	32	0	-	415	-
Lights %	100%	97.6%	100%	0%	-	99%	100%	98.5%	100%	0%	-	98.6%	95%	97.3%	100%	0%	-	97.3%	93.8%	97.2%	100%	0%	-	97.2%	-
Single-Unit Trucks	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1	0	0	0	-	1	-
Single-Unit Trucks %	0%	0%	0%	0%	-	0%	0%	0.2%	0%	0%	-	0.2%	0%	0%	0%	0%	-	0%	3.1%	0%	0%	0%	-	0.2%	-
Buses	0	0	0	0	-	0	0	3	0	0	-	3	0	0	0	0	-	0	0	8	0	0	-	8	-
Buses %	0%	0%	0%	0%	-	0%	0%	0.7%	0%	0%	-	0.7%	0%	0%	0%	0%	-	0%	0%	2.2%	0%	0%	-	1.9%	-
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	-
Articulated Trucks %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	-
Bicycles on Road	0	1	0	0	-	1	0	2	0	0	-	2	1	1	0	0	-	2	1	2	0	0	-	3	-
Bicycles on Road %	0%	2.4%	0%	0%	-	1%	0%	0.5%	0%	0%	-	0.5%	5%	2.7%	0%	0%	-	2.7%	3.1%	0.6%	0%	0%	-	0.7%	-
Pedestrians	-	-	-	-	18	-	-	-	-	2	-	-	-	-	-	8	-	-	-	-	-	-	18	-	-
Pedestrians%	-	-	-	-	39.1%	-	-	-	-	4.3%	-	-	-	-	-	17.4%	-	-	-	-	-	-	39.1%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-

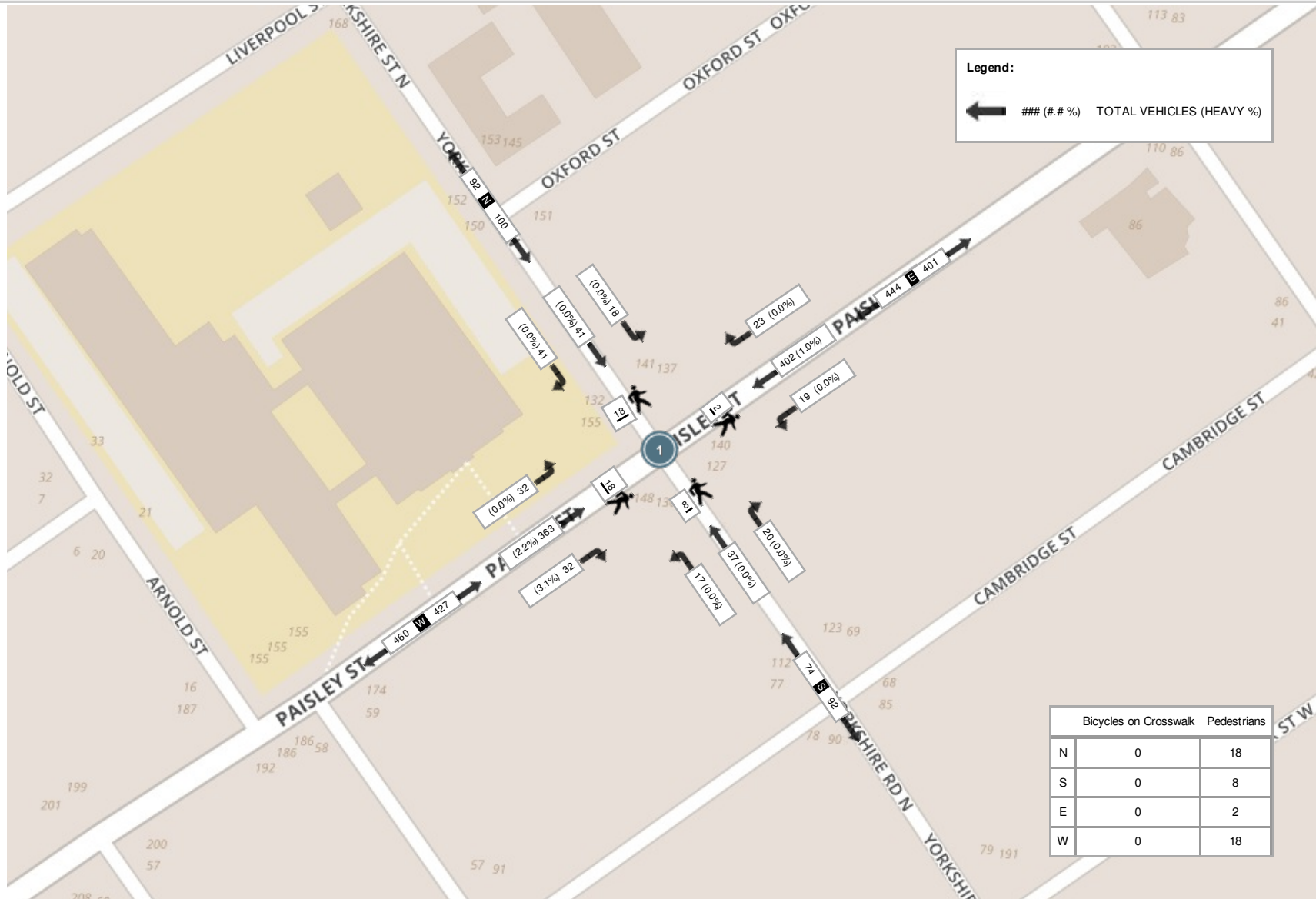
Peak Hour: 08:15 AM - 09:15 AM Weather:



Peak Hour: 12:00 PM - 01:00 PM Weather:



Peak Hour: 04:30 PM - 05:30 PM Weather:





Turning Movement Count (2 . YORKSHIRE STREET N & NORTHUMBERLAND ST)

Start Time	N Approach YORKSHIRE STREET N					E Approach NORTHUMBERLAND ST					S Approach YORKSHIRE STREET N					Int. Total (15 min)	Int. Total (1 hr)
	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	U-Turn S:S	Peds S:	Approach Total		
07:00:00	5	0	0	0	5	0	0	0	0	0	0	4	0	0	4	9	
07:15:00	7	1	0	0	8	0	0	0	0	0	0	6	0	0	6	14	
07:30:00	13	2	0	0	15	0	1	0	1	1	0	5	0	0	5	21	
07:45:00	11	2	0	1	13	1	1	0	2	2	2	9	0	0	11	26	70
08:00:00	16	1	0	3	17	0	0	0	6	0	0	14	0	2	14	31	92
08:15:00	17	2	0	0	19	2	1	0	3	3	2	25	0	3	27	49	127
08:30:00	30	4	0	0	34	1	1	0	5	2	3	33	0	0	36	72	178
08:45:00	40	3	0	0	43	2	2	0	1	4	2	27	0	0	29	76	228
09:00:00	19	2	0	0	21	2	1	0	1	3	1	13	0	0	14	38	235
09:15:00	8	0	0	0	8	0	1	0	2	1	2	6	0	0	8	17	203
09:30:00	10	0	0	0	10	1	2	0	0	3	2	5	0	0	7	20	151
09:45:00	13	3	0	3	16	2	0	0	3	2	2	9	1	0	12	30	105
BREAK																	
11:00:00	4	2	0	0	6	1	0	0	1	1	1	7	0	0	8	15	
11:15:00	21	0	0	0	21	2	1	0	0	3	1	8	0	0	9	33	
11:30:00	8	1	0	0	9	2	1	0	1	3	0	6	0	0	6	18	
11:45:00	18	2	0	0	20	1	1	0	1	2	1	8	0	0	9	31	97
12:00:00	9	2	0	0	11	0	0	0	0	0	0	8	0	0	8	19	101
12:15:00	14	4	0	0	18	0	0	0	0	0	1	12	0	0	13	31	99
12:30:00	9	2	0	1	11	0	0	0	1	0	1	14	0	0	15	26	107
12:45:00	23	3	0	1	26	1	1	0	0	2	1	8	0	0	9	37	113
BREAK																	
16:00:00	17	1	0	2	18	1	1	0	2	2	1	11	0	0	12	32	
16:15:00	14	0	0	2	14	1	2	0	2	3	2	14	0	0	16	33	



16:30:00	28	1	0	0	29	2	1	0	3	3	0	11	0	0	11	43	
16:45:00	9	2	0	1	11	1	1	0	2	2	1	19	0	0	20	33	141
17:00:00	19	2	0	0	21	2	1	0	1	3	2	18	0	0	20	44	153
17:15:00	18	7	0	0	25	2	1	0	0	3	1	15	0	0	16	44	164
17:30:00	15	2	0	2	17	3	3	0	2	6	2	22	0	0	24	47	168
17:45:00	7	1	0	0	8	0	0	0	1	0	1	10	0	0	11	19	154
18:00:00	15	2	0	5	17	0	1	0	5	1	0	9	0	0	9	27	137
18:15:00	13	2	0	1	15	0	0	0	9	0	0	10	0	1	10	25	118
18:30:00	9	0	0	1	9	0	1	0	3	1	0	6	0	1	6	16	87
18:45:00	9	1	0	1	10	0	2	0	2	2	0	10	0	0	10	22	90
Grand Total	468	57	0	24	525	30	28	0	60	58	32	382	1	7	415	998	-
Approach%	89.1%	10.9%	0%		-	51.7%	48.3%	0%		-	7.7%	92%	0.2%		-	-	-
Totals %	46.9%	5.7%	0%		52.6%	3%	2.8%	0%		5.8%	3.2%	38.3%	0.1%		41.6%	-	-
Heavy	10	4	0		-	2	0	0		-	1	5	0		-	-	-
Heavy %	2.1%	7%	0%		-	6.7%	0%	0%		-	3.1%	1.3%	0%		-	-	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	-	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	-	-



Peak Hour: 08:15 AM - 09:15 AM Weather:

Start Time	N Approach YORKSHIRE STREET N					E Approach NORTHUMBERLAND ST					S Approach YORKSHIRE STREET N					Int. Total (15 min)
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	
08:15:00	17	2	0	0	19	2	1	0	3	3	2	25	0	3	27	49
08:30:00	30	4	0	0	34	1	1	0	5	2	3	33	0	0	36	72
08:45:00	40	3	0	0	43	2	2	0	1	4	2	27	0	0	29	76
09:00:00	19	2	0	0	21	2	1	0	1	3	1	13	0	0	14	38
Grand Total	106	11	0	0	117	7	5	0	10	12	8	98	0	3	106	235
Approach%	90.6%	9.4%	0%		-	58.3%	41.7%	0%		-	7.5%	92.5%	0%		-	-
Totals %	45.1%	4.7%	0%		49.8%	3%	2.1%	0%		5.1%	3.4%	41.7%	0%		45.1%	-
PHF	0.66	0.69	0		0.68	0.88	0.63	0		0.75	0.67	0.74	0		0.74	-
Heavy	3	1	0		4	1	0	0		1	1	2	0		3	-
Heavy %	2.8%	9.1%	0%		3.4%	14.3%	0%	0%		8.3%	12.5%	2%	0%		2.8%	-
Lights	103	10	0		113	5	5	0		10	7	96	0		103	-
Lights %	97.2%	90.9%	0%		96.6%	71.4%	100%	0%		83.3%	87.5%	98%	0%		97.2%	-
Single-Unit Trucks	2	0	0		2	0	0	0		0	1	1	0		2	-
Single-Unit Trucks %	1.9%	0%	0%		1.7%	0%	0%	0%		0%	12.5%	1%	0%		1.9%	-
Buses	1	1	0		2	0	0	0		0	0	1	0		1	-
Buses %	0.9%	9.1%	0%		1.7%	0%	0%	0%		0%	0%	1%	0%		0.9%	-
Articulated Trucks	0	0	0		0	1	0	0		1	0	0	0		0	-
Articulated Trucks %	0%	0%	0%		0%	14.3%	0%	0%		8.3%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0		0	1	0	0		1	0	0	0		0	-
Bicycles on Road %	0%	0%	0%		0%	14.3%	0%	0%		8.3%	0%	0%	0%		0%	-
Pedestrians	-	-	-	0	-	-	-	-	9	-	-	-	-	3	-	-
Pedestrians%	-	-	-	0%	-	-	-	-	69.2%	-	-	-	-	23.1%	-	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%	-	-	-	-	7.7%	-	-	-	-	0%	-	-



Peak Hour: 12:00 PM - 01:00 PM Weather:

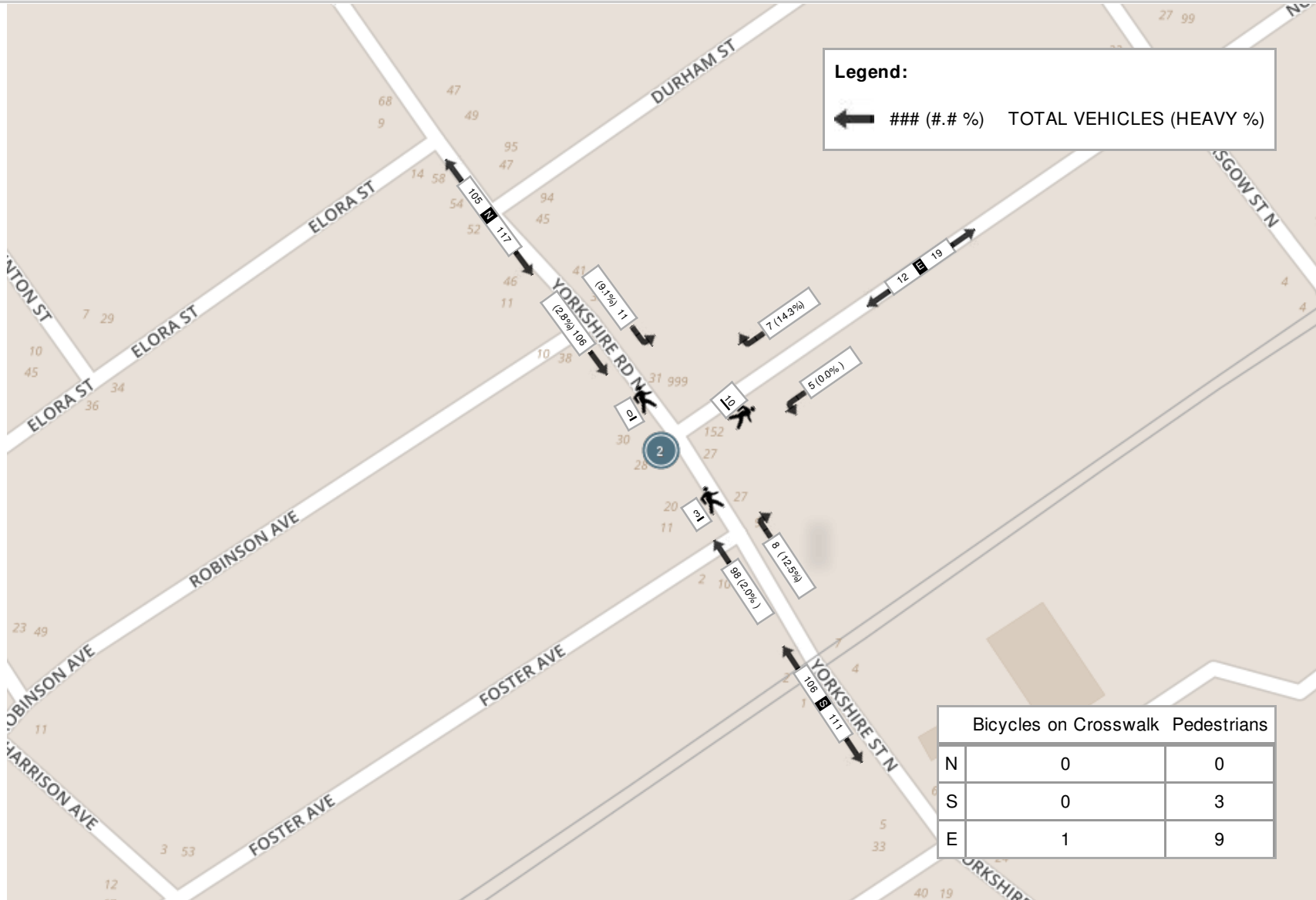
Start Time	N Approach YORKSHIRE STREET N					E Approach NORTHUMBERLAND ST					S Approach YORKSHIRE STREET N					Int. Total (15 min)
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	
12:00:00	9	2	0	0	11	0	0	0	0	0	0	8	0	0	8	19
12:15:00	14	4	0	0	18	0	0	0	0	0	1	12	0	0	13	31
12:30:00	9	2	0	1	11	0	0	0	1	0	1	14	0	0	15	26
12:45:00	23	3	0	1	26	1	1	0	0	2	1	8	0	0	9	37
Grand Total	55	11	0	2	66	1	1	0	1	2	3	42	0	0	45	113
Approach%	83.3%	16.7%	0%		-	50%	50%	0%		-	6.7%	93.3%	0%		-	-
Totals %	48.7%	9.7%	0%		58.4%	0.9%	0.9%	0%		1.8%	2.7%	37.2%	0%		39.8%	-
PHF	0.6	0.69	0		0.63	0.25	0.25	0		0.25	0.75	0.75	0		0.75	-
Heavy	0	0	0		0	0	0	0		0	0	0	0		0	-
Heavy %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-
Lights	54	9	0		63	0	1	0		1	3	41	0		44	-
Lights %	98.2%	81.8%	0%		95.5%	0%	100%	0%		50%	100%	97.6%	0%		97.8%	-
Single-Unit Trucks	0	0	0		0	0	0	0		0	0	0	0		0	-
Single-Unit Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-
Buses	0	0	0		0	0	0	0		0	0	0	0		0	-
Buses %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-
Articulated Trucks	0	0	0		0	0	0	0		0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-
Bicycles on Road	1	2	0		3	1	0	0		1	0	1	0		1	-
Bicycles on Road %	1.8%	18.2%	0%		4.5%	100%	0%	0%		50%	0%	2.4%	0%		2.2%	-
Pedestrians	-	-	-	2	-	-	-	-	1	-	-	-	-	0	-	-
Pedestrians%	-	-	-	66.7%	-	-	-	-	33.3%	-	-	-	-	0%	-	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-



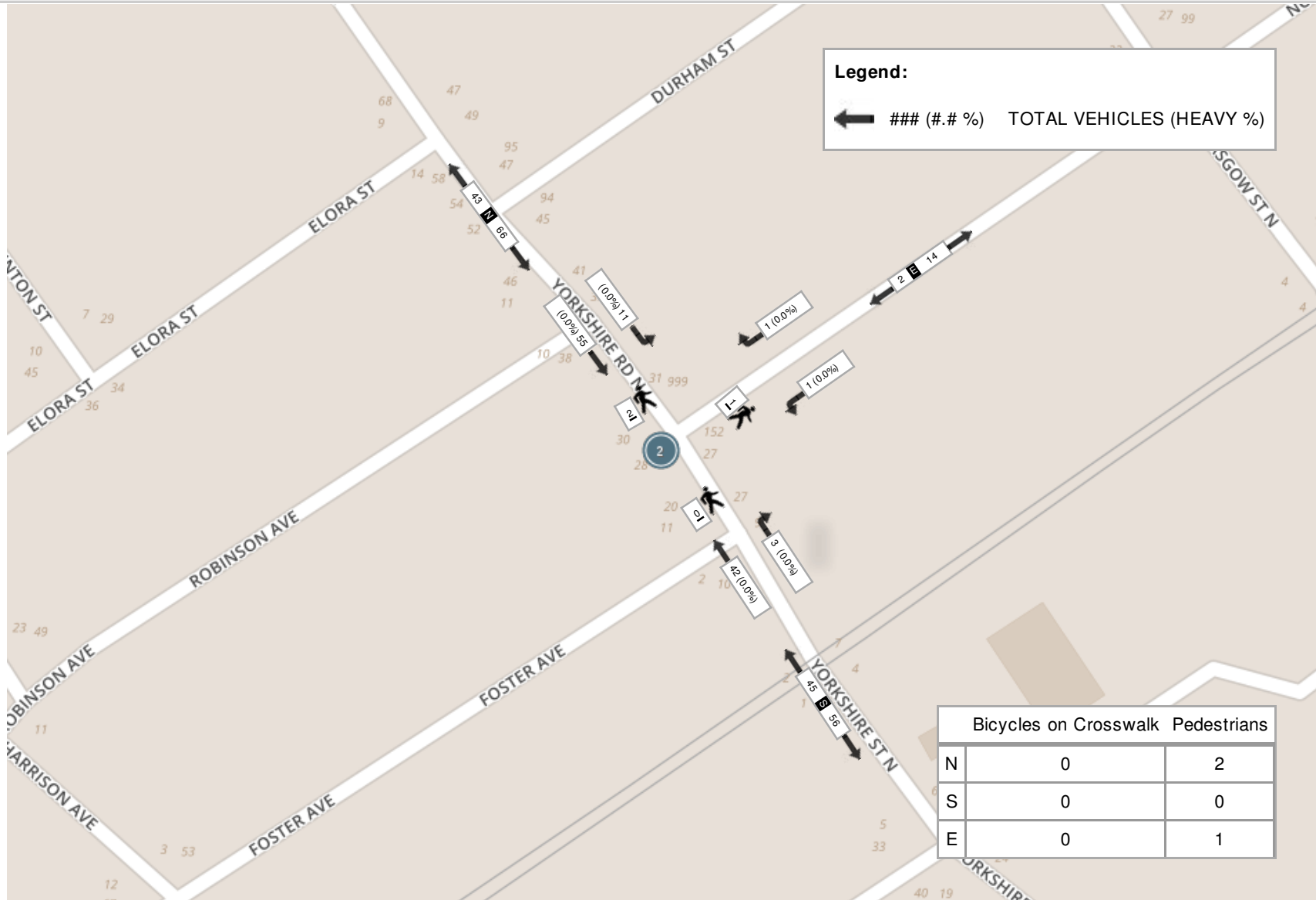
Peak Hour: 04:45 PM - 05:45 PM Weather:

Start Time	N Approach YORKSHIRE STREET N					E Approach NORTHUMBERLAND ST					S Approach YORKSHIRE STREET N					Int. Total (15 min)
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	
16:45:00	9	2	0	1	11	1	1	0	2	2	1	19	0	0	20	33
17:00:00	19	2	0	0	21	2	1	0	1	3	2	18	0	0	20	44
17:15:00	18	7	0	0	25	2	1	0	0	3	1	15	0	0	16	44
17:30:00	15	2	0	2	17	3	3	0	2	6	2	22	0	0	24	47
Grand Total	61	13	0	3	74	8	6	0	5	14	6	74	0	0	80	168
Approach%	82.4%	17.6%	0%		-	57.1%	42.9%	0%		-	7.5%	92.5%	0%		-	-
Totals %	36.3%	7.7%	0%		44%	4.8%	3.6%	0%		8.3%	3.6%	44%	0%		47.6%	-
PHF	0.8	0.46	0		0.74	0.67	0.5	0		0.58	0.75	0.84	0		0.83	-
Heavy	1	1	0		2	0	0	0		0	0	0	0		0	-
Heavy %	1.6%	7.7%	0%		2.7%	0%	0%	0%		0%	0%	0%	0%		0%	-
Lights	59	11	0		70	7	6	0		13	5	72	0		77	-
Lights %	96.7%	84.6%	0%		94.6%	87.5%	100%	0%		92.9%	83.3%	97.3%	0%		96.3%	-
Single-Unit Trucks	1	1	0		2	0	0	0		0	0	0	0		0	-
Single-Unit Trucks %	1.6%	7.7%	0%		2.7%	0%	0%	0%		0%	0%	0%	0%		0%	-
Buses	0	0	0		0	0	0	0		0	0	0	0		0	-
Buses %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-
Articulated Trucks	0	0	0		0	0	0	0		0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-
Bicycles on Road	1	1	0		2	1	0	0		1	1	2	0		3	-
Bicycles on Road %	1.6%	7.7%	0%		2.7%	12.5%	0%	0%		7.1%	16.7%	2.7%	0%		3.8%	-
Pedestrians	-	-	-	3	-	-	-	-	5	-	-	-	-	0	-	-
Pedestrians%	-	-	-	37.5%	-	-	-	-	62.5%	-	-	-	-	0%	-	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-

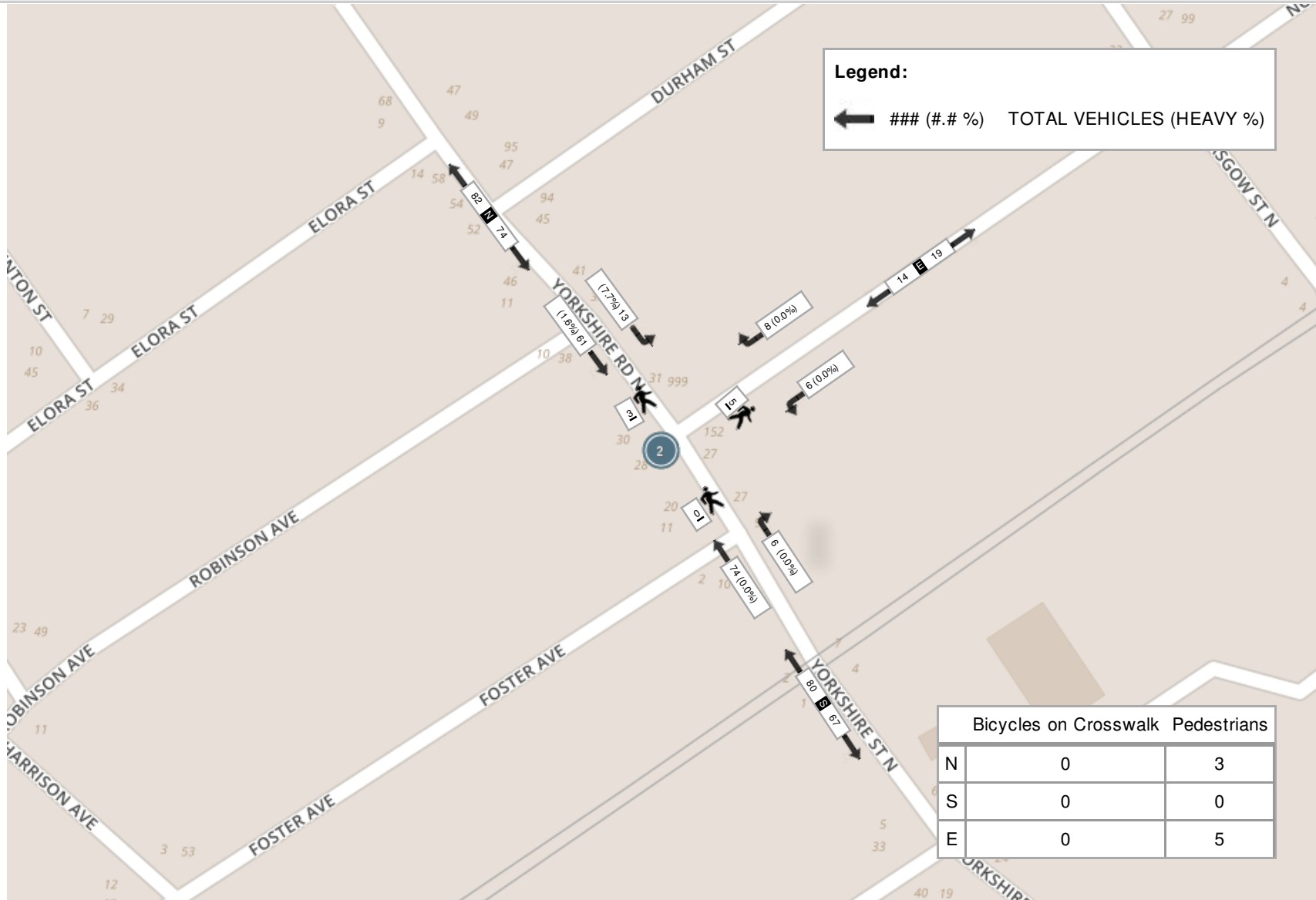
Peak Hour: 08:15 AM - 09:15 AM Weather:



Peak Hour: 12:00 PM - 01:00 PM Weather:



Peak Hour: 04:45 PM - 05:45 PM Weather:





Turning Movement Count (3 . WATERLOO AVE & YORKSHIRE ST S)

Start Time	N Approach YORKSHIRE STREET N						E Approach WATERLOO AVE						S Approach YORKSHIRE ST N						W Approach WATERLOO AVE						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total			
07:00:00	2	2	1	0	1	5	3	16	2	0	0	21	2	0	1	0	0	3	0	26	1	0	0	27	56		
07:15:00	3	2	2	0	2	7	4	11	1	0	0	16	1	1	0	0	2	2	0	24	0	0	0	24	49		
07:30:00	7	2	10	0	0	19	1	29	1	0	0	31	3	2	1	0	1	6	1	48	1	0	1	50	106		
07:45:00	5	1	7	0	1	13	1	31	0	0	1	32	2	2	1	0	4	5	0	48	3	0	3	51	101	312	
08:00:00	9	0	8	0	1	17	5	36	0	0	0	41	6	1	0	0	1	7	1	61	5	0	9	67	132	388	
08:15:00	9	0	8	0	2	17	6	39	0	0	1	45	5	3	0	0	1	8	2	74	18	0	11	94	164	503	
08:30:00	12	1	12	0	1	25	4	41	0	0	2	45	17	6	0	0	5	23	0	83	17	0	4	100	193	590	
08:45:00	27	4	11	0	4	42	5	58	4	0	2	67	7	4	0	0	2	11	1	108	14	0	4	123	243	732	
09:00:00	13	0	8	0	0	21	4	47	1	0	1	52	3	1	0	0	1	4	0	73	6	0	25	79	156	756	
09:15:00	4	2	5	0	1	11	6	45	1	0	0	52	6	0	2	0	2	8	1	65	1	0	0	67	138	730	
09:30:00	3	0	7	0	0	10	2	34	0	0	1	36	2	1	0	0	4	3	0	47	3	0	1	50	99	636	
09:45:00	3	1	6	0	1	10	3	33	0	0	0	36	4	2	1	0	1	7	0	58	3	0	2	61	114	507	
BREAK																											
11:00:00	1	0	6	0	0	7	3	43	1	0	0	47	3	0	1	0	2	4	0	36	2	0	0	38	96		
11:15:00	12	2	9	0	1	23	1	43	2	0	0	46	2	2	0	0	0	4	1	20	3	0	28	24	97		
11:30:00	7	0	3	0	3	10	2	38	0	0	1	40	2	0	1	0	4	3	0	41	4	0	0	45	98		
11:45:00	12	1	7	0	1	20	3	49	1	0	2	53	3	1	1	0	6	5	0	46	4	0	2	50	128	419	
12:00:00	7	0	4	0	0	11	4	53	2	0	0	59	0	2	0	0	3	2	0	48	2	0	0	50	122	445	
12:15:00	6	2	5	0	0	13	5	39	1	0	0	45	2	2	0	0	3	4	1	36	7	0	0	44	106	454	
12:30:00	6	0	6	0	1	12	7	41	0	0	2	48	4	3	0	0	0	7	0	49	5	0	25	54	121	477	
12:45:00	6	1	11	0	1	18	5	50	0	0	0	55	2	0	0	0	0	2	0	55	4	0	0	59	134	483	
BREAK																											
16:00:00	8	4	4	0	1	16	6	63	1	0	0	70	3	2	0	0	6	5	0	56	4	0	3	60	151		
16:15:00	9	0	9	0	4	18	5	69	0	0	0	74	3	2	1	0	6	6	2	71	6	0	1	79	177		
16:30:00	15	3	8	0	10	26	7	79	1	0	0	87	4	1	0	0	3	5	0	52	3	0	3	55	173		
16:45:00	6	4	4	0	0	14	4	74	2	0	0	80	5	6	1	0	1	12	0	57	11	0	2	68	174	675	
17:00:00	8	2	9	0	2	19	5	107	0	0	0	112	6	6	1	0	3	13	0	50	11	0	3	61	205	729	
17:15:00	6	4	7	0	7	17	4	86	1	0	1	91	8	4	1	0	5	13	1	45	3	0	7	49	170	722	
17:30:00	10	1	6	0	2	17	11	57	2	0	0	70	5	4	3	0	1	12	3	62	8	0	2	73	172	721	
17:45:00	5	2	4	0	7	11	8	48	1	0	3	57	5	0	1	0	3	6	0	38	3	0	2	41	115	662	
18:00:00	6	3	4	0	0	13	7	47	5	0	1	59	3	1	0	0	4	4	0	34	5	0	4	39	115	572	



18:15:00	3	1	6	0	4	10	6	49	3	0	0	58	4	2	0	0	0	6	1	37	4	0	11	42	116	518
18:30:00	3	0	8	0	5	11	4	47	2	0	0	53	3	0	0	0	1	3	0	46	3	0	1	49	116	462
18:45:00	6	1	5	0	5	12	3	40	1	0	1	44	2	2	0	0	6	4	0	30	4	0	1	34	94	441
Grand Total	239	46	210	0	68	495	144	1542	36	0	19	1722	127	63	17	0	81	207	15	1624	168	0	155	1807	4231	-
Approach%	48.3%	9.3%	42.4%	0%		-	8.4%	89.5%	2.1%	0%		-	61.4%	30.4%	8.2%	0%		-	0.8%	89.9%	9.3%	0%		-	-	-
Totals %	5.6%	1.1%	5%	0%		11.7%	3.4%	36.4%	0.9%	0%		40.7%	3%	1.5%	0.4%	0%		4.9%	0.4%	38.4%	4%	0%		42.7%	-	-
Heavy	5	2	3	0		-	4	37	3	0		-	5	2	2	0		-	2	38	1	0		-	-	-
Heavy %	2.1%	4.3%	1.4%	0%		-	2.8%	2.4%	8.3%	0%		-	3.9%	3.2%	11.8%	0%		-	13.3%	2.3%	0.6%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-



Peak Hour: 08:15 AM - 09:15 AM Weather:

Start Time	N Approach YORKSHIRE STREET N						E Approach WATERLOO AVE						S Approach YORKSHIRE ST N						W Approach WATERLOO AVE						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:15:00	9	0	8	0	2	17	6	39	0	0	1	45	5	3	0	0	1	8	2	74	18	0	11	94	164
08:30:00	12	1	12	0	1	25	4	41	0	0	2	45	17	6	0	0	5	23	0	83	17	0	4	100	193
08:45:00	27	4	11	0	4	42	5	58	4	0	2	67	7	4	0	0	2	11	1	108	14	0	4	123	243
09:00:00	13	0	8	0	0	21	4	47	1	0	1	52	3	1	0	0	1	4	0	73	6	0	25	79	156
Grand Total	61	5	39	0	7	105	19	185	5	0	6	209	32	14	0	0	9	46	3	338	55	0	44	396	756
Approach%	58.1%	4.8%	37.1%	0%	-	-	9.1%	88.5%	2.4%	0%	-	-	69.6%	30.4%	0%	0%	-	-	0.8%	85.4%	13.9%	0%	-	-	-
Totals %	8.1%	0.7%	5.2%	0%	-	13.9%	2.5%	24.5%	0.7%	0%	-	27.6%	4.2%	1.9%	0%	0%	-	6.1%	0.4%	44.7%	7.3%	0%	-	52.4%	-
PHF	0.56	0.31	0.81	0	-	0.63	0.79	0.8	0.31	0	-	0.78	0.47	0.58	0	0	-	0.5	0.38	0.78	0.76	0	-	0.8	-
Heavy	2	1	0	0	-	3	2	5	0	0	-	7	1	1	0	0	-	2	0	5	0	0	-	5	-
Heavy %	3.3%	20%	0%	0%	-	2.9%	10.5%	2.7%	0%	0%	-	3.3%	3.1%	7.1%	0%	0%	-	4.3%	0%	1.5%	0%	0%	-	1.3%	-
Lights	59	3	39	0	-	101	17	179	5	0	-	201	31	13	0	0	-	44	2	331	55	0	-	388	-
Lights %	96.7%	60%	100%	0%	-	96.2%	89.5%	96.8%	100%	0%	-	96.2%	96.9%	92.9%	0%	0%	-	95.7%	66.7%	97.9%	100%	0%	-	98%	-
Single-Unit Trucks	0	1	0	0	-	1	1	1	0	0	-	2	0	1	0	0	-	1	0	1	0	0	-	1	-
Single-Unit Trucks %	0%	20%	0%	0%	-	1%	5.3%	0.5%	0%	0%	-	1%	0%	7.1%	0%	0%	-	2.2%	0%	0.3%	0%	0%	-	0.3%	-
Buses	2	0	0	0	-	2	1	3	0	0	-	4	1	0	0	0	-	1	0	3	0	0	-	3	-
Buses %	3.3%	0%	0%	0%	-	1.9%	5.3%	1.6%	0%	0%	-	1.9%	3.1%	0%	0%	0%	-	2.2%	0%	0.9%	0%	0%	-	0.8%	-
Articulated Trucks	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	1	0	0	-	1	-
Articulated Trucks %	0%	0%	0%	0%	-	0%	0%	0.5%	0%	0%	-	0.5%	0%	0%	0%	0%	-	0%	0%	0.3%	0%	0%	-	0.3%	-
Bicycles on Road	0	1	0	0	-	1	0	1	0	0	-	1	0	0	0	0	-	0	1	2	0	0	-	3	-
Bicycles on Road %	0%	20%	0%	0%	-	1%	0%	0.5%	0%	0%	-	0.5%	0%	0%	0%	0%	-	0%	33.3%	0.6%	0%	0%	-	0.8%	-
Pedestrians	-	-	-	-	7	-	-	-	-	-	6	-	-	-	-	-	9	-	-	-	-	-	44	-	-
Pedestrians%	-	-	-	-	10.6%	-	-	-	-	-	9.1%	-	-	-	-	-	13.6%	-	-	-	-	-	66.7%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



Peak Hour: 12:00 PM - 01:00 PM Weather:

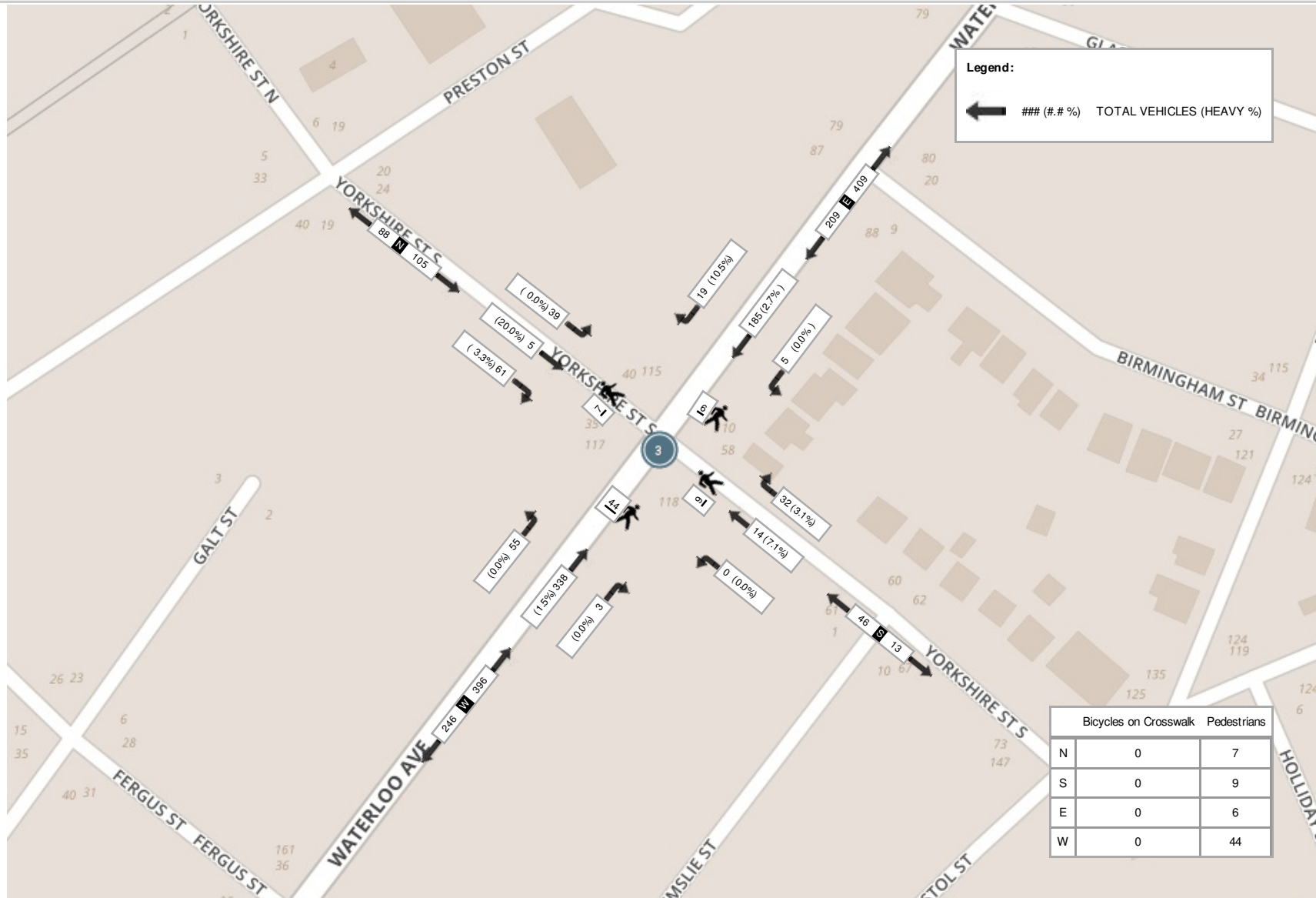
Start Time	N Approach YORKSHIRE STREET N						E Approach WATERLOO AVE						S Approach YORKSHIRE ST N						W Approach WATERLOO AVE						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
12:00:00	7	0	4	0	0	11	4	53	2	0	0	59	0	2	0	0	3	2	0	48	2	0	0	50	122
12:15:00	6	2	5	0	0	13	5	39	1	0	0	45	2	2	0	0	3	4	1	36	7	0	0	44	106
12:30:00	6	0	6	0	1	12	7	41	0	0	2	48	4	3	0	0	0	7	0	49	5	0	25	54	121
12:45:00	6	1	11	0	1	18	5	50	0	0	0	55	2	0	0	0	0	2	0	55	4	0	0	59	134
Grand Total	25	3	26	0	2	54	21	183	3	0	2	207	8	7	0	0	6	15	1	188	18	0	25	207	483
Approach%	46.3%	5.6%	48.1%	0%	-	-	10.1%	88.4%	1.4%	0%	-	-	53.3%	46.7%	0%	0%	-	-	0.5%	90.8%	8.7%	0%	-	-	
Totals %	5.2%	0.6%	5.4%	0%	-	11.2%	4.3%	37.9%	0.6%	0%	-	42.9%	1.7%	1.4%	0%	0%	-	3.1%	0.2%	38.9%	3.7%	0%	-	42.9%	-
PHF	0.89	0.38	0.59	0	-	0.75	0.75	0.86	0.38	0	-	0.88	0.5	0.58	0	0	-	0.54	0.25	0.85	0.64	0	-	0.88	-
Heavy	0	0	0	0	-	0	0	2	0	0	-	2	1	0	0	0	-	1	1	6	0	0	-	7	-
Heavy %	0%	0%	0%	0%	-	0%	0%	1.1%	0%	0%	-	1%	12.5%	0%	0%	0%	-	6.7%	100%	3.2%	0%	0%	-	3.4%	-
Lights	25	3	26	0	-	54	21	179	3	0	-	203	7	6	0	0	-	13	0	182	18	0	-	200	-
Lights %	100%	100%	100%	0%	-	100%	100%	97.8%	100%	0%	-	98.1%	87.5%	85.7%	0%	0%	-	86.7%	0%	96.8%	100%	0%	-	96.6%	-
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	1	1	1	0	0	-	2	-
Single-Unit Trucks %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	12.5%	0%	0%	0%	-	6.7%	100%	0.5%	0%	0%	-	1%	-
Buses	0	0	0	0	-	0	0	2	0	0	-	2	0	0	0	0	-	0	0	5	0	0	-	5	-
Buses %	0%	0%	0%	0%	-	0%	0%	1.1%	0%	0%	-	1%	0%	0%	0%	0%	-	0%	0%	2.7%	0%	0%	-	2.4%	-
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	-
Articulated Trucks %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	-
Bicycles on Road	0	0	0	0	-	0	0	2	0	0	-	2	0	1	0	0	-	1	0	0	0	0	-	0	-
Bicycles on Road %	0%	0%	0%	0%	-	0%	0%	1.1%	0%	0%	-	1%	0%	14.3%	0%	0%	-	6.7%	0%	0%	0%	0%	-	0%	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	5	-	-	-	-	-	25	-	-
Pedestrians%	-	-	-	-	5.7%	-	-	-	-	-	5.7%	-	-	-	-	-	14.3%	-	-	-	-	-	71.4%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	2.9%	-	-	-	-	-	0%	-	-



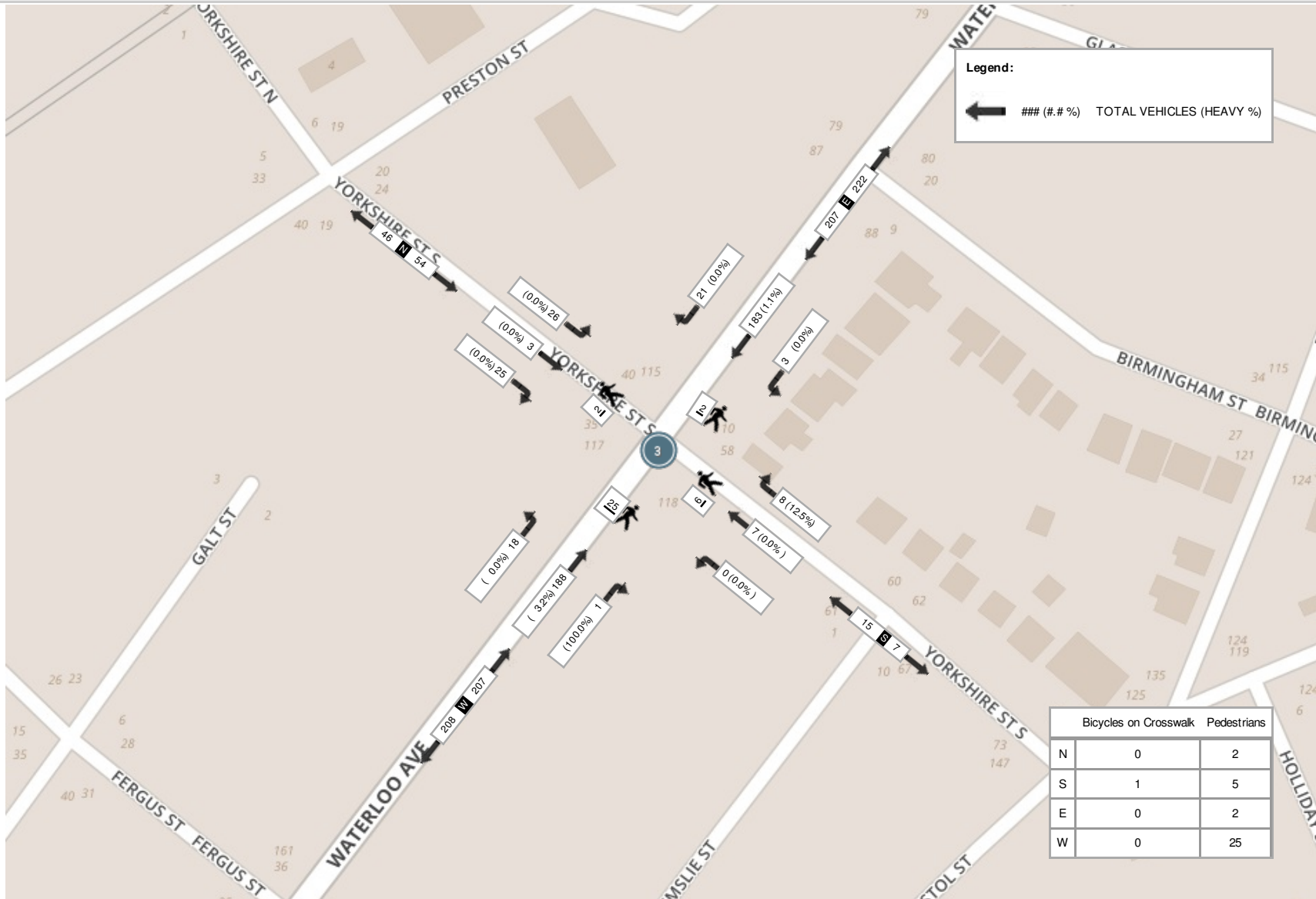
Peak Hour: 04:15 PM - 05:15 PM Weather:

Start Time	N Approach YORKSHIRE STREET N						E Approach WATERLOO AVE						S Approach YORKSHIRE ST N						W Approach WATERLOO AVE						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:15:00	9	0	9	0	4	18	5	69	0	0	0	74	3	2	1	0	6	6	2	71	6	0	1	79	177
16:30:00	15	3	8	0	10	26	7	79	1	0	0	87	4	1	0	0	3	5	0	52	3	0	3	55	173
16:45:00	6	4	4	0	0	14	4	74	2	0	0	80	5	6	1	0	1	12	0	57	11	0	2	68	174
17:00:00	8	2	9	0	2	19	5	107	0	0	0	112	6	6	1	0	3	13	0	50	11	0	3	61	205
Grand Total	38	9	30	0	16	77	21	329	3	0	0	353	18	15	3	0	13	36	2	230	31	0	9	263	729
Approach%	49.4%	11.7%	39%	0%	-	-	5.9%	93.2%	0.8%	0%	-	-	50%	41.7%	8.3%	0%	-	-	0.8%	87.5%	11.8%	0%	-	-	-
Totals %	5.2%	1.2%	4.1%	0%	-	10.6%	2.9%	45.1%	0.4%	0%	-	48.4%	2.5%	2.1%	0.4%	0%	-	4.9%	0.3%	31.6%	4.3%	0%	-	36.1%	-
PHF	0.63	0.56	0.83	0	-	0.74	0.75	0.77	0.38	0	-	0.79	0.75	0.63	0.75	0	-	0.69	0.25	0.81	0.7	0	-	0.83	-
Heavy	0	0	0	0	-	0	0	8	0	0	-	8	0	1	0	0	-	1	0	6	0	0	-	6	-
Heavy %	0%	0%	0%	0%	-	0%	0%	2.4%	0%	0%	-	2.3%	0%	6.7%	0%	0%	-	2.8%	0%	2.6%	0%	0%	-	2.3%	-
Lights	38	9	30	0	-	77	21	319	3	0	-	343	18	13	2	0	-	33	2	222	31	0	-	255	-
Lights %	100%	100%	100%	0%	-	100%	100%	97%	100%	0%	-	97.2%	100%	86.7%	66.7%	0%	-	91.7%	100%	96.5%	100%	0%	-	97%	-
Single-Unit Trucks	0	0	0	0	-	0	0	1	0	0	-	1	0	1	0	0	-	1	0	3	0	0	-	3	-
Single-Unit Trucks %	0%	0%	0%	0%	-	0%	0%	0.3%	0%	0%	-	0.3%	0%	6.7%	0%	0%	-	2.8%	0%	1.3%	0%	0%	-	1.1%	-
Buses	0	0	0	0	-	0	0	7	0	0	-	7	0	0	0	0	-	0	0	3	0	0	-	3	-
Buses %	0%	0%	0%	0%	-	0%	0%	2.1%	0%	0%	-	2%	0%	0%	0%	0%	-	0%	0%	1.3%	0%	0%	-	1.1%	-
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	-
Articulated Trucks %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	-
Bicycles on Road	0	0	0	0	-	0	0	2	0	0	-	2	0	1	1	0	-	2	0	2	0	0	-	2	-
Bicycles on Road %	0%	0%	0%	0%	-	0%	0%	0.6%	0%	0%	-	0.6%	0%	6.7%	33.3%	0%	-	5.6%	0%	0.9%	0%	0%	-	0.8%	-
Pedestrians	-	-	-	-	16	-	-	-	-	0	-	-	-	-	-	10	-	-	-	-	-	9	-	-	-
Pedestrians%	-	-	-	-	42.1%	-	-	-	-	0%	-	-	-	-	-	26.3%	-	-	-	-	-	23.7%	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	7.9%	-	-	-	-	-	0%	-	-	-

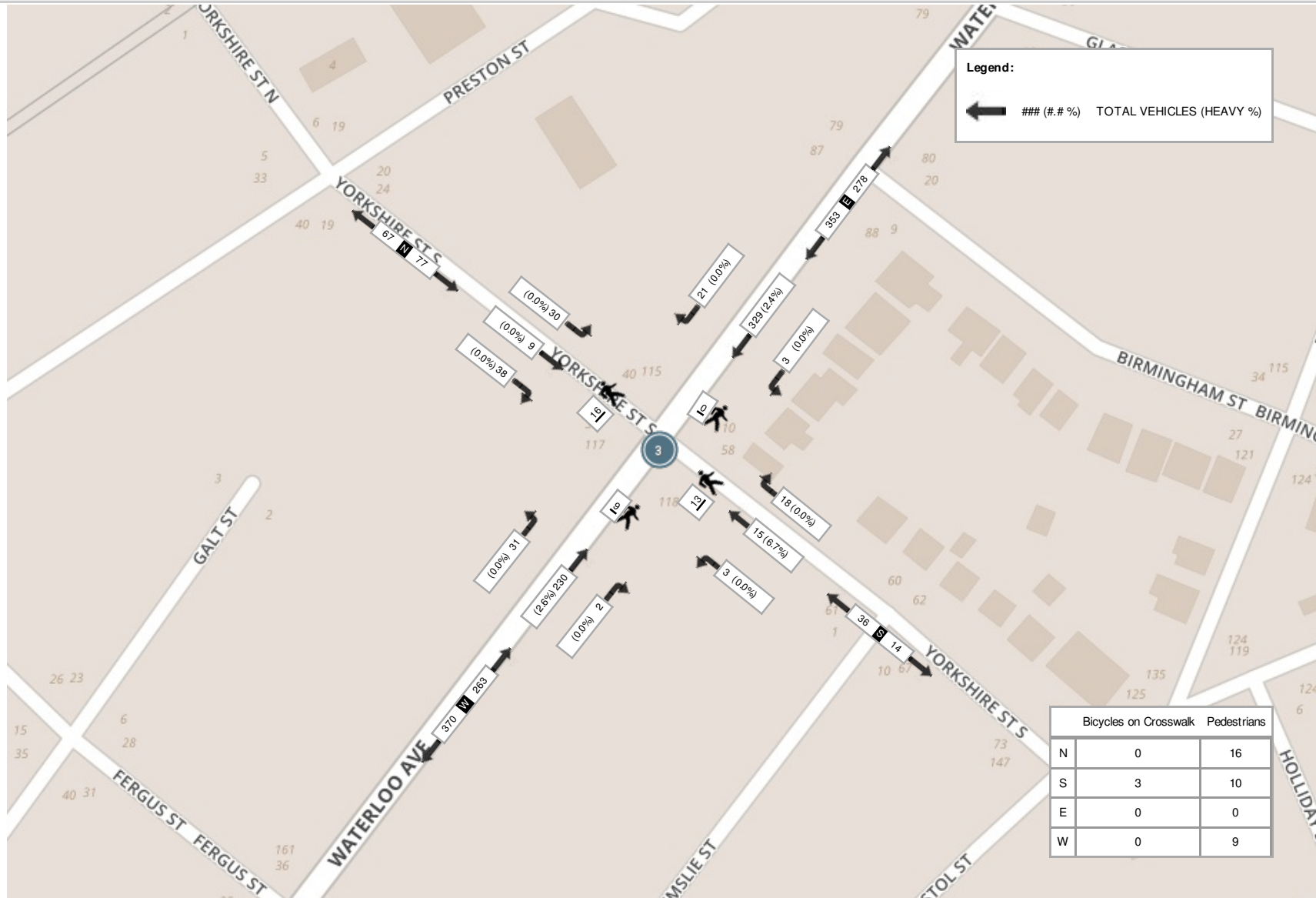
Peak Hour: 08:15 AM - 09:15 AM Weather:



Peak Hour: 12:00 PM - 01:00 PM Weather:



Peak Hour: 04:15 PM - 05:15 PM Weather:





Turning Movement Count (4 . PAISLEY ST & GLASGOW ST N)

Start Time	N Approach GLASGOW ST N						E Approach PAISLEY ST						S Approach GLASGOW ST N						W Approach PAISLEY ST						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total			
07:00:00	0	1	1	0	0	2	0	26	2	0	0	28	1	3	1	0	0	5	3	38	0	0	0	41	76		
07:15:00	1	2	0	0	0	3	0	28	1	0	0	29	0	2	1	0	1	3	1	57	2	0	0	60	95		
07:30:00	0	3	0	0	2	3	1	40	0	0	0	41	2	3	4	0	1	9	2	51	0	0	0	53	106		
07:45:00	2	3	0	0	4	5	2	49	1	0	0	52	2	3	3	0	1	8	2	78	1	0	0	81	146	423	
08:00:00	6	4	0	0	0	10	0	48	1	0	0	49	1	5	4	0	1	10	2	68	2	0	1	72	141	488	
08:15:00	1	4	2	0	5	7	0	67	1	0	1	68	5	10	3	0	5	18	2	89	3	0	6	94	187	580	
08:30:00	5	5	2	0	8	12	1	65	3	0	0	69	5	13	1	0	3	19	3	97	2	0	0	102	202	676	
08:45:00	9	18	3	0	8	30	0	60	2	0	0	62	7	12	8	0	12	27	2	126	6	0	2	134	253	783	
09:00:00	0	4	1	0	3	5	1	52	3	0	1	56	1	7	1	0	5	9	1	92	3	0	1	96	166	808	
09:15:00	1	4	1	0	1	6	1	45	2	0	0	48	1	3	3	0	4	7	2	57	4	0	0	63	124	745	
09:30:00	1	6	2	0	2	9	2	46	0	0	2	48	5	1	1	0	2	7	0	56	3	0	1	59	123	666	
09:45:00	7	4	3	0	1	14	0	43	3	0	0	46	2	6	2	0	0	10	1	64	6	0	0	71	141	554	
BREAK																											
11:00:00	2	0	1	0	2	3	1	72	2	0	1	75	2	2	5	0	3	9	3	53	4	0	0	60	147		
11:15:00	0	3	1	0	6	4	3	65	1	0	1	69	2	1	3	0	2	6	1	61	4	0	0	66	145		
11:30:00	4	3	1	0	16	8	1	63	6	0	2	70	2	2	3	0	9	7	2	75	2	0	0	79	164		
11:45:00	2	5	1	0	7	8	1	61	2	0	2	64	1	1	1	0	4	3	6	70	3	0	1	79	154	610	
12:00:00	2	3	0	0	7	5	0	90	2	0	0	92	1	4	3	0	4	8	4	77	2	0	0	83	188	651	
12:15:00	0	2	0	0	8	2	0	77	2	0	0	79	2	3	3	0	6	8	3	75	2	0	2	80	169	675	
12:30:00	3	1	1	0	7	5	2	67	3	0	0	72	1	1	5	0	4	7	5	74	1	0	2	80	164	675	
12:45:00	1	5	0	0	1	6	1	62	0	0	0	63	1	5	2	0	2	8	2	80	2	0	0	84	161	682	
BREAK																											
16:00:00	1	4	1	0	0	6	0	107	2	0	1	109	2	2	2	0	8	6	2	85	3	0	2	90	211		
16:15:00	2	2	0	0	3	4	2	99	3	0	1	104	3	5	8	0	6	16	3	89	4	0	0	96	220		
16:30:00	3	3	1	0	8	7	3	121	5	0	0	129	5	4	5	0	2	14	4	83	3	0	3	90	240		
16:45:00	2	8	1	0	1	11	5	113	2	0	1	120	3	5	3	0	2	11	4	88	8	0	1	100	242	913	
17:00:00	6	6	1	0	4	13	2	102	3	0	0	107	3	9	4	0	2	16	2	91	3	0	1	96	232	934	
17:15:00	6	2	3	0	1	11	3	74	3	0	0	80	1	8	6	0	5	15	8	111	3	0	2	122	228	942	
17:30:00	5	5	1	0	3	11	4	81	3	0	1	88	6	6	1	0	0	13	7	89	5	0	3	101	213	915	
17:45:00	0	4	0	0	2	4	0	71	6	0	1	77	4	5	4	0	3	13	4	83	2	0	1	89	183	856	
18:00:00	1	9	0	0	4	10	3	79	1	0	3	83	1	4	2	0	6	7	4	91	1	0	1	96	196	820	



18:15:00	3	5	1	0	2	9	3	76	2	0	2	81	4	2	1	0	2	7	2	75	7	0	1	84	181	773
18:30:00	2	5	0	0	4	7	0	80	4	0	0	84	2	5	3	0	1	10	0	67	2	0	1	69	170	730
18:45:00	2	4	0	0	1	6	0	57	1	0	9	58	7	6	2	0	4	15	4	72	3	0	1	79	158	705
Grand Total	80	137	29	0	121	246	42	2186	72	0	29	2300	85	148	98	0	110	331	91	2462	96	0	33	2649	5526	-
Approach%	32.5%	55.7%	11.8%	0%	-	1.8%	95%	3.1%	0%	-	25.7%	44.7%	29.6%	0%	-	3.4%	92.9%	3.6%	0%	-	-	-	-	-	-	
Totals %	1.4%	2.5%	0.5%	0%	4.5%	0.8%	39.6%	1.3%	0%	41.6%	1.5%	2.7%	1.8%	0%	6%	1.6%	44.6%	1.7%	0%	47.9%	-	-	-	-	-	
Heavy	4	1	2	0	-	0	49	0	0	-	0	1	2	0	-	2	72	0	0	-	-	-	-	-	-	
Heavy %	5%	0.7%	6.9%	0%	-	0%	2.2%	0%	0%	-	0%	0.7%	2%	0%	-	2.2%	2.9%	0%	0%	-	-	-	-	-	-	
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Peak Hour: 08:15 AM - 09:15 AM Weather:

Start Time	N Approach GLASGOW ST N						E Approach PAISLEY ST						S Approach GLASGOW ST N						W Approach PAISLEY ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:15:00	1	4	2	0	5	7	0	67	1	0	1	68	5	10	3	0	5	18	2	89	3	0	6	94	187
08:30:00	5	5	2	0	8	12	1	65	3	0	0	69	5	13	1	0	3	19	3	97	2	0	0	102	202
08:45:00	9	18	3	0	8	30	0	60	2	0	0	62	7	12	8	0	12	27	2	126	6	0	2	134	253
09:00:00	0	4	1	0	3	5	1	52	3	0	1	56	1	7	1	0	5	9	1	92	3	0	1	96	166
Grand Total	15	31	8	0	24	54	2	244	9	0	2	255	18	42	13	0	25	73	8	404	14	0	9	426	808
Approach%	27.8%	57.4%	14.8%	0%	-	-	0.8%	95.7%	3.5%	0%	-	-	24.7%	57.5%	17.8%	0%	-	-	1.9%	94.8%	3.3%	0%	-	-	-
Totals %	1.9%	3.8%	1%	0%	6.7%	6.7%	0.2%	30.2%	1.1%	0%	31.6%	31.6%	2.2%	5.2%	1.6%	0%	9%	9%	1%	50%	1.7%	0%	52.7%	52.7%	-
PHF	0.42	0.43	0.67	0	0.45	0.45	0.5	0.91	0.75	0	0.92	0.92	0.64	0.81	0.41	0	0.68	0.68	0.67	0.8	0.58	0	0.79	0.79	-
Heavy	1	0	0	0	1	1	0	9	0	0	9	9	0	1	0	0	1	1	0	13	0	0	13	13	-
Heavy %	6.7%	0%	0%	0%	1.9%	1.9%	0%	3.7%	0%	0%	3.5%	3.5%	0%	2.4%	0%	0%	1.4%	1.4%	0%	3.2%	0%	0%	3.1%	3.1%	-
Lights	14	31	8	0	53	53	2	232	9	0	243	243	18	41	13	0	72	72	8	388	14	0	410	410	-
Lights %	93.3%	100%	100%	0%	98.1%	98.1%	100%	95.1%	100%	0%	95.3%	95.3%	100%	97.6%	100%	0%	98.6%	98.6%	100%	96%	100%	0%	96.2%	96.2%	-
Single-Unit Trucks	0	0	0	0	0	0	0	3	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	-
Single-Unit Trucks %	0%	0%	0%	0%	0%	0%	0%	1.2%	0%	0%	1.2%	1.2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Buses	1	0	0	0	1	1	0	6	0	0	6	6	0	1	0	0	1	1	0	12	0	0	12	12	-
Buses %	6.7%	0%	0%	0%	1.9%	1.9%	0%	2.5%	0%	0%	2.4%	2.4%	0%	2.4%	0%	0%	1.4%	1.4%	0%	3%	0%	0%	2.8%	2.8%	-
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	-
Articulated Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.2%	0%	0%	0.2%	0.2%	-
Bicycles on Road	0	0	0	0	0	0	0	3	0	0	3	3	0	0	0	0	0	0	0	3	0	0	3	3	-
Bicycles on Road %	0%	0%	0%	0%	0%	0%	0%	1.2%	0%	0%	1.2%	1.2%	0%	0%	0%	0%	0%	0%	0%	0.7%	0%	0%	0.7%	0.7%	-
Pedestrians	-	-	-	-	24	-	-	-	-	-	2	-	-	-	-	-	25	-	-	-	-	-	9	-	-
Pedestrians%	-	-	-	-	40%	-	-	-	-	-	3.3%	-	-	-	-	-	41.7%	-	-	-	-	-	15%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



Peak Hour: 12:00 PM - 01:00 PM Weather:

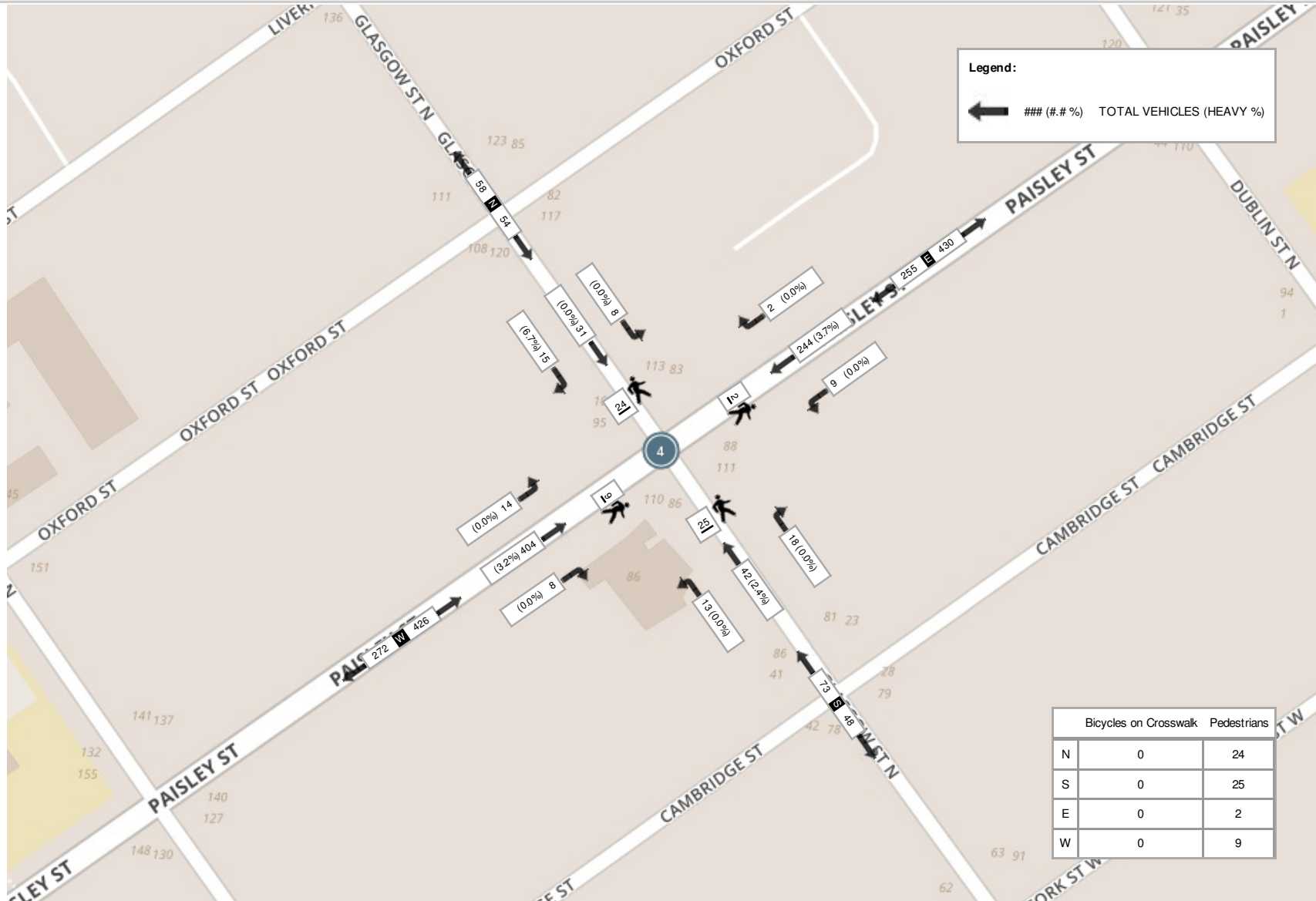
Start Time	N Approach GLASGOW ST N						E Approach PAISLEY ST						S Approach GLASGOW ST N						W Approach PAISLEY ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
12:00:00	2	3	0	0	7	5	0	90	2	0	0	92	1	4	3	0	4	8	4	77	2	0	0	83	188
12:15:00	0	2	0	0	8	2	0	77	2	0	0	79	2	3	3	0	6	8	3	75	2	0	2	80	169
12:30:00	3	1	1	0	7	5	2	67	3	0	0	72	1	1	5	0	4	7	5	74	1	0	2	80	164
12:45:00	1	5	0	0	1	6	1	62	0	0	0	63	1	5	2	0	2	8	2	80	2	0	0	84	161
Grand Total	6	11	1	0	23	18	3	296	7	0	0	306	5	13	13	0	16	31	14	306	7	0	4	327	682
Approach%	33.3%	61.1%	5.6%	0%	-	-	1%	96.7%	2.3%	0%	-	-	16.1%	41.9%	41.9%	0%	-	-	4.3%	93.6%	2.1%	0%	-	-	-
Totals %	0.9%	1.6%	0.1%	0%	2.6%	0.4%	43.4%	1%	0%	44.9%	0.7%	1.9%	1.9%	0%	4.5%	2.1%	44.9%	1%	0%	47.9%	-	-	-	-	-
PHF	0.5	0.55	0.25	0	0.75	0.38	0.82	0.58	0	0.83	0.63	0.65	0.65	0	0.97	0.7	0.96	0.88	0	0.97	-	-	-	-	-
Heavy	0	1	0	0	1	0	3	0	0	3	0	0	0	0	0	1	9	0	0	10	-	-	-	-	-
Heavy %	0%	9.1%	0%	0%	5.6%	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	7.1%	2.9%	0%	0%	3.1%	-	-	-	-	-
Lights	6	10	1	0	17	3	289	7	0	299	5	13	11	0	29	13	296	7	0	316	-	-	-	-	-
Lights %	100%	90.9%	100%	0%	94.4%	100%	97.6%	100%	0%	97.7%	100%	100%	84.6%	0%	93.5%	92.9%	96.7%	100%	0%	96.6%	-	-	-	-	-
Single-Unit Trucks	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	2	-	-	-	-	-
Single-Unit Trucks %	0%	9.1%	0%	0%	5.6%	0%	0.3%	0%	0%	0.3%	0%	0%	0%	0%	0%	7.1%	0.3%	0%	0%	0.6%	-	-	-	-	-
Buses	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	8	0	0	8	-	-	-	-	-
Buses %	0%	0%	0%	0%	0%	0%	0.7%	0%	0%	0.7%	0%	0%	0%	0%	0%	0%	2.6%	0%	0%	2.4%	-	-	-	-	-
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
Articulated Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	-	-	-	-
Bicycles on Road	0	0	0	0	0	0	4	0	0	4	0	0	2	0	2	0	1	0	0	1	-	-	-	-	-
Bicycles on Road %	0%	0%	0%	0%	0%	0%	1.4%	0%	0%	1.3%	0%	0%	15.4%	0%	6.5%	0%	0.3%	0%	0%	0.3%	-	-	-	-	-
Pedestrians	-	-	-	-	23	-	-	-	-	0	-	-	-	-	16	-	-	-	-	4	-	-	-	-	-
Pedestrians%	-	-	-	-	53.5%	-	-	-	-	0%	-	-	-	-	37.2%	-	-	-	-	9.3%	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-



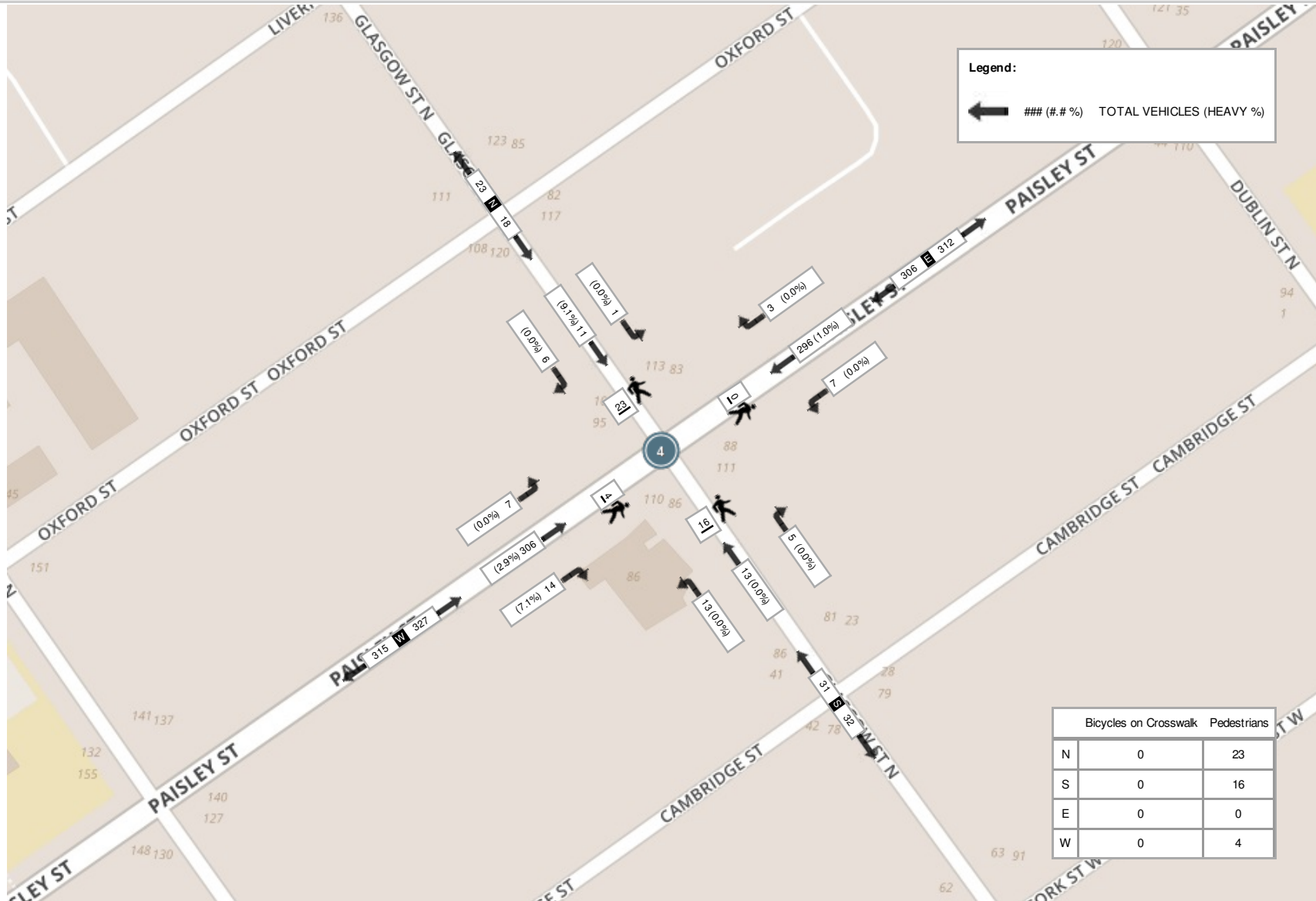
Peak Hour: 04:30 PM - 05:30 PM Weather:

Start Time	N Approach GLASGOW ST N						E Approach PAISLEY ST						S Approach GLASGOW ST N						W Approach PAISLEY ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	3	3	1	0	8	7	3	121	5	0	0	129	5	4	5	0	2	14	4	83	3	0	3	90	240
16:45:00	2	8	1	0	1	11	5	113	2	0	1	120	3	5	3	0	2	11	4	88	8	0	1	100	242
17:00:00	6	6	1	0	4	13	2	102	3	0	0	107	3	9	4	0	2	16	2	91	3	0	1	96	232
17:15:00	6	2	3	0	1	11	3	74	3	0	0	80	1	8	6	0	5	15	8	111	3	0	2	122	228
Grand Total	17	19	6	0	14	42	13	410	13	0	1	436	12	26	18	0	11	56	18	373	17	0	7	408	942
Approach%	40.5%	45.2%	14.3%	0%	-	-	3%	94%	3%	0%	-	-	21.4%	46.4%	32.1%	0%	-	-	4.4%	91.4%	4.2%	0%	-	-	-
Totals %	1.8%	2%	0.6%	0%	4.5%	1.4%	43.5%	1.4%	0%	46.3%	1.3%	2.8%	1.9%	0%	5.9%	1.9%	39.6%	1.8%	0%	43.3%	-	-	-	-	-
PHF	0.71	0.59	0.5	0	0.81	0.65	0.85	0.65	0	0.84	0.6	0.72	0.75	0	0.88	0.56	0.84	0.53	0	0.84	-	-	-	-	-
Heavy	1	0	1	0	2	0	4	0	0	4	0	0	0	0	0	0	0	0	0	8	0	0	0	8	-
Heavy %	5.9%	0%	16.7%	0%	4.8%	0%	1%	0%	0%	0.9%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2.1%	0%	0%	0%	2%	-
Lights	15	19	5	0	39	13	404	13	0	430	12	25	17	0	54	18	363	17	0	398	-	-	-	-	-
Lights %	88.2%	100%	83.3%	0%	92.9%	100%	98.5%	100%	0%	98.6%	100%	96.2%	94.4%	0%	96.4%	100%	97.3%	100%	0%	97.5%	-	-	-	-	-
Single-Unit Trucks	1	0	1	0	2	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Single-Unit Trucks %	5.9%	0%	16.7%	0%	4.8%	0%	0.2%	0%	0%	0.2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Buses	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	8	0	0	8	-	-	-	-	-
Buses %	0%	0%	0%	0%	0%	0%	0.7%	0%	0%	0.7%	0%	0%	0%	0%	0%	0%	2.1%	0%	0%	2%	-	-	-	-	-
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Articulated Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Bicycles on Road	1	0	0	0	1	0	2	0	0	2	0	1	1	0	2	0	2	0	0	2	-	-	-	-	-
Bicycles on Road %	5.9%	0%	0%	0%	2.4%	0%	0.5%	0%	0%	0.5%	0%	3.8%	5.6%	0%	3.6%	0%	0.5%	0%	0%	0.5%	-	-	-	-	-
Pedestrians	-	-	-	-	14	-	-	-	-	1	-	-	-	-	11	-	-	-	-	7	-	-	-	-	-
Pedestrians%	-	-	-	-	42.4%	-	-	-	-	3%	-	-	-	-	33.3%	-	-	-	-	21.2%	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-

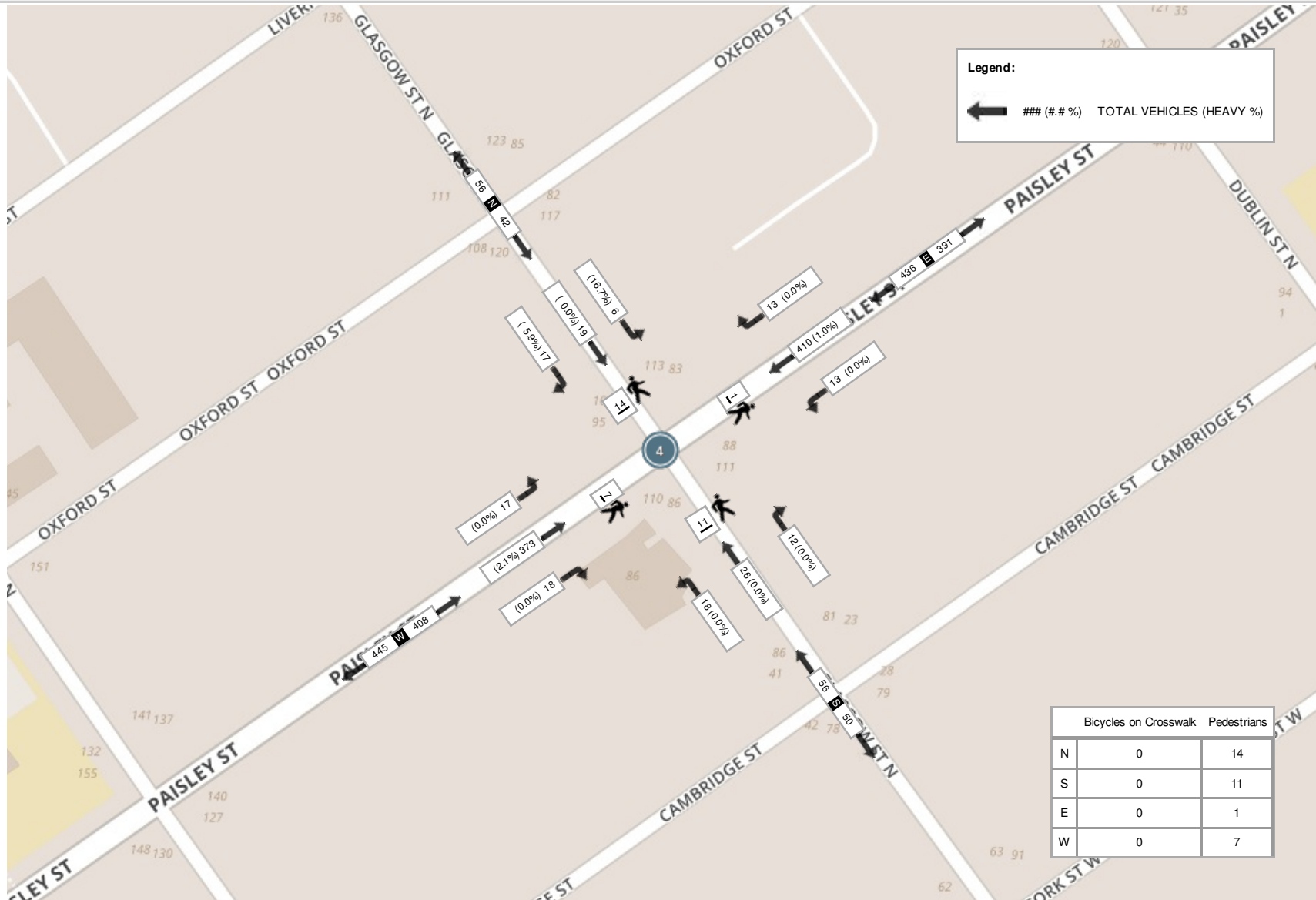
Peak Hour: 08:15 AM - 09:15 AM Weather:



Peak Hour: 12:00 PM - 01:00 PM Weather:



Peak Hour: 04:30 PM - 05:30 PM Weather:





Turning Movement Count (5 . GLASGOW ST N & NORTHUMBERLAND ST)

Start Time	N Approach GLASGOW ST N						E Approach NORTHUMBERLAND ST						S Approach GLASGOW ST N						W Approach NORTHUMBERLAND ST						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total			
07:00:00	0	2	0	0	0	2	0	0	1	0	1	1	1	2	0	0	0	3	0	0	0	0	0	0	6		
07:15:00	0	4	0	0	1	4	0	0	0	0	1	0	0	2	0	0	2	2	1	1	0	0	0	2	8		
07:30:00	0	6	1	0	0	7	4	1	0	0	0	5	0	2	0	0	0	2	2	0	0	0	1	2	16		
07:45:00	1	6	0	0	0	7	3	1	1	0	1	5	2	4	0	0	2	6	0	1	0	0	1	1	19	49	
08:00:00	0	7	0	0	1	7	0	0	0	0	1	0	0	5	0	0	5	5	1	0	2	0	11	3	15	58	
08:15:00	0	8	0	0	2	8	2	1	2	0	1	5	2	9	1	0	8	12	1	2	2	0	3	5	30	80	
08:30:00	0	13	3	0	2	16	0	1	1	0	2	2	1	8	0	0	2	9	0	1	2	0	4	3	30	94	
08:45:00	1	22	2	0	0	25	1	2	2	0	1	5	1	12	0	0	1	13	4	3	1	0	0	8	51	126	
09:00:00	0	6	0	0	0	6	1	0	0	0	2	1	1	6	1	0	1	8	1	1	0	0	0	2	17	128	
09:15:00	0	6	0	0	0	6	1	1	0	0	1	2	0	4	0	0	2	4	3	0	1	0	0	4	16	114	
09:30:00	0	10	0	1	0	11	0	2	0	0	2	2	1	5	1	0	0	7	1	1	0	0	1	2	22	106	
09:45:00	0	7	0	0	1	7	0	1	2	0	1	3	0	9	0	0	1	9	0	1	1	0	1	2	21	76	
BREAK																											
11:00:00	0	3	1	0	1	4	2	1	2	0	1	5	0	4	0	0	1	4	0	0	2	0	0	2	15		
11:15:00	2	4	0	0	1	6	1	0	0	0	1	1	0	2	1	0	1	3	1	1	1	0	0	3	13		
11:30:00	0	5	2	0	1	7	0	2	0	0	1	2	0	5	1	0	1	6	0	1	0	0	1	1	16		
11:45:00	0	5	0	0	0	5	1	0	0	0	0	1	1	2	0	0	0	3	0	2	0	0	0	2	11	55	
12:00:00	0	4	2	0	1	6	3	1	1	0	0	5	1	7	0	0	0	8	2	1	0	0	1	3	22	62	
12:15:00	0	7	1	0	0	8	3	0	0	0	0	3	2	4	0	0	0	6	1	0	1	0	0	2	19	68	
12:30:00	0	9	0	0	0	9	1	1	0	0	1	2	1	6	0	0	4	7	2	2	1	0	2	5	23	75	
12:45:00	0	7	0	0	1	7	0	2	0	0	0	2	0	7	0	0	0	7	1	1	0	0	0	2	18	82	
BREAK																											
16:00:00	1	7	0	0	2	8	3	0	1	0	0	4	0	8	1	0	2	9	0	0	0	0	1	0	21		
16:15:00	0	7	1	0	0	8	5	1	2	0	0	8	0	11	1	0	1	12	1	0	0	0	1	1	29		
16:30:00	0	12	1	0	0	13	1	2	0	0	3	3	1	8	1	0	2	10	0	0	1	0	3	1	27		
16:45:00	0	11	0	1	1	12	0	1	0	0	5	1	0	9	0	0	2	9	0	1	1	0	2	2	24	101	
17:00:00	0	10	0	0	2	10	1	0	0	0	1	1	1	12	1	0	3	14	0	1	1	0	3	2	27	107	
17:15:00	0	10	1	0	4	11	2	1	3	0	1	6	1	10	2	0	3	13	0	2	1	0	6	3	33	111	
17:30:00	1	13	3	0	0	17	0	1	1	0	2	2	0	6	2	0	1	8	2	1	2	0	1	5	32	116	
17:45:00	0	8	2	0	1	10	1	1	0	0	4	2	0	6	0	0	1	6	1	2	0	0	1	3	21	113	
18:00:00	0	7	0	0	1	7	1	3	0	0	2	4	0	5	0	0	3	5	0	1	0	0	2	1	17	103	



18:15:00	0	6	1	0	0	7	3	1	0	0	2	4	0	5	2	0	1	7	2	0	1	0	0	3	21	91
18:30:00	0	7	0	0	2	7	1	2	1	0	2	4	2	9	0	0	4	11	0	0	0	0	2	0	22	81
18:45:00	0	14	2	0	1	16	1	2	1	0	2	4	1	8	0	0	2	9	2	1	0	0	3	3	32	92
Grand Total	6	253	23	2	26	284	42	32	21	0	42	95	20	202	15	0	56	237	29	28	21	0	51	78	694	-
Approach%	2.1%	89.1%	8.1%	0.7%		-	44.2%	33.7%	22.1%	0%		-	8.4%	85.2%	6.3%	0%		-	37.2%	35.9%	26.9%	0%		-	-	-
Totals %	0.9%	36.5%	3.3%	0.3%		40.9%	6.1%	4.6%	3%	0%		13.7%	2.9%	29.1%	2.2%	0%		34.1%	4.2%	4%	3%	0%		11.2%	-	-
Heavy	0	1	0	0		-	1	2	0	0		-	1	1	0	0		-	2	1	0	0		-	-	-
Heavy %	0%	0.4%	0%	0%		-	2.4%	6.3%	0%	0%		-	5%	0.5%	0%	0%		-	6.9%	3.6%	0%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-



Peak Hour: 08:15 AM - 09:15 AM Weather:

Start Time	N Approach GLASGOW ST N						E Approach NORTHUMBERLAND ST						S Approach GLASGOW ST N						W Approach NORTHUMBERLAND ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:15:00	0	8	0	0	2	8	2	1	2	0	1	5	2	9	1	0	8	12	1	2	2	0	3	5	30
08:30:00	0	13	3	0	2	16	0	1	1	0	2	2	1	8	0	0	2	9	0	1	2	0	4	3	30
08:45:00	1	22	2	0	0	25	1	2	2	0	1	5	1	12	0	0	1	13	4	3	1	0	0	8	51
09:00:00	0	6	0	0	0	6	1	0	0	0	2	1	1	6	1	0	1	8	1	1	0	0	0	2	17
Grand Total	1	49	5	0	4	55	4	4	5	0	6	13	5	35	2	0	12	42	6	7	5	0	7	18	128
Approach%	1.8%	89.1%	9.1%	0%		-	30.8%	30.8%	38.5%	0%		-	11.9%	83.3%	4.8%	0%		-	33.3%	38.9%	27.8%	0%		-	-
Totals %	0.8%	38.3%	3.9%	0%		43%	3.1%	3.1%	3.9%	0%		10.2%	3.9%	27.3%	1.6%	0%		32.8%	4.7%	5.5%	3.9%	0%		14.1%	-
PHF	0.25	0.56	0.42	0		0.55	0.5	0.5	0.63	0		0.65	0.63	0.73	0.5	0		0.81	0.38	0.58	0.63	0		0.56	-
Heavy	0	1	0	0		1	0	1	0	0		1	1	1	0	0		2	2	0	0	0		2	-
Heavy %	0%	2%	0%	0%		1.8%	0%	25%	0%	0%		7.7%	20%	2.9%	0%	0%		4.8%	33.3%	0%	0%	0%		11.1%	-
Lights	1	47	5	0		53	4	3	5	0		12	4	34	2	0		40	4	7	5	0		16	-
Lights %	100%	95.9%	100%	0%		96.4%	100%	75%	100%	0%		92.3%	80%	97.1%	100%	0%		95.2%	66.7%	100%	100%	0%		88.9%	-
Single-Unit Trucks	0	1	0	0		1	0	1	0	0		1	1	0	0	0		1	1	0	0	0		1	-
Single-Unit Trucks %	0%	2%	0%	0%		1.8%	0%	25%	0%	0%		7.7%	20%	0%	0%	0%		2.4%	16.7%	0%	0%	0%		5.6%	-
Buses	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	1	0	0	0		1	-
Buses %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	2.9%	0%	0%		2.4%	16.7%	0%	0%	0%		5.6%	-
Bicycles on Road	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	2%	0%	0%		1.8%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	6	-	-	-	-	-	12	-	-	-	-	-	7	-	-
Pedestrians%	-	-	-	-	13.8%	-	-	-	-	-	20.7%	-	-	-	-	-	41.4%	-	-	-	-	-	24.1%	-	-



Peak Hour: 12:00 PM - 01:00 PM Weather:

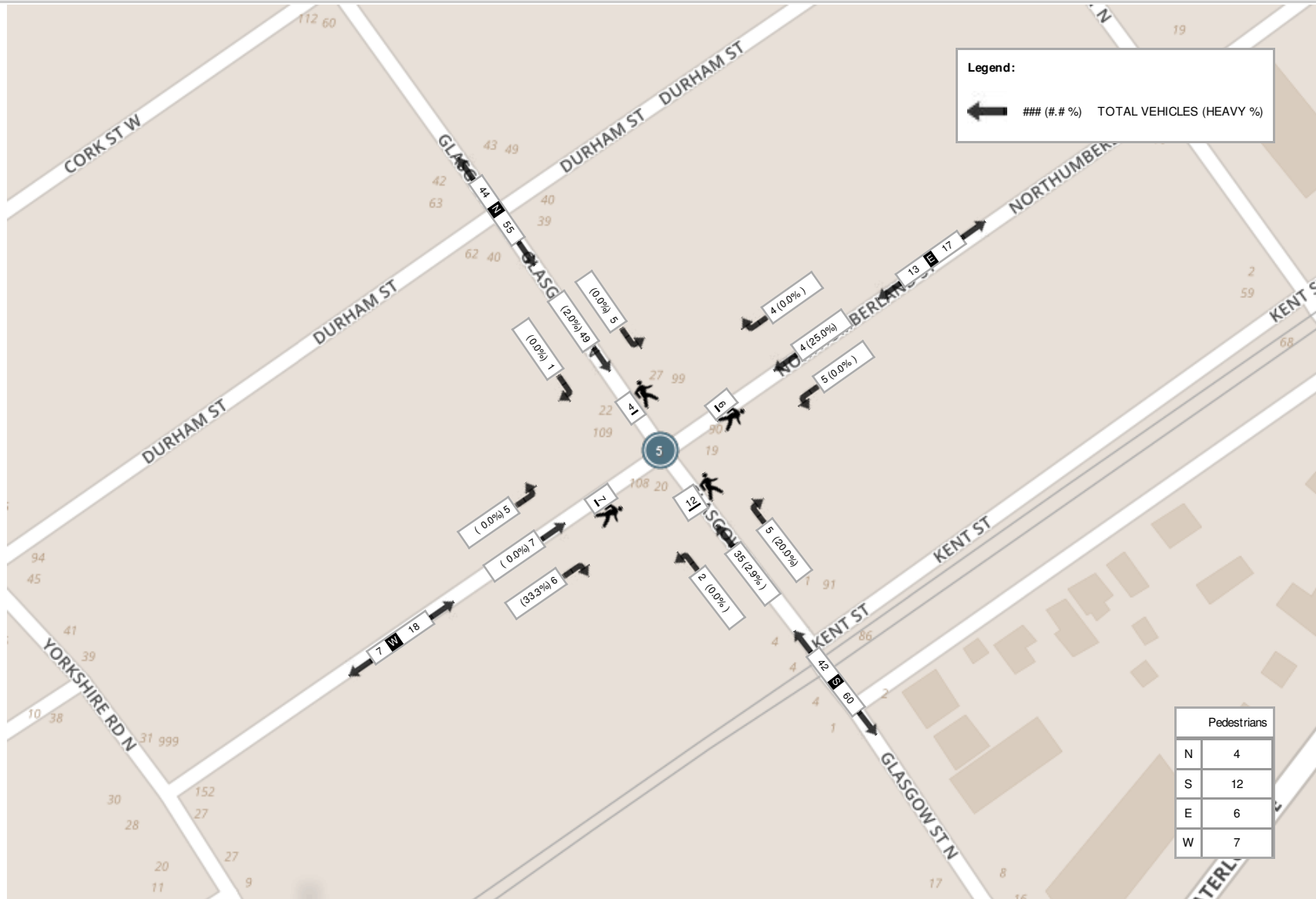
Start Time	N Approach GLASGOW ST N						E Approach NORTHUMBERLAND ST						S Approach GLASGOW ST N						W Approach NORTHUMBERLAND ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
12:00:00	0	4	2	0	1	6	3	1	1	0	0	5	1	7	0	0	0	8	2	1	0	0	1	3	22
12:15:00	0	7	1	0	0	8	3	0	0	0	0	3	2	4	0	0	0	6	1	0	1	0	0	2	19
12:30:00	0	9	0	0	0	9	1	1	0	0	1	2	1	6	0	0	4	7	2	2	1	0	2	5	23
12:45:00	0	7	0	0	1	7	0	2	0	0	0	2	0	7	0	0	0	7	1	1	0	0	0	2	18
Grand Total	0	27	3	0	2	30	7	4	1	0	1	12	4	24	0	0	4	28	6	4	2	0	3	12	82
Approach%	0%	90%	10%	0%	-	-	58.3%	33.3%	8.3%	0%	-	-	14.3%	85.7%	0%	0%	-	-	50%	33.3%	16.7%	0%	-	-	-
Totals %	0%	32.9%	3.7%	0%	-	36.6%	8.5%	4.9%	1.2%	0%	-	14.6%	4.9%	29.3%	0%	0%	-	34.1%	7.3%	4.9%	2.4%	0%	-	14.6%	-
PHF	0	0.75	0.38	0	-	0.83	0.58	0.5	0.25	0	-	0.6	0.5	0.86	0	0	-	0.88	0.75	0.5	0.5	0	-	0.6	-
Heavy	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	-
Heavy %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	-
Lights	0	27	3	0	-	30	7	4	0	0	-	11	4	22	0	0	-	26	5	4	2	0	-	11	-
Lights %	0%	100%	100%	0%	-	100%	100%	100%	0%	0%	-	91.7%	100%	91.7%	0%	0%	-	92.9%	83.3%	100%	100%	0%	-	91.7%	-
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	-
Single-Unit Trucks %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	-
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	-
Buses %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	-
Bicycles on Road	0	0	0	0	-	0	0	0	1	0	-	1	0	2	0	0	-	2	1	0	0	0	-	1	-
Bicycles on Road %	0%	0%	0%	0%	-	0%	0%	0%	100%	0%	-	8.3%	0%	8.3%	0%	0%	-	7.1%	16.7%	0%	0%	0%	-	8.3%	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	4	-	-	-	-	-	3	-	-
Pedestrians %	-	-	-	-	20%	-	-	-	-	-	10%	-	-	-	-	-	40%	-	-	-	-	-	30%	-	-



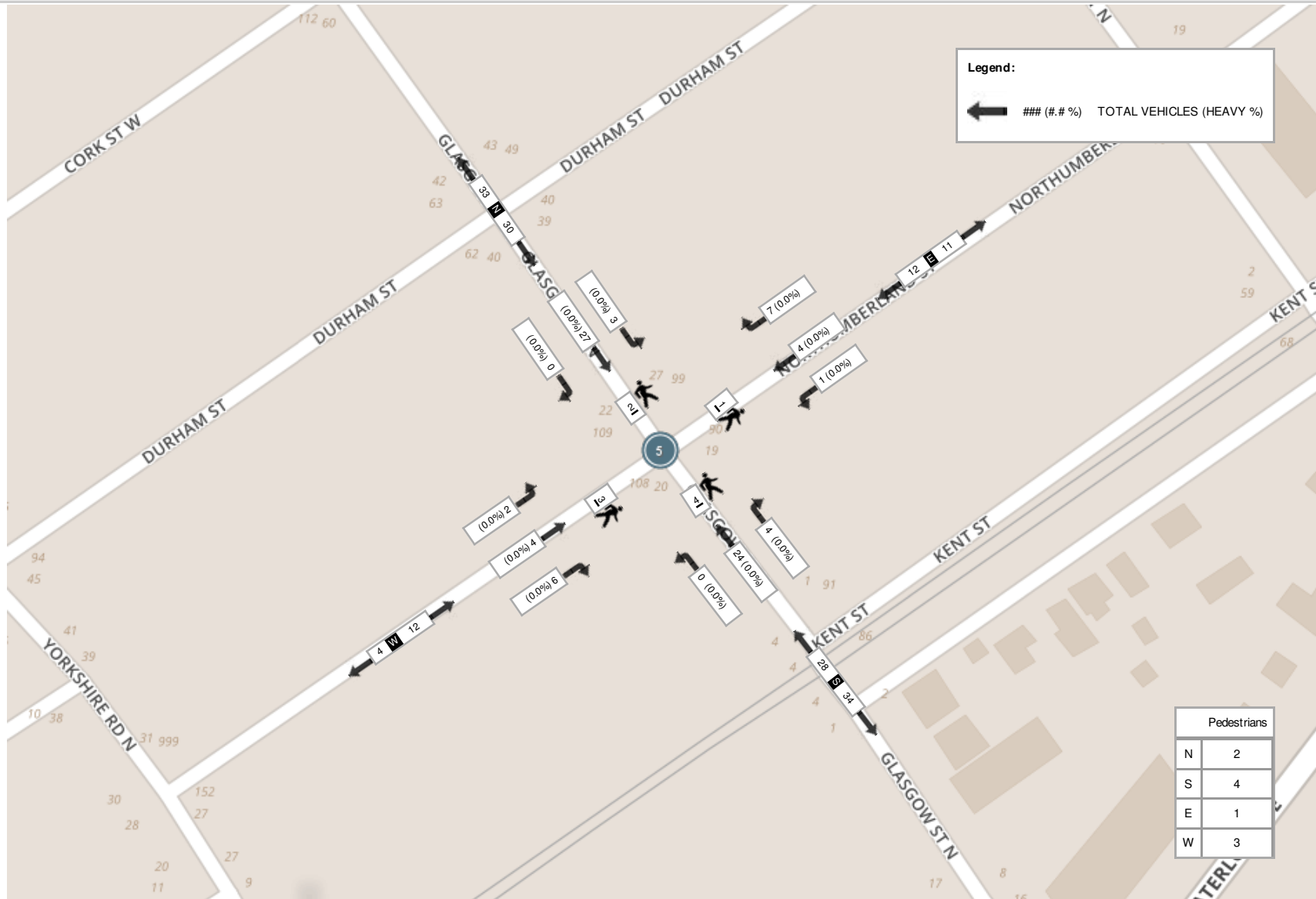
Peak Hour: 04:45 PM - 05:45 PM Weather:

Start Time	N Approach GLASGOW ST N						E Approach NORTHUMBERLAND ST						S Approach GLASGOW ST N						W Approach NORTHUMBERLAND ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:45:00	0	11	0	1	1	12	0	1	0	0	5	1	0	9	0	0	2	9	0	1	1	0	2	2	24
17:00:00	0	10	0	0	2	10	1	0	0	0	1	1	1	12	1	0	3	14	0	1	1	0	3	2	27
17:15:00	0	10	1	0	4	11	2	1	3	0	1	6	1	10	2	0	3	13	0	2	1	0	6	3	33
17:30:00	1	13	3	0	0	17	0	1	1	0	2	2	0	6	2	0	1	8	2	1	2	0	1	5	32
Grand Total	1	44	4	1	7	50	3	3	4	0	9	10	2	37	5	0	9	44	2	5	5	0	12	12	116
Approach%	2%	88%	8%	2%	-	-	30%	30%	40%	0%	-	-	4.5%	84.1%	11.4%	0%	-	-	16.7%	41.7%	41.7%	0%	-	-	-
Totals %	0.9%	37.9%	3.4%	0.9%	-	43.1%	2.6%	2.6%	3.4%	0%	-	8.6%	1.7%	31.9%	4.3%	0%	-	37.9%	1.7%	4.3%	4.3%	0%	-	10.3%	-
PHF	0.25	0.85	0.33	0.25	-	0.74	0.38	0.75	0.33	0	-	0.42	0.5	0.77	0.63	0	-	0.79	0.25	0.63	0.63	0	-	0.6	-
Heavy	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	-
Heavy %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	20%	0%	0%	-	8.3%	-
Lights	1	44	4	1	-	50	3	3	4	0	-	10	2	34	4	0	-	40	2	4	5	0	-	11	-
Lights %	100%	100%	100%	100%	-	100%	100%	100%	100%	0%	-	100%	100%	91.9%	80%	0%	-	90.9%	100%	80%	100%	0%	-	91.7%	-
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	-
Single-Unit Trucks %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	20%	0%	0%	-	8.3%	-
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	-
Buses %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	-
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	3	1	0	-	4	0	0	0	0	-	0	-
Bicycles on Road %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	8.1%	20%	0%	-	9.1%	0%	0%	0%	0%	-	0%	-
Pedestrians	-	-	-	-	7	-	-	-	-	-	9	-	-	-	-	-	9	-	-	-	-	-	12	-	-
Pedestrians%	-	-	-	-	18.9%	-	-	-	-	-	24.3%	-	-	-	-	-	24.3%	-	-	-	-	-	32.4%	-	-

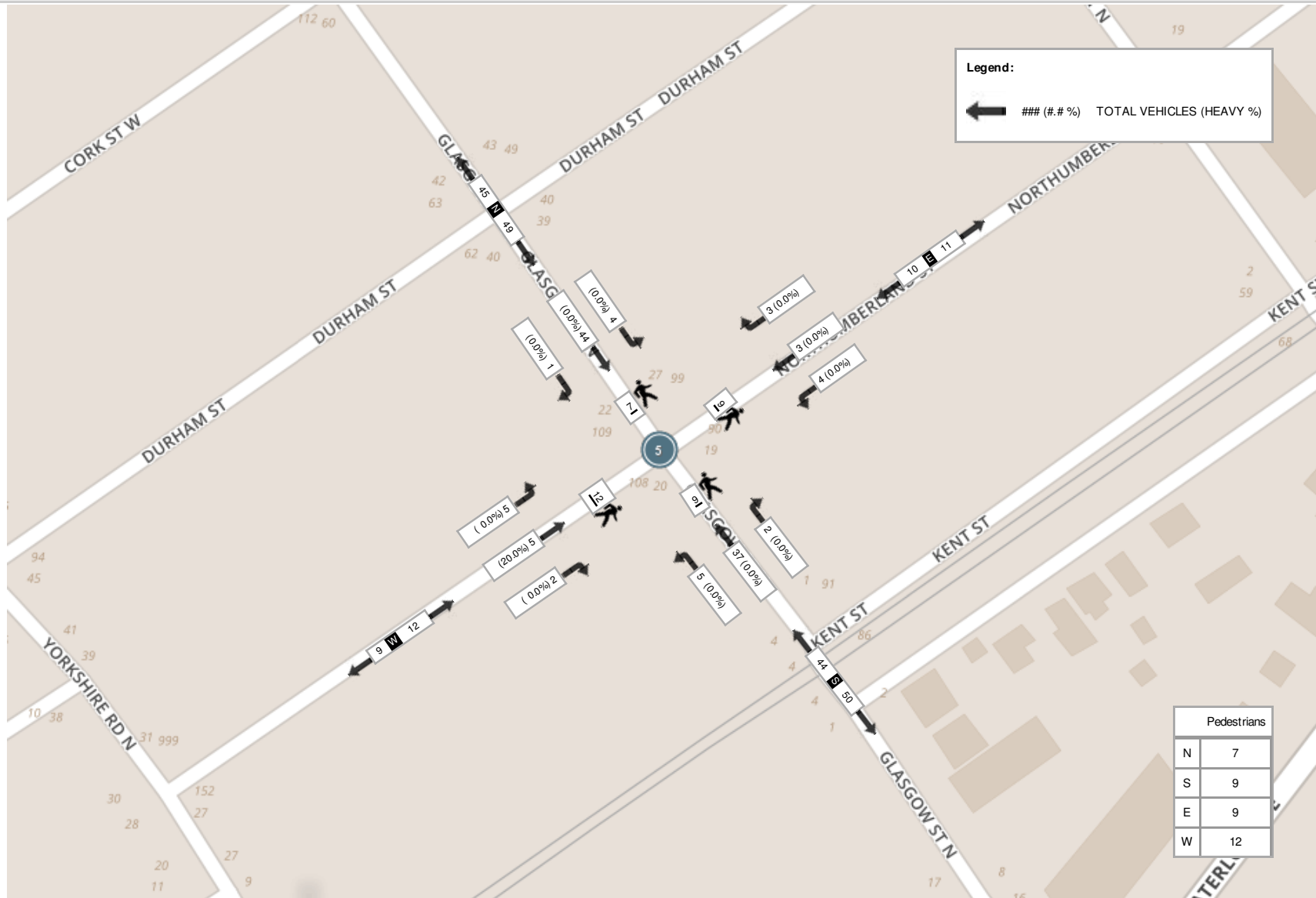
Peak Hour: 08:15 AM - 09:15 AM Weather:



Peak Hour: 12:00 PM - 01:00 PM Weather:



Peak Hour: 04:45 PM - 05:45 PM Weather:





Turning Movement Count (6 . REDO - GLASGOW ST N & KENT ST)

[illegible]



Peak Hour: 08:00 AM - 09:00 AM Weather:

Start Time	W Approach					S Approach					N Approach					E Approach					N Approach GLASGOW ST N						E Approach KENT ST						S Approach GLASGOW ST N						W Approach KENT ST						Int. Total (15 min)		
	Right	Left	Thru	Peds	Approach Total	Left	Thru	Right	Peds	Approach Total	Right	Thru	Left	Peds	Approach Total	Thru	Left	Right	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total			
08:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	12	0	0	0	0	1	0	0	6	0	0	0	0	6	0	0	0	0	2	0	18
08:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	3	14	1	0	0	0	3	1	1	10	0	0	0	4	11	0	0	0	0	4	0	26	
08:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	6	1	0	1	0	0	2	3	6	0	0	0	9	0	0	0	0	0	0	17		
08:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39	2	0	0	41	1	0	0	1	2	2	0	20	0	0	1	20	0	0	0	0	4	0	63		
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	71	2	0	3	73	3	0	1	1	6	5	4	42	0	0	1	46	0	0	0	0	10	0	124		
Approach%	0%	0%	0%		-	0%	0%	0%		-	0%	0%	0%		-	0%	0%	0%		-	0%	97.3%	2.7%	0%		-	60%	0%	20%	20%		-	8.7%	91.3%	0%	0%		-	0%	0%	0%	0%		-	-		
Totals %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	57.3%	1.6%	0%		58.9%	2.4%	0%	0.8%	0.8%		4%	3.2%	33.9%	0%	0%		37.1%	0%	0%	0%	0%		0%	-			
PHF	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0.46	0.25	0		0.45	0.75	0	0.25	0.25		0.63	0.33	0.53	0	0		0.58	0	0	0	0		0	-		
Heavy	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	-		
Heavy %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	1.4%	0%	0%		1.4%	0%	0%	0%	0%		0%	0%	2.4%	0%	0%		2.2%	0%	0%	0%	0%		0%	-		
Lights	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	68	1	0		69	2	0	1	1		4	4	41	0	0		45	0	0	0	0		0	-		
Lights %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	95.8%	50%	0%		94.5%	66.7%	0%	100%	100%		80%	100%	97.6%	0%	0%		97.8%	0%	0%	0%	0%		0%	-			
Single-Unit Trucks	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	0		0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-			
Single-Unit Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-			
Buses	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	-		
Buses %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	1.4%	0%	0%		1.4%	0%	0%	0%	0%		0%	0%	2.4%	0%	0%		2.2%	0%	0%	0%	0%		0%	-		
Articulated Trucks	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	0		0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-			
Articulated Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-			
Bicycles on Road	0	0	0		0	0	0	0		0	0	0	0		0	0	2	1	0		3	1	0	0		1	0	0	0		1	0	0	0	0		0	0	0	0	0		0	-			
Bicycles on Road %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	2.8%	50%	0%		4.1%	33.3%	0%	0%	0%		20%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%		0%	-	
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	6	-	-	-	-	-	1	-	-	-	-	9	-	-	-	-		
Pedestrians%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	15%	-	-	-	-	30%	-	-	-	-	5%	-	-	-	-	45%	-	-	-	-	45%	-	-	
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-	-	-	1	-		
Bicycles on Crosswalk%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	5%	-	-	-	-	5%	-	-	



Peak Hour: 12:00 PM - 01:00 PM Weather:

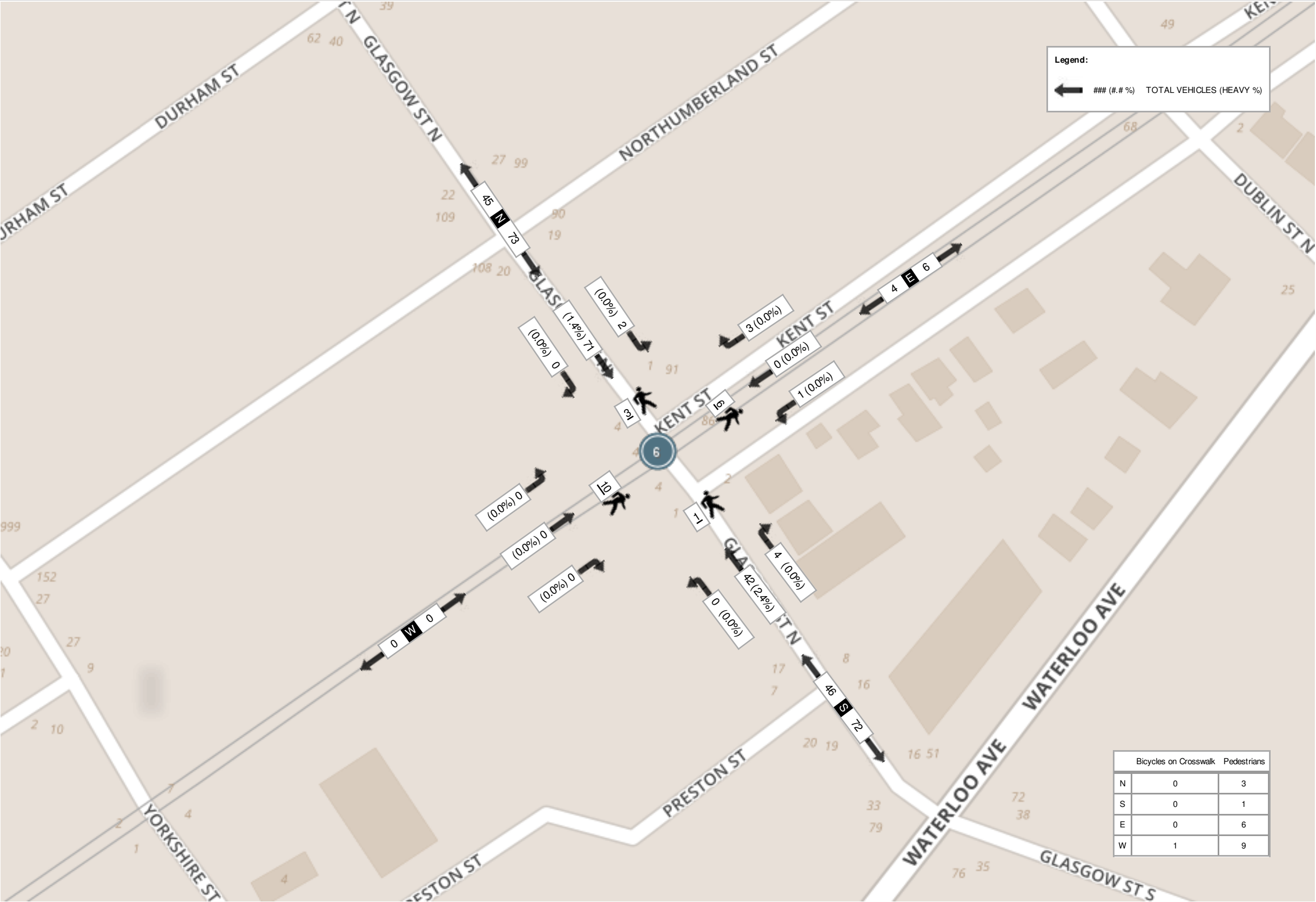
Start Time	W Approach					S Approach					N Approach					E Approach					N Approach GLASGOW ST N						E Approach KENT ST						S Approach GLASGOW ST N						W Approach KENT ST						Int. Total (15 min)			
	Right	Left	Thru	Peds	Approach Total	Left	Thru	Right	Peds	Approach Total	Right	Thru	Left	Peds	Approach Total	Thru	Left	Right	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total				
12:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	9	1	0	0	0	0	1	1	0	8	0	0	0	0	8	0	0	0	0	1	0	18
12:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	1	10	1	0	0	0	0	1	1	0	5	0	0	0	0	5	0	0	0	0	1	0	16
12:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	5	0	0	0	0	0	2	0	0	5	0	0	0	0	5	0	0	0	0	1	0	10
12:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	5	0	0	0	0	0	0	0	4	0	0	0	0	4	0	0	0	0	2	0	9	
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	0	0	0	1	29	2	0	0	0	0	4	2	0	22	0	0	0	0	22	0	0	0	0	5	0	53
Approach%	0%	0%	0%		-	0%	0%	0%		-	0%	0%	0%		-	0%	0%	0%		-	0%	100%	0%	0%		-	100%	0%	0%	0%		-	0%	100%	0%	0%		-	0%	0%	0%	0%		-	-	-		
Totals %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	54.7%	0%	0%		54.7%	3.8%	0%	0%	0%		3.8%	0%	41.5%	0%	0%		41.5%	0%	0%	0%	0%		0%	-	-			
PHF	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0.73	0	0		0.73	0.5	0	0	0		0.5	0	0.69	0	0		0.69	0	0	0	0		0	-	-		
Heavy	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-	-				
Heavy %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-	-						
Lights	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	27	0	0		27	1	0	0	0		1	0	22	0	0		22	0	0	0	0		0	-	-		
Lights %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	93.1%	0%	0%		93.1%	50%	0%	0%	0%		50%	0%	100%	0%	0%		100%	0%	0%	0%	0%		0%	-	-			
Single-Unit Trucks	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	-	-						
Single-Unit Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-	-						
Buses	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	-	-						
Buses %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-	-						
Articulated Trucks	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	-	-						
Articulated Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-	-						
Bicycles on Road	0	0	0		0	0	0	0		0	0	0	0		0	0	2	0		0	2	0	0		2	1	0	0	0		1	0	0	0		0	0	0	0		0	-	-					
Bicycles on Road %	0%	0%	0%		0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	6.9%	0%		0%	6.9%	50%	0%	0%		50%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%		0%	-	-						
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-	-	-	4	-	-	-	-	0	-	-	-	-	0	-	-	5	-	-	-			
Pedestrians%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-	-	-	0%		-	-	-	10%		-	-	-	40%		-	-	-	-	0%		-	-	-	-	50%		-	-	-	-		
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	0	-	-	-			
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-	-	-	0%		-	-	-	0%		-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-		



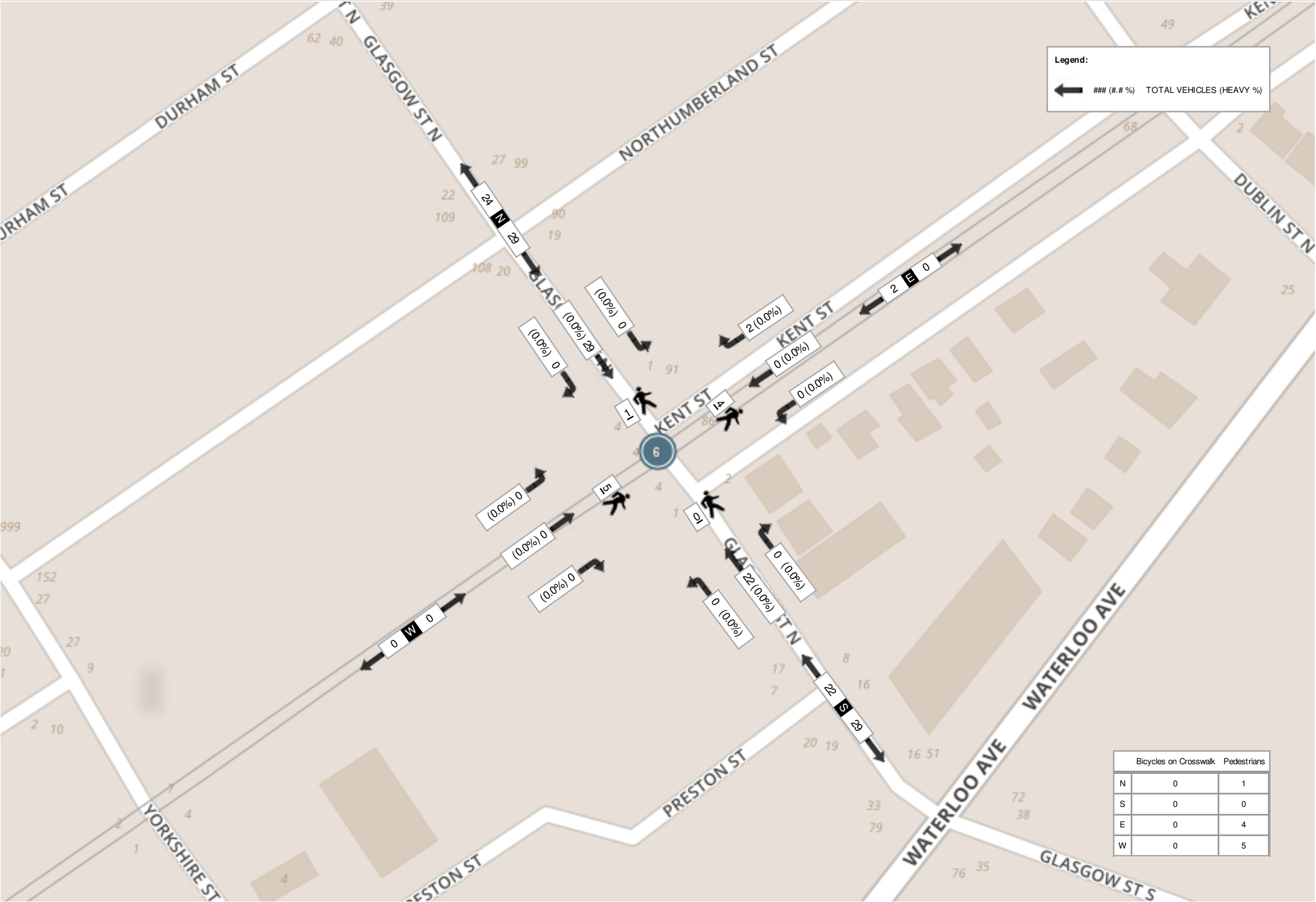
Peak Hour: 04:30 PM - 05:30 PM Weather:

Start Time	W Approach					S Approach					N Approach					E Approach					N Approach GLASGOW ST N						E Approach KENT ST						S Approach GLASGOW ST N						W Approach KENT ST						Int. Total (15 min)
	Right	Left	Thru	Peds	Approach Total	Left	Thru	Right	Peds	Approach Total	Right	Thru	Left	Peds	Approach Total	Thru	Left	Right	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total							
16:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	2	0	1	16	1	0	2	0	1	3	1	5	0	0	0	6	0	0	0	0	2	0	25
16:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	1	0	3	17	3	0	0	0	0	3	1	3	0	0	0	4	0	0	0	0	1	0	24
17:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	11	1	0	0	0	2	1	2	15	0	0	0	17	0	0	0	0	3	0	29
17:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	12	0	0	0	0	1	0	2	18	0	0	0	20	0	0	0	0	1	0	32
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	3	0	4	56	5	0	2	0	4	7	6	41	0	0	0	47	0	0	0	0	7	0	110
Approach%	0%	0%	0%		-	0%	0%	0%		-	0%	0%	0%		-	0%	94.6%	5.4%	0%		-	71.4%	0%	28.6%	0%		-	12.8%	87.2%	0%	0%		-	0%	0%	0%	0%		-		-	-	-	-	-
Totals %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	48.2%	2.7%	0%		50.9%	4.5%	0%	1.8%	0%		6.4%	5.5%	37.3%	0%	0%		42.7%	0%	0%	0%	0%		0%		-	-	-	-	
PHF	0	0	0		0	0	0	0		0	0	0	0		0	0	0.83	0.38	0		0.82	0.42	0	0.25	0		0.58	0.75	0.57	0	0		0.59	0	0	0	0		0		-	-	-	-	
Heavy	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0		-	-	-	-	
Heavy %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%		0%		-	-	-	-		
Lights	0	0	0		0	0	0	0		0	0	0	0		0	0	50	3	0		53	4	0	2	0		6	4	41	0	0		45	0	0	0	0		0		-	-	-	-	
Lights %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	94.3%	100%	0%		94.6%	80%	0%	100%	0%		85.7%	66.7%	100%	0%	0%		95.7%	0%	0%	0%	0%		0%		-	-	-	-	
Single-Unit Trucks	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0		-	-	-	-	
Single-Unit Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%		0%		-	-	-	-		
Buses	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0		-	-	-	-	
Buses %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%		0%		-	-	-	-		
Articulated Trucks	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0		-	-	-	-	
Articulated Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%		0%		-	-	-	-		
Bicycles on Road	0	0	0		0	0	0	0		0	0	0	0		0	0	3	0	0		3	1	0	0	0		1	2	0	0	0		2	0	0	0	0		0		-	-	-	-	
Bicycles on Road %	0%	0%	0%		0%	0%	0%		0%	0%	0%	0%		0%	0%	5.7%	0%	0%		5.4%	20%	0%	0%	0%		14.3%	33.3%	0%	0%	0%		4.3%	0%	0%	0%		0%		-	-	-	-			
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	0	-	-	-	7	-	-	-		
Pedestrians%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-	-	-	0%		-	-	-	-	26.7%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	46.7%		-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	0	-	-	-	0	-	-	-	0	-	
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%	-	

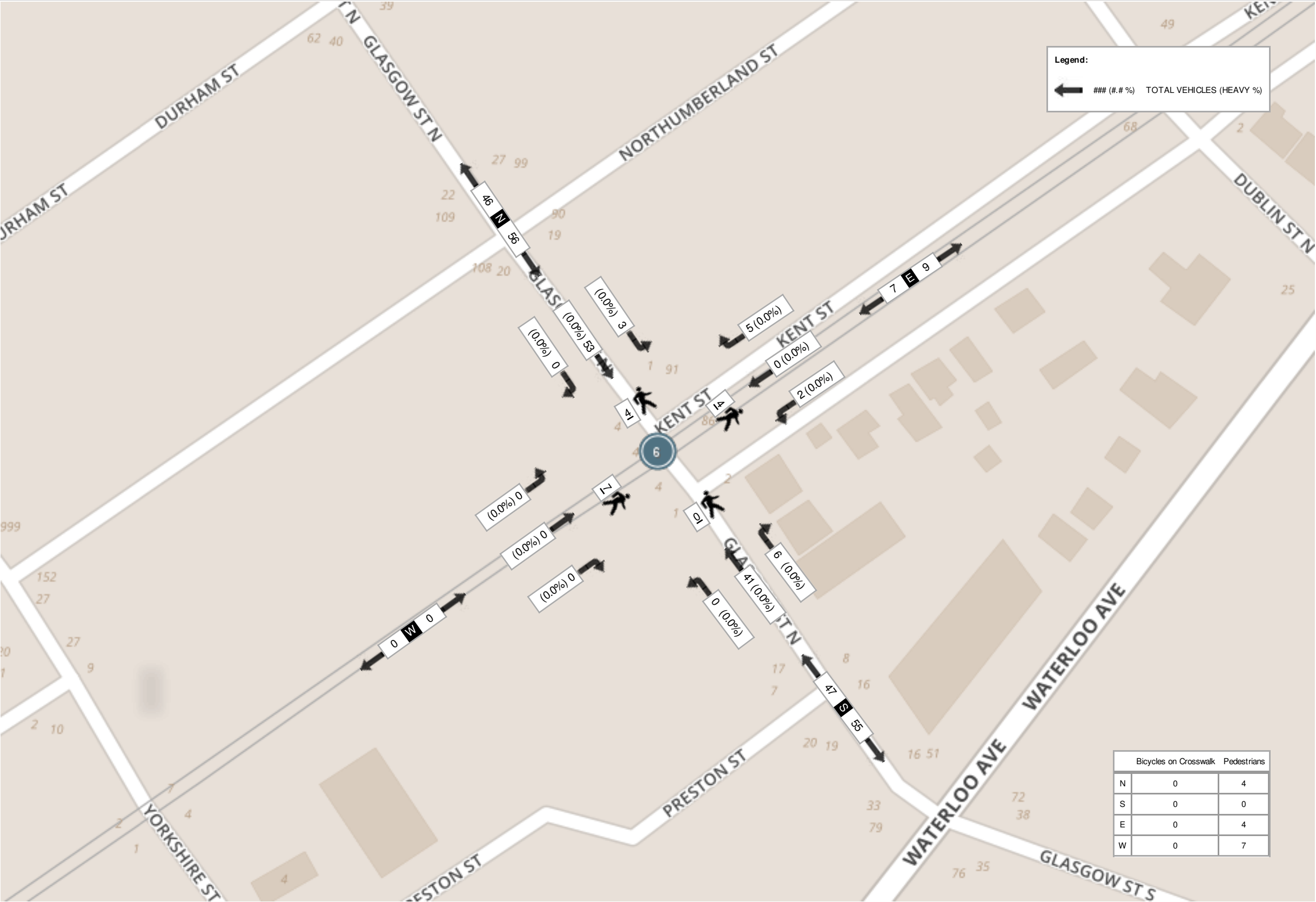
Peak Hour: 08:00 AM - 09:00 AM Weather:



Peak Hour: 12:00 PM - 01:00 PM Weather:



Peak Hour: 04:30 PM - 05:30 PM Weather:





Turning Movement Count (7 . WATERLOO AVE & GLASGOW ST S)

Start Time	N Approach GLASGOW ST S						E Approach WATERLOO AVE						S Approach GLASGOW ST S						W Approach WATERLOO AVE						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total			
07:00:00	1	0	3	0	1	4	1	17	0	0	1	18	0	0	1	0	1	1	0	20	7	0	0	27	50		
07:15:00	3	1	1	0	1	5	0	17	0	0	3	17	1	0	1	0	3	2	1	27	1	0	1	29	53		
07:30:00	1	0	4	0	0	5	0	23	3	0	0	26	0	0	1	0	1	1	1	65	0	0	0	66	98		
07:45:00	5	2	3	0	1	10	2	30	1	0	0	33	2	2	3	0	6	7	2	56	0	0	0	58	108	309	
08:00:00	3	2	7	0	0	12	1	34	4	0	1	39	0	1	1	0	1	2	2	75	1	0	0	78	131	390	
08:15:00	8	1	3	0	2	12	1	34	5	0	0	40	1	1	2	0	6	4	0	83	7	0	2	90	146	483	
08:30:00	4	3	5	0	1	12	9	45	6	0	2	60	3	2	1	0	3	6	1	107	7	0	1	115	193	578	
08:45:00	13	9	7	0	0	29	5	49	5	0	0	59	6	3	1	0	2	10	7	106	4	0	0	117	215	685	
09:00:00	2	5	3	0	0	10	4	51	2	0	0	57	2	1	2	0	3	5	2	68	3	0	0	73	145	699	
09:15:00	4	3	10	0	1	17	1	36	0	0	0	37	4	1	2	0	1	7	1	59	4	0	1	64	125	678	
09:30:00	5	2	6	0	0	13	2	29	2	0	2	33	3	2	1	0	7	6	1	54	3	0	0	58	110	595	
09:45:00	4	2	5	0	0	11	9	29	1	0	0	39	3	1	3	0	3	7	1	62	3	0	2	66	123	503	
BREAK																											
11:00:00	2	0	2	0	1	4	3	38	0	0	0	41	3	0	2	0	2	5	4	36	1	0	0	41	91		
11:15:00	4	1	1	0	0	6	0	36	2	0	0	38	0	0	1	0	0	1	1	33	1	0	0	35	80		
11:30:00	3	1	3	0	2	7	3	39	2	0	1	44	4	0	2	0	3	6	0	43	3	0	2	46	103		
11:45:00	1	1	5	0	1	7	5	48	2	0	0	55	2	0	1	0	1	3	1	51	4	0	1	56	121	395	
12:00:00	4	1	1	0	2	6	5	41	3	0	0	49	4	0	5	0	6	9	4	45	3	0	1	52	116	420	
12:15:00	3	1	5	0	1	9	3	47	1	0	1	51	7	1	1	0	5	9	1	40	3	0	0	44	113	453	
12:30:00	4	0	7	0	1	11	2	38	1	0	1	41	2	2	2	0	1	6	1	55	3	0	0	59	117	467	
12:45:00	1	2	3	0	1	6	4	51	2	0	0	57	6	0	2	0	3	8	6	56	4	0	0	66	137	483	
BREAK																											
16:00:00	5	0	4	0	1	9	7	69	2	0	1	78	1	1	2	0	11	4	2	60	3	0	1	65	156		
16:15:00	5	0	6	0	6	11	4	65	4	0	0	73	5	3	5	0	5	13	4	66	7	0	1	77	174		
16:30:00	6	1	8	0	4	15	4	71	0	0	0	75	6	0	4	0	5	10	2	60	4	0	1	66	166		
16:45:00	4	2	6	0	3	12	3	70	0	0	1	73	5	1	3	0	2	9	1	65	3	0	1	69	163	659	
17:00:00	5	3	7	0	1	15	8	89	0	0	0	97	10	0	9	0	1	19	1	58	5	0	1	64	195	698	
17:15:00	7	0	6	0	5	13	2	72	2	0	0	76	2	4	6	0	4	12	2	49	7	0	1	58	159	683	
17:30:00	5	4	6	0	3	15	1	63	2	0	4	66	1	1	2	0	1	4	1	65	6	0	0	72	157	674	
17:45:00	5	0	3	0	0	8	5	43	2	0	1	50	0	0	1	0	3	1	0	44	4	0	0	48	107	618	
18:00:00	3	1	0	0	3	4	2	56	2	0	2	60	4	2	2	0	4	8	1	38	3	0	1	42	114	537	



18:15:00	0	2	5	0	4	7	9	58	1	0	0	68	1	2	4	0	2	7	4	47	3	0	1	54	136	514
18:30:00	4	2	2	0	6	8	7	49	2	0	0	58	0	1	1	0	2	2	3	45	4	0	1	52	120	477
18:45:00	6	2	8	0	4	16	6	29	1	0	1	36	1	0	1	0	5	2	1	35	6	0	0	42	96	466
Grand Total	130	54	145	0	56	329	118	1466	60	0	22	1644	89	32	75	0	103	196	59	1773	117	0	20	1949	4118	-
Approach%	39.5%	16.4%	44.1%	0%	-	7.2%	89.2%	3.6%	0%	-	45.4%	16.3%	38.3%	0%	-	3%	91%	6%	0%	-	-	-	-	-	-	
Totals %	3.2%	1.3%	3.5%	0%	8%	2.9%	35.6%	1.5%	0%	39.9%	2.2%	0.8%	1.8%	0%	4.8%	1.4%	43.1%	2.8%	0%	47.3%	-	-	-	-	-	
Heavy	4	0	1	0	-	1	31	0	0	-	1	1	1	0	-	4	40	3	0	-	-	-	-	-	-	
Heavy %	3.1%	0%	0.7%	0%	-	0.8%	2.1%	0%	0%	-	1.1%	3.1%	1.3%	0%	-	6.8%	2.3%	2.6%	0%	-	-	-	-	-	-	
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Peak Hour: 08:15 AM - 09:15 AM Weather:

Start Time	N Approach GLASGOW ST S						E Approach WATERLOO AVE						S Approach GLASGOW ST S						W Approach WATERLOO AVE						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:15:00	8	1	3	0	2	12	1	34	5	0	0	40	1	1	2	0	6	4	0	83	7	0	2	90	146
08:30:00	4	3	5	0	1	12	9	45	6	0	2	60	3	2	1	0	3	6	1	107	7	0	1	115	193
08:45:00	13	9	7	0	0	29	5	49	5	0	0	59	6	3	1	0	2	10	7	106	4	0	0	117	215
09:00:00	2	5	3	0	0	10	4	51	2	0	0	57	2	1	2	0	3	5	2	68	3	0	0	73	145
Grand Total	27	18	18	0	3	63	19	179	18	0	2	216	12	7	6	0	14	25	10	364	21	0	3	395	699
Approach%	42.9%	28.6%	28.6%	0%		-	8.8%	82.9%	8.3%	0%		-	48%	28%	24%	0%		-	2.5%	92.2%	5.3%	0%		-	-
Totals %	3.9%	2.6%	2.6%	0%		9%	2.7%	25.6%	2.6%	0%		30.9%	1.7%	1%	0.9%	0%		3.6%	1.4%	52.1%	3%	0%		56.5%	-
PHF	0.52	0.5	0.64	0		0.54	0.53	0.88	0.75	0		0.9	0.5	0.58	0.75	0		0.63	0.36	0.85	0.75	0		0.84	-
Heavy	2	0	1	0		3	1	3	0	0		4	0	0	0	0		0	0	5	1	0		6	-
Heavy %	7.4%	0%	5.6%	0%		4.8%	5.3%	1.7%	0%	0%		1.9%	0%	0%	0%	0%		0%	0%	1.4%	4.8%	0%		1.5%	-
Lights	25	16	16	0		57	18	176	17	0		211	12	7	6	0		25	9	357	20	0		386	-
Lights %	92.6%	88.9%	88.9%	0%		90.5%	94.7%	98.3%	94.4%	0%		97.7%	100%	100%	100%	0%		100%	90%	98.1%	95.2%	0%		97.7%	-
Single-Unit Trucks	1	0	1	0		2	1	1	0	0		2	0	0	0	0		0	0	1	0	0		1	-
Single-Unit Trucks %	3.7%	0%	5.6%	0%		3.2%	5.3%	0.6%	0%	0%		0.9%	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.3%	-
Buses	1	0	0	0		1	0	2	0	0		2	0	0	0	0		0	0	3	1	0		4	-
Buses %	3.7%	0%	0%	0%		1.6%	0%	1.1%	0%	0%		0.9%	0%	0%	0%	0%		0%	0%	0.8%	4.8%	0%		1%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.3%	-
Bicycles on Road	0	2	1	0		3	0	0	1	0		1	0	0	0	0		0	1	2	0	0		3	-
Bicycles on Road %	0%	11.1%	5.6%	0%		4.8%	0%	0%	5.6%	0%		0.5%	0%	0%	0%	0%		0%	10%	0.5%	0%	0%		0.8%	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	14	-	-	-	-	-	3	-	-
Pedestrians%	-	-	-	-	13.6%	-	-	-	-	-	9.1%	-	-	-	-	-	63.6%	-	-	-	-	-	13.6%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



Peak Hour: 12:00 PM - 01:00 PM Weather:

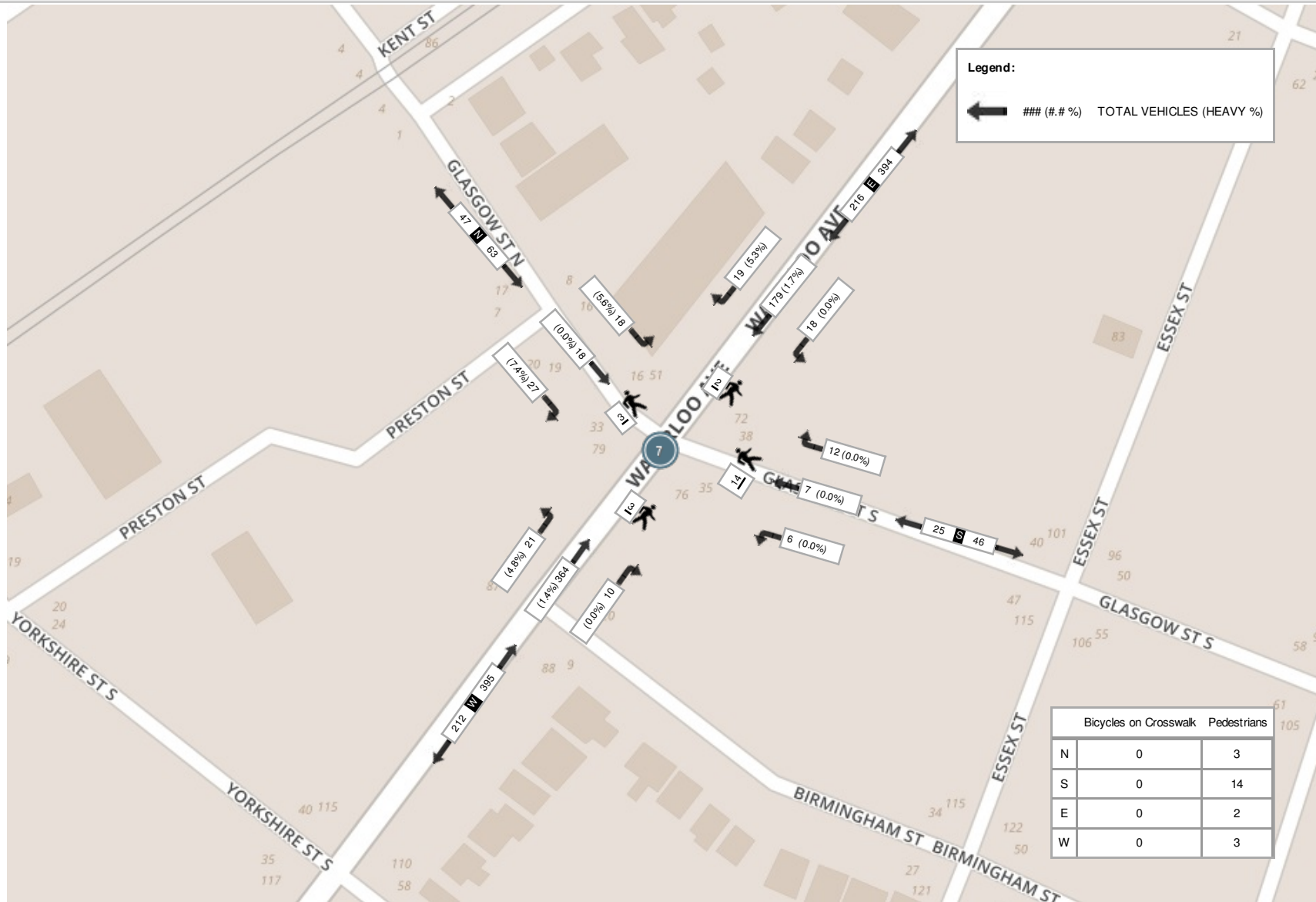
Start Time	N Approach GLASGOW ST S						E Approach WATERLOO AVE						S Approach GLASGOW ST S						W Approach WATERLOO AVE						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
12:00:00	4	1	1	0	2	6	5	41	3	0	0	49	4	0	5	0	6	9	4	45	3	0	1	52	116
12:15:00	3	1	5	0	1	9	3	47	1	0	1	51	7	1	1	0	5	9	1	40	3	0	0	44	113
12:30:00	4	0	7	0	1	11	2	38	1	0	1	41	2	2	2	0	1	6	1	55	3	0	0	59	117
12:45:00	1	2	3	0	1	6	4	51	2	0	0	57	6	0	2	0	3	8	6	56	4	0	0	66	137
Grand Total	12	4	16	0	5	32	14	177	7	0	2	198	19	3	10	0	15	32	12	196	13	0	1	221	483
Approach%	37.5%	12.5%	50%	0%	-	-	7.1%	89.4%	3.5%	0%	-	-	59.4%	9.4%	31.3%	0%	-	-	5.4%	88.7%	5.9%	0%	-	-	-
Totals %	2.5%	0.8%	3.3%	0%	6.6%	2.9%	36.6%	1.4%	0%	41%	3.9%	0.6%	2.1%	0%	6.6%	2.5%	40.6%	2.7%	0%	45.8%	-	-	-	-	-
PHF	0.75	0.5	0.57	0	0.73	0.7	0.87	0.58	0	0.87	0.68	0.38	0.5	0	0.89	0.5	0.88	0.81	0	0.84	-	-	-	-	-
Heavy	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	1	6	1	0	8	8	-
Heavy %	0%	0%	0%	0%	0%	0%	0%	1.1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	8.3%	3.1%	7.7%	0%	3.6%	3.6%	-
Lights	12	4	16	0	32	14	174	7	0	195	19	2	10	0	31	11	190	12	0	213	-	-	-	-	-
Lights %	100%	100%	100%	0%	100%	100%	98.3%	100%	0%	98.5%	100%	66.7%	100%	0%	96.9%	91.7%	96.9%	92.3%	0%	96.4%	-	-	-	-	-
Single-Unit Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	-
Single-Unit Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	7.7%	0%	0.5%	0.5%	-
Buses	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	1	6	0	0	7	7	-
Buses %	0%	0%	0%	0%	0%	0%	0%	1.1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	8.3%	3.1%	0%	0%	3.2%	3.2%	-
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Articulated Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Bicycles on Road	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	-
Bicycles on Road %	0%	0%	0%	0%	0%	0%	0%	0.6%	0%	0%	0.5%	0%	33.3%	0%	0%	3.1%	0%	0%	0%	0%	0%	0%	0%	0%	-
Pedestrians	-	-	-	-	5	-	-	-	-	-	2	-	-	-	-	-	14	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	21.7%	-	-	-	-	-	8.7%	-	-	-	-	-	60.9%	-	-	-	-	-	0%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	4.3%	-	-	-	-	-	4.3%	-	-



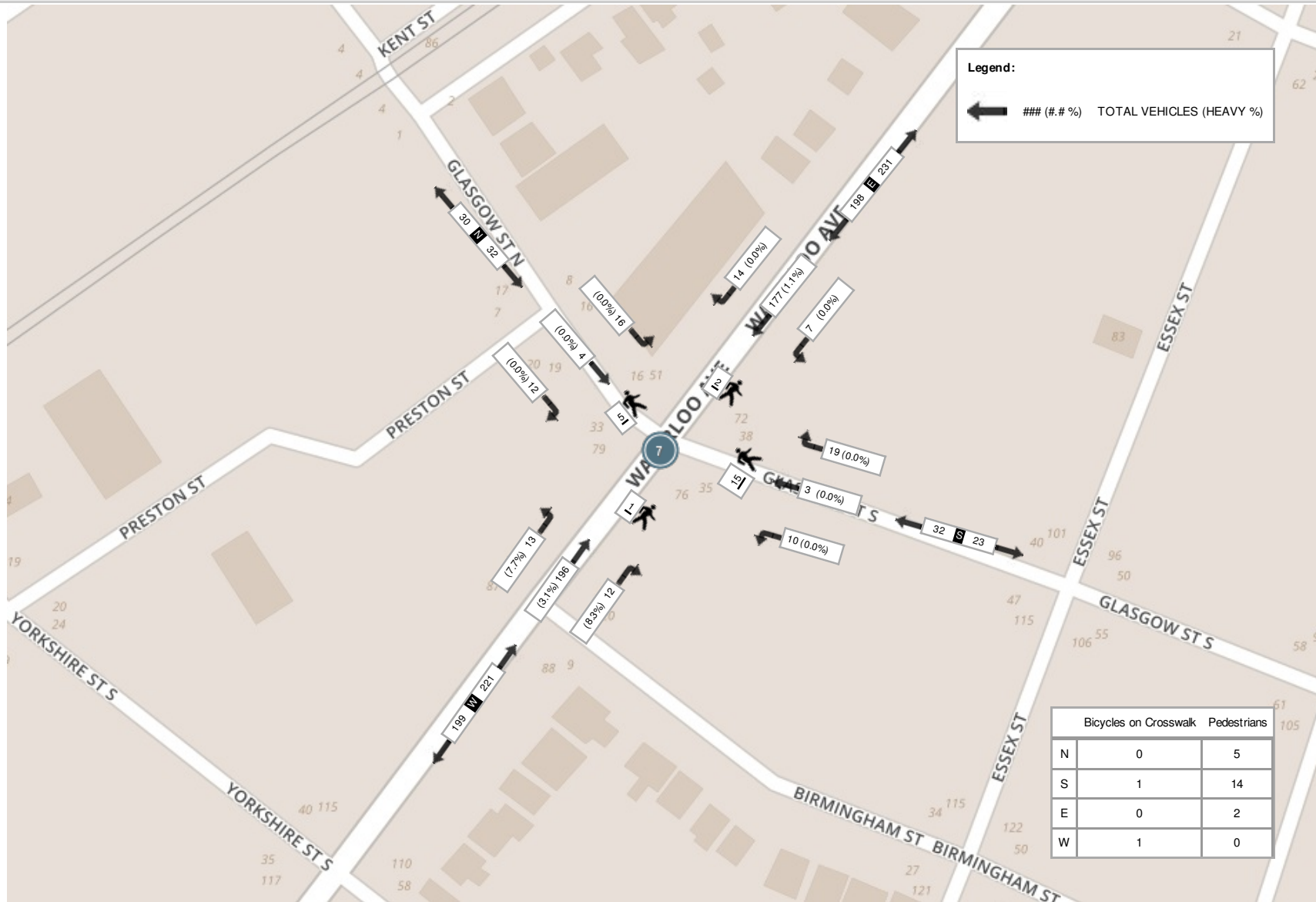
Peak Hour: 04:15 PM - 05:15 PM Weather:

Start Time	N Approach GLASGOW ST S						E Approach WATERLOO AVE						S Approach GLASGOW ST S						W Approach WATERLOO AVE						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:15:00	5	0	6	0	6	11	4	65	4	0	0	73	5	3	5	0	5	13	4	66	7	0	1	77	174
16:30:00	6	1	8	0	4	15	4	71	0	0	0	75	6	0	4	0	5	10	2	60	4	0	1	66	166
16:45:00	4	2	6	0	3	12	3	70	0	0	1	73	5	1	3	0	2	9	1	65	3	0	1	69	163
17:00:00	5	3	7	0	1	15	8	89	0	0	0	97	10	0	9	0	1	19	1	58	5	0	1	64	195
Grand Total	20	6	27	0	14	53	19	295	4	0	1	318	26	4	21	0	13	51	8	249	19	0	4	276	698
Approach%	37.7%	11.3%	50.9%	0%	-	-	6%	92.8%	1.3%	0%	-	-	51%	7.8%	41.2%	0%	-	-	2.9%	90.2%	6.9%	0%	-	-	-
Totals %	2.9%	0.9%	3.9%	0%	7.6%	2.7%	42.3%	0.6%	0%	45.6%	3.7%	0.6%	3%	0%	7.3%	1.1%	35.7%	2.7%	0%	39.5%	-	-	-	-	-
PHF	0.83	0.5	0.84	0	0.88	0.59	0.83	0.25	0	0.82	0.65	0.33	0.58	0	0.67	0.5	0.94	0.68	0	0.9	-	-	-	-	-
Heavy	0	0	0	0	0	0	0	7	0	0	7	1	0	0	0	1	0	7	0	0	7	-	-	-	-
Heavy %	0%	0%	0%	0%	0%	0%	0%	2.4%	0%	0%	2.2%	3.8%	0%	0%	0%	2%	0%	2.8%	0%	0%	2.5%	-	-	-	-
Lights	20	6	27	0	53	17	285	4	0	306	23	4	21	0	48	8	242	19	0	269	-	-	-	-	-
Lights %	100%	100%	100%	0%	100%	89.5%	96.6%	100%	0%	96.2%	88.5%	100%	100%	0%	94.1%	100%	97.2%	100%	0%	97.5%	-	-	-	-	-
Single-Unit Trucks	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	3	0	0	3	-	-	-	-	-
Single-Unit Trucks %	0%	0%	0%	0%	0%	0%	1.4%	0%	0%	1.3%	0%	0%	0%	0%	0%	0%	1.2%	0%	0%	1.1%	-	-	-	-	-
Buses	0	0	0	0	0	0	3	0	0	3	1	0	0	0	1	0	4	0	0	4	-	-	-	-	-
Buses %	0%	0%	0%	0%	0%	0%	1%	0%	0%	0.9%	3.8%	0%	0%	0%	2%	0%	1.6%	0%	0%	1.4%	-	-	-	-	-
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
Articulated Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	-	-	-	-
Bicycles on Road	0	0	0	0	0	2	3	0	0	5	2	0	0	0	2	0	0	0	0	0	-	-	-	-	-
Bicycles on Road %	0%	0%	0%	0%	0%	10.5%	1%	0%	0%	1.6%	7.7%	0%	0%	0%	3.9%	0%	0%	0%	0%	0%	-	-	-	-	-
Pedestrians	-	-	-	-	14	-	-	-	-	1	-	-	-	-	11	-	-	-	-	4	-	-	-	-	-
Pedestrians%	-	-	-	-	43.8%	-	-	-	-	3.1%	-	-	-	-	34.4%	-	-	-	-	12.5%	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	2	-	-	-	-	0	-	-	-	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	6.3%	-	-	-	-	0%	-	-	-	-	-

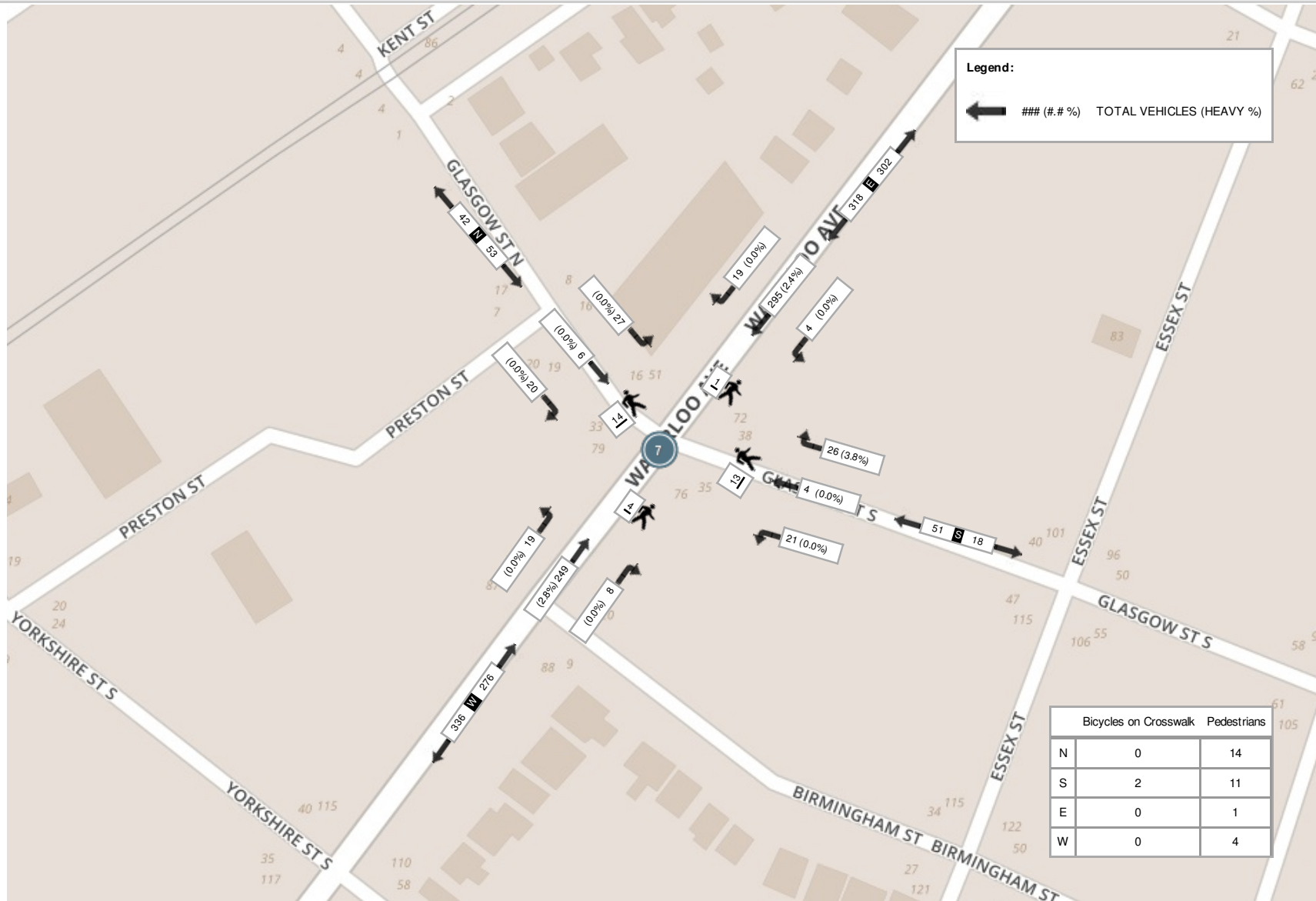
Peak Hour: 08:15 AM - 09:15 AM Weather:



Peak Hour: 12:00 PM - 01:00 PM Weather:



Peak Hour: 04:15 PM - 05:15 PM Weather:





Turning Movement Count (8 . PAISLEY ST & DUBLIN ST N)

Start Time	N Approach DUBLIN ST N						E Approach PAISLEY ST						S Approach DUBLIN ST N						W Approach PAISLEY ST						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total			
07:00:00	0	1	0	0	1	1	1	28	1	0	1	30	2	1	0	0	0	3	3	35	3	0	2	41	75		
07:15:00	1	3	1	0	0	5	0	28	1	0	0	29	3	1	0	0	1	4	6	49	1	0	1	56	94		
07:30:00	2	2	1	0	3	5	2	39	2	0	0	43	2	6	1	0	3	9	1	49	4	0	0	54	111		
07:45:00	2	8	3	0	2	13	1	46	4	0	1	51	3	6	5	0	2	14	3	76	1	0	0	80	158	438	
08:00:00	3	8	4	0	3	15	3	41	8	0	2	52	7	7	3	0	3	17	1	61	2	0	1	64	148	511	
08:15:00	2	11	3	0	7	16	2	64	6	0	9	72	4	8	2	0	10	14	8	86	3	0	2	97	199	616	
08:30:00	3	21	4	0	13	28	8	60	6	0	44	74	12	19	6	0	8	37	6	95	6	0	4	107	246	751	
08:45:00	1	19	8	0	13	28	4	49	3	0	35	56	14	23	12	0	26	49	5	126	3	0	14	134	267	860	
09:00:00	2	11	5	0	5	18	3	50	1	0	3	54	8	11	3	0	10	22	6	89	3	0	1	98	192	904	
09:15:00	1	6	3	0	1	10	5	46	6	0	2	57	6	10	1	0	6	17	0	57	1	0	0	58	142	847	
09:30:00	3	3	3	0	3	9	2	41	5	0	4	48	6	9	4	0	3	19	1	57	6	0	0	64	140	741	
09:45:00	0	2	7	0	1	9	9	44	0	0	3	53	8	11	2	0	0	21	3	65	0	0	0	68	151	625	
BREAK																											
11:00:00	5	10	2	0	2	17	9	68	2	0	1	79	1	6	2	1	4	10	0	52	5	0	2	57	163		
11:15:00	3	7	9	0	6	19	7	62	2	0	0	71	3	7	3	0	2	13	0	62	0	0	0	62	165		
11:30:00	2	6	1	0	10	9	6	65	2	0	2	73	9	7	3	0	8	19	3	71	5	0	2	79	180		
11:45:00	4	6	6	0	12	16	5	57	5	0	6	67	7	5	2	0	14	14	3	64	5	0	0	72	169	677	
12:00:00	5	10	4	0	10	19	2	81	4	0	1	87	11	13	5	0	11	29	1	74	3	0	2	78	213	727	
12:15:00	2	7	2	0	4	11	5	74	5	0	1	84	6	12	4	0	3	22	4	72	2	0	0	78	195	757	
12:30:00	1	2	4	0	8	7	13	67	5	0	2	85	5	4	3	0	8	12	2	67	2	0	2	71	175	752	
12:45:00	1	5	4	0	0	10	8	61	7	0	3	76	10	11	1	0	4	22	2	83	2	0	0	87	195	778	
BREAK																											
16:00:00	3	5	4	0	3	12	9	103	4	0	2	116	8	20	3	0	9	31	3	83	1	0	3	87	246		
16:15:00	0	6	1	0	4	7	4	97	2	0	1	103	7	12	7	0	11	26	0	87	6	0	7	93	229		
16:30:00	6	6	1	0	10	13	3	118	2	0	6	123	16	18	4	0	10	38	3	84	3	0	7	90	264		
16:45:00	6	7	4	0	4	17	8	105	3	0	5	116	12	17	8	0	6	37	4	83	5	0	1	92	262	1001	
17:00:00	6	13	5	0	9	24	7	98	6	0	8	111	11	29	3	0	9	43	6	88	2	0	0	96	274	1029	
17:15:00	4	9	5	0	1	18	9	71	5	0	4	85	11	18	5	0	10	34	1	108	3	0	2	112	249	1049	
17:30:00	4	6	7	0	4	17	6	80	1	0	4	87	4	6	4	0	4	14	6	82	7	0	2	95	213	998	
17:45:00	2	6	1	0	6	9	7	76	5	0	1	88	9	7	1	0	9	17	2	87	2	0	4	91	205	941	
18:00:00	3	7	2	0	3	12	5	75	4	0	3	84	6	18	3	0	7	27	3	83	2	0	0	88	211	878	



18:15:00	4	3	2	0	2	9	1	77	5	0	4	83	2	18	1	0	5	21	2	77	6	0	0	85	198	827
18:30:00	3	5	2	0	3	10	5	77	1	0	3	83	3	6	3	0	7	12	4	61	5	0	4	70	175	789
18:45:00	2	11	1	0	1	14	8	52	8	0	12	68	6	7	2	0	4	15	4	68	3	0	5	75	172	756
Grand Total	86	232	109	0	154	427	167	2100	121	0	173	2388	222	353	106	1	217	682	96	2381	102	0	68	2579	6076	-
Approach%	20.1%	54.3%	25.5%	0%		-	7%	87.9%	5.1%	0%		-	32.6%	51.8%	15.5%	0.1%		-	3.7%	92.3%	4%	0%		-	-	-
Totals %	1.4%	3.8%	1.8%	0%		7%	2.7%	34.6%	2%	0%		39.3%	3.7%	5.8%	1.7%	0%		11.2%	1.6%	39.2%	1.7%	0%		42.4%	-	-
Heavy	3	4	2	0		-	7	43	0	0		-	3	3	2	0		-	0	74	1	0		-	-	-
Heavy %	3.5%	1.7%	1.8%	0%		-	4.2%	2%	0%	0%		-	1.4%	0.8%	1.9%	0%		-	0%	3.1%	1%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-



Peak Hour: 08:15 AM - 09:15 AM Weather:

Start Time	N Approach DUBLIN ST N						E Approach PAISLEY ST						S Approach DUBLIN ST N						W Approach PAISLEY ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:15:00	2	11	3	0	7	16	2	64	6	0	9	72	4	8	2	0	10	14	8	86	3	0	2	97	199
08:30:00	3	21	4	0	13	28	8	60	6	0	44	74	12	19	6	0	8	37	6	95	6	0	4	107	246
08:45:00	1	19	8	0	13	28	4	49	3	0	35	56	14	23	12	0	26	49	5	126	3	0	14	134	267
09:00:00	2	11	5	0	5	18	3	50	1	0	3	54	8	11	3	0	10	22	6	89	3	0	1	98	192
Grand Total	8	62	20	0	38	90	17	223	16	0	91	256	38	61	23	0	54	122	25	396	15	0	21	436	904
Approach%	8.9%	68.9%	22.2%	0%	-	-	6.6%	87.1%	6.3%	0%	-	-	31.1%	50%	18.9%	0%	-	-	5.7%	90.8%	3.4%	0%	-	-	-
Totals %	0.9%	6.9%	2.2%	0%	-	10%	1.9%	24.7%	1.8%	0%	-	28.3%	4.2%	6.7%	2.5%	0%	-	13.5%	2.8%	43.8%	1.7%	0%	-	48.2%	-
PHF	0.67	0.74	0.63	0	-	0.8	0.53	0.87	0.67	0	-	0.86	0.68	0.66	0.48	0	-	0.62	0.78	0.79	0.63	0	-	0.81	-
Heavy	0	2	0	0	-	2	2	8	0	0	-	10	0	0	0	0	-	0	0	12	1	0	-	13	-
Heavy %	0%	3.2%	0%	0%	-	2.2%	11.8%	3.6%	0%	0%	-	3.9%	0%	0%	0%	0%	-	0%	0%	3%	6.7%	0%	-	3%	-
Lights	8	60	20	0	-	88	15	214	16	0	-	245	38	61	22	0	-	121	25	381	14	0	-	420	-
Lights %	100%	96.8%	100%	0%	-	97.8%	88.2%	96%	100%	0%	-	95.7%	100%	100%	95.7%	0%	-	99.2%	100%	96.2%	93.3%	0%	-	96.3%	-
Single-Unit Trucks	0	1	0	0	-	1	0	2	0	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	-
Single-Unit Trucks %	0%	1.6%	0%	0%	-	1.1%	0%	0.9%	0%	0%	-	0.8%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	-
Buses	0	1	0	0	-	1	2	6	0	0	-	8	0	0	0	0	-	0	0	11	1	0	-	12	-
Buses %	0%	1.6%	0%	0%	-	1.1%	11.8%	2.7%	0%	0%	-	3.1%	0%	0%	0%	0%	-	0%	0%	2.8%	6.7%	0%	-	2.8%	-
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	-
Articulated Trucks %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0.3%	0%	0%	-	0.2%	-
Bicycles on Road	0	0	0	0	-	0	0	1	0	0	-	1	0	0	1	0	-	1	0	3	0	0	-	3	-
Bicycles on Road %	0%	0%	0%	0%	-	0%	0%	0.4%	0%	0%	-	0.4%	0%	0%	4.3%	0%	-	0.8%	0%	0.8%	0%	0%	-	0.7%	-
Pedestrians	-	-	-	-	38	-	-	-	-	-	91	-	-	-	-	-	54	-	-	-	-	-	21	-	-
Pedestrians%	-	-	-	-	18.6%	-	-	-	-	-	44.6%	-	-	-	-	-	26.5%	-	-	-	-	-	10.3%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



Peak Hour: 12:00 PM - 01:00 PM Weather:

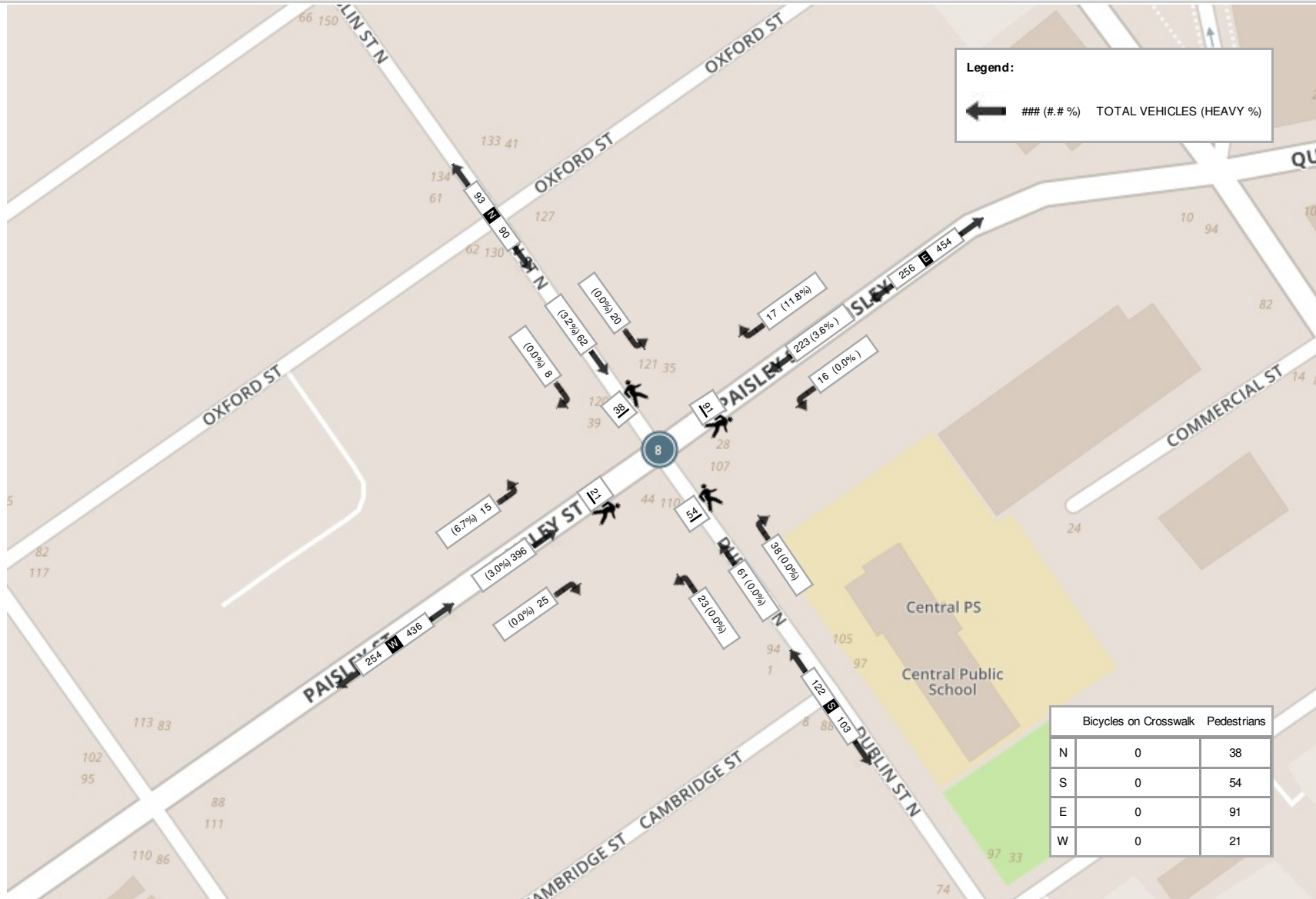
Start Time	N Approach DUBLIN ST N						E Approach PAISLEY ST						S Approach DUBLIN ST N						W Approach PAISLEY ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
12:00:00	5	10	4	0	10	19	2	81	4	0	1	87	11	13	5	0	11	29	1	74	3	0	2	78	213
12:15:00	2	7	2	0	4	11	5	74	5	0	1	84	6	12	4	0	3	22	4	72	2	0	0	78	195
12:30:00	1	2	4	0	8	7	13	67	5	0	2	85	5	4	3	0	8	12	2	67	2	0	2	71	175
12:45:00	1	5	4	0	0	10	8	61	7	0	3	76	10	11	1	0	4	22	2	83	2	0	0	87	195
Grand Total	9	24	14	0	22	47	28	283	21	0	7	332	32	40	13	0	26	85	9	296	9	0	4	314	778
Approach%	19.1%	51.1%	29.8%	0%		-	8.4%	85.2%	6.3%	0%		-	37.6%	47.1%	15.3%	0%		-	2.9%	94.3%	2.9%	0%		-	-
Totals %	1.2%	3.1%	1.8%	0%		6%	3.6%	36.4%	2.7%	0%		42.7%	4.1%	5.1%	1.7%	0%		10.9%	1.2%	38%	1.2%	0%		40.4%	-
PHF	0.45	0.6	0.88	0		0.62	0.54	0.87	0.75	0		0.95	0.73	0.77	0.65	0		0.73	0.56	0.89	0.75	0		0.9	-
Heavy	0	1	1	0		2	2	3	0	0		5	0	1	0	0		1	0	9	0	0		9	-
Heavy %	0%	4.2%	7.1%	0%		4.3%	7.1%	1.1%	0%	0%		1.5%	0%	2.5%	0%	0%		1.2%	0%	3%	0%	0%		2.9%	-
Lights	9	23	13	0		45	25	277	21	0		323	32	39	13	0		84	9	286	9	0		304	-
Lights %	100%	95.8%	92.9%	0%		95.7%	89.3%	97.9%	100%	0%		97.3%	100%	97.5%	100%	0%		98.8%	100%	96.6%	100%	0%		96.8%	-
Single-Unit Trucks	0	1	0	0		1	1	1	0	0		2	0	1	0	0		1	0	1	0	0		1	-
Single-Unit Trucks %	0%	4.2%	0%	0%		2.1%	3.6%	0.4%	0%	0%		0.6%	0%	2.5%	0%	0%		1.2%	0%	0.3%	0%	0%		0.3%	-
Buses	0	0	1	0		1	1	2	0	0		3	0	0	0	0		0	0	8	0	0		8	-
Buses %	0%	0%	7.1%	0%		2.1%	3.6%	0.7%	0%	0%		0.9%	0%	0%	0%	0%		0%	0%	2.7%	0%	0%		2.5%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0	0		0	1	3	0	0		4	0	0	0	0		0	0	1	0	0		1	-
Bicycles on Road %	0%	0%	0%	0%		0%	3.6%	1.1%	0%	0%		1.2%	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.3%	-
Pedestrians	-	-	-	-	22	-	-	-	-	-	7	-	-	-	-	-	26	-	-	-	-	-	4	-	-
Pedestrians%	-	-	-	-	37.3%	-	-	-	-	-	11.9%	-	-	-	-	-	44.1%	-	-	-	-	-	6.8%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



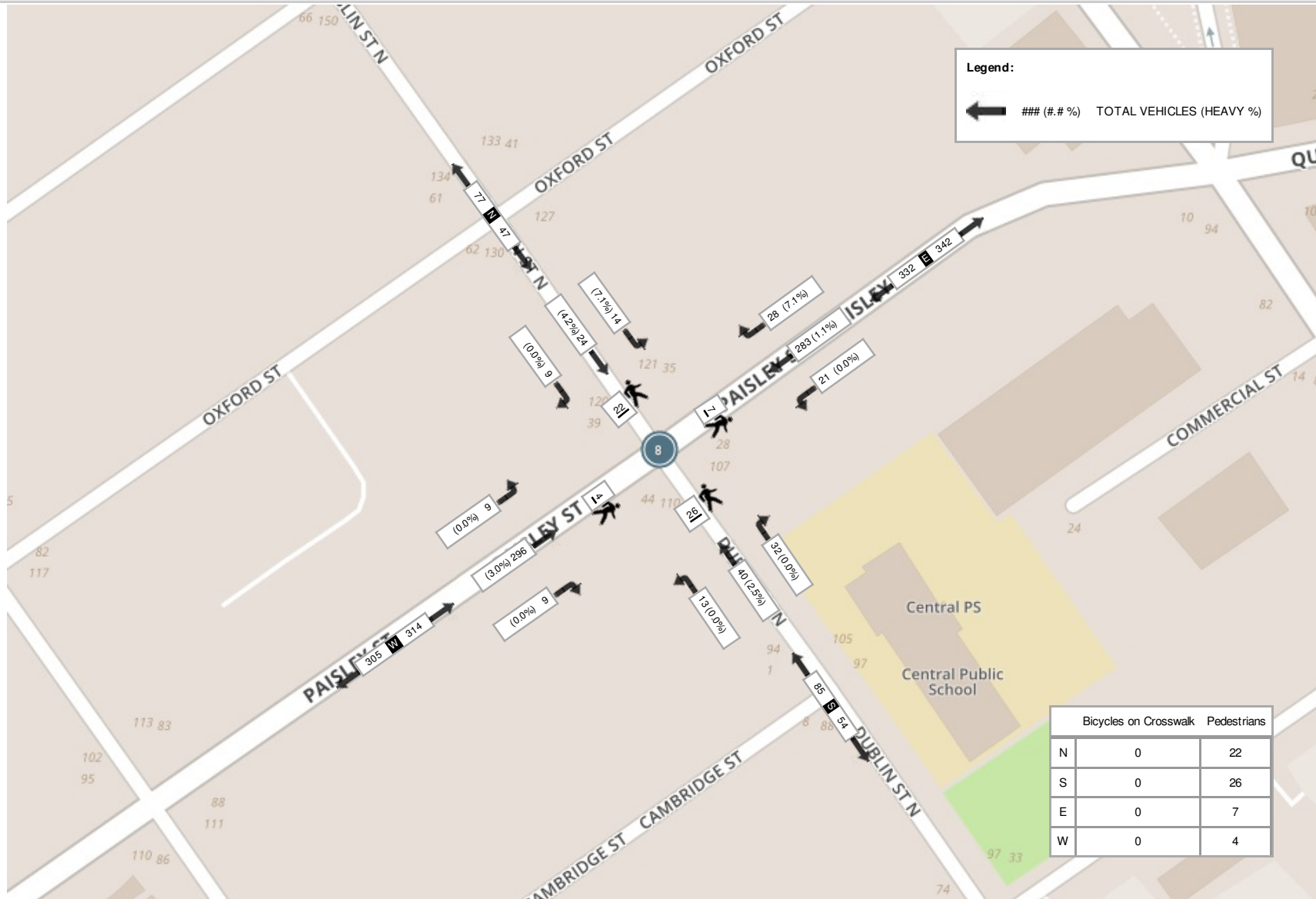
Peak Hour: 04:30 PM - 05:30 PM Weather:

Start Time	N Approach DUBLIN ST N						E Approach PAISLEY ST						S Approach DUBLIN ST N						W Approach PAISLEY ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	6	6	1	0	10	13	3	118	2	0	6	123	16	18	4	0	10	38	3	84	3	0	7	90	264
16:45:00	6	7	4	0	4	17	8	105	3	0	5	116	12	17	8	0	6	37	4	83	5	0	1	92	262
17:00:00	6	13	5	0	9	24	7	98	6	0	8	111	11	29	3	0	9	43	6	88	2	0	0	96	274
17:15:00	4	9	5	0	1	18	9	71	5	0	4	85	11	18	5	0	10	34	1	108	3	0	2	112	249
Grand Total	22	35	15	0	24	72	27	392	16	0	23	435	50	82	20	0	35	152	14	363	13	0	10	390	1049
Approach%	30.6%	48.6%	20.8%	0%	-	-	6.2%	90.1%	3.7%	0%	-	-	32.9%	53.9%	13.2%	0%	-	-	3.6%	93.1%	3.3%	0%	-	-	-
Totals %	2.1%	3.3%	1.4%	0%	6.9%	2.6%	37.4%	1.5%	0%	41.5%	4.8%	7.8%	1.9%	0%	14.5%	1.3%	34.6%	1.2%	0%	37.2%	-	-	-	-	-
PHF	0.92	0.67	0.75	0	0.75	0.75	0.83	0.67	0	0.88	0.78	0.71	0.63	0	0.88	0.58	0.84	0.65	0	0.87	-	-	-	-	-
Heavy	0	0	0	0	0	0	0	4	0	0	4	0	1	0	0	1	0	9	0	0	9	-	-	-	-
Heavy %	0%	0%	0%	0%	0%	0%	1%	0%	0%	0.9%	0%	1.2%	0%	0%	0.7%	0%	2.5%	0%	0%	2.3%	-	-	-	-	-
Lights	22	34	15	0	71	27	386	16	0	429	50	81	20	0	151	14	352	13	0	379	-	-	-	-	-
Lights %	100%	97.1%	100%	0%	98.6%	100%	98.5%	100%	0%	98.6%	100%	98.8%	100%	0%	99.3%	100%	97%	100%	0%	97.2%	-	-	-	-	-
Single-Unit Trucks	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	0	1	0	0	1	-	-	-	-	-
Single-Unit Trucks %	0%	0%	0%	0%	0%	0%	0.3%	0%	0%	0.2%	0%	1.2%	0%	0%	0.7%	0%	0.3%	0%	0%	0.3%	-	-	-	-	-
Buses	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	8	0	0	8	-	-	-	-	-
Buses %	0%	0%	0%	0%	0%	0%	0.8%	0%	0%	0.7%	0%	0%	0%	0%	0%	0%	2.2%	0%	0%	2.1%	-	-	-	-	-
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
Articulated Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	-	-	-	-
Bicycles on Road	0	1	0	0	1	0	2	0	0	2	0	0	0	0	0	0	2	0	0	2	-	-	-	-	-
Bicycles on Road %	0%	2.9%	0%	0%	1.4%	0%	0.5%	0%	0%	0.5%	0%	0%	0%	0%	0%	0%	0.6%	0%	0%	0.5%	-	-	-	-	-
Pedestrians	-	-	-	-	24	-	-	-	-	23	-	-	-	-	-	35	-	-	-	-	10	-	-	-	-
Pedestrians%	-	-	-	-	26.1%	-	-	-	-	25%	-	-	-	-	38%	-	-	-	-	10.9%	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-

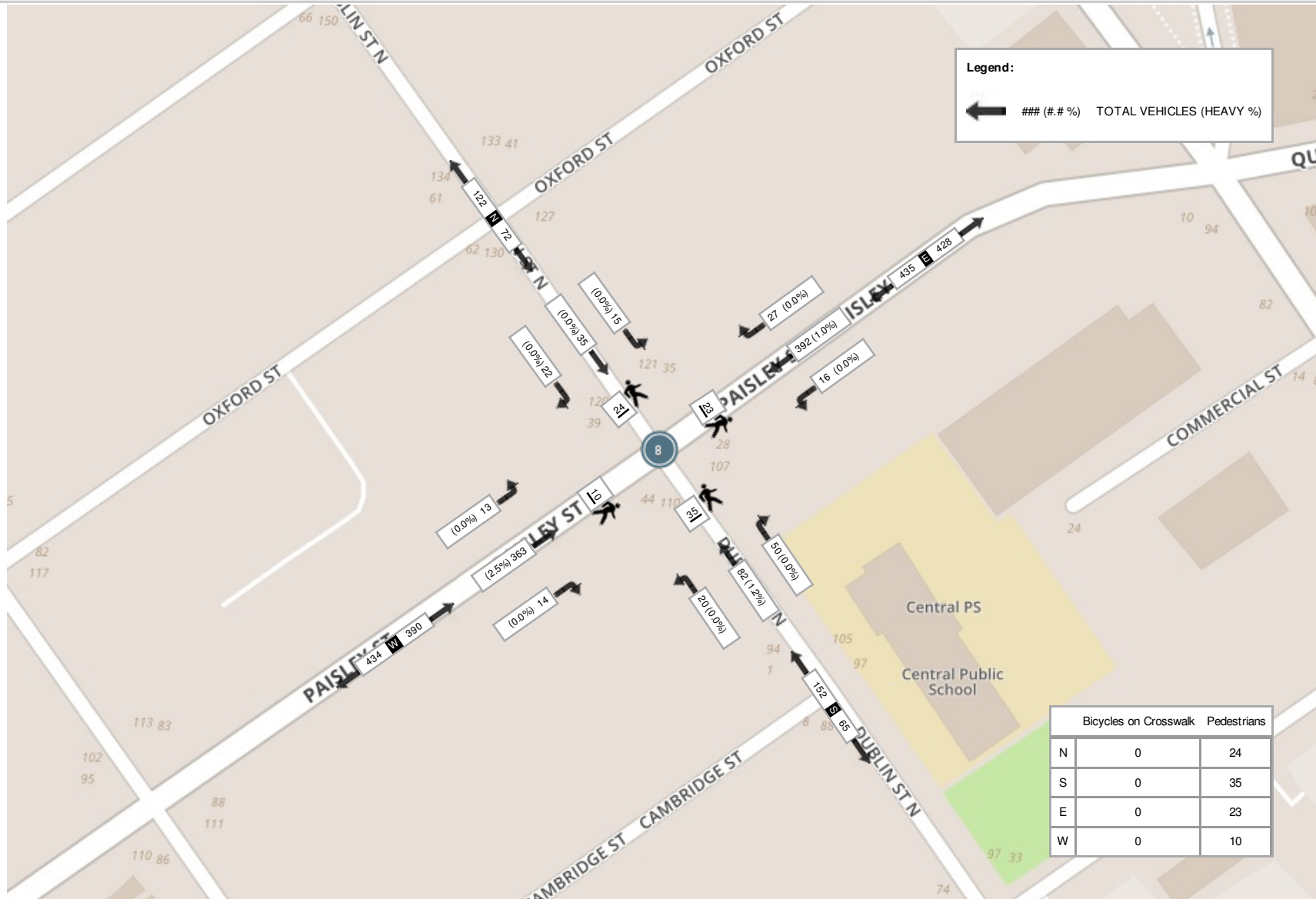
Peak Hour: 08:15 AM - 09:15 AM Weather:



Peak Hour: 12:00 PM - 01:00 PM Weather:



Peak Hour: 04:30 PM - 05:30 PM Weather:





Turning Movement Count (9 . DUBLIN ST N & NORTHUMBERLAND ST)

Start Time	N Approach DUBLIN ST N						E Approach NORTHUMBERLAND ST						S Approach DUBLIN ST N						W Approach NORTHUMBERLAND ST						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total			
07:00:00	1	2	0	0	1	3	1	0	0	0	0	1	0	7	0	0	0	7	0	0	1	0	2	1	12		
07:15:00	0	7	2	0	0	9	0	0	0	0	0	0	3	10	0	1	2	14	0	0	0	0	0	0	23		
07:30:00	0	2	0	0	0	2	0	1	0	0	1	1	0	15	2	0	1	17	1	1	0	0	1	2	22		
07:45:00	1	8	0	0	0	9	0	1	1	0	0	2	6	22	0	0	2	28	0	1	0	0	1	1	40	97	
08:00:00	0	19	0	0	1	19	0	0	0	0	0	0	2	19	0	1	4	22	0	0	0	0	0	0	41	126	
08:15:00	1	15	0	0	1	16	0	0	2	0	3	2	3	23	2	0	1	28	0	0	2	0	3	2	48	151	
08:30:00	2	16	1	0	0	19	0	0	0	0	5	0	2	26	1	0	4	29	0	0	4	0	1	4	52	181	
08:45:00	4	23	1	0	1	28	1	1	0	0	5	2	1	48	2	0	1	51	2	0	4	0	1	6	87	228	
09:00:00	0	9	0	0	0	9	0	0	0	0	1	0	0	19	1	0	4	20	2	0	3	0	3	5	34	221	
09:15:00	0	13	0	0	0	13	0	0	0	0	1	0	0	16	3	0	0	19	0	0	0	0	3	0	32	205	
09:30:00	0	11	0	0	0	11	1	0	0	0	0	1	1	14	0	0	3	15	0	0	1	0	2	1	28	181	
09:45:00	0	4	0	0	1	4	1	0	0	0	0	1	0	19	2	0	1	21	1	0	1	0	0	2	28	122	
BREAK																											
11:00:00	3	9	0	0	1	12	0	0	0	0	0	0	0	19	3	0	3	22	2	0	0	0	1	2	36		
11:15:00	0	8	0	0	0	8	0	0	1	0	1	1	1	8	0	0	1	9	0	1	0	0	0	1	19		
11:30:00	0	15	0	0	0	15	1	0	0	0	0	1	0	17	2	0	0	19	0	2	0	0	1	2	37		
11:45:00	0	9	0	0	0	9	1	0	1	0	1	2	0	18	1	0	1	19	2	1	1	0	0	4	34	126	
12:00:00	2	14	0	0	0	16	0	0	0	0	0	0	2	18	2	0	0	22	1	0	2	0	0	3	41	131	
12:15:00	0	13	1	0	0	14	1	0	0	0	0	1	2	20	0	0	0	22	0	0	1	0	0	1	38	150	
12:30:00	0	6	2	0	0	8	1	0	2	0	1	3	0	9	2	0	0	11	1	0	1	0	1	2	24	137	
12:45:00	1	7	1	0	0	9	0	0	0	0	1	0	1	24	1	0	0	26	1	0	1	0	1	2	37	140	
BREAK																											
16:00:00	1	10	2	0	1	13	0	0	1	0	0	1	1	24	2	0	5	27	0	0	1	0	3	1	42		
16:15:00	1	13	1	0	0	15	0	1	1	0	2	2	0	25	2	0	3	27	1	1	0	0	2	2	46		
16:30:00	0	12	1	0	1	13	1	1	3	0	1	5	0	34	4	0	4	38	1	0	2	0	1	3	59		
16:45:00	0	16	0	1	2	17	0	1	0	0	2	1	1	38	0	0	4	39	1	0	0	0	3	1	58	205	
17:00:00	2	24	0	0	1	26	0	0	0	0	3	0	1	40	0	0	4	41	4	0	0	0	1	4	71	234	
17:15:00	1	22	1	0	0	24	1	0	0	0	1	1	3	28	3	0	4	34	2	2	0	0	0	4	63	251	
17:30:00	1	6	0	0	0	7	0	0	0	0	0	0	2	18	2	0	2	22	3	1	0	0	0	4	33	225	
17:45:00	2	13	0	0	1	15	2	0	0	0	2	2	1	16	1	0	1	18	2	2	0	0	1	4	39	206	
18:00:00	1	18	0	0	2	19	0	0	1	0	1	1	0	26	3	0	1	29	0	0	1	0	0	1	50	185	



18:15:00	1	9	2	0	0	12	2	1	0	0	1	3	0	19	0	0	4	19	2	0	0	0	2	2	36	158
18:30:00	1	8	2	0	0	11	0	0	0	0	2	0	0	14	1	0	2	15	0	0	0	0	3	0	26	151
18:45:00	1	7	1	0	0	9	1	1	2	0	1	4	3	19	2	0	5	24	1	0	1	0	0	2	39	151
Grand Total	27	368	18	1	14	414	15	8	15	0	36	38	36	672	44	2	67	754	30	12	27	0	37	69	1275	-
Approach%	6.5%	88.9%	4.3%	0.2%	-	39.5%	21.1%	39.5%	0%	-	4.8%	89.1%	5.8%	0.3%	-	43.5%	17.4%	39.1%	0%	-	-	-	-	-	-	
Totals %	2.1%	28.9%	1.4%	0.1%	32.5%	1.2%	0.6%	1.2%	0%	3%	2.8%	52.7%	3.5%	0.2%	59.1%	2.4%	0.9%	2.1%	0%	5.4%	-	-	-	-		
Heavy	2	1	0	0	-	1	0	0	0	-	1	4	2	0	-	3	0	0	0	-	-	-	-	-		
Heavy %	7.4%	0.3%	0%	0%	-	6.7%	0%	0%	0%	-	2.8%	0.6%	4.5%	0%	-	10%	0%	0%	0%	-	-	-	-	-		
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		



Peak Hour: 08:00 AM - 09:00 AM Weather:

Start Time	N Approach DUBLIN ST N						E Approach NORTHUMBERLAND ST						S Approach DUBLIN ST N						W Approach NORTHUMBERLAND ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:00:00	0	19	0	0	1	19	0	0	0	0	0	0	2	19	0	1	4	22	0	0	0	0	0	0	41
08:15:00	1	15	0	0	1	16	0	0	2	0	3	2	3	23	2	0	1	28	0	0	2	0	3	2	48
08:30:00	2	16	1	0	0	19	0	0	0	0	5	0	2	26	1	0	4	29	0	0	4	0	1	4	52
08:45:00	4	23	1	0	1	28	1	1	0	0	5	2	1	48	2	0	1	51	2	0	4	0	1	6	87
Grand Total	7	73	2	0	3	82	1	1	2	0	13	4	8	116	5	1	10	130	2	0	10	0	5	12	228
Approach%	8.5%	89%	2.4%	0%	-	-	25%	25%	50%	0%	-	-	6.2%	89.2%	3.8%	0.8%	-	-	16.7%	0%	83.3%	0%	-	-	-
Totals %	3.1%	32%	0.9%	0%	-	36%	0.4%	0.4%	0.9%	0%	-	1.8%	3.5%	50.9%	2.2%	0.4%	-	57%	0.9%	0%	4.4%	0%	-	5.3%	-
PHF	0.44	0.79	0.5	0	-	0.73	0.25	0.25	0.25	0	-	0.5	0.67	0.6	0.63	0.25	-	0.64	0.25	0	0.63	0	-	0.5	-
Heavy	1	1	0	0	-	2	0	0	0	0	-	0	1	0	0	0	-	1	1	0	0	0	-	1	-
Heavy %	14.3%	1.4%	0%	0%	-	2.4%	0%	0%	0%	0%	-	0%	12.5%	0%	0%	0%	-	0.8%	50%	0%	0%	0%	-	8.3%	-
Lights	6	72	2	0	-	80	1	1	2	0	-	4	7	115	5	1	-	128	1	0	10	0	-	11	-
Lights %	85.7%	98.6%	100%	0%	-	97.6%	100%	100%	100%	0%	-	100%	87.5%	99.1%	100%	100%	-	98.5%	50%	0%	100%	0%	-	91.7%	-
Single-Unit Trucks	1	1	0	0	-	2	0	0	0	0	-	0	1	0	0	0	-	1	1	0	0	0	-	1	-
Single-Unit Trucks %	14.3%	1.4%	0%	0%	-	2.4%	0%	0%	0%	0%	-	0%	12.5%	0%	0%	0%	-	0.8%	50%	0%	0%	0%	-	8.3%	-
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	-
Buses %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	-
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	-
Bicycles on Road %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0.9%	0%	0%	-	0.8%	0%	0%	0%	0%	-	0%	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	13	-	-	-	-	-	10	-	-	-	-	-	5	-	-
Pedestrians%	-	-	-	-	9.7%	-	-	-	-	-	41.9%	-	-	-	-	-	32.3%	-	-	-	-	-	16.1%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



Peak Hour: 11:30 AM - 12:30 PM Weather:

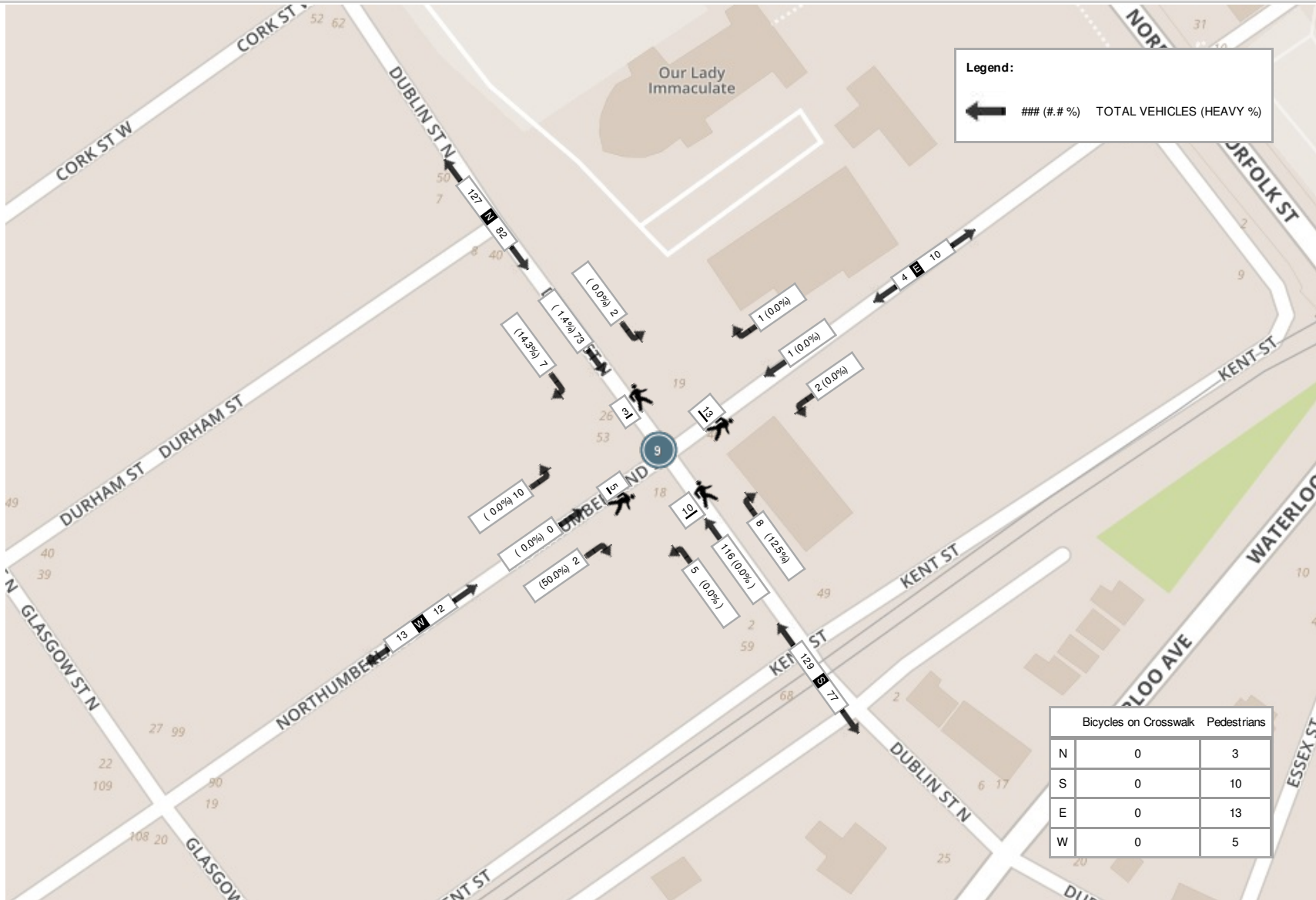
Start Time	N Approach DUBLIN ST N						E Approach NORTHUMBERLAND ST						S Approach DUBLIN ST N						W Approach NORTHUMBERLAND ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
11:30:00	0	15	0	0	0	15	1	0	0	0	0	1	0	17	2	0	0	19	0	2	0	0	1	2	37
11:45:00	0	9	0	0	0	9	1	0	1	0	1	2	0	18	1	0	1	19	2	1	1	0	0	4	34
12:00:00	2	14	0	0	0	16	0	0	0	0	0	0	2	18	2	0	0	22	1	0	2	0	0	3	41
12:15:00	0	13	1	0	0	14	1	0	0	0	0	1	2	20	0	0	0	22	0	0	1	0	0	1	38
Grand Total	2	51	1	0	0	54	3	0	1	0	1	4	4	73	5	0	1	82	3	3	4	0	1	10	150
Approach%	3.7%	94.4%	1.9%	0%		-	75%	0%	25%	0%		-	4.9%	89%	6.1%	0%		-	30%	30%	40%	0%		-	-
Totals %	1.3%	34%	0.7%	0%		36%	2%	0%	0.7%	0%		2.7%	2.7%	48.7%	3.3%	0%		54.7%	2%	2%	2.7%	0%		6.7%	-
PHF	0.25	0.85	0.25	0		0.84	0.75	0	0.25	0		0.5	0.5	0.91	0.63	0		0.93	0.38	0.38	0.5	0		0.63	-
Heavy	0	0	0	0		0	1	0	0	0		1	0	1	1	0		2	0	0	0	0		0	-
Heavy %	0%	0%	0%	0%		0%	33.3%	0%	0%	0%		25%	0%	1.4%	20%	0%		2.4%	0%	0%	0%	0%		0%	-
Lights	2	51	1	0		54	2	0	1	0		3	4	72	4	0		80	3	3	4	0		10	-
Lights %	100%	100%	100%	0%		100%	66.7%	0%	100%	0%		75%	100%	98.6%	80%	0%		97.6%	100%	100%	100%	0%		100%	-
Single-Unit Trucks	0	0	0	0		0	1	0	0	0		1	0	0	1	0		1	0	0	0	0		0	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	33.3%	0%	0%	0%		25%	0%	0%	20%	0%		1.2%	0%	0%	0%	0%		0%	-
Buses	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	-
Buses %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	1.4%	0%	0%		1.2%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	1	-	-
Pedestrians%	-	-	-	-	0%		-	-	-	-	33.3%		-	-	-	-	33.3%		-	-	-	-	33.3%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-



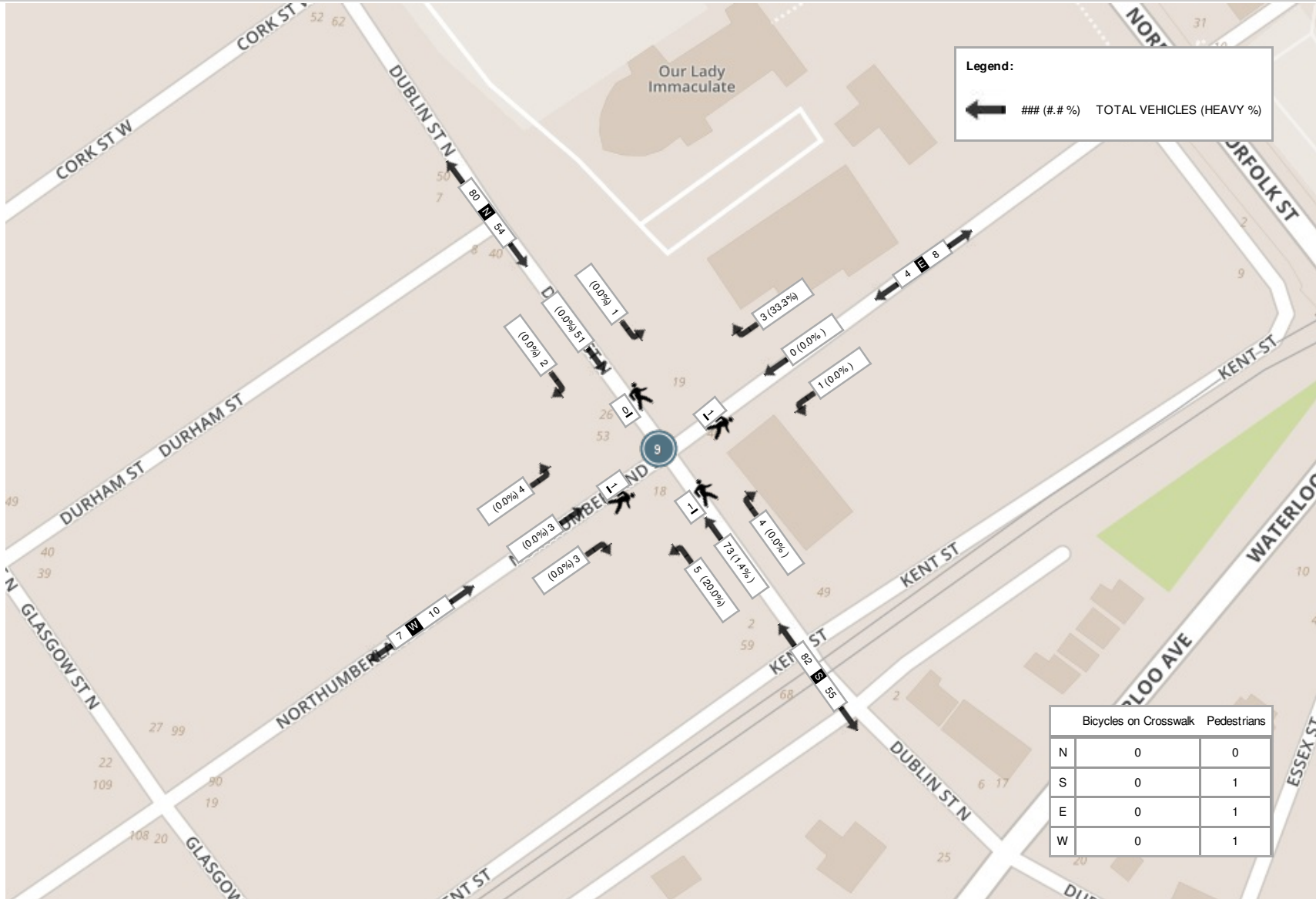
Peak Hour: 04:30 PM - 05:30 PM Weather:

Start Time	N Approach DUBLIN ST N						E Approach NORTHUMBERLAND ST						S Approach DUBLIN ST N						W Approach NORTHUMBERLAND ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	0	12	1	0	1	13	1	1	3	0	1	5	0	34	4	0	4	38	1	0	2	0	1	3	59
16:45:00	0	16	0	1	2	17	0	1	0	0	2	1	1	38	0	0	4	39	1	0	0	0	3	1	58
17:00:00	2	24	0	0	1	26	0	0	0	0	3	0	1	40	0	0	4	41	4	0	0	0	1	4	71
17:15:00	1	22	1	0	0	24	1	0	0	0	1	1	3	28	3	0	4	34	2	2	0	0	0	4	63
Grand Total	3	74	2	1	4	80	2	2	3	0	7	7	5	140	7	0	16	152	8	2	2	0	5	12	251
Approach%	3.8%	92.5%	2.5%	1.3%	-	-	28.6%	28.6%	42.9%	0%	-	-	3.3%	92.1%	4.6%	0%	-	-	66.7%	16.7%	16.7%	0%	-	-	-
Totals %	1.2%	29.5%	0.8%	0.4%	-	31.9%	0.8%	0.8%	1.2%	0%	-	2.8%	2%	55.8%	2.8%	0%	-	60.6%	3.2%	0.8%	0.8%	0%	-	4.8%	-
PHF	0.38	0.77	0.5	0.25	-	0.77	0.5	0.5	0.25	0	-	0.35	0.42	0.88	0.44	0	-	0.93	0.5	0.25	0.25	0	-	0.75	-
Heavy	0	0	0	0	-	0	0	0	0	0	-	0	0	1	1	0	-	2	2	0	0	0	-	2	-
Heavy %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0.7%	14.3%	0%	-	1.3%	25%	0%	0%	0%	-	16.7%	-
Lights	3	73	2	1	-	79	2	1	3	0	-	6	4	139	5	0	-	148	6	2	2	0	-	10	-
Lights %	100%	98.6%	100%	100%	-	98.8%	100%	50%	100%	0%	-	85.7%	80%	99.3%	71.4%	0%	-	97.4%	75%	100%	100%	0%	-	83.3%	-
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	1	1	0	-	2	2	0	0	0	-	2	-
Single-Unit Trucks %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0.7%	14.3%	0%	-	1.3%	25%	0%	0%	0%	-	16.7%	-
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	-
Buses %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	-
Bicycles on Road	0	1	0	0	-	1	0	1	0	0	-	1	1	0	1	0	-	2	0	0	0	0	-	0	-
Bicycles on Road %	0%	1.4%	0%	0%	-	1.3%	0%	50%	0%	0%	-	14.3%	20%	0%	14.3%	0%	-	1.3%	0%	0%	0%	0%	-	0%	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	7	-	-	-	-	-	16	-	-	-	-	-	5	-	-
Pedestrians%	-	-	-	-	12.5%	-	-	-	-	-	21.9%	-	-	-	-	-	50%	-	-	-	-	-	15.6%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-

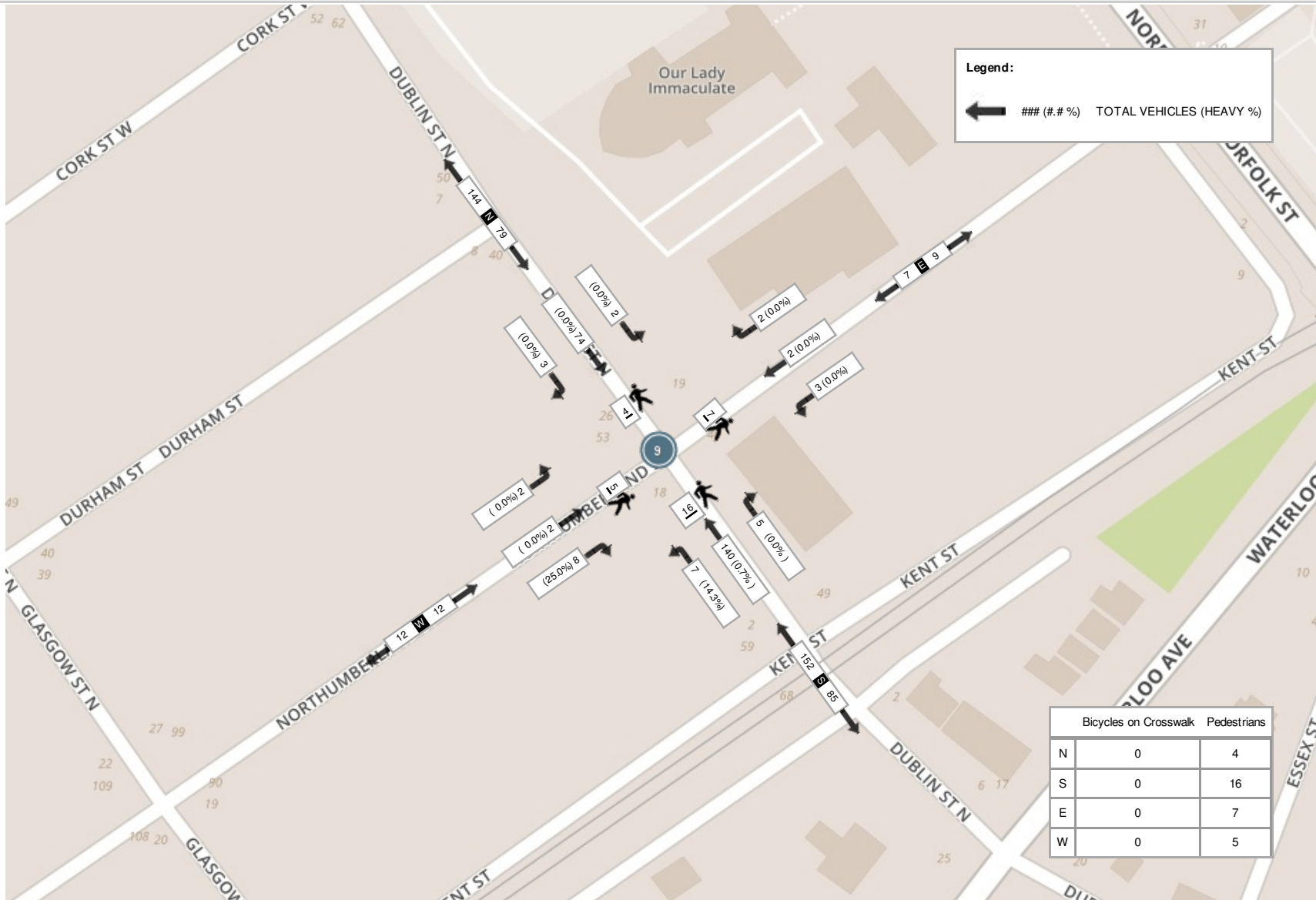
Peak Hour: 08:00 AM - 09:00 AM Weather:



Peak Hour: 11:30 AM - 12:30 PM Weather:



Peak Hour: 04:30 PM - 05:30 PM Weather:





Turning Movement Count (10 . DUBLIN ST N & KENT ST)

Start Time	N Approach DUBLIN ST N						E Approach KENT ST						S Approach DUBLIN ST N						W Approach KENT ST						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total			
07:00:00	0	1	1	0	0	2	0	0	0	0	0	0	1	6	0	0	0	7	0	1	0	0	4	1	10		
07:15:00	0	5	1	0	0	6	0	0	2	0	0	2	0	14	0	0	0	14	1	0	0	0	0	1	23		
07:30:00	0	5	0	0	0	5	0	0	2	0	3	2	0	16	0	0	1	16	1	1	0	0	1	2	25		
07:45:00	0	9	0	0	2	9	3	1	3	0	3	7	0	24	0	0	0	24	1	0	0	0	2	1	41	99	
08:00:00	0	18	0	0	1	18	1	0	1	0	0	2	1	20	0	0	2	21	1	0	0	0	3	1	42	131	
08:15:00	0	17	0	0	1	17	0	1	1	0	7	2	0	27	1	0	0	28	0	0	0	0	4	0	47	155	
08:30:00	0	13	0	0	0	13	0	1	2	0	3	3	2	29	1	0	3	32	1	1	2	0	0	4	52	182	
08:45:00	1	29	0	0	1	30	1	1	0	0	6	2	0	47	2	0	1	49	2	1	2	0	3	5	86	227	
09:00:00	1	9	1	0	2	11	0	0	0	0	3	0	0	20	0	0	2	20	1	1	0	0	2	2	33	218	
09:15:00	0	9	1	0	1	10	1	0	1	0	1	2	0	20	1	0	2	21	1	0	0	0	4	1	34	205	
09:30:00	0	12	1	0	0	13	0	0	0	0	2	0	0	14	0	0	8	14	0	1	0	0	5	1	28	181	
09:45:00	0	4	0	0	2	4	0	0	1	0	0	1	0	19	0	0	1	19	1	2	0	0	4	3	27	122	
BREAK																											
11:00:00	2	8	0	0	2	10	2	0	1	0	6	3	1	16	1	0	2	18	0	0	0	0	5	0	31		
11:15:00	0	9	0	0	1	9	1	0	1	0	4	2	0	10	0	0	1	10	0	1	0	0	1	1	22		
11:30:00	0	17	0	0	1	17	0	0	2	0	3	2	0	20	0	0	1	20	1	0	0	0	2	1	40		
11:45:00	0	10	0	0	1	10	2	0	0	0	3	2	1	19	2	0	0	22	1	0	0	0	0	1	35	128	
12:00:00	0	17	0	0	3	17	0	1	1	0	1	2	1	23	1	0	0	25	0	0	0	0	0	0	44	141	
12:15:00	0	13	0	0	2	13	1	0	1	0	3	2	0	19	0	0	2	19	2	1	0	0	0	3	37	156	
12:30:00	1	8	0	0	1	9	1	0	0	0	8	1	1	12	0	0	0	13	0	1	0	0	2	1	24	140	
12:45:00	0	9	0	0	3	9	1	0	1	0	4	2	0	25	0	0	0	25	1	4	0	0	1	5	41	146	
BREAK																											
16:00:00	0	12	0	0	0	12	2	1	4	0	5	7	1	26	1	0	4	28	1	1	0	0	6	2	49		
16:15:00	0	13	0	0	1	13	1	0	0	0	2	1	1	24	0	0	1	25	0	0	0	0	1	0	39		
16:30:00	0	17	0	0	4	17	0	1	0	0	7	1	0	38	3	0	5	41	0	0	0	0	2	0	59		
16:45:00	1	20	0	0	1	21	0	0	3	0	4	3	2	38	0	0	1	40	0	0	0	0	0	0	64	211	
17:00:00	1	25	1	0	2	27	0	0	0	0	4	0	0	40	0	0	1	40	0	0	1	0	1	1	68	230	
17:15:00	2	22	0	0	1	24	0	0	0	0	5	0	0	34	0	0	1	34	1	0	0	0	0	1	59	250	
17:30:00	0	9	0	0	1	9	2	0	0	0	0	2	0	20	0	0	1	20	1	0	0	0	1	1	32	223	
17:45:00	1	13	0	0	2	14	1	0	2	0	2	3	1	15	0	0	3	16	0	0	1	0	2	1	34	193	
18:00:00	1	14	1	0	0	16	0	0	1	0	2	1	0	30	1	0	0	31	1	0	0	0	1	1	49	174	



18:15:00	0	8	1	0	1	9	0	1	2	0	6	3	1	19	0	0	2	20	0	0	1	0	5	1	33	148
18:30:00	0	8	0	0	0	8	1	0	0	0	3	1	0	14	0	0	3	14	0	0	0	0	3	0	23	139
18:45:00	0	8	1	0	5	9	0	1	1	0	4	2	0	20	0	0	3	20	0	0	1	0	1	1	32	137
Grand Total	11	391	9	0	42	411	21	9	33	0	104	63	14	718	14	0	51	746	19	16	8	0	66	43	1263	-
Approach%	2.7%	95.1%	2.2%	0%		-	33.3%	14.3%	52.4%	0%		-	1.9%	96.2%	1.9%	0%		-	44.2%	37.2%	18.6%	0%		-	-	-
Totals %	0.9%	31%	0.7%	0%		32.5%	1.7%	0.7%	2.6%	0%		5%	1.1%	56.8%	1.1%	0%		59.1%	1.5%	1.3%	0.6%	0%		3.4%	-	-
Heavy	0	4	1	0		-	0	4	2	0		-	0	7	0	0		-	1	5	0	0		-	-	-
Heavy %	0%	1%	11.1%	0%		-	0%	44.4%	6.1%	0%		-	0%	1%	0%	0%		-	5.3%	31.3%	0%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-



Peak Hour: 08:00 AM - 09:00 AM Weather:

Start Time	N Approach DUBLIN ST N						E Approach KENT ST						S Approach DUBLIN ST N						W Approach KENT ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:00:00	0	18	0	0	1	18	1	0	1	0	0	2	1	20	0	0	2	21	1	0	0	0	3	1	42
08:15:00	0	17	0	0	1	17	0	1	1	0	7	2	0	27	1	0	0	28	0	0	0	0	4	0	47
08:30:00	0	13	0	0	0	13	0	1	2	0	3	3	2	29	1	0	3	32	1	1	2	0	0	4	52
08:45:00	1	29	0	0	1	30	1	1	0	0	6	2	0	47	2	0	1	49	2	1	2	0	3	5	86
Grand Total	1	77	0	0	3	78	2	3	4	0	16	9	3	123	4	0	6	130	4	2	4	0	10	10	227
Approach%	1.3%	98.7%	0%	0%		-	22.2%	33.3%	44.4%	0%		-	2.3%	94.6%	3.1%	0%		-	40%	20%	40%	0%		-	-
Totals %	0.4%	33.9%	0%	0%		34.4%	0.9%	1.3%	1.8%	0%		4%	1.3%	54.2%	1.8%	0%		57.3%	1.8%	0.9%	1.8%	0%		4.4%	-
PHF	0.25	0.66	0	0		0.65	0.5	0.75	0.5	0		0.75	0.38	0.65	0.5	0		0.66	0.5	0.5	0.5	0		0.5	-
Heavy	0	2	0	0		2	0	1	0	0		1	0	1	0	0		1	0	1	0	0		1	-
Heavy %	0%	2.6%	0%	0%		2.6%	0%	33.3%	0%	0%		11.1%	0%	0.8%	0%	0%		0.8%	0%	50%	0%	0%		10%	-
Lights	1	75	0	0		76	2	2	4	0		8	3	121	4	0		128	4	1	4	0		9	-
Lights %	100%	97.4%	0%	0%		97.4%	100%	66.7%	100%	0%		88.9%	100%	98.4%	100%	0%		98.5%	100%	50%	100%	0%		90%	-
Single-Unit Trucks	0	1	0	0		1	0	1	0	0		1	0	1	0	0		1	0	0	0	0		0	-
Single-Unit Trucks %	0%	1.3%	0%	0%		1.3%	0%	33.3%	0%	0%		11.1%	0%	0.8%	0%	0%		0.8%	0%	0%	0%	0%		0%	-
Buses	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	-
Buses %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	50%	0%	0%		10%	-
Articulated Trucks	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	1.3%	0%	0%		1.3%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.8%	0%	0%		0.8%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	16	-	-	-	-	-	6	-	-	-	-	-	10	-	-
Pedestrians%	-	-	-	-	8.6%	-	-	-	-	-	45.7%	-	-	-	-	-	17.1%	-	-	-	-	-	28.6%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



Peak Hour: 11:30 AM - 12:30 PM Weather:

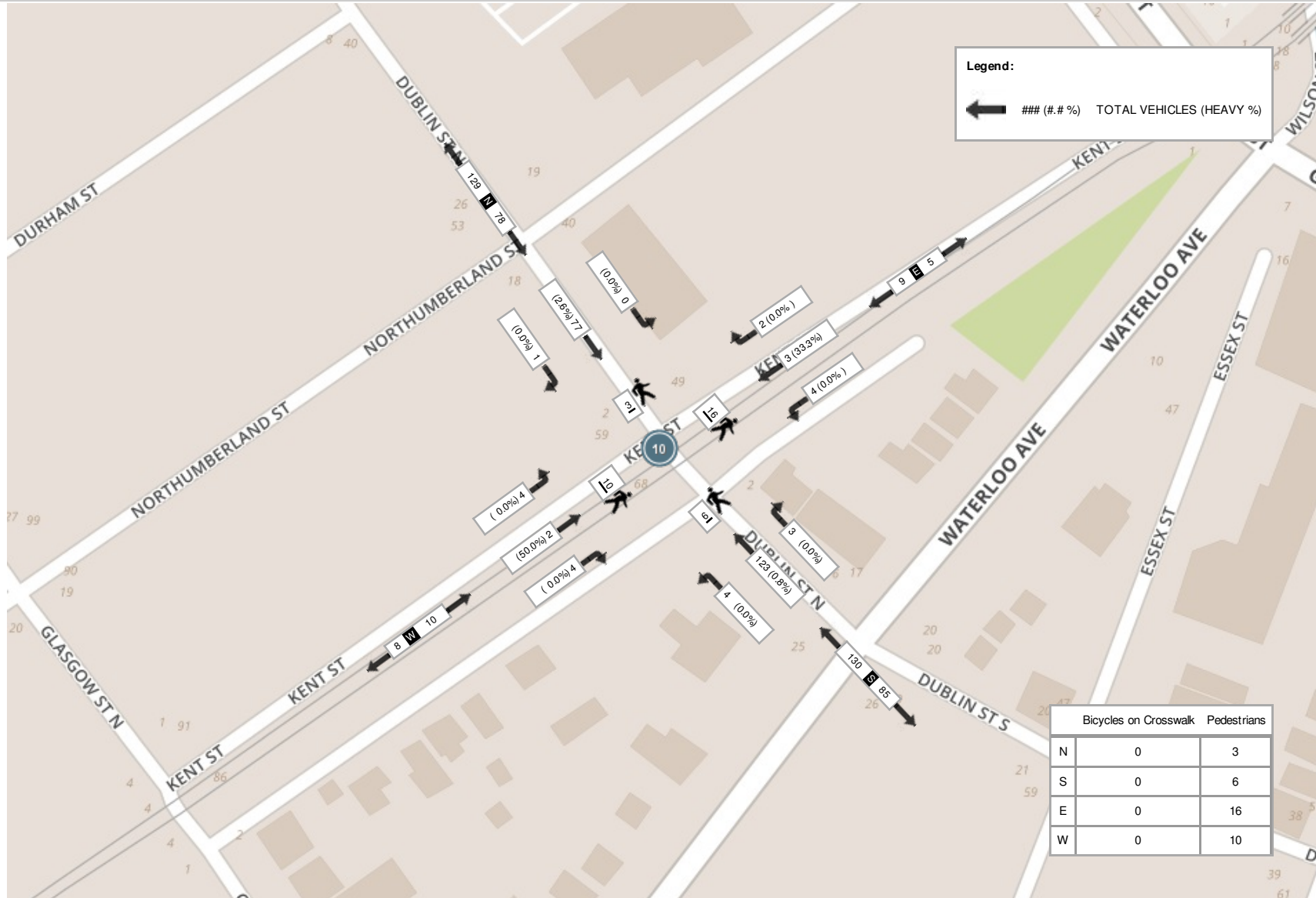
Start Time	N Approach DUBLIN ST N						E Approach KENT ST						S Approach DUBLIN ST N						W Approach KENT ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
11:30:00	0	17	0	0	1	17	0	0	2	0	3	2	0	20	0	0	1	20	1	0	0	0	2	1	40
11:45:00	0	10	0	0	1	10	2	0	0	0	3	2	1	19	2	0	0	22	1	0	0	0	0	1	35
12:00:00	0	17	0	0	3	17	0	1	1	0	1	2	1	23	1	0	0	25	0	0	0	0	0	0	44
12:15:00	0	13	0	0	2	13	1	0	1	0	3	2	0	19	0	0	2	19	2	1	0	0	0	3	37
Grand Total	0	57	0	0	7	57	3	1	4	0	10	8	2	81	3	0	3	86	4	1	0	0	2	5	156
Approach%	0%	100%	0%	0%	-	-	37.5%	12.5%	50%	0%	-	-	2.3%	94.2%	3.5%	0%	-	-	80%	20%	0%	0%	-	-	-
Totals %	0%	36.5%	0%	0%	-	36.5%	1.9%	0.6%	2.6%	0%	-	5.1%	1.3%	51.9%	1.9%	0%	-	55.1%	2.6%	0.6%	0%	0%	-	3.2%	-
PHF	0	0.84	0	0	-	0.84	0.38	0.25	0.5	0	-	1	0.5	0.88	0.38	0	-	0.86	0.5	0.25	0	0	-	0.42	-
Heavy	0	0	0	0	-	0	0	1	0	0	-	1	0	2	0	0	-	2	0	1	0	0	-	1	-
Heavy %	0%	0%	0%	0%	-	0%	0%	100%	0%	0%	-	12.5%	0%	2.5%	0%	0%	-	2.3%	0%	100%	0%	0%	-	20%	-
Lights	0	57	0	0	-	57	3	0	4	0	-	7	2	79	3	0	-	84	4	0	0	0	-	4	-
Lights %	0%	100%	0%	0%	-	100%	100%	0%	100%	0%	-	87.5%	100%	97.5%	100%	0%	-	97.7%	100%	0%	0%	0%	-	80%	-
Single-Unit Trucks	0	0	0	0	-	0	0	1	0	0	-	1	0	1	0	0	-	1	0	1	0	0	-	1	-
Single-Unit Trucks %	0%	0%	0%	0%	-	0%	0%	100%	0%	0%	-	12.5%	0%	1.2%	0%	0%	-	1.2%	0%	100%	0%	0%	-	20%	-
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	-
Buses %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	1.2%	0%	0%	-	1.2%	0%	0%	0%	0%	-	0%	-
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	-
Articulated Trucks %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	-
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	-
Bicycles on Road %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	-
Pedestrians	-	-	-	-	7	-	-	-	-	-	10	-	-	-	-	-	3	-	-	-	-	-	2	-	-
Pedestrians%	-	-	-	-	31.8%	-	-	-	-	-	45.5%	-	-	-	-	-	13.6%	-	-	-	-	-	9.1%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



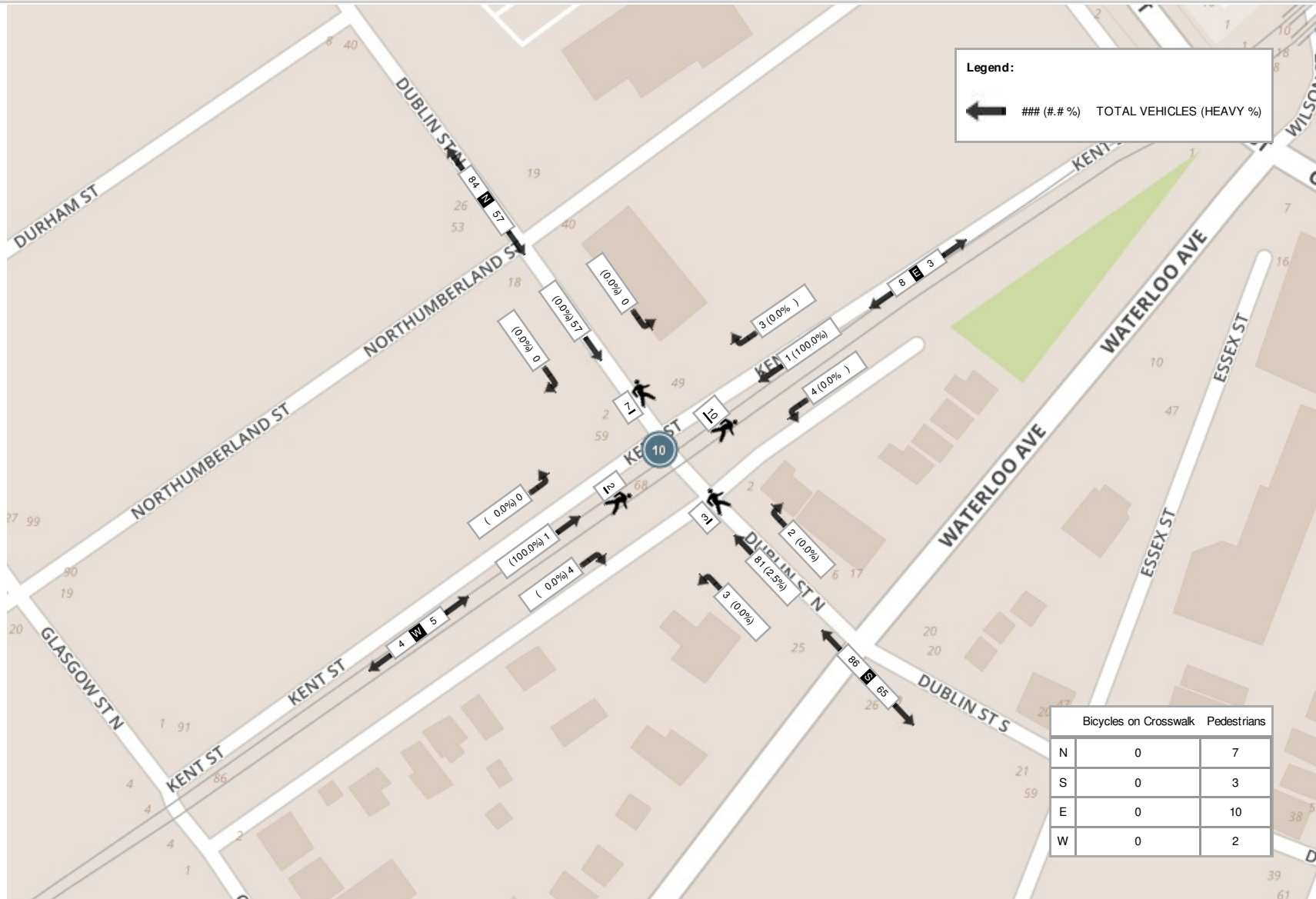
Peak Hour: 04:30 PM - 05:30 PM Weather:

Start Time	N Approach DUBLIN ST N						E Approach KENT ST						S Approach DUBLIN ST N						W Approach KENT ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	0	17	0	0	4	17	0	1	0	0	7	1	0	38	3	0	5	41	0	0	0	0	2	0	59
16:45:00	1	20	0	0	1	21	0	0	3	0	4	3	2	38	0	0	1	40	0	0	0	0	0	0	64
17:00:00	1	25	1	0	2	27	0	0	0	0	4	0	0	40	0	0	1	40	0	0	1	0	1	1	68
17:15:00	2	22	0	0	1	24	0	0	0	0	5	0	0	34	0	0	1	34	1	0	0	0	0	1	59
Grand Total	4	84	1	0	8	89	0	1	3	0	20	4	2	150	3	0	8	155	1	0	1	0	3	2	250
Approach%	4.5%	94.4%	1.1%	0%		-	0%	25%	75%	0%		-	1.3%	96.8%	1.9%	0%		-	50%	0%	50%	0%		-	-
Totals %	1.6%	33.6%	0.4%	0%		35.6%	0%	0.4%	1.2%	0%		1.6%	0.8%	60%	1.2%	0%		62%	0.4%	0%	0.4%	0%		0.8%	-
PHF	0.5	0.84	0.25	0		0.82	0	0.25	0.25	0		0.33	0.25	0.94	0.25	0		0.95	0.25	0	0.25	0		0.5	-
Heavy	0	2	0	0		2	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	-
Heavy %	0%	2.4%	0%	0%		2.2%	0%	0%	0%	0%		0%	0%	1.3%	0%	0%		1.3%	0%	0%	0%	0%		0%	-
Lights	4	81	1	0		86	0	1	3	0		4	2	146	2	0		150	1	0	1	0		2	-
Lights %	100%	96.4%	100%	0%		96.6%	0%	100%	100%	0%		100%	100%	97.3%	66.7%	0%		96.8%	100%	0%	100%	0%		100%	-
Single-Unit Trucks	0	2	0	0		2	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	-
Single-Unit Trucks %	0%	2.4%	0%	0%		2.2%	0%	0%	0%	0%		0%	0%	1.3%	0%	0%		1.3%	0%	0%	0%	0%		0%	-
Buses	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Buses %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	1	0	0		1	0	0	0	0		0	0	2	1	0		3	0	0	0	0		0	-
Bicycles on Road %	0%	1.2%	0%	0%		1.1%	0%	0%	0%	0%		0%	0%	1.3%	33.3%	0%		1.9%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	8	-	-	-	-	-	20	-	-	-	-	-	8	-	-	-	-	-	3	-	-
Pedestrians%	-	-	-	-	20.5%	-	-	-	-	-	51.3%	-	-	-	-	-	20.5%	-	-	-	-	-	7.7%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-

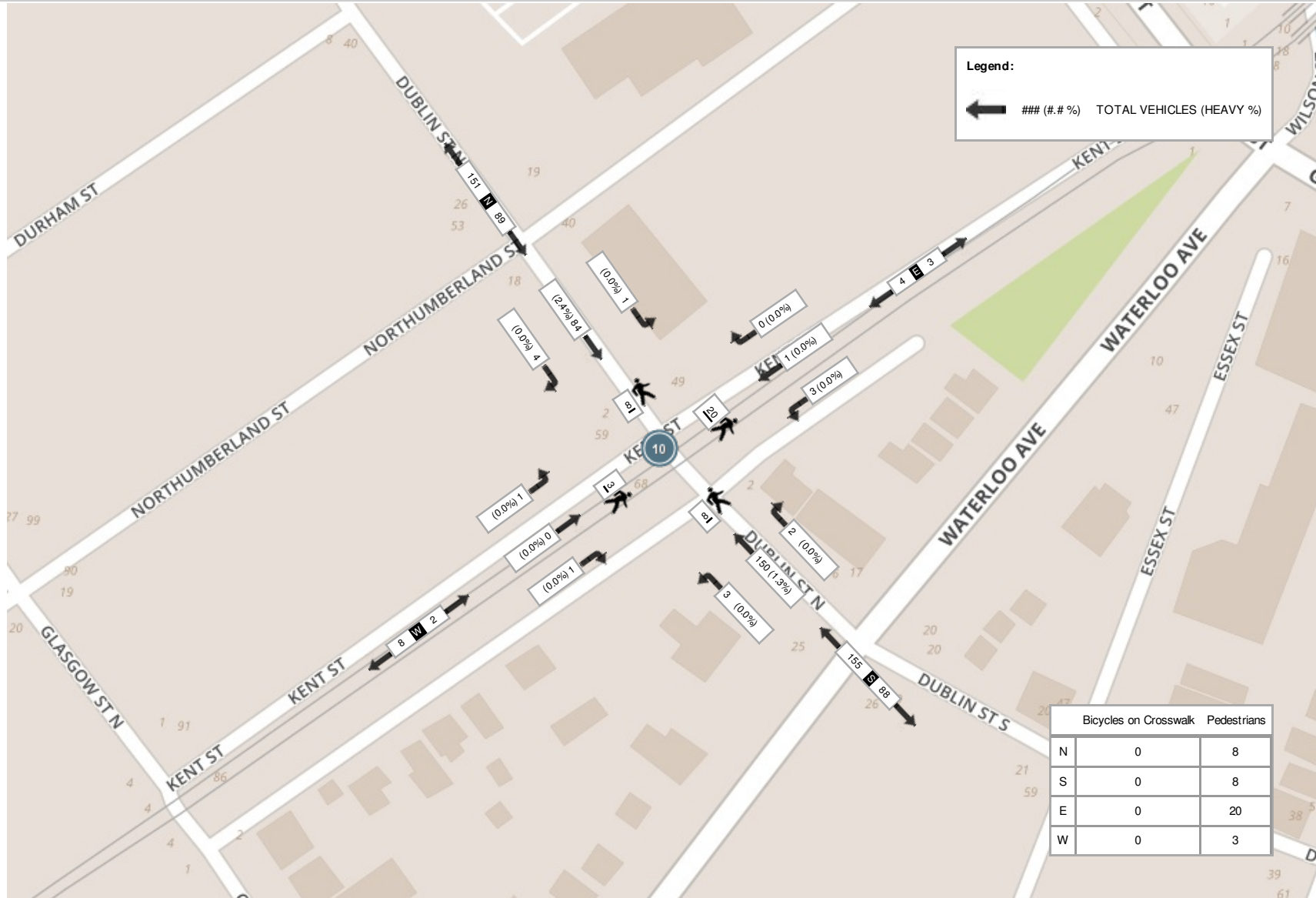
Peak Hour: 08:00 AM - 09:00 AM Weather:



Peak Hour: 11:30 AM - 12:30 PM Weather:



Peak Hour: 04:30 PM - 05:30 PM Weather:





Turning Movement Count (11 . WATERLOO AVE & DUBLIN ST S)

Start Time	N Approach DUBLIN ST S						E Approach WATERLOO AVE						S Approach DUBLIN ST S						W Approach WATERLOO AVE						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total			
07:00:00	0	0	1	0	1	1	1	16	1	0	1	18	1	3	2	0	0	6	1	23	2	0	2	26	51		
07:15:00	1	2	4	0	2	7	4	13	1	0	0	18	2	6	4	0	3	12	1	20	6	0	0	27	64		
07:30:00	4	3	3	0	0	10	4	19	0	0	2	23	3	6	0	0	1	9	5	53	9	0	1	67	109		
07:45:00	5	3	5	0	1	13	2	24	0	0	0	26	1	12	3	0	7	16	3	47	9	0	4	59	114	338	
08:00:00	11	5	5	0	0	21	4	28	2	0	1	34	0	6	5	0	2	11	5	61	14	0	2	80	146	433	
08:15:00	5	7	4	0	1	16	8	28	0	0	2	36	4	11	2	0	7	17	2	73	10	0	3	85	154	523	
08:30:00	4	7	7	0	0	18	7	46	3	0	2	56	7	15	5	0	1	27	7	85	19	0	1	111	212	626	
08:45:00	10	12	5	0	4	27	7	45	2	0	3	54	8	24	10	0	3	42	7	100	15	0	4	122	245	757	
09:00:00	2	5	5	0	0	12	2	42	0	0	0	44	5	10	9	0	4	24	9	55	12	0	4	76	156	767	
09:15:00	5	4	2	0	1	11	3	31	1	0	1	35	5	10	9	0	3	24	7	60	9	0	5	76	146	759	
09:30:00	4	8	2	0	0	14	1	22	0	0	0	23	0	7	5	0	5	12	7	50	7	0	2	64	113	660	
09:45:00	3	1	1	0	0	5	5	31	0	0	0	36	8	8	8	0	4	24	8	59	6	0	0	73	138	553	
BREAK																											
11:00:00	6	3	1	0	1	10	4	31	0	0	1	35	3	8	8	0	5	19	6	32	6	0	3	44	108		
11:15:00	5	3	3	0	1	11	2	28	0	0	1	30	4	7	7	0	2	18	0	27	2	0	2	29	88		
11:30:00	4	11	3	0	2	18	2	29	1	0	1	32	6	10	6	0	4	22	3	38	8	0	0	49	121		
11:45:00	2	7	3	0	1	12	1	42	1	0	0	44	6	14	11	0	2	31	5	42	8	0	1	55	142	459	
12:00:00	9	5	4	0	2	18	1	40	0	0	1	41	6	17	8	0	5	31	5	47	6	0	0	58	148	499	
12:15:00	1	7	10	0	1	18	3	32	2	0	2	37	4	13	6	0	3	23	7	41	4	0	0	52	130	541	
12:30:00	2	3	2	0	2	7	2	37	3	0	3	42	2	4	4	0	4	10	9	48	6	0	1	63	122	542	
12:45:00	4	4	3	0	2	11	5	38	2	0	1	45	3	14	12	0	4	29	4	55	7	0	0	66	151	551	
BREAK																											
16:00:00	8	5	5	0	0	18	9	57	0	0	1	66	1	13	13	0	10	27	3	50	6	0	4	59	170		
16:15:00	9	1	4	0	3	14	9	58	0	0	2	67	6	12	4	0	9	22	4	68	5	0	3	77	180		
16:30:00	8	4	3	0	2	15	6	51	0	0	1	57	3	24	18	0	8	45	7	51	10	0	2	68	185		
16:45:00	14	9	9	0	0	32	1	48	1	0	3	50	5	28	11	0	1	44	5	58	10	0	0	73	199	734	
17:00:00	15	3	3	0	2	21	8	67	2	0	3	77	4	18	13	0	4	35	4	63	12	0	3	79	212	776	
17:15:00	13	5	4	0	5	22	5	58	2	0	2	65	8	22	11	0	2	41	2	48	7	0	2	57	185	781	
17:30:00	2	7	4	0	2	13	5	54	0	0	1	59	1	8	8	0	6	17	7	58	4	0	3	69	158	754	
17:45:00	4	7	3	0	2	14	4	35	0	0	1	39	1	11	13	0	2	25	4	43	1	0	3	48	126	681	
18:00:00	6	6	4	0	2	16	6	40	1	0	1	47	2	18	9	0	4	29	4	32	7	0	1	43	135	604	



18:15:00	4	3	3	0	4	10	5	51	3	0	1	59	4	10	12	0	4	26	2	38	5	0	7	45	140	559
18:30:00	4	3	2	0	7	9	3	46	1	0	3	50	3	9	6	0	3	18	4	46	6	0	4	56	133	534
18:45:00	2	5	5	0	2	12	5	36	0	0	7	41	2	10	4	0	7	16	2	34	4	0	2	40	109	517
Grand Total	176	158	122	0	53	456	134	1223	29	0	48	1386	118	388	246	0	129	752	149	1605	242	0	69	1996	4590	-
Approach%	38.6%	34.6%	26.8%	0%		-	9.7%	88.2%	2.1%	0%		-	15.7%	51.6%	32.7%	0%		-	7.5%	80.4%	12.1%	0%		-	-	-
Totals %	3.8%	3.4%	2.7%	0%		9.9%	2.9%	26.6%	0.6%	0%		30.2%	2.6%	8.5%	5.4%	0%		16.4%	3.2%	35%	5.3%	0%		43.5%	-	-
Heavy	2	0	3	0		-	3	29	1	0		-	4	2	1	0		-	1	36	5	0		-	-	-
Heavy %	1.1%	0%	2.5%	0%		-	2.2%	2.4%	3.4%	0%		-	3.4%	0.5%	0.4%	0%		-	0.7%	2.2%	2.1%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-



Peak Hour: 08:15 AM - 09:15 AM Weather:

Start Time	N Approach DUBLIN ST S						E Approach WATERLOO AVE						S Approach DUBLIN ST S						W Approach WATERLOO AVE						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:15:00	5	7	4	0	1	16	8	28	0	0	2	36	4	11	2	0	7	17	2	73	10	0	3	85	154
08:30:00	4	7	7	0	0	18	7	46	3	0	2	56	7	15	5	0	1	27	7	85	19	0	1	111	212
08:45:00	10	12	5	0	4	27	7	45	2	0	3	54	8	24	10	0	3	42	7	100	15	0	4	122	245
09:00:00	2	5	5	0	0	12	2	42	0	0	0	44	5	10	9	0	4	24	9	55	12	0	4	76	156
Grand Total	21	31	21	0	5	73	24	161	5	0	7	190	24	60	26	0	15	110	25	313	56	0	12	394	767
Approach%	28.8%	42.5%	28.8%	0%	-	-	12.6%	84.7%	2.6%	0%	-	-	21.8%	54.5%	23.6%	0%	-	-	6.3%	79.4%	14.2%	0%	-	-	-
Totals %	2.7%	4%	2.7%	0%	-	9.5%	3.1%	21%	0.7%	0%	-	24.8%	3.1%	7.8%	3.4%	0%	-	14.3%	3.3%	40.8%	7.3%	0%	-	51.4%	-
PHF	0.53	0.65	0.75	0	-	0.68	0.75	0.88	0.42	0	-	0.85	0.75	0.63	0.65	0	-	0.65	0.69	0.78	0.74	0	-	0.81	-
Heavy	1	0	2	0	-	3	1	3	0	0	-	4	0	0	0	0	-	0	0	6	0	0	-	6	-
Heavy %	4.8%	0%	9.5%	0%	-	4.1%	4.2%	1.9%	0%	0%	-	2.1%	0%	0%	0%	0%	-	0%	0%	1.9%	0%	0%	-	1.5%	-
Lights	20	31	19	0	-	70	23	157	5	0	-	185	24	60	26	0	-	110	25	304	56	0	-	385	-
Lights %	95.2%	100%	90.5%	0%	-	95.9%	95.8%	97.5%	100%	0%	-	97.4%	100%	100%	100%	0%	-	100%	100%	97.1%	100%	0%	-	97.7%	-
Single-Unit Trucks	1	0	2	0	-	3	1	0	0	0	-	1	0	0	0	0	-	0	0	3	0	0	-	3	-
Single-Unit Trucks %	4.8%	0%	9.5%	0%	-	4.1%	4.2%	0%	0%	0%	-	0.5%	0%	0%	0%	0%	-	0%	0%	1%	0%	0%	-	0.8%	-
Buses	0	0	0	0	-	0	0	3	0	0	-	3	0	0	0	0	-	0	0	3	0	0	-	3	-
Buses %	0%	0%	0%	0%	-	0%	0%	1.9%	0%	0%	-	1.6%	0%	0%	0%	0%	-	0%	0%	1%	0%	0%	-	0.8%	-
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	-
Articulated Trucks %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	-
Bicycles on Road	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	3	0	0	-	3	-
Bicycles on Road %	0%	0%	0%	0%	-	0%	0%	0.6%	0%	0%	-	0.5%	0%	0%	0%	0%	-	0%	0%	1%	0%	0%	-	0.8%	-
Pedestrians	-	-	-	-	5	-	-	-	-	7	-	-	-	-	-	15	-	-	-	-	-	12	-	-	-
Pedestrians%	-	-	-	-	12.8%	-	-	-	-	17.9%	-	-	-	-	-	38.5%	-	-	-	-	-	30.8%	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-



Peak Hour: 12:00 PM - 01:00 PM Weather:

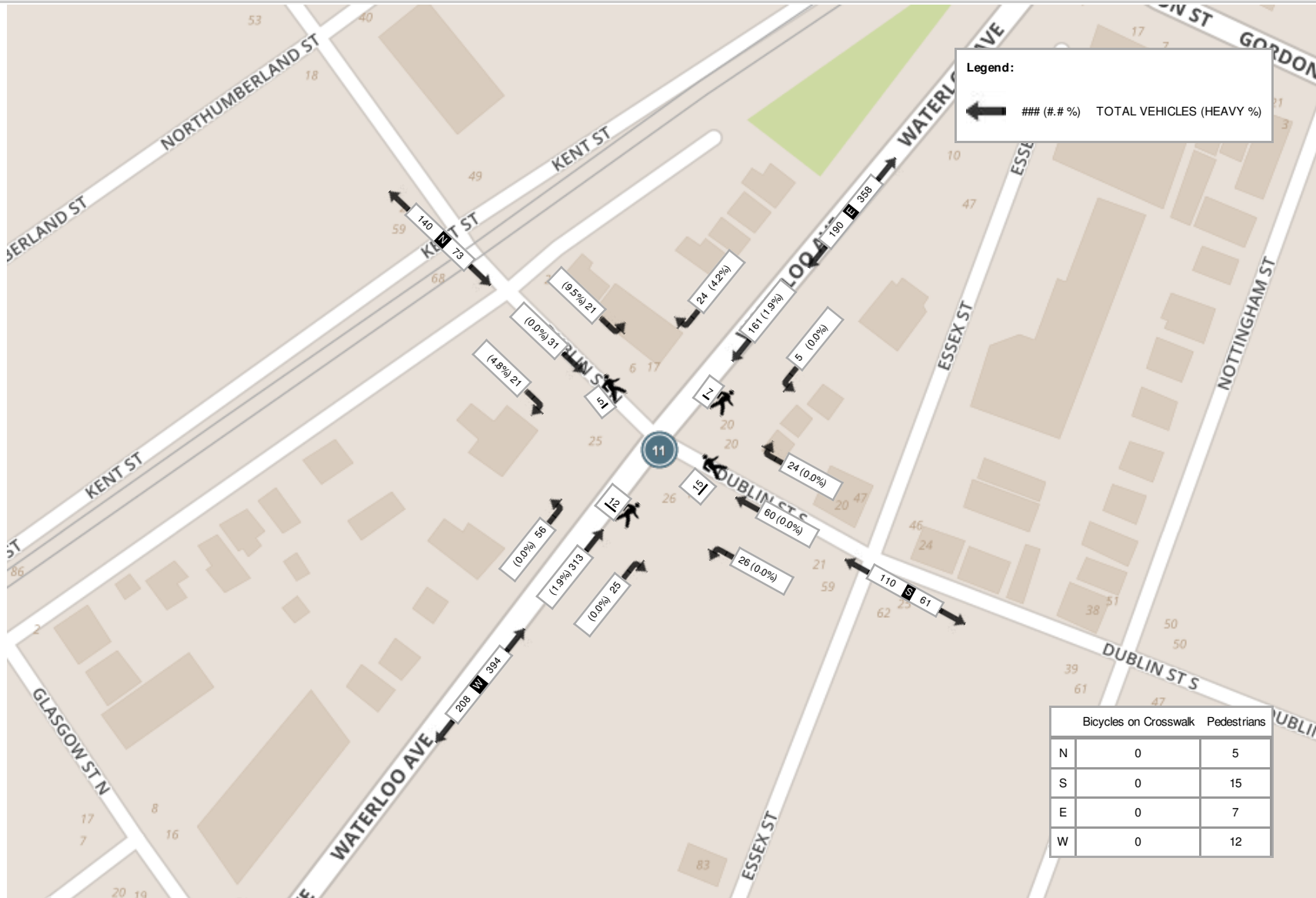
Start Time	N Approach DUBLIN ST S						E Approach WATERLOO AVE						S Approach DUBLIN ST S						W Approach WATERLOO AVE						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
12:00:00	9	5	4	0	2	18	1	40	0	0	1	41	6	17	8	0	5	31	5	47	6	0	0	58	148
12:15:00	1	7	10	0	1	18	3	32	2	0	2	37	4	13	6	0	3	23	7	41	4	0	0	52	130
12:30:00	2	3	2	0	2	7	2	37	3	0	3	42	2	4	4	0	4	10	9	48	6	0	1	63	122
12:45:00	4	4	3	0	2	11	5	38	2	0	1	45	3	14	12	0	4	29	4	55	7	0	0	66	151
Grand Total	16	19	19	0	7	54	11	147	7	0	7	165	15	48	30	0	16	93	25	191	23	0	1	239	551
Approach%	29.6%	35.2%	35.2%	0%	-	-	6.7%	89.1%	4.2%	0%	-	-	16.1%	51.6%	32.3%	0%	-	-	10.5%	79.9%	9.6%	0%	-	-	-
Totals %	2.9%	3.4%	3.4%	0%	9.8%	2%	26.7%	1.3%	0%	29.9%	2.7%	8.7%	5.4%	0%	16.9%	4.5%	34.7%	4.2%	0%	43.4%	-	-	-	-	-
PHF	0.44	0.68	0.48	0	0.75	0.55	0.92	0.58	0	0.92	0.63	0.71	0.63	0	0.75	0.69	0.87	0.82	0	0.91	-	-	-	-	-
Heavy	0	0	0	0	0	0	0	2	0	0	2	1	0	0	0	1	0	5	0	0	5	-	-	-	-
Heavy %	0%	0%	0%	0%	0%	0%	0%	1.4%	0%	0%	1.2%	6.7%	0%	0%	0%	1.1%	0%	2.6%	0%	0%	2.1%	-	-	-	-
Lights	16	19	18	0	53	11	145	7	0	163	14	48	30	0	92	25	184	23	0	232	-	-	-	-	-
Lights %	100%	100%	94.7%	0%	98.1%	100%	98.6%	100%	0%	98.8%	93.3%	100%	100%	0%	98.9%	100%	96.3%	100%	0%	97.1%	-	-	-	-	-
Single-Unit Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Single-Unit Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Buses	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	5	0	0	5	-	-	-	-
Buses %	0%	0%	0%	0%	0%	0%	0%	1.4%	0%	0%	1.2%	0%	0%	0%	0%	0%	0%	2.6%	0%	0%	2.1%	-	-	-	-
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	-
Articulated Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	6.7%	0%	0%	0%	1.1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Bicycles on Road	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	-	-	-	-
Bicycles on Road %	0%	0%	5.3%	0%	1.9%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0.8%	-	-	-	-
Pedestrians	-	-	-	-	7	-	-	-	-	7	-	-	-	-	-	16	-	-	-	-	1	-	-	-	-
Pedestrians%	-	-	-	-	22.6%	-	-	-	-	22.6%	-	-	-	-	51.6%	-	-	-	-	3.2%	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-



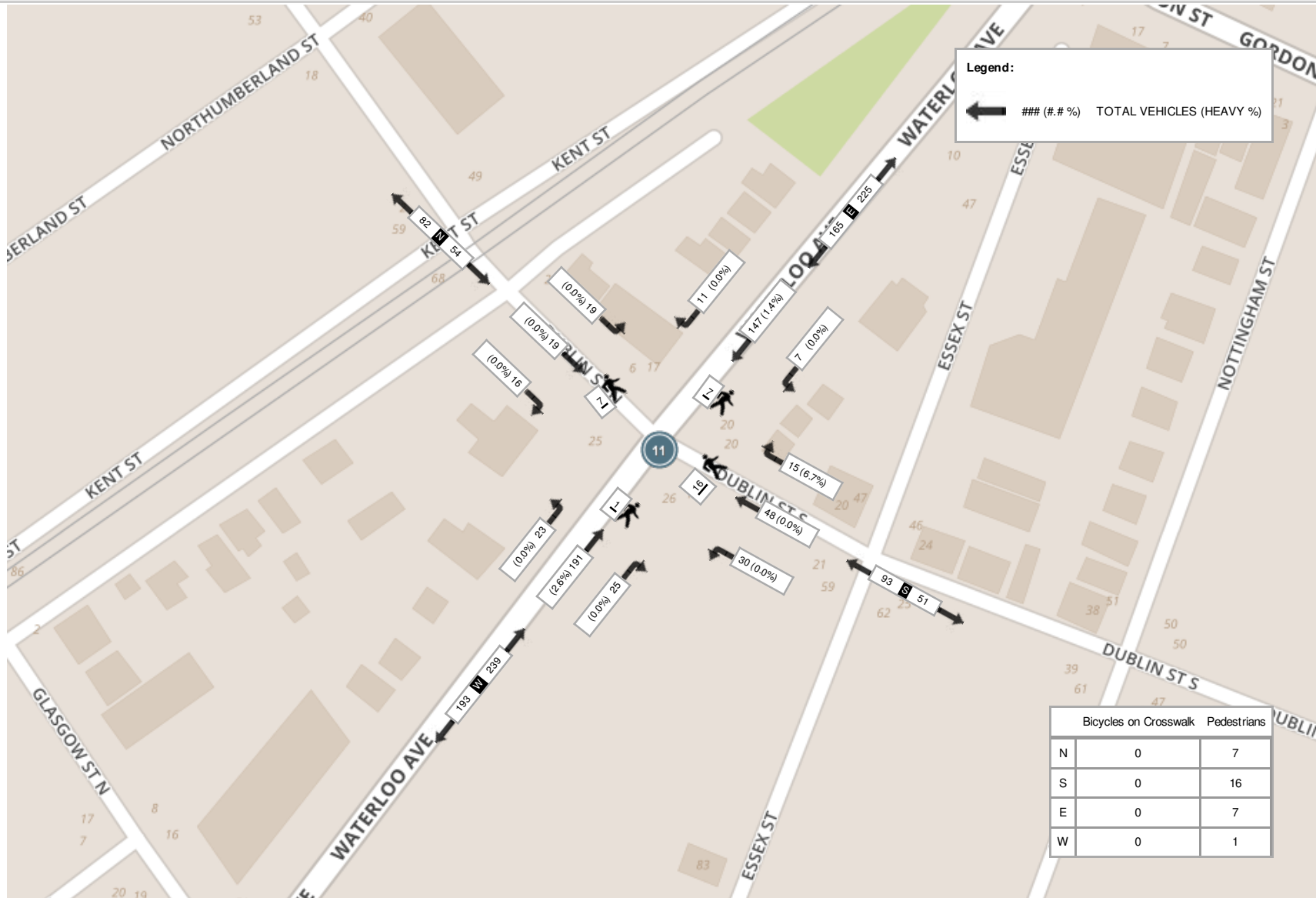
Peak Hour: 04:30 PM - 05:30 PM Weather:

Start Time	N Approach DUBLIN ST S						E Approach WATERLOO AVE						S Approach DUBLIN ST S						W Approach WATERLOO AVE						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	8	4	3	0	2	15	6	51	0	0	1	57	3	24	18	0	8	45	7	51	10	0	2	68	185
16:45:00	14	9	9	0	0	32	1	48	1	0	3	50	5	28	11	0	1	44	5	58	10	0	0	73	199
17:00:00	15	3	3	0	2	21	8	67	2	0	3	77	4	18	13	0	4	35	4	63	12	0	3	79	212
17:15:00	13	5	4	0	5	22	5	58	2	0	2	65	8	22	11	0	2	41	2	48	7	0	2	57	185
Grand Total	50	21	19	0	9	90	20	224	5	0	9	249	20	92	53	0	15	165	18	220	39	0	7	277	781
Approach%	55.6%	23.3%	21.1%	0%		-	8%	90%	2%	0%		-	12.1%	55.8%	32.1%	0%		-	6.5%	79.4%	14.1%	0%		-	-
Totals %	6.4%	2.7%	2.4%	0%		11.5%	2.6%	28.7%	0.6%	0%		31.9%	2.6%	11.8%	6.8%	0%		21.1%	2.3%	28.2%	5%	0%		35.5%	-
PHF	0.83	0.58	0.53	0		0.7	0.63	0.84	0.63	0		0.81	0.63	0.82	0.74	0		0.92	0.64	0.87	0.81	0		0.88	-
Heavy	1	0	1	0		2	1	5	0	0		6	1	0	1	0		2	1	3	2	0		6	-
Heavy %	2%	0%	5.3%	0%		2.2%	5%	2.2%	0%	0%		2.4%	5%	0%	1.9%	0%		1.2%	5.6%	1.4%	5.1%	0%		2.2%	-
Lights	49	20	18	0		87	18	216	5	0		239	19	90	50	0		159	17	214	37	0		268	-
Lights %	98%	95.2%	94.7%	0%		96.7%	90%	96.4%	100%	0%		96%	95%	97.8%	94.3%	0%		96.4%	94.4%	97.3%	94.9%	0%		96.8%	-
Single-Unit Trucks	1	0	1	0		2	1	2	0	0		3	1	0	1	0		2	1	2	2	0		5	-
Single-Unit Trucks %	2%	0%	5.3%	0%		2.2%	5%	0.9%	0%	0%		1.2%	5%	0%	1.9%	0%		1.2%	5.6%	0.9%	5.1%	0%		1.8%	-
Buses	0	0	0	0		0	0	3	0	0		3	0	0	0	0		0	0	1	0	0		1	-
Buses %	0%	0%	0%	0%		0%	0%	1.3%	0%	0%		1.2%	0%	0%	0%	0%		0%	0%	0.5%	0%	0%		0.4%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	1	0	0		1	1	3	0	0		4	0	2	2	0		4	0	3	0	0		3	-
Bicycles on Road %	0%	4.8%	0%	0%		1.1%	5%	1.3%	0%	0%		1.6%	0%	2.2%	3.8%	0%		2.4%	0%	1.4%	0%	0%		1.1%	-
Pedestrians	-	-	-	-	9	-	-	-	-	8	-	-	-	-	-	13	-	-	-	-	-	7	-	-	-
Pedestrians%	-	-	-	-	22.5%	-	-	-	-	20%	-	-	-	-	-	32.5%	-	-	-	-	-	17.5%	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	2.5%	-	-	-	-	-	5%	-	-	-	-	-	0%	-	-	-

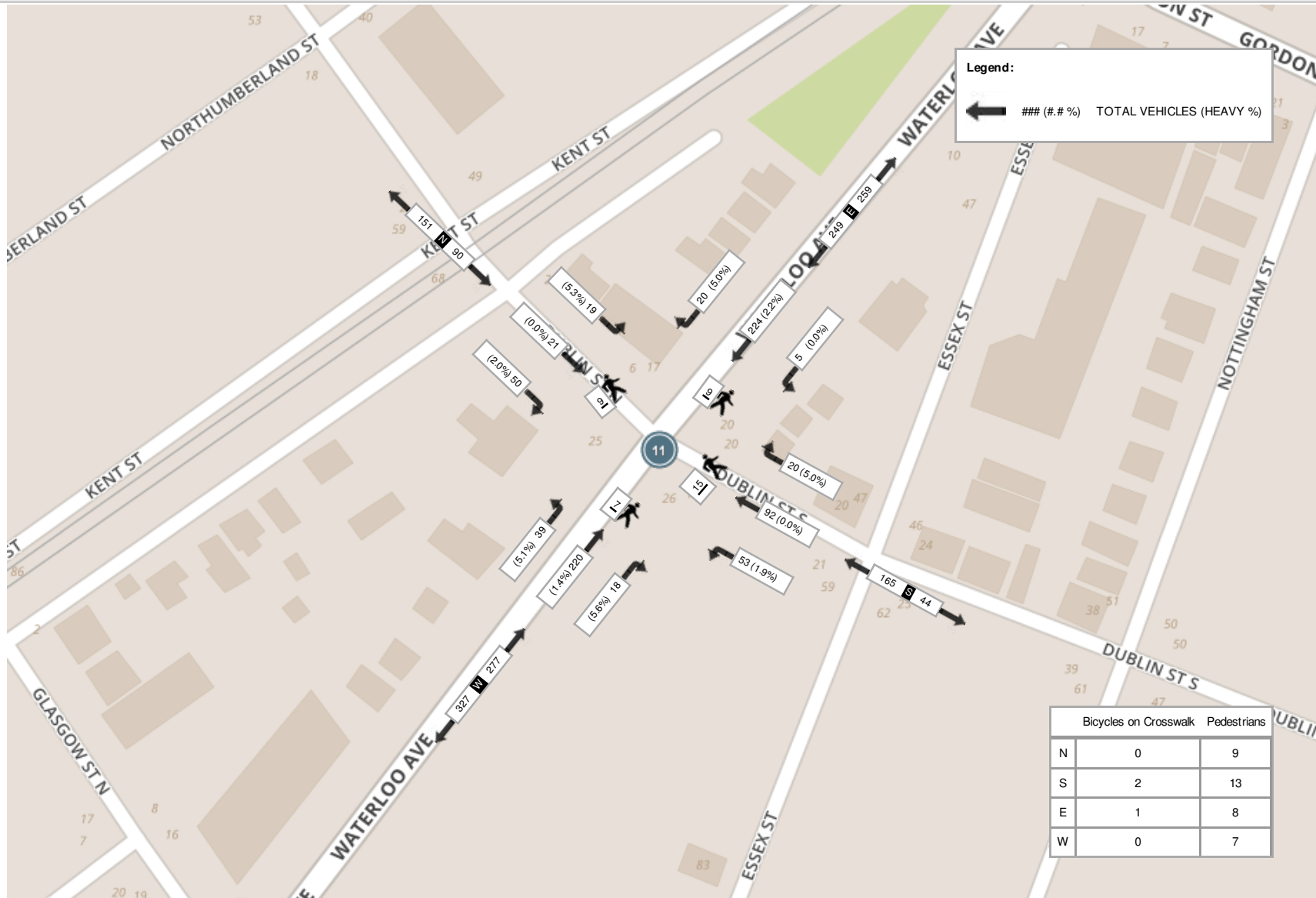
Peak Hour: 08:15 AM - 09:15 AM Weather:



Peak Hour: 12:00 PM - 01:00 PM Weather:



Peak Hour: 04:30 PM - 05:30 PM Weather:





Turning Movement Count (12 . PAISLEY ST / QUEBEC ST & YARMOUTH ST AND NORFOLK ST)

Start Time	N Approach NORFOLK ST							NE Approach YARMOUTH ST							E Approach QUEBEC ST							S Approach NORFOLK ST							W Approach PAISLEY ST							Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	Hard Left N:NE	U- Turn N:N	Peds N:	Approach Total	Hard Right NE:N	Bear Right NE:W	Bear Left NE:S	Hard Left NE:E	U- Turn NE:NE	Peds NE:	Approach Total	Hard Right E:NE	Right E:N	Thru E:W	Left E:S	U- Turn E:E	Peds E:	Approach Total	Right S:E	Bear Right S:NE	Thru S:N	Left S:W	U- Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Bear Left W:NE	Left W:N	U- Turn W:W	Peds W:	Approach Total		
07:00:00	5	66	0	1	0	3	72	0	0	0	0	0	3	0	1	3	14	9	0	7	27	7	6	26	12	0	5	51	19	12	2	1	0	0	34	184	
07:15:00	3	76	1	1	0	5	81	0	0	0	0	0	6	0	1	0	17	4	0	3	22	4	2	33	12	0	2	51	32	10	8	2	0	3	52	206	
07:30:00	5	90	1	0	0	2	96	0	0	0	0	0	4	0	1	2	17	9	0	5	29	5	8	34	18	0	11	65	24	20	8	2	0	4	54	244	
07:45:00	1	120	1	2	0	9	124	0	0	0	0	0	9	0	1	2	31	11	0	5	45	13	8	44	19	0	6	84	32	25	18	5	0	2	80	333	967
08:00:00	12	110	2	2	0	11	126	0	0	0	0	0	9	0	2	8	28	17	0	10	55	5	11	52	13	0	8	81	17	35	13	4	0	9	69	331	1114
08:15:00	9	121	5	2	0	13	137	0	0	0	0	0	11	0	0	4	32	15	0	11	51	15	11	64	28	0	19	118	43	32	10	7	0	9	92	398	1306
08:30:00	8	138	6	0	0	30	152	0	0	0	0	0	18	0	6	7	36	18	0	11	67	22	25	65	29	0	25	141	35	41	17	10	0	15	103	463	1525
08:45:00	6	139	7	4	0	23	156	0	0	0	0	0	17	0	6	10	32	22	0	9	70	25	25	66	23	0	43	139	46	43	35	12	0	18	136	501	1693
09:00:00	7	143	5	1	0	7	156	0	0	0	0	0	8	0	4	10	27	17	0	11	58	18	20	61	18	0	25	117	38	30	23	6	0	8	97	428	1790
09:15:00	14	104	6	3	0	12	127	0	0	0	0	0	12	0	5	5	21	16	0	12	47	24	11	78	14	0	19	127	23	20	9	12	0	8	64	365	1757
09:30:00	6	101	12	2	0	14	121	0	0	0	0	0	13	0	5	7	26	12	0	16	50	14	9	63	15	0	22	101	26	18	9	11	0	12	64	336	1630
09:45:00	4	102	12	4	0	10	122	0	0	0	0	0	13	0	10	14	25	18	0	11	67	28	15	76	17	0	17	136	29	25	12	11	0	12	77	402	1531
BREAK																																					
11:00:00	7	96	10	0	0	18	113	0	0	0	0	0	26	0	10	16	34	26	0	12	86	22	11	68	38	0	30	139	30	14	8	9	0	15	61	399	
11:15:00	21	104	15	3	0	15	143	0	0	0	0	0	12	0	5	5	31	25	0	12	66	15	10	66	27	0	30	118	28	23	8	14	0	10	73	400	
11:30:00	12	108	8	3	0	25	131	0	0	0	0	0	25	0	9	10	35	26	0	15	80	22	15	67	28	0	29	132	31	18	17	10	0	5	76	419	
11:45:00	10	89	12	4	0	18	115	0	0	0	0	0	16	0	6	6	30	21	0	10	63	15	11	83	24	0	39	133	42	22	11	12	0	22	87	398	1616
12:00:00	13	101	15	2	0	17	131	0	0	0	0	0	21	0	5	7	44	20	0	19	76	21	14	65	29	0	27	129	33	29	13	14	0	18	89	425	1642
12:15:00	10	88	2	2	0	11	102	0	0	0	0	0	17	0	7	13	31	20	0	21	71	20	19	88	37	0	44	164	40	17	8	9	0	14	74	411	1653
12:30:00	9	91	11	2	0	15	113	0	0	0	0	0	22	0	8	7	39	20	0	18	74	22	10	57	24	0	42	113	26	30	13	7	0	12	76	376	1610
12:45:00	10	107	12	3	0	23	132	0	0	0	0	0	20	0	8	13	32	26	0	14	79	22	15	56	29	0	47	122	38	25	20	15	0	18	98	431	1643
BREAK																																					
16:00:00	12	100	7	2	0	26	121	0	0	0	0	0	26	0	7	9	60	41	0	22	117	17	15	93	38	0	82	163	38	43	10	14	0	36	105	506	
16:15:00	13	101	6	2	0	19	122	0	0	0	0	0	27	0	9	15	39	30	0	18	93	21	17	88	42	0	52	168	31	32	17	8	0	19	88	471	
16:30:00	16	86	13	3	0	26	118	0	0	0	0	0	28	0	2	16	65	33	0	23	116	16	22	94	31	0	47	163	36	37	14	10	0	21	97	494	
16:45:00	12	108	9	2	0	27	131	0	0	0	0	0	28	0	12	19	56	37	0	13	124	13	9	106	39	0	46	167	39	24	23	11	0	14	97	519	1990
17:00:00	16	103	8	6	0	33	133	0	0	0	0	0	28	0	5	16	63	37	0	9	121	17	22	108	26	0	40	173	37	32	18	17	0	39	104	531	2015
17:15:00	14	116	7	4	0	21	141	0	0	0	0	0	20	0	7	9	36	28	0	14	80	17	16	102	26	0	23	161	49	47	13	10	0	30	119	501	2045
17:30:00	17	105	12	3	0	22	137	0	0	0	0	0	14	0	6	8	36	25	0	13	75	14	9	81	25	0	19	129	36	27	18	16	0	17	97	438	1989
17:45:00	11	127	2	3	0	25	143	0	0	0	0	0	21	0	6	10	40	20	0	12	76	16	20	89	27	0	29	152	43	27	15	11	0	28	96	467	1937
18:00:00	18	98	6	4	0	27	126	0	0	0	0	0	29	0	7	5	27	19	0	14	58	11	13	80	24	0	13	128	35	32	12	10	0	18	89	401	1807
18:15:00	8	103	8	0	0	15	119	0	0	0	0	0	20	0	9	8	43	22	0	20	82	18	18	74	27	0	23	137	38	21	9	7	0	8	75	413	1719
18:30:00	13	88	2	2	0	10	105	0	0	0	0	0	12	0	3	8	30	17	0	13	58	18	12	75	35	0	24	140	21	21	17	8	0	10	67	370	1651
18:45:00	13	85	9	1	0	5	108	0	0	0	0	0	6	0	7	6	43	18	0	12	74	15	16	66	16	0	10	113	23	24	14	8	0	17	69	364	1548



Grand Total	335	3314	232	73	0	537	3954	0	0	0	0	0	541	0	180	278	1120	679	0	415	2257	532	445	2268	810	0	898	4055	1058	856	442	303	0	471	2659	12925	-
Approach%	8.5%	83.8%	5.9%	1.8%	0%		-	0%	0%	0%	0%	0%		-	8%	12.3%	49.6%	30.1%	0%		-	13.1%	11%	55.9%	20%	0%		-	39.8%	32.2%	16.6%	11.4%	0%		-	-	-
Totals %	2.6%	25.6%	1.8%	0.6%	0%		30.6%	0%	0%	0%	0%	0%		0%	1.4%	2.2%	8.7%	5.3%	0%		17.5%	4.1%	3.4%	17.5%	6.3%	0%		31.4%	8.2%	6.6%	3.4%	2.3%	0%		20.6%	-	-
Heavy	6	90	6	1	0		-	0	0	0	0	0		-	3	4	33	5	0		-	4	9	97	12	0		-	10	63	4	5	0		-	-	-
Heavy %	1.8%	2.7%	2.6%	1.4%	0%		-	0%	0%	0%	0%	0%		-	1.7%	1.4%	2.9%	0.7%	0%		-	0.8%	2%	4.3%	1.5%	0%		-	0.9%	7.4%	0.9%	1.7%	0%		-	-	-
Bicycles	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-	-	-



Peak Hour: 08:15 AM - 09:15 AM Weather:

Start Time	N Approach NORFOLK ST							NE Approach YARMOUTH ST							E Approach QUEBEC ST							S Approach NORFOLK ST							W Approach PAISLEY ST							Int. Total (15 min)
	Right	Thru	Left	Hard Left	U- Turn	Peds	Approach Total	Hard Right	Bear Right	Bear Left	Hard Left	U- Turn	Peds	Approach Total	Hard Right	Right	Thru	Left	U- Turn	Peds	Approach Total	Right	Bear Right	Thru	Left	U- Turn	Peds	Approach Total	Right	Thru	Bear Left	Left	U- Turn	Peds	Approach Total	
08:15:00	9	121	5	2	0	13	137	0	0	0	0	0	11	0	0	4	32	15	0	11	51	15	11	64	28	0	19	118	43	32	10	7	0	9	92	398
08:30:00	8	138	6	0	0	30	152	0	0	0	0	0	18	0	6	7	36	18	0	11	67	22	25	65	29	0	25	141	35	41	17	10	0	15	103	463
08:45:00	6	139	7	4	0	23	156	0	0	0	0	0	17	0	6	10	32	22	0	9	70	25	25	66	23	0	43	139	46	43	35	12	0	18	136	501
09:00:00	7	143	5	1	0	7	156	0	0	0	0	0	8	0	4	10	27	17	0	11	58	18	20	61	18	0	25	117	38	30	23	6	0	8	97	428
Grand Total	30	541	23	7	0	73	601	0	0	0	0	0	54	0	16	31	127	72	0	42	246	80	81	256	98	0	112	515	162	146	85	35	0	50	428	1790
Approach%	5%	90%	3.8%	1.2%	0%		-	0%	0%	0%	0%	0%		-	6.5%	12.6%	51.6%	29.3%	0%		-	15.5%	15.7%	49.7%	19%	0%		-	37.9%	34.1%	19.9%	8.2%	0%		-	-
Totals %	1.7%	30.2%	1.3%	0.4%	0%		33.6%	0%	0%	0%	0%	0%		0%	0.9%	1.7%	7.1%	4%	0%		13.7%	4.5%	4.5%	14.3%	5.5%	0%		28.8%	9.1%	8.2%	4.7%	2%	0%		23.9%	-
PHF	0.83	0.95	0.82	0.44	0		0.96	0	0	0	0	0		0	0.67	0.78	0.88	0.82	0		0.88	0.8	0.81	0.97	0.84	0		0.91	0.88	0.85	0.61	0.73	0		0.79	-
Heavy	2	11	0	0	0		13	0	0	0	0	0		0	0	0	6	0	0		6	0	3	16	3	0		22	1	10	0	1	0		12	-
Heavy %	6.7%	2%	0%	0%	0%		2.2%	0%	0%	0%	0%	0%		0%	0%	0%	4.7%	0%	0%		2.4%	0%	3.7%	6.3%	3.1%	0%		4.3%	0.6%	6.8%	0%	2.9%	0%		2.8%	-
Lights	28	523	23	7	0		581	0	0	0	0	0		0	16	31	120	72	0		239	80	78	239	95	0		492	159	136	85	34	0		414	-
Lights %	93.3%	96.7%	100%	100%	0%		96.7%	0%	0%	0%	0%	0%		0%	100%	100%	94.5%	100%	0%		97.2%	100%	96.3%	93.4%	96.9%	0%		95.5%	98.1%	93.2%	100%	97.1%	0%		96.7%	-
Single-Unit Trucks	1	6	0	0	0		7	0	0	0	0	0		0	0	0	0	0	0		0	0	3	8	2	0		13	0	0	0	0	0		0	-
Single-Unit Trucks %	3.3%	1.1%	0%	0%	0%		1.2%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	0%	3.7%	3.1%	2%	0%		2.5%	0%	0%	0%	0%	0%		0%	-
Buses	1	5	0	0	0		6	0	0	0	0	0		0	0	0	6	0	0		6	0	0	8	1	0		9	0	10	0	1	0		11	-
Buses %	3.3%	0.9%	0%	0%	0%		1%	0%	0%	0%	0%	0%		0%	0%	0%	4.7%	0%	0%		2.4%	0%	0%	3.1%	1%	0%		1.7%	0%	6.8%	0%	2.9%	0%		2.6%	-
Articulated Trucks	0	0	0	0	0		0	0	0	0	0	0		0	0	0	0	0	0		0	0	0	0	0	0		0	1	0	0	0	0		1	-
Articulated Trucks %	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	0.6%	0%	0%	0%	0%		0.2%	-
Bicycles on Road	0	7	0	0	0		7	0	0	0	0	0		0	0	0	1	0	0		1	0	0	1	0	0		1	2	0	0	0	0		2	-
Bicycles on Road %	0%	1.3%	0%	0%	0%		1.2%	0%	0%	0%	0%	0%		0%	0%	0%	0.8%	0%	0%		0.4%	0%	0%	0.4%	0%	0%		0.2%	1.2%	0%	0%	0%	0%		0.5%	-
Pedestrians	-	-	-	-	-	73	-	-	-	-	-	-	54	-	-	-	-	-	-	42	-	-	-	-	-	-	111	-	-	-	-	-	-	50	-	-
Pedestrians%	-	-	-	-	-	22.1%	-	-	-	-	-	-	16.3%	-	-	-	-	-	-	12.7%	-	-	-	-	-	-	33.5%	-	-	-	-	-	-	15.1%	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	-	0.3%	-	-	-	-	-	-	0%	-	-



Peak Hour: 11:30 AM - 12:30 PM Weather:

Start Time	N Approach NORFOLK ST							NE Approach YARMOUTH ST							E Approach QUEBEC ST							S Approach NORFOLK ST							W Approach PAISLEY ST							Int. Total (15 min)
	Right	Thru	Left	Hard Left	U- Turn	Peds	Approach Total	Hard Right	Bear Right	Bear Left	Hard Left	U- Turn	Peds	Approach Total	Hard Right	Right	Thru	Left	U- Turn	Peds	Approach Total	Right	Bear Right	Thru	Left	U- Turn	Peds	Approach Total	Right	Thru	Bear Left	Left	U- Turn	Peds	Approach Total	
11:30:00	12	108	8	3	0	25	131	0	0	0	0	0	25	0	9	10	35	26	0	15	80	22	15	67	28	0	29	132	31	18	17	10	0	5	76	419
11:45:00	10	89	12	4	0	18	115	0	0	0	0	0	16	0	6	6	30	21	0	10	63	15	11	83	24	0	39	133	42	22	11	12	0	22	87	398
12:00:00	13	101	15	2	0	17	131	0	0	0	0	0	21	0	5	7	44	20	0	19	76	21	14	65	29	0	27	129	33	29	13	14	0	18	89	425
12:15:00	10	88	2	2	0	11	102	0	0	0	0	0	17	0	7	13	31	20	0	21	71	20	19	88	37	0	44	164	40	17	8	9	0	14	74	411
Grand Total	45	386	37	11	0	71	479	0	0	0	0	0	79	0	27	36	140	87	0	65	290	78	59	303	118	0	139	558	146	86	49	45	0	59	326	1653
Approach%	9.4%	80.6%	7.7%	2.3%	0%	-	-	0%	0%	0%	0%	0%	-	-	9.3%	12.4%	48.3%	30%	0%	-	-	14%	10.6%	54.3%	21.1%	0%	-	-	44.8%	26.4%	15%	13.8%	0%	-	-	
Totals %	2.7%	23.4%	2.2%	0.7%	0%	29%	-	0%	0%	0%	0%	0%	0%	0%	1.6%	2.2%	8.5%	5.3%	0%	17.5%	-	4.7%	3.6%	18.3%	7.1%	0%	33.8%	-	8.8%	5.2%	3%	2.7%	0%	19.7%	-	
PHF	0.87	0.89	0.62	0.69	0	0.91	-	0	0	0	0	0	0	0	0.75	0.69	0.8	0.84	0	0.91	-	0.89	0.78	0.86	0.8	0	0.85	-	0.87	0.74	0.72	0.8	0	0.92	-	
Heavy	0	10	1	0	0	11	-	0	0	0	0	0	0	0	1	2	2	0	0	5	-	2	3	13	2	0	20	-	4	9	1	1	0	15	-	
Heavy %	0%	2.6%	2.7%	0%	0%	2.3%	-	0%	0%	0%	0%	0%	0%	0%	3.7%	5.6%	1.4%	0%	0%	1.7%	-	2.6%	5.1%	4.3%	1.7%	0%	3.6%	-	2.7%	10.5%	2%	2.2%	0%	4.6%	-	
Lights	44	374	36	11	0	465	-	0	0	0	0	0	0	0	26	34	138	87	0	285	-	76	55	290	115	0	536	-	142	77	48	44	0	311	-	
Lights %	97.8%	96.9%	97.3%	100%	0%	97.1%	-	0%	0%	0%	0%	0%	0%	0%	96.3%	94.4%	98.6%	100%	0%	98.3%	-	97.4%	93.2%	95.7%	97.5%	0%	96.1%	-	97.3%	89.5%	98%	97.8%	0%	95.4%	-	
Single-Unit Trucks	0	2	1	0	0	3	-	0	0	0	0	0	0	0	1	1	0	0	0	2	-	2	2	4	2	0	10	-	1	2	0	0	0	3	-	
Single-Unit Trucks %	0%	0.5%	2.7%	0%	0%	0.6%	-	0%	0%	0%	0%	0%	0%	0%	3.7%	2.8%	0%	0%	0%	0.7%	-	2.6%	3.4%	1.3%	1.7%	0%	1.8%	-	0.7%	2.3%	0%	0%	0%	0.9%	-	
Buses	0	7	0	0	0	7	-	0	0	0	0	0	0	0	0	1	2	0	0	3	-	0	1	8	0	0	9	-	3	7	1	1	0	12	-	
Buses %	0%	1.8%	0%	0%	0%	1.5%	-	0%	0%	0%	0%	0%	0%	0%	0%	2.8%	1.4%	0%	0%	1%	-	0%	1.7%	2.6%	0%	0%	1.6%	-	2.1%	8.1%	2%	2.2%	0%	3.7%	-	
Articulated Trucks	0	1	0	0	0	1	-	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	1	0	0	1	-	0	0	0	0	0	0	-	
Articulated Trucks %	0%	0.3%	0%	0%	0%	0.2%	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	0%	0%	0.3%	0%	0%	0.2%	-	0%	0%	0%	0%	0%	0%	0%	-
Bicycles on Road	1	2	0	0	0	3	-	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	1	0	1	0	2	-	0	0	0	0	0	0	-	
Bicycles on Road %	2.2%	0.5%	0%	0%	0%	0.6%	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	0%	1.7%	0%	0.8%	0%	0.4%	-	0%	0%	0%	0%	0%	0%	0%	-
Pedestrians	-	-	-	-	-	71	-	-	-	-	-	-	79	-	-	-	-	-	-	65	-	-	-	-	-	139	-	-	-	-	-	-	59	-	-	
Pedestrians%	-	-	-	-	-	17.2%	-	-	-	-	-	-	19.1%	-	-	-	-	-	-	15.7%	-	-	-	-	-	33.7%	-	-	-	-	-	-	14.3%	-	-	
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	
Bicycles on Crosswalk%	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	



Peak Hour: 04:30 PM - 05:30 PM Weather:

Start Time	N Approach NORFOLK ST							NE Approach YARMOUTH ST							E Approach QUEBEC ST							S Approach NORFOLK ST							W Approach PAISLEY ST							Int. Total (15 min)
	Right	Thru	Left	Hard Left	U- Turn	Peds	Approach Total	Hard Right	Bear Right	Bear Left	Hard Left	U- Turn	Peds	Approach Total	Hard Right	Right	Thru	Left	U- Turn	Peds	Approach Total	Right	Bear Right	Thru	Left	U- Turn	Peds	Approach Total	Right	Thru	Bear Left	Left	U- Turn	Peds	Approach Total	
16:30:00	16	86	13	3	0	26	118	0	0	0	0	0	28	0	2	16	65	33	0	23	116	16	22	94	31	0	47	163	36	37	14	10	0	21	97	494
16:45:00	12	108	9	2	0	27	131	0	0	0	0	0	28	0	12	19	56	37	0	13	124	13	9	106	39	0	46	167	39	24	23	11	0	14	97	519
17:00:00	16	103	8	6	0	33	133	0	0	0	0	0	28	0	5	16	63	37	0	9	121	17	22	108	26	0	40	173	37	32	18	17	0	39	104	531
17:15:00	14	116	7	4	0	21	141	0	0	0	0	0	20	0	7	9	36	28	0	14	80	17	16	102	26	0	23	161	49	47	13	10	0	30	119	501
Grand Total	58	413	37	15	0	107	523	0	0	0	0	0	104	0	26	60	220	135	0	59	441	63	69	410	122	0	156	664	161	140	68	48	0	104	417	2045
Approach%	11.1%	79%	7.1%	2.9%	0%		-	0%	0%	0%	0%	0%		-	5.9%	13.6%	49.9%	30.6%	0%		-	9.5%	10.4%	61.7%	18.4%	0%		-	38.6%	33.6%	16.3%	11.5%	0%		-	-
Totals %	2.8%	20.2%	1.8%	0.7%	0%		25.6%	0%	0%	0%	0%	0%		0%	1.3%	2.9%	10.8%	6.6%	0%		21.6%	3.1%	3.4%	20%	6%	0%		32.5%	7.9%	6.8%	3.3%	2.3%	0%		20.4%	-
PHF	0.91	0.89	0.71	0.63	0		0.93	0	0	0	0	0		0	0.54	0.79	0.85	0.91	0		0.89	0.93	0.78	0.95	0.78	0		0.96	0.82	0.74	0.74	0.71	0		0.88	-
Heavy	1	7	2	0	0		10	0	0	0	0	0		0	0	0	3	0	0		3	0	0	11	1	0		12	0	8	0	1	0		9	-
Heavy %	1.7%	1.7%	5.4%	0%	0%		1.9%	0%	0%	0%	0%	0%		0%	0%	0%	1.4%	0%	0%		0.7%	0%	0%	2.7%	0.8%	0%		1.8%	0%	5.7%	0%	2.1%	0%		2.2%	-
Lights	57	402	34	15	0		508	0	0	0	0	0		0	26	59	215	134	0		434	63	66	395	121	0		645	160	130	68	47	0		405	-
Lights %	98.3%	97.3%	91.9%	100%	0%		97.1%	0%	0%	0%	0%	0%		0%	100%	98.3%	97.7%	99.3%	0%		98.4%	100%	95.7%	96.3%	99.2%	0%		97.1%	99.4%	92.9%	100%	97.9%	0%		97.1%	-
Single-Unit Trucks	1	2	0	0	0		3	0	0	0	0	0		0	0	0	0	0	0		0	0	0	1	1	0		2	0	0	0	1	0		1	-
Single-Unit Trucks %	1.7%	0.5%	0%	0%	0%		0.6%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	0%	0%	0.2%	0.8%	0%		0.3%	0%	0%	0%	2.1%	0%		0.2%	-
Buses	0	5	1	0	0		6	0	0	0	0	0		0	0	0	3	0	0		3	0	0	10	0	0		10	0	8	0	0	0		8	-
Buses %	0%	1.2%	2.7%	0%	0%		1.1%	0%	0%	0%	0%	0%		0%	0%	0%	1.4%	0%	0%		0.7%	0%	0%	2.4%	0%	0%		1.5%	0%	5.7%	0%	0%	0%		1.9%	-
Articulated Trucks	0	0	1	0	0		1	0	0	0	0	0		0	0	0	0	0	0		0	0	0	0	0	0		0	0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	2.7%	0%	0%		0.2%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	4	1	0	0		5	0	0	0	0	0		0	0	1	2	1	0		4	0	3	4	0	0		7	1	2	0	0	0		3	-
Bicycles on Road %	0%	1%	2.7%	0%	0%		1%	0%	0%	0%	0%	0%		0%	0%	1.7%	0.9%	0.7%	0%		0.9%	0%	4.3%	1%	0%	0%		1.1%	0.6%	1.4%	0%	0%	0%		0.7%	-
Pedestrians	-	-	-	-	-	107	-	-	-	-	-	-	104	-	-	-	-	-	-	59	-	-	-	-	-	156	-	-	-	-	-	-	103	-	-	
Pedestrians%	-	-	-	-	-	20.2%	-	-	-	-	-	-	19.6%	-	-	-	-	-	-	11.1%	-	-	-	-	-	29.4%	-	-	-	-	-	-	19.4%	-	-	
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-	
Bicycles on Crosswalk%	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	-	0.2%	-	-	

Peak Hour: 08:15 AM - 09:15 AM Weather:



Peak Hour: 11:30 AM - 12:30 PM Weather:



Peak Hour: 04:30 PM - 05:30 PM Weather:





Turning Movement Count (13 . NORFOLK ST & CORK ST W / CORK ST E)

Start Time	N Approach NORFOLK ST						E Approach CORK ST E						S Approach NORFOLK ST						W Approach CORK ST W						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total			
07:00:00	2	97	5	0	0	104	4	0	1	0	2	5	1	48	4	0	0	53	1	0	1	0	2	2	164		
07:15:00	1	104	7	0	0	112	3	1	1	0	1	5	2	47	8	0	0	57	1	2	0	0	4	3	177		
07:30:00	2	116	8	0	1	126	9	0	3	0	2	12	1	68	3	0	1	72	0	1	2	0	2	3	213		
07:45:00	1	147	12	0	2	160	4	0	1	0	6	5	5	78	1	0	2	84	0	3	1	0	5	4	253	807	
08:00:00	3	135	8	0	0	146	2	0	1	0	4	3	7	88	1	0	4	96	8	1	1	0	5	10	255	898	
08:15:00	6	161	18	0	3	185	11	3	1	0	6	15	10	116	5	0	1	131	7	0	0	0	6	7	338	1059	
08:30:00	8	168	13	0	1	189	5	0	4	0	12	9	11	156	11	0	2	178	9	3	0	0	9	12	388	1234	
08:45:00	7	183	16	0	4	206	11	2	4	0	6	17	12	143	9	0	4	164	8	5	1	0	10	14	401	1382	
09:00:00	6	166	10	0	1	182	10	1	4	0	11	15	13	121	4	0	2	138	4	2	4	0	12	10	345	1472	
09:15:00	1	142	13	1	2	157	10	4	3	0	5	17	8	128	3	0	0	139	7	3	0	0	5	10	323	1457	
09:30:00	4	128	6	0	0	138	13	2	4	0	11	19	16	100	2	0	1	118	1	1	0	0	8	2	277	1346	
09:45:00	5	127	19	1	4	152	14	1	7	0	12	22	16	133	6	0	0	155	2	1	2	0	6	5	334	1279	
BREAK																											
11:00:00	2	142	14	0	2	158	14	1	2	0	15	17	7	130	4	0	0	141	8	1	1	0	9	10	326		
11:15:00	6	147	5	1	2	159	10	0	7	0	11	17	7	109	4	0	1	120	3	0	3	0	7	6	302		
11:30:00	8	166	13	0	0	187	12	1	9	0	13	22	9	131	1	0	1	141	4	3	1	0	9	8	358		
11:45:00	2	143	14	0	1	159	12	0	3	0	11	15	13	138	5	0	1	156	6	2	1	0	13	9	339	1325	
12:00:00	1	146	15	0	0	162	13	2	8	0	14	23	6	127	3	0	0	136	5	0	0	0	8	5	326	1325	
12:15:00	8	140	12	1	1	161	15	0	6	0	18	21	7	144	6	0	0	157	3	2	3	0	4	8	347	1370	
12:30:00	4	126	13	0	1	143	10	2	10	0	12	22	7	116	4	0	1	127	7	0	3	0	9	10	302	1314	
12:45:00	4	163	11	0	2	178	18	3	4	0	9	25	10	127	7	1	0	145	5	1	2	0	10	8	356	1331	
BREAK																											
16:00:00	5	169	9	1	1	184	18	1	8	0	16	27	10	156	2	0	3	168	5	0	1	0	20	6	385		
16:15:00	8	164	6	0	0	178	19	0	6	0	9	25	16	154	0	0	3	170	2	0	1	0	7	3	376		
16:30:00	7	149	10	0	1	166	15	1	4	1	13	21	6	150	2	0	1	158	7	0	2	0	12	9	354		
16:45:00	4	184	9	0	2	197	10	0	5	0	19	15	6	177	4	0	0	187	8	1	0	0	12	9	408	1523	
17:00:00	7	178	7	0	3	192	13	2	3	0	15	18	9	171	10	0	2	190	6	2	1	0	18	9	409	1547	
17:15:00	4	178	13	0	0	195	12	4	6	0	16	22	13	154	5	0	0	172	4	2	2	0	10	8	397	1568	
17:30:00	2	162	16	0	1	180	9	0	10	0	6	19	5	124	3	0	0	132	2	3	1	0	9	6	337	1551	
17:45:00	8	169	9	0	0	186	8	0	4	0	9	12	9	146	5	0	0	160	5	4	1	0	17	10	368	1511	
18:00:00	1	165	11	0	3	177	9	0	5	0	12	14	5	130	1	0	0	136	2	0	0	0	9	2	329	1431	



18:15:00	4	161	13	0	2	178	8	3	5	0	11	16	3	132	3	1	0	139	2	1	0	0	6	3	336	1370
18:30:00	5	135	7	0	1	147	10	2	6	0	7	18	5	134	4	1	1	144	1	1	2	0	17	4	313	1346
18:45:00	0	115	11	0	0	126	9	1	5	0	7	15	4	110	4	1	0	119	2	0	0	0	11	2	262	1240
Grand Total	136	4776	353	5	41	5270	340	37	150	1	321	528	259	3986	134	4	31	4383	135	45	37	0	291	217	10398	-
Approach%	2.6%	90.6%	6.7%	0.1%		-	64.4%	7%	28.4%	0.2%		-	5.9%	90.9%	3.1%	0.1%		-	62.2%	20.7%	17.1%	0%		-	-	-
Totals %	1.3%	45.9%	3.4%	0%		50.7%	3.3%	0.4%	1.4%	0%		5.1%	2.5%	38.3%	1.3%	0%		42.2%	1.3%	0.4%	0.4%	0%		2.1%	-	-
Heavy	1	106	1	0		-	5	0	2	0		-	4	123	0	0		-	0	0	0	0		-	-	-
Heavy %	0.7%	2.2%	0.3%	0%		-	1.5%	0%	1.3%	0%		-	1.5%	3.1%	0%	0%		-	0%	0%	0%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-



Peak Hour: 08:15 AM - 09:15 AM Weather:

Start Time	N Approach NORFOLK ST						E Approach CORK ST E						S Approach NORFOLK ST						W Approach CORK ST W						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:15:00	6	161	18	0	3	185	11	3	1	0	6	15	10	116	5	0	1	131	7	0	0	0	6	7	338
08:30:00	8	168	13	0	1	189	5	0	4	0	12	9	11	156	11	0	2	178	9	3	0	0	9	12	388
08:45:00	7	183	16	0	4	206	11	2	4	0	6	17	12	143	9	0	4	164	8	5	1	0	10	14	401
09:00:00	6	166	10	0	1	182	10	1	4	0	11	15	13	121	4	0	2	138	4	2	4	0	12	10	345
Grand Total	27	678	57	0	9	762	37	6	13	0	35	56	46	536	29	0	9	611	28	10	5	0	37	43	1472
Approach%	3.5%	89%	7.5%	0%		-	66.1%	10.7%	23.2%	0%		-	7.5%	87.7%	4.7%	0%		-	65.1%	23.3%	11.6%	0%		-	-
Totals %	1.8%	46.1%	3.9%	0%		51.8%	2.5%	0.4%	0.9%	0%		3.8%	3.1%	36.4%	2%	0%		41.5%	1.9%	0.7%	0.3%	0%		2.9%	-
PHF	0.84	0.93	0.79	0		0.92	0.84	0.5	0.81	0		0.82	0.88	0.86	0.66	0		0.86	0.78	0.5	0.31	0		0.77	-
Heavy	0	14	0	0		14	0	0	0	0		0	2	24	0	0		26	0	0	0	0		0	-
Heavy %	0%	2.1%	0%	0%		1.8%	0%	0%	0%	0%		0%	4.3%	4.5%	0%	0%		4.3%	0%	0%	0%	0%		0%	-
Lights	27	653	57	0		737	37	6	12	0		55	44	510	29	0		583	28	10	5	0		43	-
Lights %	100%	96.3%	100%	0%		96.7%	100%	100%	92.3%	0%		98.2%	95.7%	95.1%	100%	0%		95.4%	100%	100%	100%	0%		100%	-
Single-Unit Trucks	0	7	0	0		7	0	0	0	0		0	2	15	0	0		17	0	0	0	0		0	-
Single-Unit Trucks %	0%	1%	0%	0%		0.9%	0%	0%	0%	0%		0%	4.3%	2.8%	0%	0%		2.8%	0%	0%	0%	0%		0%	-
Buses	0	6	0	0		6	0	0	0	0		0	0	9	0	0		9	0	0	0	0		0	-
Buses %	0%	0.9%	0%	0%		0.8%	0%	0%	0%	0%		0%	0%	1.7%	0%	0%		1.5%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0.1%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	11	0	0		11	0	0	1	0		1	0	2	0	0		2	0	0	0	0		0	-
Bicycles on Road %	0%	1.6%	0%	0%		1.4%	0%	0%	7.7%	0%		1.8%	0%	0.4%	0%	0%		0.3%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	9	-	-	-	-	-	35	-	-	-	-	-	9	-	-	-	-	-	37	-	-
Pedestrians%	-	-	-	-	10%	-	-	-	-	-	38.9%	-	-	-	-	-	10%	-	-	-	-	-	41.1%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



Peak Hour: 11:30 AM - 12:30 PM Weather:

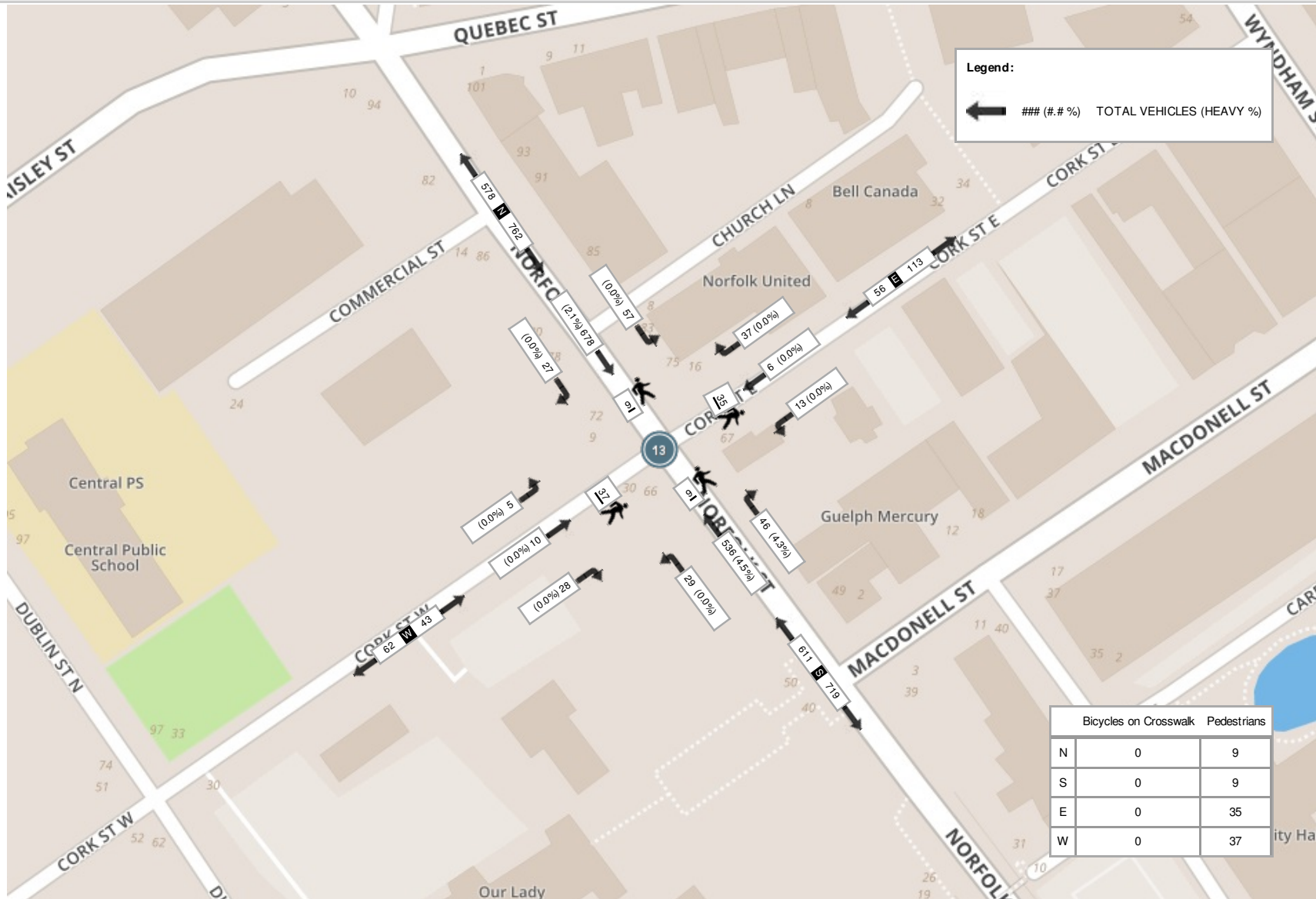
Start Time	N Approach NORFOLK ST						E Approach CORK ST E						S Approach NORFOLK ST						W Approach CORK ST W						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
11:30:00	8	166	13	0	0	187	12	1	9	0	13	22	9	131	1	0	1	141	4	3	1	0	9	8	358
11:45:00	2	143	14	0	1	159	12	0	3	0	11	15	13	138	5	0	1	156	6	2	1	0	13	9	339
12:00:00	1	146	15	0	0	162	13	2	8	0	14	23	6	127	3	0	0	136	5	0	0	0	8	5	326
12:15:00	8	140	12	1	1	161	15	0	6	0	18	21	7	144	6	0	0	157	3	2	3	0	4	8	347
Grand Total	19	595	54	1	2	669	52	3	26	0	56	81	35	540	15	0	2	590	18	7	5	0	34	30	1370
Approach%	2.8%	88.9%	8.1%	0.1%	-	-	64.2%	3.7%	32.1%	0%	-	-	5.9%	91.5%	2.5%	0%	-	-	60%	23.3%	16.7%	0%	-	-	-
Totals %	1.4%	43.4%	3.9%	0.1%	-	48.8%	3.8%	0.2%	1.9%	0%	-	5.9%	2.6%	39.4%	1.1%	0%	-	43.1%	1.3%	0.5%	0.4%	0%	-	2.2%	-
PHF	0.59	0.9	0.9	0.25	-	0.89	0.87	0.38	0.72	0	-	0.88	0.67	0.94	0.63	0	-	0.94	0.75	0.58	0.42	0	-	0.83	-
Heavy	0	14	1	0	-	15	2	0	0	0	-	2	1	19	0	0	-	20	0	0	0	0	-	0	-
Heavy %	0%	2.4%	1.9%	0%	-	2.2%	3.8%	0%	0%	0%	-	2.5%	2.9%	3.5%	0%	0%	-	3.4%	0%	0%	0%	0%	-	0%	-
Lights	19	579	53	1	-	652	50	3	26	0	-	79	34	520	15	0	-	569	18	7	5	0	-	30	-
Lights %	100%	97.3%	98.1%	100%	-	97.5%	96.2%	100%	100%	0%	-	97.5%	97.1%	96.3%	100%	0%	-	96.4%	100%	100%	100%	0%	-	100%	-
Single-Unit Trucks	0	4	1	0	-	5	2	0	0	0	-	2	0	10	0	0	-	10	0	0	0	0	-	0	-
Single-Unit Trucks %	0%	0.7%	1.9%	0%	-	0.7%	3.8%	0%	0%	0%	-	2.5%	0%	1.9%	0%	0%	-	1.7%	0%	0%	0%	0%	-	0%	-
Buses	0	9	0	0	-	9	0	0	0	0	-	0	1	9	0	0	-	10	0	0	0	0	-	0	-
Buses %	0%	1.5%	0%	0%	-	1.3%	0%	0%	0%	0%	-	0%	2.9%	1.7%	0%	0%	-	1.7%	0%	0%	0%	0%	-	0%	-
Articulated Trucks	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	-
Articulated Trucks %	0%	0.2%	0%	0%	-	0.1%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	-
Bicycles on Road	0	2	0	0	-	2	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	-
Bicycles on Road %	0%	0.3%	0%	0%	-	0.3%	0%	0%	0%	0%	-	0%	0%	0.2%	0%	0%	-	0.2%	0%	0%	0%	0%	-	0%	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	56	-	-	-	-	-	2	-	-	-	-	-	32	-	-
Pedestrians%	-	-	-	-	2.1%	-	-	-	-	-	59.6%	-	-	-	-	-	2.1%	-	-	-	-	-	34%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	2.1%	-	-



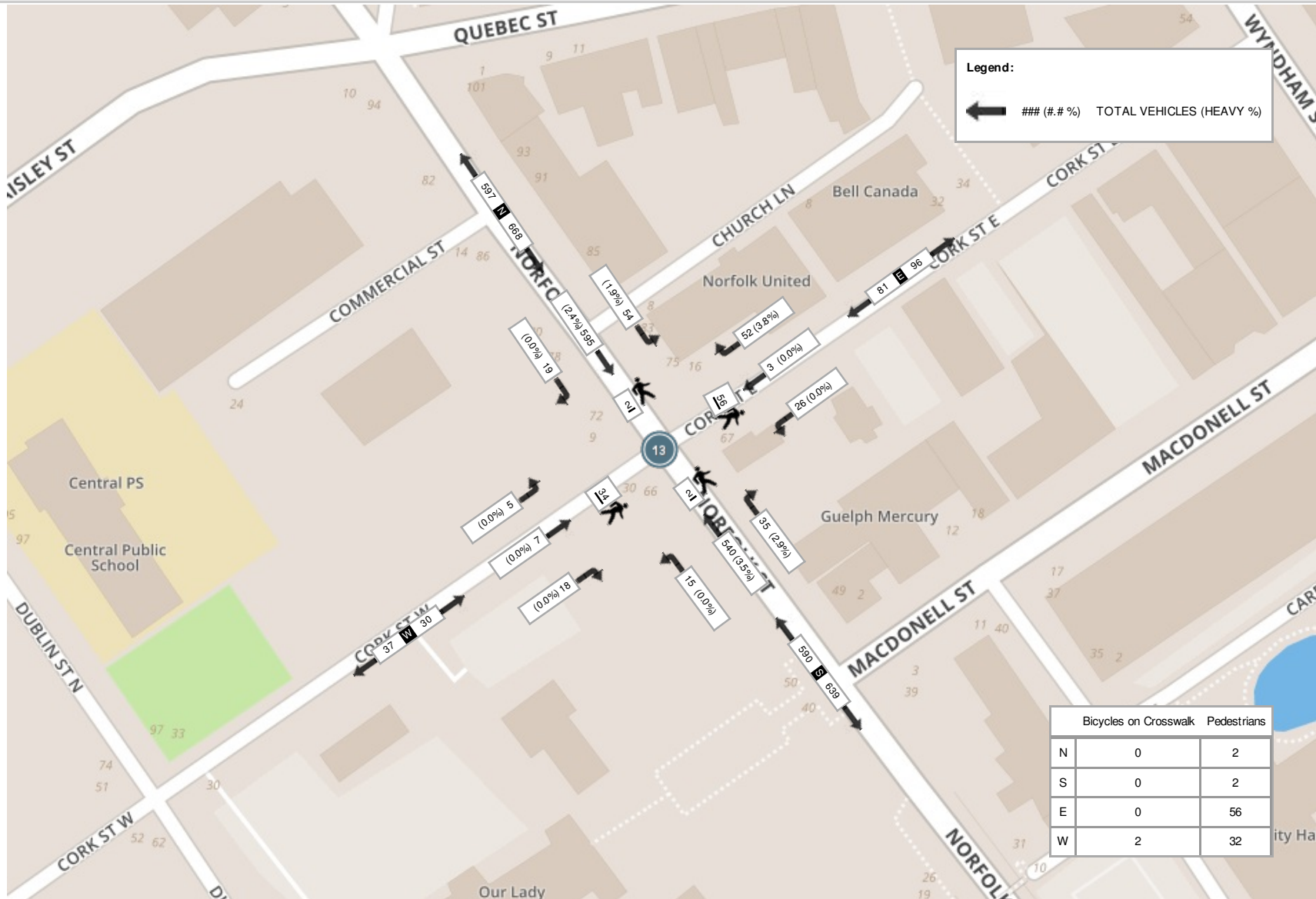
Peak Hour: 04:30 PM - 05:30 PM Weather:

Start Time	N Approach NORFOLK ST						E Approach CORK ST E						S Approach NORFOLK ST						W Approach CORK ST W						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	7	149	10	0	1	166	15	1	4	1	13	21	6	150	2	0	1	158	7	0	2	0	12	9	354
16:45:00	4	184	9	0	2	197	10	0	5	0	19	15	6	177	4	0	0	187	8	1	0	0	12	9	408
17:00:00	7	178	7	0	3	192	13	2	3	0	15	18	9	171	10	0	2	190	6	2	1	0	18	9	409
17:15:00	4	178	13	0	0	195	12	4	6	0	16	22	13	154	5	0	0	172	4	2	2	0	10	8	397
Grand Total	22	689	39	0	6	750	50	7	18	1	63	76	34	652	21	0	3	707	25	5	5	0	52	35	1568
Approach%	2.9%	91.9%	5.2%	0%	-	-	65.8%	9.2%	23.7%	1.3%	-	-	4.8%	92.2%	3%	0%	-	-	71.4%	14.3%	14.3%	0%	-	-	-
Totals %	1.4%	43.9%	2.5%	0%	-	47.8%	3.2%	0.4%	1.1%	0.1%	-	4.8%	2.2%	41.6%	1.3%	0%	-	45.1%	1.6%	0.3%	0.3%	0%	-	2.2%	-
PHF	0.79	0.94	0.75	0	-	0.95	0.83	0.44	0.75	0.25	-	0.86	0.65	0.92	0.53	0	-	0.93	0.78	0.63	0.63	0	-	0.97	-
Heavy	0	9	0	0	-	9	0	0	0	0	-	0	0	12	0	0	-	12	0	0	0	0	-	0	-
Heavy %	0%	1.3%	0%	0%	-	1.2%	0%	0%	0%	0%	-	0%	0%	1.8%	0%	0%	-	1.7%	0%	0%	0%	0%	-	0%	-
Lights	22	673	38	0	-	733	50	7	18	1	-	76	34	633	21	0	-	688	25	5	5	0	-	35	-
Lights %	100%	97.7%	97.4%	0%	-	97.7%	100%	100%	100%	100%	-	100%	100%	97.1%	100%	0%	-	97.3%	100%	100%	100%	0%	-	100%	-
Single-Unit Trucks	0	3	0	0	-	3	0	0	0	0	-	0	0	2	0	0	-	2	0	0	0	0	-	0	-
Single-Unit Trucks %	0%	0.4%	0%	0%	-	0.4%	0%	0%	0%	0%	-	0%	0%	0.3%	0%	0%	-	0.3%	0%	0%	0%	0%	-	0%	-
Buses	0	6	0	0	-	6	0	0	0	0	-	0	0	10	0	0	-	10	0	0	0	0	-	0	-
Buses %	0%	0.9%	0%	0%	-	0.8%	0%	0%	0%	0%	-	0%	0%	1.5%	0%	0%	-	1.4%	0%	0%	0%	0%	-	0%	-
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	-
Articulated Trucks %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	-
Bicycles on Road	0	7	1	0	-	8	0	0	0	0	-	0	0	7	0	0	-	7	0	0	0	0	-	0	-
Bicycles on Road %	0%	1%	2.6%	0%	-	1.1%	0%	0%	0%	0%	-	0%	0%	1.1%	0%	0%	-	1%	0%	0%	0%	0%	-	0%	-
Pedestrians	-	-	-	-	6	-	-	-	-	-	63	-	-	-	-	-	3	-	-	-	-	-	51	-	-
Pedestrians%	-	-	-	-	4.8%	-	-	-	-	-	50.8%	-	-	-	-	-	2.4%	-	-	-	-	-	41.1%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0.8%	-	-

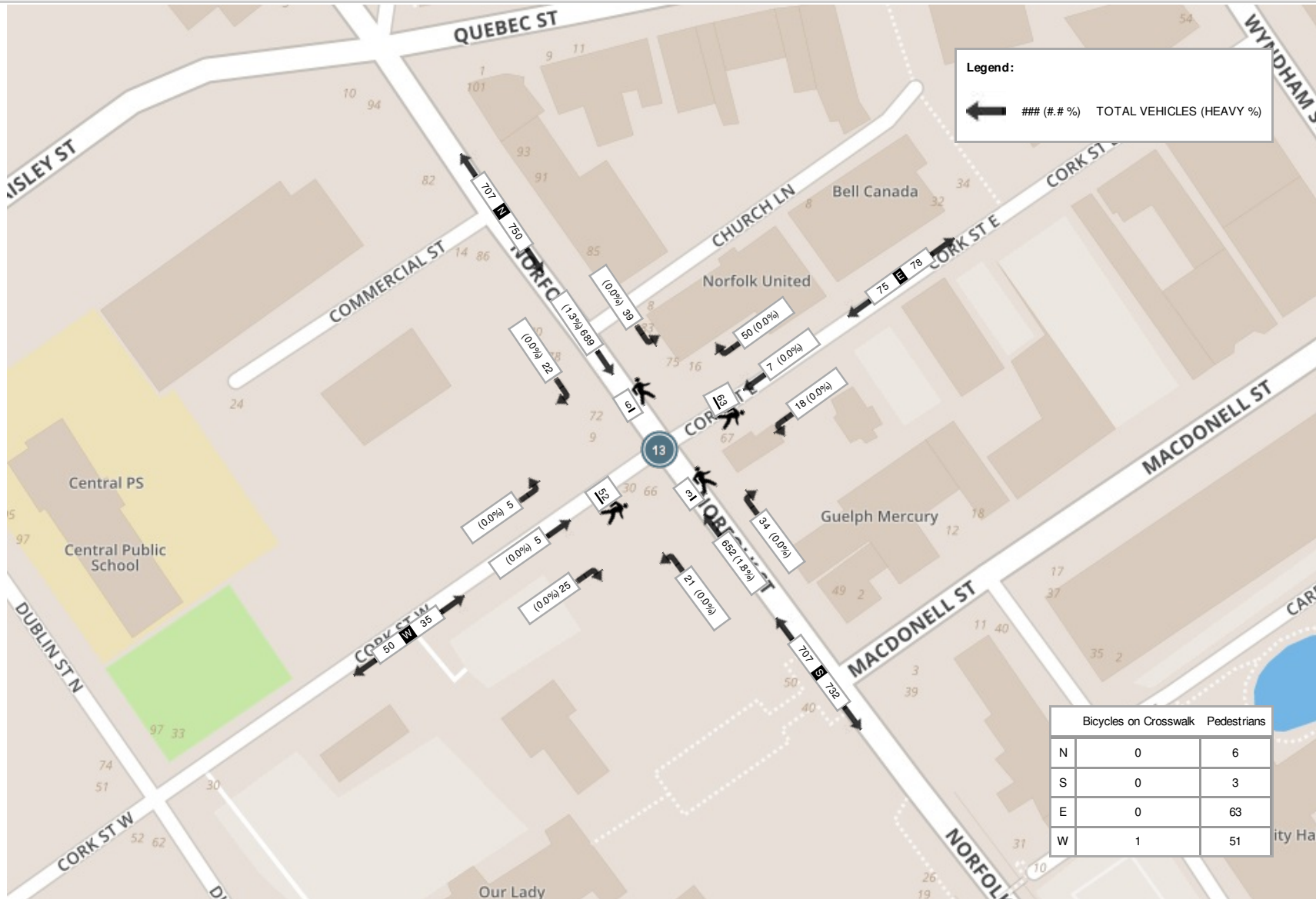
Peak Hour: 08:15 AM - 09:15 AM Weather:



Peak Hour: 11:30 AM - 12:30 PM Weather:



Peak Hour: 04:30 PM - 05:30 PM Weather:





Turning Movement Count (14 . NORFOLK ST & MACDONELL ST)

Start Time	N Approach NORFOLK ST					E Approach MACDONELL ST					S Approach NORFOLK ST					Int. Total (15 min)	Int. Total (1 hr)
	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	U-Turn S:S	Peds S:	Approach Total		
07:00:00	82	14	0	1	96	9	9	0	0	18	13	39	0	1	52	166	
07:15:00	86	21	0	0	107	9	11	0	0	20	15	50	0	4	65	192	
07:30:00	98	18	0	2	116	13	17	0	0	30	19	58	0	4	77	223	
07:45:00	125	19	0	3	144	15	30	0	2	45	24	71	0	6	95	284	865
08:00:00	127	15	0	4	142	11	31	0	2	42	25	85	0	3	110	294	993
08:15:00	135	28	0	6	163	16	35	0	0	51	30	118	0	6	148	362	1163
08:30:00	155	23	0	11	178	26	42	0	1	68	35	151	0	16	186	432	1372
08:45:00	158	26	0	8	184	30	31	0	3	61	41	133	0	13	174	419	1507
09:00:00	157	37	0	5	194	23	31	0	5	54	42	111	0	9	153	401	1614
09:15:00	116	26	0	7	142	31	23	0	1	54	34	109	0	5	143	339	1591
09:30:00	107	30	0	10	137	34	26	0	4	60	29	78	0	5	107	304	1463
09:45:00	105	31	0	4	136	35	28	0	4	63	18	129	0	6	147	346	1390
BREAK																	
11:00:00	131	24	0	3	155	41	32	0	4	73	27	92	0	7	119	347	
11:15:00	133	23	0	4	156	34	24	0	0	58	23	92	0	5	115	329	
11:30:00	146	31	0	6	177	32	32	0	6	64	33	106	0	7	139	380	
11:45:00	121	32	0	4	153	30	27	0	9	57	24	117	0	10	141	351	1407
12:00:00	134	28	0	6	162	39	27	0	4	66	27	105	0	13	132	360	1420
12:15:00	123	24	0	10	147	38	35	0	7	73	35	119	0	10	154	374	1465
12:30:00	110	30	0	15	140	23	46	1	9	70	31	105	0	3	136	346	1431
12:45:00	144	29	0	12	173	32	29	0	0	61	27	116	0	6	143	377	1457
BREAK																	
16:00:00	153	33	0	8	186	43	44	0	6	87	31	123	0	28	154	427	
16:15:00	141	32	0	8	173	49	35	0	3	84	27	118	0	3	145	402	



16:30:00	131	28	0	10	159	38	43	0	4	81	30	124	0	18	154	394	
16:45:00	162	25	0	10	187	42	40	0	13	82	29	152	0	18	181	450	1673
17:00:00	143	41	0	10	184	37	53	0	8	90	22	143	0	15	165	439	1685
17:15:00	164	38	0	15	202	47	37	0	8	84	30	134	0	5	164	450	1733
17:30:00	146	29	0	7	175	29	49	0	5	78	43	101	0	10	144	397	1736
17:45:00	145	36	0	1	181	39	25	0	1	64	24	124	0	5	148	393	1679
18:00:00	136	28	0	13	164	24	30	0	10	54	32	112	0	13	144	362	1602
18:15:00	133	36	0	10	169	32	30	0	6	62	29	107	0	7	136	367	1519
18:30:00	117	27	0	10	144	42	36	0	6	78	35	95	0	5	130	352	1474
18:45:00	107	25	0	6	132	21	26	0	4	47	27	101	0	9	128	307	1388
Grand Total	4171	887	0	229	5058	964	1014	1	135	1979	911	3418	0	275	4329	11366	-
Approach%	82.5%	17.5%	0%		-	48.7%	51.2%	0.1%		-	21%	79%	0%		-	-	-
Totals %	36.7%	7.8%	0%		44.5%	8.5%	8.9%	0%		17.4%	8%	30.1%	0%		38.1%	-	-
Heavy	54	53	0		-	74	100	0		-	97	57	0		-	-	-
Heavy %	1.3%	6%	0%		-	7.7%	9.9%	0%		-	10.6%	1.7%	0%		-	-	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	-	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	-	-



Peak Hour: 08:15 AM - 09:15 AM Weather:

Start Time	N Approach NORFOLK ST					E Approach MACDONELL ST					S Approach NORFOLK ST					Int. Total (15 min)
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	
08:15:00	135	28	0	6	163	16	35	0	0	51	30	118	0	6	148	362
08:30:00	155	23	0	11	178	26	42	0	1	68	35	151	0	16	186	432
08:45:00	158	26	0	8	184	30	31	0	3	61	41	133	0	13	174	419
09:00:00	157	37	0	5	194	23	31	0	5	54	42	111	0	9	153	401
Grand Total	605	114	0	30	719	95	139	0	9	234	148	513	0	44	661	1614
Approach%	84.1%	15.9%	0%		-	40.6%	59.4%	0%		-	22.4%	77.6%	0%		-	-
Totals %	37.5%	7.1%	0%		44.5%	5.9%	8.6%	0%		14.5%	9.2%	31.8%	0%		41%	-
PHF	0.96	0.77	0		0.93	0.79	0.83	0		0.86	0.88	0.85	0		0.89	-
Heavy	8	4	0		12	11	16	0		27	12	15	0		27	-
Heavy %	1.3%	3.5%	0%		1.7%	11.6%	11.5%	0%		11.5%	8.1%	2.9%	0%		4.1%	-
Lights	593	108	0		701	84	123	0		207	136	497	0		633	-
Lights %	98%	94.7%	0%		97.5%	88.4%	88.5%	0%		88.5%	91.9%	96.9%	0%		95.8%	-
Single-Unit Trucks	4	1	0		5	2	2	0		4	1	15	0		16	-
Single-Unit Trucks %	0.7%	0.9%	0%		0.7%	2.1%	1.4%	0%		1.7%	0.7%	2.9%	0%		2.4%	-
Buses	1	3	0		4	9	13	0		22	11	0	0		11	-
Buses %	0.2%	2.6%	0%		0.6%	9.5%	9.4%	0%		9.4%	7.4%	0%	0%		1.7%	-
Articulated Trucks	3	0	0		3	0	1	0		1	0	0	0		0	-
Articulated Trucks %	0.5%	0%	0%		0.4%	0%	0.7%	0%		0.4%	0%	0%	0%		0%	-
Bicycles on Road	4	2	0		6	0	0	0		0	0	1	0		1	-
Bicycles on Road %	0.7%	1.8%	0%		0.8%	0%	0%	0%		0%	0%	0.2%	0%		0.2%	-
Pedestrians	-	-	-	30	-	-	-	-	9	-	-	-	-	44	-	-
Pedestrians%	-	-	-	36.1%	-	-	-	-	10.8%	-	-	-	-	53%	-	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-



Peak Hour: 11:30 AM - 12:30 PM Weather:

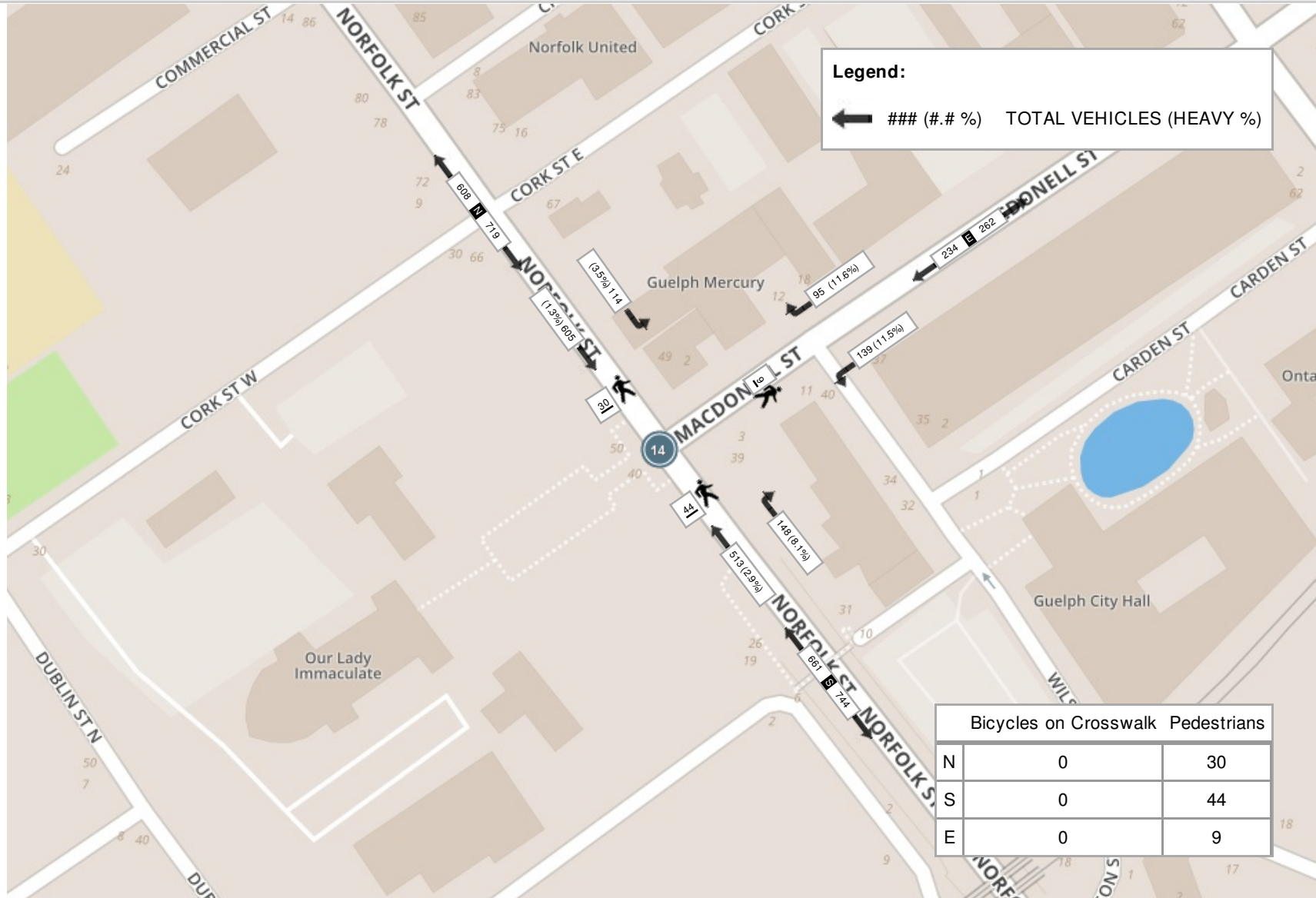
Start Time	N Approach NORFOLK ST					E Approach MACDONELL ST					S Approach NORFOLK ST					Int. Total (15 min)
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	
11:30:00	146	31	0	6	177	32	32	0	6	64	33	106	0	7	139	380
11:45:00	121	32	0	4	153	30	27	0	9	57	24	117	0	10	141	351
12:00:00	134	28	0	6	162	39	27	0	4	66	27	105	0	13	132	360
12:15:00	123	24	0	10	147	38	35	0	7	73	35	119	0	10	154	374
Grand Total	524	115	0	26	639	139	121	0	26	260	119	447	0	40	566	1465
Approach%	82%	18%	0%		-	53.5%	46.5%	0%		-	21%	79%	0%		-	-
Totals %	35.8%	7.8%	0%		43.6%	9.5%	8.3%	0%		17.7%	8.1%	30.5%	0%		38.6%	-
PHF	0.9	0.9	0		0.9	0.89	0.86	0		0.89	0.85	0.94	0		0.92	-
Heavy	8	7	0		15	9	9	0		18	13	11	0		24	-
Heavy %	1.5%	6.1%	0%		2.3%	6.5%	7.4%	0%		6.9%	10.9%	2.5%	0%		4.2%	-
Lights	514	108	0		622	129	112	0		241	106	435	0		541	-
Lights %	98.1%	93.9%	0%		97.3%	92.8%	92.6%	0%		92.7%	89.1%	97.3%	0%		95.6%	-
Single-Unit Trucks	3	1	0		4	1	1	0		2	2	10	0		12	-
Single-Unit Trucks %	0.6%	0.9%	0%		0.6%	0.7%	0.8%	0%		0.8%	1.7%	2.2%	0%		2.1%	-
Buses	3	6	0		9	8	8	0		16	10	1	0		11	-
Buses %	0.6%	5.2%	0%		1.4%	5.8%	6.6%	0%		6.2%	8.4%	0.2%	0%		1.9%	-
Articulated Trucks	2	0	0		2	0	0	0		0	1	0	0		1	-
Articulated Trucks %	0.4%	0%	0%		0.3%	0%	0%	0%		0%	0.8%	0%	0%		0.2%	-
Bicycles on Road	2	0	0		2	1	0	0		1	0	1	0		1	-
Bicycles on Road %	0.4%	0%	0%		0.3%	0.7%	0%	0%		0.4%	0%	0.2%	0%		0.2%	-
Pedestrians	-	-	-	25	-	-	-	-	25	-	-	-	-	40	-	-
Pedestrians%	-	-	-	27.2%	-	-	-	-	27.2%	-	-	-	-	43.5%	-	-
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	1	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	1.1%	-	-	-	-	1.1%	-	-	-	-	0%	-	-



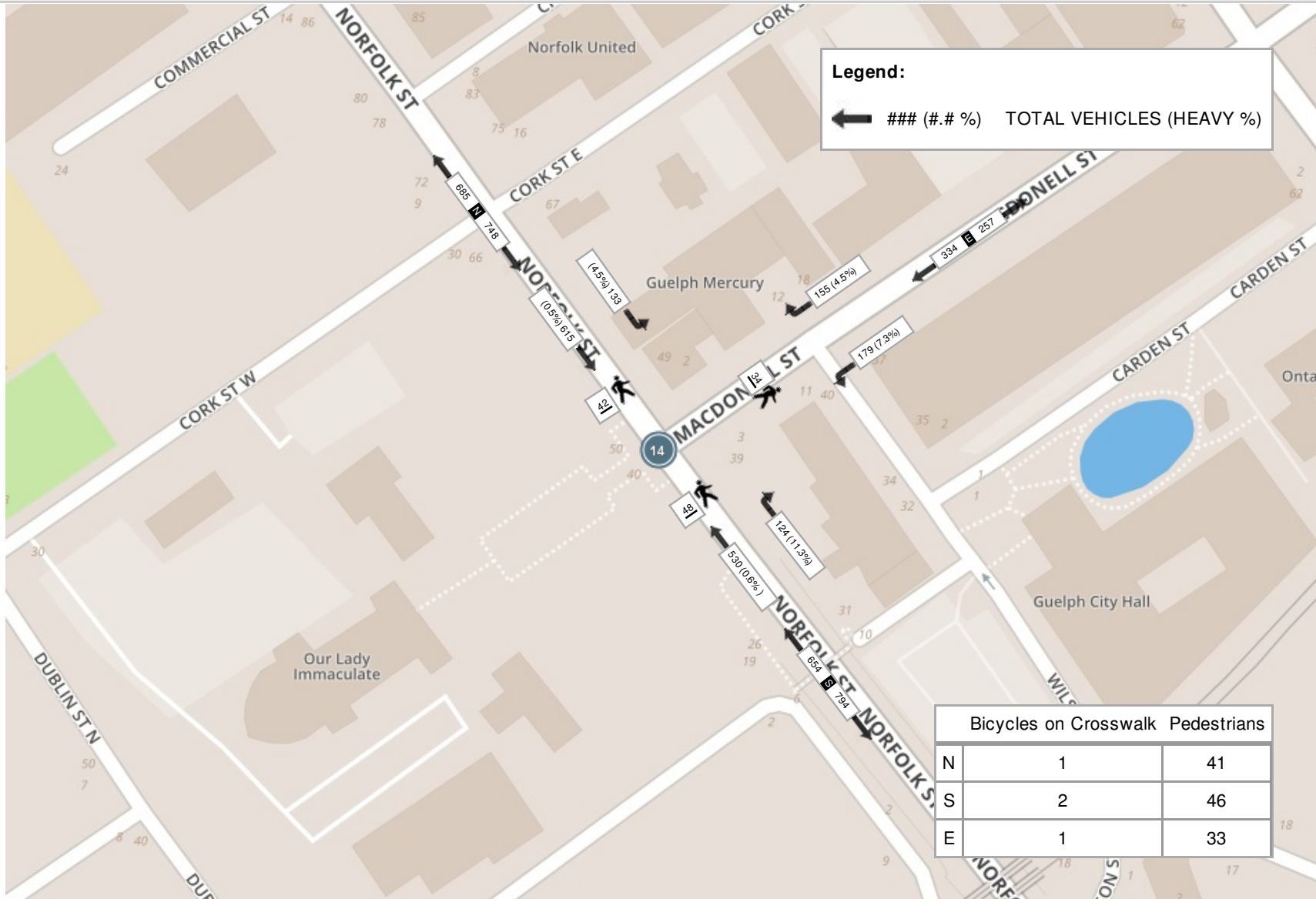
Peak Hour: 04:45 PM - 05:45 PM Weather:

Start Time	N Approach NORFOLK ST					E Approach MACDONELL ST					S Approach NORFOLK ST					Int. Total (15 min)
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	
16:45:00	162	25	0	10	187	42	40	0	13	82	29	152	0	18	181	450
17:00:00	143	41	0	10	184	37	53	0	8	90	22	143	0	15	165	439
17:15:00	164	38	0	15	202	47	37	0	8	84	30	134	0	5	164	450
17:30:00	146	29	0	7	175	29	49	0	5	78	43	101	0	10	144	397
Grand Total	615	133	0	42	748	155	179	0	34	334	124	530	0	48	654	1736
Approach%	82.2%	17.8%	0%		-	46.4%	53.6%	0%		-	19%	81%	0%		-	-
Totals %	35.4%	7.7%	0%		43.1%	8.9%	10.3%	0%		19.2%	7.1%	30.5%	0%		37.7%	-
PHF	0.94	0.81	0		0.93	0.82	0.84	0		0.93	0.72	0.87	0		0.9	-
Heavy	3	6	0		9	7	13	0		20	14	3	0		17	-
Heavy %	0.5%	4.5%	0%		1.2%	4.5%	7.3%	0%		6%	11.3%	0.6%	0%		2.6%	-
Lights	608	127	0		735	146	165	0		311	110	522	0		632	-
Lights %	98.9%	95.5%	0%		98.3%	94.2%	92.2%	0%		93.1%	88.7%	98.5%	0%		96.6%	-
Single-Unit Trucks	3	0	0		3	0	0	0		0	0	2	0		2	-
Single-Unit Trucks %	0.5%	0%	0%		0.4%	0%	0%	0%		0%	0%	0.4%	0%		0.3%	-
Buses	0	6	0		6	7	13	0		20	14	1	0		15	-
Buses %	0%	4.5%	0%		0.8%	4.5%	7.3%	0%		6%	11.3%	0.2%	0%		2.3%	-
Articulated Trucks	0	0	0		0	0	0	0		0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-
Bicycles on Road	4	0	0		4	2	1	0		3	0	5	0		5	-
Bicycles on Road %	0.7%	0%	0%		0.5%	1.3%	0.6%	0%		0.9%	0%	0.9%	0%		0.8%	-
Pedestrians	-	-	-	41	-	-	-	-	33	-	-	-	-	46	-	-
Pedestrians%	-	-	-	33.1%	-	-	-	-	26.6%	-	-	-	-	37.1%	-	-
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	1	-	-	-	-	2	-	-
Bicycles on Crosswalk%	-	-	-	0.8%	-	-	-	-	0.8%	-	-	-	-	1.6%	-	-

Peak Hour: 08:15 AM - 09:15 AM Weather:



Peak Hour: 04:45 PM - 05:45 PM Weather:





Turning Movement Count (15 . WATERLOO AVE / WILSON ST & NORFOLK ST / GORDON ST)

Start Time	N Approach NORFOLK ST						E Approach WILSON ST						S Approach GORDON ST						W Approach WATERLOO AVE						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total			
07:00:00	6	81	0	1	0	88	0	0	0	0	0	0	1	41	10	0	3	52	16	0	9	0	2	25	165		
07:15:00	6	90	0	0	1	96	0	0	0	0	0	0	0	53	14	0	7	67	15	0	14	0	6	29	192		
07:30:00	16	100	0	0	0	116	0	0	0	0	0	0	0	53	6	0	5	59	32	0	24	0	7	56	231		
07:45:00	20	133	0	0	2	153	0	0	0	0	2	0	0	71	13	0	17	84	32	0	22	0	6	54	291	879	
08:00:00	22	135	0	0	0	157	0	0	0	0	0	0	0	78	13	0	17	91	33	0	36	0	9	69	317	1031	
08:15:00	19	140	0	0	1	159	0	0	0	0	0	0	0	106	23	0	32	129	39	0	45	0	7	84	372	1211	
08:30:00	36	164	0	0	0	200	0	0	0	0	0	0	0	130	20	0	25	150	38	1	63	0	16	102	452	1432	
08:45:00	37	155	0	0	0	192	0	0	0	0	1	0	0	104	20	0	18	124	47	2	70	0	9	119	435	1576	
09:00:00	33	154	0	0	1	187	0	0	0	0	1	0	0	119	20	0	12	139	30	0	36	0	12	66	392	1651	
09:15:00	22	121	0	0	0	143	0	0	0	0	0	0	0	109	10	0	24	119	35	0	31	0	15	66	328	1607	
09:30:00	16	116	0	0	0	132	0	0	0	0	1	0	0	84	11	0	17	95	26	0	31	0	14	57	284	1439	
09:45:00	15	121	0	0	2	136	0	0	0	0	0	0	0	104	27	0	9	131	41	0	33	0	6	74	341	1345	
BREAK																											
11:00:00	21	138	0	0	0	159	0	0	0	0	0	0	0	97	11	0	9	108	18	0	23	0	15	41	308		
11:15:00	19	137	0	0	0	156	0	0	0	0	0	0	0	100	9	0	11	109	22	0	16	0	8	38	303		
11:30:00	29	144	0	0	0	173	0	0	0	0	0	0	0	123	12	0	13	135	31	0	16	0	10	47	355		
11:45:00	25	128	0	0	0	153	0	0	0	0	1	0	0	126	24	0	10	150	30	0	24	0	15	54	357	1323	
12:00:00	23	136	0	0	1	159	0	0	0	0	0	0	0	113	22	0	16	135	35	0	24	0	15	59	353	1368	
12:15:00	20	143	0	0	1	163	0	0	0	0	2	0	0	130	24	0	20	154	26	0	28	0	9	54	371	1436	
12:30:00	23	133	0	0	3	156	0	0	0	0	4	0	0	117	19	0	15	136	35	0	22	0	13	57	349	1430	
12:45:00	31	136	0	0	2	167	0	0	0	0	2	0	0	112	15	0	13	127	27	0	35	0	15	62	356	1429	
BREAK																											
16:00:00	42	157	0	0	2	199	1	0	0	0	0	1	0	122	30	0	31	152	34	0	30	0	13	64	416		
16:15:00	35	144	0	0	0	179	0	0	0	0	0	0	0	122	29	0	21	151	41	0	38	0	16	79	409		
16:30:00	35	140	0	0	1	175	0	1	0	0	1	1	0	122	20	0	45	142	40	0	26	0	14	66	384		
16:45:00	35	156	0	0	0	191	0	0	0	0	0	0	0	146	18	0	31	164	44	0	33	0	13	77	432	1641	
17:00:00	49	140	0	0	1	189	0	0	0	0	1	0	0	125	30	0	20	155	27	0	41	0	10	68	412	1637	
17:15:00	40	154	0	0	5	194	1	0	0	0	6	1	0	138	26	0	16	164	38	0	32	0	9	70	429	1657	
17:30:00	36	152	0	0	6	188	0	0	0	0	6	0	0	115	28	0	22	143	36	0	28	0	13	64	395	1668	
17:45:00	19	149	0	1	0	169	0	0	0	0	0	0	1	125	23	0	15	149	29	0	20	0	18	49	367	1603	
18:00:00	26	140	0	0	0	166	0	0	0	0	1	0	0	124	28	0	19	152	24	0	23	0	9	47	365	1556	



18:15:00	34	132	0	0	1	166	0	0	0	0	4	0	0	115	29	0	15	144	22	0	28	0	10	50	360	1487
18:30:00	35	122	0	0	0	157	0	0	0	0	0	0	0	97	22	0	28	119	25	0	26	0	12	51	327	1419
18:45:00	19	120	0	0	3	139	0	0	0	0	4	0	0	105	26	0	7	131	24	0	20	0	10	44	314	1366
Grand Total	844	4311	0	2	33	5157	2	1	0	0	37	3	2	3426	632	0	563	4060	992	3	947	0	356	1942	11162	-
Approach%	16.4%	83.6%	0%	0%		-	66.7%	33.3%	0%	0%		-	0%	84.4%	15.6%	0%		-	51.1%	0.2%	48.8%	0%		-	-	-
Totals %	7.6%	38.6%	0%	0%		46.2%	0%	0%	0%	0%		0%	0%	30.7%	5.7%	0%		36.4%	8.9%	0%	8.5%	0%		17.4%	-	-
Heavy	10	141	0	0		-	0	0	0	0		-	0	122	23	0		-	13	0	30	0		-	-	-
Heavy %	1.2%	3.3%	0%	0%		-	0%	0%	0%	0%		-	0%	3.6%	3.6%	0%		-	1.3%	0%	3.2%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-



Peak Hour: 08:15 AM - 09:15 AM Weather:

Start Time	N Approach NORFOLK ST						E Approach WILSON ST						S Approach GORDON ST						W Approach WATERLOO AVE						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:15:00	19	140	0	0	1	159	0	0	0	0	0	0	0	106	23	0	32	129	39	0	45	0	7	84	372
08:30:00	36	164	0	0	0	200	0	0	0	0	0	0	0	130	20	0	25	150	38	1	63	0	16	102	452
08:45:00	37	155	0	0	0	192	0	0	0	0	1	0	0	104	20	0	18	124	47	2	70	0	9	119	435
09:00:00	33	154	0	0	1	187	0	0	0	0	1	0	0	119	20	0	12	139	30	0	36	0	12	66	392
Grand Total	125	613	0	0	2	738	0	0	0	0	2	0	0	459	83	0	87	542	154	3	214	0	44	371	1651
Approach%	16.9%	83.1%	0%	0%		-	0%	0%	0%	0%		-	0%	84.7%	15.3%	0%		-	41.5%	0.8%	57.7%	0%		-	-
Totals %	7.6%	37.1%	0%	0%		44.7%	0%	0%	0%	0%		0%	0%	27.8%	5%	0%		32.8%	9.3%	0.2%	13%	0%		22.5%	-
PHF	0.84	0.93	0	0		0.92	0	0	0	0		0	0	0.88	0.9	0		0.9	0.82	0.38	0.76	0		0.78	-
Heavy	1	25	0	0		26	0	0	0	0		0	0	21	3	0		24	5	0	3	0		8	-
Heavy %	0.8%	4.1%	0%	0%		3.5%	0%	0%	0%	0%		0%	0%	4.6%	3.6%	0%		4.4%	3.2%	0%	1.4%	0%		2.2%	-
Lights	124	585	0	0		709	0	0	0	0		0	0	438	80	0		518	147	2	211	0		360	-
Lights %	99.2%	95.4%	0%	0%		96.1%	0%	0%	0%	0%		0%	0%	95.4%	96.4%	0%		95.6%	95.5%	66.7%	98.6%	0%		97%	-
Single-Unit Trucks	0	8	0	0		8	0	0	0	0		0	0	11	1	0		12	2	0	1	0		3	-
Single-Unit Trucks %	0%	1.3%	0%	0%		1.1%	0%	0%	0%	0%		0%	0%	2.4%	1.2%	0%		2.2%	1.3%	0%	0.5%	0%		0.8%	-
Buses	0	16	0	0		16	0	0	0	0		0	0	10	2	0		12	1	0	2	0		3	-
Buses %	0%	2.6%	0%	0%		2.2%	0%	0%	0%	0%		0%	0%	2.2%	2.4%	0%		2.2%	0.6%	0%	0.9%	0%		0.8%	-
Articulated Trucks	1	1	0	0		2	0	0	0	0		0	0	0	0	0		0	2	0	0	0		2	-
Articulated Trucks %	0.8%	0.2%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	1.3%	0%	0%	0%		0.5%	-
Bicycles on Road	0	3	0	0		3	0	0	0	0		0	0	0	0	0		0	2	1	0	0		3	-
Bicycles on Road %	0%	0.5%	0%	0%		0.4%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	1.3%	33.3%	0%	0%		0.8%	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	86	-	-	-	-	-	43	-	-
Pedestrians%	-	-	-	-	1.5%	-	-	-	-	-	1.5%	-	-	-	-	-	63.7%	-	-	-	-	-	31.9%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0.7%	-	-	-	-	-	0.7%	-	-



Peak Hour: 11:30 AM - 12:30 PM Weather:

Start Time	N Approach NORFOLK ST						E Approach WILSON ST						S Approach GORDON ST						W Approach WATERLOO AVE						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
11:30:00	29	144	0	0	0	173	0	0	0	0	0	0	0	123	12	0	13	135	31	0	16	0	10	47	355
11:45:00	25	128	0	0	0	153	0	0	0	0	1	0	0	126	24	0	10	150	30	0	24	0	15	54	357
12:00:00	23	136	0	0	1	159	0	0	0	0	0	0	0	113	22	0	16	135	35	0	24	0	15	59	353
12:15:00	20	143	0	0	1	163	0	0	0	0	2	0	0	130	24	0	20	154	26	0	28	0	9	54	371
Grand Total	97	551	0	0	2	648	0	0	0	0	3	0	0	492	82	0	59	574	122	0	92	0	49	214	1436
Approach%	15%	85%	0%	0%		-	0%	0%	0%	0%		-	0%	85.7%	14.3%	0%		-	57%	0%	43%	0%		-	-
Totals %	6.8%	38.4%	0%	0%		45.1%	0%	0%	0%	0%		0%	0%	34.3%	5.7%	0%		40%	8.5%	0%	6.4%	0%		14.9%	-
PHF	0.84	0.96	0	0		0.94	0	0	0	0		0	0	0.95	0.85	0		0.93	0.87	0	0.82	0		0.91	-
Heavy	0	17	0	0		17	0	0	0	0		0	0	20	2	0		22	2	0	5	0		7	-
Heavy %	0%	3.1%	0%	0%		2.6%	0%	0%	0%	0%		0%	0%	4.1%	2.4%	0%		3.8%	1.6%	0%	5.4%	0%		3.3%	-
Lights	97	531	0	0		628	0	0	0	0		0	0	471	80	0		551	119	0	87	0		206	-
Lights %	100%	96.4%	0%	0%		96.9%	0%	0%	0%	0%		0%	0%	95.7%	97.6%	0%		96%	97.5%	0%	94.6%	0%		96.3%	-
Single-Unit Trucks	0	4	0	0		4	0	0	0	0		0	0	12	0	0		12	2	0	1	0		3	-
Single-Unit Trucks %	0%	0.7%	0%	0%		0.6%	0%	0%	0%	0%		0%	0%	2.4%	0%	0%		2.1%	1.6%	0%	1.1%	0%		1.4%	-
Buses	0	11	0	0		11	0	0	0	0		0	0	8	2	0		10	0	0	3	0		3	-
Buses %	0%	2%	0%	0%		1.7%	0%	0%	0%	0%		0%	0%	1.6%	2.4%	0%		1.7%	0%	0%	3.3%	0%		1.4%	-
Articulated Trucks	0	2	0	0		2	0	0	0	0		0	0	0	0	0		0	0	0	1	0		1	-
Articulated Trucks %	0%	0.4%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	1.1%	0%		0.5%	-
Bicycles on Road	0	3	0	0		3	0	0	0	0		0	0	1	0	0		1	1	0	0	0		1	-
Bicycles on Road %	0%	0.5%	0%	0%		0.5%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	0.8%	0%	0%	0%		0.5%	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	3	-	-	-	-	-	55	-	-	-	-	-	48	-	-
Pedestrians%	-	-	-	-	1.8%	-	-	-	-	-	2.7%	-	-	-	-	-	48.7%	-	-	-	-	-	42.5%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	4	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	3.5%	-	-	-	-	-	0.9%	-	-



Peak Hour: 04:45 PM - 05:45 PM Weather:

Start Time	N Approach NORFOLK ST						E Approach WILSON ST						S Approach GORDON ST						W Approach WATERLOO AVE						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:45:00	35	156	0	0	0	191	0	0	0	0	0	0	0	146	18	0	31	164	44	0	33	0	13	77	432
17:00:00	49	140	0	0	1	189	0	0	0	0	1	0	0	125	30	0	20	155	27	0	41	0	10	68	412
17:15:00	40	154	0	0	5	194	1	0	0	0	6	1	0	138	26	0	16	164	38	0	32	0	9	70	429
17:30:00	36	152	0	0	6	188	0	0	0	0	6	0	0	115	28	0	22	143	36	0	28	0	13	64	395
Grand Total	160	602	0	0	12	762	1	0	0	0	13	1	0	524	102	0	89	626	145	0	134	0	45	279	1668
Approach%	21%	79%	0%	0%		-	100%	0%	0%	0%		-	0%	83.7%	16.3%	0%		-	52%	0%	48%	0%		-	-
Totals %	9.6%	36.1%	0%	0%		45.7%	0.1%	0%	0%	0%		0.1%	0%	31.4%	6.1%	0%		37.5%	8.7%	0%	8%	0%		16.7%	-
PHF	0.82	0.96	0	0		0.98	0.25	0	0	0		0.25	0	0.9	0.85	0		0.95	0.82	0	0.82	0		0.91	-
Heavy	0	15	0	0		15	0	0	0	0		0	0	14	2	0		16	2	0	3	0		5	-
Heavy %	0%	2.5%	0%	0%		2%	0%	0%	0%	0%		0%	0%	2.7%	2%	0%		2.6%	1.4%	0%	2.2%	0%		1.8%	-
Lights	160	586	0	0		746	1	0	0	0		1	0	506	99	0		605	143	0	130	0		273	-
Lights %	100%	97.3%	0%	0%		97.9%	100%	0%	0%	0%		100%	0%	96.6%	97.1%	0%		96.6%	98.6%	0%	97%	0%		97.8%	-
Single-Unit Trucks	0	2	0	0		2	0	0	0	0		0	0	3	0	0		3	2	0	0	0		2	-
Single-Unit Trucks %	0%	0.3%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0.6%	0%	0%		0.5%	1.4%	0%	0%	0%		0.7%	-
Buses	0	13	0	0		13	0	0	0	0		0	0	11	2	0		13	0	0	3	0		3	-
Buses %	0%	2.2%	0%	0%		1.7%	0%	0%	0%	0%		0%	0%	2.1%	2%	0%		2.1%	0%	0%	2.2%	0%		1.1%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	1	0	0		1	0	0	0	0		0	0	4	1	0		5	0	0	1	0		1	-
Bicycles on Road %	0%	0.2%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0.8%	1%	0%		0.8%	0%	0%	0.7%	0%		0.4%	-
Pedestrians	-	-	-	-	12	-	-	-	-	-	13	-	-	-	-	-	87	-	-	-	-	-	45	-	-
Pedestrians%	-	-	-	-	7.5%	-	-	-	-	-	8.2%	-	-	-	-	-	54.7%	-	-	-	-	-	28.3%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	1.3%	-	-	-	-	-	0%	-	-

Peak Hour: 08:15 AM - 09:15 AM Weather:



Peak Hour: 11:30 AM - 12:30 PM Weather:



Peak Hour: 04:45 PM - 05:45 PM Weather:



Study Name ALMA ST & RAIL CROSSING (PEDESTRIAN STUDY) [Mon Oct 1

Start Date 10/01/2018

Start Time 7:00 AM

Site Code

Start Time	ALMA ST N Southbound		RAIL CROSSING Westbound		ALMA ST N Northbound		RAIL CROSSING Eastbound	
	Peds CCW	Peds CW	Peds CCW	Peds CW	Peds CCW	Peds CW	Peds CCW	Peds CW
7:00 AM	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	1	0	0	1	0
7:30 AM	0	0	0	0	0	0	0	0
7:45 AM	3	0	1	5	0	0	0	0
8:00 AM	2	4	5	2	4	0	1	6
8:15 AM	1	0	11	3	0	1	0	2
8:30 AM	0	0	9	3	2	0	0	11
8:45 AM	1	2	1	3	0	2	3	0
9:00 AM	0	1	2	0	1	0	0	1
9:15 AM	0	0	1	1	0	1	0	1
9:30 AM	0	0	0	1	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	1	0	0	0	0
10:45 AM	0	0	0	0	0	0	1	0
11:00 AM	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	1	0	0	110	1
11:45 AM	0	0	3	7	0	3	80	0
12:00 PM	0	0	3	4	0	0	0	0
12:15 PM	0	0	1	4	0	0	0	0
12:30 PM	0	0	2	2	0	0	0	0
12:45 PM	0	2	0	0	0	1	0	78
1:00 PM	0	0	0	0	0	0	0	82
1:15 PM	0	0	2	0	0	0	0	0
1:30 PM	0	0	3	3	0	2	0	1
1:45 PM	0	0	0	1	0	0	0	0
2:00 PM	0	0	0	0	0	0	0	1
2:15 PM	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0
3:00 PM	0	0	2	1	0	0	2	3
3:15 PM	0	0	0	11	0	1	0	0
3:30 PM	0	0	0	6	0	0	17	0
3:45 PM	0	0	0	0	0	0	0	0
4:00 PM	0	0	1	1	1	0	0	0
4:15 PM	0	0	2	2	0	0	0	1
4:30 PM	0	0	0	1	0	0	0	0
4:45 PM	0	0	0	4	0	2	0	0
5:00 PM	2	0	4	1	2	1	0	0
5:15 PM	1	1	1	1	0	0	0	0
5:30 PM	0	0	1	1	1	0	0	0
5:45 PM	0	0	1	4	0	1	0	0
6:00 PM	0	0	0	2	0	0	0	0
6:15 PM	0	0	0	0	1	0	0	0
6:30 PM	0	0	1	2	0	0	0	0
6:45 PM	0	0	0	1	0	0	0	0

Study Name ALMA ST & RAIL CROSSING (PEDESTRIAN STUDY) [Sun Sep 3
Start Date 09/30/2018
Start Time 8:00 AM
Site Code

	ALMA ST N Southbound		RAIL CROSSING Westbound		ALMA ST N Northbound		RAIL CROSSING Eastbound	
Start Time	Peds CCW	Peds CW	Peds CCW	Peds CW	Peds CCW	Peds CW	Peds CCW	Peds CW
8:00 AM	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0
9:00 AM	0	0	1	0	0	0	1	0
9:15 AM	0	0	0	5	0	2	0	0
9:30 AM	0	0	2	1	0	1	0	1
9:45 AM	1	0	1	1	0	1	0	1
10:00 AM	0	0	1	0	1	0	0	0
10:15 AM	0	0	1	2	1	2	1	0
10:30 AM	1	0	0	0	0	0	1	0
10:45 AM	1	0	2	1	0	0	1	0
11:00 AM	0	3	0	0	0	1	1	0
11:15 AM	0	0	2	1	0	0	0	0
11:30 AM	0	0	0	0	0	0	2	0
11:45 AM	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	2	0	0	0
12:15 PM	0	1	0	1	0	0	0	1
12:30 PM	0	0	0	1	0	0	0	0
12:45 PM	0	0	1	1	0	0	0	0
1:00 PM	0	0	1	1	2	1	0	0
1:15 PM	0	0	2	2	0	0	1	0
1:30 PM	0	0	2	0	4	0	0	0
1:45 PM	0	0	0	4	0	0	0	0
2:00 PM	1	0	3	3	1	1	3	0
2:15 PM	0	0	0	5	0	0	2	2
2:30 PM	0	0	3	2	0	0	0	0
2:45 PM	0	0	6	2	1	1	0	0
3:00 PM	0	0	6	2	0	0	0	0
3:15 PM	0	0	1	3	0	0	0	0
3:30 PM	0	0	1	7	0	0	0	0
3:45 PM	0	0	1	5	1	0	0	0

Study Name YORKSHIRE ST & RAIL CROSSING (PEDESTRIAN STUDY) [Moi

Start Date 10/01/2018

Start Time 7:00 AM

Site Code

	YORKSHIRE ST N Southbound		RAIL CROSSING Westbound		YORKSHIRE ST N Northbound		RAIL CROSSING Eastbound	
Start Time	Peds CCW	Peds CW	Peds CCW	Peds CW	Peds CCW	Peds CW	Peds CCW	Peds CW
7:00 AM	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	1
7:30 AM	0	0	0	0	0	0	1	1
7:45 AM	0	0	0	0	0	0	1	6
8:00 AM	0	0	0	0	0	0	6	1
8:15 AM	0	0	0	0	0	0	7	2
8:30 AM	0	0	3	0	0	0	0	10
8:45 AM	0	0	1	2	0	0	0	2
9:00 AM	0	0	0	0	0	0	1	1
9:15 AM	0	0	0	1	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0
10:00 AM	0	0	1	0	0	0	1	0
10:15 AM	0	0	0	0	0	0	2	0
10:30 AM	0	0	0	0	0	0	0	1
10:45 AM	0	0	0	0	0	0	1	0
11:00 AM	0	0	0	1	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	2	0	0	7	0
11:45 AM	0	0	0	0	0	0	2	1
12:00 PM	0	0	0	0	0	0	0	1
12:15 PM	0	0	2	2	0	0	3	5
12:30 PM	0	0	0	0	0	0	1	2
12:45 PM	0	0	0	3	1	1	2	0
1:00 PM	1	0	1	0	0	0	0	0
1:15 PM	0	0	0	0	0	0	0	0
1:30 PM	0	0	1	0	0	0	0	0
1:45 PM	0	0	0	1	0	0	0	1
2:00 PM	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	2	2
2:45 PM	0	0	0	0	0	2	1	0
3:00 PM	0	0	1	2	1	1	18	0
3:15 PM	0	0	0	2	0	1	2	3
3:30 PM	0	0	2	0	0	0	3	4
3:45 PM	0	0	0	0	0	1	2	0
4:00 PM	0	0	0	2	0	0	1	1
4:15 PM	0	0	0	0	0	0	1	0
4:30 PM	1	0	1	2	0	0	2	1
4:45 PM	0	0	0	0	0	0	2	0
5:00 PM	0	0	0	1	0	0	1	0
5:15 PM	0	0	0	1	0	1	7	2
5:30 PM	0	0	0	1	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	1
6:00 PM	0	0	1	0	0	0	1	0
6:15 PM	0	0	0	0	0	0	0	2
6:30 PM	0	0	1	1	0	0	0	0
6:45 PM	0	0	0	0	0	0	1	1

Study Name YORKSHIRE ST & RAIL CROSSING (PEDESTRIAN STUDY) [Sur
Start Date 09/30/2018
Start Time 8:00 AM
Site Code

	YORKSHIRE ST Southbound		RAIL CROSSING Westbound		YORKSHIRE ST Northbound		RAIL CROSSING Eastbound	
Start Time	Peds CCW	Peds CW	Peds CCW	Peds CW	Peds CCW	Peds CW	Peds CCW	Peds CW
8:00 AM	0	0	1	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	1	0
8:30 AM	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	1	0	0	0	1
9:00 AM	0	0	0	0	0	0	0	1
9:15 AM	0	0	0	1	1	0	3	0
9:30 AM	0	0	2	0	0	0	4	2
9:45 AM	0	0	1	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	2	0	0	0	0
10:30 AM	0	0	1	0	0	0	0	0
10:45 AM	0	0	2	0	0	0	1	2
11:00 AM	0	0	1	0	0	0	3	0
11:15 AM	0	0	0	0	0	0	1	0
11:30 AM	0	0	1	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	1	3
12:15 PM	0	1	1	0	0	0	1	1
12:30 PM	0	0	0	1	0	0	3	4
12:45 PM	0	0	0	0	0	0	0	1
1:00 PM	0	0	0	0	0	0	1	0
1:15 PM	1	0	1	1	0	0	0	0
1:30 PM	0	0	1	0	0	0	1	0
1:45 PM	0	1	0	0	0	0	1	0
2:00 PM	0	0	0	0	0	1	1	1
2:15 PM	0	0	1	2	0	0	1	2
2:30 PM	0	0	2	0	0	1	0	3
2:45 PM	0	0	0	2	0	0	0	2
3:00 PM	0	0	6	0	0	0	2	1
3:15 PM	1	0	9	1	2	0	5	1
3:30 PM	0	0	0	0	1	0	0	0
3:45 PM	0	0	0	0	0	0	1	2

Study Name GLASGOW ST & RAIL CROSSING (PEDESTRIAN STUDY) [Mon 10/01/2018]

Start Date 10/01/2018

Start Time 7:00 AM

Site Code

Start Time	GLASGOW ST Southbound		L CROSSING / KENT Westbound		GLASGOW ST Northbound		L CROSSING / KENT Eastbound	
	Peds CCW	Peds CW	Peds CCW	Peds CW	Peds CCW	Peds CW	Peds CCW	Peds CW
7:00 AM	1	0	1	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	1	0
7:30 AM	0	0	0	1	0	0	0	0
7:45 AM	0	0	1	0	0	0	2	0
8:00 AM	0	1	0	2	0	0	0	1
8:15 AM	0	1	0	1	0	0	0	0
8:30 AM	0	0	2	0	1	0	0	3
8:45 AM	0	0	0	1	0	0	1	0
9:00 AM	1	0	1	0	0	0	0	0
9:15 AM	0	0	0	1	0	0	2	0
9:30 AM	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	1	0	0	1	0
10:00 AM	0	0	0	0	0	0	1	0
10:15 AM	0	0	0	0	0	0	1	0
10:30 AM	0	0	1	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	2	0	0	0	0
11:30 AM	0	0	0	0	0	0	2	0
11:45 AM	0	0	2	2	1	0	4	2
12:00 PM	0	0	1	0	0	0	0	1
12:15 PM	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	1	0	0	0	2
12:45 PM	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	1	0
1:15 PM	0	0	0	0	0	0	1	2
1:30 PM	0	0	0	0	0	0	1	0
1:45 PM	0	0	1	3	0	0	0	1
2:00 PM	0	0	0	3	0	0	0	0
2:15 PM	0	0	1	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	0
2:45 PM	1	0	0	0	0	0	1	0
3:00 PM	0	4	1	2	0	0	0	2
3:15 PM	4	1	0	1	0	0	4	1
3:30 PM	0	0	2	0	0	0	1	2
3:45 PM	2	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	1	0
4:15 PM	0	0	0	0	0	0	1	0
4:30 PM	0	0	1	0	0	1	0	2
4:45 PM	2	0	1	1	0	0	2	0
5:00 PM	1	1	2	1	1	0	4	3
5:15 PM	0	0	1	0	0	0	0	0
5:30 PM	0	0	0	4	1	0	1	1
5:45 PM	0	0	1	0	0	0	0	1
6:00 PM	0	1	0	0	0	0	0	0
6:15 PM	0	0	0	3	0	0	0	1
6:30 PM	0	0	0	0	0	0	0	0
6:45 PM	0	1	0	0	0	0	0	1

Study Name GLASGOW ST & RAIL CROSSING (PEDESTRIAN STUDY) [Sun 5
Start Date 09/30/2018
Start Time 8:00 AM
Site Code

	GLASGOW ST Southbound		RAIL CROSSING Westbound		GLASGOW ST Northbound		RAIL CROSSING Eastbound	
Start Time	Peds CCW	Peds CW	Peds CCW	Peds CW	Peds CCW	Peds CW	Peds CCW	Peds CW
8:00 AM	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	3	0	0	0	0
8:30 AM	0	1	0	1	0	0	1	0
8:45 AM	0	0	1	1	0	0	1	0
9:00 AM	1	0	1	0	0	0	0	1
9:15 AM	0	0	2	0	0	0	1	0
9:30 AM	0	0	0	0	0	0	0	0
9:45 AM	0	0	1	0	0	0	1	0
10:00 AM	0	0	0	0	1	0	0	1
10:15 AM	0	0	0	1	0	1	2	2
10:30 AM	0	0	0	1	0	0	2	3
10:45 AM	0	0	1	0	0	0	1	0
11:00 AM	0	0	0	0	0	0	2	0
11:15 AM	0	0	0	1	0	0	4	0
11:30 AM	1	0	6	1	0	0	0	0
11:45 AM	0	0	0	1	0	0	2	0
12:00 PM	0	0	0	0	0	0	0	2
12:15 PM	0	0	1	4	0	0	1	0
12:30 PM	0	0	1	0	0	0	0	1
12:45 PM	0	0	2	2	0	2	0	2
1:00 PM	0	0	1	0	0	2	0	0
1:15 PM	0	1	0	2	0	0	0	2
1:30 PM	0	0	0	2	0	0	0	0
1:45 PM	0	0	0	2	1	2	1	2
2:00 PM	0	3	0	1	0	0	0	3
2:15 PM	2	0	5	0	0	0	1	4
2:30 PM	0	1	0	0	0	0	0	0
2:45 PM	1	0	1	0	0	0	0	0
3:00 PM	0	0	0	2	0	0	2	2
3:15 PM	0	0	0	1	0	0	1	1
3:30 PM	0	0	0	3	0	0	0	0
3:45 PM	1	0	1	0	0	0	1	0

Study Name DUBLIN ST & RAIL CROSSING (PEDESTRIAN STUDY) [Mon Oct 15]

Start Date 10/01/2018

Start Time 7:00 AM

Site Code

	DUBLIN ST Southbound		RAIL CROSSING Westbound		DUBLIN ST Northbound		RAIL CROSSING Eastbound	
Start Time	Peds CCW	Peds CW	Peds CCW	Peds CW	Peds CCW	Peds CW	Peds CCW	Peds CW
7:00 AM	0	0	1	0	0	0	0	0
7:15 AM	1	1	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0
7:45 AM	0	0	1	1	0	0	0	0
8:00 AM	0	0	0	10	2	0	2	0
8:15 AM	0	2	1	2	0	0	0	2
8:30 AM	1	0	6	2	0	0	0	0
8:45 AM	2	0	2	5	1	1	2	1
9:00 AM	1	0	1	2	0	0	0	0
9:15 AM	0	0	0	1	0	0	1	2
9:30 AM	0	0	3	3	2	0	2	0
9:45 AM	0	0	0	2	0	0	1	0
10:00 AM	0	0	0	2	1	0	3	0
10:15 AM	1	1	2	3	0	0	1	0
10:30 AM	1	0	2	0	0	0	1	0
10:45 AM	0	1	0	0	1	0	2	0
11:00 AM	0	1	0	0	0	0	0	1
11:15 AM	0	0	1	0	0	0	0	1
11:30 AM	0	0	3	1	0	0	1	2
11:45 AM	0	1	0	0	0	0	1	0
12:00 PM	1	2	2	2	0	0	0	0
12:15 PM	2	0	1	0	1	0	2	1
12:30 PM	2	0	3	2	0	0	1	0
12:45 PM	0	0	0	0	0	1	1	0
1:00 PM	0	0	1	1	0	0	1	1
1:15 PM	1	1	0	2	0	0	1	1
1:30 PM	3	3	2	0	0	0	0	3
1:45 PM	0	1	1	1	1	1	0	0
2:00 PM	0	0	3	3	0	0	1	4
2:15 PM	0	2	0	1	2	0	0	0
2:30 PM	3	0	1	0	0	0	0	0
2:45 PM	4	0	4	1	0	0	0	1
3:00 PM	0	4	2	2	0	0	0	0
3:15 PM	0	1	0	9	2	6	2	5
3:30 PM	0	1	1	1	0	0	0	4
3:45 PM	5	0	3	2	0	0	0	1
4:00 PM	2	0	3	1	1	0	2	0
4:15 PM	0	0	0	4	1	0	0	2
4:30 PM	2	0	4	0	0	1	1	1
4:45 PM	0	0	9	0	0	0	1	3
5:00 PM	0	1	1	2	0	0	0	2
5:15 PM	0	0	1	1	0	0	0	3
5:30 PM	2	0	4	0	1	0	0	1
5:45 PM	1	0	4	0	2	0	2	0
6:00 PM	0	0	0	1	1	1	4	2
6:15 PM	2	0	1	0	0	0	2	2
6:30 PM	2	0	1	0	1	0	3	1
6:45 PM	2	1	4	0	3	0	0	1

Study Name DUBLIN ST & RAIL CROSSING (PEDESTRIAN STUDY) [Sun Sep 30]
Start Date 09/30/2018
Start Time 8:00 AM
Site Code

	DUBLIN ST Southbound		RAIL CROSSING Westbound		DUBLIN ST Northbound		RAIL CROSSING Eastbound	
Start Time	Peds CCW	Peds CW	Peds CCW	Peds CW	Peds CCW	Peds CW	Peds CCW	Peds CW
8:00 AM	0	0	0	0	0	0	1	0
8:15 AM	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	2
8:45 AM	0	0	1	1	1	0	0	0
9:00 AM	0	0	0	0	0	1	0	1
9:15 AM	1	1	0	0	0	0	0	0
9:30 AM	2	2	2	1	0	0	3	2
9:45 AM	0	0	1	0	0	0	2	0
10:00 AM	0	0	1	3	0	0	0	0
10:15 AM	0	0	2	2	0	0	1	0
10:30 AM	1	0	3	0	0	0	1	3
10:45 AM	0	0	2	1	1	0	1	2
11:00 AM	0	3	0	2	0	0	0	5
11:15 AM	0	0	1	1	0	0	0	1
11:30 AM	0	0	2	0	0	0	0	4
11:45 AM	0	1	0	0	0	0	0	1
12:00 PM	0	0	0	0	0	0	4	0
12:15 PM	0	1	1	1	0	0	1	1
12:30 PM	2	0	1	0	0	0	0	5
12:45 PM	0	1	0	0	0	0	2	2
1:00 PM	0	2	6	3	0	1	0	1
1:15 PM	0	0	2	0	1	0	1	2
1:30 PM	1	0	1	0	0	1	0	1
1:45 PM	1	1	2	0	1	2	0	0
2:00 PM	0	3	3	2	0	0	2	4
2:15 PM	1	0	1	0	0	1	3	7
2:30 PM	1	0	3	0	0	0	5	3
2:45 PM	0	0	1	0	0	0	1	0
3:00 PM	0	2	0	1	0	0	2	0
3:15 PM	0	0	0	1	1	0	3	0
3:30 PM	3	0	0	1	0	0	1	0
3:45 PM	1	0	1	0	0	0	0	0

Time/Speed Report

Device ID: 404099
Operator:

Location: 17
Lane: SB

Raw Count: 1,224
AADT Count: 1,224

Begin: 10/02/2018 12:00 AM
End: 10/03/2018 12:00 AM
Hours: 24.00
Period (min): 15

Street:
City:
County:
State: ON

AADT Factor: 1
Speed Limit: 64

Date And Time Range	< to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to 79	80 to 84	85 to >	Total
Tue,10/02/2018																
[12:00 AM-12:15 AM]	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
[12:15 AM-12:30 AM]	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
[12:30 AM-12:45 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[12:45 AM-01:00 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	3
[01:00 AM-01:15 AM]	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
[01:15 AM-01:30 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[01:30 AM-01:45 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[01:45 AM-02:00 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
[02:00 AM-02:15 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[02:15 AM-02:30 AM]	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
[02:30 AM-02:45 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[02:45 AM-03:00 AM]	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
[03:00 AM-03:15 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[03:15 AM-03:30 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[03:30 AM-03:45 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[03:45 AM-04:00 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[04:00 AM-04:15 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[04:15 AM-04:30 AM]	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
[04:30 AM-04:45 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[04:45 AM-05:00 AM]	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2
[05:00 AM-05:15 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[05:15 AM-05:30 AM]	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2
[05:30 AM-05:45 AM]	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
[05:45 AM-06:00 AM]	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	2
	1	0	0	0	1	1	0	1	0	0	0	0	0	0	1	5
[06:00 AM-06:15 AM]	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
[06:15 AM-06:30 AM]	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2
[06:30 AM-06:45 AM]	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
[06:45 AM-07:00 AM]	0	0	0	1	0	0	5	0	0	1	0	0	0	0	0	7
	0	0	0	1	1	2	5	1	0	1	0	0	0	0	0	11
[07:00 AM-07:15 AM]	0	0	0	0	4	2	0	1	1	0	0	0	0	0	0	8
[07:15 AM-07:30 AM]	0	0	0	0	3	2	5	3	0	0	0	0	0	0	0	13
[07:30 AM-07:45 AM]	0	0	0	2	1	5	6	1	1	0	0	0	0	0	0	16
[07:45 AM-08:00 AM]	0	0	0	0	2	3	8	4	4	0	0	0	0	0	0	21
Tue,10/02/2018																

	0	0	0	2	10	12	19	9	6	0	0	0	0	0	0	58
[08:00 AM-08:15 AM]	0	0	0	2	1	8	3	4	1	0	0	0	0	0	0	19
[08:15 AM-08:30 AM]	0	1	1	1	5	3	9	2	0	0	0	0	0	0	0	22
[08:30 AM-08:45 AM]	0	0	0	6	12	12	5	2	0	0	0	0	0	0	0	37
[08:45 AM-09:00 AM]	0	1	10	12	8	12	6	2	0	0	0	0	0	0	0	51
	0	2	11	21	26	35	23	10	1	0	0	0	0	0	0	129
[09:00 AM-09:15 AM]	0	0	2	0	4	4	6	3	1	1	0	0	0	0	0	21
[09:15 AM-09:30 AM]	0	0	2	3	3	6	1	3	1	0	0	0	0	0	0	19
[09:30 AM-09:45 AM]	0	0	1	0	4	5	4	3	0	0	0	0	0	0	0	17
[09:45 AM-10:00 AM]	0	1	2	0	3	8	3	4	0	0	0	0	0	0	0	21
	0	1	7	3	14	23	14	13	2	1	0	0	0	0	0	78
[10:00 AM-10:15 AM]	0	2	0	1	5	1	2	1	0	0	0	0	0	0	1	13
[10:15 AM-10:30 AM]	0	0	0	0	2	6	2	5	3	0	0	0	0	0	0	18
[10:30 AM-10:45 AM]	0	0	0	0	0	3	10	1	1	0	0	0	0	0	0	15
[10:45 AM-11:00 AM]	0	0	0	0	2	2	2	3	1	0	0	0	0	0	0	10
	0	2	0	1	9	12	16	10	5	0	0	0	0	0	1	56
[11:00 AM-11:15 AM]	1	0	0	1	5	5	3	2	0	0	0	0	0	0	0	17
[11:15 AM-11:30 AM]	0	0	0	1	4	1	4	0	0	0	0	0	0	0	0	10
[11:30 AM-11:45 AM]	0	0	0	2	3	5	4	2	1	0	1	0	0	0	0	18
[11:45 AM-12:00 PM]	0	0	0	0	4	7	2	5	2	0	0	0	0	0	0	20
	1	0	0	4	16	18	13	9	3	0	1	0	0	0	0	65
[12:00 PM-12:15 PM]	0	1	2	0	4	3	5	2	1	0	1	0	0	0	0	19
[12:15 PM-12:30 PM]	0	0	0	2	5	5	2	6	1	0	0	0	0	0	0	21
[12:30 PM-12:45 PM]	0	0	1	2	2	2	0	3	1	0	0	0	0	0	0	11
[12:45 PM-01:00 PM]	3	1	1	5	4	5	5	4	1	0	0	0	0	0	0	29
	3	2	4	9	15	15	12	15	4	0	1	0	0	0	0	80
[01:00 PM-01:15 PM]	0	0	0	2	2	6	5	0	0	0	0	0	0	0	0	15
[01:15 PM-01:30 PM]	0	0	0	2	3	4	10	4	0	0	0	0	0	0	0	23
[01:30 PM-01:45 PM]	0	0	0	2	2	7	2	2	1	0	0	0	0	0	0	16
[01:45 PM-02:00 PM]	0	0	1	5	5	8	2	1	0	0	0	0	0	0	0	22
	0	0	1	11	12	25	19	7	1	0	0	0	0	0	0	76
[02:00 PM-02:15 PM]	0	0	0	0	2	4	3	2	1	1	0	0	0	0	0	13
[02:15 PM-02:30 PM]	0	1	0	1	6	6	6	4	1	1	0	1	0	0	0	27
[02:30 PM-02:45 PM]	0	0	0	1	5	3	8	3	1	0	0	0	0	0	1	22
[02:45 PM-03:00 PM]	0	1	0	3	9	7	7	2	0	0	0	0	0	0	0	29
	0	2	0	5	22	20	24	11	3	2	0	1	0	0	1	91
[03:00 PM-03:15 PM]	1	6	1	10	4	6	0	4	0	1	0	0	0	0	0	33
[03:15 PM-03:30 PM]	0	0	3	3	5	5	2	1	0	0	0	0	0	0	0	19
Tue, 10/02/2018																
[03:30 PM-03:45 PM]	0	0	1	1	2	7	1	4	0	0	0	0	0	0	0	16
[03:45 PM-04:00 PM]	1	0	0	2	2	5	6	4	1	2	0	0	0	0	0	23
	2	6	5	16	13	23	9	13	1	3	0	0	0	0	0	91
[04:00 PM-04:15 PM]	0	0	0	2	2	12	6	2	0	0	0	0	0	0	0	24
[04:15 PM-04:30 PM]	0	0	0	1	7	7	4	5	0	0	0	0	0	0	0	24
[04:30 PM-04:45 PM]	1	0	1	8	2	10	7	8	0	0	0	0	0	0	0	37
[04:45 PM-05:00 PM]	0	1	2	4	6	5	9	11	2	1	0	0	0	0	0	41
	1	1	3	15	17	34	26	26	2	1	0	0	0	0	0	126
[05:00 PM-05:15 PM]	0	0	1	0	2	5	17	8	2	1	0	0	0	0	0	36
[05:15 PM-05:30 PM]	1	0	2	2	4	7	11	5	0	0	0	0	0	0	0	32
[05:30 PM-05:45 PM]	0	0	1	1	2	5	4	3	0	0	0	0	0	0	0	16

[05:45 PM-06:00 PM]	0	0	0	2	6	4	6	2	0	0	0	0	0	0	0	20
	1	0	4	5	14	21	38	18	2	1	0	0	0	0	0	104
[06:00 PM-06:15 PM]	0	0	3	2	3	9	4	5	2	0	0	0	0	0	0	28
[06:15 PM-06:30 PM]	0	0	0	5	2	5	4	5	0	0	1	0	0	0	0	22
[06:30 PM-06:45 PM]	0	0	0	1	3	6	4	1	0	0	0	0	0	0	0	15
[06:45 PM-07:00 PM]	0	0	0	0	2	10	3	1	2	0	0	0	0	0	0	18
	0	0	3	8	10	30	15	12	4	0	1	0	0	0	0	83
[07:00 PM-07:15 PM]	0	0	2	0	5	3	8	5	1	1	0	0	1	0	0	26
[07:15 PM-07:30 PM]	1	0	0	3	4	5	2	1	1	0	1	1	0	0	0	19
[07:30 PM-07:45 PM]	0	0	0	0	1	2	3	1	0	0	0	0	0	0	1	8
[07:45 PM-08:00 PM]	0	0	1	2	1	5	1	2	0	0	0	0	0	0	0	12
	1	0	3	5	11	15	14	9	2	1	1	1	1	0	1	65
[08:00 PM-08:15 PM]	0	0	0	2	0	5	4	1	1	0	0	0	0	0	0	13
[08:15 PM-08:30 PM]	0	0	1	0	1	2	1	4	0	0	0	0	0	0	0	9
[08:30 PM-08:45 PM]	0	0	0	2	0	2	1	0	0	1	0	0	0	0	0	6
[08:45 PM-09:00 PM]	0	0	1	0	4	1	1	3	0	0	0	0	0	0	0	10
	0	0	2	4	5	10	7	8	1	1	0	0	0	0	0	38
[09:00 PM-09:15 PM]	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	5
[09:15 PM-09:30 PM]	0	0	0	0	1	3	2	2	0	0	0	0	0	0	0	8
[09:30 PM-09:45 PM]	0	0	0	1	0	1	2	0	0	0	1	0	0	0	0	5
[09:45 PM-10:00 PM]	0	0	0	1	0	1	3	1	0	0	0	0	0	0	1	7
	0	0	0	3	2	6	8	4	0	0	1	0	0	0	1	25
[10:00 PM-10:15 PM]	0	0	1	1	0	1	2	0	1	0	0	0	0	0	0	6
[10:15 PM-10:30 PM]	0	1	0	0	0	2	1	1	0	1	0	0	0	0	0	6
[10:30 PM-10:45 PM]	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
[10:45 PM-11:00 PM]	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
	0	1	1	1	0	3	5	3	1	1	0	0	0	0	0	16
Tue, 10/02/2018																
[11:00 PM-11:15 PM]	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	3
[11:15 PM-11:30 PM]	0	0	0	0	3	1	1	2	0	1	0	0	0	0	0	8
[11:30 PM-11:45 PM]	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
[11:45 PM-12:00 AM]	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
	0	0	1	1	3	4	1	3	1	1	0	0	0	0	0	15
10/02/2018 12:00 AM																
10/03/2018 12:00 AM	10	17	45	115	201	312	270	183	40	13	5	2	2	0	5	1220

Device ID: 404100		Location: 17		Raw Count: 716												
Operator:		Lane: NB		AADT Count: 716												
Begin: 10/02/2018 12:00 AM		Street:		AADT Factor: 1												
End: 10/03/2018 12:00 AM		City:		Speed Limit: 64												
Hours: 24.00		County:														
Period (min): 15		State: ON														
Date	<	20	25	30	35	40	45	50	55	60	65	70	75	80	85	
And	to	to	to	to	to	to	to	to	to	to	to	to	to	to	to	Total
Time Range	19	24	29	34	39	44	49	54	59	64	69	74	79	84	>	
Tue,10/02/2018																
[12:00 AM-12:15 AM]	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
[12:15 AM-12:30 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[12:30 AM-12:45 AM]	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
[12:45 AM-01:00 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	2
[01:00 AM-01:15 AM]	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
[01:15 AM-01:30 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[01:30 AM-01:45 AM]	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
[01:45 AM-02:00 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
[02:00 AM-02:15 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[02:15 AM-02:30 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[02:30 AM-02:45 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[02:45 AM-03:00 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[03:00 AM-03:15 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[03:15 AM-03:30 AM]	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
[03:30 AM-03:45 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[03:45 AM-04:00 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
[04:00 AM-04:15 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[04:15 AM-04:30 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[04:30 AM-04:45 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[04:45 AM-05:00 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[05:00 AM-05:15 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[05:15 AM-05:30 AM]	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
[05:30 AM-05:45 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[05:45 AM-06:00 AM]	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2
	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	3

	1	0	0	0	1	3	6	9	2	1	0	0	0	0	0	23
[08:00 AM-08:15 AM]	0	0	0	1	2	2	2	4	3	2	0	0	0	0	1	17
[08:15 AM-08:30 AM]	1	0	0	0	1	4	1	5	1	0	0	0	0	0	0	13
[08:30 AM-08:45 AM]	0	1	3	3	5	3	2	2	0	0	0	0	1	0	1	21
[08:45 AM-09:00 AM]	1	0	0	1	9	7	7	3	0	1	0	0	0	0	0	29
	2	1	3	5	17	16	12	14	4	3	0	0	1	0	2	80
[09:00 AM-09:15 AM]	1	0	0	1	2	2	4	0	0	1	0	0	0	0	0	11
[09:15 AM-09:30 AM]	0	0	0	1	4	1	4	2	1	0	0	0	0	0	0	13
[09:30 AM-09:45 AM]	0	0	0	0	0	2	6	2	3	0	0	0	0	0	0	13
[09:45 AM-10:00 AM]	0	0	0	0	3	1	1	1	0	0	0	0	0	0	0	6
	1	0	0	2	9	6	15	5	4	1	0	0	0	0	0	43
[10:00 AM-10:15 AM]	0	0	0	0	1	3	0	1	0	0	0	0	0	0	0	5
[10:15 AM-10:30 AM]	0	0	1	1	3	3	3	1	1	0	2	0	0	0	0	15
[10:30 AM-10:45 AM]	0	0	0	0	4	2	2	0	0	0	0	0	0	0	0	8
[10:45 AM-11:00 AM]	0	0	0	0	1	1	6	2	2	0	0	0	0	0	0	12
	0	0	1	1	9	9	11	4	3	0	2	0	0	0	0	40
[11:00 AM-11:15 AM]	0	0	0	0	1	5	3	2	1	0	0	0	0	0	0	12
[11:15 AM-11:30 AM]	0	0	0	0	0	1	6	0	0	0	0	0	0	0	0	7
[11:30 AM-11:45 AM]	0	0	1	0	2	1	5	2	0	0	1	0	0	0	1	13
[11:45 AM-12:00 PM]	0	0	0	0	2	2	1	1	1	0	0	0	0	1	0	8
	0	0	1	0	5	9	15	5	2	0	1	0	0	1	1	40
[12:00 PM-12:15 PM]	0	0	0	1	2	3	2	4	1	1	0	1	0	0	1	16
[12:15 PM-12:30 PM]	0	0	1	1	3	1	2	1	4	1	0	0	0	0	0	14
[12:30 PM-12:45 PM]	0	0	1	0	1	1	1	1	2	1	0	1	0	0	0	9
[12:45 PM-01:00 PM]	0	0	0	0	0	0	3	2	4	0	0	1	0	0	0	10
	0	0	2	2	6	5	8	8	11	3	0	3	0	0	1	49
[01:00 PM-01:15 PM]	0	0	1	0	0	3	2	2	0	2	0	0	0	0	0	10
[01:15 PM-01:30 PM]	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	4
[01:30 PM-01:45 PM]	0	0	1	2	3	4	4	1	1	0	0	0	0	0	0	16
[01:45 PM-02:00 PM]	1	0	1	2	3	1	3	1	0	1	0	0	0	1	1	15
	1	0	3	4	7	9	9	6	1	3	0	0	0	1	1	45
[02:00 PM-02:15 PM]	0	0	0	0	0	1	4	4	0	0	1	0	0	0	0	10
[02:15 PM-02:30 PM]	0	0	0	0	2	0	3	4	2	0	0	0	0	0	0	11
[02:30 PM-02:45 PM]	0	0	0	2	1	4	2	1	0	0	0	0	0	0	0	10
[02:45 PM-03:00 PM]	0	0	1	1	1	3	0	4	0	0	0	0	0	0	0	10
	0	0	1	3	4	8	9	13	2	0	1	0	0	0	0	41
[03:00 PM-03:15 PM]	0	0	1	0	1	4	2	2	1	0	0	0	0	0	0	11
[03:15 PM-03:30 PM]	0	0	0	1	3	4	2	2	0	0	0	0	0	0	1	13
Tue, 10/02/2018																
[03:30 PM-03:45 PM]	0	0	1	1	2	7	1	2	3	0	1	0	0	0	0	18
[03:45 PM-04:00 PM]	0	0	0	0	0	1	3	1	1	1	0	0	0	0	0	7
	0	0	2	2	6	16	8	7	5	1	1	0	0	0	1	49
[04:00 PM-04:15 PM]	0	0	0	0	1	2	3	6	0	0	0	0	0	0	0	12
[04:15 PM-04:30 PM]	1	0	2	1	0	3	1	6	0	0	0	0	0	0	0	14
[04:30 PM-04:45 PM]	0	0	0	0	1	1	4	1	0	0	0	1	0	0	1	9
[04:45 PM-05:00 PM]	0	0	0	0	1	5	4	2	2	0	1	0	0	0	0	15
	1	0	2	1	3	11	12	15	2	0	1	1	0	0	1	50
[05:00 PM-05:15 PM]	0	1	0	2	5	10	2	8	2	0	0	0	0	0	0	30
[05:15 PM-05:30 PM]	0	0	1	0	2	4	7	5	2	1	0	0	0	0	0	22
[05:30 PM-05:45 PM]	0	0	0	0	1	0	2	2	2	0	0	0	0	0	0	7

[05:45 PM-06:00 PM]	0	0	0	1	1	1	2	8	1	0	0	0	0	0	0	14
	0	1	1	3	9	15	13	23	7	1	0	0	0	0	0	73
[06:00 PM-06:15 PM]	0	0	0	0	0	4	6	5	2	1	0	0	0	0	0	18
[06:15 PM-06:30 PM]	1	0	0	0	1	1	4	3	1	0	1	0	0	0	0	12
[06:30 PM-06:45 PM]	0	0	0	1	1	2	3	1	1	1	0	0	0	0	0	10
[06:45 PM-07:00 PM]	0	0	0	0	1	0	2	2	1	1	0	1	0	0	0	8
	1	0	0	1	3	7	15	11	5	3	1	1	0	0	0	48
[07:00 PM-07:15 PM]	0	0	0	1	3	0	2	0	1	2	0	0	0	0	0	9
[07:15 PM-07:30 PM]	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	3
[07:30 PM-07:45 PM]	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0	5
[07:45 PM-08:00 PM]	0	0	0	0	0	3	4	0	1	0	0	0	0	0	0	8
	0	0	0	1	4	5	9	2	2	2	0	0	0	0	0	25
[08:00 PM-08:15 PM]	0	0	0	0	0	1	1	4	0	0	0	0	0	0	0	6
[08:15 PM-08:30 PM]	0	0	0	0	1	3	1	2	2	0	0	0	0	0	0	9
[08:30 PM-08:45 PM]	0	0	0	0	5	3	3	2	0	0	0	0	0	0	0	13
[08:45 PM-09:00 PM]	0	0	0	1	0	2	1	3	1	0	0	1	0	0	0	9
	0	0	0	1	6	9	6	11	3	0	0	1	0	0	0	37
[09:00 PM-09:15 PM]	0	0	0	0	1	1	2	1	0	0	0	0	0	0	0	5
[09:15 PM-09:30 PM]	0	0	0	0	0	2	2	2	1	0	0	0	0	0	0	7
[09:30 PM-09:45 PM]	0	0	0	0	2	0	3	0	0	1	0	0	0	0	0	6
[09:45 PM-10:00 PM]	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	3
	0	0	0	0	4	4	8	3	1	1	0	0	0	0	0	21
[10:00 PM-10:15 PM]	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	2
[10:15 PM-10:30 PM]	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
[10:30 PM-10:45 PM]	0	0	0	1	1	0	1	1	0	0	0	0	1	0	0	5
[10:45 PM-11:00 PM]	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
	0	0	0	1	2	0	2	2	1	0	0	0	1	0	0	9
Tue, 10/02/2018																
[11:00 PM-11:15 PM]	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
[11:15 PM-11:30 PM]	0	0	0	0	0	1	0	2	0	1	0	0	0	0	0	4
[11:30 PM-11:45 PM]	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	3
[11:45 PM-12:00 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	1	2	3	0	1	0	1	0	0	0	8
10/02/2018 12:00 AM																
10/03/2018 12:00 AM	7	2	16	27	96	137	167	144	56	21	7	7	2	2	7	698

	0	0	1	7	6	4	2	3	1	1	0	0	2	0	2	29
[08:00 AM-08:15 AM]	0	0	2	2	2	2	2	3	2	0	0	0	0	1	0	16
[08:15 AM-08:30 AM]	0	0	1	5	5	3	3	3	0	0	0	0	0	0	1	21
[08:30 AM-08:45 AM]	1	0	3	9	12	4	2	1	0	0	1	0	0	0	1	34
[08:45 AM-09:00 AM]	0	3	0	10	14	7	1	1	1	0	0	0	0	0	0	37
	1	3	6	26	33	16	8	8	3	0	1	0	0	1	2	108
[09:00 AM-09:15 AM]	1	2	2	2	5	3	0	1	0	0	0	0	0	0	0	16
[09:15 AM-09:30 AM]	0	1	2	3	3	1	0	2	1	0	0	0	0	0	1	14
[09:30 AM-09:45 AM]	1	0	1	2	0	0	2	1	0	0	0	0	0	0	0	7
[09:45 AM-10:00 AM]	0	0	3	3	4	1	2	1	0	0	0	0	0	0	0	14
	2	3	8	10	12	5	4	5	1	0	0	0	0	0	1	51
[10:00 AM-10:15 AM]	0	0	1	0	1	2	0	0	0	1	0	0	0	0	1	6
[10:15 AM-10:30 AM]	0	0	0	0	1	2	1	0	0	0	1	0	0	0	2	7
[10:30 AM-10:45 AM]	0	0	0	0	2	3	2	1	1	0	1	0	0	0	0	10
[10:45 AM-11:00 AM]	0	0	1	0	1	0	1	0	0	0	0	1	0	0	0	4
	0	0	2	0	5	7	4	1	1	1	2	1	0	0	3	27
[11:00 AM-11:15 AM]	0	0	2	2	0	1	0	1	0	0	0	0	0	0	1	7
[11:15 AM-11:30 AM]	0	2	0	0	2	2	2	2	0	0	1	0	0	0	0	11
[11:30 AM-11:45 AM]	0	0	0	1	2	2	1	1	1	0	0	0	0	0	0	8
[11:45 AM-12:00 PM]	1	0	1	1	1	1	1	2	0	0	0	0	0	0	0	8
	1	2	3	4	5	6	4	6	1	0	1	0	0	0	1	34
[12:00 PM-12:15 PM]	0	0	0	3	2	1	1	0	0	0	0	0	0	0	0	7
[12:15 PM-12:30 PM]	0	0	0	1	2	1	1	1	1	0	0	0	0	0	0	7
[12:30 PM-12:45 PM]	1	1	2	0	6	1	0	1	0	0	0	0	0	0	0	12
[12:45 PM-01:00 PM]	0	0	2	1	2	2	0	1	0	0	0	0	0	0	0	8
	1	1	4	5	12	5	2	3	1	0	0	0	0	0	0	34
[01:00 PM-01:15 PM]	0	0	0	2	3	5	3	1	1	0	0	0	0	1	0	16
[01:15 PM-01:30 PM]	0	0	2	1	1	1	0	1	0	0	0	0	0	0	0	6
[01:30 PM-01:45 PM]	0	0	2	1	1	1	0	0	1	0	0	0	0	0	0	6
[01:45 PM-02:00 PM]	0	2	3	5	2	0	0	0	0	1	0	0	0	0	0	13
	0	2	7	9	7	7	3	2	2	1	0	0	0	1	0	41
[02:00 PM-02:15 PM]	0	1	0	3	5	0	1	0	0	0	0	0	0	0	0	10
[02:15 PM-02:30 PM]	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	4
[02:30 PM-02:45 PM]	1	0	3	0	3	3	0	0	0	0	1	0	0	0	0	11
[02:45 PM-03:00 PM]	0	0	0	1	2	3	1	0	0	0	0	0	0	0	0	7
	1	1	3	6	12	6	2	0	0	0	1	0	0	0	0	32
[03:00 PM-03:15 PM]	0	1	0	1	2	5	6	1	0	0	0	0	0	0	0	16
[03:15 PM-03:30 PM]	0	0	3	5	4	3	2	1	1	1	0	0	0	0	0	20
Tue, 10/02/2018																
[03:30 PM-03:45 PM]	0	0	2	3	2	7	5	4	0	0	0	0	0	0	0	23
[03:45 PM-04:00 PM]	0	1	0	2	2	4	2	3	0	1	0	1	0	0	0	16
	0	2	5	11	10	19	15	9	1	2	0	1	0	0	0	75
[04:00 PM-04:15 PM]	0	0	0	1	2	1	3	3	1	0	0	0	0	0	0	11
[04:15 PM-04:30 PM]	0	0	0	0	2	4	2	7	1	0	0	0	0	0	0	16
[04:30 PM-04:45 PM]	0	0	2	0	4	2	5	2	1	0	0	0	0	0	0	16
[04:45 PM-05:00 PM]	0	0	2	3	0	3	5	1	3	1	0	0	0	0	0	18
	0	0	4	4	8	10	15	13	6	1	0	0	0	0	0	61
[05:00 PM-05:15 PM]	0	0	0	1	4	4	4	6	0	0	0	0	0	0	0	19
[05:15 PM-05:30 PM]	0	0	0	1	4	4	3	3	2	0	1	0	0	0	0	18
[05:30 PM-05:45 PM]	0	1	2	0	1	3	10	6	0	0	0	0	1	0	0	24

[05:45 PM-06:00 PM]	0	0	1	2	1	3	4	1	0	0	0	0	0	0	0	12
	0	1	3	4	10	14	21	16	2	0	1	0	1	0	0	73
[06:00 PM-06:15 PM]	0	0	1	0	2	3	0	2	0	0	0	0	0	0	0	8
[06:15 PM-06:30 PM]	0	0	1	1	0	4	3	2	1	0	1	0	0	0	0	13
[06:30 PM-06:45 PM]	0	1	0	3	0	1	2	0	1	0	1	0	0	0	0	9
[06:45 PM-07:00 PM]	0	0	0	1	2	2	2	2	0	1	0	0	0	0	0	10
	0	1	2	5	4	10	7	6	2	1	2	0	0	0	0	40
[07:00 PM-07:15 PM]	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	3
[07:15 PM-07:30 PM]	0	0	0	0	3	4	2	0	0	0	0	0	0	0	1	10
[07:30 PM-07:45 PM]	0	0	0	1	3	1	1	1	0	0	0	0	0	0	0	7
[07:45 PM-08:00 PM]	0	0	0	0	0	1	1	0	0	0	2	0	0	0	0	4
	0	0	0	1	7	7	4	2	0	0	2	0	0	0	1	24
[08:00 PM-08:15 PM]	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	3
[08:15 PM-08:30 PM]	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	3
[08:30 PM-08:45 PM]	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	4
[08:45 PM-09:00 PM]	0	0	1	0	2	1	0	0	0	0	0	0	0	0	0	4
	0	0	2	0	7	2	1	1	1	0	0	0	0	0	0	14
[09:00 PM-09:15 PM]	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
[09:15 PM-09:30 PM]	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	4
[09:30 PM-09:45 PM]	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	3
[09:45 PM-10:00 PM]	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
	0	0	2	1	1	1	3	1	0	0	1	0	0	0	0	10
[10:00 PM-10:15 PM]	0	0	0	1	1	1	0	0	0	0	1	0	0	0	0	4
[10:15 PM-10:30 PM]	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	3
[10:30 PM-10:45 PM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[10:45 PM-11:00 PM]	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
	0	0	0	1	2	1	2	1	0	0	1	0	0	0	0	8
Tue, 10/02/2018																
[11:00 PM-11:15 PM]	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
[11:15 PM-11:30 PM]	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
[11:30 PM-11:45 PM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[11:45 PM-12:00 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
10/02/2018 12:00 AM																
10/03/2018 12:00 AM	6	17	54	96	142	124	99	82	22	9	12	2	3	2	10	680

Device ID: 404102		Location: 16		Raw Count: 836												
Operator:		Lane: NB		AADT Count: 836												
Begin: 10/02/2018 12:00 AM		Street:		AADT Factor: 1												
End: 10/03/2018 12:00 AM		City:		Speed Limit: 64												
Hours: 24.00		County:														
Period (min): 15		State: ON														
Date	<	20	25	30	35	40	45	50	55	60	65	70	75	80	85	
And	to	to	to	to	to	to	to	to	to	to	to	to	to	to	to	
Time Range	19	24	29	34	39	44	49	54	59	64	69	74	79	84	>	Total
Tue,10/02/2018																
[12:00 AM-12:15 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[12:15 AM-12:30 AM]	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
[12:30 AM-12:45 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[12:45 AM-01:00 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
[01:00 AM-01:15 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[01:15 AM-01:30 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[01:30 AM-01:45 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[01:45 AM-02:00 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[02:00 AM-02:15 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[02:15 AM-02:30 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[02:30 AM-02:45 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[02:45 AM-03:00 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[03:00 AM-03:15 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[03:15 AM-03:30 AM]	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
[03:30 AM-03:45 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[03:45 AM-04:00 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
[04:00 AM-04:15 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[04:15 AM-04:30 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[04:30 AM-04:45 AM]	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
[04:45 AM-05:00 AM]	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
[05:00 AM-05:15 AM]	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
[05:15 AM-05:30 AM]	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2
[05:30 AM-05:45 AM]	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
[05:45 AM-06:00 AM]	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
	0	0	0	0	0											

	1	0	1	4	3	5	4	7	0	3	1	0	0	0	5	34
[08:00 AM-08:15 AM]	0	0	0	0	1	5	4	3	2	0	0	0	1	1	0	17
[08:15 AM-08:30 AM]	1	0	0	1	2	2	6	5	1	0	0	0	0	0	1	19
[08:30 AM-08:45 AM]	0	0	3	2	5	6	7	3	1	0	0	0	0	0	0	27
[08:45 AM-09:00 AM]	0	0	2	6	7	7	7	2	2	0	0	0	0	0	1	34
	1	0	5	9	15	20	24	13	6	0	0	0	1	1	2	97
[09:00 AM-09:15 AM]	1	0	3	2	6	4	3	2	1	0	0	0	0	0	1	23
[09:15 AM-09:30 AM]	0	0	0	1	5	0	0	1	0	0	0	0	0	0	0	7
[09:30 AM-09:45 AM]	0	1	0	0	4	1	0	1	0	0	0	1	0	0	0	8
[09:45 AM-10:00 AM]	0	0	1	0	0	1	2	5	0	0	0	0	0	0	0	9
	1	1	4	3	15	6	5	9	1	0	0	1	0	0	1	47
[10:00 AM-10:15 AM]	0	0	1	0	0	7	1	2	0	0	0	0	0	0	0	11
[10:15 AM-10:30 AM]	0	0	0	0	1	1	1	0	0	0	0	1	0	0	0	4
[10:30 AM-10:45 AM]	0	0	0	2	2	4	2	1	0	0	0	0	0	0	0	11
[10:45 AM-11:00 AM]	0	0	0	1	0	2	1	2	0	0	0	0	0	0	0	6
	0	0	1	3	3	14	5	5	0	0	0	1	0	0	0	32
[11:00 AM-11:15 AM]	0	0	1	0	3	1	1	3	0	0	0	0	0	0	0	9
[11:15 AM-11:30 AM]	0	0	1	3	3	5	4	3	1	0	0	1	0	0	0	21
[11:30 AM-11:45 AM]	0	0	0	1	0	3	2	0	0	0	0	1	0	0	0	7
[11:45 AM-12:00 PM]	0	0	1	0	6	4	3	2	0	1	0	0	0	0	0	17
	0	0	3	4	12	13	10	8	1	1	0	2	0	0	0	54
[12:00 PM-12:15 PM]	1	1	1	0	0	1	2	1	1	0	0	0	0	0	0	8
[12:15 PM-12:30 PM]	0	0	0	0	3	8	6	2	0	0	0	0	0	0	0	19
[12:30 PM-12:45 PM]	0	0	0	2	1	2	2	2	0	1	0	0	0	0	1	11
[12:45 PM-01:00 PM]	1	0	0	2	3	0	3	4	1	0	0	1	0	0	0	15
	2	1	1	4	7	11	13	9	2	1	0	1	0	0	1	53
[01:00 PM-01:15 PM]	0	0	0	1	1	4	2	1	0	0	0	0	0	0	0	9
[01:15 PM-01:30 PM]	0	0	0	0	3	3	1	3	2	0	0	0	0	0	0	12
[01:30 PM-01:45 PM]	0	1	0	0	4	0	2	0	2	0	0	0	0	0	0	9
[01:45 PM-02:00 PM]	3	1	1	2	2	3	1	0	0	0	0	0	1	0	0	14
	3	2	1	3	10	10	6	4	4	0	0	0	1	0	0	44
[02:00 PM-02:15 PM]	0	2	1	0	2	1	2	1	0	0	0	0	0	0	0	9
[02:15 PM-02:30 PM]	0	0	0	1	0	2	7	2	0	0	0	0	0	0	0	12
[02:30 PM-02:45 PM]	0	0	1	0	1	4	2	2	0	0	2	0	0	0	0	12
[02:45 PM-03:00 PM]	0	0	1	2	5	4	3	1	0	2	0	0	0	0	1	19
	0	2	3	3	8	11	14	6	0	2	2	0	0	0	1	52
[03:00 PM-03:15 PM]	0	0	1	0	2	2	4	4	1	1	0	0	0	0	1	16
[03:15 PM-03:30 PM]	2	1	3	7	10	6	7	1	1	1	0	0	0	0	1	40
Tue, 10/02/2018																
[03:30 PM-03:45 PM]	0	0	1	1	5	7	4	3	1	0	0	0	1	0	0	23
[03:45 PM-04:00 PM]	0	0	1	0	5	4	9	1	0	1	1	0	0	0	0	22
	2	1	6	8	22	19	24	9	3	3	1	0	1	0	2	101
[04:00 PM-04:15 PM]	0	1	0	4	1	4	5	6	1	0	0	0	0	0	0	22
[04:15 PM-04:30 PM]	0	0	0	1	2	0	3	2	1	0	0	0	0	0	0	9
[04:30 PM-04:45 PM]	0	0	0	3	2	6	3	9	1	1	0	0	0	0	0	25
[04:45 PM-05:00 PM]	0	0	1	3	4	3	1	1	3	1	0	0	0	0	1	18
	0	1	1	11	9	13	12	18	6	2	0	0	0	0	1	74
[05:00 PM-05:15 PM]	0	1	1	0	2	6	2	3	0	0	0	1	0	0	0	16
[05:15 PM-05:30 PM]	0	0	4	0	6	4	6	2	1	3	0	0	1	0	1	28
[05:30 PM-05:45 PM]	0	0	0	0	4	4	2	3	1	0	0	1	0	0	0	15

[05:45 PM-06:00 PM]	1	0	0	0	0	3	2	1	0	1	0	0	0	0	0	8
	1	1	5	0	12	17	12	9	2	4	0	2	1	0	1	67
[06:00 PM-06:15 PM]	1	0	0	1	4	2	2	0	0	0	0	1	0	0	1	12
[06:15 PM-06:30 PM]	0	0	0	1	2	1	3	2	0	0	0	0	0	0	0	9
[06:30 PM-06:45 PM]	0	0	0	1	1	1	1	0	0	0	1	0	0	0	1	6
[06:45 PM-07:00 PM]	0	0	0	1	0	1	5	2	1	1	0	0	0	0	0	11
	1	0	0	4	7	5	11	4	1	1	1	1	0	0	2	38
[07:00 PM-07:15 PM]	0	0	0	1	4	1	0	0	1	0	0	0	0	0	0	7
[07:15 PM-07:30 PM]	0	1	3	1	1	1	1	2	0	0	0	0	0	0	0	10
[07:30 PM-07:45 PM]	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
[07:45 PM-08:00 PM]	0	0	0	1	1	2	3	0	0	0	0	0	0	0	1	8
	0	1	3	3	6	4	5	3	1	0	0	0	0	0	1	27
[08:00 PM-08:15 PM]	0	0	0	0	0	3	0	0	1	1	0	0	0	0	0	5
[08:15 PM-08:30 PM]	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	6
[08:30 PM-08:45 PM]	0	0	0	0	1	4	1	0	0	0	0	0	0	0	0	6
[08:45 PM-09:00 PM]	0	0	1	0	0	2	1	1	0	1	1	0	0	0	0	7
	0	0	2	2	3	10	2	1	1	2	1	0	0	0	0	24
[09:00 PM-09:15 PM]	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	3
[09:15 PM-09:30 PM]	0	0	0	0	1	1	3	0	0	0	0	0	0	0	0	5
[09:30 PM-09:45 PM]	0	0	0	0	2	0	0	1	0	1	0	0	0	0	0	4
[09:45 PM-10:00 PM]	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	1	0	0	0	3	2	4	1	1	1	0	0	0	0	0	13
[10:00 PM-10:15 PM]	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	4
[10:15 PM-10:30 PM]	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
[10:30 PM-10:45 PM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[10:45 PM-11:00 PM]	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2
	1	1	1	0	1	1	0	1	0	1	0	0	0	0	0	7
Tue, 10/02/2018																
[11:00 PM-11:15 PM]	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
[11:15 PM-11:30 PM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[11:30 PM-11:45 PM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[11:45 PM-12:00 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
10/02/2018 12:00 AM																
10/03/2018 12:00 AM	14	11	38	61	140	164	156	110	30	24	6	8	4	1	17	784



Turning Movement Count (18 - AT ALMA ST & RAIL CROSSING)

Start Time	S Approach		N Approach		Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Approach Total	Thru N:S	Approach Total		
00:00:00	2	2	2	2	4	
00:15:00	3	3	3	3	6	
00:30:00	1	1	5	5	6	
00:45:00	0	0	0	0	0	16
01:00:00	0	0	0	0	0	12
01:15:00	0	0	1	1	1	7
01:30:00	0	0	2	2	2	3
01:45:00	4	4	0	0	4	7
02:00:00	2	2	1	1	3	10
02:15:00	2	2	0	0	2	11
02:30:00	1	1	2	2	3	12
02:45:00	0	0	1	1	1	9
03:00:00	0	0	0	0	0	6
03:15:00	0	0	0	0	0	4
03:30:00	1	1	1	1	2	3
03:45:00	0	0	2	2	2	4
04:00:00	1	1	1	1	2	6
04:15:00	0	0	0	0	0	6
04:30:00	0	0	1	1	1	5
04:45:00	1	1	0	0	1	4



05:00:00	1	1	2	2	3	5
05:15:00	1	1	2	2	3	8
05:30:00	2	2	0	0	2	9
05:45:00	2	2	1	1	3	11
06:00:00	3	3	4	4	7	15
06:15:00	2	2	2	2	4	16
06:30:00	3	3	0	0	3	17
06:45:00	3	3	4	4	7	21
07:00:00	5	5	6	6	11	25
07:15:00	2	2	5	5	7	28
07:30:00	10	10	5	5	15	40
07:45:00	5	5	5	5	10	43
08:00:00	7	7	5	5	12	44
08:15:00	14	14	5	5	19	56
08:30:00	11	11	11	11	22	63
08:45:00	9	9	6	6	15	68
09:00:00	8	8	8	8	16	72
09:15:00	5	5	5	5	10	63
09:30:00	7	7	10	10	17	58
09:45:00	10	10	7	7	17	60
10:00:00	8	8	9	9	17	61
10:15:00	17	17	17	17	34	85
10:30:00	12	12	8	8	20	88



10:45:00	17	17	12	12	29	100
11:00:00	14	14	9	9	23	106
11:15:00	17	17	12	12	29	101
11:30:00	11	11	15	15	26	107
11:45:00	14	14	12	12	26	104
12:00:00	13	13	19	19	32	113
12:15:00	18	18	20	20	38	122
12:30:00	10	10	18	18	28	124
12:45:00	12	12	14	14	26	124
13:00:00	7	7	17	17	24	116
13:15:00	21	21	13	13	34	112
13:30:00	12	12	26	26	38	122
13:45:00	21	21	20	20	41	137
14:00:00	13	13	24	24	37	150
14:15:00	23	23	23	23	46	162
14:30:00	7	7	14	14	21	145
14:45:00	15	15	25	25	40	144
15:00:00	17	17	20	20	37	144
15:15:00	13	13	25	25	38	136
15:30:00	22	22	28	28	50	165
15:45:00	12	12	22	22	34	159
16:00:00	15	15	20	20	35	157
16:15:00	23	23	16	16	39	158



16:30:00	14	14	18	18	32	140
16:45:00	6	6	18	18	24	130
17:00:00	13	13	24	24	37	132
17:15:00	11	11	19	19	30	123
17:30:00	13	13	15	15	28	119
17:45:00	13	13	22	22	35	130
18:00:00	13	13	22	22	35	128
18:15:00	12	12	22	22	34	132
18:30:00	13	13	17	17	30	134
18:45:00	12	12	20	20	32	131
19:00:00	5	5	13	13	18	114
19:15:00	6	6	16	16	22	102
19:30:00	8	8	10	10	18	90
19:45:00	8	8	8	8	16	74
20:00:00	2	2	9	9	11	67
20:15:00	1	1	6	6	7	52
20:30:00	4	4	8	8	12	46
20:45:00	3	3	3	3	6	36
21:00:00	4	4	4	4	8	33
21:15:00	8	8	5	5	13	39
21:30:00	9	9	6	6	15	42
21:45:00	2	2	6	6	8	44
22:00:00	4	4	6	6	10	46



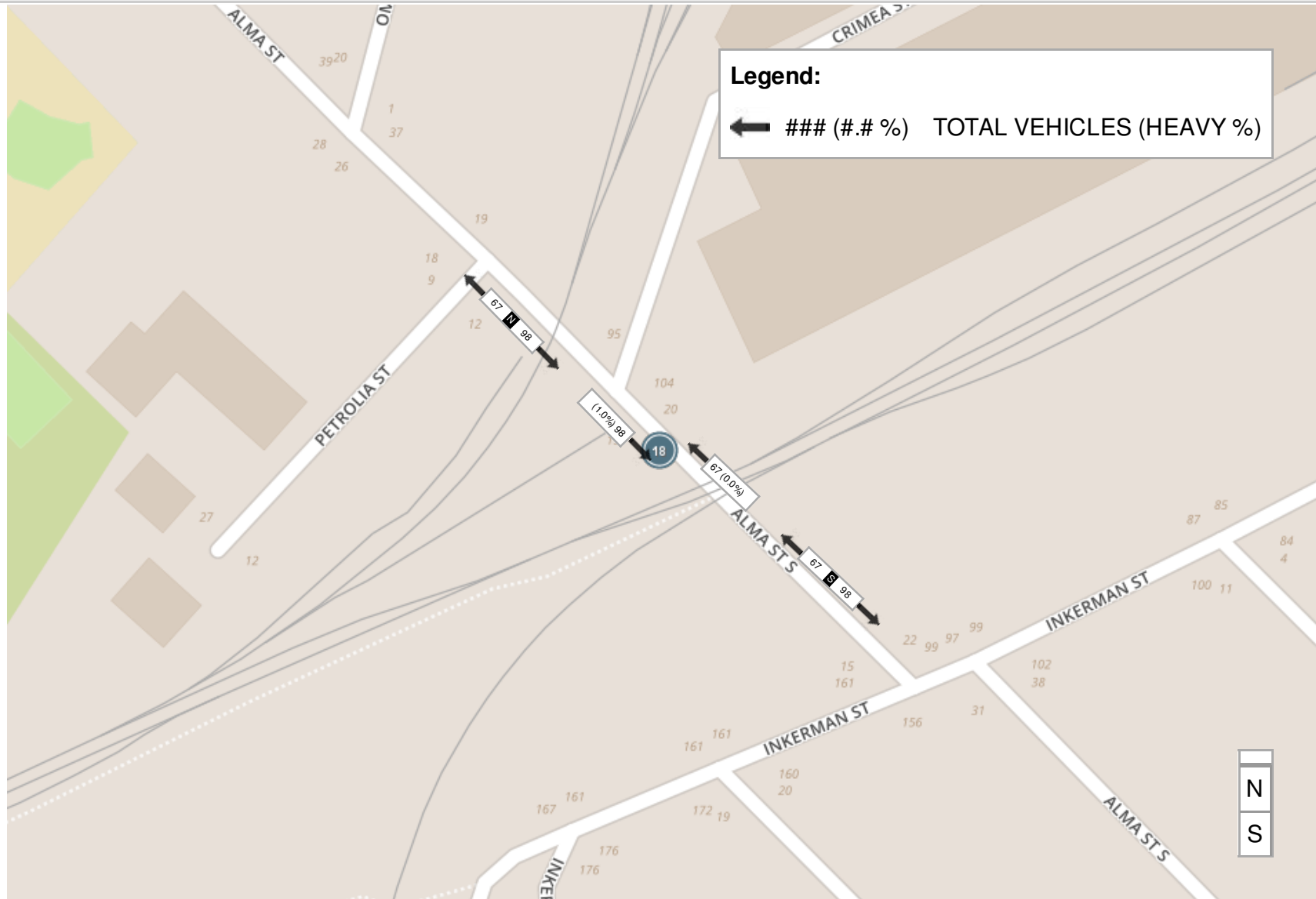
22:15:00 22:30:00	7 3	7 3	7 2	7 2	14 5	47 37
22:45:00	2	2	2	2	4	33
23:00:00	3	3	2	2	5	28
23:15:00	2	2	3	3	5	19
23:30:00	6	6	3	3	9	23
23:45:00	2	2	4	4	6	25
Grand Total	721	721	893	893	1614	-
Approach%	100%	-	100%	-	-	-
Totals %	44.7%	44.7%	55.3%	55.3%	-	-
Heavy	15	-	22	-	-	-
Heavy %	2.1%	-	2.5%	-	-	-
Bicycles	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-



Peak Hour: 02:45 PM - 03:45 PM Weather:

Start Time	S Approach		N Approach		Int. Total (15 min)
	Thru	Approach Total	Thru	Approach Total	
14:45:00	15	15	25	25	40
15:00:00	17	17	20	20	37
15:15:00	13	13	25	25	38
15:30:00	22	22	28	28	50
Grand Total	67	67	98	98	165
Approach%	100%	-	100%	-	-
Totals %	40.6%	40.6%	59.4%	59.4%	-
PHF	0.76	0.76	0.88	0.88	-
Heavy	0	0	1	1	-
Heavy %	0%	0%	1%	1%	-
Lights	64	64	85	85	-
Lights %	95.5%	95.5%	86.7%	86.7%	-
Single-Unit Trucks	0	0	1	1	-
Single-Unit Trucks %	0%	0%	1%	1%	-
Articulated Trucks	0	0	0	0	-
Articulated Trucks %	0%	0%	0%	0%	-
Bicycles on Road	3	3	12	12	-
Bicycles on Road %	4.5%	4.5%	12.2%	12.2%	-

Peak Hour: 02:45 PM - 03:45 PM Weather:





Turning Movement Count (18) AT ALMA ST & RAIL CROSSING

Start Time	S Approach		N Approach		Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Approach Total	Thru N:S	Approach Total		
00:00:00	3	3	2	2	5	
00:15:00	3	3	2	2	5	
00:30:00	2	2	4	4	6	
00:45:00	1	1	1	1	2	18
01:00:00	1	1	1	1	2	15
01:15:00	2	2	0	0	2	12
01:30:00	2	2	0	0	2	8
01:45:00	1	1	2	2	3	9
02:00:00	2	2	0	0	2	9
02:15:00	2	2	1	1	3	10
02:30:00	0	0	3	3	3	11
02:45:00	0	0	0	0	0	8
03:00:00	0	0	1	1	1	7
03:15:00	1	1	2	2	3	7
03:30:00	0	0	0	0	0	4
03:45:00	1	1	0	0	1	5
04:00:00	1	1	1	1	2	6
04:15:00	0	0	1	1	1	4
04:30:00	1	1	1	1	2	6
04:45:00	0	0	0	0	0	5



05:00:00	1	1	0	0	1	4
05:15:00	1	1	0	0	1	4
05:30:00	1	1	0	0	1	3
05:45:00	1	1	0	0	1	4
06:00:00	1	1	2	2	3	6
06:15:00	4	4	0	0	4	9
06:30:00	1	1	3	3	4	12
06:45:00	2	2	0	0	2	13
07:00:00	2	2	0	0	2	12
07:15:00	1	1	1	1	2	10
07:30:00	5	5	1	1	6	12
07:45:00	1	1	2	2	3	13
08:00:00	5	5	3	3	8	19
08:15:00	6	6	5	5	11	28
08:30:00	3	3	6	6	9	31
08:45:00	7	7	5	5	12	40
09:00:00	6	6	6	6	12	44
09:15:00	9	9	17	17	26	59
09:30:00	11	11	15	15	26	76
09:45:00	14	14	9	9	23	87
10:00:00	14	14	8	8	22	97
10:15:00	16	16	10	10	26	97
10:30:00	6	6	14	14	20	91



10:45:00	8	8	6	6	14	82
11:00:00	10	10	13	13	23	83
11:15:00	9	9	11	11	20	77
11:30:00	8	8	13	13	21	78
11:45:00	13	13	14	14	27	91
12:00:00	15	15	22	22	37	105
12:15:00	10	10	21	21	31	116
12:30:00	16	16	14	14	30	125
12:45:00	16	16	14	14	30	128
13:00:00	14	14	20	20	34	125
13:15:00	13	13	22	22	35	129
13:30:00	14	14	17	17	31	130
13:45:00	21	21	28	28	49	149
14:00:00	11	11	19	19	30	145
14:15:00	16	16	16	16	32	142
14:30:00	19	19	24	24	43	154
14:45:00	16	16	10	10	26	131
15:00:00	12	12	23	23	35	136
15:15:00	11	11	25	25	36	140
15:30:00	9	9	20	20	29	126
15:45:00	18	18	21	21	39	139
16:00:00	12	12	28	28	40	144
16:15:00	13	13	20	20	33	141



16:30:00	19	19	14	14	33	145
16:45:00	10	10	19	19	29	135
17:00:00	13	13	19	19	32	127
17:15:00	10	10	12	12	22	116
17:30:00	7	7	14	14	21	104
17:45:00	11	11	14	14	25	100
18:00:00	12	12	10	10	22	90
18:15:00	3	3	16	16	19	87
18:30:00	10	10	15	15	25	91
18:45:00	10	10	10	10	20	86
19:00:00	10	10	11	11	21	85
19:15:00	5	5	13	13	18	84
19:30:00	6	6	9	9	15	74
19:45:00	12	12	7	7	19	73
20:00:00	3	3	2	2	5	57
20:15:00	9	9	8	8	17	56
20:30:00	6	6	8	8	14	55
20:45:00	2	2	9	9	11	47
21:00:00	5	5	6	6	11	53
21:15:00	3	3	6	6	9	45
21:30:00	7	7	3	3	10	41
21:45:00	3	3	5	5	8	38
22:00:00	1	1	3	3	4	31



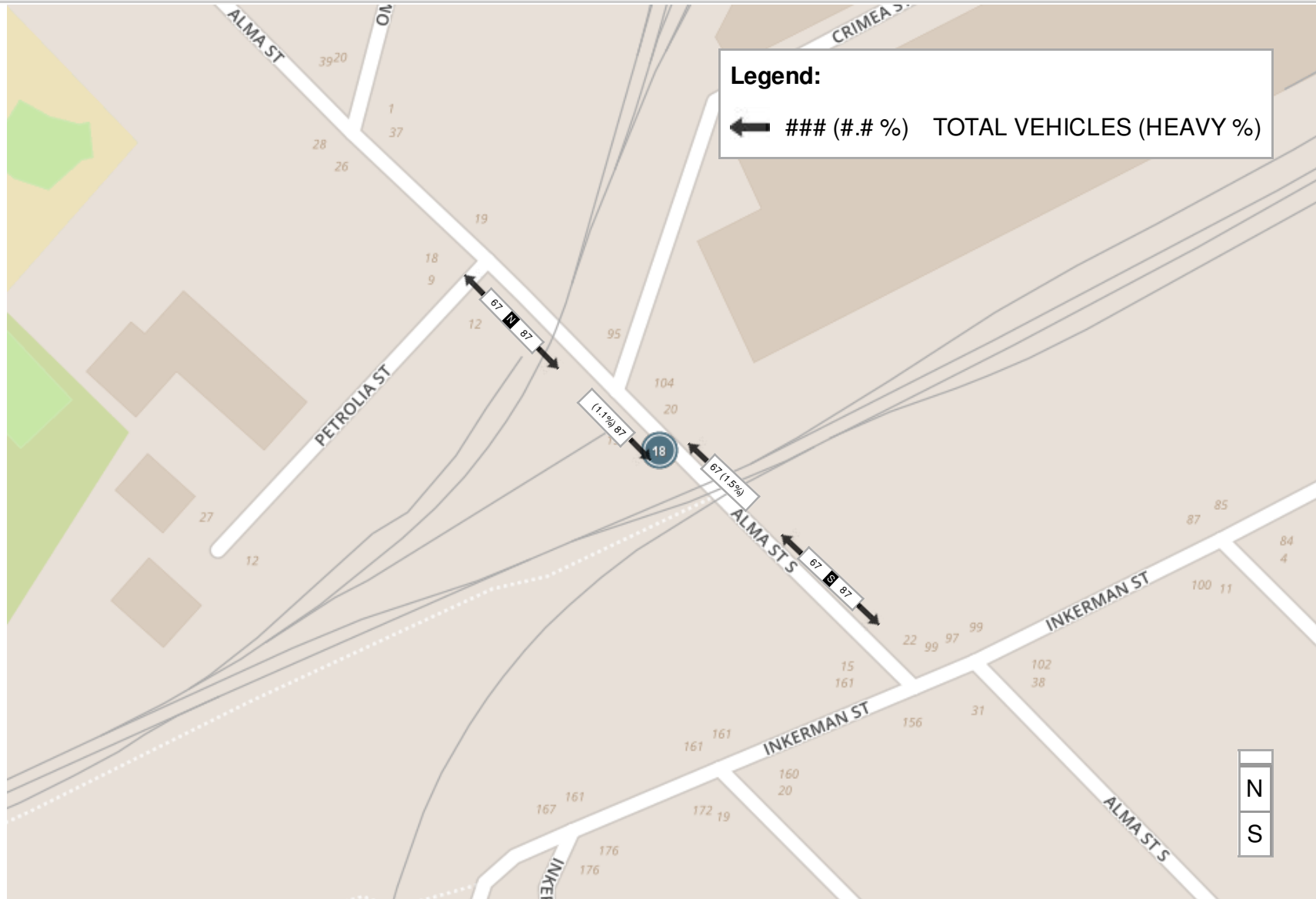
~~22:15:00~~ 22:30:00	1 2	1 2	1 4	1 4	2 6	24 20
22:45:00	2	2	6	6	8	20
23:00:00	1	1	2	2	3	19
23:15:00	0	0	2	2	2	19
23:30:00	1	1	2	2	3	16
23:45:00	0	0	1	1	1	9
Grand Total	629	629	801	801	1430	-
Approach%	100%	-	100%	-	-	-
Totals %	44%	44%	56%	56%	-	-
Heavy	17	-	14	-	-	-
Heavy %	2.7%	-	1.7%	-	-	-
Bicycles	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-



Peak Hour: 01:45 PM - 02:45 PM Weather:

Start Time	S Approach		N Approach		Int. Total (15 min)
	Thru	Approach Total	Thru	Approach Total	
13:45:00	21	21	28	28	49
14:00:00	11	11	19	19	30
14:15:00	16	16	16	16	32
14:30:00	19	19	24	24	43
Grand Total	67	67	87	87	154
Approach%	100%	-	100%	-	-
Totals %	43.5%	43.5%	56.5%	56.5%	-
PHF	0.8	0.8	0.78	0.78	-
Heavy	1	1	1	1	-
Heavy %	1.5%	1.5%	1.1%	1.1%	-
Lights	62	62	82	82	-
Lights %	92.5%	92.5%	94.3%	94.3%	-
Single-Unit Trucks	0	0	0	0	-
Single-Unit Trucks %	0%	0%	0%	0%	-
Heavy	1	1	1	1	-
Heavy %	1.5%	1.5%	1.1%	1.1%	-
Bicycles on Road	4	4	4	4	-
Bicycles on Road %	6%	6%	4.6%	4.6%	-

Peak Hour: 01:45 PM - 02:45 PM Weather:





Turning Movement Count (18 - AT ALMA ST & RAIL CROSSING)

Start Time	S Approach		N Approach		Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Approach Total	Thru N:S	Approach Total		
00:00:00	3	3	2	2	5	
00:15:00	1	1	5	5	6	
00:30:00	0	0	0	0	0	
00:45:00	1	1	0	0	1	12
01:00:00	1	1	2	2	3	10
01:15:00	2	2	0	0	2	6
01:30:00	0	0	0	0	0	6
01:45:00	2	2	0	0	2	7
02:00:00	2	2	0	0	2	6
02:15:00	0	0	0	0	0	4
02:30:00	0	0	0	0	0	4
02:45:00	1	1	0	0	1	3
03:00:00	0	0	0	0	0	1
03:15:00	1	1	2	2	3	4
03:30:00	1	1	2	2	3	7
03:45:00	6	6	1	1	7	13
04:00:00	5	5	6	6	11	24
04:15:00	2	2	1	1	3	24
04:30:00	4	4	4	4	8	29
04:45:00	4	4	6	6	10	32



05:00:00	8	8	3	3	11	32
05:15:00	0	0	1	1	1	30
05:30:00	4	4	3	3	7	29
05:45:00	1	1	2	2	3	22
06:00:00	3	3	7	7	10	21
06:15:00	4	4	9	9	13	33
06:30:00	5	5	4	4	9	35
06:45:00	7	7	5	5	12	44
07:00:00	8	8	13	13	21	55
07:15:00	7	7	7	7	14	56
07:30:00	22	22	12	12	34	81
07:45:00	16	16	16	16	32	101
08:00:00	16	16	19	19	35	115
08:15:00	24	24	17	17	41	142
08:30:00	22	22	22	22	44	152
08:45:00	14	14	21	21	35	155
09:00:00	12	12	22	22	34	154
09:15:00	15	15	18	18	33	146
09:30:00	17	17	9	9	26	128
09:45:00	16	16	11	11	27	120
10:00:00	14	14	21	21	35	121
10:15:00	14	14	5	5	19	107
10:30:00	11	11	15	15	26	107



10:45:00	9	9	20	20	29	109
11:00:00	10	10	13	13	23	97
11:15:00	11	11	16	16	27	105
11:30:00	11	11	15	15	26	105
11:45:00	20	20	16	16	36	112
12:00:00	11	11	18	18	29	118
12:15:00	13	13	16	16	29	120
12:30:00	10	10	14	14	24	118
12:45:00	13	13	11	11	24	106
13:00:00	14	14	12	12	26	103
13:15:00	7	7	14	14	21	95
13:30:00	10	10	14	14	24	95
13:45:00	11	11	19	19	30	101
14:00:00	13	13	19	19	32	107
14:15:00	14	14	14	14	28	114
14:30:00	12	12	19	19	31	121
14:45:00	21	21	12	12	33	124
15:00:00	22	22	17	17	39	131
15:15:00	14	14	32	32	46	149
15:30:00	15	15	29	29	44	162
15:45:00	11	11	18	18	29	158
16:00:00	12	12	21	21	33	152
16:15:00	17	17	35	35	52	158



16:30:00	17	17	22	22	39	153
16:45:00	28	28	21	21	49	173
17:00:00	18	18	23	23	41	181
17:15:00	18	18	24	24	42	171
17:30:00	15	15	20	20	35	167
17:45:00	15	15	14	14	29	147
18:00:00	9	9	16	16	25	131
18:15:00	10	10	16	16	26	115
18:30:00	11	11	15	15	26	106
18:45:00	9	9	12	12	21	98
19:00:00	10	10	15	15	25	98
19:15:00	9	9	4	4	13	85
19:30:00	9	9	11	11	20	79
19:45:00	6	6	5	5	11	69
20:00:00	4	4	18	18	22	66
20:15:00	13	13	7	7	20	73
20:30:00	6	6	8	8	14	67
20:45:00	9	9	11	11	20	76
21:00:00	3	3	7	7	10	64
21:15:00	3	3	2	2	5	49
21:30:00	5	5	3	3	8	43
21:45:00	7	7	8	8	15	38
22:00:00	3	3	2	2	5	33



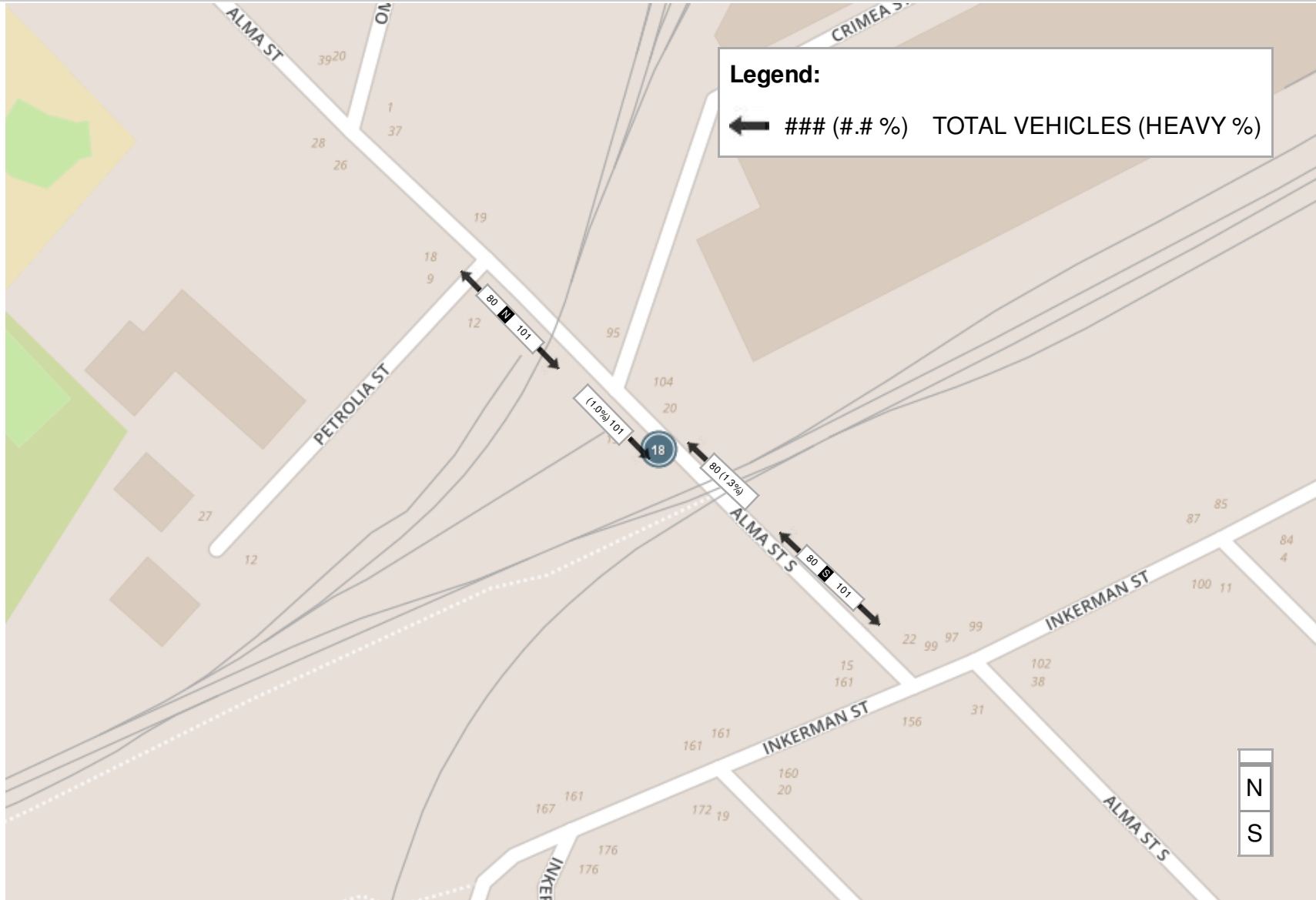
22:15:00 22:30:00	3 4	3 4	4 6	4 6	7 10	35 37
22:45:00	2	2	2	2	4	26
23:00:00	1	1	4	4	5	26
23:15:00	2	2	4	4	6	25
23:30:00	1	1	1	1	2	17
23:45:00	3	3	3	3	6	19
Grand Total	850	850	1015	1015	1865	-
Approach%	100%	-	100%	-	-	-
Totals %	45.6%	45.6%	54.4%	54.4%	-	-
Heavy	35	-	47	-	-	-
Heavy %	4.1%	-	4.6%	-	-	-
Bicycles	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-



Peak Hour: 04:15 PM - 05:15 PM Weather:

Start Time	S Approach		N Approach		Int. Total (15 min)
	Thru	Approach Total	Thru	Approach Total	
16:15:00	17	17	35	35	52
16:30:00	17	17	22	22	39
16:45:00	28	28	21	21	49
17:00:00	18	18	23	23	41
Grand Total	80	80	101	101	181
Approach%	100%	-	100%	-	-
Totals %	44.2%	44.2%	55.8%	55.8%	-
PHF	0.71	0.71	0.72	0.72	-
Heavy	1	1	1	1	-
Heavy %	1.3%	1.3%	1%	1%	-
Lights	76	76	100	100	-
Lights %	95%	95%	99%	99%	-
Single-Unit Trucks	1	1	1	1	-
Single-Unit Trucks %	1.3%	1.3%	1%	1%	-
Buses	0	0	0	0	-
Buses %	0%	0%	0%	0%	-
Articulated Trucks	0	0	0	0	-
Articulated Trucks %	0%	0%	0%	0%	-
Bicycles on Road	3	3	0	0	-
Bicycles on Road %	3.8%	3.8%	0%	0%	-

Peak Hour: 04:15 PM - 05:15 PM Weather:





Turning Movement Count (18 - AT ALMA ST & RAIL CROSSING)

Start Time	S Approach		N Approach		Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Approach Total	Thru N:S	Approach Total		
00:00:00	1	1	3	3	4	
00:15:00	0	0	0	0	0	
00:30:00	0	0	0	0	0	
00:45:00	0	0	0	0	0	4
01:00:00	2	2	0	0	2	2
01:15:00	3	3	0	0	3	5
01:30:00	0	0	0	0	0	5
01:45:00	1	1	1	1	2	7
02:00:00	2	2	1	1	3	8
02:15:00	1	1	1	1	2	7
02:30:00	0	0	0	0	0	7
02:45:00	0	0	1	1	1	6
03:00:00	0	0	0	0	0	3
03:15:00	1	1	1	1	2	3
03:30:00	1	1	1	1	2	5
03:45:00	0	0	2	2	2	6
04:00:00	2	2	0	0	2	8
04:15:00	2	2	1	1	3	9
04:30:00	1	1	1	1	2	9
04:45:00	2	2	0	0	2	9



05:00:00	1	1	1	1	2	9
05:15:00	3	3	2	2	5	11
05:30:00	3	3	3	3	6	15
05:45:00	2	2	3	3	5	18
06:00:00	1	1	5	5	6	22
06:15:00	6	6	8	8	14	31
06:30:00	6	6	2	2	8	33
06:45:00	9	9	2	2	11	39
07:00:00	7	7	11	11	18	51
07:15:00	14	14	13	13	27	64
07:30:00	15	15	10	10	25	81
07:45:00	18	18	15	15	33	103
08:00:00	17	17	15	15	32	117
08:15:00	24	24	12	12	36	126
08:30:00	26	26	23	23	49	150
08:45:00	18	18	23	23	41	158
09:00:00	17	17	14	14	31	157
09:15:00	10	10	14	14	24	145
09:30:00	11	11	12	12	23	119
09:45:00	18	18	4	4	22	100
10:00:00	8	8	18	18	26	95
10:15:00	11	11	13	13	24	95
10:30:00	14	14	12	12	26	98



10:45:00	7	7	17	17	24	100
11:00:00	13	13	5	5	18	92
11:15:00	5	5	12	12	17	85
11:30:00	10	10	17	17	27	86
11:45:00	11	11	14	14	25	87
12:00:00	5	5	14	14	19	88
12:15:00	8	8	17	17	25	96
12:30:00	14	14	17	17	31	100
12:45:00	20	20	9	9	29	104
13:00:00	23	23	12	12	35	120
13:15:00	9	9	11	11	20	115
13:30:00	14	14	16	16	30	114
13:45:00	13	13	27	27	40	125
14:00:00	9	9	8	8	17	107
14:15:00	7	7	26	26	33	120
14:30:00	16	16	14	14	30	120
14:45:00	19	19	13	13	32	112
15:00:00	29	29	14	14	43	138
15:15:00	12	12	43	43	55	160
15:30:00	22	22	27	27	49	179
15:45:00	12	12	25	25	37	184
16:00:00	23	23	20	20	43	184
16:15:00	20	20	27	27	47	176



16:30:00	21	21	24	24	45	172
16:45:00	23	23	22	22	45	180
17:00:00	19	19	30	30	49	186
17:15:00	22	22	26	26	48	187
17:30:00	19	19	23	23	42	184
17:45:00	15	15	22	22	37	176
18:00:00	13	13	18	18	31	158
18:15:00	19	19	9	9	28	138
18:30:00	19	19	25	25	44	140
18:45:00	15	15	15	15	30	133
19:00:00	11	11	14	14	25	127
19:15:00	13	13	15	15	28	127
19:30:00	6	6	16	16	22	105
19:45:00	5	5	14	14	19	94
20:00:00	6	6	11	11	17	86
20:15:00	5	5	11	11	16	74
20:30:00	9	9	9	9	18	70
20:45:00	8	8	9	9	17	68
21:00:00	0	0	6	6	6	57
21:15:00	6	6	6	6	12	53
21:30:00	6	6	11	11	17	52
21:45:00	6	6	10	10	16	51
22:00:00	6	6	3	3	9	54



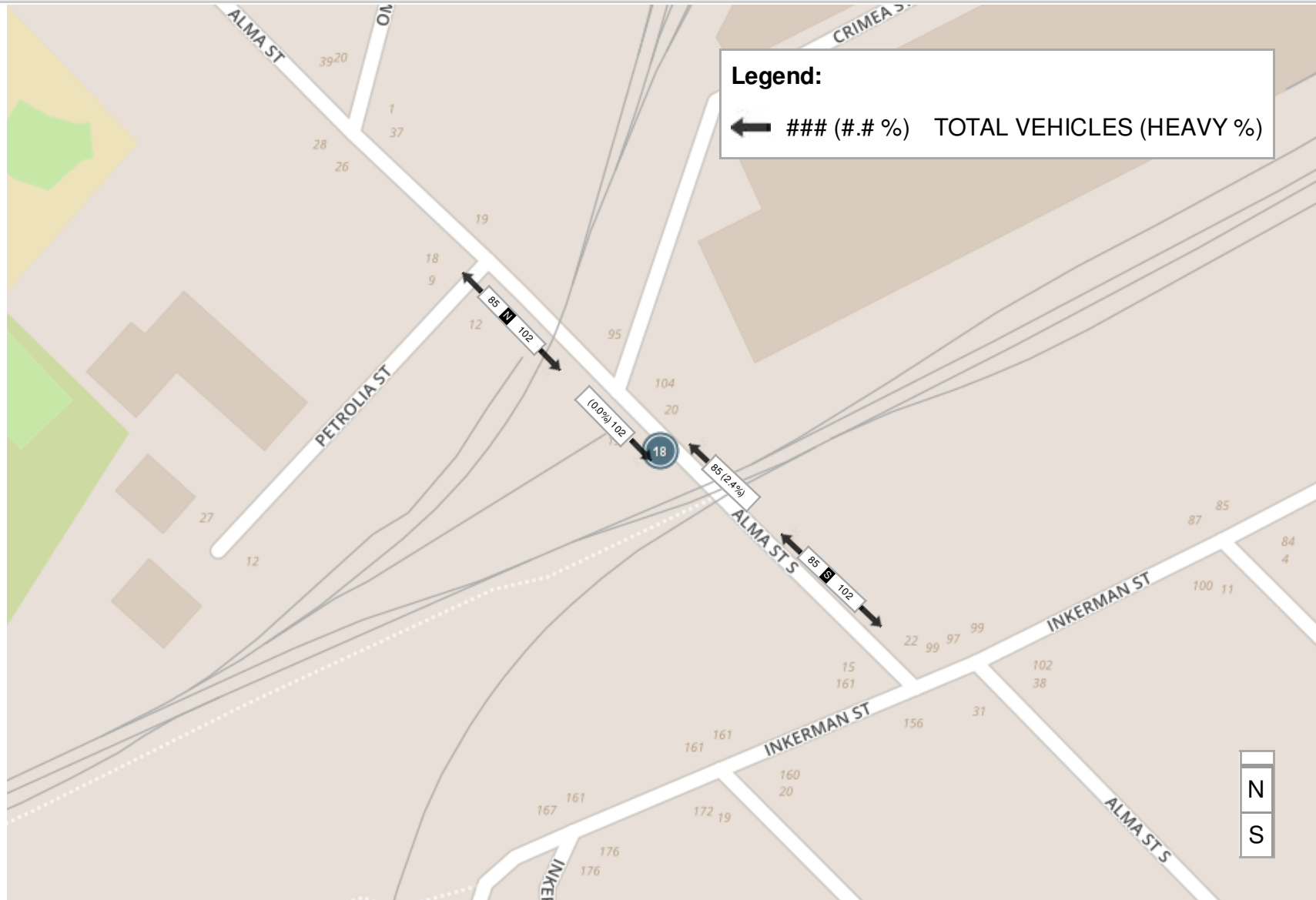
22:15:00 22:30:00	5 2	5 2	2 1	2 1	7 3	49 35
22:45:00	2	2	2	2	4	23
23:00:00	1	1	7	7	8	22
23:15:00	1	1	3	3	4	19
23:30:00	2	2	3	3	5	21
23:45:00	1	1	1	1	2	19
Grand Total	885	885	1021	1021	1906	-
Approach%	100%	-	100%	-	-	-
Totals %	46.4%	46.4%	53.6%	53.6%	-	-
Heavy	39	-	40	-	-	-
Heavy %	4.4%	-	3.9%	-	-	-
Bicycles	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-



Peak Hour: 04:30 PM - 05:30 PM Weather:

Start Time	S Approach		N Approach		Int. Total (15 min)
	Thru	Approach Total	Thru	Approach Total	
16:30:00	21	21	24	24	45
16:45:00	23	23	22	22	45
17:00:00	19	19	30	30	49
17:15:00	22	22	26	26	48
Grand Total	85	85	102	102	187
Approach%	100%	-	100%	-	-
Totals %	45.5%	45.5%	54.5%	54.5%	-
PHF	0.92	0.92	0.85	0.85	-
Heavy	2	2	0	0	-
Heavy %	2.4%	2.4%	0%	0%	-
Lights	77	77	99	99	-
Lights %	90.6%	90.6%	97.1%	97.1%	-
Single-Unit Trucks	2	2	0	0	-
Single-Unit Trucks %	2.4%	2.4%	0%	0%	-
Buses	0	0	0	0	-
Buses %	0%	0%	0%	0%	-
Articulated Trucks	0	0	0	0	-
Articulated Trucks %	0%	0%	0%	0%	-
Bicycles on Road	6	6	3	3	-
Bicycles on Road %	7.1%	7.1%	2.9%	2.9%	-

Peak Hour: 04:30 PM - 05:30 PM Weather:





Turning Movement Count (18 - AT ALMA ST & RAIL CROSSING)

Start Time	S Approach		N Approach		Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Approach Total	Thru N:S	Approach Total		
00:00:00	2	2	1	1	3	
00:15:00	2	2	2	2	4	
00:30:00	1	1	1	1	2	
00:45:00	1	1	1	1	2	11
01:00:00	0	0	2	2	2	10
01:15:00	1	1	1	1	2	8
01:30:00	2	2	1	1	3	9
01:45:00	1	1	0	0	1	8
02:00:00	0	0	1	1	1	7
02:15:00	1	1	0	0	1	6
02:30:00	0	0	1	1	1	4
02:45:00	2	2	1	1	3	6
03:00:00	0	0	0	0	0	5
03:15:00	1	1	3	3	4	8
03:30:00	1	1	4	4	5	12
03:45:00	1	1	2	2	3	12
04:00:00	0	0	1	1	1	13
04:15:00	4	4	3	3	7	16
04:30:00	3	3	4	4	7	18
04:45:00	2	2	0	0	2	17



05:00:00	0	0	1	1	1	17
05:15:00	1	1	2	2	3	13
05:30:00	4	4	2	2	6	12
05:45:00	2	2	2	2	4	14
06:00:00	1	1	4	4	5	18
06:15:00	6	6	7	7	13	28
06:30:00	5	5	4	4	9	31
06:45:00	7	7	2	2	9	36
07:00:00	10	10	16	16	26	57
07:15:00	16	16	10	10	26	70
07:30:00	11	11	19	19	30	91
07:45:00	17	17	14	14	31	113
08:00:00	18	18	20	20	38	125
08:15:00	26	26	19	19	45	144
08:30:00	26	26	23	23	49	163
08:45:00	30	30	28	28	58	190
09:00:00	15	15	15	15	30	182
09:15:00	9	9	10	10	19	156
09:30:00	8	8	13	13	21	128
09:45:00	15	15	13	13	28	98
10:00:00	16	16	5	5	21	89
10:15:00	6	6	10	10	16	86
10:30:00	13	13	9	9	22	87



10:45:00	20	20	12	12	32	91
11:00:00	15	15	15	15	30	100
11:15:00	12	12	15	15	27	111
11:30:00	10	10	22	22	32	121
11:45:00	23	23	37	37	60	149
12:00:00	13	13	48	48	61	180
12:15:00	13	13	26	26	39	192
12:30:00	4	4	2	2	6	166
12:45:00	17	17	15	15	32	138
13:00:00	15	15	10	10	25	102
13:15:00	19	19	16	16	35	98
13:30:00	9	9	12	12	21	113
13:45:00	17	17	10	10	27	108
14:00:00	14	14	19	19	33	116
14:15:00	13	13	13	13	26	107
14:30:00	14	14	18	18	32	118
14:45:00	25	25	13	13	38	129
15:00:00	25	25	20	20	45	141
15:15:00	15	15	26	26	41	156
15:30:00	16	16	39	39	55	179
15:45:00	19	19	36	36	55	196
16:00:00	22	22	19	19	41	192
16:15:00	18	18	42	42	60	211



16:30:00	32	32	34	34	66	222
16:45:00	26	26	23	23	49	216
17:00:00	26	26	25	25	51	226
17:15:00	24	24	36	36	60	226
17:30:00	32	32	17	17	49	209
17:45:00	30	30	30	30	60	220
18:00:00	17	17	20	20	37	206
18:15:00	16	16	24	24	40	186
18:30:00	10	10	16	16	26	163
18:45:00	6	6	15	15	21	124
19:00:00	14	14	21	21	35	122
19:15:00	8	8	16	16	24	106
19:30:00	10	10	14	14	24	104
19:45:00	9	9	13	13	22	105
20:00:00	5	5	14	14	19	89
20:15:00	8	8	13	13	21	86
20:30:00	7	7	6	6	13	75
20:45:00	8	8	6	6	14	67
21:00:00	7	7	10	10	17	65
21:15:00	7	7	8	8	15	59
21:30:00	6	6	6	6	12	58
21:45:00	2	2	3	3	5	49
22:00:00	6	6	3	3	9	41



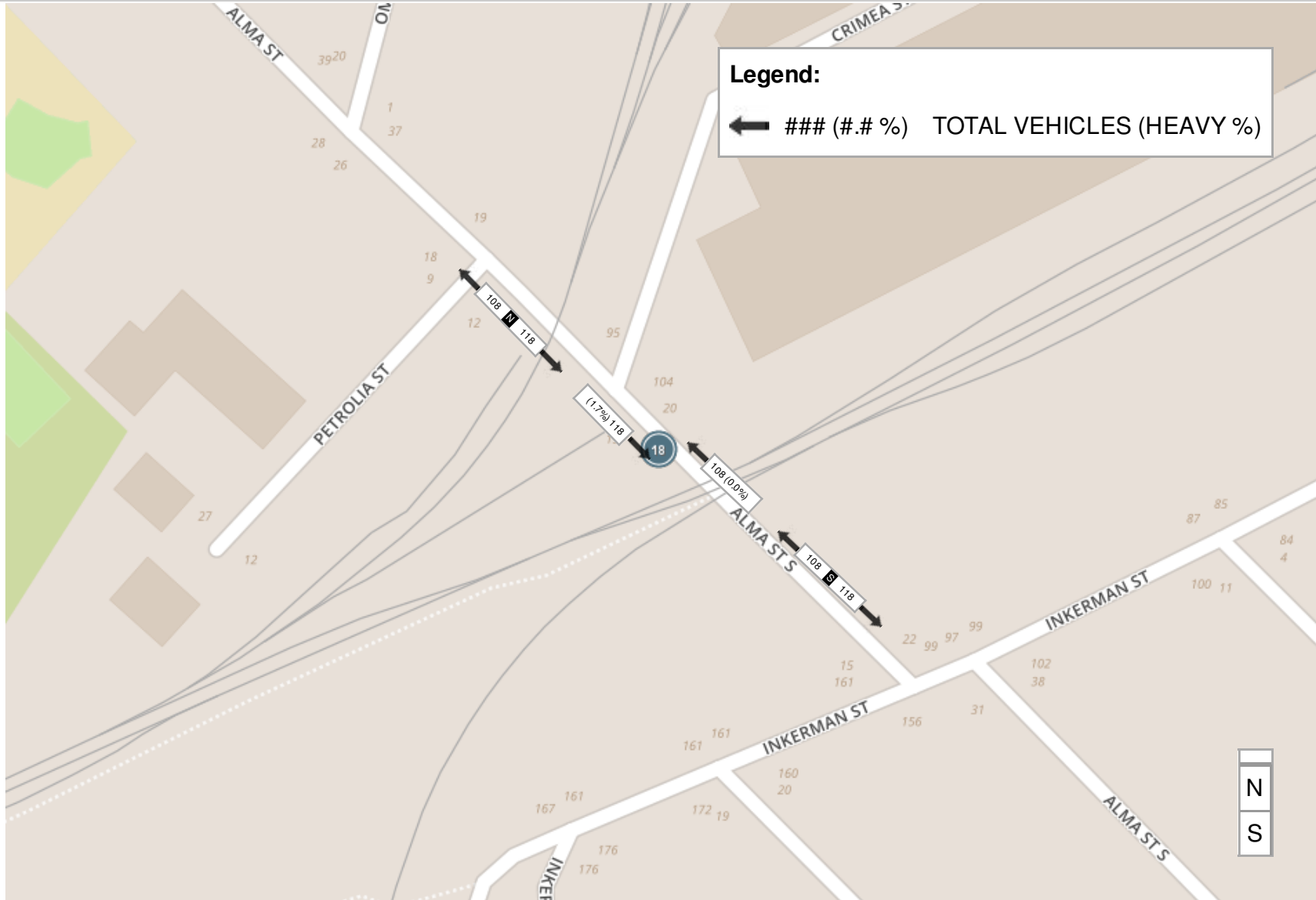
~~22:15:00~~ 22:30:00	~~3~~ 3	~~3~~ 3	~~3~~ 3	~~3~~ 3	~~6~~ 6	~~32~~ 26
22:45:00	3	3	4	4	7	28
23:00:00	2	2	4	4	6	25
23:15:00	4	4	7	7	11	30
23:30:00	3	3	5	5	8	32
23:45:00	1	1	2	2	3	28
Grand Total	990	990	1163	1163	2153	-
Approach%	100%	-	100%	-	-	-
Totals %	46%	46%	54%	54%	-	-
Heavy	18	-	28	-	-	-
Heavy %	1.8%	-	2.4%	-	-	-
Bicycles	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-



Peak Hour: 04:30 PM - 05:30 PM Weather:

Start Time	S Approach		N Approach		Int. Total (15 min)
	Thru	Approach Total	Thru	Approach Total	
16:30:00	32	32	34	34	66
16:45:00	26	26	23	23	49
17:00:00	26	26	25	25	51
17:15:00	24	24	36	36	60
Grand Total	108	108	118	118	226
Approach%	100%	-	100%	-	-
Totals %	47.8%	47.8%	52.2%	52.2%	-
PHF	0.84	0.84	0.82	0.82	-
Heavy	0	0	2	2	-
Heavy %	0%	0%	1.7%	1.7%	-
Lights	104	104	108	108	-
Lights %	96.3%	96.3%	91.5%	91.5%	-
Single-Unit Trucks	0	0	2	2	-
Single-Unit Trucks %	0%	0%	1.7%	1.7%	-
Buses	0	0	0	0	-
Buses %	0%	0%	0%	0%	-
Articulated Trucks	0	0	0	0	-
Articulated Trucks %	0%	0%	0%	0%	-
Bicycles on Road	4	4	8	8	-
Bicycles on Road %	3.7%	3.7%	6.8%	6.8%	-

Peak Hour: 04:30 PM - 05:30 PM Weather:





Turning Movement Count (18 - AT ALMA ST & RAIL CROSSING)

Start Time	S Approach		N Approach		Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Approach Total	Thru N:S	Approach Total		
00:00:00	5	5	2	2	7	
00:15:00	1	1	2	2	3	
00:30:00	1	1	1	1	2	
00:45:00	3	3	0	0	3	15
01:00:00	0	0	1	1	1	9
01:15:00	0	0	1	1	1	7
01:30:00	0	0	0	0	0	5
01:45:00	1	1	1	1	2	4
02:00:00	0	0	3	3	3	6
02:15:00	2	2	2	2	4	9
02:30:00	2	2	1	1	3	12
02:45:00	0	0	0	0	0	10
03:00:00	0	0	0	0	0	7
03:15:00	1	1	1	1	2	5
03:30:00	1	1	0	0	1	3
03:45:00	1	1	3	3	4	7
04:00:00	1	1	0	0	1	8
04:15:00	2	2	4	4	6	12
04:30:00	5	5	1	1	6	17
04:45:00	2	2	0	0	2	15



05:00:00	1	1	5	5	6	20
05:15:00	2	2	2	2	4	18
05:30:00	4	4	8	8	12	24
05:45:00	3	3	0	0	3	25
06:00:00	2	2	2	2	4	23
06:15:00	6	6	5	5	11	30
06:30:00	7	7	6	6	13	31
06:45:00	11	11	4	4	15	43
07:00:00	11	11	9	9	20	59
07:15:00	11	11	13	13	24	72
07:30:00	16	16	12	12	28	87
07:45:00	23	23	15	15	38	110
08:00:00	19	19	23	23	42	132
08:15:00	24	24	19	19	43	151
08:30:00	41	41	16	16	57	180
08:45:00	17	17	42	42	59	201
09:00:00	17	17	19	19	36	195
09:15:00	19	19	9	9	28	180
09:30:00	20	20	15	15	35	158
09:45:00	11	11	14	14	25	124
10:00:00	24	24	11	11	35	123
10:15:00	11	11	16	16	27	122
10:30:00	33	33	18	18	51	138



10:45:00	19	19	25	25	44	157
11:00:00	18	18	12	12	30	152
11:15:00	28	28	19	19	47	172
11:30:00	23	23	21	21	44	165
11:45:00	24	24	27	27	51	172
12:00:00	19	19	12	12	31	173
12:15:00	16	16	18	18	34	160
12:30:00	21	21	20	20	41	157
12:45:00	25	25	14	14	39	145
13:00:00	21	21	9	9	30	144
13:15:00	23	23	17	17	40	150
13:30:00	22	22	24	24	46	155
13:45:00	14	14	22	22	36	152
14:00:00	15	15	16	16	31	153
14:15:00	21	21	29	29	50	163
14:30:00	27	27	23	23	50	167
14:45:00	22	22	22	22	44	175
15:00:00	24	24	15	15	39	183
15:15:00	24	24	36	36	60	193
15:30:00	24	24	31	31	55	198
15:45:00	13	13	26	26	39	193
16:00:00	28	28	29	29	57	211
16:15:00	24	24	41	41	65	216



16:30:00	23	23	28	28	51	212
16:45:00	24	24	29	29	53	226
17:00:00	24	24	32	32	56	225
17:15:00	24	24	40	40	64	224
17:30:00	13	13	22	22	35	208
17:45:00	13	13	20	20	33	188
18:00:00	20	20	22	22	42	174
18:15:00	14	14	24	24	38	148
18:30:00	20	20	22	22	42	155
18:45:00	23	23	14	14	37	159
19:00:00	13	13	15	15	28	145
19:15:00	21	21	17	17	38	145
19:30:00	7	7	19	19	26	129
19:45:00	12	12	13	13	25	117
20:00:00	7	7	11	11	18	107
20:15:00	6	6	8	8	14	83
20:30:00	6	6	12	12	18	75
20:45:00	8	8	9	9	17	67
21:00:00	2	2	4	4	6	55
21:15:00	5	5	6	6	11	52
21:30:00	6	6	4	4	10	44
21:45:00	1	1	1	1	2	29
22:00:00	4	4	4	4	8	31



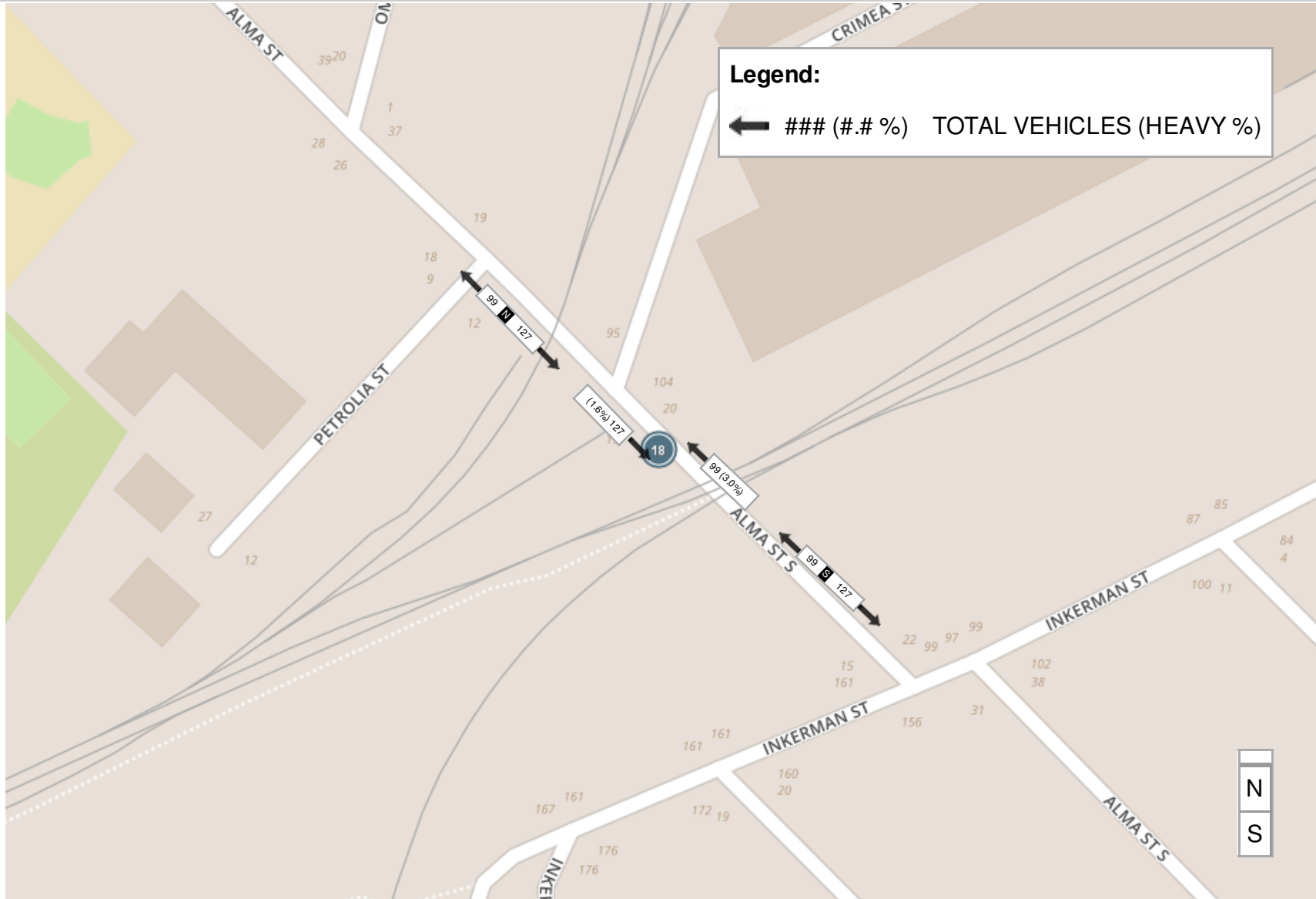
~~22:15:00~~ 22:30:00	~~7~~ 3	~~7~~ 3	~~5~~ 3	~~5~~ 3	~~12~~ 6	~~32~~ 28
22:45:00	2	2	4	4	6	32
23:00:00	1	1	6	6	7	31
23:15:00	2	2	5	5	7	26
23:30:00	2	2	4	4	6	26
23:45:00	1	1	2	2	3	23
Grand Total	1170	1170	1219	1219	2389	-
Approach%	100%	-	100%	-	-	-
Totals %	49%	49%	51%	51%	-	-
Heavy	24	-	23	-	-	-
Heavy %	2.1%	-	1.9%	-	-	-
Bicycles	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-



Peak Hour: 04:00 PM - 05:00 PM Weather:

Start Time	S Approach		N Approach		Int. Total (15 min)
	Thru	Approach Total	Thru	Approach Total	
16:00:00	28	28	29	29	57
16:15:00	24	24	41	41	65
16:30:00	23	23	28	28	51
16:45:00	24	24	29	29	53
Grand Total	99	99	127	127	226
Approach%	100%	-	100%	-	-
Totals %	43.8%	43.8%	56.2%	56.2%	-
PHF	0.88	0.88	0.77	0.77	-
Heavy	3	3	2	2	-
Heavy %	3%	3%	1.6%	1.6%	-
Lights	92	92	123	123	-
Lights %	92.9%	92.9%	96.9%	96.9%	-
Single-Unit Trucks	3	3	2	2	-
Single-Unit Trucks %	3%	3%	1.6%	1.6%	-
Buses	0	0	0	0	-
Buses %	0%	0%	0%	0%	-
Articulated Trucks	0	0	0	0	-
Articulated Trucks %	0%	0%	0%	0%	-
Bicycles on Road	4	4	2	2	-
Bicycles on Road %	4%	4%	1.6%	1.6%	-

Peak Hour: 04:00 PM - 05:00 PM Weather:





Turning Movement Count (18 - AT ALMA ST & RAIL CROSSING)

Start Time	S Approach		N Approach		Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Approach Total	Thru N:S	Approach Total		
00:00:00	1	1	4	4	5	
00:15:00	0	0	2	2	2	
00:30:00	1	1	4	4	5	
00:45:00	1	1	1	1	2	14
01:00:00	1	1	1	1	2	11
01:15:00	1	1	0	0	1	10
01:30:00	2	2	3	3	5	10
01:45:00	0	0	0	0	0	8
02:00:00	1	1	1	1	2	8
02:15:00	0	0	0	0	0	7
02:30:00	1	1	0	0	1	3
02:45:00	0	0	0	0	0	3
03:00:00	1	1	1	1	2	3
03:15:00	0	0	0	0	0	3
03:30:00	0	0	1	1	1	3
03:45:00	0	0	0	0	0	3
04:00:00	0	0	0	0	0	1
04:15:00	1	1	1	1	2	3
04:30:00	0	0	0	0	0	2
04:45:00	1	1	1	1	2	4



05:00:00	0	0	3	3	3	7
05:15:00	2	2	2	2	4	9
05:30:00	2	2	3	3	5	14
05:45:00	3	3	7	7	10	22
06:00:00	1	1	3	3	4	23
06:15:00	5	5	6	6	11	30
06:30:00	7	7	4	4	11	36
06:45:00	6	6	6	6	12	38
07:00:00	12	12	14	14	26	60
07:15:00	17	17	12	12	29	78
07:30:00	21	21	16	16	37	104
07:45:00	18	18	17	17	35	127
08:00:00	15	15	14	14	29	130
08:15:00	17	17	16	16	33	134
08:30:00	40	40	34	34	74	171
08:45:00	15	15	32	32	47	183
09:00:00	12	12	13	13	25	179
09:15:00	13	13	12	12	25	171
09:30:00	14	14	9	9	23	120
09:45:00	9	9	13	13	22	95
10:00:00	14	14	17	17	31	101
10:15:00	7	7	15	15	22	98
10:30:00	10	10	17	17	27	102



10:45:00	18	18	20	20	38	118
11:00:00	18	18	16	16	34	121
11:15:00	21	21	15	15	36	135
11:30:00	12	12	17	17	29	137
11:45:00	15	15	10	10	25	124
12:00:00	36	36	68	68	104	194
12:15:00	29	29	25	25	54	212
12:30:00	11	11	18	18	29	212
12:45:00	11	11	24	24	35	222
13:00:00	20	20	22	22	42	160
13:15:00	10	10	22	22	32	138
13:30:00	17	17	22	22	39	148
13:45:00	19	19	17	17	36	149
14:00:00	14	14	16	16	30	137
14:15:00	16	16	22	22	38	143
14:30:00	21	21	24	24	45	149
14:45:00	23	23	22	22	45	158
15:00:00	24	24	17	17	41	169
15:15:00	20	20	40	40	60	191
15:30:00	25	25	37	37	62	208
15:45:00	26	26	26	26	52	215
16:00:00	16	16	31	31	47	221
16:15:00	27	27	28	28	55	216



16:30:00	27	27	53	53	80	234
16:45:00	25	25	30	30	55	237
17:00:00	24	24	27	27	51	241
17:15:00	26	26	30	30	56	242
17:30:00	19	19	27	27	46	208
17:45:00	21	21	23	23	44	197
18:00:00	13	13	17	17	30	176
18:15:00	17	17	17	17	34	154
18:30:00	17	17	15	15	32	140
18:45:00	9	9	18	18	27	123
19:00:00	12	12	14	14	26	119
19:15:00	8	8	23	23	31	116
19:30:00	13	13	12	12	25	109
19:45:00	9	9	13	13	22	104
20:00:00	15	15	13	13	28	106
20:15:00	9	9	10	10	19	94
20:30:00	12	12	8	8	20	89
20:45:00	5	5	2	2	7	74
21:00:00	8	8	5	5	13	59
21:15:00	5	5	4	4	9	49
21:30:00	7	7	6	6	13	42
21:45:00	6	6	7	7	13	48
22:00:00	6	6	3	3	9	44



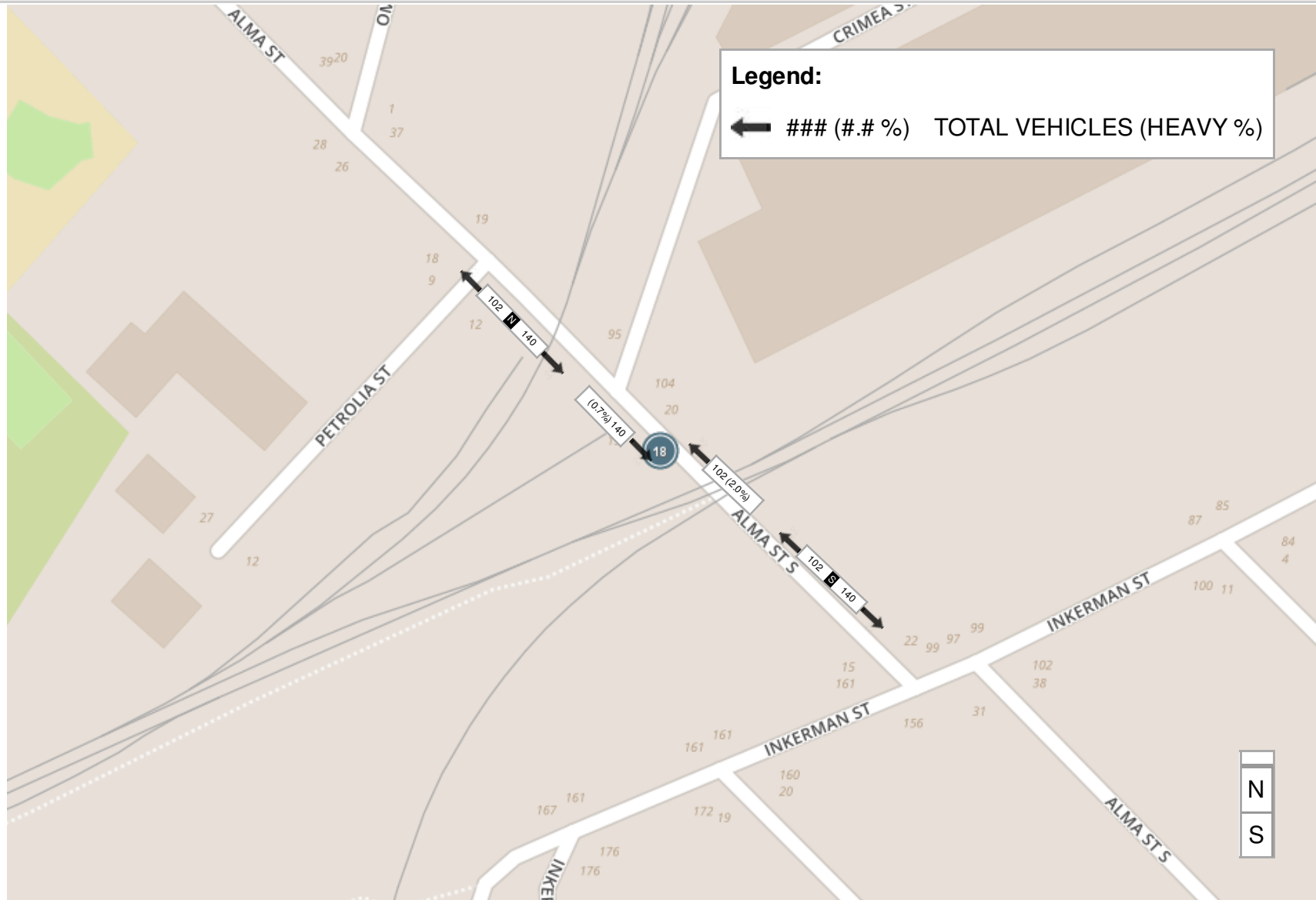
22:15:00 22:30:00	4 2	4 2	3 4	3 4	7 6	42 35
22:45:00	1	1	1	1	2	24
23:00:00	2	2	4	4	6	21
23:15:00	3	3	1	1	4	18
23:30:00	4	4	4	4	8	20
23:45:00	2	2	0	0	2	20
Grand Total	1052	1052	1258	1258	2310	-
Approach%	100%	-	100%	-	-	-
Totals %	45.5%	45.5%	54.5%	54.5%	-	-
Heavy	15	-	19	-	-	-
Heavy %	1.4%	-	1.5%	-	-	-
Bicycles	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-



Peak Hour: 04:30 PM - 05:30 PM Weather:

Start Time	S Approach		N Approach		Int. Total (15 min)
	Thru	Approach Total	Thru	Approach Total	
16:30:00	27	27	53	53	80
16:45:00	25	25	30	30	55
17:00:00	24	24	27	27	51
17:15:00	26	26	30	30	56
Grand Total	102	102	140	140	242
Approach%	100%	-	100%	-	-
Totals %	42.1%	42.1%	57.9%	57.9%	-
PHF	0.94	0.94	0.66	0.66	-
Heavy	2	2	1	1	-
Heavy %	2%	2%	0.7%	0.7%	-
Lights	96	96	136	136	-
Lights %	94.1%	94.1%	97.1%	97.1%	-
Single-Unit Trucks	1	1	1	1	-
Single-Unit Trucks %	1%	1%	0.7%	0.7%	-
Buses	0	0	0	0	-
Buses %	0%	0%	0%	0%	-
Articulated Trucks	1	1	0	0	-
Articulated Trucks %	1%	1%	0%	0%	-
Bicycles on Road	4	4	3	3	-
Bicycles on Road %	3.9%	3.9%	2.1%	2.1%	-

Peak Hour: 04:30 PM - 05:30 PM Weather:





Turning Movement Count (21 . AT DUBLIN ST & RAIL CROSSING)

Start Time	S Approach			N Approach			Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Peds S:	Approach Total	Thru N:S	Peds N:	Approach Total		
00:00:00	6	0	6	3	0	3	9	
00:15:00	1	0	1	5	0	5	6	
00:30:00	3	0	3	3	0	3	6	
00:45:00	3	0	3	1	0	1	4	25
01:00:00	1	0	1	2	0	2	3	19
01:15:00	2	0	2	3	0	3	5	18
01:30:00	4	0	4	2	0	2	6	18
01:45:00	1	0	1	1	0	1	2	16
02:00:00	2	0	2	2	0	2	4	17
02:15:00	0	0	0	4	0	4	4	16
02:30:00	1	0	1	1	0	1	2	12
02:45:00	1	0	1	1	0	1	2	12
03:00:00	1	0	1	1	0	1	2	10
03:15:00	0	0	0	1	0	1	1	7
03:30:00	1	0	1	1	0	1	2	7
03:45:00	0	0	0	0	0	0	0	5
04:00:00	0	0	0	1	0	1	1	4
04:15:00	0	0	0	0	0	0	0	3
04:30:00	0	0	0	0	0	0	0	1
04:45:00	0	0	0	2	0	2	2	3
05:00:00	2	0	2	1	0	1	3	5
05:15:00	0	0	0	0	0	0	0	5
05:30:00	0	0	0	2	0	2	2	7
05:45:00	2	0	2	4	0	4	6	11



06:00:00	0	0	0	2	0	2	2	10
06:15:00	0	0	0	0	0	0	0	10
06:30:00	3	0	3	3	0	3	6	14
06:45:00	3	0	3	1	0	1	4	12
07:00:00	2	0	2	6	0	6	8	18
07:15:00	1	0	1	0	0	0	1	19
07:30:00	4	0	4	4	0	4	8	21
07:45:00	6	0	6	6	0	6	12	29
08:00:00	8	0	8	5	0	5	13	34
08:15:00	8	0	8	7	0	7	15	48
08:30:00	13	0	13	10	0	10	23	63
08:45:00	15	0	15	13	0	13	28	79
09:00:00	13	0	13	13	0	13	26	92
09:15:00	12	0	12	12	0	12	24	101
09:30:00	18	0	18	18	0	18	36	114
09:45:00	21	0	21	12	0	12	33	119
10:00:00	28	0	28	11	0	11	39	132
10:15:00	20	0	20	19	0	19	39	147
10:30:00	16	0	16	9	0	9	25	136
10:45:00	28	0	28	18	0	18	46	149
11:00:00	32	0	32	11	0	11	43	153
11:15:00	21	0	21	17	0	17	38	152
11:30:00	28	0	28	11	0	11	39	166
11:45:00	22	0	22	18	0	18	40	160
12:00:00	23	0	23	12	0	12	35	152
12:15:00	24	0	24	16	0	16	40	154
12:30:00	22	0	22	10	0	10	32	147
12:45:00	18	0	18	11	0	11	29	136



13:00:00	31	0	31	13	0	13	44	145
13:15:00	25	0	25	9	0	9	34	139
13:30:00	22	0	22	9	0	9	31	138
13:45:00	22	0	22	10	0	10	32	141
14:00:00	24	0	24	9	0	9	33	130
14:15:00	26	0	26	19	0	19	45	141
14:30:00	18	0	18	10	0	10	28	138
14:45:00	21	0	21	14	0	14	35	141
15:00:00	22	0	22	13	0	13	35	143
15:15:00	24	0	24	10	0	10	34	132
15:30:00	16	0	16	15	0	15	31	135
15:45:00	21	0	21	20	0	20	41	141
16:00:00	18	0	18	12	0	12	30	136
16:15:00	22	0	22	13	0	13	35	137
16:30:00	22	0	22	15	0	15	37	143
16:45:00	43	0	43	16	0	16	59	161
17:00:00	29	0	29	21	0	21	50	181
17:15:00	31	0	31	12	0	12	43	189
17:30:00	21	0	21	10	0	10	31	183
17:45:00	18	0	18	13	0	13	31	155
18:00:00	11	0	11	10	0	10	21	126
18:15:00	13	0	13	35	0	35	48	131
18:30:00	7	0	7	17	0	17	24	124
18:45:00	9	0	9	9	0	9	18	111
19:00:00	12	0	12	8	0	8	20	110
19:15:00	12	0	12	9	0	9	21	83
19:30:00	11	0	11	2	0	2	13	72
19:45:00	6	0	6	4	0	4	10	64



20:00:00	13	0	13	7	0	7	20	64
20:15:00	4	0	4	3	0	3	7	50
20:30:00	9	0	9	0	0	0	9	46
20:45:00	7	0	7	5	0	5	12	48
21:00:00	5	0	5	7	0	7	12	40
21:15:00	9	0	9	4	0	4	13	46
21:30:00	14	0	14	5	0	5	19	56
21:45:00	8	0	8	2	0	2	10	54
22:00:00	4	0	4	2	0	2	6	48
22:15:00	10	0	10	1	0	1	11	46
22:30:00	6	0	6	4	0	4	10	37
22:45:00	4	0	4	1	0	1	5	32
23:00:00	4	0	4	2	0	2	6	32
23:15:00	5	0	5	3	0	3	8	29
23:30:00	7	0	7	6	0	6	13	32
23:45:00	2	0	2	2	0	2	4	31
Grand Total	1108	0	1108	727	0	727	1835	-

Approach%	100%	-	100%	-	-	-
Totals %	60.4%	60.4%	39.6%	39.6%	-	-
Heavy	4	-	0	-	-	-
Heavy %	0.4%	-	0%	-	-	-
Bicycles	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-



Peak Hour: 04:30 PM - 05:30 PM Weather:

Start Time	S Approach			N Approach			Int. Total (15 min)
	Thru	Peds	Approach Total	Thru	Peds	Approach Total	
16:30:00	22	0	22	15	0	15	37
16:45:00	43	0	43	16	0	16	59
17:00:00	29	0	29	21	0	21	50
17:15:00	31	0	31	12	0	12	43
Grand Total	125	0	125	64	0	64	189
Approach%	100%		-	100%		-	-
Totals %	66.1%		66.1%	33.9%		33.9%	-
PHF	0.73		0.73	0.76		0.76	-
Heavy	0		0	0		0	-
Heavy %	0%		0%	0%		0%	-
Lights	124		124	63		63	-
Lights %	99.2%		99.2%	98.4%		98.4%	-
Single-Unit Trucks	0		0	0		0	-
Single-Unit Trucks %	0%		0%	0%		0%	-
Buses	0		0	0		0	-
Buses %	0%		0%	0%		0%	-
Bicycles on Road	1		1	1		1	-
Bicycles on Road %	0.8%		0.8%	1.6%		1.6%	-



Turning Movement Count (21 . AT DUBLIN ST & RAIL CROSSING)

Start Time	S Approach			N Approach			Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Peds S:	Approach Total	Thru N:S	Peds N:	Approach Total		
00:00:00	5	0	5	6	0	6	11	
00:15:00	3	0	3	4	0	4	7	
00:30:00	6	0	6	2	0	2	8	
00:45:00	3	0	3	2	0	2	5	31
01:00:00	4	0	4	3	0	3	7	27
01:15:00	4	0	4	2	0	2	6	26
01:30:00	5	0	5	4	0	4	9	27
01:45:00	2	0	2	2	0	2	4	26
02:00:00	1	0	1	0	0	0	1	20
02:15:00	1	0	1	6	0	6	7	21
02:30:00	2	0	2	1	0	1	3	15
02:45:00	1	0	1	3	0	3	4	15
03:00:00	1	0	1	1	0	1	2	16
03:15:00	0	0	0	1	0	1	1	10
03:30:00	0	0	0	0	0	0	0	7
03:45:00	0	0	0	0	0	0	0	3
04:00:00	0	0	0	1	0	1	1	2
04:15:00	0	0	0	0	0	0	0	1
04:30:00	1	0	1	0	0	0	1	2
04:45:00	1	0	1	2	0	2	3	5
05:00:00	0	0	0	0	0	0	0	4
05:15:00	2	0	2	0	0	0	2	6
05:30:00	0	0	0	1	0	1	1	6
05:45:00	1	0	1	0	0	0	1	4



06:00:00	0	0	0	0	0	0	0	4
06:15:00	0	0	0	0	0	0	0	2
06:30:00	1	0	1	5	0	5	6	7
06:45:00	1	0	1	2	0	2	3	9
07:00:00	2	0	2	2	0	2	4	13
07:15:00	0	0	0	3	0	3	3	16
07:30:00	1	0	1	3	0	3	4	14
07:45:00	4	0	4	4	0	4	8	19
08:00:00	3	0	3	3	0	3	6	21
08:15:00	9	0	9	6	0	6	15	33
08:30:00	27	0	27	13	0	13	40	69
08:45:00	43	0	43	5	0	5	48	109
09:00:00	20	0	20	8	0	8	28	131
09:15:00	4	0	4	17	0	17	21	137
09:30:00	15	0	15	11	0	11	26	123
09:45:00	19	0	19	20	0	20	39	114
10:00:00	19	0	19	38	0	38	57	143
10:15:00	17	0	17	51	0	51	68	190
10:30:00	28	0	28	21	0	21	49	213
10:45:00	59	0	59	13	0	13	72	246
11:00:00	30	0	30	14	0	14	44	233
11:15:00	19	0	19	4	0	4	23	188
11:30:00	9	0	9	11	0	11	20	159
11:45:00	19	0	19	6	0	6	25	112
12:00:00	16	0	16	53	0	53	69	137
12:15:00	28	0	28	31	0	31	59	173
12:30:00	19	0	19	13	0	13	32	185
12:45:00	24	0	24	11	0	11	35	195



13:00:00	21	0	21	12	0	12	33	159
13:15:00	18	0	18	11	0	11	29	129
13:30:00	24	0	24	8	0	8	32	129
13:45:00	21	0	21	11	0	11	32	126
14:00:00	23	0	23	8	0	8	31	124
14:15:00	15	0	15	11	0	11	26	121
14:30:00	22	0	22	9	0	9	31	120
14:45:00	19	0	19	8	0	8	27	115
15:00:00	22	0	22	12	0	12	34	118
15:15:00	14	0	14	8	0	8	22	114
15:30:00	15	0	15	8	0	8	23	106
15:45:00	20	0	20	6	0	6	26	105
16:00:00	14	0	14	10	0	10	24	95
16:15:00	7	0	7	8	0	8	15	88
16:30:00	9	0	9	7	0	7	16	81
16:45:00	15	0	15	6	0	6	21	76
17:00:00	17	0	17	10	0	10	27	79
17:15:00	19	0	19	17	0	17	36	100
17:30:00	14	0	14	5	0	5	19	103
17:45:00	12	0	12	8	0	8	20	102
18:00:00	8	0	8	4	0	4	12	87
18:15:00	11	0	11	6	0	6	17	68
18:30:00	12	0	12	7	0	7	19	68
18:45:00	14	0	14	6	0	6	20	68
19:00:00	7	0	7	3	0	3	10	66
19:15:00	10	0	10	6	0	6	16	65
19:30:00	3	0	3	4	0	4	7	53
19:45:00	10	0	10	2	0	2	12	45



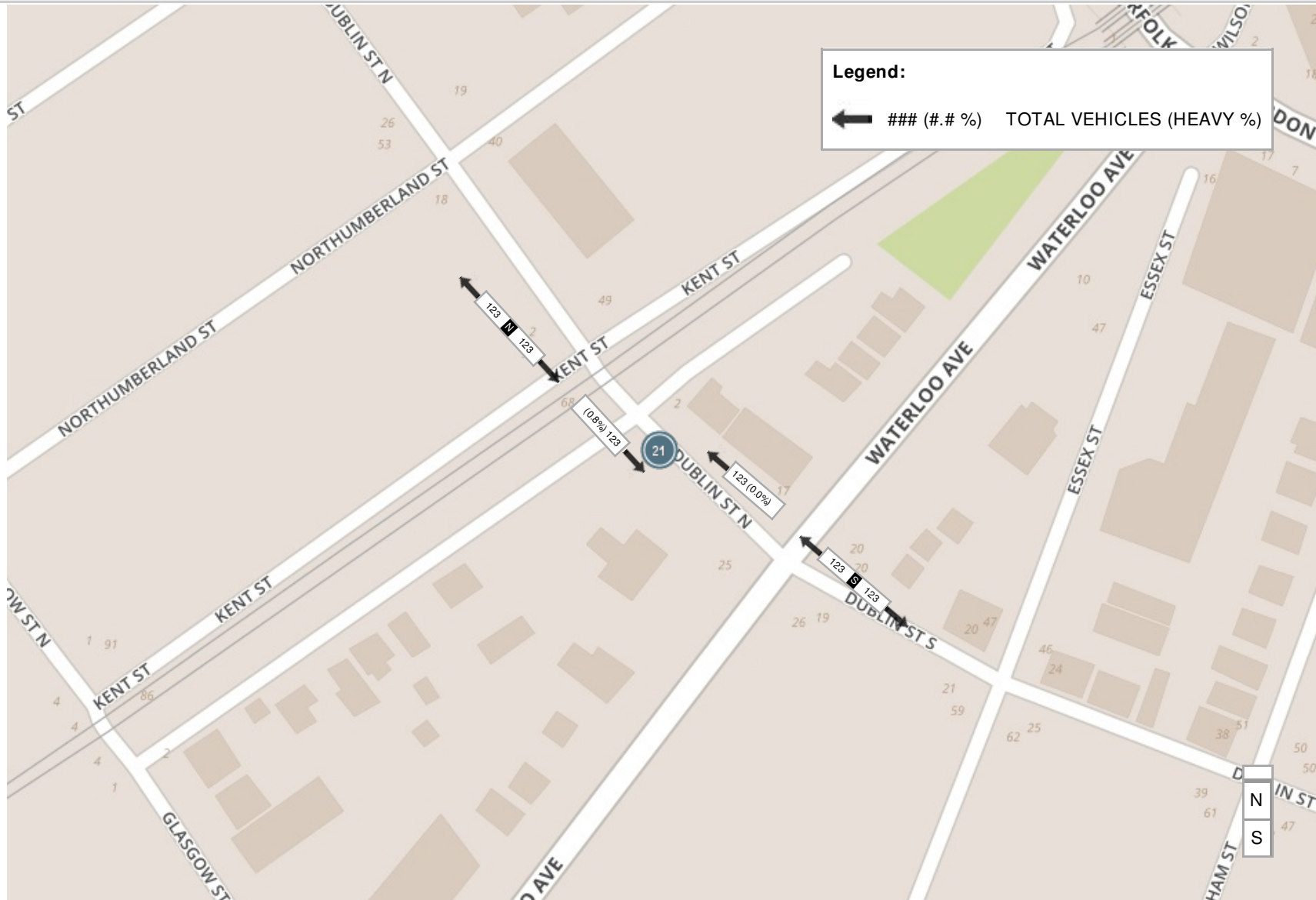
20:00:00	9	0	9	1	0	1	10	45
20:15:00	3	0	3	1	0	1	4	33
20:30:00	10	0	10	1	0	1	11	37
20:45:00	4	0	4	3	0	3	7	32
21:00:00	2	0	2	6	0	6	8	30
21:15:00	3	0	3	5	0	5	8	34
21:30:00	6	0	6	4	0	4	10	33
21:45:00	7	0	7	3	0	3	10	36
22:00:00	4	0	4	4	0	4	8	36
22:15:00	4	0	4	1	0	1	5	33
22:30:00	8	0	8	5	0	5	13	36
22:45:00	2	0	2	2	0	2	4	30
23:00:00	1	0	1	1	0	1	2	24
23:15:00	1	0	1	2	0	2	3	22
23:30:00	3	0	3	1	0	1	4	13
23:45:00	2	0	2	1	0	1	3	12
Grand Total	964	0	964	671	0	671	1635	-
Approach%	100%	-	-	100%	-	-	-	-
Totals %	59%	59%	59%	41%	41%	41%	-	-
Heavy	6	-	-	11	-	-	-	-
Heavy %	0.6%	-	-	1.6%	-	-	-	-
Bicycles	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-



Peak Hour: 10:00 AM - 11:00 AM Weather:

Start Time	S Approach			N Approach			Int. Total (15 min)
	Thru	Peds	Approach Total	Thru	Peds	Approach Total	
10:00:00	19	0	19	38	0	38	57
10:15:00	17	0	17	51	0	51	68
10:30:00	28	0	28	21	0	21	49
10:45:00	59	0	59	13	0	13	72
Grand Total	123	0	123	123	0	123	246
Approach%	100%		-	100%		-	-
Totals %	50%		50%	50%		50%	-
PHF	0.52		0.52	0.6		0.6	-
Heavy	0		0	1		1	-
Heavy %	0%		0%	0.8%		0.8%	-
Lights	121		121	118		118	-
Lights %	98.4%		98.4%	95.9%		95.9%	-
Single-Unit Trucks	0		0	1		1	-
Single-Unit Trucks %	0%		0%	0.8%		0.8%	-
Articulated Trucks	0		0	0		0	-
Articulated Trucks %	0%		0%	0%		0%	-
Bicycles on Road	2		2	4		4	-
Bicycles on Road %	1.6%		1.6%	3.3%		3.3%	-

Peak Hour: 10:00 AM - 11:00 AM Weather:





Turning Movement Count (21 . AT DUBLIN ST & RAIL CROSSING)

Start Time	S Approach			N Approach			Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Peds S:	Approach Total	Thru N:S	Peds N:	Approach Total		
00:00:00	1	0	1	1	0	1	2	
00:15:00	1	0	1	1	0	1	2	
00:30:00	4	0	4	0	0	0	4	
00:45:00	1	0	1	2	0	2	3	11
01:00:00	5	0	5	0	0	0	5	14
01:15:00	0	0	0	2	0	2	2	14
01:30:00	5	0	5	1	0	1	6	16
01:45:00	1	0	1	4	0	4	5	18
02:00:00	3	0	3	0	0	0	3	16
02:15:00	3	0	3	2	0	2	5	19
02:30:00	0	0	0	3	0	3	3	16
02:45:00	3	0	3	0	0	0	3	14
03:00:00	0	0	0	2	0	2	2	13
03:15:00	0	0	0	0	0	0	0	8
03:30:00	1	0	1	2	0	2	3	8
03:45:00	0	0	0	0	0	0	0	5
04:00:00	0	0	0	0	0	0	0	3
04:15:00	1	0	1	2	0	2	3	6
04:30:00	0	0	0	0	0	0	0	3
04:45:00	0	0	0	1	0	1	1	4
05:00:00	0	0	0	0	0	0	0	4
05:15:00	1	0	1	1	0	1	2	3
05:30:00	0	0	0	1	0	1	1	4
05:45:00	1	0	1	3	0	3	4	7



06:00:00	4	0	4	6	0	6	10	17
06:15:00	2	0	2	3	0	3	5	20
06:30:00	2	0	2	9	0	9	11	30
06:45:00	2	0	2	3	0	3	5	31
07:00:00	9	0	9	4	0	4	13	34
07:15:00	14	0	14	8	0	8	22	51
07:30:00	20	0	20	6	0	6	26	66
07:45:00	24	0	24	17	0	17	41	102
08:00:00	18	0	18	20	0	20	38	127
08:15:00	23	0	23	13	0	13	36	141
08:30:00	43	0	43	11	0	11	54	169
08:45:00	30	0	30	22	0	22	52	180
09:00:00	23	0	23	14	0	14	37	179
09:15:00	20	0	20	19	0	19	39	182
09:30:00	18	0	18	8	0	8	26	154
09:45:00	18	0	18	11	0	11	29	131
10:00:00	15	0	15	6	0	6	21	115
10:15:00	10	0	10	13	0	13	23	99
10:30:00	18	0	18	11	0	11	29	102
10:45:00	11	0	11	15	0	15	26	99
11:00:00	23	0	23	10	0	10	33	111
11:15:00	19	0	19	6	0	6	25	113
11:30:00	12	0	12	11	0	11	23	107
11:45:00	16	0	16	18	0	18	34	115
12:00:00	22	0	22	13	0	13	35	117
12:15:00	18	0	18	16	0	16	34	126
12:30:00	27	0	27	15	0	15	42	145
12:45:00	15	0	15	14	0	14	29	140



13:00:00	24	0	24	8	0	8	32	137
13:15:00	10	0	10	7	0	7	17	120
13:30:00	24	0	24	9	0	9	33	111
13:45:00	17	0	17	16	0	16	33	115
14:00:00	19	0	19	13	0	13	32	115
14:15:00	17	0	17	7	0	7	24	122
14:30:00	17	0	17	19	0	19	36	125
14:45:00	30	0	30	25	0	25	55	147
15:00:00	21	0	21	24	0	24	45	160
15:15:00	22	0	22	27	0	27	49	185
15:30:00	19	0	19	18	0	18	37	186
15:45:00	20	0	20	12	0	12	32	163
16:00:00	27	0	27	14	0	14	41	159
16:15:00	21	0	21	16	0	16	37	147
16:30:00	23	0	23	16	0	16	39	149
16:45:00	31	0	31	23	0	23	54	171
17:00:00	25	0	25	29	0	29	54	184
17:15:00	27	0	27	20	0	20	47	194
17:30:00	29	0	29	16	0	16	45	200
17:45:00	20	0	20	18	0	18	38	184
18:00:00	21	0	21	15	0	15	36	166
18:15:00	22	0	22	14	0	14	36	155
18:30:00	25	0	25	9	0	9	34	144
18:45:00	9	0	9	5	0	5	14	120
19:00:00	13	0	13	7	0	7	20	104
19:15:00	15	0	15	12	0	12	27	95
19:30:00	5	0	5	13	0	13	18	79
19:45:00	8	0	8	5	0	5	13	78



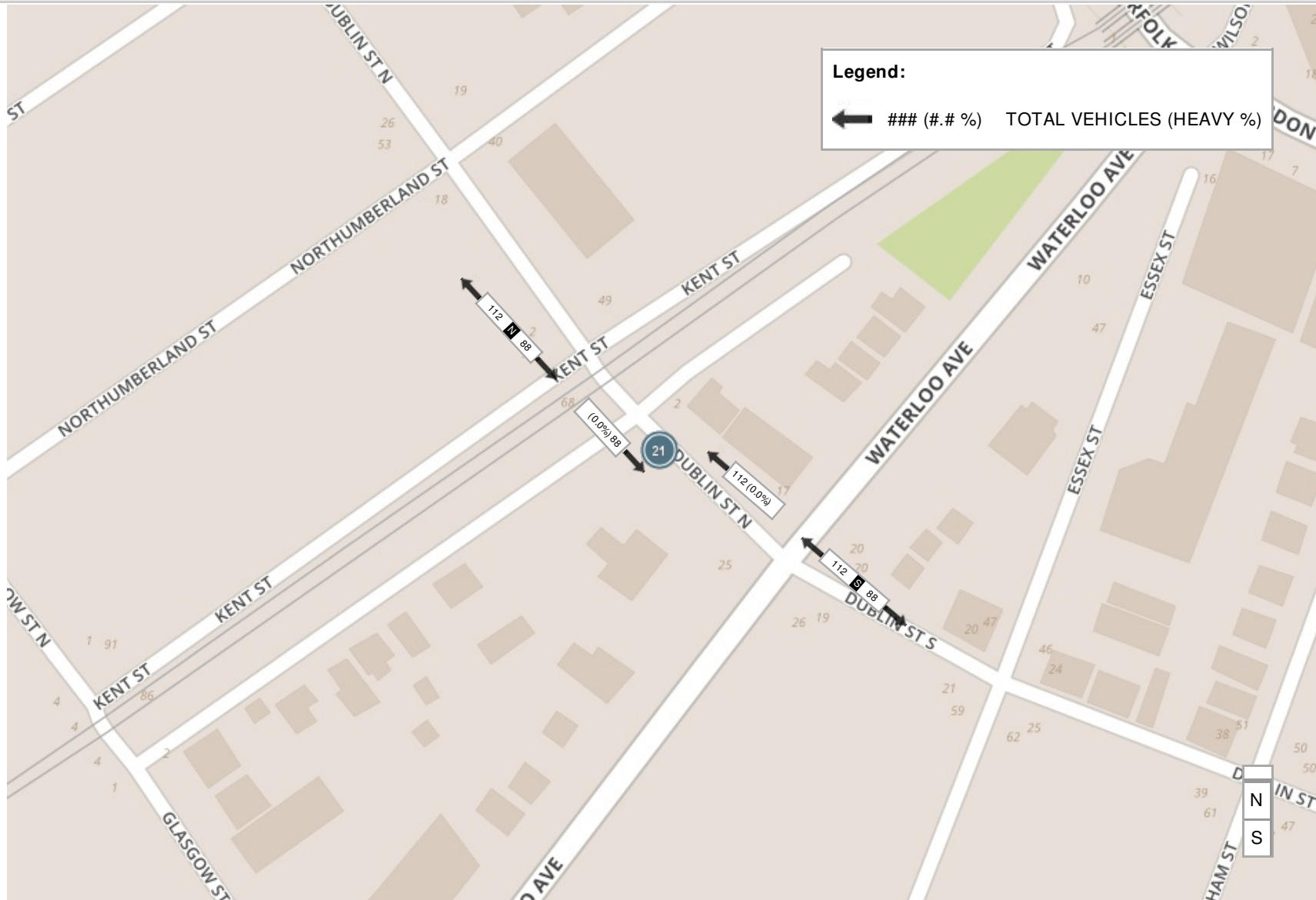
20:00:00	12	0	12	10	0	10	22	80
20:15:00	6	0	6	8	0	8	14	67
20:30:00	6	0	6	6	0	6	12	61
20:45:00	9	0	9	10	0	10	19	67
21:00:00	11	0	11	8	0	8	19	64
21:15:00	10	0	10	5	0	5	15	65
21:30:00	10	0	10	5	0	5	15	68
21:45:00	4	0	4	5	0	5	9	58
22:00:00	6	0	6	12	0	12	18	57
22:15:00	11	0	11	4	0	4	15	57
22:30:00	8	0	8	4	0	4	12	54
22:45:00	3	0	3	1	0	1	4	49
23:00:00	2	0	2	3	0	3	5	36
23:15:00	3	0	3	3	0	3	6	27
23:30:00	0	0	0	2	0	2	2	17
23:45:00	7	0	7	2	0	2	9	22
Grand Total	1176	0	1176	855	0	855	2031	-
Approach%	100%	-	-	100%	-	-	-	-
Totals %	57.9%	57.9%	57.9%	42.1%	42.1%	42.1%	-	-
Heavy	26	-	-	18	-	-	-	-
Heavy %	2.2%	-	-	2.1%	-	-	-	-
Bicycles	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-



Peak Hour: 04:45 PM - 05:45 PM Weather:

Start Time	S Approach			N Approach			Int. Total (15 min)
	Thru	Peds	Approach Total	Thru	Peds	Approach Total	
16:45:00	31	0	31	23	0	23	54
17:00:00	25	0	25	29	0	29	54
17:15:00	27	0	27	20	0	20	47
17:30:00	29	0	29	16	0	16	45
Grand Total	112	0	112	88	0	88	200
Approach%	100%		-	100%		-	-
Totals %	56%		56%	44%		44%	-
PHF	0.9		0.9	0.76		0.76	-
Heavy	0		0	0		0	-
Heavy %	0%		0%	0%		0%	-
Lights	111		111	88		88	-
Lights %	99.1%		99.1%	100%		100%	-
Single-Unit Trucks	0		0	0		0	-
Single-Unit Trucks %	0%		0%	0%		0%	-
Buses	0		0	0		0	-
Buses %	0%		0%	0%		0%	-
Articulated Trucks	0		0	0		0	-
Articulated Trucks %	0%		0%	0%		0%	-
Bicycles on Road	1		1	0		0	-
Bicycles on Road %	0.9%		0.9%	0%		0%	-

Peak Hour: 04:45 PM - 05:45 PM Weather:





Turning Movement Count (21 . AT DUBLIN ST & RAIL CROSSING)

Start Time	S Approach			N Approach			Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Peds S:	Approach Total	Thru N:S	Peds N:	Approach Total		
00:00:00	4	0	4	2	0	2	6	
00:15:00	2	0	2	2	0	2	4	
00:30:00	0	0	0	0	0	0	0	
00:45:00	1	0	1	0	0	0	1	11
01:00:00	0	0	0	2	0	2	2	7
01:15:00	0	0	0	0	0	0	0	3
01:30:00	0	0	0	1	0	1	1	4
01:45:00	0	0	0	0	0	0	0	3
02:00:00	1	0	1	1	0	1	2	3
02:15:00	1	0	1	0	0	0	1	4
02:30:00	1	0	1	0	0	0	1	4
02:45:00	0	0	0	0	0	0	0	4
03:00:00	0	0	0	0	0	0	0	2
03:15:00	0	0	0	0	0	0	0	1
03:30:00	0	0	0	0	0	0	0	0
03:45:00	0	0	0	0	0	0	0	0
04:00:00	1	0	1	0	0	0	1	1
04:15:00	0	0	0	0	0	0	0	1
04:30:00	0	0	0	1	0	1	1	2
04:45:00	1	0	1	2	0	2	3	5
05:00:00	1	0	1	0	0	0	1	5
05:15:00	2	0	2	1	0	1	3	8
05:30:00	0	0	0	0	0	0	0	7
05:45:00	1	0	1	3	0	3	4	8



06:00:00	1	0	1	4	0	4	5	12
06:15:00	0	0	0	2	0	2	2	11
06:30:00	2	0	2	6	0	6	8	19
06:45:00	7	0	7	5	0	5	12	27
07:00:00	7	0	7	1	0	1	8	30
07:15:00	14	0	14	9	0	9	23	51
07:30:00	16	0	16	8	0	8	24	67
07:45:00	24	0	24	13	0	13	37	92
08:00:00	20	0	20	20	0	20	40	124
08:15:00	31	0	31	15	0	15	46	147
08:30:00	23	0	23	10	0	10	33	156
08:45:00	44	0	44	18	0	18	62	181
09:00:00	17	0	17	9	0	9	26	167
09:15:00	21	0	21	14	0	14	35	156
09:30:00	15	0	15	12	0	12	27	150
09:45:00	20	0	20	4	0	4	24	112
10:00:00	15	0	15	5	0	5	20	106
10:15:00	18	0	18	13	0	13	31	102
10:30:00	14	0	14	5	0	5	19	94
10:45:00	10	0	10	12	0	12	22	92
11:00:00	16	0	16	9	0	9	25	97
11:15:00	8	0	8	10	0	10	18	84
11:30:00	17	0	17	19	0	19	36	101
11:45:00	21	0	21	13	0	13	34	113
12:00:00	26	0	26	16	0	16	42	130
12:15:00	18	0	18	18	0	18	36	148
12:30:00	12	0	12	7	0	7	19	131
12:45:00	22	0	22	9	0	9	31	128



13:00:00	24	0	24	11	0	11	35	121
13:15:00	19	0	19	5	0	5	24	109
13:30:00	17	0	17	16	0	16	33	123
13:45:00	20	0	20	13	0	13	33	125
14:00:00	18	0	18	11	0	11	29	119
14:15:00	19	0	19	9	0	9	28	123
14:30:00	26	0	26	10	0	10	36	126
14:45:00	22	0	22	8	0	8	30	123
15:00:00	32	0	32	12	0	12	44	138
15:15:00	25	0	25	12	0	12	37	147
15:30:00	14	0	14	20	0	20	34	145
15:45:00	24	0	24	13	0	13	37	152
16:00:00	30	0	30	13	0	13	43	151
16:15:00	29	0	29	14	0	14	43	157
16:30:00	38	0	38	16	0	16	54	177
16:45:00	38	0	38	18	0	18	56	196
17:00:00	33	0	33	21	0	21	54	207
17:15:00	26	0	26	15	0	15	41	205
17:30:00	20	0	20	11	0	11	31	182
17:45:00	15	0	15	13	0	13	28	154
18:00:00	34	0	34	14	0	14	48	148
18:15:00	17	0	17	11	0	11	28	135
18:30:00	16	0	16	7	0	7	23	127
18:45:00	18	0	18	8	0	8	26	125
19:00:00	31	0	31	8	0	8	39	116
19:15:00	18	0	18	4	0	4	22	110
19:30:00	7	0	7	7	0	7	14	101
19:45:00	22	0	22	8	0	8	30	105



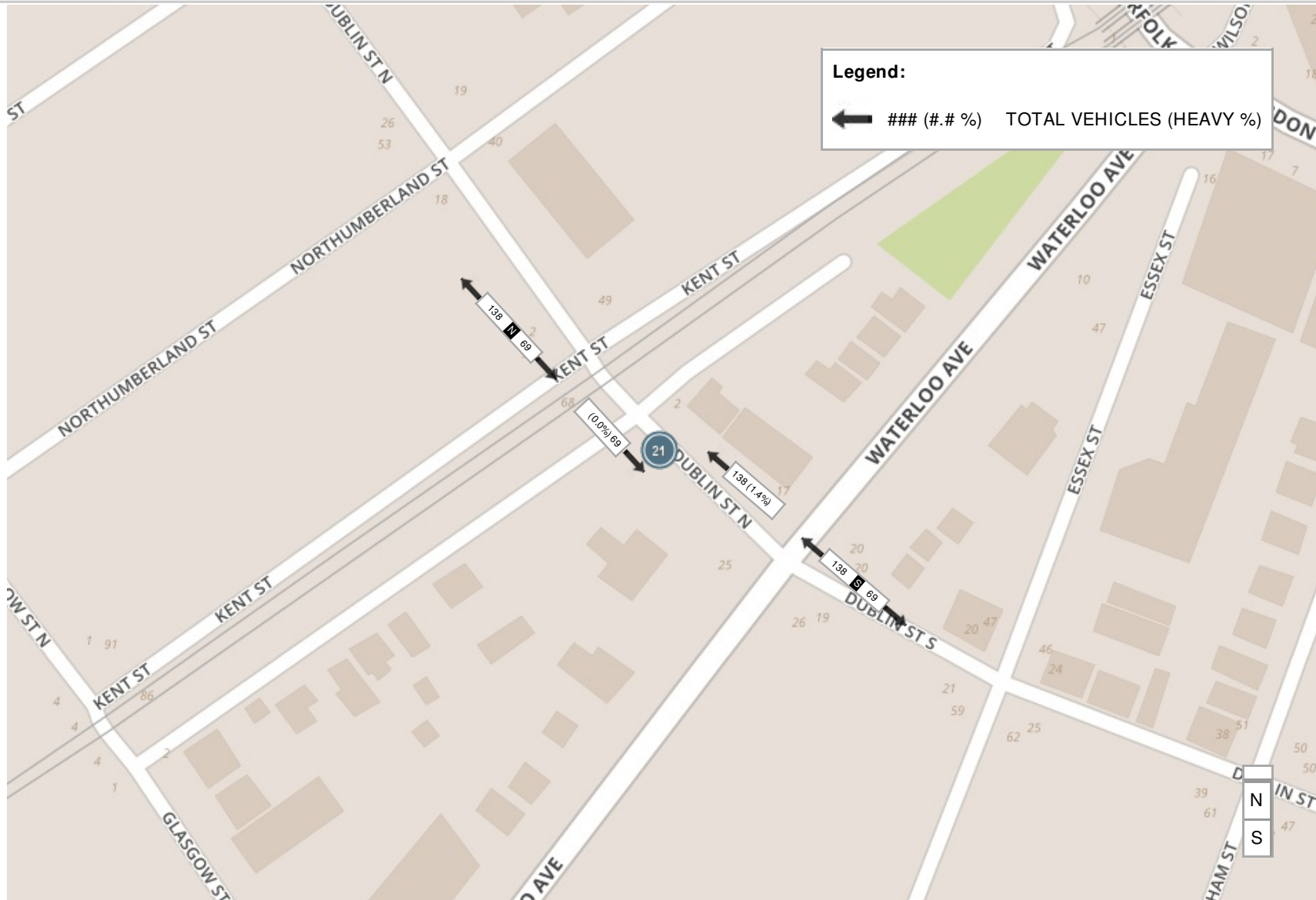
20:00:00	15	0	15	8	0	8	23	89
20:15:00	8	0	8	4	0	4	12	79
20:30:00	12	0	12	12	0	12	24	89
20:45:00	8	0	8	7	0	7	15	74
21:00:00	10	0	10	5	0	5	15	66
21:15:00	5	0	5	6	0	6	11	65
21:30:00	9	0	9	4	0	4	13	54
21:45:00	10	0	10	6	0	6	16	55
22:00:00	7	0	7	0	0	0	7	47
22:15:00	5	0	5	0	0	0	5	41
22:30:00	2	0	2	3	0	3	5	33
22:45:00	5	0	5	1	0	1	6	23
23:00:00	5	0	5	0	0	0	5	21
23:15:00	1	0	1	0	0	0	1	17
23:30:00	3	0	3	3	0	3	6	18
23:45:00	2	0	2	0	0	0	2	14
Grand Total	1234	0	1234	688	0	688	1922	-
Approach%	100%	-	100%	-	-	-	-	-
Totals %	64.2%	64.2%	35.8%	35.8%	-	-	-	-
Heavy	16	-	11	-	-	-	-	-
Heavy %	1.3%	-	1.6%	-	-	-	-	-
Bicycles	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-



Peak Hour: 04:15 PM - 05:15 PM Weather:

Start Time	S Approach			N Approach			Int. Total (15 min)
	Thru	Peds	Approach Total	Thru	Peds	Approach Total	
16:15:00	29	0	29	14	0	14	43
16:30:00	38	0	38	16	0	16	54
16:45:00	38	0	38	18	0	18	56
17:00:00	33	0	33	21	0	21	54
Grand Total	138	0	138	69	0	69	207
Approach%	100%		-	100%		-	-
Totals %	66.7%		66.7%	33.3%		33.3%	-
PHF	0.91		0.91	0.82		0.82	-
Heavy	2		2	0		0	-
Heavy %	1.4%		1.4%	0%		0%	-
Lights	132		132	68		68	-
Lights %	95.7%		95.7%	98.6%		98.6%	-
Single-Unit Trucks	2		2	0		0	-
Single-Unit Trucks %	1.4%		1.4%	0%		0%	-
Articulated Trucks	0		0	0		0	-
Articulated Trucks %	0%		0%	0%		0%	-
Bicycles on Road	4		4	1		1	-
Bicycles on Road %	2.9%		2.9%	1.4%		1.4%	-

Peak Hour: 04:15 PM - 05:15 PM Weather:





Turning Movement Count (21 . AT DUBLIN ST & RAIL CROSSING)

Start Time	S Approach			N Approach			Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Peds S:	Approach Total	Thru N:S	Peds N:	Approach Total		
00:00:00	3	0	3	1	0	1	4	
00:15:00	2	0	2	1	0	1	3	
00:30:00	1	0	1	0	0	0	1	
00:45:00	0	0	0	1	0	1	1	9
01:00:00	0	0	0	0	0	0	0	5
01:15:00	1	0	1	1	0	1	2	4
01:30:00	2	0	2	0	0	0	2	5
01:45:00	0	0	0	0	0	0	0	4
02:00:00	1	0	1	0	0	0	1	5
02:15:00	0	0	0	0	0	0	0	3
02:30:00	1	0	1	0	0	0	1	2
02:45:00	0	0	0	0	0	0	0	2
03:00:00	0	0	0	1	0	1	1	2
03:15:00	0	0	0	0	0	0	0	2
03:30:00	1	0	1	2	0	2	3	4
03:45:00	0	0	0	0	0	0	0	4
04:00:00	1	0	1	0	0	0	1	4
04:15:00	0	0	0	0	0	0	0	4
04:30:00	0	0	0	1	0	1	1	2
04:45:00	1	0	1	1	0	1	2	4
05:00:00	0	0	0	1	0	1	1	4
05:15:00	1	0	1	1	0	1	2	6
05:30:00	1	0	1	1	0	1	2	7
05:45:00	1	0	1	2	0	2	3	8



06:00:00	4	0	4	4	0	4	8	15
06:15:00	2	0	2	5	0	5	7	20
06:30:00	2	0	2	9	0	9	11	29
06:45:00	4	0	4	8	0	8	12	38
07:00:00	8	0	8	4	0	4	12	42
07:15:00	14	0	14	8	0	8	22	57
07:30:00	16	0	16	7	0	7	23	69
07:45:00	15	0	15	13	0	13	28	85
08:00:00	27	0	27	18	0	18	45	118
08:15:00	22	0	22	20	0	20	42	138
08:30:00	46	0	46	14	0	14	60	175
08:45:00	36	0	36	22	0	22	58	205
09:00:00	25	0	25	12	0	12	37	197
09:15:00	20	0	20	13	0	13	33	188
09:30:00	10	0	10	9	0	9	19	147
09:45:00	15	0	15	17	0	17	32	121
10:00:00	19	0	19	11	0	11	30	114
10:15:00	29	0	29	11	0	11	40	121
10:30:00	36	0	36	15	0	15	51	153
10:45:00	18	0	18	17	0	17	35	156
11:00:00	24	0	24	14	0	14	38	164
11:15:00	30	0	30	10	0	10	40	164
11:30:00	13	0	13	13	0	13	26	139
11:45:00	22	0	22	22	0	22	44	148
12:00:00	31	0	31	25	0	25	56	166
12:15:00	20	0	20	33	0	33	53	179
12:30:00	22	0	22	23	0	23	45	198
12:45:00	25	0	25	15	0	15	40	194



13:00:00	22	0	22	8	0	8	30	168
13:15:00	18	0	18	17	0	17	35	150
13:30:00	19	0	19	5	0	5	24	129
13:45:00	22	0	22	17	0	17	39	128
14:00:00	21	0	21	22	0	22	43	141
14:15:00	12	0	12	8	0	8	20	126
14:30:00	25	0	25	16	0	16	41	143
14:45:00	22	0	22	16	0	16	38	142
15:00:00	23	0	23	13	0	13	36	135
15:15:00	20	0	20	18	0	18	38	153
15:30:00	23	0	23	23	0	23	46	158
15:45:00	18	0	18	16	0	16	34	154
16:00:00	23	0	23	13	0	13	36	154
16:15:00	21	0	21	15	0	15	36	152
16:30:00	40	0	40	32	0	32	72	178
16:45:00	45	0	45	20	0	20	65	209
17:00:00	28	0	28	27	0	27	55	228
17:15:00	15	0	15	19	0	19	34	226
17:30:00	26	0	26	14	0	14	40	194
17:45:00	32	0	32	14	0	14	46	175
18:00:00	23	0	23	15	0	15	38	158
18:15:00	14	0	14	9	0	9	23	147
18:30:00	23	0	23	13	0	13	36	143
18:45:00	15	0	15	12	0	12	27	124
19:00:00	16	0	16	6	0	6	22	108
19:15:00	18	0	18	7	0	7	25	110
19:30:00	12	0	12	8	0	8	20	94
19:45:00	13	0	13	4	0	4	17	84



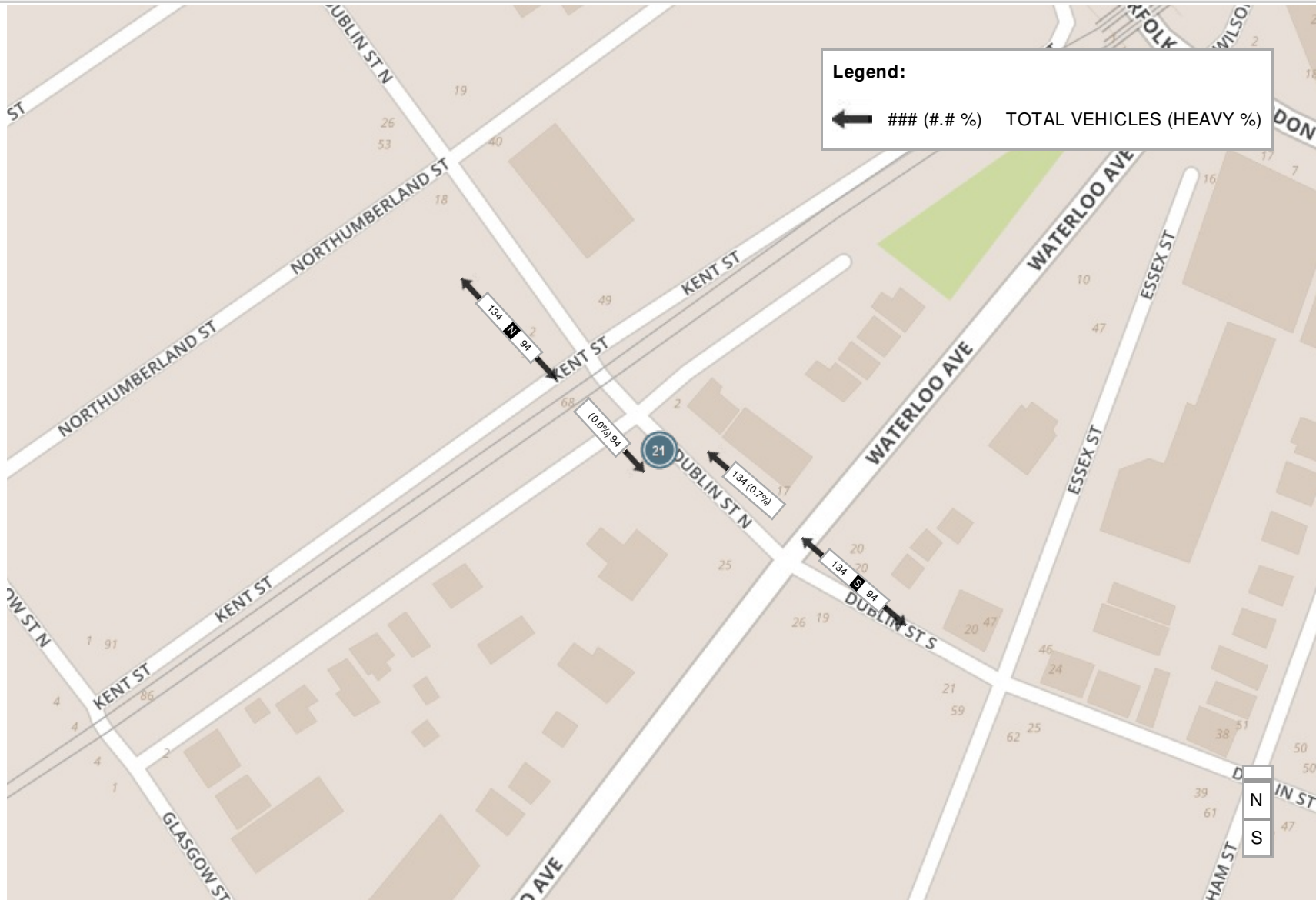
20:00:00	16	0	16	7	0	7	23	85
20:15:00	5	0	5	8	0	8	13	73
20:30:00	9	0	9	11	0	11	20	73
20:45:00	6	0	6	3	0	3	9	65
21:00:00	11	0	11	8	0	8	19	61
21:15:00	6	0	6	6	0	6	12	60
21:30:00	7	0	7	6	0	6	13	53
21:45:00	9	0	9	2	0	2	11	55
22:00:00	9	0	9	6	0	6	15	51
22:15:00	6	0	6	2	0	2	8	47
22:30:00	4	0	4	2	0	2	6	40
22:45:00	3	0	3	1	0	1	4	33
23:00:00	3	0	3	2	0	2	5	23
23:15:00	3	0	3	1	0	1	4	19
23:30:00	4	0	4	0	0	0	4	17
23:45:00	1	0	1	1	0	1	2	15
Grand Total	1283	0	1283	879	0	879	2162	-
Approach%	100%	-	-	100%	-	-	-	-
Totals %	59.3%	59.3%	59.3%	40.7%	40.7%	40.7%	-	-
Heavy	19	-	-	21	-	-	-	-
Heavy %	1.5%	-	-	2.4%	-	-	-	-
Bicycles	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-



Peak Hour: 04:15 PM - 05:15 PM Weather:

Start Time	S Approach			N Approach			Int. Total (15 min)
	Thru	Peds	Approach Total	Thru	Peds	Approach Total	
16:15:00	21	0	21	15	0	15	36
16:30:00	40	0	40	32	0	32	72
16:45:00	45	0	45	20	0	20	65
17:00:00	28	0	28	27	0	27	55
Grand Total	134	0	134	94	0	94	228
Approach%	100%		-	100%		-	-
Totals %	58.8%		58.8%	41.2%		41.2%	-
PHF	0.74		0.74	0.73		0.73	-
Heavy	1		1	0		0	-
Heavy %	0.7%		0.7%	0%		0%	-
Lights	128		128	92		92	-
Lights %	95.5%		95.5%	97.9%		97.9%	-
Single-Unit Trucks	1		1	0		0	-
Single-Unit Trucks %	0.7%		0.7%	0%		0%	-
Buses	0		0	0		0	-
Buses %	0%		0%	0%		0%	-
Articulated Trucks	0		0	0		0	-
Articulated Trucks %	0%		0%	0%		0%	-
Bicycles on Road	5		5	2		2	-
Bicycles on Road %	3.7%		3.7%	2.1%		2.1%	-

Peak Hour: 04:15 PM - 05:15 PM Weather:





Turning Movement Count (21 . AT DUBLIN ST & RAIL CROSSING)

Start Time	S Approach			N Approach			Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Peds S:	Approach Total	Thru N:S	Peds N:	Approach Total		
00:00:00	1	0	1	3	1	3	4	
00:15:00	3	2	3	3	0	3	6	
00:30:00	3	0	3	0	1	0	3	
00:45:00	0	0	0	0	0	0	0	13
01:00:00	0	0	0	0	0	0	0	9
01:15:00	0	0	0	0	0	0	0	3
01:30:00	1	0	1	0	0	0	1	1
01:45:00	0	1	0	0	1	0	0	1
02:00:00	2	0	2	1	0	1	3	4
02:15:00	2	0	2	0	0	0	2	6
02:30:00	0	0	0	0	0	0	0	5
02:45:00	0	0	0	1	0	1	1	6
03:00:00	0	0	0	0	0	0	0	3
03:15:00	0	0	0	0	0	0	0	1
03:30:00	0	0	0	1	0	1	1	2
03:45:00	0	0	0	0	0	0	0	1
04:00:00	0	0	0	1	0	1	1	2
04:15:00	0	0	0	0	0	0	0	2
04:30:00	1	0	1	0	0	0	1	2
04:45:00	0	0	0	0	0	0	0	2
05:00:00	2	0	2	1	0	1	3	4
05:15:00	1	0	1	2	0	2	3	7
05:30:00	1	0	1	3	0	3	4	10
05:45:00	1	1	1	1	2	1	2	12



06:00:00	2	0	2	1	1	1	3	12
06:15:00	3	3	3	7	3	7	10	19
06:30:00	5	0	5	5	0	5	10	25
06:45:00	4	0	4	9	0	9	13	36
07:00:00	2	0	2	2	1	2	4	37
07:15:00	6	0	6	5	0	5	11	38
07:30:00	17	0	17	2	0	2	19	47
07:45:00	16	1	16	13	0	13	29	63
08:00:00	23	1	23	16	0	16	39	98
08:15:00	30	3	30	21	0	21	51	138
08:30:00	13	1	13	8	0	8	21	140
08:45:00	54	0	54	28	0	28	82	193
09:00:00	23	0	23	14	0	14	37	191
09:15:00	20	2	20	9	0	9	29	169
09:30:00	14	0	14	13	0	13	27	175
09:45:00	27	0	27	11	0	11	38	131
10:00:00	17	0	17	14	0	14	31	125
10:15:00	25	0	25	11	0	11	36	132
10:30:00	21	0	21	8	0	8	29	134
10:45:00	19	0	19	7	0	7	26	122
11:00:00	18	0	18	12	0	12	30	121
11:15:00	20	0	20	11	0	11	31	116
11:30:00	20	0	20	11	0	11	31	118
11:45:00	32	0	32	29	0	29	61	153
12:00:00	12	0	12	12	0	12	24	147
12:15:00	22	0	22	14	0	14	36	152
12:30:00	13	0	13	15	0	15	28	149
12:45:00	24	0	24	14	0	14	38	126



13:00:00	15	0	15	22	0	22	37	139
13:15:00	19	0	19	11	0	11	30	133
13:30:00	26	0	26	12	1	12	38	143
13:45:00	21	0	21	14	0	14	35	140
14:00:00	22	4	22	10	0	10	32	135
14:15:00	20	2	20	18	0	18	38	143
14:30:00	30	0	30	13	0	13	43	148
14:45:00	28	0	28	9	0	9	37	150
15:00:00	31	0	31	17	0	17	48	166
15:15:00	15	3	15	16	3	16	31	159
15:30:00	28	0	28	20	0	20	48	164
15:45:00	27	0	27	16	0	16	43	170
16:00:00	24	0	24	28	0	28	52	174
16:15:00	30	1	30	20	1	20	50	193
16:30:00	24	0	24	24	0	24	48	193
16:45:00	30	1	30	19	0	19	49	199
17:00:00	28	1	28	26	1	26	54	201
17:15:00	30	0	30	19	1	19	49	200
17:30:00	26	0	26	16	0	16	42	194
17:45:00	30	0	30	19	0	19	49	194
18:00:00	26	2	26	20	0	20	46	186
18:15:00	13	1	13	10	0	10	23	160
18:30:00	32	0	32	11	0	11	43	161
18:45:00	27	1	27	15	0	15	42	154
19:00:00	21	0	21	14	0	14	35	143
19:15:00	21	0	21	10	0	10	31	151
19:30:00	17	3	17	9	0	9	26	134
19:45:00	15	0	15	8	0	8	23	115



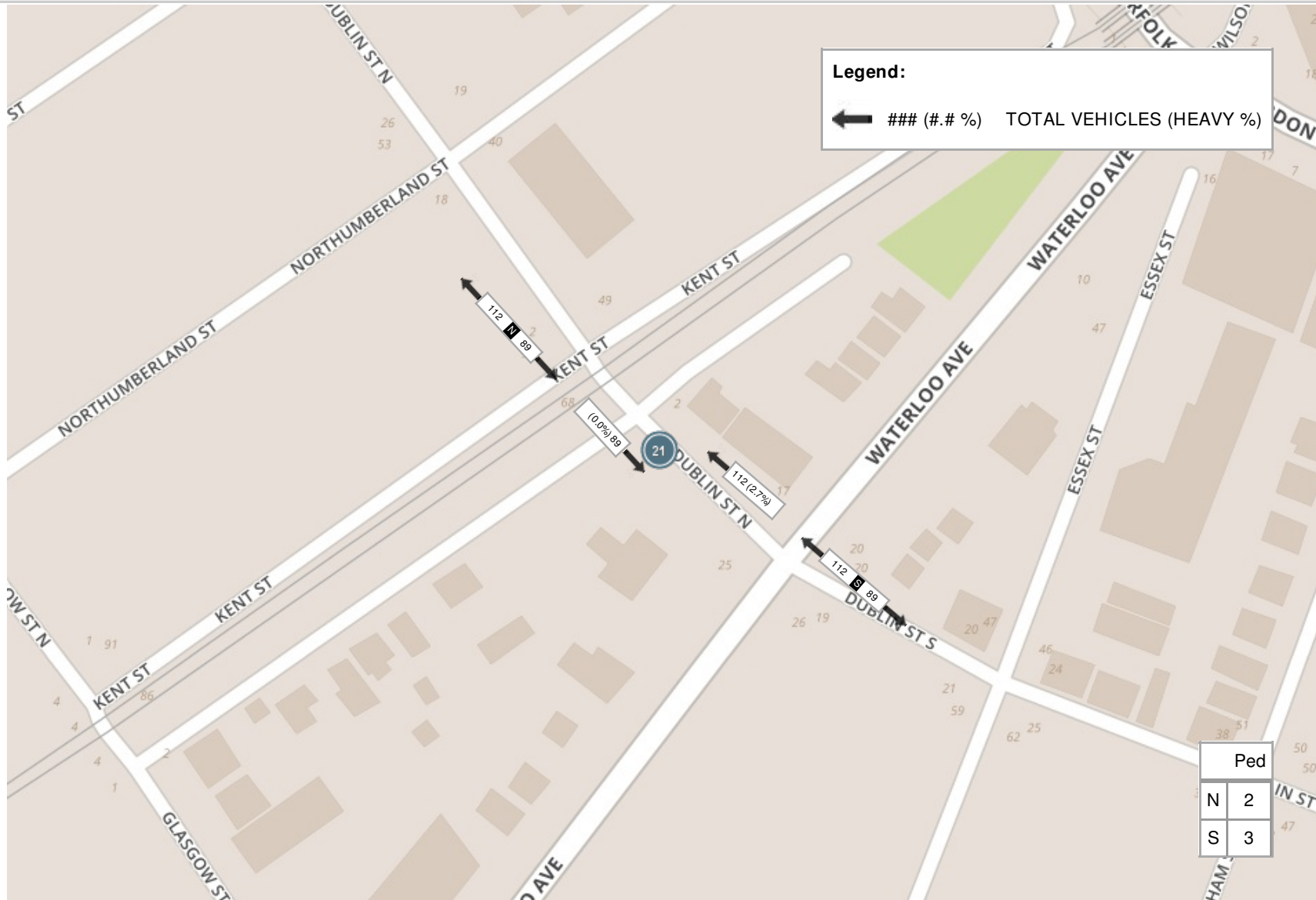
20:00:00	9	0	9	8	0	8	17	97
20:15:00	12	0	12	4	0	4	16	82
20:30:00	16	1	16	6	0	6	22	78
20:45:00	14	0	14	6	0	6	20	75
21:00:00	16	0	16	6	0	6	22	80
21:15:00	10	0	10	9	0	9	19	83
21:30:00	5	0	5	6	0	6	11	72
21:45:00	8	0	8	8	0	8	16	68
22:00:00	9	0	9	5	0	5	14	60
22:15:00	9	0	9	3	0	3	12	53
22:30:00	8	0	8	7	0	7	15	57
22:45:00	1	0	1	7	0	7	8	49
23:00:00	5	0	5	2	0	2	7	42
23:15:00	3	0	3	1	0	1	4	34
23:30:00	4	0	4	2	0	2	6	25
23:45:00	1	0	1	0	0	0	1	18
Grand Total	1326	35	1326	865	17	865	2191	-
Approach%	100%	-	-	100%	-	-	-	-
Totals %	60.5%	60.5%	60.5%	39.5%	39.5%	39.5%	-	-
Heavy	12	-	-	10	-	-	-	-
Heavy %	0.9%	-	-	1.2%	-	-	-	-
Bicycles	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-



Peak Hour: 04:15 PM - 05:15 PM Weather:

Start Time	S Approach			N Approach			Int. Total (15 min)
	Thru	Peds	Approach Total	Thru	Peds	Approach Total	
16:15:00	30	1	30	20	1	20	50
16:30:00	24	0	24	24	0	24	48
16:45:00	30	1	30	19	0	19	49
17:00:00	28	1	28	26	1	26	54
Grand Total	112	3	112	89	2	89	201
Approach%	100%		-	100%		-	-
Totals %	55.7%		55.7%	44.3%		44.3%	-
PHF	0.93		0.93	0.86		0.86	-
Heavy	3		3	0		0	-
Heavy %	2.7%		2.7%	0%		0%	-
Lights	104		104	89		89	-
Lights %	92.9%		92.9%	100%		100%	-
Single-Unit Trucks	3		3	0		0	-
Single-Unit Trucks %	2.7%		2.7%	0%		0%	-
Bicycles on Road	5		5	0		0	-
Bicycles on Road %	4.5%		4.5%	0%		0%	-
Ped	-	3	-	-	2	-	-
Ped%	-	60%	-	-	40%	-	-

Peak Hour: 04:15 PM - 05:15 PM Weather:





Turning Movement Count (21 . AT DUBLIN ST & RAIL CROSSING)

Start Time	S Approach			N Approach			Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Peds S:	Approach Total	Thru N:S	Peds N:	Approach Total		
00:00:00	1	0	1	3	0	3	4	
00:15:00	2	0	2	3	0	3	5	
00:30:00	1	0	1	0	0	0	1	
00:45:00	1	0	1	1	0	1	2	12
01:00:00	1	0	1	3	0	3	4	12
01:15:00	1	0	1	0	0	0	1	8
01:30:00	0	0	0	0	0	0	0	7
01:45:00	1	0	1	1	0	1	2	7
02:00:00	3	0	3	0	0	0	3	6
02:15:00	0	0	0	1	0	1	1	6
02:30:00	1	0	1	0	0	0	1	7
02:45:00	1	0	1	0	0	0	1	6
03:00:00	0	0	0	0	0	0	0	3
03:15:00	0	0	0	0	0	0	0	2
03:30:00	0	0	0	0	0	0	0	1
03:45:00	0	0	0	0	0	0	0	0
04:00:00	1	0	1	1	0	1	2	2
04:15:00	0	0	0	0	0	0	0	2
04:30:00	0	0	0	1	0	1	1	3
04:45:00	0	0	0	1	0	1	1	4
05:00:00	1	0	1	0	0	0	1	3
05:15:00	0	0	0	3	0	3	3	6
05:30:00	3	0	3	1	0	1	4	9
05:45:00	1	0	1	1	0	1	2	10



06:00:00	3	0	3	2	0	2	5	14
06:15:00	2	0	2	4	0	4	6	17
06:30:00	6	0	6	11	0	11	17	30
06:45:00	6	0	6	8	0	8	14	42
07:00:00	4	0	4	2	0	2	6	43
07:15:00	16	0	16	9	0	9	25	62
07:30:00	14	0	14	6	0	6	20	65
07:45:00	19	0	19	11	0	11	30	81
08:00:00	19	0	19	18	0	18	37	112
08:15:00	26	0	26	12	0	12	38	125
08:30:00	34	0	34	18	0	18	52	157
08:45:00	38	0	38	27	0	27	65	192
09:00:00	23	0	23	13	0	13	36	191
09:15:00	22	0	22	9	0	9	31	184
09:30:00	19	0	19	17	0	17	36	168
09:45:00	11	0	11	11	0	11	22	125
10:00:00	15	0	15	11	0	11	26	115
10:15:00	14	0	14	9	0	9	23	107
10:30:00	15	0	15	9	0	9	24	95
10:45:00	20	0	20	12	0	12	32	105
11:00:00	12	0	12	7	0	7	19	98
11:15:00	18	0	18	10	0	10	28	103
11:30:00	13	0	13	14	0	14	27	106
11:45:00	30	0	30	9	0	9	39	113
12:00:00	32	0	32	26	0	26	58	152
12:15:00	14	0	14	12	0	12	26	150
12:30:00	28	0	28	15	0	15	43	166
12:45:00	28	0	28	14	0	14	42	169



13:00:00	20	0	20	16	0	16	36	147
13:15:00	17	0	17	11	0	11	28	149
13:30:00	15	0	15	9	0	9	24	130
13:45:00	18	0	18	13	0	13	31	119
14:00:00	18	0	18	12	0	12	30	113
14:15:00	22	0	22	15	0	15	37	122
14:30:00	25	0	25	10	0	10	35	133
14:45:00	29	0	29	17	0	17	46	148
15:00:00	26	0	26	10	0	10	36	154
15:15:00	21	0	21	9	0	9	30	147
15:30:00	19	0	19	13	0	13	32	144
15:45:00	30	0	30	12	0	12	42	140
16:00:00	28	0	28	22	0	22	50	154
16:15:00	28	0	28	23	0	23	51	175
16:30:00	38	0	38	31	0	31	69	212
16:45:00	39	0	39	15	0	15	54	224
17:00:00	27	0	27	22	0	22	49	223
17:15:00	19	0	19	22	0	22	41	213
17:30:00	24	0	24	13	0	13	37	181
17:45:00	27	0	27	17	0	17	44	171
18:00:00	23	0	23	11	0	11	34	156
18:15:00	15	0	15	13	0	13	28	143
18:30:00	23	0	23	11	0	11	34	140
18:45:00	21	0	21	7	0	7	28	124
19:00:00	16	0	16	11	0	11	27	117
19:15:00	15	0	15	9	0	9	24	113
19:30:00	12	0	12	11	0	11	23	102
19:45:00	5	0	5	6	0	6	11	85



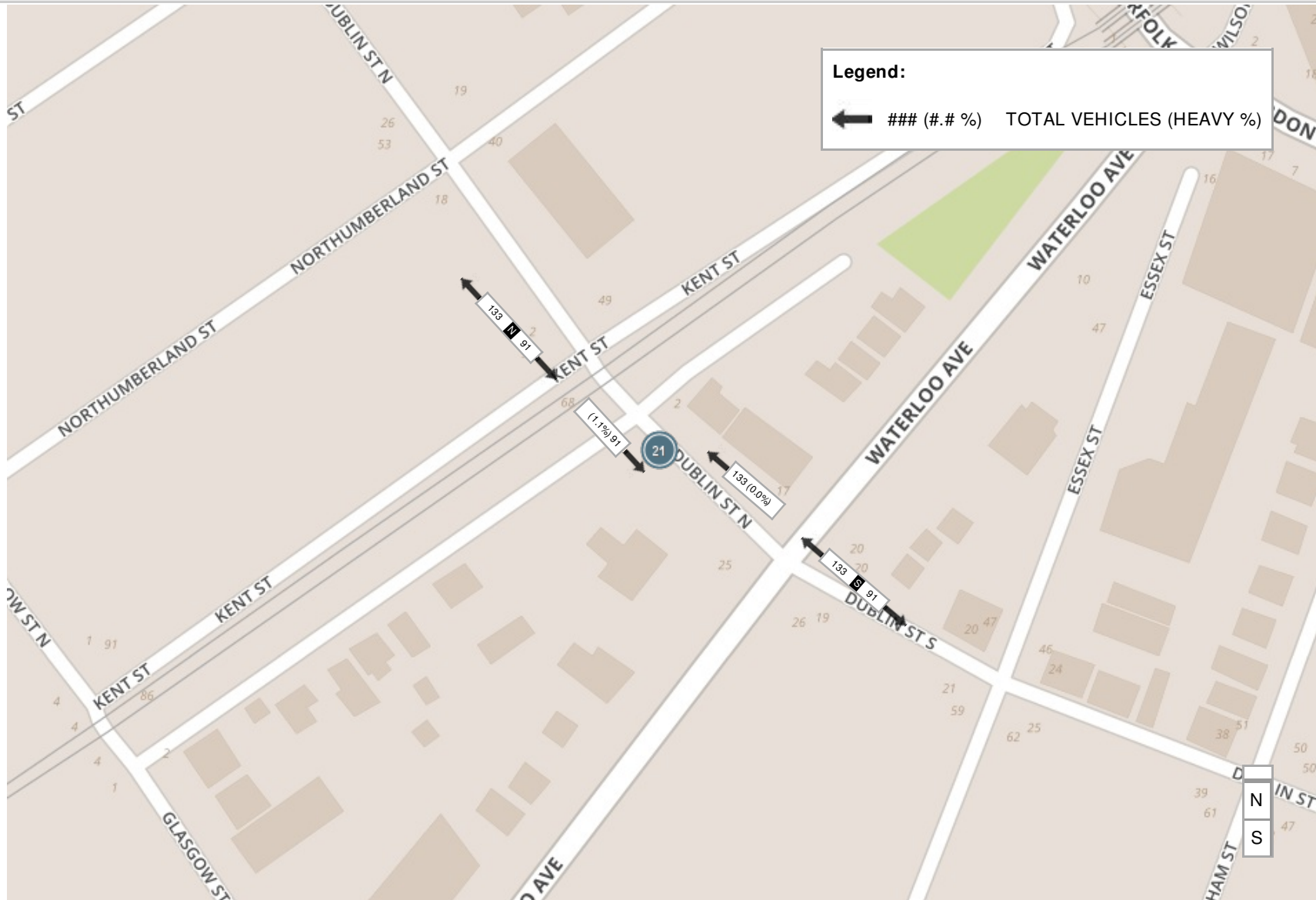
20:00:00	4	0	4	4	0	4	8	66
20:15:00	10	0	10	11	0	11	21	63
20:30:00	13	0	13	6	0	6	19	59
20:45:00	9	0	9	5	0	5	14	62
21:00:00	10	0	10	6	0	6	16	70
21:15:00	7	0	7	5	0	5	12	61
21:30:00	9	0	9	8	0	8	17	59
21:45:00	5	0	5	3	0	3	8	53
22:00:00	8	0	8	9	0	9	17	54
22:15:00	8	0	8	1	0	1	9	51
22:30:00	8	0	8	1	0	1	9	43
22:45:00	2	0	2	3	0	3	5	40
23:00:00	2	0	2	2	0	2	4	27
23:15:00	3	0	3	1	0	1	4	22
23:30:00	5	0	5	2	0	2	7	20
23:45:00	4	0	4	5	0	5	9	24
Grand Total	1247	0	1247	809	0	809	2056	-
Approach%	100%	-	-	100%	-	-	-	-
Totals %	60.7%	60.7%	60.7%	39.3%	39.3%	39.3%	-	-
Heavy	10	-	-	13	-	-	-	-
Heavy %	0.8%	-	-	1.6%	-	-	-	-
Bicycles	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-



Peak Hour: 04:00 PM - 05:00 PM Weather:

Start Time	S Approach			N Approach			Int. Total (15 min)
	Thru	Peds	Approach Total	Thru	Peds	Approach Total	
16:00:00	28	0	28	22	0	22	50
16:15:00	28	0	28	23	0	23	51
16:30:00	38	0	38	31	0	31	69
16:45:00	39	0	39	15	0	15	54
Grand Total	133	0	133	91	0	91	224
Approach%	100%		-	100%		-	-
Totals %	59.4%		59.4%	40.6%		40.6%	-
PHF	0.85		0.85	0.73		0.73	-
Heavy	0		0	1		1	-
Heavy %	0%		0%	1.1%		1.1%	-
Lights	131		131	90		90	-
Lights %	98.5%		98.5%	98.9%		98.9%	-
Single-Unit Trucks	0		0	1		1	-
Single-Unit Trucks %	0%		0%	1.1%		1.1%	-
Articulated Trucks	0		0	0		0	-
Articulated Trucks %	0%		0%	0%		0%	-
Bicycles on Road	2		2	0		0	-
Bicycles on Road %	1.5%		1.5%	0%		0%	-

Peak Hour: 04:00 PM - 05:00 PM Weather:





Turning Movement Count (20 - AT GLASGOW ST & RAIL CROSSING)

Start Time	S Approach		N Approach		Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Approach Total	Thru N:S	Approach Total		
00:00:00	3	3	3	3	6	
00:15:00	0	0	0	0	0	
00:30:00	4	4	1	1	5	
00:45:00	0	0	0	0	0	11
01:00:00	0	0	2	2	2	7
01:15:00	0	0	1	1	1	8
01:30:00	0	0	0	0	0	3
01:45:00	1	1	1	1	2	5
02:00:00	0	0	1	1	1	4
02:15:00	1	1	1	1	2	5
02:30:00	1	1	1	1	2	7
02:45:00	3	3	0	0	3	8
03:00:00	0	0	1	1	1	8
03:15:00	0	0	1	1	1	7
03:30:00	0	0	0	0	0	5
03:45:00	0	0	0	0	0	2
04:00:00	0	0	0	0	0	1
04:15:00	0	0	0	0	0	0
04:30:00	1	1	0	0	1	1
04:45:00	1	1	2	2	3	4



05:00:00	1	1	0	0	1	5
05:15:00	0	0	0	0	0	5
05:30:00	0	0	0	0	0	4
05:45:00	0	0	0	0	0	1
06:00:00	1	1	1	1	2	2
06:15:00	0	0	1	1	1	3
06:30:00	1	1	1	1	2	5
06:45:00	2	2	3	3	5	10
07:00:00	1	1	2	2	3	11
07:15:00	1	1	6	6	7	17
07:30:00	2	2	5	5	7	22
07:45:00	3	3	4	4	7	24
08:00:00	3	3	3	3	6	27
08:15:00	1	1	3	3	4	24
08:30:00	0	0	6	6	6	23
08:45:00	5	5	7	7	12	28
09:00:00	7	7	7	7	14	36
09:15:00	2	2	9	9	11	43
09:30:00	4	4	5	5	9	46
09:45:00	5	5	8	8	13	47
10:00:00	4	4	6	6	10	43
10:15:00	3	3	6	6	9	41
10:30:00	5	5	12	12	17	49



10:45:00	1	1	9	9	10	46
11:00:00	5	5	8	8	13	49
11:15:00	6	6	10	10	16	56
11:30:00	17	17	6	6	23	62
11:45:00	10	10	6	6	16	68
12:00:00	6	6	10	10	16	71
12:15:00	5	5	7	7	12	67
12:30:00	9	9	7	7	16	60
12:45:00	2	2	10	10	12	56
13:00:00	6	6	8	8	14	54
13:15:00	6	6	10	10	16	58
13:30:00	4	4	16	16	20	62
13:45:00	8	8	8	8	16	66
14:00:00	4	4	6	6	10	62
14:15:00	8	8	9	9	17	63
14:30:00	2	2	3	3	5	48
14:45:00	3	3	2	2	5	37
15:00:00	6	6	9	9	15	42
15:15:00	7	7	9	9	16	41
15:30:00	7	7	5	5	12	48
15:45:00	5	5	8	8	13	56
16:00:00	8	8	5	5	13	54
16:15:00	8	8	7	7	15	53



16:30:00	3	3	14	14	17	58
16:45:00	11	11	13	13	24	69
17:00:00	13	13	5	5	18	74
17:15:00	4	4	8	8	12	71
17:30:00	8	8	10	10	18	72
17:45:00	3	3	4	4	7	55
18:00:00	7	7	5	5	12	49
18:15:00	5	5	8	8	13	50
18:30:00	3	3	6	6	9	41
18:45:00	6	6	7	7	13	47
19:00:00	9	9	5	5	14	49
19:15:00	4	4	5	5	9	45
19:30:00	4	4	8	8	12	48
19:45:00	6	6	4	4	10	45
20:00:00	3	3	9	9	12	43
20:15:00	5	5	2	2	7	41
20:30:00	1	1	4	4	5	34
20:45:00	3	3	3	3	6	30
21:00:00	6	6	5	5	11	29
21:15:00	6	6	3	3	9	31
21:30:00	2	2	3	3	5	31
21:45:00	0	0	2	2	2	27
22:00:00	1	1	2	2	3	19



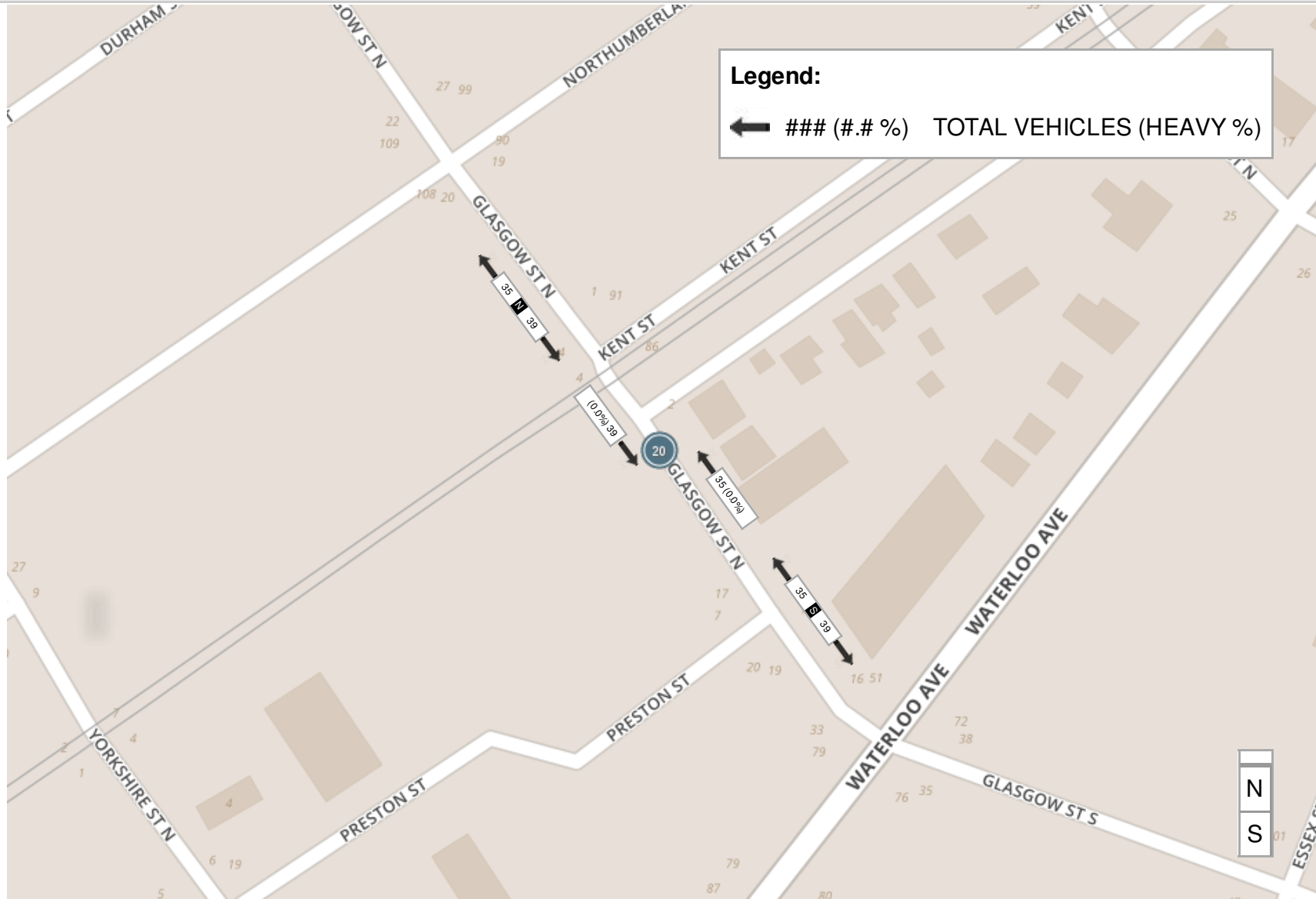
22:15:00 22:30:00	3 2	3 2	0 3	0 3	3 5	13 13
22:45:00	2	2	0	0	2	13
23:00:00	2	2	3	3	5	15
23:15:00	2	2	1	1	3	15
23:30:00	5	5	2	2	7	17
23:45:00	3	3	1	1	4	19
Grand Total	341	341	433	433	774	-
Approach%	100%	-	100%	-	-	-
Totals %	44.1%	44.1%	55.9%	55.9%	-	-
Heavy	6	-	5	-	-	-
Heavy %	1.8%	-	1.2%	-	-	-
Bicycles	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-



Peak Hour: 04:15 PM - 05:15 PM Weather:

Start Time	S Approach		N Approach		Int. Total (15 min)
	Thru	Approach Total	Thru	Approach Total	
16:15:00	8	8	7	7	15
16:30:00	3	3	14	14	17
16:45:00	11	11	13	13	24
17:00:00	13	13	5	5	18
Grand Total	35	35	39	39	74
Approach%	100%	-	100%	-	-
Totals %	47.3%	47.3%	52.7%	52.7%	-
PHF	0.67	0.67	0.7	0.7	-
Heavy	0	0	0	0	-
Heavy %	0%	0%	0%	0%	-
Lights	31	31	34	34	-
Lights %	88.6%	88.6%	87.2%	87.2%	-
Single-Unit Trucks	0	0	0	0	-
Single-Unit Trucks %	0%	0%	0%	0%	-
Articulated Trucks	0	0	0	0	-
Articulated Trucks %	0%	0%	0%	0%	-
Bicycles on Road	4	4	5	5	-
Bicycles on Road %	11.4%	11.4%	12.8%	12.8%	-

Peak Hour: 04:15 PM - 05:15 PM Weather:





Turning Movement Count (20 - AT GLASGOW ST & RAIL CROSSING)

Start Time	S Approach		N Approach		Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Approach Total	Thru N:S	Approach Total		
00:00:00	1	1	1	1	2	
00:15:00	2	2	0	0	2	
00:30:00	2	2	1	1	3	
00:45:00	1	1	0	0	1	8
01:00:00	1	1	0	0	1	7
01:15:00	1	1	1	1	2	7
01:30:00	0	0	1	1	1	5
01:45:00	1	1	1	1	2	6
02:00:00	0	0	0	0	0	5
02:15:00	1	1	0	0	1	4
02:30:00	3	3	2	2	5	8
02:45:00	1	1	0	0	1	7
03:00:00	0	0	0	0	0	7
03:15:00	0	0	1	1	1	7
03:30:00	0	0	1	1	1	3
03:45:00	1	1	0	0	1	3
04:00:00	0	0	1	1	1	4
04:15:00	0	0	1	1	1	4
04:30:00	0	0	1	1	1	4
04:45:00	0	0	1	1	1	4



05:00:00	1	1	0	0	1	4
05:15:00	1	1	2	2	3	6
05:30:00	0	0	0	0	0	5
05:45:00	0	0	0	0	0	4
06:00:00	0	0	1	1	1	4
06:15:00	1	1	1	1	2	3
06:30:00	1	1	0	0	1	4
06:45:00	0	0	0	0	0	4
07:00:00	2	2	0	0	2	5
07:15:00	0	0	0	0	0	3
07:30:00	0	0	1	1	1	3
07:45:00	2	2	0	0	2	5
08:00:00	1	1	1	1	2	5
08:15:00	2	2	3	3	5	10
08:30:00	2	2	5	5	7	16
08:45:00	2	2	7	7	9	23
09:00:00	7	7	7	7	14	35
09:15:00	2	2	4	4	6	36
09:30:00	3	3	8	8	11	40
09:45:00	5	5	9	9	14	45
10:00:00	3	3	12	12	15	46
10:15:00	5	5	4	4	9	49
10:30:00	4	4	10	10	14	52



10:45:00	9	9	8	8	17	55
11:00:00	5	5	11	11	16	56
11:15:00	2	2	4	4	6	53
11:30:00	6	6	6	6	12	51
11:45:00	6	6	4	4	10	44
12:00:00	10	10	10	10	20	48
12:15:00	6	6	13	13	19	61
12:30:00	5	5	9	9	14	63
12:45:00	5	5	8	8	13	66
13:00:00	13	13	6	6	19	65
13:15:00	6	6	9	9	15	61
13:30:00	10	10	8	8	18	65
13:45:00	7	7	6	6	13	65
14:00:00	9	9	5	5	14	60
14:15:00	6	6	8	8	14	59
14:30:00	3	3	8	8	11	52
14:45:00	3	3	9	9	12	51
15:00:00	3	3	7	7	10	47
15:15:00	8	8	9	9	17	50
15:30:00	5	5	8	8	13	52
15:45:00	3	3	10	10	13	53
16:00:00	3	3	6	6	9	52
16:15:00	1	1	5	5	6	41



16:30:00	6	6	6	6	12	40
16:45:00	5	5	5	5	10	37
17:00:00	7	7	10	10	17	45
17:15:00	5	5	6	6	11	50
17:30:00	5	5	4	4	9	47
17:45:00	4	4	4	4	8	45
18:00:00	5	5	4	4	9	37
18:15:00	9	9	4	4	13	39
18:30:00	4	4	6	6	10	40
18:45:00	8	8	5	5	13	45
19:00:00	2	2	7	7	9	45
19:15:00	4	4	4	4	8	40
19:30:00	2	2	3	3	5	35
19:45:00	1	1	1	1	2	24
20:00:00	4	4	2	2	6	21
20:15:00	5	5	4	4	9	22
20:30:00	2	2	5	5	7	24
20:45:00	4	4	5	5	9	31
21:00:00	3	3	6	6	9	34
21:15:00	1	1	2	2	3	28
21:30:00	5	5	0	0	5	26
21:45:00	4	4	1	1	5	22
22:00:00	1	1	1	1	2	15



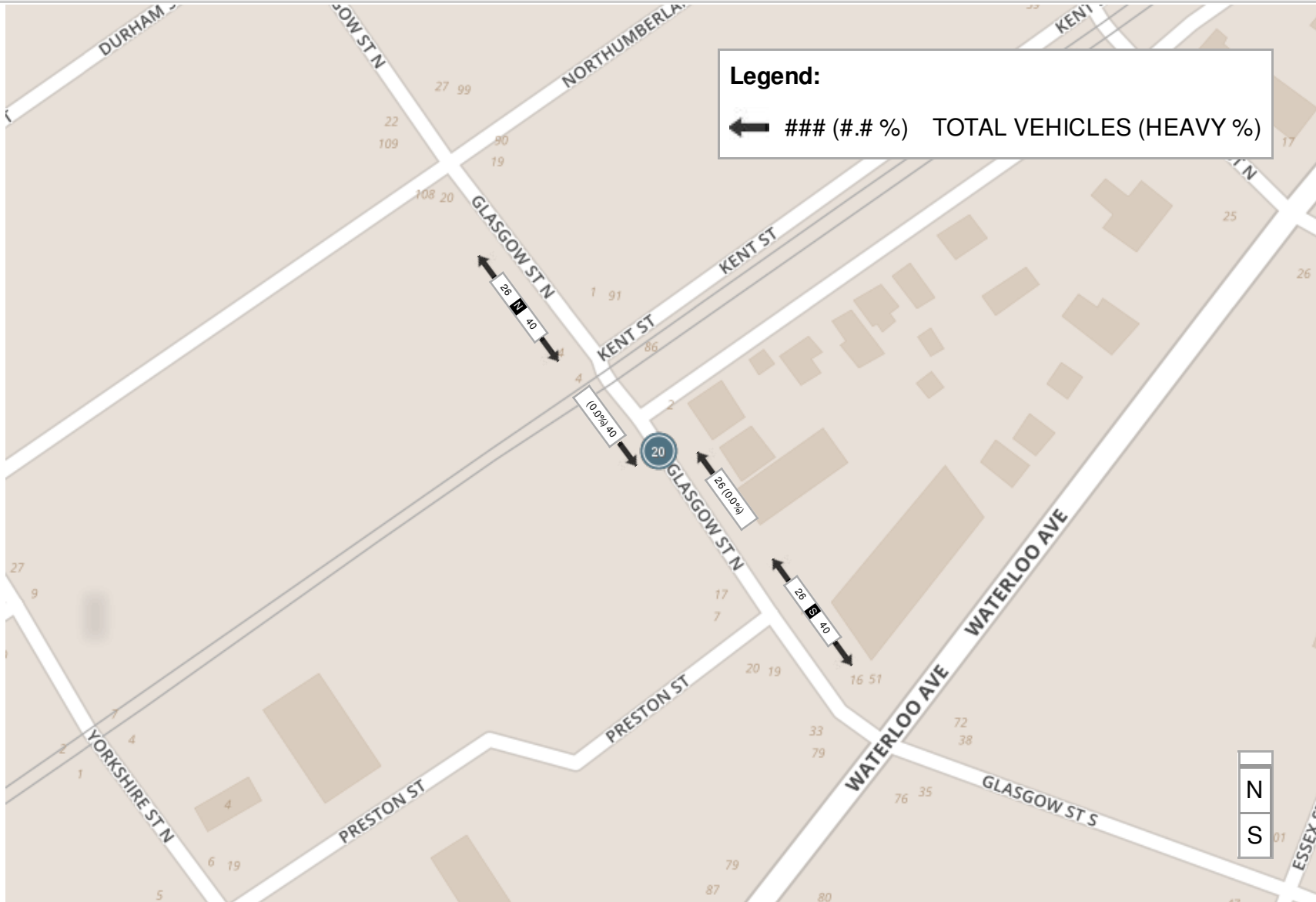
22:15:00 22:30:00	0 1	0 1	2 0	2 0	2 1	14 10
22:45:00	3	3	0	0	3	8
23:00:00	2	2	1	1	3	9
23:15:00	1	1	2	2	3	10
23:30:00	1	1	2	2	3	12
23:45:00	1	1	2	2	3	12
Grand Total	298	298	369	369	667	-
Approach%	100%	-	100%	-	-	-
Totals %	44.7%	44.7%	55.3%	55.3%	-	-
Heavy	3	-	6	-	-	-
Heavy %	1%	-	1.6%	-	-	-
Bicycles	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-



Peak Hour: 12:00 PM - 01:00 PM Weather:

Start Time	S Approach		N Approach		Int. Total (15 min)
	Thru	Approach Total	Thru	Approach Total	
12:00:00	10	10	10	10	20
12:15:00	6	6	13	13	19
12:30:00	5	5	9	9	14
12:45:00	5	5	8	8	13
Grand Total	26	26	40	40	66
Approach%	100%	-	100%	-	-
Totals %	39.4%	39.4%	60.6%	60.6%	-
PHF	0.65	0.65	0.77	0.77	-
Heavy	0	0	0	0	-
Heavy %	0%	0%	0%	0%	-
Lights	26	26	37	37	-
Lights %	100%	100%	92.5%	92.5%	-
Single-Unit Trucks	0	0	0	0	-
Single-Unit Trucks %	0%	0%	0%	0%	-
Articulated Trucks	0	0	0	0	-
Articulated Trucks %	0%	0%	0%	0%	-
Bicycles on Road	0	0	3	3	-
Bicycles on Road %	0%	0%	7.5%	7.5%	-

Peak Hour: 12:00 PM - 01:00 PM Weather:





Turning Movement Count (20 - AT GLASGOW ST & RAIL CROSSING)

Start Time	S Approach		N Approach		Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Approach Total	Thru N:S	Approach Total		
00:00:00	3	3	1	1	4	
00:15:00	2	2	0	0	2	
00:30:00	0	0	1	1	1	
00:45:00	0	0	0	0	0	7
01:00:00	0	0	2	2	2	5
01:15:00	0	0	0	0	0	3
01:30:00	0	0	1	1	1	3
01:45:00	0	0	0	0	0	3
02:00:00	0	0	0	0	0	1
02:15:00	0	0	0	0	0	1
02:30:00	0	0	0	0	0	0
02:45:00	0	0	0	0	0	0
03:00:00	0	0	0	0	0	0
03:15:00	0	0	0	0	0	0
03:30:00	0	0	0	0	0	0
03:45:00	2	2	1	1	3	3
04:00:00	1	1	0	0	1	4
04:15:00	0	0	1	1	1	5
04:30:00	0	0	0	0	0	5
04:45:00	1	1	0	0	1	3



05:00:00	1	1	1	1	2	4
05:15:00	0	0	1	1	1	4
05:30:00	0	0	3	3	3	7
05:45:00	1	1	1	1	2	8
06:00:00	1	1	4	4	5	11
06:15:00	2	2	4	4	6	16
06:30:00	2	2	4	4	6	19
06:45:00	0	0	2	2	2	19
07:00:00	5	5	6	6	11	25
07:15:00	4	4	5	5	9	28
07:30:00	4	4	4	4	8	30
07:45:00	5	5	8	8	13	41
08:00:00	7	7	8	8	15	45
08:15:00	10	10	14	14	24	60
08:30:00	15	15	11	11	26	78
08:45:00	13	13	17	17	30	95
09:00:00	5	5	14	14	19	99
09:15:00	2	2	14	14	16	91
09:30:00	3	3	10	10	13	78
09:45:00	1	1	8	8	9	57
10:00:00	4	4	5	5	9	47
10:15:00	0	0	4	4	4	35
10:30:00	4	4	1	1	5	27



10:45:00	8	8	8	8	16	34
11:00:00	13	13	4	4	17	42
11:15:00	5	5	7	7	12	50
11:30:00	5	5	7	7	12	57
11:45:00	7	7	6	6	13	54
12:00:00	10	10	4	4	14	51
12:15:00	7	7	17	17	24	63
12:30:00	6	6	10	10	16	67
12:45:00	7	7	13	13	20	74
13:00:00	2	2	11	11	13	73
13:15:00	5	5	8	8	13	62
13:30:00	7	7	9	9	16	62
13:45:00	3	3	9	9	12	54
14:00:00	11	11	7	7	18	59
14:15:00	2	2	6	6	8	54
14:30:00	4	4	6	6	10	48
14:45:00	8	8	13	13	21	57
15:00:00	6	6	15	15	21	60
15:15:00	8	8	17	17	25	77
15:30:00	11	11	7	7	18	85
15:45:00	5	5	10	10	15	79
16:00:00	16	16	18	18	34	92
16:15:00	17	17	9	9	26	93



16:30:00	12	12	17	17	29	104
16:45:00	14	14	13	13	27	116
17:00:00	12	12	8	8	20	102
17:15:00	12	12	9	9	21	97
17:30:00	5	5	10	10	15	83
17:45:00	10	10	4	4	14	70
18:00:00	9	9	8	8	17	67
18:15:00	6	6	8	8	14	60
18:30:00	2	2	8	8	10	55
18:45:00	9	9	6	6	15	56
19:00:00	5	5	7	7	12	51
19:15:00	11	11	7	7	18	55
19:30:00	6	6	4	4	10	55
19:45:00	5	5	3	3	8	48
20:00:00	7	7	6	6	13	49
20:15:00	2	2	2	2	4	35
20:30:00	3	3	1	1	4	29
20:45:00	5	5	1	1	6	27
21:00:00	2	2	7	7	9	23
21:15:00	0	0	2	2	2	21
21:30:00	2	2	2	2	4	21
21:45:00	2	2	2	2	4	19
22:00:00	5	5	4	4	9	19



22:15:00 22:30:00	6 1	6 1	2 1	2 1	8 2	25 23
22:45:00	2	2	1	1	3	22
23:00:00	2	2	1	1	3	16
23:15:00	0	0	1	1	1	9
23:30:00	0	0	3	3	3	10
23:45:00	2	2	2	2	4	11
Grand Total	430	430	527	527	957	-
Approach%	100%	-	100%	-	-	-
Totals %	44.9%	44.9%	55.1%	55.1%	-	-
Heavy	7	-	7	-	-	-
Heavy %	1.6%	-	1.3%	-	-	-
Bicycles	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-

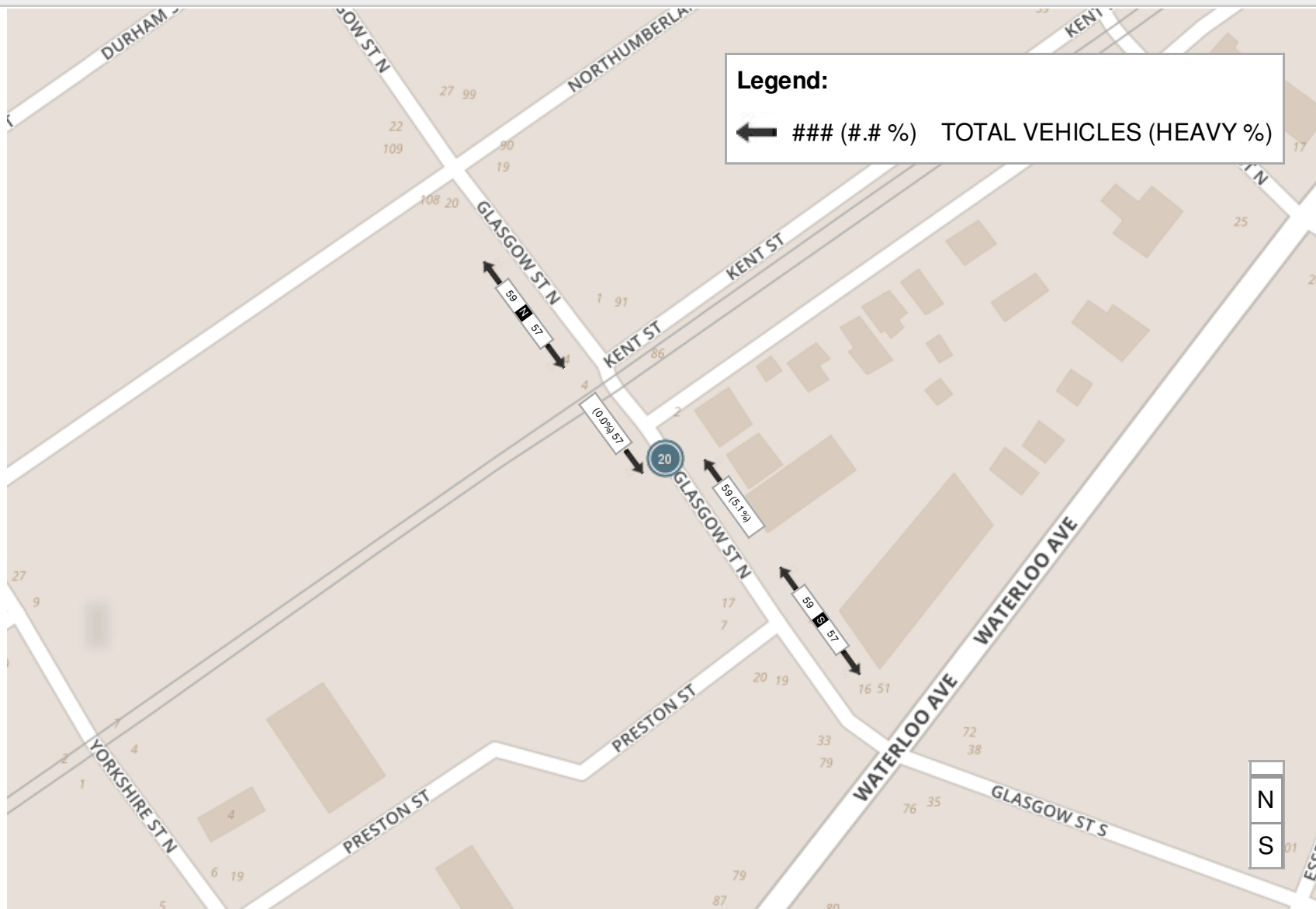


Peak Hour: 04:00 PM - 05:00 PM Weather:

Start Time	S Approach		N Approach		Int. Total (15 min)
	Thru	Approach Total	Thru	Approach Total	
16:00:00	16	16	18	18	34
16:15:00	17	17	9	9	26
16:30:00	12	12	17	17	29
16:45:00	14	14	13	13	27
Grand Total	59	59	57	57	116
Approach%	100%	-	100%	-	-
Totals %	50.9%	50.9%	49.1%	49.1%	-
PHF	0.87	0.87	0.79	0.79	-
Heavy	3	3	0	0	-
Heavy %	5.1%	5.1%	0%	0%	-
Lights	56	56	55	55	-
Lights %	94.9%	94.9%	96.5%	96.5%	-
Single-Unit Trucks	2	2	0	0	-
Single-Unit Trucks %	3.4%	3.4%	0%	0%	-
Buses	1	1	0	0	-
Buses %	1.7%	1.7%	0%	0%	-
Bicycles on Road	0	0	2	2	-
Bicycles on Road %	0%	0%	3.5%	3.5%	-



Peak Hour: 04:00 PM - 05:00 PM Weather:





Turning Movement Count (20 - AT GLASGOW ST & RAIL CROSSING)

Start Time	S Approach		N Approach		Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Approach Total	Thru N:S	Approach Total		
00:00:00	2	2	3	3	5	
00:15:00	1	1	1	1	2	
00:30:00	0	0	1	1	1	
00:45:00	0	0	2	2	2	10
01:00:00	2	2	0	0	2	7
01:15:00	0	0	0	0	0	5
01:30:00	0	0	0	0	0	4
01:45:00	0	0	0	0	0	2
02:00:00	0	0	0	0	0	0
02:15:00	0	0	0	0	0	0
02:30:00	0	0	0	0	0	0
02:45:00	0	0	0	0	0	0
03:00:00	0	0	0	0	0	0
03:15:00	0	0	0	0	0	0
03:30:00	0	0	0	0	0	0
03:45:00	0	0	0	0	0	0
04:00:00	0	0	1	1	1	1
04:15:00	0	0	1	1	1	2
04:30:00	0	0	1	1	1	3
04:45:00	0	0	1	1	1	4



05:00:00	0	0	1	1	1	4
05:15:00	0	0	1	1	1	4
05:30:00	1	1	1	1	2	5
05:45:00	0	0	1	1	1	5
06:00:00	0	0	2	2	2	6
06:15:00	1	1	1	1	2	7
06:30:00	1	1	6	6	7	12
06:45:00	2	2	5	5	7	18
07:00:00	4	4	1	1	5	21
07:15:00	2	2	4	4	6	25
07:30:00	1	1	5	5	6	24
07:45:00	6	6	6	6	12	29
08:00:00	4	4	10	10	14	38
08:15:00	8	8	11	11	19	51
08:30:00	8	8	16	16	24	69
08:45:00	10	10	22	22	32	89
09:00:00	9	9	8	8	17	92
09:15:00	6	6	12	12	18	91
09:30:00	6	6	11	11	17	84
09:45:00	9	9	11	11	20	72
10:00:00	2	2	4	4	6	61
10:15:00	3	3	3	3	6	49
10:30:00	5	5	6	6	11	43



10:45:00	12	12	3	3	15	38
11:00:00	3	3	6	6	9	41
11:15:00	3	3	5	5	8	43
11:30:00	6	6	6	6	12	44
11:45:00	5	5	5	5	10	39
12:00:00	8	8	7	7	15	45
12:15:00	5	5	9	9	14	51
12:30:00	6	6	10	10	16	55
12:45:00	7	7	7	7	14	59
13:00:00	2	2	7	7	9	53
13:15:00	7	7	7	7	14	53
13:30:00	13	13	4	4	17	54
13:45:00	7	7	5	5	12	52
14:00:00	9	9	8	8	17	60
14:15:00	7	7	11	11	18	64
14:30:00	8	8	9	9	17	64
14:45:00	2	2	7	7	9	61
15:00:00	11	11	7	7	18	62
15:15:00	7	7	12	12	19	63
15:30:00	18	18	11	11	29	75
15:45:00	11	11	5	5	16	82
16:00:00	11	11	9	9	20	84
16:15:00	11	11	9	9	20	85



16:30:00	9	9	15	15	24	80
16:45:00	7	7	11	11	18	82
17:00:00	15	15	14	14	29	91
17:15:00	12	12	16	16	28	99
17:30:00	4	4	15	15	19	94
17:45:00	6	6	7	7	13	89
18:00:00	6	6	6	6	12	72
18:15:00	11	11	8	8	19	63
18:30:00	10	10	9	9	19	63
18:45:00	11	11	15	15	26	76
19:00:00	8	8	5	5	13	77
19:15:00	8	8	4	4	12	70
19:30:00	3	3	4	4	7	58
19:45:00	2	2	10	10	12	44
20:00:00	5	5	4	4	9	40
20:15:00	5	5	4	4	9	37
20:30:00	3	3	3	3	6	36
20:45:00	3	3	2	2	5	29
21:00:00	1	1	2	2	3	23
21:15:00	3	3	0	0	3	17
21:30:00	4	4	3	3	7	18
21:45:00	7	7	1	1	8	21
22:00:00	6	6	0	0	6	24



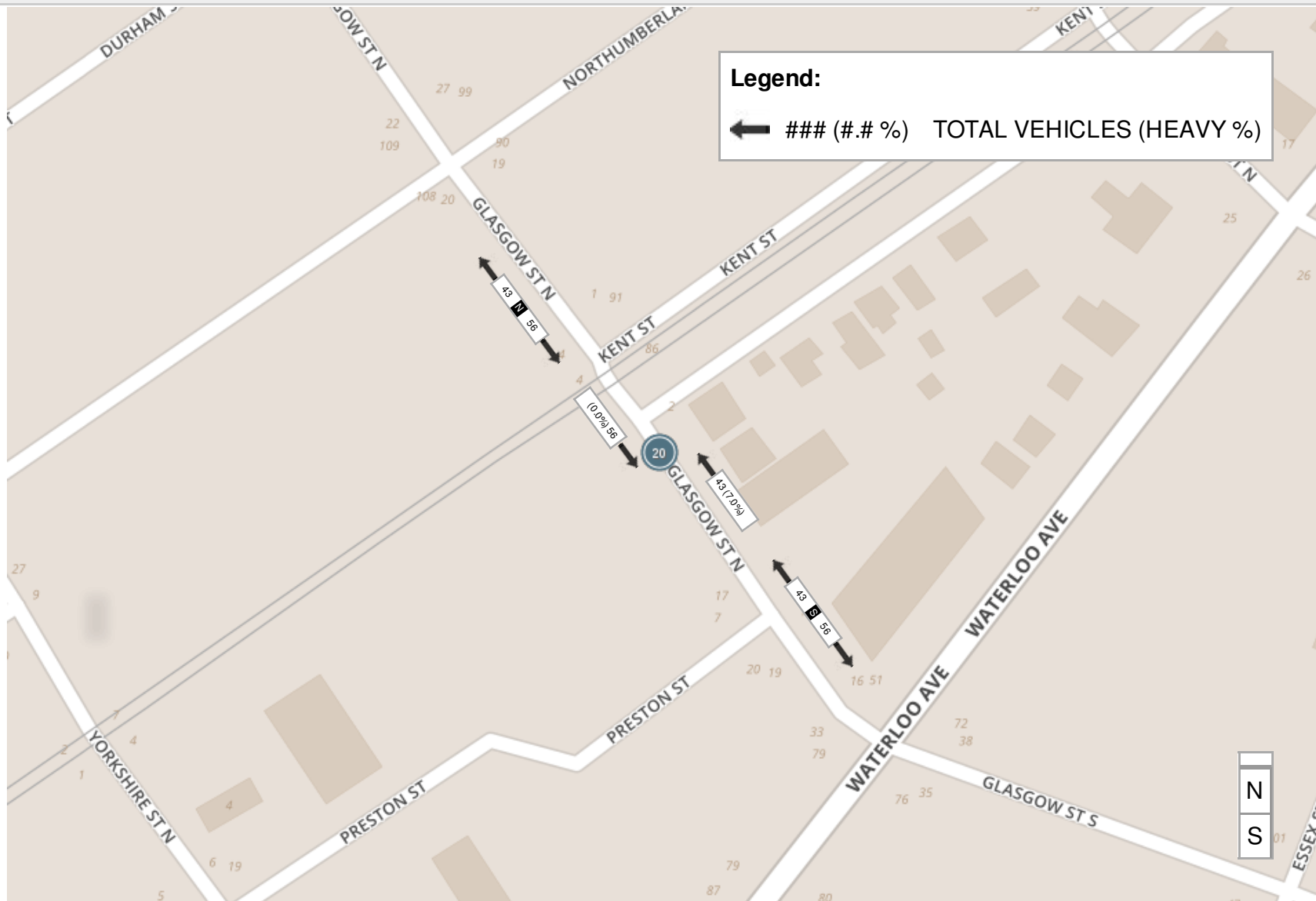
22:15:00 22:30:00	2 1	2 1	1 1	1 1	3 2	24 19
22:45:00	2	2	3	3	5	16
23:00:00	1	1	3	3	4	14
23:15:00	2	2	1	1	3	14
23:30:00	1	1	2	2	3	15
23:45:00	0	0	0	0	0	10
Grand Total	430	430	497	497	927	-
Approach%	100%	-	100%	-	-	-
Totals %	46.4%	46.4%	53.6%	53.6%	-	-
Heavy	12	-	7	-	-	-
Heavy %	2.8%	-	1.4%	-	-	-
Bicycles	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-



Peak Hour: 04:30 PM - 05:30 PM Weather:

Start Time	S Approach		N Approach		Int. Total (15 min)
	Thru	Approach Total	Thru	Approach Total	
16:30:00	9	9	15	15	24
16:45:00	7	7	11	11	18
17:00:00	15	15	14	14	29
17:15:00	12	12	16	16	28
Grand Total	43	43	56	56	99
Approach%	100%	-	100%	-	-
Totals %	43.4%	43.4%	56.6%	56.6%	-
PHF	0.72	0.72	0.88	0.88	-
Heavy	3	3	0	0	-
Heavy %	7%	7%	0%	0%	-
Lights	38	38	56	56	-
Lights %	88.4%	88.4%	100%	100%	-
Single-Unit Trucks	3	3	0	0	-
Single-Unit Trucks %	7%	7%	0%	0%	-
Buses	0	0	0	0	-
Buses %	0%	0%	0%	0%	-
Articulated Trucks	0	0	0	0	-
Articulated Trucks %	0%	0%	0%	0%	-
Bicycles on Road	2	2	0	0	-
Bicycles on Road %	4.7%	4.7%	0%	0%	-

Peak Hour: 04:30 PM - 05:30 PM Weather:





Turning Movement Count (20 - AT GLASGOW ST & RAIL CROSSING)

Start Time	S Approach		N Approach		Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Approach Total	Thru N:S	Approach Total		
00:00:00	1	1	0	0	1	
00:15:00	0	0	0	0	0	
00:30:00	0	0	1	1	1	
00:45:00	0	0	0	0	0	2
01:00:00	0	0	0	0	0	1
01:15:00	1	1	0	0	1	2
01:30:00	0	0	1	1	1	2
01:45:00	0	0	1	1	1	3
02:00:00	0	0	0	0	0	3
02:15:00	0	0	1	1	1	3
02:30:00	0	0	0	0	0	2
02:45:00	1	1	0	0	1	2
03:00:00	0	0	0	0	0	2
03:15:00	0	0	0	0	0	1
03:30:00	1	1	0	0	1	2
03:45:00	0	0	0	0	0	1
04:00:00	0	0	0	0	0	1
04:15:00	1	1	0	0	1	2
04:30:00	0	0	0	0	0	1
04:45:00	0	0	0	0	0	1



05:00:00	0	0	1	1	1	2
05:15:00	1	1	2	2	3	4
05:30:00	0	0	1	1	1	5
05:45:00	1	1	4	4	5	10
06:00:00	1	1	2	2	3	12
06:15:00	0	0	3	3	3	12
06:30:00	0	0	4	4	4	15
06:45:00	2	2	4	4	6	16
07:00:00	4	4	4	4	8	21
07:15:00	3	3	7	7	10	28
07:30:00	2	2	6	6	8	32
07:45:00	8	8	11	11	19	45
08:00:00	5	5	19	19	24	61
08:15:00	14	14	15	15	29	80
08:30:00	12	12	12	12	24	96
08:45:00	12	12	18	18	30	107
09:00:00	11	11	14	14	25	108
09:15:00	11	11	14	14	25	104
09:30:00	3	3	10	10	13	93
09:45:00	3	3	8	8	11	74
10:00:00	6	6	8	8	14	63
10:15:00	6	6	5	5	11	49
10:30:00	7	7	8	8	15	51



10:45:00	10	10	1	1	11	51
11:00:00	5	5	5	5	10	47
11:15:00	3	3	2	2	5	41
11:30:00	3	3	7	7	10	36
11:45:00	5	5	13	13	18	43
12:00:00	5	5	6	6	11	44
12:15:00	8	8	13	13	21	60
12:30:00	8	8	13	13	21	71
12:45:00	6	6	11	11	17	70
13:00:00	10	10	5	5	15	74
13:15:00	7	7	13	13	20	73
13:30:00	5	5	7	7	12	64
13:45:00	3	3	4	4	7	54
14:00:00	8	8	12	12	20	59
14:15:00	8	8	10	10	18	57
14:30:00	8	8	7	7	15	60
14:45:00	6	6	6	6	12	65
15:00:00	11	11	13	13	24	69
15:15:00	6	6	15	15	21	72
15:30:00	6	6	12	12	18	75
15:45:00	9	9	8	8	17	80
16:00:00	13	13	18	18	31	87
16:15:00	5	5	8	8	13	79



16:30:00	11	11	11	11	22	83
16:45:00	6	6	11	11	17	83
17:00:00	13	13	9	9	22	74
17:15:00	14	14	12	12	26	87
17:30:00	8	8	6	6	14	79
17:45:00	2	2	7	7	9	71
18:00:00	4	4	6	6	10	59
18:15:00	6	6	7	7	13	46
18:30:00	8	8	10	10	18	50
18:45:00	13	13	7	7	20	61
19:00:00	9	9	5	5	14	65
19:15:00	7	7	12	12	19	71
19:30:00	8	8	7	7	15	68
19:45:00	4	4	6	6	10	58
20:00:00	4	4	2	2	6	50
20:15:00	4	4	1	1	5	36
20:30:00	4	4	4	4	8	29
20:45:00	6	6	1	1	7	26
21:00:00	2	2	4	4	6	26
21:15:00	3	3	4	4	7	28
21:30:00	4	4	4	4	8	28
21:45:00	3	3	1	1	4	25
22:00:00	2	2	2	2	4	23



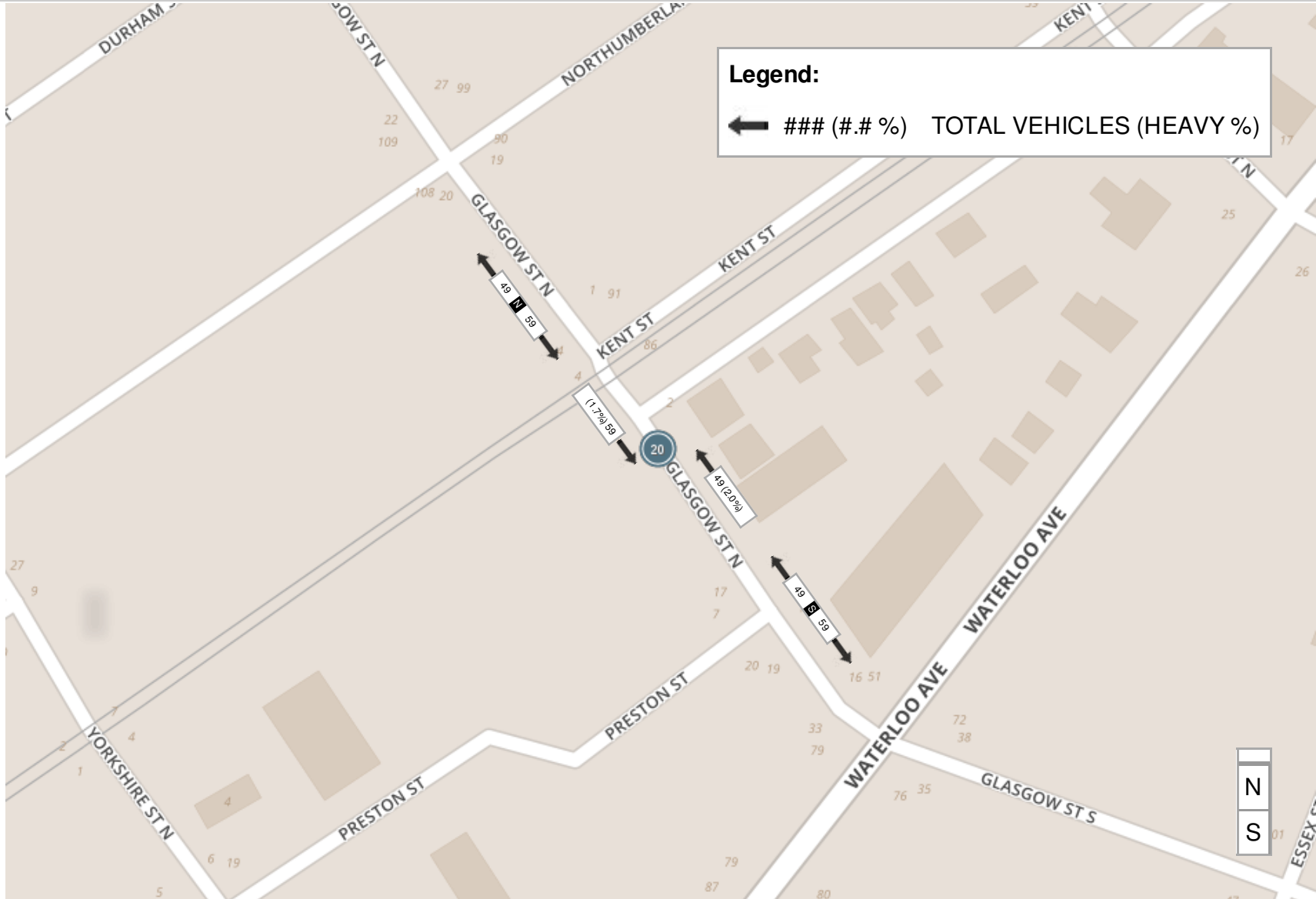
22:15:00 22:30:00	0 3	0 3	0 2	0 2	0 5	16 13
22:45:00	0	0	1	1	1	10
23:00:00	0	0	0	0	0	6
23:15:00	2	2	2	2	4	10
23:30:00	0	0	0	0	0	5
23:45:00	1	1	1	1	2	6
Grand Total	426	426	538	538	964	-
Approach%	100%	-	100%	-	-	-
Totals %	44.2%	44.2%	55.8%	55.8%	-	-
Heavy	14	-	8	-	-	-
Heavy %	3.3%	-	1.5%	-	-	-
Bicycles	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-



Peak Hour: 08:15 AM - 09:15 AM Weather:

Start Time	S Approach		N Approach		Int. Total (15 min)
	Thru	Approach Total	Thru	Approach Total	
08:15:00	14	14	15	15	29
08:30:00	12	12	12	12	24
08:45:00	12	12	18	18	30
09:00:00	11	11	14	14	25
Grand Total	49	49	59	59	108
Approach%	100%	-	100%	-	-
Totals %	45.4%	45.4%	54.6%	54.6%	-
PHF	0.88	0.88	0.82	0.82	-
Heavy	1	1	1	1	-
Heavy %	2%	2%	1.7%	1.7%	-
Lights	48	48	51	51	-
Lights %	98%	98%	86.4%	86.4%	-
Single-Unit Trucks	0	0	1	1	-
Single-Unit Trucks %	0%	0%	1.7%	1.7%	-
Buses	1	1	0	0	-
Buses %	2%	2%	0%	0%	-
Heavy	0	0	0	0	-
Heavy %	0%	0%	0%	0%	-
Bicycles on Road	0	0	7	7	-
Bicycles on Road %	0%	0%	11.9%	11.9%	-

Peak Hour: 08:15 AM - 09:15 AM Weather:





Turning Movement Count (20 - AT GLASGOW ST & RAIL CROSSING)

Start Time	S Approach		N Approach		Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Approach Total	Thru N:S	Approach Total		
00:00:00	0	0	1	1	1	
00:15:00	0	0	1	1	1	
00:30:00	0	0	0	0	0	
00:45:00	0	0	0	0	0	2
01:00:00	3	3	0	0	3	4
01:15:00	0	0	1	1	1	4
01:30:00	0	0	1	1	1	5
01:45:00	0	0	0	0	0	5
02:00:00	0	0	0	0	0	2
02:15:00	0	0	0	0	0	1
02:30:00	0	0	0	0	0	0
02:45:00	0	0	0	0	0	0
03:00:00	0	0	0	0	0	0
03:15:00	0	0	0	0	0	0
03:30:00	0	0	0	0	0	0
03:45:00	0	0	0	0	0	0
04:00:00	2	2	1	1	3	3
04:15:00	0	0	1	1	1	4
04:30:00	0	0	0	0	0	4
04:45:00	1	1	1	1	2	6



05:00:00	0	0	1	1	1	4
05:15:00	0	0	1	1	1	4
05:30:00	0	0	2	2	2	6
05:45:00	1	1	1	1	2	6
06:00:00	0	0	3	3	3	8
06:15:00	2	2	2	2	4	11
06:30:00	2	2	7	7	9	18
06:45:00	2	2	0	0	2	18
07:00:00	3	3	8	8	11	26
07:15:00	2	2	8	8	10	32
07:30:00	5	5	7	7	12	35
07:45:00	9	9	14	14	23	56
08:00:00	6	6	11	11	17	62
08:15:00	12	12	16	16	28	80
08:30:00	11	11	9	9	20	88
08:45:00	14	14	38	38	52	117
09:00:00	8	8	10	10	18	118
09:15:00	7	7	9	9	16	106
09:30:00	5	5	6	6	11	97
09:45:00	2	2	3	3	5	50
10:00:00	4	4	4	4	8	40
10:15:00	4	4	8	8	12	36
10:30:00	6	6	8	8	14	39



10:45:00	6	6	4	4	10	44
11:00:00	9	9	7	7	16	52
11:15:00	7	7	5	5	12	52
11:30:00	12	12	3	3	15	53
11:45:00	5	5	3	3	8	51
12:00:00	7	7	7	7	14	49
12:15:00	5	5	11	11	16	53
12:30:00	6	6	5	5	11	49
12:45:00	4	4	5	5	9	50
13:00:00	10	10	6	6	16	52
13:15:00	5	5	4	4	9	45
13:30:00	11	11	9	9	20	54
13:45:00	7	7	13	13	20	65
14:00:00	5	5	10	10	15	64
14:15:00	7	7	7	7	14	69
14:30:00	6	6	12	12	18	67
14:45:00	6	6	3	3	9	56
15:00:00	9	9	10	10	19	60
15:15:00	9	9	14	14	23	69
15:30:00	13	13	10	10	23	74
15:45:00	13	13	13	13	26	91
16:00:00	5	5	11	11	16	88
16:15:00	13	13	13	13	26	91



16:30:00	5	5	16	16	21	89
16:45:00	4	4	16	16	20	83
17:00:00	17	17	11	11	28	95
17:15:00	18	18	13	13	31	100
17:30:00	11	11	12	12	23	102
17:45:00	0	0	9	9	9	91
18:00:00	14	14	8	8	22	85
18:15:00	8	8	9	9	17	71
18:30:00	6	6	8	8	14	62
18:45:00	10	10	8	8	18	71
19:00:00	6	6	9	9	15	64
19:15:00	9	9	4	4	13	60
19:30:00	10	10	13	13	23	69
19:45:00	6	6	7	7	13	64
20:00:00	10	10	7	7	17	66
20:15:00	0	0	3	3	3	56
20:30:00	6	6	3	3	9	42
20:45:00	2	2	4	4	6	35
21:00:00	9	9	5	5	14	32
21:15:00	6	6	4	4	10	39
21:30:00	2	2	2	2	4	34
21:45:00	3	3	2	2	5	33
22:00:00	1	1	5	5	6	25



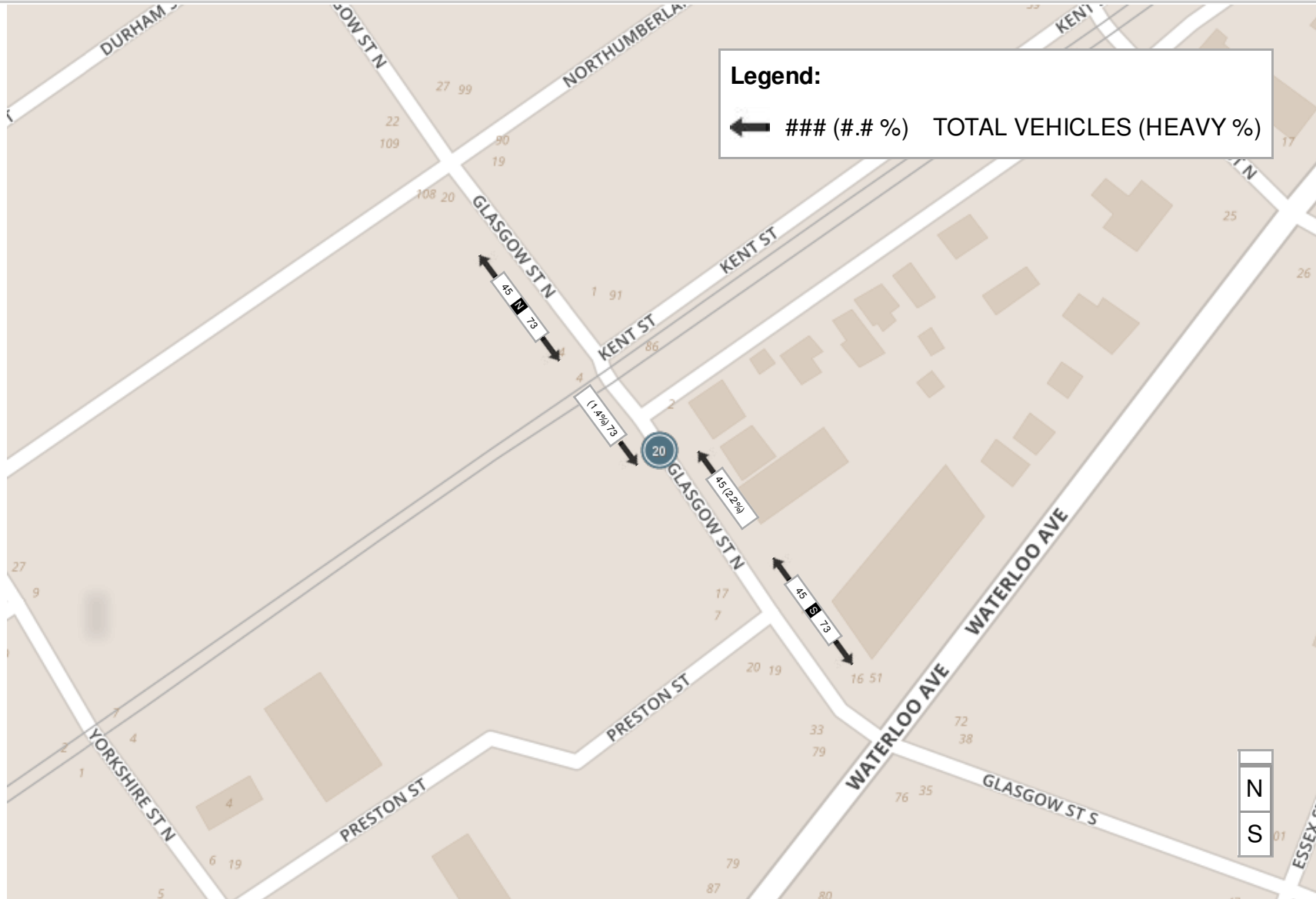
22:15:00 22:30:00	2 3	2 3	1 0	1 0	3 3	18 17
22:45:00	2	2	2	2	4	16
23:00:00	2	2	0	0	2	12
23:15:00	0	0	1	1	1	10
23:30:00	2	2	0	0	2	9
23:45:00	1	1	0	0	1	6
Grand Total	466	466	550	550	1016	-
Approach%	100%	-	100%	-	-	-
Totals %	45.9%	45.9%	54.1%	54.1%	-	-
Heavy	4	-	2	-	-	-
Heavy %	0.9%	-	0.4%	-	-	-
Bicycles	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-



Peak Hour: 08:15 AM - 09:15 AM Weather:

Start Time	S Approach		N Approach		Int. Total (15 min)
	Thru	Approach Total	Thru	Approach Total	
08:15:00	12	12	16	16	28
08:30:00	11	11	9	9	20
08:45:00	14	14	38	38	52
09:00:00	8	8	10	10	18
Grand Total	45	45	73	73	118
Approach%	100%	-	100%	-	-
Totals %	38.1%	38.1%	61.9%	61.9%	-
PHF	0.8	0.8	0.48	0.48	-
Heavy	1	1	1	1	-
Heavy %	2.2%	2.2%	1.4%	1.4%	-
Lights	44	44	69	69	-
Lights %	97.8%	97.8%	94.5%	94.5%	-
Single-Unit Trucks	0	0	0	0	-
Single-Unit Trucks %	0%	0%	0%	0%	-
Buses	1	1	1	1	-
Buses %	2.2%	2.2%	1.4%	1.4%	-
Bicycles on Road	0	0	3	3	-
Bicycles on Road %	0%	0%	4.1%	4.1%	-

Peak Hour: 08:15 AM - 09:15 AM Weather:





Turning Movement Count (20 - AT GLASGOW ST & RAIL CROSSING)

Start Time	S Approach		N Approach		Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Approach Total	Thru N:S	Approach Total		
00:00:00	3	3	0	0	3	
00:15:00	0	0	2	2	2	
00:30:00	1	1	1	1	2	
00:45:00	0	0	1	1	1	8
01:00:00	3	3	1	1	4	9
01:15:00	1	1	0	0	1	8
01:30:00	0	0	0	0	0	6
01:45:00	0	0	0	0	0	5
02:00:00	1	1	0	0	1	2
02:15:00	0	0	2	2	2	3
02:30:00	0	0	0	0	0	3
02:45:00	0	0	1	1	1	4
03:00:00	0	0	0	0	0	3
03:15:00	0	0	0	0	0	1
03:30:00	0	0	0	0	0	1
03:45:00	0	0	0	0	0	0
04:00:00	1	1	1	1	2	2
04:15:00	0	0	0	0	0	2
04:30:00	0	0	0	0	0	2
04:45:00	0	0	0	0	0	2



05:00:00	0	0	2	2	2	2
05:15:00	0	0	4	4	4	6
05:30:00	1	1	3	3	4	10
05:45:00	1	1	3	3	4	14
06:00:00	2	2	1	1	3	15
06:15:00	1	1	4	4	5	16
06:30:00	0	0	2	2	2	14
06:45:00	1	1	5	5	6	16
07:00:00	4	4	4	4	8	21
07:15:00	2	2	5	5	7	23
07:30:00	1	1	6	6	7	28
07:45:00	10	10	11	11	21	43
08:00:00	6	6	13	13	19	54
08:15:00	13	13	19	19	32	79
08:30:00	14	14	14	14	28	100
08:45:00	9	9	18	18	27	106
09:00:00	6	6	14	14	20	107
09:15:00	7	7	10	10	17	92
09:30:00	6	6	6	6	12	76
09:45:00	3	3	6	6	9	58
10:00:00	10	10	2	2	12	50
10:15:00	10	10	6	6	16	49
10:30:00	7	7	9	9	16	53



10:45:00	6	6	9	9	15	59
11:00:00	9	9	10	10	19	66
11:15:00	6	6	10	10	16	66
11:30:00	8	8	10	10	18	68
11:45:00	5	5	10	10	15	68
12:00:00	9	9	8	8	17	66
12:15:00	9	9	13	13	22	72
12:30:00	7	7	12	12	19	73
12:45:00	6	6	12	12	18	76
13:00:00	7	7	9	9	16	75
13:15:00	4	4	6	6	10	63
13:30:00	12	12	5	5	17	61
13:45:00	10	10	6	6	16	59
14:00:00	6	6	9	9	15	58
14:15:00	10	10	5	5	15	63
14:30:00	5	5	6	6	11	57
14:45:00	14	14	6	6	20	61
15:00:00	12	12	8	8	20	66
15:15:00	7	7	12	12	19	70
15:30:00	14	14	12	12	26	85
15:45:00	7	7	8	8	15	80
16:00:00	9	9	24	24	33	93
16:15:00	12	12	7	7	19	93



16:30:00	9	9	8	8	17	84
16:45:00	10	10	17	17	27	96
17:00:00	10	10	13	13	23	86
17:15:00	14	14	10	10	24	91
17:30:00	3	3	11	11	14	88
17:45:00	7	7	9	9	16	77
18:00:00	8	8	9	9	17	71
18:15:00	6	6	8	8	14	61
18:30:00	6	6	13	13	19	66
18:45:00	3	3	10	10	13	63
19:00:00	2	2	7	7	9	55
19:15:00	6	6	12	12	18	59
19:30:00	7	7	5	5	12	52
19:45:00	4	4	6	6	10	49
20:00:00	8	8	1	1	9	49
20:15:00	7	7	4	4	11	42
20:30:00	3	3	5	5	8	38
20:45:00	1	1	3	3	4	32
21:00:00	4	4	3	3	7	30
21:15:00	9	9	6	6	15	34
21:30:00	5	5	2	2	7	33
21:45:00	2	2	1	1	3	32
22:00:00	5	5	5	5	10	35



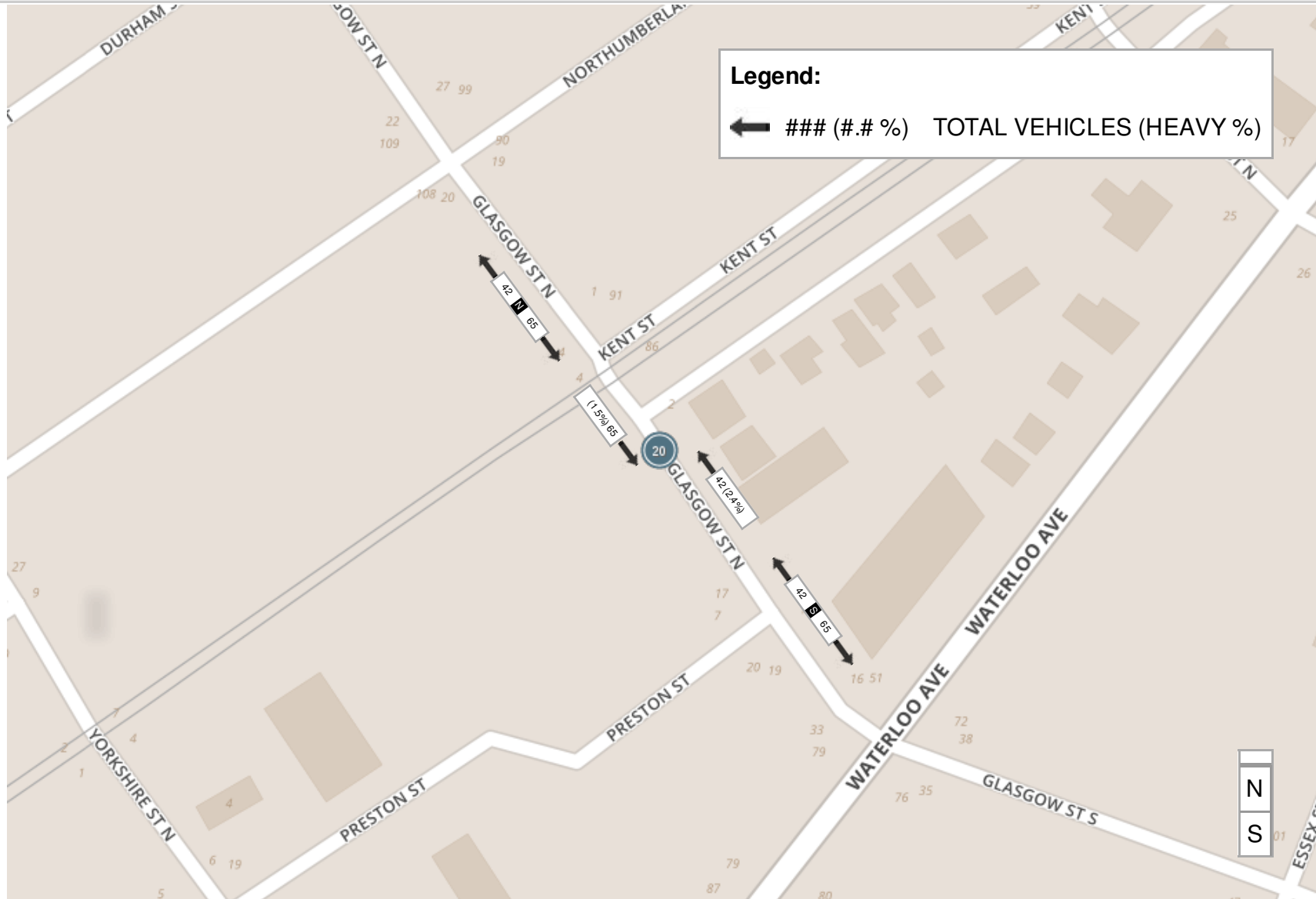
22:15:00 22:30:00	1 3	1 3	0 1	0 1	1 4	21 18
22:45:00	1	1	1	1	2	17
23:00:00	1	1	2	2	3	10
23:15:00	3	3	2	2	5	14
23:30:00	2	2	1	1	3	13
23:45:00	2	2	4	4	6	17
Grand Total	470	470	572	572	1042	-
Approach%	100%	-	100%	-	-	-
Totals %	45.1%	45.1%	54.9%	54.9%	-	-
Heavy	11	-	9	-	-	-
Heavy %	2.3%	-	1.6%	-	-	-
Bicycles	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-



Peak Hour: 08:15 AM - 09:15 AM Weather:

Start Time	S Approach		N Approach		Int. Total (15 min)
	Thru	Approach Total	Thru	Approach Total	
08:15:00	13	13	19	19	32
08:30:00	14	14	14	14	28
08:45:00	9	9	18	18	27
09:00:00	6	6	14	14	20
Grand Total	42	42	65	65	107
Approach%	100%	-	100%	-	-
Totals %	39.3%	39.3%	60.7%	60.7%	-
PHF	0.75	0.75	0.86	0.86	-
Heavy	1	1	1	1	-
Heavy %	2.4%	2.4%	1.5%	1.5%	-
Lights	41	41	61	61	-
Lights %	97.6%	97.6%	93.8%	93.8%	-
Single-Unit Trucks	0	0	1	1	-
Single-Unit Trucks %	0%	0%	1.5%	1.5%	-
Buses	1	1	0	0	-
Buses %	2.4%	2.4%	0%	0%	-
Articulated Trucks	0	0	0	0	-
Articulated Trucks %	0%	0%	0%	0%	-
Bicycles on Road	0	0	3	3	-
Bicycles on Road %	0%	0%	4.6%	4.6%	-

Peak Hour: 08:15 AM - 09:15 AM Weather:





Turning Movement Count (19 - AT YORKSHIRE ST & RAIL CROSSING)

Start Time	S Approach		N Approach		Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Approach Total	Thru N:S	Approach Total		
00:00:00	1	1	0	0	1	
00:15:00	1	1	0	0	1	
00:30:00	1	1	2	2	3	
00:45:00	2	2	1	1	3	8
01:00:00	1	1	1	1	2	9
01:15:00	1	1	0	0	1	9
01:30:00	1	1	2	2	3	9
01:45:00	0	0	0	0	0	6
02:00:00	0	0	0	0	0	4
02:15:00	0	0	1	1	1	4
02:30:00	0	0	1	1	1	2
02:45:00	1	1	1	1	2	4
03:00:00	1	1	0	0	1	5
03:15:00	0	0	1	1	1	5
03:30:00	0	0	0	0	0	4
03:45:00	0	0	0	0	0	2
04:00:00	0	0	2	2	2	3
04:15:00	0	0	0	0	0	2
04:30:00	0	0	0	0	0	2
04:45:00	0	0	0	0	0	2



05:00:00	2	2	1	1	3	3
05:15:00	0	0	0	0	0	3
05:30:00	0	0	0	0	0	3
05:45:00	0	0	0	0	0	3
06:00:00	1	1	1	1	2	2
06:15:00	0	0	2	2	2	4
06:30:00	4	4	0	0	4	8
06:45:00	2	2	4	4	6	14
07:00:00	1	1	3	3	4	16
07:15:00	3	3	4	4	7	21
07:30:00	1	1	2	2	3	20
07:45:00	0	0	7	7	7	21
08:00:00	1	1	4	4	5	22
08:15:00	0	0	5	5	5	20
08:30:00	5	5	13	13	18	35
08:45:00	12	12	8	8	20	48
09:00:00	6	6	11	11	17	60
09:15:00	8	8	5	5	13	68
09:30:00	7	7	10	10	17	67
09:45:00	11	11	14	14	25	72
10:00:00	4	4	12	12	16	71
10:15:00	9	9	12	12	21	79
10:30:00	12	12	10	10	22	84



10:45:00	7	7	8	8	15	74
11:00:00	9	9	13	13	22	80
11:15:00	9	9	20	20	29	88
11:30:00	5	5	12	12	17	83
11:45:00	6	6	10	10	16	84
12:00:00	9	9	16	16	25	87
12:15:00	7	7	9	9	16	74
12:30:00	12	12	16	16	28	85
12:45:00	10	10	15	15	25	94
13:00:00	10	10	11	11	21	90
13:15:00	7	7	15	15	22	96
13:30:00	9	9	4	4	13	81
13:45:00	9	9	11	11	20	76
14:00:00	3	3	12	12	15	70
14:15:00	15	15	11	11	26	74
14:30:00	5	5	9	9	14	75
14:45:00	7	7	11	11	18	73
15:00:00	7	7	7	7	14	72
15:15:00	15	15	10	10	25	71
15:30:00	7	7	8	8	15	72
15:45:00	10	10	12	12	22	76
16:00:00	9	9	11	11	20	82
16:15:00	9	9	9	9	18	75



16:30:00	9	9	5	5	14	74
16:45:00	9	9	3	3	12	64
17:00:00	6	6	11	11	17	61
17:15:00	7	7	14	14	21	64
17:30:00	3	3	9	9	12	62
17:45:00	11	11	4	4	15	65
18:00:00	10	10	3	3	13	61
18:15:00	6	6	5	5	11	51
18:30:00	9	9	12	12	21	60
18:45:00	9	9	10	10	19	64
19:00:00	6	6	9	9	15	66
19:15:00	10	10	4	4	14	69
19:30:00	4	4	10	10	14	62
19:45:00	4	4	8	8	12	55
20:00:00	4	4	2	2	6	46
20:15:00	6	6	5	5	11	43
20:30:00	3	3	1	1	4	33
20:45:00	3	3	6	6	9	30
21:00:00	10	10	4	4	14	38
21:15:00	2	2	4	4	6	33
21:30:00	3	3	4	4	7	36
21:45:00	4	4	2	2	6	33
22:00:00	2	2	2	2	4	23



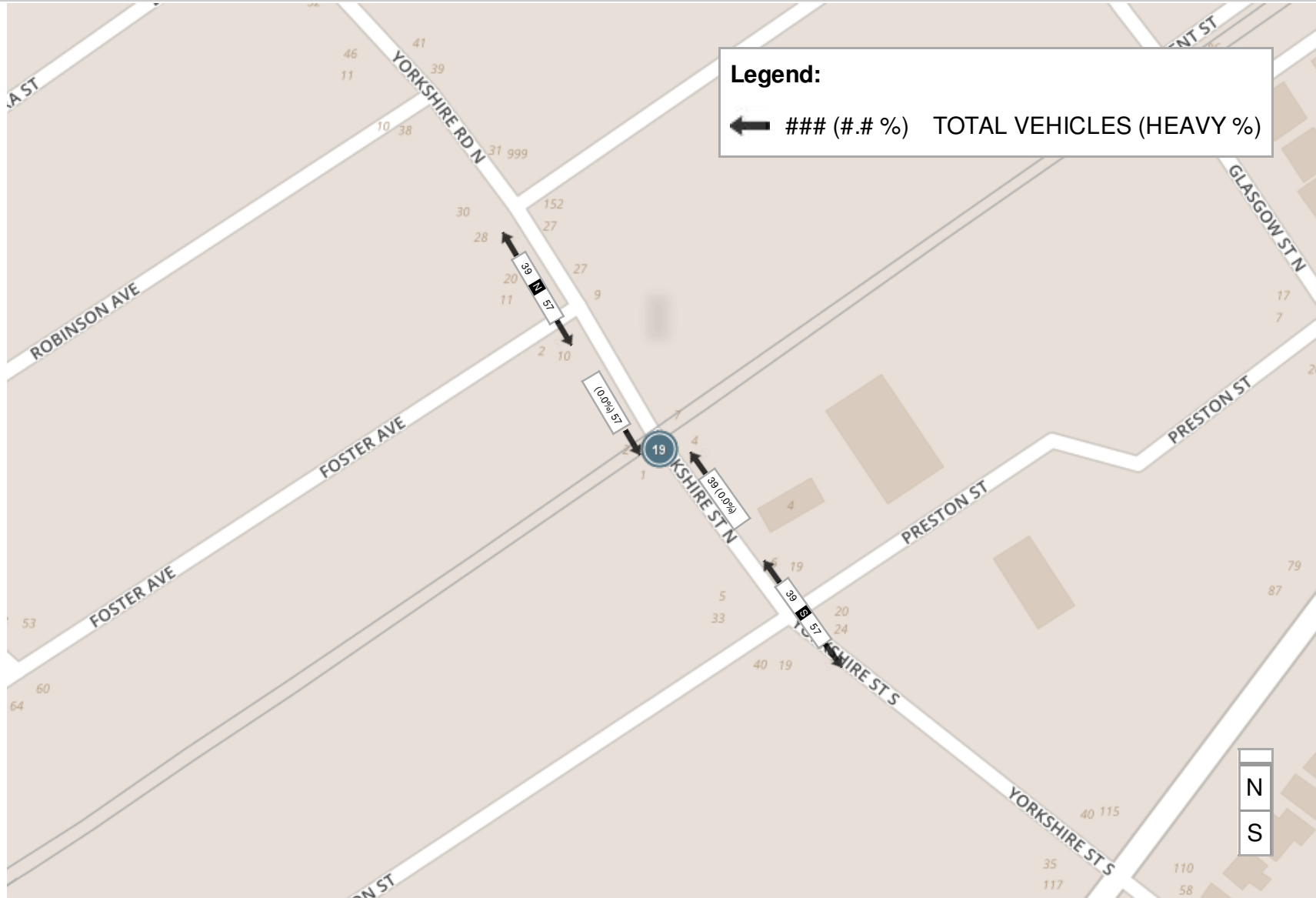
22:15:00 22:30:00	5 2	5 2	2 1	2 1	7 3	24 20
22:45:00	1	1	2	2	3	17
23:00:00	1	1	2	2	3	16
23:15:00	3	3	2	2	5	14
23:30:00	0	0	1	1	1	12
23:45:00	3	3	1	1	4	13
Grand Total	450	450	548	548	998	-
Approach%	100%	-	100%	-	-	-
Totals %	45.1%	45.1%	54.9%	54.9%	-	-
Heavy	0	-	1	-	-	-
Heavy %	0%	-	0.2%	-	-	-
Bicycles	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-



Peak Hour: 12:30 PM - 01:30 PM Weather:

Start Time	S Approach		N Approach		Int. Total (15 min)
	Thru	Approach Total	Thru	Approach Total	
12:30:00	12	12	16	16	28
12:45:00	10	10	15	15	25
13:00:00	10	10	11	11	21
13:15:00	7	7	15	15	22
Grand Total	39	39	57	57	96
Approach%	100%	-	100%	-	-
Totals %	40.6%	40.6%	59.4%	59.4%	-
PHF	0.81	0.81	0.89	0.89	-
Heavy	0	0	0	0	-
Heavy %	0%	0%	0%	0%	-
Lights	35	35	55	55	-
Lights %	89.7%	89.7%	96.5%	96.5%	-
Single-Unit Trucks	0	0	0	0	-
Single-Unit Trucks %	0%	0%	0%	0%	-
Bicycles on Road	4	4	2	2	-
Bicycles on Road %	10.3%	10.3%	3.5%	3.5%	-

Peak Hour: 12:30 PM - 01:30 PM Weather:





Turning Movement Count (19 - AT YORKSHIRE ST & RAIL CROSSING)

Start Time	S Approach		N Approach		Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Approach Total	Thru N:S	Approach Total		
00:00:00	2	2	2	2	4	
00:15:00	1	1	0	0	1	
00:30:00	4	4	1	1	5	
00:45:00	1	1	2	2	3	13
01:00:00	0	0	1	1	1	10
01:15:00	1	1	0	0	1	10
01:30:00	2	2	0	0	2	7
01:45:00	1	1	0	0	1	5
02:00:00	0	0	0	0	0	4
02:15:00	1	1	0	0	1	4
02:30:00	0	0	1	1	1	3
02:45:00	0	0	2	2	2	4
03:00:00	1	1	1	1	2	6
03:15:00	0	0	0	0	0	5
03:30:00	0	0	1	1	1	5
03:45:00	1	1	0	0	1	4
04:00:00	0	0	0	0	0	2
04:15:00	0	0	1	1	1	3
04:30:00	0	0	1	1	1	3
04:45:00	0	0	0	0	0	2



05:00:00	0	0	1	1	1	3
05:15:00	0	0	0	0	0	2
05:30:00	1	1	1	1	2	3
05:45:00	0	0	0	0	0	3
06:00:00	0	0	1	1	1	3
06:15:00	2	2	2	2	4	7
06:30:00	1	1	0	0	1	6
06:45:00	3	3	1	1	4	10
07:00:00	0	0	1	1	1	10
07:15:00	1	1	1	1	2	8
07:30:00	3	3	1	1	4	11
07:45:00	3	3	2	2	5	12
08:00:00	0	0	4	4	4	15
08:15:00	3	3	3	3	6	19
08:30:00	2	2	3	3	5	20
08:45:00	1	1	8	8	9	24
09:00:00	3	3	5	5	8	28
09:15:00	7	7	5	5	12	34
09:30:00	8	8	6	6	14	43
09:45:00	5	5	8	8	13	47
10:00:00	12	12	12	12	24	63
10:15:00	10	10	16	16	26	77
10:30:00	4	4	14	14	18	81



10:45:00	5	5	10	10	15	83
11:00:00	5	5	8	8	13	72
11:15:00	4	4	7	7	11	57
11:30:00	11	11	9	9	20	59
11:45:00	7	7	17	17	24	68
12:00:00	5	5	15	15	20	75
12:15:00	10	10	11	11	21	85
12:30:00	9	9	19	19	28	93
12:45:00	20	20	14	14	34	103
13:00:00	7	7	9	9	16	99
13:15:00	8	8	10	10	18	96
13:30:00	6	6	12	12	18	86
13:45:00	7	7	9	9	16	68
14:00:00	6	6	15	15	21	73
14:15:00	8	8	8	8	16	71
14:30:00	4	4	14	14	18	71
14:45:00	18	18	12	12	30	85
15:00:00	11	11	15	15	26	90
15:15:00	8	8	7	7	15	89
15:30:00	10	10	5	5	15	86
15:45:00	11	11	10	10	21	77
16:00:00	9	9	6	6	15	66
16:15:00	13	13	11	11	24	75



16:30:00	8	8	3	3	11	71
16:45:00	9	9	10	10	19	69
17:00:00	10	10	8	8	18	72
17:15:00	9	9	10	10	19	67
17:30:00	6	6	8	8	14	70
17:45:00	12	12	14	14	26	77
18:00:00	4	4	7	7	11	70
18:15:00	2	2	6	6	8	59
18:30:00	6	6	7	7	13	58
18:45:00	6	6	4	4	10	42
19:00:00	9	9	1	1	10	41
19:15:00	3	3	5	5	8	41
19:30:00	5	5	2	2	7	35
19:45:00	5	5	3	3	8	33
20:00:00	5	5	4	4	9	32
20:15:00	5	5	5	5	10	34
20:30:00	1	1	0	0	1	28
20:45:00	3	3	5	5	8	28
21:00:00	1	1	2	2	3	22
21:15:00	3	3	3	3	6	18
21:30:00	2	2	6	6	8	25
21:45:00	2	2	1	1	3	20
22:00:00	4	4	0	0	4	21



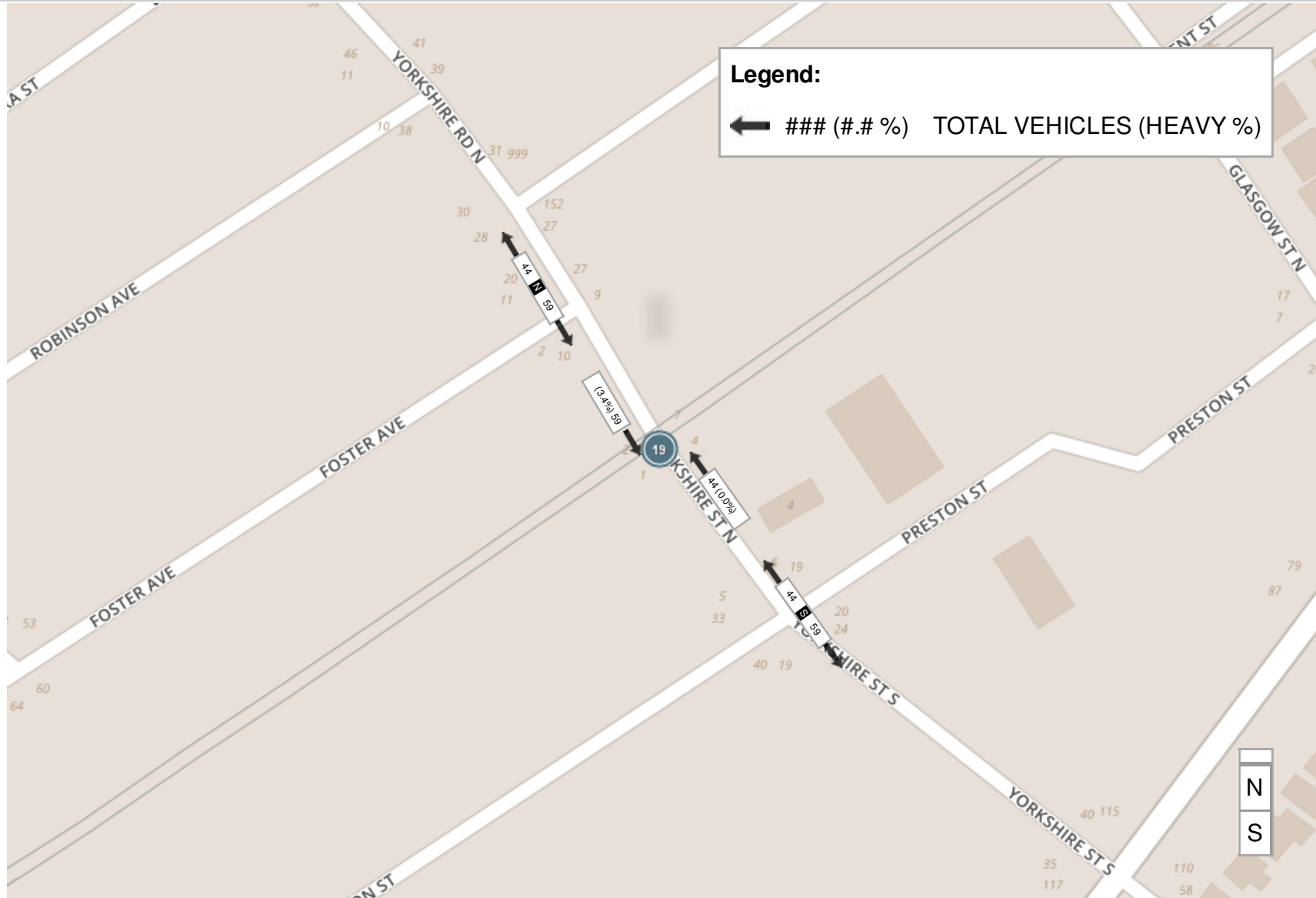
22:15:00 22:30:00	7 0	7 0	3 1	3 1	10 1	25 18
22:45:00	1	1	0	0	1	16
23:00:00	2	2	0	0	2	14
23:15:00	1	1	3	3	4	8
23:30:00	0	0	3	3	3	10
23:45:00	0	0	0	0	0	9
Grand Total	417	417	485	485	902	-
Approach%	100%	-	100%	-	-	-
Totals %	46.2%	46.2%	53.8%	53.8%	-	-
Heavy	4	-	4	-	-	-
Heavy %	1%	-	0.8%	-	-	-
Bicycles	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-



Peak Hour: 12:00 PM - 01:00 PM Weather:

Start Time	S Approach		N Approach		Int. Total (15 min)
	Thru	Approach Total	Thru	Approach Total	
12:00:00	5	5	15	15	20
12:15:00	10	10	11	11	21
12:30:00	9	9	19	19	28
12:45:00	20	20	14	14	34
Grand Total	44	44	59	59	103
Approach%	100%	-	100%	-	-
Totals %	42.7%	42.7%	57.3%	57.3%	-
PHF	0.55	0.55	0.78	0.78	-
Heavy	0	0	2	2	-
Heavy %	0%	0%	3.4%	3.4%	-
Lights	43	43	50	50	-
Lights %	97.7%	97.7%	84.7%	84.7%	-
Single-Unit Trucks	0	0	1	1	-
Single-Unit Trucks %	0%	0%	1.7%	1.7%	-
Heavy	0	0	1	1	-
Heavy %	0%	0%	1.7%	1.7%	-
Bicycles on Road	1	1	7	7	-
Bicycles on Road %	2.3%	2.3%	11.9%	11.9%	-

Peak Hour: 12:00 PM - 01:00 PM Weather:





Turning Movement Count (19 - AT YORKSHIRE ST & RAIL CROSSING)

Start Time	S Approach		N Approach		Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Approach Total	Thru N:S	Approach Total		
00:00:00	3	3	0	0	3	
00:15:00	0	0	0	0	0	
00:30:00	0	0	0	0	0	
00:45:00	0	0	1	1	1	4
01:00:00	1	1	0	0	1	2
01:15:00	0	0	0	0	0	2
01:30:00	0	0	0	0	0	2
01:45:00	1	1	0	0	1	2
02:00:00	2	2	0	0	2	3
02:15:00	0	0	0	0	0	3
02:30:00	0	0	0	0	0	3
02:45:00	1	1	0	0	1	3
03:00:00	0	0	0	0	0	1
03:15:00	0	0	0	0	0	1
03:30:00	0	0	0	0	0	1
03:45:00	0	0	1	1	1	1
04:00:00	1	1	1	1	2	3
04:15:00	0	0	0	0	0	3
04:30:00	0	0	1	1	1	4
04:45:00	0	0	1	1	1	4



05:00:00	0	0	2	2	2	4
05:15:00	0	0	2	2	2	6
05:30:00	2	2	1	1	3	8
05:45:00	3	3	5	5	8	15
06:00:00	1	1	2	2	3	16
06:15:00	2	2	2	2	4	18
06:30:00	2	2	2	2	4	19
06:45:00	3	3	7	7	10	21
07:00:00	1	1	4	4	5	23
07:15:00	5	5	3	3	8	27
07:30:00	5	5	7	7	12	35
07:45:00	8	8	7	7	15	40
08:00:00	9	9	12	12	21	56
08:15:00	21	21	26	26	47	95
08:30:00	37	37	33	33	70	153
08:45:00	24	24	38	38	62	200
09:00:00	15	15	18	18	33	212
09:15:00	7	7	12	12	19	184
09:30:00	4	4	14	14	18	132
09:45:00	4	4	7	7	11	81
10:00:00	6	6	9	9	15	63
10:15:00	5	5	11	11	16	60
10:30:00	6	6	12	12	18	60



10:45:00	6	6	10	10	16	65
11:00:00	8	8	12	12	20	70
11:15:00	8	8	10	10	18	72
11:30:00	3	3	14	14	17	71
11:45:00	14	14	20	20	34	89
12:00:00	12	12	9	9	21	90
12:15:00	7	7	14	14	21	93
12:30:00	9	9	15	15	24	100
12:45:00	11	11	17	17	28	94
13:00:00	8	8	7	7	15	88
13:15:00	8	8	5	5	13	80
13:30:00	11	11	10	10	21	77
13:45:00	8	8	10	10	18	67
14:00:00	4	4	9	9	13	65
14:15:00	11	11	10	10	21	73
14:30:00	10	10	9	9	19	71
14:45:00	22	22	15	15	37	90
15:00:00	16	16	30	30	46	123
15:15:00	12	12	30	30	42	144
15:30:00	14	14	15	15	29	154
15:45:00	22	22	21	21	43	160
16:00:00	10	10	18	18	28	142
16:15:00	15	15	20	20	35	135



16:30:00	9	9	17	17	26	132
16:45:00	14	14	19	19	33	122
17:00:00	11	11	15	15	26	120
17:15:00	18	18	18	18	36	121
17:30:00	12	12	12	12	24	119
17:45:00	16	16	12	12	28	114
18:00:00	11	11	14	14	25	113
18:15:00	16	16	6	6	22	99
18:30:00	10	10	9	9	19	94
18:45:00	10	10	14	14	24	90
19:00:00	8	8	17	17	25	90
19:15:00	14	14	10	10	24	92
19:30:00	8	8	8	8	16	89
19:45:00	3	3	10	10	13	78
20:00:00	7	7	8	8	15	68
20:15:00	8	8	8	8	16	60
20:30:00	3	3	8	8	11	55
20:45:00	1	1	5	5	6	48
21:00:00	7	7	3	3	10	43
21:15:00	3	3	3	3	6	33
21:30:00	5	5	5	5	10	32
21:45:00	4	4	5	5	9	35
22:00:00	4	4	3	3	7	32



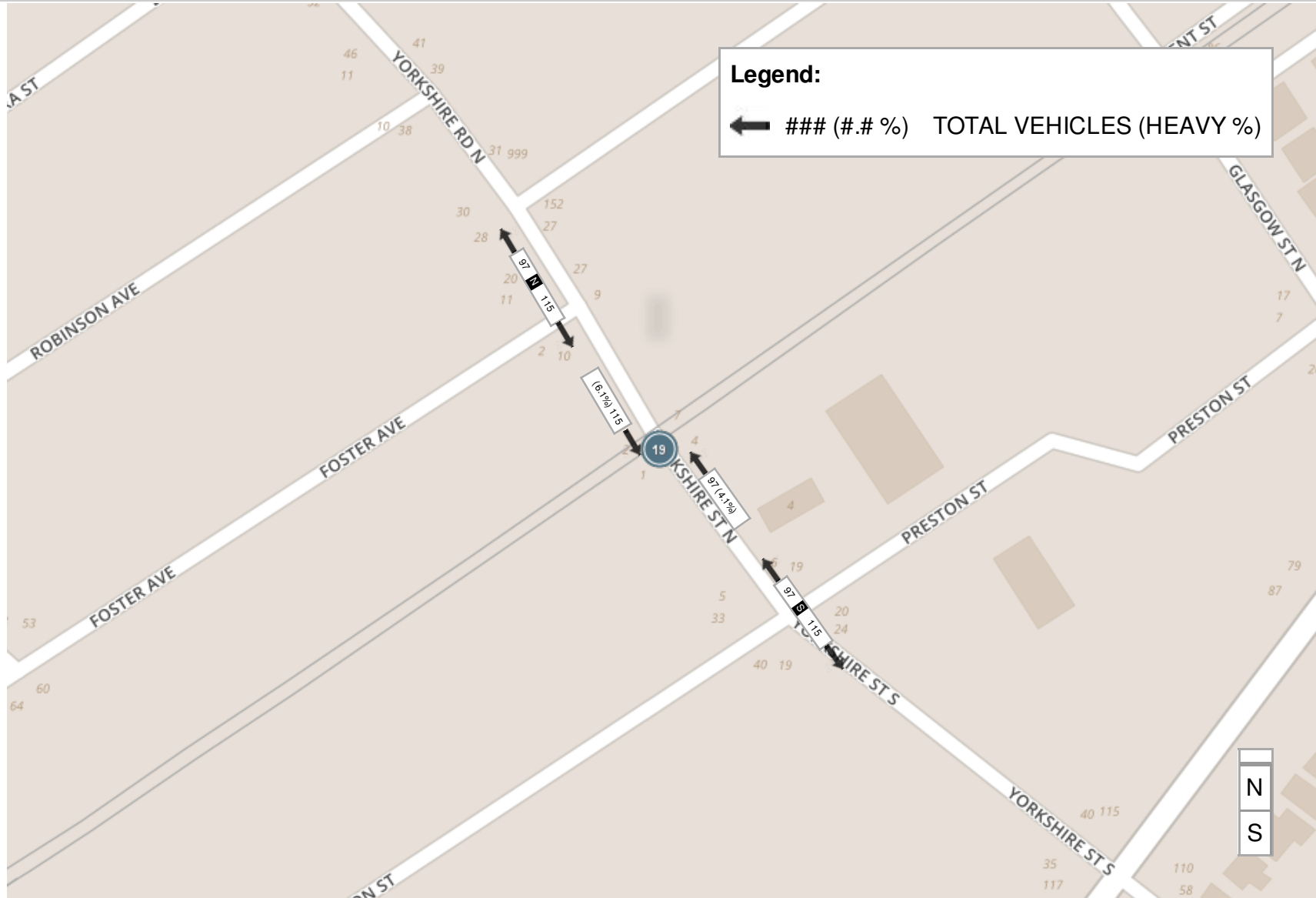
22:15:00 22:30:00	2 1	2 1	2 1	2 1	4 2	30 22
22:45:00	1	1	2	2	3	16
23:00:00	2	2	2	2	4	13
23:15:00	1	1	0	0	1	10
23:30:00	0	0	0	0	0	8
23:45:00	1	1	0	0	1	6
Grand Total	638	638	807	807	1445	-
Approach%	100%	-	100%	-	-	-
Totals %	44.2%	44.2%	55.8%	55.8%	-	-
Heavy	20	-	33	-	-	-
Heavy %	3.1%	-	4.1%	-	-	-
Bicycles	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-



Peak Hour: 08:15 AM - 09:15 AM Weather:

Start Time	S Approach		N Approach		Int. Total (15 min)
	Thru	Approach Total	Thru	Approach Total	
08:15:00	21	21	26	26	47
08:30:00	37	37	33	33	70
08:45:00	24	24	38	38	62
09:00:00	15	15	18	18	33
Grand Total	97	97	115	115	212
Approach%	100%	-	100%	-	-
Totals %	45.8%	45.8%	54.2%	54.2%	-
PHF	0.66	0.66	0.76	0.76	-
Heavy	4	4	7	7	-
Heavy %	4.1%	4.1%	6.1%	6.1%	-
Lights	93	93	106	106	-
Lights %	95.9%	95.9%	92.2%	92.2%	-
Single-Unit Trucks	2	2	4	4	-
Single-Unit Trucks %	2.1%	2.1%	3.5%	3.5%	-
Buses	2	2	3	3	-
Buses %	2.1%	2.1%	2.6%	2.6%	-
Bicycles on Road	0	0	2	2	-
Bicycles on Road %	0%	0%	1.7%	1.7%	-

Peak Hour: 08:15 AM - 09:15 AM Weather:





Turning Movement Count (19 - AT YORKSHIRE ST & RAIL CROSSING)

Start Time	S Approach		N Approach		Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Approach Total	Thru N:S	Approach Total		
00:00:00	2	2	0	0	2	
00:15:00	0	0	0	0	0	
00:30:00	1	1	0	0	1	
00:45:00	0	0	0	0	0	3
01:00:00	0	0	0	0	0	1
01:15:00	0	0	0	0	0	1
01:30:00	0	0	0	0	0	0
01:45:00	0	0	0	0	0	0
02:00:00	0	0	0	0	0	0
02:15:00	0	0	0	0	0	0
02:30:00	0	0	0	0	0	0
02:45:00	0	0	0	0	0	0
03:00:00	0	0	0	0	0	0
03:15:00	0	0	0	0	0	0
03:30:00	0	0	0	0	0	0
03:45:00	0	0	0	0	0	0
04:00:00	0	0	0	0	0	0
04:15:00	0	0	0	0	0	0
04:30:00	0	0	0	0	0	0
04:45:00	0	0	0	0	0	0



05:00:00	0	0	3	3	3	3
05:15:00	0	0	3	3	3	6
05:30:00	1	1	2	2	3	9
05:45:00	1	1	2	2	3	12
06:00:00	0	0	1	1	1	10
06:15:00	1	1	8	8	9	16
06:30:00	4	4	4	4	8	21
06:45:00	2	2	6	6	8	26
07:00:00	3	3	5	5	8	33
07:15:00	8	8	7	7	15	39
07:30:00	3	3	18	18	21	52
07:45:00	7	7	10	10	17	61
08:00:00	13	13	18	18	31	84
08:15:00	28	28	21	21	49	118
08:30:00	36	36	35	35	71	168
08:45:00	21	21	34	34	55	206
09:00:00	15	15	19	19	34	209
09:15:00	8	8	8	8	16	176
09:30:00	10	10	10	10	20	125
09:45:00	10	10	14	14	24	94
10:00:00	11	11	13	13	24	84
10:15:00	7	7	5	5	12	80
10:30:00	11	11	14	14	25	85



10:45:00	4	4	7	7	11	72
11:00:00	5	5	6	6	11	59
11:15:00	11	11	23	23	34	81
11:30:00	6	6	10	10	16	72
11:45:00	8	8	24	24	32	93
12:00:00	8	8	7	7	15	97
12:15:00	16	16	12	12	28	91
12:30:00	12	12	11	11	23	98
12:45:00	8	8	19	19	27	93
13:00:00	17	17	11	11	28	106
13:15:00	8	8	13	13	21	99
13:30:00	8	8	12	12	20	96
13:45:00	11	11	7	7	18	87
14:00:00	11	11	15	15	26	85
14:15:00	6	6	16	16	22	86
14:30:00	9	9	9	9	18	84
14:45:00	4	4	17	17	21	87
15:00:00	25	25	15	15	40	101
15:15:00	15	15	29	29	44	123
15:30:00	19	19	40	40	59	164
15:45:00	13	13	19	19	32	175
16:00:00	10	10	23	23	33	168
16:15:00	15	15	13	13	28	152



16:30:00	13	13	28	28	41	134
16:45:00	24	24	14	14	38	140
17:00:00	16	16	20	20	36	143
17:15:00	20	20	18	18	38	153
17:30:00	18	18	16	16	34	146
17:45:00	12	12	10	10	22	130
18:00:00	7	7	13	13	20	114
18:15:00	13	13	16	16	29	105
18:30:00	6	6	6	6	12	83
18:45:00	7	7	11	11	18	79
19:00:00	6	6	9	9	15	74
19:15:00	11	11	11	11	22	67
19:30:00	6	6	7	7	13	68
19:45:00	5	5	8	8	13	63
20:00:00	5	5	8	8	13	61
20:15:00	1	1	7	7	8	47
20:30:00	5	5	3	3	8	42
20:45:00	7	7	5	5	12	41
21:00:00	5	5	3	3	8	36
21:15:00	4	4	5	5	9	37
21:30:00	4	4	6	6	10	39
21:45:00	1	1	2	2	3	30
22:00:00	8	8	4	4	12	34



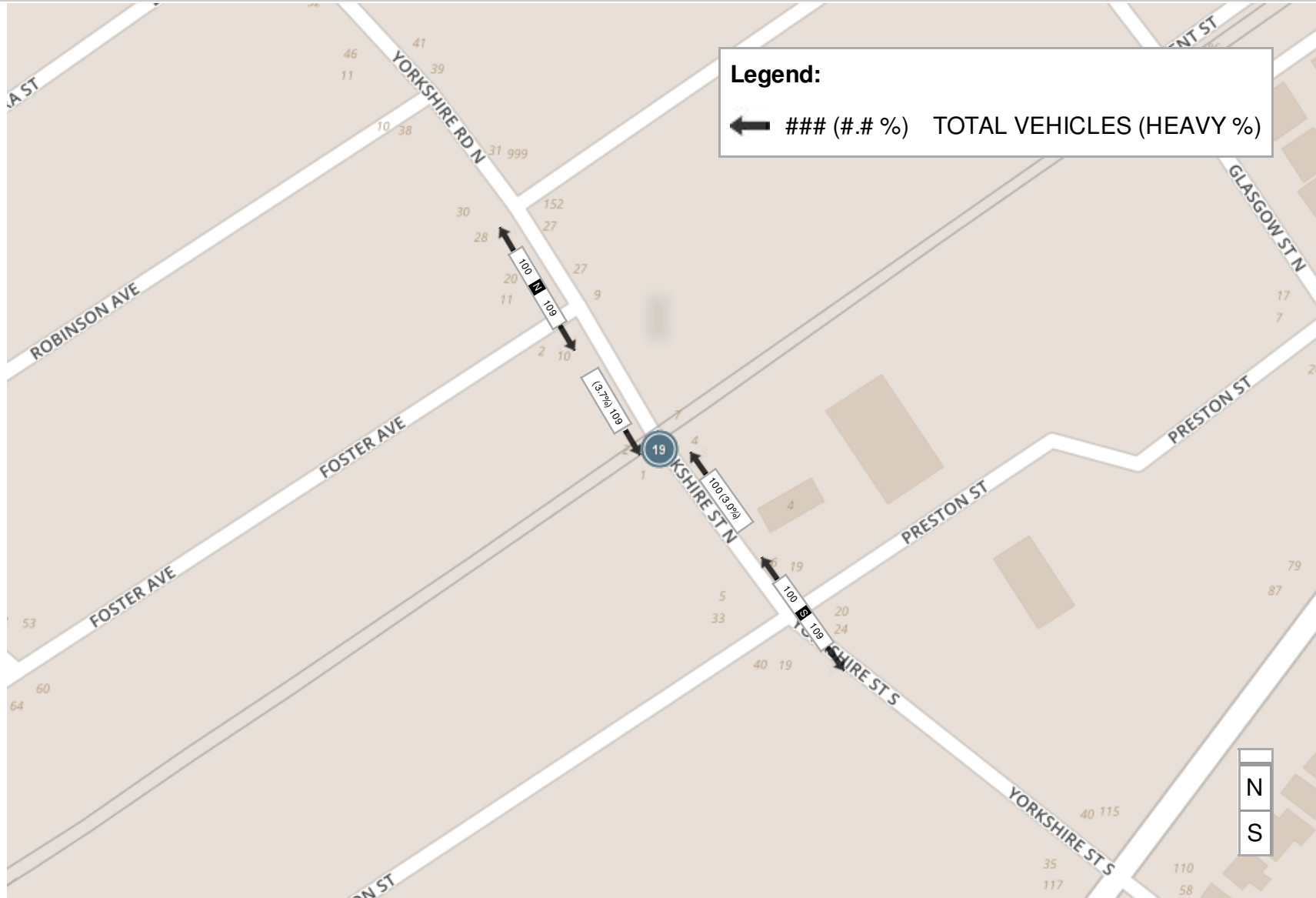
22:15:00 22:30:00	1 1	1 1	2 1	2 1	3 2	28 20
22:45:00	2	2	3	3	5	22
23:00:00	3	3	2	2	5	15
23:15:00	1	1	0	0	1	13
23:30:00	0	0	1	1	1	12
23:45:00	0	0	0	0	0	7
Grand Total	664	664	857	857	1521	-
Approach%	100%	-	100%	-	-	-
Totals %	43.7%	43.7%	56.3%	56.3%	-	-
Heavy	13	-	26	-	-	-
Heavy %	2%	-	3%	-	-	-
Bicycles	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-



Peak Hour: 08:15 AM - 09:15 AM Weather:

Start Time	S Approach		N Approach		Int. Total (15 min)
	Thru	Approach Total	Thru	Approach Total	
08:15:00	28	28	21	21	49
08:30:00	36	36	35	35	71
08:45:00	21	21	34	34	55
09:00:00	15	15	19	19	34
Grand Total	100	100	109	109	209
Approach%	100%	-	100%	-	-
Totals %	47.8%	47.8%	52.2%	52.2%	-
PHF	0.69	0.69	0.78	0.78	-
Heavy	3	3	4	4	-
Heavy %	3%	3%	3.7%	3.7%	-
Lights	96	96	104	104	-
Lights %	96%	96%	95.4%	95.4%	-
Single-Unit Trucks	1	1	1	1	-
Single-Unit Trucks %	1%	1%	0.9%	0.9%	-
Buses	1	1	2	2	-
Buses %	1%	1%	1.8%	1.8%	-
Heavy	1	1	1	1	-
Heavy %	1%	1%	0.9%	0.9%	-
Bicycles on Road	1	1	1	1	-
Bicycles on Road %	1%	1%	0.9%	0.9%	-

Peak Hour: 08:15 AM - 09:15 AM Weather:





Turning Movement Count (19 - AT YORKSHIRE ST & RAIL CROSSING)

Start Time	S Approach		N Approach		Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Approach Total	Thru N:S	Approach Total		
00:00:00	0	0	0	0	0	
00:15:00	0	0	0	0	0	
00:30:00	0	0	0	0	0	
00:45:00	0	0	0	0	0	0
01:00:00	0	0	0	0	0	0
01:15:00	1	1	0	0	1	1
01:30:00	0	0	0	0	0	1
01:45:00	0	0	0	0	0	1
02:00:00	0	0	0	0	0	1
02:15:00	0	0	0	0	0	0
02:30:00	0	0	0	0	0	0
02:45:00	0	0	0	0	0	0
03:00:00	0	0	0	0	0	0
03:15:00	0	0	0	0	0	0
03:30:00	0	0	0	0	0	0
03:45:00	0	0	0	0	0	0
04:00:00	0	0	0	0	0	0
04:15:00	0	0	0	0	0	0
04:30:00	1	1	0	0	1	1
04:45:00	1	1	1	1	2	3



05:00:00	0	0	1	1	1	4
05:15:00	0	0	2	2	2	6
05:30:00	1	1	2	2	3	8
05:45:00	2	2	1	1	3	9
06:00:00	1	1	4	4	5	13
06:15:00	0	0	7	7	7	18
06:30:00	2	2	3	3	5	20
06:45:00	4	4	4	4	8	25
07:00:00	2	2	5	5	7	27
07:15:00	4	4	11	11	15	35
07:30:00	5	5	14	14	19	49
07:45:00	9	9	13	13	22	63
08:00:00	12	12	11	11	23	79
08:15:00	16	16	32	32	48	112
08:30:00	36	36	19	19	55	148
08:45:00	31	31	36	36	67	193
09:00:00	15	15	22	22	37	207
09:15:00	13	13	15	15	28	187
09:30:00	3	3	11	11	14	146
09:45:00	8	8	14	14	22	101
10:00:00	8	8	12	12	20	84
10:15:00	6	6	11	11	17	73
10:30:00	8	8	7	7	15	74



10:45:00	10	10	12	12	22	74
11:00:00	4	4	12	12	16	70
11:15:00	8	8	13	13	21	74
11:30:00	6	6	12	12	18	77
11:45:00	9	9	23	23	32	87
12:00:00	16	16	37	37	53	124
12:15:00	11	11	12	12	23	126
12:30:00	11	11	14	14	25	133
12:45:00	9	9	19	19	28	129
13:00:00	9	9	16	16	25	101
13:15:00	4	4	10	10	14	92
13:30:00	8	8	8	8	16	83
13:45:00	8	8	10	10	18	73
14:00:00	3	3	9	9	12	60
14:15:00	10	10	8	8	18	64
14:30:00	12	12	14	14	26	74
14:45:00	13	13	10	10	23	79
15:00:00	19	19	19	19	38	105
15:15:00	18	18	44	44	62	149
15:30:00	13	13	32	32	45	168
15:45:00	19	19	22	22	41	186
16:00:00	11	11	14	14	25	173
16:15:00	8	8	21	21	29	140



16:30:00	16	16	21	21	37	132
16:45:00	25	25	12	12	37	128
17:00:00	32	32	18	18	50	153
17:15:00	18	18	17	17	35	159
17:30:00	19	19	13	13	32	154
17:45:00	12	12	18	18	30	147
18:00:00	17	17	9	9	26	123
18:15:00	9	9	13	13	22	110
18:30:00	13	13	10	10	23	101
18:45:00	14	14	16	16	30	101
19:00:00	13	13	7	7	20	95
19:15:00	10	10	15	15	25	98
19:30:00	7	7	7	7	14	89
19:45:00	4	4	7	7	11	70
20:00:00	6	6	6	6	12	62
20:15:00	4	4	8	8	12	49
20:30:00	3	3	3	3	6	41
20:45:00	4	4	7	7	11	41
21:00:00	3	3	7	7	10	39
21:15:00	5	5	8	8	13	40
21:30:00	8	8	4	4	12	46
21:45:00	6	6	3	3	9	44
22:00:00	2	2	4	4	6	40



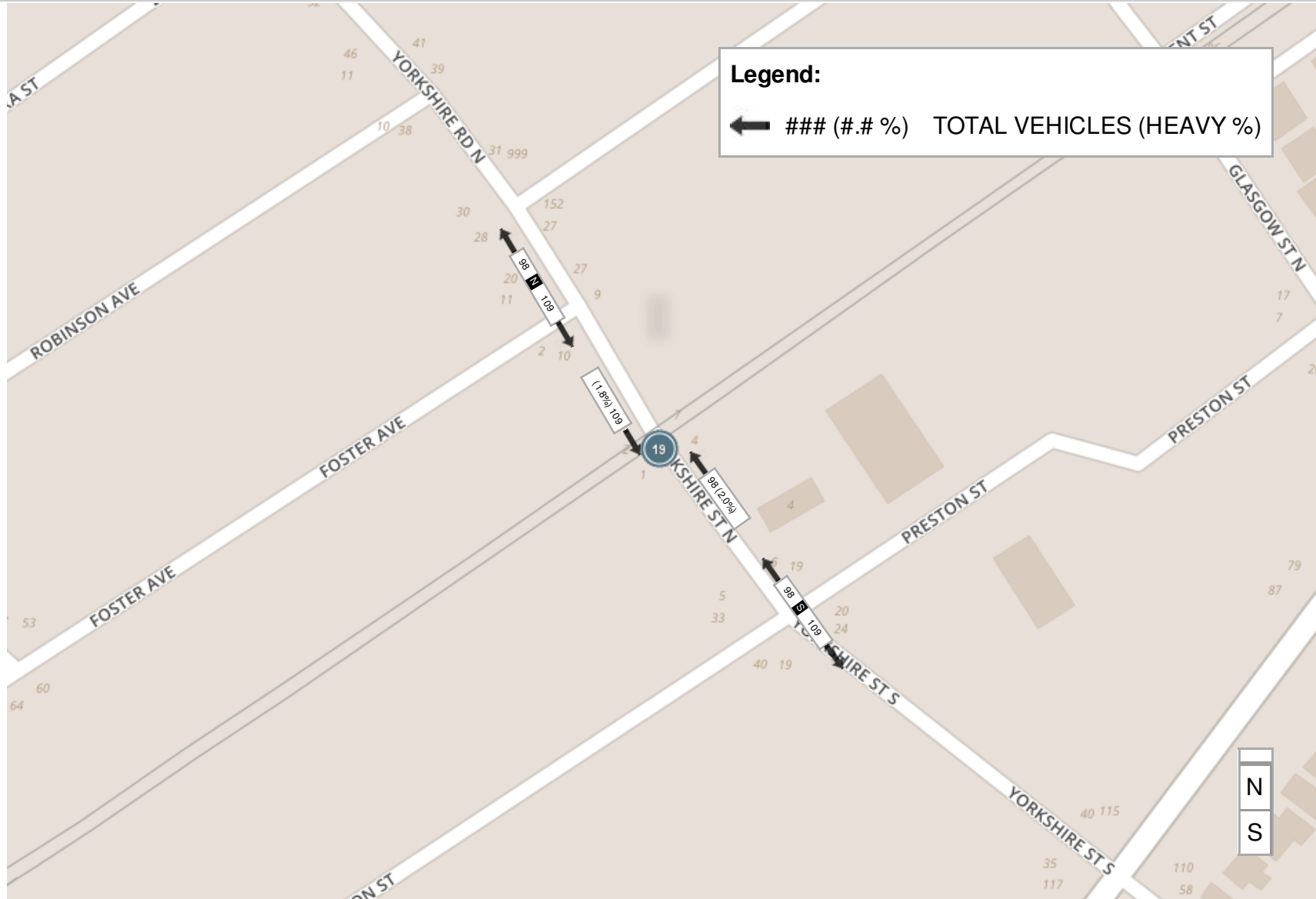
22:15:00 22:30:00	1 3	1 3	7 7	7 7	8 10	35 33
22:45:00	3	3	3	3	6	30
23:00:00	1	1	1	1	2	26
23:15:00	1	1	0	0	1	19
23:30:00	1	1	0	0	1	10
23:45:00	0	0	0	0	0	4
Grand Total	688	688	900	900	1588	-
Approach%	100%	-	100%	-	-	-
Totals %	43.3%	43.3%	56.7%	56.7%	-	-
Heavy	6	-	12	-	-	-
Heavy %	0.9%	-	1.3%	-	-	-
Bicycles	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-



Peak Hour: 08:15 AM - 09:15 AM Weather:

Start Time	S Approach		N Approach		Int. Total (15 min)
	Thru	Approach Total	Thru	Approach Total	
08:15:00	16	16	32	32	48
08:30:00	36	36	19	19	55
08:45:00	31	31	36	36	67
09:00:00	15	15	22	22	37
Grand Total	98	98	109	109	207
Approach%	100%	-	100%	-	-
Totals %	47.3%	47.3%	52.7%	52.7%	-
PHF	0.68	0.68	0.76	0.76	-
Heavy	2	2	2	2	-
Heavy %	2%	2%	1.8%	1.8%	-
Lights	86	86	95	95	-
Lights %	87.8%	87.8%	87.2%	87.2%	-
Single-Unit Trucks	0	0	1	1	-
Single-Unit Trucks %	0%	0%	0.9%	0.9%	-
Buses	2	2	1	1	-
Buses %	2%	2%	0.9%	0.9%	-
Bicycles on Road	10	10	12	12	-
Bicycles on Road %	10.2%	10.2%	11%	11%	-

Peak Hour: 08:15 AM - 09:15 AM Weather:





Turning Movement Count (19 - AT YORKSHIRE ST & RAIL CROSSING)

Start Time	S Approach		N Approach		Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Approach Total	Thru N:S	Approach Total		
00:00:00	2	2	1	1	3	
00:15:00	0	0	1	1	1	
00:30:00	0	0	0	0	0	
00:45:00	3	3	2	2	5	9
01:00:00	0	0	0	0	0	6
01:15:00	0	0	0	0	0	5
01:30:00	2	2	2	2	4	9
01:45:00	0	0	0	0	0	4
02:00:00	0	0	0	0	0	4
02:15:00	0	0	0	0	0	4
02:30:00	0	0	0	0	0	0
02:45:00	0	0	0	0	0	0
03:00:00	0	0	2	2	2	2
03:15:00	1	1	0	0	1	3
03:30:00	0	0	0	0	0	3
03:45:00	0	0	0	0	0	3
04:00:00	0	0	0	0	0	1
04:15:00	0	0	0	0	0	0
04:30:00	1	1	0	0	1	1
04:45:00	0	0	0	0	0	1



05:00:00	1	1	1	1	2	3
05:15:00	0	0	3	3	3	6
05:30:00	0	0	4	4	4	9
05:45:00	2	2	0	0	2	11
06:00:00	0	0	3	3	3	12
06:15:00	1	1	6	6	7	16
06:30:00	6	6	1	1	7	19
06:45:00	3	3	3	3	6	23
07:00:00	5	5	10	10	15	35
07:15:00	2	2	7	7	9	37
07:30:00	4	4	13	13	17	47
07:45:00	15	15	11	11	26	67
08:00:00	15	15	15	15	30	82
08:15:00	23	23	37	37	60	133
08:30:00	15	15	13	13	28	144
08:45:00	49	49	40	40	89	207
09:00:00	14	14	18	18	32	209
09:15:00	12	12	14	14	26	175
09:30:00	14	14	14	14	28	175
09:45:00	15	15	6	6	21	107
10:00:00	9	9	7	7	16	91
10:15:00	10	10	14	14	24	89
10:30:00	14	14	24	24	38	99



10:45:00	16	16	14	14	30	108
11:00:00	10	10	15	15	25	117
11:15:00	13	13	23	23	36	129
11:30:00	18	18	17	17	35	126
11:45:00	17	17	28	28	45	141
12:00:00	18	18	19	19	37	153
12:15:00	21	21	13	13	34	151
12:30:00	19	19	15	15	34	150
12:45:00	14	14	25	25	39	144
13:00:00	15	15	12	12	27	134
13:15:00	14	14	19	19	33	133
13:30:00	16	16	9	9	25	124
13:45:00	12	12	23	23	35	120
14:00:00	5	5	10	10	15	108
14:15:00	8	8	8	8	16	91
14:30:00	13	13	18	18	31	97
14:45:00	19	19	25	25	44	106
15:00:00	19	19	24	24	43	134
15:15:00	21	21	43	43	64	182
15:30:00	16	16	16	16	32	183
15:45:00	13	13	26	26	39	178
16:00:00	12	12	18	18	30	165
16:15:00	15	15	21	21	36	137



16:30:00	23	23	21	21	44	149
16:45:00	22	22	20	20	42	152
17:00:00	30	30	25	25	55	177
17:15:00	22	22	28	28	50	191
17:30:00	14	14	23	23	37	184
17:45:00	15	15	13	13	28	170
18:00:00	13	13	18	18	31	146
18:15:00	12	12	14	14	26	122
18:30:00	10	10	11	11	21	106
18:45:00	11	11	11	11	22	100
19:00:00	9	9	12	12	21	90
19:15:00	8	8	11	11	19	83
19:30:00	7	7	10	10	17	79
19:45:00	5	5	6	6	11	68
20:00:00	5	5	4	4	9	56
20:15:00	6	6	3	3	9	46
20:30:00	3	3	10	10	13	42
20:45:00	7	7	6	6	13	44
21:00:00	5	5	7	7	12	47
21:15:00	9	9	9	9	18	56
21:30:00	4	4	5	5	9	52
21:45:00	2	2	2	2	4	43
22:00:00	4	4	3	3	7	38



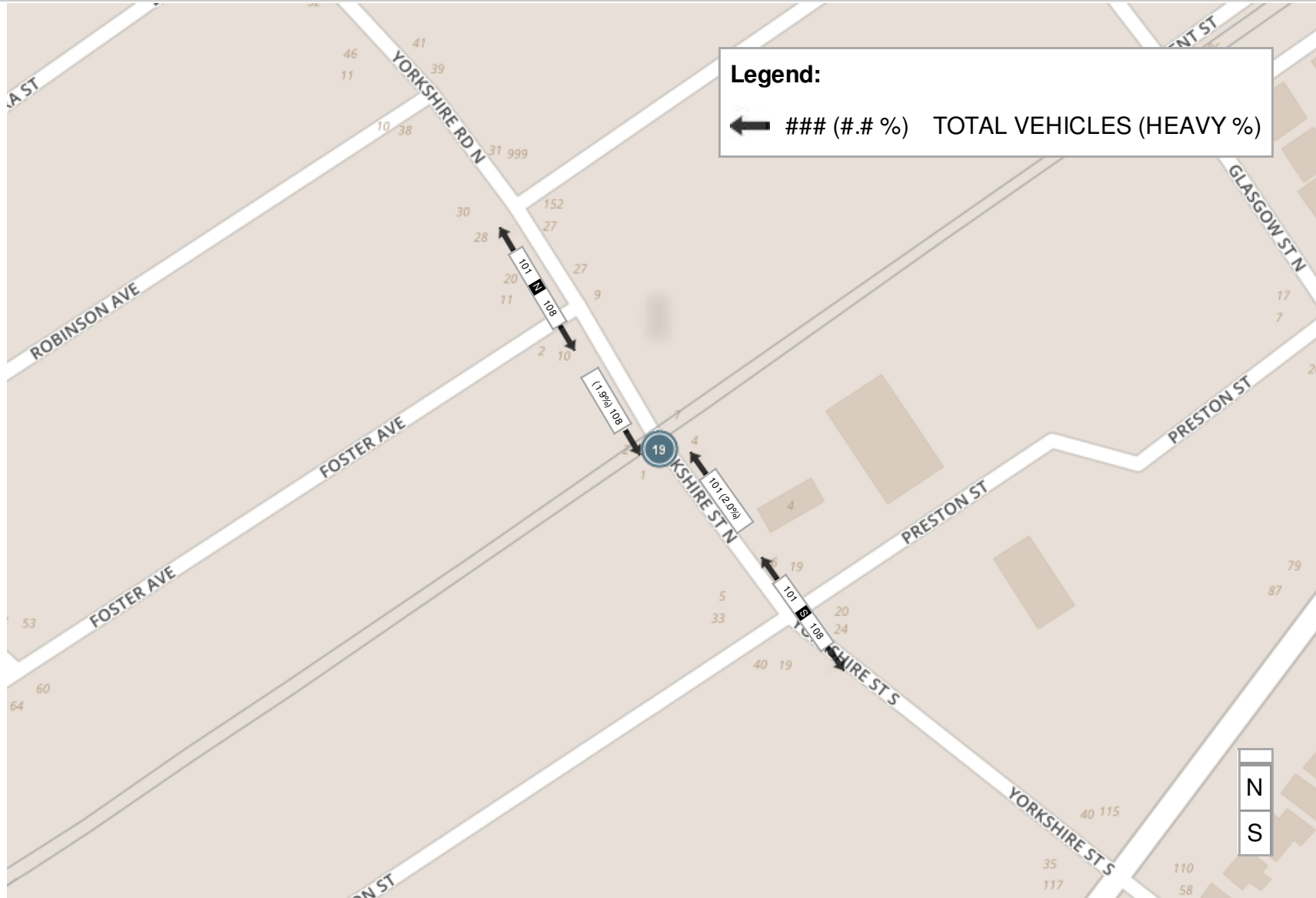
22:15:00 22:30:00	7 4	7 4	3 4	3 4	10 8	30 29
22:45:00	2	2	3	3	5	30
23:00:00	2	2	3	3	5	28
23:15:00	2	2	1	1	3	21
23:30:00	1	1	2	2	3	16
23:45:00	2	2	0	0	2	13
Grand Total	848	848	1001	1001	1849	-
Approach%	100%	-	100%	-	-	-
Totals %	45.9%	45.9%	54.1%	54.1%	-	-
Heavy	17	-	11	-	-	-
Heavy %	2%	-	1.1%	-	-	-
Bicycles	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-



Peak Hour: 08:15 AM - 09:15 AM Weather:

Start Time	S Approach		N Approach		Int. Total (15 min)
	Thru	Approach Total	Thru	Approach Total	
08:15:00	23	23	37	37	60
08:30:00	15	15	13	13	28
08:45:00	49	49	40	40	89
09:00:00	14	14	18	18	32
Grand Total	101	101	108	108	209
Approach%	100%	-	100%	-	-
Totals %	48.3%	48.3%	51.7%	51.7%	-
PHF	0.52	0.52	0.68	0.68	-
Heavy	2	2	2	2	-
Heavy %	2%	2%	1.9%	1.9%	-
Lights	96	96	99	99	-
Lights %	95%	95%	91.7%	91.7%	-
Single-Unit Trucks	0	0	0	0	-
Single-Unit Trucks %	0%	0%	0%	0%	-
Buses	2	2	2	2	-
Buses %	2%	2%	1.9%	1.9%	-
Bicycles on Road	3	3	7	7	-
Bicycles on Road %	3%	3%	6.5%	6.5%	-

Peak Hour: 08:15 AM - 09:15 AM Weather:





Turning Movement Count (19 - AT YORKSHIRE ST & RAIL CROSSING)

Start Time	S Approach		N Approach		Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Approach Total	Thru N:S	Approach Total		
00:00:00	2	2	1	1	3	
00:15:00	0	0	0	0	0	
00:30:00	0	0	1	1	1	
00:45:00	1	1	0	0	1	5
01:00:00	0	0	0	0	0	2
01:15:00	1	1	0	0	1	3
01:30:00	0	0	0	0	0	2
01:45:00	0	0	0	0	0	1
02:00:00	0	0	0	0	0	1
02:15:00	0	0	0	0	0	0
02:30:00	0	0	0	0	0	0
02:45:00	0	0	1	1	1	1
03:00:00	1	1	0	0	1	2
03:15:00	0	0	1	1	1	3
03:30:00	0	0	0	0	0	3
03:45:00	0	0	0	0	0	2
04:00:00	0	0	0	0	0	1
04:15:00	0	0	0	0	0	0
04:30:00	1	1	1	1	2	2
04:45:00	0	0	1	1	1	3



05:00:00	0	0	2	2	2	5
05:15:00	0	0	1	1	1	6
05:30:00	0	0	3	3	3	7
05:45:00	1	1	0	0	1	7
06:00:00	4	4	4	4	8	13
06:15:00	2	2	7	7	9	21
06:30:00	2	2	4	4	6	24
06:45:00	2	2	3	3	5	28
07:00:00	3	3	5	5	8	28
07:15:00	2	2	9	9	11	30
07:30:00	6	6	11	11	17	41
07:45:00	11	11	12	12	23	59
08:00:00	16	16	13	13	29	80
08:15:00	22	22	19	19	41	110
08:30:00	41	41	32	32	73	166
08:45:00	20	20	30	30	50	193
09:00:00	16	16	11	11	27	191
09:15:00	11	11	10	10	21	171
09:30:00	5	5	10	10	15	113
09:45:00	15	15	18	18	33	96
10:00:00	11	11	11	11	22	91
10:15:00	8	8	22	22	30	100
10:30:00	7	7	10	10	17	102



10:45:00	5	5	11	11	16	85
11:00:00	5	5	14	14	19	82
11:15:00	9	9	7	7	16	68
11:30:00	7	7	26	26	33	84
11:45:00	15	15	20	20	35	103
12:00:00	23	23	40	40	63	147
12:15:00	14	14	23	23	37	168
12:30:00	6	6	10	10	16	151
12:45:00	8	8	15	15	23	139
13:00:00	11	11	17	17	28	104
13:15:00	12	12	13	13	25	92
13:30:00	9	9	9	9	18	94
13:45:00	13	13	15	15	28	99
14:00:00	11	11	12	12	23	94
14:15:00	7	7	12	12	19	88
14:30:00	7	7	15	15	22	92
14:45:00	10	10	14	14	24	88
15:00:00	19	19	14	14	33	98
15:15:00	17	17	47	47	64	143
15:30:00	14	14	25	25	39	160
15:45:00	14	14	21	21	35	171
16:00:00	11	11	17	17	28	166
16:15:00	11	11	18	18	29	131



16:30:00	18	18	18	18	36	128
16:45:00	20	20	16	16	36	129
17:00:00	21	21	17	17	38	139
17:15:00	14	14	15	15	29	139
17:30:00	19	19	13	13	32	135
17:45:00	11	11	17	17	28	127
18:00:00	7	7	10	10	17	106
18:15:00	12	12	9	9	21	98
18:30:00	19	19	8	8	27	93
18:45:00	10	10	10	10	20	85
19:00:00	7	7	12	12	19	87
19:15:00	10	10	11	11	21	87
19:30:00	2	2	5	5	7	67
19:45:00	11	11	5	5	16	63
20:00:00	5	5	4	4	9	53
20:15:00	5	5	3	3	8	40
20:30:00	4	4	8	8	12	45
20:45:00	3	3	8	8	11	40
21:00:00	2	2	5	5	7	38
21:15:00	8	8	2	2	10	40
21:30:00	2	2	3	3	5	33
21:45:00	2	2	3	3	5	27
22:00:00	3	3	5	5	8	28



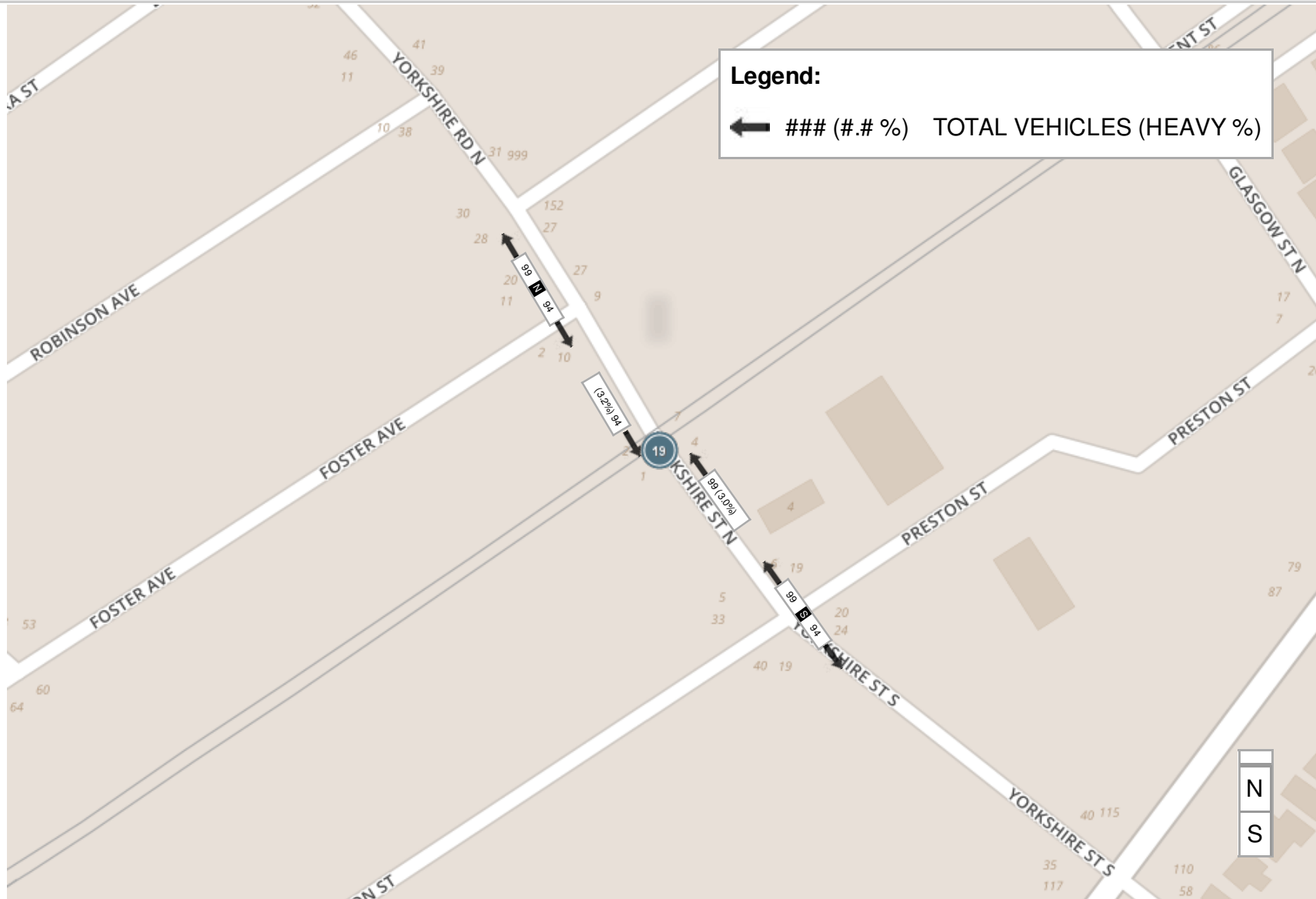
22:15:00 22:30:00	5 2	5 2	5 2	5 2	10 4	28 27
22:45:00	3	3	3	3	6	28
23:00:00	0	0	1	1	1	21
23:15:00	2	2	1	1	3	14
23:30:00	4	4	2	2	6	16
23:45:00	0	0	2	2	2	12
Grand Total	700	700	891	891	1591	-
Approach%	100%	-	100%	-	-	-
Totals %	44%	44%	56%	56%	-	-
Heavy	8	-	17	-	-	-
Heavy %	1.1%	-	1.9%	-	-	-
Bicycles	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-



Peak Hour: 08:00 AM - 09:00 AM Weather:

Start Time	S Approach		N Approach		Int. Total (15 min)
	Thru	Approach Total	Thru	Approach Total	
08:00:00	16	16	13	13	29
08:15:00	22	22	19	19	41
08:30:00	41	41	32	32	73
08:45:00	20	20	30	30	50
Grand Total	99	99	94	94	193
Approach%	100%	-	100%	-	-
Totals %	51.3%	51.3%	48.7%	48.7%	-
PHF	0.6	0.6	0.73	0.73	-
Heavy	3	3	3	3	-
Heavy %	3%	3%	3.2%	3.2%	-
Lights	91	91	88	88	-
Lights %	91.9%	91.9%	93.6%	93.6%	-
Single-Unit Trucks	0	0	0	0	-
Single-Unit Trucks %	0%	0%	0%	0%	-
Buses	2	2	3	3	-
Buses %	2%	2%	3.2%	3.2%	-
Articulated Trucks	1	1	0	0	-
Articulated Trucks %	1%	1%	0%	0%	-
Bicycles on Road	5	5	3	3	-
Bicycles on Road %	5.1%	5.1%	3.2%	3.2%	-

Peak Hour: 08:00 AM - 09:00 AM Weather:



Appendix C: Signal Timing Data

CITY OF GUELPH

Traffic Signal Timing Parameters

Database Date		From field				Prepared Date:		Sep. 28, 2018			
Database Rev		From field				Completed By:		I.T.			
Timing Card / Field rev		From field				Checked By:					
Location:		Gordon/Norfolk @ Waterloo/Wilson					TIME PERIOD (sec.) (Green+Amber+All Red)				
Phase #	Direction	Vehicle Minimum (sec.)	Pedestrian Minimum (sec.)		Amber (sec.)	All Red (sec.)					
			WALK	FDWALK			AM MAX	OFF MAX	PM MAX	OVERNIGHT MAX	
1	not in use										
2	NB Gordon	10.0	14.0	14.0	4.0	2.0	58.0	58.0	58.0	38.0	
3	not in use										
4	WB Wilson	7.0	8.0	17.0	4.0	2.0	32.0	32.0	32.0	32.0	
5	NBLT Gordon P+P	6.0			3.0		10.0	10.0	10.0		
6	SB Norfolk	10.0	14.0	14.0	4.0	2.0	48.0	48.0	48.0	38.0	
7	not in use										
8	EB Waterloo	7.0	8.0	17.0	4.0	2.0	32.0	32.0	32.0	32.0	
System Control		Yes									
Local Control		No									
Semi-Actuated Mode		Yes									
Note: P+P = Protected Permissive Phase Prot. = Fully Protected Phase				TIME (M-F)		PEAK	CYCLE LENGTH (sec.)		OFFSET (sec.)		
				7:00 - 9:00		AM	90		10		
				9:00 - 15:00		OFF	90		64		
				15:00 - 21:00		PM	90		89		
				21:00 - -7:00		OVERNIGHT	70		10		

Traffic Signal Timing Information

Main Street: Norfolk Street
Side Street: Macdonell Street
Signal Operation: Fixed Time
Coordinated: YES

Movement		Period	Period
		1	2
Norfolk Street Walk		20	15
Norfolk Street Flashing Don't Walk		13	13
Norfolk Street Northbound/Southbound Through Green		33	28
Norfolk Street Northbound Amber/ Norfolk Street Southbound Through Green		2	4
Norfolk Street Northbound Red/ Norfolk Street Southbound Through Green		4	2
Norfolk Street Southbound Through Green/ Norfolk Street Southbound Left Turn Green/ Macdonell Street Westbound Right Turn Green		15	13
Norfolk Street Southbound Through Amber/ Norfolk Street Southbound Left Turn Amber/ Macdonell Street Westbound Right Turn Amber		4	4
All Red		2	2
Macdonell Street Walk		11	8
Macdonell Street Flashing Don't Walk		13	13
Macdonell Street Through Green		24	21
Macdonell Street Amber		4	4
All-Red		2	2
Cycle Length		90	80

All times displayed in seconds

* Actuated Phase

The Macdonell Street southbound left turn is a fully protected movement.

Period 1: 07:00-21:00 Daily

Period 2: 21:00-07:00 Daily

CITY OF GUELPH

Traffic Signal Timing Parameters

Database Date		Field				Prepared Date:		Oct. 10, 2018			
Database Rev		Field				Completed By:		I.T.			
Timing Card / Field rev		Field				Checked By:					
Location:		Paisley Street at Paisley/Quebec						TIME PERIOD			
Phase #	Direction	Vehicle Minimum (sec.)	Pedestrian Minimum (sec.)		Amber (sec.)	All Red (sec.)	(sec.)				
			WALK	FDWALK			(Green+Amber+All Red)				
							AM MAX	OFF MAX	PM MAX	OVERNIGHT MAX	
1	SBLT-Norfolk	6.0			3.0		10.0	10.0	10.0		
2	NB-Norfolk	10.0	8.0	17.0	4.0	2.0	41.0	41.0	41.0	46.0	
3	EBLT-Paisley	6.0			3.0						
4	WB-Quebec	10.0	9.0	14.0	4.0	2.0	39.0	39.0	39.0	34.0	
5	NBLT-Norfolk	6.0			3.0		10.0	10.0	10.0		
6	SB-Norfolk	10.0	8.0	17.0	4.0	2.0	41.0	41.0	41.0	46.0	
7	WBLT-Quebec	6.0			3.0		10.0	10.0	10.0		
8	EB-Paisley	10.0	9.0	14.0	4.0	2.0	29.0	29.0	29.0	34.0	
System Control		Yes									
Local Control		No									
Semi-Actuated Mode		Yes									
				TIME (M-F)		PEAK	CYCLE LENGTH (sec.)			OFFSET (sec.)	
				07:00-9:00		AM	90			84	
				9:00 - 15:00		OFF	90			38	
				15:00 - 21:00		PM	90			30	
				21:00 - 7:00		Overnight	80			3	

Note: P+P = Protected Permissive Phase
 Prot. = Fully Protected Phase

CITY OF GUELPH

Traffic Signal Timing Parameters

Database Date		Field			Prepared Date:		Sep. 28, 2018		
Database Rev		Field			Completed By:		I.T.		
Timing Card / Field rev		Field			Checked By:				
Location:		Paisley Street at Dublin Street						TIME PERIOD	
Phase #	Direction	Vehicle Minimum (sec.)	Pedestrian Minimum (sec.)		Amber (sec.)	All Red (sec.)	(sec.) (Green+Amber+All Red)		
			WALK	FDWALK			Day MAX		
1	Not in use								
2	Paisley Road	10.0	18.0	10.0	4.0	2.0	48.0		
3	Not in use								
4	Dublin Street	7.0	7.0	11.0	4.0	2.0	27.0		
5	Not in use								
6	Paisley Road	10.0	18.0	10.0	4.0	2.0	48.0		
7	Not in use								
8	Dublin Street	7.0	7.0	11.0	4.0	2.0	27.0		
System Control		Yes							
Local Control		No							
Semi-Actuated Mode		Yes							
Note: P+P = Protected Permissive Phase Prot. = Fully Protected Phase				TIME (M-F)		PEAK	CYCLE LENGTH (sec.)		OFFSET (sec.)
				07:00-21:00		Day	75		62

CITY OF GUELPH

Traffic Signal Timing Parameters

Database Date		From field				Prepared Date:		Sep. 28, 2018			
Database Rev		From field				Completed By:		I.T.			
Timing Card / Field rev		From field				Checked By:					
Location:		Paisley @ Yorkshire						TIME PERIOD			
Phase #	Direction	Vehicle Minimum (sec.)	Pedestrian Minimum (sec.)		Amber (sec.)	All Red (sec.)	(sec.) (Green+Amber+All Red)				
			WALK	FDWALK			DAY MAX				
1	not in use										
2	EB Paisley	18.0	18.0	12.0	4.0	2.0	50.0				
3	not in use										
4	NB Yorkshire	7.0	7.0	11.0	4.0	2.0	25.0				
5	not in use										
6	WB Paisley	18.0	18.0	12.0	4.0	2.0	50.0				
7	not in use										
8	SB Yorkshire	7.0	7.0	11.0	4.0	2.0	25.0				
System Control		Yes									
Local Control		No									
Semi-Actuated Mode		Yes									
Note: P+P = Protected Permissive Phase Prot. = Fully Protected Phase				TIME (M-F)		PEAK	CYCLE LENGTH (sec.)		OFFSET (sec.)		
				7:00 - 16:00		AM	75		43		

CITY OF GUELPH

Traffic Signal Timing Parameters

Database Date		From field				Prepared Date:		Sep. 28, 2018	
Database Rev		From field				Completed By:		I.T.	
Timing Card / Field rev		From field				Checked By:			
Location:		Waterloo @ Dublin (IPS)					TIME PERIOD (sec.) (Green+Amber+All Red)		
Phase #	Direction	Vehicle Minimum (sec.)	Pedestrian Minimum (sec.)		Amber (sec.)	All Red (sec.)			
			WALK	FDWALK			AM MAX	OFF MAX	PM MAX
1	not in use								
2	EB Waterloo	10.0	26.0	7.0	4.0	2.0			
3	not in use								
4	SB Dublin	7.0	7.0	10.0	3.0	2.0			
5	not in use								
6	WB Waterloo	10.0	26.0	7.0	4.0	2.0			
7	not in use								
8	not in use								
System Control		No							
Local Control		Yes							
Semi-Actuated Mode		Yes							
Note: P+P = Protected Permissive Phase Prot. = Fully Protected Phase				TIME (M-F)		PEAK	CYCLE LENGTH (sec.)		OFFSET (sec.)
						AM			
						OFF			
						PM			

CITY OF GUELPH

Traffic Signal Timing Parameters

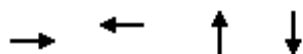
Database Date		From field				Prepared Date:		Sep. 28, 2018	
Database Rev		From field				Completed By:		I.T.	
Timing Card / Field rev		From field				Checked By:			
Location:		Waterloo @ Yorkshire (IPS)					TIME PERIOD (sec.) (Green+Amber+All Red)		
Phase #	Direction	Vehicle Minimum (sec.)	Pedestrian Minimum (sec.)		Amber (sec.)	All Red (sec.)			
			WALK	FDWALK			AM MAX	OFF MAX	PM MAX
1	not in use								
2	EB Waterloo	33.0	26.0	7.0	4.0	2.0			
3	not in use								
4	SB Yorkshire	17.0	7.0	10.0	4.0	2.0			
5	not in use								
6	WB Waterloo	33.0	26.0	7.0	4.0	2.0			
7	not in use								
8	not in use								
System Control		No							
Local Control		Yes							
Semi-Actuated Mode		Yes							
Note: P+P = Protected Permissive Phase Prot. = Fully Protected Phase				TIME (M-F)		PEAK	CYCLE LENGTH (sec.)		OFFSET (sec.)
						AM			
						OFF			
						PM			

Appendix D: Synchro Worksheets for Existing Conditions

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	598	348	152	330
v/c Ratio	0.63	0.34	0.37	0.94
Control Delay	13.8	13.2	23.4	60.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	13.8	13.2	23.4	60.5
Queue Length 50th (m)	50.0	32.0	15.5	37.5
Queue Length 95th (m)	60.0	48.2	26.1	#66.5
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	944	1015	426	358
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	0.63	0.34	0.36	0.92

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	360	19	11	196	57	12	79	22	50	66	98
Future Volume (vph)	76	360	19	11	196	57	12	79	22	50	66	98
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			0.98			0.99			0.81	
Flpb, ped/bikes		0.99			1.00			0.98			0.99	
Frt		0.99			0.96			0.97			0.93	
Flt Protected		0.99			1.00			0.99			0.99	
Satd. Flow (prot)		1774			1754			1760			1391	
Flt Permitted		0.89			0.96			0.92			0.87	
Satd. Flow (perm)		1587			1684			1632			1230	
Peak-hour factor, PHF	0.83	0.76	0.59	0.55	0.83	0.62	0.60	0.79	0.69	0.60	0.79	0.60
Adj. Flow (vph)	92	474	32	20	236	92	20	100	32	83	84	163
RTOR Reduction (vph)	0	3	0	0	17	0	0	13	0	0	47	0
Lane Group Flow (vph)	0	595	0	0	331	0	0	139	0	0	283	0
Confl. Peds. (#/hr)	56		43	43		56	175		19	19		175
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	3%	5%	0%	4%	0%	0%	1%	5%	2%	3%	3%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		44.5			44.5			18.5			18.5	
Effective Green, g (s)		44.5			44.5			18.5			18.5	
Actuated g/C Ratio		0.59			0.59			0.25			0.25	
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)		941			999			402			303	
v/s Ratio Prot												
v/s Ratio Perm		c0.38			0.20			0.09			c0.23	
v/c Ratio		0.63			0.33			0.35			0.93	
Uniform Delay, d1		9.9			7.7			23.3			27.6	
Progression Factor		1.00			1.73			1.00			1.00	
Incremental Delay, d2		3.2			0.9			0.5			34.2	
Delay (s)		13.2			14.2			23.8			61.9	
Level of Service		B			B			C			E	
Approach Delay (s)		13.2			14.2			23.8			61.9	
Approach LOS		B			B			C			E	
Intersection Summary												
HCM 2000 Control Delay			25.8			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			84.2%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	7	98	8	11	106
Future Volume (Veh/h)	5	7	98	8	11	106
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.63	0.88	0.74	0.67	0.69	0.66
Hourly flow rate (vph)	8	8	132	12	16	161
Pedestrians	10		3			
Lane Width (m)	3.7		3.7			
Walking Speed (m/s)	1.1		1.1			
Percent Blockage	1		0			
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	344	148			154	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	344	148			154	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	99	99			99	
cM capacity (veh/h)	641	860			1371	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	16	144	177			
Volume Left	8	0	16			
Volume Right	8	12	0			
cSH	734	1700	1371			
Volume to Capacity	0.02	0.08	0.01			
Queue Length 95th (m)	0.5	0.0	0.3			
Control Delay (s)	10.0	0.0	0.8			
Lane LOS	B		A			
Approach Delay (s)	10.0	0.0	0.8			
Approach LOS	B					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			22.9%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	338	3	5	185	19	0	14	32	39	5	61
Future Volume (Veh/h)	55	338	3	5	185	19	0	14	32	39	5	61
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.76	0.78	0.38	0.31	0.80	0.79	0.25	0.58	0.47	0.81	0.31	0.56
Hourly flow rate (vph)	72	433	8	16	231	24	0	24	68	48	16	109
Pedestrians		44			6			9			7	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		4			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	262			450			1026	884	452	949	876	294
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	262			450			1026	884	452	949	876	294
tC, single (s)	4.1			4.1			7.1	6.6	6.2	7.1	6.7	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.3	3.5	4.2	3.3
p0 queue free %	94			99			100	91	89	74	94	85
cM capacity (veh/h)	1305			1111			153	256	597	184	246	706
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	513	271	92	173								
Volume Left	72	16	0	48								
Volume Right	8	24	68	109								
cSH	1305	1111	443	361								
Volume to Capacity	0.06	0.01	0.21	0.48								
Queue Length 95th (m)	1.3	0.3	5.9	19.0								
Control Delay (s)	1.6	0.6	15.3	23.8								
Lane LOS	A	A	C	C								
Approach Delay (s)	1.6	0.6	15.3	23.8								
Approach LOS			C	C								
Intersection Summary												
Average Delay			6.2									
Intersection Capacity Utilization			57.6%		ICU Level of Service				B			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	404	8	9	244	2	13	42	18	8	31	15
Future Volume (Veh/h)	14	404	8	9	244	2	13	42	18	8	31	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.80	0.67	0.75	0.91	0.50	0.41	0.81	0.64	0.67	0.43	0.42
Hourly flow rate (vph)	24	505	12	12	268	4	32	52	28	12	72	36
Pedestrians		9			2			25			24	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked				0.86			0.86	0.86	0.86	0.86	0.86	
vC, conflicting volume	296			542			959	904	538	933	908	303
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	296			386			871	807	382	841	812	303
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 %	98			99			80	79	95	93	71	95
cM capacity (veh/h)	1247			993			159	250	561	181	250	702
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	541	284	112	120								
Volume Left	24	12	32	12								
Volume Right	12	4	28	36								
cSH	1247	993	244	296								
Volume to Capacity	0.02	0.01	0.46	0.41								
Queue Length 95th (m)	0.4	0.3	17.1	14.3								
Control Delay (s)	0.6	0.5	31.7	25.2								
Lane LOS	A	A	D	D								
Approach Delay (s)	0.6	0.5	31.7	25.2								
Approach LOS			D	D								
Intersection Summary												
Average Delay			6.6									
Intersection Capacity Utilization			40.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	7	6	5	4	4	2	35	5	5	49	1
Future Volume (Veh/h)	5	7	6	5	4	4	2	35	5	5	49	1
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.58	0.38	0.63	0.50	0.50	0.50	0.73	0.63	0.42	0.56	0.25
Hourly flow rate (vph)	8	12	16	8	8	8	4	48	8	12	88	4
Pedestrians	7			6			12			4		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	1			1			1			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	197	191	109	214	189	62	99				62	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	197	191	109	214	189	62	99				62	
tC, single (s)	7.1	6.5	6.5	7.1	6.8	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.6	3.5	4.2	3.3	2.2				2.2	
p0 queue free %	99	98	98	99	99	99	100				99	
cM capacity (veh/h)	732	691	851	698	651	999	1496				1545	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	36	24	60	104								
Volume Left	8	8	4	12								
Volume Right	16	8	8	4								
cSH	764	756	1496	1545								
Volume to Capacity	0.05	0.03	0.00	0.01								
Queue Length 95th (m)	1.1	0.7	0.1	0.2								
Control Delay (s)	9.9	9.9	0.5	0.9								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.9	9.9	0.5	0.9								
Approach LOS	A	A										
Intersection Summary												
Average Delay				3.2								
Intersection Capacity Utilization				19.6%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

									
Movement	WBL	WBR	NBT	NBR	SBL	SBT			
Lane Configurations									
Traffic Volume (veh/h)	1	3	42	4	2	71			
Future Volume (Veh/h)	1	3	42	4	2	71			
Sign Control	Stop		Free			Free			
Grade	0%		0%			0%			
Peak Hour Factor	0.25	0.75	0.53	0.33	0.25	0.46			
Hourly flow rate (vph)	4	4	79	12	8	154			
Pedestrians	6		1			3			
Lane Width (m)	3.7		3.7			3.7			
Walking Speed (m/s)	1.1		1.1			1.1			
Percent Blockage	1		0			0			
Right turn flare (veh)									
Median type			None			None			
Median storage (veh)									
Upstream signal (m)									
pX, platoon unblocked									
vC, conflicting volume	262	94			97				
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol	262	94			97				
tC, single (s)	6.4	6.2			4.1				
tC, 2 stage (s)									
tF (s)	3.5	3.3			2.2				
p0 queue free %	99	100			99				
cM capacity (veh/h)	722	960			1500				
Direction, Lane #	WB 1	NB 1	SB 1						
Volume Total	8	91	162						
Volume Left	4	0	8						
Volume Right	4	12	0						
cSH	824	1700	1500						
Volume to Capacity	0.01	0.05	0.01						
Queue Length 95th (m)	0.2	0.0	0.1						
Control Delay (s)	9.4	0.0	0.4						
Lane LOS	A		A						
Approach Delay (s)	9.4	0.0	0.4						
Approach LOS	A								
Intersection Summary									
Average Delay		0.5							
Intersection Capacity Utilization		16.3%	ICU Level of Service	A					
Analysis Period (min)		15							

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

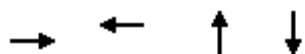
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	364	10	18	179	19	6	7	12	18	18	27
Future Volume (Veh/h)	21	364	10	18	179	19	6	7	12	18	18	27
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.85	0.36	0.75	0.88	0.53	0.75	0.58	0.50	0.64	0.50	0.52
Hourly flow rate (vph)	28	428	28	24	203	36	8	12	24	28	36	52
Pedestrians		3			2			14			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)												
pX, platoon unblocked												
vC, conflicting volume	242			470			854	802	458	802	798	227
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	242			470			854	802	458	802	798	227
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 %	98			98			96	96	96	89	88	93
cM capacity (veh/h)	1303			1087			224	301	598	263	302	795
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	484	263	44	116								
Volume Left	28	24	8	28								
Volume Right	28	36	24	52								
cSH	1303	1087	380	399								
Volume to Capacity	0.02	0.02	0.12	0.29								
Queue Length 95th (m)	0.5	0.5	3.0	9.0								
Control Delay (s)	0.7	1.0	15.7	17.7								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.7	1.0	15.7	17.7								
Approach LOS			C	C								
Intersection Summary												
Average Delay			3.7									
Intersection Capacity Utilization			37.6%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	557	312	196	128
v/c Ratio	0.48	0.29	0.60	0.41
Control Delay	5.9	7.4	30.4	27.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.9	7.4	30.4	27.3
Queue Length 50th (m)	24.4	18.5	20.4	14.1
Queue Length 95th (m)	m29.9	31.5	25.3	21.7
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1157	1093	451	441
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	0.48	0.29	0.43	0.29

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	15	396	25	16	223	17	23	61	38	20	62	8
Future Volume (vph)	15	396	25	16	223	17	23	61	38	20	62	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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.94			0.99	
Flpb, ped/bikes		1.00			1.00			0.99			0.97	
Frt		0.99			0.99			0.96			0.99	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1834			1789			1702			1770	
Flt Permitted		0.98			0.95			0.90			0.87	
Satd. Flow (perm)		1800			1697			1544			1559	
Peak-hour factor, PHF	0.63	0.79	0.78	0.67	0.87	0.53	0.48	0.66	0.68	0.63	0.74	0.67
Adj. Flow (vph)	24	501	32	24	256	32	48	92	56	32	84	12
RTOR Reduction (vph)	0	3	0	0	4	0	0	22	0	0	6	0
Lane Group Flow (vph)	0	554	0	0	308	0	0	174	0	0	122	0
Confl. Peds. (#/hr)	38		54	54		38	21		91	91		21
Confl. Bikes (#/hr)			3			1			1			
Heavy Vehicles (%)	7%	3%	0%	0%	4%	12%	0%	0%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		48.1			48.1			14.9			14.9	
Effective Green, g (s)		48.1			48.1			14.9			14.9	
Actuated g/C Ratio		0.64			0.64			0.20			0.20	
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)		1154			1088			306			309	
v/s Ratio Prot												
v/s Ratio Perm		c0.31			0.18			c0.11			0.08	
v/c Ratio		0.48			0.28			0.57			0.40	
Uniform Delay, d1		7.0			5.9			27.2			26.1	
Progression Factor		0.58			1.00			1.00			1.00	
Incremental Delay, d2		1.2			0.7			2.4			0.8	
Delay (s)		5.2			6.5			29.6			27.0	
Level of Service		A			A			C			C	
Approach Delay (s)		5.2			6.5			29.6			27.0	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			11.9			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			51.7%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	2	2	1	1	5	116	8	2	73	7
Future Volume (Veh/h)	10	0	2	2	1	1	5	116	8	2	73	7
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.25	0.25	0.25	0.25	0.25	0.63	0.60	0.67	0.50	0.79	0.44
Hourly flow rate (vph)	16	0	8	8	4	4	8	193	12	4	92	16
Pedestrians	5			13			10			3		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	0			1			1			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												355
pX, platoon unblocked												
vC, conflicting volume	337	347	115	354	349	215	113				218	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	337	347	115	354	349	215	113				218	
tC, single (s)	7.1	6.5	6.7	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.8	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	97	100	99	99	99	100	99				100	
cM capacity (veh/h)	597	565	810	574	563	817	1482				1346	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	24	16	213	112								
Volume Left	16	8	8	4								
Volume Right	8	4	12	16								
cSH	655	617	1482	1346								
Volume to Capacity	0.04	0.03	0.01	0.00								
Queue Length 95th (m)	0.9	0.6	0.1	0.1								
Control Delay (s)	10.7	11.0	0.3	0.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.7	11.0	0.3	0.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay				1.5								
Intersection Capacity Utilization				23.4%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	2	4	4	3	2	4	123	3	0	77	1
Future Volume (Veh/h)	4	2	4	4	3	2	4	123	3	0	77	1
Sign Control	Stop				Stop				Free		Free	
Grade	0%				0%				0%		0%	
Peak Hour Factor	0.50	0.50	0.50	0.50	0.75	0.50	0.50	0.65	0.38	0.25	0.66	0.25
Hourly flow rate (vph)	8	4	8	8	4	4	8	189	8	0	117	4
Pedestrians	10				16				6		3	
Lane Width (m)	3.7				3.7				3.7		3.7	
Walking Speed (m/s)	1.1				1.1				1.1		1.1	
Percent Blockage	1				2				1		0	
Right turn flare (veh)												
Median type	None								None			
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	347	358	135	360	356	212	131			213		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	347	358	135	360	356	212	131			213		
tC, single (s)	7.1	7.0	6.2	7.1	6.8	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.5	3.3	3.5	4.3	3.3	2.2			2.2		
p0 queue free %	99	99	99	99	99	100	99			100		
cM capacity (veh/h)	583	484	905	564	507	818	1452			1348		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	20	16	205	121								
Volume Left	8	8	8	0								
Volume Right	8	4	8	4								
cSH	649	594	1452	1348								
Volume to Capacity	0.03	0.03	0.01	0.00								
Queue Length 95th (m)	0.7	0.6	0.1	0.0								
Control Delay (s)	10.7	11.2	0.3	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	10.7	11.2	0.3	0.0								
Approach LOS	B	B										
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			23.1%	ICU Level of Service				A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	313	25	5	161	24	26	60	24	21	31	21
Future Volume (Veh/h)	56	313	25	5	161	24	26	60	24	21	31	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.74	0.78	0.69	0.42	0.88	0.75	0.65	0.63	0.75	0.75	0.65	0.53
Hourly flow rate (vph)	76	401	36	12	183	32	40	95	32	28	48	40
Pedestrians		12			7			15			5	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					207							
pX, platoon unblocked												
vC, conflicting volume	220			452			885	830	441	886	832	216
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	220			452			885	830	441	886	832	216
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.3
p0 queue free %	94			99			80	66	95	83	83	95
cM capacity (veh/h)	1355			1103			202	282	607	167	281	803
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	513	227	167	116								
Volume Left	76	12	40	28								
Volume Right	36	32	32	40								
cSH	1355	1103	284	299								
Volume to Capacity	0.06	0.01	0.59	0.39								
Queue Length 95th (m)	1.4	0.3	26.3	13.4								
Control Delay (s)	1.7	0.5	34.3	24.5								
Lane LOS	A	A	D	C								
Approach Delay (s)	1.7	0.5	34.3	24.5								
Approach LOS			D	C								
Intersection Summary												
Average Delay			9.3									
Intersection Capacity Utilization			50.8%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	187	172	184	88	144	64	117	374	90	44	605
v/c Ratio	0.51	0.44	0.45	0.23	0.39	0.19	0.35	0.47	0.12	0.08	0.69
Control Delay	26.0	33.4	8.1	20.0	32.8	2.9	15.3	19.9	5.8	10.1	26.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.0	33.4	8.1	20.0	32.8	2.9	15.3	19.9	5.8	10.1	26.4
Queue Length 50th (m)	21.1	24.6	0.0	9.4	20.2	0.0	6.7	34.6	0.7	3.4	90.6
Queue Length 95th (m)	22.9	39.7	14.4	17.0	35.1	0.8	m19.1	61.4	m6.0	7.5	#146.7
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	365	445	443	385	467	387	330	791	777	528	873
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.39	0.42	0.23	0.31	0.17	0.35	0.47	0.12	0.08	0.69

Intersection Summary

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.

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	35	85	146	162	72	127	31	16	98	256	81	80
Future Volume (vph)	35	85	146	162	72	127	31	16	98	256	81	80
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.76	1.00	1.00	0.73		1.00	0.97		0.94
Flpb, ped/bikes		0.88	1.00	1.00	0.89	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	0.96		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1600	1745	1199	1627	1830	1198		1764	1601		1463
Flt Permitted		0.61	1.00	1.00	0.65	1.00	1.00		0.23	1.00		1.00
Satd. Flow (perm)		1032	1745	1199	1110	1830	1198		427	1601		1463
Peak-hour factor, PHF	0.73	0.61	0.85	0.88	0.82	0.88	0.78	0.67	0.84	0.97	0.81	0.80
Adj. Flow (vph)	48	139	172	184	88	144	40	24	117	264	100	100
RTOR Reduction (vph)	0	0	0	143	0	0	51	0	0	1	0	47
Lane Group Flow (vph)	0	187	172	41	88	144	13	0	117	373	0	43
Confl. Peds. (#/hr)	73	54		112	112		73	54	50		54	42
Confl. Bikes (#/hr)				2			1	1			1	1
Heavy Vehicles (%)	3%	0%	7%	1%	0%	5%	0%	0%	3%	6%	4%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		27.2	20.2	20.2	24.4	18.8	18.8		47.6	42.6		42.6
Effective Green, g (s)		27.2	20.2	20.2	24.4	18.8	18.8		47.6	42.6		42.6
Actuated g/C Ratio		0.30	0.22	0.22	0.27	0.21	0.21		0.53	0.47		0.47
Clearance Time (s)		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
Lane Grp Cap (vph)		356	391	269	333	382	250		300	757		692
v/s Ratio Prot		c0.04	0.10		0.02	0.08			c0.02	0.23		
v/s Ratio Perm		c0.12		0.03	0.06		0.01		0.18			0.03
v/c Ratio		0.53	0.44	0.15	0.26	0.38	0.05		0.39	0.49		0.06
Uniform Delay, d1		25.1	30.0	28.0	25.3	30.6	28.5		13.3	16.3		12.9
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.28	0.99		2.11
Incremental Delay, d2		1.4	0.8	0.3	0.4	0.6	0.1		0.7	2.0		0.2
Delay (s)		26.5	30.8	28.3	25.7	31.2	28.6		17.8	18.2		27.3
Level of Service		C	C	C	C	C	C		B	B		C
Approach Delay (s)			28.5			29.0				19.5		
Approach LOS			C			C				B		
Intersection Summary												
HCM 2000 Control Delay			24.6									
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			77.5%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	7	23	541	30
Future Volume (vph)	7	23	541	30
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.99	
Flpb, ped/bikes		0.98	1.00	
Frt		1.00	0.99	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1783	1849	
Flt Permitted		0.45	1.00	
Satd. Flow (perm)		852	1849	
Peak-hour factor, PHF	0.44	0.82	0.95	0.83
Adj. Flow (vph)	16	28	569	36
RTOR Reduction (vph)	0	0	2	0
Lane Group Flow (vph)	0	44	603	0
Confl. Peds. (#/hr)	54	42		50
Confl. Bikes (#/hr)				7
Heavy Vehicles (%)	0%	0%	2%	7%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		44.8	41.2	
Effective Green, g (s)		44.8	41.2	
Actuated g/C Ratio		0.50	0.46	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		461	846	
v/s Ratio Prot		0.00	c0.33	
v/s Ratio Perm		0.04		
v/c Ratio		0.10	0.71	
Uniform Delay, d1		11.8	19.6	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.1	5.1	
Delay (s)		11.9	24.7	
Level of Service		B	C	
Approach Delay (s)			23.8	
Approach LOS			C	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	0.31	0.50	0.78	0.81	0.50	0.84	0.66	0.86	0.88	0.79	0.93	0.84
Hourly flow rate (vph)	16	20	36	16	12	44	44	623	52	72	729	32
Pedestrians		37			35			9			9	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		4			3			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)								94			144	
pX, platoon unblocked	0.81	0.81	0.73	0.81	0.81	0.84	0.73			0.84		
vC, conflicting volume	1384	1724	791	1700	1714	382	798			710		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	613	1030	532	1001	1018	0	542			268		
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	87	90	85	92	95	94			93		
cM capacity (veh/h)	228	156	348	108	159	875	732			1058		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	72	72	356	364	72	761						
Volume Left	16	16	44	0	72	0						
Volume Right	36	44	0	52	0	32						
cSH	238	263	732	1700	1058	1700						
Volume to Capacity	0.30	0.27	0.06	0.21	0.07	0.45						
Queue Length 95th (m)	9.3	8.2	1.5	0.0	1.7	0.0						
Control Delay (s)	26.5	23.7	1.9	0.0	8.7	0.0						
Lane LOS	D	C	A		A							
Approach Delay (s)	26.5	23.7	1.0		0.7							
Approach LOS	D	C										
Intersection Summary												
Average Delay			2.9									
Intersection Capacity Utilization			62.3%	ICU Level of Service					B			
Analysis Period (min)			15									

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	167	120	772	148	630
v/c Ratio	0.38	0.20	0.61	0.51	0.55
Control Delay	30.2	13.5	19.1	33.1	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	30.2	13.5	19.1	33.1	7.8
Queue Length 50th (m)	23.6	10.8	42.7	25.0	22.7
Queue Length 95th (m)	37.4	17.5	55.7	35.7	38.3
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	434	614	1263	292	1141
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	0.38	0.20	0.61	0.51	0.55
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

10/29/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	139	95	513	148	114	605
Future Volume (vph)	139	95	513	148	114	605
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.97	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.97		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1630	1418	3368		1755	1902
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1630	1418	3368		1755	1902
Peak-hour factor, PHF	0.83	0.79	0.85	0.88	0.77	0.96
Adj. Flow (vph)	167	120	604	168	148	630
RTOR Reduction (vph)	0	0	29	0	0	0
Lane Group Flow (vph)	167	120	744	0	148	630
Confl. Peds. (#/hr)	44	30		9	9	
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	12%	12%	3%	8%	4%	1%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	434	709	1234		292	1141
v/s Ratio Prot	c0.10	0.03	0.22		0.08	c0.33
v/s Ratio Perm		0.06				
v/c Ratio	0.38	0.17	0.60		0.51	0.55
Uniform Delay, d1	27.0	15.6	23.2		34.1	10.8
Progression Factor	1.00	1.00	0.77		0.80	0.55
Incremental Delay, d2	2.6	0.5	1.9		5.2	1.6
Delay (s)	29.5	16.1	19.9		32.5	7.5
Level of Service	C	B	B		C	A
Approach Delay (s)	23.9		19.9			12.3
Approach LOS	C		B			B
Intersection Summary						
HCM 2000 Control Delay			17.3		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.54			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	282	188	92	522	808
v/c Ratio	0.73	0.42	0.21	0.45	0.44
Control Delay	43.9	7.2	6.8	10.1	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	43.9	7.2	6.8	10.1	9.2
Queue Length 50th (m)	45.7	0.0	4.6	39.4	22.8
Queue Length 95th (m)	52.9	10.9	11.6	71.7	35.2
Internal Link Dist (m)				157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	520	539	450	1165	1848
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	0.54	0.35	0.20	0.45	0.44
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

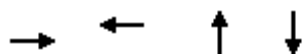
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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		0.89				1.00	1.00			0.98	
Flpb, ped/bikes	1.00		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)	1803		1405				1747	1786			3373	
Flt Permitted	0.95		1.00				0.28	1.00			1.00	
Satd. Flow (perm)	1803		1405				518	1786			3373	
Peak-hour factor, PHF	0.76	0.38	0.82	1.00	1.00	1.00	0.90	0.88	0.25	0.25	0.93	0.84
Adj. Flow (vph)	282	0	188	0	0	0	92	522	0	0	659	149
RTOR Reduction (vph)	0	0	148	0	0	0	0	0	0	0	18	0
Lane Group Flow (vph)	282	0	40	0	0	0	92	522	0	0	790	0
Confl. Peds. (#/hr)	2		87	87		2	44		2	2		44
Confl. Bikes (#/hr)			3									3
Heavy Vehicles (%)	1%	0%	3%	0%	0%	0%	4%	5%	0%	0%	4%	1%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm				pm+pt	NA			NA	
Protected Phases							5	2			6	
Permitted Phases	4		4				2					
Actuated Green, G (s)	19.2		19.2				58.8	58.8			48.9	
Effective Green, g (s)	19.2		19.2				58.8	58.8			48.9	
Actuated g/C Ratio	0.21		0.21				0.65	0.65			0.54	
Clearance Time (s)	6.0		6.0				3.0	6.0			6.0	
Vehicle Extension (s)	3.0		3.0				3.0	3.0			3.0	
Lane Grp Cap (vph)	384		299				432	1166			1832	
v/s Ratio Prot							0.02	c0.29			0.23	
v/s Ratio Perm	c0.16		0.03				0.12					
v/c Ratio	0.73		0.13				0.21	0.45			0.43	
Uniform Delay, d1	33.0		28.7				6.3	7.6			12.3	
Progression Factor	1.00		1.00				1.00	1.00			0.67	
Incremental Delay, d2	7.1		0.2				0.2	1.2			0.6	
Delay (s)	40.1		28.9				6.6	8.9			8.9	
Level of Service	D		C				A	A			A	
Approach Delay (s)		35.6			0.0			8.5			8.9	
Approach LOS		D			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			15.4				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			15.0		
Intersection Capacity Utilization			53.9%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	517	550	92	148
v/c Ratio	0.48	0.46	0.28	0.45
Control Delay	9.1	16.9	22.1	23.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.1	16.9	22.1	23.0
Queue Length 50th (m)	36.9	72.3	8.4	12.6
Queue Length 95th (m)	56.4	91.6	14.5	20.7
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	1087	1183	443	432
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	0.48	0.46	0.21	0.34
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	363	32	19	402	23	17	37	20	18	41	41
Future Volume (vph)	32	363	32	19	402	23	17	37	20	18	41	41
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			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			1.00	
Frt		0.99			0.99			0.97			0.95	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1792			1881			1822			1760	
Flt Permitted		0.92			0.96			0.92			0.89	
Satd. Flow (perm)		1654			1803			1694			1593	
Peak-hour factor, PHF	0.67	0.87	0.62	0.59	0.82	0.82	0.85	0.71	1.00	0.50	0.73	0.73
Adj. Flow (vph)	48	417	52	32	490	28	20	52	20	36	56	56
RTOR Reduction (vph)	0	4	0	0	2	0	0	15	0	0	32	0
Lane Group Flow (vph)	0	513	0	0	548	0	0	77	0	0	116	0
Confl. Peds. (#/hr)	18		8	8		18	18		2	2		18
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		49.1			49.1			13.9			13.9	
Effective Green, g (s)		49.1			49.1			13.9			13.9	
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)		1082			1180			313			295	
v/s Ratio Prot												
v/s Ratio Perm		c0.31			0.30			0.05			c0.07	
v/c Ratio		0.47			0.46			0.25			0.39	
Uniform Delay, d1		6.5			6.4			26.1			26.8	
Progression Factor		1.00			2.06			1.00			1.00	
Incremental Delay, d2		1.5			1.2			0.4			0.9	
Delay (s)		8.0			14.5			26.5			27.7	
Level of Service		A			B			C			C	
Approach Delay (s)		8.0			14.5			26.5			27.7	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay		14.2			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.46										
Actuated Cycle Length (s)		75.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		54.3%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	8	74	6	13	61
Future Volume (Veh/h)	6	8	74	6	13	61
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.50	0.67	0.84	0.75	0.46	0.80
Hourly flow rate (vph)	12	12	88	8	28	76
Pedestrians	5					3
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	229	100			101	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	229	100			101	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	98	99			98	
cM capacity (veh/h)	745	954			1447	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	24	96	104			
Volume Left	12	0	28			
Volume Right	12	8	0			
cSH	837	1700	1447			
Volume to Capacity	0.03	0.06	0.02			
Queue Length 95th (m)	0.7	0.0	0.4			
Control Delay (s)	9.4	0.0	2.1			
Lane LOS	A		A			
Approach Delay (s)	9.4	0.0	2.1			
Approach LOS	A					
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			21.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	230	2	3	329	21	3	15	18	30	9	38
Future Volume (Veh/h)	31	230	2	3	329	21	3	15	18	30	9	38
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.81	0.25	0.38	0.77	0.75	0.75	0.63	0.75	0.83	0.56	0.63
Hourly flow rate (vph)	44	284	8	8	427	28	4	24	24	36	16	60
Pedestrians		9						13			16	
Lane Width (m)		3.7						3.7			3.7	
Walking Speed (m/s)		1.1						1.1			1.1	
Percent Blockage		1						1			2	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	471			305			923	876	301	885	866	466
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	471			305			923	876	301	885	866	466
tC, single (s)	4.1			4.1			7.1	6.6	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.3	3.5	4.0	3.3
p0 queue free %	96			99			98	91	97	84	94	90
cM capacity (veh/h)	1084			1251			200	261	734	224	272	586
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	336	463	52	112								
Volume Left	44	8	4	36								
Volume Right	8	28	24	60								
cSH	1084	1251	360	348								
Volume to Capacity	0.04	0.01	0.14	0.32								
Queue Length 95th (m)	1.0	0.1	3.8	10.4								
Control Delay (s)	1.5	0.2	16.7	20.2								
Lane LOS	A	A	C	C								
Approach Delay (s)	1.5	0.2	16.7	20.2								
Approach LOS			C	C								
Intersection Summary												
Average Delay			3.9									
Intersection Capacity Utilization			52.2%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	373	18	13	410	13	18	26	12	6	19	17
Future Volume (Veh/h)	17	373	18	13	410	13	18	26	12	6	19	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.53	0.84	0.56	0.65	0.85	0.65	0.75	0.72	0.60	0.50	0.59	0.71
Hourly flow rate (vph)	32	444	32	20	482	20	24	36	20	12	32	24
Pedestrians		7			1			11			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked	0.88			0.91			0.92	0.92	0.91	0.92	0.92	0.88
vC, conflicting volume	516			487			1114	1091	472	1109	1097	513
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	375			381			850	825	364	845	832	372
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 %	97			98			89	86	97	94	88	96
cM capacity (veh/h)	1031			1064			210	265	613	199	263	570
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	508	522	80	68								
Volume Left	32	20	24	12								
Volume Right	32	20	20	24								
cSH	1031	1064	283	303								
Volume to Capacity	0.03	0.02	0.28	0.22								
Queue Length 95th (m)	0.7	0.4	8.6	6.4								
Control Delay (s)	0.9	0.5	22.6	20.3								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.9	0.5	22.6	20.3								
Approach LOS			C	C								
Intersection Summary												
Average Delay			3.3									
Intersection Capacity Utilization			41.2%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	2	4	3	3	5	37	2	4	44	1
Future Volume (Veh/h)	5	5	2	4	3	3	5	37	2	4	44	1
Sign Control	Stop				Stop				Free			
Grade	0%				0%				0%			
Peak Hour Factor	0.63	0.63	0.25	0.33	0.75	0.38	0.63	0.77	0.50	0.33	0.85	0.25
Hourly flow rate (vph)	8	8	8	12	4	8	8	48	4	12	52	4
Pedestrians	12				9				9			
Lane Width (m)	3.7				3.7				3.7			
Walking Speed (m/s)	1.1				1.1				1.1			
Percent Blockage	1				1				1			
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	173	167	75	174	167	66	68				61	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	173	167	75	174	167	66	68				61	
tC, single (s)	7.1	6.7	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.2	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	99	99	98	99	99	99				99	
cM capacity (veh/h)	751	671	972	747	705	988	1528				1541	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	24	24	60	68								
Volume Left	8	12	8	12								
Volume Right	8	8	4	4								
cSH	779	804	1528	1541								
Volume to Capacity	0.03	0.03	0.01	0.01								
Queue Length 95th (m)	0.7	0.7	0.1	0.2								
Control Delay (s)	9.8	9.6	1.0	1.3								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.8	9.6	1.0	1.3								
Approach LOS	A	A										
Intersection Summary												
Average Delay			3.5									
Intersection Capacity Utilization			19.2%	ICU Level of Service				A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	2	5	41	6	3	53
Future Volume (Veh/h)	2	5	41	6	3	53
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.42	0.57	0.75	0.38	0.83
Hourly flow rate (vph)	8	12	72	8	8	64
Pedestrians	4					4
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	160	84			84	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	160	84			84	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			99	
cM capacity (veh/h)	828	973			1520	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	20	80	72			
Volume Left	8	0	8			
Volume Right	12	8	0			
cSH	909	1700	1520			
Volume to Capacity	0.02	0.05	0.01			
Queue Length 95th (m)	0.5	0.0	0.1			
Control Delay (s)	9.0	0.0	0.9			
Lane LOS	A		A			
Approach Delay (s)	9.0	0.0	0.9			
Approach LOS	A					
Intersection Summary						
Average Delay		1.4				
Intersection Capacity Utilization		16.5%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

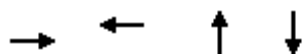
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	248	8	4	295	19	21	4	26	27	6	20
Future Volume (Veh/h)	19	248	8	4	295	19	21	4	26	27	6	20
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.68	0.94	0.50	0.59	0.83	0.25	0.58	0.33	0.65	0.84	0.50	0.83
Hourly flow rate (vph)	28	264	16	7	355	76	36	12	40	32	12	24
Pedestrians		4			1			13			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)												
pX, platoon unblocked												
vC, conflicting volume	445			293			782	800	286	796	770	411
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	445			293			782	800	286	796	770	411
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			87	96	95	88	96	96
cM capacity (veh/h)	1110			1264			276	302	738	266	315	634
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	308	438	88	68								
Volume Left	28	7	36	32								
Volume Right	16	76	40	24								
cSH	1110	1264	393	346								
Volume to Capacity	0.03	0.01	0.22	0.20								
Queue Length 95th (m)	0.6	0.1	6.4	5.5								
Control Delay (s)	1.0	0.2	16.8	17.9								
Lane LOS	A	A	C	C								
Approach Delay (s)	1.0	0.2	16.8	17.9								
Approach LOS			C	C								
Intersection Summary												
Average Delay			3.4									
Intersection Capacity Utilization			37.4%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	476	532	211	96
v/c Ratio	0.41	0.45	0.60	0.28
Control Delay	5.6	9.1	29.9	20.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.6	9.1	29.9	20.8
Queue Length 50th (m)	18.3	37.4	22.0	8.4
Queue Length 95th (m)	24.7	54.0	29.6	13.3
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1157	1174	489	478
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	0.41	0.45	0.43	0.20
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	363	14	16	392	27	20	82	50	15	35	22
Future Volume (vph)	13	363	14	16	392	27	20	82	50	15	35	22
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			0.98			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		0.99			0.99			0.96			0.97	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1846			1874			1777			1806	
Flt Permitted		0.97			0.97			0.93			0.90	
Satd. Flow (perm)		1798			1823			1673			1651	
Peak-hour factor, PHF	0.65	0.84	0.58	0.67	0.83	0.75	0.63	0.71	0.78	0.75	0.67	0.92
Adj. Flow (vph)	20	432	24	24	472	36	32	115	64	20	52	24
RTOR Reduction (vph)	0	2	0	0	3	0	0	23	0	0	18	0
Lane Group Flow (vph)	0	474	0	0	529	0	0	188	0	0	78	0
Confl. Peds. (#/hr)	24		35	35		24	10		23	23		10
Confl. Bikes (#/hr)			2			2						1
Heavy Vehicles (%)	0%	3%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		48.2			48.2			14.8			14.8	
Effective Green, g (s)		48.2			48.2			14.8			14.8	
Actuated g/C Ratio		0.64			0.64			0.20			0.20	
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)		1155			1171			330			325	
v/s Ratio Prot												
v/s Ratio Perm		0.26			0.29			0.11			0.05	
v/c Ratio		0.41			0.45			0.57			0.24	
Uniform Delay, d1		6.5			6.7			27.2			25.4	
Progression Factor		0.61			1.00			1.00			1.00	
Incremental Delay, d2		1.0			1.3			2.2			0.4	
Delay (s)		5.0			8.0			29.5			25.8	
Level of Service		A			A			C			C	
Approach Delay (s)		5.0			8.0			29.5			25.8	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			11.6									
HCM 2000 Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			75.0									
Intersection Capacity Utilization			52.1%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	2	8	3	2	2	7	140	5	2	74	3
Future Volume (Veh/h)	2	2	8	3	2	2	7	140	5	2	74	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.50	0.25	0.50	0.50	0.44	0.88	0.42	0.50	0.77	0.38
Hourly flow rate (vph)	8	8	16	12	4	4	16	159	12	4	96	8
Pedestrians		5			7			16			4	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			2			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)											355	
pX, platoon unblocked												
vC, conflicting volume	320	323	121	348	321	176	109			178		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	320	323	121	348	321	176	109			178		
tC, single (s)	7.1	6.5	6.5	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	99	99	98	98	99	100	99			100		
cM capacity (veh/h)	613	582	854	568	584	863	1403			1400		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	32	20	187	108								
Volume Left	8	12	16	4								
Volume Right	16	4	12	8								
cSH	703	613	1403	1400								
Volume to Capacity	0.05	0.03	0.01	0.00								
Queue Length 95th (m)	1.1	0.8	0.3	0.1								
Control Delay (s)	10.4	11.1	0.7	0.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.4	11.1	0.7	0.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.1									
Intersection Capacity Utilization			25.6%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

																				
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR								
Lane Configurations																				
Traffic Volume (veh/h)	1	0	1	3	1	0	3	150	2	1	84	4								
Future Volume (Veh/h)	1	0	1	3	1	0	3	150	2	1	84	4								
Sign Control	Stop			Stop			Free			Free										
Grade	0%			0%			0%			0%										
Peak Hour Factor	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.94	0.25	0.25	0.84	0.50								
Hourly flow rate (vph)	4	0	4	12	4	0	12	160	8	4	100	8								
Pedestrians	3			20			8			8										
Lane Width (m)	3.7			3.7			3.7			3.7										
Walking Speed (m/s)	1.1			1.1			1.1			1.1										
Percent Blockage	0			2			1			1										
Right turn flare (veh)																				
Median type							None			None										
Median storage (veh)																				
Upstream signal (m)																				
pX, platoon unblocked																				
vC, conflicting volume	313	327	115	332	327	192	111				188									
vC1, stage 1 conf vol																				
vC2, stage 2 conf vol																				
vCu, unblocked vol	313	327	115	332	327	192	111				188									
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	99	100	100	98	99	100	99				100									
cM capacity (veh/h)	617	575	933	590	575	831	1487				1371									
Direction, Lane #	EB 1	WB 1	NB 1	SB 1																
Volume Total	8	16	180	112																
Volume Left	4	12	12	4																
Volume Right	4	0	8	8																
cSH	743	586	1487	1371																
Volume to Capacity	0.01	0.03	0.01	0.00																
Queue Length 95th (m)	0.2	0.6	0.2	0.1																
Control Delay (s)	9.9	11.3	0.6	0.3																
Lane LOS	A	B	A	A																
Approach Delay (s)	9.9	11.3	0.6	0.3																
Approach LOS	A	B																		
Intersection Summary																				
Average Delay				1.2																
Intersection Capacity Utilization				23.9%	ICU Level of Service				A											
Analysis Period (min)				15																

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	220	18	5	224	20	53	92	20	19	21	50
Future Volume (Veh/h)	39	220	18	5	224	20	53	92	20	19	21	50
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.87	0.64	0.63	0.84	0.63	0.74	0.82	0.63	0.53	0.58	0.83
Hourly flow rate (vph)	48	253	28	8	267	32	72	112	32	36	36	60
Pedestrians		7			9			15			9	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					207							
pX, platoon unblocked												
vC, conflicting volume	308			296			762	702	291	768	700	299
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	308			296			762	702	291	768	700	299
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 %	96			99			71	67	96	83	89	92
cM capacity (veh/h)	1225			1258			252	340	724	210	341	729
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	329	307	216	132								
Volume Left	48	8	72	36								
Volume Right	28	32	32	60								
cSH	1225	1258	328	367								
Volume to Capacity	0.04	0.01	0.66	0.36								
Queue Length 95th (m)	0.9	0.1	33.5	12.1								
Control Delay (s)	1.5	0.3	34.9	20.2								
Lane LOS	A	A	D	C								
Approach Delay (s)	1.5	0.3	34.9	20.2								
Approach LOS			D	C								
Intersection Summary												
Average Delay			11.0									
Intersection Capacity Utilization			52.7%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	160	189	196	148	259	124	156	527	61	76	528
v/c Ratio	0.56	0.51	0.51	0.43	0.64	0.44	0.42	0.68	0.08	0.21	0.66
Control Delay	27.9	35.2	9.4	23.4	39.3	12.6	7.6	18.9	1.6	11.3	25.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.9	35.2	9.4	23.4	39.3	12.6	7.6	18.9	1.6	11.3	25.8
Queue Length 50th (m)	17.8	27.3	0.0	16.3	38.6	2.0	3.8	86.9	1.2	6.0	74.2
Queue Length 95th (m)	24.9	36.8	11.7	29.1	57.6	11.5	5.4	#134.1	m2.5	9.7	109.8
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	284	450	420	346	486	318	370	775	720	360	795
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.42	0.47	0.43	0.53	0.39	0.42	0.68	0.08	0.21	0.66

Intersection Summary

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.

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	48	68	140	161	135	220	60	26	122	410	69	63
Future Volume (vph)	48	68	140	161	135	220	60	26	122	410	69	63
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.68	1.00	1.00	0.57		1.00	0.97		0.92
Flpb, ped/bikes		0.90	1.00	1.00	0.88	1.00	1.00		0.99	1.00		1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.97		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1636	1762	1075	1606	1902	926		1781	1674		1431
Flt Permitted		0.41	1.00	1.00	0.56	1.00	1.00		0.28	1.00		1.00
Satd. Flow (perm)		712	1762	1075	949	1902	926		525	1674		1431
Peak-hour factor, PHF	0.71	0.74	0.74	0.82	0.91	0.85	0.79	0.54	0.78	0.95	0.78	0.93
Adj. Flow (vph)	68	92	189	196	148	259	76	48	156	432	88	68
RTOR Reduction (vph)	0	0	0	154	0	0	86	0	0	1	0	33
Lane Group Flow (vph)	0	160	189	42	148	259	38	0	156	526	0	28
Confl. Peds. (#/hr)	107	104		156	156		107	104	104		104	59
Confl. Bikes (#/hr)				3			4	4			7	7
Heavy Vehicles (%)	2%	0%	6%	0%	0%	1%	0%	0%	1%	3%	0%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		26.1	19.1	19.1	26.1	19.1	19.1		47.4	41.0		41.0
Effective Green, g (s)		26.1	19.1	19.1	26.1	19.1	19.1		47.4	41.0		41.0
Actuated g/C Ratio		0.29	0.21	0.21	0.29	0.21	0.21		0.53	0.46		0.46
Clearance Time (s)		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
Lane Grp Cap (vph)		278	373	228	326	403	196		365	762		651
v/s Ratio Prot		c0.04	0.11		0.04	c0.14			c0.03	c0.31		
v/s Ratio Perm		0.12		0.04	0.10		0.04		0.19			0.02
v/c Ratio		0.58	0.51	0.18	0.45	0.64	0.19		0.43	0.69		0.04
Uniform Delay, d1		25.4	31.3	29.1	25.0	32.3	29.1		12.9	19.5		13.6
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		0.44	0.65		1.68
Incremental Delay, d2		2.9	1.1	0.4	1.0	3.5	0.5		0.7	4.5		0.1
Delay (s)		28.2	32.4	29.4	26.0	35.8	29.6		6.4	17.1		23.0
Level of Service		C	C	C	C	D	C		A	B		C
Approach Delay (s)			30.1			31.6				15.3		
Approach LOS			C			C				B		
Intersection Summary												
HCM 2000 Control Delay			24.1									
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			76.4%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	15	37	413	58
Future Volume (vph)	15	37	413	58
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.97	
Flpb, ped/bikes		0.98	1.00	
Frt		1.00	0.98	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1738	1803	
Flt Permitted		0.29	1.00	
Satd. Flow (perm)		532	1803	
Peak-hour factor, PHF	0.63	0.71	0.89	0.91
Adj. Flow (vph)	24	52	464	64
RTOR Reduction (vph)	0	0	5	0
Lane Group Flow (vph)	0	76	523	0
Confl. Peds. (#/hr)	104	59		104
Confl. Bikes (#/hr)				5
Heavy Vehicles (%)	0%	5%	2%	2%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		44.4	39.5	
Effective Green, g (s)		44.4	39.5	
Actuated g/C Ratio		0.49	0.44	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		328	791	
v/s Ratio Prot		0.01	0.29	
v/s Ratio Perm		0.10		
v/c Ratio		0.23	0.66	
Uniform Delay, d1		13.3	20.0	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.4	4.3	
Delay (s)		13.7	24.3	
Level of Service		B	C	
Approach Delay (s)			22.9	
Approach LOS			C	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	0.63	0.63	0.78	0.75	0.44	0.83	0.53	0.92	0.65	0.75	0.94	0.79
Hourly flow rate (vph)	8	8	32	24	16	60	40	709	52	52	733	28
Pedestrians	52			63			3			6		
Lane Width (m)	3.7			3.7			3.7			3.7		
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)							94			144		
pX, platoon unblocked	0.81	0.81	0.73	0.81	0.81	0.84	0.73				0.84	
vC, conflicting volume	1412	1807	802	1754	1795	450	813				824	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	631	1117	546	1052	1102	0	561				394	
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 %	96	94	91	76	88	93	94				94	
cM capacity (veh/h)	203	135	337	102	138	850	708				921	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	48	100	394	406	52	761						
Volume Left	8	24	40	0	52	0						
Volume Right	32	60	0	52	0	28						
cSH	248	236	708	1700	921	1700						
Volume to Capacity	0.19	0.42	0.06	0.24	0.06	0.45						
Queue Length 95th (m)	5.3	15.0	1.4	0.0	1.4	0.0						
Control Delay (s)	23.0	30.9	1.7	0.0	9.1	0.0						
Lane LOS	C	D	A		A							
Approach Delay (s)	23.0	30.9	0.8		0.6							
Approach LOS	C	D										
Intersection Summary												
Average Delay				3.0								
Intersection Capacity Utilization				53.1%	ICU Level of Service				A			
Analysis Period (min)				15								

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	213	189	781	164	654
v/c Ratio	0.47	0.29	0.62	0.56	0.57
Control Delay	31.7	14.5	21.3	47.4	18.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	31.7	14.5	21.3	47.4	18.2
Queue Length 50th (m)	30.9	17.7	59.5	25.3	85.6
Queue Length 95th (m)	47.4	27.2	36.6	39.9	125.4
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	454	649	1263	292	1152
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	0.47	0.29	0.62	0.56	0.57
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

10/29/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	179	155	530	124	133	615
Future Volume (vph)	179	155	530	124	133	615
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.96	0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.97		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1706	1498	3367		1755	1921
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1706	1498	3367		1755	1921
Peak-hour factor, PHF	0.84	0.82	0.87	0.72	0.81	0.94
Adj. Flow (vph)	213	189	609	172	164	654
RTOR Reduction (vph)	0	0	29	0	0	0
Lane Group Flow (vph)	213	189	753	0	164	654
Confl. Peds. (#/hr)	48	42		34	34	
Confl. Bikes (#/hr)		3		5		
Heavy Vehicles (%)	7%	5%	1%	11%	4%	0%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	454	749	1234		292	1152
v/s Ratio Prot	c0.12	0.04	0.22		0.09	c0.34
v/s Ratio Perm		0.08				
v/c Ratio	0.47	0.25	0.61		0.56	0.57
Uniform Delay, d1	27.7	16.2	23.2		34.5	10.9
Progression Factor	1.00	1.00	0.87		1.16	1.45
Incremental Delay, d2	3.5	0.8	2.1		6.7	1.8
Delay (s)	31.1	17.0	22.2		46.5	17.7
Level of Service	C	B	C		D	B
Approach Delay (s)	24.5		22.2			23.4
Approach LOS	C		C			C
Intersection Summary						
HCM 2000 Control Delay			23.2		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.58			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	163	177	120	582	822
v/c Ratio	0.56	0.46	0.24	0.46	0.41
Control Delay	40.8	8.7	5.7	8.4	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	40.8	8.7	5.7	8.4	7.2
Queue Length 50th (m)	26.7	0.0	4.5	35.5	8.3
Queue Length 95th (m)	35.1	10.7	13.3	83.5	46.0
Internal Link Dist (m)				157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	510	539	495	1277	2009
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	0.32	0.33	0.24	0.46	0.41
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018

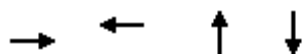
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	134	0	145	0	0	0	102	524	0	0	602	160
Future Volume (vph)	134	0	145	0	0	0	102	524	0	0	602	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	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	0.99		1.00				1.00	1.00			1.00	
Frt	1.00		0.85				1.00	1.00			0.96	
Flt Protected	0.95		1.00				0.95	1.00			1.00	
Satd. Flow (prot)	1766		1432				1780	1820			3367	
Flt Permitted	0.95		1.00				0.29	1.00			1.00	
Satd. Flow (perm)	1766		1432				542	1820			3367	
Peak-hour factor, PHF	0.82	0.25	0.82	1.00	1.00	1.00	0.85	0.90	0.25	0.25	0.96	0.82
Adj. Flow (vph)	163	0	177	0	0	0	120	582	0	0	627	195
RTOR Reduction (vph)	0	0	148	0	0	0	0	0	0	0	25	0
Lane Group Flow (vph)	163	0	29	0	0	0	120	582	0	0	797	0
Confl. Peds. (#/hr)	12		89	89		12	45		13	13		45
Confl. Bikes (#/hr)			1						5			1
Heavy Vehicles (%)	2%	0%	1%	0%	0%	0%	2%	3%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm				pm+pt	NA			NA	
Protected Phases							5	2			6	
Permitted Phases	4		4				2					
Actuated Green, G (s)	14.8		14.8				63.2	63.2			53.1	
Effective Green, g (s)	14.8		14.8				63.2	63.2			53.1	
Actuated g/C Ratio	0.16		0.16				0.70	0.70			0.59	
Clearance Time (s)	6.0		6.0				3.0	6.0			6.0	
Vehicle Extension (s)	3.0		3.0				3.0	3.0			3.0	
Lane Grp Cap (vph)	290		235				478	1278			1986	
v/s Ratio Prot							0.02	c0.32			0.24	
v/s Ratio Perm	c0.09		0.02				0.16					
v/c Ratio	0.56		0.12				0.25	0.46			0.40	
Uniform Delay, d1	34.6		32.1				4.8	5.9			9.9	
Progression Factor	1.00		1.00				1.00	1.00			0.64	
Incremental Delay, d2	2.5		0.2				0.3	1.2			0.5	
Delay (s)	37.1		32.3				5.1	7.0			6.9	
Level of Service	D		C				A	A			A	
Approach Delay (s)		34.6			0.0			6.7			6.9	
Approach LOS		C			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			11.9				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			15.0		
Intersection Capacity Utilization			53.8%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

Appendix E: Synchro Worksheets for Future Background Conditions

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	642	372	160	349
v/c Ratio	0.69	0.37	0.38	0.98
Control Delay	15.6	13.7	23.7	69.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.6	13.7	23.7	69.4
Queue Length 50th (m)	56.5	35.3	16.6	41.3
Queue Length 95th (m)	67.1	52.4	27.4	#73.2
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	930	1000	421	356
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	0.69	0.37	0.38	0.98

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	80	389	20	12	210	60	13	83	23	53	70	103
Future Volume (vph)	80	389	20	12	210	60	13	83	23	53	70	103
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			0.98			0.99			0.81	
Flpb, ped/bikes		0.99			1.00			0.98			0.99	
Frt		0.99			0.96			0.97			0.93	
Flt Protected		0.99			1.00			0.99			0.99	
Satd. Flow (prot)		1775			1755			1761			1392	
Flt Permitted		0.88			0.95			0.91			0.87	
Satd. Flow (perm)		1581			1675			1615			1223	
Peak-hour factor, PHF	0.83	0.76	0.59	0.55	0.83	0.62	0.60	0.79	0.69	0.60	0.79	0.60
Adj. Flow (vph)	96	512	34	22	253	97	22	105	33	88	89	172
RTOR Reduction (vph)	0	2	0	0	17	0	0	13	0	0	46	0
Lane Group Flow (vph)	0	640	0	0	355	0	0	147	0	0	303	0
Confl. Peds. (#/hr)	56		43	43		56	175		19	19		175
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	3%	5%	0%	4%	0%	0%	1%	5%	2%	3%	3%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		44.0			44.0			19.0			19.0	
Effective Green, g (s)		44.0			44.0			19.0			19.0	
Actuated g/C Ratio		0.59			0.59			0.25			0.25	
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)		927			982			409			309	
v/s Ratio Prot												
v/s Ratio Perm		c0.40			0.21			0.09			c0.25	
v/c Ratio		0.69			0.36			0.36			0.98	
Uniform Delay, d1		10.8			8.1			23.0			27.8	
Progression Factor		1.00			1.70			1.00			1.00	
Incremental Delay, d2		4.2			1.0			0.5			45.1	
Delay (s)		15.0			14.9			23.5			72.9	
Level of Service		B			B			C			E	
Approach Delay (s)		15.0			14.9			23.5			72.9	
Approach LOS		B			B			C			E	
Intersection Summary												
HCM 2000 Control Delay			29.1									
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			75.0									
Intersection Capacity Utilization			87.7%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	7	103	8	12	112
Future Volume (Veh/h)	5	7	103	8	12	112
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.63	0.88	0.74	0.67	0.69	0.66
Hourly flow rate (vph)	8	8	139	12	17	170
Pedestrians	10		3			
Lane Width (m)	3.7		3.7			
Walking Speed (m/s)	1.1		1.1			
Percent Blockage	1		0			
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	362	155			161	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	362	155			161	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	99	99			99	
cM capacity (veh/h)	625	852			1363	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	16	151	187			
Volume Left	8	0	17			
Volume Right	8	12	0			
cSH	721	1700	1363			
Volume to Capacity	0.02	0.09	0.01			
Queue Length 95th (m)	0.5	0.0	0.3			
Control Delay (s)	10.1	0.0	0.8			
Lane LOS	B		A			
Approach Delay (s)	10.1	0.0	0.8			
Approach LOS	B					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			23.2%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	58	380	3	5	199	20	0	15	34	41	5	64
Future Volume (Veh/h)	58	380	3	5	199	20	0	15	34	41	5	64
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.76	0.78	0.38	0.31	0.80	0.79	0.25	0.58	0.47	0.81	0.31	0.56
Hourly flow rate (vph)	76	487	8	16	249	25	0	26	72	51	16	114
Pedestrians		44			6			9			7	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		4			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	281			504			1112	965	506	1034	956	312
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	281			504			1112	965	506	1034	956	312
tC, single (s)	4.1			4.1			7.1	6.6	6.2	7.1	6.7	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.3	3.5	4.2	3.3
p0 queue free %	94			98			100	89	87	67	93	83
cM capacity (veh/h)	1284			1061			131	228	556	155	219	689
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	571	290	98	181								
Volume Left	76	16	0	51								
Volume Right	8	25	72	114								
cSH	1284	1061	402	319								
Volume to Capacity	0.06	0.02	0.24	0.57								
Queue Length 95th (m)	1.4	0.3	7.2	25.0								
Control Delay (s)	1.6	0.6	16.8	30.0								
Lane LOS	A	A	C	D								
Approach Delay (s)	1.6	0.6	16.8	30.0								
Approach LOS			C	D								
Intersection Summary												
Average Delay			7.2									
Intersection Capacity Utilization			60.9%		ICU Level of Service				B			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	435	8	9	260	2	14	44	19	8	33	16
Future Volume (Veh/h)	15	435	8	9	260	2	14	44	19	8	33	16
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.80	0.67	0.75	0.91	0.50	0.41	0.81	0.64	0.67	0.43	0.42
Hourly flow rate (vph)	26	544	12	12	286	4	34	54	30	12	77	38
Pedestrians		9			2			25			24	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked				0.83			0.83	0.83	0.83	0.83	0.83	
vC, conflicting volume	314			581			1024	965	577	997	969	321
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	314			391			926	854	386	893	859	321
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 %	98			99			74	76	94	92	66	94
cM capacity (veh/h)	1228			953			132	226	537	155	226	686
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	582	302	118	127								
Volume Left	26	12	34	12								
Volume Right	12	4	30	38								
cSH	1228	953	213	268								
Volume to Capacity	0.02	0.01	0.55	0.47								
Queue Length 95th (m)	0.5	0.3	22.6	18.1								
Control Delay (s)	0.6	0.5	40.9	30.0								
Lane LOS	A	A	E	D								
Approach Delay (s)	0.6	0.5	40.9	30.0								
Approach LOS			E	D								
Intersection Summary												
Average Delay			8.1									
Intersection Capacity Utilization			43.0%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	7	6	5	4	4	2	37	5	5	52	1
Future Volume (Veh/h)	5	7	6	5	4	4	2	37	5	5	52	1
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.58	0.38	0.63	0.50	0.50	0.50	0.73	0.63	0.42	0.56	0.25
Hourly flow rate (vph)	8	12	16	8	8	8	4	51	8	12	93	4
Pedestrians	7			6			12			4		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	1			1			1			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	205	199	114	222	197	65	104				65	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	205	199	114	222	197	65	104				65	
tC, single (s)	7.1	6.5	6.5	7.1	6.8	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.6	3.5	4.2	3.3	2.2				2.2	
p0 queue free %	99	98	98	99	99	99	100				99	
cM capacity (veh/h)	723	684	845	690	644	995	1490				1541	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	36	24	63	109								
Volume Left	8	8	4	12								
Volume Right	16	8	8	4								
cSH	757	749	1490	1541								
Volume to Capacity	0.05	0.03	0.00	0.01								
Queue Length 95th (m)	1.1	0.8	0.1	0.2								
Control Delay (s)	10.0	10.0	0.5	0.9								
Lane LOS	A	A	A	A								
Approach Delay (s)	10.0	10.0	0.5	0.9								
Approach LOS	A	A										
Intersection Summary												
Average Delay				3.1								
Intersection Capacity Utilization				19.8%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

									
Movement	WBL	WBR	NBT	NBR	SBL	SBT			
Lane Configurations									
Traffic Volume (veh/h)	1	3	44	4	2	75			
Future Volume (Veh/h)	1	3	44	4	2	75			
Sign Control	Stop		Free			Free			
Grade	0%		0%			0%			
Peak Hour Factor	0.25	0.75	0.53	0.33	0.25	0.46			
Hourly flow rate (vph)	4	4	83	12	8	163			
Pedestrians	6		1			3			
Lane Width (m)	3.7		3.7			3.7			
Walking Speed (m/s)	1.1		1.1			1.1			
Percent Blockage	1		0			0			
Right turn flare (veh)									
Median type			None			None			
Median storage (veh)									
Upstream signal (m)									
pX, platoon unblocked									
vC, conflicting volume	275	98			101				
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol	275	98			101				
tC, single (s)	6.4	6.2			4.1				
tC, 2 stage (s)									
tF (s)	3.5	3.3			2.2				
p0 queue free %	99	100			99				
cM capacity (veh/h)	710	955			1495				
Direction, Lane #	WB 1	NB 1	SB 1						
Volume Total	8	95	171						
Volume Left	4	0	8						
Volume Right	4	12	0						
cSH	815	1700	1495						
Volume to Capacity	0.01	0.06	0.01						
Queue Length 95th (m)	0.2	0.0	0.1						
Control Delay (s)	9.5	0.0	0.4						
Lane LOS	A		A						
Approach Delay (s)	9.5	0.0	0.4						
Approach LOS	A								
Intersection Summary									
Average Delay		0.5							
Intersection Capacity Utilization		16.5%	ICU Level of Service	A					
Analysis Period (min)		15							

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

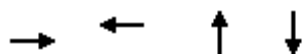
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	407	11	19	193	20	6	7	13	19	19	28
Future Volume (Veh/h)	22	407	11	19	193	20	6	7	13	19	19	28
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.85	0.36	0.75	0.88	0.53	0.75	0.58	0.50	0.64	0.50	0.52
Hourly flow rate (vph)	29	479	31	25	219	38	8	12	26	30	38	54
Pedestrians		3			2			14			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)												
pX, platoon unblocked												
vC, conflicting volume	260			524			930	876	510	878	873	244
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	260			524			930	876	510	878	873	244
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 %	98			98			96	96	95	87	86	93
cM capacity (veh/h)	1283			1038			194	271	558	231	273	778
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	539	282	46	122								
Volume Left	29	25	8	30								
Volume Right	31	38	26	54								
cSH	1283	1038	349	360								
Volume to Capacity	0.02	0.02	0.13	0.34								
Queue Length 95th (m)	0.5	0.6	3.4	11.1								
Control Delay (s)	0.7	1.0	16.9	20.0								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.7	1.0	16.9	20.0								
Approach LOS			C	C								
Intersection Summary												
Average Delay			3.9									
Intersection Capacity Utilization			40.6%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	599	333	206	133
v/c Ratio	0.52	0.31	0.62	0.42
Control Delay	6.5	7.7	31.2	27.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	6.5	7.7	31.2	27.4
Queue Length 50th (m)	25.7	20.1	21.9	14.8
Queue Length 95th (m)	m37.0	34.8	26.3	22.2
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1152	1084	450	437
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	0.52	0.31	0.46	0.30

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	427	26	17	238	18	24	64	40	21	65	8
Future Volume (vph)	16	427	26	17	238	18	24	64	40	21	65	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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.94			0.99	
Flpb, ped/bikes		1.00			1.00			0.99			0.97	
Frt		0.99			0.99			0.96			0.99	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1836			1789			1702			1773	
Flt Permitted		0.98			0.94			0.89			0.86	
Satd. Flow (perm)		1800			1692			1538			1548	
Peak-hour factor, PHF	0.63	0.79	0.78	0.67	0.87	0.53	0.48	0.66	0.68	0.63	0.74	0.67
Adj. Flow (vph)	25	541	33	25	274	34	50	97	59	33	88	12
RTOR Reduction (vph)	0	2	0	0	4	0	0	22	0	0	6	0
Lane Group Flow (vph)	0	597	0	0	329	0	0	184	0	0	127	0
Confl. Peds. (#/hr)	38		54	54		38	21		91	91		21
Confl. Bikes (#/hr)			3			1			1			
Heavy Vehicles (%)	7%	3%	0%	0%	4%	12%	0%	0%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		47.9			47.9			15.1			15.1	
Effective Green, g (s)		47.9			47.9			15.1			15.1	
Actuated g/C Ratio		0.64			0.64			0.20			0.20	
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)		1149			1080			309			311	
v/s Ratio Prot												
v/s Ratio Perm		c0.33			0.19			c0.12			0.08	
v/c Ratio		0.52			0.30			0.60			0.41	
Uniform Delay, d1		7.3			6.1			27.2			26.1	
Progression Factor		0.61			1.00			1.00			1.00	
Incremental Delay, d2		1.3			0.7			3.1			0.9	
Delay (s)		5.7			6.8			30.3			27.0	
Level of Service		A			A			C			C	
Approach Delay (s)		5.7			6.8			30.3			27.0	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			12.2			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			53.7%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	0	2	2	1	1	5	122	8	2	77	7
Future Volume (Veh/h)	11	0	2	2	1	1	5	122	8	2	77	7
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.25	0.25	0.25	0.25	0.25	0.63	0.60	0.67	0.50	0.79	0.44
Hourly flow rate (vph)	17	0	8	8	4	4	8	203	12	4	97	16
Pedestrians	5			13			10			3		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	0			1			1			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												355
pX, platoon unblocked												
vC, conflicting volume	352	362	120	369	364	225	118				228	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	352	362	120	369	364	225	118				228	
tC, single (s)	7.1	6.5	6.7	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.8	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	97	100	99	99	99	100	99				100	
cM capacity (veh/h)	584	554	805	561	552	807	1476				1335	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	25	16	223	117								
Volume Left	17	8	8	4								
Volume Right	8	4	12	16								
cSH	640	605	1476	1335								
Volume to Capacity	0.04	0.03	0.01	0.00								
Queue Length 95th (m)	0.9	0.6	0.1	0.1								
Control Delay (s)	10.9	11.1	0.3	0.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.9	11.1	0.3	0.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay				1.4								
Intersection Capacity Utilization				23.6%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	2	4	4	3	2	4	130	3	0	81	1
Future Volume (Veh/h)	4	2	4	4	3	2	4	130	3	0	81	1
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.50	0.50	0.50	0.50	0.75	0.50	0.50	0.65	0.38	0.25	0.66	0.25
Hourly flow rate (vph)	8	4	8	8	4	4	8	200	8	0	123	4
Pedestrians	10			16			6			3		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	1			2			1			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	364	375	141	377	373	223	137				224	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	364	375	141	377	373	223	137				224	
tC, single (s)	7.1	7.0	6.2	7.1	6.8	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.5	3.3	3.5	4.3	3.3	2.2				2.2	
p0 queue free %	99	99	99	99	99	100	99				100	
cM capacity (veh/h)	568	473	898	550	496	806	1445				1335	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	20	16	216	127								
Volume Left	8	8	8	0								
Volume Right	8	4	8	4								
cSH	636	580	1445	1335								
Volume to Capacity	0.03	0.03	0.01	0.00								
Queue Length 95th (m)	0.7	0.6	0.1	0.0								
Control Delay (s)	10.8	11.4	0.3	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	10.8	11.4	0.3	0.0								
Approach LOS	B	B										
Intersection Summary												
Average Delay				1.2								
Intersection Capacity Utilization				23.4%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	59	353	26	5	174	25	27	63	25	22	33	22
Future Volume (Veh/h)	59	353	26	5	174	25	27	63	25	22	33	22
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.74	0.78	0.69	0.42	0.88	0.75	0.65	0.63	0.75	0.75	0.65	0.53
Hourly flow rate (vph)	80	453	38	12	198	33	42	100	33	29	51	42
Pedestrians		12			7			15			5	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					207							
pX, platoon unblocked												
vC, conflicting volume	236			506			965	907	494	966	910	232
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	236			506			965	907	494	966	910	232
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.3
p0 queue free %	94			99			76	60	94	79	80	95
cM capacity (veh/h)	1336			1053			172	253	567	137	252	787
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	571	243	175	122								
Volume Left	80	12	42	29								
Volume Right	38	33	33	42								
cSH	1336	1053	251	261								
Volume to Capacity	0.06	0.01	0.70	0.47								
Queue Length 95th (m)	1.4	0.3	35.3	17.7								
Control Delay (s)	1.7	0.5	46.9	30.4								
Lane LOS	A	A	E	D								
Approach Delay (s)	1.7	0.5	46.9	30.4								
Approach LOS			E	D								
Intersection Summary												
Average Delay			11.7									
Intersection Capacity Utilization			54.0%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	199	181	205	98	152	67	117	407	97	45	676
v/c Ratio	0.55	0.46	0.48	0.26	0.41	0.20	0.42	0.52	0.13	0.09	0.78
Control Delay	27.2	33.9	8.2	20.4	33.1	3.2	19.7	24.0	8.1	10.2	30.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.2	33.9	8.2	20.4	33.1	3.2	19.7	24.0	8.1	10.2	30.2
Queue Length 50th (m)	22.7	26.0	0.0	10.5	21.4	0.0	9.6	46.5	1.8	3.5	107.4
Queue Length 95th (m)	24.2	41.7	15.1	18.4	36.6	1.3	m17.2	m72.9	m6.4	7.5	#175.2
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	361	445	459	380	467	387	279	790	775	499	872
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.41	0.45	0.26	0.33	0.17	0.42	0.52	0.13	0.09	0.78

Intersection Summary

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.

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	37	90	154	180	80	134	33	17	98	280	87	86
Future Volume (vph)	37	90	154	180	80	134	33	17	98	280	87	86
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.76	1.00	1.00	0.73		1.00	0.97		0.94
Flpb, ped/bikes		0.89	1.00	1.00	0.90	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	0.96		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1610	1745	1199	1637	1830	1198		1768	1603		1463
Flt Permitted		0.60	1.00	1.00	0.63	1.00	1.00		0.17	1.00		1.00
Satd. Flow (perm)		1012	1745	1199	1085	1830	1198		316	1603		1463
Peak-hour factor, PHF	0.73	0.61	0.85	0.88	0.82	0.88	0.78	0.67	0.84	0.97	0.81	0.80
Adj. Flow (vph)	51	148	181	205	98	152	42	25	117	289	107	108
RTOR Reduction (vph)	0	0	0	159	0	0	53	0	0	1	0	51
Lane Group Flow (vph)	0	199	181	46	98	152	14	0	117	406	0	46
Confl. Peds. (#/hr)	73	54		112	112		73	54	50		54	42
Confl. Bikes (#/hr)				2			1	1			1	1
Heavy Vehicles (%)	3%	0%	7%	1%	0%	5%	0%	0%	3%	6%	4%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		27.3	20.3	20.3	24.5	18.9	18.9		47.5	42.5		42.5
Effective Green, g (s)		27.3	20.3	20.3	24.5	18.9	18.9		47.5	42.5		42.5
Actuated g/C Ratio		0.30	0.23	0.23	0.27	0.21	0.21		0.53	0.47		0.47
Clearance Time (s)		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
Lane Grp Cap (vph)		353	393	270	329	384	251		247	756		690
v/s Ratio Prot		c0.04	0.10		0.02	0.08			c0.03	0.25		
v/s Ratio Perm		c0.13		0.04	0.06		0.01		0.22			0.03
v/c Ratio		0.56	0.46	0.17	0.30	0.40	0.06		0.47	0.54		0.07
Uniform Delay, d1		25.4	30.1	28.1	25.4	30.6	28.4		14.8	16.8		12.9
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.62	1.17		2.54
Incremental Delay, d2		2.1	0.9	0.3	0.5	0.7	0.1		1.1	2.2		0.1
Delay (s)		27.4	31.0	28.4	25.9	31.3	28.5		25.1	21.9		33.0
Level of Service		C	C	C	C	C	C		C	C		C
Approach Delay (s)			28.9			29.0				24.2		
Approach LOS			C			C				C		
Intersection Summary												
HCM 2000 Control Delay			27.2									
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			81.3%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations		LT	LT	LT
Traffic Volume (vph)	7	24	605	32
Future Volume (vph)	7	24	605	32
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.99	
Flpb, ped/bikes		0.98	1.00	
Frt		1.00	0.99	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1789	1850	
Flt Permitted		0.42	1.00	
Satd. Flow (perm)		791	1850	
Peak-hour factor, PHF	0.44	0.82	0.95	0.83
Adj. Flow (vph)	16	29	637	39
RTOR Reduction (vph)	0	0	2	0
Lane Group Flow (vph)	0	45	674	0
Confl. Peds. (#/hr)	54	42		50
Confl. Bikes (#/hr)				7
Heavy Vehicles (%)	0%	0%	2%	7%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		44.7	41.1	
Effective Green, g (s)		44.7	41.1	
Actuated g/C Ratio		0.50	0.46	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		432	844	
v/s Ratio Prot		0.00	c0.36	
v/s Ratio Perm		0.05		
v/c Ratio		0.10	0.80	
Uniform Delay, d1		12.0	20.9	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.1	7.8	
Delay (s)		12.1	28.7	
Level of Service		B	C	
Approach Delay (s)			27.7	
Approach LOS			C	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	11	30	14	6	39	31	582	49	60	762	28
Future Volume (Veh/h)	5	11	30	14	6	39	31	582	49	60	762	28
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.31	0.50	0.78	0.81	0.50	0.84	0.66	0.86	0.88	0.79	0.93	0.84
Hourly flow rate (vph)	16	22	38	17	12	46	47	677	56	76	819	33
Pedestrians	37			35			9			9		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	4			3			1			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)							94			144		
pX, platoon unblocked	0.78	0.78	0.67	0.78	0.78	0.79	0.67				0.79	
vC, conflicting volume	1518	1886	882	1863	1875	410	889				768	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	517	991	581	961	976	0	592				180	
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 %	94	86	87	84	92	94	93				93	
cM capacity (veh/h)	250	155	297	105	158	826	644				1076	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	76	75	386	394	76	852						
Volume Left	16	17	47	0	76	0						
Volume Right	38	46	0	56	0	33						
cSH	227	256	644	1700	1076	1700						
Volume to Capacity	0.33	0.29	0.07	0.23	0.07	0.50						
Queue Length 95th (m)	10.7	9.0	1.8	0.0	1.7	0.0						
Control Delay (s)	28.6	24.8	2.2	0.0	8.6	0.0						
Lane LOS	D	C	A		A							
Approach Delay (s)	28.6	24.8	1.1		0.7							
Approach LOS	D	C										
Intersection Summary												
Average Delay				3.0								
Intersection Capacity Utilization				65.2%	ICU Level of Service			C				
Analysis Period (min)				15								

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	177	133	968	217	665
v/c Ratio	0.41	0.22	0.76	0.74	0.58
Control Delay	30.6	13.7	19.2	42.9	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	30.6	13.7	19.2	42.9	7.9
Queue Length 50th (m)	25.2	12.1	49.8	38.2	24.4
Queue Length 95th (m)	39.4	19.1	64.4	m52.2	40.3
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	434	614	1269	292	1141
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	0.41	0.22	0.76	0.74	0.58

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

10/29/2018

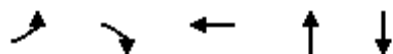


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	147	105	553	279	167	638
Future Volume (vph)	147	105	553	279	167	638
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.97	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.95		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1630	1418	3281		1755	1902
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1630	1418	3281		1755	1902
Peak-hour factor, PHF	0.83	0.79	0.85	0.88	0.77	0.96
Adj. Flow (vph)	177	133	651	317	217	665
RTOR Reduction (vph)	0	0	66	0	0	0
Lane Group Flow (vph)	177	133	902	0	217	665
Confl. Peds. (#/hr)	44	30		9	9	
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	12%	12%	3%	8%	4%	1%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	434	709	1203		292	1141
v/s Ratio Prot	c0.11	0.03	c0.27		c0.12	0.35
v/s Ratio Perm		0.06				
v/c Ratio	0.41	0.19	0.75		0.74	0.58
Uniform Delay, d1	27.2	15.7	24.9		35.7	11.1
Progression Factor	1.00	1.00	0.70		0.80	0.54
Incremental Delay, d2	2.8	0.6	3.4		12.8	1.7
Delay (s)	30.0	16.3	20.8		41.4	7.7
Level of Service	C	B	C		D	A
Approach Delay (s)	24.1		20.8			16.0
Approach LOS	C		C			B
Intersection Summary						
HCM 2000 Control Delay			19.3		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.63			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	328	198	39	755	853
v/c Ratio	0.89	0.39	0.09	0.53	0.50
Control Delay	58.1	6.8	15.7	12.1	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	58.1	6.8	15.7	12.1	11.3
Queue Length 50th (m)	52.7	1.0	2.6	34.4	28.2
Queue Length 95th (m)	66.9	12.1	9.8	44.5	37.0
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	400	541	490	1430	1705
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	0.82	0.37	0.08	0.53	0.50
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

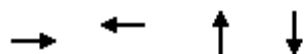
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	249	0	162	17	4	18	88	578	0	0	647	132
Future Volume (vph)	249	0	162	17	4	18	88	578	0	0	647	132
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	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	1.00		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.94			1.00			0.97	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1802		1406		1651			3412			3373	
Flt Permitted	0.73		1.00		0.98			0.68			1.00	
Satd. Flow (perm)	1388		1406		1651			2325			3373	
Peak-hour factor, PHF	0.76	0.38	0.82	1.00	1.00	1.00	0.90	0.88	0.25	0.25	0.93	0.84
Adj. Flow (vph)	328	0	198	17	4	18	98	657	0	0	696	157
RTOR Reduction (vph)	0	0	139	0	13	0	0	0	0	0	20	0
Lane Group Flow (vph)	328	0	59	0	26	0	0	755	0	0	833	0
Confl. Peds. (#/hr)	2		87	87		2	44		2	2		44
Confl. Bikes (#/hr)			3									3
Heavy Vehicles (%)	1%	0%	3%	0%	0%	0%	4%	5%	0%	0%	4%	1%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	24.0		24.0		24.0			54.0			45.0	
Effective Green, g (s)	24.0		24.0		24.0			54.0			45.0	
Actuated g/C Ratio	0.27		0.27		0.27			0.60			0.50	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	370		374		440			1467			1686	
v/s Ratio Prot								c0.03			0.25	
v/s Ratio Perm	c0.24		0.04		0.02			c0.27				
v/c Ratio	0.89		0.16		0.06			0.51			0.49	
Uniform Delay, d1	31.7		25.3		24.6			10.4			14.9	
Progression Factor	1.00		1.00		1.00			1.00			0.70	
Incremental Delay, d2	21.6		0.2		0.1			0.3			0.9	
Delay (s)	53.3		25.5		24.6			10.7			11.3	
Level of Service	D		C		C			B			B	
Approach Delay (s)		42.8			24.6			10.7			11.3	
Approach LOS		D			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			19.0									
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			80.5%									
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018

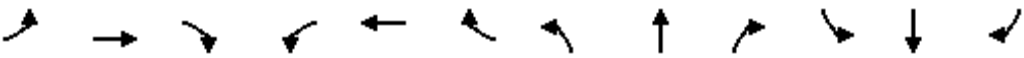


Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	552	602	97	156
v/c Ratio	0.51	0.51	0.29	0.48
Control Delay	9.7	17.9	22.3	23.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.7	17.9	22.3	23.9
Queue Length 50th (m)	41.0	82.2	8.9	13.6
Queue Length 95th (m)	62.5	99.9	15.2	21.8
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	1077	1179	443	433
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	0.51	0.51	0.22	0.36
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	34	388	34	20	442	24	18	39	21	19	43	43
Future Volume (vph)	34	388	34	20	442	24	18	39	21	19	43	43
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			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			1.00	
Frt		0.99			0.99			0.97			0.95	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1792			1882			1823			1760	
Flt Permitted		0.91			0.95			0.92			0.90	
Satd. Flow (perm)		1640			1800			1695			1595	
Peak-hour factor, PHF	0.67	0.87	0.62	0.59	0.82	0.82	0.85	0.71	1.00	0.50	0.73	0.73
Adj. Flow (vph)	51	446	55	34	539	29	21	55	21	38	59	59
RTOR Reduction (vph)	0	5	0	0	2	0	0	15	0	0	32	0
Lane Group Flow (vph)	0	547	0	0	600	0	0	82	0	0	124	0
Confl. Peds. (#/hr)	18		8	8		18	18		2	2		18
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
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)		1071			1176			316			297	
v/s Ratio Prot												
v/s Ratio Perm		c0.33			0.33			0.05			c0.08	
v/c Ratio		0.51			0.51			0.26			0.42	
Uniform Delay, d1		6.8			6.8			26.1			26.9	
Progression Factor		1.00			2.06			1.00			1.00	
Incremental Delay, d2		1.7			1.5			0.4			1.0	
Delay (s)		8.5			15.4			26.5			27.9	
Level of Service		A			B			C			C	
Approach Delay (s)		8.5			15.4			26.5			27.9	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			14.8			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			57.0%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	8	78	6	14	64
Future Volume (Veh/h)	6	8	78	6	14	64
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.50	0.67	0.84	0.75	0.46	0.80
Hourly flow rate (vph)	12	12	93	8	30	80
Pedestrians	5					3
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	242	105			106	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	242	105			106	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	98	99			98	
cM capacity (veh/h)	731	947			1441	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	24	101	110			
Volume Left	12	0	30			
Volume Right	12	8	0			
cSH	826	1700	1441			
Volume to Capacity	0.03	0.06	0.02			
Queue Length 95th (m)	0.7	0.0	0.5			
Control Delay (s)	9.5	0.0	2.2			
Lane LOS	A		A			
Approach Delay (s)	9.5	0.0	2.2			
Approach LOS	A					
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			21.8%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	251	2	3	369	22	3	16	19	32	9	40
Future Volume (Veh/h)	33	251	2	3	369	22	3	16	19	32	9	40
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.81	0.25	0.38	0.77	0.75	0.75	0.63	0.75	0.83	0.56	0.63
Hourly flow rate (vph)	47	310	8	8	479	29	4	25	25	39	16	63
Pedestrians		9						13			16	
Lane Width (m)		3.7						3.7			3.7	
Walking Speed (m/s)		1.1						1.1			1.1	
Percent Blockage		1						1			2	
Right turn flare (veh)												
Median type	None				None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	524			331			1010	961	327	971	950	518
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	524			331			1010	961	327	971	950	518
tC, single (s)	4.1			4.1			7.1	6.6	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.3	3.5	4.0	3.3
p0 queue free %	95			99			98	89	96	80	93	88
cM capacity (veh/h)	1036			1224			170	232	710	192	241	548
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	365	516	54	118								
Volume Left	47	8	4	39								
Volume Right	8	29	25	63								
cSH	1036	1224	324	307								
Volume to Capacity	0.05	0.01	0.17	0.38								
Queue Length 95th (m)	1.1	0.1	4.5	13.3								
Control Delay (s)	1.5	0.2	18.3	23.9								
Lane LOS	A	A	C	C								
Approach Delay (s)	1.5	0.2	18.3	23.9								
Approach LOS			C	C								
Intersection Summary												
Average Delay			4.2									
Intersection Capacity Utilization			55.3%	ICU Level of Service					B			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	399	19	14	451	14	19	27	13	6	20	18
Future Volume (Veh/h)	18	399	19	14	451	14	19	27	13	6	20	18
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.53	0.84	0.56	0.65	0.85	0.65	0.75	0.72	0.60	0.50	0.59	0.71
Hourly flow rate (vph)	34	475	34	22	531	22	25	38	22	12	34	25
Pedestrians		7			1			11			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked	0.85			0.89			0.90	0.90	0.89	0.90	0.90	0.85
vC, conflicting volume	567			520			1206	1182	504	1202	1188	563
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	397			396			893	867	378	889	873	392
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 %	97			98			87	84	96	93	86	95
cM capacity (veh/h)	978			1030			188	244	591	176	242	537
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	543	575	85	71								
Volume Left	34	22	25	12								
Volume Right	34	22	22	25								
cSH	978	1030	260	278								
Volume to Capacity	0.03	0.02	0.33	0.26								
Queue Length 95th (m)	0.8	0.5	10.4	7.5								
Control Delay (s)	1.0	0.6	25.4	22.3								
Lane LOS	A	A	D	C								
Approach Delay (s)	1.0	0.6	25.4	22.3								
Approach LOS			D	C								
Intersection Summary												
Average Delay			3.6									
Intersection Capacity Utilization			43.6%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	2	4	3	3	5	39	2	4	46	1
Future Volume (Veh/h)	5	5	2	4	3	3	5	39	2	4	46	1
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.63	0.25	0.33	0.75	0.38	0.63	0.77	0.50	0.33	0.85	0.25
Hourly flow rate (vph)	8	8	8	12	4	8	8	51	4	12	54	4
Pedestrians	12			9			9			7		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	1			1			1			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	178	172	77	179	172	69	70				64	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	178	172	77	179	172	69	70				64	
tC, single (s)	7.1	6.7	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.2	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	99	99	98	99	99	99				99	
cM capacity (veh/h)	745	667	969	741	701	984	1525				1538	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	24	24	63	70								
Volume Left	8	12	8	12								
Volume Right	8	8	4	4								
cSH	775	799	1525	1538								
Volume to Capacity	0.03	0.03	0.01	0.01								
Queue Length 95th (m)	0.7	0.7	0.1	0.2								
Control Delay (s)	9.8	9.6	1.0	1.3								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.8	9.6	1.0	1.3								
Approach LOS	A	A										
Intersection Summary												
Average Delay				3.4								
Intersection Capacity Utilization				19.2%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	2	5	43	6	3	56
Future Volume (Veh/h)	2	5	43	6	3	56
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.42	0.57	0.75	0.38	0.83
Hourly flow rate (vph)	8	12	75	8	8	67
Pedestrians	4					4
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	166	87			87	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	166	87			87	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			99	
cM capacity (veh/h)	822	969			1516	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	20	83	75			
Volume Left	8	0	8			
Volume Right	12	8	0			
cSH	904	1700	1516			
Volume to Capacity	0.02	0.05	0.01			
Queue Length 95th (m)	0.5	0.0	0.1			
Control Delay (s)	9.1	0.0	0.8			
Lane LOS	A		A			
Approach Delay (s)	9.1	0.0	0.8			
Approach LOS	A					
Intersection Summary						
Average Delay		1.4				
Intersection Capacity Utilization		16.6%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

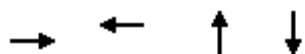
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	271	8	4	333	20	22	4	27	28	6	21
Future Volume (Veh/h)	20	271	8	4	333	20	22	4	27	28	6	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.68	0.94	0.50	0.59	0.83	0.25	0.58	0.33	0.65	0.84	0.50	0.83
Hourly flow rate (vph)	29	288	16	7	401	80	38	12	42	33	12	25
Pedestrians		4			1			13			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)												
pX, platoon unblocked												
vC, conflicting volume	495			317			857	876	310	872	844	459
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	495			317			857	876	310	872	844	459
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			84	96	94	86	96	96
cM capacity (veh/h)	1064			1239			244	273	716	234	285	596
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	333	488	92	70								
Volume Left	29	7	38	33								
Volume Right	16	80	42	25								
cSH	1064	1239	356	311								
Volume to Capacity	0.03	0.01	0.26	0.23								
Queue Length 95th (m)	0.6	0.1	7.7	6.4								
Control Delay (s)	1.0	0.2	18.6	19.9								
Lane LOS	A	A	C	C								
Approach Delay (s)	1.0	0.2	18.6	19.9								
Approach LOS			C	C								
Intersection Summary												
Average Delay			3.6									
Intersection Capacity Utilization			39.7%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	510	582	224	101
v/c Ratio	0.45	0.50	0.62	0.29
Control Delay	5.9	9.9	30.6	20.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.9	9.9	30.6	20.8
Queue Length 50th (m)	19.7	42.7	23.8	9.0
Queue Length 95th (m)	26.5	62.8	30.9	13.8
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1145	1165	489	474
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	0.45	0.50	0.46	0.21
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	14	388	15	17	432	28	21	87	53	16	37	23
Future Volume (vph)	14	388	15	17	432	28	21	87	53	16	37	23
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			0.98			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		0.99			0.99			0.96			0.97	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1846			1876			1777			1808	
Flt Permitted		0.97			0.97			0.94			0.90	
Satd. Flow (perm)		1790			1823			1675			1637	
Peak-hour factor, PHF	0.65	0.84	0.58	0.67	0.83	0.75	0.63	0.71	0.78	0.75	0.67	0.92
Adj. Flow (vph)	22	462	26	25	520	37	33	123	68	21	55	25
RTOR Reduction (vph)	0	2	0	0	3	0	0	23	0	0	18	0
Lane Group Flow (vph)	0	508	0	0	579	0	0	201	0	0	83	0
Confl. Peds. (#/hr)	24		35	35		24	10		23	23		10
Confl. Bikes (#/hr)			2			2						1
Heavy Vehicles (%)	0%	3%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		47.9			47.9			15.1			15.1	
Effective Green, g (s)		47.9			47.9			15.1			15.1	
Actuated g/C Ratio		0.64			0.64			0.20			0.20	
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)		1143			1164			337			329	
v/s Ratio Prot												
v/s Ratio Perm		0.28			0.32			0.12			0.05	
v/c Ratio		0.44			0.50			0.60			0.25	
Uniform Delay, d1		6.8			7.2			27.2			25.2	
Progression Factor		0.59			1.00			1.00			1.00	
Incremental Delay, d2		1.2			1.5			2.8			0.4	
Delay (s)		5.2			8.7			30.0			25.6	
Level of Service		A			A			C			C	
Approach Delay (s)		5.2			8.7			30.0			25.6	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			12.0									
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			75.0									
Intersection Capacity Utilization			54.9%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	2	8	3	2	2	7	148	5	2	78	3
Future Volume (Veh/h)	2	2	8	3	2	2	7	148	5	2	78	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.50	0.25	0.50	0.50	0.44	0.88	0.42	0.50	0.77	0.38
Hourly flow rate (vph)	8	8	16	12	4	4	16	168	12	4	101	8
Pedestrians		5			7			16			4	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			2			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)											355	
pX, platoon unblocked												
vC, conflicting volume	334	337	126	362	335	185	114			187		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	334	337	126	362	335	185	114			187		
tC, single (s)	7.1	6.5	6.5	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	99	99	98	98	99	100	99			100		
cM capacity (veh/h)	600	572	848	556	573	853	1397			1390		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	32	20	196	113								
Volume Left	8	12	16	4								
Volume Right	16	4	12	8								
cSH	693	601	1397	1390								
Volume to Capacity	0.05	0.03	0.01	0.00								
Queue Length 95th (m)	1.1	0.8	0.3	0.1								
Control Delay (s)	10.4	11.2	0.7	0.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.4	11.2	0.7	0.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.0									
Intersection Capacity Utilization			26.0%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	1	3	1	0	3	158	2	1	89	4
Future Volume (Veh/h)	1	0	1	3	1	0	3	158	2	1	89	4
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.94	0.25	0.25	0.84	0.50
Hourly flow rate (vph)	4	0	4	12	4	0	12	168	8	4	106	8
Pedestrians	3			20			8			8		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	0			2			1			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	327	341	121	346	341	200	117				196	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	327	341	121	346	341	200	117				196	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	99	100	100	98	99	100	99				100	
cM capacity (veh/h)	604	565	926	578	565	823	1480				1362	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	8	16	188	118								
Volume Left	4	12	12	4								
Volume Right	4	0	8	8								
cSH	731	575	1480	1362								
Volume to Capacity	0.01	0.03	0.01	0.00								
Queue Length 95th (m)	0.3	0.7	0.2	0.1								
Control Delay (s)	10.0	11.4	0.5	0.3								
Lane LOS	A	B	A	A								
Approach Delay (s)	10.0	11.4	0.5	0.3								
Approach LOS	A	B										
Intersection Summary												
Average Delay				1.2								
Intersection Capacity Utilization				24.1%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	240	19	5	258	21	56	97	21	20	22	53
Future Volume (Veh/h)	41	240	19	5	258	21	56	97	21	20	22	53
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.87	0.64	0.63	0.84	0.63	0.74	0.82	0.63	0.53	0.58	0.83
Hourly flow rate (vph)	51	276	30	8	307	33	76	118	33	38	38	64
Pedestrians		7			9			15			9	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					207							
pX, platoon unblocked												
vC, conflicting volume	349			321			838	773	315	842	772	340
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	349			321			838	773	315	842	772	340
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 %	96			99			65	62	95	78	88	91
cM capacity (veh/h)	1183			1232			218	308	702	175	309	692
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	357	348	227	140								
Volume Left	51	8	76	38								
Volume Right	30	33	33	64								
cSH	1183	1232	291	324								
Volume to Capacity	0.04	0.01	0.78	0.43								
Queue Length 95th (m)	1.0	0.1	45.9	15.9								
Control Delay (s)	1.5	0.2	50.1	24.3								
Lane LOS	A	A	F	C								
Approach Delay (s)	1.5	0.2	50.1	24.3								
Approach LOS			F	C								
Intersection Summary												
Average Delay			14.4									
Intersection Capacity Utilization			56.6%		ICU Level of Service				B			
Analysis Period (min)			15									

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	169	200	213	160	273	130	188	600	66	80	578
v/c Ratio	0.61	0.53	0.54	0.47	0.67	0.46	0.57	0.78	0.09	0.26	0.73
Control Delay	29.8	35.8	9.5	24.3	40.2	13.5	12.3	22.2	1.2	12.2	28.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.8	35.8	9.5	24.3	40.2	13.5	12.3	22.2	1.2	12.2	28.9
Queue Length 50th (m)	18.9	29.0	0.0	17.8	41.1	2.8	4.8	101.2	0.8	6.4	84.7
Queue Length 95th (m)	26.1	38.8	12.1	31.1	60.8	12.6	m6.3	#166.4	m1.5	10.1	#127.4
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	278	450	433	342	486	318	331	772	716	303	787
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.44	0.49	0.47	0.56	0.41	0.57	0.78	0.09	0.26	0.73

Intersection Summary

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.

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	51	72	148	175	146	232	63	27	147	472	75	68
Future Volume (vph)	51	72	148	175	146	232	63	27	147	472	75	68
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.68	1.00	1.00	0.57		1.00	0.97		0.92
Flpb, ped/bikes		0.91	1.00	1.00	0.89	1.00	1.00		0.99	1.00		1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.97		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1654	1762	1075	1621	1902	926		1790	1679		1431
Flt Permitted		0.39	1.00	1.00	0.54	1.00	1.00		0.23	1.00		1.00
Satd. Flow (perm)		675	1762	1075	920	1902	926		428	1679		1431
Peak-hour factor, PHF	0.71	0.74	0.74	0.82	0.91	0.85	0.79	0.54	0.78	0.95	0.78	0.93
Adj. Flow (vph)	72	97	200	213	160	273	80	50	188	497	96	73
RTOR Reduction (vph)	0	0	0	167	0	0	86	0	0	1	0	36
Lane Group Flow (vph)	0	169	200	46	160	273	44	0	188	599	0	30
Confl. Peds. (#/hr)	107	104		156	156		107	104	104		104	59
Confl. Bikes (#/hr)				3			4	4			7	7
Heavy Vehicles (%)	2%	0%	6%	0%	0%	1%	0%	0%	1%	3%	0%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		26.3	19.3	19.3	26.3	19.3	19.3		47.6	40.8		40.8
Effective Green, g (s)		26.3	19.3	19.3	26.3	19.3	19.3		47.6	40.8		40.8
Actuated g/C Ratio		0.29	0.21	0.21	0.29	0.21	0.21		0.53	0.45		0.45
Clearance Time (s)		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
Lane Grp Cap (vph)		273	377	230	323	407	198		329	761		648
v/s Ratio Prot		c0.05	0.11		0.04	c0.14			c0.04	c0.36		
v/s Ratio Perm		0.13		0.04	0.11		0.05		0.26			0.02
v/c Ratio		0.62	0.53	0.20	0.50	0.67	0.22		0.57	0.79		0.05
Uniform Delay, d1		25.6	31.3	29.0	25.1	32.4	29.2		14.0	20.9		13.7
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		0.59	0.63		0.85
Incremental Delay, d2		4.1	1.4	0.4	1.2	4.3	0.6		1.9	6.6		0.1
Delay (s)		29.7	32.8	29.4	26.3	36.7	29.7		10.2	19.7		11.8
Level of Service		C	C	C	C	D	C		B	B		B
Approach Delay (s)			30.7			32.1				17.0		
Approach LOS			C			C				B		
Intersection Summary												
HCM 2000 Control Delay			25.4									
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			80.7%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	16	39	455	61
Future Volume (vph)	16	39	455	61
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.98	
Flpb, ped/bikes		0.99	1.00	
Frt		1.00	0.98	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1749	1806	
Flt Permitted		0.22	1.00	
Satd. Flow (perm)		407	1806	
Peak-hour factor, PHF	0.63	0.71	0.89	0.91
Adj. Flow (vph)	25	55	511	67
RTOR Reduction (vph)	0	0	5	0
Lane Group Flow (vph)	0	80	573	0
Confl. Peds. (#/hr)	104	59		104
Confl. Bikes (#/hr)				5
Heavy Vehicles (%)	0%	5%	2%	2%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		43.8	38.9	
Effective Green, g (s)		43.8	38.9	
Actuated g/C Ratio		0.49	0.43	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		271	780	
v/s Ratio Prot		0.02	0.32	
v/s Ratio Perm		0.13		
v/c Ratio		0.30	0.73	
Uniform Delay, d1		14.6	21.3	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.6	6.1	
Delay (s)		15.2	27.3	
Level of Service		B	C	
Approach Delay (s)			25.9	
Approach LOS			C	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	26	19	7	53	22	749	36	41	755	23
Future Volume (Veh/h)	5	5	26	19	7	53	22	749	36	41	755	23
Sign Control	Stop				Stop				Free		Free	
Grade	0%				0%				0%		0%	
Peak Hour Factor	0.63	0.63	0.78	0.75	0.44	0.83	0.53	0.92	0.65	0.75	0.94	0.79
Hourly flow rate (vph)	8	8	33	25	16	64	42	814	55	55	803	29
Pedestrians	52				63				3		6	
Lane Width (m)	3.7				3.7				3.7		3.7	
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)							94			144		
pX, platoon unblocked	0.79	0.79	0.69	0.79	0.79	0.78	0.69				0.78	
vC, conflicting volume	1548	1996	872	1942	1982	504	884				932	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	542	1104	587	1036	1088	0	603				362	
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 %	96	94	89	75	88	92	93				94	
cM capacity (veh/h)	224	132	298	99	135	798	642				888	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	49	105	449	462	55	832						
Volume Left	8	25	42	0	55	0						
Volume Right	33	64	0	55	0	29						
cSH	237	233	642	1700	888	1700						
Volume to Capacity	0.21	0.45	0.07	0.27	0.06	0.49						
Queue Length 95th (m)	5.8	16.5	1.6	0.0	1.5	0.0						
Control Delay (s)	24.1	32.6	1.9	0.0	9.3	0.0						
Lane LOS	C	D	A		A							
Approach Delay (s)	24.1	32.6	0.9		0.6							
Approach LOS	C	D										
Intersection Summary												
Average Delay			3.1									
Intersection Capacity Utilization			57.0%		ICU Level of Service				B			
Analysis Period (min)			15									

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	225	222	945	207	690
v/c Ratio	0.50	0.34	0.75	0.71	0.60
Control Delay	32.4	15.1	23.9	53.9	19.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	32.4	15.1	23.9	53.9	19.4
Queue Length 50th (m)	32.8	21.3	75.6	32.9	93.0
Queue Length 95th (m)	49.9	31.7	70.0	m47.9	132.9
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	454	649	1257	292	1152
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	0.50	0.34	0.75	0.71	0.60

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

10/29/2018

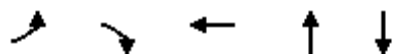


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	189	182	602	182	168	649
Future Volume (vph)	189	182	602	182	168	649
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.96	0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1706	1498	3316		1755	1921
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1706	1498	3316		1755	1921
Peak-hour factor, PHF	0.84	0.82	0.87	0.72	0.81	0.94
Adj. Flow (vph)	225	222	692	253	207	690
RTOR Reduction (vph)	0	0	41	0	0	0
Lane Group Flow (vph)	225	222	904	0	207	690
Confl. Peds. (#/hr)	48	42		34	34	
Confl. Bikes (#/hr)		3		5		
Heavy Vehicles (%)	7%	5%	1%	11%	4%	0%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	454	749	1215		292	1152
v/s Ratio Prot	c0.13	0.05	c0.27		c0.12	0.36
v/s Ratio Perm		0.10				
v/c Ratio	0.50	0.30	0.74		0.71	0.60
Uniform Delay, d1	27.9	16.6	24.8		35.4	11.2
Progression Factor	1.00	1.00	0.86		1.16	1.50
Incremental Delay, d2	3.8	1.0	3.8		11.5	1.9
Delay (s)	31.7	17.6	25.0		52.8	18.7
Level of Service	C	B	C		D	B
Approach Delay (s)	24.7		25.0			26.6
Approach LOS	C		C			C
Intersection Summary						
HCM 2000 Control Delay			25.6		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.65			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	182	187	138	775	867
v/c Ratio	0.74	0.43	0.38	0.51	0.45
Control Delay	50.4	7.4	23.8	9.5	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	50.4	7.4	23.8	9.5	8.5
Queue Length 50th (m)	29.7	0.0	14.8	26.8	25.4
Queue Length 95th (m)	41.6	10.9	27.7	46.4	50.7
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	355	546	504	1515	1929
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	0.51	0.34	0.27	0.51	0.45
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

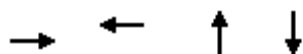
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	149	0	153	60	22	56	108	583	0	0	635	169
Future Volume (vph)	149	0	153	60	22	56	108	583	0	0	635	169
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	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Flpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	0.99		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.95			1.00			0.96	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1766		1432		1654			3472			3367	
Flt Permitted	0.66		1.00		0.98			0.63			1.00	
Satd. Flow (perm)	1231		1432		1654			2215			3367	
Peak-hour factor, PHF	0.82	0.25	0.82	1.00	1.00	1.00	0.85	0.90	0.25	0.25	0.96	0.82
Adj. Flow (vph)	182	0	187	60	22	56	127	648	0	0	661	206
RTOR Reduction (vph)	0	0	149	0	30	0	0	0	0	0	27	0
Lane Group Flow (vph)	182	0	38	0	108	0	0	775	0	0	840	0
Confl. Peds. (#/hr)	12		89	89		12	45		13	13		45
Confl. Bikes (#/hr)			1						5			1
Heavy Vehicles (%)	2%	0%	1%	0%	0%	0%	2%	3%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	18.1		18.1		18.1			59.9			50.9	
Effective Green, g (s)	18.1		18.1		18.1			59.9			50.9	
Actuated g/C Ratio	0.20		0.20		0.20			0.67			0.57	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	247		287		332			1558			1904	
v/s Ratio Prot								c0.03			0.25	
v/s Ratio Perm	c0.15		0.03		0.07			c0.30				
v/c Ratio	0.74		0.13		0.32			0.50			0.44	
Uniform Delay, d1	33.7		29.5		30.7			7.5			11.3	
Progression Factor	1.00		1.00		1.00			1.00			0.68	
Incremental Delay, d2	10.9		0.2		0.6			0.3			0.6	
Delay (s)	44.6		29.7		31.3			7.8			8.3	
Level of Service	D		C		C			A			A	
Approach Delay (s)		37.0			31.3			7.8			8.3	
Approach LOS		D			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			14.5				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			15.0		
Intersection Capacity Utilization			77.1%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	701	406	174	381
v/c Ratio	0.76	0.41	0.42	1.08
Control Delay	18.5	14.0	24.7	98.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	18.5	14.0	24.7	98.0
Queue Length 50th (m)	66.4	39.5	18.4	~54.3
Queue Length 95th (m)	77.7	57.9	29.8	#83.5
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	918	994	417	352
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	0.76	0.41	0.42	1.08

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	88	424	22	13	229	66	14	91	25	58	76	113
Future Volume (vph)	88	424	22	13	229	66	14	91	25	58	76	113
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			0.98			0.99			0.81	
Flpb, ped/bikes		0.99			1.00			0.98			0.99	
Frt		0.99			0.96			0.97			0.93	
Flt Protected		0.99			1.00			0.99			0.99	
Satd. Flow (prot)		1775			1755			1766			1392	
Flt Permitted		0.87			0.95			0.90			0.85	
Satd. Flow (perm)		1562			1665			1597			1204	
Peak-hour factor, PHF	0.83	0.76	0.59	0.55	0.83	0.62	0.60	0.79	0.69	0.60	0.79	0.60
Adj. Flow (vph)	106	558	37	24	276	106	23	115	36	97	96	188
RTOR Reduction (vph)	0	2	0	0	17	0	0	13	0	0	47	0
Lane Group Flow (vph)	0	699	0	0	389	0	0	161	0	0	334	0
Confl. Peds. (#/hr)	56		43	43		56	175		19	19		175
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	3%	5%	0%	4%	0%	0%	1%	5%	2%	3%	3%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		44.0			44.0			19.0			19.0	
Effective Green, g (s)		44.0			44.0			19.0			19.0	
Actuated g/C Ratio		0.59			0.59			0.25			0.25	
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)		916			976			404			305	
v/s Ratio Prot												
v/s Ratio Perm		c0.45			0.23			0.10			c0.28	
v/c Ratio		0.76			0.40			0.40			1.09	
Uniform Delay, d1		11.6			8.4			23.3			28.0	
Progression Factor		1.00			1.66			1.00			1.00	
Incremental Delay, d2		6.0			1.2			0.6			79.4	
Delay (s)		17.6			15.0			23.9			107.4	
Level of Service		B			B			C			F	
Approach Delay (s)		17.6			15.0			23.9			107.4	
Approach LOS		B			B			C			F	
Intersection Summary												
HCM 2000 Control Delay			38.2			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			92.9%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	8	113	9	13	122
Future Volume (Veh/h)	6	8	113	9	13	122
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.63	0.88	0.74	0.67	0.69	0.66
Hourly flow rate (vph)	10	9	153	13	19	185
Pedestrians	10		3			
Lane Width (m)	3.7		3.7			
Walking Speed (m/s)	1.1		1.1			
Percent Blockage	1		0			
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	396	170			176	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	396	170			176	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	98	99			99	
cM capacity (veh/h)	597	836			1346	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	19	166	204			
Volume Left	10	0	19			
Volume Right	9	13	0			
cSH	690	1700	1346			
Volume to Capacity	0.03	0.10	0.01			
Queue Length 95th (m)	0.6	0.0	0.3			
Control Delay (s)	10.4	0.0	0.8			
Lane LOS	B		A			
Approach Delay (s)	10.4	0.0	0.8			
Approach LOS	B					
Intersection Summary						
Average Delay		0.9				
Intersection Capacity Utilization		27.3%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	63	413	3	6	217	22	0	16	37	45	6	70
Future Volume (Veh/h)	63	413	3	6	217	22	0	16	37	45	6	70
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.76	0.78	0.38	0.31	0.80	0.79	0.25	0.58	0.47	0.81	0.31	0.56
Hourly flow rate (vph)	83	529	8	19	271	28	0	28	79	56	19	125
Pedestrians		44			6			9			7	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		4			1			1			1	
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	306			546			1210	1052	548	1128	1042	336
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	306			546			1210	1052	548	1128	1042	336
tC, single (s)	4.1			4.1			7.1	6.6	6.2	7.1	6.7	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.3	3.5	4.2	3.3
p0 queue free %	93			98			100	86	85	56	90	81
cM capacity (veh/h)	1258			1024			106	200	526	127	193	669
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	620	318	107	200								
Volume Left	83	19	0	56								
Volume Right	8	28	79	125								
cSH	1258	1024	369	276								
Volume to Capacity	0.07	0.02	0.29	0.73								
Queue Length 95th (m)	1.6	0.4	9.0	39.1								
Control Delay (s)	1.8	0.7	18.7	46.2								
Lane LOS	A	A	C	E								
Approach Delay (s)	1.8	0.7	18.7	46.2								
Approach LOS			C	E								
Intersection Summary												
Average Delay			10.1									
Intersection Capacity Utilization			64.5%		ICU Level of Service				C			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	475	9	10	284	2	15	48	21	9	36	17
Future Volume (Veh/h)	16	475	9	10	284	2	15	48	21	9	36	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.80	0.67	0.75	0.91	0.50	0.41	0.81	0.64	0.67	0.43	0.42
Hourly flow rate (vph)	28	594	13	13	312	4	37	59	33	13	84	40
Pedestrians		9			2			25			24	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked	0.99			0.79			0.80	0.80	0.79	0.80	0.80	0.99
vC, conflicting volume	340			632			1112	1048	628	1085	1052	347
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	325			403			978	896	398	943	902	332
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 %	98			99			66	71	93	90	59	94
cM capacity (veh/h)	1201			901			108	205	506	130	205	667
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	635	329	129	137								
Volume Left	28	13	37	13								
Volume Right	13	4	33	40								
cSH	1201	901	185	240								
Volume to Capacity	0.02	0.01	0.70	0.57								
Queue Length 95th (m)	0.5	0.3	32.6	24.3								
Control Delay (s)	0.6	0.5	60.1	38.2								
Lane LOS	A	A	F	E								
Approach Delay (s)	0.6	0.5	60.1	38.2								
Approach LOS			F	E								
Intersection Summary												
Average Delay			11.0									
Intersection Capacity Utilization			45.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	8	7	6	5	5	2	40	6	6	57	1
Future Volume (Veh/h)	6	8	7	6	5	5	2	40	6	6	57	1
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.58	0.38	0.63	0.50	0.50	0.50	0.73	0.63	0.42	0.56	0.25
Hourly flow rate (vph)	10	14	18	10	10	10	4	55	10	14	102	4
Pedestrians	7			6			12			4		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	1			1			1			0		
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	226	218	123	243	215	70	113				71	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	226	218	123	243	215	70	113				71	
tC, single (s)	7.1	6.5	6.5	7.1	6.8	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.6	3.5	4.2	3.3	2.2				2.2	
p0 queue free %	99	98	98	98	98	99	100				99	
cM capacity (veh/h)	697	667	835	664	629	989	1479				1533	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	42	30	69	120								
Volume Left	10	10	4	14								
Volume Right	18	10	10	4								
cSH	738	730	1479	1533								
Volume to Capacity	0.06	0.04	0.00	0.01								
Queue Length 95th (m)	1.4	1.0	0.1	0.2								
Control Delay (s)	10.2	10.1	0.5	0.9								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.2	10.1	0.5	0.9								
Approach LOS	B	B										
Intersection Summary												
Average Delay	3.3											
Intersection Capacity Utilization	20.4%			ICU Level of Service					A			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	3	48	5	2	82
Future Volume (Veh/h)	1	3	48	5	2	82
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.75	0.53	0.33	0.25	0.46
Hourly flow rate (vph)	4	4	91	15	8	178
Pedestrians	6		1			3
Lane Width (m)	3.7		3.7			3.7
Walking Speed (m/s)	1.1		1.1			1.1
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	300	108			112	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	300	108			112	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			99	
cM capacity (veh/h)	688	944			1482	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	8	106	186			
Volume Left	4	0	8			
Volume Right	4	15	0			
cSH	796	1700	1482			
Volume to Capacity	0.01	0.06	0.01			
Queue Length 95th (m)	0.2	0.0	0.1			
Control Delay (s)	9.6	0.0	0.4			
Lane LOS	A		A			
Approach Delay (s)	9.6	0.0	0.4			
Approach LOS	A					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			16.9%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

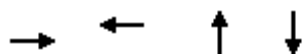
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	443	12	21	210	22	7	8	14	21	21	31
Future Volume (Veh/h)	24	443	12	21	210	22	7	8	14	21	21	31
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.85	0.36	0.75	0.88	0.53	0.75	0.58	0.50	0.64	0.50	0.52
Hourly flow rate (vph)	32	521	33	28	239	42	9	14	28	33	42	60
Pedestrians		3			2			14			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)												
pX, platoon unblocked												
vC, conflicting volume	284			568			1016	956	554	958	951	266
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	284			568			1016	956	554	958	951	266
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 %	97			97			94	94	95	83	83	92
cM capacity (veh/h)	1258			1000			163	242	528	199	244	756
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	586	309	51	135								
Volume Left	32	28	9	33								
Volume Right	33	42	28	60								
cSH	1258	1000	307	324								
Volume to Capacity	0.03	0.03	0.17	0.42								
Queue Length 95th (m)	0.6	0.7	4.5	15.1								
Control Delay (s)	0.7	1.1	19.0	23.9								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.7	1.1	19.0	23.9								
Approach LOS			C	C								
Intersection Summary												
Average Delay			4.6									
Intersection Capacity Utilization			43.4%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	654	367	227	147
v/c Ratio	0.58	0.34	0.68	0.46
Control Delay	7.6	8.3	33.5	28.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	7.6	8.3	33.5	28.5
Queue Length 50th (m)	28.5	22.7	25.0	16.8
Queue Length 95th (m)	m44.7	40.3	28.6	24.1
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1136	1066	442	426
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	0.58	0.34	0.51	0.35

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	466	29	18	263	20	27	70	44	23	72	9
Future Volume (vph)	17	466	29	18	263	20	27	70	44	23	72	9
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			0.99			0.94			0.99	
Flpb, ped/bikes		1.00			1.00			0.99			0.97	
Frt		0.99			0.99			0.96			0.99	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1835			1789			1702			1776	
Flt Permitted		0.98			0.94			0.88			0.84	
Satd. Flow (perm)		1796			1682			1513			1509	
Peak-hour factor, PHF	0.63	0.79	0.78	0.67	0.87	0.53	0.48	0.66	0.68	0.63	0.74	0.67
Adj. Flow (vph)	27	590	37	27	302	38	56	106	65	37	97	13
RTOR Reduction (vph)	0	3	0	0	5	0	0	21	0	0	5	0
Lane Group Flow (vph)	0	651	0	0	362	0	0	206	0	0	142	0
Confl. Peds. (#/hr)	38		54	54		38	21		91	91		21
Confl. Bikes (#/hr)			3			1			1			
Heavy Vehicles (%)	7%	3%	0%	0%	4%	12%	0%	0%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		47.4			47.4			15.6			15.6	
Effective Green, g (s)		47.4			47.4			15.6			15.6	
Actuated g/C Ratio		0.63			0.63			0.21			0.21	
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)		1135			1063			314			313	
v/s Ratio Prot												
v/s Ratio Perm		c0.36			0.22			c0.14			0.09	
v/c Ratio		0.57			0.34			0.65			0.45	
Uniform Delay, d1		8.0			6.5			27.2			26.0	
Progression Factor		0.65			1.00			1.00			1.00	
Incremental Delay, d2		1.4			0.9			4.9			1.0	
Delay (s)		6.6			7.3			32.1			27.0	
Level of Service		A			A			C			C	
Approach Delay (s)		6.6			7.3			32.1			27.0	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			13.1			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			56.5%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	0	2	2	1	1	6	134	9	2	84	8
Future Volume (Veh/h)	12	0	2	2	1	1	6	134	9	2	84	8
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.25	0.25	0.25	0.25	0.25	0.63	0.60	0.67	0.50	0.79	0.44
Hourly flow rate (vph)	19	0	8	8	4	4	10	223	13	4	106	18
Pedestrians	5			13			10			3		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	0			1			1			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												355
pX, platoon unblocked												
vC, conflicting volume	386	397	130	404	400	246	129				249	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	386	397	130	404	400	246	129				249	
tC, single (s)	7.1	6.5	6.7	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.8	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	97	100	99	98	99	99	99				100	
cM capacity (veh/h)	553	529	794	532	527	786	1462				1312	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	27	16	246	128								
Volume Left	19	8	10	4								
Volume Right	8	4	13	18								
cSH	608	577	1462	1312								
Volume to Capacity	0.04	0.03	0.01	0.00								
Queue Length 95th (m)	1.1	0.6	0.2	0.1								
Control Delay (s)	11.2	11.4	0.4	0.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	11.2	11.4	0.4	0.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay				1.5								
Intersection Capacity Utilization				24.5%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	2	5	5	3	2	5	142	3	0	89	1
Future Volume (Veh/h)	5	2	5	5	3	2	5	142	3	0	89	1
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.50	0.50	0.50	0.50	0.75	0.50	0.50	0.65	0.38	0.25	0.66	0.25
Hourly flow rate (vph)	10	4	10	10	4	4	10	218	8	0	135	4
Pedestrians	10			16			6			3		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	1			2			1			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	398	409	153	413	407	241	149				242	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	398	409	153	413	407	241	149				242	
tC, single (s)	7.1	7.0	6.2	7.1	6.8	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.5	3.3	3.5	4.3	3.3	2.2				2.2	
p0 queue free %	98	99	99	98	99	99	99				100	
cM capacity (veh/h)	539	450	884	518	473	788	1431				1315	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	24	18	236	139								
Volume Left	10	10	10	0								
Volume Right	10	4	8	4								
cSH	619	548	1431	1315								
Volume to Capacity	0.04	0.03	0.01	0.00								
Queue Length 95th (m)	0.9	0.8	0.2	0.0								
Control Delay (s)	11.0	11.8	0.4	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	11.0	11.8	0.4	0.0								
Approach LOS	B	B										
Intersection Summary												
Average Delay				1.4								
Intersection Capacity Utilization				24.2%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	384	29	6	190	28	30	69	28	24	36	24
Future Volume (Veh/h)	65	384	29	6	190	28	30	69	28	24	36	24
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.74	0.78	0.69	0.42	0.88	0.75	0.65	0.63	0.75	0.75	0.65	0.53
Hourly flow rate (vph)	88	492	42	14	216	37	46	110	37	32	55	45
Pedestrians		12			7			15			5	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					207							
pX, platoon unblocked												
vC, conflicting volume	258			549			1051	990	535	1056	992	252
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	258			549			1051	990	535	1056	992	252
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.3
p0 queue free %	93			99			68	51	93	69	75	94
cM capacity (veh/h)	1312			1016			142	224	537	103	223	767
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	622	267	193	132								
Volume Left	88	14	46	32								
Volume Right	42	37	37	45								
cSH	1312	1016	219	215								
Volume to Capacity	0.07	0.01	0.88	0.61								
Queue Length 95th (m)	1.6	0.3	53.6	27.0								
Control Delay (s)	1.8	0.6	80.2	45.3								
Lane LOS	A	A	F	E								
Approach Delay (s)	1.8	0.6	80.2	45.3								
Approach LOS			F	E								
Intersection Summary												
Average Delay			18.7									
Intersection Capacity Utilization			57.8%		ICU Level of Service				B			
Analysis Period (min)			15									

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	216	198	223	106	166	73	138	442	107	51	735
v/c Ratio	0.61	0.50	0.50	0.29	0.44	0.22	0.63	0.56	0.14	0.11	0.89
Control Delay	29.4	34.8	8.3	20.9	33.8	3.9	35.9	25.8	9.5	10.3	39.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.4	34.8	8.3	20.9	33.8	3.9	35.9	25.8	9.5	10.3	39.6
Queue Length 50th (m)	24.9	28.8	0.0	11.4	23.5	0.0	17.2	53.6	3.0	4.0	123.0
Queue Length 95th (m)	26.1	45.2	15.7	19.6	39.7	2.2	m24.6	m76.1	m6.4	8.3	#198.6
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	354	445	472	369	467	387	218	787	773	473	827
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.44	0.47	0.29	0.36	0.19	0.63	0.56	0.14	0.11	0.89

Intersection Summary

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.

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	40	98	168	196	87	146	36	18	116	305	94	95
Future Volume (vph)	40	98	168	196	87	146	36	18	116	305	94	95
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.76	1.00	1.00	0.73		1.00	0.97		0.94
Flpb, ped/bikes		0.90	1.00	1.00	0.91	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	0.96		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1627	1745	1199	1656	1830	1198		1772	1603		1463
Flt Permitted		0.57	1.00	1.00	0.59	1.00	1.00		0.10	1.00		1.00
Satd. Flow (perm)		974	1745	1199	1034	1830	1198		184	1603		1463
Peak-hour factor, PHF	0.73	0.61	0.85	0.88	0.82	0.88	0.78	0.67	0.84	0.97	0.81	0.80
Adj. Flow (vph)	55	161	198	223	106	166	46	27	138	314	116	119
RTOR Reduction (vph)	0	0	0	172	0	0	58	0	0	1	0	57
Lane Group Flow (vph)	0	216	198	51	106	166	15	0	138	441	0	50
Confl. Peds. (#/hr)	73	54		112	112		73	54	50		54	42
Confl. Bikes (#/hr)				2			1	1			1	1
Heavy Vehicles (%)	3%	0%	7%	1%	0%	5%	0%	0%	3%	6%	4%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		27.4	20.4	20.4	24.6	19.0	19.0		48.8	42.4		42.4
Effective Green, g (s)		27.4	20.4	20.4	24.6	19.0	19.0		48.8	42.4		42.4
Actuated g/C Ratio		0.30	0.23	0.23	0.27	0.21	0.21		0.54	0.47		0.47
Clearance Time (s)		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
Lane Grp Cap (vph)		347	395	271	321	386	252		212	755		689
v/s Ratio Prot		c0.05	0.11		0.02	0.09			c0.05	0.28		
v/s Ratio Perm		c0.14		0.04	0.07		0.01		0.31			0.03
v/c Ratio		0.62	0.50	0.19	0.33	0.43	0.06		0.65	0.58		0.07
Uniform Delay, d1		25.9	30.4	28.1	25.4	30.8	28.4		17.1	17.4		13.0
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		2.06	1.22		2.53
Incremental Delay, d2		3.5	1.0	0.3	0.6	0.8	0.1		5.2	2.5		0.2
Delay (s)		29.3	31.4	28.4	26.0	31.6	28.5		40.5	23.6		33.2
Level of Service		C	C	C	C	C	C		D	C		C
Approach Delay (s)			29.7			29.2				28.4		
Approach LOS			C			C				C		
Intersection Summary												
HCM 2000 Control Delay			31.5			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)				18.0		
Intersection Capacity Utilization			85.9%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	8	27	658	35
Future Volume (vph)	8	27	658	35
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.99	
Flpb, ped/bikes		0.98	1.00	
Frt		1.00	0.99	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1793	1850	
Flt Permitted		0.40	1.00	
Satd. Flow (perm)		752	1850	
Peak-hour factor, PHF	0.44	0.82	0.95	0.83
Adj. Flow (vph)	18	33	693	42
RTOR Reduction (vph)	0	0	2	0
Lane Group Flow (vph)	0	51	733	0
Confl. Peds. (#/hr)	54	42		50
Confl. Bikes (#/hr)				7
Heavy Vehicles (%)	0%	0%	2%	7%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		43.2	39.6	
Effective Green, g (s)		43.2	39.6	
Actuated g/C Ratio		0.48	0.44	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		402	814	
v/s Ratio Prot		0.01	c0.40	
v/s Ratio Perm		0.06		
v/c Ratio		0.13	0.90	
Uniform Delay, d1		12.9	23.4	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.1	15.0	
Delay (s)		13.0	38.3	
Level of Service		B	D	
Approach Delay (s)			36.7	
Approach LOS			D	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	12	32	15	7	43	33	635	53	66	829	31
Future Volume (Veh/h)	6	12	32	15	7	43	33	635	53	66	829	31
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.31	0.50	0.78	0.81	0.50	0.84	0.66	0.86	0.88	0.79	0.93	0.84
Hourly flow rate (vph)	19	24	41	19	14	51	50	738	60	84	891	37
Pedestrians		37			35			9			9	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		4			3			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)								94			144	
pX, platoon unblocked	0.73	0.73	0.61	0.73	0.73	0.76	0.61			0.76		
vC, conflicting volume	1650	2048	956	2024	2036	443	965			833		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	466	1011	605	979	995	0	620			145		
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 %	92	83	84	78	90	94	91			92		
cM capacity (veh/h)	243	138	259	88	141	793	569			1063		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	84	84	419	429	84	928						
Volume Left	19	19	50	0	84	0						
Volume Right	41	51	0	60	0	37						
cSH	204	222	569	1700	1063	1700						
Volume to Capacity	0.41	0.38	0.09	0.25	0.08	0.55						
Queue Length 95th (m)	14.1	12.7	2.2	0.0	2.0	0.0						
Control Delay (s)	34.4	30.8	2.6	0.0	8.7	0.0						
Lane LOS	D	D	A		A							
Approach Delay (s)	34.4	30.8	1.3		0.7							
Approach LOS	D	D										
Intersection Summary												
Average Delay			3.6									
Intersection Capacity Utilization			70.3%	ICU Level of Service					C			
Analysis Period (min)			15									

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	193	146	1045	231	727
v/c Ratio	0.44	0.24	0.82	0.79	0.64
Control Delay	31.4	14.0	22.7	44.6	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	31.4	14.0	22.7	44.6	7.8
Queue Length 50th (m)	27.7	13.4	56.1	39.5	27.0
Queue Length 95th (m)	43.1	20.8	80.2	m50.4	m40.6
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	434	614	1267	292	1141
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	0.44	0.24	0.82	0.79	0.64

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

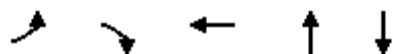
10/29/2018

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	160	115	604	294	178	698
Future Volume (vph)	160	115	604	294	178	698
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.97	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.95		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1630	1418	3287		1755	1902
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1630	1418	3287		1755	1902
Peak-hour factor, PHF	0.83	0.79	0.85	0.88	0.77	0.96
Adj. Flow (vph)	193	146	711	334	231	727
RTOR Reduction (vph)	0	0	62	0	0	0
Lane Group Flow (vph)	193	146	983	0	231	727
Confl. Peds. (#/hr)	44	30		9	9	
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	12%	12%	3%	8%	4%	1%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	434	709	1205		292	1141
v/s Ratio Prot	c0.12	0.03	c0.30		c0.13	0.38
v/s Ratio Perm		0.07				
v/c Ratio	0.44	0.21	0.82		0.79	0.64
Uniform Delay, d1	27.5	15.9	25.8		36.0	11.7
Progression Factor	1.00	1.00	0.76		0.78	0.48
Incremental Delay, d2	3.3	0.7	4.4		14.5	2.0
Delay (s)	30.7	16.5	24.0		42.7	7.5
Level of Service	C	B	C		D	A
Approach Delay (s)	24.6		24.0			16.0
Approach LOS	C		C			B
Intersection Summary						
HCM 2000 Control Delay			20.8		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.69			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	355	217	39	815	931
v/c Ratio	0.92	0.41	0.08	0.62	0.56
Control Delay	63.1	7.9	15.7	14.1	12.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	63.1	7.9	15.7	14.1	12.2
Queue Length 50th (m)	58.4	3.0	2.6	38.1	33.9
Queue Length 95th (m)	#79.4	14.6	9.8	48.7	40.0
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	400	543	490	1320	1668
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	0.89	0.40	0.08	0.62	0.56

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

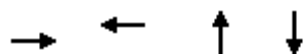
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	270	0	178	17	4	18	96	623	0	0	707	144
Future Volume (vph)	270	0	178	17	4	18	96	623	0	0	707	144
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	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	1.00		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.94			1.00			0.97	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1802		1406		1651			3412			3374	
Flt Permitted	0.73		1.00		0.98			0.63			1.00	
Satd. Flow (perm)	1388		1406		1651			2174			3374	
Peak-hour factor, PHF	0.76	0.38	0.82	1.00	1.00	1.00	0.90	0.88	0.25	0.25	0.93	0.84
Adj. Flow (vph)	355	0	217	17	4	18	107	708	0	0	760	171
RTOR Reduction (vph)	0	0	139	0	13	0	0	0	0	0	20	0
Lane Group Flow (vph)	355	0	78	0	26	0	0	815	0	0	911	0
Confl. Peds. (#/hr)	2		87	87		2	44		2	2		44
Confl. Bikes (#/hr)			3									3
Heavy Vehicles (%)	1%	0%	3%	0%	0%	0%	4%	5%	0%	0%	4%	1%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	25.0		25.0		25.0			53.0			44.0	
Effective Green, g (s)	25.0		25.0		25.0			53.0			44.0	
Actuated g/C Ratio	0.28		0.28		0.28			0.59			0.49	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	385		390		458			1362			1649	
v/s Ratio Prot								c0.04			0.27	
v/s Ratio Perm	c0.26		0.06		0.02			c0.31				
v/c Ratio	0.92		0.20		0.06			0.60			0.55	
Uniform Delay, d1	31.6		24.8		23.8			11.7			16.1	
Progression Factor	1.00		1.00		1.00			1.00			0.70	
Incremental Delay, d2	27.2		0.3		0.1			0.7			1.1	
Delay (s)	58.7		25.1		23.9			12.5			12.4	
Level of Service	E		C		C			B			B	
Approach Delay (s)		46.0			23.9			12.5			12.4	
Approach LOS		D			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			20.7									
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			90.0								15.0	
Intersection Capacity Utilization			83.0%								E	
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	602	658	108	170
v/c Ratio	0.57	0.56	0.33	0.51
Control Delay	10.7	18.8	23.3	25.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.7	18.8	23.3	25.3
Queue Length 50th (m)	47.2	89.9	10.4	15.4
Queue Length 95th (m)	72.1	110.1	16.8	23.9
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	1064	1169	437	436
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	0.57	0.56	0.25	0.39
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	424	37	22	482	27	20	43	23	21	47	47
Future Volume (vph)	37	424	37	22	482	27	20	43	23	21	47	47
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			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			1.00	
Frt		0.99			0.99			0.97			0.95	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1792			1881			1824			1760	
Flt Permitted		0.90			0.95			0.91			0.90	
Satd. Flow (perm)		1625			1790			1676			1608	
Peak-hour factor, PHF	0.67	0.87	0.62	0.59	0.82	0.82	0.85	0.71	1.00	0.50	0.73	0.73
Adj. Flow (vph)	55	487	60	37	588	33	24	61	23	42	64	64
RTOR Reduction (vph)	0	5	0	0	2	0	0	14	0	0	32	0
Lane Group Flow (vph)	0	597	0	0	656	0	0	94	0	0	138	0
Confl. Peds. (#/hr)	18		8	8		18	18		2	2		18
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		48.9			48.9			14.1			14.1	
Effective Green, g (s)		48.9			48.9			14.1			14.1	
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)		1059			1167			315			302	
v/s Ratio Prot												
v/s Ratio Perm		c0.37			0.37			0.06			c0.09	
v/c Ratio		0.56			0.56			0.30			0.46	
Uniform Delay, d1		7.2			7.2			26.2			27.1	
Progression Factor		1.00			1.99			1.00			1.00	
Incremental Delay, d2		2.2			1.8			0.5			1.1	
Delay (s)		9.4			16.0			26.7			28.2	
Level of Service		A			B			C			C	
Approach Delay (s)		9.4			16.0			26.7			28.2	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			15.5			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			60.6%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	7	9	85	7	15	70
Future Volume (Veh/h)	7	9	85	7	15	70
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.50	0.67	0.84	0.75	0.46	0.80
Hourly flow rate (vph)	14	13	101	9	33	88
Pedestrians	5					3
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	264	114			115	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	264	114			115	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	98	99			98	
cM capacity (veh/h)	709	937			1430	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	27	110	121			
Volume Left	14	0	33			
Volume Right	13	9	0			
cSH	803	1700	1430			
Volume to Capacity	0.03	0.06	0.02			
Queue Length 95th (m)	0.8	0.0	0.5			
Control Delay (s)	9.6	0.0	2.2			
Lane LOS	A		A			
Approach Delay (s)	9.6	0.0	2.2			
Approach LOS	A					
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			22.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	273	2	3	401	24	3	17	21	35	10	44
Future Volume (Veh/h)	36	273	2	3	401	24	3	17	21	35	10	44
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.81	0.25	0.38	0.77	0.75	0.75	0.63	0.75	0.83	0.56	0.63
Hourly flow rate (vph)	51	337	8	8	521	32	4	27	28	42	18	70
Pedestrians		9						13			16	
Lane Width (m)		3.7						3.7			3.7	
Walking Speed (m/s)		1.1						1.1			1.1	
Percent Blockage		1						1			2	
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	569			358			1097	1041	354	1054	1029	562
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	569			358			1097	1041	354	1054	1029	562
tC, single (s)	4.1			4.1			7.1	6.6	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.3	3.5	4.0	3.3
p0 queue free %	95			99			97	87	96	74	92	86
cM capacity (veh/h)	997			1196			143	206	686	164	216	517
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	396	561	59	130								
Volume Left	51	8	4	42								
Volume Right	8	32	28	70								
cSH	997	1196	295	274								
Volume to Capacity	0.05	0.01	0.20	0.48								
Queue Length 95th (m)	1.2	0.2	5.6	18.2								
Control Delay (s)	1.6	0.2	20.2	29.5								
Lane LOS	A	A	C	D								
Approach Delay (s)	1.6	0.2	20.2	29.5								
Approach LOS			C	D								
Intersection Summary												
Average Delay			5.0									
Intersection Capacity Utilization			59.2%	ICU Level of Service					B			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	435	21	15	491	15	21	30	14	7	22	20
Future Volume (Veh/h)	20	435	21	15	491	15	21	30	14	7	22	20
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.53	0.84	0.56	0.65	0.85	0.65	0.75	0.72	0.60	0.50	0.59	0.71
Hourly flow rate (vph)	38	518	38	23	578	23	28	42	23	14	37	28
Pedestrians		7			1			11			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked	0.82			0.86			0.89	0.89	0.86	0.89	0.89	0.82
vC, conflicting volume	615			567			1313	1285	549	1308	1292	610
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	415			417			936	904	396	930	913	410
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 %	96			98			83	81	96	91	83	94
cM capacity (veh/h)	929			982			166	225	560	156	223	506
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	594	624	93	79								
Volume Left	38	23	28	14								
Volume Right	38	23	23	28								
cSH	929	982	235	254								
Volume to Capacity	0.04	0.02	0.40	0.31								
Queue Length 95th (m)	1.0	0.5	13.6	9.7								
Control Delay (s)	1.1	0.6	30.1	25.4								
Lane LOS	A	A	D	D								
Approach Delay (s)	1.1	0.6	30.1	25.4								
Approach LOS			D	D								
Intersection Summary												
Average Delay			4.2									
Intersection Capacity Utilization			47.0%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	6	2	5	3	3	6	43	2	5	51	1
Future Volume (Veh/h)	6	6	2	5	3	3	6	43	2	5	51	1
Sign Control	Stop				Stop				Free			
Grade	0%				0%				0%			
Peak Hour Factor	0.63	0.63	0.25	0.33	0.75	0.38	0.63	0.77	0.50	0.33	0.85	0.25
Hourly flow rate (vph)	10	10	8	15	4	8	10	56	4	15	60	4
Pedestrians	12				9				9			
Lane Width (m)	3.7				3.7				3.7			
Walking Speed (m/s)	1.1				1.1				1.1			
Percent Blockage	1				1				1			
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	199	193	83	201	193	74	76				69	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	199	193	83	201	193	74	76				69	
tC, single (s)	7.1	6.7	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.2	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	98	99	98	99	99	99				99	
cM capacity (veh/h)	720	647	962	713	680	978	1518				1531	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	28	27	70	79								
Volume Left	10	15	10	15								
Volume Right	8	8	4	4								
cSH	743	769	1518	1531								
Volume to Capacity	0.04	0.04	0.01	0.01								
Queue Length 95th (m)	0.9	0.8	0.2	0.2								
Control Delay (s)	10.0	9.9	1.1	1.5								
Lane LOS	B	A	A	A								
Approach Delay (s)	10.0	9.9	1.1	1.5								
Approach LOS	B	A										
Intersection Summary												
Average Delay			3.6									
Intersection Capacity Utilization			19.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	2	6	47	7	3	61
Future Volume (Veh/h)	2	6	47	7	3	61
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.42	0.57	0.75	0.38	0.83
Hourly flow rate (vph)	8	14	82	9	8	73
Pedestrians	4					4
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	180	94			95	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	180	94			95	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			99	
cM capacity (veh/h)	807	960			1506	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	22	91	81			
Volume Left	8	0	8			
Volume Right	14	9	0			
cSH	898	1700	1506			
Volume to Capacity	0.02	0.05	0.01			
Queue Length 95th (m)	0.6	0.0	0.1			
Control Delay (s)	9.1	0.0	0.8			
Lane LOS	A		A			
Approach Delay (s)	9.1	0.0	0.8			
Approach LOS	A					
Intersection Summary						
Average Delay		1.4				
Intersection Capacity Utilization		16.9%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

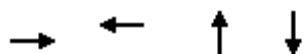
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	295	9	5	362	22	24	5	30	31	7	23
Future Volume (Veh/h)	22	295	9	5	362	22	24	5	30	31	7	23
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.68	0.94	0.50	0.59	0.83	0.25	0.58	0.33	0.65	0.84	0.50	0.83
Hourly flow rate (vph)	32	314	18	8	436	88	41	15	46	37	14	28
Pedestrians		4			1			13			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)												
pX, platoon unblocked												
vC, conflicting volume	538			345			935	954	337	952	919	498
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	538			345			935	954	337	952	919	498
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			81	94	93	82	95	95
cM capacity (veh/h)	1026			1210			211	244	691	202	256	566
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	364	532	102	79								
Volume Left	32	8	41	37								
Volume Right	18	88	46	28								
cSH	1026	1210	317	275								
Volume to Capacity	0.03	0.01	0.32	0.29								
Queue Length 95th (m)	0.7	0.2	10.3	8.8								
Control Delay (s)	1.1	0.2	21.7	23.3								
Lane LOS	A	A	C	C								
Approach Delay (s)	1.1	0.2	21.7	23.3								
Approach LOS			C	C								
Intersection Summary												
Average Delay			4.2									
Intersection Capacity Utilization			42.3%	ICU Level of Service					A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	556	634	245	110
v/c Ratio	0.49	0.55	0.66	0.31
Control Delay	6.3	11.1	32.0	21.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	6.3	11.1	32.0	21.0
Queue Length 50th (m)	21.8	48.5	26.9	10.0
Queue Length 95th (m)	29.4	74.2	33.1	14.6
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1130	1150	487	467
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	0.49	0.55	0.50	0.24
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	424	16	18	470	31	23	95	58	17	40	25
Future Volume (vph)	15	424	16	18	470	31	23	95	58	17	40	25
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			0.98			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		0.99			0.99			0.96			0.97	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1846			1875			1778			1809	
Flt Permitted		0.97			0.97			0.93			0.88	
Satd. Flow (perm)		1787			1817			1668			1612	
Peak-hour factor, PHF	0.65	0.84	0.58	0.67	0.83	0.75	0.63	0.71	0.78	0.75	0.67	0.92
Adj. Flow (vph)	23	505	28	27	566	41	37	134	74	23	60	27
RTOR Reduction (vph)	0	2	0	0	3	0	0	23	0	0	17	0
Lane Group Flow (vph)	0	554	0	0	631	0	0	222	0	0	93	0
Confl. Peds. (#/hr)	24		35	35		24	10		23	23		10
Confl. Bikes (#/hr)			2			2						1
Heavy Vehicles (%)	0%	3%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		47.3			47.3			15.7			15.7	
Effective Green, g (s)		47.3			47.3			15.7			15.7	
Actuated g/C Ratio		0.63			0.63			0.21			0.21	
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)		1127			1145			349			337	
v/s Ratio Prot												
v/s Ratio Perm		0.31			0.35			0.13			0.06	
v/c Ratio		0.49			0.55			0.64			0.27	
Uniform Delay, d1		7.4			7.8			27.0			24.9	
Progression Factor		0.57			1.00			1.00			1.00	
Incremental Delay, d2		1.4			1.9			3.8			0.4	
Delay (s)		5.6			9.8			30.8			25.3	
Level of Service		A			A			C			C	
Approach Delay (s)		5.6			9.8			30.8			25.3	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			12.7									
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			75.0									
Intersection Capacity Utilization			58.1%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	2	9	3	2	2	8	161	6	2	85	3
Future Volume (Veh/h)	2	2	9	3	2	2	8	161	6	2	85	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.50	0.25	0.50	0.50	0.44	0.88	0.42	0.50	0.77	0.38
Hourly flow rate (vph)	8	8	18	12	4	4	18	183	14	4	110	8
Pedestrians		5			7			16			4	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			2			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)											355	
pX, platoon unblocked												
vC, conflicting volume	363	367	135	393	364	201	123			204		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	363	367	135	393	364	201	123			204		
tC, single (s)	7.1	6.5	6.5	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	99	99	98	98	99	100	99			100		
cM capacity (veh/h)	573	549	838	528	552	836	1386			1370		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	34	20	215	122								
Volume Left	8	12	18	4								
Volume Right	18	4	14	8								
cSH	680	575	1386	1370								
Volume to Capacity	0.05	0.03	0.01	0.00								
Queue Length 95th (m)	1.2	0.8	0.3	0.1								
Control Delay (s)	10.6	11.5	0.7	0.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.6	11.5	0.7	0.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.0									
Intersection Capacity Utilization			27.1%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	1	3	1	0	3	173	2	1	97	5
Future Volume (Veh/h)	1	0	1	3	1	0	3	173	2	1	97	5
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.94	0.25	0.25	0.84	0.50
Hourly flow rate (vph)	4	0	4	12	4	0	12	184	8	4	115	10
Pedestrians	3			20			8			8		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	0			2			1			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	353	367	131	372	368	216	128				212	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	353	367	131	372	368	216	128				212	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	99	100	100	98	99	100	99				100	
cM capacity (veh/h)	581	546	914	555	545	806	1466				1344	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	8	16	204	129								
Volume Left	4	12	12	4								
Volume Right	4	0	8	10								
cSH	710	553	1466	1344								
Volume to Capacity	0.01	0.03	0.01	0.00								
Queue Length 95th (m)	0.3	0.7	0.2	0.1								
Control Delay (s)	10.1	11.7	0.5	0.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.1	11.7	0.5	0.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay				1.1								
Intersection Capacity Utilization				24.5%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	262	21	6	280	23	61	106	23	22	24	58
Future Volume (Veh/h)	45	262	21	6	280	23	61	106	23	22	24	58
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.87	0.64	0.63	0.84	0.63	0.74	0.82	0.63	0.53	0.58	0.83
Hourly flow rate (vph)	56	301	33	10	333	37	82	129	37	42	41	70
Pedestrians		7			9			15			9	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	207											
pX, platoon unblocked												
vC, conflicting volume	379			349			914	844	342	920	842	368
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	379			349			914	844	342	920	842	368
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 %	95			99			56	54	95	70	85	90
cM capacity (veh/h)	1153			1203			186	279	678	139	279	667
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	390	380	248	153								
Volume Left	56	10	82	42								
Volume Right	33	37	37	70								
cSH	1153	1203	259	276								
Volume to Capacity	0.05	0.01	0.96	0.55								
Queue Length 95th (m)	1.2	0.2	68.4	23.6								
Control Delay (s)	1.6	0.3	87.7	33.1								
Lane LOS	A	A	F	D								
Approach Delay (s)	1.6	0.3	87.7	33.1								
Approach LOS			F	D								
Intersection Summary												
Average Delay			23.5									
Intersection Capacity Utilization			60.8%	ICU Level of Service						B		
Analysis Period (min)			15									

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	182	218	233	176	299	143	204	652	73	88	630
v/c Ratio	0.68	0.57	0.56	0.53	0.72	0.50	0.70	0.85	0.10	0.34	0.82
Control Delay	34.1	36.6	9.6	25.8	42.3	15.5	24.1	26.9	1.2	13.6	34.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.1	36.6	9.6	25.8	42.3	15.5	24.1	26.9	1.2	13.6	34.6
Queue Length 50th (m)	20.5	32.1	0.0	19.8	45.7	4.6	5.7	110.5	0.9	7.1	96.5
Queue Length 95th (m)	27.8	42.0	12.3	34.0	66.7	15.3	m#17.7	m#182.4	m1.4	10.8	#155.5
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	268	450	448	335	486	318	291	764	710	262	765
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.48	0.52	0.53	0.62	0.45	0.70	0.85	0.10	0.34	0.82

Intersection Summary

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.

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	55	78	161	191	160	254	69	30	159	512	82	75
Future Volume (vph)	55	78	161	191	160	254	69	30	159	512	82	75
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.68	1.00	1.00	0.57		1.00	0.97		0.92
Flpb, ped/bikes		0.93	1.00	1.00	0.90	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	0.97		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1684	1762	1075	1644	1902	927		1798	1678		1431
Flt Permitted		0.34	1.00	1.00	0.51	1.00	1.00		0.17	1.00		1.00
Satd. Flow (perm)		608	1762	1075	875	1902	927		316	1678		1431
Peak-hour factor, PHF	0.71	0.74	0.74	0.82	0.91	0.85	0.79	0.54	0.78	0.95	0.78	0.93
Adj. Flow (vph)	77	105	218	233	176	299	87	56	204	539	105	81
RTOR Reduction (vph)	0	0	0	182	0	0	85	0	0	1	0	40
Lane Group Flow (vph)	0	182	218	51	176	299	58	0	204	651	0	33
Confl. Peds. (#/hr)	107	104		156	156		107	104	104		104	59
Confl. Bikes (#/hr)				3			4	4			7	7
Heavy Vehicles (%)	2%	0%	6%	0%	0%	1%	0%	0%	1%	3%	0%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		26.7	19.7	19.7	26.7	19.7	19.7		47.8	40.4		40.4
Effective Green, g (s)		26.7	19.7	19.7	26.7	19.7	19.7		47.8	40.4		40.4
Actuated g/C Ratio		0.30	0.22	0.22	0.30	0.22	0.22		0.53	0.45		0.45
Clearance Time (s)		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
Lane Grp Cap (vph)		264	385	235	319	416	202		289	753		642
v/s Ratio Prot		c0.05	0.12		0.04	c0.16			c0.06	c0.39		
v/s Ratio Perm		0.15		0.05	0.12		0.06		0.32			0.02
v/c Ratio		0.69	0.57	0.22	0.55	0.72	0.29		0.71	0.87		0.05
Uniform Delay, d1		26.0	31.3	28.8	25.3	32.6	29.3		15.6	22.3		14.0
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		0.95	0.62		0.63
Incremental Delay, d2		7.3	1.9	0.5	2.1	5.9	0.8		5.9	10.0		0.1
Delay (s)		33.3	33.3	29.3	27.3	38.4	30.1		20.7	23.8		9.0
Level of Service		C	C	C	C	D	C		C	C		A
Approach Delay (s)			31.8			33.3				22.0		
Approach LOS			C			C				C		
Intersection Summary												
HCM 2000 Control Delay			28.8									
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			84.3%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	17	43	495	67
Future Volume (vph)	17	43	495	67
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.98	
Flpb, ped/bikes		1.00	1.00	
Frt		1.00	0.98	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1755	1805	
Flt Permitted		0.17	1.00	
Satd. Flow (perm)		312	1805	
Peak-hour factor, PHF	0.63	0.71	0.89	0.91
Adj. Flow (vph)	27	61	556	74
RTOR Reduction (vph)	0	0	5	0
Lane Group Flow (vph)	0	88	625	0
Confl. Peds. (#/hr)	104	59		104
Confl. Bikes (#/hr)				5
Heavy Vehicles (%)	0%	5%	2%	2%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		42.8	37.9	
Effective Green, g (s)		42.8	37.9	
Actuated g/C Ratio		0.48	0.42	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		226	760	
v/s Ratio Prot		0.02	0.35	
v/s Ratio Perm		0.16		
v/c Ratio		0.39	0.82	
Uniform Delay, d1		16.1	23.1	
Progression Factor		1.00	1.00	
Incremental Delay, d2		1.1	9.8	
Delay (s)		17.2	32.8	
Level of Service		B	C	
Approach Delay (s)			30.9	
Approach LOS			C	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	6	29	21	8	58	24	813	39	45	823	25
Future Volume (Veh/h)	6	6	29	21	8	58	24	813	39	45	823	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.63	0.63	0.78	0.75	0.44	0.83	0.80	0.95	0.80	0.80	0.95	0.80
Hourly flow rate (vph)	10	10	37	28	18	70	30	856	49	56	866	31
Pedestrians		52			63			3			6	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)								94			144	
pX, platoon unblocked	0.75	0.75	0.64	0.75	0.75	0.76	0.64			0.76		
vC, conflicting volume	1618	2074	936	2026	2064	522	949			968		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	480	1084	613	1022	1072	0	633			338		
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 %	96	92	86	70	86	91	95			94		
cM capacity (veh/h)	231	130	265	93	132	777	579			883		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	57	116	458	477	56	897						
Volume Left	10	28	30	0	56	0						
Volume Right	37	70	0	49	0	31						
cSH	219	220	579	1700	883	1700						
Volume to Capacity	0.26	0.53	0.05	0.28	0.06	0.53						
Queue Length 95th (m)	7.6	21.0	1.2	0.0	1.5	0.0						
Control Delay (s)	27.1	38.3	1.5	0.0	9.4	0.0						
Lane LOS	D	E	A		A							
Approach Delay (s)	27.1	38.3	0.7		0.5							
Approach LOS	D	E										
Intersection Summary												
Average Delay			3.5									
Intersection Capacity Utilization			61.2%		ICU Level of Service		B					
Analysis Period (min)			15									

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	245	240	1021	223	754
v/c Ratio	0.54	0.37	0.81	0.76	0.65
Control Delay	33.5	15.5	26.3	57.3	21.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	33.5	15.5	26.3	57.3	21.1
Queue Length 50th (m)	36.2	23.4	84.1	35.9	105.5
Queue Length 95th (m)	54.4	34.4	84.1	m48.2	m144.6
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	454	649	1256	292	1152
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	0.54	0.37	0.81	0.76	0.65

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

10/29/2018

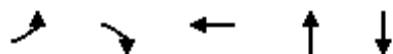
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	206	197	654	194	181	709
Future Volume (vph)	206	197	654	194	181	709
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.96	0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1706	1498	3320		1755	1921
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1706	1498	3320		1755	1921
Peak-hour factor, PHF	0.84	0.82	0.87	0.72	0.81	0.94
Adj. Flow (vph)	245	240	752	269	223	754
RTOR Reduction (vph)	0	0	40	0	0	0
Lane Group Flow (vph)	245	240	981	0	223	754
Confl. Peds. (#/hr)	48	42		34	34	
Confl. Bikes (#/hr)		3		5		
Heavy Vehicles (%)	7%	5%	1%	11%	4%	0%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	454	749	1217		292	1152
v/s Ratio Prot	c0.14	0.05	c0.30		0.13	c0.39
v/s Ratio Perm		0.11				
v/c Ratio	0.54	0.32	0.81		0.76	0.65
Uniform Delay, d1	28.3	16.8	25.6		35.8	11.9
Progression Factor	1.00	1.00	0.87		1.18	1.52
Incremental Delay, d2	4.5	1.1	5.0		13.9	2.3
Delay (s)	32.8	17.9	27.1		56.1	20.3
Level of Service	C	B	C		E	C
Approach Delay (s)	25.4		27.1			28.5
Approach LOS	C		C			C
Intersection Summary						
HCM 2000 Control Delay			27.3		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.71			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.0%		ICU Level of Service	D
Analysis Period (min)			15			

c Critical Lane Group

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	199	204	138	843	949
v/c Ratio	0.76	0.44	0.36	0.60	0.50
Control Delay	51.0	7.1	22.8	11.4	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	51.0	7.1	22.8	11.4	9.9
Queue Length 50th (m)	32.4	0.0	14.5	31.4	32.4
Queue Length 95th (m)	45.2	11.1	27.4	52.1	60.2
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	356	558	504	1404	1893
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	0.56	0.37	0.27	0.60	0.50
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

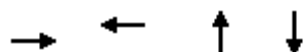
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	163	0	167	60	22	56	118	634	0	0	694	185
Future Volume (vph)	163	0	167	60	22	56	118	634	0	0	694	185
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	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	0.99		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.95			1.00			0.96	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1766		1432		1654			3473			3366	
Flt Permitted	0.67		1.00		0.98			0.59			1.00	
Satd. Flow (perm)	1236		1432		1654			2076			3366	
Peak-hour factor, PHF	0.82	0.25	0.82	1.00	1.00	1.00	0.85	0.90	0.25	0.25	0.96	0.82
Adj. Flow (vph)	199	0	204	60	22	56	139	704	0	0	723	226
RTOR Reduction (vph)	0	0	161	0	30	0	0	0	0	0	28	0
Lane Group Flow (vph)	199	0	43	0	108	0	0	843	0	0	921	0
Confl. Peds. (#/hr)	12		89	89		12	45		13	13		45
Confl. Bikes (#/hr)			1						5			1
Heavy Vehicles (%)	2%	0%	1%	0%	0%	0%	2%	3%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	19.1		19.1		19.1			58.9			49.9	
Effective Green, g (s)	19.1		19.1		19.1			58.9			49.9	
Actuated g/C Ratio	0.21		0.21		0.21			0.65			0.55	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	262		303		351			1451			1866	
v/s Ratio Prot								c0.04			0.27	
v/s Ratio Perm	c0.16		0.03		0.07			c0.34				
v/c Ratio	0.76		0.14		0.31			0.58			0.49	
Uniform Delay, d1	33.3		28.8		29.9			8.7			12.3	
Progression Factor	1.00		1.00		1.00			1.00			0.73	
Incremental Delay, d2	11.9		0.2		0.5			0.6			0.7	
Delay (s)	45.2		29.0		30.4			9.3			9.7	
Level of Service	D		C		C			A			A	
Approach Delay (s)		37.0			30.4			9.3			9.7	
Approach LOS		D			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			15.5				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			15.0		
Intersection Capacity Utilization			79.3%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	724	438	188	410
v/c Ratio	0.80	0.44	0.46	1.18
Control Delay	20.6	14.6	25.8	133.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.6	14.6	25.8	133.0
Queue Length 50th (m)	71.3	43.7	20.3	~63.9
Queue Length 95th (m)	92.6	63.1	32.4	#93.5
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	907	993	409	347
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	0.80	0.44	0.46	1.18

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	456	24	14	247	71	15	98	27	62	82	122
Future Volume (vph)	94	456	24	14	247	71	15	98	27	62	82	122
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			0.98			0.99			0.81	
Flpb, ped/bikes		0.99			1.00			0.98			0.99	
Frt		0.99			0.96			0.97			0.93	
Flt Protected		0.99			1.00			0.99			0.99	
Satd. Flow (prot)		1774			1755			1769			1391	
Flt Permitted		0.86			0.95			0.88			0.84	
Satd. Flow (perm)		1543			1663			1568			1188	
Peak-hour factor, PHF	0.83	0.80	0.59	0.55	0.83	0.62	0.60	0.79	0.69	0.60	0.79	0.60
Adj. Flow (vph)	113	570	41	25	298	115	25	124	39	103	104	203
RTOR Reduction (vph)	0	3	0	0	17	0	0	13	0	0	47	0
Lane Group Flow (vph)	0	721	0	0	421	0	0	175	0	0	363	0
Confl. Peds. (#/hr)	56		43	43		56	175		19	19		175
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	3%	5%	0%	4%	0%	0%	1%	5%	2%	3%	3%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		44.0			44.0			19.0			19.0	
Effective Green, g (s)		44.0			44.0			19.0			19.0	
Actuated g/C Ratio		0.59			0.59			0.25			0.25	
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)		905			975			397			300	
v/s Ratio Prot												
v/s Ratio Perm		c0.47			0.25			0.11			c0.31	
v/c Ratio		0.80			0.43			0.44			1.21	
Uniform Delay, d1		12.0			8.6			23.5			28.0	
Progression Factor		1.00			1.65			1.00			1.00	
Incremental Delay, d2		7.2			1.3			0.8			121.4	
Delay (s)		19.3			15.5			24.3			149.4	
Level of Service		B			B			C			F	
Approach Delay (s)		19.3			15.5			24.3			149.4	
Approach LOS		B			B			C			F	
Intersection Summary												
HCM 2000 Control Delay			49.2			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			101.9%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	9	122	10	14	132
Future Volume (Veh/h)	6	9	122	10	14	132
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.63	0.88	0.74	0.67	0.69	0.66
Hourly flow rate (vph)	10	10	165	15	20	200
Pedestrians	10		3			
Lane Width (m)	3.7		3.7			
Walking Speed (m/s)	1.1		1.1			
Percent Blockage	1		0			
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	426	182			190	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	426	182			190	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	98	99			98	
cM capacity (veh/h)	573	822			1330	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	20	180	220			
Volume Left	10	0	20			
Volume Right	10	15	0			
cSH	675	1700	1330			
Volume to Capacity	0.03	0.11	0.02			
Queue Length 95th (m)	0.7	0.0	0.3			
Control Delay (s)	10.5	0.0	0.8			
Lane LOS	B		A			
Approach Delay (s)	10.5	0.0	0.8			
Approach LOS	B					
Intersection Summary						
Average Delay		0.9				
Intersection Capacity Utilization		28.6%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

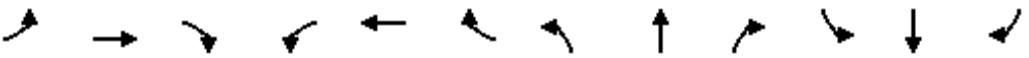
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	443	4	6	234	24	0	17	40	48	6	76
Future Volume (Veh/h)	69	443	4	6	234	24	0	17	40	48	6	76
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.76	0.78	0.38	0.31	0.80	0.79	0.25	0.58	0.47	0.81	0.31	0.56
Hourly flow rate (vph)	91	568	11	19	293	30	0	29	85	59	19	136
Pedestrians		44			6			9			7	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		4			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	330			588			1300	1132	588	1214	1123	359
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	330			588			1300	1132	588	1214	1123	359
tC, single (s)	4.1			4.1			7.1	6.6	6.2	7.1	6.7	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.3	3.5	4.2	3.3
p0 queue free %	93			98			100	84	83	44	89	79
cM capacity (veh/h)	1232			988			88	178	499	106	170	649
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	670	342	114	214								
Volume Left	91	19	0	59								
Volume Right	11	30	85	136								
cSH	1232	988	342	243								
Volume to Capacity	0.07	0.02	0.33	0.88								
Queue Length 95th (m)	1.8	0.4	10.9	55.6								
Control Delay (s)	1.9	0.7	20.7	74.0								
Lane LOS	A	A	C	F								
Approach Delay (s)	1.9	0.7	20.7	74.0								
Approach LOS			C	F								
Intersection Summary												
Average Delay			14.7									
Intersection Capacity Utilization			68.0%		ICU Level of Service				C			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	17	511	10	11	306	2	16	52	22	10	39	19
Future Volume (Veh/h)	17	511	10	11	306	2	16	52	22	10	39	19
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.80	0.67	0.75	0.91	0.50	0.41	0.81	0.64	0.67	0.43	0.42
Hourly flow rate (vph)	29	639	15	15	336	4	39	64	34	15	91	45
Pedestrians		9			2			25			24	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked	0.97			0.77			0.78	0.78	0.77	0.78	0.78	0.97
vC, conflicting volume	364			679			1197	1124	674	1164	1129	371
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	332			427			1031	937	420	990	944	339
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 %	98			98			55	66	93	86	52	93
cM capacity (veh/h)	1176			853			87	188	475	111	188	651
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	683	355	137	151								
Volume Left	29	15	39	15								
Volume Right	15	4	34	45								
cSH	1176	853	159	219								
Volume to Capacity	0.02	0.02	0.86	0.69								
Queue Length 95th (m)	0.6	0.4	44.9	33.3								
Control Delay (s)	0.7	0.6	94.7	51.4								
Lane LOS	A	A	F	F								
Approach Delay (s)	0.7	0.6	94.7	51.4								
Approach LOS			F	F								
Intersection Summary												
Average Delay			16.1									
Intersection Capacity Utilization			48.6%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	9	7	6	5	5	2	43	6	6	61	1
Future Volume (Veh/h)	6	9	7	6	5	5	2	43	6	6	61	1
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.58	0.38	0.63	0.50	0.50	0.50	0.73	0.63	0.42	0.56	0.25
Hourly flow rate (vph)	10	16	18	10	10	10	4	59	10	14	109	4
Pedestrians	7			6			12			4		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	1			1			1			0		
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	237	229	130	255	226	74	120				75	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	237	229	130	255	226	74	120				75	
tC, single (s)	7.1	6.5	6.5	7.1	6.8	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.6	3.5	4.2	3.3	2.2				2.2	
p0 queue free %	99	98	98	98	98	99	100				99	
cM capacity (veh/h)	685	658	827	650	620	984	1470				1528	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	44	30	73	127								
Volume Left	10	10	4	14								
Volume Right	18	10	10	4								
cSH	725	720	1470	1528								
Volume to Capacity	0.06	0.04	0.00	0.01								
Queue Length 95th (m)	1.5	1.0	0.1	0.2								
Control Delay (s)	10.3	10.2	0.4	0.9								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.3	10.2	0.4	0.9								
Approach LOS	B	B										
Intersection Summary												
Average Delay				3.3								
Intersection Capacity Utilization				20.6%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

									
Movement	WBL	WBR	NBT	NBR	SBL	SBT			
Lane Configurations									
Traffic Volume (veh/h)	1	4	52	5	2	88			
Future Volume (Veh/h)	1	4	52	5	2	88			
Sign Control	Stop		Free			Free			
Grade	0%		0%			0%			
Peak Hour Factor	0.25	0.75	0.53	0.33	0.25	0.46			
Hourly flow rate (vph)	4	5	98	15	8	191			
Pedestrians	6		1			3			
Lane Width (m)	3.7		3.7			3.7			
Walking Speed (m/s)	1.1		1.1			1.1			
Percent Blockage	1		0			0			
Right turn flare (veh)									
Median type			None			None			
Median storage veh									
Upstream signal (m)									
pX, platoon unblocked									
vC, conflicting volume	320	114			119				
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol	320	114			119				
tC, single (s)	6.4	6.2			4.1				
tC, 2 stage (s)									
tF (s)	3.5	3.3			2.2				
p0 queue free %	99	99			99				
cM capacity (veh/h)	670	935			1473				
Direction, Lane #	WB 1	NB 1	SB 1						
Volume Total	9	113	199						
Volume Left	4	0	8						
Volume Right	5	15	0						
cSH	795	1700	1473						
Volume to Capacity	0.01	0.07	0.01						
Queue Length 95th (m)	0.3	0.0	0.1						
Control Delay (s)	9.6	0.0	0.3						
Lane LOS	A		A						
Approach Delay (s)	9.6	0.0	0.3						
Approach LOS	A								
Intersection Summary									
Average Delay		0.5							
Intersection Capacity Utilization		17.2%	ICU Level of Service	A					
Analysis Period (min)		15							

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

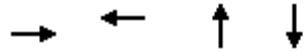
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	475	12	22	226	24	7	9	15	22	22	34
Future Volume (Veh/h)	26	475	12	22	226	24	7	9	15	22	22	34
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.85	0.36	0.75	0.88	0.53	0.75	0.58	0.50	0.64	0.50	0.52
Hourly flow rate (vph)	35	559	33	29	257	45	9	16	30	34	44	65
Pedestrians		3			2			14			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)												
pX, platoon unblocked												
vC, conflicting volume	305			606			1087	1022	592	1026	1016	286
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	305			606			1087	1022	592	1026	1016	286
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 %	97			97			94	93	94	81	80	91
cM capacity (veh/h)	1235			968			140	220	502	175	222	737
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	627	331	55	143								
Volume Left	35	29	9	34								
Volume Right	33	45	30	65								
cSH	1235	968	280	297								
Volume to Capacity	0.03	0.03	0.20	0.48								
Queue Length 95th (m)	0.7	0.7	5.4	18.7								
Control Delay (s)	0.8	1.1	21.0	27.8								
Lane LOS	A	A	C	D								
Approach Delay (s)	0.8	1.1	21.0	27.8								
Approach LOS			C	D								
Intersection Summary												
Average Delay			5.2									
Intersection Capacity Utilization			46.2%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	704	392	244	159
v/c Ratio	0.63	0.37	0.72	0.50
Control Delay	8.3	8.8	35.8	29.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	8.3	8.8	35.8	29.1
Queue Length 50th (m)	32.1	25.0	27.7	18.3
Queue Length 95th (m)	m47.9	44.1	31.1	25.8
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1124	1046	438	418
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	0.63	0.37	0.56	0.38

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	19	501	31	20	280	21	29	76	47	25	77	10
Future Volume (vph)	19	501	31	20	280	21	29	76	47	25	77	10
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			0.99			0.94			0.99	
Flpb, ped/bikes		1.00			1.00			0.99			0.97	
Frt		0.99			0.99			0.96			0.99	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1835			1790			1705			1777	
Flt Permitted		0.97			0.93			0.87			0.82	
Satd. Flow (perm)		1791			1666			1497			1480	
Peak-hour factor, PHF	0.63	0.79	0.78	0.67	0.87	0.53	0.48	0.66	0.68	0.63	0.74	0.67
Adj. Flow (vph)	30	634	40	30	322	40	60	115	69	40	104	15
RTOR Reduction (vph)	0	3	0	0	4	0	0	20	0	0	6	0
Lane Group Flow (vph)	0	701	0	0	388	0	0	224	0	0	153	0
Confl. Peds. (#/hr)	38		54	54		38	21		91	91		21
Confl. Bikes (#/hr)			3			1			1			
Heavy Vehicles (%)	7%	3%	0%	0%	4%	12%	0%	0%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		47.0			47.0			16.0			16.0	
Effective Green, g (s)		47.0			47.0			16.0			16.0	
Actuated g/C Ratio		0.63			0.63			0.21			0.21	
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)		1122			1044			319			315	
v/s Ratio Prot												
v/s Ratio Perm		c0.39			0.23			c0.15			0.10	
v/c Ratio		0.63			0.37			0.70			0.49	
Uniform Delay, d1		8.6			6.8			27.3			25.9	
Progression Factor		0.66			1.00			1.00			1.00	
Incremental Delay, d2		1.7			1.0			6.8			1.2	
Delay (s)		7.3			7.8			34.1			27.1	
Level of Service		A			A			C			C	
Approach Delay (s)		7.3			7.8			34.1			27.1	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			13.9				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			75.0				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			58.9%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	0	2	2	1	1	6	144	10	2	91	9
Future Volume (Veh/h)	12	0	2	2	1	1	6	144	10	2	91	9
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.25	0.25	0.25	0.25	0.25	0.63	0.60	0.67	0.50	0.79	0.44
Hourly flow rate (vph)	19	0	8	8	4	4	10	240	15	4	115	20
Pedestrians	5			13			10			3		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	0			1			1			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												355
pX, platoon unblocked												
vC, conflicting volume	414	426	140	432	428	264	140				268	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	414	426	140	432	428	264	140				268	
tC, single (s)	7.1	6.5	6.7	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.8	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	96	100	99	98	99	99	99				100	
cM capacity (veh/h)	530	509	783	509	508	768	1449				1291	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	27	16	265	139								
Volume Left	19	8	10	4								
Volume Right	8	4	15	20								
cSH	586	556	1449	1291								
Volume to Capacity	0.05	0.03	0.01	0.00								
Queue Length 95th (m)	1.1	0.7	0.2	0.1								
Control Delay (s)	11.4	11.7	0.3	0.2								
Lane LOS	B	B	A	A								
Approach Delay (s)	11.4	11.7	0.3	0.2								
Approach LOS	B	B										
Intersection Summary												
Average Delay				1.4								
Intersection Capacity Utilization				24.9%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	2	5	5	4	2	5	153	4	0	96	1
Future Volume (Veh/h)	5	2	5	5	4	2	5	153	4	0	96	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.50	0.50	0.50	0.50	0.75	0.50	0.50	0.65	0.38	0.25	0.66	0.25
Hourly flow rate (vph)	10	4	10	10	5	4	10	235	11	0	145	4
Pedestrians		10			16			6			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			2			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	427	439	163	442	436	260	159			262		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	427	439	163	442	436	260	159			262		
tC, single (s)	7.1	7.0	6.2	7.1	6.8	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.5	3.3	3.5	4.3	3.3	2.2			2.2		
p0 queue free %	98	99	99	98	99	99	99			100		
cM capacity (veh/h)	514	432	873	496	455	769	1419			1293		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	24	19	256	149								
Volume Left	10	10	10	0								
Volume Right	10	4	11	4								
cSH	598	523	1419	1293								
Volume to Capacity	0.04	0.04	0.01	0.00								
Queue Length 95th (m)	1.0	0.9	0.2	0.0								
Control Delay (s)	11.3	12.1	0.4	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	11.3	12.1	0.4	0.0								
Approach LOS	B	B										
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			24.6%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	412	31	6	204	30	32	75	30	26	39	26
Future Volume (Veh/h)	70	412	31	6	204	30	32	75	30	26	39	26
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.74	0.78	0.69	0.42	0.88	0.75	0.65	0.63	0.75	0.75	0.65	0.53
Hourly flow rate (vph)	95	528	45	14	232	40	49	119	40	35	60	49
Pedestrians		12			7			15			5	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					207							
pX, platoon unblocked												
vC, conflicting volume	277			588			1126	1060	572	1132	1063	269
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	277			588			1126	1060	572	1132	1063	269
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.3
p0 queue free %	93			99			59	41	92	55	70	93
cM capacity (veh/h)	1291			982			119	202	512	78	201	750
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	668	286	208	144								
Volume Left	95	14	49	35								
Volume Right	45	40	40	49								
cSH	1291	982	193	178								
Volume to Capacity	0.07	0.01	1.08	0.81								
Queue Length 95th (m)	1.8	0.3	74.8	42.1								
Control Delay (s)	1.9	0.6	138.4	78.5								
Lane LOS	A	A	F	F								
Approach Delay (s)	1.9	0.6	138.4	78.5								
Approach LOS			F	F								
Intersection Summary												
Average Delay			31.8									
Intersection Capacity Utilization			60.9%		ICU Level of Service				B			
Analysis Period (min)			15									

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	233	213	239	113	180	80	149	477	115	55	788
v/c Ratio	0.67	0.54	0.52	0.31	0.48	0.24	0.68	0.63	0.15	0.13	0.96
Control Delay	32.3	35.6	8.3	21.2	34.6	4.6	38.7	28.9	10.5	10.6	50.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.3	35.6	8.3	21.2	34.6	4.6	38.7	28.9	10.5	10.6	50.6
Queue Length 50th (m)	27.1	31.3	0.0	12.2	25.8	0.0	19.2	60.8	4.3	4.3	~151.4
Queue Length 95th (m)	27.9	48.5	16.3	20.7	43.0	3.4	m25.6	m78.4	m6.7	8.7	#219.8
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	347	445	484	361	467	387	218	753	744	423	821
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.48	0.49	0.31	0.39	0.21	0.68	0.63	0.15	0.13	0.96

Intersection Summary

~ 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.

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

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	43	106	181	210	93	158	39	20	125	328	102	102
Future Volume (vph)	43	106	181	210	93	158	39	20	125	328	102	102
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.76	1.00	1.00	0.73		1.00	0.97		0.94
Flpb, ped/bikes		0.91	1.00	1.00	0.92	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	0.96		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1643	1745	1199	1671	1830	1198		1772	1602		1463
Flt Permitted		0.54	1.00	1.00	0.56	1.00	1.00		0.10	1.00		1.00
Satd. Flow (perm)		937	1745	1199	989	1830	1198		182	1602		1463
Peak-hour factor, PHF	0.73	0.61	0.85	0.88	0.82	0.88	0.78	0.67	0.84	0.97	0.81	0.80
Adj. Flow (vph)	59	174	213	239	113	180	50	30	149	338	126	128
RTOR Reduction (vph)	0	0	0	184	0	0	63	0	0	1	0	59
Lane Group Flow (vph)	0	233	213	55	113	180	17	0	149	476	0	56
Confl. Peds. (#/hr)	73	54		112	112		73	54	50		54	42
Confl. Bikes (#/hr)				2			1	1			1	1
Heavy Vehicles (%)	3%	0%	7%	1%	0%	5%	0%	0%	3%	6%	4%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		27.6	20.6	20.6	24.8	19.2	19.2		47.6	41.0		41.0
Effective Green, g (s)		27.6	20.6	20.6	24.8	19.2	19.2		47.6	41.0		41.0
Actuated g/C Ratio		0.31	0.23	0.23	0.28	0.21	0.21		0.53	0.46		0.46
Clearance Time (s)		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
Lane Grp Cap (vph)		342	399	274	314	390	255		212	729		666
v/s Ratio Prot		c0.05	0.12		0.02	0.10			c0.05	0.30		
v/s Ratio Perm		c0.16		0.05	0.08		0.01		0.32			0.04
v/c Ratio		0.68	0.53	0.20	0.36	0.46	0.07		0.70	0.65		0.08
Uniform Delay, d1		26.4	30.5	28.0	25.4	30.9	28.3		18.7	19.0		13.9
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		2.01	1.23		2.44
Incremental Delay, d2		5.5	1.4	0.4	0.7	0.9	0.1		7.2	3.2		0.2
Delay (s)		31.9	31.9	28.4	26.1	31.8	28.4		44.9	26.6		34.0
Level of Service		C	C	C	C	C	C		D	C		C
Approach Delay (s)			30.7			29.3				31.4		
Approach LOS			C			C				C		
Intersection Summary												
HCM 2000 Control Delay			36.5		HCM 2000 Level of Service					D		
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			90.0		Sum of lost time (s)					18.0		
Intersection Capacity Utilization			89.7%		ICU Level of Service					E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	9	29	706	37
Future Volume (vph)	9	29	706	37
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.99	
Flpb, ped/bikes		0.99	1.00	
Frt		1.00	0.99	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1802	1850	
Flt Permitted		0.34	1.00	
Satd. Flow (perm)		650	1850	
Peak-hour factor, PHF	0.44	0.82	0.95	0.83
Adj. Flow (vph)	20	35	743	45
RTOR Reduction (vph)	0	0	2	0
Lane Group Flow (vph)	0	55	786	0
Confl. Peds. (#/hr)	54	42		50
Confl. Bikes (#/hr)				7
Heavy Vehicles (%)	0%	0%	2%	7%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		44.0	39.2	
Effective Green, g (s)		44.0	39.2	
Actuated g/C Ratio		0.49	0.44	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		379	805	
v/s Ratio Prot		0.01	c0.42	
v/s Ratio Perm		0.06		
v/c Ratio		0.15	0.98	
Uniform Delay, d1		12.9	24.9	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.2	26.4	
Delay (s)		13.0	51.4	
Level of Service		B	D	
Approach Delay (s)			48.9	
Approach LOS			D	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	12	35	16	7	46	36	683	57	71	889	34
Future Volume (Veh/h)	6	12	35	16	7	46	36	683	57	71	889	34
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.31	0.50	0.78	0.81	0.50	0.84	0.66	0.95	0.88	0.79	0.95	0.84
Hourly flow rate (vph)	19	24	45	20	14	55	55	719	65	90	936	40
Pedestrians	37			35			9			9		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	4			3			1			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)							94			144		
pX, platoon unblocked	0.69	0.69	0.57	0.69	0.69	0.76	0.57				0.76	
vC, conflicting volume	1714	2102	1002	2078	2090	436	1013				819	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	512	1079	621	1045	1061	0	640				140	
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	79	81	71	88	93	89				92	
cM capacity (veh/h)	204	115	236	68	118	796	521				1072	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	88	89	414	424	90	976						
Volume Left	19	20	55	0	90	0						
Volume Right	45	55	0	65	0	40						
cSH	179	185	521	1700	1072	1700						
Volume to Capacity	0.49	0.48	0.11	0.25	0.08	0.57						
Queue Length 95th (m)	18.3	17.7	2.7	0.0	2.1	0.0						
Control Delay (s)	43.3	41.3	3.2	0.0	8.7	0.0						
Lane LOS	E	E	A		A							
Approach Delay (s)	43.3	41.3	1.6		0.7							
Approach LOS	E	E										
Intersection Summary												
Average Delay				4.6								
Intersection Capacity Utilization				75.0%	ICU Level of Service			D				
Analysis Period (min)				15								

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	208	156	1113	245	783
v/c Ratio	0.48	0.25	0.88	0.84	0.69
Control Delay	32.2	14.1	26.5	48.3	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	32.2	14.1	26.5	48.3	8.4
Queue Length 50th (m)	30.2	14.4	65.1	42.4	30.2
Queue Length 95th (m)	46.1	22.0	m94.4	m51.2	m42.5
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	434	614	1265	292	1141
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.48	0.25	0.88	0.84	0.69

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

10/29/2018

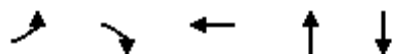


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	173	123	649	307	189	752
Future Volume (vph)	173	123	649	307	189	752
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.97	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.95		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1630	1418	3292		1755	1902
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1630	1418	3292		1755	1902
Peak-hour factor, PHF	0.83	0.79	0.85	0.88	0.77	0.96
Adj. Flow (vph)	208	156	764	349	245	783
RTOR Reduction (vph)	0	0	59	0	0	0
Lane Group Flow (vph)	208	156	1054	0	245	783
Confl. Peds. (#/hr)	44	30		9	9	
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	12%	12%	3%	8%	4%	1%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	434	709	1207		292	1141
v/s Ratio Prot	c0.13	0.04	c0.32		c0.14	0.41
v/s Ratio Perm		0.07				
v/c Ratio	0.48	0.22	0.87		0.84	0.69
Uniform Delay, d1	27.7	16.0	26.6		36.3	12.2
Progression Factor	1.00	1.00	0.82		0.78	0.47
Incremental Delay, d2	3.8	0.7	5.7		17.5	2.3
Delay (s)	31.5	16.7	27.5		46.0	8.1
Level of Service	C	B	C		D	A
Approach Delay (s)	25.2		27.5			17.1
Approach LOS	C		C			B
Intersection Summary						
HCM 2000 Control Delay			22.9		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.73			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.6%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	380	233	39	869	1004
v/c Ratio	0.96	0.43	0.08	0.70	0.61
Control Delay	69.8	8.9	15.7	16.4	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	69.8	8.9	15.7	16.4	12.8
Queue Length 50th (m)	64.2	5.0	2.6	41.4	36.9
Queue Length 95th (m)	#88.1	17.3	9.8	52.8	42.9
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	400	543	490	1237	1641
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	0.95	0.43	0.08	0.70	0.61

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

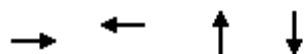
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	289	0	191	17	4	18	103	664	0	0	762	155
Future Volume (vph)	289	0	191	17	4	18	103	664	0	0	762	155
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	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	1.00		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.94			1.00			0.97	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1802		1406		1651			3413			3373	
Flt Permitted	0.73		1.00		0.98			0.60			1.00	
Satd. Flow (perm)	1388		1406		1651			2055			3373	
Peak-hour factor, PHF	0.76	0.38	0.82	1.00	1.00	1.00	0.90	0.88	0.25	0.25	0.93	0.84
Adj. Flow (vph)	380	0	233	17	4	18	114	755	0	0	819	185
RTOR Reduction (vph)	0	0	138	0	13	0	0	0	0	0	21	0
Lane Group Flow (vph)	380	0	95	0	26	0	0	869	0	0	983	0
Confl. Peds. (#/hr)	2		87	87		2	44		2	2		44
Confl. Bikes (#/hr)			3									3
Heavy Vehicles (%)	1%	0%	3%	0%	0%	0%	4%	5%	0%	0%	4%	1%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	25.7		25.7		25.7			52.3			43.3	
Effective Green, g (s)	25.7		25.7		25.7			52.3			43.3	
Actuated g/C Ratio	0.29		0.29		0.29			0.58			0.48	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	396		401		471			1284			1622	
v/s Ratio Prot								c0.05			0.29	
v/s Ratio Perm	c0.27		0.07		0.02			c0.35				
v/c Ratio	0.96		0.24		0.06			0.68			0.61	
Uniform Delay, d1	31.6		24.6		23.3			13.0			17.1	
Progression Factor	1.00		1.00		1.00			1.00			0.68	
Incremental Delay, d2	34.4		0.3		0.0			1.4			1.3	
Delay (s)	66.0		24.9		23.4			14.4			13.0	
Level of Service	E		C		C			B			B	
Approach Delay (s)		50.4			23.4			14.4			13.0	
Approach LOS		D			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			22.7				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			15.0		
Intersection Capacity Utilization			86.0%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	649	708	115	184
v/c Ratio	0.62	0.61	0.35	0.55
Control Delay	11.9	19.8	23.6	26.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	11.9	19.8	23.6	26.8
Queue Length 50th (m)	53.9	97.0	11.1	17.2
Queue Length 95th (m)	82.9	120.1	17.8	25.8
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	1049	1158	434	436
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	0.62	0.61	0.26	0.42
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	456	40	24	518	29	21	46	25	22	51	51
Future Volume (vph)	40	456	40	24	518	29	21	46	25	22	51	51
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			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			1.00	
Frt		0.99			0.99			0.97			0.95	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1792			1882			1823			1759	
Flt Permitted		0.89			0.94			0.90			0.90	
Satd. Flow (perm)		1606			1777			1660			1609	
Peak-hour factor, PHF	0.67	0.87	0.62	0.59	0.82	0.82	0.85	0.71	1.00	0.50	0.73	0.73
Adj. Flow (vph)	60	524	65	41	632	35	25	65	25	44	70	70
RTOR Reduction (vph)	0	5	0	0	2	0	0	15	0	0	32	0
Lane Group Flow (vph)	0	644	0	0	706	0	0	100	0	0	152	0
Confl. Peds. (#/hr)	18		8	8		18	18		2	2		18
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		48.8			48.8			14.2			14.2	
Effective Green, g (s)		48.8			48.8			14.2			14.2	
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)		1044			1156			314			304	
v/s Ratio Prot												
v/s Ratio Perm		c0.40			0.40			0.06			c0.09	
v/c Ratio		0.62			0.61			0.32			0.50	
Uniform Delay, d1		7.6			7.6			26.2			27.2	
Progression Factor		1.00			1.95			1.00			1.00	
Incremental Delay, d2		2.7			2.1			0.6			1.3	
Delay (s)		10.4			16.9			26.8			28.5	
Level of Service		B			B			C			C	
Approach Delay (s)		10.4			16.9			26.8			28.5	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			16.3			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			63.8%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	7	10	92	7	16	76
Future Volume (Veh/h)	7	10	92	7	16	76
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.50	0.67	0.84	0.75	0.46	0.80
Hourly flow rate (vph)	14	15	110	9	35	95
Pedestrians	5					3
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	284	122			124	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	284	122			124	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	98	98			98	
cM capacity (veh/h)	689	927			1419	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	29	119	130			
Volume Left	14	0	35			
Volume Right	15	9	0			
cSH	794	1700	1419			
Volume to Capacity	0.04	0.07	0.02			
Queue Length 95th (m)	0.9	0.0	0.6			
Control Delay (s)	9.7	0.0	2.2			
Lane LOS	A		A			
Approach Delay (s)	9.7	0.0	2.2			
Approach LOS	A					
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			22.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	294	2	4	431	26	4	19	22	37	11	47
Future Volume (Veh/h)	39	294	2	4	431	26	4	19	22	37	11	47
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.81	0.25	0.38	0.77	0.75	0.75	0.63	0.75	0.83	0.56	0.63
Hourly flow rate (vph)	56	363	8	11	560	35	5	30	29	45	20	75
Pedestrians		9						13			16	
Lane Width (m)		3.7						3.7			3.7	
Walking Speed (m/s)		1.1						1.1			1.1	
Percent Blockage		1						1			2	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	611			384			1186	1125	380	1138	1112	602
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	611			384			1186	1125	380	1138	1112	602
tC, single (s)	4.1			4.1			7.1	6.6	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.3	3.5	4.0	3.3
p0 queue free %	94			99			96	84	96	67	90	85
cM capacity (veh/h)	962			1170			119	182	663	138	191	491
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	427	606	64	140								
Volume Left	56	11	5	45								
Volume Right	8	35	29	75								
cSH	962	1170	255	240								
Volume to Capacity	0.06	0.01	0.25	0.58								
Queue Length 95th (m)	1.4	0.2	7.3	25.3								
Control Delay (s)	1.8	0.3	23.8	39.2								
Lane LOS	A	A	C	E								
Approach Delay (s)	1.8	0.3	23.8	39.2								
Approach LOS			C	E								
Intersection Summary												
Average Delay			6.4									
Intersection Capacity Utilization			61.7%		ICU Level of Service				B			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	468	22	16	527	16	22	32	15	7	24	21
Future Volume (Veh/h)	21	468	22	16	527	16	22	32	15	7	24	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.53	0.84	0.56	0.65	0.85	0.65	0.75	0.72	0.60	0.50	0.59	0.71
Hourly flow rate (vph)	40	557	39	25	620	25	29	44	25	14	41	30
Pedestrians		7			1			11			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked	0.79			0.84			0.87	0.87	0.84	0.87	0.87	0.79
vC, conflicting volume	659			607			1408	1376	588	1401	1384	654
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	431			432			968	932	409	961	940	424
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 %	95			97			81	79	95	90	80	94
cM capacity (veh/h)	884			942			149	211	534	141	209	479
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	636	670	98	85								
Volume Left	40	25	29	14								
Volume Right	39	25	25	30								
cSH	884	942	218	238								
Volume to Capacity	0.05	0.03	0.45	0.36								
Queue Length 95th (m)	1.1	0.6	16.3	11.7								
Control Delay (s)	1.2	0.7	34.4	28.3								
Lane LOS	A	A	D	D								
Approach Delay (s)	1.2	0.7	34.4	28.3								
Approach LOS			D	D								
Intersection Summary												
Average Delay			4.7									
Intersection Capacity Utilization			49.8%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	6	2	5	4	4	6	46	2	5	55	1
Future Volume (Veh/h)	6	6	2	5	4	4	6	46	2	5	55	1
Sign Control	Stop				Stop				Free			
Grade	0%				0%				0%			
Peak Hour Factor	0.63	0.63	0.25	0.33	0.75	0.38	0.63	0.77	0.50	0.33	0.85	0.25
Hourly flow rate (vph)	10	10	8	15	5	11	10	60	4	15	65	4
Pedestrians	12				9				9			
Lane Width (m)	3.7				3.7				3.7			
Walking Speed (m/s)	1.1				1.1				1.1			
Percent Blockage	1				1				1			
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	212	202	88	210	202	78	81				73	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	212	202	88	210	202	78	81				73	
tC, single (s)	7.1	6.7	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.2	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	98	99	98	99	99	99				99	
cM capacity (veh/h)	703	639	956	703	672	973	1511				1526	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	28	31	74	84								
Volume Left	10	15	10	15								
Volume Right	8	11	4	4								
cSH	732	774	1511	1526								
Volume to Capacity	0.04	0.04	0.01	0.01								
Queue Length 95th (m)	0.9	1.0	0.2	0.2								
Control Delay (s)	10.1	9.8	1.0	1.4								
Lane LOS	B	A	A	A								
Approach Delay (s)	10.1	9.8	1.0	1.4								
Approach LOS	B	A										
Intersection Summary												
Average Delay			3.6									
Intersection Capacity Utilization			19.7%	ICU Level of Service				A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	2	6	51	7	4	66
Future Volume (Veh/h)	2	6	51	7	4	66
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.42	0.57	0.75	0.38	0.83
Hourly flow rate (vph)	8	14	89	9	11	80
Pedestrians	4					4
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	200	102			102	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	200	102			102	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			99	
cM capacity (veh/h)	785	952			1497	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	22	98	91			
Volume Left	8	0	11			
Volume Right	14	9	0			
cSH	883	1700	1497			
Volume to Capacity	0.02	0.06	0.01			
Queue Length 95th (m)	0.6	0.0	0.2			
Control Delay (s)	9.2	0.0	0.9			
Lane LOS	A		A			
Approach Delay (s)	9.2	0.0	0.9			
Approach LOS	A					
Intersection Summary						
Average Delay		1.4				
Intersection Capacity Utilization		18.0%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

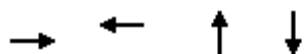
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	317	10	5	389	24	26	5	32	34	7	25
Future Volume (Veh/h)	24	317	10	5	389	24	26	5	32	34	7	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.68	0.94	0.50	0.59	0.83	0.25	0.58	0.33	0.65	0.84	0.50	0.83
Hourly flow rate (vph)	35	337	20	8	469	96	45	15	49	40	14	30
Pedestrians		4			1			13			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)												
pX, platoon unblocked												
vC, conflicting volume	579			370			1004	1025	361	1022	987	535
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	579			370			1004	1025	361	1022	987	535
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 %	96			99			76	93	93	78	94	94
cM capacity (veh/h)	991			1184			187	221	670	178	233	540
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	392	573	109	84								
Volume Left	35	8	45	40								
Volume Right	20	96	49	30								
cSH	991	1184	286	247								
Volume to Capacity	0.04	0.01	0.38	0.34								
Queue Length 95th (m)	0.8	0.2	13.1	11.0								
Control Delay (s)	1.1	0.2	25.2	27.0								
Lane LOS	A	A	D	D								
Approach Delay (s)	1.1	0.2	25.2	27.0								
Approach LOS			D	D								
Intersection Summary												
Average Delay			4.8									
Intersection Capacity Utilization			45.3%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	597	683	263	118
v/c Ratio	0.53	0.60	0.70	0.33
Control Delay	6.8	12.1	33.6	21.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	6.8	12.1	33.6	21.4
Queue Length 50th (m)	23.4	54.9	29.5	11.0
Queue Length 95th (m)	32.4	83.4	35.7	15.6
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1118	1136	487	457
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	0.53	0.60	0.54	0.26
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	16	456	17	20	505	34	25	102	62	19	43	27
Future Volume (vph)	16	456	17	20	505	34	25	102	62	19	43	27
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			0.98			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		0.99			0.99			0.96			0.97	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1847			1875			1778			1809	
Flt Permitted		0.96			0.96			0.93			0.86	
Satd. Flow (perm)		1780			1808			1668			1578	
Peak-hour factor, PHF	0.65	0.84	0.58	0.67	0.83	0.75	0.63	0.71	0.78	0.75	0.67	0.92
Adj. Flow (vph)	25	543	29	30	608	45	40	144	79	25	64	29
RTOR Reduction (vph)	0	2	0	0	3	0	0	23	0	0	17	0
Lane Group Flow (vph)	0	595	0	0	680	0	0	240	0	0	101	0
Confl. Peds. (#/hr)	24		35	35		24	10		23	23		10
Confl. Bikes (#/hr)			2			2						1
Heavy Vehicles (%)	0%	3%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		47.0			47.0			16.0			16.0	
Effective Green, g (s)		47.0			47.0			16.0			16.0	
Actuated g/C Ratio		0.63			0.63			0.21			0.21	
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)		1115			1133			355			336	
v/s Ratio Prot												
v/s Ratio Perm		0.33			0.38			0.14			0.06	
v/c Ratio		0.53			0.60			0.68			0.30	
Uniform Delay, d1		7.9			8.4			27.1			24.8	
Progression Factor		0.57			1.00			1.00			1.00	
Incremental Delay, d2		1.6			2.4			5.0			0.5	
Delay (s)		6.0			10.7			32.2			25.3	
Level of Service		A			B			C			C	
Approach Delay (s)		6.0			10.7			32.2			25.3	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			13.5									
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			75.0									
Intersection Capacity Utilization			61.3%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	2	10	4	2	2	9	174	6	2	92	4
Future Volume (Veh/h)	2	2	10	4	2	2	9	174	6	2	92	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.50	0.25	0.50	0.50	0.44	0.88	0.42	0.50	0.77	0.38
Hourly flow rate (vph)	8	8	20	16	4	4	20	198	14	4	119	11
Pedestrians		5			7			16			4	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			2			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)											355	
pX, platoon unblocked												
vC, conflicting volume	392	396	146	424	395	216	135			219		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	392	396	146	424	395	216	135			219		
tC, single (s)	7.1	6.5	6.5	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	99	98	98	97	99	100	99			100		
cM capacity (veh/h)	547	528	827	501	529	820	1372			1353		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	36	24	232	134								
Volume Left	8	16	20	4								
Volume Right	20	4	14	11								
cSH	667	541	1372	1353								
Volume to Capacity	0.05	0.04	0.01	0.00								
Queue Length 95th (m)	1.3	1.1	0.3	0.1								
Control Delay (s)	10.7	12.0	0.8	0.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.7	12.0	0.8	0.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.1									
Intersection Capacity Utilization			28.3%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	1	4	1	0	4	186	2	1	104	5
Future Volume (Veh/h)	1	0	1	4	1	0	4	186	2	1	104	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.94	0.25	0.25	0.84	0.50
Hourly flow rate (vph)	4	0	4	16	4	0	16	198	8	4	124	10
Pedestrians		3			20			8			8	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			2			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	384	398	140	403	399	230	137			226		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	384	398	140	403	399	230	137			226		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	99	100	100	97	99	100	99			100		
cM capacity (veh/h)	553	523	904	529	523	792	1455			1328		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	8	20	222	138								
Volume Left	4	16	16	4								
Volume Right	4	0	8	10								
cSH	686	528	1455	1328								
Volume to Capacity	0.01	0.04	0.01	0.00								
Queue Length 95th (m)	0.3	0.9	0.3	0.1								
Control Delay (s)	10.3	12.1	0.6	0.2								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.3	12.1	0.6	0.2								
Approach LOS	B	B										
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			25.2%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	48	281	22	6	300	25	66	114	25	24	26	62
Future Volume (Veh/h)	48	281	22	6	300	25	66	114	25	24	26	62
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.87	0.64	0.63	0.84	0.63	0.74	0.82	0.63	0.53	0.58	0.83
Hourly flow rate (vph)	59	323	34	10	357	40	89	139	40	45	45	75
Pedestrians		7			9			15			9	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					207							
pX, platoon unblocked												
vC, conflicting volume	406			372			974	899	364	982	896	393
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	406			372			974	899	364	982	896	393
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 %	95			99			45	46	94	60	83	88
cM capacity (veh/h)	1127			1180			162	258	659	112	259	646
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	416	407	268	165								
Volume Left	59	10	89	45								
Volume Right	34	40	40	75								
cSH	1127	1180	233	239								
Volume to Capacity	0.05	0.01	1.15	0.69								
Queue Length 95th (m)	1.3	0.2	94.4	34.2								
Control Delay (s)	1.7	0.3	149.0	48.0								
Lane LOS	A	A	F	E								
Approach Delay (s)	1.7	0.3	149.0	48.0								
Approach LOS			F	E								
Intersection Summary												
Average Delay			38.8									
Intersection Capacity Utilization			64.4%		ICU Level of Service				C			
Analysis Period (min)			15									

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	199	235	250	189	321	154	218	699	77	95	677
v/c Ratio	0.77	0.60	0.60	0.58	0.76	0.53	0.82	0.92	0.11	0.43	0.93
Control Delay	42.3	37.5	11.5	27.5	44.4	17.3	44.9	34.6	1.1	16.4	47.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.3	37.5	11.5	27.5	44.4	17.3	44.9	34.6	1.1	16.4	47.1
Queue Length 50th (m)	22.7	35.0	2.4	21.4	49.8	6.1	~24.2	~138.1	0.8	7.6	108.3
Queue Length 95th (m)	30.2	45.1	15.9	36.3	71.8	17.7	m#41.7	m#190.5	m1.6	11.5	#174.5
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	257	450	447	328	486	318	265	757	704	219	728
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.52	0.56	0.58	0.66	0.48	0.82	0.92	0.11	0.43	0.93

Intersection Summary

~ 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.

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

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	60	84	174	205	172	273	75	32	170	548	88	80
Future Volume (vph)	60	84	174	205	172	273	75	32	170	548	88	80
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.68	1.00	1.00	0.57		1.00	0.97		0.92
Flpb, ped/bikes		0.94	1.00	1.00	0.91	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	0.97		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1707	1762	1075	1663	1902	927		1807	1677		1431
Flt Permitted		0.31	1.00	1.00	0.47	1.00	1.00		0.10	1.00		1.00
Satd. Flow (perm)		549	1762	1075	830	1902	927		195	1677		1431
Peak-hour factor, PHF	0.71	0.74	0.74	0.82	0.91	0.85	0.79	0.54	0.78	0.95	0.78	0.93
Adj. Flow (vph)	85	114	235	250	189	321	95	59	218	577	113	86
RTOR Reduction (vph)	0	0	0	180	0	0	85	0	0	1	0	43
Lane Group Flow (vph)	0	199	235	70	189	321	69	0	218	698	0	34
Confl. Peds. (#/hr)	107	104		156	156		107	104	104		104	59
Confl. Bikes (#/hr)				3			4	4			7	7
Heavy Vehicles (%)	2%	0%	6%	0%	0%	1%	0%	0%	1%	3%	0%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		27.0	20.0	20.0	27.0	20.0	20.0		48.0	40.0		40.0
Effective Green, g (s)		27.0	20.0	20.0	27.0	20.0	20.0		48.0	40.0		40.0
Actuated g/C Ratio		0.30	0.22	0.22	0.30	0.22	0.22		0.53	0.44		0.44
Clearance Time (s)		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
Lane Grp Cap (vph)		254	391	238	313	422	206		263	745		636
v/s Ratio Prot		c0.06	0.13		0.05	0.17			c0.08	c0.42		
v/s Ratio Perm		c0.17		0.06	0.13		0.07		0.36			0.02
v/c Ratio		0.78	0.60	0.29	0.60	0.76	0.34		0.83	0.94		0.05
Uniform Delay, d1		26.9	31.4	29.1	25.6	32.8	29.4		20.0	23.8		14.2
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.37	0.63		0.52
Incremental Delay, d2		14.5	2.6	0.7	3.3	7.9	1.0		14.7	16.9		0.1
Delay (s)		41.4	34.0	29.8	28.8	40.6	30.4		42.2	31.9		7.6
Level of Service		D	C	C	C	D	C		D	C		A
Approach Delay (s)			34.6			34.9				32.3		
Approach LOS			C			C				C		
Intersection Summary												
HCM 2000 Control Delay			35.9			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)				18.0		
Intersection Capacity Utilization			87.8%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations		LT	LT	LT
Traffic Volume (vph)	19	46	532	72
Future Volume (vph)	19	46	532	72
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.98	
Flpb, ped/bikes		1.00	1.00	
Frt		1.00	0.98	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1760	1806	
Flt Permitted		0.12	1.00	
Satd. Flow (perm)		226	1806	
Peak-hour factor, PHF	0.63	0.71	0.89	0.91
Adj. Flow (vph)	30	65	598	79
RTOR Reduction (vph)	0	0	5	0
Lane Group Flow (vph)	0	95	672	0
Confl. Peds. (#/hr)	104	59		104
Confl. Bikes (#/hr)				5
Heavy Vehicles (%)	0%	5%	2%	2%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		41.1	36.1	
Effective Green, g (s)		41.1	36.1	
Actuated g/C Ratio		0.46	0.40	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		188	724	
v/s Ratio Prot		0.03	0.37	
v/s Ratio Perm		0.20		
v/c Ratio		0.51	0.93	
Uniform Delay, d1		17.9	25.7	
Progression Factor		1.00	1.00	
Incremental Delay, d2		2.1	19.8	
Delay (s)		20.1	45.5	
Level of Service		C	D	
Approach Delay (s)			42.4	
Approach LOS			D	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	6	31	22	9	62	26	871	42	48	884	27
Future Volume (Veh/h)	6	6	31	22	9	62	26	871	42	48	884	27
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.63	0.78	0.75	0.44	0.83	0.80	1.00	0.80	0.80	1.00	0.80
Hourly flow rate (vph)	10	10	40	29	20	75	33	871	53	60	884	34
Pedestrians	52			63			3			6		
Lane Width (m)	3.7			3.7			3.7			3.7		
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)							94			144		
pX, platoon unblocked	0.72	0.72	0.59	0.72	0.72	0.74	0.59				0.74	
vC, conflicting volume	1666	2126	956	2078	2116	531	970				987	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	395	1037	577	971	1024	0	601				296	
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 %	96	92	85	69	85	90	94				93	
cM capacity (veh/h)	245	131	259	94	133	758	552				892	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	60	124	468	488	60	918						
Volume Left	10	29	33	0	60	0						
Volume Right	40	75	0	53	0	34						
cSH	221	222	552	1700	892	1700						
Volume to Capacity	0.27	0.56	0.06	0.29	0.07	0.54						
Queue Length 95th (m)	8.1	23.2	1.4	0.0	1.6	0.0						
Control Delay (s)	27.3	40.1	1.7	0.0	9.3	0.0						
Lane LOS	D	E	A		A							
Approach Delay (s)	27.3	40.1	0.8		0.6							
Approach LOS	D	E										
Intersection Summary												
Average Delay	3.8											
Intersection Capacity Utilization	65.1%			ICU Level of Service					C			
Analysis Period (min)	15											

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	264	257	1092	238	813
v/c Ratio	0.58	0.40	0.87	0.82	0.71
Control Delay	34.7	15.9	29.2	62.0	23.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	34.7	15.9	29.2	62.0	23.4
Queue Length 50th (m)	39.5	25.4	89.0	39.1	117.3
Queue Length 95th (m)	58.7	36.9	100.5	m48.9	m147.1
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	454	649	1257	292	1152
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	0.58	0.40	0.87	0.82	0.71

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

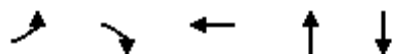
10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	222	211	702	205	193	764
Future Volume (vph)	222	211	702	205	193	764
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.96	0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1706	1498	3323		1755	1921
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1706	1498	3323		1755	1921
Peak-hour factor, PHF	0.84	0.82	0.87	0.72	0.81	0.94
Adj. Flow (vph)	264	257	807	285	238	813
RTOR Reduction (vph)	0	0	39	0	0	0
Lane Group Flow (vph)	264	257	1053	0	238	813
Confl. Peds. (#/hr)	48	42		34	34	
Confl. Bikes (#/hr)		3		5		
Heavy Vehicles (%)	7%	5%	1%	11%	4%	0%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	454	749	1218		292	1152
v/s Ratio Prot	c0.15	0.06	c0.32		0.14	c0.42
v/s Ratio Perm		0.11				
v/c Ratio	0.58	0.34	0.86		0.82	0.71
Uniform Delay, d1	28.6	17.0	26.4		36.2	12.5
Progression Factor	1.00	1.00	0.87		1.21	1.57
Incremental Delay, d2	5.4	1.3	6.8		17.0	2.8
Delay (s)	34.0	18.2	29.7		60.8	22.4
Level of Service	C	B	C		E	C
Approach Delay (s)	26.2		29.7			31.1
Approach LOS	C		C			C
Intersection Summary						
HCM 2000 Control Delay			29.6		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.76			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	213	220	138	906	1022
v/c Ratio	0.78	0.45	0.35	0.68	0.55
Control Delay	52.1	6.9	22.3	13.8	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	52.1	6.9	22.3	13.8	11.0
Queue Length 50th (m)	34.6	0.0	14.3	36.0	41.8
Queue Length 95th (m)	48.3	11.4	27.4	57.1	67.9
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	357	570	504	1323	1867
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	0.60	0.39	0.27	0.68	0.55
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018

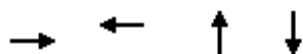
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	175	0	180	60	22	56	127	681	0	0	748	199
Future Volume (vph)	175	0	180	60	22	56	127	681	0	0	748	199
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0		6.0			6.0			6.0	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Flpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	0.99		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.95			1.00			0.96	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1765		1432		1654			3474			3366	
Flt Permitted	0.67		1.00		0.98			0.56			1.00	
Satd. Flow (perm)	1240		1432		1654			1971			3366	
Peak-hour factor, PHF	0.82	0.25	0.82	1.00	1.00	1.00	0.85	0.90	0.25	0.25	0.96	0.82
Adj. Flow (vph)	213	0	220	60	22	56	149	757	0	0	779	243
RTOR Reduction (vph)	0	0	172	0	30	0	0	0	0	0	28	0
Lane Group Flow (vph)	213	0	48	0	108	0	0	906	0	0	994	0
Confl. Peds. (#/hr)	12		89	89		12	45		13	13		45
Confl. Bikes (#/hr)			1						5			1
Heavy Vehicles (%)	2%	0%	1%	0%	0%	0%	2%	3%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	19.8		19.8		19.8			58.2			49.2	
Effective Green, g (s)	19.8		19.8		19.8			58.2			49.2	
Actuated g/C Ratio	0.22		0.22		0.22			0.65			0.55	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	272		315		363			1374			1840	
v/s Ratio Prot								c0.04			0.30	
v/s Ratio Perm	c0.17		0.03		0.07			c0.38				
v/c Ratio	0.78		0.15		0.30			0.66			0.54	
Uniform Delay, d1	33.1		28.3		29.3			9.8			13.1	
Progression Factor	1.00		1.00		1.00			1.00			0.76	
Incremental Delay, d2	13.7		0.2		0.5			1.2			0.8	
Delay (s)	46.7		28.6		29.8			11.0			10.8	
Level of Service	D		C		C			B			B	
Approach Delay (s)		37.5			29.8			11.0			10.8	
Approach LOS		D			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			16.5				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			15.0		
Intersection Capacity Utilization			81.2%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Appendix F: Synchro Worksheets for Conversion of Kent Street to One-Way Operation

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	642	372	160	349
v/c Ratio	0.69	0.37	0.38	0.98
Control Delay	15.6	13.7	23.7	69.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.6	13.7	23.7	69.4
Queue Length 50th (m)	56.5	35.3	16.6	41.3
Queue Length 95th (m)	67.1	52.4	27.4	#73.2
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	930	1000	421	356
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	0.69	0.37	0.38	0.98

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	80	389	20	12	210	60	13	83	23	53	70	103
Future Volume (vph)	80	389	20	12	210	60	13	83	23	53	70	103
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			0.98			0.99			0.81	
Flpb, ped/bikes		0.99			1.00			0.98			0.99	
Frt		0.99			0.96			0.97			0.93	
Flt Protected		0.99			1.00			0.99			0.99	
Satd. Flow (prot)		1775			1755			1761			1392	
Flt Permitted		0.88			0.95			0.91			0.87	
Satd. Flow (perm)		1581			1675			1615			1223	
Peak-hour factor, PHF	0.83	0.76	0.59	0.55	0.83	0.62	0.60	0.79	0.69	0.60	0.79	0.60
Adj. Flow (vph)	96	512	34	22	253	97	22	105	33	88	89	172
RTOR Reduction (vph)	0	2	0	0	17	0	0	13	0	0	46	0
Lane Group Flow (vph)	0	640	0	0	355	0	0	147	0	0	303	0
Confl. Peds. (#/hr)	56		43	43		56	175		19	19		175
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	3%	5%	0%	4%	0%	0%	1%	5%	2%	3%	3%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		44.0			44.0			19.0			19.0	
Effective Green, g (s)		44.0			44.0			19.0			19.0	
Actuated g/C Ratio		0.59			0.59			0.25			0.25	
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)		927			982			409			309	
v/s Ratio Prot												
v/s Ratio Perm		c0.40			0.21			0.09			c0.25	
v/c Ratio		0.69			0.36			0.36			0.98	
Uniform Delay, d1		10.8			8.1			23.0			27.8	
Progression Factor		1.00			1.70			1.00			1.00	
Incremental Delay, d2		4.2			1.0			0.5			45.1	
Delay (s)		15.0			14.9			23.5			72.9	
Level of Service		B			B			C			E	
Approach Delay (s)		15.0			14.9			23.5			72.9	
Approach LOS		B			B			C			E	
Intersection Summary												
HCM 2000 Control Delay			29.1			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			87.7%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	7	103	8	12	112
Future Volume (Veh/h)	5	7	103	8	12	112
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.63	0.88	0.74	0.67	0.69	0.66
Hourly flow rate (vph)	8	8	139	12	17	170
Pedestrians	10		3			
Lane Width (m)	3.7		3.7			
Walking Speed (m/s)	1.1		1.1			
Percent Blockage	1		0			
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	362	155			161	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	362	155			161	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	99	99			99	
cM capacity (veh/h)	625	852			1363	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	16	151	187			
Volume Left	8	0	17			
Volume Right	8	12	0			
cSH	721	1700	1363			
Volume to Capacity	0.02	0.09	0.01			
Queue Length 95th (m)	0.5	0.0	0.3			
Control Delay (s)	10.1	0.0	0.8			
Lane LOS	B		A			
Approach Delay (s)	10.1	0.0	0.8			
Approach LOS	B					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			23.2%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	58	380	3	5	199	20	0	15	34	41	5	64
Future Volume (Veh/h)	58	380	3	5	199	20	0	15	34	41	5	64
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.76	0.78	0.38	0.31	0.80	0.79	0.25	0.58	0.47	0.81	0.31	0.56
Hourly flow rate (vph)	76	487	8	16	249	25	0	26	72	51	16	114
Pedestrians		44			6			9			7	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		4			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	281			504			1112	965	506	1034	956	312
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	281			504			1112	965	506	1034	956	312
tC, single (s)	4.1			4.1			7.1	6.6	6.2	7.1	6.7	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.3	3.5	4.2	3.3
p0 queue free %	94			98			100	89	87	67	93	83
cM capacity (veh/h)	1284			1061			131	228	556	155	219	689
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	571	290	98	181								
Volume Left	76	16	0	51								
Volume Right	8	25	72	114								
cSH	1284	1061	402	319								
Volume to Capacity	0.06	0.02	0.24	0.57								
Queue Length 95th (m)	1.4	0.3	7.2	25.0								
Control Delay (s)	1.6	0.6	16.8	30.0								
Lane LOS	A	A	C	D								
Approach Delay (s)	1.6	0.6	16.8	30.0								
Approach LOS			C	D								
Intersection Summary												
Average Delay			7.2									
Intersection Capacity Utilization			60.9%	ICU Level of Service					B			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	15	435	8	9	260	2	14	44	19	8	33	16
Future Volume (Veh/h)	15	435	8	9	260	2	14	44	19	8	33	16
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.80	0.67	0.75	0.91	0.50	0.41	0.81	0.64	0.67	0.43	0.42
Hourly flow rate (vph)	26	544	12	12	286	4	34	54	30	12	77	38
Pedestrians		9			2			25			24	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked				0.83			0.83	0.83	0.83	0.83	0.83	
vC, conflicting volume	314			581			1024	965	577	997	969	321
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	314			391			926	854	386	893	859	321
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 %	98			99			74	76	94	92	66	94
cM capacity (veh/h)	1228			953			132	226	537	155	226	686
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	582	302	118	127								
Volume Left	26	12	34	12								
Volume Right	12	4	30	38								
cSH	1228	953	213	268								
Volume to Capacity	0.02	0.01	0.55	0.47								
Queue Length 95th (m)	0.5	0.3	22.6	18.1								
Control Delay (s)	0.6	0.5	40.9	30.0								
Lane LOS	A	A	E	D								
Approach Delay (s)	0.6	0.5	40.9	30.0								
Approach LOS			E	D								
Intersection Summary												
Average Delay			8.1									
Intersection Capacity Utilization			43.0%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	7	6	5	4	4	2	37	15	7	50	1
Future Volume (Veh/h)	5	7	6	5	4	4	2	37	15	7	50	1
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.58	0.38	0.63	0.50	0.50	0.50	0.73	0.63	0.42	0.56	0.25
Hourly flow rate (vph)	8	12	16	8	8	8	4	51	24	17	89	4
Pedestrians	7			6			12			4		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	1			1			1			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	219	221	110	236	211	73	100				81	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	219	221	110	236	211	73	100				81	
tC, single (s)	7.1	6.5	6.5	7.1	6.8	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.6	3.5	4.2	3.3	2.2				2.2	
p0 queue free %	99	98	98	99	99	99	100				99	
cM capacity (veh/h)	706	663	850	673	631	985	1495				1520	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	36	24	79	110								
Volume Left	8	8	4	17								
Volume Right	16	8	24	4								
cSH	746	734	1495	1520								
Volume to Capacity	0.05	0.03	0.00	0.01								
Queue Length 95th (m)	1.2	0.8	0.1	0.3								
Control Delay (s)	10.1	10.1	0.4	1.2								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.1	10.1	0.4	1.2								
Approach LOS	B	B										
Intersection Summary												
Average Delay				3.1								
Intersection Capacity Utilization				20.6%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	9	48	0	0	75
Future Volume (Veh/h)	5	9	48	0	0	75
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.75	0.53	0.33	0.25	0.46
Hourly flow rate (vph)	20	12	91	0	0	163
Pedestrians	6		1			3
Lane Width (m)	3.7		3.7			3.7
Walking Speed (m/s)	1.1		1.1			1.1
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	261	100	97			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	261	100	97			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	100			
cM capacity (veh/h)	727	953	1500			
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	32	91	163			
Volume Left	20	0	0			
Volume Right	12	0	0			
cSH	798	1700	1500			
Volume to Capacity	0.04	0.05	0.00			
Queue Length 95th (m)	1.0	0.0	0.0			
Control Delay (s)	9.7	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.7	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			16.1%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

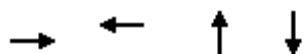
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	407	11	19	193	20	6	7	13	23	19	28
Future Volume (Veh/h)	22	407	11	19	193	20	6	7	13	23	19	28
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.85	0.36	0.75	0.88	0.53	0.75	0.58	0.50	0.64	0.50	0.52
Hourly flow rate (vph)	29	479	31	25	219	38	8	12	26	36	38	54
Pedestrians		3			2			14			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)												
pX, platoon unblocked												
vC, conflicting volume	260			524			930	876	510	878	873	244
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	260			524			930	876	510	878	873	244
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 %	98			98			96	96	95	84	86	93
cM capacity (veh/h)	1283			1038			194	271	558	231	273	778
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	539	282	46	128								
Volume Left	29	25	8	36								
Volume Right	31	38	26	54								
cSH	1283	1038	349	351								
Volume to Capacity	0.02	0.02	0.13	0.36								
Queue Length 95th (m)	0.5	0.6	3.4	12.4								
Control Delay (s)	0.7	1.0	16.9	21.0								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.7	1.0	16.9	21.0								
Approach LOS			C	C								
Intersection Summary												
Average Delay			4.1									
Intersection Capacity Utilization			41.2%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	599	333	206	133
v/c Ratio	0.52	0.31	0.62	0.42
Control Delay	6.5	7.7	31.2	27.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	6.5	7.7	31.2	27.4
Queue Length 50th (m)	25.7	20.1	21.9	14.8
Queue Length 95th (m)	m37.0	34.8	26.3	22.2
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1152	1084	450	437
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	0.52	0.31	0.46	0.30

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	427	26	17	238	18	24	64	40	21	65	8
Future Volume (vph)	16	427	26	17	238	18	24	64	40	21	65	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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.94			0.99	
Flpb, ped/bikes		1.00			1.00			0.99			0.97	
Frt		0.99			0.99			0.96			0.99	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1836			1789			1702			1773	
Flt Permitted		0.98			0.94			0.89			0.86	
Satd. Flow (perm)		1800			1692			1538			1548	
Peak-hour factor, PHF	0.63	0.79	0.78	0.67	0.87	0.53	0.48	0.66	0.68	0.63	0.74	0.67
Adj. Flow (vph)	25	541	33	25	274	34	50	97	59	33	88	12
RTOR Reduction (vph)	0	2	0	0	4	0	0	22	0	0	6	0
Lane Group Flow (vph)	0	597	0	0	329	0	0	184	0	0	127	0
Confl. Peds. (#/hr)	38		54	54		38	21		91	91		21
Confl. Bikes (#/hr)			3			1			1			
Heavy Vehicles (%)	7%	3%	0%	0%	4%	12%	0%	0%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		47.9			47.9			15.1			15.1	
Effective Green, g (s)		47.9			47.9			15.1			15.1	
Actuated g/C Ratio		0.64			0.64			0.20			0.20	
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)		1149			1080			309			311	
v/s Ratio Prot												
v/s Ratio Perm		c0.33			0.19			c0.12			0.08	
v/c Ratio		0.52			0.30			0.60			0.41	
Uniform Delay, d1		7.3			6.1			27.2			26.1	
Progression Factor		0.61			1.00			1.00			1.00	
Incremental Delay, d2		1.3			0.7			3.1			0.9	
Delay (s)		5.7			6.8			30.3			27.0	
Level of Service		A			A			C			C	
Approach Delay (s)		5.7			6.8			30.3			27.0	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			12.2			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			53.7%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	2	8	2	1	1	5	118	11	2	77	7
Future Volume (Veh/h)	15	2	8	2	1	1	5	118	11	2	77	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.63	0.25	0.25	0.25	0.25	0.25	0.63	0.60	0.67	0.50	0.79	0.44
Hourly flow rate (vph)	24	8	32	8	4	4	8	197	16	4	97	16
Pedestrians		5			13			10			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)											355	
pX, platoon unblocked												
vC, conflicting volume	348	360	120	393	360	221	118			226		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	348	360	120	393	360	221	118			226		
tC, single (s)	7.1	6.5	6.7	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.8	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	99	96	98	99	100	99			100		
cM capacity (veh/h)	587	555	805	519	555	811	1476			1337		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	64	16	221	117								
Volume Left	24	8	8	4								
Volume Right	32	4	16	16								
cSH	674	581	1476	1337								
Volume to Capacity	0.10	0.03	0.01	0.00								
Queue Length 95th (m)	2.4	0.6	0.1	0.1								
Control Delay (s)	10.9	11.4	0.3	0.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.9	11.4	0.3	0.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.4									
Intersection Capacity Utilization			23.6%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	4	3	2	4	133	0	7	81	1
Future Volume (Veh/h)	0	0	0	4	3	2	4	133	0	7	81	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.50	0.50	0.50	0.50	0.75	0.50	0.50	0.65	0.38	0.25	0.66	0.25
Hourly flow rate (vph)	0	0	0	8	4	4	8	205	0	28	123	4
Pedestrians		10			16			6			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			2			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	421	428	141	424	430	224	137			221		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	421	428	141	424	430	224	137			221		
tC, single (s)	7.1	7.0	6.2	7.1	6.8	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.5	3.3	3.5	4.3	3.3	2.2			2.2		
p0 queue free %	100	100	100	98	99	100	99			98		
cM capacity (veh/h)	512	430	898	512	450	805	1445			1339		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	16	213	155								
Volume Left	0	8	8	28								
Volume Right	0	4	0	4								
cSH	1700	542	1445	1339								
Volume to Capacity	0.00	0.03	0.01	0.02								
Queue Length 95th (m)	0.0	0.7	0.1	0.5								
Control Delay (s)	0.0	11.8	0.3	1.5								
Lane LOS	A	B	A	A								
Approach Delay (s)	0.0	11.8	0.3	1.5								
Approach LOS	A	B										
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			22.0%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	59	357	26	5	174	25	27	63	25	10	33	22
Future Volume (Veh/h)	59	357	26	5	174	25	27	63	25	10	33	22
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.74	0.78	0.69	0.42	0.88	0.75	0.65	0.63	0.75	0.75	0.65	0.53
Hourly flow rate (vph)	80	458	38	12	198	33	42	100	33	13	51	42
Pedestrians		12			7			15			5	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					207							
pX, platoon unblocked												
vC, conflicting volume	236			511			970	912	499	970	914	232
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	236			511			970	912	499	970	914	232
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.3
p0 queue free %	94			99			75	60	94	90	80	95
cM capacity (veh/h)	1336			1049			170	251	563	135	251	787
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	576	243	175	106								
Volume Left	80	12	42	13								
Volume Right	38	33	33	42								
cSH	1336	1049	249	300								
Volume to Capacity	0.06	0.01	0.70	0.35								
Queue Length 95th (m)	1.4	0.3	35.7	11.7								
Control Delay (s)	1.7	0.5	47.7	23.4								
Lane LOS	A	A	E	C								
Approach Delay (s)	1.7	0.5	47.7	23.4								
Approach LOS			E	C								
Intersection Summary												
Average Delay			10.8									
Intersection Capacity Utilization			55.9%		ICU Level of Service				B			
Analysis Period (min)			15									

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	199	181	205	98	152	67	117	407	97	45	676
v/c Ratio	0.55	0.46	0.48	0.26	0.41	0.20	0.42	0.52	0.13	0.09	0.78
Control Delay	27.2	33.9	8.2	20.4	33.1	3.2	19.7	24.0	8.1	10.2	30.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.2	33.9	8.2	20.4	33.1	3.2	19.7	24.0	8.1	10.2	30.2
Queue Length 50th (m)	22.7	26.0	0.0	10.5	21.4	0.0	9.6	46.5	1.8	3.5	107.4
Queue Length 95th (m)	24.2	41.7	15.1	18.4	36.6	1.3	m17.2	m72.9	m6.4	7.5	#175.2
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	361	445	459	380	467	387	279	790	775	499	872
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.41	0.45	0.26	0.33	0.17	0.42	0.52	0.13	0.09	0.78

Intersection Summary

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.

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	37	90	154	180	80	134	33	17	98	280	87	86
Future Volume (vph)	37	90	154	180	80	134	33	17	98	280	87	86
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.76	1.00	1.00	0.73		1.00	0.97		0.94
Flpb, ped/bikes		0.89	1.00	1.00	0.90	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	0.96		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1610	1745	1199	1637	1830	1198		1768	1603		1463
Flt Permitted		0.60	1.00	1.00	0.63	1.00	1.00		0.17	1.00		1.00
Satd. Flow (perm)		1012	1745	1199	1085	1830	1198		316	1603		1463
Peak-hour factor, PHF	0.73	0.61	0.85	0.88	0.82	0.88	0.78	0.67	0.84	0.97	0.81	0.80
Adj. Flow (vph)	51	148	181	205	98	152	42	25	117	289	107	108
RTOR Reduction (vph)	0	0	0	159	0	0	53	0	0	1	0	51
Lane Group Flow (vph)	0	199	181	46	98	152	14	0	117	406	0	46
Confl. Peds. (#/hr)	73	54		112	112		73	54	50		54	42
Confl. Bikes (#/hr)				2			1	1			1	1
Heavy Vehicles (%)	3%	0%	7%	1%	0%	5%	0%	0%	3%	6%	4%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		27.3	20.3	20.3	24.5	18.9	18.9		47.5	42.5		42.5
Effective Green, g (s)		27.3	20.3	20.3	24.5	18.9	18.9		47.5	42.5		42.5
Actuated g/C Ratio		0.30	0.23	0.23	0.27	0.21	0.21		0.53	0.47		0.47
Clearance Time (s)		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
Lane Grp Cap (vph)		353	393	270	329	384	251		247	756		690
v/s Ratio Prot		c0.04	0.10		0.02	0.08			c0.03	0.25		
v/s Ratio Perm		c0.13		0.04	0.06		0.01		0.22			0.03
v/c Ratio		0.56	0.46	0.17	0.30	0.40	0.06		0.47	0.54		0.07
Uniform Delay, d1		25.4	30.1	28.1	25.4	30.6	28.4		14.8	16.8		12.9
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.62	1.17		2.54
Incremental Delay, d2		2.1	0.9	0.3	0.5	0.7	0.1		1.1	2.2		0.1
Delay (s)		27.4	31.0	28.4	25.9	31.3	28.5		25.1	21.9		33.0
Level of Service		C	C	C	C	C	C		C	C		C
Approach Delay (s)			28.9			29.0				24.2		
Approach LOS			C			C				C		
Intersection Summary												
HCM 2000 Control Delay			27.2									
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			81.3%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	7	24	605	32
Future Volume (vph)	7	24	605	32
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.99	
Flpb, ped/bikes		0.98	1.00	
Frt		1.00	0.99	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1789	1850	
Flt Permitted		0.42	1.00	
Satd. Flow (perm)		791	1850	
Peak-hour factor, PHF	0.44	0.82	0.95	0.83
Adj. Flow (vph)	16	29	637	39
RTOR Reduction (vph)	0	0	2	0
Lane Group Flow (vph)	0	45	674	0
Confl. Peds. (#/hr)	54	42		50
Confl. Bikes (#/hr)				7
Heavy Vehicles (%)	0%	0%	2%	7%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		44.7	41.1	
Effective Green, g (s)		44.7	41.1	
Actuated g/C Ratio		0.50	0.46	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		432	844	
v/s Ratio Prot		0.00	c0.36	
v/s Ratio Perm		0.05		
v/c Ratio		0.10	0.80	
Uniform Delay, d1		12.0	20.9	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.1	7.8	
Delay (s)		12.1	28.7	
Level of Service		B	C	
Approach Delay (s)			27.7	
Approach LOS			C	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	11	30	14	6	39	31	582	49	60	762	28
Future Volume (Veh/h)	5	11	30	14	6	39	31	582	49	60	762	28
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.31	0.50	0.78	0.81	0.50	0.84	0.66	0.86	0.88	0.79	0.93	0.84
Hourly flow rate (vph)	16	22	38	17	12	46	47	677	56	76	819	33
Pedestrians	37			35			9			9		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	4			3			1			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)							94			144		
pX, platoon unblocked	0.78	0.78	0.67	0.78	0.78	0.79	0.67				0.79	
vC, conflicting volume	1518	1886	882	1863	1875	410	889				768	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	517	991	581	961	976	0	592				180	
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 %	94	86	87	84	92	94	93				93	
cM capacity (veh/h)	250	155	297	105	158	826	644				1076	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	76	75	386	394	76	852						
Volume Left	16	17	47	0	76	0						
Volume Right	38	46	0	56	0	33						
cSH	227	256	644	1700	1076	1700						
Volume to Capacity	0.33	0.29	0.07	0.23	0.07	0.50						
Queue Length 95th (m)	10.7	9.0	1.8	0.0	1.7	0.0						
Control Delay (s)	28.6	24.8	2.2	0.0	8.6	0.0						
Lane LOS	D	C	A		A							
Approach Delay (s)	28.6	24.8	1.1		0.7							
Approach LOS	D	C										
Intersection Summary												
Average Delay				3.0								
Intersection Capacity Utilization				65.2%	ICU Level of Service			C				
Analysis Period (min)				15								

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	177	133	968	217	665
v/c Ratio	0.41	0.22	0.76	0.74	0.58
Control Delay	30.6	13.7	19.2	42.9	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	30.6	13.7	19.2	42.9	7.9
Queue Length 50th (m)	25.2	12.1	49.8	38.2	24.4
Queue Length 95th (m)	39.4	19.1	64.4	m52.2	40.3
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	434	614	1269	292	1141
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	0.41	0.22	0.76	0.74	0.58

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

10/29/2018

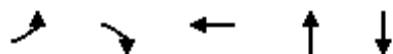


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	147	105	553	279	167	638
Future Volume (vph)	147	105	553	279	167	638
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.97	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.95		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1630	1418	3281		1755	1902
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1630	1418	3281		1755	1902
Peak-hour factor, PHF	0.83	0.79	0.85	0.88	0.77	0.96
Adj. Flow (vph)	177	133	651	317	217	665
RTOR Reduction (vph)	0	0	66	0	0	0
Lane Group Flow (vph)	177	133	902	0	217	665
Confl. Peds. (#/hr)	44	30		9	9	
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	12%	12%	3%	8%	4%	1%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	434	709	1203		292	1141
v/s Ratio Prot	c0.11	0.03	c0.27		c0.12	0.35
v/s Ratio Perm		0.06				
v/c Ratio	0.41	0.19	0.75		0.74	0.58
Uniform Delay, d1	27.2	15.7	24.9		35.7	11.1
Progression Factor	1.00	1.00	0.70		0.80	0.54
Incremental Delay, d2	2.8	0.6	3.4		12.8	1.7
Delay (s)	30.0	16.3	20.8		41.4	7.7
Level of Service	C	B	C		D	A
Approach Delay (s)	24.1		20.8			16.0
Approach LOS	C		C			B
Intersection Summary						
HCM 2000 Control Delay			19.3		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.63			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	328	198	39	755	853
v/c Ratio	0.89	0.39	0.09	0.53	0.50
Control Delay	58.1	6.8	15.7	12.1	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	58.1	6.8	15.7	12.1	11.3
Queue Length 50th (m)	52.7	1.0	2.6	34.4	28.2
Queue Length 95th (m)	66.9	12.1	9.8	44.5	37.0
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	400	541	490	1430	1705
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	0.82	0.37	0.08	0.53	0.50
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

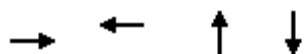
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	249	0	162	17	4	18	88	578	0	0	647	132
Future Volume (vph)	249	0	162	17	4	18	88	578	0	0	647	132
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	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	1.00		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.94			1.00			0.97	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1802		1406		1651			3412			3373	
Flt Permitted	0.73		1.00		0.98			0.68			1.00	
Satd. Flow (perm)	1388		1406		1651			2325			3373	
Peak-hour factor, PHF	0.76	0.38	0.82	1.00	1.00	1.00	0.90	0.88	0.25	0.25	0.93	0.84
Adj. Flow (vph)	328	0	198	17	4	18	98	657	0	0	696	157
RTOR Reduction (vph)	0	0	139	0	13	0	0	0	0	0	20	0
Lane Group Flow (vph)	328	0	59	0	26	0	0	755	0	0	833	0
Confl. Peds. (#/hr)	2		87	87		2	44		2	2		44
Confl. Bikes (#/hr)			3									3
Heavy Vehicles (%)	1%	0%	3%	0%	0%	0%	4%	5%	0%	0%	4%	1%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	24.0		24.0		24.0			54.0			45.0	
Effective Green, g (s)	24.0		24.0		24.0			54.0			45.0	
Actuated g/C Ratio	0.27		0.27		0.27			0.60			0.50	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	370		374		440			1467			1686	
v/s Ratio Prot								c0.03			0.25	
v/s Ratio Perm	c0.24		0.04		0.02			c0.27				
v/c Ratio	0.89		0.16		0.06			0.51			0.49	
Uniform Delay, d1	31.7		25.3		24.6			10.4			14.9	
Progression Factor	1.00		1.00		1.00			1.00			0.70	
Incremental Delay, d2	21.6		0.2		0.1			0.3			0.9	
Delay (s)	53.3		25.5		24.6			10.7			11.3	
Level of Service	D		C		C			B			B	
Approach Delay (s)		42.8			24.6			10.7			11.3	
Approach LOS		D			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			19.0									
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			80.5%									
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018

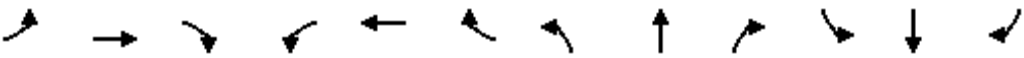


Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	552	602	97	156
v/c Ratio	0.51	0.51	0.29	0.48
Control Delay	9.7	17.9	22.3	23.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.7	17.9	22.3	23.9
Queue Length 50th (m)	41.0	82.2	8.9	13.6
Queue Length 95th (m)	62.5	99.9	15.2	21.8
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	1077	1179	443	433
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	0.51	0.51	0.22	0.36
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	34	388	34	20	442	24	18	39	21	19	43	43
Future Volume (vph)	34	388	34	20	442	24	18	39	21	19	43	43
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			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			1.00	
Frt		0.99			0.99			0.97			0.95	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1792			1882			1823			1760	
Flt Permitted		0.91			0.95			0.92			0.90	
Satd. Flow (perm)		1640			1800			1695			1595	
Peak-hour factor, PHF	0.67	0.87	0.62	0.59	0.82	0.82	0.85	0.71	1.00	0.50	0.73	0.73
Adj. Flow (vph)	51	446	55	34	539	29	21	55	21	38	59	59
RTOR Reduction (vph)	0	5	0	0	2	0	0	15	0	0	32	0
Lane Group Flow (vph)	0	547	0	0	600	0	0	82	0	0	124	0
Confl. Peds. (#/hr)	18		8	8		18	18		2	2		18
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
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)		1071			1176			316			297	
v/s Ratio Prot												
v/s Ratio Perm		c0.33			0.33			0.05			c0.08	
v/c Ratio		0.51			0.51			0.26			0.42	
Uniform Delay, d1		6.8			6.8			26.1			26.9	
Progression Factor		1.00			2.06			1.00			1.00	
Incremental Delay, d2		1.7			1.5			0.4			1.0	
Delay (s)		8.5			15.4			26.5			27.9	
Level of Service		A			B			C			C	
Approach Delay (s)		8.5			15.4			26.5			27.9	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			14.8			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			57.0%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	8	78	6	14	64
Future Volume (Veh/h)	6	8	78	6	14	64
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.50	0.67	0.84	0.75	0.46	0.80
Hourly flow rate (vph)	12	12	93	8	30	80
Pedestrians	5					3
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	242	105			106	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	242	105			106	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	98	99			98	
cM capacity (veh/h)	731	947			1441	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	24	101	110			
Volume Left	12	0	30			
Volume Right	12	8	0			
cSH	826	1700	1441			
Volume to Capacity	0.03	0.06	0.02			
Queue Length 95th (m)	0.7	0.0	0.5			
Control Delay (s)	9.5	0.0	2.2			
Lane LOS	A		A			
Approach Delay (s)	9.5	0.0	2.2			
Approach LOS	A					
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			21.8%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	251	2	3	369	22	3	16	19	32	9	40
Future Volume (Veh/h)	33	251	2	3	369	22	3	16	19	32	9	40
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.81	0.25	0.38	0.77	0.75	0.75	0.63	0.75	0.83	0.56	0.63
Hourly flow rate (vph)	47	310	8	8	479	29	4	25	25	39	16	63
Pedestrians		9						13			16	
Lane Width (m)		3.7						3.7			3.7	
Walking Speed (m/s)		1.1						1.1			1.1	
Percent Blockage		1						1			2	
Right turn flare (veh)												
Median type	None				None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	524			331			1010	961	327	971	950	518
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	524			331			1010	961	327	971	950	518
tC, single (s)	4.1			4.1			7.1	6.6	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.3	3.5	4.0	3.3
p0 queue free %	95			99			98	89	96	80	93	88
cM capacity (veh/h)	1036			1224			170	232	710	192	241	548
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	365	516	54	118								
Volume Left	47	8	4	39								
Volume Right	8	29	25	63								
cSH	1036	1224	324	307								
Volume to Capacity	0.05	0.01	0.17	0.38								
Queue Length 95th (m)	1.1	0.1	4.5	13.3								
Control Delay (s)	1.5	0.2	18.3	23.9								
Lane LOS	A	A	C	C								
Approach Delay (s)	1.5	0.2	18.3	23.9								
Approach LOS			C	C								
Intersection Summary												
Average Delay			4.2									
Intersection Capacity Utilization			55.3%	ICU Level of Service					B			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	18	399	19	14	451	14	19	27	13	6	20	18
Future Volume (Veh/h)	18	399	19	14	451	14	19	27	13	6	20	18
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.53	0.84	0.56	0.65	0.85	0.65	0.75	0.72	0.60	0.50	0.59	0.71
Hourly flow rate (vph)	34	475	34	22	531	22	25	38	22	12	34	25
Pedestrians		7			1			11			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked	0.85			0.89			0.90	0.90	0.89	0.90	0.90	0.85
vC, conflicting volume	567			520			1206	1182	504	1202	1188	563
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	397			396			893	867	378	889	873	392
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 %	97			98			87	84	96	93	86	95
cM capacity (veh/h)	978			1030			188	244	591	176	242	537
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	543	575	85	71								
Volume Left	34	22	25	12								
Volume Right	34	22	22	25								
cSH	978	1030	260	278								
Volume to Capacity	0.03	0.02	0.33	0.26								
Queue Length 95th (m)	0.8	0.5	10.4	7.5								
Control Delay (s)	1.0	0.6	25.4	22.3								
Lane LOS	A	A	D	C								
Approach Delay (s)	1.0	0.6	25.4	22.3								
Approach LOS			D	C								
Intersection Summary												
Average Delay			3.6									
Intersection Capacity Utilization			43.6%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	2	4	3	3	5	39	9	7	43	1
Future Volume (Veh/h)	5	5	2	4	3	3	5	39	9	7	43	1
Sign Control	Stop				Stop				Free		Free	
Grade	0%				0%				0%		0%	
Peak Hour Factor	0.63	0.63	0.25	0.33	0.75	0.38	0.63	0.77	0.50	0.33	0.85	0.25
Hourly flow rate (vph)	8	8	8	12	4	8	8	51	18	21	51	4
Pedestrians	12				9				9		7	
Lane Width (m)	3.7				3.7				3.7		3.7	
Walking Speed (m/s)	1.1				1.1				1.1		1.1	
Percent Blockage	1				1				1		1	
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	200	201	74	201	194	76	67				78	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	200	201	74	201	194	76	67				78	
tC, single (s)	7.1	6.7	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.2	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	99	99	98	99	99	99				99	
cM capacity (veh/h)	717	638	973	713	677	975	1529				1520	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	24	24	77	76								
Volume Left	8	12	8	21								
Volume Right	8	8	18	4								
cSH	752	776	1529	1520								
Volume to Capacity	0.03	0.03	0.01	0.01								
Queue Length 95th (m)	0.8	0.7	0.1	0.3								
Control Delay (s)	9.9	9.8	0.8	2.1								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.9	9.8	0.8	2.1								
Approach LOS	A	A										
Intersection Summary												
Average Delay			3.5									
Intersection Capacity Utilization			19.7%	ICU Level of Service				A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	6	49	0	0	56
Future Volume (Veh/h)	3	6	49	0	0	56
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.42	0.57	0.75	0.38	0.83
Hourly flow rate (vph)	12	14	86	0	0	67
Pedestrians	4					4
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	157	94			90	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	157	94			90	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	836	961			1512	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	26	86	67			
Volume Left	12	0	0			
Volume Right	14	0	0			
cSH	899	1700	1512			
Volume to Capacity	0.03	0.05	0.00			
Queue Length 95th (m)	0.7	0.0	0.0			
Control Delay (s)	9.1	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.1	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		1.3				
Intersection Capacity Utilization		15.8%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

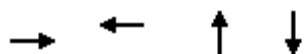
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	271	8	4	333	20	22	4	27	29	6	21
Future Volume (Veh/h)	20	271	8	4	333	20	22	4	27	29	6	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.68	0.94	0.50	0.59	0.83	0.25	0.58	0.33	0.65	0.84	0.50	0.83
Hourly flow rate (vph)	29	288	16	7	401	80	38	12	42	35	12	25
Pedestrians		4			1			13			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)												
pX, platoon unblocked												
vC, conflicting volume	495			317			857	876	310	872	844	459
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	495			317			857	876	310	872	844	459
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			84	96	94	85	96	96
cM capacity (veh/h)	1064			1239			244	273	716	234	285	596
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	333	488	92	72								
Volume Left	29	7	38	35								
Volume Right	16	80	42	25								
cSH	1064	1239	356	308								
Volume to Capacity	0.03	0.01	0.26	0.23								
Queue Length 95th (m)	0.6	0.1	7.7	6.7								
Control Delay (s)	1.0	0.2	18.6	20.2								
Lane LOS	A	A	C	C								
Approach Delay (s)	1.0	0.2	18.6	20.2								
Approach LOS			C	C								
Intersection Summary												
Average Delay			3.6									
Intersection Capacity Utilization			39.8%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	510	582	224	101
v/c Ratio	0.45	0.50	0.62	0.29
Control Delay	5.9	9.9	30.6	20.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.9	9.9	30.6	20.8
Queue Length 50th (m)	19.7	42.7	23.8	9.0
Queue Length 95th (m)	26.5	62.8	30.9	13.8
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1145	1165	489	474
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	0.45	0.50	0.46	0.21
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	14	388	15	17	432	28	21	87	53	16	37	23
Future Volume (vph)	14	388	15	17	432	28	21	87	53	16	37	23
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			0.98			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		0.99			0.99			0.96			0.97	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1846			1876			1777			1808	
Flt Permitted		0.97			0.97			0.94			0.90	
Satd. Flow (perm)		1790			1823			1675			1637	
Peak-hour factor, PHF	0.65	0.84	0.58	0.67	0.83	0.75	0.63	0.71	0.78	0.75	0.67	0.92
Adj. Flow (vph)	22	462	26	25	520	37	33	123	68	21	55	25
RTOR Reduction (vph)	0	2	0	0	3	0	0	23	0	0	18	0
Lane Group Flow (vph)	0	508	0	0	579	0	0	201	0	0	83	0
Confl. Peds. (#/hr)	24		35	35		24	10		23	23		10
Confl. Bikes (#/hr)			2			2						1
Heavy Vehicles (%)	0%	3%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		47.9			47.9			15.1			15.1	
Effective Green, g (s)		47.9			47.9			15.1			15.1	
Actuated g/C Ratio		0.64			0.64			0.20			0.20	
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)		1143			1164			337			329	
v/s Ratio Prot												
v/s Ratio Perm		0.28			0.32			0.12			0.05	
v/c Ratio		0.44			0.50			0.60			0.25	
Uniform Delay, d1		6.8			7.2			27.2			25.2	
Progression Factor		0.59			1.00			1.00			1.00	
Incremental Delay, d2		1.2			1.5			2.8			0.4	
Delay (s)		5.2			8.7			30.0			25.6	
Level of Service		A			A			C			C	
Approach Delay (s)		5.2			8.7			30.0			25.6	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			12.0									
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			75.0									
Intersection Capacity Utilization			54.9%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	2	17	3	2	2	7	147	7	3	77	3
Future Volume (Veh/h)	3	2	17	3	2	2	7	147	7	3	77	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.50	0.25	0.50	0.50	0.44	0.88	0.42	0.50	0.77	0.38
Hourly flow rate (vph)	12	8	34	12	4	4	16	167	17	6	100	8
Pedestrians		5			7			16			4	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			2			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)											355	
pX, platoon unblocked												
vC, conflicting volume	338	344	125	384	340	186	113			191		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	338	344	125	384	340	186	113			191		
tC, single (s)	7.1	6.5	6.5	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	98	99	96	98	99	100	99			100		
cM capacity (veh/h)	595	566	850	525	569	852	1398			1385		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	54	20	200	114								
Volume Left	12	12	16	6								
Volume Right	34	4	17	8								
cSH	727	578	1398	1385								
Volume to Capacity	0.07	0.03	0.01	0.00								
Queue Length 95th (m)	1.8	0.8	0.3	0.1								
Control Delay (s)	10.4	11.4	0.7	0.4								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.4	11.4	0.7	0.4								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.5									
Intersection Capacity Utilization			25.6%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	3	1	0	3	160	0	0	89	13
Future Volume (Veh/h)	0	0	0	3	1	0	3	160	0	0	89	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.94	0.25	0.25	0.84	0.50
Hourly flow rate (vph)	0	0	0	12	4	0	12	170	0	0	106	26
Pedestrians		3			20			8			8	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			2			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	326	336	130	341	349	198	135			190		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	326	336	130	341	349	198	135			190		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	100	100	100	98	99	100	99			100		
cM capacity (veh/h)	606	570	915	586	561	825	1458			1369		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	16	182	132								
Volume Left	0	12	12	0								
Volume Right	0	0	0	26								
cSH	1700	579	1458	1369								
Volume to Capacity	0.00	0.03	0.01	0.00								
Queue Length 95th (m)	0.0	0.6	0.2	0.0								
Control Delay (s)	0.0	11.4	0.6	0.0								
Lane LOS	A	B	A									
Approach Delay (s)	0.0	11.4	0.6	0.0								
Approach LOS	A	B										
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			24.4%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	241	19	5	258	21	56	97	21	19	22	53
Future Volume (Veh/h)	41	241	19	5	258	21	56	97	21	19	22	53
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.87	0.64	0.63	0.84	0.63	0.74	0.82	0.63	0.53	0.58	0.83
Hourly flow rate (vph)	51	277	30	8	307	33	76	118	33	36	38	64
Pedestrians		7			9			15			9	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					207							
pX, platoon unblocked												
vC, conflicting volume	349			322			838	774	316	844	772	340
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	349			322			838	774	316	844	772	340
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 %	96			99			65	62	95	79	88	91
cM capacity (veh/h)	1183			1231			217	308	701	175	309	692
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	358	348	227	138								
Volume Left	51	8	76	36								
Volume Right	30	33	33	64								
cSH	1183	1231	291	327								
Volume to Capacity	0.04	0.01	0.78	0.42								
Queue Length 95th (m)	1.0	0.1	46.0	15.3								
Control Delay (s)	1.5	0.2	50.3	23.8								
Lane LOS	A	A	F	C								
Approach Delay (s)	1.5	0.2	50.3	23.8								
Approach LOS			F	C								
Intersection Summary												
Average Delay			14.3									
Intersection Capacity Utilization			56.9%		ICU Level of Service				B			
Analysis Period (min)			15									

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	169	200	213	160	273	130	188	600	66	80	578
v/c Ratio	0.61	0.53	0.54	0.47	0.67	0.46	0.57	0.78	0.09	0.26	0.73
Control Delay	29.8	35.8	9.5	24.3	40.2	13.5	12.3	22.2	1.2	12.2	28.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.8	35.8	9.5	24.3	40.2	13.5	12.3	22.2	1.2	12.2	28.9
Queue Length 50th (m)	18.9	29.0	0.0	17.8	41.1	2.8	4.8	101.2	0.8	6.4	84.7
Queue Length 95th (m)	26.1	38.8	12.1	31.1	60.8	12.6	m6.3	#166.4	m1.5	10.1	#127.4
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	278	450	433	342	486	318	331	772	716	303	787
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.44	0.49	0.47	0.56	0.41	0.57	0.78	0.09	0.26	0.73

Intersection Summary

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.

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	51	72	148	175	146	232	63	27	147	472	75	68
Future Volume (vph)	51	72	148	175	146	232	63	27	147	472	75	68
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.68	1.00	1.00	0.57		1.00	0.97		0.92
Flpb, ped/bikes		0.91	1.00	1.00	0.89	1.00	1.00		0.99	1.00		1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.97		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1654	1762	1075	1621	1902	926		1790	1679		1431
Flt Permitted		0.39	1.00	1.00	0.54	1.00	1.00		0.23	1.00		1.00
Satd. Flow (perm)		675	1762	1075	920	1902	926		428	1679		1431
Peak-hour factor, PHF	0.71	0.74	0.74	0.82	0.91	0.85	0.79	0.54	0.78	0.95	0.78	0.93
Adj. Flow (vph)	72	97	200	213	160	273	80	50	188	497	96	73
RTOR Reduction (vph)	0	0	0	167	0	0	86	0	0	1	0	36
Lane Group Flow (vph)	0	169	200	46	160	273	44	0	188	599	0	30
Confl. Peds. (#/hr)	107	104		156	156		107	104	104		104	59
Confl. Bikes (#/hr)				3			4	4			7	7
Heavy Vehicles (%)	2%	0%	6%	0%	0%	1%	0%	0%	1%	3%	0%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		26.3	19.3	19.3	26.3	19.3	19.3		47.6	40.8		40.8
Effective Green, g (s)		26.3	19.3	19.3	26.3	19.3	19.3		47.6	40.8		40.8
Actuated g/C Ratio		0.29	0.21	0.21	0.29	0.21	0.21		0.53	0.45		0.45
Clearance Time (s)		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
Lane Grp Cap (vph)		273	377	230	323	407	198		329	761		648
v/s Ratio Prot		c0.05	0.11		0.04	c0.14			c0.04	c0.36		
v/s Ratio Perm		0.13		0.04	0.11		0.05		0.26			0.02
v/c Ratio		0.62	0.53	0.20	0.50	0.67	0.22		0.57	0.79		0.05
Uniform Delay, d1		25.6	31.3	29.0	25.1	32.4	29.2		14.0	20.9		13.7
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		0.59	0.63		0.85
Incremental Delay, d2		4.1	1.4	0.4	1.2	4.3	0.6		1.9	6.6		0.1
Delay (s)		29.7	32.8	29.4	26.3	36.7	29.7		10.2	19.7		11.8
Level of Service		C	C	C	C	D	C		B	B		B
Approach Delay (s)			30.7			32.1				17.0		
Approach LOS			C			C				B		
Intersection Summary												
HCM 2000 Control Delay			25.4									
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			80.7%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	16	39	455	61
Future Volume (vph)	16	39	455	61
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.98	
Flpb, ped/bikes		0.99	1.00	
Frt		1.00	0.98	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1749	1806	
Flt Permitted		0.22	1.00	
Satd. Flow (perm)		407	1806	
Peak-hour factor, PHF	0.63	0.71	0.89	0.91
Adj. Flow (vph)	25	55	511	67
RTOR Reduction (vph)	0	0	5	0
Lane Group Flow (vph)	0	80	573	0
Confl. Peds. (#/hr)	104	59		104
Confl. Bikes (#/hr)				5
Heavy Vehicles (%)	0%	5%	2%	2%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		43.8	38.9	
Effective Green, g (s)		43.8	38.9	
Actuated g/C Ratio		0.49	0.43	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		271	780	
v/s Ratio Prot		0.02	0.32	
v/s Ratio Perm		0.13		
v/c Ratio		0.30	0.73	
Uniform Delay, d1		14.6	21.3	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.6	6.1	
Delay (s)		15.2	27.3	
Level of Service		B	C	
Approach Delay (s)			25.9	
Approach LOS			C	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	26	19	7	53	22	749	36	41	755	23
Future Volume (Veh/h)	5	5	26	19	7	53	22	749	36	41	755	23
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.63	0.78	0.75	0.44	0.83	0.53	0.92	0.65	0.75	0.94	0.79
Hourly flow rate (vph)	8	8	33	25	16	64	42	814	55	55	803	29
Pedestrians	52			63			3			6		
Lane Width (m)	3.7			3.7			3.7			3.7		
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)							94			144		
pX, platoon unblocked	0.79	0.79	0.69	0.79	0.79	0.78	0.69				0.78	
vC, conflicting volume	1548	1996	872	1942	1982	504	884				932	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	542	1104	587	1036	1088	0	603				362	
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 %	96	94	89	75	88	92	93				94	
cM capacity (veh/h)	224	132	298	99	135	798	642				888	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	49	105	449	462	55	832						
Volume Left	8	25	42	0	55	0						
Volume Right	33	64	0	55	0	29						
cSH	237	233	642	1700	888	1700						
Volume to Capacity	0.21	0.45	0.07	0.27	0.06	0.49						
Queue Length 95th (m)	5.8	16.5	1.6	0.0	1.5	0.0						
Control Delay (s)	24.1	32.6	1.9	0.0	9.3	0.0						
Lane LOS	C	D	A		A							
Approach Delay (s)	24.1	32.6	0.9		0.6							
Approach LOS	C	D										
Intersection Summary												
Average Delay				3.1								
Intersection Capacity Utilization				57.0%	ICU Level of Service				B			
Analysis Period (min)				15								

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	225	222	945	207	690
v/c Ratio	0.50	0.34	0.75	0.71	0.60
Control Delay	32.4	15.1	23.9	53.9	19.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	32.4	15.1	23.9	53.9	19.4
Queue Length 50th (m)	32.8	21.3	75.6	32.9	93.0
Queue Length 95th (m)	49.9	31.7	70.0	m47.9	132.9
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	454	649	1257	292	1152
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	0.50	0.34	0.75	0.71	0.60

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

10/29/2018

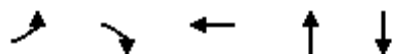
						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	189	182	602	182	168	649
Future Volume (vph)	189	182	602	182	168	649
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.96	0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1706	1498	3316		1755	1921
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1706	1498	3316		1755	1921
Peak-hour factor, PHF	0.84	0.82	0.87	0.72	0.81	0.94
Adj. Flow (vph)	225	222	692	253	207	690
RTOR Reduction (vph)	0	0	41	0	0	0
Lane Group Flow (vph)	225	222	904	0	207	690
Confl. Peds. (#/hr)	48	42		34	34	
Confl. Bikes (#/hr)		3		5		
Heavy Vehicles (%)	7%	5%	1%	11%	4%	0%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	454	749	1215		292	1152
v/s Ratio Prot	c0.13	0.05	c0.27		c0.12	0.36
v/s Ratio Perm		0.10				
v/c Ratio	0.50	0.30	0.74		0.71	0.60
Uniform Delay, d1	27.9	16.6	24.8		35.4	11.2
Progression Factor	1.00	1.00	0.86		1.16	1.50
Incremental Delay, d2	3.8	1.0	3.8		11.5	1.9
Delay (s)	31.7	17.6	25.0		52.8	18.7
Level of Service	C	B	C		D	B
Approach Delay (s)	24.7		25.0			26.6
Approach LOS	C		C			C
Intersection Summary						
HCM 2000 Control Delay			25.6		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.65			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.0%		ICU Level of Service	D
Analysis Period (min)			15			

c Critical Lane Group

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	182	187	138	775	867
v/c Ratio	0.74	0.43	0.38	0.51	0.45
Control Delay	50.4	7.4	23.8	9.5	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	50.4	7.4	23.8	9.5	8.5
Queue Length 50th (m)	29.7	0.0	14.8	26.8	25.4
Queue Length 95th (m)	41.6	10.9	27.7	46.4	50.7
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	355	546	504	1515	1929
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	0.51	0.34	0.27	0.51	0.45
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

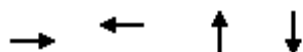
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	149	0	153	60	22	56	108	583	0	0	635	169
Future Volume (vph)	149	0	153	60	22	56	108	583	0	0	635	169
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	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	0.99		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.95			1.00			0.96	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1766		1432		1654			3472			3367	
Flt Permitted	0.66		1.00		0.98			0.63			1.00	
Satd. Flow (perm)	1231		1432		1654			2215			3367	
Peak-hour factor, PHF	0.82	0.25	0.82	1.00	1.00	1.00	0.85	0.90	0.25	0.25	0.96	0.82
Adj. Flow (vph)	182	0	187	60	22	56	127	648	0	0	661	206
RTOR Reduction (vph)	0	0	149	0	30	0	0	0	0	0	27	0
Lane Group Flow (vph)	182	0	38	0	108	0	0	775	0	0	840	0
Confl. Peds. (#/hr)	12		89	89		12	45		13	13		45
Confl. Bikes (#/hr)			1						5			1
Heavy Vehicles (%)	2%	0%	1%	0%	0%	0%	2%	3%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	18.1		18.1		18.1			59.9			50.9	
Effective Green, g (s)	18.1		18.1		18.1			59.9			50.9	
Actuated g/C Ratio	0.20		0.20		0.20			0.67			0.57	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	247		287		332			1558			1904	
v/s Ratio Prot								c0.03			0.25	
v/s Ratio Perm	c0.15		0.03		0.07			c0.30				
v/c Ratio	0.74		0.13		0.32			0.50			0.44	
Uniform Delay, d1	33.7		29.5		30.7			7.5			11.3	
Progression Factor	1.00		1.00		1.00			1.00			0.68	
Incremental Delay, d2	10.9		0.2		0.6			0.3			0.6	
Delay (s)	44.6		29.7		31.3			7.8			8.3	
Level of Service	D		C		C			A			A	
Approach Delay (s)		37.0			31.3			7.8			8.3	
Approach LOS		D			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			14.5				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			15.0		
Intersection Capacity Utilization			77.1%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	701	406	174	381
v/c Ratio	0.76	0.41	0.42	1.08
Control Delay	18.5	14.0	24.7	98.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	18.5	14.0	24.7	98.0
Queue Length 50th (m)	66.4	39.5	18.4	~54.3
Queue Length 95th (m)	77.7	57.9	29.8	#83.5
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	918	994	417	352
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	0.76	0.41	0.42	1.08

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	424	22	13	229	66	14	91	25	58	76	113
Future Volume (vph)	88	424	22	13	229	66	14	91	25	58	76	113
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			0.98			0.99			0.81	
Flpb, ped/bikes		0.99			1.00			0.98			0.99	
Frt		0.99			0.96			0.97			0.93	
Flt Protected		0.99			1.00			0.99			0.99	
Satd. Flow (prot)		1775			1755			1766			1392	
Flt Permitted		0.87			0.95			0.90			0.85	
Satd. Flow (perm)		1562			1665			1597			1204	
Peak-hour factor, PHF	0.83	0.76	0.59	0.55	0.83	0.62	0.60	0.79	0.69	0.60	0.79	0.60
Adj. Flow (vph)	106	558	37	24	276	106	23	115	36	97	96	188
RTOR Reduction (vph)	0	2	0	0	17	0	0	13	0	0	47	0
Lane Group Flow (vph)	0	699	0	0	389	0	0	161	0	0	334	0
Confl. Peds. (#/hr)	56		43	43		56	175		19	19		175
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	3%	5%	0%	4%	0%	0%	1%	5%	2%	3%	3%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		44.0			44.0			19.0			19.0	
Effective Green, g (s)		44.0			44.0			19.0			19.0	
Actuated g/C Ratio		0.59			0.59			0.25			0.25	
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)		916			976			404			305	
v/s Ratio Prot												
v/s Ratio Perm		c0.45			0.23			0.10			c0.28	
v/c Ratio		0.76			0.40			0.40			1.09	
Uniform Delay, d1		11.6			8.4			23.3			28.0	
Progression Factor		1.00			1.66			1.00			1.00	
Incremental Delay, d2		6.0			1.2			0.6			79.4	
Delay (s)		17.6			15.0			23.9			107.4	
Level of Service		B			B			C			F	
Approach Delay (s)		17.6			15.0			23.9			107.4	
Approach LOS		B			B			C			F	
Intersection Summary												
HCM 2000 Control Delay			38.2			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			92.9%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	8	113	9	13	122
Future Volume (Veh/h)	6	8	113	9	13	122
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.63	0.88	0.74	0.67	0.69	0.66
Hourly flow rate (vph)	10	9	153	13	19	185
Pedestrians	10		3			
Lane Width (m)	3.7		3.7			
Walking Speed (m/s)	1.1		1.1			
Percent Blockage	1		0			
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	396	170			176	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	396	170			176	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	98	99			99	
cM capacity (veh/h)	597	836			1346	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	19	166	204			
Volume Left	10	0	19			
Volume Right	9	13	0			
cSH	690	1700	1346			
Volume to Capacity	0.03	0.10	0.01			
Queue Length 95th (m)	0.6	0.0	0.3			
Control Delay (s)	10.4	0.0	0.8			
Lane LOS	B		A			
Approach Delay (s)	10.4	0.0	0.8			
Approach LOS	B					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			27.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	63	413	3	6	217	22	0	16	37	45	6	70
Future Volume (Veh/h)	63	413	3	6	217	22	0	16	37	45	6	70
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.76	0.78	0.38	0.31	0.80	0.79	0.25	0.58	0.47	0.81	0.31	0.56
Hourly flow rate (vph)	83	529	8	19	271	28	0	28	79	56	19	125
Pedestrians		44			6			9			7	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		4			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	306			546			1210	1052	548	1128	1042	336
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	306			546			1210	1052	548	1128	1042	336
tC, single (s)	4.1			4.1			7.1	6.6	6.2	7.1	6.7	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.3	3.5	4.2	3.3
p0 queue free %	93			98			100	86	85	56	90	81
cM capacity (veh/h)	1258			1024			106	200	526	127	193	669
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	620	318	107	200								
Volume Left	83	19	0	56								
Volume Right	8	28	79	125								
cSH	1258	1024	369	276								
Volume to Capacity	0.07	0.02	0.29	0.73								
Queue Length 95th (m)	1.6	0.4	9.0	39.1								
Control Delay (s)	1.8	0.7	18.7	46.2								
Lane LOS	A	A	C	E								
Approach Delay (s)	1.8	0.7	18.7	46.2								
Approach LOS			C	E								
Intersection Summary												
Average Delay			10.1									
Intersection Capacity Utilization			64.5%		ICU Level of Service				C			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	475	9	10	284	2	15	48	21	9	36	17
Future Volume (Veh/h)	16	475	9	10	284	2	15	48	21	9	36	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.80	0.67	0.75	0.91	0.50	0.41	0.81	0.64	0.67	0.43	0.42
Hourly flow rate (vph)	28	594	13	13	312	4	37	59	33	13	84	40
Pedestrians		9			2			25			24	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked	0.99			0.79			0.80	0.80	0.79	0.80	0.80	0.99
vC, conflicting volume	340			632			1112	1048	628	1085	1052	347
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	325			403			978	896	398	943	902	332
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 %	98			99			66	71	93	90	59	94
cM capacity (veh/h)	1201			901			108	205	506	130	205	667
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	635	329	129	137								
Volume Left	28	13	37	13								
Volume Right	13	4	33	40								
cSH	1201	901	185	240								
Volume to Capacity	0.02	0.01	0.70	0.57								
Queue Length 95th (m)	0.5	0.3	32.6	24.3								
Control Delay (s)	0.6	0.5	60.1	38.2								
Lane LOS	A	A	F	E								
Approach Delay (s)	0.6	0.5	60.1	38.2								
Approach LOS			F	E								
Intersection Summary												
Average Delay			11.0									
Intersection Capacity Utilization			45.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	8	7	6	5	5	2	40	18	8	55	1
Future Volume (Veh/h)	6	8	7	6	5	5	2	40	18	8	55	1
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.58	0.38	0.63	0.50	0.50	0.50	0.73	0.63	0.42	0.56	0.25
Hourly flow rate (vph)	10	14	18	10	10	10	4	55	29	19	98	4
Pedestrians	7			6			12			4		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	1			1			1			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	242	243	119	258	230	80	109				90	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	242	243	119	258	230	80	109				90	
tC, single (s)	7.1	6.5	6.5	7.1	6.8	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.6	3.5	4.2	3.3	2.2				2.2	
p0 queue free %	99	98	98	98	98	99	100				99	
cM capacity (veh/h)	678	644	840	647	614	977	1484				1509	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	42	30	88	121								
Volume Left	10	10	4	19								
Volume Right	18	10	29	4								
cSH	725	714	1484	1509								
Volume to Capacity	0.06	0.04	0.00	0.01								
Queue Length 95th (m)	1.4	1.0	0.1	0.3								
Control Delay (s)	10.3	10.3	0.4	1.2								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.3	10.3	0.4	1.2								
Approach LOS	B	B										
Intersection Summary												
Average Delay				3.3								
Intersection Capacity Utilization				21.3%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	10	53	0	0	82
Future Volume (Veh/h)	6	10	53	0	0	82
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.75	0.53	0.33	0.25	0.46
Hourly flow rate (vph)	24	13	100	0	0	178
Pedestrians	6		1			3
Lane Width (m)	3.7		3.7			3.7
Walking Speed (m/s)	1.1		1.1			1.1
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	285	109			106	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	285	109			106	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	99			100	
cM capacity (veh/h)	705	942			1489	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	37	100	178			
Volume Left	24	0	0			
Volume Right	13	0	0			
cSH	773	1700	1489			
Volume to Capacity	0.05	0.06	0.00			
Queue Length 95th (m)	1.1	0.0	0.0			
Control Delay (s)	9.9	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.9	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		1.2				
Intersection Capacity Utilization		16.1%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

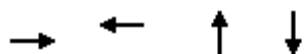
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	443	12	21	210	22	7	8	14	26	21	31
Future Volume (Veh/h)	24	443	12	21	210	22	7	8	14	26	21	31
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.85	0.36	0.75	0.88	0.53	0.75	0.58	0.50	0.64	0.50	0.52
Hourly flow rate (vph)	32	521	33	28	239	42	9	14	28	41	42	60
Pedestrians		3			2			14			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)												
pX, platoon unblocked												
vC, conflicting volume	284			568			1016	956	554	958	951	266
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	284			568			1016	956	554	958	951	266
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 %	97			97			94	94	95	79	83	92
cM capacity (veh/h)	1258			1000			163	242	528	199	244	756
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	586	309	51	143								
Volume Left	32	28	9	41								
Volume Right	33	42	28	60								
cSH	1258	1000	307	313								
Volume to Capacity	0.03	0.03	0.17	0.46								
Queue Length 95th (m)	0.6	0.7	4.5	17.4								
Control Delay (s)	0.7	1.1	19.0	25.9								
Lane LOS	A	A	C	D								
Approach Delay (s)	0.7	1.1	19.0	25.9								
Approach LOS			C	D								
Intersection Summary												
Average Delay			5.0									
Intersection Capacity Utilization			44.1%	ICU Level of Service					A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	654	367	227	147
v/c Ratio	0.58	0.34	0.68	0.46
Control Delay	7.6	8.3	33.5	28.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	7.6	8.3	33.5	28.5
Queue Length 50th (m)	28.5	22.7	25.0	16.8
Queue Length 95th (m)	m44.7	40.3	28.6	24.1
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1136	1066	442	426
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	0.58	0.34	0.51	0.35

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	466	29	18	263	20	27	70	44	23	72	9
Future Volume (vph)	17	466	29	18	263	20	27	70	44	23	72	9
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			0.99			0.94			0.99	
Flpb, ped/bikes		1.00			1.00			0.99			0.97	
Frt		0.99			0.99			0.96			0.99	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1835			1789			1702			1776	
Flt Permitted		0.98			0.94			0.88			0.84	
Satd. Flow (perm)		1796			1682			1513			1509	
Peak-hour factor, PHF	0.63	0.79	0.78	0.67	0.87	0.53	0.48	0.66	0.68	0.63	0.74	0.67
Adj. Flow (vph)	27	590	37	27	302	38	56	106	65	37	97	13
RTOR Reduction (vph)	0	3	0	0	5	0	0	21	0	0	5	0
Lane Group Flow (vph)	0	651	0	0	362	0	0	206	0	0	142	0
Confl. Peds. (#/hr)	38		54	54		38	21		91	91		21
Confl. Bikes (#/hr)			3			1			1			
Heavy Vehicles (%)	7%	3%	0%	0%	4%	12%	0%	0%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		47.4			47.4			15.6			15.6	
Effective Green, g (s)		47.4			47.4			15.6			15.6	
Actuated g/C Ratio		0.63			0.63			0.21			0.21	
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)		1135			1063			314			313	
v/s Ratio Prot												
v/s Ratio Perm		c0.36			0.22			c0.14			0.09	
v/c Ratio		0.57			0.34			0.65			0.45	
Uniform Delay, d1		8.0			6.5			27.2			26.0	
Progression Factor		0.65			1.00			1.00			1.00	
Incremental Delay, d2		1.4			0.9			4.9			1.0	
Delay (s)		6.6			7.3			32.1			27.0	
Level of Service		A			A			C			C	
Approach Delay (s)		6.6			7.3			32.1			27.0	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			13.1									
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			75.0									
Intersection Capacity Utilization			56.5%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	17	2	9	2	1	1	6	129	12	2	84	8	
Future Volume (Veh/h)	17	2	9	2	1	1	6	129	12	2	84	8	
Sign Control	Stop				Stop				Free				
Grade	0%				0%				0%				
Peak Hour Factor	0.63	0.25	0.25	0.25	0.25	0.25	0.63	0.60	0.67	0.50	0.79	0.44	
Hourly flow rate (vph)	27	8	36	8	4	4	10	215	18	4	106	18	
Pedestrians	5				13				10				
Lane Width (m)	3.7				3.7				3.7				
Walking Speed (m/s)	1.1				1.1				1.1				
Percent Blockage	0				1				1				
Right turn flare (veh)													
Median type	None								None				
Median storage (veh)													
Upstream signal (m)												355	
pX, platoon unblocked													
vC, conflicting volume	381	394	130	430	394	240	129						246
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	381	394	130	430	394	240	129						246
tC, single (s)	7.1	6.5	6.7	7.1	6.5	6.2	4.1						4.1
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.8	3.5	4.0	3.3	2.2						2.2
p0 queue free %	95	98	95	98	99	99	99						100
cM capacity (veh/h)	558	531	794	487	531	791	1462						1315
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	71	16	243	128									
Volume Left	27	8	10	4									
Volume Right	36	4	18	18									
cSH	653	551	1462	1315									
Volume to Capacity	0.11	0.03	0.01	0.00									
Queue Length 95th (m)	2.8	0.7	0.2	0.1									
Control Delay (s)	11.2	11.7	0.4	0.3									
Lane LOS	B	B	A	A									
Approach Delay (s)	11.2	11.7	0.4	0.3									
Approach LOS	B	B											
Intersection Summary													
Average Delay	2.4												
Intersection Capacity Utilization	24.4%			ICU Level of Service					A				
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	5	3	2	5	145	0	0	89	8
Future Volume (Veh/h)	0	0	0	5	3	2	5	145	0	0	89	8
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.50	0.50	0.50	0.50	0.75	0.50	0.50	0.65	0.38	0.25	0.66	0.25
Hourly flow rate (vph)	0	0	0	10	4	4	10	223	0	0	135	32
Pedestrians		10			16			6			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			2			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	413	420	167	416	436	242	177			239		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	413	420	167	416	436	242	177			239		
tC, single (s)	7.1	7.0	6.2	7.1	6.8	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.5	3.3	3.5	4.3	3.3	2.2			2.2		
p0 queue free %	100	100	100	98	99	99	99			100		
cM capacity (veh/h)	526	443	869	525	455	787	1397			1319		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	18	233	167								
Volume Left	0	10	10	0								
Volume Right	0	4	0	32								
cSH	1700	547	1397	1319								
Volume to Capacity	0.00	0.03	0.01	0.00								
Queue Length 95th (m)	0.0	0.8	0.2	0.0								
Control Delay (s)	0.0	11.8	0.4	0.0								
Lane LOS	A	B	A									
Approach Delay (s)	0.0	11.8	0.4	0.0								
Approach LOS	A	B										
Intersection Summary												
Average Delay			0.7									
Intersection Capacity Utilization			24.2%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	389	29	6	190	28	30	69	28	19	36	24
Future Volume (Veh/h)	65	389	29	6	190	28	30	69	28	19	36	24
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.74	0.78	0.69	0.42	0.88	0.75	0.65	0.63	0.75	0.75	0.65	0.53
Hourly flow rate (vph)	88	499	42	14	216	37	46	110	37	25	55	45
Pedestrians		12			7			15			5	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					207							
pX, platoon unblocked												
vC, conflicting volume	258			556			1058	997	542	1062	1000	252
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	258			556			1058	997	542	1062	1000	252
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.3
p0 queue free %	93			99			67	50	93	75	75	94
cM capacity (veh/h)	1312			1010			141	222	533	102	221	767
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	629	267	193	125								
Volume Left	88	14	46	25								
Volume Right	42	37	37	45								
cSH	1312	1010	216	226								
Volume to Capacity	0.07	0.01	0.89	0.55								
Queue Length 95th (m)	1.6	0.3	54.5	22.8								
Control Delay (s)	1.8	0.6	82.7	39.1								
Lane LOS	A	A	F	E								
Approach Delay (s)	1.8	0.6	82.7	39.1								
Approach LOS			F	E								
Intersection Summary												
Average Delay			18.2									
Intersection Capacity Utilization			58.5%		ICU Level of Service				B			
Analysis Period (min)			15									

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	216	198	223	106	166	73	138	442	107	51	735
v/c Ratio	0.61	0.50	0.50	0.29	0.44	0.22	0.63	0.56	0.14	0.11	0.89
Control Delay	29.4	34.8	8.3	20.9	33.8	3.9	35.9	25.8	9.5	10.3	39.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.4	34.8	8.3	20.9	33.8	3.9	35.9	25.8	9.5	10.3	39.6
Queue Length 50th (m)	24.9	28.8	0.0	11.4	23.5	0.0	17.2	53.6	3.0	4.0	123.0
Queue Length 95th (m)	26.1	45.2	15.7	19.6	39.7	2.2	m24.6	m76.1	m6.4	8.3	#198.6
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	354	445	472	369	467	387	218	787	773	473	827
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.44	0.47	0.29	0.36	0.19	0.63	0.56	0.14	0.11	0.89

Intersection Summary

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.

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	40	98	168	196	87	146	36	18	116	305	94	95
Future Volume (vph)	40	98	168	196	87	146	36	18	116	305	94	95
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.76	1.00	1.00	0.73		1.00	0.97		0.94
Flpb, ped/bikes		0.90	1.00	1.00	0.91	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	0.96		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1627	1745	1199	1656	1830	1198		1772	1603		1463
Flt Permitted		0.57	1.00	1.00	0.59	1.00	1.00		0.10	1.00		1.00
Satd. Flow (perm)		974	1745	1199	1034	1830	1198		184	1603		1463
Peak-hour factor, PHF	0.73	0.61	0.85	0.88	0.82	0.88	0.78	0.67	0.84	0.97	0.81	0.80
Adj. Flow (vph)	55	161	198	223	106	166	46	27	138	314	116	119
RTOR Reduction (vph)	0	0	0	172	0	0	58	0	0	1	0	57
Lane Group Flow (vph)	0	216	198	51	106	166	15	0	138	441	0	50
Confl. Peds. (#/hr)	73	54		112	112		73	54	50		54	42
Confl. Bikes (#/hr)				2			1	1			1	1
Heavy Vehicles (%)	3%	0%	7%	1%	0%	5%	0%	0%	3%	6%	4%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		27.4	20.4	20.4	24.6	19.0	19.0		48.8	42.4		42.4
Effective Green, g (s)		27.4	20.4	20.4	24.6	19.0	19.0		48.8	42.4		42.4
Actuated g/C Ratio		0.30	0.23	0.23	0.27	0.21	0.21		0.54	0.47		0.47
Clearance Time (s)		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
Lane Grp Cap (vph)		347	395	271	321	386	252		212	755		689
v/s Ratio Prot		c0.05	0.11		0.02	0.09			c0.05	0.28		
v/s Ratio Perm		c0.14		0.04	0.07		0.01		0.31			0.03
v/c Ratio		0.62	0.50	0.19	0.33	0.43	0.06		0.65	0.58		0.07
Uniform Delay, d1		25.9	30.4	28.1	25.4	30.8	28.4		17.1	17.4		13.0
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		2.06	1.22		2.53
Incremental Delay, d2		3.5	1.0	0.3	0.6	0.8	0.1		5.2	2.5		0.2
Delay (s)		29.3	31.4	28.4	26.0	31.6	28.5		40.5	23.6		33.2
Level of Service		C	C	C	C	C	C		D	C		C
Approach Delay (s)			29.7			29.2				28.4		
Approach LOS			C			C				C		
Intersection Summary												
HCM 2000 Control Delay			31.5									
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			85.9%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	8	27	658	35
Future Volume (vph)	8	27	658	35
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.99	
Flpb, ped/bikes		0.98	1.00	
Frt		1.00	0.99	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1793	1850	
Flt Permitted		0.40	1.00	
Satd. Flow (perm)		752	1850	
Peak-hour factor, PHF	0.44	0.82	0.95	0.83
Adj. Flow (vph)	18	33	693	42
RTOR Reduction (vph)	0	0	2	0
Lane Group Flow (vph)	0	51	733	0
Confl. Peds. (#/hr)	54	42		50
Confl. Bikes (#/hr)				7
Heavy Vehicles (%)	0%	0%	2%	7%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		43.2	39.6	
Effective Green, g (s)		43.2	39.6	
Actuated g/C Ratio		0.48	0.44	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		402	814	
v/s Ratio Prot		0.01	c0.40	
v/s Ratio Perm		0.06		
v/c Ratio		0.13	0.90	
Uniform Delay, d1		12.9	23.4	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.1	15.0	
Delay (s)		13.0	38.3	
Level of Service		B	D	
Approach Delay (s)			36.7	
Approach LOS			D	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	12	32	15	7	43	33	635	53	66	829	31
Future Volume (Veh/h)	6	12	32	15	7	43	33	635	53	66	829	31
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.31	0.50	0.78	0.81	0.50	0.84	0.66	0.86	0.88	0.79	0.93	0.84
Hourly flow rate (vph)	19	24	41	19	14	51	50	738	60	84	891	37
Pedestrians	37			35			9			9		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	4			3			1			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)							94			144		
pX, platoon unblocked	0.73	0.73	0.61	0.73	0.73	0.76	0.61				0.76	
vC, conflicting volume	1650	2048	956	2024	2036	443	965				833	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	466	1011	605	979	995	0	620				145	
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 %	92	83	84	78	90	94	91				92	
cM capacity (veh/h)	243	138	259	88	141	793	569				1063	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	84	84	419	429	84	928						
Volume Left	19	19	50	0	84	0						
Volume Right	41	51	0	60	0	37						
cSH	204	222	569	1700	1063	1700						
Volume to Capacity	0.41	0.38	0.09	0.25	0.08	0.55						
Queue Length 95th (m)	14.1	12.7	2.2	0.0	2.0	0.0						
Control Delay (s)	34.4	30.8	2.6	0.0	8.7	0.0						
Lane LOS	D	D	A		A							
Approach Delay (s)	34.4	30.8	1.3		0.7							
Approach LOS	D	D										
Intersection Summary												
Average Delay				3.6								
Intersection Capacity Utilization				70.3%	ICU Level of Service			C				
Analysis Period (min)				15								

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	193	146	1045	231	727
v/c Ratio	0.44	0.24	0.82	0.79	0.64
Control Delay	31.4	14.0	22.7	44.6	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	31.4	14.0	22.7	44.6	7.8
Queue Length 50th (m)	27.7	13.4	56.1	39.5	27.0
Queue Length 95th (m)	43.1	20.8	80.2	m50.4	m40.6
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	434	614	1267	292	1141
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	0.44	0.24	0.82	0.79	0.64

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

10/29/2018

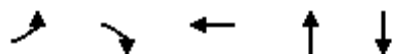
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	160	115	604	294	178	698
Future Volume (vph)	160	115	604	294	178	698
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.97	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.95		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1630	1418	3287		1755	1902
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1630	1418	3287		1755	1902
Peak-hour factor, PHF	0.83	0.79	0.85	0.88	0.77	0.96
Adj. Flow (vph)	193	146	711	334	231	727
RTOR Reduction (vph)	0	0	62	0	0	0
Lane Group Flow (vph)	193	146	983	0	231	727
Confl. Peds. (#/hr)	44	30		9	9	
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	12%	12%	3%	8%	4%	1%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	434	709	1205		292	1141
v/s Ratio Prot	c0.12	0.03	c0.30		c0.13	0.38
v/s Ratio Perm		0.07				
v/c Ratio	0.44	0.21	0.82		0.79	0.64
Uniform Delay, d1	27.5	15.9	25.8		36.0	11.7
Progression Factor	1.00	1.00	0.76		0.78	0.48
Incremental Delay, d2	3.3	0.7	4.4		14.5	2.0
Delay (s)	30.7	16.5	24.0		42.7	7.5
Level of Service	C	B	C		D	A
Approach Delay (s)	24.6		24.0			16.0
Approach LOS	C		C			B
Intersection Summary						
HCM 2000 Control Delay			20.8		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.69			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.0%		ICU Level of Service	D
Analysis Period (min)			15			

c Critical Lane Group

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	355	217	39	815	931
v/c Ratio	0.92	0.41	0.08	0.62	0.56
Control Delay	63.1	7.9	15.7	14.1	12.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	63.1	7.9	15.7	14.1	12.2
Queue Length 50th (m)	58.4	3.0	2.6	38.1	33.9
Queue Length 95th (m)	#79.4	14.6	9.8	48.7	40.0
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	400	543	490	1320	1668
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	0.89	0.40	0.08	0.62	0.56

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

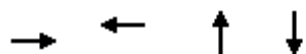
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	270	0	178	17	4	18	96	623	0	0	707	144
Future Volume (vph)	270	0	178	17	4	18	96	623	0	0	707	144
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	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	1.00		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.94			1.00			0.97	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1802		1406		1651			3412			3374	
Flt Permitted	0.73		1.00		0.98			0.63			1.00	
Satd. Flow (perm)	1388		1406		1651			2174			3374	
Peak-hour factor, PHF	0.76	0.38	0.82	1.00	1.00	1.00	0.90	0.88	0.25	0.25	0.93	0.84
Adj. Flow (vph)	355	0	217	17	4	18	107	708	0	0	760	171
RTOR Reduction (vph)	0	0	139	0	13	0	0	0	0	0	20	0
Lane Group Flow (vph)	355	0	78	0	26	0	0	815	0	0	911	0
Confl. Peds. (#/hr)	2		87	87		2	44		2	2		44
Confl. Bikes (#/hr)			3									3
Heavy Vehicles (%)	1%	0%	3%	0%	0%	0%	4%	5%	0%	0%	4%	1%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	25.0		25.0		25.0			53.0			44.0	
Effective Green, g (s)	25.0		25.0		25.0			53.0			44.0	
Actuated g/C Ratio	0.28		0.28		0.28			0.59			0.49	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	385		390		458			1362			1649	
v/s Ratio Prot								c0.04			0.27	
v/s Ratio Perm	c0.26		0.06		0.02			c0.31				
v/c Ratio	0.92		0.20		0.06			0.60			0.55	
Uniform Delay, d1	31.6		24.8		23.8			11.7			16.1	
Progression Factor	1.00		1.00		1.00			1.00			0.70	
Incremental Delay, d2	27.2		0.3		0.1			0.7			1.1	
Delay (s)	58.7		25.1		23.9			12.5			12.4	
Level of Service	E		C		C			B			B	
Approach Delay (s)		46.0			23.9			12.5			12.4	
Approach LOS		D			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			20.7									
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			90.0								15.0	
Intersection Capacity Utilization			83.0%								E	
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	602	658	108	170
v/c Ratio	0.57	0.56	0.33	0.51
Control Delay	10.7	18.8	23.3	25.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.7	18.8	23.3	25.3
Queue Length 50th (m)	47.2	89.9	10.4	15.4
Queue Length 95th (m)	72.1	110.1	16.8	23.9
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	1064	1169	437	436
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	0.57	0.56	0.25	0.39
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	37	424	37	22	482	27	20	43	23	21	47	47
Future Volume (vph)	37	424	37	22	482	27	20	43	23	21	47	47
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			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			1.00	
Frt		0.99			0.99			0.97			0.95	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1792			1881			1824			1760	
Flt Permitted		0.90			0.95			0.91			0.90	
Satd. Flow (perm)		1625			1790			1676			1608	
Peak-hour factor, PHF	0.67	0.87	0.62	0.59	0.82	0.82	0.85	0.71	1.00	0.50	0.73	0.73
Adj. Flow (vph)	55	487	60	37	588	33	24	61	23	42	64	64
RTOR Reduction (vph)	0	5	0	0	2	0	0	14	0	0	32	0
Lane Group Flow (vph)	0	597	0	0	656	0	0	94	0	0	138	0
Confl. Peds. (#/hr)	18		8	8		18	18		2	2		18
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		48.9			48.9			14.1			14.1	
Effective Green, g (s)		48.9			48.9			14.1			14.1	
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)		1059			1167			315			302	
v/s Ratio Prot												
v/s Ratio Perm		c0.37			0.37			0.06			c0.09	
v/c Ratio		0.56			0.56			0.30			0.46	
Uniform Delay, d1		7.2			7.2			26.2			27.1	
Progression Factor		1.00			1.99			1.00			1.00	
Incremental Delay, d2		2.2			1.8			0.5			1.1	
Delay (s)		9.4			16.0			26.7			28.2	
Level of Service		A			B			C			C	
Approach Delay (s)		9.4			16.0			26.7			28.2	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			15.5			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			60.6%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	7	9	85	7	15	70
Future Volume (Veh/h)	7	9	85	7	15	70
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.50	0.67	0.84	0.75	0.46	0.80
Hourly flow rate (vph)	14	13	101	9	33	88
Pedestrians	5					3
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	264	114			115	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	264	114			115	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	98	99			98	
cM capacity (veh/h)	709	937			1430	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	27	110	121			
Volume Left	14	0	33			
Volume Right	13	9	0			
cSH	803	1700	1430			
Volume to Capacity	0.03	0.06	0.02			
Queue Length 95th (m)	0.8	0.0	0.5			
Control Delay (s)	9.6	0.0	2.2			
Lane LOS	A		A			
Approach Delay (s)	9.6	0.0	2.2			
Approach LOS	A					
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			22.1%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	273	2	3	401	24	3	17	21	35	10	44
Future Volume (Veh/h)	36	273	2	3	401	24	3	17	21	35	10	44
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.81	0.25	0.38	0.77	0.75	0.75	0.63	0.75	0.83	0.56	0.63
Hourly flow rate (vph)	51	337	8	8	521	32	4	27	28	42	18	70
Pedestrians		9						13			16	
Lane Width (m)		3.7						3.7			3.7	
Walking Speed (m/s)		1.1						1.1			1.1	
Percent Blockage		1						1			2	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	569			358			1097	1041	354	1054	1029	562
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	569			358			1097	1041	354	1054	1029	562
tC, single (s)	4.1			4.1			7.1	6.6	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.3	3.5	4.0	3.3
p0 queue free %	95			99			97	87	96	74	92	86
cM capacity (veh/h)	997			1196			143	206	686	164	216	517
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	396	561	59	130								
Volume Left	51	8	4	42								
Volume Right	8	32	28	70								
cSH	997	1196	295	274								
Volume to Capacity	0.05	0.01	0.20	0.48								
Queue Length 95th (m)	1.2	0.2	5.6	18.2								
Control Delay (s)	1.6	0.2	20.2	29.5								
Lane LOS	A	A	C	D								
Approach Delay (s)	1.6	0.2	20.2	29.5								
Approach LOS			C	D								
Intersection Summary												
Average Delay			5.0									
Intersection Capacity Utilization			59.2%		ICU Level of Service				B			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	435	21	15	491	15	21	30	14	7	22	20
Future Volume (Veh/h)	20	435	21	15	491	15	21	30	14	7	22	20
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.53	0.84	0.56	0.65	0.85	0.65	0.75	0.72	0.60	0.50	0.59	0.71
Hourly flow rate (vph)	38	518	38	23	578	23	28	42	23	14	37	28
Pedestrians		7			1			11			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked	0.82			0.86			0.89	0.89	0.86	0.89	0.89	0.82
vC, conflicting volume	615			567			1313	1285	549	1308	1292	610
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	415			417			936	904	396	930	913	410
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 %	96			98			83	81	96	91	83	94
cM capacity (veh/h)	929			982			166	225	560	156	223	506
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	594	624	93	79								
Volume Left	38	23	28	14								
Volume Right	38	23	23	28								
cSH	929	982	235	254								
Volume to Capacity	0.04	0.02	0.40	0.31								
Queue Length 95th (m)	1.0	0.5	13.6	9.7								
Control Delay (s)	1.1	0.6	30.1	25.4								
Lane LOS	A	A	D	D								
Approach Delay (s)	1.1	0.6	30.1	25.4								
Approach LOS			D	D								
Intersection Summary												
Average Delay			4.2									
Intersection Capacity Utilization			47.0%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	6	2	5	3	3	6	43	10	8	48	1
Future Volume (Veh/h)	6	6	2	5	3	3	6	43	10	8	48	1
Sign Control	Stop				Stop				Free			
Grade	0%				0%				0%			
Peak Hour Factor	0.63	0.63	0.25	0.33	0.75	0.38	0.63	0.77	0.50	0.33	0.85	0.25
Hourly flow rate (vph)	10	10	8	15	4	8	10	56	20	24	56	4
Pedestrians	12				9				9			
Lane Width (m)	3.7				3.7				3.7			
Walking Speed (m/s)	1.1				1.1				1.1			
Percent Blockage	1				1				1			
Right turn flare (veh)												
Median type	None								None			
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	221	223	79	223	215	82	72				85	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	221	223	79	223	215	82	72				85	
tC, single (s)	7.1	6.7	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.2	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	98	99	98	99	99	99				98	
cM capacity (veh/h)	693	618	967	686	657	968	1523				1511	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	28	27	86	84								
Volume Left	10	15	10	24								
Volume Right	8	8	20	4								
cSH	720	746	1523	1511								
Volume to Capacity	0.04	0.04	0.01	0.02								
Queue Length 95th (m)	0.9	0.9	0.2	0.4								
Control Delay (s)	10.2	10.0	0.9	2.2								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.2	10.0	0.9	2.2								
Approach LOS	B	B										
Intersection Summary												
Average Delay			3.6									
Intersection Capacity Utilization			20.0%	ICU Level of Service				A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	7	54	0	0	61
Future Volume (Veh/h)	3	7	54	0	0	61
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.42	0.57	0.75	0.38	0.83
Hourly flow rate (vph)	12	17	95	0	0	73
Pedestrians	4					4
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	172	103			99	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	172	103			99	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	98			100	
cM capacity (veh/h)	819	950			1501	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	29	95	73			
Volume Left	12	0	0			
Volume Right	17	0	0			
cSH	891	1700	1501			
Volume to Capacity	0.03	0.06	0.00			
Queue Length 95th (m)	0.8	0.0	0.0			
Control Delay (s)	9.2	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.2	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		1.4				
Intersection Capacity Utilization		15.8%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

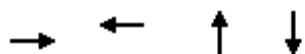
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	295	9	5	362	22	24	5	30	32	7	23
Future Volume (Veh/h)	22	295	9	5	362	22	24	5	30	32	7	23
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.68	0.94	0.50	0.59	0.83	0.25	0.58	0.33	0.65	0.84	0.50	0.83
Hourly flow rate (vph)	32	314	18	8	436	88	41	15	46	38	14	28
Pedestrians		4			1			13			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)												
pX, platoon unblocked												
vC, conflicting volume	538			345			935	954	337	952	919	498
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	538			345			935	954	337	952	919	498
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			81	94	93	81	95	95
cM capacity (veh/h)	1026			1210			211	244	691	202	256	566
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	364	532	102	80								
Volume Left	32	8	41	38								
Volume Right	18	88	46	28								
cSH	1026	1210	317	273								
Volume to Capacity	0.03	0.01	0.32	0.29								
Queue Length 95th (m)	0.7	0.2	10.3	9.0								
Control Delay (s)	1.1	0.2	21.7	23.5								
Lane LOS	A	A	C	C								
Approach Delay (s)	1.1	0.2	21.7	23.5								
Approach LOS			C	C								
Intersection Summary												
Average Delay			4.3									
Intersection Capacity Utilization			42.4%	ICU Level of Service					A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	556	634	245	110
v/c Ratio	0.49	0.55	0.66	0.31
Control Delay	6.3	11.1	32.0	21.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	6.3	11.1	32.0	21.0
Queue Length 50th (m)	21.8	48.5	26.9	10.0
Queue Length 95th (m)	29.4	74.2	33.1	14.6
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1130	1150	487	467
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	0.49	0.55	0.50	0.24
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	424	16	18	470	31	23	95	58	17	40	25
Future Volume (vph)	15	424	16	18	470	31	23	95	58	17	40	25
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			0.98			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		0.99			0.99			0.96			0.97	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1846			1875			1778			1809	
Flt Permitted		0.97			0.97			0.93			0.88	
Satd. Flow (perm)		1787			1817			1668			1612	
Peak-hour factor, PHF	0.65	0.84	0.58	0.67	0.83	0.75	0.63	0.71	0.78	0.75	0.67	0.92
Adj. Flow (vph)	23	505	28	27	566	41	37	134	74	23	60	27
RTOR Reduction (vph)	0	2	0	0	3	0	0	23	0	0	17	0
Lane Group Flow (vph)	0	554	0	0	631	0	0	222	0	0	93	0
Confl. Peds. (#/hr)	24		35	35		24	10		23	23		10
Confl. Bikes (#/hr)			2			2						1
Heavy Vehicles (%)	0%	3%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		47.3			47.3			15.7			15.7	
Effective Green, g (s)		47.3			47.3			15.7			15.7	
Actuated g/C Ratio		0.63			0.63			0.21			0.21	
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)		1127			1145			349			337	
v/s Ratio Prot												
v/s Ratio Perm		0.31			0.35			0.13			0.06	
v/c Ratio		0.49			0.55			0.64			0.27	
Uniform Delay, d1		7.4			7.8			27.0			24.9	
Progression Factor		0.57			1.00			1.00			1.00	
Incremental Delay, d2		1.4			1.9			3.8			0.4	
Delay (s)		5.6			9.8			30.8			25.3	
Level of Service		A			A			C			C	
Approach Delay (s)		5.6			9.8			30.8			25.3	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			12.7			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			58.1%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	2	19	3	2	2	8	160	8	3	84	3
Future Volume (Veh/h)	3	2	19	3	2	2	8	160	8	3	84	3
Sign Control	Stop				Stop				Free		Free	
Grade	0%				0%				0%		0%	
Peak Hour Factor	0.25	0.25	0.50	0.25	0.50	0.50	0.44	0.88	0.42	0.50	0.77	0.38
Hourly flow rate (vph)	12	8	38	12	4	4	18	182	19	6	109	8
Pedestrians	5				7				16		4	
Lane Width (m)	3.7				3.7				3.7		3.7	
Walking Speed (m/s)	1.1				1.1				1.1		1.1	
Percent Blockage	0				1				2		0	
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												355
pX, platoon unblocked												
vC, conflicting volume	368	374	134	418	368	202	122				208	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	368	374	134	418	368	202	122				208	
tC, single (s)	7.1	6.5	6.5	7.1	6.5	6.2	4.2				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.5	4.0	3.3	2.3				2.2	
p0 queue free %	98	99	95	98	99	100	99				100	
cM capacity (veh/h)	569	544	840	496	548	834	1387				1366	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	58	20	219	123								
Volume Left	12	12	18	6								
Volume Right	38	4	19	8								
cSH	715	551	1387	1366								
Volume to Capacity	0.08	0.04	0.01	0.00								
Queue Length 95th (m)	2.0	0.9	0.3	0.1								
Control Delay (s)	10.5	11.8	0.7	0.4								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.5	11.8	0.7	0.4								
Approach LOS	B	B										
Intersection Summary												
Average Delay				2.5								
Intersection Capacity Utilization				26.6%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	3	1	0	3	173	0	0	97	15
Future Volume (Veh/h)	0	0	0	3	1	0	3	173	0	0	97	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.94	0.25	0.25	0.84	0.50
Hourly flow rate (vph)	0	0	0	12	4	0	12	184	0	0	115	30
Pedestrians		3			20			8			8	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			2			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	351	361	141	366	376	212	148			204		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	351	361	141	366	376	212	148			204		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	100	100	100	98	99	100	99			100		
cM capacity (veh/h)	584	552	902	564	541	810	1442			1353		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	16	196	145								
Volume Left	0	12	12	0								
Volume Right	0	0	0	30								
cSH	1700	558	1442	1353								
Volume to Capacity	0.00	0.03	0.01	0.00								
Queue Length 95th (m)	0.0	0.7	0.2	0.0								
Control Delay (s)	0.0	11.6	0.5	0.0								
Lane LOS	A	B	A									
Approach Delay (s)	0.0	11.6	0.5	0.0								
Approach LOS	A	B										
Intersection Summary												
Average Delay			0.8									
Intersection Capacity Utilization			24.7%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	263	21	6	280	23	61	106	23	21	24	58
Future Volume (Veh/h)	45	263	21	6	280	23	61	106	23	21	24	58
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.87	0.64	0.63	0.84	0.63	0.74	0.82	0.63	0.53	0.58	0.83
Hourly flow rate (vph)	56	302	33	10	333	37	82	129	37	40	41	70
Pedestrians		7			9			15			9	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type	None				None							
Median storage (veh)												
Upstream signal (m)	207											
pX, platoon unblocked												
vC, conflicting volume	379			350			914	844	342	922	842	368
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	379			350			914	844	342	922	842	368
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 %	95			99			56	54	95	71	85	90
cM capacity (veh/h)	1153			1202			186	278	677	138	279	667
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	391	380	248	151								
Volume Left	56	10	82	40								
Volume Right	33	37	37	70								
cSH	1153	1202	258	279								
Volume to Capacity	0.05	0.01	0.96	0.54								
Queue Length 95th (m)	1.2	0.2	68.6	22.6								
Control Delay (s)	1.6	0.3	88.1	32.1								
Lane LOS	A	A	F	D								
Approach Delay (s)	1.6	0.3	88.1	32.1								
Approach LOS			F	D								
Intersection Summary												
Average Delay				23.4								
Intersection Capacity Utilization				61.1%	ICU Level of Service				B			
Analysis Period (min)				15								

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	182	218	233	176	299	143	204	652	73	88	630
v/c Ratio	0.68	0.57	0.56	0.53	0.72	0.50	0.70	0.85	0.10	0.34	0.82
Control Delay	34.1	36.6	9.6	25.8	42.3	15.5	24.1	26.9	1.2	13.6	34.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.1	36.6	9.6	25.8	42.3	15.5	24.1	26.9	1.2	13.6	34.6
Queue Length 50th (m)	20.5	32.1	0.0	19.8	45.7	4.6	5.7	110.5	0.9	7.1	96.5
Queue Length 95th (m)	27.8	42.0	12.3	34.0	66.7	15.3	m#17.7	m#182.4	m1.4	10.8	#155.5
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	268	450	448	335	486	318	291	764	710	262	765
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.48	0.52	0.53	0.62	0.45	0.70	0.85	0.10	0.34	0.82

Intersection Summary

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.

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	55	78	161	191	160	254	69	30	159	512	82	75
Future Volume (vph)	55	78	161	191	160	254	69	30	159	512	82	75
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.68	1.00	1.00	0.57		1.00	0.97		0.92
Flpb, ped/bikes		0.93	1.00	1.00	0.90	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	0.97		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1684	1762	1075	1644	1902	927		1798	1678		1431
Flt Permitted		0.34	1.00	1.00	0.51	1.00	1.00		0.17	1.00		1.00
Satd. Flow (perm)		608	1762	1075	875	1902	927		316	1678		1431
Peak-hour factor, PHF	0.71	0.74	0.74	0.82	0.91	0.85	0.79	0.54	0.78	0.95	0.78	0.93
Adj. Flow (vph)	77	105	218	233	176	299	87	56	204	539	105	81
RTOR Reduction (vph)	0	0	0	182	0	0	85	0	0	1	0	40
Lane Group Flow (vph)	0	182	218	51	176	299	58	0	204	651	0	33
Confl. Peds. (#/hr)	107	104		156	156		107	104	104		104	59
Confl. Bikes (#/hr)				3			4	4			7	7
Heavy Vehicles (%)	2%	0%	6%	0%	0%	1%	0%	0%	1%	3%	0%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		26.7	19.7	19.7	26.7	19.7	19.7		47.8	40.4		40.4
Effective Green, g (s)		26.7	19.7	19.7	26.7	19.7	19.7		47.8	40.4		40.4
Actuated g/C Ratio		0.30	0.22	0.22	0.30	0.22	0.22		0.53	0.45		0.45
Clearance Time (s)		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
Lane Grp Cap (vph)		264	385	235	319	416	202		289	753		642
v/s Ratio Prot		c0.05	0.12		0.04	c0.16			c0.06	c0.39		
v/s Ratio Perm		0.15		0.05	0.12		0.06		0.32			0.02
v/c Ratio		0.69	0.57	0.22	0.55	0.72	0.29		0.71	0.87		0.05
Uniform Delay, d1		26.0	31.3	28.8	25.3	32.6	29.3		15.6	22.3		14.0
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		0.95	0.62		0.63
Incremental Delay, d2		7.3	1.9	0.5	2.1	5.9	0.8		5.9	10.0		0.1
Delay (s)		33.3	33.3	29.3	27.3	38.4	30.1		20.7	23.8		9.0
Level of Service		C	C	C	C	D	C		C	C		A
Approach Delay (s)			31.8			33.3				22.0		
Approach LOS			C			C				C		
Intersection Summary												
HCM 2000 Control Delay			28.8			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			84.3%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	17	43	495	67
Future Volume (vph)	17	43	495	67
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.98	
Flpb, ped/bikes		1.00	1.00	
Frt		1.00	0.98	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1755	1805	
Flt Permitted		0.17	1.00	
Satd. Flow (perm)		312	1805	
Peak-hour factor, PHF	0.63	0.71	0.89	0.91
Adj. Flow (vph)	27	61	556	74
RTOR Reduction (vph)	0	0	5	0
Lane Group Flow (vph)	0	88	625	0
Confl. Peds. (#/hr)	104	59		104
Confl. Bikes (#/hr)				5
Heavy Vehicles (%)	0%	5%	2%	2%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		42.8	37.9	
Effective Green, g (s)		42.8	37.9	
Actuated g/C Ratio		0.48	0.42	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		226	760	
v/s Ratio Prot		0.02	0.35	
v/s Ratio Perm		0.16		
v/c Ratio		0.39	0.82	
Uniform Delay, d1		16.1	23.1	
Progression Factor		1.00	1.00	
Incremental Delay, d2		1.1	9.8	
Delay (s)		17.2	32.8	
Level of Service		B	C	
Approach Delay (s)			30.9	
Approach LOS			C	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	6	29	21	8	58	24	813	39	45	823	25
Future Volume (Veh/h)	6	6	29	21	8	58	24	813	39	45	823	25
Sign Control	Stop				Stop				Free			
Grade	0%				0%				0%			
Peak Hour Factor	0.63	0.63	0.78	0.75	0.44	0.83	0.80	0.95	0.80	0.80	0.95	0.80
Hourly flow rate (vph)	10	10	37	28	18	70	30	856	49	56	866	31
Pedestrians	52				63				3			
Lane Width (m)	3.7				3.7				3.7			
Walking Speed (m/s)	1.1				1.1				1.1			
Percent Blockage	5				6				0			
Right turn flare (veh)												
Median type	None								None			
Median storage (veh)												
Upstream signal (m)	94								144			
pX, platoon unblocked	0.75	0.75	0.64	0.75	0.75	0.76	0.64			0.76		
vC, conflicting volume	1618	2074	936	2026	2064	522	949			968		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	480	1084	613	1022	1072	0	633			338		
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 %	96	92	86	70	86	91	95			94		
cM capacity (veh/h)	231	130	265	93	132	777	579			883		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	57	116	458	477	56	897						
Volume Left	10	28	30	0	56	0						
Volume Right	37	70	0	49	0	31						
cSH	219	220	579	1700	883	1700						
Volume to Capacity	0.26	0.53	0.05	0.28	0.06	0.53						
Queue Length 95th (m)	7.6	21.0	1.2	0.0	1.5	0.0						
Control Delay (s)	27.1	38.3	1.5	0.0	9.4	0.0						
Lane LOS	D	E	A		A							
Approach Delay (s)	27.1	38.3	0.7		0.5							
Approach LOS	D	E										
Intersection Summary												
Average Delay			3.5									
Intersection Capacity Utilization			61.2%	ICU Level of Service				B				
Analysis Period (min)			15									

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	245	240	1021	223	754
v/c Ratio	0.54	0.37	0.81	0.76	0.65
Control Delay	33.5	15.5	26.3	57.3	21.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	33.5	15.5	26.3	57.3	21.1
Queue Length 50th (m)	36.2	23.4	84.1	35.9	105.5
Queue Length 95th (m)	54.4	34.4	84.1	m48.2	m144.6
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	454	649	1256	292	1152
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	0.54	0.37	0.81	0.76	0.65

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

10/29/2018

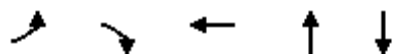
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	206	197	654	194	181	709
Future Volume (vph)	206	197	654	194	181	709
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.96	0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1706	1498	3320		1755	1921
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1706	1498	3320		1755	1921
Peak-hour factor, PHF	0.84	0.82	0.87	0.72	0.81	0.94
Adj. Flow (vph)	245	240	752	269	223	754
RTOR Reduction (vph)	0	0	40	0	0	0
Lane Group Flow (vph)	245	240	981	0	223	754
Confl. Peds. (#/hr)	48	42		34	34	
Confl. Bikes (#/hr)		3		5		
Heavy Vehicles (%)	7%	5%	1%	11%	4%	0%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	454	749	1217		292	1152
v/s Ratio Prot	c0.14	0.05	c0.30		0.13	c0.39
v/s Ratio Perm		0.11				
v/c Ratio	0.54	0.32	0.81		0.76	0.65
Uniform Delay, d1	28.3	16.8	25.6		35.8	11.9
Progression Factor	1.00	1.00	0.87		1.18	1.52
Incremental Delay, d2	4.5	1.1	5.0		13.9	2.3
Delay (s)	32.8	17.9	27.1		56.1	20.3
Level of Service	C	B	C		E	C
Approach Delay (s)	25.4		27.1			28.5
Approach LOS	C		C			C
Intersection Summary						
HCM 2000 Control Delay			27.3		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.71			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.0%		ICU Level of Service	D
Analysis Period (min)			15			

c Critical Lane Group

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	199	204	138	843	949
v/c Ratio	0.76	0.44	0.36	0.60	0.50
Control Delay	51.0	7.1	22.8	11.4	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	51.0	7.1	22.8	11.4	9.9
Queue Length 50th (m)	32.4	0.0	14.5	31.4	32.4
Queue Length 95th (m)	45.2	11.1	27.4	52.1	60.2
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	356	558	504	1404	1893
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	0.56	0.37	0.27	0.60	0.50
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

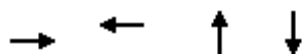
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	163	0	167	60	22	56	118	634	0	0	694	185
Future Volume (vph)	163	0	167	60	22	56	118	634	0	0	694	185
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	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Flpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	0.99		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.95			1.00			0.96	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1766		1432		1654			3473			3366	
Flt Permitted	0.67		1.00		0.98			0.59			1.00	
Satd. Flow (perm)	1236		1432		1654			2076			3366	
Peak-hour factor, PHF	0.82	0.25	0.82	1.00	1.00	1.00	0.85	0.90	0.25	0.25	0.96	0.82
Adj. Flow (vph)	199	0	204	60	22	56	139	704	0	0	723	226
RTOR Reduction (vph)	0	0	161	0	30	0	0	0	0	0	28	0
Lane Group Flow (vph)	199	0	43	0	108	0	0	843	0	0	921	0
Confl. Peds. (#/hr)	12		89	89		12	45		13	13		45
Confl. Bikes (#/hr)			1						5			1
Heavy Vehicles (%)	2%	0%	1%	0%	0%	0%	2%	3%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	19.1		19.1		19.1			58.9			49.9	
Effective Green, g (s)	19.1		19.1		19.1			58.9			49.9	
Actuated g/C Ratio	0.21		0.21		0.21			0.65			0.55	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	262		303		351			1451			1866	
v/s Ratio Prot								c0.04			0.27	
v/s Ratio Perm	c0.16		0.03		0.07			c0.34				
v/c Ratio	0.76		0.14		0.31			0.58			0.49	
Uniform Delay, d1	33.3		28.8		29.9			8.7			12.3	
Progression Factor	1.00		1.00		1.00			1.00			0.73	
Incremental Delay, d2	11.9		0.2		0.5			0.6			0.7	
Delay (s)	45.2		29.0		30.4			9.3			9.7	
Level of Service	D		C		C			A			A	
Approach Delay (s)		37.0			30.4			9.3			9.7	
Approach LOS		D			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			15.5				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			15.0		
Intersection Capacity Utilization			79.3%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	724	438	188	410
v/c Ratio	0.80	0.44	0.46	1.18
Control Delay	20.6	14.6	25.8	133.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.6	14.6	25.8	133.0
Queue Length 50th (m)	71.3	43.7	20.3	~63.9
Queue Length 95th (m)	92.6	63.1	32.4	#93.5
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	907	993	409	347
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	0.80	0.44	0.46	1.18

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	456	24	14	247	71	15	98	27	62	82	122
Future Volume (vph)	94	456	24	14	247	71	15	98	27	62	82	122
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			0.98			0.99			0.81	
Flpb, ped/bikes		0.99			1.00			0.98			0.99	
Frt		0.99			0.96			0.97			0.93	
Flt Protected		0.99			1.00			0.99			0.99	
Satd. Flow (prot)		1774			1755			1769			1391	
Flt Permitted		0.86			0.95			0.88			0.84	
Satd. Flow (perm)		1543			1663			1568			1188	
Peak-hour factor, PHF	0.83	0.80	0.59	0.55	0.83	0.62	0.60	0.79	0.69	0.60	0.79	0.60
Adj. Flow (vph)	113	570	41	25	298	115	25	124	39	103	104	203
RTOR Reduction (vph)	0	3	0	0	17	0	0	13	0	0	47	0
Lane Group Flow (vph)	0	721	0	0	421	0	0	175	0	0	363	0
Confl. Peds. (#/hr)	56		43	43		56	175		19	19		175
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	3%	5%	0%	4%	0%	0%	1%	5%	2%	3%	3%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		44.0			44.0			19.0			19.0	
Effective Green, g (s)		44.0			44.0			19.0			19.0	
Actuated g/C Ratio		0.59			0.59			0.25			0.25	
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)		905			975			397			300	
v/s Ratio Prot												
v/s Ratio Perm		c0.47			0.25			0.11			c0.31	
v/c Ratio		0.80			0.43			0.44			1.21	
Uniform Delay, d1		12.0			8.6			23.5			28.0	
Progression Factor		1.00			1.65			1.00			1.00	
Incremental Delay, d2		7.2			1.3			0.8			121.4	
Delay (s)		19.3			15.5			24.3			149.4	
Level of Service		B			B			C			F	
Approach Delay (s)		19.3			15.5			24.3			149.4	
Approach LOS		B			B			C			F	
Intersection Summary												
HCM 2000 Control Delay			49.2			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			101.9%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	9	122	10	14	132
Future Volume (Veh/h)	6	9	122	10	14	132
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.63	0.88	0.74	0.67	0.69	0.66
Hourly flow rate (vph)	10	10	165	15	20	200
Pedestrians	10		3			
Lane Width (m)	3.7		3.7			
Walking Speed (m/s)	1.1		1.1			
Percent Blockage	1		0			
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	426	182			190	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	426	182			190	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	98	99			98	
cM capacity (veh/h)	573	822			1330	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	20	180	220			
Volume Left	10	0	20			
Volume Right	10	15	0			
cSH	675	1700	1330			
Volume to Capacity	0.03	0.11	0.02			
Queue Length 95th (m)	0.7	0.0	0.3			
Control Delay (s)	10.5	0.0	0.8			
Lane LOS	B		A			
Approach Delay (s)	10.5	0.0	0.8			
Approach LOS	B					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			28.6%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	443	4	6	234	24	0	17	40	48	6	76
Future Volume (Veh/h)	69	443	4	6	234	24	0	17	40	48	6	76
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.76	0.78	0.38	0.31	0.80	0.79	0.25	0.58	0.47	0.81	0.31	0.56
Hourly flow rate (vph)	91	568	11	19	293	30	0	29	85	59	19	136
Pedestrians		44			6			9			7	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		4			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	330			588			1300	1132	588	1214	1123	359
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	330			588			1300	1132	588	1214	1123	359
tC, single (s)	4.1			4.1			7.1	6.6	6.2	7.1	6.7	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.3	3.5	4.2	3.3
p0 queue free %	93			98			100	84	83	44	89	79
cM capacity (veh/h)	1232			988			88	178	499	106	170	649
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	670	342	114	214								
Volume Left	91	19	0	59								
Volume Right	11	30	85	136								
cSH	1232	988	342	243								
Volume to Capacity	0.07	0.02	0.33	0.88								
Queue Length 95th (m)	1.8	0.4	10.9	55.6								
Control Delay (s)	1.9	0.7	20.7	74.0								
Lane LOS	A	A	C	F								
Approach Delay (s)	1.9	0.7	20.7	74.0								
Approach LOS			C	F								
Intersection Summary												
Average Delay			14.7									
Intersection Capacity Utilization			68.0%		ICU Level of Service				C			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	511	10	11	306	2	16	52	22	10	39	19
Future Volume (Veh/h)	17	511	10	11	306	2	16	52	22	10	39	19
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.80	0.67	0.75	0.91	0.50	0.41	0.81	0.64	0.67	0.43	0.42
Hourly flow rate (vph)	29	639	15	15	336	4	39	64	34	15	91	45
Pedestrians		9			2			25			24	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked	0.97			0.77			0.78	0.78	0.77	0.78	0.78	0.97
vC, conflicting volume	364			679			1197	1124	674	1164	1129	371
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	332			427			1031	937	420	990	944	339
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 %	98			98			55	66	93	86	52	93
cM capacity (veh/h)	1176			853			87	188	475	111	188	651
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	683	355	137	151								
Volume Left	29	15	39	15								
Volume Right	15	4	34	45								
cSH	1176	853	159	219								
Volume to Capacity	0.02	0.02	0.86	0.69								
Queue Length 95th (m)	0.6	0.4	44.9	33.3								
Control Delay (s)	0.7	0.6	94.7	51.4								
Lane LOS	A	A	F	F								
Approach Delay (s)	0.7	0.6	94.7	51.4								
Approach LOS			F	F								
Intersection Summary												
Average Delay			16.1									
Intersection Capacity Utilization			48.6%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	9	7	6	5	5	2	43	18	8	59	1
Future Volume (Veh/h)	6	9	7	6	5	5	2	43	18	8	59	1
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.58	0.38	0.63	0.50	0.50	0.50	0.73	0.63	0.42	0.56	0.25
Hourly flow rate (vph)	10	16	18	10	10	10	4	59	29	19	105	4
Pedestrians	7			6			12			4		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	1			1			1			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	252	254	126	270	242	84	116				94	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	252	254	126	270	242	84	116				94	
tC, single (s)	7.1	6.5	6.5	7.1	6.8	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.6	3.5	4.2	3.3	2.2				2.2	
p0 queue free %	99	97	98	98	98	99	100				99	
cM capacity (veh/h)	667	635	832	633	605	972	1475				1504	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	44	30	92	128								
Volume Left	10	10	4	19								
Volume Right	18	10	29	4								
cSH	712	704	1475	1504								
Volume to Capacity	0.06	0.04	0.00	0.01								
Queue Length 95th (m)	1.5	1.0	0.1	0.3								
Control Delay (s)	10.4	10.3	0.3	1.2								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.4	10.3	0.3	1.2								
Approach LOS	B	B										
Intersection Summary												
Average Delay				3.2								
Intersection Capacity Utilization				21.5%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	11	57	0	0	88
Future Volume (Veh/h)	6	11	57	0	0	88
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.75	0.53	0.33	0.25	0.46
Hourly flow rate (vph)	24	15	108	0	0	191
Pedestrians	6		1			3
Lane Width (m)	3.7		3.7			3.7
Walking Speed (m/s)	1.1		1.1			1.1
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	306	117			114	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	306	117			114	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	98			100	
cM capacity (veh/h)	685	932			1479	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	39	108	191			
Volume Left	24	0	0			
Volume Right	15	0	0			
cSH	763	1700	1479			
Volume to Capacity	0.05	0.06	0.00			
Queue Length 95th (m)	1.2	0.0	0.0			
Control Delay (s)	10.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	10.0	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		1.2				
Intersection Capacity Utilization		16.1%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

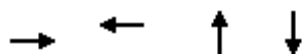
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	475	12	22	226	24	7	9	15	27	22	34
Future Volume (Veh/h)	26	475	12	22	226	24	7	9	15	27	22	34
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.85	0.36	0.75	0.88	0.53	0.75	0.58	0.50	0.64	0.50	0.52
Hourly flow rate (vph)	35	559	33	29	257	45	9	16	30	42	44	65
Pedestrians		3			2			14			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)												
pX, platoon unblocked												
vC, conflicting volume	305			606			1087	1022	592	1026	1016	286
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	305			606			1087	1022	592	1026	1016	286
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 %	97			97			94	93	94	76	80	91
cM capacity (veh/h)	1235			968			140	220	502	175	222	737
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	627	331	55	151								
Volume Left	35	29	9	42								
Volume Right	33	45	30	65								
cSH	1235	968	280	287								
Volume to Capacity	0.03	0.03	0.20	0.53								
Queue Length 95th (m)	0.7	0.7	5.4	21.7								
Control Delay (s)	0.8	1.1	21.0	30.7								
Lane LOS	A	A	C	D								
Approach Delay (s)	0.8	1.1	21.0	30.7								
Approach LOS			C	D								
Intersection Summary												
Average Delay			5.7									
Intersection Capacity Utilization			46.9%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	704	392	244	159
v/c Ratio	0.63	0.37	0.72	0.50
Control Delay	8.3	8.8	35.8	29.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	8.3	8.8	35.8	29.1
Queue Length 50th (m)	32.1	25.0	27.7	18.3
Queue Length 95th (m)	m47.9	44.1	31.1	25.8
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1124	1046	438	418
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	0.63	0.37	0.56	0.38

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	501	31	20	280	21	29	76	47	25	77	10
Future Volume (vph)	19	501	31	20	280	21	29	76	47	25	77	10
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			0.99			0.94			0.99	
Flpb, ped/bikes		1.00			1.00			0.99			0.97	
Frt		0.99			0.99			0.96			0.99	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1835			1790			1705			1777	
Flt Permitted		0.97			0.93			0.87			0.82	
Satd. Flow (perm)		1791			1666			1497			1480	
Peak-hour factor, PHF	0.63	0.79	0.78	0.67	0.87	0.53	0.48	0.66	0.68	0.63	0.74	0.67
Adj. Flow (vph)	30	634	40	30	322	40	60	115	69	40	104	15
RTOR Reduction (vph)	0	3	0	0	4	0	0	20	0	0	6	0
Lane Group Flow (vph)	0	701	0	0	388	0	0	224	0	0	153	0
Confl. Peds. (#/hr)	38		54	54		38	21		91	91		21
Confl. Bikes (#/hr)			3			1			1			
Heavy Vehicles (%)	7%	3%	0%	0%	4%	12%	0%	0%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		47.0			47.0			16.0			16.0	
Effective Green, g (s)		47.0			47.0			16.0			16.0	
Actuated g/C Ratio		0.63			0.63			0.21			0.21	
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)		1122			1044			319			315	
v/s Ratio Prot												
v/s Ratio Perm		c0.39			0.23			c0.15			0.10	
v/c Ratio		0.63			0.37			0.70			0.49	
Uniform Delay, d1		8.6			6.8			27.3			25.9	
Progression Factor		0.66			1.00			1.00			1.00	
Incremental Delay, d2		1.7			1.0			6.8			1.2	
Delay (s)		7.3			7.8			34.1			27.1	
Level of Service		A			A			C			C	
Approach Delay (s)		7.3			7.8			34.1			27.1	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			13.9				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			75.0				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			58.9%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	2	9	2	1	1	6	139	14	2	91	9
Future Volume (Veh/h)	17	2	9	2	1	1	6	139	14	2	91	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.63	0.25	0.25	0.25	0.25	0.25	0.63	0.60	0.67	0.50	0.79	0.44
Hourly flow rate (vph)	27	8	36	8	4	4	10	232	21	4	115	20
Pedestrians		5			13			10			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)											355	
pX, platoon unblocked												
vC, conflicting volume	410	424	140	458	424	258	140			266		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	410	424	140	458	424	258	140			266		
tC, single (s)	7.1	6.5	6.7	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.8	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	98	95	98	99	99	99			100		
cM capacity (veh/h)	534	511	783	466	511	773	1449			1293		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	71	16	263	139								
Volume Left	27	8	10	4								
Volume Right	36	4	21	20								
cSH	633	530	1449	1293								
Volume to Capacity	0.11	0.03	0.01	0.00								
Queue Length 95th (m)	2.9	0.7	0.2	0.1								
Control Delay (s)	11.4	12.0	0.3	0.2								
Lane LOS	B	B	A	A								
Approach Delay (s)	11.4	12.0	0.3	0.2								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.3									
Intersection Capacity Utilization			24.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	5	4	2	5	157	0	0	96	8
Future Volume (Veh/h)	0	0	0	5	4	2	5	157	0	0	96	8
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.50	0.50	0.50	0.50	0.75	0.50	0.50	0.65	0.38	0.25	0.66	0.25
Hourly flow rate (vph)	0	0	0	10	5	4	10	242	0	0	145	32
Pedestrians		10			16			6			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			2			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	442	449	177	445	465	261	187			258		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	442	449	177	445	465	261	187			258		
tC, single (s)	7.1	7.0	6.2	7.1	6.8	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.5	3.3	3.5	4.3	3.3	2.2			2.2		
p0 queue free %	100	100	100	98	99	99	99			100		
cM capacity (veh/h)	502	426	858	503	437	768	1386			1298		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	19	252	177								
Volume Left	0	10	10	0								
Volume Right	0	4	0	32								
cSH	1700	520	1386	1298								
Volume to Capacity	0.00	0.04	0.01	0.00								
Queue Length 95th (m)	0.0	0.9	0.2	0.0								
Control Delay (s)	0.0	12.2	0.4	0.0								
Lane LOS	A	B	A									
Approach Delay (s)	0.0	12.2	0.4	0.0								
Approach LOS	A	B										
Intersection Summary												
Average Delay			0.7									
Intersection Capacity Utilization			24.5%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	417	31	6	204	30	32	75	30	21	39	26
Future Volume (Veh/h)	70	417	31	6	204	30	32	75	30	21	39	26
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.74	0.78	0.69	0.42	0.88	0.75	0.65	0.63	0.75	0.75	0.65	0.53
Hourly flow rate (vph)	95	535	45	14	232	40	49	119	40	28	60	49
Pedestrians		12			7			15			5	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					207							
pX, platoon unblocked												
vC, conflicting volume	277			595			1134	1068	580	1139	1070	269
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	277			595			1134	1068	580	1139	1070	269
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.3
p0 queue free %	93			99			58	41	92	63	70	93
cM capacity (veh/h)	1291			977			117	200	507	77	200	750
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	675	286	208	137								
Volume Left	95	14	49	28								
Volume Right	45	40	40	49								
cSH	1291	977	191	187								
Volume to Capacity	0.07	0.01	1.09	0.73								
Queue Length 95th (m)	1.8	0.3	75.9	35.6								
Control Delay (s)	1.9	0.6	143.0	63.6								
Lane LOS	A	A	F	F								
Approach Delay (s)	1.9	0.6	143.0	63.6								
Approach LOS			F	F								
Intersection Summary												
Average Delay			30.6									
Intersection Capacity Utilization			61.6%		ICU Level of Service				B			
Analysis Period (min)			15									

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	233	213	239	113	180	80	149	477	115	55	788
v/c Ratio	0.67	0.54	0.52	0.31	0.48	0.24	0.68	0.63	0.15	0.13	0.96
Control Delay	32.3	35.6	8.3	21.2	34.6	4.6	38.7	28.9	10.5	10.6	50.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.3	35.6	8.3	21.2	34.6	4.6	38.7	28.9	10.5	10.6	50.6
Queue Length 50th (m)	27.1	31.3	0.0	12.2	25.8	0.0	19.2	60.8	4.3	4.3	~151.4
Queue Length 95th (m)	27.9	48.5	16.3	20.7	43.0	3.4	m25.6	m78.4	m6.7	8.7	#219.8
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	347	445	484	361	467	387	218	753	744	423	821
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.48	0.49	0.31	0.39	0.21	0.68	0.63	0.15	0.13	0.96

Intersection Summary

~ 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.

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

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	43	106	181	210	93	158	39	20	125	328	102	102
Future Volume (vph)	43	106	181	210	93	158	39	20	125	328	102	102
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.76	1.00	1.00	0.73		1.00	0.97		0.94
Flpb, ped/bikes		0.91	1.00	1.00	0.92	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	0.96		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1643	1745	1199	1671	1830	1198		1772	1602		1463
Flt Permitted		0.54	1.00	1.00	0.56	1.00	1.00		0.10	1.00		1.00
Satd. Flow (perm)		937	1745	1199	989	1830	1198		182	1602		1463
Peak-hour factor, PHF	0.73	0.61	0.85	0.88	0.82	0.88	0.78	0.67	0.84	0.97	0.81	0.80
Adj. Flow (vph)	59	174	213	239	113	180	50	30	149	338	126	128
RTOR Reduction (vph)	0	0	0	184	0	0	63	0	0	1	0	59
Lane Group Flow (vph)	0	233	213	55	113	180	17	0	149	476	0	56
Confl. Peds. (#/hr)	73	54		112	112		73	54	50		54	42
Confl. Bikes (#/hr)				2			1	1			1	1
Heavy Vehicles (%)	3%	0%	7%	1%	0%	5%	0%	0%	3%	6%	4%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		27.6	20.6	20.6	24.8	19.2	19.2		47.6	41.0		41.0
Effective Green, g (s)		27.6	20.6	20.6	24.8	19.2	19.2		47.6	41.0		41.0
Actuated g/C Ratio		0.31	0.23	0.23	0.28	0.21	0.21		0.53	0.46		0.46
Clearance Time (s)		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
Lane Grp Cap (vph)		342	399	274	314	390	255		212	729		666
v/s Ratio Prot		c0.05	0.12		0.02	0.10			c0.05	0.30		
v/s Ratio Perm		c0.16		0.05	0.08		0.01		0.32			0.04
v/c Ratio		0.68	0.53	0.20	0.36	0.46	0.07		0.70	0.65		0.08
Uniform Delay, d1		26.4	30.5	28.0	25.4	30.9	28.3		18.7	19.0		13.9
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		2.01	1.23		2.44
Incremental Delay, d2		5.5	1.4	0.4	0.7	0.9	0.1		7.2	3.2		0.2
Delay (s)		31.9	31.9	28.4	26.1	31.8	28.4		44.9	26.6		34.0
Level of Service		C	C	C	C	C	C		D	C		C
Approach Delay (s)			30.7			29.3				31.4		
Approach LOS			C			C				C		
Intersection Summary												
HCM 2000 Control Delay			36.5									HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			90.0									Sum of lost time (s) 18.0
Intersection Capacity Utilization			89.7%									ICU Level of Service E
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	9	29	706	37
Future Volume (vph)	9	29	706	37
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.99	
Flpb, ped/bikes		0.99	1.00	
Frt		1.00	0.99	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1802	1850	
Flt Permitted		0.34	1.00	
Satd. Flow (perm)		650	1850	
Peak-hour factor, PHF	0.44	0.82	0.95	0.83
Adj. Flow (vph)	20	35	743	45
RTOR Reduction (vph)	0	0	2	0
Lane Group Flow (vph)	0	55	786	0
Confl. Peds. (#/hr)	54	42		50
Confl. Bikes (#/hr)				7
Heavy Vehicles (%)	0%	0%	2%	7%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		44.0	39.2	
Effective Green, g (s)		44.0	39.2	
Actuated g/C Ratio		0.49	0.44	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		379	805	
v/s Ratio Prot		0.01	c0.42	
v/s Ratio Perm		0.06		
v/c Ratio		0.15	0.98	
Uniform Delay, d1		12.9	24.9	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.2	26.4	
Delay (s)		13.0	51.4	
Level of Service		B	D	
Approach Delay (s)			48.9	
Approach LOS			D	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	12	35	16	7	46	36	683	57	71	889	34
Future Volume (Veh/h)	6	12	35	16	7	46	36	683	57	71	889	34
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.31	0.50	0.78	0.81	0.50	0.84	0.66	0.95	0.88	0.79	0.95	0.84
Hourly flow rate (vph)	19	24	45	20	14	55	55	719	65	90	936	40
Pedestrians	37			35			9			9		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	4			3			1			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)							94			144		
pX, platoon unblocked	0.69	0.69	0.57	0.69	0.69	0.76	0.57				0.76	
vC, conflicting volume	1714	2102	1002	2078	2090	436	1013				819	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	512	1079	621	1045	1061	0	640				140	
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	79	81	71	88	93	89				92	
cM capacity (veh/h)	204	115	236	68	118	796	521				1072	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	88	89	414	424	90	976						
Volume Left	19	20	55	0	90	0						
Volume Right	45	55	0	65	0	40						
cSH	179	185	521	1700	1072	1700						
Volume to Capacity	0.49	0.48	0.11	0.25	0.08	0.57						
Queue Length 95th (m)	18.3	17.7	2.7	0.0	2.1	0.0						
Control Delay (s)	43.3	41.3	3.2	0.0	8.7	0.0						
Lane LOS	E	E	A		A							
Approach Delay (s)	43.3	41.3	1.6		0.7							
Approach LOS	E	E										
Intersection Summary												
Average Delay				4.6								
Intersection Capacity Utilization				75.0%	ICU Level of Service				D			
Analysis Period (min)				15								

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	208	156	1113	245	783
v/c Ratio	0.48	0.25	0.88	0.84	0.69
Control Delay	32.2	14.1	26.5	48.3	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	32.2	14.1	26.5	48.3	8.4
Queue Length 50th (m)	30.2	14.4	65.1	42.4	30.2
Queue Length 95th (m)	46.1	22.0	m94.4	m51.2	m42.5
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	434	614	1265	292	1141
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.48	0.25	0.88	0.84	0.69

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

10/29/2018

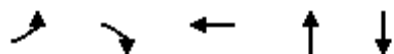
						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	173	123	649	307	189	752
Future Volume (vph)	173	123	649	307	189	752
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.97	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.95		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1630	1418	3292		1755	1902
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1630	1418	3292		1755	1902
Peak-hour factor, PHF	0.83	0.79	0.85	0.88	0.77	0.96
Adj. Flow (vph)	208	156	764	349	245	783
RTOR Reduction (vph)	0	0	59	0	0	0
Lane Group Flow (vph)	208	156	1054	0	245	783
Confl. Peds. (#/hr)	44	30		9	9	
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	12%	12%	3%	8%	4%	1%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	434	709	1207		292	1141
v/s Ratio Prot	c0.13	0.04	c0.32		c0.14	0.41
v/s Ratio Perm		0.07				
v/c Ratio	0.48	0.22	0.87		0.84	0.69
Uniform Delay, d1	27.7	16.0	26.6		36.3	12.2
Progression Factor	1.00	1.00	0.82		0.78	0.47
Incremental Delay, d2	3.8	0.7	5.7		17.5	2.3
Delay (s)	31.5	16.7	27.5		46.0	8.1
Level of Service	C	B	C		D	A
Approach Delay (s)	25.2		27.5			17.1
Approach LOS	C		C			B
Intersection Summary						
HCM 2000 Control Delay			22.9		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.73			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.6%		ICU Level of Service	D
Analysis Period (min)			15			

c Critical Lane Group

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	380	233	39	869	1004
v/c Ratio	0.96	0.43	0.08	0.70	0.61
Control Delay	69.8	8.9	15.7	16.4	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	69.8	8.9	15.7	16.4	12.8
Queue Length 50th (m)	64.2	5.0	2.6	41.4	36.9
Queue Length 95th (m)	#88.1	17.3	9.8	52.8	42.9
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	400	543	490	1237	1641
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	0.95	0.43	0.08	0.70	0.61

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

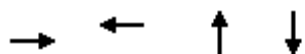
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	289	0	191	17	4	18	103	664	0	0	762	155
Future Volume (vph)	289	0	191	17	4	18	103	664	0	0	762	155
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	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	1.00		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.94			1.00			0.97	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1802		1406		1651			3413			3373	
Flt Permitted	0.73		1.00		0.98			0.60			1.00	
Satd. Flow (perm)	1388		1406		1651			2055			3373	
Peak-hour factor, PHF	0.76	0.38	0.82	1.00	1.00	1.00	0.90	0.88	0.25	0.25	0.93	0.84
Adj. Flow (vph)	380	0	233	17	4	18	114	755	0	0	819	185
RTOR Reduction (vph)	0	0	138	0	13	0	0	0	0	0	21	0
Lane Group Flow (vph)	380	0	95	0	26	0	0	869	0	0	983	0
Confl. Peds. (#/hr)	2		87	87		2	44		2	2		44
Confl. Bikes (#/hr)			3									3
Heavy Vehicles (%)	1%	0%	3%	0%	0%	0%	4%	5%	0%	0%	4%	1%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	25.7		25.7		25.7			52.3			43.3	
Effective Green, g (s)	25.7		25.7		25.7			52.3			43.3	
Actuated g/C Ratio	0.29		0.29		0.29			0.58			0.48	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	396		401		471			1284			1622	
v/s Ratio Prot								c0.05			0.29	
v/s Ratio Perm	c0.27		0.07		0.02			c0.35				
v/c Ratio	0.96		0.24		0.06			0.68			0.61	
Uniform Delay, d1	31.6		24.6		23.3			13.0			17.1	
Progression Factor	1.00		1.00		1.00			1.00			0.68	
Incremental Delay, d2	34.4		0.3		0.0			1.4			1.3	
Delay (s)	66.0		24.9		23.4			14.4			13.0	
Level of Service	E		C		C			B			B	
Approach Delay (s)		50.4			23.4			14.4			13.0	
Approach LOS		D			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			22.7				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			15.0		
Intersection Capacity Utilization			86.0%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	649	708	115	184
v/c Ratio	0.62	0.61	0.35	0.55
Control Delay	11.9	19.8	23.6	26.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	11.9	19.8	23.6	26.8
Queue Length 50th (m)	53.9	97.0	11.1	17.2
Queue Length 95th (m)	82.9	120.1	17.8	25.8
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	1049	1158	434	436
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	0.62	0.61	0.26	0.42
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	40	456	40	24	518	29	21	46	25	22	51	51
Future Volume (vph)	40	456	40	24	518	29	21	46	25	22	51	51
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			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			1.00	
Frt		0.99			0.99			0.97			0.95	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1792			1882			1823			1759	
Flt Permitted		0.89			0.94			0.90			0.90	
Satd. Flow (perm)		1606			1777			1660			1609	
Peak-hour factor, PHF	0.67	0.87	0.62	0.59	0.82	0.82	0.85	0.71	1.00	0.50	0.73	0.73
Adj. Flow (vph)	60	524	65	41	632	35	25	65	25	44	70	70
RTOR Reduction (vph)	0	5	0	0	2	0	0	15	0	0	32	0
Lane Group Flow (vph)	0	644	0	0	706	0	0	100	0	0	152	0
Confl. Peds. (#/hr)	18		8	8		18	18		2	2		18
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		48.8			48.8			14.2			14.2	
Effective Green, g (s)		48.8			48.8			14.2			14.2	
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)		1044			1156			314			304	
v/s Ratio Prot												
v/s Ratio Perm		c0.40			0.40			0.06			c0.09	
v/c Ratio		0.62			0.61			0.32			0.50	
Uniform Delay, d1		7.6			7.6			26.2			27.2	
Progression Factor		1.00			1.95			1.00			1.00	
Incremental Delay, d2		2.7			2.1			0.6			1.3	
Delay (s)		10.4			16.9			26.8			28.5	
Level of Service		B			B			C			C	
Approach Delay (s)		10.4			16.9			26.8			28.5	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			16.3									
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			75.0									
Intersection Capacity Utilization			63.8%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	7	10	92	7	16	76
Future Volume (Veh/h)	7	10	92	7	16	76
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.50	0.67	0.84	0.75	0.46	0.80
Hourly flow rate (vph)	14	15	110	9	35	95
Pedestrians	5					3
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	284	122			124	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	284	122			124	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	98	98			98	
cM capacity (veh/h)	689	927			1419	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	29	119	130			
Volume Left	14	0	35			
Volume Right	15	9	0			
cSH	794	1700	1419			
Volume to Capacity	0.04	0.07	0.02			
Queue Length 95th (m)	0.9	0.0	0.6			
Control Delay (s)	9.7	0.0	2.2			
Lane LOS	A		A			
Approach Delay (s)	9.7	0.0	2.2			
Approach LOS	A					
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			22.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	294	2	4	431	26	4	19	22	37	11	47
Future Volume (Veh/h)	39	294	2	4	431	26	4	19	22	37	11	47
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.81	0.25	0.38	0.77	0.75	0.75	0.63	0.75	0.83	0.56	0.63
Hourly flow rate (vph)	56	363	8	11	560	35	5	30	29	45	20	75
Pedestrians		9						13			16	
Lane Width (m)		3.7						3.7			3.7	
Walking Speed (m/s)		1.1						1.1			1.1	
Percent Blockage		1						1			2	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	611			384			1186	1125	380	1138	1112	602
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	611			384			1186	1125	380	1138	1112	602
tC, single (s)	4.1			4.1			7.1	6.6	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.3	3.5	4.0	3.3
p0 queue free %	94			99			96	84	96	67	90	85
cM capacity (veh/h)	962			1170			119	182	663	138	191	491
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	427	606	64	140								
Volume Left	56	11	5	45								
Volume Right	8	35	29	75								
cSH	962	1170	255	240								
Volume to Capacity	0.06	0.01	0.25	0.58								
Queue Length 95th (m)	1.4	0.2	7.3	25.3								
Control Delay (s)	1.8	0.3	23.8	39.2								
Lane LOS	A	A	C	E								
Approach Delay (s)	1.8	0.3	23.8	39.2								
Approach LOS			C	E								
Intersection Summary												
Average Delay			6.4									
Intersection Capacity Utilization			61.7%		ICU Level of Service				B			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	468	22	16	527	16	22	32	15	7	24	21
Future Volume (Veh/h)	21	468	22	16	527	16	22	32	15	7	24	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.53	0.84	0.56	0.65	0.85	0.65	0.75	0.72	0.60	0.50	0.59	0.71
Hourly flow rate (vph)	40	557	39	25	620	25	29	44	25	14	41	30
Pedestrians		7			1			11			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked	0.79			0.84			0.87	0.87	0.84	0.87	0.87	0.79
vC, conflicting volume	659			607			1408	1376	588	1401	1384	654
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	431			432			968	932	409	961	940	424
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 %	95			97			81	79	95	90	80	94
cM capacity (veh/h)	884			942			149	211	534	141	209	479
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	636	670	98	85								
Volume Left	40	25	29	14								
Volume Right	39	25	25	30								
cSH	884	942	218	238								
Volume to Capacity	0.05	0.03	0.45	0.36								
Queue Length 95th (m)	1.1	0.6	16.3	11.7								
Control Delay (s)	1.2	0.7	34.4	28.3								
Lane LOS	A	A	D	D								
Approach Delay (s)	1.2	0.7	34.4	28.3								
Approach LOS			D	D								
Intersection Summary												
Average Delay			4.7									
Intersection Capacity Utilization			49.8%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	6	2	5	4	4	6	46	10	9	51	1
Future Volume (Veh/h)	6	6	2	5	4	4	6	46	10	9	51	1
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.63	0.25	0.33	0.75	0.38	0.63	0.77	0.50	0.33	0.85	0.25
Hourly flow rate (vph)	10	10	8	15	5	11	10	60	20	27	60	4
Pedestrians	12			9			9			7		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	1			1			1			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	238	237	83	237	229	86	76				89	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	238	237	83	237	229	86	76				89	
tC, single (s)	7.1	6.7	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.2	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	98	99	98	99	99	99				98	
cM capacity (veh/h)	671	606	962	671	644	963	1518				1506	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	28	31	90	91								
Volume Left	10	15	10	27								
Volume Right	8	11	20	4								
cSH	705	746	1518	1506								
Volume to Capacity	0.04	0.04	0.01	0.02								
Queue Length 95th (m)	0.9	1.0	0.2	0.4								
Control Delay (s)	10.3	10.0	0.9	2.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.3	10.0	0.9	2.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay				3.7								
Intersection Capacity Utilization				20.3%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	7	58	0	0	66
Future Volume (Veh/h)	3	7	58	0	0	66
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.42	0.57	0.75	0.38	0.83
Hourly flow rate (vph)	12	17	102	0	0	80
Pedestrians	4					4
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	186	110			106	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	186	110			106	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	98			100	
cM capacity (veh/h)	805	941			1492	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	29	102	80			
Volume Left	12	0	0			
Volume Right	17	0	0			
cSH	880	1700	1492			
Volume to Capacity	0.03	0.06	0.00			
Queue Length 95th (m)	0.8	0.0	0.0			
Control Delay (s)	9.2	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.2	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		1.3				
Intersection Capacity Utilization		15.8%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

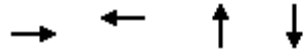
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	317	10	5	389	24	26	5	32	35	7	25
Future Volume (Veh/h)	24	317	10	5	389	24	26	5	32	35	7	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.68	0.94	0.50	0.59	0.83	0.25	0.58	0.33	0.65	0.84	0.50	0.83
Hourly flow rate (vph)	35	337	20	8	469	96	45	15	49	42	14	30
Pedestrians		4			1			13			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)												
pX, platoon unblocked												
vC, conflicting volume	579			370			1004	1025	361	1022	987	535
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	579			370			1004	1025	361	1022	987	535
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 %	96			99			76	93	93	76	94	94
cM capacity (veh/h)	991			1184			187	221	670	178	233	540
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	392	573	109	86								
Volume Left	35	8	45	42								
Volume Right	20	96	49	30								
cSH	991	1184	286	244								
Volume to Capacity	0.04	0.01	0.38	0.35								
Queue Length 95th (m)	0.8	0.2	13.1	11.5								
Control Delay (s)	1.1	0.2	25.2	27.5								
Lane LOS	A	A	D	D								
Approach Delay (s)	1.1	0.2	25.2	27.5								
Approach LOS			D	D								
Intersection Summary												
Average Delay			4.9									
Intersection Capacity Utilization			45.4%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	597	683	263	118
v/c Ratio	0.53	0.60	0.70	0.33
Control Delay	6.8	12.1	33.6	21.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	6.8	12.1	33.6	21.4
Queue Length 50th (m)	23.4	54.9	29.5	11.0
Queue Length 95th (m)	32.4	83.4	35.7	15.6
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1118	1136	487	457
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	0.53	0.60	0.54	0.26
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	16	456	17	20	505	34	25	102	62	19	43	27
Future Volume (vph)	16	456	17	20	505	34	25	102	62	19	43	27
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			0.98			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		0.99			0.99			0.96			0.97	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1847			1875			1778			1809	
Flt Permitted		0.96			0.96			0.93			0.86	
Satd. Flow (perm)		1780			1808			1668			1578	
Peak-hour factor, PHF	0.65	0.84	0.58	0.67	0.83	0.75	0.63	0.71	0.78	0.75	0.67	0.92
Adj. Flow (vph)	25	543	29	30	608	45	40	144	79	25	64	29
RTOR Reduction (vph)	0	2	0	0	3	0	0	23	0	0	17	0
Lane Group Flow (vph)	0	595	0	0	680	0	0	240	0	0	101	0
Confl. Peds. (#/hr)	24		35	35		24	10		23	23		10
Confl. Bikes (#/hr)			2			2						1
Heavy Vehicles (%)	0%	3%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		47.0			47.0			16.0			16.0	
Effective Green, g (s)		47.0			47.0			16.0			16.0	
Actuated g/C Ratio		0.63			0.63			0.21			0.21	
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)		1115			1133			355			336	
v/s Ratio Prot												
v/s Ratio Perm		0.33			0.38			0.14			0.06	
v/c Ratio		0.53			0.60			0.68			0.30	
Uniform Delay, d1		7.9			8.4			27.1			24.8	
Progression Factor		0.57			1.00			1.00			1.00	
Incremental Delay, d2		1.6			2.4			5.0			0.5	
Delay (s)		6.0			10.7			32.2			25.3	
Level of Service		A			B			C			C	
Approach Delay (s)		6.0			10.7			32.2			25.3	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			13.5									
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			75.0									
Intersection Capacity Utilization			61.3%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	2	21	4	2	2	9	173	8	3	91	4
Future Volume (Veh/h)	3	2	21	4	2	2	9	173	8	3	91	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.50	0.25	0.50	0.50	0.44	0.88	0.42	0.50	0.77	0.38
Hourly flow rate (vph)	12	8	42	16	4	4	20	197	19	6	118	11
Pedestrians		5			7			16			4	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			2			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)											355	
pX, platoon unblocked												
vC, conflicting volume	397	404	144	451	400	218	134			223		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	397	404	144	451	400	218	134			223		
tC, single (s)	7.1	6.5	6.5	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	98	98	95	97	99	100	99			100		
cM capacity (veh/h)	543	523	828	468	525	818	1373			1349		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	62	24	236	135								
Volume Left	12	16	20	6								
Volume Right	42	4	19	11								
cSH	703	514	1373	1349								
Volume to Capacity	0.09	0.05	0.01	0.00								
Queue Length 95th (m)	2.2	1.1	0.3	0.1								
Control Delay (s)	10.6	12.4	0.8	0.4								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.6	12.4	0.8	0.4								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.6									
Intersection Capacity Utilization			27.7%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	4	1	0	4	186	0	0	104	16
Future Volume (Veh/h)	0	0	0	4	1	0	4	186	0	0	104	16
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.94	0.25	0.25	0.84	0.50
Hourly flow rate (vph)	0	0	0	16	4	0	16	198	0	0	124	32
Pedestrians	3			20			8			8		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	0			2			1			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	383	393	151	398	409	226	159				218	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	383	393	151	398	409	226	159				218	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	100	100	100	97	99	100	99				100	
cM capacity (veh/h)	555	528	891	536	517	796	1429				1337	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	20	214	156								
Volume Left	0	16	16	0								
Volume Right	0	0	0	32								
cSH	1700	532	1429	1337								
Volume to Capacity	0.00	0.04	0.01	0.00								
Queue Length 95th (m)	0.0	0.9	0.3	0.0								
Control Delay (s)	0.0	12.0	0.7	0.0								
Lane LOS	A	B	A									
Approach Delay (s)	0.0	12.0	0.7	0.0								
Approach LOS	A	B										
Intersection Summary												
Average Delay				1.0								
Intersection Capacity Utilization				25.5%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	48	282	22	6	300	25	66	114	25	23	26	62
Future Volume (Veh/h)	48	282	22	6	300	25	66	114	25	23	26	62
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.87	0.64	0.63	0.84	0.63	0.74	0.82	0.63	0.53	0.58	0.83
Hourly flow rate (vph)	59	324	34	10	357	40	89	139	40	43	45	75
Pedestrians		7			9			15			9	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					207							
pX, platoon unblocked												
vC, conflicting volume	406			373			976	900	365	984	897	393
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	406			373			976	900	365	984	897	393
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 %	95			99			45	46	94	62	83	88
cM capacity (veh/h)	1127			1179			162	257	658	112	258	646
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	417	407	268	163								
Volume Left	59	10	89	43								
Volume Right	34	40	40	75								
cSH	1127	1179	233	242								
Volume to Capacity	0.05	0.01	1.15	0.67								
Queue Length 95th (m)	1.3	0.2	94.6	32.8								
Control Delay (s)	1.7	0.3	149.7	46.0								
Lane LOS	A	A	F	E								
Approach Delay (s)	1.7	0.3	149.7	46.0								
Approach LOS			F	E								
Intersection Summary												
Average Delay			38.6									
Intersection Capacity Utilization			64.6%		ICU Level of Service				C			
Analysis Period (min)			15									

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	199	235	250	189	321	154	218	699	77	95	677
v/c Ratio	0.77	0.60	0.60	0.58	0.76	0.53	0.82	0.92	0.11	0.43	0.93
Control Delay	42.3	37.5	11.5	27.5	44.4	17.3	44.9	34.6	1.1	16.4	47.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.3	37.5	11.5	27.5	44.4	17.3	44.9	34.6	1.1	16.4	47.1
Queue Length 50th (m)	22.7	35.0	2.4	21.4	49.8	6.1	~24.2	~138.1	0.8	7.6	108.3
Queue Length 95th (m)	30.2	45.1	15.9	36.3	71.8	17.7	m#41.7	m#190.5	m1.6	11.5	#174.5
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	257	450	447	328	486	318	265	757	704	219	728
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.52	0.56	0.58	0.66	0.48	0.82	0.92	0.11	0.43	0.93

Intersection Summary

~ 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.

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

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	60	84	174	205	172	273	75	32	170	548	88	80
Future Volume (vph)	60	84	174	205	172	273	75	32	170	548	88	80
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.68	1.00	1.00	0.57		1.00	0.97		0.92
Flpb, ped/bikes		0.94	1.00	1.00	0.91	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	0.97		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1707	1762	1075	1663	1902	927		1807	1677		1431
Flt Permitted		0.31	1.00	1.00	0.47	1.00	1.00		0.10	1.00		1.00
Satd. Flow (perm)		549	1762	1075	830	1902	927		195	1677		1431
Peak-hour factor, PHF	0.71	0.74	0.74	0.82	0.91	0.85	0.79	0.54	0.78	0.95	0.78	0.93
Adj. Flow (vph)	85	114	235	250	189	321	95	59	218	577	113	86
RTOR Reduction (vph)	0	0	0	180	0	0	85	0	0	1	0	43
Lane Group Flow (vph)	0	199	235	70	189	321	69	0	218	698	0	34
Confl. Peds. (#/hr)	107	104		156	156		107	104	104		104	59
Confl. Bikes (#/hr)				3			4	4			7	7
Heavy Vehicles (%)	2%	0%	6%	0%	0%	1%	0%	0%	1%	3%	0%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		27.0	20.0	20.0	27.0	20.0	20.0		48.0	40.0		40.0
Effective Green, g (s)		27.0	20.0	20.0	27.0	20.0	20.0		48.0	40.0		40.0
Actuated g/C Ratio		0.30	0.22	0.22	0.30	0.22	0.22		0.53	0.44		0.44
Clearance Time (s)		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
Lane Grp Cap (vph)		254	391	238	313	422	206		263	745		636
v/s Ratio Prot		c0.06	0.13		0.05	0.17			c0.08	c0.42		
v/s Ratio Perm		c0.17		0.06	0.13		0.07		0.36			0.02
v/c Ratio		0.78	0.60	0.29	0.60	0.76	0.34		0.83	0.94		0.05
Uniform Delay, d1		26.9	31.4	29.1	25.6	32.8	29.4		20.0	23.8		14.2
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.37	0.63		0.52
Incremental Delay, d2		14.5	2.6	0.7	3.3	7.9	1.0		14.7	16.9		0.1
Delay (s)		41.4	34.0	29.8	28.8	40.6	30.4		42.2	31.9		7.6
Level of Service		D	C	C	C	D	C		D	C		A
Approach Delay (s)			34.6			34.9				32.3		
Approach LOS			C			C				C		
Intersection Summary												
HCM 2000 Control Delay			35.9			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)				18.0		
Intersection Capacity Utilization			87.8%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations		LT	LT	LT
Traffic Volume (vph)	19	46	532	72
Future Volume (vph)	19	46	532	72
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.98	
Flpb, ped/bikes		1.00	1.00	
Frt		1.00	0.98	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1760	1806	
Flt Permitted		0.12	1.00	
Satd. Flow (perm)		226	1806	
Peak-hour factor, PHF	0.63	0.71	0.89	0.91
Adj. Flow (vph)	30	65	598	79
RTOR Reduction (vph)	0	0	5	0
Lane Group Flow (vph)	0	95	672	0
Confl. Peds. (#/hr)	104	59		104
Confl. Bikes (#/hr)				5
Heavy Vehicles (%)	0%	5%	2%	2%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		41.1	36.1	
Effective Green, g (s)		41.1	36.1	
Actuated g/C Ratio		0.46	0.40	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		188	724	
v/s Ratio Prot		0.03	0.37	
v/s Ratio Perm		0.20		
v/c Ratio		0.51	0.93	
Uniform Delay, d1		17.9	25.7	
Progression Factor		1.00	1.00	
Incremental Delay, d2		2.1	19.8	
Delay (s)		20.1	45.5	
Level of Service		C	D	
Approach Delay (s)			42.4	
Approach LOS			D	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	6	31	22	9	62	26	871	42	48	884	27
Future Volume (Veh/h)	6	6	31	22	9	62	26	871	42	48	884	27
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.63	0.78	0.75	0.44	0.83	0.80	1.00	0.80	0.80	1.00	0.80
Hourly flow rate (vph)	10	10	40	29	20	75	33	871	53	60	884	34
Pedestrians	52			63			3			6		
Lane Width (m)	3.7			3.7			3.7			3.7		
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)							94			144		
pX, platoon unblocked	0.72	0.72	0.59	0.72	0.72	0.74	0.59				0.74	
vC, conflicting volume	1666	2126	956	2078	2116	531	970				987	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	395	1037	577	971	1024	0	601				296	
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 %	96	92	85	69	85	90	94				93	
cM capacity (veh/h)	245	131	259	94	133	758	552				892	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	60	124	468	488	60	918						
Volume Left	10	29	33	0	60	0						
Volume Right	40	75	0	53	0	34						
cSH	221	222	552	1700	892	1700						
Volume to Capacity	0.27	0.56	0.06	0.29	0.07	0.54						
Queue Length 95th (m)	8.1	23.2	1.4	0.0	1.6	0.0						
Control Delay (s)	27.3	40.1	1.7	0.0	9.3	0.0						
Lane LOS	D	E	A		A							
Approach Delay (s)	27.3	40.1	0.8		0.6							
Approach LOS	D	E										
Intersection Summary												
Average Delay				3.8								
Intersection Capacity Utilization				65.1%	ICU Level of Service					C		
Analysis Period (min)				15								

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	264	257	1092	238	813
v/c Ratio	0.58	0.40	0.87	0.82	0.71
Control Delay	34.7	15.9	29.2	62.0	23.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	34.7	15.9	29.2	62.0	23.4
Queue Length 50th (m)	39.5	25.4	89.0	39.1	117.3
Queue Length 95th (m)	58.7	36.9	100.5	m48.9	m147.1
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	454	649	1257	292	1152
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	0.58	0.40	0.87	0.82	0.71

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

10/29/2018

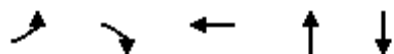
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	222	211	702	205	193	764
Future Volume (vph)	222	211	702	205	193	764
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.96	0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1706	1498	3323		1755	1921
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1706	1498	3323		1755	1921
Peak-hour factor, PHF	0.84	0.82	0.87	0.72	0.81	0.94
Adj. Flow (vph)	264	257	807	285	238	813
RTOR Reduction (vph)	0	0	39	0	0	0
Lane Group Flow (vph)	264	257	1053	0	238	813
Confl. Peds. (#/hr)	48	42		34	34	
Confl. Bikes (#/hr)		3		5		
Heavy Vehicles (%)	7%	5%	1%	11%	4%	0%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	454	749	1218		292	1152
v/s Ratio Prot	c0.15	0.06	c0.32		0.14	c0.42
v/s Ratio Perm		0.11				
v/c Ratio	0.58	0.34	0.86		0.82	0.71
Uniform Delay, d1	28.6	17.0	26.4		36.2	12.5
Progression Factor	1.00	1.00	0.87		1.21	1.57
Incremental Delay, d2	5.4	1.3	6.8		17.0	2.8
Delay (s)	34.0	18.2	29.7		60.8	22.4
Level of Service	C	B	C		E	C
Approach Delay (s)	26.2		29.7			31.1
Approach LOS	C		C			C
Intersection Summary						
HCM 2000 Control Delay			29.6		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.76			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.0%		ICU Level of Service	D
Analysis Period (min)			15			

c Critical Lane Group

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	213	220	138	906	1022
v/c Ratio	0.78	0.45	0.35	0.68	0.55
Control Delay	52.1	6.9	22.3	13.8	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	52.1	6.9	22.3	13.8	11.0
Queue Length 50th (m)	34.6	0.0	14.3	36.0	41.8
Queue Length 95th (m)	48.3	11.4	27.4	57.1	67.9
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	357	570	504	1323	1867
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	0.60	0.39	0.27	0.68	0.55
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018

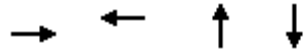
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	175	0	180	60	22	56	127	681	0	0	748	199
Future Volume (vph)	175	0	180	60	22	56	127	681	0	0	748	199
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0		6.0			6.0			6.0	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Flpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	0.99		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.95			1.00			0.96	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1765		1432		1654			3474			3366	
Flt Permitted	0.67		1.00		0.98			0.56			1.00	
Satd. Flow (perm)	1240		1432		1654			1971			3366	
Peak-hour factor, PHF	0.82	0.25	0.82	1.00	1.00	1.00	0.85	0.90	0.25	0.25	0.96	0.82
Adj. Flow (vph)	213	0	220	60	22	56	149	757	0	0	779	243
RTOR Reduction (vph)	0	0	172	0	30	0	0	0	0	0	28	0
Lane Group Flow (vph)	213	0	48	0	108	0	0	906	0	0	994	0
Confl. Peds. (#/hr)	12		89	89		12	45		13	13		45
Confl. Bikes (#/hr)			1						5			1
Heavy Vehicles (%)	2%	0%	1%	0%	0%	0%	2%	3%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	19.8		19.8		19.8			58.2			49.2	
Effective Green, g (s)	19.8		19.8		19.8			58.2			49.2	
Actuated g/C Ratio	0.22		0.22		0.22			0.65			0.55	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	272		315		363			1374			1840	
v/s Ratio Prot								c0.04			0.30	
v/s Ratio Perm	c0.17		0.03		0.07			c0.38				
v/c Ratio	0.78		0.15		0.30			0.66			0.54	
Uniform Delay, d1	33.1		28.3		29.3			9.8			13.1	
Progression Factor	1.00		1.00		1.00			1.00			0.76	
Incremental Delay, d2	13.7		0.2		0.5			1.2			0.8	
Delay (s)	46.7		28.6		29.8			11.0			10.8	
Level of Service	D		C		C			B			B	
Approach Delay (s)		37.5			29.8			11.0			10.8	
Approach LOS		D			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			16.5				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			15.0		
Intersection Capacity Utilization			81.2%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Appendix G: Synchro Worksheets for Closure of Dublin Street at Rail Crossing

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	661	392	231	349
v/c Ratio	0.72	0.43	0.58	1.05
Control Delay	16.4	15.5	30.0	89.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	16.4	15.5	30.0	89.8
Queue Length 50th (m)	59.3	40.1	27.2	~47.6
Queue Length 95th (m)	70.0	60.5	40.8	#76.9
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	924	910	399	332
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	0.72	0.43	0.58	1.05

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	80	389	31	29	201	60	22	127	23	53	70	103
Future Volume (vph)	80	389	31	29	201	60	22	127	23	53	70	103
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			0.99			0.81	
Flpb, ped/bikes		0.99			1.00			0.97			0.99	
Frt		0.99			0.97			0.98			0.93	
Flt Protected		0.99			0.99			0.99			0.99	
Satd. Flow (prot)		1765			1756			1780			1394	
Flt Permitted		0.88			0.86			0.86			0.80	
Satd. Flow (perm)		1570			1525			1545			1132	
Peak-hour factor, PHF	0.83	0.76	0.59	0.55	0.83	0.62	0.60	0.79	0.69	0.60	0.79	0.60
Adj. Flow (vph)	96	512	53	53	242	97	37	161	33	88	89	172
RTOR Reduction (vph)	0	4	0	0	16	0	0	8	0	0	46	0
Lane Group Flow (vph)	0	657	0	0	376	0	0	223	0	0	303	0
Confl. Peds. (#/hr)	56		43	43		56	175		19	19		175
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	3%	5%	0%	4%	0%	0%	1%	5%	2%	3%	3%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		44.0			44.0			19.0			19.0	
Effective Green, g (s)		44.0			44.0			19.0			19.0	
Actuated g/C Ratio		0.59			0.59			0.25			0.25	
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)		921			894			391			286	
v/s Ratio Prot												
v/s Ratio Perm		c0.42			0.25			0.14			c0.27	
v/c Ratio		0.71			0.42			0.57			1.06	
Uniform Delay, d1		11.0			8.5			24.4			28.0	
Progression Factor		1.00			1.77			1.00			1.00	
Incremental Delay, d2		4.7			1.4			1.9			69.4	
Delay (s)		15.7			16.5			26.3			97.4	
Level of Service		B			B			C			F	
Approach Delay (s)		15.7			16.5			26.3			97.4	
Approach LOS		B			B			C			F	
Intersection Summary												
HCM 2000 Control Delay			34.9									
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			75.0									
Intersection Capacity Utilization			77.2%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	7	156	8	12	140
Future Volume (Veh/h)	5	7	156	8	12	140
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.63	0.88	0.74	0.67	0.69	0.66
Hourly flow rate (vph)	8	8	211	12	17	212
Pedestrians	10		3			
Lane Width (m)	3.7		3.7			
Walking Speed (m/s)	1.1		1.1			
Percent Blockage	1		0			
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	476	227			233	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	476	227			233	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	99	99			99	
cM capacity (veh/h)	537	776			1282	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	16	223	229			
Volume Left	8	0	17			
Volume Right	8	12	0			
cSH	635	1700	1282			
Volume to Capacity	0.03	0.13	0.01			
Queue Length 95th (m)	0.6	0.0	0.3			
Control Delay (s)	10.8	0.0	0.7			
Lane LOS	B		A			
Approach Delay (s)	10.8	0.0	0.7			
Approach LOS	B					
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			27.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	345	3	5	196	38	0	15	34	41	30	67
Future Volume (Veh/h)	93	345	3	5	196	38	0	15	34	41	30	67
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.76	0.78	0.38	0.31	0.80	0.79	0.25	0.58	0.47	0.81	0.31	0.56
Hourly flow rate (vph)	122	442	8	16	245	48	0	26	72	51	97	120
Pedestrians		44			6			9			7	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		4			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	300			459			1212	1031	461	1089	1011	320
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	300			459			1212	1031	461	1089	1011	320
tC, single (s)	4.1			4.1			7.1	6.6	6.2	7.1	6.7	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.3	3.5	4.2	3.3
p0 queue free %	90			99			100	87	88	63	50	82
cM capacity (veh/h)	1264			1103			70	200	590	138	195	683
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	572	309	98	268								
Volume Left	122	16	0	51								
Volume Right	8	48	72	120								
cSH	1264	1103	389	257								
Volume to Capacity	0.10	0.01	0.25	1.04								
Queue Length 95th (m)	2.4	0.3	7.5	81.5								
Control Delay (s)	2.6	0.6	17.3	110.0								
Lane LOS	A	A	C	F								
Approach Delay (s)	2.6	0.6	17.3	110.0								
Approach LOS			C	F								
Intersection Summary												
Average Delay			26.3									
Intersection Capacity Utilization			63.0%	ICU Level of Service					B			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	416	15	50	255	2	14	44	19	8	33	16
Future Volume (Veh/h)	15	416	15	50	255	2	14	44	19	8	33	16
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.80	0.67	0.75	0.91	0.50	0.41	0.81	0.64	0.67	0.43	0.42
Hourly flow rate (vph)	26	520	22	67	280	4	34	54	30	12	77	38
Pedestrians		9			2			25			24	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked	0.97			0.83			0.85	0.85	0.83	0.85	0.85	0.97
vC, conflicting volume	308			567			1110	1050	558	1082	1059	315
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	271			382			961	891	371	929	902	279
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 %	98			93			71	74	95	92	63	95
cM capacity (veh/h)	1235			967			119	208	552	141	206	703
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	568	351	118	127								
Volume Left	26	67	34	12								
Volume Right	22	4	30	38								
cSH	1235	967	196	248								
Volume to Capacity	0.02	0.07	0.60	0.51								
Queue Length 95th (m)	0.5	1.7	25.6	20.4								
Control Delay (s)	0.6	2.3	47.7	33.9								
Lane LOS	A	A	E	D								
Approach Delay (s)	0.6	2.3	47.7	33.9								
Approach LOS			E	D								
Intersection Summary												
Average Delay			9.5									
Intersection Capacity Utilization			49.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	7	6	9	4	4	2	53	18	5	70	1
Future Volume (Veh/h)	5	7	6	9	4	4	2	53	18	5	70	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.63	0.58	0.38	0.63	0.50	0.50	0.50	0.73	0.63	0.42	0.56	0.25
Hourly flow rate (vph)	8	12	16	14	8	8	4	73	29	12	125	4
Pedestrians		7			6			12			4	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	270	274	146	286	262	98	136			108		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	270	274	146	286	262	98	136			108		
tC, single (s)	7.1	6.5	6.5	7.1	6.8	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.6	3.5	4.2	3.3	2.2			2.2		
p0 queue free %	99	98	98	98	99	99	100			99		
cM capacity (veh/h)	655	622	810	624	592	955	1451			1486		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	36	30	106	141								
Volume Left	8	14	4	12								
Volume Right	16	8	29	4								
cSH	702	677	1451	1486								
Volume to Capacity	0.05	0.04	0.00	0.01								
Queue Length 95th (m)	1.2	1.1	0.1	0.2								
Control Delay (s)	10.4	10.6	0.3	0.7								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.4	10.6	0.3	0.7								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.6									
Intersection Capacity Utilization			20.9%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

									
Movement	WBL	WBR	NBT	NBR	SBL	SBT			
Lane Configurations									
Traffic Volume (veh/h)	9	3	72	11	2	97			
Future Volume (Veh/h)	9	3	72	11	2	97			
Sign Control	Stop		Free			Free			
Grade	0%		0%			0%			
Peak Hour Factor	0.25	0.75	0.53	0.33	0.25	0.46			
Hourly flow rate (vph)	36	4	136	33	8	211			
Pedestrians	6		1			3			
Lane Width (m)	3.7		3.7			3.7			
Walking Speed (m/s)	1.1		1.1			1.1			
Percent Blockage	1		0			0			
Right turn flare (veh)									
Median type			None			None			
Median storage veh									
Upstream signal (m)									
pX, platoon unblocked									
vC, conflicting volume	386	162			175				
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol	386	162			175				
tC, single (s)	6.4	6.2			4.1				
tC, 2 stage (s)									
tF (s)	3.5	3.3			2.2				
p0 queue free %	94	100			99				
cM capacity (veh/h)	613	881			1405				
Direction, Lane #	WB 1	NB 1	SB 1						
Volume Total	40	169	219						
Volume Left	36	0	8						
Volume Right	4	33	0						
cSH	632	1700	1405						
Volume to Capacity	0.06	0.10	0.01						
Queue Length 95th (m)	1.5	0.0	0.1						
Control Delay (s)	11.1	0.0	0.3						
Lane LOS	B		A						
Approach Delay (s)	11.1	0.0	0.3						
Approach LOS	B								
Intersection Summary									
Average Delay		1.2							
Intersection Capacity Utilization		17.7%	ICU Level of Service	A					
Analysis Period (min)		15							

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

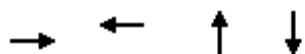
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	348	11	19	185	32	6	7	13	23	23	51
Future Volume (Veh/h)	46	348	11	19	185	32	6	7	13	23	23	51
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.85	0.36	0.75	0.88	0.53	0.75	0.58	0.50	0.64	0.50	0.52
Hourly flow rate (vph)	61	409	31	25	210	60	8	12	26	36	46	98
Pedestrians		3			2			14			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)												
pX, platoon unblocked												
vC, conflicting volume	273			454			974	884	440	874	869	246
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	273			454			974	884	440	874	869	246
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 %	95			98			95	95	96	84	83	87
cM capacity (veh/h)	1269			1102			163	262	611	229	267	776
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	501	295	46	180								
Volume Left	61	25	8	36								
Volume Right	31	60	26	98								
cSH	1269	1102	335	395								
Volume to Capacity	0.05	0.02	0.14	0.46								
Queue Length 95th (m)	1.1	0.5	3.6	17.6								
Control Delay (s)	1.4	0.9	17.5	21.5								
Lane LOS	A	A	C	C								
Approach Delay (s)	1.4	0.9	17.5	21.5								
Approach LOS			C	C								
Intersection Summary												
Average Delay			5.5									
Intersection Capacity Utilization			46.3%	ICU Level of Service					A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	575	328	16	145
v/c Ratio	0.49	0.28	0.05	0.54
Control Delay	6.1	7.0	19.5	29.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	6.1	7.0	19.5	29.7
Queue Length 50th (m)	24.8	19.5	1.3	14.6
Queue Length 95th (m)	m35.9	31.1	4.1	23.5
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1179	1158	453	386
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	0.49	0.28	0.04	0.38

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	427	7	5	250	18	2	5	3	52	19	24
Future Volume (vph)	16	427	7	5	250	18	2	5	3	52	19	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			0.99			0.95			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			0.89	
Frt		1.00			0.99			0.97			0.97	
Flt Protected		1.00			1.00			0.99			0.97	
Satd. Flow (prot)		1850			1792			1724			1580	
Flt Permitted		0.98			0.99			0.92			0.81	
Satd. Flow (perm)		1813			1775			1611			1323	
Peak-hour factor, PHF	0.63	0.79	0.78	0.67	0.87	0.53	0.48	0.66	0.68	0.63	0.74	0.67
Adj. Flow (vph)	25	541	9	7	287	34	4	8	4	83	26	36
RTOR Reduction (vph)	0	1	0	0	5	0	0	3	0	0	18	0
Lane Group Flow (vph)	0	574	0	0	323	0	0	13	0	0	127	0
Confl. Peds. (#/hr)	38		54	54		38	21		91	91		21
Confl. Bikes (#/hr)			3			1			1			
Heavy Vehicles (%)	7%	3%	0%	0%	4%	12%	0%	0%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		48.8			48.8			14.2			14.2	
Effective Green, g (s)		48.8			48.8			14.2			14.2	
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)		1179			1154			305			250	
v/s Ratio Prot												
v/s Ratio Perm		c0.32			0.18			0.01			c0.10	
v/c Ratio		0.49			0.28			0.04			0.51	
Uniform Delay, d1		6.7			5.6			24.8			27.3	
Progression Factor		0.64			1.00			1.00			1.00	
Incremental Delay, d2		1.0			0.6			0.1			1.6	
Delay (s)		5.3			6.2			24.9			28.9	
Level of Service		A			A			C			C	
Approach Delay (s)		5.3			6.2			24.9			28.9	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			9.1			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			56.0%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	8	0	0	3	1	0	5	0	2	0	7
Future Volume (Veh/h)	11	8	0	0	3	1	0	5	0	2	0	7
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.25	0.25	0.25	0.25	0.25	0.63	0.60	0.67	0.50	0.79	0.44
Hourly flow rate (vph)	17	32	0	0	12	4	0	8	0	4	0	16
Pedestrians	5			13			10			3		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	0			1			1			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												355
pX, platoon unblocked												
vC, conflicting volume	42	42	23	63	50	24	21				21	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	42	42	23	63	50	24	21				21	
tC, single (s)	7.1	6.5	6.7	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.8	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	98	96	100	100	99	100	100				100	
cM capacity (veh/h)	930	837	917	875	828	1042	1600				1588	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	49	16	8	20								
Volume Left	17	0	0	4								
Volume Right	0	4	0	16								
cSH	867	873	1600	1588								
Volume to Capacity	0.06	0.02	0.00	0.00								
Queue Length 95th (m)	1.4	0.4	0.0	0.1								
Control Delay (s)	9.4	9.2	0.0	1.5								
Lane LOS	A	A		A								
Approach Delay (s)	9.4	9.2	0.0	1.5								
Approach LOS	A	A										
Intersection Summary												
Average Delay				6.9								
Intersection Capacity Utilization				22.8%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	4	0	0	7	2	0	0	0	0	0	1
Future Volume (Veh/h)	4	4	0	0	7	2	0	0	0	0	0	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.50	0.50	0.50	0.50	0.75	0.50	0.50	0.65	0.38	0.25	0.66	0.25
Hourly flow rate (vph)	8	8	0	0	9	4	0	0	0	0	0	4
Pedestrians		10			16			6			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			2			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	24	28	18	28	30	19	14			16		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	24	28	18	28	30	19	14			16		
tC, single (s)	7.1	7.0	6.2	7.1	6.8	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.5	3.3	3.5	4.3	3.3	2.2			2.2		
p0 queue free %	99	99	100	100	99	100	100			100		
cM capacity (veh/h)	950	760	1050	939	785	1045	1602			1589		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	16	13	0	4								
Volume Left	8	0	0	0								
Volume Right	0	4	0	4								
cSH	844	850	1700	1589								
Volume to Capacity	0.02	0.02	0.00	0.00								
Queue Length 95th (m)	0.4	0.4	0.0	0.0								
Control Delay (s)	9.3	9.3	0.0	0.0								
Lane LOS	A	A										
Approach Delay (s)	9.3	9.3	0.0	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay			8.2									
Intersection Capacity Utilization			19.6%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	357	26	5	199	0	31	0	84	0	0	0
Future Volume (Veh/h)	0	357	26	5	199	0	31	0	84	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.74	0.78	0.69	0.42	0.88	0.75	0.65	0.63	0.75	0.75	0.65	0.53
Hourly flow rate (vph)	0	458	38	12	226	0	48	0	112	0	0	0
Pedestrians		12			7			15			5	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					207							
pX, platoon unblocked												
vC, conflicting volume	231			511			754	747	499	851	766	243
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	231			511			754	747	499	851	766	243
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.3
p0 queue free %	100			99			85	100	80	100	100	100
cM capacity (veh/h)	1342			1049			312	333	563	210	325	775
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	496	238	160	0								
Volume Left	0	12	48	0								
Volume Right	38	0	112	0								
cSH	1342	1049	454	1700								
Volume to Capacity	0.00	0.01	0.35	0.00								
Queue Length 95th (m)	0.0	0.3	11.9	0.0								
Control Delay (s)	0.0	0.5	17.2	0.0								
Lane LOS		A	C	A								
Approach Delay (s)	0.0	0.5	17.2	0.0								
Approach LOS			C	A								
Intersection Summary												
Average Delay			3.2									
Intersection Capacity Utilization			36.2%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	172	158	240	98	152	67	126	460	111	45	676
v/c Ratio	0.48	0.41	0.53	0.26	0.41	0.20	0.48	0.58	0.14	0.10	0.81
Control Delay	25.2	32.8	8.5	20.5	33.4	3.2	23.7	26.5	10.1	10.2	32.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.2	32.8	8.5	20.5	33.4	3.2	23.7	26.5	10.1	10.2	32.4
Queue Length 50th (m)	19.3	22.4	0.0	10.5	21.4	0.0	12.0	55.2	3.6	3.5	107.4
Queue Length 95th (m)	21.3	36.9	16.3	18.4	36.6	1.3	m18.9	m78.6	m7.1	7.5	#175.2
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	358	445	485	385	467	387	265	789	779	462	837
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.36	0.49	0.25	0.33	0.17	0.48	0.58	0.14	0.10	0.81

Intersection Summary

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.

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	32	78	134	211	80	134	33	17	106	307	107	98
Future Volume (vph)	32	78	134	211	80	134	33	17	106	307	107	98
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.76	1.00	1.00	0.73		1.00	0.96		0.94
Flpb, ped/bikes		0.89	1.00	1.00	0.89	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	0.95		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1611	1745	1199	1620	1830	1198		1772	1593		1463
Flt Permitted		0.60	1.00	1.00	0.66	1.00	1.00		0.15	1.00		1.00
Satd. Flow (perm)		1010	1745	1199	1120	1830	1198		284	1593		1463
Peak-hour factor, PHF	0.73	0.61	0.85	0.88	0.82	0.88	0.78	0.67	0.84	0.97	0.81	0.80
Adj. Flow (vph)	44	128	158	240	98	152	42	25	126	316	132	122
RTOR Reduction (vph)	0	0	0	186	0	0	53	0	0	1	0	57
Lane Group Flow (vph)	0	172	158	54	98	152	14	0	126	459	0	54
Confl. Peds. (#/hr)	73	54		112	112		73	54	50		54	42
Confl. Bikes (#/hr)				2			1	1			1	1
Heavy Vehicles (%)	3%	0%	7%	1%	0%	5%	0%	0%	3%	6%	4%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		27.1	20.1	20.1	24.3	18.7	18.7		49.0	42.7		42.7
Effective Green, g (s)		27.1	20.1	20.1	24.3	18.7	18.7		49.0	42.7		42.7
Actuated g/C Ratio		0.30	0.22	0.22	0.27	0.21	0.21		0.54	0.47		0.47
Clearance Time (s)		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
Lane Grp Cap (vph)		350	389	267	333	380	248		258	755		694
v/s Ratio Prot		c0.04	0.09		0.02	0.08			c0.03	0.29		
v/s Ratio Perm		c0.11		0.04	0.06		0.01		0.23			0.04
v/c Ratio		0.49	0.41	0.20	0.29	0.40	0.06		0.49	0.61		0.08
Uniform Delay, d1		24.8	29.9	28.4	25.5	30.8	28.6		14.8	17.5		12.9
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.95	1.23		2.53
Incremental Delay, d2		1.1	0.7	0.4	0.5	0.7	0.1		1.1	2.7		0.2
Delay (s)		25.8	30.5	28.8	26.0	31.5	28.7		30.0	24.1		32.8
Level of Service		C	C	C	C	C	C		C	C		C
Approach Delay (s)			28.4			29.2				26.6		
Approach LOS			C			C				C		
Intersection Summary												
HCM 2000 Control Delay			28.4			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)				18.0		
Intersection Capacity Utilization			80.8%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	7	24	605	32
Future Volume (vph)	7	24	605	32
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.99	
Flpb, ped/bikes		0.98	1.00	
Frt		1.00	0.99	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1796	1850	
Flt Permitted		0.38	1.00	
Satd. Flow (perm)		721	1850	
Peak-hour factor, PHF	0.44	0.82	0.95	0.83
Adj. Flow (vph)	16	29	637	39
RTOR Reduction (vph)	0	0	2	0
Lane Group Flow (vph)	0	45	674	0
Confl. Peds. (#/hr)	54	42		50
Confl. Bikes (#/hr)				7
Heavy Vehicles (%)	0%	0%	2%	7%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		43.6	40.0	
Effective Green, g (s)		43.6	40.0	
Actuated g/C Ratio		0.48	0.44	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		392	822	
v/s Ratio Prot		0.00	c0.36	
v/s Ratio Perm		0.05		
v/c Ratio		0.11	0.82	
Uniform Delay, d1		12.7	21.8	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.1	9.0	
Delay (s)		12.8	30.8	
Level of Service		B	C	
Approach Delay (s)			29.7	
Approach LOS			C	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	11	30	14	6	39	31	641	49	60	793	28
Future Volume (Veh/h)	5	11	30	14	6	39	31	641	49	60	793	28
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.31	0.50	0.78	0.81	0.50	0.84	0.66	0.86	0.88	0.79	0.93	0.84
Hourly flow rate (vph)	16	22	38	17	12	46	47	745	56	76	853	33
Pedestrians		37			35			9			9	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		4			3			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)								94			144	
pX, platoon unblocked	0.79	0.79	0.67	0.79	0.79	0.76	0.67			0.76		
vC, conflicting volume	1586	1988	916	1965	1977	444	923			836		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	450	962	621	932	947	0	633			141		
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 %	94	86	86	85	93	94	92			93		
cM capacity (veh/h)	281	162	276	111	165	790	615			1063		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	76	75	420	428	76	886						
Volume Left	16	17	47	0	76	0						
Volume Right	38	46	0	56	0	33						
cSH	230	264	615	1700	1063	1700						
Volume to Capacity	0.33	0.28	0.08	0.25	0.07	0.52						
Queue Length 95th (m)	10.5	8.6	1.9	0.0	1.8	0.0						
Control Delay (s)	28.2	24.0	2.3	0.0	8.6	0.0						
Lane LOS	D	C	A		A							
Approach Delay (s)	28.2	24.0	1.1		0.7							
Approach LOS	D	C										
Intersection Summary												
Average Delay			2.8									
Intersection Capacity Utilization			65.2%	ICU Level of Service						C		
Analysis Period (min)			15									

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	177	133	1037	217	697
v/c Ratio	0.41	0.22	0.82	0.74	0.61
Control Delay	30.6	13.7	21.0	42.6	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	30.6	13.7	21.0	42.6	8.0
Queue Length 50th (m)	25.2	12.1	58.1	38.0	26.7
Queue Length 95th (m)	39.4	19.1	m70.1	m50.3	m43.7
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	434	614	1264	292	1141
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	0.41	0.22	0.82	0.74	0.61

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

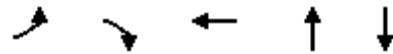
10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	147	105	612	279	167	669
Future Volume (vph)	147	105	612	279	167	669
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.97	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.95		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1630	1418	3298		1755	1902
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1630	1418	3298		1755	1902
Peak-hour factor, PHF	0.83	0.79	0.85	0.88	0.77	0.96
Adj. Flow (vph)	177	133	720	317	217	697
RTOR Reduction (vph)	0	0	55	0	0	0
Lane Group Flow (vph)	177	133	982	0	217	697
Confl. Peds. (#/hr)	44	30		9	9	
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	12%	12%	3%	8%	4%	1%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	434	709	1209		292	1141
v/s Ratio Prot	c0.11	0.03	c0.30		c0.12	0.37
v/s Ratio Perm		0.06				
v/c Ratio	0.41	0.19	0.81		0.74	0.61
Uniform Delay, d1	27.2	15.7	25.7		35.7	11.4
Progression Factor	1.00	1.00	0.69		0.80	0.52
Incremental Delay, d2	2.8	0.6	4.1		12.5	1.9
Delay (s)	30.0	16.3	22.0		41.1	7.8
Level of Service	C	B	C		D	A
Approach Delay (s)	24.1		22.0			15.7
Approach LOS	C		C			B
Intersection Summary						
HCM 2000 Control Delay			19.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.66			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	405	171	39	755	886
v/c Ratio	1.01	0.34	0.08	0.56	0.54
Control Delay	82.3	9.5	15.7	13.3	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	82.3	9.5	15.7	13.3	11.9
Queue Length 50th (m)	~71.1	4.8	2.6	34.4	29.0
Queue Length 95th (m)	#96.8	15.9	9.8	44.5	37.6
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	400	500	490	1341	1633
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	1.01	0.34	0.08	0.56	0.54

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

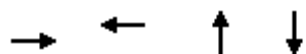
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	308	0	140	17	4	18	88	578	0	0	678	132
Future Volume (vph)	308	0	140	17	4	18	88	578	0	0	678	132
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	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	1.00		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.94			1.00			0.97	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1802		1406		1651			3412			3378	
Flt Permitted	0.73		1.00		0.98			0.66			1.00	
Satd. Flow (perm)	1388		1406		1651			2257			3378	
Peak-hour factor, PHF	0.76	0.38	0.82	1.00	1.00	1.00	0.90	0.88	0.25	0.25	0.93	0.84
Adj. Flow (vph)	405	0	171	17	4	18	98	657	0	0	729	157
RTOR Reduction (vph)	0	0	95	0	13	0	0	0	0	0	20	0
Lane Group Flow (vph)	405	0	76	0	26	0	0	755	0	0	866	0
Confl. Peds. (#/hr)	2		87	87		2	44		2	2		44
Confl. Bikes (#/hr)			3									3
Heavy Vehicles (%)	1%	0%	3%	0%	0%	0%	4%	5%	0%	0%	4%	1%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	26.0		26.0		26.0			52.0			43.0	
Effective Green, g (s)	26.0		26.0		26.0			52.0			43.0	
Actuated g/C Ratio	0.29		0.29		0.29			0.58			0.48	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	400		406		476			1381			1613	
v/s Ratio Prot								c0.04			0.26	
v/s Ratio Perm	c0.29		0.05		0.02			c0.28				
v/c Ratio	1.01		0.19		0.06			0.55			0.54	
Uniform Delay, d1	32.0		24.1		23.1			11.7			16.5	
Progression Factor	1.00		1.00		1.00			1.00			0.67	
Incremental Delay, d2	48.2		0.2		0.0			0.4			1.1	
Delay (s)	80.2		24.3		23.2			12.2			12.2	
Level of Service	F		C		C			B			B	
Approach Delay (s)		63.6			23.2			12.2			12.2	
Approach LOS		E			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			25.5				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			15.0		
Intersection Capacity Utilization			83.9%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	556	630	177	156
v/c Ratio	0.52	0.57	0.51	0.48
Control Delay	10.0	19.8	30.0	23.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.0	19.8	30.0	23.9
Queue Length 50th (m)	41.1	88.2	20.0	13.7
Queue Length 95th (m)	63.3	108.4	27.8	21.9
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	1061	1108	456	419
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	0.52	0.57	0.39	0.37
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	378	44	38	440	24	20	94	21	19	43	43
Future Volume (vph)	34	378	44	38	440	24	20	94	21	19	43	43
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			1.00			0.98	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.99			0.98			0.95	
Flt Protected		1.00			0.99			0.99			0.99	
Satd. Flow (prot)		1783			1879			1865			1760	
Flt Permitted		0.91			0.90			0.95			0.86	
Satd. Flow (perm)		1627			1705			1775			1539	
Peak-hour factor, PHF	0.67	0.87	0.62	0.59	0.82	0.82	0.85	0.71	1.00	0.50	0.73	0.73
Adj. Flow (vph)	51	434	71	64	537	29	24	132	21	38	59	59
RTOR Reduction (vph)	0	6	0	0	2	0	0	7	0	0	32	0
Lane Group Flow (vph)	0	550	0	0	628	0	0	170	0	0	124	0
Confl. Peds. (#/hr)	18		8	8		18	18		2	2		18
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		48.6			48.6			14.4			14.4	
Effective Green, g (s)		48.6			48.6			14.4			14.4	
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)		1054			1104			340			295	
v/s Ratio Prot												
v/s Ratio Perm		0.34			c0.37			c0.10			0.08	
v/c Ratio		0.52			0.57			0.50			0.42	
Uniform Delay, d1		7.0			7.4			27.1			26.6	
Progression Factor		1.00			2.05			1.00			1.00	
Incremental Delay, d2		1.8			2.0			1.2			1.0	
Delay (s)		8.9			17.1			28.2			27.6	
Level of Service		A			B			C			C	
Approach Delay (s)		8.9			17.1			28.2			27.6	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			16.5			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			56.8%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	8	135	6	14	92
Future Volume (Veh/h)	6	8	135	6	14	92
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.50	0.67	0.84	0.75	0.46	0.80
Hourly flow rate (vph)	12	12	161	8	30	115
Pedestrians	5					3
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	345	173			174	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	345	173			174	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	98	99			98	
cM capacity (veh/h)	638	869			1360	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	24	169	145			
Volume Left	12	0	30			
Volume Right	12	8	0			
cSH	736	1700	1360			
Volume to Capacity	0.03	0.10	0.02			
Queue Length 95th (m)	0.8	0.0	0.5			
Control Delay (s)	10.1	0.0	1.7			
Lane LOS	B		A			
Approach Delay (s)	10.1	0.0	1.7			
Approach LOS	B					
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			27.6%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	58	226	2	3	345	55	3	16	19	32	13	67
Future Volume (Veh/h)	58	226	2	3	345	55	3	16	19	32	13	67
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.81	0.25	0.38	0.77	0.75	0.75	0.63	0.75	0.83	0.56	0.63
Hourly flow rate (vph)	83	279	8	8	448	73	4	25	25	39	23	106
Pedestrians		9						13			16	
Lane Width (m)		3.7						3.7			3.7	
Walking Speed (m/s)		1.1						1.1			1.1	
Percent Blockage		1						1			2	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	537			300			1089	1015	296	1003	982	510
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	537			300			1089	1015	296	1003	982	510
tC, single (s)	4.1			4.1			7.1	6.6	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.3	3.5	4.0	3.3
p0 queue free %	92			99			97	88	97	78	90	81
cM capacity (veh/h)	1025			1256			130	207	739	176	223	554
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	370	529	54	168								
Volume Left	83	8	4	39								
Volume Right	8	73	25	106								
cSH	1025	1256	291	325								
Volume to Capacity	0.08	0.01	0.19	0.52								
Queue Length 95th (m)	2.0	0.1	5.1	21.3								
Control Delay (s)	2.6	0.2	20.1	27.3								
Lane LOS	A	A	C	D								
Approach Delay (s)	2.6	0.2	20.1	27.3								
Approach LOS			C	D								
Intersection Summary												
Average Delay			6.0									
Intersection Capacity Utilization			60.9%		ICU Level of Service				B			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	382	26	26	450	14	36	31	13	6	20	18
Future Volume (Veh/h)	18	382	26	26	450	14	36	31	13	6	20	18
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.53	0.84	0.56	0.65	0.85	0.65	0.75	0.72	0.60	0.50	0.59	0.71
Hourly flow rate (vph)	34	455	46	40	529	22	48	43	22	12	34	25
Pedestrians		7			1			11			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked	0.85			0.89			0.91	0.91	0.89	0.91	0.91	0.85
vC, conflicting volume	565			512			1226	1202	490	1224	1214	561
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	406			391			929	903	367	928	916	401
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 %	97			96			73	81	96	93	85	95
cM capacity (veh/h)	981			1039			175	230	602	161	226	536
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	535	591	113	71								
Volume Left	34	40	48	12								
Volume Right	46	22	22	25								
cSH	981	1039	227	261								
Volume to Capacity	0.03	0.04	0.50	0.27								
Queue Length 95th (m)	0.8	0.9	19.2	8.1								
Control Delay (s)	1.0	1.0	35.6	23.9								
Lane LOS	A	A	E	C								
Approach Delay (s)	1.0	1.0	35.6	23.9								
Approach LOS			E	C								
Intersection Summary												
Average Delay			5.2									
Intersection Capacity Utilization			52.1%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	2	4	3	3	5	39	2	4	46	1
Future Volume (Veh/h)	5	5	2	4	3	3	5	39	2	4	46	1
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.63	0.25	0.33	0.75	0.38	0.63	0.77	0.50	0.33	0.85	0.25
Hourly flow rate (vph)	8	8	8	12	4	8	8	51	4	12	54	4
Pedestrians	12			9			9			7		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	1			1			1			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	178	172	77	179	172	69	70				64	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	178	172	77	179	172	69	70				64	
tC, single (s)	7.1	6.7	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.2	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	99	99	98	99	99	99				99	
cM capacity (veh/h)	745	667	969	741	701	984	1525				1538	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	24	24	63	70								
Volume Left	8	12	8	12								
Volume Right	8	8	4	4								
cSH	775	799	1525	1538								
Volume to Capacity	0.03	0.03	0.01	0.01								
Queue Length 95th (m)	0.7	0.7	0.1	0.2								
Control Delay (s)	9.8	9.6	1.0	1.3								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.8	9.6	1.0	1.3								
Approach LOS	A	A										
Intersection Summary												
Average Delay	3.4											
Intersection Capacity Utilization	19.2%			ICU Level of Service					A			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	2	5	43	6	3	56
Future Volume (Veh/h)	2	5	43	6	3	56
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.42	0.57	0.75	0.38	0.83
Hourly flow rate (vph)	8	12	75	8	8	67
Pedestrians	4					4
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	166	87			87	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	166	87			87	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			99	
cM capacity (veh/h)	822	969			1516	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	20	83	75			
Volume Left	8	0	8			
Volume Right	12	8	0			
cSH	904	1700	1516			
Volume to Capacity	0.02	0.05	0.01			
Queue Length 95th (m)	0.5	0.0	0.1			
Control Delay (s)	9.1	0.0	0.8			
Lane LOS	A		A			
Approach Delay (s)	9.1	0.0	0.8			
Approach LOS	A					
Intersection Summary						
Average Delay		1.4				
Intersection Capacity Utilization		16.6%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

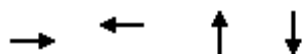
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	230	8	4	314	42	22	4	27	32	8	49
Future Volume (Veh/h)	36	230	8	4	314	42	22	4	27	32	8	49
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.68	0.94	0.50	0.59	0.83	0.25	0.58	0.33	0.65	0.84	0.50	0.83
Hourly flow rate (vph)	53	245	16	7	378	168	38	12	42	38	16	59
Pedestrians		4			1			13			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)												
pX, platoon unblocked												
vC, conflicting volume	560			274			919	946	267	898	870	480
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	560			274			919	946	267	898	870	480
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 %	95			99			81	95	94	83	94	90
cM capacity (veh/h)	1007			1284			201	242	756	220	268	580
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	314	553	92	113								
Volume Left	53	7	38	38								
Volume Right	16	168	42	59								
cSH	1007	1284	312	338								
Volume to Capacity	0.05	0.01	0.29	0.33								
Queue Length 95th (m)	1.3	0.1	9.1	10.9								
Control Delay (s)	1.9	0.2	21.3	20.9								
Lane LOS	A	A	C	C								
Approach Delay (s)	1.9	0.2	21.3	20.9								
Approach LOS			C	C								
Intersection Summary												
Average Delay			4.7									
Intersection Capacity Utilization			50.4%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	493	587	20	107
v/c Ratio	0.39	0.44	0.06	0.37
Control Delay	5.0	8.3	18.5	21.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.0	8.3	18.5	21.2
Queue Length 50th (m)	19.9	42.8	1.5	8.2
Queue Length 95th (m)	26.2	58.1	4.9	13.6
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1276	1327	482	421
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	0.44	0.04	0.25
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	388	5	5	451	28	2	8	5	47	5	34
Future Volume (vph)	14	388	5	5	451	28	2	8	5	47	5	34
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			0.98			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			0.97	
Frt		1.00			0.99			0.96			0.95	
Flt Protected		1.00			1.00			0.99			0.97	
Satd. Flow (prot)		1856			1879			1778			1705	
Flt Permitted		0.97			0.99			0.95			0.81	
Satd. Flow (perm)		1799			1871			1707			1417	
Peak-hour factor, PHF	0.65	0.84	0.58	0.67	0.83	0.75	0.63	0.71	0.78	0.75	0.67	0.92
Adj. Flow (vph)	22	462	9	7	543	37	3	11	6	63	7	37
RTOR Reduction (vph)	0	1	0	0	2	0	0	5	0	0	29	0
Lane Group Flow (vph)	0	492	0	0	585	0	0	15	0	0	78	0
Confl. Peds. (#/hr)	24		35	35		24	10		23	23		10
Confl. Bikes (#/hr)			2			2						1
Heavy Vehicles (%)	0%	3%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		50.8			50.8			12.2			12.2	
Effective Green, g (s)		50.8			50.8			12.2			12.2	
Actuated g/C Ratio		0.68			0.68			0.16			0.16	
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)		1218			1267			277			230	
v/s Ratio Prot												
v/s Ratio Perm		0.27			0.31			0.01			0.05	
v/c Ratio		0.40			0.46			0.05			0.34	
Uniform Delay, d1		5.4			5.7			26.5			27.8	
Progression Factor		0.60			1.00			1.00			1.00	
Incremental Delay, d2		0.9			1.2			0.1			0.9	
Delay (s)		4.2			6.9			26.6			28.7	
Level of Service		A			A			C			C	
Approach Delay (s)		4.2			6.9			26.6			28.7	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay		8.0			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.44										
Actuated Cycle Length (s)		75.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		52.4%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	7	0	0	5	2	0	2	0	2	0	3
Future Volume (Veh/h)	2	7	0	0	5	2	0	2	0	2	0	3
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.25	0.25	0.50	0.25	0.50	0.50	0.44	0.88	0.42	0.50	0.77	0.38
Hourly flow rate (vph)	8	28	0	0	10	4	0	2	0	4	0	8
Pedestrians	5			7			16			4		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	0			1			2			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												355
pX, platoon unblocked												
vC, conflicting volume	32	26	25	51	30	13	13				9	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	32	26	25	51	30	13	13				9	
tC, single (s)	7.1	6.5	6.5	7.1	6.5	6.2	4.2				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.5	4.0	3.3	2.3				2.2	
p0 queue free %	99	97	100	100	99	100	100				100	
cM capacity (veh/h)	949	859	968	899	855	1062	1523				1613	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	36	14	2	12								
Volume Left	8	0	0	4								
Volume Right	0	4	0	8								
cSH	877	905	1523	1613								
Volume to Capacity	0.04	0.02	0.00	0.00								
Queue Length 95th (m)	1.0	0.4	0.0	0.1								
Control Delay (s)	9.3	9.0	0.0	2.4								
Lane LOS	A	A		A								
Approach Delay (s)	9.3	9.0	0.0	2.4								
Approach LOS	A	A										
Intersection Summary												
Average Delay				7.7								
Intersection Capacity Utilization				19.5%	ICU Level of Service			A				
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	3	0	0	4	0	0	0	0	1	0	4
Future Volume (Veh/h)	1	3	0	0	4	0	0	0	0	1	0	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.94	0.25	0.25	0.84	0.50
Hourly flow rate (vph)	4	12	0	0	16	0	0	0	0	4	0	8
Pedestrians		3			20			8			8	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			2			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	31	35	15	46	39	28	11			20		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	31	35	15	46	39	28	11			20		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	100	99	100	100	98	100	100			100		
cM capacity (veh/h)	939	840	1059	907	836	1024	1617			1578		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	16	16	0	12								
Volume Left	4	0	0	4								
Volume Right	0	0	0	8								
cSH	863	836	1700	1578								
Volume to Capacity	0.02	0.02	0.00	0.00								
Queue Length 95th (m)	0.4	0.4	0.0	0.1								
Control Delay (s)	9.3	9.4	0.0	2.4								
Lane LOS	A	A		A								
Approach Delay (s)	9.3	9.4	0.0	2.4								
Approach LOS	A	A										
Intersection Summary												
Average Delay			7.4									
Intersection Capacity Utilization			20.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	244	19	5	279	0	89	0	85	0	0	1
Future Volume (Veh/h)	0	244	19	5	279	0	89	0	85	0	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.87	0.64	0.63	0.84	0.63	0.74	0.82	0.63	0.53	0.58	0.83
Hourly flow rate (vph)	0	280	30	8	332	0	120	0	135	0	0	1
Pedestrians		7			9			15			9	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					207							
pX, platoon unblocked												
vC, conflicting volume	341			325			666	667	319	796	682	348
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	341			325			666	667	319	796	682	348
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 %	100			99			66	100	81	100	100	100
cM capacity (veh/h)	1191			1228			356	371	698	233	364	684
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	310	340	255	1								
Volume Left	0	8	120	0								
Volume Right	30	0	135	1								
cSH	1191	1228	481	684								
Volume to Capacity	0.00	0.01	0.53	0.00								
Queue Length 95th (m)	0.0	0.1	23.2	0.0								
Control Delay (s)	0.0	0.2	20.6	10.3								
Lane LOS		A	C	B								
Approach Delay (s)	0.0	0.2	20.6	10.3								
Approach LOS			C	B								
Intersection Summary												
Average Delay			5.9									
Intersection Capacity Utilization			42.6%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	139	165	251	160	273	130	188	646	91	80	578
v/c Ratio	0.50	0.44	0.59	0.44	0.67	0.46	0.57	0.84	0.13	0.29	0.73
Control Delay	25.6	33.3	9.9	23.5	40.2	13.5	12.1	25.6	1.5	12.8	28.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.6	33.3	9.9	23.5	40.2	13.5	12.1	25.6	1.5	12.8	28.9
Queue Length 50th (m)	15.3	23.5	0.0	17.8	41.1	2.8	4.3	110.9	1.7	6.4	84.7
Queue Length 95th (m)	22.0	32.5	12.7	31.1	60.8	12.6	m5.4 m#	181.0	m2.5	10.1	#127.4
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	278	450	461	364	486	318	331	767	716	273	787
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.37	0.54	0.44	0.56	0.41	0.57	0.84	0.13	0.29	0.73

Intersection Summary

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.

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	42	59	122	206	146	232	63	27	147	497	88	94
Future Volume (vph)	42	59	122	206	146	232	63	27	147	497	88	94
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.68	1.00	1.00	0.57		1.00	0.96		0.92
Flpb, ped/bikes		0.91	1.00	1.00	0.86	1.00	1.00		0.99	1.00		1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.97		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1654	1762	1075	1568	1902	926		1790	1668		1431
Flt Permitted		0.39	1.00	1.00	0.61	1.00	1.00		0.23	1.00		1.00
Satd. Flow (perm)		676	1762	1075	1014	1902	926		428	1668		1431
Peak-hour factor, PHF	0.71	0.74	0.74	0.82	0.91	0.85	0.79	0.54	0.78	0.95	0.78	0.93
Adj. Flow (vph)	59	80	165	251	160	273	80	50	188	523	113	101
RTOR Reduction (vph)	0	0	0	197	0	0	86	0	0	1	0	50
Lane Group Flow (vph)	0	139	165	54	160	273	44	0	188	645	0	41
Confl. Peds. (#/hr)	107	104		156	156		107	104	104		104	59
Confl. Bikes (#/hr)				3			4	4			7	7
Heavy Vehicles (%)	2%	0%	6%	0%	0%	1%	0%	0%	1%	3%	0%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		26.3	19.3	19.3	26.3	19.3	19.3		47.6	40.8		40.8
Effective Green, g (s)		26.3	19.3	19.3	26.3	19.3	19.3		47.6	40.8		40.8
Actuated g/C Ratio		0.29	0.21	0.21	0.29	0.21	0.21		0.53	0.45		0.45
Clearance Time (s)		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
Lane Grp Cap (vph)		273	377	230	339	407	198		329	756		648
v/s Ratio Prot		c0.04	0.09		0.04	c0.14			c0.04	c0.39		
v/s Ratio Perm		0.11		0.05	0.10		0.05		0.26			0.03
v/c Ratio		0.51	0.44	0.23	0.47	0.67	0.22		0.57	0.85		0.06
Uniform Delay, d1		24.9	30.6	29.2	25.1	32.4	29.2		14.0	21.9		13.8
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		0.60	0.60		0.44
Incremental Delay, d2		1.5	0.8	0.5	1.0	4.3	0.6		1.8	9.2		0.1
Delay (s)		26.4	31.5	29.8	26.2	36.7	29.7		10.2	22.4		6.3
Level of Service		C	C	C	C	D	C		B	C		A
Approach Delay (s)			29.4			32.1				18.3		
Approach LOS			C			C				B		
Intersection Summary												
HCM 2000 Control Delay			25.4									
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			83.5%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	16	39	455	61
Future Volume (vph)	16	39	455	61
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.98	
Flpb, ped/bikes		0.99	1.00	
Frt		1.00	0.98	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1755	1806	
Flt Permitted		0.18	1.00	
Satd. Flow (perm)		327	1806	
Peak-hour factor, PHF	0.63	0.71	0.89	0.91
Adj. Flow (vph)	25	55	511	67
RTOR Reduction (vph)	0	0	5	0
Lane Group Flow (vph)	0	80	573	0
Confl. Peds. (#/hr)	104	59		104
Confl. Bikes (#/hr)				5
Heavy Vehicles (%)	0%	5%	2%	2%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		43.8	38.9	
Effective Green, g (s)		43.8	38.9	
Actuated g/C Ratio		0.49	0.43	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		236	780	
v/s Ratio Prot		0.02	0.32	
v/s Ratio Perm		0.15		
v/c Ratio		0.34	0.73	
Uniform Delay, d1		15.4	21.3	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.9	6.1	
Delay (s)		16.3	27.3	
Level of Service		B	C	
Approach Delay (s)			26.0	
Approach LOS			C	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	26	19	7	53	22	813	36	41	786	23
Future Volume (Veh/h)	5	5	26	19	7	53	22	813	36	41	786	23
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.63	0.78	0.75	0.44	0.83	0.53	0.92	0.65	0.75	0.94	0.79
Hourly flow rate (vph)	8	8	33	25	16	64	42	884	55	55	836	29
Pedestrians	52			63			3			6		
Lane Width (m)	3.7			3.7			3.7			3.7		
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)							94			144		
pX, platoon unblocked	0.81	0.81	0.69	0.81	0.81	0.75	0.69				0.75	
vC, conflicting volume	1616	2098	906	2044	2086	538	917				1002	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	503	1098	635	1032	1082	0	651				349	
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 %	97	94	88	75	88	92	93				94	
cM capacity (veh/h)	242	135	277	100	138	767	616				864	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	49	105	484	497	55	865						
Volume Left	8	25	42	0	55	0						
Volume Right	33	64	0	55	0	29						
cSH	232	234	616	1700	864	1700						
Volume to Capacity	0.21	0.45	0.07	0.29	0.06	0.51						
Queue Length 95th (m)	5.9	16.3	1.7	0.0	1.5	0.0						
Control Delay (s)	24.6	32.3	1.9	0.0	9.5	0.0						
Lane LOS	C	D	A		A							
Approach Delay (s)	24.6	32.3	1.0		0.6							
Approach LOS	C	D										
Intersection Summary												
Average Delay				2.9								
Intersection Capacity Utilization				58.7%	ICU Level of Service				B			
Analysis Period (min)				15								

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	225	222	1019	207	723
v/c Ratio	0.50	0.34	0.81	0.71	0.63
Control Delay	32.4	15.1	25.1	53.6	19.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	32.4	15.1	25.1	53.6	19.8
Queue Length 50th (m)	32.8	21.3	81.7	33.0	98.1
Queue Length 95th (m)	49.9	31.7	83.6	m47.9	140.1
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	454	649	1259	292	1152
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	0.50	0.34	0.81	0.71	0.63

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

10/29/2018

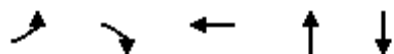


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	189	182	666	182	168	680
Future Volume (vph)	189	182	666	182	168	680
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.96	0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1706	1498	3337		1755	1921
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1706	1498	3337		1755	1921
Peak-hour factor, PHF	0.84	0.82	0.87	0.72	0.81	0.94
Adj. Flow (vph)	225	222	766	253	207	723
RTOR Reduction (vph)	0	0	35	0	0	0
Lane Group Flow (vph)	225	222	984	0	207	723
Confl. Peds. (#/hr)	48	42		34	34	
Confl. Bikes (#/hr)		3		5		
Heavy Vehicles (%)	7%	5%	1%	11%	4%	0%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	454	749	1223		292	1152
v/s Ratio Prot	c0.13	0.05	c0.29		0.12	c0.38
v/s Ratio Perm		0.10				
v/c Ratio	0.50	0.30	0.80		0.71	0.63
Uniform Delay, d1	27.9	16.6	25.6		35.4	11.5
Progression Factor	1.00	1.00	0.82		1.16	1.47
Incremental Delay, d2	3.8	1.0	4.8		11.5	2.2
Delay (s)	31.7	17.6	25.8		52.5	19.1
Level of Service	C	B	C		D	B
Approach Delay (s)	24.7		25.8			26.5
Approach LOS	C		C			C
Intersection Summary						
HCM 2000 Control Delay			25.9		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.69			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	260	167	138	775	900
v/c Ratio	0.84	0.35	0.32	0.57	0.51
Control Delay	55.7	6.3	20.7	12.2	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	55.7	6.3	20.7	12.2	11.1
Queue Length 50th (m)	41.5	0.0	13.5	33.3	32.6
Queue Length 95th (m)	59.8	10.4	27.4	47.1	54.6
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	361	532	504	1363	1781
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	0.72	0.31	0.27	0.57	0.51
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

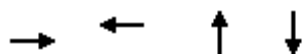
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	213	0	137	60	22	56	108	583	0	0	666	169
Future Volume (vph)	213	0	137	60	22	56	108	583	0	0	666	169
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	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	0.99		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.95			1.00			0.97	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1765		1432		1654			3473			3373	
Flt Permitted	0.67		1.00		0.98			0.61			1.00	
Satd. Flow (perm)	1252		1432		1654			2129			3373	
Peak-hour factor, PHF	0.82	0.25	0.82	1.00	1.00	1.00	0.85	0.90	0.25	0.25	0.96	0.82
Adj. Flow (vph)	260	0	167	60	22	56	127	648	0	0	694	206
RTOR Reduction (vph)	0	0	126	0	29	0	0	0	0	0	28	0
Lane Group Flow (vph)	260	0	41	0	109	0	0	775	0	0	872	0
Confl. Peds. (#/hr)	12		89	89		12	45		13	13		45
Confl. Bikes (#/hr)			1						5			1
Heavy Vehicles (%)	2%	0%	1%	0%	0%	0%	2%	3%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	22.2		22.2		22.2			55.8			46.8	
Effective Green, g (s)	22.2		22.2		22.2			55.8			46.8	
Actuated g/C Ratio	0.25		0.25		0.25			0.62			0.52	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	308		353		407			1409			1753	
v/s Ratio Prot								c0.04			0.26	
v/s Ratio Perm	c0.21		0.03		0.07			c0.30				
v/c Ratio	0.84		0.12		0.27			0.55			0.50	
Uniform Delay, d1	32.3		26.3		27.4			9.9			14.0	
Progression Factor	1.00		1.00		1.00			1.00			0.73	
Incremental Delay, d2	18.6		0.1		0.4			0.5			0.8	
Delay (s)	50.9		26.4		27.7			10.3			11.1	
Level of Service	D		C		C			B			B	
Approach Delay (s)		41.3			27.7			10.3			11.1	
Approach LOS		D			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			17.6				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			15.0		
Intersection Capacity Utilization			79.7%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	648	389	256	349
v/c Ratio	0.70	0.44	0.72	1.06
Control Delay	15.9	16.5	38.2	93.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.9	16.5	38.2	93.9
Queue Length 50th (m)	57.2	41.7	31.8	~48.4
Queue Length 95th (m)	67.8	62.7	47.2	#77.6
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	921	876	355	328
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	0.70	0.44	0.72	1.06

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	373	36	36	188	60	35	130	23	53	70	103
Future Volume (vph)	80	373	36	36	188	60	35	130	23	53	70	103
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			0.99			0.81	
Flpb, ped/bikes		0.99			1.00			0.96			0.99	
Frt		0.99			0.97			0.98			0.93	
Flt Protected		0.99			0.99			0.99			0.99	
Satd. Flow (prot)		1759			1753			1762			1394	
Flt Permitted		0.88			0.83			0.77			0.79	
Satd. Flow (perm)		1562			1467			1373			1112	
Peak-hour factor, PHF	0.83	0.76	0.59	0.55	0.83	0.62	0.60	0.79	0.69	0.60	0.79	0.60
Adj. Flow (vph)	96	491	61	65	227	97	58	165	33	88	89	172
RTOR Reduction (vph)	0	5	0	0	16	0	0	7	0	0	46	0
Lane Group Flow (vph)	0	643	0	0	373	0	0	249	0	0	303	0
Confl. Peds. (#/hr)	56		43	43		56	175		19	19		175
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	3%	5%	0%	4%	0%	0%	1%	5%	2%	3%	3%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		44.0			44.0			19.0			19.0	
Effective Green, g (s)		44.0			44.0			19.0			19.0	
Actuated g/C Ratio		0.59			0.59			0.25			0.25	
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)		916			860			347			281	
v/s Ratio Prot												
v/s Ratio Perm		c0.41			0.25			0.18			c0.27	
v/c Ratio		0.70			0.43			0.72			1.08	
Uniform Delay, d1		10.9			8.6			25.5			28.0	
Progression Factor		1.00			1.86			1.00			1.00	
Incremental Delay, d2		4.5			1.6			6.9			75.8	
Delay (s)		15.4			17.5			32.4			103.8	
Level of Service		B			B			C			F	
Approach Delay (s)		15.4			17.5			32.4			103.8	
Approach LOS		B			B			C			F	
Intersection Summary												
HCM 2000 Control Delay			37.3			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			70.6%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	7	172	8	12	151
Future Volume (Veh/h)	5	7	172	8	12	151
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.63	0.88	0.74	0.67	0.69	0.66
Hourly flow rate (vph)	8	8	232	12	17	229
Pedestrians	10		3			
Lane Width (m)	3.7		3.7			
Walking Speed (m/s)	1.1		1.1			
Percent Blockage	1		0			
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	514	248			254	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	514	248			254	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	98	99			99	
cM capacity (veh/h)	510	755			1259	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	16	244	246			
Volume Left	8	0	17			
Volume Right	8	12	0			
cSH	609	1700	1259			
Volume to Capacity	0.03	0.14	0.01			
Queue Length 95th (m)	0.6	0.0	0.3			
Control Delay (s)	11.1	0.0	0.7			
Lane LOS	B		A			
Approach Delay (s)	11.1	0.0	0.7			
Approach LOS	B					
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			27.8%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	104	334	3	5	185	43	0	15	34	41	30	78
Future Volume (Veh/h)	104	334	3	5	185	43	0	15	34	41	30	78
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.76	0.78	0.38	0.31	0.80	0.79	0.25	0.58	0.47	0.81	0.31	0.56
Hourly flow rate (vph)	137	428	8	16	231	54	0	26	72	51	97	139
Pedestrians		44			6			9			7	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		4			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	292			445			1236	1039	447	1094	1016	309
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	292			445			1236	1039	447	1094	1016	309
tC, single (s)	4.1			4.1			7.1	6.6	6.2	7.1	6.7	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.3	3.5	4.2	3.3
p0 queue free %	89			99			100	87	88	62	49	80
cM capacity (veh/h)	1272			1116			64	196	601	136	192	693
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	573	301	98	287								
Volume Left	137	16	0	51								
Volume Right	8	54	72	139								
cSH	1272	1116	388	265								
Volume to Capacity	0.11	0.01	0.25	1.08								
Queue Length 95th (m)	2.7	0.3	7.5	90.0								
Control Delay (s)	2.9	0.6	17.4	120.7								
Lane LOS	A	A	C	F								
Approach Delay (s)	2.9	0.6	17.4	120.7								
Approach LOS			C	F								
Intersection Summary												
Average Delay			30.3									
Intersection Capacity Utilization			63.6%		ICU Level of Service				B			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	416	11	13	261	2	14	44	19	8	33	16
Future Volume (Veh/h)	15	416	11	13	261	2	14	44	19	8	33	16
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.80	0.67	0.75	0.91	0.50	0.41	0.81	0.64	0.67	0.43	0.42
Hourly flow rate (vph)	26	520	16	17	287	4	34	54	30	12	77	38
Pedestrians		9			2			25			24	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked	0.98			0.84			0.85	0.85	0.84	0.85	0.85	0.98
vC, conflicting volume	315			561			1014	954	555	986	960	322
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	293			385			880	810	377	848	817	300
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 %	98			98			77	78	95	93	68	95
cM capacity (veh/h)	1227			973			149	245	552	173	244	692
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	562	308	118	127								
Volume Left	26	17	34	12								
Volume Right	16	4	30	38								
cSH	1227	973	234	289								
Volume to Capacity	0.02	0.02	0.50	0.44								
Queue Length 95th (m)	0.5	0.4	19.6	16.2								
Control Delay (s)	0.6	0.7	35.0	26.9								
Lane LOS	A	A	D	D								
Approach Delay (s)	0.6	0.7	35.0	26.9								
Approach LOS			D	D								
Intersection Summary												
Average Delay			7.3									
Intersection Capacity Utilization			41.2%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	7	6	9	4	4	2	37	18	5	59	1
Future Volume (Veh/h)	5	7	6	9	4	4	2	37	18	5	59	1
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.58	0.38	0.63	0.50	0.50	0.50	0.73	0.63	0.42	0.56	0.25
Hourly flow rate (vph)	8	12	16	14	8	8	4	51	29	12	105	4
Pedestrians	7			6			12			4		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	1			1			1			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	228	232	126	244	220	76	116				86	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	228	232	126	244	220	76	116				86	
tC, single (s)	7.1	6.5	6.5	7.1	6.8	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.6	3.5	4.2	3.3	2.2				2.2	
p0 queue free %	99	98	98	98	99	99	100				99	
cM capacity (veh/h)	699	656	832	666	626	982	1475				1514	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	36	30	84	121								
Volume Left	8	14	4	12								
Volume Right	16	8	29	4								
cSH	735	715	1475	1514								
Volume to Capacity	0.05	0.04	0.00	0.01								
Queue Length 95th (m)	1.2	1.0	0.1	0.2								
Control Delay (s)	10.1	10.3	0.4	0.8								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.1	10.3	0.4	0.8								
Approach LOS	B	B										
Intersection Summary												
Average Delay	3.0											
Intersection Capacity Utilization	20.3%			ICU Level of Service					A			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	3	56	11	2	86
Future Volume (Veh/h)	9	3	56	11	2	86
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.75	0.53	0.33	0.25	0.46
Hourly flow rate (vph)	36	4	106	33	8	187
Pedestrians	6		1			3
Lane Width (m)	3.7		3.7			3.7
Walking Speed (m/s)	1.1		1.1			1.1
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	332	132			145	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	332	132			145	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	100			99	
cM capacity (veh/h)	658	915			1441	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	40	139	195			
Volume Left	36	0	8			
Volume Right	4	33	0			
cSH	677	1700	1441			
Volume to Capacity	0.06	0.08	0.01			
Queue Length 95th (m)	1.4	0.0	0.1			
Control Delay (s)	10.6	0.0	0.4			
Lane LOS	B		A			
Approach Delay (s)	10.6	0.0	0.4			
Approach LOS	B					
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			17.1%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

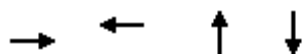
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	348	11	19	190	26	6	7	13	23	23	39
Future Volume (Veh/h)	35	348	11	19	190	26	6	7	13	23	23	39
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.85	0.36	0.75	0.88	0.53	0.75	0.58	0.50	0.64	0.50	0.52
Hourly flow rate (vph)	47	409	31	25	216	49	8	12	26	36	46	75
Pedestrians		3			2			14			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)												
pX, platoon unblocked												
vC, conflicting volume	268			454			924	850	440	846	842	246
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	268			454			924	850	440	846	842	246
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			98			96	96	96	85	84	90
cM capacity (veh/h)	1275			1102			185	277	611	241	281	776
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	487	290	46	157								
Volume Left	47	25	8	36								
Volume Right	31	49	26	75								
cSH	1275	1102	356	383								
Volume to Capacity	0.04	0.02	0.13	0.41								
Queue Length 95th (m)	0.9	0.5	3.3	14.8								
Control Delay (s)	1.1	0.9	16.6	20.8								
Lane LOS	A	A	C	C								
Approach Delay (s)	1.1	0.9	16.6	20.8								
Approach LOS			C	C								
Intersection Summary												
Average Delay			4.9									
Intersection Capacity Utilization			42.4%	ICU Level of Service					A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	575	328	16	145
v/c Ratio	0.49	0.28	0.05	0.54
Control Delay	6.0	7.0	19.5	29.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	6.0	7.0	19.5	29.7
Queue Length 50th (m)	25.2	19.5	1.3	14.6
Queue Length 95th (m)	m34.7	31.1	4.1	23.5
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1179	1158	453	386
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	0.49	0.28	0.04	0.38

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	16	427	7	5	250	18	2	5	3	52	19	24
Future Volume (vph)	16	427	7	5	250	18	2	5	3	52	19	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			0.99			0.95			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			0.89	
Frt		1.00			0.99			0.97			0.97	
Flt Protected		1.00			1.00			0.99			0.97	
Satd. Flow (prot)		1850			1792			1724			1580	
Flt Permitted		0.98			0.99			0.92			0.81	
Satd. Flow (perm)		1813			1775			1611			1323	
Peak-hour factor, PHF	0.63	0.79	0.78	0.67	0.87	0.53	0.48	0.66	0.68	0.63	0.74	0.67
Adj. Flow (vph)	25	541	9	7	287	34	4	8	4	83	26	36
RTOR Reduction (vph)	0	1	0	0	5	0	0	3	0	0	18	0
Lane Group Flow (vph)	0	574	0	0	323	0	0	13	0	0	127	0
Confl. Peds. (#/hr)	38		54	54		38	21		91	91		21
Confl. Bikes (#/hr)			3			1			1			
Heavy Vehicles (%)	7%	3%	0%	0%	4%	12%	0%	0%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		48.8			48.8			14.2			14.2	
Effective Green, g (s)		48.8			48.8			14.2			14.2	
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)		1179			1154			305			250	
v/s Ratio Prot												
v/s Ratio Perm		c0.32			0.18			0.01			c0.10	
v/c Ratio		0.49			0.28			0.04			0.51	
Uniform Delay, d1		6.7			5.6			24.8			27.3	
Progression Factor		0.63			1.00			1.00			1.00	
Incremental Delay, d2		1.0			0.6			0.1			1.6	
Delay (s)		5.2			6.2			24.9			28.9	
Level of Service		A			A			C			C	
Approach Delay (s)		5.2			6.2			24.9			28.9	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			9.1			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			56.0%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	8	0	0	3	1	0	5	0	2	0	7
Future Volume (Veh/h)	11	8	0	0	3	1	0	5	0	2	0	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.63	0.25	0.25	0.25	0.25	0.25	0.63	0.60	0.67	0.50	0.79	0.44
Hourly flow rate (vph)	17	32	0	0	12	4	0	8	0	4	0	16
Pedestrians		5			13			10			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)											355	
pX, platoon unblocked												
vC, conflicting volume	42	42	23	63	50	24	21			21		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	42	42	23	63	50	24	21			21		
tC, single (s)	7.1	6.5	6.7	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.8	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	96	100	100	99	100	100			100		
cM capacity (veh/h)	930	837	917	875	828	1042	1600			1588		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	49	16	8	20								
Volume Left	17	0	0	4								
Volume Right	0	4	0	16								
cSH	867	873	1600	1588								
Volume to Capacity	0.06	0.02	0.00	0.00								
Queue Length 95th (m)	1.4	0.4	0.0	0.1								
Control Delay (s)	9.4	9.2	0.0	1.5								
Lane LOS	A	A		A								
Approach Delay (s)	9.4	9.2	0.0	1.5								
Approach LOS	A	A										
Intersection Summary												
Average Delay			6.9									
Intersection Capacity Utilization			22.8%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	4	0	0	7	2	0	0	0	0	0	1
Future Volume (Veh/h)	4	4	0	0	7	2	0	0	0	0	0	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.50	0.50	0.50	0.50	0.75	0.50	0.50	0.65	0.38	0.25	0.66	0.25
Hourly flow rate (vph)	8	8	0	0	9	4	0	0	0	0	0	4
Pedestrians		10			16			6			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			2			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	24	28	18	28	30	19	14			16		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	24	28	18	28	30	19	14			16		
tC, single (s)	7.1	7.0	6.2	7.1	6.8	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.5	3.3	3.5	4.3	3.3	2.2			2.2		
p0 queue free %	99	99	100	100	99	100	100			100		
cM capacity (veh/h)	950	760	1050	939	785	1045	1602			1589		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	16	13	0	4								
Volume Left	8	0	0	0								
Volume Right	0	4	0	4								
cSH	844	850	1700	1589								
Volume to Capacity	0.02	0.02	0.00	0.00								
Queue Length 95th (m)	0.4	0.4	0.0	0.0								
Control Delay (s)	9.3	9.3	0.0	0.0								
Lane LOS	A	A										
Approach Delay (s)	9.3	9.3	0.0	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay			8.2									
Intersection Capacity Utilization			19.6%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	357	26	5	199	0	31	0	84	0	0	0
Future Volume (Veh/h)	0	357	26	5	199	0	31	0	84	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.74	0.78	0.69	0.42	0.88	0.75	0.65	0.63	0.75	0.75	0.65	0.53
Hourly flow rate (vph)	0	458	38	12	226	0	48	0	112	0	0	0
Pedestrians		12			7			15			5	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					207							
pX, platoon unblocked												
vC, conflicting volume	231			511			754	747	499	851	766	243
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	231			511			754	747	499	851	766	243
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.3
p0 queue free %	100			99			85	100	80	100	100	100
cM capacity (veh/h)	1342			1049			312	333	563	210	325	775
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	496	238	160	0								
Volume Left	0	12	48	0								
Volume Right	38	0	112	0								
cSH	1342	1049	454	1700								
Volume to Capacity	0.00	0.01	0.35	0.00								
Queue Length 95th (m)	0.0	0.3	11.9	0.0								
Control Delay (s)	0.0	0.5	17.2	0.0								
Lane LOS		A	C	A								
Approach Delay (s)	0.0	0.5	17.2	0.0								
Approach LOS			C	A								
Intersection Summary												
Average Delay			3.2									
Intersection Capacity Utilization			36.2%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	172	158	240	98	152	67	126	460	111	45	676
v/c Ratio	0.48	0.41	0.53	0.26	0.41	0.20	0.48	0.58	0.14	0.10	0.81
Control Delay	25.2	32.8	8.5	20.5	33.4	3.2	23.7	26.5	10.1	10.2	32.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.2	32.8	8.5	20.5	33.4	3.2	23.7	26.5	10.1	10.2	32.4
Queue Length 50th (m)	19.3	22.4	0.0	10.5	21.4	0.0	12.0	55.2	3.6	3.5	107.4
Queue Length 95th (m)	21.3	36.9	16.3	18.4	36.6	1.3	m18.9	m78.6	m7.1	7.5	#175.2
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	358	445	485	385	467	387	265	789	779	462	837
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.36	0.49	0.25	0.33	0.17	0.48	0.58	0.14	0.10	0.81

Intersection Summary

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.

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	32	78	134	211	80	134	33	17	106	307	107	98
Future Volume (vph)	32	78	134	211	80	134	33	17	106	307	107	98
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.76	1.00	1.00	0.73		1.00	0.96		0.94
Flpb, ped/bikes		0.89	1.00	1.00	0.89	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	0.95		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1611	1745	1199	1620	1830	1198		1772	1593		1463
Flt Permitted		0.60	1.00	1.00	0.66	1.00	1.00		0.15	1.00		1.00
Satd. Flow (perm)		1010	1745	1199	1120	1830	1198		284	1593		1463
Peak-hour factor, PHF	0.73	0.61	0.85	0.88	0.82	0.88	0.78	0.67	0.84	0.97	0.81	0.80
Adj. Flow (vph)	44	128	158	240	98	152	42	25	126	316	132	122
RTOR Reduction (vph)	0	0	0	186	0	0	53	0	0	1	0	57
Lane Group Flow (vph)	0	172	158	54	98	152	14	0	126	459	0	54
Confl. Peds. (#/hr)	73	54		112	112		73	54	50		54	42
Confl. Bikes (#/hr)				2			1	1			1	1
Heavy Vehicles (%)	3%	0%	7%	1%	0%	5%	0%	0%	3%	6%	4%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		27.1	20.1	20.1	24.3	18.7	18.7		49.0	42.7		42.7
Effective Green, g (s)		27.1	20.1	20.1	24.3	18.7	18.7		49.0	42.7		42.7
Actuated g/C Ratio		0.30	0.22	0.22	0.27	0.21	0.21		0.54	0.47		0.47
Clearance Time (s)		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
Lane Grp Cap (vph)		350	389	267	333	380	248		258	755		694
v/s Ratio Prot		c0.04	0.09		0.02	0.08			c0.03	0.29		
v/s Ratio Perm		c0.11		0.04	0.06		0.01		0.23			0.04
v/c Ratio		0.49	0.41	0.20	0.29	0.40	0.06		0.49	0.61		0.08
Uniform Delay, d1		24.8	29.9	28.4	25.5	30.8	28.6		14.8	17.5		12.9
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.95	1.23		2.53
Incremental Delay, d2		1.1	0.7	0.4	0.5	0.7	0.1		1.1	2.7		0.2
Delay (s)		25.8	30.5	28.8	26.0	31.5	28.7		30.0	24.1		32.8
Level of Service		C	C	C	C	C	C		C	C		C
Approach Delay (s)			28.4			29.2				26.6		
Approach LOS			C			C				C		
Intersection Summary												
HCM 2000 Control Delay			28.4			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)				18.0		
Intersection Capacity Utilization			80.8%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	7	24	605	32
Future Volume (vph)	7	24	605	32
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.99	
Flpb, ped/bikes		0.98	1.00	
Frt		1.00	0.99	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1796	1850	
Flt Permitted		0.38	1.00	
Satd. Flow (perm)		721	1850	
Peak-hour factor, PHF	0.44	0.82	0.95	0.83
Adj. Flow (vph)	16	29	637	39
RTOR Reduction (vph)	0	0	2	0
Lane Group Flow (vph)	0	45	674	0
Confl. Peds. (#/hr)	54	42		50
Confl. Bikes (#/hr)				7
Heavy Vehicles (%)	0%	0%	2%	7%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		43.6	40.0	
Effective Green, g (s)		43.6	40.0	
Actuated g/C Ratio		0.48	0.44	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		392	822	
v/s Ratio Prot		0.00	c0.36	
v/s Ratio Perm		0.05		
v/c Ratio		0.11	0.82	
Uniform Delay, d1		12.7	21.8	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.1	9.0	
Delay (s)		12.8	30.8	
Level of Service		B	C	
Approach Delay (s)			29.7	
Approach LOS			C	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	11	30	14	6	39	31	641	49	60	793	28
Future Volume (Veh/h)	5	11	30	14	6	39	31	641	49	60	793	28
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.31	0.50	0.78	0.81	0.50	0.84	0.66	0.86	0.88	0.79	0.93	0.84
Hourly flow rate (vph)	16	22	38	17	12	46	47	745	56	76	853	33
Pedestrians	37			35			9			9		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	4			3			1			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)							94			144		
pX, platoon unblocked	0.79	0.79	0.67	0.79	0.79	0.76	0.67				0.76	
vC, conflicting volume	1586	1988	916	1965	1977	444	923				836	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	450	962	621	932	947	0	633				141	
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 %	94	86	86	85	93	94	92				93	
cM capacity (veh/h)	281	162	276	111	165	790	615				1063	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	76	75	420	428	76	886						
Volume Left	16	17	47	0	76	0						
Volume Right	38	46	0	56	0	33						
cSH	230	264	615	1700	1063	1700						
Volume to Capacity	0.33	0.28	0.08	0.25	0.07	0.52						
Queue Length 95th (m)	10.5	8.6	1.9	0.0	1.8	0.0						
Control Delay (s)	28.2	24.0	2.3	0.0	8.6	0.0						
Lane LOS	D	C	A		A							
Approach Delay (s)	28.2	24.0	1.1		0.7							
Approach LOS	D	C										
Intersection Summary												
Average Delay				2.8								
Intersection Capacity Utilization				65.2%	ICU Level of Service			C				
Analysis Period (min)				15								

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	177	133	1037	217	697
v/c Ratio	0.41	0.22	0.82	0.74	0.61
Control Delay	30.6	13.7	21.0	42.6	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	30.6	13.7	21.0	42.6	8.0
Queue Length 50th (m)	25.2	12.1	58.1	38.0	26.7
Queue Length 95th (m)	39.4	19.1	m70.1	m50.3	m43.7
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	434	614	1264	292	1141
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	0.41	0.22	0.82	0.74	0.61

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

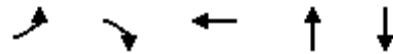
10/29/2018

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	147	105	612	279	167	669
Future Volume (vph)	147	105	612	279	167	669
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.97	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.95		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1630	1418	3298		1755	1902
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1630	1418	3298		1755	1902
Peak-hour factor, PHF	0.83	0.79	0.85	0.88	0.77	0.96
Adj. Flow (vph)	177	133	720	317	217	697
RTOR Reduction (vph)	0	0	55	0	0	0
Lane Group Flow (vph)	177	133	982	0	217	697
Confl. Peds. (#/hr)	44	30		9	9	
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	12%	12%	3%	8%	4%	1%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	434	709	1209		292	1141
v/s Ratio Prot	c0.11	0.03	c0.30		c0.12	0.37
v/s Ratio Perm		0.06				
v/c Ratio	0.41	0.19	0.81		0.74	0.61
Uniform Delay, d1	27.2	15.7	25.7		35.7	11.4
Progression Factor	1.00	1.00	0.69		0.80	0.52
Incremental Delay, d2	2.8	0.6	4.1		12.5	1.9
Delay (s)	30.0	16.3	22.0		41.1	7.8
Level of Service	C	B	C		D	A
Approach Delay (s)	24.1		22.0			15.7
Approach LOS	C		C			B
Intersection Summary						
HCM 2000 Control Delay			19.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.66			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	405	171	39	755	886
v/c Ratio	1.01	0.34	0.08	0.56	0.54
Control Delay	82.3	9.5	15.7	13.3	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	82.3	9.5	15.7	13.3	11.9
Queue Length 50th (m)	~71.1	4.8	2.6	34.4	29.0
Queue Length 95th (m)	#96.8	15.9	9.8	44.5	37.6
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	400	500	490	1341	1633
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	1.01	0.34	0.08	0.56	0.54

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

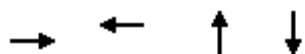
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	308	0	140	17	4	18	88	578	0	0	678	132
Future Volume (vph)	308	0	140	17	4	18	88	578	0	0	678	132
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	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	1.00		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.94			1.00			0.97	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1802		1406		1651			3412			3378	
Flt Permitted	0.73		1.00		0.98			0.66			1.00	
Satd. Flow (perm)	1388		1406		1651			2257			3378	
Peak-hour factor, PHF	0.76	0.38	0.82	1.00	1.00	1.00	0.90	0.88	0.25	0.25	0.93	0.84
Adj. Flow (vph)	405	0	171	17	4	18	98	657	0	0	729	157
RTOR Reduction (vph)	0	0	95	0	13	0	0	0	0	0	20	0
Lane Group Flow (vph)	405	0	76	0	26	0	0	755	0	0	866	0
Confl. Peds. (#/hr)	2		87	87		2	44		2	2		44
Confl. Bikes (#/hr)			3									3
Heavy Vehicles (%)	1%	0%	3%	0%	0%	0%	4%	5%	0%	0%	4%	1%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	26.0		26.0		26.0			52.0			43.0	
Effective Green, g (s)	26.0		26.0		26.0			52.0			43.0	
Actuated g/C Ratio	0.29		0.29		0.29			0.58			0.48	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	400		406		476			1381			1613	
v/s Ratio Prot								c0.04			0.26	
v/s Ratio Perm	c0.29		0.05		0.02			c0.28				
v/c Ratio	1.01		0.19		0.06			0.55			0.54	
Uniform Delay, d1	32.0		24.1		23.1			11.7			16.5	
Progression Factor	1.00		1.00		1.00			1.00			0.67	
Incremental Delay, d2	48.2		0.2		0.0			0.4			1.1	
Delay (s)	80.2		24.3		23.2			12.2			12.2	
Level of Service	F		C		C			B			B	
Approach Delay (s)		63.6			23.2			12.2			12.2	
Approach LOS		E			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			25.5									
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			83.9%									
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	556	630	177	156
v/c Ratio	0.52	0.57	0.51	0.48
Control Delay	10.0	20.0	30.0	23.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.0	20.0	30.0	23.9
Queue Length 50th (m)	41.1	88.7	20.0	13.7
Queue Length 95th (m)	63.3	109.2	27.8	21.9
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	1061	1108	456	419
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	0.52	0.57	0.39	0.37
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	378	44	38	440	24	20	94	21	19	43	43
Future Volume (vph)	34	378	44	38	440	24	20	94	21	19	43	43
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			1.00			0.98	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.99			0.98			0.95	
Flt Protected		1.00			0.99			0.99			0.99	
Satd. Flow (prot)		1783			1879			1865			1760	
Flt Permitted		0.91			0.90			0.95			0.86	
Satd. Flow (perm)		1627			1705			1775			1539	
Peak-hour factor, PHF	0.67	0.87	0.62	0.59	0.82	0.82	0.85	0.71	1.00	0.50	0.73	0.73
Adj. Flow (vph)	51	434	71	64	537	29	24	132	21	38	59	59
RTOR Reduction (vph)	0	6	0	0	2	0	0	7	0	0	32	0
Lane Group Flow (vph)	0	550	0	0	628	0	0	170	0	0	124	0
Confl. Peds. (#/hr)	18		8	8		18	18		2	2		18
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		48.6			48.6			14.4			14.4	
Effective Green, g (s)		48.6			48.6			14.4			14.4	
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)		1054			1104			340			295	
v/s Ratio Prot												
v/s Ratio Perm		0.34			c0.37			c0.10			0.08	
v/c Ratio		0.52			0.57			0.50			0.42	
Uniform Delay, d1		7.0			7.4			27.1			26.6	
Progression Factor		1.00			2.08			1.00			1.00	
Incremental Delay, d2		1.8			2.0			1.2			1.0	
Delay (s)		8.9			17.3			28.2			27.6	
Level of Service		A			B			C			C	
Approach Delay (s)		8.9			17.3			28.2			27.6	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			16.5			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			56.8%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	8	135	6	14	92
Future Volume (Veh/h)	6	8	135	6	14	92
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.50	0.67	0.84	0.75	0.46	0.80
Hourly flow rate (vph)	12	12	161	8	30	115
Pedestrians	5					3
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	345	173			174	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	345	173			174	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	98	99			98	
cM capacity (veh/h)	638	869			1360	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	24	169	145			
Volume Left	12	0	30			
Volume Right	12	8	0			
cSH	736	1700	1360			
Volume to Capacity	0.03	0.10	0.02			
Queue Length 95th (m)	0.8	0.0	0.5			
Control Delay (s)	10.1	0.0	1.7			
Lane LOS	B		A			
Approach Delay (s)	10.1	0.0	1.7			
Approach LOS	B					
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			27.6%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	217	2	3	333	67	3	16	19	32	13	76
Future Volume (Veh/h)	67	217	2	3	333	67	3	16	19	32	13	76
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.81	0.25	0.38	0.77	0.75	0.75	0.63	0.75	0.83	0.56	0.63
Hourly flow rate (vph)	96	268	8	8	432	89	4	25	25	39	23	121
Pedestrians		9						13			16	
Lane Width (m)		3.7						3.7			3.7	
Walking Speed (m/s)		1.1						1.1			1.1	
Percent Blockage		1						1			2	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	537			289			1111	1030	285	1010	990	502
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	537			289			1111	1030	285	1010	990	502
tC, single (s)	4.1			4.1			7.1	6.6	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.3	3.5	4.0	3.3
p0 queue free %	91			99			97	88	97	77	89	78
cM capacity (veh/h)	1025			1268			120	200	749	172	218	560
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	372	529	54	183								
Volume Left	96	8	4	39								
Volume Right	8	89	25	121								
cSH	1025	1268	282	333								
Volume to Capacity	0.09	0.01	0.19	0.55								
Queue Length 95th (m)	2.3	0.1	5.3	23.8								
Control Delay (s)	3.0	0.2	20.8	28.2								
Lane LOS	A	A	C	D								
Approach Delay (s)	3.0	0.2	20.8	28.2								
Approach LOS			C	D								
Intersection Summary												
Average Delay			6.6									
Intersection Capacity Utilization			61.7%		ICU Level of Service				B			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	382	22	18	457	14	19	27	13	6	20	18
Future Volume (Veh/h)	18	382	22	18	457	14	19	27	13	6	20	18
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.53	0.84	0.56	0.65	0.85	0.65	0.75	0.72	0.60	0.50	0.59	0.71
Hourly flow rate (vph)	34	455	39	28	538	22	25	38	22	12	34	25
Pedestrians		7			1			11			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked	0.85			0.89			0.91	0.91	0.89	0.91	0.91	0.85
vC, conflicting volume	574			505			1208	1184	486	1204	1192	570
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	417			383			909	883	363	905	892	412
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 %	97			97			86	84	96	93	86	95
cM capacity (veh/h)	972			1046			183	239	605	172	236	529
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	528	588	85	71								
Volume Left	34	28	25	12								
Volume Right	39	22	22	25								
cSH	972	1046	256	272								
Volume to Capacity	0.03	0.03	0.33	0.26								
Queue Length 95th (m)	0.8	0.6	10.6	7.7								
Control Delay (s)	1.0	0.7	25.9	22.8								
Lane LOS	A	A	D	C								
Approach Delay (s)	1.0	0.7	25.9	22.8								
Approach LOS			D	C								
Intersection Summary												
Average Delay			3.7									
Intersection Capacity Utilization			44.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	2	15	3	3	5	39	14	4	53	1
Future Volume (Veh/h)	5	5	2	15	3	3	5	39	14	4	53	1
Sign Control	Stop				Stop				Free		Free	
Grade	0%				0%				0%		0%	
Peak Hour Factor	0.63	0.63	0.25	0.33	0.75	0.38	0.63	0.77	0.50	0.33	0.85	0.25
Hourly flow rate (vph)	8	8	8	45	4	8	8	51	28	12	62	4
Pedestrians	12				9				9		7	
Lane Width (m)	3.7				3.7				3.7		3.7	
Walking Speed (m/s)	1.1				1.1				1.1		1.1	
Percent Blockage	1				1				1		1	
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	198	204	85	199	192	81	78				88	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	198	204	85	199	192	81	78				88	
tC, single (s)	7.1	6.7	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.2	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	99	99	94	99	99	99				99	
cM capacity (veh/h)	723	640	960	719	683	969	1515				1507	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	24	57	87	78								
Volume Left	8	45	8	12								
Volume Right	8	8	28	4								
cSH	752	743	1515	1507								
Volume to Capacity	0.03	0.08	0.01	0.01								
Queue Length 95th (m)	0.8	1.9	0.1	0.2								
Control Delay (s)	9.9	10.2	0.7	1.2								
Lane LOS	A	B	A	A								
Approach Delay (s)	9.9	10.2	0.7	1.2								
Approach LOS	A	B										
Intersection Summary												
Average Delay				4.0								
Intersection Capacity Utilization				19.6%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	5	55	11	3	74
Future Volume (Veh/h)	6	5	55	11	3	74
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.42	0.57	0.75	0.38	0.83
Hourly flow rate (vph)	24	12	96	15	8	89
Pedestrians	4					4
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	212	112			115	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	212	112			115	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	99			99	
cM capacity (veh/h)	773	940			1481	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	36	111	97			
Volume Left	24	0	8			
Volume Right	12	15	0			
cSH	822	1700	1481			
Volume to Capacity	0.04	0.07	0.01			
Queue Length 95th (m)	1.0	0.0	0.1			
Control Delay (s)	9.6	0.0	0.7			
Lane LOS	A		A			
Approach Delay (s)	9.6	0.0	0.7			
Approach LOS	A					
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization			17.6%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

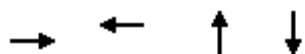
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	230	8	4	326	30	22	4	27	32	8	37
Future Volume (Veh/h)	27	230	8	4	326	30	22	4	27	32	8	37
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.68	0.94	0.50	0.59	0.83	0.25	0.58	0.33	0.65	0.84	0.50	0.83
Hourly flow rate (vph)	40	245	16	7	393	120	38	12	42	38	16	45
Pedestrians		4			1			13			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)												
pX, platoon unblocked												
vC, conflicting volume	527			274			870	887	267	863	835	471
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	527			274			870	887	267	863	835	471
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 %	96			99			83	95	94	84	94	92
cM capacity (veh/h)	1036			1284			226	266	756	236	285	586
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	301	520	92	99								
Volume Left	40	7	38	38								
Volume Right	16	120	42	45								
cSH	1036	1284	342	337								
Volume to Capacity	0.04	0.01	0.27	0.29								
Queue Length 95th (m)	0.9	0.1	8.1	9.1								
Control Delay (s)	1.5	0.2	19.4	20.1								
Lane LOS	A	A	C	C								
Approach Delay (s)	1.5	0.2	19.4	20.1								
Approach LOS			C	C								
Intersection Summary												
Average Delay			4.3									
Intersection Capacity Utilization			43.6%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	493	587	20	107
v/c Ratio	0.39	0.44	0.06	0.37
Control Delay	5.0	8.3	18.5	21.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.0	8.3	18.5	21.2
Queue Length 50th (m)	19.8	42.8	1.5	8.2
Queue Length 95th (m)	26.0	58.1	4.9	13.6
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1276	1327	482	421
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	0.44	0.04	0.25
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	388	5	5	451	28	2	8	5	47	5	34
Future Volume (vph)	14	388	5	5	451	28	2	8	5	47	5	34
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			0.98			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			0.97	
Frt		1.00			0.99			0.96			0.95	
Flt Protected		1.00			1.00			0.99			0.97	
Satd. Flow (prot)		1856			1879			1778			1705	
Flt Permitted		0.97			0.99			0.95			0.81	
Satd. Flow (perm)		1799			1871			1707			1417	
Peak-hour factor, PHF	0.65	0.84	0.58	0.67	0.83	0.75	0.63	0.71	0.78	0.75	0.67	0.92
Adj. Flow (vph)	22	462	9	7	543	37	3	11	6	63	7	37
RTOR Reduction (vph)	0	1	0	0	2	0	0	5	0	0	29	0
Lane Group Flow (vph)	0	492	0	0	585	0	0	15	0	0	78	0
Confl. Peds. (#/hr)	24		35	35		24	10		23	23		10
Confl. Bikes (#/hr)			2			2						1
Heavy Vehicles (%)	0%	3%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		50.8			50.8			12.2			12.2	
Effective Green, g (s)		50.8			50.8			12.2			12.2	
Actuated g/C Ratio		0.68			0.68			0.16			0.16	
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)		1218			1267			277			230	
v/s Ratio Prot												
v/s Ratio Perm		0.27			0.31			0.01			0.05	
v/c Ratio		0.40			0.46			0.05			0.34	
Uniform Delay, d1		5.4			5.7			26.5			27.8	
Progression Factor		0.60			1.00			1.00			1.00	
Incremental Delay, d2		0.9			1.2			0.1			0.9	
Delay (s)		4.1			6.9			26.6			28.7	
Level of Service		A			A			C			C	
Approach Delay (s)		4.1			6.9			26.6			28.7	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay		8.0			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.44										
Actuated Cycle Length (s)		75.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		52.4%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	7	0	0	5	2	0	2	0	2	0	3
Future Volume (Veh/h)	2	7	0	0	5	2	0	2	0	2	0	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.50	0.25	0.50	0.50	0.44	0.88	0.42	0.50	0.77	0.38
Hourly flow rate (vph)	8	28	0	0	10	4	0	2	0	4	0	8
Pedestrians		5			7			16			4	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			2			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)											355	
pX, platoon unblocked												
vC, conflicting volume	32	26	25	51	30	13	13			9		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	32	26	25	51	30	13	13			9		
tC, single (s)	7.1	6.5	6.5	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	99	97	100	100	99	100	100			100		
cM capacity (veh/h)	949	859	968	899	855	1062	1523			1613		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	36	14	2	12								
Volume Left	8	0	0	4								
Volume Right	0	4	0	8								
cSH	877	905	1523	1613								
Volume to Capacity	0.04	0.02	0.00	0.00								
Queue Length 95th (m)	1.0	0.4	0.0	0.1								
Control Delay (s)	9.3	9.0	0.0	2.4								
Lane LOS	A	A		A								
Approach Delay (s)	9.3	9.0	0.0	2.4								
Approach LOS	A	A										
Intersection Summary												
Average Delay			7.7									
Intersection Capacity Utilization			19.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	3	0	0	4	0	0	0	0	1	0	4
Future Volume (Veh/h)	1	3	0	0	4	0	0	0	0	1	0	4
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.94	0.25	0.25	0.84	0.50
Hourly flow rate (vph)	4	12	0	0	16	0	0	0	0	4	0	8
Pedestrians	3			20			8			8		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	0			2			1			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	31	35	15	46	39	28	11				20	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	31	35	15	46	39	28	11				20	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	100	99	100	100	98	100	100				100	
cM capacity (veh/h)	939	840	1059	907	836	1024	1617				1578	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	16	16	0	12								
Volume Left	4	0	0	4								
Volume Right	0	0	0	8								
cSH	863	836	1700	1578								
Volume to Capacity	0.02	0.02	0.00	0.00								
Queue Length 95th (m)	0.4	0.4	0.0	0.1								
Control Delay (s)	9.3	9.4	0.0	2.4								
Lane LOS	A	A		A								
Approach Delay (s)	9.3	9.4	0.0	2.4								
Approach LOS	A	A										
Intersection Summary												
Average Delay				7.4								
Intersection Capacity Utilization				20.5%	ICU Level of Service			A				
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	244	19	5	279	0	89	0	85	0	0	1
Future Volume (Veh/h)	0	244	19	5	279	0	89	0	85	0	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.87	0.64	0.63	0.84	0.63	0.74	0.82	0.63	0.53	0.58	0.83
Hourly flow rate (vph)	0	280	30	8	332	0	120	0	135	0	0	1
Pedestrians		7			9			15			9	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					207							
pX, platoon unblocked												
vC, conflicting volume	341			325			666	667	319	796	682	348
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	341			325			666	667	319	796	682	348
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 %	100			99			66	100	81	100	100	100
cM capacity (veh/h)	1191			1228			356	371	698	233	364	684
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	310	340	255	1								
Volume Left	0	8	120	0								
Volume Right	30	0	135	1								
cSH	1191	1228	481	684								
Volume to Capacity	0.00	0.01	0.53	0.00								
Queue Length 95th (m)	0.0	0.1	23.2	0.0								
Control Delay (s)	0.0	0.2	20.6	10.3								
Lane LOS		A	C	B								
Approach Delay (s)	0.0	0.2	20.6	10.3								
Approach LOS			C	B								
Intersection Summary												
Average Delay			5.9									
Intersection Capacity Utilization			42.6%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	139	165	251	160	273	130	188	646	91	80	578
v/c Ratio	0.50	0.44	0.59	0.44	0.67	0.46	0.57	0.84	0.13	0.29	0.73
Control Delay	25.6	33.3	9.9	23.5	40.2	13.5	12.1	25.6	1.5	12.8	28.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.6	33.3	9.9	23.5	40.2	13.5	12.1	25.6	1.5	12.8	28.9
Queue Length 50th (m)	15.3	23.5	0.0	17.8	41.1	2.8	4.3	110.9	1.7	6.4	84.7
Queue Length 95th (m)	22.0	32.5	12.7	31.1	60.8	12.6	m5.4 m#181.0	m2.5	10.1	#127.4	
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	278	450	461	364	486	318	331	767	716	273	787
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.37	0.54	0.44	0.56	0.41	0.57	0.84	0.13	0.29	0.73

Intersection Summary

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.

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	42	59	122	206	146	232	63	27	147	497	88	94
Future Volume (vph)	42	59	122	206	146	232	63	27	147	497	88	94
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.68	1.00	1.00	0.57		1.00	0.96		0.92
Flpb, ped/bikes		0.91	1.00	1.00	0.86	1.00	1.00		0.99	1.00		1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.97		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1654	1762	1075	1568	1902	926		1790	1668		1431
Flt Permitted		0.39	1.00	1.00	0.61	1.00	1.00		0.23	1.00		1.00
Satd. Flow (perm)		676	1762	1075	1014	1902	926		428	1668		1431
Peak-hour factor, PHF	0.71	0.74	0.74	0.82	0.91	0.85	0.79	0.54	0.78	0.95	0.78	0.93
Adj. Flow (vph)	59	80	165	251	160	273	80	50	188	523	113	101
RTOR Reduction (vph)	0	0	0	197	0	0	86	0	0	1	0	50
Lane Group Flow (vph)	0	139	165	54	160	273	44	0	188	645	0	41
Confl. Peds. (#/hr)	107	104		156	156		107	104	104		104	59
Confl. Bikes (#/hr)				3			4	4			7	7
Heavy Vehicles (%)	2%	0%	6%	0%	0%	1%	0%	0%	1%	3%	0%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		26.3	19.3	19.3	26.3	19.3	19.3		47.6	40.8		40.8
Effective Green, g (s)		26.3	19.3	19.3	26.3	19.3	19.3		47.6	40.8		40.8
Actuated g/C Ratio		0.29	0.21	0.21	0.29	0.21	0.21		0.53	0.45		0.45
Clearance Time (s)		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
Lane Grp Cap (vph)		273	377	230	339	407	198		329	756		648
v/s Ratio Prot		c0.04	0.09		0.04	c0.14			c0.04	c0.39		
v/s Ratio Perm		0.11		0.05	0.10		0.05		0.26			0.03
v/c Ratio		0.51	0.44	0.23	0.47	0.67	0.22		0.57	0.85		0.06
Uniform Delay, d1		24.9	30.6	29.2	25.1	32.4	29.2		14.0	21.9		13.8
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		0.60	0.60		0.44
Incremental Delay, d2		1.5	0.8	0.5	1.0	4.3	0.6		1.8	9.2		0.1
Delay (s)		26.4	31.5	29.8	26.2	36.7	29.7		10.2	22.4		6.3
Level of Service		C	C	C	C	D	C		B	C		A
Approach Delay (s)			29.4			32.1				18.3		
Approach LOS			C			C				B		
Intersection Summary												
HCM 2000 Control Delay			25.4									
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			83.5%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	16	39	455	61
Future Volume (vph)	16	39	455	61
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.98	
Flpb, ped/bikes		0.99	1.00	
Frt		1.00	0.98	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1755	1806	
Flt Permitted		0.18	1.00	
Satd. Flow (perm)		327	1806	
Peak-hour factor, PHF	0.63	0.71	0.89	0.91
Adj. Flow (vph)	25	55	511	67
RTOR Reduction (vph)	0	0	5	0
Lane Group Flow (vph)	0	80	573	0
Confl. Peds. (#/hr)	104	59		104
Confl. Bikes (#/hr)				5
Heavy Vehicles (%)	0%	5%	2%	2%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		43.8	38.9	
Effective Green, g (s)		43.8	38.9	
Actuated g/C Ratio		0.49	0.43	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		236	780	
v/s Ratio Prot		0.02	0.32	
v/s Ratio Perm		0.15		
v/c Ratio		0.34	0.73	
Uniform Delay, d1		15.4	21.3	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.9	6.1	
Delay (s)		16.3	27.3	
Level of Service		B	C	
Approach Delay (s)			26.0	
Approach LOS			C	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	26	19	7	53	22	813	36	41	786	23
Future Volume (Veh/h)	5	5	26	19	7	53	22	813	36	41	786	23
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.63	0.78	0.75	0.44	0.83	0.53	0.92	0.65	0.75	0.94	0.79
Hourly flow rate (vph)	8	8	33	25	16	64	42	884	55	55	836	29
Pedestrians	52			63			3			6		
Lane Width (m)	3.7			3.7			3.7			3.7		
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)							94			144		
pX, platoon unblocked	0.81	0.81	0.69	0.81	0.81	0.75	0.69				0.75	
vC, conflicting volume	1616	2098	906	2044	2086	538	917				1002	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	503	1098	635	1032	1082	0	651				349	
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 %	97	94	88	75	88	92	93				94	
cM capacity (veh/h)	242	135	277	100	138	767	616				864	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	49	105	484	497	55	865						
Volume Left	8	25	42	0	55	0						
Volume Right	33	64	0	55	0	29						
cSH	232	234	616	1700	864	1700						
Volume to Capacity	0.21	0.45	0.07	0.29	0.06	0.51						
Queue Length 95th (m)	5.9	16.3	1.7	0.0	1.5	0.0						
Control Delay (s)	24.6	32.3	1.9	0.0	9.5	0.0						
Lane LOS	C	D	A		A							
Approach Delay (s)	24.6	32.3	1.0		0.6							
Approach LOS	C	D										
Intersection Summary												
Average Delay				2.9								
Intersection Capacity Utilization				58.7%	ICU Level of Service			B				
Analysis Period (min)				15								

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	225	222	1019	207	723
v/c Ratio	0.50	0.34	0.81	0.71	0.63
Control Delay	32.4	15.1	25.1	53.6	19.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	32.4	15.1	25.1	53.6	19.8
Queue Length 50th (m)	32.8	21.3	81.7	33.0	98.1
Queue Length 95th (m)	49.9	31.7	83.6	m47.9	140.1
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	454	649	1259	292	1152
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	0.50	0.34	0.81	0.71	0.63

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

10/29/2018

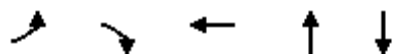
						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	189	182	666	182	168	680
Future Volume (vph)	189	182	666	182	168	680
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.96	0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1706	1498	3337		1755	1921
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1706	1498	3337		1755	1921
Peak-hour factor, PHF	0.84	0.82	0.87	0.72	0.81	0.94
Adj. Flow (vph)	225	222	766	253	207	723
RTOR Reduction (vph)	0	0	35	0	0	0
Lane Group Flow (vph)	225	222	984	0	207	723
Confl. Peds. (#/hr)	48	42		34	34	
Confl. Bikes (#/hr)		3		5		
Heavy Vehicles (%)	7%	5%	1%	11%	4%	0%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	454	749	1223		292	1152
v/s Ratio Prot	c0.13	0.05	c0.29		0.12	c0.38
v/s Ratio Perm		0.10				
v/c Ratio	0.50	0.30	0.80		0.71	0.63
Uniform Delay, d1	27.9	16.6	25.6		35.4	11.5
Progression Factor	1.00	1.00	0.82		1.16	1.47
Incremental Delay, d2	3.8	1.0	4.8		11.5	2.2
Delay (s)	31.7	17.6	25.8		52.5	19.1
Level of Service	C	B	C		D	B
Approach Delay (s)	24.7		25.8			26.5
Approach LOS	C		C			C
Intersection Summary						
HCM 2000 Control Delay			25.9		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.69			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.0%		ICU Level of Service	D
Analysis Period (min)			15			

c Critical Lane Group

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	260	167	138	775	900
v/c Ratio	0.84	0.35	0.32	0.57	0.51
Control Delay	55.7	6.3	20.7	12.2	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	55.7	6.3	20.7	12.2	11.1
Queue Length 50th (m)	41.5	0.0	13.5	33.3	32.6
Queue Length 95th (m)	59.8	10.4	27.4	47.1	54.6
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	361	532	504	1363	1781
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	0.72	0.31	0.27	0.57	0.51
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

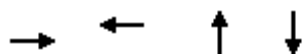
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	213	0	137	60	22	56	108	583	0	0	666	169
Future Volume (vph)	213	0	137	60	22	56	108	583	0	0	666	169
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	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	0.99		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.95			1.00			0.97	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1765		1432		1654			3473			3373	
Flt Permitted	0.67		1.00		0.98			0.61			1.00	
Satd. Flow (perm)	1252		1432		1654			2129			3373	
Peak-hour factor, PHF	0.82	0.25	0.82	1.00	1.00	1.00	0.85	0.90	0.25	0.25	0.96	0.82
Adj. Flow (vph)	260	0	167	60	22	56	127	648	0	0	694	206
RTOR Reduction (vph)	0	0	126	0	29	0	0	0	0	0	28	0
Lane Group Flow (vph)	260	0	41	0	109	0	0	775	0	0	872	0
Confl. Peds. (#/hr)	12		89	89		12	45		13	13		45
Confl. Bikes (#/hr)			1						5			1
Heavy Vehicles (%)	2%	0%	1%	0%	0%	0%	2%	3%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	22.2		22.2		22.2			55.8			46.8	
Effective Green, g (s)	22.2		22.2		22.2			55.8			46.8	
Actuated g/C Ratio	0.25		0.25		0.25			0.62			0.52	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	308		353		407			1409			1753	
v/s Ratio Prot								c0.04			0.26	
v/s Ratio Perm	c0.21		0.03		0.07			c0.30				
v/c Ratio	0.84		0.12		0.27			0.55			0.50	
Uniform Delay, d1	32.3		26.3		27.4			9.9			14.0	
Progression Factor	1.00		1.00		1.00			1.00			0.73	
Incremental Delay, d2	18.6		0.1		0.4			0.5			0.8	
Delay (s)	50.9		26.4		27.7			10.3			11.1	
Level of Service	D		C		C			B			B	
Approach Delay (s)		41.3			27.7			10.3			11.1	
Approach LOS		D			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			17.6				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			15.0		
Intersection Capacity Utilization			79.7%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	648	389	256	349
v/c Ratio	0.76	0.48	0.59	0.89
Control Delay	22.8	10.3	21.4	45.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	22.8	10.3	21.4	45.4
Queue Length 50th (m)	69.2	21.5	16.1	36.3
Queue Length 95th (m)	90.2	31.1	25.1	52.3
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	851	817	527	459
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	0.76	0.48	0.49	0.76
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	373	36	36	188	60	35	130	23	53	70	103
Future Volume (vph)	80	373	36	36	188	60	35	130	23	53	70	103
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			0.99			0.81	
Flpb, ped/bikes		0.99			1.00			0.96			0.99	
Frt		0.99			0.97			0.98			0.93	
Flt Protected		0.99			0.99			0.99			0.99	
Satd. Flow (prot)		1759			1753			1760			1394	
Flt Permitted		0.88			0.84			0.81			0.81	
Satd. Flow (perm)		1560			1478			1449			1146	
Peak-hour factor, PHF	0.83	0.76	0.59	0.55	0.83	0.62	0.60	0.79	0.69	0.60	0.79	0.60
Adj. Flow (vph)	96	491	61	65	227	97	58	165	33	88	89	172
RTOR Reduction (vph)	0	5	0	0	14	0	0	8	0	0	51	0
Lane Group Flow (vph)	0	643	0	0	375	0	0	248	0	0	298	0
Confl. Peds. (#/hr)	56		43	43		56	175		19	19		175
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	3%	5%	0%	4%	0%	0%	1%	5%	2%	3%	3%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		40.8			40.8			22.2			22.2	
Effective Green, g (s)		40.8			40.8			22.2			22.2	
Actuated g/C Ratio		0.54			0.54			0.30			0.30	
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)		848			804			428			339	
v/s Ratio Prot												
v/s Ratio Perm		c0.41			0.25			0.17			c0.26	
v/c Ratio		0.76			0.47			0.58			0.88	
Uniform Delay, d1		13.3			10.4			22.4			25.1	
Progression Factor		1.00			0.73			0.78			1.00	
Incremental Delay, d2		6.3			1.9			1.9			21.7	
Delay (s)		19.6			9.5			19.4			46.8	
Level of Service		B			A			B			D	
Approach Delay (s)		19.6			9.5			19.4			46.8	
Approach LOS		B			A			B			D	
Intersection Summary												
HCM 2000 Control Delay			23.0			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			70.6%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018

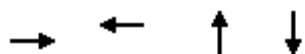


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	7	172	8	12	151
Future Volume (Veh/h)	5	7	172	8	12	151
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.63	0.88	0.74	0.67	0.69	0.66
Hourly flow rate (vph)	8	8	232	12	17	229
Pedestrians	10		3			
Lane Width (m)	3.7		3.7			
Walking Speed (m/s)	1.1		1.1			
Percent Blockage	1		0			
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			284			362
pX, platoon unblocked						
vC, conflicting volume	514	248			254	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	514	248			254	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	98	99			99	
cM capacity (veh/h)	510	755			1259	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	16	244	246			
Volume Left	8	0	17			
Volume Right	8	12	0			
cSH	609	1700	1259			
Volume to Capacity	0.03	0.14	0.01			
Queue Length 95th (m)	0.6	0.0	0.3			
Control Delay (s)	11.1	0.0	0.7			
Lane LOS	B		A			
Approach Delay (s)	11.1	0.0	0.7			
Approach LOS	B					
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			27.8%	ICU Level of Service		A
Analysis Period (min)			15			

Queues

3: Yorkshire Street South & Waterloo Avenue

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	573	301	98	287
v/c Ratio	0.65	0.31	0.19	0.64
Control Delay	15.7	9.1	9.3	22.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.7	9.1	9.3	22.5
Queue Length 50th (m)	51.1	18.9	2.7	23.7
Queue Length 95th (m)	64.6	27.4	5.2	6.5
Internal Link Dist (m)	50.5	146.5	65.6	106.9
Turn Bay Length (m)				
Base Capacity (vph)	885	974	506	451
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	0.65	0.31	0.19	0.64
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	104	334	3	5	185	43	0	15	34	41	30	78
Future Volume (vph)	104	334	3	5	185	43	0	15	34	41	30	78
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			0.98			0.95	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		1.00			0.98			0.90			0.93	
Flt Protected		0.99			1.00			1.00			0.99	
Satd. Flow (prot)		1862			1781			1624			1553	
Flt Permitted		0.84			0.96			1.00			0.93	
Satd. Flow (perm)		1579			1722			1624			1449	
Peak-hour factor, PHF	0.76	0.78	0.38	0.31	0.80	0.79	0.25	0.58	0.47	0.81	0.31	0.56
Adj. Flow (vph)	137	428	8	16	231	54	0	26	72	51	97	139
RTOR Reduction (vph)	0	1	0	0	11	0	0	52	0	0	45	0
Lane Group Flow (vph)	0	572	0	0	290	0	0	46	0	0	242	0
Confl. Peds. (#/hr)	7		9	9		7	44		6	6		44
Confl. Bikes (#/hr)			3			1						1
Heavy Vehicles (%)	0%	2%	0%	0%	3%	11%	0%	7%	3%	0%	20%	3%
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		42.0			42.0			21.0			21.0	
Effective Green, g (s)		42.0			42.0			21.0			21.0	
Actuated g/C Ratio		0.56			0.56			0.28			0.28	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		884			964			454			405	
v/s Ratio Prot								0.03				
v/s Ratio Perm		c0.36			0.17						c0.17	
v/c Ratio		0.65			0.30			0.10			0.60	
Uniform Delay, d1		11.4			8.7			20.0			23.3	
Progression Factor		1.00			1.00			1.00			0.87	
Incremental Delay, d2		3.7			0.8			0.4			5.7	
Delay (s)		15.0			9.5			20.5			26.0	
Level of Service		B			A			C			C	
Approach Delay (s)		15.0			9.5			20.5			26.0	
Approach LOS		B			A			C			C	
Intersection Summary												
HCM 2000 Control Delay		16.6			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.63										
Actuated Cycle Length (s)		75.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		70.7%			ICU Level of Service			C				
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	416	11	13	261	2	14	44	19	8	33	16
Future Volume (Veh/h)	15	416	11	13	261	2	14	44	19	8	33	16
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.80	0.67	0.75	0.91	0.50	0.41	0.81	0.64	0.67	0.43	0.42
Hourly flow rate (vph)	26	520	16	17	287	4	34	54	30	12	77	38
Pedestrians		9			2			25			24	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked	0.98			0.82			0.83	0.83	0.82	0.83	0.83	0.98
vC, conflicting volume	315			561			1014	954	555	986	960	322
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	293			350			861	789	343	828	797	300
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 %	98			98			77	78	95	93	68	95
cM capacity (veh/h)	1227			972			149	244	560	173	243	692
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	562	308	118	127								
Volume Left	26	17	34	12								
Volume Right	16	4	30	38								
cSH	1227	972	234	288								
Volume to Capacity	0.02	0.02	0.50	0.44								
Queue Length 95th (m)	0.5	0.4	19.6	16.2								
Control Delay (s)	0.6	0.7	35.0	27.0								
Lane LOS	A	A	D	D								
Approach Delay (s)	0.6	0.7	35.0	27.0								
Approach LOS			D	D								
Intersection Summary												
Average Delay			7.3									
Intersection Capacity Utilization			41.2%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	7	6	9	4	4	2	37	18	5	59	1
Future Volume (Veh/h)	5	7	6	9	4	4	2	37	18	5	59	1
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.58	0.38	0.63	0.50	0.50	0.50	0.73	0.63	0.42	0.56	0.25
Hourly flow rate (vph)	8	12	16	14	8	8	4	51	29	12	105	4
Pedestrians	7			6			12			4		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	1			1			1			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	228	232	126	244	220	76	116				86	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	228	232	126	244	220	76	116				86	
tC, single (s)	7.1	6.5	6.5	7.1	6.8	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.6	3.5	4.2	3.3	2.2				2.2	
p0 queue free %	99	98	98	98	99	99	100				99	
cM capacity (veh/h)	699	656	832	666	626	982	1475				1514	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	36	30	84	121								
Volume Left	8	14	4	12								
Volume Right	16	8	29	4								
cSH	735	715	1475	1514								
Volume to Capacity	0.05	0.04	0.00	0.01								
Queue Length 95th (m)	1.2	1.0	0.1	0.2								
Control Delay (s)	10.1	10.3	0.4	0.8								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.1	10.3	0.4	0.8								
Approach LOS	B	B										
Intersection Summary												
Average Delay				3.0								
Intersection Capacity Utilization				20.3%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	3	56	11	2	86
Future Volume (Veh/h)	9	3	56	11	2	86
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.75	0.53	0.33	0.25	0.46
Hourly flow rate (vph)	36	4	106	33	8	187
Pedestrians	6		1			3
Lane Width (m)	3.7		3.7			3.7
Walking Speed (m/s)	1.1		1.1			1.1
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	332	132			145	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	332	132			145	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	100			99	
cM capacity (veh/h)	658	915			1441	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	40	139	195			
Volume Left	36	0	8			
Volume Right	4	33	0			
cSH	677	1700	1441			
Volume to Capacity	0.06	0.08	0.01			
Queue Length 95th (m)	1.4	0.0	0.1			
Control Delay (s)	10.6	0.0	0.4			
Lane LOS	B		A			
Approach Delay (s)	10.6	0.0	0.4			
Approach LOS	B					
Intersection Summary						
Average Delay		1.3				
Intersection Capacity Utilization		17.1%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

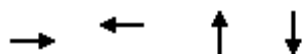
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	348	11	19	190	26	6	7	13	23	23	39
Future Volume (Veh/h)	35	348	11	19	190	26	6	7	13	23	23	39
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.85	0.36	0.75	0.88	0.53	0.75	0.58	0.50	0.64	0.50	0.52
Hourly flow rate (vph)	47	409	31	25	216	49	8	12	26	36	46	75
Pedestrians		3			2			14			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		170										
pX, platoon unblocked				0.88			0.88	0.88	0.88	0.88	0.88	
vC, conflicting volume	268			454			924	850	440	846	842	246
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	268			310			845	761	295	756	751	246
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			98			96	96	96	85	83	90
cM capacity (veh/h)	1275			1094			184	275	648	245	278	776
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	487	290	46	157								
Volume Left	47	25	8	36								
Volume Right	31	49	26	75								
cSH	1275	1094	361	384								
Volume to Capacity	0.04	0.02	0.13	0.41								
Queue Length 95th (m)	0.9	0.5	3.3	14.8								
Control Delay (s)	1.1	0.9	16.4	20.7								
Lane LOS	A	A	C	C								
Approach Delay (s)	1.1	0.9	16.4	20.7								
Approach LOS			C	C								
Intersection Summary												
Average Delay			4.9									
Intersection Capacity Utilization			42.4%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	575	328	16	145
v/c Ratio	0.49	0.28	0.05	0.54
Control Delay	15.6	7.0	19.5	29.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.6	7.0	19.5	29.7
Queue Length 50th (m)	63.0	19.5	1.3	14.6
Queue Length 95th (m)	85.8	31.1	4.1	23.5
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1179	1158	453	386
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	0.49	0.28	0.04	0.38
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	427	7	5	250	18	2	5	3	52	19	24
Future Volume (vph)	16	427	7	5	250	18	2	5	3	52	19	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			0.99			0.95			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			0.89	
Frt		1.00			0.99			0.97			0.97	
Flt Protected		1.00			1.00			0.99			0.97	
Satd. Flow (prot)		1850			1792			1724			1580	
Flt Permitted		0.98			0.99			0.92			0.81	
Satd. Flow (perm)		1813			1775			1611			1323	
Peak-hour factor, PHF	0.63	0.79	0.78	0.67	0.87	0.53	0.48	0.66	0.68	0.63	0.74	0.67
Adj. Flow (vph)	25	541	9	7	287	34	4	8	4	83	26	36
RTOR Reduction (vph)	0	1	0	0	5	0	0	3	0	0	18	0
Lane Group Flow (vph)	0	574	0	0	323	0	0	13	0	0	127	0
Confl. Peds. (#/hr)	38		54	54		38	21		91	91		21
Confl. Bikes (#/hr)			3			1			1			
Heavy Vehicles (%)	7%	3%	0%	0%	4%	12%	0%	0%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		48.8			48.8			14.2			14.2	
Effective Green, g (s)		48.8			48.8			14.2			14.2	
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)		1179			1154			305			250	
v/s Ratio Prot												
v/s Ratio Perm		c0.32			0.18			0.01			c0.10	
v/c Ratio		0.49			0.28			0.04			0.51	
Uniform Delay, d1		6.7			5.6			24.8			27.3	
Progression Factor		1.83			1.00			1.00			1.00	
Incremental Delay, d2		1.1			0.6			0.1			1.6	
Delay (s)		13.3			6.2			24.9			28.9	
Level of Service		B			A			C			C	
Approach Delay (s)		13.3			6.2			24.9			28.9	
Approach LOS		B			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			13.4			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			56.0%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	8	0	0	3	1	0	5	0	2	0	7
Future Volume (Veh/h)	11	8	0	0	3	1	0	5	0	2	0	7
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.25	0.25	0.25	0.25	0.25	0.63	0.60	0.67	0.50	0.79	0.44
Hourly flow rate (vph)	17	32	0	0	12	4	0	8	0	4	0	16
Pedestrians	5			13			10			3		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	0			1			1			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												355
pX, platoon unblocked												
vC, conflicting volume	42	42	23	63	50	24	21				21	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	42	42	23	63	50	24	21				21	
tC, single (s)	7.1	6.5	6.7	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.8	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	98	96	100	100	99	100	100				100	
cM capacity (veh/h)	930	837	917	875	828	1042	1600				1588	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	49	16	8	20								
Volume Left	17	0	0	4								
Volume Right	0	4	0	16								
cSH	867	873	1600	1588								
Volume to Capacity	0.06	0.02	0.00	0.00								
Queue Length 95th (m)	1.4	0.4	0.0	0.1								
Control Delay (s)	9.4	9.2	0.0	1.5								
Lane LOS	A	A		A								
Approach Delay (s)	9.4	9.2	0.0	1.5								
Approach LOS	A	A										
Intersection Summary												
Average Delay				6.9								
Intersection Capacity Utilization				22.8%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	4	0	0	7	2	0	0	0	0	0	1
Future Volume (Veh/h)	4	4	0	0	7	2	0	0	0	0	0	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.50	0.50	0.50	0.50	0.75	0.50	0.50	0.65	0.38	0.25	0.66	0.25
Hourly flow rate (vph)	8	8	0	0	9	4	0	0	0	0	0	4
Pedestrians		10			16			6			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			2			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	24	28	18	28	30	19	14			16		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	24	28	18	28	30	19	14			16		
tC, single (s)	7.1	7.0	6.2	7.1	6.8	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.5	3.3	3.5	4.3	3.3	2.2			2.2		
p0 queue free %	99	99	100	100	99	100	100			100		
cM capacity (veh/h)	950	760	1050	939	785	1045	1602			1589		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	16	13	0	4								
Volume Left	8	0	0	0								
Volume Right	0	4	0	4								
cSH	844	850	1700	1589								
Volume to Capacity	0.02	0.02	0.00	0.00								
Queue Length 95th (m)	0.4	0.4	0.0	0.0								
Control Delay (s)	9.3	9.3	0.0	0.0								
Lane LOS	A	A										
Approach Delay (s)	9.3	9.3	0.0	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay			8.2									
Intersection Capacity Utilization			19.6%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	357	26	5	199	0	31	0	84	0	0	0
Future Volume (Veh/h)	0	357	26	5	199	0	31	0	84	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.74	0.78	0.69	0.42	0.88	0.75	0.65	0.63	0.75	0.75	0.65	0.53
Hourly flow rate (vph)	0	458	38	12	226	0	48	0	112	0	0	0
Pedestrians		12			7			15			5	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		374			207							
pX, platoon unblocked												
vC, conflicting volume	231			511			754	747	499	851	766	243
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	231			511			754	747	499	851	766	243
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.3
p0 queue free %	100			99			85	100	80	100	100	100
cM capacity (veh/h)	1342			1049			312	333	563	210	325	775
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	496	238	160	0								
Volume Left	0	12	48	0								
Volume Right	38	0	112	0								
cSH	1342	1049	454	1700								
Volume to Capacity	0.00	0.01	0.35	0.00								
Queue Length 95th (m)	0.0	0.3	11.9	0.0								
Control Delay (s)	0.0	0.5	17.2	0.0								
Lane LOS		A	C	A								
Approach Delay (s)	0.0	0.5	17.2	0.0								
Approach LOS			C	A								
Intersection Summary												
Average Delay			3.2									
Intersection Capacity Utilization			36.2%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	172	158	240	98	152	67	126	460	111	45	676
v/c Ratio	0.49	0.42	0.54	0.26	0.43	0.21	0.46	0.57	0.14	0.10	0.79
Control Delay	26.0	33.7	8.8	21.1	34.4	3.4	21.5	24.6	9.3	9.7	30.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.0	33.7	8.8	21.1	34.4	3.4	21.5	24.6	9.3	9.7	30.9
Queue Length 50th (m)	19.7	22.7	0.0	10.7	21.7	0.0	10.9	52.4	3.2	3.4	105.1
Queue Length 95th (m)	21.7	37.5	16.7	18.8	37.2	1.3	m17.8	m75.5	m6.6	7.3	#171.3
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	352	426	474	378	447	375	274	800	788	470	851
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.37	0.51	0.26	0.34	0.18	0.46	0.57	0.14	0.10	0.79

Intersection Summary

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.

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	32	78	134	211	80	134	33	17	106	307	107	98
Future Volume (vph)	32	78	134	211	80	134	33	17	106	307	107	98
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.76	1.00	1.00	0.73		1.00	0.96		0.94
Flpb, ped/bikes		0.89	1.00	1.00	0.89	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	0.95		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1613	1745	1198	1620	1830	1198		1772	1593		1463
Flt Permitted		0.59	1.00	1.00	0.66	1.00	1.00		0.16	1.00		1.00
Satd. Flow (perm)		1004	1745	1198	1120	1830	1198		300	1593		1463
Peak-hour factor, PHF	0.73	0.61	0.85	0.88	0.82	0.88	0.78	0.67	0.84	0.97	0.81	0.80
Adj. Flow (vph)	44	128	158	240	98	152	42	25	126	316	132	122
RTOR Reduction (vph)	0	0	0	188	0	0	54	0	0	1	0	57
Lane Group Flow (vph)	0	172	158	52	98	152	13	0	126	459	0	54
Confl. Peds. (#/hr)	73	54		112	112		73	54	50		54	42
Confl. Bikes (#/hr)				2			1	1			1	1
Heavy Vehicles (%)	3%	0%	7%	1%	0%	5%	0%	0%	3%	6%	4%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		26.5	19.5	19.5	23.7	18.1	18.1		49.5	43.3		43.3
Effective Green, g (s)		26.5	19.5	19.5	23.7	18.1	18.1		49.5	43.3		43.3
Actuated g/C Ratio		0.29	0.22	0.22	0.26	0.20	0.20		0.55	0.48		0.48
Clearance Time (s)		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
Lane Grp Cap (vph)		342	378	259	326	368	240		266	766		703
v/s Ratio Prot		c0.04	0.09		0.02	0.08			c0.03	0.29		
v/s Ratio Perm		c0.11		0.04	0.06		0.01		0.23			0.04
v/c Ratio		0.50	0.42	0.20	0.30	0.41	0.06		0.47	0.60		0.08
Uniform Delay, d1		25.2	30.4	28.9	26.0	31.3	29.0		14.4	17.0		12.6
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.84	1.17		2.41
Incremental Delay, d2		1.2	0.8	0.4	0.5	0.8	0.1		1.0	2.5		0.2
Delay (s)		26.4	31.1	29.3	26.5	32.1	29.1		27.5	22.5		30.5
Level of Service		C	C	C	C	C	C		C	C		C
Approach Delay (s)			28.9			29.7				24.7		
Approach LOS			C			C				C		
Intersection Summary												
HCM 2000 Control Delay			27.6									
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			80.8%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	7	24	605	32
Future Volume (vph)	7	24	605	32
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.99	
Flpb, ped/bikes		0.98	1.00	
Frt		1.00	0.99	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1796	1850	
Flt Permitted		0.38	1.00	
Satd. Flow (perm)		727	1850	
Peak-hour factor, PHF	0.44	0.82	0.95	0.83
Adj. Flow (vph)	16	29	637	39
RTOR Reduction (vph)	0	0	2	0
Lane Group Flow (vph)	0	45	674	0
Confl. Peds. (#/hr)	54	42		50
Confl. Bikes (#/hr)				7
Heavy Vehicles (%)	0%	0%	2%	7%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		44.3	40.7	
Effective Green, g (s)		44.3	40.7	
Actuated g/C Ratio		0.49	0.45	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		400	836	
v/s Ratio Prot		0.00	c0.36	
v/s Ratio Perm		0.05		
v/c Ratio		0.11	0.81	
Uniform Delay, d1		12.3	21.2	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.1	8.2	
Delay (s)		12.5	29.4	
Level of Service		B	C	
Approach Delay (s)			28.4	
Approach LOS			C	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	11	30	14	6	39	31	641	49	60	793	28
Future Volume (Veh/h)	5	11	30	14	6	39	31	641	49	60	793	28
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.31	0.50	0.78	0.81	0.50	0.84	0.66	0.86	0.88	0.79	0.93	0.84
Hourly flow rate (vph)	16	22	38	17	12	46	47	745	56	76	853	33
Pedestrians		37			35			9			9	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		4			3			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)								94			144	
pX, platoon unblocked	0.79	0.79	0.67	0.79	0.79	0.76	0.67			0.76		
vC, conflicting volume	1586	1988	916	1965	1977	444	923			836		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	456	965	626	935	950	0	638			141		
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 %	94	86	86	85	93	94	92			93		
cM capacity (veh/h)	280	162	276	111	165	790	616			1063		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	76	75	420	428	76	886						
Volume Left	16	17	47	0	76	0						
Volume Right	38	46	0	56	0	33						
cSH	230	264	616	1700	1063	1700						
Volume to Capacity	0.33	0.28	0.08	0.25	0.07	0.52						
Queue Length 95th (m)	10.5	8.6	1.9	0.0	1.8	0.0						
Control Delay (s)	28.2	24.0	2.3	0.0	8.6	0.0						
Lane LOS	D	C	A		A							
Approach Delay (s)	28.2	24.0	1.1		0.7							
Approach LOS	D	C										
Intersection Summary												
Average Delay			2.8									
Intersection Capacity Utilization			65.2%	ICU Level of Service						C		
Analysis Period (min)			15									

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	177	133	1037	217	697
v/c Ratio	0.41	0.22	0.82	0.74	0.61
Control Delay	30.6	13.7	24.4	44.0	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	30.6	13.7	24.4	44.0	8.7
Queue Length 50th (m)	25.2	12.1	51.8	38.4	29.0
Queue Length 95th (m)	39.4	19.1	79.5	m50.6	45.5
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	434	614	1264	292	1141
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	0.41	0.22	0.82	0.74	0.61

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

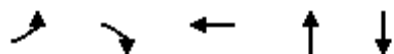
10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	147	105	612	279	167	669
Future Volume (vph)	147	105	612	279	167	669
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.97	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.95		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1630	1418	3298		1755	1902
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1630	1418	3298		1755	1902
Peak-hour factor, PHF	0.83	0.79	0.85	0.88	0.77	0.96
Adj. Flow (vph)	177	133	720	317	217	697
RTOR Reduction (vph)	0	0	55	0	0	0
Lane Group Flow (vph)	177	133	982	0	217	697
Confl. Peds. (#/hr)	44	30		9	9	
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	12%	12%	3%	8%	4%	1%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	434	709	1209		292	1141
v/s Ratio Prot	c0.11	0.03	c0.30		c0.12	0.37
v/s Ratio Perm		0.06				
v/c Ratio	0.41	0.19	0.81		0.74	0.61
Uniform Delay, d1	27.2	15.7	25.7		35.7	11.4
Progression Factor	1.00	1.00	0.82		0.84	0.57
Incremental Delay, d2	2.8	0.6	4.5		12.5	1.9
Delay (s)	30.0	16.3	25.6		42.5	8.4
Level of Service	C	B	C		D	A
Approach Delay (s)	24.1		25.6			16.5
Approach LOS	C		C			B
Intersection Summary						
HCM 2000 Control Delay			21.7		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.66			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	405	171	39	755	886
v/c Ratio	0.87	0.30	0.07	0.63	0.60
Control Delay	47.0	5.5	11.8	18.4	18.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	47.0	5.5	11.8	18.4	18.5
Queue Length 50th (m)	63.0	1.8	2.4	40.8	41.7
Queue Length 95th (m)	72.8	10.8	8.2	57.0	61.1
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	539	641	653	1193	1470
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	0.75	0.27	0.06	0.63	0.60
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

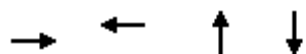
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	308	0	140	17	4	18	88	578	0	0	678	132
Future Volume (vph)	308	0	140	17	4	18	88	578	0	0	678	132
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	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Flpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	1.00		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.94			1.00			0.97	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1802		1406		1651			3413			3378	
Flt Permitted	0.73		1.00		0.98			0.63			1.00	
Satd. Flow (perm)	1388		1406		1651			2175			3378	
Peak-hour factor, PHF	0.76	0.38	0.82	1.00	1.00	1.00	0.90	0.88	0.25	0.25	0.93	0.84
Adj. Flow (vph)	405	0	171	17	4	18	98	657	0	0	729	157
RTOR Reduction (vph)	0	0	103	0	12	0	0	0	0	0	18	0
Lane Group Flow (vph)	405	0	68	0	27	0	0	755	0	0	868	0
Confl. Peds. (#/hr)	2		87	87		2	44		2	2		44
Confl. Bikes (#/hr)			3									3
Heavy Vehicles (%)	1%	0%	3%	0%	0%	0%	4%	5%	0%	0%	4%	1%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	30.3		30.3		30.3			47.7			38.7	
Effective Green, g (s)	30.3		30.3		30.3			47.7			38.7	
Actuated g/C Ratio	0.34		0.34		0.34			0.53			0.43	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	467		473		555			1235			1452	
v/s Ratio Prot								c0.04			0.26	
v/s Ratio Perm	c0.29		0.05		0.02			c0.28				
v/c Ratio	0.87		0.14		0.05			0.61			0.60	
Uniform Delay, d1	28.0		20.8		20.1			14.7			19.7	
Progression Factor	1.00		1.00		1.00			1.00			0.83	
Incremental Delay, d2	15.5		0.1		0.0			0.9			1.5	
Delay (s)	43.5		21.0		20.2			15.6			17.9	
Level of Service	D		C		C			B			B	
Approach Delay (s)		36.8			20.2			15.6			17.9	
Approach LOS		D			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			22.0									
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			83.9%									
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	556	630	177	156
v/c Ratio	0.52	0.57	0.51	0.48
Control Delay	10.0	20.0	35.1	23.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.0	20.0	35.1	23.9
Queue Length 50th (m)	41.1	88.7	24.4	13.7
Queue Length 95th (m)	63.3	109.2	31.9	21.9
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	1061	1108	456	419
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	0.52	0.57	0.39	0.37
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	34	378	44	38	440	24	20	94	21	19	43	43
Future Volume (vph)	34	378	44	38	440	24	20	94	21	19	43	43
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			1.00			0.98	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.99			0.98			0.95	
Flt Protected		1.00			0.99			0.99			0.99	
Satd. Flow (prot)		1783			1879			1865			1760	
Flt Permitted		0.91			0.90			0.95			0.86	
Satd. Flow (perm)		1627			1705			1775			1539	
Peak-hour factor, PHF	0.67	0.87	0.62	0.59	0.82	0.82	0.85	0.71	1.00	0.50	0.73	0.73
Adj. Flow (vph)	51	434	71	64	537	29	24	132	21	38	59	59
RTOR Reduction (vph)	0	6	0	0	2	0	0	7	0	0	32	0
Lane Group Flow (vph)	0	550	0	0	628	0	0	170	0	0	124	0
Confl. Peds. (#/hr)	18		8	8		18	18		2	2		18
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		48.6			48.6			14.4			14.4	
Effective Green, g (s)		48.6			48.6			14.4			14.4	
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)		1054			1104			340			295	
v/s Ratio Prot												
v/s Ratio Perm		0.34			0.37			0.10			0.08	
v/c Ratio		0.52			0.57			0.50			0.42	
Uniform Delay, d1		7.0			7.4			27.1			26.6	
Progression Factor		1.00			2.08			1.22			1.00	
Incremental Delay, d2		1.8			2.0			1.1			1.0	
Delay (s)		8.9			17.3			34.2			27.6	
Level of Service		A			B			C			C	
Approach Delay (s)		8.9			17.3			34.2			27.6	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			17.2			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			56.8%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

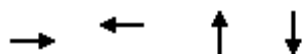
10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	8	135	6	14	92
Future Volume (Veh/h)	6	8	135	6	14	92
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.50	0.67	0.84	0.75	0.46	0.80
Hourly flow rate (vph)	12	12	161	8	30	115
Pedestrians	5					3
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			284			362
pX, platoon unblocked						
vC, conflicting volume	345	173			174	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	345	173			174	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	98	99			98	
cM capacity (veh/h)	638	869			1360	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	24	169	145			
Volume Left	12	0	30			
Volume Right	12	8	0			
cSH	736	1700	1360			
Volume to Capacity	0.03	0.10	0.02			
Queue Length 95th (m)	0.8	0.0	0.5			
Control Delay (s)	10.1	0.0	1.7			
Lane LOS	B		A			
Approach Delay (s)	10.1	0.0	1.7			
Approach LOS	B					
Intersection Summary						
Average Delay		1.5				
Intersection Capacity Utilization		27.6%		ICU Level of Service		A
Analysis Period (min)		15				

Queues

3: Yorkshire Street South & Waterloo Avenue

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	372	529	54	183
v/c Ratio	0.44	0.49	0.12	0.37
Control Delay	10.5	10.5	14.6	12.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.5	10.5	14.6	12.2
Queue Length 50th (m)	26.2	37.3	3.1	8.2
Queue Length 95th (m)	37.7	46.1	6.8	9.1
Internal Link Dist (m)	50.5	146.5	65.6	106.9
Turn Bay Length (m)				
Base Capacity (vph)	853	1076	445	490
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	0.44	0.49	0.12	0.37
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	217	2	3	333	67	3	16	19	32	13	76
Future Volume (vph)	67	217	2	3	333	67	3	16	19	32	13	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		1.00			0.99			0.99			0.97	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		1.00			0.98			0.94			0.91	
Flt Protected		0.99			1.00			1.00			0.99	
Satd. Flow (prot)		1843			1829			1718			1687	
Flt Permitted		0.78			0.99			0.98			0.92	
Satd. Flow (perm)		1452			1820			1685			1577	
Peak-hour factor, PHF	0.70	0.81	0.25	0.38	0.77	0.75	0.75	0.63	0.75	0.83	0.56	0.63
Adj. Flow (vph)	96	268	8	8	432	89	4	25	25	39	23	121
RTOR Reduction (vph)	0	1	0	0	10	0	0	19	0	0	90	0
Lane Group Flow (vph)	0	371	0	0	519	0	0	35	0	0	93	0
Confl. Peds. (#/hr)	16		13	13		16	9					9
Confl. Bikes (#/hr)			2			2			2			
Heavy Vehicles (%)	0%	3%	0%	0%	2%	0%	0%	7%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		44.0			44.0			19.0			19.0	
Effective Green, g (s)		44.0			44.0			19.0			19.0	
Actuated g/C Ratio		0.59			0.59			0.25			0.25	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		851			1067			426			399	
v/s Ratio Prot												
v/s Ratio Perm		0.26			c0.29			0.02			c0.06	
v/c Ratio		0.44			0.49			0.08			0.23	
Uniform Delay, d1		8.6			9.0			21.4			22.2	
Progression Factor		1.00			1.00			1.00			1.09	
Incremental Delay, d2		1.6			1.6			0.4			1.3	
Delay (s)		10.2			10.6			21.7			25.5	
Level of Service		B			B			C			C	
Approach Delay (s)		10.2			10.6			21.7			25.5	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay		13.4			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.41										
Actuated Cycle Length (s)		75.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		67.3%			ICU Level of Service			C				
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	382	22	18	457	14	19	27	13	6	20	18
Future Volume (Veh/h)	18	382	22	18	457	14	19	27	13	6	20	18
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.53	0.84	0.56	0.65	0.85	0.65	0.75	0.72	0.60	0.50	0.59	0.71
Hourly flow rate (vph)	34	455	39	28	538	22	25	38	22	12	34	25
Pedestrians		7			1			11			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)	195			192								
pX, platoon unblocked	0.85			0.89			0.91	0.91	0.89	0.91	0.91	0.85
vC, conflicting volume	574			505			1208	1184	486	1204	1192	570
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	417			383			909	883	363	905	892	412
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 %	97			97			86	84	96	93	86	95
cM capacity (veh/h)	972			1046			183	239	605	172	236	529
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	528	588	85	71								
Volume Left	34	28	25	12								
Volume Right	39	22	22	25								
cSH	972	1046	256	272								
Volume to Capacity	0.03	0.03	0.33	0.26								
Queue Length 95th (m)	0.8	0.6	10.6	7.7								
Control Delay (s)	1.0	0.7	25.9	22.8								
Lane LOS	A	A	D	C								
Approach Delay (s)	1.0	0.7	25.9	22.8								
Approach LOS			D	C								
Intersection Summary												
Average Delay			3.7									
Intersection Capacity Utilization			44.9%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	2	15	3	3	5	39	14	4	53	1
Future Volume (Veh/h)	5	5	2	15	3	3	5	39	14	4	53	1
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.63	0.25	0.33	0.75	0.38	0.63	0.77	0.50	0.33	0.85	0.25
Hourly flow rate (vph)	8	8	8	45	4	8	8	51	28	12	62	4
Pedestrians	12			9			9			7		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	1			1			1			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	198	204	85	199	192	81	78				88	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	198	204	85	199	192	81	78				88	
tC, single (s)	7.1	6.7	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.2	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	99	99	94	99	99	99				99	
cM capacity (veh/h)	723	640	960	719	683	969	1515				1507	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	24	57	87	78								
Volume Left	8	45	8	12								
Volume Right	8	8	28	4								
cSH	752	743	1515	1507								
Volume to Capacity	0.03	0.08	0.01	0.01								
Queue Length 95th (m)	0.8	1.9	0.1	0.2								
Control Delay (s)	9.9	10.2	0.7	1.2								
Lane LOS	A	B	A	A								
Approach Delay (s)	9.9	10.2	0.7	1.2								
Approach LOS	A	B										
Intersection Summary												
Average Delay				4.0								
Intersection Capacity Utilization				19.6%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	5	55	11	3	74
Future Volume (Veh/h)	6	5	55	11	3	74
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.42	0.57	0.75	0.38	0.83
Hourly flow rate (vph)	24	12	96	15	8	89
Pedestrians	4					4
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	212	112			115	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	212	112			115	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	99			99	
cM capacity (veh/h)	773	940			1481	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	36	111	97			
Volume Left	24	0	8			
Volume Right	12	15	0			
cSH	822	1700	1481			
Volume to Capacity	0.04	0.07	0.01			
Queue Length 95th (m)	1.0	0.0	0.1			
Control Delay (s)	9.6	0.0	0.7			
Lane LOS	A		A			
Approach Delay (s)	9.6	0.0	0.7			
Approach LOS	A					
Intersection Summary						
Average Delay		1.7				
Intersection Capacity Utilization		17.6%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

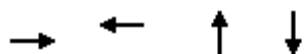
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	230	8	4	326	30	22	4	27	32	8	37
Future Volume (Veh/h)	27	230	8	4	326	30	22	4	27	32	8	37
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.68	0.94	0.50	0.59	0.83	0.25	0.58	0.33	0.65	0.84	0.50	0.83
Hourly flow rate (vph)	40	245	16	7	393	120	38	12	42	38	16	45
Pedestrians		4			1			13			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		170										
pX, platoon unblocked				0.99			0.99	0.99	0.99	0.99	0.99	
vC, conflicting volume	527			274			870	887	267	863	835	471
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	527			258			862	879	251	855	826	471
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 %	96			99			83	95	94	84	94	92
cM capacity (veh/h)	1036			1285			226	265	762	236	284	586
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	301	520	92	99								
Volume Left	40	7	38	38								
Volume Right	16	120	42	45								
cSH	1036	1285	342	337								
Volume to Capacity	0.04	0.01	0.27	0.29								
Queue Length 95th (m)	0.9	0.1	8.1	9.1								
Control Delay (s)	1.5	0.2	19.3	20.1								
Lane LOS	A	A	C	C								
Approach Delay (s)	1.5	0.2	19.3	20.1								
Approach LOS			C	C								
Intersection Summary												
Average Delay			4.2									
Intersection Capacity Utilization			43.6%	ICU Level of Service					A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	493	587	20	107
v/c Ratio	0.39	0.44	0.06	0.37
Control Delay	5.0	8.3	18.5	21.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.0	8.3	18.5	21.2
Queue Length 50th (m)	19.9	42.8	1.5	8.2
Queue Length 95th (m)	26.2	58.1	4.9	13.6
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1276	1327	482	421
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	0.44	0.04	0.25
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	14	388	5	5	451	28	2	8	5	47	5	34
Future Volume (vph)	14	388	5	5	451	28	2	8	5	47	5	34
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			0.98			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			0.97	
Frt		1.00			0.99			0.96			0.95	
Flt Protected		1.00			1.00			0.99			0.97	
Satd. Flow (prot)		1856			1879			1778			1705	
Flt Permitted		0.97			0.99			0.95			0.81	
Satd. Flow (perm)		1799			1871			1707			1417	
Peak-hour factor, PHF	0.65	0.84	0.58	0.67	0.83	0.75	0.63	0.71	0.78	0.75	0.67	0.92
Adj. Flow (vph)	22	462	9	7	543	37	3	11	6	63	7	37
RTOR Reduction (vph)	0	1	0	0	2	0	0	5	0	0	29	0
Lane Group Flow (vph)	0	492	0	0	585	0	0	15	0	0	78	0
Confl. Peds. (#/hr)	24		35	35		24	10		23	23		10
Confl. Bikes (#/hr)			2			2						1
Heavy Vehicles (%)	0%	3%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		50.8			50.8			12.2			12.2	
Effective Green, g (s)		50.8			50.8			12.2			12.2	
Actuated g/C Ratio		0.68			0.68			0.16			0.16	
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)		1218			1267			277			230	
v/s Ratio Prot												
v/s Ratio Perm		0.27			0.31			0.01			0.05	
v/c Ratio		0.40			0.46			0.05			0.34	
Uniform Delay, d1		5.4			5.7			26.5			27.8	
Progression Factor		0.60			1.00			1.00			1.00	
Incremental Delay, d2		0.9			1.2			0.1			0.9	
Delay (s)		4.1			6.9			26.6			28.7	
Level of Service		A			A			C			C	
Approach Delay (s)		4.1			6.9			26.6			28.7	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay		8.0			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.44										
Actuated Cycle Length (s)		75.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		52.4%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	7	0	0	5	2	0	2	0	2	0	3
Future Volume (Veh/h)	2	7	0	0	5	2	0	2	0	2	0	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.50	0.25	0.50	0.50	0.44	0.88	0.42	0.50	0.77	0.38
Hourly flow rate (vph)	8	28	0	0	10	4	0	2	0	4	0	8
Pedestrians		5			7			16			4	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			2			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)											355	
pX, platoon unblocked												
vC, conflicting volume	32	26	25	51	30	13	13			9		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	32	26	25	51	30	13	13			9		
tC, single (s)	7.1	6.5	6.5	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	99	97	100	100	99	100	100			100		
cM capacity (veh/h)	949	859	968	899	855	1062	1523			1613		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	36	14	2	12								
Volume Left	8	0	0	4								
Volume Right	0	4	0	8								
cSH	877	905	1523	1613								
Volume to Capacity	0.04	0.02	0.00	0.00								
Queue Length 95th (m)	1.0	0.4	0.0	0.1								
Control Delay (s)	9.3	9.0	0.0	2.4								
Lane LOS	A	A		A								
Approach Delay (s)	9.3	9.0	0.0	2.4								
Approach LOS	A	A										
Intersection Summary												
Average Delay			7.7									
Intersection Capacity Utilization			19.5%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	3	0	0	4	0	0	0	0	1	0	4
Future Volume (Veh/h)	1	3	0	0	4	0	0	0	0	1	0	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.94	0.25	0.25	0.84	0.50
Hourly flow rate (vph)	4	12	0	0	16	0	0	0	0	4	0	8
Pedestrians		3			20			8			8	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			2			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	31	35	15	46	39	28	11			20		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	31	35	15	46	39	28	11			20		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	100	99	100	100	98	100	100			100		
cM capacity (veh/h)	939	840	1059	907	836	1024	1617			1578		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	16	16	0	12								
Volume Left	4	0	0	4								
Volume Right	0	0	0	8								
cSH	863	836	1700	1578								
Volume to Capacity	0.02	0.02	0.00	0.00								
Queue Length 95th (m)	0.4	0.4	0.0	0.1								
Control Delay (s)	9.3	9.4	0.0	2.4								
Lane LOS	A	A		A								
Approach Delay (s)	9.3	9.4	0.0	2.4								
Approach LOS	A	A										
Intersection Summary												
Average Delay			7.4									
Intersection Capacity Utilization			20.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	244	19	5	279	0	89	0	85	0	0	1
Future Volume (Veh/h)	0	244	19	5	279	0	89	0	85	0	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.87	0.64	0.63	0.84	0.63	0.74	0.82	0.63	0.53	0.58	0.83
Hourly flow rate (vph)	0	280	30	8	332	0	120	0	135	0	0	1
Pedestrians		7			9			15			9	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		374			207							
pX, platoon unblocked												
vC, conflicting volume	341			325			666	667	319	796	682	348
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	341			325			666	667	319	796	682	348
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 %	100			99			66	100	81	100	100	100
cM capacity (veh/h)	1191			1228			356	371	698	233	364	684
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	310	340	255	1								
Volume Left	0	8	120	0								
Volume Right	30	0	135	1								
cSH	1191	1228	481	684								
Volume to Capacity	0.00	0.01	0.53	0.00								
Queue Length 95th (m)	0.0	0.1	23.2	0.0								
Control Delay (s)	0.0	0.2	20.6	10.3								
Lane LOS		A	C	B								
Approach Delay (s)	0.0	0.2	20.6	10.3								
Approach LOS			C	B								
Intersection Summary												
Average Delay		5.9										
Intersection Capacity Utilization		42.6%	ICU Level of Service	A								
Analysis Period (min)		15										

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	139	165	251	160	273	130	188	646	91	80	578
v/c Ratio	0.50	0.44	0.59	0.44	0.67	0.46	0.57	0.84	0.13	0.29	0.73
Control Delay	25.6	33.3	9.9	23.5	40.2	13.5	14.1	30.4	2.5	12.8	28.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.6	33.3	9.9	23.5	40.2	13.5	14.1	30.4	2.5	12.8	28.9
Queue Length 50th (m)	15.3	23.5	0.0	17.8	41.1	2.8	9.5	128.0	1.7	6.4	84.7
Queue Length 95th (m)	22.0	32.5	12.7	31.1	60.8	12.6	m13.0	#193.3	m2.2	10.1	#127.4
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	278	450	461	364	486	318	331	767	716	273	787
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.37	0.54	0.44	0.56	0.41	0.57	0.84	0.13	0.29	0.73

Intersection Summary

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.

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	42	59	122	206	146	232	63	27	147	497	88	94
Future Volume (vph)	42	59	122	206	146	232	63	27	147	497	88	94
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.68	1.00	1.00	0.57		1.00	0.96		0.92
Flpb, ped/bikes		0.91	1.00	1.00	0.86	1.00	1.00		0.99	1.00		1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.97		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1654	1762	1075	1568	1902	926		1790	1668		1431
Flt Permitted		0.39	1.00	1.00	0.61	1.00	1.00		0.23	1.00		1.00
Satd. Flow (perm)		676	1762	1075	1014	1902	926		428	1668		1431
Peak-hour factor, PHF	0.71	0.74	0.74	0.82	0.91	0.85	0.79	0.54	0.78	0.95	0.78	0.93
Adj. Flow (vph)	59	80	165	251	160	273	80	50	188	523	113	101
RTOR Reduction (vph)	0	0	0	197	0	0	86	0	0	1	0	50
Lane Group Flow (vph)	0	139	165	54	160	273	44	0	188	645	0	41
Confl. Peds. (#/hr)	107	104		156	156		107	104	104		104	59
Confl. Bikes (#/hr)				3			4	4			7	7
Heavy Vehicles (%)	2%	0%	6%	0%	0%	1%	0%	0%	1%	3%	0%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		26.3	19.3	19.3	26.3	19.3	19.3		47.6	40.8		40.8
Effective Green, g (s)		26.3	19.3	19.3	26.3	19.3	19.3		47.6	40.8		40.8
Actuated g/C Ratio		0.29	0.21	0.21	0.29	0.21	0.21		0.53	0.45		0.45
Clearance Time (s)		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
Lane Grp Cap (vph)		273	377	230	339	407	198		329	756		648
v/s Ratio Prot		c0.04	0.09		0.04	c0.14			c0.04	c0.39		
v/s Ratio Perm		0.11		0.05	0.10		0.05		0.26			0.03
v/c Ratio		0.51	0.44	0.23	0.47	0.67	0.22		0.57	0.85		0.06
Uniform Delay, d1		24.9	30.6	29.2	25.1	32.4	29.2		14.0	21.9		13.8
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		0.81	0.86		0.82
Incremental Delay, d2		1.5	0.8	0.5	1.0	4.3	0.6		1.7	8.5		0.1
Delay (s)		26.4	31.5	29.8	26.2	36.7	29.7		13.0	27.5		11.5
Level of Service		C	C	C	C	D	C		B	C		B
Approach Delay (s)			29.4			32.1				23.0		
Approach LOS			C			C				C		
Intersection Summary												
HCM 2000 Control Delay			26.9									
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			83.5%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations		LT	LT	LT
Traffic Volume (vph)	16	39	455	61
Future Volume (vph)	16	39	455	61
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.98	
Flpb, ped/bikes		0.99	1.00	
Frt		1.00	0.98	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1755	1806	
Flt Permitted		0.18	1.00	
Satd. Flow (perm)		327	1806	
Peak-hour factor, PHF	0.63	0.71	0.89	0.91
Adj. Flow (vph)	25	55	511	67
RTOR Reduction (vph)	0	0	5	0
Lane Group Flow (vph)	0	80	573	0
Confl. Peds. (#/hr)	104	59		104
Confl. Bikes (#/hr)				5
Heavy Vehicles (%)	0%	5%	2%	2%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		43.8	38.9	
Effective Green, g (s)		43.8	38.9	
Actuated g/C Ratio		0.49	0.43	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		236	780	
v/s Ratio Prot		0.02	0.32	
v/s Ratio Perm		0.15		
v/c Ratio		0.34	0.73	
Uniform Delay, d1		15.4	21.3	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.9	6.1	
Delay (s)		16.3	27.3	
Level of Service		B	C	
Approach Delay (s)			26.0	
Approach LOS			C	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	26	19	7	53	22	813	36	41	786	23
Future Volume (Veh/h)	5	5	26	19	7	53	22	813	36	41	786	23
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.63	0.63	0.78	0.75	0.44	0.83	0.53	0.92	0.65	0.75	0.94	0.79
Hourly flow rate (vph)	8	8	33	25	16	64	42	884	55	55	836	29
Pedestrians		52			63			3			6	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)								94			144	
pX, platoon unblocked	0.81	0.81	0.69	0.81	0.81	0.76	0.69			0.76		
vC, conflicting volume	1616	2098	906	2044	2086	538	917			1002		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	523	1120	635	1053	1104	0	651			366		
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 %	97	94	88	74	88	92	93			94		
cM capacity (veh/h)	233	131	277	96	134	772	616			857		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	49	105	484	497	55	865						
Volume Left	8	25	42	0	55	0						
Volume Right	33	64	0	55	0	29						
cSH	228	227	616	1700	857	1700						
Volume to Capacity	0.21	0.46	0.07	0.29	0.06	0.51						
Queue Length 95th (m)	6.0	17.1	1.7	0.0	1.6	0.0						
Control Delay (s)	25.0	33.7	1.9	0.0	9.5	0.0						
Lane LOS	D	D	A		A							
Approach Delay (s)	25.0	33.7	1.0		0.6							
Approach LOS	D	D										
Intersection Summary												
Average Delay			3.0									
Intersection Capacity Utilization			58.7%		ICU Level of Service				B			
Analysis Period (min)			15									

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	225	222	1019	207	723
v/c Ratio	0.59	0.69	0.79	0.59	0.58
Control Delay	38.8	44.5	25.4	42.5	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	38.8	44.5	25.4	42.5	15.0
Queue Length 50th (m)	35.0	35.4	84.7	29.7	83.7
Queue Length 95th (m)	53.2	52.9	80.6	m44.3	125.1
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	379	324	1296	351	1237
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	0.59	0.69	0.79	0.59	0.58

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

10/29/2018

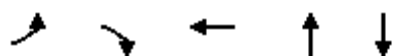
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	189	182	666	182	168	680
Future Volume (vph)	189	182	666	182	168	680
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.94	0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1706	1460	3337		1755	1921
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1706	1460	3337		1755	1921
Peak-hour factor, PHF	0.84	0.82	0.87	0.72	0.81	0.94
Adj. Flow (vph)	225	222	766	253	207	723
RTOR Reduction (vph)	0	0	35	0	0	0
Lane Group Flow (vph)	225	222	984	0	207	723
Confl. Peds. (#/hr)	48	42		34	34	
Confl. Bikes (#/hr)		3		5		
Heavy Vehicles (%)	7%	5%	1%	11%	4%	0%
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	20.0	20.0	34.0		18.0	58.0
Effective Green, g (s)	20.0	20.0	34.0		18.0	58.0
Actuated g/C Ratio	0.22	0.22	0.38		0.20	0.64
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	379	324	1260		351	1237
v/s Ratio Prot	0.13		c0.29		0.12	c0.38
v/s Ratio Perm		c0.15				
v/c Ratio	0.59	0.69	0.78		0.59	0.58
Uniform Delay, d1	31.4	32.1	24.7		32.7	9.1
Progression Factor	1.00	1.00	0.89		1.10	1.40
Incremental Delay, d2	6.7	11.2	4.2		5.9	1.7
Delay (s)	38.1	43.3	26.3		41.7	14.5
Level of Service	D	D	C		D	B
Approach Delay (s)	40.7		26.3			20.5
Approach LOS	D		C			C
Intersection Summary						
HCM 2000 Control Delay			26.7		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.72			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.0%		ICU Level of Service	D
Analysis Period (min)			15			

c Critical Lane Group

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	260	167	138	775	900
v/c Ratio	0.80	0.34	0.30	0.59	0.52
Control Delay	48.0	5.5	18.2	13.8	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	48.0	5.5	18.2	13.8	12.5
Queue Length 50th (m)	41.7	0.0	13.0	32.9	30.5
Queue Length 95th (m)	53.5	9.3	23.9	55.8	66.5
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	446	617	615	1322	1732
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	0.58	0.27	0.22	0.59	0.52
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

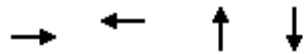
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	213	0	137	60	22	56	108	583	0	0	666	169
Future Volume (vph)	213	0	137	60	22	56	108	583	0	0	666	169
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	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	0.99		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.95			1.00			0.97	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1765		1432		1654			3473			3373	
Flt Permitted	0.68		1.00		0.98			0.60			1.00	
Satd. Flow (perm)	1257		1432		1654			2110			3373	
Peak-hour factor, PHF	0.82	0.25	0.82	1.00	1.00	1.00	0.85	0.90	0.25	0.25	0.96	0.82
Adj. Flow (vph)	260	0	167	60	22	56	127	648	0	0	694	206
RTOR Reduction (vph)	0	0	123	0	31	0	0	0	0	0	25	0
Lane Group Flow (vph)	260	0	44	0	107	0	0	775	0	0	875	0
Confl. Peds. (#/hr)	12		89	89		12	45		13	13		45
Confl. Bikes (#/hr)			1						5			1
Heavy Vehicles (%)	2%	0%	1%	0%	0%	0%	2%	3%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	23.5		23.5		23.5			54.5			45.5	
Effective Green, g (s)	23.5		23.5		23.5			54.5			45.5	
Actuated g/C Ratio	0.26		0.26		0.26			0.61			0.51	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	328		373		431			1368			1705	
v/s Ratio Prot								c0.04			0.26	
v/s Ratio Perm	c0.21		0.03		0.06			c0.31				
v/c Ratio	0.79		0.12		0.25			0.57			0.51	
Uniform Delay, d1	31.0		25.3		26.3			10.7			14.9	
Progression Factor	1.00		1.00		1.00			1.00			0.75	
Incremental Delay, d2	12.3		0.1		0.3			0.5			0.9	
Delay (s)	43.3		25.5		26.6			11.2			12.1	
Level of Service	D		C		C			B			B	
Approach Delay (s)		36.3			26.6			11.2			12.1	
Approach LOS		D			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			17.3				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			15.0		
Intersection Capacity Utilization			79.7%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	708	424	277	381
v/c Ratio	0.78	0.49	0.81	1.19
Control Delay	19.3	17.2	45.8	136.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	19.3	17.2	45.8	136.5
Queue Length 50th (m)	67.6	47.3	35.5	~59.1
Queue Length 95th (m)	79.2	67.7	#58.3	#88.4
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	910	862	343	321
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	0.78	0.49	0.81	1.19

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	88	406	40	39	205	66	38	141	25	58	76	113
Future Volume (vph)	88	406	40	39	205	66	38	141	25	58	76	113
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			0.99			0.81	
Flpb, ped/bikes		0.99			1.00			0.97			0.99	
Frt		0.99			0.97			0.98			0.93	
Flt Protected		0.99			0.99			0.99			0.99	
Satd. Flow (prot)		1758			1754			1767			1394	
Flt Permitted		0.87			0.82			0.74			0.77	
Satd. Flow (perm)		1542			1443			1326			1084	
Peak-hour factor, PHF	0.83	0.76	0.59	0.55	0.83	0.62	0.60	0.79	0.69	0.60	0.79	0.60
Adj. Flow (vph)	106	534	68	71	247	106	63	178	36	97	96	188
RTOR Reduction (vph)	0	5	0	0	16	0	0	7	0	0	47	0
Lane Group Flow (vph)	0	703	0	0	408	0	0	270	0	0	334	0
Confl. Peds. (#/hr)	56		43	43		56	175		19	19		175
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	3%	5%	0%	4%	0%	0%	1%	5%	2%	3%	3%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		44.0			44.0			19.0			19.0	
Effective Green, g (s)		44.0			44.0			19.0			19.0	
Actuated g/C Ratio		0.59			0.59			0.25			0.25	
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)		904			846			335			274	
v/s Ratio Prot												
v/s Ratio Perm		c0.46			0.28			0.20			c0.31	
v/c Ratio		0.78			0.48			0.80			1.22	
Uniform Delay, d1		11.8			8.9			26.3			28.0	
Progression Factor		1.00			1.81			1.00			1.00	
Incremental Delay, d2		6.5			1.9			13.1			126.9	
Delay (s)		18.3			18.1			39.4			154.9	
Level of Service		B			B			D			F	
Approach Delay (s)		18.3			18.1			39.4			154.9	
Approach LOS		B			B			D			F	
Intersection Summary												
HCM 2000 Control Delay			50.6									
HCM 2000 Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			75.0									
Intersection Capacity Utilization			76.1%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	8	188	9	13	165
Future Volume (Veh/h)	6	8	188	9	13	165
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.63	0.88	0.74	0.67	0.69	0.66
Hourly flow rate (vph)	10	9	254	13	19	250
Pedestrians	10		3			
Lane Width (m)	3.7		3.7			
Walking Speed (m/s)	1.1		1.1			
Percent Blockage	1		0			
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	562	270			277	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	562	270			277	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	98	99			98	
cM capacity (veh/h)	478	733			1234	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	19	267	269			
Volume Left	10	0	19			
Volume Right	9	13	0			
cSH	572	1700	1234			
Volume to Capacity	0.03	0.16	0.02			
Queue Length 95th (m)	0.8	0.0	0.4			
Control Delay (s)	11.5	0.0	0.7			
Lane LOS	B		A			
Approach Delay (s)	11.5	0.0	0.7			
Approach LOS	B					
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			29.4%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	113	363	3	6	202	47	0	16	37	45	34	85
Future Volume (Veh/h)	113	363	3	6	202	47	0	16	37	45	34	85
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.76	0.78	0.38	0.31	0.80	0.79	0.25	0.58	0.47	0.81	0.31	0.56
Hourly flow rate (vph)	149	465	8	19	253	59	0	28	79	56	110	152
Pedestrians		44			6			9			7	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		4			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	319			482			1348	1133	484	1194	1108	334
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	319			482			1348	1133	484	1194	1108	334
tC, single (s)	4.1			4.1			7.1	6.6	6.2	7.1	6.7	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.3	3.5	4.2	3.3
p0 queue free %	88			98			100	83	86	49	34	77
cM capacity (veh/h)	1244			1081			40	169	572	109	166	671
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	622	331	107	318								
Volume Left	149	19	0	56								
Volume Right	8	59	79	152								
cSH	1244	1081	352	227								
Volume to Capacity	0.12	0.02	0.30	1.40								
Queue Length 95th (m)	3.1	0.4	9.6	137.1								
Control Delay (s)	3.0	0.7	19.6	246.8								
Lane LOS	A	A	C	F								
Approach Delay (s)	3.0	0.7	19.6	246.8								
Approach LOS			C	F								
Intersection Summary												
Average Delay			60.0									
Intersection Capacity Utilization			67.5%		ICU Level of Service				C			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	454	12	15	285	2	15	48	21	9	36	17
Future Volume (Veh/h)	16	454	12	15	285	2	15	48	21	9	36	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.80	0.67	0.75	0.91	0.50	0.41	0.81	0.64	0.67	0.43	0.42
Hourly flow rate (vph)	28	568	18	20	313	4	37	59	33	13	84	40
Pedestrians		9			2			25			24	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked	0.97			0.80			0.82	0.82	0.80	0.82	0.82	0.97
vC, conflicting volume	341			611			1104	1039	604	1076	1046	348
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	302			394			928	849	385	895	857	310
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 %	98			98			70	73	94	91	62	94
cM capacity (veh/h)	1200			922			123	222	522	147	221	673
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	614	337	129	137								
Volume Left	28	20	37	13								
Volume Right	18	4	33	40								
cSH	1200	922	205	260								
Volume to Capacity	0.02	0.02	0.63	0.53								
Queue Length 95th (m)	0.5	0.5	27.9	21.5								
Control Delay (s)	0.6	0.8	48.3	33.3								
Lane LOS	A	A	E	D								
Approach Delay (s)	0.6	0.8	48.3	33.3								
Approach LOS			E	D								
Intersection Summary												
Average Delay			9.4									
Intersection Capacity Utilization			43.8%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	8	7	10	5	5	2	40	20	6	65	1
Future Volume (Veh/h)	6	8	7	10	5	5	2	40	20	6	65	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.63	0.58	0.38	0.63	0.50	0.50	0.50	0.73	0.63	0.42	0.56	0.25
Hourly flow rate (vph)	10	14	18	16	10	10	4	55	32	14	116	4
Pedestrians		7			6			12			4	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	251	254	137	268	240	81	127			93		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	251	254	137	268	240	81	127			93		
tC, single (s)	7.1	6.5	6.5	7.1	6.8	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.6	3.5	4.2	3.3	2.2			2.2		
p0 queue free %	99	98	98	97	98	99	100			99		
cM capacity (veh/h)	670	637	820	639	608	975	1462			1505		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	42	36	91	134								
Volume Left	10	16	4	14								
Volume Right	18	10	32	4								
cSH	714	696	1462	1505								
Volume to Capacity	0.06	0.05	0.00	0.01								
Queue Length 95th (m)	1.4	1.2	0.1	0.2								
Control Delay (s)	10.4	10.5	0.3	0.8								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.4	10.5	0.3	0.8								
Approach LOS	B	B										
Intersection Summary												
Average Delay			3.2									
Intersection Capacity Utilization			20.9%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	11	3	62	13	2	94
Future Volume (Veh/h)	11	3	62	13	2	94
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.75	0.53	0.33	0.25	0.46
Hourly flow rate (vph)	44	4	117	39	8	204
Pedestrians	6		1			3
Lane Width (m)	3.7		3.7			3.7
Walking Speed (m/s)	1.1		1.1			1.1
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	364	146			162	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	364	146			162	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	100			99	
cM capacity (veh/h)	632	899			1421	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	48	156	212			
Volume Left	44	0	8			
Volume Right	4	39	0			
cSH	648	1700	1421			
Volume to Capacity	0.07	0.09	0.01			
Queue Length 95th (m)	1.8	0.0	0.1			
Control Delay (s)	11.0	0.0	0.3			
Lane LOS	B		A			
Approach Delay (s)	11.0	0.0	0.3			
Approach LOS	B					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			17.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

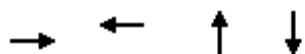
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	378	12	21	207	29	7	8	14	25	25	44
Future Volume (Veh/h)	39	378	12	21	207	29	7	8	14	25	25	44
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.85	0.36	0.75	0.88	0.53	0.75	0.58	0.50	0.64	0.50	0.52
Hourly flow rate (vph)	52	445	33	28	235	55	9	14	28	39	50	85
Pedestrians		3			2			14			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)												
pX, platoon unblocked												
vC, conflicting volume	293			492			1011	928	478	924	918	268
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	293			492			1011	928	478	924	918	268
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			97			94	94	95	81	80	89
cM capacity (veh/h)	1248			1067			153	248	583	209	251	754
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	530	318	51	174								
Volume Left	52	28	9	39								
Volume Right	33	55	28	85								
cSH	1248	1067	312	349								
Volume to Capacity	0.04	0.03	0.16	0.50								
Queue Length 95th (m)	1.0	0.6	4.4	20.2								
Control Delay (s)	1.2	1.0	18.8	25.1								
Lane LOS	A	A	C	D								
Approach Delay (s)	1.2	1.0	18.8	25.1								
Approach LOS			C	D								
Intersection Summary												
Average Delay			5.9									
Intersection Capacity Utilization			45.6%	ICU Level of Service					A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	627	359	23	157
v/c Ratio	0.54	0.31	0.07	0.58
Control Delay	6.7	7.5	18.4	30.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	6.7	7.5	18.4	30.9
Queue Length 50th (m)	28.2	21.8	1.9	16.2
Queue Length 95th (m)	m43.1	35.9	4.9	25.0
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1169	1150	448	384
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	0.54	0.31	0.05	0.41

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	466	8	5	273	20	3	7	4	57	21	26
Future Volume (vph)	17	466	8	5	273	20	3	7	4	57	21	26
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			0.95			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			0.89	
Frt		1.00			0.99			0.96			0.97	
Flt Protected		1.00			1.00			0.99			0.97	
Satd. Flow (prot)		1850			1791			1716			1581	
Flt Permitted		0.98			0.99			0.91			0.81	
Satd. Flow (perm)		1810			1774			1588			1317	
Peak-hour factor, PHF	0.63	0.79	0.78	0.67	0.87	0.53	0.48	0.66	0.68	0.63	0.74	0.67
Adj. Flow (vph)	27	590	10	7	314	38	6	11	6	90	28	39
RTOR Reduction (vph)	0	1	0	0	5	0	0	5	0	0	18	0
Lane Group Flow (vph)	0	626	0	0	354	0	0	18	0	0	139	0
Confl. Peds. (#/hr)	38		54	54		38	21		91	91		21
Confl. Bikes (#/hr)			3			1			1			
Heavy Vehicles (%)	7%	3%	0%	0%	4%	12%	0%	0%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		48.5			48.5			14.5			14.5	
Effective Green, g (s)		48.5			48.5			14.5			14.5	
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)		1170			1147			307			254	
v/s Ratio Prot												
v/s Ratio Perm		c0.35			0.20			0.01			c0.11	
v/c Ratio		0.54			0.31			0.06			0.55	
Uniform Delay, d1		7.2			5.9			24.7			27.3	
Progression Factor		0.65			1.00			1.00			1.00	
Incremental Delay, d2		1.1			0.7			0.1			2.4	
Delay (s)		5.7			6.6			24.8			29.7	
Level of Service		A			A			C			C	
Approach Delay (s)		5.7			6.6			24.8			29.7	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			9.6									
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			75.0									
Intersection Capacity Utilization			58.9%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	12	9	0	0	6	1	0	6	0	2	0	8	
Future Volume (Veh/h)	12	9	0	0	6	1	0	6	0	2	0	8	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.63	0.25	0.25	0.25	0.25	0.25	0.63	0.60	0.67	0.50	0.79	0.44	
Hourly flow rate (vph)	19	36	0	0	24	4	0	10	0	4	0	18	
Pedestrians	5			13			10			3			
Lane Width (m)	3.7			3.7			3.7			3.7			
Walking Speed (m/s)	1.1			1.1			1.1			1.1			
Percent Blockage	0			1			1			0			
Right turn flare (veh)													
Median type							None			None			
Median storage (veh)													
Upstream signal (m)												355	
pX, platoon unblocked													
vC, conflicting volume	51	45	24	68	54	26	23						23
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	51	45	24	68	54	26	23						23
tC, single (s)	7.1	6.5	6.7	7.1	6.5	6.2	4.1						4.1
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.8	3.5	4.0	3.3	2.2						2.2
p0 queue free %	98	96	100	100	97	100	100						100
cM capacity (veh/h)	907	834	916	865	824	1039	1597						1585
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	55	28	10	22									
Volume Left	19	0	0	4									
Volume Right	0	4	0	18									
cSH	858	849	1597	1585									
Volume to Capacity	0.06	0.03	0.00	0.00									
Queue Length 95th (m)	1.6	0.8	0.0	0.1									
Control Delay (s)	9.5	9.4	0.0	1.3									
Lane LOS	A	A		A									
Approach Delay (s)	9.5	9.4	0.0	1.3									
Approach LOS	A	A											
Intersection Summary													
Average Delay	7.1												
Intersection Capacity Utilization	22.9%			ICU Level of Service					A				
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	5	4	0	0	8	2	0	0	0	0	0	1	
Future Volume (Veh/h)	5	4	0	0	8	2	0	0	0	0	0	1	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.50	0.50	0.50	0.50	0.75	0.50	0.50	0.65	0.38	0.25	0.66	0.25	
Hourly flow rate (vph)	10	8	0	0	11	4	0	0	0	0	0	4	
Pedestrians	10			16			6			3			
Lane Width (m)	3.7			3.7			3.7			3.7			
Walking Speed (m/s)	1.1			1.1			1.1			1.1			
Percent Blockage	1			2			1			0			
Right turn flare (veh)													
Median type							None			None			
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	24	28	18	28	30	19	14						16
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	24	28	18	28	30	19	14						16
tC, single (s)	7.1	7.0	6.2	7.1	6.8	6.2	4.1						4.1
tC, 2 stage (s)													
tF (s)	3.5	4.5	3.3	3.5	4.3	3.3	2.2						2.2
p0 queue free %	99	99	100	100	99	100	100						100
cM capacity (veh/h)	946	760	1050	939	785	1045	1602						1589
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	18	15	0	4									
Volume Left	10	0	0	0									
Volume Right	0	4	0	4									
cSH	853	841	1700	1589									
Volume to Capacity	0.02	0.02	0.00	0.00									
Queue Length 95th (m)	0.5	0.4	0.0	0.0									
Control Delay (s)	9.3	9.4	0.0	0.0									
Lane LOS	A	A											
Approach Delay (s)	9.3	9.4	0.0	0.0									
Approach LOS	A	A											
Intersection Summary													
Average Delay	8.3												
Intersection Capacity Utilization	20.4%			ICU Level of Service					A				
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	388	29	6	218	0	34	0	93	0	0	0
Future Volume (Veh/h)	0	388	29	6	218	0	34	0	93	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.74	0.78	0.69	0.42	0.88	0.75	0.65	0.63	0.75	0.75	0.65	0.53
Hourly flow rate (vph)	0	497	42	14	248	0	52	0	124	0	0	0
Pedestrians		12			7			15			5	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					207							
pX, platoon unblocked												
vC, conflicting volume	253			554			821	814	540	930	835	265
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	253			554			821	814	540	930	835	265
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.3
p0 queue free %	100			99			81	100	77	100	100	100
cM capacity (veh/h)	1318			1011			281	304	534	177	296	754
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	539	262	176	0								
Volume Left	0	14	52	0								
Volume Right	42	0	124	0								
cSH	1318	1011	422	1700								
Volume to Capacity	0.00	0.01	0.42	0.00								
Queue Length 95th (m)	0.0	0.3	15.3	0.0								
Control Delay (s)	0.0	0.6	19.5	0.0								
Lane LOS		A	C	A								
Approach Delay (s)	0.0	0.6	19.5	0.0								
Approach LOS			C	A								
Intersection Summary												
Average Delay			3.7									
Intersection Capacity Utilization			38.6%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	187	172	261	106	166	73	138	492	131	51	735
v/c Ratio	0.53	0.44	0.55	0.28	0.45	0.22	0.63	0.62	0.17	0.12	0.88
Control Delay	26.7	33.4	8.6	20.8	34.1	3.9	35.3	28.0	12.0	10.4	38.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.7	33.4	8.6	20.8	34.1	3.9	35.3	28.0	12.0	10.4	38.9
Queue Length 50th (m)	21.1	24.6	0.0	11.4	23.5	0.0	17.4	62.5	5.8	4.0	123.0
Queue Length 95th (m)	22.9	39.7	17.2	19.6	39.7	2.2	m22.8	m79.2	m8.6	8.3	#198.6
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	351	445	500	385	467	387	219	790	777	434	832
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.39	0.52	0.28	0.36	0.19	0.63	0.62	0.17	0.12	0.88

Intersection Summary

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.

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	35	85	146	230	87	146	36	18	116	335	107	117
Future Volume (vph)	35	85	146	230	87	146	36	18	116	335	107	117
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.76	1.00	1.00	0.73		1.00	0.97		0.94
Flpb, ped/bikes		0.90	1.00	1.00	0.89	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	0.96		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1628	1745	1199	1627	1830	1198		1772	1599		1463
Flt Permitted		0.57	1.00	1.00	0.65	1.00	1.00		0.10	1.00		1.00
Satd. Flow (perm)		972	1745	1199	1110	1830	1198		189	1599		1463
Peak-hour factor, PHF	0.73	0.61	0.85	0.88	0.82	0.88	0.78	0.67	0.84	0.97	0.81	0.80
Adj. Flow (vph)	48	139	172	261	106	166	46	27	138	345	132	146
RTOR Reduction (vph)	0	0	0	202	0	0	58	0	0	1	0	57
Lane Group Flow (vph)	0	187	172	59	106	166	15	0	138	491	0	74
Confl. Peds. (#/hr)	73	54		112	112		73	54	50		54	42
Confl. Bikes (#/hr)				2			1	1			1	1
Heavy Vehicles (%)	3%	0%	7%	1%	0%	5%	0%	0%	3%	6%	4%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		27.2	20.2	20.2	24.4	18.8	18.8		49.0	42.6		42.6
Effective Green, g (s)		27.2	20.2	20.2	24.4	18.8	18.8		49.0	42.6		42.6
Actuated g/C Ratio		0.30	0.22	0.22	0.27	0.21	0.21		0.54	0.47		0.47
Clearance Time (s)		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
Lane Grp Cap (vph)		344	391	269	333	382	250		215	756		692
v/s Ratio Prot		c0.04	0.10		0.02	0.09			c0.05	0.31		
v/s Ratio Perm		c0.12		0.05	0.07		0.01		0.30			0.05
v/c Ratio		0.54	0.44	0.22	0.32	0.43	0.06		0.64	0.65		0.11
Uniform Delay, d1		25.1	30.0	28.5	25.6	31.0	28.5		16.9	18.0		13.1
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		2.16	1.25		2.24
Incremental Delay, d2		1.8	0.8	0.4	0.6	0.8	0.1		4.4	2.9		0.2
Delay (s)		26.9	30.8	28.9	26.1	31.8	28.6		40.9	25.5		29.7
Level of Service		C	C	C	C	C	C		D	C		C
Approach Delay (s)			28.8			29.4				29.0		
Approach LOS			C			C				C		
Intersection Summary												
HCM 2000 Control Delay			31.2									
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			84.9%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	8	27	658	35
Future Volume (vph)	8	27	658	35
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.99	
Flpb, ped/bikes		0.99	1.00	
Frt		1.00	0.99	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1801	1850	
Flt Permitted		0.35	1.00	
Satd. Flow (perm)		663	1850	
Peak-hour factor, PHF	0.44	0.82	0.95	0.83
Adj. Flow (vph)	18	33	693	42
RTOR Reduction (vph)	0	0	2	0
Lane Group Flow (vph)	0	51	733	0
Confl. Peds. (#/hr)	54	42		50
Confl. Bikes (#/hr)				7
Heavy Vehicles (%)	0%	0%	2%	7%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		43.4	39.8	
Effective Green, g (s)		43.4	39.8	
Actuated g/C Ratio		0.48	0.44	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		365	818	
v/s Ratio Prot		0.01	c0.40	
v/s Ratio Perm		0.06		
v/c Ratio		0.14	0.90	
Uniform Delay, d1		13.0	23.2	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.2	14.5	
Delay (s)		13.2	37.6	
Level of Service		B	D	
Approach Delay (s)			36.1	
Approach LOS			D	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	12	32	15	7	43	33	700	53	66	863	31
Future Volume (Veh/h)	6	12	32	15	7	43	33	700	53	66	863	31
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.31	0.50	0.78	0.81	0.50	0.84	0.66	0.86	0.88	0.79	0.93	0.84
Hourly flow rate (vph)	19	24	41	19	14	51	50	814	60	84	928	37
Pedestrians	37			35			9			9		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	4			3			1			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)							94			144		
pX, platoon unblocked	0.75	0.75	0.61	0.75	0.75	0.72	0.61				0.72	
vC, conflicting volume	1726	2160	992	2137	2149	481	1002				909	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	398	979	666	948	964	0	682				95	
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	84	83	80	91	93	91				92	
cM capacity (veh/h)	278	147	236	94	150	752	540				1051	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	84	84	457	467	84	965						
Volume Left	19	19	50	0	84	0						
Volume Right	41	51	0	60	0	37						
cSH	207	231	540	1700	1051	1700						
Volume to Capacity	0.41	0.36	0.09	0.27	0.08	0.57						
Queue Length 95th (m)	13.9	12.0	2.3	0.0	2.0	0.0						
Control Delay (s)	33.7	29.2	2.7	0.0	8.7	0.0						
Lane LOS	D	D	A		A							
Approach Delay (s)	33.7	29.2	1.3		0.7							
Approach LOS	D	D										
Intersection Summary												
Average Delay				3.4								
Intersection Capacity Utilization				70.3%	ICU Level of Service			C				
Analysis Period (min)				15								

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	193	146	1121	231	763
v/c Ratio	0.44	0.24	0.89	0.79	0.67
Control Delay	31.4	14.0	25.3	44.9	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	31.4	14.0	25.3	44.9	8.5
Queue Length 50th (m)	27.7	13.4	65.8	39.4	29.5
Queue Length 95th (m)	43.1	20.8	m86.8	m50.9	m45.0
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	434	614	1263	292	1141
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	0.44	0.24	0.89	0.79	0.67

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

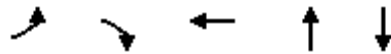
10/29/2018

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	160	115	669	294	178	732
Future Volume (vph)	160	115	669	294	178	732
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.97	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1630	1418	3304		1755	1902
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1630	1418	3304		1755	1902
Peak-hour factor, PHF	0.83	0.79	0.85	0.88	0.77	0.96
Adj. Flow (vph)	193	146	787	334	231	762
RTOR Reduction (vph)	0	0	52	0	0	0
Lane Group Flow (vph)	193	146	1069	0	231	763
Confl. Peds. (#/hr)	44	30		9	9	
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	12%	12%	3%	8%	4%	1%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	434	709	1211		292	1141
v/s Ratio Prot	c0.12	0.03	c0.32		c0.13	0.40
v/s Ratio Perm		0.07				
v/c Ratio	0.44	0.21	0.88		0.79	0.67
Uniform Delay, d1	27.5	15.9	26.7		36.0	12.0
Progression Factor	1.00	1.00	0.75		0.79	0.50
Incremental Delay, d2	3.3	0.7	5.7		14.5	2.3
Delay (s)	30.7	16.5	25.8		43.1	8.2
Level of Service	C	B	C		D	A
Approach Delay (s)	24.6		25.8			16.3
Approach LOS	C		C			B
Intersection Summary						
HCM 2000 Control Delay			21.8		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.72			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.7%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	441	188	39	815	968
v/c Ratio	1.10	0.38	0.08	0.64	0.59
Control Delay	108.3	10.9	15.7	14.9	12.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	108.3	10.9	15.7	14.9	12.6
Queue Length 50th (m)	~87.4	6.9	2.6	38.1	34.8
Queue Length 95th (m)	#109.2	18.7	9.8	48.7	40.8
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	400	501	490	1266	1634
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	1.10	0.38	0.08	0.64	0.59

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

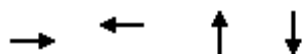
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	335	0	154	17	4	18	96	623	0	0	741	144
Future Volume (vph)	335	0	154	17	4	18	96	623	0	0	741	144
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	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	1.00		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.94			1.00			0.97	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1802		1406		1651			3413			3379	
Flt Permitted	0.73		1.00		0.98			0.62			1.00	
Satd. Flow (perm)	1388		1406		1651			2120			3379	
Peak-hour factor, PHF	0.76	0.38	0.82	1.00	1.00	1.00	0.90	0.88	0.25	0.25	0.93	0.84
Adj. Flow (vph)	441	0	188	17	4	18	107	708	0	0	797	171
RTOR Reduction (vph)	0	0	95	0	13	0	0	0	0	0	20	0
Lane Group Flow (vph)	441	0	93	0	26	0	0	815	0	0	948	0
Confl. Peds. (#/hr)	2		87	87		2	44		2	2		44
Confl. Bikes (#/hr)			3									3
Heavy Vehicles (%)	1%	0%	3%	0%	0%	0%	4%	5%	0%	0%	4%	1%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	26.0		26.0		26.0			52.0			43.0	
Effective Green, g (s)	26.0		26.0		26.0			52.0			43.0	
Actuated g/C Ratio	0.29		0.29		0.29			0.58			0.48	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	400		406		476			1311			1614	
v/s Ratio Prot								c0.04			0.28	
v/s Ratio Perm	c0.32		0.07		0.02			c0.32				
v/c Ratio	1.10		0.23		0.06			0.62			0.59	
Uniform Delay, d1	32.0		24.4		23.1			12.5			17.1	
Progression Factor	1.00		1.00		1.00			1.00			0.68	
Incremental Delay, d2	75.6		0.3		0.0			0.9			1.2	
Delay (s)	107.6		24.7		23.2			13.4			12.8	
Level of Service	F		C		C			B			B	
Approach Delay (s)		82.8			23.2			13.4			12.8	
Approach LOS		F			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			31.2									
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			87.6%									
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	609	680	223	170
v/c Ratio	0.59	0.65	0.65	0.52
Control Delay	11.6	22.7	35.2	25.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	11.6	22.7	35.2	25.1
Queue Length 50th (m)	47.9	99.0	26.8	15.5
Queue Length 95th (m)	76.5	120.9	34.4	23.8
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	1030	1040	424	401
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	0.59	0.65	0.53	0.42
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	408	53	50	461	27	41	108	23	21	47	47
Future Volume (vph)	37	408	53	50	461	27	41	108	23	21	47	47
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			1.00			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			1.00	
Frt		0.98			0.99			0.99			0.95	
Flt Protected		1.00			0.99			0.99			0.99	
Satd. Flow (prot)		1780			1876			1858			1760	
Flt Permitted		0.90			0.86			0.88			0.82	
Satd. Flow (perm)		1609			1631			1656			1468	
Peak-hour factor, PHF	0.67	0.87	0.62	0.59	0.82	0.82	0.85	0.71	1.00	0.50	0.73	0.73
Adj. Flow (vph)	55	469	85	85	562	33	48	152	23	42	64	64
RTOR Reduction (vph)	0	7	0	0	2	0	0	6	0	0	31	0
Lane Group Flow (vph)	0	602	0	0	678	0	0	217	0	0	139	0
Confl. Peds. (#/hr)	18		8	8		18	18		2	2		18
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		47.7			47.7			15.3			15.3	
Effective Green, g (s)		47.7			47.7			15.3			15.3	
Actuated g/C Ratio		0.64			0.64			0.20			0.20	
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)		1023			1037			337			299	
v/s Ratio Prot												
v/s Ratio Perm		0.37			0.42			0.13			0.09	
v/c Ratio		0.59			0.65			0.65			0.46	
Uniform Delay, d1		7.9			8.5			27.4			26.2	
Progression Factor		1.00			1.96			1.00			1.00	
Incremental Delay, d2		2.5			3.0			4.2			1.1	
Delay (s)		10.4			19.7			31.6			27.4	
Level of Service		B			B			C			C	
Approach Delay (s)		10.4			19.7			31.6			27.4	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			18.7				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			75.0				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			63.8%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	7	9	171	7	15	113
Future Volume (Veh/h)	7	9	171	7	15	113
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.50	0.67	0.84	0.75	0.46	0.80
Hourly flow rate (vph)	14	13	204	9	33	141
Pedestrians	5					3
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	420	216			218	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	420	216			218	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	98	98			97	
cM capacity (veh/h)	576	822			1310	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	27	213	174			
Volume Left	14	0	33			
Volume Right	13	9	0			
cSH	673	1700	1310			
Volume to Capacity	0.04	0.13	0.03			
Queue Length 95th (m)	1.0	0.0	0.6			
Control Delay (s)	10.6	0.0	1.7			
Lane LOS	B		A			
Approach Delay (s)	10.6	0.0	1.7			
Approach LOS	B					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			29.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	236	2	3	362	73	3	17	21	35	14	83
Future Volume (Veh/h)	73	236	2	3	362	73	3	17	21	35	14	83
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.81	0.25	0.38	0.77	0.75	0.75	0.63	0.75	0.83	0.56	0.63
Hourly flow rate (vph)	104	291	8	8	470	97	4	27	28	42	25	132
Pedestrians		9						13			16	
Lane Width (m)		3.7						3.7			3.7	
Walking Speed (m/s)		1.1						1.1			1.1	
Percent Blockage		1						1			2	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	583			312			1204	1115	308	1095	1070	544
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	583			312			1204	1115	308	1095	1070	544
tC, single (s)	4.1			4.1			7.1	6.6	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.3	3.5	4.0	3.3
p0 queue free %	89			99			96	85	96	71	87	75
cM capacity (veh/h)	986			1244			96	176	727	145	192	530
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	403	575	59	199								
Volume Left	104	8	4	42								
Volume Right	8	97	28	132								
cSH	986	1244	253	297								
Volume to Capacity	0.11	0.01	0.23	0.67								
Queue Length 95th (m)	2.7	0.1	6.7	33.9								
Control Delay (s)	3.2	0.2	23.5	38.6								
Lane LOS	A	A	C	E								
Approach Delay (s)	3.2	0.2	23.5	38.6								
Approach LOS			C	E								
Intersection Summary												
Average Delay			8.5									
Intersection Capacity Utilization			65.5%		ICU Level of Service				C			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	417	24	20	498	15	21	30	14	7	22	20
Future Volume (Veh/h)	20	417	24	20	498	15	21	30	14	7	22	20
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.53	0.84	0.56	0.65	0.85	0.65	0.75	0.72	0.60	0.50	0.59	0.71
Hourly flow rate (vph)	38	496	43	31	586	23	28	42	23	14	37	28
Pedestrians		7			1			11			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked	0.83			0.86			0.90	0.90	0.86	0.90	0.90	0.83
vC, conflicting volume	623			550			1318	1290	530	1312	1300	618
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	440			397			948	917	373	942	928	435
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 %	96			97			83	81	96	91	83	94
cM capacity (veh/h)	923			999			163	223	577	154	219	497
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	577	640	93	79								
Volume Left	38	31	28	14								
Volume Right	43	23	23	28								
cSH	923	999	233	250								
Volume to Capacity	0.04	0.03	0.40	0.32								
Queue Length 95th (m)	1.0	0.7	13.8	9.9								
Control Delay (s)	1.1	0.8	30.4	25.9								
Lane LOS	A	A	D	D								
Approach Delay (s)	1.1	0.8	30.4	25.9								
Approach LOS			D	D								
Intersection Summary												
Average Delay			4.3									
Intersection Capacity Utilization			48.2%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	6	2	17	3	3	6	43	16	5	59	1
Future Volume (Veh/h)	6	6	2	17	3	3	6	43	16	5	59	1
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.63	0.25	0.33	0.75	0.38	0.63	0.77	0.50	0.33	0.85	0.25
Hourly flow rate (vph)	10	10	8	52	4	8	10	56	32	15	69	4
Pedestrians	12			9			9			7		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	1			1			1			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	222	230	92	224	216	88	85				97	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	222	230	92	224	216	88	85				97	
tC, single (s)	7.1	6.7	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.2	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	98	99	92	99	99	99				99	
cM capacity (veh/h)	695	616	951	688	660	961	1506				1496	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	28	64	98	88								
Volume Left	10	52	10	15								
Volume Right	8	8	32	4								
cSH	717	712	1506	1496								
Volume to Capacity	0.04	0.09	0.01	0.01								
Queue Length 95th (m)	0.9	2.2	0.2	0.2								
Control Delay (s)	10.2	10.6	0.8	1.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.2	10.6	0.8	1.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay	4.2											
Intersection Capacity Utilization	19.9%			ICU Level of Service				A				
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	6	61	12	3	81
Future Volume (Veh/h)	6	6	61	12	3	81
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.42	0.57	0.75	0.38	0.83
Hourly flow rate (vph)	24	14	107	16	8	98
Pedestrians	4					4
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	233	123			127	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	233	123			127	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	98			99	
cM capacity (veh/h)	753	926			1466	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	38	123	106			
Volume Left	24	0	8			
Volume Right	14	16	0			
cSH	808	1700	1466			
Volume to Capacity	0.05	0.07	0.01			
Queue Length 95th (m)	1.1	0.0	0.1			
Control Delay (s)	9.7	0.0	0.6			
Lane LOS	A		A			
Approach Delay (s)	9.7	0.0	0.6			
Approach LOS	A					
Intersection Summary						
Average Delay		1.6				
Intersection Capacity Utilization		17.9%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

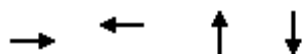
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	250	9	5	354	33	24	5	30	35	9	40
Future Volume (Veh/h)	30	250	9	5	354	33	24	5	30	35	9	40
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.68	0.94	0.50	0.59	0.83	0.25	0.58	0.33	0.65	0.84	0.50	0.83
Hourly flow rate (vph)	44	266	18	8	427	132	41	15	46	42	18	48
Pedestrians		4			1			13			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)												
pX, platoon unblocked												
vC, conflicting volume	573			297			946	965	289	940	908	511
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	573			297			946	965	289	940	908	511
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 %	96			99			79	94	94	79	93	91
cM capacity (veh/h)	996			1260			195	238	735	204	257	557
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	328	567	102	108								
Volume Left	44	8	41	42								
Volume Right	18	132	46	48								
cSH	996	1260	304	298								
Volume to Capacity	0.04	0.01	0.34	0.36								
Queue Length 95th (m)	1.1	0.1	10.9	12.2								
Control Delay (s)	1.6	0.2	22.7	23.8								
Lane LOS	A	A	C	C								
Approach Delay (s)	1.6	0.2	22.7	23.8								
Approach LOS			C	C								
Intersection Summary												
Average Delay			5.0									
Intersection Capacity Utilization			46.5%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	537	640	24	115
v/c Ratio	0.42	0.48	0.08	0.40
Control Delay	5.1	8.9	17.9	21.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.1	8.9	17.9	21.8
Queue Length 50th (m)	22.0	48.7	1.7	9.0
Queue Length 95th (m)	28.3	65.6	5.4	14.5
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1273	1325	483	421
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	0.42	0.48	0.05	0.27
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	424	5	5	491	31	2	9	6	51	5	37
Future Volume (vph)	15	424	5	5	491	31	2	9	6	51	5	37
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			0.98			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			0.97	
Frt		1.00			0.99			0.95			0.95	
Flt Protected		1.00			1.00			0.99			0.97	
Satd. Flow (prot)		1857			1879			1769			1704	
Flt Permitted		0.96			0.99			0.96			0.80	
Satd. Flow (perm)		1796			1871			1708			1411	
Peak-hour factor, PHF	0.65	0.84	0.58	0.67	0.83	0.75	0.63	0.71	0.78	0.75	0.67	0.92
Adj. Flow (vph)	23	505	9	7	592	41	3	13	8	68	7	40
RTOR Reduction (vph)	0	1	0	0	2	0	0	7	0	0	30	0
Lane Group Flow (vph)	0	536	0	0	638	0	0	17	0	0	85	0
Confl. Peds. (#/hr)	24		35	35		24	10		23	23		10
Confl. Bikes (#/hr)			2			2						1
Heavy Vehicles (%)	0%	3%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		50.7			50.7			12.3			12.3	
Effective Green, g (s)		50.7			50.7			12.3			12.3	
Actuated g/C Ratio		0.68			0.68			0.16			0.16	
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)		1214			1264			280			231	
v/s Ratio Prot												
v/s Ratio Perm		0.30			0.34			0.01			0.06	
v/c Ratio		0.44			0.50			0.06			0.37	
Uniform Delay, d1		5.6			6.0			26.5			27.9	
Progression Factor		0.58			1.00			1.00			1.00	
Incremental Delay, d2		1.0			1.4			0.1			1.0	
Delay (s)		4.3			7.4			26.6			28.9	
Level of Service		A			A			C			C	
Approach Delay (s)		4.3			7.4			26.6			28.9	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay		8.4			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.48										
Actuated Cycle Length (s)		75.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		55.3%			ICU Level of Service			B				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	8	0	0	5	2	0	2	0	2	0	3
Future Volume (Veh/h)	2	8	0	0	5	2	0	2	0	2	0	3
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.25	0.25	0.50	0.25	0.50	0.50	0.44	0.88	0.42	0.50	0.77	0.38
Hourly flow rate (vph)	8	32	0	0	10	4	0	2	0	4	0	8
Pedestrians	5			7			16			4		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	0			1			2			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												355
pX, platoon unblocked												
vC, conflicting volume	32	26	25	53	30	13	13				9	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	32	26	25	53	30	13	13				9	
tC, single (s)	7.1	6.5	6.5	7.1	6.5	6.2	4.2				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.5	4.0	3.3	2.3				2.2	
p0 queue free %	99	96	100	100	99	100	100				100	
cM capacity (veh/h)	949	859	968	893	855	1062	1523				1613	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	40	14	2	12								
Volume Left	8	0	0	4								
Volume Right	0	4	0	8								
cSH	876	905	1523	1613								
Volume to Capacity	0.05	0.02	0.00	0.00								
Queue Length 95th (m)	1.1	0.4	0.0	0.1								
Control Delay (s)	9.3	9.0	0.0	2.4								
Lane LOS	A	A		A								
Approach Delay (s)	9.3	9.0	0.0	2.4								
Approach LOS	A	A										
Intersection Summary												
Average Delay				7.8								
Intersection Capacity Utilization				19.5%	ICU Level of Service			A				
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	3	0	0	4	0	0	0	0	1	0	5
Future Volume (Veh/h)	1	3	0	0	4	0	0	0	0	1	0	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.94	0.25	0.25	0.84	0.50
Hourly flow rate (vph)	4	12	0	0	16	0	0	0	0	4	0	10
Pedestrians		3			20			8			8	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			2			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	32	36	16	47	41	28	13			20		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	32	36	16	47	41	28	13			20		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	100	99	100	100	98	100	100			100		
cM capacity (veh/h)	938	839	1058	905	834	1024	1614			1578		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	16	16	0	14								
Volume Left	4	0	0	4								
Volume Right	0	0	0	10								
cSH	862	834	1700	1578								
Volume to Capacity	0.02	0.02	0.00	0.00								
Queue Length 95th (m)	0.4	0.4	0.0	0.1								
Control Delay (s)	9.3	9.4	0.0	2.1								
Lane LOS	A	A		A								
Approach Delay (s)	9.3	9.4	0.0	2.1								
Approach LOS	A	A										
Intersection Summary												
Average Delay			7.1									
Intersection Capacity Utilization			20.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	266	21	6	303	0	97	0	93	1	1	2
Future Volume (Veh/h)	0	266	21	6	303	0	97	0	93	1	1	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.87	0.64	0.63	0.84	0.63	0.74	0.82	0.63	0.53	0.58	0.83
Hourly flow rate (vph)	0	306	33	10	361	0	131	0	148	2	2	2
Pedestrians		7			9			15			9	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	207											
pX, platoon unblocked												
vC, conflicting volume	370			354			728	728	346	870	744	377
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	370			354			728	728	346	870	744	377
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 %	100			99			59	100	78	99	99	100
cM capacity (veh/h)	1162			1198			321	342	674	201	334	659
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	339	371	279	6								
Volume Left	0	10	131	2								
Volume Right	33	0	148	2								
cSH	1162	1198	444	316								
Volume to Capacity	0.00	0.01	0.63	0.02								
Queue Length 95th (m)	0.0	0.2	32.0	0.4								
Control Delay (s)	0.0	0.3	25.8	16.6								
Lane LOS		A	D	C								
Approach Delay (s)	0.0	0.3	25.8	16.6								
Approach LOS			D	C								
Intersection Summary												
Average Delay	7.4											
Intersection Capacity Utilization	45.6%			ICU Level of Service					A			
Analysis Period (min)	15											

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	149	178	274	176	299	143	204	701	101	88	630
v/c Ratio	0.56	0.46	0.64	0.49	0.72	0.50	0.70	0.92	0.14	0.40	0.82
Control Delay	27.6	33.7	12.5	24.6	42.3	15.5	23.7	33.2	1.5	15.4	34.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.6	33.7	12.5	24.6	42.3	15.5	23.7	33.2	1.5	15.4	34.6
Queue Length 50th (m)	16.5	25.5	3.0	19.8	45.7	4.6	6.3	~141.1	2.0	7.1	96.5
Queue Length 95th (m)	23.3	35.0	17.6	34.0	66.7	15.3	m13.1	m#188.9	m2.7	10.8	#155.5
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	268	450	461	361	486	318	291	759	710	222	765
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.40	0.59	0.49	0.62	0.45	0.70	0.92	0.14	0.40	0.82

Intersection Summary

~ 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.

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

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	45	64	132	225	160	254	69	30	159	539	96	104
Future Volume (vph)	45	64	132	225	160	254	69	30	159	539	96	104
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.68	1.00	1.00	0.57		1.00	0.96		0.92
Flpb, ped/bikes		0.93	1.00	1.00	0.87	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	0.97		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1684	1762	1075	1588	1902	927		1798	1668		1431
Flt Permitted		0.34	1.00	1.00	0.59	1.00	1.00		0.17	1.00		1.00
Satd. Flow (perm)		608	1762	1075	984	1902	927		316	1668		1431
Peak-hour factor, PHF	0.71	0.74	0.74	0.82	0.91	0.85	0.79	0.54	0.78	0.95	0.78	0.93
Adj. Flow (vph)	63	86	178	274	176	299	87	56	204	567	123	112
RTOR Reduction (vph)	0	0	0	196	0	0	85	0	0	1	0	56
Lane Group Flow (vph)	0	149	178	78	176	299	58	0	204	700	0	45
Confl. Peds. (#/hr)	107	104		156	156		107	104	104		104	59
Confl. Bikes (#/hr)				3			4	4			7	7
Heavy Vehicles (%)	2%	0%	6%	0%	0%	1%	0%	0%	1%	3%	0%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		26.7	19.7	19.7	26.7	19.7	19.7		47.8	40.4		40.4
Effective Green, g (s)		26.7	19.7	19.7	26.7	19.7	19.7		47.8	40.4		40.4
Actuated g/C Ratio		0.30	0.22	0.22	0.30	0.22	0.22		0.53	0.45		0.45
Clearance Time (s)		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
Lane Grp Cap (vph)		264	385	235	338	416	202		289	748		642
v/s Ratio Prot		c0.04	0.10		0.04	c0.16			c0.06	c0.42		
v/s Ratio Perm		0.12		0.07	0.11		0.06		0.32			0.03
v/c Ratio		0.56	0.46	0.33	0.52	0.72	0.29		0.71	0.94		0.07
Uniform Delay, d1		24.8	30.5	29.6	25.2	32.6	29.3		15.6	23.6		14.1
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		0.98	0.60		0.36
Incremental Delay, d2		2.8	0.9	0.8	1.4	5.9	0.8		5.4	15.9		0.1
Delay (s)		27.6	31.4	30.4	26.7	38.4	30.1		20.8	30.0		5.3
Level of Service		C	C	C	C	D	C		C	C		A
Approach Delay (s)			30.0			33.2				25.6		
Approach LOS			C			C				C		
Intersection Summary												
HCM 2000 Control Delay			29.5			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			87.1%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations		LT	LT	LT
Traffic Volume (vph)	17	43	495	67
Future Volume (vph)	17	43	495	67
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.98	
Flpb, ped/bikes		1.00	1.00	
Frt		1.00	0.98	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1764	1805	
Flt Permitted		0.12	1.00	
Satd. Flow (perm)		225	1805	
Peak-hour factor, PHF	0.63	0.71	0.89	0.91
Adj. Flow (vph)	27	61	556	74
RTOR Reduction (vph)	0	0	5	0
Lane Group Flow (vph)	0	88	625	0
Confl. Peds. (#/hr)	104	59		104
Confl. Bikes (#/hr)				5
Heavy Vehicles (%)	0%	5%	2%	2%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		42.8	37.9	
Effective Green, g (s)		42.8	37.9	
Actuated g/C Ratio		0.48	0.42	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		190	760	
v/s Ratio Prot		0.03	0.35	
v/s Ratio Perm		0.19		
v/c Ratio		0.46	0.82	
Uniform Delay, d1		17.3	23.1	
Progression Factor		1.00	1.00	
Incremental Delay, d2		1.8	9.8	
Delay (s)		19.1	32.8	
Level of Service		B	C	
Approach Delay (s)			31.1	
Approach LOS			C	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	6	29	21	8	58	24	883	39	45	857	25
Future Volume (Veh/h)	6	6	29	21	8	58	24	883	39	45	857	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.63	0.63	0.78	0.75	0.44	0.83	0.80	0.95	0.80	0.80	0.95	0.80
Hourly flow rate (vph)	10	10	37	28	18	70	30	929	49	56	902	31
Pedestrians		52			63			3			6	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)								94			144	
pX, platoon unblocked	0.77	0.77	0.64	0.77	0.77	0.73	0.64			0.73		
vC, conflicting volume	1691	2182	972	2136	2174	558	985			1041		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	425	1061	671	1001	1050	0	690			308		
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 %	96	93	85	71	87	91	95			94		
cM capacity (veh/h)	259	137	243	97	139	741	552			863		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	57	116	494	514	56	933						
Volume Left	10	28	30	0	56	0						
Volume Right	37	70	0	49	0	31						
cSH	216	226	552	1700	863	1700						
Volume to Capacity	0.26	0.51	0.05	0.30	0.06	0.55						
Queue Length 95th (m)	7.8	20.1	1.3	0.0	1.6	0.0						
Control Delay (s)	27.5	36.5	1.6	0.0	9.5	0.0						
Lane LOS	D	E	A		A							
Approach Delay (s)	27.5	36.5	0.8		0.5							
Approach LOS	D	E										
Intersection Summary												
Average Delay			3.3									
Intersection Capacity Utilization			63.0%		ICU Level of Service				B			
Analysis Period (min)			15									

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	245	240	1101	223	790
v/c Ratio	0.54	0.37	0.87	0.76	0.69
Control Delay	33.5	15.5	28.5	56.8	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	33.5	15.5	28.5	56.8	21.5
Queue Length 50th (m)	36.2	23.4	78.8	36.1	112.2
Queue Length 95th (m)	54.4	34.4	102.9	m48.7	m154.1
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	454	649	1259	292	1152
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	0.54	0.37	0.87	0.76	0.69

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

10/29/2018

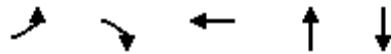
						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	206	197	724	194	181	743
Future Volume (vph)	206	197	724	194	181	743
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.96	0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1706	1498	3341		1755	1921
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1706	1498	3341		1755	1921
Peak-hour factor, PHF	0.84	0.82	0.87	0.72	0.81	0.94
Adj. Flow (vph)	245	240	832	269	223	790
RTOR Reduction (vph)	0	0	35	0	0	0
Lane Group Flow (vph)	245	240	1066	0	223	790
Confl. Peds. (#/hr)	48	42		34	34	
Confl. Bikes (#/hr)		3		5		
Heavy Vehicles (%)	7%	5%	1%	11%	4%	0%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	454	749	1225		292	1152
v/s Ratio Prot	c0.14	0.05	c0.32		0.13	c0.41
v/s Ratio Perm		0.11				
v/c Ratio	0.54	0.32	0.87		0.76	0.69
Uniform Delay, d1	28.3	16.8	26.5		35.8	12.2
Progression Factor	1.00	1.00	0.83		1.17	1.48
Incremental Delay, d2	4.5	1.1	6.7		13.8	2.6
Delay (s)	32.8	17.9	28.8		55.6	20.7
Level of Service	C	B	C		E	C
Approach Delay (s)	25.4		28.8			28.4
Approach LOS	C		C			C
Intersection Summary						
HCM 2000 Control Delay			28.0		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.75			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.0%		ICU Level of Service	D
Analysis Period (min)			15			

c Critical Lane Group

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	284	183	138	843	984
v/c Ratio	0.87	0.36	0.30	0.67	0.57
Control Delay	58.3	6.1	20.1	14.9	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	58.3	6.1	20.1	14.9	12.8
Queue Length 50th (m)	44.9	0.0	13.0	39.5	39.2
Queue Length 95th (m)	#70.7	10.8	27.4	52.1	63.9
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	362	543	504	1253	1738
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	0.78	0.34	0.27	0.67	0.57

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

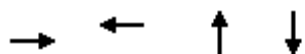
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	233	0	150	60	22	56	118	634	0	0	728	185
Future Volume (vph)	233	0	150	60	22	56	118	634	0	0	728	185
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	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Flpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	0.99		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.95			1.00			0.97	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1765		1432		1654			3474			3372	
Flt Permitted	0.68		1.00		0.98			0.57			1.00	
Satd. Flow (perm)	1256		1432		1654			1985			3372	
Peak-hour factor, PHF	0.82	0.25	0.82	1.00	1.00	1.00	0.85	0.90	0.25	0.25	0.96	0.82
Adj. Flow (vph)	284	0	183	60	22	56	139	704	0	0	758	226
RTOR Reduction (vph)	0	0	135	0	28	0	0	0	0	0	29	0
Lane Group Flow (vph)	284	0	48	0	110	0	0	843	0	0	955	0
Confl. Peds. (#/hr)	12		89	89		12	45		13	13		45
Confl. Bikes (#/hr)			1						5			1
Heavy Vehicles (%)	2%	0%	1%	0%	0%	0%	2%	3%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	23.4		23.4		23.4			54.6			45.6	
Effective Green, g (s)	23.4		23.4		23.4			54.6			45.6	
Actuated g/C Ratio	0.26		0.26		0.26			0.61			0.51	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	326		372		430			1303			1708	
v/s Ratio Prot								c0.04			0.28	
v/s Ratio Perm	c0.23		0.03		0.07			c0.35				
v/c Ratio	0.87		0.13		0.26			0.65			0.56	
Uniform Delay, d1	31.9		25.5		26.4			11.5			15.3	
Progression Factor	1.00		1.00		1.00			1.00			0.78	
Incremental Delay, d2	21.6		0.2		0.3			1.1			1.0	
Delay (s)	53.4		25.6		26.7			12.6			12.9	
Level of Service	D		C		C			B			B	
Approach Delay (s)		42.5			26.7			12.6			12.9	
Approach LOS		D			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			19.2				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			15.0		
Intersection Capacity Utilization			83.0%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	708	424	277	381
v/c Ratio	0.88	0.55	0.59	0.92
Control Delay	32.0	12.0	20.8	49.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	32.0	12.0	20.8	49.6
Queue Length 50th (m)	89.4	25.1	15.7	39.8
Queue Length 95th (m)	#110.6	34.5	28.4	#67.3
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	809	765	525	454
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	0.88	0.55	0.53	0.84

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	88	406	40	39	205	66	38	141	25	58	76	113
Future Volume (vph)	88	406	40	39	205	66	38	141	25	58	76	113
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			0.99			0.81	
Flpb, ped/bikes		0.99			1.00			0.96			0.99	
Frt		0.99			0.97			0.98			0.93	
Flt Protected		0.99			0.99			0.99			0.99	
Satd. Flow (prot)		1759			1754			1763			1394	
Flt Permitted		0.88			0.82			0.81			0.80	
Satd. Flow (perm)		1550			1445			1442			1135	
Peak-hour factor, PHF	0.83	0.76	0.59	0.55	0.83	0.62	0.60	0.79	0.69	0.60	0.79	0.60
Adj. Flow (vph)	106	534	68	71	247	106	63	178	36	97	96	188
RTOR Reduction (vph)	0	5	0	0	15	0	0	7	0	0	50	0
Lane Group Flow (vph)	0	703	0	0	409	0	0	270	0	0	331	0
Confl. Peds. (#/hr)	56		43	43		56	175		19	19		175
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	3%	5%	0%	4%	0%	0%	1%	5%	2%	3%	3%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		38.9			38.9			24.1			24.1	
Effective Green, g (s)		38.9			38.9			24.1			24.1	
Actuated g/C Ratio		0.52			0.52			0.32			0.32	
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)		803			749			463			364	
v/s Ratio Prot												
v/s Ratio Perm		c0.45			0.28			0.19			c0.29	
v/c Ratio		0.88			0.55			0.58			0.91	
Uniform Delay, d1		15.9			12.1			21.2			24.4	
Progression Factor		1.00			0.72			0.79			1.00	
Incremental Delay, d2		12.8			2.8			1.7			26.1	
Delay (s)		28.8			11.5			18.5			50.6	
Level of Service		C			B			B			D	
Approach Delay (s)		28.8			11.5			18.5			50.6	
Approach LOS		C			B			B			D	
Intersection Summary												
HCM 2000 Control Delay			27.7									
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			75.0									
Intersection Capacity Utilization			76.1%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

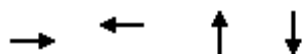
10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	8	188	9	13	165
Future Volume (Veh/h)	6	8	188	9	13	165
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.63	0.88	0.74	0.67	0.69	0.66
Hourly flow rate (vph)	10	9	254	13	19	250
Pedestrians	10		3			
Lane Width (m)	3.7		3.7			
Walking Speed (m/s)	1.1		1.1			
Percent Blockage	1		0			
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			284			362
pX, platoon unblocked						
vC, conflicting volume	562	270			277	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	562	270			277	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	98	99			98	
cM capacity (veh/h)	478	733			1234	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	19	267	269			
Volume Left	10	0	19			
Volume Right	9	13	0			
cSH	572	1700	1234			
Volume to Capacity	0.03	0.16	0.02			
Queue Length 95th (m)	0.8	0.0	0.4			
Control Delay (s)	11.5	0.0	0.7			
Lane LOS	B		A			
Approach Delay (s)	11.5	0.0	0.7			
Approach LOS	B					
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			29.4%	ICU Level of Service		A
Analysis Period (min)			15			

Queues

3: Yorkshire Street South & Waterloo Avenue

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	622	331	107	318
v/c Ratio	0.71	0.34	0.21	0.71
Control Delay	17.7	9.5	9.2	26.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	17.7	9.5	9.2	26.3
Queue Length 50th (m)	58.8	21.4	2.9	27.5
Queue Length 95th (m)	73.4	30.5	5.5	8.3
Internal Link Dist (m)	50.5	146.5	65.6	106.9
Turn Bay Length (m)				
Base Capacity (vph)	876	967	511	448
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	0.71	0.34	0.21	0.71
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	363	3	6	202	47	0	16	37	45	34	85
Future Volume (vph)	113	363	3	6	202	47	0	16	37	45	34	85
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			0.98			0.95	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		1.00			0.98			0.90			0.94	
Flt Protected		0.99			1.00			1.00			0.99	
Satd. Flow (prot)		1862			1781			1623			1554	
Flt Permitted		0.83			0.96			1.00			0.92	
Satd. Flow (perm)		1565			1708			1623			1445	
Peak-hour factor, PHF	0.76	0.78	0.38	0.31	0.80	0.79	0.25	0.58	0.47	0.81	0.31	0.56
Adj. Flow (vph)	149	465	8	19	252	59	0	28	79	56	110	152
RTOR Reduction (vph)	0	0	0	0	11	0	0	57	0	0	44	0
Lane Group Flow (vph)	0	622	0	0	320	0	0	50	0	0	274	0
Confl. Peds. (#/hr)	7		9	9		7	44		6	6		44
Confl. Bikes (#/hr)			3			1						1
Heavy Vehicles (%)	0%	2%	0%	0%	3%	11%	0%	7%	3%	0%	20%	3%
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		42.0			42.0			21.0			21.0	
Effective Green, g (s)		42.0			42.0			21.0			21.0	
Actuated g/C Ratio		0.56			0.56			0.28			0.28	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		876			956			454			404	
v/s Ratio Prot								0.03				
v/s Ratio Perm		c0.40			0.19						c0.19	
v/c Ratio		0.71			0.34			0.11			0.68	
Uniform Delay, d1		12.0			8.9			20.1			24.0	
Progression Factor		1.00			1.00			1.00			0.88	
Incremental Delay, d2		4.8			0.9			0.5			7.7	
Delay (s)		16.9			9.9			20.6			28.9	
Level of Service		B			A			C			C	
Approach Delay (s)		16.9			9.9			20.6			28.9	
Approach LOS		B			A			C			C	
Intersection Summary												
HCM 2000 Control Delay		18.3			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.70										
Actuated Cycle Length (s)		75.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		73.6%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	454	12	15	285	2	15	48	21	9	36	17
Future Volume (Veh/h)	16	454	12	15	285	2	15	48	21	9	36	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.80	0.67	0.75	0.91	0.50	0.41	0.81	0.64	0.67	0.43	0.42
Hourly flow rate (vph)	28	568	18	20	313	4	37	59	33	13	84	40
Pedestrians		9			2			25			24	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked	0.97			0.76			0.77	0.77	0.76	0.77	0.77	0.97
vC, conflicting volume	341			611			1104	1039	604	1076	1046	348
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	302			327			894	810	317	859	819	310
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 %	98			98			70	73	94	91	62	94
cM capacity (veh/h)	1200			920			122	221	537	146	220	673
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	614	337	129	137								
Volume Left	28	20	37	13								
Volume Right	18	4	33	40								
cSH	1200	920	204	258								
Volume to Capacity	0.02	0.02	0.63	0.53								
Queue Length 95th (m)	0.5	0.5	28.0	21.7								
Control Delay (s)	0.6	0.8	48.7	33.6								
Lane LOS	A	A	E	D								
Approach Delay (s)	0.6	0.8	48.7	33.6								
Approach LOS			E	D								
Intersection Summary												
Average Delay			9.5									
Intersection Capacity Utilization			43.8%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	8	7	10	5	5	2	40	20	6	65	1
Future Volume (Veh/h)	6	8	7	10	5	5	2	40	20	6	65	1
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.58	0.38	0.63	0.50	0.50	0.50	0.73	0.63	0.42	0.56	0.25
Hourly flow rate (vph)	10	14	18	16	10	10	4	55	32	14	116	4
Pedestrians	7			6			12			4		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	1			1			1			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	251	254	137	268	240	81	127				93	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	251	254	137	268	240	81	127				93	
tC, single (s)	7.1	6.5	6.5	7.1	6.8	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.6	3.5	4.2	3.3	2.2				2.2	
p0 queue free %	99	98	98	97	98	99	100				99	
cM capacity (veh/h)	670	637	820	639	608	975	1462				1505	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	42	36	91	134								
Volume Left	10	16	4	14								
Volume Right	18	10	32	4								
cSH	714	696	1462	1505								
Volume to Capacity	0.06	0.05	0.00	0.01								
Queue Length 95th (m)	1.4	1.2	0.1	0.2								
Control Delay (s)	10.4	10.5	0.3	0.8								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.4	10.5	0.3	0.8								
Approach LOS	B	B										
Intersection Summary												
Average Delay				3.2								
Intersection Capacity Utilization				20.9%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	11	3	62	13	2	94
Future Volume (Veh/h)	11	3	62	13	2	94
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.75	0.53	0.33	0.25	0.46
Hourly flow rate (vph)	44	4	117	39	8	204
Pedestrians	6		1			3
Lane Width (m)	3.7		3.7			3.7
Walking Speed (m/s)	1.1		1.1			1.1
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	364	146			162	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	364	146			162	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	100			99	
cM capacity (veh/h)	632	899			1421	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	48	156	212			
Volume Left	44	0	8			
Volume Right	4	39	0			
cSH	648	1700	1421			
Volume to Capacity	0.07	0.09	0.01			
Queue Length 95th (m)	1.8	0.0	0.1			
Control Delay (s)	11.0	0.0	0.3			
Lane LOS	B		A			
Approach Delay (s)	11.0	0.0	0.3			
Approach LOS	B					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			17.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

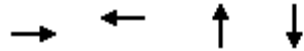
10/29/2018

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	39	378	12	21	207	29	7	8	14	25	25	44		
Future Volume (Veh/h)	39	378	12	21	207	29	7	8	14	25	25	44		
Sign Control	Free			Free			Stop			Stop				
Grade	0%			0%			0%			0%				
Peak Hour Factor	0.75	0.85	0.36	0.75	0.88	0.53	0.75	0.58	0.50	0.64	0.50	0.52		
Hourly flow rate (vph)	52	445	33	28	235	55	9	14	28	39	50	85		
Pedestrians	3			2			14			3				
Lane Width (m)	3.7			3.7			3.7			3.7				
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)	170													
pX, platoon unblocked				0.85			0.85			0.85	0.85	0.85		
vC, conflicting volume	293				492				1011	928	478	924	918	268
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	293				318				926	830	301	824	817	268
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				97				94	94	96	81	80	89
cM capacity (veh/h)	1248				1054				148	241	624	209	245	754
Direction, Lane #	EB 1	WB 1	NB 1	SB 1										
Volume Total	530	318	51	174										
Volume Left	52	28	9	39										
Volume Right	33	55	28	85										
cSH	1248	1054	311	345										
Volume to Capacity	0.04	0.03	0.16	0.50										
Queue Length 95th (m)	1.0	0.6	4.4	20.6										
Control Delay (s)	1.2	1.0	18.8	25.5										
Lane LOS	A	A	C	D										
Approach Delay (s)	1.2	1.0	18.8	25.5										
Approach LOS				C	D									
Intersection Summary														
Average Delay				5.9										
Intersection Capacity Utilization				45.6%	ICU Level of Service				A					
Analysis Period (min)				15										

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	627	359	23	157
v/c Ratio	0.54	0.31	0.07	0.58
Control Delay	17.1	7.5	18.4	30.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	17.1	7.5	18.4	30.9
Queue Length 50th (m)	79.6	21.8	1.9	16.2
Queue Length 95th (m)	m94.6	35.9	4.9	25.0
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1169	1150	448	384
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	0.54	0.31	0.05	0.41

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	466	8	5	273	20	3	7	4	57	21	26
Future Volume (vph)	17	466	8	5	273	20	3	7	4	57	21	26
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			0.95			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			0.89	
Frt		1.00			0.99			0.96			0.97	
Flt Protected		1.00			1.00			0.99			0.97	
Satd. Flow (prot)		1850			1791			1716			1581	
Flt Permitted		0.98			0.99			0.91			0.81	
Satd. Flow (perm)		1810			1774			1588			1317	
Peak-hour factor, PHF	0.63	0.79	0.78	0.67	0.87	0.53	0.48	0.66	0.68	0.63	0.74	0.67
Adj. Flow (vph)	27	590	10	7	314	38	6	11	6	90	28	39
RTOR Reduction (vph)	0	1	0	0	5	0	0	5	0	0	18	0
Lane Group Flow (vph)	0	626	0	0	354	0	0	18	0	0	139	0
Confl. Peds. (#/hr)	38		54	54		38	21		91	91		21
Confl. Bikes (#/hr)			3			1			1			
Heavy Vehicles (%)	7%	3%	0%	0%	4%	12%	0%	0%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		48.5			48.5			14.5			14.5	
Effective Green, g (s)		48.5			48.5			14.5			14.5	
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)		1170			1147			307			254	
v/s Ratio Prot												
v/s Ratio Perm		c0.35			0.20			0.01			c0.11	
v/c Ratio		0.54			0.31			0.06			0.55	
Uniform Delay, d1		7.2			5.9			24.7			27.3	
Progression Factor		1.86			1.00			1.00			1.00	
Incremental Delay, d2		1.1			0.7			0.1			2.4	
Delay (s)		14.4			6.6			24.8			29.7	
Level of Service		B			A			C			C	
Approach Delay (s)		14.4			6.6			24.8			29.7	
Approach LOS		B			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			14.2			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)				12.0		
Intersection Capacity Utilization			58.9%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	9	0	0	6	1	0	6	0	2	0	8
Future Volume (Veh/h)	12	9	0	0	6	1	0	6	0	2	0	8
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.25	0.25	0.25	0.25	0.25	0.63	0.60	0.67	0.50	0.79	0.44
Hourly flow rate (vph)	19	36	0	0	24	4	0	10	0	4	0	18
Pedestrians	5			13			10			3		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	0			1			1			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												355
pX, platoon unblocked												
vC, conflicting volume	51	45	24	68	54	26	23				23	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	51	45	24	68	54	26	23				23	
tC, single (s)	7.1	6.5	6.7	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.8	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	98	96	100	100	97	100	100				100	
cM capacity (veh/h)	907	834	916	865	824	1039	1597				1585	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	55	28	10	22								
Volume Left	19	0	0	4								
Volume Right	0	4	0	18								
cSH	858	849	1597	1585								
Volume to Capacity	0.06	0.03	0.00	0.00								
Queue Length 95th (m)	1.6	0.8	0.0	0.1								
Control Delay (s)	9.5	9.4	0.0	1.3								
Lane LOS	A	A		A								
Approach Delay (s)	9.5	9.4	0.0	1.3								
Approach LOS	A	A										
Intersection Summary												
Average Delay				7.1								
Intersection Capacity Utilization				22.9%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	4	0	0	8	2	0	0	0	0	0	1
Future Volume (Veh/h)	5	4	0	0	8	2	0	0	0	0	0	1
Sign Control	Stop				Stop				Free		Free	
Grade	0%				0%				0%		0%	
Peak Hour Factor	0.50	0.50	0.50	0.50	0.75	0.50	0.50	0.65	0.38	0.25	0.66	0.25
Hourly flow rate (vph)	10	8	0	0	11	4	0	0	0	0	0	4
Pedestrians	10				16				6		3	
Lane Width (m)	3.7				3.7				3.7		3.7	
Walking Speed (m/s)	1.1				1.1				1.1		1.1	
Percent Blockage	1				2				1		0	
Right turn flare (veh)												
Median type	None								None			
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	24	28	18	28	30	19	14			16		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	24	28	18	28	30	19	14			16		
tC, single (s)	7.1	7.0	6.2	7.1	6.8	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.5	3.3	3.5	4.3	3.3	2.2			2.2		
p0 queue free %	99	99	100	100	99	100	100			100		
cM capacity (veh/h)	946	760	1050	939	785	1045	1602			1589		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	18	15	0	4								
Volume Left	10	0	0	0								
Volume Right	0	4	0	4								
cSH	853	841	1700	1589								
Volume to Capacity	0.02	0.02	0.00	0.00								
Queue Length 95th (m)	0.5	0.4	0.0	0.0								
Control Delay (s)	9.3	9.4	0.0	0.0								
Lane LOS	A	A										
Approach Delay (s)	9.3	9.4	0.0	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay			8.3									
Intersection Capacity Utilization			20.4%	ICU Level of Service				A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	388	29	6	218	0	34	0	93	0	0	0
Future Volume (Veh/h)	0	388	29	6	218	0	34	0	93	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.74	0.78	0.69	0.42	0.88	0.75	0.65	0.63	0.75	0.75	0.65	0.53
Hourly flow rate (vph)	0	497	42	14	248	0	52	0	124	0	0	0
Pedestrians		12			7			15			5	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		374			207							
pX, platoon unblocked												
vC, conflicting volume	253			554			821	814	540	930	835	265
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	253			554			821	814	540	930	835	265
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.3
p0 queue free %	100			99			81	100	77	100	100	100
cM capacity (veh/h)	1318			1011			281	304	534	177	296	754
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	539	262	176	0								
Volume Left	0	14	52	0								
Volume Right	42	0	124	0								
cSH	1318	1011	422	1700								
Volume to Capacity	0.00	0.01	0.42	0.00								
Queue Length 95th (m)	0.0	0.3	15.3	0.0								
Control Delay (s)	0.0	0.6	19.5	0.0								
Lane LOS		A	C	A								
Approach Delay (s)	0.0	0.6	19.5	0.0								
Approach LOS			C	A								
Intersection Summary												
Average Delay			3.7									
Intersection Capacity Utilization			38.6%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	187	172	261	106	166	73	138	492	131	51	735
v/c Ratio	0.55	0.45	0.56	0.28	0.46	0.23	0.61	0.61	0.17	0.12	0.87
Control Delay	27.7	34.4	9.0	21.4	35.2	4.0	32.5	26.3	11.2	9.9	36.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.7	34.4	9.0	21.4	35.2	4.0	32.5	26.3	11.2	9.9	36.9
Queue Length 50th (m)	21.6	25.0	0.0	11.6	23.9	0.0	16.4	59.5	5.4	3.9	120.4
Queue Length 95th (m)	23.4	40.4	17.6	20.1	40.4	2.3	m21.9	m76.2	m8.0	8.1	#194.8
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	343	426	490	378	447	375	228	800	786	441	844
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.40	0.53	0.28	0.37	0.19	0.61	0.61	0.17	0.12	0.87

Intersection Summary

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.

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	35	85	146	230	87	146	36	18	116	335	107	117
Future Volume (vph)	35	85	146	230	87	146	36	18	116	335	107	117
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.76	1.00	1.00	0.73		1.00	0.97		0.94
Flpb, ped/bikes		0.90	1.00	1.00	0.89	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	0.96		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1630	1745	1198	1627	1830	1198		1772	1599		1463
Flt Permitted		0.56	1.00	1.00	0.65	1.00	1.00		0.11	1.00		1.00
Satd. Flow (perm)		965	1745	1198	1109	1830	1198		203	1599		1463
Peak-hour factor, PHF	0.73	0.61	0.85	0.88	0.82	0.88	0.78	0.67	0.84	0.97	0.81	0.80
Adj. Flow (vph)	48	139	172	261	106	166	46	27	138	345	132	146
RTOR Reduction (vph)	0	0	0	204	0	0	58	0	0	1	0	57
Lane Group Flow (vph)	0	187	172	57	106	166	15	0	138	491	0	74
Confl. Peds. (#/hr)	73	54		112	112		73	54	50		54	42
Confl. Bikes (#/hr)				2			1	1			1	1
Heavy Vehicles (%)	3%	0%	7%	1%	0%	5%	0%	0%	3%	6%	4%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		26.6	19.6	19.6	23.8	18.2	18.2		49.6	43.2		43.2
Effective Green, g (s)		26.6	19.6	19.6	23.8	18.2	18.2		49.6	43.2		43.2
Actuated g/C Ratio		0.30	0.22	0.22	0.26	0.20	0.20		0.55	0.48		0.48
Clearance Time (s)		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
Lane Grp Cap (vph)		336	380	260	325	370	242		223	767		702
v/s Ratio Prot		c0.04	0.10		0.02	0.09			c0.04	0.31		
v/s Ratio Perm		c0.12		0.05	0.07		0.01		0.30			0.05
v/c Ratio		0.56	0.45	0.22	0.33	0.45	0.06		0.62	0.64		0.11
Uniform Delay, d1		25.6	30.5	28.9	26.0	31.5	29.0		16.5	17.6		12.8
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		2.21	1.21		2.16
Incremental Delay, d2		2.0	0.9	0.4	0.6	0.9	0.1		3.4	2.8		0.2
Delay (s)		27.6	31.4	29.3	26.6	32.4	29.1		39.8	24.1		27.9
Level of Service		C	C	C	C	C	C		D	C		C
Approach Delay (s)			29.4			29.9				27.6		
Approach LOS			C			C				C		
Intersection Summary												
HCM 2000 Control Delay			30.4									
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			84.9%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	8	27	658	35
Future Volume (vph)	8	27	658	35
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.99	
Flpb, ped/bikes		0.99	1.00	
Frt		1.00	0.99	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1801	1850	
Flt Permitted		0.35	1.00	
Satd. Flow (perm)		671	1850	
Peak-hour factor, PHF	0.44	0.82	0.95	0.83
Adj. Flow (vph)	18	33	693	42
RTOR Reduction (vph)	0	0	2	0
Lane Group Flow (vph)	0	51	733	0
Confl. Peds. (#/hr)	54	42		50
Confl. Bikes (#/hr)				7
Heavy Vehicles (%)	0%	0%	2%	7%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		44.0	40.4	
Effective Green, g (s)		44.0	40.4	
Actuated g/C Ratio		0.49	0.45	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		373	830	
v/s Ratio Prot		0.01	c0.40	
v/s Ratio Perm		0.06		
v/c Ratio		0.14	0.88	
Uniform Delay, d1		12.7	22.6	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.2	13.1	
Delay (s)		12.9	35.7	
Level of Service		B	D	
Approach Delay (s)			34.3	
Approach LOS			C	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	12	32	15	7	43	33	700	53	66	863	31
Future Volume (Veh/h)	6	12	32	15	7	43	33	700	53	66	863	31
Sign Control	Stop				Stop				Free		Free	
Grade	0%				0%				0%		0%	
Peak Hour Factor	0.31	0.50	0.78	0.81	0.50	0.84	0.66	0.86	0.88	0.79	0.93	0.84
Hourly flow rate (vph)	19	24	41	19	14	51	50	814	60	84	928	37
Pedestrians	37				35				9		9	
Lane Width (m)	3.7				3.7				3.7		3.7	
Walking Speed (m/s)	1.1				1.1				1.1		1.1	
Percent Blockage	4				3				1		1	
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)							94			144		
pX, platoon unblocked	0.75	0.75	0.61	0.75	0.75	0.72	0.61				0.72	
vC, conflicting volume	1726	2160	992	2137	2149	481	1002				909	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	404	982	671	951	967	0	687				95	
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	84	83	80	91	93	91				92	
cM capacity (veh/h)	277	147	236	94	150	752	541				1051	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	84	84	457	467	84	965						
Volume Left	19	19	50	0	84	0						
Volume Right	41	51	0	60	0	37						
cSH	207	232	541	1700	1051	1700						
Volume to Capacity	0.41	0.36	0.09	0.27	0.08	0.57						
Queue Length 95th (m)	13.9	12.0	2.3	0.0	2.0	0.0						
Control Delay (s)	33.8	29.1	2.7	0.0	8.7	0.0						
Lane LOS	D	D	A		A							
Approach Delay (s)	33.8	29.1	1.3		0.7							
Approach LOS	D	D										
Intersection Summary												
Average Delay			3.4									
Intersection Capacity Utilization			70.3%		ICU Level of Service			C				
Analysis Period (min)			15									

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	193	146	1121	231	763
v/c Ratio	0.44	0.24	0.89	0.79	0.67
Control Delay	31.4	14.0	28.9	46.2	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	31.4	14.0	28.9	46.2	9.1
Queue Length 50th (m)	27.7	13.4	66.4	40.2	32.0
Queue Length 95th (m)	43.1	20.8	100.2	m50.8	m46.9
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	434	614	1263	292	1141
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	0.44	0.24	0.89	0.79	0.67

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

10/29/2018

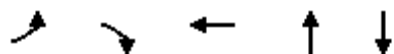
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	160	115	669	294	178	732
Future Volume (vph)	160	115	669	294	178	732
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.97	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1630	1418	3304		1755	1902
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1630	1418	3304		1755	1902
Peak-hour factor, PHF	0.83	0.79	0.85	0.88	0.77	0.96
Adj. Flow (vph)	193	146	787	334	231	762
RTOR Reduction (vph)	0	0	52	0	0	0
Lane Group Flow (vph)	193	146	1069	0	231	763
Confl. Peds. (#/hr)	44	30		9	9	
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	12%	12%	3%	8%	4%	1%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	434	709	1211		292	1141
v/s Ratio Prot	c0.12	0.03	c0.32		c0.13	0.40
v/s Ratio Perm		0.07				
v/c Ratio	0.44	0.21	0.88		0.79	0.67
Uniform Delay, d1	27.5	15.9	26.7		36.0	12.0
Progression Factor	1.00	1.00	0.88		0.83	0.54
Incremental Delay, d2	3.3	0.7	6.2		14.6	2.3
Delay (s)	30.7	16.5	29.7		44.4	8.8
Level of Service	C	B	C		D	A
Approach Delay (s)	24.6		29.7			17.1
Approach LOS	C		C			B
Intersection Summary						
HCM 2000 Control Delay			23.9		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.72			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.7%		ICU Level of Service	D
Analysis Period (min)			15			

c Critical Lane Group

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	441	188	39	815	968
v/c Ratio	0.90	0.31	0.07	0.76	0.69
Control Delay	50.0	6.3	11.6	23.5	20.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	50.0	6.3	11.6	23.5	20.4
Queue Length 50th (m)	67.7	3.4	2.2	48.0	51.8
Queue Length 95th (m)	81.2	13.0	8.2	62.4	71.0
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	539	642	653	1071	1413
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	0.82	0.29	0.06	0.76	0.69
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

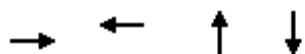
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	335	0	154	17	4	18	96	623	0	0	741	144
Future Volume (vph)	335	0	154	17	4	18	96	623	0	0	741	144
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	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	1.00		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.94			1.00			0.97	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1802		1407		1651			3413			3379	
Flt Permitted	0.73		1.00		0.98			0.58			1.00	
Satd. Flow (perm)	1388		1407		1651			2001			3379	
Peak-hour factor, PHF	0.76	0.38	0.82	1.00	1.00	1.00	0.90	0.88	0.25	0.25	0.93	0.84
Adj. Flow (vph)	441	0	188	17	4	18	107	708	0	0	797	171
RTOR Reduction (vph)	0	0	101	0	12	0	0	0	0	0	19	0
Lane Group Flow (vph)	441	0	87	0	27	0	0	815	0	0	949	0
Confl. Peds. (#/hr)	2		87	87		2	44		2	2		44
Confl. Bikes (#/hr)			3									3
Heavy Vehicles (%)	1%	0%	3%	0%	0%	0%	4%	5%	0%	0%	4%	1%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	31.9		31.9		31.9			46.1			37.1	
Effective Green, g (s)	31.9		31.9		31.9			46.1			37.1	
Actuated g/C Ratio	0.35		0.35		0.35			0.51			0.41	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	491		498		585			1119			1392	
v/s Ratio Prot								c0.05			0.28	
v/s Ratio Perm	c0.32		0.06		0.02			c0.32				
v/c Ratio	0.90		0.18		0.05			0.73			0.68	
Uniform Delay, d1	27.5		20.0		19.1			17.1			21.6	
Progression Factor	1.00		1.00		1.00			1.00			0.83	
Incremental Delay, d2	18.9		0.2		0.0			2.4			2.2	
Delay (s)	46.4		20.2		19.1			19.5			20.1	
Level of Service	D		C		B			B			C	
Approach Delay (s)		38.5			19.1			19.5			20.1	
Approach LOS		D			B			B			C	
Intersection Summary												
HCM 2000 Control Delay			24.6									
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			87.6%									
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	609	680	223	170
v/c Ratio	0.59	0.65	0.65	0.52
Control Delay	11.6	22.7	40.4	25.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	11.6	22.7	40.4	25.1
Queue Length 50th (m)	47.9	99.0	31.6	15.5
Queue Length 95th (m)	76.5	120.9	40.3	23.8
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	1030	1040	424	401
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	0.59	0.65	0.53	0.42
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	408	53	50	461	27	41	108	23	21	47	47
Future Volume (vph)	37	408	53	50	461	27	41	108	23	21	47	47
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			1.00			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			1.00	
Frt		0.98			0.99			0.99			0.95	
Flt Protected		1.00			0.99			0.99			0.99	
Satd. Flow (prot)		1780			1876			1858			1760	
Flt Permitted		0.90			0.86			0.88			0.82	
Satd. Flow (perm)		1609			1631			1656			1468	
Peak-hour factor, PHF	0.67	0.87	0.62	0.59	0.82	0.82	0.85	0.71	1.00	0.50	0.73	0.73
Adj. Flow (vph)	55	469	85	85	562	33	48	152	23	42	64	64
RTOR Reduction (vph)	0	7	0	0	2	0	0	6	0	0	31	0
Lane Group Flow (vph)	0	602	0	0	678	0	0	217	0	0	139	0
Confl. Peds. (#/hr)	18		8	8		18	18		2	2		18
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		47.7			47.7			15.3			15.3	
Effective Green, g (s)		47.7			47.7			15.3			15.3	
Actuated g/C Ratio		0.64			0.64			0.20			0.20	
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)		1023			1037			337			299	
v/s Ratio Prot												
v/s Ratio Perm		0.37			c0.42			c0.13			0.09	
v/c Ratio		0.59			0.65			0.65			0.46	
Uniform Delay, d1		7.9			8.5			27.4			26.2	
Progression Factor		1.00			1.96			1.23			1.00	
Incremental Delay, d2		2.5			3.0			3.9			1.1	
Delay (s)		10.4			19.7			37.5			27.4	
Level of Service		B			B			D			C	
Approach Delay (s)		10.4			19.7			37.5			27.4	
Approach LOS		B			B			D			C	
Intersection Summary												
HCM 2000 Control Delay			19.5			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			63.8%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018

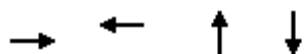


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	7	9	171	7	15	113
Future Volume (Veh/h)	7	9	171	7	15	113
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.50	0.67	0.84	0.75	0.46	0.80
Hourly flow rate (vph)	14	13	204	9	33	141
Pedestrians	5					3
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			284			362
pX, platoon unblocked						
vC, conflicting volume	420	216			218	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	420	216			218	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	98	98			97	
cM capacity (veh/h)	576	822			1310	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	27	213	174			
Volume Left	14	0	33			
Volume Right	13	9	0			
cSH	673	1700	1310			
Volume to Capacity	0.04	0.13	0.03			
Queue Length 95th (m)	1.0	0.0	0.6			
Control Delay (s)	10.6	0.0	1.7			
Lane LOS	B		A			
Approach Delay (s)	10.6	0.0	1.7			
Approach LOS	B					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			29.5%	ICU Level of Service		A
Analysis Period (min)			15			

Queues

3: Yorkshire Street South & Waterloo Avenue

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	403	575	59	199
v/c Ratio	0.48	0.53	0.13	0.40
Control Delay	11.3	11.1	14.4	12.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	11.3	11.1	14.4	12.5
Queue Length 50th (m)	29.4	42.2	3.3	10.3
Queue Length 95th (m)	41.9	51.4	7.1	9.8
Internal Link Dist (m)	50.5	146.5	65.6	106.9
Turn Bay Length (m)				
Base Capacity (vph)	840	1077	447	493
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	0.48	0.53	0.13	0.40
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	236	2	3	362	73	3	17	21	35	14	83
Future Volume (vph)	73	236	2	3	362	73	3	17	21	35	14	83
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			0.97	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		1.00			0.98			0.94			0.91	
Flt Protected		0.99			1.00			1.00			0.99	
Satd. Flow (prot)		1844			1829			1716			1687	
Flt Permitted		0.77			0.99			0.98			0.92	
Satd. Flow (perm)		1433			1820			1685			1573	
Peak-hour factor, PHF	0.70	0.81	0.25	0.38	0.77	0.75	0.75	0.63	0.75	0.83	0.56	0.63
Adj. Flow (vph)	104	291	8	8	470	97	4	27	28	42	25	132
RTOR Reduction (vph)	0	1	0	0	10	0	0	21	0	0	95	0
Lane Group Flow (vph)	0	402	0	0	565	0	0	38	0	0	104	0
Confl. Peds. (#/hr)	16		13	13		16	9					9
Confl. Bikes (#/hr)			2			2			2			
Heavy Vehicles (%)	0%	3%	0%	0%	2%	0%	0%	7%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		44.0			44.0			19.0			19.0	
Effective Green, g (s)		44.0			44.0			19.0			19.0	
Actuated g/C Ratio		0.59			0.59			0.25			0.25	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		840			1067			426			398	
v/s Ratio Prot												
v/s Ratio Perm		0.28			c0.31			0.02			c0.07	
v/c Ratio		0.48			0.53			0.09			0.26	
Uniform Delay, d1		8.9			9.3			21.4			22.4	
Progression Factor		1.00			1.00			1.00			1.06	
Incremental Delay, d2		2.0			1.9			0.4			1.5	
Delay (s)		10.9			11.2			21.8			25.2	
Level of Service		B			B			C			C	
Approach Delay (s)		10.9			11.2			21.8			25.2	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay		13.8			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.45										
Actuated Cycle Length (s)		75.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		70.5%			ICU Level of Service			C				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	417	24	20	498	15	21	30	14	7	22	20
Future Volume (Veh/h)	20	417	24	20	498	15	21	30	14	7	22	20
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.53	0.84	0.56	0.65	0.85	0.65	0.75	0.72	0.60	0.50	0.59	0.71
Hourly flow rate (vph)	38	496	43	31	586	23	28	42	23	14	37	28
Pedestrians		7			1			11			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked	0.83			0.86			0.90	0.90	0.86	0.90	0.90	0.83
vC, conflicting volume	623			550			1318	1290	530	1312	1300	618
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	440			397			948	917	373	942	928	435
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 %	96			97			83	81	96	91	83	94
cM capacity (veh/h)	923			999			163	223	577	154	219	497
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	577	640	93	79								
Volume Left	38	31	28	14								
Volume Right	43	23	23	28								
cSH	923	999	233	250								
Volume to Capacity	0.04	0.03	0.40	0.32								
Queue Length 95th (m)	1.0	0.7	13.8	9.9								
Control Delay (s)	1.1	0.8	30.4	25.9								
Lane LOS	A	A	D	D								
Approach Delay (s)	1.1	0.8	30.4	25.9								
Approach LOS			D	D								
Intersection Summary												
Average Delay			4.3									
Intersection Capacity Utilization			48.2%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	6	2	17	3	3	6	43	16	5	59	1
Future Volume (Veh/h)	6	6	2	17	3	3	6	43	16	5	59	1
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.63	0.25	0.33	0.75	0.38	0.63	0.77	0.50	0.33	0.85	0.25
Hourly flow rate (vph)	10	10	8	52	4	8	10	56	32	15	69	4
Pedestrians	12			9			9			7		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	1			1			1			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	222	230	92	224	216	88	85				97	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	222	230	92	224	216	88	85				97	
tC, single (s)	7.1	6.7	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.2	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	98	99	92	99	99	99				99	
cM capacity (veh/h)	695	616	951	688	660	961	1506				1496	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	28	64	98	88								
Volume Left	10	52	10	15								
Volume Right	8	8	32	4								
cSH	717	712	1506	1496								
Volume to Capacity	0.04	0.09	0.01	0.01								
Queue Length 95th (m)	0.9	2.2	0.2	0.2								
Control Delay (s)	10.2	10.6	0.8	1.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.2	10.6	0.8	1.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay	4.2											
Intersection Capacity Utilization	19.9%			ICU Level of Service					A			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	6	61	12	3	81
Future Volume (Veh/h)	6	6	61	12	3	81
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.42	0.57	0.75	0.38	0.83
Hourly flow rate (vph)	24	14	107	16	8	98
Pedestrians	4					4
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	233	123			127	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	233	123			127	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	98			99	
cM capacity (veh/h)	753	926			1466	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	38	123	106			
Volume Left	24	0	8			
Volume Right	14	16	0			
cSH	808	1700	1466			
Volume to Capacity	0.05	0.07	0.01			
Queue Length 95th (m)	1.1	0.0	0.1			
Control Delay (s)	9.7	0.0	0.6			
Lane LOS	A		A			
Approach Delay (s)	9.7	0.0	0.6			
Approach LOS	A					
Intersection Summary						
Average Delay		1.6				
Intersection Capacity Utilization		17.9%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

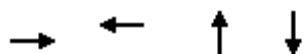
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	250	9	5	354	33	24	5	30	35	9	40
Future Volume (Veh/h)	30	250	9	5	354	33	24	5	30	35	9	40
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.68	0.94	0.50	0.59	0.83	0.25	0.58	0.33	0.65	0.84	0.50	0.83
Hourly flow rate (vph)	44	266	18	8	427	132	41	15	46	42	18	48
Pedestrians		4			1			13			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		170										
pX, platoon unblocked				0.97			0.97	0.97	0.97	0.97	0.97	
vC, conflicting volume	573			297			946	965	289	940	908	511
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	573			263			930	950	255	925	891	511
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 %	96			99			79	94	94	79	93	91
cM capacity (veh/h)	996			1261			195	236	747	203	255	557
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	328	567	102	108								
Volume Left	44	8	41	42								
Volume Right	18	132	46	48								
cSH	996	1261	304	297								
Volume to Capacity	0.04	0.01	0.34	0.36								
Queue Length 95th (m)	1.1	0.1	10.9	12.2								
Control Delay (s)	1.6	0.2	22.7	23.9								
Lane LOS	A	A	C	C								
Approach Delay (s)	1.6	0.2	22.7	23.9								
Approach LOS			C	C								
Intersection Summary												
Average Delay			5.0									
Intersection Capacity Utilization			46.5%	ICU Level of Service					A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	537	640	24	115
v/c Ratio	0.42	0.48	0.08	0.40
Control Delay	5.1	8.9	17.9	21.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.1	8.9	17.9	21.8
Queue Length 50th (m)	22.2	48.7	1.7	9.0
Queue Length 95th (m)	28.3	65.6	5.4	14.5
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1273	1325	483	421
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	0.42	0.48	0.05	0.27
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	424	5	5	491	31	2	9	6	51	5	37
Future Volume (vph)	15	424	5	5	491	31	2	9	6	51	5	37
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			0.98			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			0.97	
Frt		1.00			0.99			0.95			0.95	
Flt Protected		1.00			1.00			0.99			0.97	
Satd. Flow (prot)		1857			1879			1769			1704	
Flt Permitted		0.96			0.99			0.96			0.80	
Satd. Flow (perm)		1796			1871			1708			1411	
Peak-hour factor, PHF	0.65	0.84	0.58	0.67	0.83	0.75	0.63	0.71	0.78	0.75	0.67	0.92
Adj. Flow (vph)	23	505	9	7	592	41	3	13	8	68	7	40
RTOR Reduction (vph)	0	1	0	0	2	0	0	7	0	0	30	0
Lane Group Flow (vph)	0	536	0	0	638	0	0	17	0	0	85	0
Confl. Peds. (#/hr)	24		35	35		24	10		23	23		10
Confl. Bikes (#/hr)			2			2						1
Heavy Vehicles (%)	0%	3%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		50.7			50.7			12.3			12.3	
Effective Green, g (s)		50.7			50.7			12.3			12.3	
Actuated g/C Ratio		0.68			0.68			0.16			0.16	
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)		1214			1264			280			231	
v/s Ratio Prot												
v/s Ratio Perm		0.30			0.34			0.01			0.06	
v/c Ratio		0.44			0.50			0.06			0.37	
Uniform Delay, d1		5.6			6.0			26.5			27.9	
Progression Factor		0.58			1.00			1.00			1.00	
Incremental Delay, d2		1.0			1.4			0.1			1.0	
Delay (s)		4.3			7.4			26.6			28.9	
Level of Service		A			A			C			C	
Approach Delay (s)		4.3			7.4			26.6			28.9	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay		8.4			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.48										
Actuated Cycle Length (s)		75.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		55.3%			ICU Level of Service			B				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	8	0	0	5	2	0	2	0	2	0	3
Future Volume (Veh/h)	2	8	0	0	5	2	0	2	0	2	0	3
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.25	0.25	0.50	0.25	0.50	0.50	0.44	0.88	0.42	0.50	0.77	0.38
Hourly flow rate (vph)	8	32	0	0	10	4	0	2	0	4	0	8
Pedestrians	5			7			16			4		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	0			1			2			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												355
pX, platoon unblocked												
vC, conflicting volume	32	26	25	53	30	13	13	9				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	32	26	25	53	30	13	13	9				
tC, single (s)	7.1	6.5	6.5	7.1	6.5	6.2	4.2	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.5	4.0	3.3	2.3	2.2				
p0 queue free %	99	96	100	100	99	100	100	100				
cM capacity (veh/h)	949	859	968	893	855	1062	1523	1613				
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	40	14	2	12								
Volume Left	8	0	0	4								
Volume Right	0	4	0	8								
cSH	876	905	1523	1613								
Volume to Capacity	0.05	0.02	0.00	0.00								
Queue Length 95th (m)	1.1	0.4	0.0	0.1								
Control Delay (s)	9.3	9.0	0.0	2.4								
Lane LOS	A	A		A								
Approach Delay (s)	9.3	9.0	0.0	2.4								
Approach LOS	A	A										
Intersection Summary												
Average Delay	7.8											
Intersection Capacity Utilization	19.5%			ICU Level of Service					A			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	3	0	0	4	0	0	0	0	1	0	5
Future Volume (Veh/h)	1	3	0	0	4	0	0	0	0	1	0	5
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.94	0.25	0.25	0.84	0.50
Hourly flow rate (vph)	4	12	0	0	16	0	0	0	0	4	0	10
Pedestrians	3			20			8			8		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	0			2			1			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	32	36	16	47	41	28	13				20	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	32	36	16	47	41	28	13				20	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	100	99	100	100	98	100	100				100	
cM capacity (veh/h)	938	839	1058	905	834	1024	1614				1578	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	16	16	0	14								
Volume Left	4	0	0	4								
Volume Right	0	0	0	10								
cSH	862	834	1700	1578								
Volume to Capacity	0.02	0.02	0.00	0.00								
Queue Length 95th (m)	0.4	0.4	0.0	0.1								
Control Delay (s)	9.3	9.4	0.0	2.1								
Lane LOS	A	A		A								
Approach Delay (s)	9.3	9.4	0.0	2.1								
Approach LOS	A	A										
Intersection Summary												
Average Delay				7.1								
Intersection Capacity Utilization				20.5%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	266	21	6	303	0	97	0	93	1	1	2
Future Volume (Veh/h)	0	266	21	6	303	0	97	0	93	1	1	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.87	0.64	0.63	0.84	0.63	0.74	0.82	0.63	0.53	0.58	0.83
Hourly flow rate (vph)	0	306	33	10	361	0	131	0	148	2	2	2
Pedestrians		7			9			15			9	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		374			207							
pX, platoon unblocked												
vC, conflicting volume	370			354			728	728	346	870	744	377
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	370			354			728	728	346	870	744	377
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 %	100			99			59	100	78	99	99	100
cM capacity (veh/h)	1162			1198			321	342	674	201	334	659
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	339	371	279	6								
Volume Left	0	10	131	2								
Volume Right	33	0	148	2								
cSH	1162	1198	444	316								
Volume to Capacity	0.00	0.01	0.63	0.02								
Queue Length 95th (m)	0.0	0.2	32.0	0.4								
Control Delay (s)	0.0	0.3	25.8	16.6								
Lane LOS		A	D	C								
Approach Delay (s)	0.0	0.3	25.8	16.6								
Approach LOS			D	C								
Intersection Summary												
Average Delay		7.4										
Intersection Capacity Utilization		45.6%	ICU Level of Service	A								
Analysis Period (min)		15										

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	149	178	274	176	299	143	204	701	101	88	630
v/c Ratio	0.56	0.46	0.64	0.49	0.72	0.50	0.70	0.92	0.14	0.40	0.82
Control Delay	27.6	33.7	12.5	24.6	42.3	15.5	21.9	37.1	2.7	15.4	34.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.6	33.7	12.5	24.6	42.3	15.5	21.9	37.1	2.7	15.4	34.6
Queue Length 50th (m)	16.5	25.5	3.0	19.8	45.7	4.6	10.4	~146.4	2.0	7.1	96.5
Queue Length 95th (m)	23.3	35.0	17.6	34.0	66.7	15.3	m14.4	m#202.2	m2.3	10.8	#155.5
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	268	450	461	361	486	318	291	759	710	222	765
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.40	0.59	0.49	0.62	0.45	0.70	0.92	0.14	0.40	0.82

Intersection Summary

~ 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.

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

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	45	64	132	225	160	254	69	30	159	539	96	104
Future Volume (vph)	45	64	132	225	160	254	69	30	159	539	96	104
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.68	1.00	1.00	0.57		1.00	0.96		0.92
Flpb, ped/bikes		0.93	1.00	1.00	0.87	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	0.97		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1684	1762	1075	1588	1902	927		1798	1668		1431
Flt Permitted		0.34	1.00	1.00	0.59	1.00	1.00		0.17	1.00		1.00
Satd. Flow (perm)		608	1762	1075	984	1902	927		316	1668		1431
Peak-hour factor, PHF	0.71	0.74	0.74	0.82	0.91	0.85	0.79	0.54	0.78	0.95	0.78	0.93
Adj. Flow (vph)	63	86	178	274	176	299	87	56	204	567	123	112
RTOR Reduction (vph)	0	0	0	196	0	0	85	0	0	1	0	56
Lane Group Flow (vph)	0	149	178	78	176	299	58	0	204	700	0	45
Confl. Peds. (#/hr)	107	104		156	156		107	104	104		104	59
Confl. Bikes (#/hr)				3			4	4			7	7
Heavy Vehicles (%)	2%	0%	6%	0%	0%	1%	0%	0%	1%	3%	0%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		26.7	19.7	19.7	26.7	19.7	19.7		47.8	40.4		40.4
Effective Green, g (s)		26.7	19.7	19.7	26.7	19.7	19.7		47.8	40.4		40.4
Actuated g/C Ratio		0.30	0.22	0.22	0.30	0.22	0.22		0.53	0.45		0.45
Clearance Time (s)		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
Lane Grp Cap (vph)		264	385	235	338	416	202		289	748		642
v/s Ratio Prot		c0.04	0.10		0.04	c0.16			c0.06	c0.42		
v/s Ratio Perm		0.12		0.07	0.11		0.06		0.32			0.03
v/c Ratio		0.56	0.46	0.33	0.52	0.72	0.29		0.71	0.94		0.07
Uniform Delay, d1		24.8	30.5	29.6	25.2	32.6	29.3		15.6	23.6		14.1
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		0.90	0.85		0.73
Incremental Delay, d2		2.8	0.9	0.8	1.4	5.9	0.8		4.9	14.7		0.1
Delay (s)		27.6	31.4	30.4	26.7	38.4	30.1		18.9	34.6		10.4
Level of Service		C	C	C	C	D	C		B	C		B
Approach Delay (s)			30.0			33.2				29.0		
Approach LOS			C			C				C		
Intersection Summary												
HCM 2000 Control Delay			30.6									
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			87.1%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	17	43	495	67
Future Volume (vph)	17	43	495	67
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.98	
Flpb, ped/bikes		1.00	1.00	
Frt		1.00	0.98	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1764	1805	
Flt Permitted		0.12	1.00	
Satd. Flow (perm)		225	1805	
Peak-hour factor, PHF	0.63	0.71	0.89	0.91
Adj. Flow (vph)	27	61	556	74
RTOR Reduction (vph)	0	0	5	0
Lane Group Flow (vph)	0	88	625	0
Confl. Peds. (#/hr)	104	59		104
Confl. Bikes (#/hr)				5
Heavy Vehicles (%)	0%	5%	2%	2%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		42.8	37.9	
Effective Green, g (s)		42.8	37.9	
Actuated g/C Ratio		0.48	0.42	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		190	760	
v/s Ratio Prot		0.03	0.35	
v/s Ratio Perm		0.19		
v/c Ratio		0.46	0.82	
Uniform Delay, d1		17.3	23.1	
Progression Factor		1.00	1.00	
Incremental Delay, d2		1.8	9.8	
Delay (s)		19.1	32.8	
Level of Service		B	C	
Approach Delay (s)			31.1	
Approach LOS			C	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	6	29	21	8	58	24	883	39	45	857	25
Future Volume (Veh/h)	6	6	29	21	8	58	24	883	39	45	857	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.63	0.63	0.78	0.75	0.44	0.83	0.80	0.95	0.80	0.80	0.95	0.80
Hourly flow rate (vph)	10	10	37	28	18	70	30	929	49	56	902	31
Pedestrians		52			63			3			6	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)								94			144	
pX, platoon unblocked	0.77	0.77	0.64	0.77	0.77	0.73	0.64			0.73		
vC, conflicting volume	1691	2182	972	2136	2174	558	985			1041		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	448	1086	671	1025	1075	0	690			328		
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 %	96	92	85	70	87	91	95			93		
cM capacity (veh/h)	247	132	243	92	134	746	552			855		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	57	116	494	514	56	933						
Volume Left	10	28	30	0	56	0						
Volume Right	37	70	0	49	0	31						
cSH	212	218	552	1700	855	1700						
Volume to Capacity	0.27	0.53	0.05	0.30	0.07	0.55						
Queue Length 95th (m)	7.9	21.2	1.3	0.0	1.6	0.0						
Control Delay (s)	28.1	38.7	1.6	0.0	9.5	0.0						
Lane LOS	D	E	A		A							
Approach Delay (s)	28.1	38.7	0.8		0.5							
Approach LOS	D	E										
Intersection Summary												
Average Delay			3.4									
Intersection Capacity Utilization			63.0%	ICU Level of Service					B			
Analysis Period (min)			15									

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	245	240	1101	223	790
v/c Ratio	0.65	0.74	0.85	0.64	0.64
Control Delay	40.8	48.2	27.9	44.4	16.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	40.8	48.2	27.9	44.4	16.5
Queue Length 50th (m)	38.7	38.8	92.1	32.9	97.5
Queue Length 95th (m)	58.0	#58.5	99.1	m45.1	m137.7
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	379	324	1296	351	1237
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	0.65	0.74	0.85	0.64	0.64

Intersection Summary

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.

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

10/29/2018

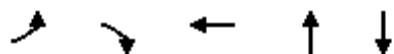


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	206	197	724	194	181	743
Future Volume (vph)	206	197	724	194	181	743
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.94	0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1706	1460	3341		1755	1921
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1706	1460	3341		1755	1921
Peak-hour factor, PHF	0.84	0.82	0.87	0.72	0.81	0.94
Adj. Flow (vph)	245	240	832	269	223	790
RTOR Reduction (vph)	0	0	35	0	0	0
Lane Group Flow (vph)	245	240	1066	0	223	790
Confl. Peds. (#/hr)	48	42		34	34	
Confl. Bikes (#/hr)		3		5		
Heavy Vehicles (%)	7%	5%	1%	11%	4%	0%
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	20.0	20.0	34.0		18.0	58.0
Effective Green, g (s)	20.0	20.0	34.0		18.0	58.0
Actuated g/C Ratio	0.22	0.22	0.38		0.20	0.64
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	379	324	1262		351	1237
v/s Ratio Prot	0.14		c0.32		0.13	c0.41
v/s Ratio Perm		c0.16				
v/c Ratio	0.65	0.74	0.84		0.64	0.64
Uniform Delay, d1	31.8	32.6	25.6		33.0	9.7
Progression Factor	1.00	1.00	0.89		1.12	1.44
Incremental Delay, d2	8.3	14.2	5.6		6.7	2.0
Delay (s)	40.0	46.7	28.4		43.6	15.9
Level of Service	D	D	C		D	B
Approach Delay (s)	43.4		28.4			22.0
Approach LOS	D		C			C
Intersection Summary						
HCM 2000 Control Delay			28.7		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.79			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	284	183	138	843	984
v/c Ratio	0.82	0.35	0.29	0.70	0.58
Control Delay	49.1	5.3	17.5	17.2	14.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	49.1	5.3	17.5	17.2	14.6
Queue Length 50th (m)	45.5	0.0	12.6	38.7	30.4
Queue Length 95th (m)	58.9	9.7	23.9	61.8	50.3
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	448	627	615	1212	1687
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	0.63	0.29	0.22	0.70	0.58
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

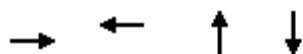
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	233	0	150	60	22	56	118	634	0	0	728	185
Future Volume (vph)	233	0	150	60	22	56	118	634	0	0	728	185
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	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	0.99		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.95			1.00			0.97	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1765		1432		1654			3474			3372	
Flt Permitted	0.68		1.00		0.98			0.56			1.00	
Satd. Flow (perm)	1261		1432		1654			1965			3372	
Peak-hour factor, PHF	0.82	0.25	0.82	1.00	1.00	1.00	0.85	0.90	0.25	0.25	0.96	0.82
Adj. Flow (vph)	284	0	183	60	22	56	139	704	0	0	758	226
RTOR Reduction (vph)	0	0	133	0	30	0	0	0	0	0	26	0
Lane Group Flow (vph)	284	0	50	0	108	0	0	843	0	0	958	0
Confl. Peds. (#/hr)	12		89	89		12	45		13	13		45
Confl. Bikes (#/hr)			1						5			1
Heavy Vehicles (%)	2%	0%	1%	0%	0%	0%	2%	3%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	24.7		24.7		24.7			53.3			44.3	
Effective Green, g (s)	24.7		24.7		24.7			53.3			44.3	
Actuated g/C Ratio	0.27		0.27		0.27			0.59			0.49	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	346		393		453			1264			1659	
v/s Ratio Prot								c0.04			0.28	
v/s Ratio Perm	c0.23		0.04		0.07			c0.35				
v/c Ratio	0.82		0.13		0.24			0.67			0.58	
Uniform Delay, d1	30.6		24.6		25.3			12.4			16.2	
Progression Factor	1.00		1.00		1.00			1.00			0.81	
Incremental Delay, d2	14.4		0.1		0.3			1.3			1.1	
Delay (s)	45.0		24.7		25.6			13.7			14.2	
Level of Service	D		C		C			B			B	
Approach Delay (s)		37.0			25.6			13.7			14.2	
Approach LOS		D			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			19.1				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			15.0		
Intersection Capacity Utilization			83.0%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	732	457	299	410
v/c Ratio	0.81	0.53	0.90	1.30
Control Delay	21.4	17.9	59.4	181.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.4	17.9	59.4	181.8
Queue Length 50th (m)	72.6	52.8	39.6	~69.0
Queue Length 95th (m)	94.8	72.9	#67.1	#98.6
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	901	860	331	315
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	0.81	0.53	0.90	1.30

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	437	43	42	221	71	41	152	27	62	82	122
Future Volume (vph)	94	437	43	42	221	71	41	152	27	62	82	122
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			0.99			0.81	
Flpb, ped/bikes		0.99			1.00			0.97			1.00	
Frt		0.99			0.97			0.98			0.93	
Flt Protected		0.99			0.99			0.99			0.99	
Satd. Flow (prot)		1757			1753			1772			1393	
Flt Permitted		0.86			0.81			0.71			0.75	
Satd. Flow (perm)		1526			1439			1281			1061	
Peak-hour factor, PHF	0.83	0.80	0.59	0.55	0.83	0.62	0.60	0.79	0.69	0.60	0.79	0.60
Adj. Flow (vph)	113	546	73	76	266	115	68	192	39	103	104	203
RTOR Reduction (vph)	0	5	0	0	16	0	0	7	0	0	47	0
Lane Group Flow (vph)	0	727	0	0	441	0	0	292	0	0	363	0
Confl. Peds. (#/hr)	56		43	43		56	175		19	19		175
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	3%	5%	0%	4%	0%	0%	1%	5%	2%	3%	3%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		44.0			44.0			19.0			19.0	
Effective Green, g (s)		44.0			44.0			19.0			19.0	
Actuated g/C Ratio		0.59			0.59			0.25			0.25	
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)		895			844			324			268	
v/s Ratio Prot												
v/s Ratio Perm		c0.48			0.31			0.23			c0.34	
v/c Ratio		0.81			0.52			0.90			1.35	
Uniform Delay, d1		12.2			9.2			27.1			28.0	
Progression Factor		1.00			1.76			1.00			1.00	
Incremental Delay, d2		7.9			2.3			26.1			181.9	
Delay (s)		20.2			18.6			53.1			209.9	
Level of Service		C			B			D			F	
Approach Delay (s)		20.2			18.6			53.1			209.9	
Approach LOS		C			B			D			F	
Intersection Summary												
HCM 2000 Control Delay			66.0			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			80.7%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	9	203	10	14	179
Future Volume (Veh/h)	6	9	203	10	14	179
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.63	0.88	0.74	0.67	0.69	0.66
Hourly flow rate (vph)	10	10	274	15	20	271
Pedestrians	10		3			
Lane Width (m)	3.7		3.7			
Walking Speed (m/s)	1.1		1.1			
Percent Blockage	1		0			
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	606	292			299	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	606	292			299	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	98	99			98	
cM capacity (veh/h)	450	713			1211	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	20	289	291			
Volume Left	10	0	20			
Volume Right	10	15	0			
cSH	552	1700	1211			
Volume to Capacity	0.04	0.17	0.02			
Queue Length 95th (m)	0.9	0.0	0.4			
Control Delay (s)	11.8	0.0	0.7			
Lane LOS	B		A			
Approach Delay (s)	11.8	0.0	0.7			
Approach LOS	B					
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			31.0%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	122	389	4	6	217	51	0	17	40	48	36	93
Future Volume (Veh/h)	122	389	4	6	217	51	0	17	40	48	36	93
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.76	0.78	0.38	0.31	0.80	0.79	0.25	0.58	0.47	0.81	0.31	0.56
Hourly flow rate (vph)	161	499	11	19	271	65	0	29	85	59	116	166
Pedestrians		44			6			9			7	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		4			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	343			519			1445	1216	520	1280	1190	354
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	343			519			1445	1216	520	1280	1190	354
tC, single (s)	4.1			4.1			7.1	6.6	6.2	7.1	6.7	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.3	3.5	4.2	3.3
p0 queue free %	87			98			100	80	84	34	20	75
cM capacity (veh/h)	1219			1048			24	148	546	90	146	653
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	671	355	114	341								
Volume Left	161	19	0	59								
Volume Right	11	65	85	166								
cSH	1219	1048	325	200								
Volume to Capacity	0.13	0.02	0.35	1.71								
Queue Length 95th (m)	3.5	0.4	11.7	176.2								
Control Delay (s)	3.2	0.6	22.0	380.4								
Lane LOS	A	A	C	F								
Approach Delay (s)	3.2	0.6	22.0	380.4								
Approach LOS			C	F								
Intersection Summary												
Average Delay			90.9									
Intersection Capacity Utilization			71.3%		ICU Level of Service				C			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	489	13	16	308	2	16	52	22	10	39	19
Future Volume (Veh/h)	17	489	13	16	308	2	16	52	22	10	39	19
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.80	0.67	0.75	0.91	0.50	0.41	0.81	0.64	0.67	0.43	0.42
Hourly flow rate (vph)	29	611	19	21	338	4	39	64	34	15	91	45
Pedestrians		9			2			25			24	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked	0.95			0.78			0.80	0.80	0.78	0.80	0.80	0.95
vC, conflicting volume	366			655			1185	1112	648	1152	1119	373
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	311			411			976	884	401	935	893	319
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 %	98			98			62	69	93	88	56	93
cM capacity (veh/h)	1174			877			102	206	493	127	205	656
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	659	363	137	151								
Volume Left	29	21	39	15								
Volume Right	19	4	34	45								
cSH	1174	877	180	239								
Volume to Capacity	0.02	0.02	0.76	0.63								
Queue Length 95th (m)	0.6	0.6	37.8	28.9								
Control Delay (s)	0.7	0.8	70.1	42.6								
Lane LOS	A	A	F	E								
Approach Delay (s)	0.7	0.8	70.1	42.6								
Approach LOS			F	E								
Intersection Summary												
Average Delay			12.8									
Intersection Capacity Utilization			46.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	9	7	10	5	5	2	43	21	6	69	1
Future Volume (Veh/h)	6	9	7	10	5	5	2	43	21	6	69	1
Sign Control	Stop				Stop				Free		Free	
Grade	0%				0%				0%		0%	
Peak Hour Factor	0.63	0.58	0.38	0.63	0.50	0.50	0.50	0.73	0.63	0.42	0.56	0.25
Hourly flow rate (vph)	10	16	18	16	10	10	4	59	33	14	123	4
Pedestrians	7				6				12		4	
Lane Width (m)	3.7				3.7				3.7		3.7	
Walking Speed (m/s)	1.1				1.1				1.1		1.1	
Percent Blockage	1				1				1		0	
Right turn flare (veh)												
Median type	None								None			
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	262	266	144	280	252	86	134				98	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	262	266	144	280	252	86	134				98	
tC, single (s)	7.1	6.5	6.5	7.1	6.8	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.6	3.5	4.2	3.3	2.2				2.2	
p0 queue free %	98	97	98	97	98	99	100				99	
cM capacity (veh/h)	659	627	812	625	599	969	1453				1499	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	44	36	96	141								
Volume Left	10	16	4	14								
Volume Right	18	10	33	4								
cSH	700	684	1453	1499								
Volume to Capacity	0.06	0.05	0.00	0.01								
Queue Length 95th (m)	1.5	1.3	0.1	0.2								
Control Delay (s)	10.5	10.6	0.3	0.8								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.5	10.6	0.3	0.8								
Approach LOS	B	B										
Intersection Summary												
Average Delay			3.1									
Intersection Capacity Utilization			21.1%	ICU Level of Service				A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	11	4	67	14	2	100
Future Volume (Veh/h)	11	4	67	14	2	100
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.75	0.53	0.33	0.25	0.46
Hourly flow rate (vph)	44	5	126	42	8	217
Pedestrians	6		1			3
Lane Width (m)	3.7		3.7			3.7
Walking Speed (m/s)	1.1		1.1			1.1
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	387	156			174	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	387	156			174	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	99			99	
cM capacity (veh/h)	613	887			1407	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	49	168	225			
Volume Left	44	0	8			
Volume Right	5	42	0			
cSH	632	1700	1407			
Volume to Capacity	0.08	0.10	0.01			
Queue Length 95th (m)	1.9	0.0	0.1			
Control Delay (s)	11.2	0.0	0.3			
Lane LOS	B		A			
Approach Delay (s)	11.2	0.0	0.3			
Approach LOS	B					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			17.8%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

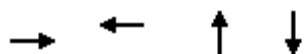
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	405	12	22	223	32	7	9	15	27	27	47
Future Volume (Veh/h)	42	405	12	22	223	32	7	9	15	27	27	47
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.85	0.36	0.75	0.88	0.53	0.75	0.58	0.50	0.64	0.50	0.52
Hourly flow rate (vph)	56	476	33	29	253	60	9	16	30	42	54	90
Pedestrians		3			2			14			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)												
pX, platoon unblocked												
vC, conflicting volume	316			523			1080	992	508	988	979	289
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	316			523			1080	992	508	988	979	289
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 %	95			97			93	93	95	77	77	88
cM capacity (veh/h)	1224			1039			131	226	560	185	230	734
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	565	342	55	186								
Volume Left	56	29	9	42								
Volume Right	33	60	30	90								
cSH	1224	1039	284	318								
Volume to Capacity	0.05	0.03	0.19	0.58								
Queue Length 95th (m)	1.1	0.7	5.3	26.5								
Control Delay (s)	1.3	1.0	20.7	31.1								
Lane LOS	A	A	C	D								
Approach Delay (s)	1.3	1.0	20.7	31.1								
Approach LOS			C	D								
Intersection Summary												
Average Delay			7.0									
Intersection Capacity Utilization			48.7%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	676	387	23	171
v/c Ratio	0.58	0.34	0.07	0.61
Control Delay	7.4	7.9	18.0	32.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	7.4	7.9	18.0	32.3
Queue Length 50th (m)	31.3	24.1	1.9	18.1
Queue Length 95th (m)	m46.4	41.0	4.8	26.7
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1157	1138	448	384
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	0.58	0.34	0.05	0.45

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	19	501	9	6	294	21	3	7	4	62	22	29
Future Volume (vph)	19	501	9	6	294	21	3	7	4	62	22	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			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.99			0.95			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			0.89	
Frt		1.00			0.99			0.96			0.97	
Flt Protected		1.00			1.00			0.99			0.97	
Satd. Flow (prot)		1849			1792			1717			1580	
Flt Permitted		0.97			0.99			0.91			0.81	
Satd. Flow (perm)		1804			1768			1586			1317	
Peak-hour factor, PHF	0.63	0.79	0.78	0.67	0.87	0.53	0.48	0.66	0.68	0.63	0.74	0.67
Adj. Flow (vph)	30	634	12	9	338	40	6	11	6	98	30	43
RTOR Reduction (vph)	0	1	0	0	5	0	0	5	0	0	18	0
Lane Group Flow (vph)	0	675	0	0	382	0	0	18	0	0	153	0
Confl. Peds. (#/hr)	38		54	54		38	21		91	91		21
Confl. Bikes (#/hr)			3			1			1			
Heavy Vehicles (%)	7%	3%	0%	0%	4%	12%	0%	0%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		48.1			48.1			14.9			14.9	
Effective Green, g (s)		48.1			48.1			14.9			14.9	
Actuated g/C Ratio		0.64			0.64			0.20			0.20	
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)		1156			1133			315			261	
v/s Ratio Prot												
v/s Ratio Perm		c0.37			0.22			0.01			c0.12	
v/c Ratio		0.58			0.34			0.06			0.59	
Uniform Delay, d1		7.7			6.2			24.4			27.3	
Progression Factor		0.66			1.00			1.00			1.00	
Incremental Delay, d2		1.2			0.8			0.1			3.4	
Delay (s)		6.4			7.0			24.4			30.6	
Level of Service		A			A			C			C	
Approach Delay (s)		6.4			7.0			24.4			30.6	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			10.2									
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			75.0									
Intersection Capacity Utilization			61.6%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	10	0	0	3	1	0	6	0	2	0	9
Future Volume (Veh/h)	12	10	0	0	3	1	0	6	0	2	0	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.63	0.25	0.25	0.25	0.25	0.25	0.63	0.60	0.67	0.50	0.79	0.44
Hourly flow rate (vph)	19	40	0	0	12	4	0	10	0	4	0	20
Pedestrians		5			13			10			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)											355	
pX, platoon unblocked												
vC, conflicting volume	46	46	25	71	56	26	25			23		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	46	46	25	71	56	26	25			23		
tC, single (s)	7.1	6.5	6.7	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.8	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	95	100	100	99	100	100			100		
cM capacity (veh/h)	924	833	915	858	822	1039	1595			1585		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	59	16	10	24								
Volume Left	19	0	0	4								
Volume Right	0	4	0	20								
cSH	860	867	1595	1585								
Volume to Capacity	0.07	0.02	0.00	0.00								
Queue Length 95th (m)	1.7	0.4	0.0	0.1								
Control Delay (s)	9.5	9.2	0.0	1.2								
Lane LOS	A	A		A								
Approach Delay (s)	9.5	9.2	0.0	1.2								
Approach LOS	A	A										
Intersection Summary												
Average Delay			6.8									
Intersection Capacity Utilization			22.9%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	4	0	0	9	2	0	0	0	0	0	1
Future Volume (Veh/h)	5	4	0	0	9	2	0	0	0	0	0	1
Sign Control	Stop				Stop				Free			
Grade	0%				0%				0%			
Peak Hour Factor	0.50	0.50	0.50	0.50	0.75	0.50	0.50	0.65	0.38	0.25	0.66	0.25
Hourly flow rate (vph)	10	8	0	0	12	4	0	0	0	0	0	4
Pedestrians	10				16				6			
Lane Width (m)	3.7				3.7				3.7			
Walking Speed (m/s)	1.1				1.1				1.1			
Percent Blockage	1				2				1			
Right turn flare (veh)												
Median type	None								None			
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	25	28	18	28	30	19	14			16		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	25	28	18	28	30	19	14			16		
tC, single (s)	7.1	7.0	6.2	7.1	6.8	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.5	3.3	3.5	4.3	3.3	2.2			2.2		
p0 queue free %	99	99	100	100	98	100	100			100		
cM capacity (veh/h)	945	760	1050	939	785	1045	1602			1589		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	18	16	0	4								
Volume Left	10	0	0	0								
Volume Right	0	4	0	4								
cSH	853	837	1700	1589								
Volume to Capacity	0.02	0.02	0.00	0.00								
Queue Length 95th (m)	0.5	0.4	0.0	0.0								
Control Delay (s)	9.3	9.4	0.0	0.0								
Lane LOS	A	A										
Approach Delay (s)	9.3	9.4	0.0	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay			8.4									
Intersection Capacity Utilization			20.4%	ICU Level of Service				A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	417	31	6	234	0	37	0	100	0	0	0
Future Volume (Veh/h)	0	417	31	6	234	0	37	0	100	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.74	0.78	0.69	0.42	0.88	0.75	0.65	0.63	0.75	0.75	0.65	0.53
Hourly flow rate (vph)	0	535	45	14	266	0	57	0	133	0	0	0
Pedestrians		12			7			15			5	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					207							
pX, platoon unblocked												
vC, conflicting volume	271			595			878	872	580	996	894	283
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	271			595			878	872	580	996	894	283
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.3
p0 queue free %	100			99			78	100	74	100	100	100
cM capacity (veh/h)	1298			977			257	281	507	153	273	736
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	580	280	190	0								
Volume Left	0	14	57	0								
Volume Right	45	0	133	0								
cSH	1298	977	392	1700								
Volume to Capacity	0.00	0.01	0.48	0.00								
Queue Length 95th (m)	0.0	0.3	19.4	0.0								
Control Delay (s)	0.0	0.6	22.5	0.0								
Lane LOS		A	C	A								
Approach Delay (s)	0.0	0.6	22.5	0.0								
Approach LOS			C	A								
Intersection Summary												
Average Delay			4.2									
Intersection Capacity Utilization			40.8%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	202	186	281	113	180	80	149	531	140	55	788
v/c Ratio	0.59	0.47	0.59	0.30	0.48	0.24	0.68	0.70	0.19	0.14	0.95
Control Delay	28.6	34.1	10.1	21.1	34.9	4.6	38.2	31.1	12.9	10.7	49.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.6	34.1	10.1	21.1	34.9	4.6	38.2	31.1	12.9	10.7	49.3
Queue Length 50th (m)	23.1	26.8	2.0	12.2	25.8	0.0	19.6	70.4	7.3	4.3	~151.4
Queue Length 95th (m)	24.6	42.8	20.9	20.7	43.0	3.4	m24.1	m81.4	m8.7	8.7	#219.8
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	344	445	504	377	467	387	218	755	748	381	826
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.42	0.56	0.30	0.39	0.21	0.68	0.70	0.19	0.14	0.95

Intersection Summary

~ 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.

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

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	37	92	158	247	93	158	39	20	125	361	116	125
Future Volume (vph)	37	92	158	247	93	158	39	20	125	361	116	125
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.76	1.00	1.00	0.73		1.00	0.97		0.94
Flpb, ped/bikes		0.91	1.00	1.00	0.90	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	0.96		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1644	1745	1199	1643	1830	1198		1772	1599		1463
Flt Permitted		0.54	1.00	1.00	0.62	1.00	1.00		0.10	1.00		1.00
Satd. Flow (perm)		933	1745	1199	1070	1830	1198		181	1599		1463
Peak-hour factor, PHF	0.73	0.61	0.85	0.88	0.82	0.88	0.78	0.67	0.84	0.97	0.81	0.80
Adj. Flow (vph)	51	151	186	281	113	180	50	30	149	372	143	156
RTOR Reduction (vph)	0	0	0	206	0	0	63	0	0	1	0	59
Lane Group Flow (vph)	0	202	186	75	113	180	17	0	149	530	0	81
Confl. Peds. (#/hr)	73	54		112	112		73	54	50		54	42
Confl. Bikes (#/hr)				2			1	1			1	1
Heavy Vehicles (%)	3%	0%	7%	1%	0%	5%	0%	0%	3%	6%	4%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		27.3	20.3	20.3	24.5	18.9	18.9		47.9	41.3		41.3
Effective Green, g (s)		27.3	20.3	20.3	24.5	18.9	18.9		47.9	41.3		41.3
Actuated g/C Ratio		0.30	0.23	0.23	0.27	0.21	0.21		0.53	0.46		0.46
Clearance Time (s)		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
Lane Grp Cap (vph)		338	393	270	326	384	251		213	733		671
v/s Ratio Prot		c0.05	0.11		0.02	0.10			c0.05	0.33		
v/s Ratio Perm		c0.13		0.06	0.07		0.01		0.32			0.06
v/c Ratio		0.60	0.47	0.28	0.35	0.47	0.07		0.70	0.72		0.12
Uniform Delay, d1		25.6	30.2	28.8	25.6	31.2	28.5		18.6	19.7		13.9
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		2.05	1.25		2.21
Incremental Delay, d2		2.8	0.9	0.6	0.6	0.9	0.1		6.1	3.8		0.2
Delay (s)		28.5	31.1	29.4	26.2	32.1	28.6		44.2	28.6		31.1
Level of Service		C	C	C	C	C	C		D	C		C
Approach Delay (s)			29.6			29.6				31.8		
Approach LOS			C			C				C		
Intersection Summary												
HCM 2000 Control Delay			35.7		HCM 2000 Level of Service					D		
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			90.0		Sum of lost time (s)					18.0		
Intersection Capacity Utilization			88.6%		ICU Level of Service					E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	9	29	706	37
Future Volume (vph)	9	29	706	37
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.99	
Flpb, ped/bikes		0.99	1.00	
Frt		1.00	0.99	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1809	1850	
Flt Permitted		0.29	1.00	
Satd. Flow (perm)		556	1850	
Peak-hour factor, PHF	0.44	0.82	0.95	0.83
Adj. Flow (vph)	20	35	743	45
RTOR Reduction (vph)	0	0	2	0
Lane Group Flow (vph)	0	55	786	0
Confl. Peds. (#/hr)	54	42		50
Confl. Bikes (#/hr)				7
Heavy Vehicles (%)	0%	0%	2%	7%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		44.3	39.5	
Effective Green, g (s)		44.3	39.5	
Actuated g/C Ratio		0.49	0.44	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		340	811	
v/s Ratio Prot		0.01	c0.42	
v/s Ratio Perm		0.07		
v/c Ratio		0.16	0.97	
Uniform Delay, d1		13.2	24.6	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.2	24.9	
Delay (s)		13.4	49.5	
Level of Service		B	D	
Approach Delay (s)			47.2	
Approach LOS			D	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	12	35	16	7	46	36	753	57	71	926	34
Future Volume (Veh/h)	6	12	35	16	7	46	36	753	57	71	926	34
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.31	0.50	0.78	0.81	0.50	0.84	0.66	0.95	0.88	0.79	0.95	0.84
Hourly flow rate (vph)	19	24	45	20	14	55	55	793	65	90	975	40
Pedestrians	37			35			9			9		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	4			3			1			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)							94			144		
pX, platoon unblocked	0.71	0.71	0.57	0.71	0.71	0.71	0.57				0.71	
vC, conflicting volume	1790	2215	1041	2192	2202	473	1052				893	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	366	964	688	931	947	0	707				23	
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	83	79	77	90	93	89				92	
cM capacity (veh/h)	271	139	212	86	142	739	491				1097	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	88	89	452	462	90	1015						
Volume Left	19	20	55	0	90	0						
Volume Right	45	55	0	65	0	40						
cSH	193	219	491	1700	1097	1700						
Volume to Capacity	0.45	0.41	0.11	0.27	0.08	0.60						
Queue Length 95th (m)	16.4	14.0	2.9	0.0	2.0	0.0						
Control Delay (s)	38.3	32.3	3.3	0.0	8.6	0.0						
Lane LOS	E	D	A		A							
Approach Delay (s)	38.3	32.3	1.6		0.7							
Approach LOS	E	D										
Intersection Summary												
Average Delay				3.9								
Intersection Capacity Utilization				75.0%	ICU Level of Service			D				
Analysis Period (min)				15								

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	208	156	1195	245	822
v/c Ratio	0.48	0.25	0.95	0.84	0.72
Control Delay	32.2	14.1	30.6	48.8	9.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	32.2	14.1	30.6	48.8	9.6
Queue Length 50th (m)	30.2	14.4	84.9	42.5	34.3
Queue Length 95th (m)	46.1	22.0	m97.2	m51.6	m48.0
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	434	614	1262	292	1141
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.48	0.25	0.95	0.84	0.72

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

10/29/2018

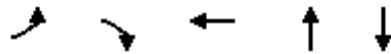


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	173	123	719	307	189	789
Future Volume (vph)	173	123	719	307	189	789
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.97	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1630	1418	3309		1755	1902
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1630	1418	3309		1755	1902
Peak-hour factor, PHF	0.83	0.79	0.85	0.88	0.77	0.96
Adj. Flow (vph)	208	156	846	349	245	822
RTOR Reduction (vph)	0	0	50	0	0	0
Lane Group Flow (vph)	208	156	1145	0	245	822
Confl. Peds. (#/hr)	44	30		9	9	
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	12%	12%	3%	8%	4%	1%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	434	709	1213		292	1141
v/s Ratio Prot	c0.13	0.04	c0.35		0.14	c0.43
v/s Ratio Perm		0.07				
v/c Ratio	0.48	0.22	0.94		0.84	0.72
Uniform Delay, d1	27.7	16.0	27.6		36.3	12.7
Progression Factor	1.00	1.00	0.81		0.80	0.52
Incremental Delay, d2	3.8	0.7	8.3		17.5	2.7
Delay (s)	31.5	16.7	30.7		46.6	9.2
Level of Service	C	B	C		D	A
Approach Delay (s)	25.2		30.7			17.8
Approach LOS	C		C			B
Intersection Summary						
HCM 2000 Control Delay			24.7		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.77			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			77.5%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	472	201	39	869	1044
v/c Ratio	1.18	0.40	0.08	0.72	0.64
Control Delay	135.4	12.1	15.7	17.1	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	135.4	12.1	15.7	17.1	13.3
Queue Length 50th (m)	~98.7	8.6	2.6	41.4	37.6
Queue Length 95th (m)	#119.7	21.2	9.8	52.8	49.5
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	400	501	490	1209	1633
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	1.18	0.40	0.08	0.72	0.64

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

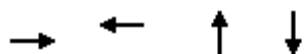
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	359	0	165	17	4	18	103	664	0	0	799	155
Future Volume (vph)	359	0	165	17	4	18	103	664	0	0	799	155
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	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	1.00		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.94			1.00			0.97	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1802		1406		1651			3414			3378	
Flt Permitted	0.73		1.00		0.98			0.59			1.00	
Satd. Flow (perm)	1388		1406		1651			2014			3378	
Peak-hour factor, PHF	0.76	0.38	0.82	1.00	1.00	1.00	0.90	0.88	0.25	0.25	0.93	0.84
Adj. Flow (vph)	472	0	201	17	4	18	114	755	0	0	859	185
RTOR Reduction (vph)	0	0	95	0	13	0	0	0	0	0	20	0
Lane Group Flow (vph)	472	0	106	0	26	0	0	869	0	0	1024	0
Confl. Peds. (#/hr)	2		87	87		2	44		2	2		44
Confl. Bikes (#/hr)			3									3
Heavy Vehicles (%)	1%	0%	3%	0%	0%	0%	4%	5%	0%	0%	4%	1%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	26.0		26.0		26.0			52.0			43.0	
Effective Green, g (s)	26.0		26.0		26.0			52.0			43.0	
Actuated g/C Ratio	0.29		0.29		0.29			0.58			0.48	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	400		406		476			1256			1613	
v/s Ratio Prot								c0.05			0.30	
v/s Ratio Perm	c0.34		0.08		0.02			c0.35				
v/c Ratio	1.18		0.26		0.06			0.69			0.63	
Uniform Delay, d1	32.0		24.6		23.1			13.4			17.6	
Progression Factor	1.00		1.00		1.00			1.00			0.69	
Incremental Delay, d2	104.0		0.3		0.0			1.7			1.4	
Delay (s)	136.0		24.9		23.2			15.0			13.6	
Level of Service	F		C		C			B			B	
Approach Delay (s)		102.8			23.2			15.0			13.6	
Approach LOS		F			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			37.1				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			15.0		
Intersection Capacity Utilization			90.8%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	656	731	239	184
v/c Ratio	0.65	0.72	0.70	0.56
Control Delay	13.0	24.6	37.4	26.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	13.0	24.6	37.4	26.8
Queue Length 50th (m)	54.8	108.9	29.1	17.4
Queue Length 95th (m)	88.3	130.3	37.0	25.9
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	1012	1020	417	395
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	0.65	0.72	0.57	0.47
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	40	440	56	54	495	29	44	115	25	22	51	51
Future Volume (vph)	40	440	56	54	495	29	44	115	25	22	51	51
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			1.00			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			1.00	
Frt		0.98			0.99			0.99			0.95	
Flt Protected		1.00			0.99			0.99			0.99	
Satd. Flow (prot)		1781			1876			1858			1760	
Flt Permitted		0.89			0.85			0.86			0.81	
Satd. Flow (perm)		1590			1607			1622			1445	
Peak-hour factor, PHF	0.67	0.87	0.62	0.59	0.82	0.82	0.85	0.71	1.00	0.50	0.73	0.73
Adj. Flow (vph)	60	506	90	92	604	35	52	162	25	44	70	70
RTOR Reduction (vph)	0	7	0	0	2	0	0	6	0	0	31	0
Lane Group Flow (vph)	0	649	0	0	729	0	0	233	0	0	153	0
Confl. Peds. (#/hr)	18		8	8		18	18		2	2		18
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		47.5			47.5			15.5			15.5	
Effective Green, g (s)		47.5			47.5			15.5			15.5	
Actuated g/C Ratio		0.63			0.63			0.21			0.21	
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)		1007			1017			335			298	
v/s Ratio Prot												
v/s Ratio Perm		0.41			c0.45			c0.14			0.11	
v/c Ratio		0.64			0.72			0.69			0.51	
Uniform Delay, d1		8.5			9.2			27.6			26.4	
Progression Factor		1.00			1.89			1.00			1.00	
Incremental Delay, d2		3.2			4.0			6.1			1.5	
Delay (s)		11.7			21.4			33.7			27.9	
Level of Service		B			C			C			C	
Approach Delay (s)		11.7			21.4			33.7			27.9	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			20.2			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			67.8%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	7	10	184	7	16	122
Future Volume (Veh/h)	7	10	184	7	16	122
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.50	0.67	0.84	0.75	0.46	0.80
Hourly flow rate (vph)	14	15	219	9	35	153
Pedestrians	5					3
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	452	232			233	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	452	232			233	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	97	98			97	
cM capacity (veh/h)	551	806			1294	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	29	228	188			
Volume Left	14	0	35			
Volume Right	15	9	0			
cSH	659	1700	1294			
Volume to Capacity	0.04	0.13	0.03			
Queue Length 95th (m)	1.0	0.0	0.6			
Control Delay (s)	10.7	0.0	1.7			
Lane LOS	B		A			
Approach Delay (s)	10.7	0.0	1.7			
Approach LOS	B					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			30.8%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	255	2	4	390	79	4	19	22	37	16	88
Future Volume (Veh/h)	78	255	2	4	390	79	4	19	22	37	16	88
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.81	0.25	0.38	0.77	0.75	0.75	0.63	0.75	0.83	0.56	0.63
Hourly flow rate (vph)	111	315	8	11	506	105	5	30	29	45	29	140
Pedestrians		9						13			16	
Lane Width (m)		3.7						3.7			3.7	
Walking Speed (m/s)		1.1						1.1			1.1	
Percent Blockage		1						1			2	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	627			336			1298	1203	332	1182	1154	584
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	627			336			1298	1203	332	1182	1154	584
tC, single (s)	4.1			4.1			7.1	6.6	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.3	3.5	4.0	3.3
p0 queue free %	88			99			93	80	96	62	83	72
cM capacity (veh/h)	949			1219			76	153	705	120	169	503
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	434	622	64	214								
Volume Left	111	11	5	45								
Volume Right	8	105	29	140								
cSH	949	1219	212	259								
Volume to Capacity	0.12	0.01	0.30	0.83								
Queue Length 95th (m)	3.0	0.2	9.3	49.9								
Control Delay (s)	3.4	0.3	29.2	61.4								
Lane LOS	A	A	D	F								
Approach Delay (s)	3.4	0.3	29.2	61.4								
Approach LOS			D	F								
Intersection Summary												
Average Delay			12.5									
Intersection Capacity Utilization			69.2%		ICU Level of Service				C			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	449	25	21	534	16	22	32	15	7	24	21
Future Volume (Veh/h)	21	449	25	21	534	16	22	32	15	7	24	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.53	0.84	0.56	0.65	0.85	0.65	0.75	0.72	0.60	0.50	0.59	0.71
Hourly flow rate (vph)	40	535	45	32	628	25	29	44	25	14	41	30
Pedestrians		7			1			11			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked	0.80			0.83			0.88	0.88	0.83	0.88	0.88	0.80
vC, conflicting volume	667			591			1410	1380	570	1404	1390	662
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	460			409			974	939	383	967	950	454
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 %	95			97			81	79	95	90	80	94
cM capacity (veh/h)	878			957			149	212	551	142	209	469
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	620	685	98	85								
Volume Left	40	32	29	14								
Volume Right	45	25	25	30								
cSH	878	957	219	237								
Volume to Capacity	0.05	0.03	0.45	0.36								
Queue Length 95th (m)	1.1	0.8	16.2	11.8								
Control Delay (s)	1.2	0.9	34.1	28.5								
Lane LOS	A	A	D	D								
Approach Delay (s)	1.2	0.9	34.1	28.5								
Approach LOS			D	D								
Intersection Summary												
Average Delay			4.8									
Intersection Capacity Utilization			51.2%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	6	2	9	4	4	6	45	17	5	63	1
Future Volume (Veh/h)	6	6	2	9	4	4	6	45	17	5	63	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.63	0.63	0.25	0.33	0.75	0.38	0.63	0.77	0.50	0.33	0.85	0.25
Hourly flow rate (vph)	10	10	8	27	5	11	10	58	34	15	74	4
Pedestrians		12			9			9			7	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	234	239	97	232	224	91	90			101		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	234	239	97	232	224	91	90			101		
tC, single (s)	7.1	6.7	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.2	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	98	99	96	99	99	99			99		
cM capacity (veh/h)	680	609	945	680	654	957	1500			1491		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	28	43	102	93								
Volume Left	10	27	10	15								
Volume Right	8	11	34	4								
cSH	707	731	1500	1491								
Volume to Capacity	0.04	0.06	0.01	0.01								
Queue Length 95th (m)	0.9	1.4	0.2	0.2								
Control Delay (s)	10.3	10.2	0.8	1.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.3	10.2	0.8	1.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay			3.5									
Intersection Capacity Utilization			20.1%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	7	6	65	13	4	88
Future Volume (Veh/h)	7	6	65	13	4	88
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.42	0.57	0.75	0.38	0.83
Hourly flow rate (vph)	28	14	114	17	11	106
Pedestrians	4					4
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	254	130			135	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	254	130			135	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	98			99	
cM capacity (veh/h)	730	917			1456	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	42	131	117			
Volume Left	28	0	11			
Volume Right	14	17	0			
cSH	783	1700	1456			
Volume to Capacity	0.05	0.08	0.01			
Queue Length 95th (m)	1.3	0.0	0.2			
Control Delay (s)	9.9	0.0	0.8			
Lane LOS	A		A			
Approach Delay (s)	9.9	0.0	0.8			
Approach LOS	A					
Intersection Summary						
Average Delay		1.7				
Intersection Capacity Utilization		19.1%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

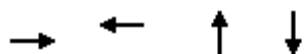
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	269	10	5	381	36	26	5	32	39	10	45
Future Volume (Veh/h)	33	269	10	5	381	36	26	5	32	39	10	45
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.68	0.94	0.50	0.59	0.83	0.25	0.58	0.33	0.65	0.84	0.50	0.83
Hourly flow rate (vph)	49	286	20	8	459	144	45	15	49	46	20	54
Pedestrians		4			1			13			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)												
pX, platoon unblocked												
vC, conflicting volume	617			319			1022	1040	310	1012	978	549
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	617			319			1022	1040	310	1012	978	549
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 %	95			99			73	93	93	74	91	90
cM capacity (veh/h)	959			1236			167	213	716	179	232	530
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	355	611	109	120								
Volume Left	49	8	45	46								
Volume Right	20	144	49	54								
cSH	959	1236	267	269								
Volume to Capacity	0.05	0.01	0.41	0.45								
Queue Length 95th (m)	1.2	0.1	14.3	16.4								
Control Delay (s)	1.7	0.2	27.4	28.7								
Lane LOS	A	A	D	D								
Approach Delay (s)	1.7	0.2	27.4	28.7								
Approach LOS			D	D								
Intersection Summary												
Average Delay			6.0									
Intersection Capacity Utilization			50.5%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	577	688	25	122
v/c Ratio	0.46	0.52	0.08	0.43
Control Delay	5.6	9.4	17.9	22.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.6	9.4	17.9	22.8
Queue Length 50th (m)	23.6	54.5	1.9	10.0
Queue Length 95th (m)	34.8	73.1	5.5	15.6
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1265	1324	485	419
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	0.46	0.52	0.05	0.29
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	16	456	5	5	528	34	2	10	6	55	5	39
Future Volume (vph)	16	456	5	5	528	34	2	10	6	55	5	39
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			0.98			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			0.97	
Frt		1.00			0.99			0.96			0.95	
Flt Protected		1.00			1.00			0.99			0.97	
Satd. Flow (prot)		1858			1879			1775			1704	
Flt Permitted		0.96			0.99			0.96			0.80	
Satd. Flow (perm)		1788			1870			1714			1408	
Peak-hour factor, PHF	0.65	0.84	0.58	0.67	0.83	0.75	0.63	0.71	0.78	0.75	0.67	0.92
Adj. Flow (vph)	25	543	9	7	636	45	3	14	8	73	7	42
RTOR Reduction (vph)	0	1	0	0	3	0	0	7	0	0	29	0
Lane Group Flow (vph)	0	576	0	0	685	0	0	18	0	0	93	0
Confl. Peds. (#/hr)	24		35	35		24	10		23	23		10
Confl. Bikes (#/hr)			2			2						1
Heavy Vehicles (%)	0%	3%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		50.6			50.6			12.4			12.4	
Effective Green, g (s)		50.6			50.6			12.4			12.4	
Actuated g/C Ratio		0.67			0.67			0.17			0.17	
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)		1206			1261			283			232	
v/s Ratio Prot												
v/s Ratio Perm		0.32			0.37			0.01			0.07	
v/c Ratio		0.48			0.54			0.06			0.40	
Uniform Delay, d1		5.9			6.3			26.4			28.0	
Progression Factor		0.61			1.00			1.00			1.00	
Incremental Delay, d2		1.2			1.7			0.1			1.1	
Delay (s)		4.7			8.0			26.5			29.1	
Level of Service		A			A			C			C	
Approach Delay (s)		4.7			8.0			26.5			29.1	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			8.8									
HCM 2000 Volume to Capacity ratio			0.51									
Actuated Cycle Length (s)			75.0									
Intersection Capacity Utilization			58.1%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	8	0	0	6	2	0	3	0	2	2	4
Future Volume (Veh/h)	2	8	0	0	6	2	0	3	0	2	2	4
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.25	0.25	0.50	0.25	0.50	0.50	0.44	0.88	0.42	0.50	0.77	0.38
Hourly flow rate (vph)	8	32	0	0	12	4	0	3	0	4	3	11
Pedestrians	5			7			16			4		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	0			1			2			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												355
pX, platoon unblocked												
vC, conflicting volume	38	32	30	58	37	14	19				10	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	38	32	30	58	37	14	19				10	
tC, single (s)	7.1	6.5	6.5	7.1	6.5	6.2	4.2				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.5	4.0	3.3	2.3				2.2	
p0 queue free %	99	96	100	100	99	100	100				100	
cM capacity (veh/h)	939	853	963	886	847	1060	1515				1612	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	40	16	3	18								
Volume Left	8	0	0	4								
Volume Right	0	4	0	11								
cSH	869	892	1515	1612								
Volume to Capacity	0.05	0.02	0.00	0.00								
Queue Length 95th (m)	1.1	0.4	0.0	0.1								
Control Delay (s)	9.3	9.1	0.0	1.6								
Lane LOS	A	A		A								
Approach Delay (s)	9.3	9.1	0.0	1.6								
Approach LOS	A	A										
Intersection Summary												
Average Delay				7.1								
Intersection Capacity Utilization				19.5%	ICU Level of Service			A				
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	4	0	0	5	0	0	0	0	1	0	5
Future Volume (Veh/h)	1	4	0	0	5	0	0	0	0	1	0	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.94	0.25	0.25	0.84	0.50
Hourly flow rate (vph)	4	16	0	0	20	0	0	0	0	4	0	10
Pedestrians		3			20			8			8	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			2			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	34	36	16	49	41	28	13			20		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	34	36	16	49	41	28	13			20		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	100	98	100	100	98	100	100			100		
cM capacity (veh/h)	932	839	1058	899	834	1024	1614			1578		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	20	20	0	14								
Volume Left	4	0	0	4								
Volume Right	0	0	0	10								
cSH	856	834	1700	1578								
Volume to Capacity	0.02	0.02	0.00	0.00								
Queue Length 95th (m)	0.5	0.6	0.0	0.1								
Control Delay (s)	9.3	9.4	0.0	2.1								
Lane LOS	A	A		A								
Approach Delay (s)	9.3	9.4	0.0	2.1								
Approach LOS	A	A										
Intersection Summary												
Average Delay			7.5									
Intersection Capacity Utilization			20.5%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	286	22	6	325	0	105	0	100	1	1	2
Future Volume (Veh/h)	0	286	22	6	325	0	105	0	100	1	1	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.87	0.64	0.63	0.84	0.63	0.74	0.82	0.63	0.53	0.58	0.83
Hourly flow rate (vph)	0	329	34	10	387	0	142	0	159	2	2	2
Pedestrians		7			9			15			9	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	207											
pX, platoon unblocked												
vC, conflicting volume	396			378			778	777	370	930	794	403
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	396			378			778	777	370	930	794	403
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 %	100			99			52	100	76	99	99	100
cM capacity (veh/h)	1136			1174			297	320	653	177	313	637
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	363	397	301	6								
Volume Left	0	10	142	2								
Volume Right	34	0	159	2								
cSH	1136	1174	417	288								
Volume to Capacity	0.00	0.01	0.72	0.02								
Queue Length 95th (m)	0.0	0.2	42.6	0.5								
Control Delay (s)	0.0	0.3	33.0	17.8								
Lane LOS		A	D	C								
Approach Delay (s)	0.0	0.3	33.0	17.8								
Approach LOS			D	C								
Intersection Summary												
Average Delay	9.5											
Intersection Capacity Utilization	47.6%			ICU Level of Service					A			
Analysis Period (min)	15											

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	162	193	294	189	321	154	218	751	107	95	677
v/c Ratio	0.63	0.49	0.70	0.53	0.76	0.53	0.82	1.00	0.15	0.45	0.93
Control Delay	31.1	34.3	16.7	25.8	44.4	17.3	44.2	47.8	1.5	17.3	47.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.1	34.3	16.7	25.8	44.4	17.3	44.2	47.8	1.5	17.3	47.1
Queue Length 50th (m)	18.0	27.9	7.8	21.4	49.8	6.1	~24.2	~159.8	1.7	7.6	108.3
Queue Length 95th (m)	25.2	37.5	25.5	36.3	71.8	17.7	m#36.4	m#197.5	m2.7	11.5	#174.5
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	257	450	451	356	486	318	265	752	704	209	728
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.43	0.65	0.53	0.66	0.48	0.82	1.00	0.15	0.45	0.93

Intersection Summary

~ 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.

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

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	49	69	143	241	172	273	75	32	170	577	103	111
Future Volume (vph)	49	69	143	241	172	273	75	32	170	577	103	111
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.68	1.00	1.00	0.57		1.00	0.96		0.92
Flpb, ped/bikes		0.94	1.00	1.00	0.88	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	0.97		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1707	1762	1075	1608	1902	927		1807	1668		1431
Flt Permitted		0.31	1.00	1.00	0.56	1.00	1.00		0.10	1.00		1.00
Satd. Flow (perm)		549	1762	1075	948	1902	927		195	1668		1431
Peak-hour factor, PHF	0.71	0.74	0.74	0.82	0.91	0.85	0.79	0.54	0.78	0.95	0.78	0.93
Adj. Flow (vph)	69	93	193	294	189	321	95	59	218	607	132	119
RTOR Reduction (vph)	0	0	0	184	0	0	85	0	0	1	0	59
Lane Group Flow (vph)	0	162	193	110	189	321	69	0	218	750	0	48
Confl. Peds. (#/hr)	107	104		156	156		107	104	104		104	59
Confl. Bikes (#/hr)				3			4	4			7	7
Heavy Vehicles (%)	2%	0%	6%	0%	0%	1%	0%	0%	1%	3%	0%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		27.0	20.0	20.0	27.0	20.0	20.0		48.0	40.0		40.0
Effective Green, g (s)		27.0	20.0	20.0	27.0	20.0	20.0		48.0	40.0		40.0
Actuated g/C Ratio		0.30	0.22	0.22	0.30	0.22	0.22		0.53	0.44		0.44
Clearance Time (s)		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
Lane Grp Cap (vph)		254	391	238	335	422	206		263	741		636
v/s Ratio Prot		c0.05	0.11		0.04	c0.17			c0.08	c0.45		
v/s Ratio Perm		0.14		0.10	0.13		0.07		0.36			0.03
v/c Ratio		0.64	0.49	0.46	0.56	0.76	0.34		0.83	1.01		0.07
Uniform Delay, d1		24.9	30.6	30.3	25.4	32.8	29.4		20.0	25.0		14.4
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.43	0.61		0.32
Incremental Delay, d2		5.2	1.0	1.4	2.2	7.9	1.0		13.7	30.5		0.2
Delay (s)		30.1	31.6	31.7	27.6	40.6	30.4		42.2	45.7		4.8
Level of Service		C	C	C	C	D	C		D	D		A
Approach Delay (s)			31.3			34.5				40.9		
Approach LOS			C			C				D		
Intersection Summary												
HCM 2000 Control Delay			38.0									
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			90.4%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations		LT	LT	LT
Traffic Volume (vph)	19	46	532	72
Future Volume (vph)	19	46	532	72
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.98	
Flpb, ped/bikes		1.00	1.00	
Frt		1.00	0.98	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1765	1806	
Flt Permitted		0.11	1.00	
Satd. Flow (perm)		206	1806	
Peak-hour factor, PHF	0.63	0.71	0.89	0.91
Adj. Flow (vph)	30	65	598	79
RTOR Reduction (vph)	0	0	5	0
Lane Group Flow (vph)	0	95	672	0
Confl. Peds. (#/hr)	104	59		104
Confl. Bikes (#/hr)				5
Heavy Vehicles (%)	0%	5%	2%	2%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		41.1	36.1	
Effective Green, g (s)		41.1	36.1	
Actuated g/C Ratio		0.46	0.40	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		180	724	
v/s Ratio Prot		0.03	0.37	
v/s Ratio Perm		0.21		
v/c Ratio		0.53	0.93	
Uniform Delay, d1		19.3	25.7	
Progression Factor		1.00	1.00	
Incremental Delay, d2		2.8	19.8	
Delay (s)		22.0	45.5	
Level of Service		C	D	
Approach Delay (s)			42.6	
Approach LOS			D	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	6	31	22	9	62	26	946	42	48	920	27
Future Volume (Veh/h)	6	6	31	22	9	62	26	946	42	48	920	27
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.63	0.78	0.75	0.44	0.83	0.80	1.00	0.80	0.80	1.00	0.80
Hourly flow rate (vph)	10	10	40	29	20	75	33	946	53	60	920	34
Pedestrians	52			63			3			6		
Lane Width (m)	3.7			3.7			3.7			3.7		
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)							94			144		
pX, platoon unblocked	0.74	0.74	0.59	0.74	0.74	0.70	0.59				0.70	
vC, conflicting volume	1739	2237	992	2190	2228	568	1006				1062	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	316	989	640	925	976	0	663				243	
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 %	97	93	83	72	86	90	94				93	
cM capacity (veh/h)	288	143	236	103	145	715	524				881	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	60	124	506	526	60	954						
Volume Left	10	29	33	0	60	0						
Volume Right	40	75	0	53	0	34						
cSH	219	236	524	1700	881	1700						
Volume to Capacity	0.27	0.53	0.06	0.31	0.07	0.56						
Queue Length 95th (m)	8.2	21.1	1.5	0.0	1.7	0.0						
Control Delay (s)	27.5	36.0	1.8	0.0	9.4	0.0						
Lane LOS	D	E	A		A							
Approach Delay (s)	27.5	36.0	0.9		0.6							
Approach LOS	D	E										
Intersection Summary												
Average Delay	3.4											
Intersection Capacity Utilization	67.0%			ICU Level of Service			C					
Analysis Period (min)	15											

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	264	257	1178	238	851
v/c Ratio	0.58	0.40	0.93	0.82	0.74
Control Delay	34.7	15.9	33.9	61.3	23.9
Queue Delay	0.0	0.0	0.0	0.0	0.1
Total Delay	34.7	15.9	33.9	61.3	23.9
Queue Length 50th (m)	39.5	25.4	84.5	39.2	125.2
Queue Length 95th (m)	58.7	36.9	#131.2	m49.3	m157.0
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	454	649	1260	292	1152
Starvation Cap Reductn	0	0	0	0	10
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.58	0.40	0.93	0.82	0.75

Intersection Summary

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.

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

10/29/2018

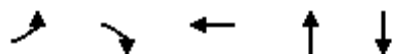
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	222	211	777	205	193	800
Future Volume (vph)	222	211	777	205	193	800
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.96	0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1706	1498	3344		1755	1921
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1706	1498	3344		1755	1921
Peak-hour factor, PHF	0.84	0.82	0.87	0.72	0.81	0.94
Adj. Flow (vph)	264	257	893	285	238	851
RTOR Reduction (vph)	0	0	34	0	0	0
Lane Group Flow (vph)	264	257	1144	0	238	851
Confl. Peds. (#/hr)	48	42		34	34	
Confl. Bikes (#/hr)		3		5		
Heavy Vehicles (%)	7%	5%	1%	11%	4%	0%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	454	749	1226		292	1152
v/s Ratio Prot	c0.15	0.06	c0.34		0.14	c0.44
v/s Ratio Perm		0.11				
v/c Ratio	0.58	0.34	0.93		0.82	0.74
Uniform Delay, d1	28.6	17.0	27.4		36.2	12.9
Progression Factor	1.00	1.00	0.86		1.20	1.52
Incremental Delay, d2	5.4	1.3	10.3		16.8	3.2
Delay (s)	34.0	18.2	33.9		60.2	22.8
Level of Service	C	B	C		E	C
Approach Delay (s)	26.2		33.9			31.0
Approach LOS	C		C			C
Intersection Summary						
HCM 2000 Control Delay			31.3		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.80			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			76.1%		ICU Level of Service	D
Analysis Period (min)			15			

c Critical Lane Group

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	305	196	138	906	1060
v/c Ratio	0.90	0.37	0.29	0.76	0.62
Control Delay	62.1	6.0	19.8	18.4	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	62.1	6.0	19.8	18.4	13.9
Queue Length 50th (m)	49.3	0.0	13.0	43.5	47.2
Queue Length 95th (m)	#78.9	10.9	27.4	57.1	72.0
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	363	553	504	1185	1707
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	0.84	0.35	0.27	0.76	0.62

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

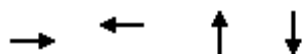
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	0	161	60	22	56	127	681	0	0	784	199
Future Volume (vph)	250	0	161	60	22	56	127	681	0	0	784	199
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	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	0.99		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.95			1.00			0.97	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1765		1432		1654			3475			3373	
Flt Permitted	0.68		1.00		0.98			0.54			1.00	
Satd. Flow (perm)	1259		1432		1654			1898			3373	
Peak-hour factor, PHF	0.82	0.25	0.82	1.00	1.00	1.00	0.85	0.90	0.25	0.25	0.96	0.82
Adj. Flow (vph)	305	0	196	60	22	56	149	757	0	0	817	243
RTOR Reduction (vph)	0	0	143	0	28	0	0	0	0	0	29	0
Lane Group Flow (vph)	305	0	53	0	110	0	0	906	0	0	1031	0
Confl. Peds. (#/hr)	12		89	89		12	45		13	13		45
Confl. Bikes (#/hr)			1						5			1
Heavy Vehicles (%)	2%	0%	1%	0%	0%	0%	2%	3%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	24.2		24.2		24.2			53.8			44.8	
Effective Green, g (s)	24.2		24.2		24.2			53.8			44.8	
Actuated g/C Ratio	0.27		0.27		0.27			0.60			0.50	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	338		385		444			1239			1679	
v/s Ratio Prot								c0.05			0.31	
v/s Ratio Perm	c0.24		0.04		0.07			c0.39				
v/c Ratio	0.90		0.14		0.25			0.73			0.61	
Uniform Delay, d1	31.8		25.0		25.8			12.9			16.3	
Progression Factor	1.00		1.00		1.00			1.00			0.79	
Incremental Delay, d2	26.0		0.2		0.3			2.3			1.2	
Delay (s)	57.7		25.1		26.1			15.2			14.1	
Level of Service	E		C		C			B			B	
Approach Delay (s)		45.0			26.1			15.2			14.1	
Approach LOS		D			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			21.1				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			15.0		
Intersection Capacity Utilization			86.0%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	732	457	299	410
v/c Ratio	0.97	0.64	0.60	0.94
Control Delay	47.6	14.6	20.7	51.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	47.6	14.6	20.7	51.6
Queue Length 50th (m)	~106.4	28.7	18.4	44.1
Queue Length 95th (m)	#142.9	38.8	m30.3	#74.5
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	757	716	541	468
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	0.97	0.64	0.55	0.88

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	437	43	42	221	71	41	152	27	62	82	122
Future Volume (vph)	94	437	43	42	221	71	41	152	27	62	82	122
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			0.99			0.81	
Flpb, ped/bikes		0.99			1.00			0.97			0.99	
Frt		0.99			0.97			0.98			0.93	
Flt Protected		0.99			0.99			0.99			0.99	
Satd. Flow (prot)		1757			1753			1766			1393	
Flt Permitted		0.86			0.80			0.80			0.80	
Satd. Flow (perm)		1515			1411			1432			1129	
Peak-hour factor, PHF	0.83	0.80	0.59	0.55	0.83	0.62	0.60	0.79	0.69	0.60	0.79	0.60
Adj. Flow (vph)	113	546	73	76	266	115	68	192	39	103	104	203
RTOR Reduction (vph)	0	5	0	0	15	0	0	7	0	0	49	0
Lane Group Flow (vph)	0	727	0	0	442	0	0	292	0	0	361	0
Confl. Peds. (#/hr)	56		43	43		56	175		19	19		175
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	3%	5%	0%	4%	0%	0%	1%	5%	2%	3%	3%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		37.3			37.3			25.7			25.7	
Effective Green, g (s)		37.3			37.3			25.7			25.7	
Actuated g/C Ratio		0.50			0.50			0.34			0.34	
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)		753			701			490			386	
v/s Ratio Prot												
v/s Ratio Perm		c0.48			0.31			0.20			c0.32	
v/c Ratio		0.97			0.63			0.60			0.93	
Uniform Delay, d1		18.2			13.8			20.4			23.8	
Progression Factor		1.00			0.71			0.83			1.00	
Incremental Delay, d2		25.4			4.2			1.7			29.5	
Delay (s)		43.6			14.1			18.5			53.3	
Level of Service		D			B			B			D	
Approach Delay (s)		43.6			14.1			18.5			53.3	
Approach LOS		D			B			B			D	
Intersection Summary												
HCM 2000 Control Delay			34.6			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			80.7%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

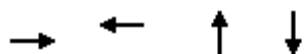
10/29/2018

									
Movement	WBL	WBR	NBT	NBR	SBL	SBT			
Lane Configurations									
Traffic Volume (veh/h)	6	9	203	10	14	179			
Future Volume (Veh/h)	6	9	203	10	14	179			
Sign Control	Yield		Free			Free			
Grade	0%		0%			0%			
Peak Hour Factor	0.63	0.88	0.74	0.67	0.69	0.66			
Hourly flow rate (vph)	10	10	274	15	20	271			
Pedestrians	10		3						
Lane Width (m)	3.7		3.7						
Walking Speed (m/s)	1.1		1.1						
Percent Blockage	1		0						
Right turn flare (veh)									
Median type			None			None			
Median storage (veh)									
Upstream signal (m)			284			362			
pX, platoon unblocked									
vC, conflicting volume	606	292			299				
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol	606	292			299				
tC, single (s)	6.4	6.3			4.2				
tC, 2 stage (s)									
tF (s)	3.5	3.4			2.3				
p0 queue free %	98	99			98				
cM capacity (veh/h)	450	713			1211				
Direction, Lane #	WB 1	NB 1	SB 1						
Volume Total	20	289	291						
Volume Left	10	0	20						
Volume Right	10	15	0						
cSH	552	1700	1211						
Volume to Capacity	0.04	0.17	0.02						
Queue Length 95th (m)	0.9	0.0	0.4						
Control Delay (s)	11.8	0.0	0.7						
Lane LOS	B		A						
Approach Delay (s)	11.8	0.0	0.7						
Approach LOS	B								
Intersection Summary									
Average Delay		0.7							
Intersection Capacity Utilization		31.0%	ICU Level of Service	A					
Analysis Period (min)		15							

Queues

3: Yorkshire Street South & Waterloo Avenue

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	671	355	114	341
v/c Ratio	0.78	0.37	0.22	0.76
Control Delay	20.9	9.8	9.0	29.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.9	9.8	9.0	29.1
Queue Length 50th (m)	67.5	23.5	3.0	30.6
Queue Length 95th (m)	83.9	33.2	5.5	10.2
Internal Link Dist (m)	50.5	146.5	65.6	106.9
Turn Bay Length (m)				
Base Capacity (vph)	863	965	514	448
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	0.78	0.37	0.22	0.76
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	122	389	4	6	217	51	0	17	40	48	36	93
Future Volume (vph)	122	389	4	6	217	51	0	17	40	48	36	93
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			0.98			0.95	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		1.00			0.98			0.90			0.93	
Flt Protected		0.99			1.00			1.00			0.99	
Satd. Flow (prot)		1862			1780			1621			1552	
Flt Permitted		0.82			0.96			1.00			0.92	
Satd. Flow (perm)		1541			1705			1621			1441	
Peak-hour factor, PHF	0.76	0.78	0.38	0.31	0.80	0.79	0.25	0.58	0.47	0.81	0.31	0.56
Adj. Flow (vph)	161	499	11	19	271	65	0	29	85	59	116	166
RTOR Reduction (vph)	0	1	0	0	11	0	0	61	0	0	45	0
Lane Group Flow (vph)	0	670	0	0	344	0	0	53	0	0	296	0
Confl. Peds. (#/hr)	7		9	9		7	44		6	6		44
Confl. Bikes (#/hr)			3			1						1
Heavy Vehicles (%)	0%	2%	0%	0%	3%	11%	0%	7%	3%	0%	20%	3%
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		42.0			42.0			21.0			21.0	
Effective Green, g (s)		42.0			42.0			21.0			21.0	
Actuated g/C Ratio		0.56			0.56			0.28			0.28	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		862			954			453			403	
v/s Ratio Prot								0.03				
v/s Ratio Perm		c0.43			0.20						c0.21	
v/c Ratio		0.78			0.36			0.12			0.73	
Uniform Delay, d1		12.9			9.1			20.1			24.5	
Progression Factor		1.00			1.00			1.00			0.89	
Incremental Delay, d2		6.8			1.1			0.5			9.4	
Delay (s)		19.7			10.2			20.6			31.2	
Level of Service		B			B			C			C	
Approach Delay (s)		19.7			10.2			20.6			31.2	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay		20.1			HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio		0.76										
Actuated Cycle Length (s)		75.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		76.3%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	489	13	16	308	2	16	52	22	10	39	19
Future Volume (Veh/h)	17	489	13	16	308	2	16	52	22	10	39	19
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.80	0.67	0.75	0.91	0.50	0.41	0.81	0.64	0.67	0.43	0.42
Hourly flow rate (vph)	29	611	19	21	338	4	39	64	34	15	91	45
Pedestrians		9			2			25			24	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked	0.95			0.71			0.74	0.74	0.71	0.74	0.74	0.95
vC, conflicting volume	366			655			1185	1112	648	1152	1119	373
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	311			314			931	831	303	886	841	319
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 %	98			98			61	69	93	88	55	93
cM capacity (veh/h)	1174			874			100	204	514	126	202	656
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	659	363	137	151								
Volume Left	29	21	39	15								
Volume Right	19	4	34	45								
cSH	1174	874	178	237								
Volume to Capacity	0.02	0.02	0.77	0.64								
Queue Length 95th (m)	0.6	0.6	38.4	29.4								
Control Delay (s)	0.7	0.8	72.0	43.5								
Lane LOS	A	A	F	E								
Approach Delay (s)	0.7	0.8	72.0	43.5								
Approach LOS			F	E								
Intersection Summary												
Average Delay			13.1									
Intersection Capacity Utilization			46.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	9	7	10	5	5	2	43	21	6	69	1
Future Volume (Veh/h)	6	9	7	10	5	5	2	43	21	6	69	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.63	0.58	0.38	0.63	0.50	0.50	0.50	0.73	0.63	0.42	0.56	0.25
Hourly flow rate (vph)	10	16	18	16	10	10	4	59	33	14	123	4
Pedestrians		7			6			12			4	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	262	266	144	280	252	86	134			98		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	262	266	144	280	252	86	134			98		
tC, single (s)	7.1	6.5	6.5	7.1	6.8	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.6	3.5	4.2	3.3	2.2			2.2		
p0 queue free %	98	97	98	97	98	99	100			99		
cM capacity (veh/h)	659	627	812	625	599	969	1453			1499		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	44	36	96	141								
Volume Left	10	16	4	14								
Volume Right	18	10	33	4								
cSH	700	684	1453	1499								
Volume to Capacity	0.06	0.05	0.00	0.01								
Queue Length 95th (m)	1.5	1.3	0.1	0.2								
Control Delay (s)	10.5	10.6	0.3	0.8								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.5	10.6	0.3	0.8								
Approach LOS	B	B										
Intersection Summary												
Average Delay			3.1									
Intersection Capacity Utilization			21.1%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	11	4	67	14	2	100
Future Volume (Veh/h)	11	4	67	14	2	100
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.75	0.53	0.33	0.25	0.46
Hourly flow rate (vph)	44	5	126	42	8	217
Pedestrians	6		1			3
Lane Width (m)	3.7		3.7			3.7
Walking Speed (m/s)	1.1		1.1			1.1
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	387	156			174	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	387	156			174	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	99			99	
cM capacity (veh/h)	613	887			1407	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	49	168	225			
Volume Left	44	0	8			
Volume Right	5	42	0			
cSH	632	1700	1407			
Volume to Capacity	0.08	0.10	0.01			
Queue Length 95th (m)	1.9	0.0	0.1			
Control Delay (s)	11.2	0.0	0.3			
Lane LOS	B		A			
Approach Delay (s)	11.2	0.0	0.3			
Approach LOS	B					
Intersection Summary						
Average Delay		1.4				
Intersection Capacity Utilization		17.8%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

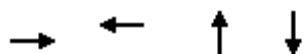
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	405	12	22	223	32	7	9	15	27	27	47
Future Volume (Veh/h)	42	405	12	22	223	32	7	9	15	27	27	47
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.85	0.36	0.75	0.88	0.53	0.75	0.58	0.50	0.64	0.50	0.52
Hourly flow rate (vph)	56	476	33	29	253	60	9	16	30	42	54	90
Pedestrians		3			2			14			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		170										
pX, platoon unblocked				0.83			0.83	0.83	0.83	0.83	0.83	
vC, conflicting volume	316			523			1080	992	508	988	979	289
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	316			319			992	887	302	882	870	289
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 %	95			97			93	93	95	77	75	88
cM capacity (veh/h)	1224			1022			123	215	605	181	220	734
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	565	342	55	186								
Volume Left	56	29	9	42								
Volume Right	33	60	30	90								
cSH	1224	1022	279	310								
Volume to Capacity	0.05	0.03	0.20	0.60								
Queue Length 95th (m)	1.1	0.7	5.5	27.7								
Control Delay (s)	1.3	1.0	21.1	32.6								
Lane LOS	A	A	C	D								
Approach Delay (s)	1.3	1.0	21.1	32.6								
Approach LOS			C	D								
Intersection Summary												
Average Delay			7.2									
Intersection Capacity Utilization			48.7%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	676	387	23	171
v/c Ratio	0.58	0.34	0.07	0.61
Control Delay	18.5	7.9	18.0	32.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	18.5	7.9	18.0	32.3
Queue Length 50th (m)	88.1	24.1	1.9	18.1
Queue Length 95th (m)	m95.9	41.0	4.8	26.7
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1157	1138	448	384
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	0.58	0.34	0.05	0.45

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	501	9	6	294	21	3	7	4	62	22	29
Future Volume (vph)	19	501	9	6	294	21	3	7	4	62	22	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			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.99			0.95			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			0.89	
Frt		1.00			0.99			0.96			0.97	
Flt Protected		1.00			1.00			0.99			0.97	
Satd. Flow (prot)		1849			1792			1717			1580	
Flt Permitted		0.97			0.99			0.91			0.81	
Satd. Flow (perm)		1804			1768			1586			1317	
Peak-hour factor, PHF	0.63	0.79	0.78	0.67	0.87	0.53	0.48	0.66	0.68	0.63	0.74	0.67
Adj. Flow (vph)	30	634	12	9	338	40	6	11	6	98	30	43
RTOR Reduction (vph)	0	1	0	0	5	0	0	5	0	0	18	0
Lane Group Flow (vph)	0	675	0	0	382	0	0	18	0	0	153	0
Confl. Peds. (#/hr)	38		54	54		38	21		91	91		21
Confl. Bikes (#/hr)			3			1			1			
Heavy Vehicles (%)	7%	3%	0%	0%	4%	12%	0%	0%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		48.1			48.1			14.9			14.9	
Effective Green, g (s)		48.1			48.1			14.9			14.9	
Actuated g/C Ratio		0.64			0.64			0.20			0.20	
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)		1156			1133			315			261	
v/s Ratio Prot												
v/s Ratio Perm		c0.37			0.22			0.01			c0.12	
v/c Ratio		0.58			0.34			0.06			0.59	
Uniform Delay, d1		7.7			6.2			24.4			27.3	
Progression Factor		1.86			1.00			1.00			1.00	
Incremental Delay, d2		1.1			0.8			0.1			3.4	
Delay (s)		15.5			7.0			24.4			30.6	
Level of Service		B			A			C			C	
Approach Delay (s)		15.5			7.0			24.4			30.6	
Approach LOS		B			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			15.1			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)				12.0		
Intersection Capacity Utilization			61.6%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	10	0	0	3	1	0	6	0	2	0	9
Future Volume (Veh/h)	12	10	0	0	3	1	0	6	0	2	0	9
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.25	0.25	0.25	0.25	0.25	0.63	0.60	0.67	0.50	0.79	0.44
Hourly flow rate (vph)	19	40	0	0	12	4	0	10	0	4	0	20
Pedestrians	5			13			10			3		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	0			1			1			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												355
pX, platoon unblocked												
vC, conflicting volume	46	46	25	71	56	26	25				23	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	46	46	25	71	56	26	25				23	
tC, single (s)	7.1	6.5	6.7	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.8	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	98	95	100	100	99	100	100				100	
cM capacity (veh/h)	924	833	915	858	822	1039	1595				1585	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	59	16	10	24								
Volume Left	19	0	0	4								
Volume Right	0	4	0	20								
cSH	860	867	1595	1585								
Volume to Capacity	0.07	0.02	0.00	0.00								
Queue Length 95th (m)	1.7	0.4	0.0	0.1								
Control Delay (s)	9.5	9.2	0.0	1.2								
Lane LOS	A	A		A								
Approach Delay (s)	9.5	9.2	0.0	1.2								
Approach LOS	A	A										
Intersection Summary												
Average Delay				6.8								
Intersection Capacity Utilization				22.9%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	4	0	0	9	2	0	0	0	0	0	1
Future Volume (Veh/h)	5	4	0	0	9	2	0	0	0	0	0	1
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.50	0.50	0.50	0.50	0.75	0.50	0.50	0.65	0.38	0.25	0.66	0.25
Hourly flow rate (vph)	10	8	0	0	12	4	0	0	0	0	0	4
Pedestrians	10			16			6			3		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	1			2			1			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	25	28	18	28	30	19	14				16	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	25	28	18	28	30	19	14				16	
tC, single (s)	7.1	7.0	6.2	7.1	6.8	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.5	3.3	3.5	4.3	3.3	2.2				2.2	
p0 queue free %	99	99	100	100	98	100	100				100	
cM capacity (veh/h)	945	760	1050	939	785	1045	1602				1589	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	18	16	0	4								
Volume Left	10	0	0	0								
Volume Right	0	4	0	4								
cSH	853	837	1700	1589								
Volume to Capacity	0.02	0.02	0.00	0.00								
Queue Length 95th (m)	0.5	0.4	0.0	0.0								
Control Delay (s)	9.3	9.4	0.0	0.0								
Lane LOS	A	A										
Approach Delay (s)	9.3	9.4	0.0	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay				8.4								
Intersection Capacity Utilization				20.4%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	417	31	6	234	0	37	0	100	0	0	0
Future Volume (Veh/h)	0	417	31	6	234	0	37	0	100	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.74	0.78	0.69	0.42	0.88	0.75	0.65	0.63	0.75	0.75	0.65	0.53
Hourly flow rate (vph)	0	535	45	14	266	0	57	0	133	0	0	0
Pedestrians		12			7			15			5	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		374			207							
pX, platoon unblocked												
vC, conflicting volume	271			595			878	872	580	996	894	283
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	271			595			878	872	580	996	894	283
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.3
p0 queue free %	100			99			78	100	74	100	100	100
cM capacity (veh/h)	1298			977			257	281	507	153	273	736
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	580	280	190	0								
Volume Left	0	14	57	0								
Volume Right	45	0	133	0								
cSH	1298	977	392	1700								
Volume to Capacity	0.00	0.01	0.48	0.00								
Queue Length 95th (m)	0.0	0.3	19.4	0.0								
Control Delay (s)	0.0	0.6	22.5	0.0								
Lane LOS		A	C	A								
Approach Delay (s)	0.0	0.6	22.5	0.0								
Approach LOS			C	A								
Intersection Summary												
Average Delay			4.2									
Intersection Capacity Utilization			40.8%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	202	186	281	113	180	80	149	531	140	55	788
v/c Ratio	0.60	0.49	0.60	0.31	0.50	0.25	0.69	0.69	0.18	0.14	0.94
Control Delay	29.8	35.2	10.7	21.8	36.0	4.8	38.1	29.3	12.0	10.2	46.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.8	35.2	10.7	21.8	36.0	4.8	38.1	29.3	12.0	10.2	46.1
Queue Length 50th (m)	23.6	27.3	2.3	12.5	26.2	0.0	19.4	67.3	6.8	4.2	~147.6
Queue Length 95th (m)	25.1	43.5	21.8	21.2	43.6	3.5	m23.8	m78.3	m8.1	8.5	#216.0
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	336	426	492	370	447	375	217	766	757	390	838
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.44	0.57	0.31	0.40	0.21	0.69	0.69	0.18	0.14	0.94

Intersection Summary

~ 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.

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

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	37	92	158	247	93	158	39	20	125	361	116	125
Future Volume (vph)	37	92	158	247	93	158	39	20	125	361	116	125
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.76	1.00	1.00	0.73		1.00	0.97		0.94
Flpb, ped/bikes		0.91	1.00	1.00	0.90	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	0.96		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1646	1745	1198	1644	1830	1198		1772	1599		1463
Flt Permitted		0.53	1.00	1.00	0.62	1.00	1.00		0.10	1.00		1.00
Satd. Flow (perm)		925	1745	1198	1066	1830	1198		178	1599		1463
Peak-hour factor, PHF	0.73	0.61	0.85	0.88	0.82	0.88	0.78	0.67	0.84	0.97	0.81	0.80
Adj. Flow (vph)	51	151	186	281	113	180	50	30	149	372	143	156
RTOR Reduction (vph)	0	0	0	206	0	0	64	0	0	1	0	58
Lane Group Flow (vph)	0	202	186	75	113	180	16	0	149	530	0	82
Confl. Peds. (#/hr)	73	54		112	112		73	54	50		54	42
Confl. Bikes (#/hr)				2			1	1			1	1
Heavy Vehicles (%)	3%	0%	7%	1%	0%	5%	0%	0%	3%	6%	4%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		26.7	19.7	19.7	23.9	18.3	18.3		48.5	41.9		41.9
Effective Green, g (s)		26.7	19.7	19.7	23.9	18.3	18.3		48.5	41.9		41.9
Actuated g/C Ratio		0.30	0.22	0.22	0.27	0.20	0.20		0.54	0.47		0.47
Clearance Time (s)		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
Lane Grp Cap (vph)		330	381	262	319	372	243		212	744		681
v/s Ratio Prot		c0.05	0.11		0.02	0.10			c0.05	0.33		
v/s Ratio Perm		c0.13		0.06	0.07		0.01		0.33			0.06
v/c Ratio		0.61	0.49	0.29	0.35	0.48	0.07		0.70	0.71		0.12
Uniform Delay, d1		26.1	30.7	29.3	26.1	31.7	29.0		18.2	19.2		13.6
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		2.03	1.22		2.13
Incremental Delay, d2		3.3	1.0	0.6	0.7	1.0	0.1		6.4	3.6		0.2
Delay (s)		29.5	31.7	29.9	26.7	32.7	29.1		43.5	27.0		29.3
Level of Service		C	C	C	C	C	C		D	C		C
Approach Delay (s)			30.3			30.1				30.4		
Approach LOS			C			C				C		
Intersection Summary												
HCM 2000 Control Delay			34.5									
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			88.6%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	9	29	706	37
Future Volume (vph)	9	29	706	37
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.99	
Flpb, ped/bikes		0.99	1.00	
Frt		1.00	0.99	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1808	1850	
Flt Permitted		0.30	1.00	
Satd. Flow (perm)		566	1850	
Peak-hour factor, PHF	0.44	0.82	0.95	0.83
Adj. Flow (vph)	20	35	743	45
RTOR Reduction (vph)	0	0	2	0
Lane Group Flow (vph)	0	55	786	0
Confl. Peds. (#/hr)	54	42		50
Confl. Bikes (#/hr)				7
Heavy Vehicles (%)	0%	0%	2%	7%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		44.9	40.1	
Effective Green, g (s)		44.9	40.1	
Actuated g/C Ratio		0.50	0.45	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		348	824	
v/s Ratio Prot		0.01	c0.42	
v/s Ratio Perm		0.07		
v/c Ratio		0.16	0.95	
Uniform Delay, d1		12.8	24.1	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.2	21.9	
Delay (s)		13.0	46.0	
Level of Service		B	D	
Approach Delay (s)			43.8	
Approach LOS			D	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	12	35	16	7	46	36	753	57	71	926	34
Future Volume (Veh/h)	6	12	35	16	7	46	36	753	57	71	926	34
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.31	0.50	0.78	0.81	0.50	0.84	0.66	0.95	0.88	0.79	0.95	0.84
Hourly flow rate (vph)	19	24	45	20	14	55	55	793	65	90	975	40
Pedestrians	37			35			9			9		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	4			3			1			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)							94			144		
pX, platoon unblocked	0.71	0.71	0.56	0.71	0.71	0.71	0.56				0.71	
vC, conflicting volume	1790	2215	1041	2192	2202	473	1052				893	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	362	962	684	929	945	0	703				23	
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	83	79	77	90	93	89				92	
cM capacity (veh/h)	272	139	213	86	142	739	490				1097	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	88	89	452	462	90	1015						
Volume Left	19	20	55	0	90	0						
Volume Right	45	55	0	65	0	40						
cSH	194	219	490	1700	1097	1700						
Volume to Capacity	0.45	0.41	0.11	0.27	0.08	0.60						
Queue Length 95th (m)	16.3	14.0	2.9	0.0	2.0	0.0						
Control Delay (s)	38.2	32.3	3.3	0.0	8.6	0.0						
Lane LOS	E	D	A		A							
Approach Delay (s)	38.2	32.3	1.6		0.7							
Approach LOS	E	D										
Intersection Summary												
Average Delay	3.9											
Intersection Capacity Utilization	75.0%			ICU Level of Service			D					
Analysis Period (min)	15											

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	208	156	1195	245	822
v/c Ratio	0.48	0.25	0.95	0.84	0.72
Control Delay	32.2	14.1	33.9	49.8	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	32.2	14.1	33.9	49.8	10.1
Queue Length 50th (m)	30.2	14.4	89.0	42.3	36.9
Queue Length 95th (m)	46.1	22.0	#126.4	m51.9	m50.2
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	434	614	1262	292	1141
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.48	0.25	0.95	0.84	0.72

Intersection Summary

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.

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

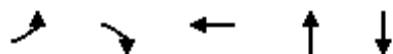
10/29/2018

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	173	123	719	307	189	789
Future Volume (vph)	173	123	719	307	189	789
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.97	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1630	1418	3309		1755	1902
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1630	1418	3309		1755	1902
Peak-hour factor, PHF	0.83	0.79	0.85	0.88	0.77	0.96
Adj. Flow (vph)	208	156	846	349	245	822
RTOR Reduction (vph)	0	0	50	0	0	0
Lane Group Flow (vph)	208	156	1145	0	245	822
Confl. Peds. (#/hr)	44	30		9	9	
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	12%	12%	3%	8%	4%	1%
Turn Type	Prot	pm+ov	NA		Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	39.0	33.0		15.0	54.0
Effective Green, g (s)	24.0	39.0	33.0		15.0	54.0
Actuated g/C Ratio	0.27	0.43	0.37		0.17	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	434	709	1213		292	1141
v/s Ratio Prot	c0.13	0.04	c0.35		0.14	c0.43
v/s Ratio Perm		0.07				
v/c Ratio	0.48	0.22	0.94		0.84	0.72
Uniform Delay, d1	27.7	16.0	27.6		36.3	12.7
Progression Factor	1.00	1.00	0.93		0.83	0.56
Incremental Delay, d2	3.8	0.7	8.7		17.6	2.7
Delay (s)	31.5	16.7	34.3		47.7	9.8
Level of Service	C	B	C		D	A
Approach Delay (s)	25.2		34.3			18.5
Approach LOS	C		C			B
Intersection Summary						
HCM 2000 Control Delay			26.6		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.77			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			77.5%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	472	201	39	869	1044
v/c Ratio	0.93	0.33	0.06	0.88	0.76
Control Delay	53.6	6.9	11.5	32.8	23.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	53.6	6.9	11.5	32.8	23.0
Queue Length 50th (m)	74.0	4.8	2.2	53.1	61.5
Queue Length 95th (m)	88.7	14.8	8.2	#79.3	87.4
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	539	642	653	982	1366
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	0.88	0.31	0.06	0.88	0.76

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

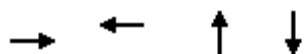
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	359	0	165	17	4	18	103	664	0	0	799	155
Future Volume (vph)	359	0	165	17	4	18	103	664	0	0	799	155
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	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	1.00		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.94			1.00			0.97	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1802		1407		1651			3414			3378	
Flt Permitted	0.73		1.00		0.98			0.54			1.00	
Satd. Flow (perm)	1388		1407		1651			1867			3378	
Peak-hour factor, PHF	0.76	0.38	0.82	1.00	1.00	1.00	0.90	0.88	0.25	0.25	0.93	0.84
Adj. Flow (vph)	472	0	201	17	4	18	114	755	0	0	859	185
RTOR Reduction (vph)	0	0	99	0	11	0	0	0	0	0	19	0
Lane Group Flow (vph)	472	0	102	0	28	0	0	869	0	0	1025	0
Confl. Peds. (#/hr)	2		87	87		2	44		2	2		44
Confl. Bikes (#/hr)			3									3
Heavy Vehicles (%)	1%	0%	3%	0%	0%	0%	4%	5%	0%	0%	4%	1%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	33.1		33.1		33.1			44.9			35.9	
Effective Green, g (s)	33.1		33.1		33.1			44.9			35.9	
Actuated g/C Ratio	0.37		0.37		0.37			0.50			0.40	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	510		517		607			1034			1347	
v/s Ratio Prot								c0.06			0.30	
v/s Ratio Perm	c0.34		0.07		0.02			c0.36				
v/c Ratio	0.93		0.20		0.05			0.84			0.76	
Uniform Delay, d1	27.3		19.4		18.3			19.5			23.3	
Progression Factor	1.00		1.00		1.00			1.00			0.84	
Incremental Delay, d2	22.8		0.2		0.0			6.3			3.1	
Delay (s)	50.0		19.6		18.3			25.7			22.7	
Level of Service	D		B		B			C			C	
Approach Delay (s)		40.9			18.3			25.7			22.7	
Approach LOS		D			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			28.3				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			15.0		
Intersection Capacity Utilization			90.8%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Yorkshire Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	656	731	239	184
v/c Ratio	0.65	0.72	0.70	0.56
Control Delay	13.0	24.6	42.0	26.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	13.0	24.6	42.0	26.8
Queue Length 50th (m)	54.8	108.9	33.7	17.4
Queue Length 95th (m)	88.3	130.3	43.3	25.9
Internal Link Dist (m)	75.8	170.8	338.4	63.8
Turn Bay Length (m)				
Base Capacity (vph)	1012	1020	417	395
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	0.65	0.72	0.57	0.47
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Yorkshire Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	440	56	54	495	29	44	115	25	22	51	51
Future Volume (vph)	40	440	56	54	495	29	44	115	25	22	51	51
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			1.00			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			1.00	
Frt		0.98			0.99			0.99			0.95	
Flt Protected		1.00			0.99			0.99			0.99	
Satd. Flow (prot)		1781			1876			1858			1760	
Flt Permitted		0.89			0.85			0.86			0.81	
Satd. Flow (perm)		1590			1607			1622			1445	
Peak-hour factor, PHF	0.67	0.87	0.62	0.59	0.82	0.82	0.85	0.71	1.00	0.50	0.73	0.73
Adj. Flow (vph)	60	506	90	92	604	35	52	162	25	44	70	70
RTOR Reduction (vph)	0	7	0	0	2	0	0	6	0	0	31	0
Lane Group Flow (vph)	0	649	0	0	729	0	0	233	0	0	153	0
Confl. Peds. (#/hr)	18		8	8		18	18		2	2		18
Confl. Bikes (#/hr)			3			2			2			1
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	7	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		47.5			47.5			15.5			15.5	
Effective Green, g (s)		47.5			47.5			15.5			15.5	
Actuated g/C Ratio		0.63			0.63			0.21			0.21	
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)		1007			1017			335			298	
v/s Ratio Prot												
v/s Ratio Perm		0.41			c0.45			c0.14			0.11	
v/c Ratio		0.64			0.72			0.69			0.51	
Uniform Delay, d1		8.5			9.2			27.6			26.4	
Progression Factor		1.00			1.89			1.21			1.00	
Incremental Delay, d2		3.2			4.0			5.6			1.5	
Delay (s)		11.7			21.4			39.0			27.9	
Level of Service		B			C			D			C	
Approach Delay (s)		11.7			21.4			39.0			27.9	
Approach LOS		B			C			D			C	
Intersection Summary												
HCM 2000 Control Delay			20.9			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			67.8%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Yorkshire Street North & Northumberland Street

10/29/2018

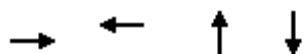


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	7	10	184	7	16	122
Future Volume (Veh/h)	7	10	184	7	16	122
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.50	0.67	0.84	0.75	0.46	0.80
Hourly flow rate (vph)	14	15	219	9	35	153
Pedestrians	5					3
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			284			362
pX, platoon unblocked						
vC, conflicting volume	452	232			233	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	452	232			233	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	97	98			97	
cM capacity (veh/h)	551	806			1294	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	29	228	188			
Volume Left	14	0	35			
Volume Right	15	9	0			
cSH	659	1700	1294			
Volume to Capacity	0.04	0.13	0.03			
Queue Length 95th (m)	1.0	0.0	0.6			
Control Delay (s)	10.7	0.0	1.7			
Lane LOS	B		A			
Approach Delay (s)	10.7	0.0	1.7			
Approach LOS	B					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			30.8%	ICU Level of Service		A
Analysis Period (min)			15			

Queues

3: Yorkshire Street South & Waterloo Avenue

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	434	622	64	214
v/c Ratio	0.53	0.58	0.14	0.44
Control Delay	12.2	12.0	14.8	13.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.2	12.0	14.8	13.8
Queue Length 50th (m)	33.0	47.6	3.8	12.5
Queue Length 95th (m)	46.9	57.5	7.6	11.0
Internal Link Dist (m)	50.5	146.5	65.6	106.9
Turn Bay Length (m)				
Base Capacity (vph)	822	1074	447	489
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	0.53	0.58	0.14	0.44
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

3: Yorkshire Street South & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	78	255	2	4	390	79	4	19	22	37	16	88
Future Volume (vph)	78	255	2	4	390	79	4	19	22	37	16	88
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			0.97	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		1.00			0.98			0.94			0.91	
Flt Protected		0.99			1.00			1.00			0.99	
Satd. Flow (prot)		1845			1828			1720			1690	
Flt Permitted		0.75			0.99			0.97			0.92	
Satd. Flow (perm)		1400			1815			1680			1572	
Peak-hour factor, PHF	0.70	0.81	0.25	0.38	0.77	0.75	0.75	0.63	0.75	0.83	0.56	0.63
Adj. Flow (vph)	111	315	8	11	506	105	5	30	29	45	29	140
RTOR Reduction (vph)	0	1	0	0	10	0	0	22	0	0	91	0
Lane Group Flow (vph)	0	433	0	0	612	0	0	42	0	0	123	0
Confl. Peds. (#/hr)	16		13	13		16	9					9
Confl. Bikes (#/hr)			2			2			2			
Heavy Vehicles (%)	0%	3%	0%	0%	2%	0%	0%	7%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		44.0			44.0			19.0			19.0	
Effective Green, g (s)		44.0			44.0			19.0			19.0	
Actuated g/C Ratio		0.59			0.59			0.25			0.25	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		821			1064			425			398	
v/s Ratio Prot												
v/s Ratio Perm		0.31			0.34			0.03			0.08	
v/c Ratio		0.53			0.58			0.10			0.31	
Uniform Delay, d1		9.3			9.7			21.4			22.7	
Progression Factor		1.00			1.00			1.00			1.02	
Incremental Delay, d2		2.4			2.3			0.5			1.8	
Delay (s)		11.7			11.9			21.9			25.1	
Level of Service		B			B			C			C	
Approach Delay (s)		11.7			11.9			21.9			25.1	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay		14.4			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.49										
Actuated Cycle Length (s)		75.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		74.2%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Glasgow Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	449	25	21	534	16	22	32	15	7	24	21
Future Volume (Veh/h)	21	449	25	21	534	16	22	32	15	7	24	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.53	0.84	0.56	0.65	0.85	0.65	0.75	0.72	0.60	0.50	0.59	0.71
Hourly flow rate (vph)	40	535	45	32	628	25	29	44	25	14	41	30
Pedestrians		7			1			11			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		195			192							
pX, platoon unblocked	0.80			0.83			0.88	0.88	0.83	0.88	0.88	0.80
vC, conflicting volume	667			591			1410	1380	570	1404	1390	662
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	460			409			974	939	383	967	950	454
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 %	95			97			81	79	95	90	80	94
cM capacity (veh/h)	878			957			149	212	551	142	209	469
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	620	685	98	85								
Volume Left	40	32	29	14								
Volume Right	45	25	25	30								
cSH	878	957	219	237								
Volume to Capacity	0.05	0.03	0.45	0.36								
Queue Length 95th (m)	1.1	0.8	16.2	11.8								
Control Delay (s)	1.2	0.9	34.1	28.5								
Lane LOS	A	A	D	D								
Approach Delay (s)	1.2	0.9	34.1	28.5								
Approach LOS			D	D								
Intersection Summary												
Average Delay			4.8									
Intersection Capacity Utilization			51.2%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glasgow Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	6	2	9	4	4	6	45	17	5	63	1
Future Volume (Veh/h)	6	6	2	9	4	4	6	45	17	5	63	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.63	0.63	0.25	0.33	0.75	0.38	0.63	0.77	0.50	0.33	0.85	0.25
Hourly flow rate (vph)	10	10	8	27	5	11	10	58	34	15	74	4
Pedestrians		12			9			9			7	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	234	239	97	232	224	91	90			101		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	234	239	97	232	224	91	90			101		
tC, single (s)	7.1	6.7	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.2	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	98	99	96	99	99	99			99		
cM capacity (veh/h)	680	609	945	680	654	957	1500			1491		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	28	43	102	93								
Volume Left	10	27	10	15								
Volume Right	8	11	34	4								
cSH	707	731	1500	1491								
Volume to Capacity	0.04	0.06	0.01	0.01								
Queue Length 95th (m)	0.9	1.4	0.2	0.2								
Control Delay (s)	10.3	10.2	0.8	1.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.3	10.2	0.8	1.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay			3.5									
Intersection Capacity Utilization			20.1%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: Glasgow Street North & Kent Street

10/29/2018

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	7	6	65	13	4	88
Future Volume (Veh/h)	7	6	65	13	4	88
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.42	0.57	0.75	0.38	0.83
Hourly flow rate (vph)	28	14	114	17	11	106
Pedestrians	4					4
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	254	130			135	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	254	130			135	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	98			99	
cM capacity (veh/h)	730	917			1456	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	42	131	117			
Volume Left	28	0	11			
Volume Right	14	17	0			
cSH	783	1700	1456			
Volume to Capacity	0.05	0.08	0.01			
Queue Length 95th (m)	1.3	0.0	0.2			
Control Delay (s)	9.9	0.0	0.8			
Lane LOS	A		A			
Approach Delay (s)	9.9	0.0	0.8			
Approach LOS	A					
Intersection Summary						
Average Delay		1.7				
Intersection Capacity Utilization		19.1%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: Glasgow Street North & Waterloo Avenue

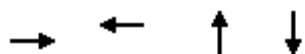
10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	269	10	5	381	36	26	5	32	39	10	45
Future Volume (Veh/h)	33	269	10	5	381	36	26	5	32	39	10	45
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.68	0.94	0.50	0.59	0.83	0.25	0.58	0.33	0.65	0.84	0.50	0.83
Hourly flow rate (vph)	49	286	20	8	459	144	45	15	49	46	20	54
Pedestrians		4			1			13			14	
Lane Width (m)		3.7			3.7			3.7			3.7	
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)		170										
pX, platoon unblocked				0.96			0.96	0.96	0.96	0.96	0.96	
vC, conflicting volume	617			319			1022	1040	310	1012	978	549
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	617			264			1000	1019	255	990	954	549
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 %	95			99			73	93	93	74	91	90
cM capacity (veh/h)	959			1237			165	210	734	177	229	530
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	355	611	109	120								
Volume Left	49	8	45	46								
Volume Right	20	144	49	54								
cSH	959	1237	266	267								
Volume to Capacity	0.05	0.01	0.41	0.45								
Queue Length 95th (m)	1.2	0.1	14.5	16.6								
Control Delay (s)	1.7	0.2	27.7	29.0								
Lane LOS	A	A	D	D								
Approach Delay (s)	1.7	0.2	27.7	29.0								
Approach LOS			D	D								
Intersection Summary												
Average Delay			6.0									
Intersection Capacity Utilization			50.5%	ICU Level of Service					A			
Analysis Period (min)			15									

Queues

8: Dublin Street North & Paisley Street

10/29/2018



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	577	688	25	122
v/c Ratio	0.46	0.52	0.08	0.43
Control Delay	5.6	9.4	17.9	22.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.6	9.4	17.9	22.8
Queue Length 50th (m)	23.8	54.5	1.9	10.0
Queue Length 95th (m)	34.8	73.1	5.5	15.6
Internal Link Dist (m)	168.1	100.1	331.5	47.4
Turn Bay Length (m)				
Base Capacity (vph)	1265	1324	485	419
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	0.46	0.52	0.05	0.29
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

8: Dublin Street North & Paisley Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	456	5	5	528	34	2	10	6	55	5	39
Future Volume (vph)	16	456	5	5	528	34	2	10	6	55	5	39
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			0.98			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			0.97	
Frt		1.00			0.99			0.96			0.95	
Flt Protected		1.00			1.00			0.99			0.97	
Satd. Flow (prot)		1858			1879			1775			1704	
Flt Permitted		0.96			0.99			0.96			0.80	
Satd. Flow (perm)		1788			1870			1714			1408	
Peak-hour factor, PHF	0.65	0.84	0.58	0.67	0.83	0.75	0.63	0.71	0.78	0.75	0.67	0.92
Adj. Flow (vph)	25	543	9	7	636	45	3	14	8	73	7	42
RTOR Reduction (vph)	0	1	0	0	3	0	0	7	0	0	29	0
Lane Group Flow (vph)	0	576	0	0	685	0	0	18	0	0	93	0
Confl. Peds. (#/hr)	24		35	35		24	10		23	23		10
Confl. Bikes (#/hr)			2			2						1
Heavy Vehicles (%)	0%	3%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		50.6			50.6			12.4			12.4	
Effective Green, g (s)		50.6			50.6			12.4			12.4	
Actuated g/C Ratio		0.67			0.67			0.17			0.17	
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)		1206			1261			283			232	
v/s Ratio Prot												
v/s Ratio Perm		0.32			0.37			0.01			0.07	
v/c Ratio		0.48			0.54			0.06			0.40	
Uniform Delay, d1		5.9			6.3			26.4			28.0	
Progression Factor		0.61			1.00			1.00			1.00	
Incremental Delay, d2		1.2			1.7			0.1			1.1	
Delay (s)		4.7			8.0			26.5			29.1	
Level of Service		A			A			C			C	
Approach Delay (s)		4.7			8.0			26.5			29.1	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay		8.8			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.51										
Actuated Cycle Length (s)		75.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		58.1%			ICU Level of Service			B				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

9: Dublin Street North & Northumberland Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	8	0	0	6	2	0	3	0	2	2	4
Future Volume (Veh/h)	2	8	0	0	6	2	0	3	0	2	2	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.50	0.25	0.50	0.50	0.44	0.88	0.42	0.50	0.77	0.38
Hourly flow rate (vph)	8	32	0	0	12	4	0	3	0	4	3	11
Pedestrians		5			7			16			4	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			2			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)											355	
pX, platoon unblocked												
vC, conflicting volume	38	32	30	58	37	14	19			10		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	38	32	30	58	37	14	19			10		
tC, single (s)	7.1	6.5	6.5	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	99	96	100	100	99	100	100			100		
cM capacity (veh/h)	939	853	963	886	847	1060	1515			1612		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	40	16	3	18								
Volume Left	8	0	0	4								
Volume Right	0	4	0	11								
cSH	869	892	1515	1612								
Volume to Capacity	0.05	0.02	0.00	0.00								
Queue Length 95th (m)	1.1	0.4	0.0	0.1								
Control Delay (s)	9.3	9.1	0.0	1.6								
Lane LOS	A	A		A								
Approach Delay (s)	9.3	9.1	0.0	1.6								
Approach LOS	A	A										
Intersection Summary												
Average Delay			7.1									
Intersection Capacity Utilization			19.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Dublin Street North & Kent Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	4	0	0	5	0	0	0	0	1	0	5
Future Volume (Veh/h)	1	4	0	0	5	0	0	0	0	1	0	5
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.94	0.25	0.25	0.84	0.50
Hourly flow rate (vph)	4	16	0	0	20	0	0	0	0	4	0	10
Pedestrians	3			20			8			8		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	0			2			1			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	34	36	16	49	41	28	13				20	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	34	36	16	49	41	28	13				20	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	100	98	100	100	98	100	100				100	
cM capacity (veh/h)	932	839	1058	899	834	1024	1614				1578	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	20	20	0	14								
Volume Left	4	0	0	4								
Volume Right	0	0	0	10								
cSH	856	834	1700	1578								
Volume to Capacity	0.02	0.02	0.00	0.00								
Queue Length 95th (m)	0.5	0.6	0.0	0.1								
Control Delay (s)	9.3	9.4	0.0	2.1								
Lane LOS	A	A		A								
Approach Delay (s)	9.3	9.4	0.0	2.1								
Approach LOS	A	A										
Intersection Summary												
Average Delay				7.5								
Intersection Capacity Utilization				20.5%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

11: Dublin Street North & Waterloo Avenue

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	286	22	6	325	0	105	0	100	1	1	2
Future Volume (Veh/h)	0	286	22	6	325	0	105	0	100	1	1	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.87	0.64	0.63	0.84	0.63	0.74	0.82	0.63	0.53	0.58	0.83
Hourly flow rate (vph)	0	329	34	10	387	0	142	0	159	2	2	2
Pedestrians		7			9			15			9	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		374			207							
pX, platoon unblocked												
vC, conflicting volume	396			378			778	777	370	930	794	403
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	396			378			778	777	370	930	794	403
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 %	100			99			52	100	76	99	99	100
cM capacity (veh/h)	1136			1174			297	320	653	177	313	637
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	363	397	301	6								
Volume Left	0	10	142	2								
Volume Right	34	0	159	2								
cSH	1136	1174	417	288								
Volume to Capacity	0.00	0.01	0.72	0.02								
Queue Length 95th (m)	0.0	0.2	42.6	0.5								
Control Delay (s)	0.0	0.3	33.0	17.8								
Lane LOS		A	D	C								
Approach Delay (s)	0.0	0.3	33.0	17.8								
Approach LOS			D	C								
Intersection Summary												
Average Delay			9.5									
Intersection Capacity Utilization			47.6%	ICU Level of Service					A			
Analysis Period (min)			15									

Queues

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Group Flow (vph)	162	193	294	189	321	154	218	751	107	95	677
v/c Ratio	0.66	0.52	0.71	0.55	0.80	0.55	0.80	0.97	0.15	0.45	0.87
Control Delay	34.9	36.4	18.3	27.7	49.6	18.7	31.8	44.8	2.8	16.5	37.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.9	36.4	18.3	27.7	49.6	18.7	31.8	44.8	2.8	16.5	37.4
Queue Length 50th (m)	18.8	28.8	8.2	22.3	51.4	6.3	11.5	~158.7	1.7	7.2	103.7
Queue Length 95th (m)	26.2	38.8	26.8	37.8	74.2	18.4	m#24.9	m#202.5	m2.3	10.9	#166.9
Internal Link Dist (m)		53.1			97.4			120.3			67.1
Turn Bay Length (m)	15.0		25.0	25.0		25.0	60.0		10.0	20.0	
Base Capacity (vph)	244	411	431	342	443	299	271	772	721	209	779
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.47	0.68	0.55	0.72	0.52	0.80	0.97	0.15	0.45	0.87

Intersection Summary

~ 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.

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

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	49	69	143	241	172	273	75	32	170	577	103	111
Future Volume (vph)	49	69	143	241	172	273	75	32	170	577	103	111
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
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.95		0.95
Frpb, ped/bikes		1.00	1.00	0.68	1.00	1.00	0.57		1.00	0.96		0.92
Flpb, ped/bikes		0.95	1.00	1.00	0.88	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	0.97		0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		1.00
Satd. Flow (prot)		1716	1762	1075	1613	1902	926		1807	1668		1431
Flt Permitted		0.28	1.00	1.00	0.55	1.00	1.00		0.13	1.00		1.00
Satd. Flow (perm)		512	1762	1075	935	1902	926		257	1668		1431
Peak-hour factor, PHF	0.71	0.74	0.74	0.82	0.91	0.85	0.79	0.54	0.78	0.95	0.78	0.93
Adj. Flow (vph)	69	93	193	294	189	321	95	59	218	607	132	119
RTOR Reduction (vph)	0	0	0	186	0	0	86	0	0	1	0	58
Lane Group Flow (vph)	0	162	193	108	189	321	68	0	218	750	0	49
Confl. Peds. (#/hr)	107	104		156	156		107	104	104		104	59
Confl. Bikes (#/hr)				3			4	4			7	7
Heavy Vehicles (%)	2%	0%	6%	0%	0%	1%	0%	0%	1%	3%	0%	0%
Bus Blockages (#/hr)	0	0	7	7	0	0	0	0	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm		pm+pt	NA		Perm
Protected Phases	3	3	8		7	4			5	2		
Permitted Phases	8	8		8	4		4		2			2
Actuated Green, G (s)		25.9	18.9	18.9	25.9	18.9	18.9		48.6	41.1		41.1
Effective Green, g (s)		25.9	18.9	18.9	25.9	18.9	18.9		48.6	41.1		41.1
Actuated g/C Ratio		0.29	0.21	0.21	0.29	0.21	0.21		0.54	0.46		0.46
Clearance Time (s)		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
Lane Grp Cap (vph)		240	370	225	321	399	194		267	761		653
v/s Ratio Prot		c0.05	0.11		0.05	c0.17			c0.07	c0.45		
v/s Ratio Perm		0.14		0.10	0.12		0.07		0.37			0.03
v/c Ratio		0.68	0.52	0.48	0.59	0.80	0.35		0.82	0.99		0.07
Uniform Delay, d1		25.8	31.5	31.2	26.3	33.8	30.3		16.7	24.2		13.8
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.20	0.90		0.74
Incremental Delay, d2		7.3	1.3	1.6	2.8	11.2	1.1		11.2	22.3		0.1
Delay (s)		33.1	32.9	32.8	29.1	45.0	31.4		31.2	44.2		10.4
Level of Service		C	C	C	C	D	C		C	D		B
Approach Delay (s)			32.9			37.3				38.2		
Approach LOS			C			D				D		
Intersection Summary												
HCM 2000 Control Delay			35.9									HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			90.0									Sum of lost time (s) 18.0
Intersection Capacity Utilization			90.4%									ICU Level of Service E
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Norfolk Street & Paisley Street/Quebec Street & Yarmouth Street

10/29/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	19	46	532	72
Future Volume (vph)	19	46	532	72
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		3.0	6.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.98	
Flpb, ped/bikes		1.00	1.00	
Frt		1.00	0.98	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1765	1806	
Flt Permitted		0.10	1.00	
Satd. Flow (perm)		192	1806	
Peak-hour factor, PHF	0.63	0.71	0.89	0.91
Adj. Flow (vph)	30	65	598	79
RTOR Reduction (vph)	0	0	5	0
Lane Group Flow (vph)	0	95	672	0
Confl. Peds. (#/hr)	104	59		104
Confl. Bikes (#/hr)				5
Heavy Vehicles (%)	0%	5%	2%	2%
Bus Blockages (#/hr)	0	0	0	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	1	1	6	
Permitted Phases	6	6		
Actuated Green, G (s)		43.6	38.6	
Effective Green, g (s)		43.6	38.6	
Actuated g/C Ratio		0.48	0.43	
Clearance Time (s)		3.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		180	774	
v/s Ratio Prot		0.03	0.37	
v/s Ratio Perm		0.23		
v/c Ratio		0.53	0.87	
Uniform Delay, d1		18.2	23.4	
Progression Factor		1.00	1.00	
Incremental Delay, d2		2.8	12.6	
Delay (s)		21.0	36.0	
Level of Service		C	D	
Approach Delay (s)			34.2	
Approach LOS			C	
Intersection Summary				

HCM Unsignalized Intersection Capacity Analysis

13: Norfolk Street & Cork Street West/Cork Street East

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	6	31	22	9	62	26	946	42	48	920	27
Future Volume (Veh/h)	6	6	31	22	9	62	26	946	42	48	920	27
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.63	0.63	0.78	0.75	0.44	0.83	0.80	1.00	0.80	0.80	1.00	0.80
Hourly flow rate (vph)	10	10	40	29	20	75	33	946	53	60	920	34
Pedestrians	52			63			3			6		
Lane Width (m)	3.7			3.7			3.7			3.7		
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)							94			144		
pX, platoon unblocked	0.75	0.75	0.61	0.75	0.75	0.71	0.61				0.71	
vC, conflicting volume	1739	2237	992	2190	2228	568	1006				1062	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	365	1028	661	964	1015	0	684				266	
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 %	96	93	83	70	86	90	94				93	
cM capacity (veh/h)	269	138	235	97	140	721	528				871	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	60	124	506	526	60	954						
Volume Left	10	29	33	0	60	0						
Volume Right	40	75	0	53	0	34						
cSH	214	228	528	1700	871	1700						
Volume to Capacity	0.28	0.54	0.06	0.31	0.07	0.56						
Queue Length 95th (m)	8.4	22.3	1.5	0.0	1.7	0.0						
Control Delay (s)	28.2	38.3	1.8	0.0	9.4	0.0						
Lane LOS	D	E	A		A							
Approach Delay (s)	28.2	38.3	0.9		0.6							
Approach LOS	D	E										
Intersection Summary												
Average Delay				3.5								
Intersection Capacity Utilization				67.0%	ICU Level of Service				C			
Analysis Period (min)				15								

Queues

14: Norfolk Street & Macdonell Street

10/29/2018



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	264	257	1178	238	851
v/c Ratio	0.70	0.79	0.91	0.68	0.69
Control Delay	43.3	52.5	31.7	46.2	17.6
Queue Delay	0.0	0.0	0.0	0.0	0.1
Total Delay	43.3	52.5	31.7	46.2	17.7
Queue Length 50th (m)	42.2	42.1	90.7	36.0	110.2
Queue Length 95th (m)	62.5	#67.5	#119.3	m47.6	m146.5
Internal Link Dist (m)	107.2		170.6		69.8
Turn Bay Length (m)				60.0	
Base Capacity (vph)	379	324	1297	351	1237
Starvation Cap Reductn	0	0	0	0	35
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.70	0.79	0.91	0.68	0.71

Intersection Summary

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.

HCM Signalized Intersection Capacity Analysis

14: Norfolk Street & Macdonell Street

10/29/2018

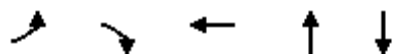
						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	222	211	777	205	193	800
Future Volume (vph)	222	211	777	205	193	800
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	0.94	0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1706	1460	3344		1755	1921
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1706	1460	3344		1755	1921
Peak-hour factor, PHF	0.84	0.82	0.87	0.72	0.81	0.94
Adj. Flow (vph)	264	257	893	285	238	851
RTOR Reduction (vph)	0	0	34	0	0	0
Lane Group Flow (vph)	264	257	1144	0	238	851
Confl. Peds. (#/hr)	48	42		34	34	
Confl. Bikes (#/hr)		3		5		
Heavy Vehicles (%)	7%	5%	1%	11%	4%	0%
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	20.0	20.0	34.0		18.0	58.0
Effective Green, g (s)	20.0	20.0	34.0		18.0	58.0
Actuated g/C Ratio	0.22	0.22	0.38		0.20	0.64
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	379	324	1263		351	1237
v/s Ratio Prot	0.15		c0.34		0.14	c0.44
v/s Ratio Perm		c0.18				
v/c Ratio	0.70	0.79	0.91		0.68	0.69
Uniform Delay, d1	32.2	33.0	26.5		33.3	10.2
Progression Factor	1.00	1.00	0.90		1.12	1.41
Incremental Delay, d2	10.1	17.9	8.1		7.8	2.4
Delay (s)	42.4	50.9	31.9		45.2	16.8
Level of Service	D	D	C		D	B
Approach Delay (s)	46.6		31.9			23.0
Approach LOS	D		C			C
Intersection Summary						
HCM 2000 Control Delay			31.2		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.84			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			76.1%		ICU Level of Service	D
Analysis Period (min)			15			

c Critical Lane Group

Queues

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018



Lane Group	EBL	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	305	196	138	906	1060
v/c Ratio	0.84	0.36	0.27	0.79	0.64
Control Delay	50.3	5.2	16.9	21.9	17.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	50.3	5.2	16.9	21.9	17.0
Queue Length 50th (m)	48.7	0.0	12.3	44.5	36.2
Queue Length 95th (m)	64.1	9.8	23.9	#78.0	60.7
Internal Link Dist (m)			37.3	157.6	170.6
Turn Bay Length (m)	25.0	35.0			
Base Capacity (vph)	449	635	615	1144	1647
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	0.68	0.31	0.22	0.79	0.64

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

15: Gordon Street/Norfolk Street & Waterloo Avenue/Wilson Street

10/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	0	161	60	22	56	127	681	0	0	784	199
Future Volume (vph)	250	0	161	60	22	56	127	681	0	0	784	199
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	
Lane Util. Factor	1.00		1.00		1.00			0.95			0.95	
Flpb, ped/bikes	1.00		0.89		0.99			1.00			0.98	
Flpb, ped/bikes	0.99		1.00		0.94			1.00			1.00	
Frt	1.00		0.85		0.95			1.00			0.97	
Flt Protected	0.95		1.00		0.98			0.99			1.00	
Satd. Flow (prot)	1765		1432		1654			3475			3373	
Flt Permitted	0.68		1.00		0.98			0.54			1.00	
Satd. Flow (perm)	1265		1432		1654			1882			3373	
Peak-hour factor, PHF	0.82	0.25	0.82	1.00	1.00	1.00	0.85	0.90	0.25	0.25	0.96	0.82
Adj. Flow (vph)	305	0	196	60	22	56	149	757	0	0	817	243
RTOR Reduction (vph)	0	0	140	0	30	0	0	0	0	0	27	0
Lane Group Flow (vph)	305	0	56	0	108	0	0	906	0	0	1033	0
Confl. Peds. (#/hr)	12		89	89		12	45		13	13		45
Confl. Bikes (#/hr)			1						5			1
Heavy Vehicles (%)	2%	0%	1%	0%	0%	0%	2%	3%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	2	2	0	0	0	0	6	6	0	0	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)	25.8		25.8		25.8			52.2			43.2	
Effective Green, g (s)	25.8		25.8		25.8			52.2			43.2	
Actuated g/C Ratio	0.29		0.29		0.29			0.58			0.48	
Clearance Time (s)	6.0		6.0		6.0			6.0			6.0	
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)	362		410		474			1197			1619	
v/s Ratio Prot								c0.05			0.31	
v/s Ratio Perm	c0.24		0.04		0.07			c0.39				
v/c Ratio	0.84		0.14		0.23			0.76			0.64	
Uniform Delay, d1	30.2		23.8		24.5			14.1			17.5	
Progression Factor	1.00		1.00		1.00			1.00			0.86	
Incremental Delay, d2	16.1		0.2		0.2			2.8			1.4	
Delay (s)	46.3		24.0		24.7			16.9			16.5	
Level of Service	D		C		C			B			B	
Approach Delay (s)		37.6			24.7			16.9			16.5	
Approach LOS		D			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			21.1				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			15.0		
Intersection Capacity Utilization			86.0%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Appendix H: Signal Warrant Analysis Spreadsheets

Analysis Sheet

Input Sheet

Results Sheet

Proposed Collision

GO TO Justification:

Intersection: Norfolk Street and Cork Street

Count Date: 2031 - Kent Street One-Way

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 Lanes		2 or More Lanes		Hour Ending											
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	8:00	9:00	10:00	12:00	13:00	17:00	18:00	19:00				
1A	☐	☐	☐	☒	1,324	1,892	1,702	1,629	1,629	2,034	2,034	1,629				
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100		
1B	120	170	120	170	85	122	109	110	110	136	136	110				
	COMPLIANCE %				50	72	64	65	65	80	80	65	540	68		
Restricted Flow					Both 1A and 1B 100% Fulfilled each of 8 hours								Yes ☐		No ☒	
Signal Justification 1:					Lesser of 1A or 1B at least 80% fulfilled each of 8 hours								Yes ☐		No ☒	

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 lanes		2 or More lanes		Hour Ending											
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☐	FREE FLOW ☐	RESTR. FLOW ☒	8:00	9:00	10:00	12:00	13:00	17:00	18:00	19:00				
2A	480	720	600	900	1,239	1,770	1,593	1,519	1,519	1,898	1,898	1,519	800	100		
	COMPLIANCE %				100	100	100	100	100	100	100	100				
2B	50	75	50	75	36	52	46	37	37	46	46	37				
	COMPLIANCE %				48	69	61	49	49	61	61	49	449	56		
Restricted Flow Signal Justification 2:					Both 2A and 2B 100% fulfilled each of 8 hours Lesser of 2A or 2B at least 80% fulfilled each of 8 hours								Yes ☐	No ☒	Yes ☐	No ☒

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☐	NO ☒	YES ☐	NO ☒
Justification 2	Delay Cross Traffic	YES ☐	NO ☒		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach	Required Value	Average % Compliance	Overall % Compliance
		X	Y (actual)	Y (warrant threshold)		
Justification 4	9:00	1,770	69	115	60 %	69 %
	10:00	1,593	61	115	53 %	
	17:00	1,898	93	115	81 %	
	18:00	1,898	93	115	81 %	

Analysis Sheet

[Input Sheet](#)
[Results Sheet](#)
[Proposed Collision](#)

GO TO Justification:

Intersection: Norfolk Street and Cork Street

Count Date: 2031 - Kent Street One-Way

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	20 %	47 %
	13-24	40 %	
	25-36	80 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Analysis Sheet

[Input Sheet](#)
[Results Sheet](#)
[Proposed Collision](#)

GO TO Justification:

Intersection: Paisley Street and Glasgow Street

Count Date: 2031 - Kent Street One-Way

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	8:00	9:00	10:00	12:00	13:00	17:00	18:00	19:00		
1A	☐	☒	☐	☐	510	1,015	709	834	834	1,191	1,191	955		
	COMPLIANCE %				71	100	98	100	100	100	100	100	769	96
1B	120	170	120	170	80	158	109	85	85	121	121	98		
	COMPLIANCE %				47	93	64	50	50	71	71	58	504	63
Restricted Flow Signal Justification 1:					Both 1A and 1B 100% Fulfilled each of 8 hours								Yes ☐	No ☒
					Lesser of 1A or 1B at least 80% fulfilled each of 8 hours								Yes ☐	No ☒

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent						
	1 lanes		2 or More lanes		Hour Ending															
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	8:00	9:00	10:00	12:00	13:00	17:00	18:00	19:00								
2A	☐	☒	☐	☐	480	720	600	900	430	857	600	749	749	1,070	1,070	857				
	COMPLIANCE %				60	100	83	100	100	100	100	100	100	743	93					
2B	50	75	50	75	45	89	62	48	48	70	70	57								
	COMPLIANCE %				60	100	83	64	64	93	93	76	633	79						
Restricted Flow					Both 2A and 2B 100% fulfilled each of 8 hours												Yes	☐	No	☒
Signal Justification 2:					Lesser of 2A or 2B at least 80% fulfilled each of 8 hours												Yes	☐	No	☒

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☐	NO ☒	YES ☐	NO ☒
Justification 2	Delay Cross Traffic	YES ☐	NO ☒		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach Y (actual)	Required Value Y (warrant threshold)	Average % Compliance	Overall % Compliance
Justification 4	9:00	X	90	136	66 %	66 %
	17:00	1,070	69	89	77 %	
	18:00	1,070	69	89	77 %	
	19:00	857	56	136	41 %	

Analysis Sheet

[Input Sheet](#)
[Results Sheet](#)
[Proposed Collision](#)

GO TO Justification:

Intersection: Paisley Street and Glasgow Street

Count Date: 2031 - Kent Street One-Way

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	20 %	13 %
	13-24	20 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Analysis Sheet

[Input Sheet](#)
[Results Sheet](#)
[Proposed Collision](#)

GO TO Justification:

Intersection: Waterloo Street and Dublin Street

Count Date: 2031 - Kent Street One-Way

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 Lanes		2 or More Lanes		Hour Ending											
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	8:00	9:00	10:00	12:00	13:00	17:00	18:00	19:00				
	☐	☒	☐	☐												
1A	480	720	600	900	493	981	687	600	699	999	999	699	741	93		
	COMPLIANCE %				68	100	95	83	97	100	100	97				
1B	120	170	120	170	113	223	156	190	221	316	316	221				
	COMPLIANCE %				66	100	92	100	100	100	100	100			758	95
Restricted Flow Signal Justification 1:					Both 1A and 1B 100% Fulfilled each of 8 hours								Yes	☐	No	☒
					Lesser of 1A or 1B at least 80% fulfilled each of 8 hours								Yes	☒	No	☐

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent				
	1 lanes		2 or More lanes		Hour Ending													
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	8:00	9:00	10:00	12:00	13:00	17:00	18:00	19:00						
2A	☐	☒	☐	☐	480	720	600	900	380	758	531	410	478	683	683	478		
	COMPLIANCE %				53	100	74	57	66	95	95	66	606	76				
2B	50	75	50	75	75	147	103	132	153	219	219	153						
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100				
Restricted Flow					Both 2A and 2B 100% fulfilled each of 8 hours								Yes	☐	No	☒		
Signal Justification 2:					Lesser of 2A or 2B at least 80% fulfilled each of 8 hours								Yes	☐	No	☒		

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☒	NO ☐	YES ☐	NO ☒
Justification 2	Delay Cross Traffic	YES ☐	NO ☒		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach Y (actual)	Required Value Y (warrant threshold)	Average % Compliance	Overall % Compliance
Justification 4	9:00	X	137	164	83 %	80 %
	10:00	531	96	249	39 %	
	17:00	683	205	190	100 %	
	18:00	683	205	190	100 %	

Analysis Sheet

[Input Sheet](#)
[Results Sheet](#)
[Proposed Collision](#)

GO TO Justification:

Intersection: Waterloo Street and Dublin Street

Count Date: 2031 - Kent Street One-Way

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	60 %	33 %
	13-24	20 %	
	25-36	20 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Analysis Sheet

[Input Sheet](#)
[Results Sheet](#)
[Proposed Collision](#)

GO TO Justification:

Intersection: Waterloo Street and Yorkshire Street

Count Date: 2031 - Kent Street One-Way

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 Lanes		2 or More Lanes		Hour Ending											
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	8:00	9:00	10:00	12:00	13:00	17:00	18:00	19:00				
	☐	☒	☐	☐												
1A	480	720	600	900	484	966	677	715	834	1,191	786	834			761	95
	COMPLIANCE %				67	100	94	99	100	100	100	100				
1B	120	170	120	170	94	187	131	72	85	121	187	85	546	68		
	COMPLIANCE %				55	100	77	42	50	71	100	50				
Restricted Flow					Both 1A and 1B 100% Fulfilled each of 8 hours								Yes ☐		No ☒	
Signal Justification 1:					Lesser of 1A or 1B at least 80% fulfilled each of 8 hours								Yes ☐		No ☒	

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☒	FREE FLOW ☐	RESTR. FLOW ☐	8:00	9:00	10:00	12:00	13:00	17:00	18:00	19:00		
2A	480	720	600	900	390	779	546	643	749	1,070	599	749	703	88
	COMPLIANCE %				54	100	76	89	100	100	83	100		
2B	50	75	50	75	58	115	81	43	50	72	76	50		
	COMPLIANCE %				77	100	100	57	67	96	100	67	664	83
Restricted Flow Signal Justification 2:					Both 2A and 2B 100% fulfilled each of 8 hours Lesser of 2A or 2B at least 80% fulfilled each of 8 hours								Yes ☐ Yes ☒	No ☒ No ☐

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☐	NO ☒	YES ☐	NO ☒
Justification 2	Delay Cross Traffic	YES ☒	NO ☐		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach Y (actual)	Required Value Y (warrant threshold)	Average % Compliance	Overall % Compliance
Justification 4	9:00	X	130	158	82 %	54 %
	13:00	749	48	167	29 %	
	17:00	1,070	69	89	77 %	
	19:00	749	48	167	29 %	

Analysis Sheet

[Input Sheet](#)
[Results Sheet](#)
[Proposed Collision](#)

GO TO Justification:

Intersection: Waterloo Street and Yorkshire Street

Count Date: 2031 - Kent Street One-Way

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	40 %	27 %
	13-24	0 %	
	25-36	40 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Analysis Sheet

Input Sheet

Results Sheet

Proposed Collision

GO TO Justification:

Intersection: Waterloo Street and Yorkshire Street

Count Date: 2021 - Dublin Detour

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	8:00	9:00	10:00	12:00	13:00	17:00	18:00	19:00		
1A	☐	☒	☐	☐	439	872	613	509	592	848	848	592	681	85
	480	720	600	900	61	100	85	71	82	100	100	82		
	COMPLIANCE %													
1B	120	170	120	170	100	198	140	96	110	159	159	110	614	77
	59	100	82	56	65	94	94	65						
	COMPLIANCE %													
Restricted Flow Signal Justification 1:					Both 1A and 1B 100% Fulfilled each of 8 hours								Yes ☐	No ☒
					Lesser of 1A or 1B at least 80% fulfilled each of 8 hours								Yes ☐	No ☒

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 lanes		2 or More lanes		Hour Ending											
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☒	FREE FLOW ☐	RESTR. FLOW ☐	8:00	9:00	10:00	12:00	13:00	17:00	18:00	19:00				
2A	480	720	600	900	339	674	473	413	482	689	689	482	589	74		
	COMPLIANCE %				47	94	66	57	67	96	96	67				
2B	50	75	50	75	61	121	85	36	41	60	60	41				
	COMPLIANCE %				81	100	100	48	55	80	80	55	599	75		
Restricted Flow Signal Justification 2:					Both 2A and 2B 100% fulfilled each of 8 hours Lesser of 2A or 2B at least 80% fulfilled each of 8 hours								Yes ☐	No ☒	Yes ☐	No ☒

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☐	NO ☒	YES ☐	NO ☒
Justification 2	Delay Cross Traffic	YES ☐	NO ☒		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach Y (actual)	Required Value Y (warrant threshold)	Average % Compliance	Overall % Compliance
Justification 4	9:00	X	149	193	77 %	59 %
	13:00	482	84	270	31 %	
	17:00	689	121	187	65 %	
	18:00	689	121	187	65 %	

Analysis Sheet

[Input Sheet](#)
[Results Sheet](#)
[Proposed Collision](#)

GO TO Justification:

Intersection: Waterloo Street and Yorkshire Street

Count Date: 2021 - Dublin Detour

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	40 %	27 %
	13-24	0 %	
	25-36	40 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

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Proposed Collision

GO TO Justification:

Intersection: Waterloo Street and Yorkshire Street

Count Date: 2026 - Dublin Detour

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 Lanes		2 or More Lanes		Hour Ending											
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	8:00	9:00	10:00	12:00	13:00	17:00	18:00	19:00				
	☐	☒	☐	☐												
1A	480	720	600	900	479	951	666	554	645	922	922	645	715	89		
	COMPLIANCE %				67	100	93	77	90	100	100	90				
1B	120	170	120	170	110	217	153	104	122	173	173	122	659	82		
	COMPLIANCE %				65	100	90	61	72	100	100	72				
Restricted Flow					Both 1A and 1B 100% Fulfilled each of 8 hours								Yes ☐		No ☒	
Signal Justification 1:					Lesser of 1A or 1B at least 80% fulfilled each of 8 hours								Yes ☒		No ☐	

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 lanes		2 or More lanes		Hour Ending											
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☒	FREE FLOW ☐	RESTR. FLOW ☐	8:00	9:00	10:00	12:00	13:00	17:00	18:00	19:00				
2A	480	720	600	900	369	734	513	450	523	749	749	523	630	79		
	COMPLIANCE %				51	100	71	63	73	100	100	73				
2B	50	75	50	75	65	129	91	38	45	64	64	45				
	COMPLIANCE %				87	100	100	51	60	85	85	60	628	79		
Restricted Flow Signal Justification 2:					Both 2A and 2B 100% fulfilled each of 8 hours Lesser of 2A or 2B at least 80% fulfilled each of 8 hours								Yes ☐	No ☒	Yes ☐	No ☒

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☒	NO ☐	YES ☐	NO ☒
Justification 2	Delay Cross Traffic	YES ☐	NO ☒		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach Y (actual)	Required Value Y (warrant threshold)	Average % Compliance	Overall % Compliance
Justification 4	9:00	X	164	172	95 %	72 %
	13:00	523	93	252	37 %	
	17:00	749	132	167	79 %	
	18:00	749	132	167	79 %	

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GO TO Justification:

Intersection: Waterloo Street and Yorkshire Street

Count Date: 2026 - Dublin Detour

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	40 %	27 %
	13-24	0 %	
	25-36	40 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

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Proposed Collision

GO TO Justification:

Intersection: Waterloo Street and Yorkshire Street

Count Date: 2031 - Dublin Detour

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	8:00	9:00	10:00	12:00	13:00	17:00	18:00	19:00		
1A	☐	☒	☐	☐										
	480	720	600	900	514	1,023	716	595	696	994	994	696		
	COMPLIANCE %				71	100	99	83	97	100	100	97	747	93
1B	120	170	120	170	118	234	164	111	130	186	186	130		
	COMPLIANCE %				69	100	96	65	76	100	100	76	684	86
Restricted Flow Signal Justification 1:					Both 1A and 1B 100% Fulfilled each of 8 hours								Yes ☐	No ☒
					Lesser of 1A or 1B at least 80% fulfilled each of 8 hours								Yes ☒	No ☐

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 lanes		2 or More lanes		Hour Ending											
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	8:00	9:00	10:00	12:00	13:00	17:00	18:00	19:00				
2A	☐	☒	☐	☐	396	789	552	484	566	808	808	566				
	COMPLIANCE %				55	100	77	67	79	100	100	79	656	82		
2B	50	75	50	75	67	134	94	42	50	71	71	50				
	COMPLIANCE %				89	100	100	56	67	95	95	67	668	84		
Restricted Flow					Both 2A and 2B 100% fulfilled each of 8 hours								Yes	☐	No	☒
Signal Justification 2:					Lesser of 2A or 2B at least 80% fulfilled each of 8 hours								Yes	☒	No	☐

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☒	NO ☐	YES ☒	NO ☐
Justification 2	Delay Cross Traffic	YES ☒	NO ☐	JUSTIFIED	

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach Y (actual)	Required Value Y (warrant threshold)	Average % Compliance	Overall % Compliance
Justification 4	9:00	789	177	155	100 %	83 %
	13:00	566	99	234	42 %	
	17:00	808	141	149	94 %	
	18:00	808	141	149	94 %	

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GO TO Justification:

Intersection: Waterloo Street and Yorkshire Street

Count Date: 2031 - Dublin Detour

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	40 %	27 %
	13-24	0 %	
	25-36	40 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Analysis Sheet

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Proposed Collision

GO TO Justification:

Intersection: Paisley Street and Glasgow Street

Count Date: 2031 - Dublin Closures

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	8:00	9:00	10:00	12:00	13:00	17:00	18:00	19:00		
1A	☐	☒	☐	☐	510	1,015	709	834	834	1,191	1,191	955		
	COMPLIANCE %				71	100	98	100	100	100	100	100	769	96
1B	120	170	120	170	80	158	109	85	85	121	121	98		
	COMPLIANCE %				47	93	64	50	50	71	71	58	504	63
Restricted Flow Signal Justification 1:					Both 1A and 1B 100% Fulfilled each of 8 hours								Yes ☐	No ☒
					Lesser of 1A or 1B at least 80% fulfilled each of 8 hours								Yes ☐	No ☒

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 lanes		2 or More lanes		Hour Ending											
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☒	FREE FLOW ☐	RESTR. FLOW ☐	8:00	9:00	10:00	12:00	13:00	17:00	18:00	19:00				
2A	480	720	600	900	430	857	600	749	749	1,070	1,070	857	743	93		
	COMPLIANCE %				60	100	83	100	100	100	100	100				
2B	50	75	50	75	45	89	62	48	48	70	70	57				
	COMPLIANCE %				60	100	83	64	64	93	93	76	633	79		
Restricted Flow Signal Justification 2:					Both 2A and 2B 100% fulfilled each of 8 hours Lesser of 2A or 2B at least 80% fulfilled each of 8 hours								Yes ☐	No ☒	Yes ☐	No ☒

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☐	NO ☒	YES ☐	NO ☒
Justification 2	Delay Cross Traffic	YES ☐	NO ☒		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach Y (actual)	Required Value Y (warrant threshold)	Average % Compliance	Overall % Compliance
Justification 4	9:00	X	90	136	66 %	66 %
	17:00	1,070	69	89	77 %	
	18:00	1,070	69	89	77 %	
	19:00	857	56	136	41 %	

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GO TO Justification:

Intersection: Paisley Street and Glasgow Street

Count Date: 2031 - Dublin Closures

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	20 %	13 %
	13-24	20 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

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Proposed Collision

GO TO Justification:

Intersection: Norfolk Street and Cork Street

Count Date: 2031

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	8:00	9:00	10:00	12:00	13:00	17:00	18:00	19:00		
	☐	☐	☐	☒										
1A	480	720	600	900	1,324	1,892	1,702	1,629	1,629	2,034	2,034	1,629		
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100
1B	120	170	120	170	85	122	109	110	110	136	136	110		
	COMPLIANCE %				50	72	64	65	65	80	80	65	540	68
Restricted Flow					Both 1A and 1B 100% Fulfilled each of 8 hours								Yes ☐	No ☒
Signal Justification 1:					Lesser of 1A or 1B at least 80% fulfilled each of 8 hours								Yes ☐	No ☒

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 lanes		2 or More lanes		Hour Ending											
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☐	FREE FLOW ☐	RESTR. FLOW ☒	8:00	9:00	10:00	12:00	13:00	17:00	18:00	19:00				
2A	480	720	600	900	1,239	1,770	1,593	1,519	1,519	1,898	1,898	1,519	800	100		
	COMPLIANCE %				100	100	100	100	100	100	100	100				
2B	50	75	50	75	36	52	46	37	37	46	46	37				
	COMPLIANCE %				48	69	61	49	49	61	61	49	449	56		
Restricted Flow Signal Justification 2:					Both 2A and 2B 100% fulfilled each of 8 hours Lesser of 2A or 2B at least 80% fulfilled each of 8 hours								Yes ☐	No ☒	Yes ☐	No ☒

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☐	NO ☒	YES ☐	NO ☒
Justification 2	Delay Cross Traffic	YES ☐	NO ☒		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach Y (actual)	Required Value Y (warrant threshold)	Average % Compliance	Overall % Compliance
Justification 4	9:00	1,770	69	115	60 %	69 %
	10:00	1,593	61	115	53 %	
	17:00	1,898	93	115	81 %	
	18:00	1,898	93	115	81 %	

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GO TO Justification:

Intersection: Norfolk Street and Cork Street

Count Date: 2031

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	20 %	47 %
	13-24	40 %	
	25-36	80 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			