BA GROUP
Transportation Consultants

East Bayfront Transit

Class Environmental Assessment

Traffic Assessment

Queens Quay Design Alternatives

Prepared For:
Toronto Transit Commission / Waterfront Toronto

January 2010

Table of Contents

1. Introduction 1

1.1 East Bayfront Transit Environmental Assessment 1

1.1.1 Environmental Assessment Study Area 1

1.1.2 Preferred Alignment and Technology 3

1.2 Queens Quay East - Design Options Under Consideration 3

1.3 Coordination with Other Adjacent Studies 4

1.3.1 Queens Quay Revitalization Environmental Assessment 4

1.3.2 Lower Don Lands Planning 6

1.3.3 Gardiner Expressway 6

1.4 This Study 7

1.4.1 Traffic Assessment Study Area 7

1.4.2 Study Scope 7

1.6 Summary and Key Findings 8

2. Area Road Context 13

2.1 Study Area 13

2.2 Existing Road Network 14

2.3 Planned Road Modifications 18

2.3.1 Committed Modifications and New Roads 18

2.3.2 Planned Major Street Linkages 18

2.3.3 Potential New Development Related Connections 19

3. Proposed Queens Quay East Options 20

3.1 Centre Transit Option 23

3.1.1 Queens Quay East Cross-Section 23

3.1.2 Signalized Intersections 23

3.1.3 Unsignalized Intersections 24

3.1.4 Turning Movement Prohibitions 25

3.1.5 Emergency Vehicle Access 25

3.2 South Side Transit Option 25

3.2.1 Queens Quay East Cross-Section 25

3.2.2 Signalized Intersections 26

3.2.3 Unsignalized Intersections 28

3.2.4 Turning Movement Prohibitions 29

3.2.5 Emergency Vehicle Access 30

3.2.6 Potential Future Pedestrian Crossings 30

4. Traffic Volume Forecasts 31

4.1 Approach 31

4.1.1 Road Network Assumptions 31

4.1.2 Traffic Volume Forecasting Methodology 31

4.1.3 Coordination with Queens Quay Revitalization EA 32
4.2 Existing Baseline Traffic Volumes 32
4.2.1 Intersection / Driveway Traffic Count Information 32
4.2.2 Volume Balancing – Queens Quay East Corridor 33
4.2.3 Existing Traffic Redistribution: Planned Area Road Network 33
4.2.4 Existing Traffic Diversion: Queens Quay East to Lake Shore Boulevard East 35
4.2.5. Baseline (Adjusted) Existing Volumes 35
4.3 New Development Related Traffic Allowances 37
4.3.1 Traffic Allowances - East Bayfront Precinct 40
4.3.2 Travel Demand Forecasts – Western Portions of Lower Don Lands 46
4.3.3 Travel Demand Forecasts – West Don Lands 48
4.3.4 Travel Demand Forecasts – Other Central Waterfront Area Developments 51
4.4 Design Option Volume Forecasts 54
5.0 Traffic Operations Analysis 58
5.1 Methodology 58
5.1.1 Analysis Methodology 58
5.1.2 Options Under Evaluation 58
5.1.3 Road Network and Lane Configurations 58
5.1.4 Intersections Analysed 59
5.1.5 Signal Timings 59
5.1.6 Pedestrian Activity Assumptions 60
5.1.7 Peak Hour Factor - Synchro 60
5.1.8 Heavy Vehicle Assumptions 60
5.1.9 Base Saturation Flow Rate Assumptions 60
5.2 Analysis Findings – South Side Transit Option 60
5.2.1 Traffic Operations Analyses 60
5.2.2 Queuing Considerations 62
5.3 Analysis Findings – Centre Transit Option 64
5.3.1 Traffic Operations Analyses 64
5.3.2 Queuing Considerations 64

List of Tables

Table 1 East Bayfront Precinct Plan, Development Floor Areas 41
Table 2 Trip Generation Dock Side (South of Queens Quay East, Lower Jarvis Street to Sherbourne Park)..... 44
Table 3 Traffic Volumes – East Bayfront Precinct 44
Table 4 Traffic Distribution Patterns – East Bayfront Precinct..... 45
Table 5 Lower Don Lands- West of Cherry Street- Development Floor Areas..... 47
Table 6 Trip Generation – Lower Don Lands – West of Cherry Street..... 47
Table 7 Traffic Distribution Patterns – Western Portions of Lower Don Lands Precinct 48
Table 8 West Don Lands – Block Statistics Development Floor Area / Units..... 49
Table 9 West Don Lands Precinct – Forecast Traffic Volumes 50
Table 10 Trip Generation – Waterpark Place Phase 3 51
Table 11 Trip Generation – Railway Lands Blocks, Yonge Street to Simcoe Street... 53
Table 12 Trip Generation – MT27 Condominium Development 54
Table 13 Traffic Operations Analysis Summary – Transit on South Side of Queens Quay..... 61
Table 14 Calculated Queue Length Summary (SimTraffic) – South Side Transit Option 63
Table 15 Traffic Operations Analysis Summary – Centre Transit Option..... 65
Table 16 Calculated Queue Length Summary (SimTraffic) – Centre Transit Option .. 66

List of Appendices

Appendix A Traffic Volume Figures

Appendix B Transit on South Side of Queens Quay

– Traffic figures
– Signal Timing Plans
– Synchro/Simtraffic Worksheets

Appendix C Transit in Middle of Queens Quay

– Traffic figures
– Signal Timing Plans
– Synchro/Simtraffic Worksheets

1. Introduction

BA Group is retained, as part of a multi-disciplinary consultant team led by McCormick Rankin Corporation, by the Toronto Transit Commission (TTC) and Waterfront Toronto to provide transportation consulting advice and input into the East Bayfront Transit Class Environmental Assessment study.

This Environmental Assessment study is being undertaken in cooperation with Waterfront Toronto (formerly known as Toronto Waterfront Revitalization Corporation or TWRC) and the City of Toronto and will identify a preferred approach to providing an effective transit service supporting planned development within the East Bayfront precinct as well as other areas of the Eastern City of Toronto waterfront.

1.1 East Bayfront Transit Environmental Assessment

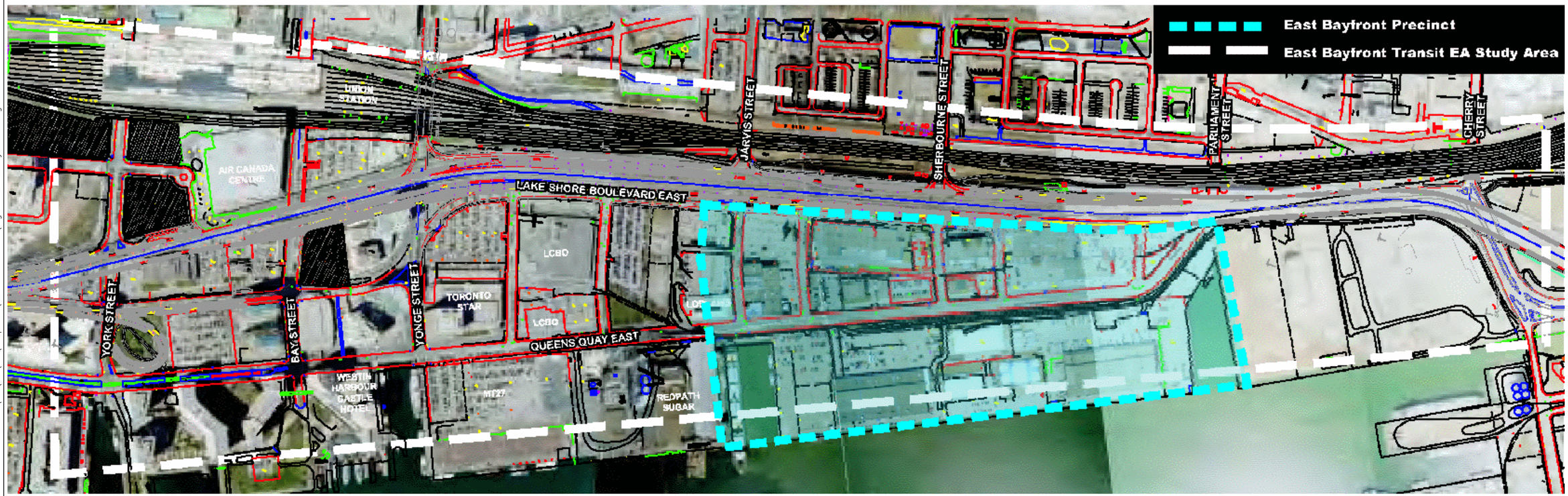
The Environmental Assessment study for transit services in the East Bayfront area was initiated as an Individual Environmental Assessment. In September 2007, the Ministry of the Environmental approved an amendment to the Municipal Class Environmental Assessment to permit transit projects to be undertaken under the Municipal Class Environmental Assessment process. Accordingly, this study has been converted to fall under the new Municipal Class Environmental Assessment process for transit projects.

1.1.1 Environmental Assessment Study Area

The broad study area considered for the East Bayfront Transit Environmental Assessment extends from York Street in the west to Cherry Street in the east and from the main CP / CN rail line in the north and Lake Ontario to the south. The study area encompasses the East Bayfront Precinct area and potential routing alternatives considered for a facility linking between Union Station and future connections to the transit services on Cherry Street in the West Don Lands and within the Lower Don Lands area east of the Parliament Street.

Please note that the East Bayfront Transit Environmental Assessment is seeking approval for transit facility and modifications to the Queens Quay East corridor only as far east as the Parliament Street at the easterly limit of the East Bayfront Precinct. A likely easterly extension of Queens Quay East and the East Bayfront transit facility to the Port Lands (as contemplated in the Central Waterfront Secondary Plan) will be addressed within a Class Environmental Assessment Master Plan being undertaken by Waterfront Toronto for the Lower Don Lands area.

The study area for the East Bayfront Transit Environmental Assessment is shown in Figure 1.



STUDY AREA

Source: EBF Class EAReport, Figure E1-1, Prepared by MRC, August 2009

1.1.2 Preferred Alignment and Technology

The Environmental Assessment is undertaken in three key stages. This study forms part of the evaluation of design alternatives that forms the third stage of the assessment process.

The first stage relates, having identified a need for the proposal from a demand perspective, to the identification of a preferred corridor for the planned transit facility. The Queens Quay East corridor has been selected as the preferred corridor for the new transit facility serving the East Bayfront Precinct in that its alignment bisects the development areas to be served by the proposed service.

The second stage involves identified of a preferred technology to provide the best quality of transit service in the chosen corridor. In this case, streetcars / LRT in a dedicated right-of-way was selected as the preferred technology for the East Bayfront transit facility. The portion of the proposed transit line located west of a portal located between Yonge Street and Freeland Street is to be located below grade and will connect to an expanded streetcar / LRT terminal facility located at Union Station subway station. The portion of the streetcar facility located to the east of the portal is to be at-grade and will serve the East Bayfront and other adjacent development along the Queens Quay corridor.

The third stage, which is the subject of this study report, involves the identification of a preferred arrangement for the roadway and street cross-section within the at-grade sections of the preferred corridor. Two design options are considered within the Environmental Assessment as outlined in Section 1.2 in the selection of a preferred arrangement for the East Bayfront transit facility and Queens Quay East.

1.2 Queens Quay East - Design Options Under Consideration

Two design alternatives have been developed as part of the Environmental Assessment for an exclusive LRT / streetcar facility running along Queens Quay East between Union Station and a temporary streetcar loop located just east of the Parliament Street .

The temporary loop facility forms the interim terminus of the East Bayfront facility prior to the extension of the service eastwards through the Lower Don Lands area to connect with the planned streetcar line on Cherry Street within the West Don Lands and future services serving the Port Lands. The future easterly extension of the East Bayfront transit facility to connect to Cherry Street will be the subject of further Environmental Assessment studies related to the extension of Queens Quay East and other infrastructure modifications in the Lower Don Lands area.

The two alternative design considered as part of the Environmental Assessment are:

- Transit in the middle of Queens Quay East ("*Centre Transit*" option)
- Transit on the south side of Queens Quay East ("*South Side Transit*" option)

These two arrangements both provide a basic one vehicular travel-lane in each direction on Queens Quay East with turn lanes at intersections as well as accommodating continuous cycling facilities across the waterfront and pedestrian boulevard spaces / sidewalks.

Both the options differ in the location of the exclusive transit facility within the overall Queens Quay East right-of-way, the character of the cycling facilities provided, overall space allocations to the

public realm and pedestrian spaces and the number and location of traffic signals provided along the corridor.

The *Centre Transit* option locates the exclusive transit facility within the centre of the Queens Quay East roadway as is typical of similar facilities across Toronto (i.e. Spadina Avenue, St. Clair Avenue West). It notably also incorporates cycling facilities within on-street bicycle lanes that extend from Freeland Street eastwards to Parliament Street.

The *South Side Transit* option locates the exclusive transit facility on the south side of the Queens Quay East roadway separated from the road, generally, by a 3.0 metre wide median facility. Cycling facilities are provided off-street within a wide boulevard area south of the LRT / streetcar tracks as an extension / enhancement of the Martin Goodman Trail.

Illustrative cross-sections of the two alternatives are shown in Figure 2. The arrangement of the two design alternatives is discussed further in Section 3.

1.3 Coordination with Other Adjacent Studies

1.3.1 Queens Quay Revitalization Environmental Assessment

The Queens Quay Revitalization Environmental Assessment is an ongoing study evaluating the design of Queens Quay East through the central waterfront area of Toronto. The study area extends from Bathurst Street in the west to Lower Jarvis Street in the east and overlaps with that of the East Bayfront Transit Environmental Assessment between Bay Street to Lower Jarvis Street.

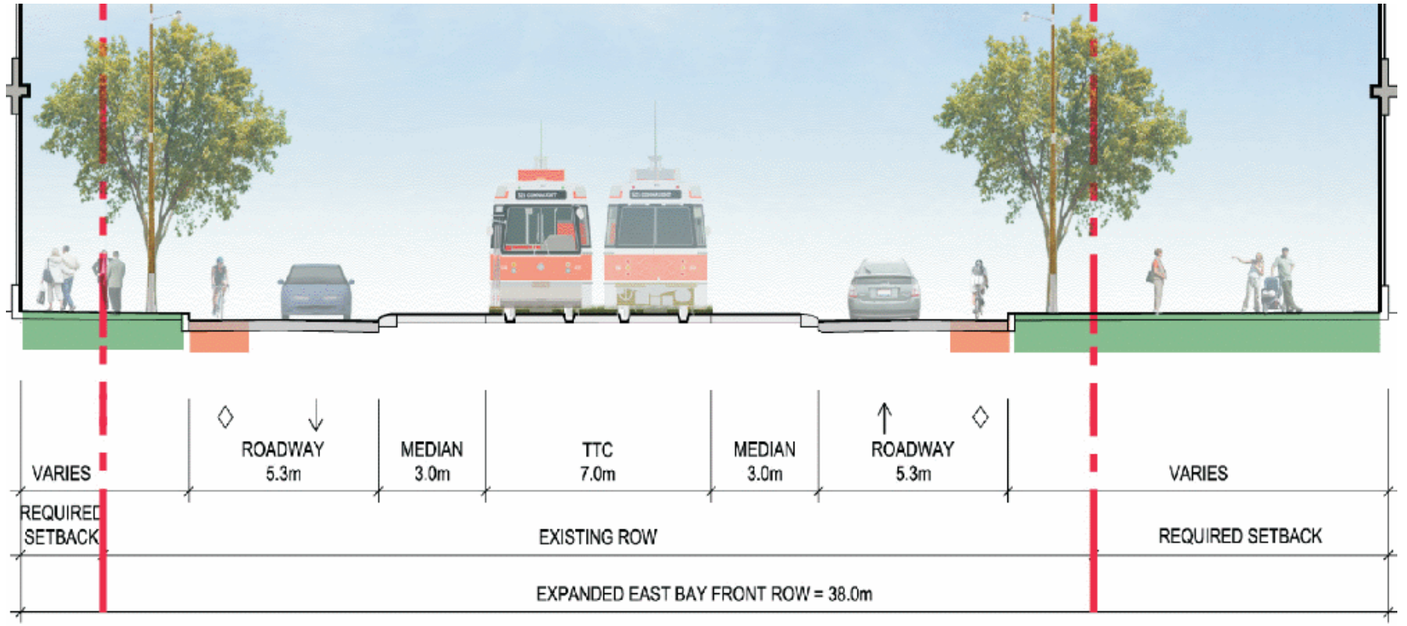
The Queens Quay Revitalization and East Bayfront Transit Environmental Assessments, while separate processes, are closely linked in that they are both considering the future arrangement and configuration of Queens Quay East across the Toronto waterfront. They are both, as such, central to delivering a significant component of Waterfront Toronto's vision for the Lake Ontario waterfront and are being carefully coordinated to establish a desired design consistency along the length of Queens Quay.

The East Bayfront Transit Environmental Assessment project team has worked closely with Waterfront Toronto and its consulting team working on the Queens Quay Revitalization Environmental Assessment. Key aspects from a transportation analysis perspective include:

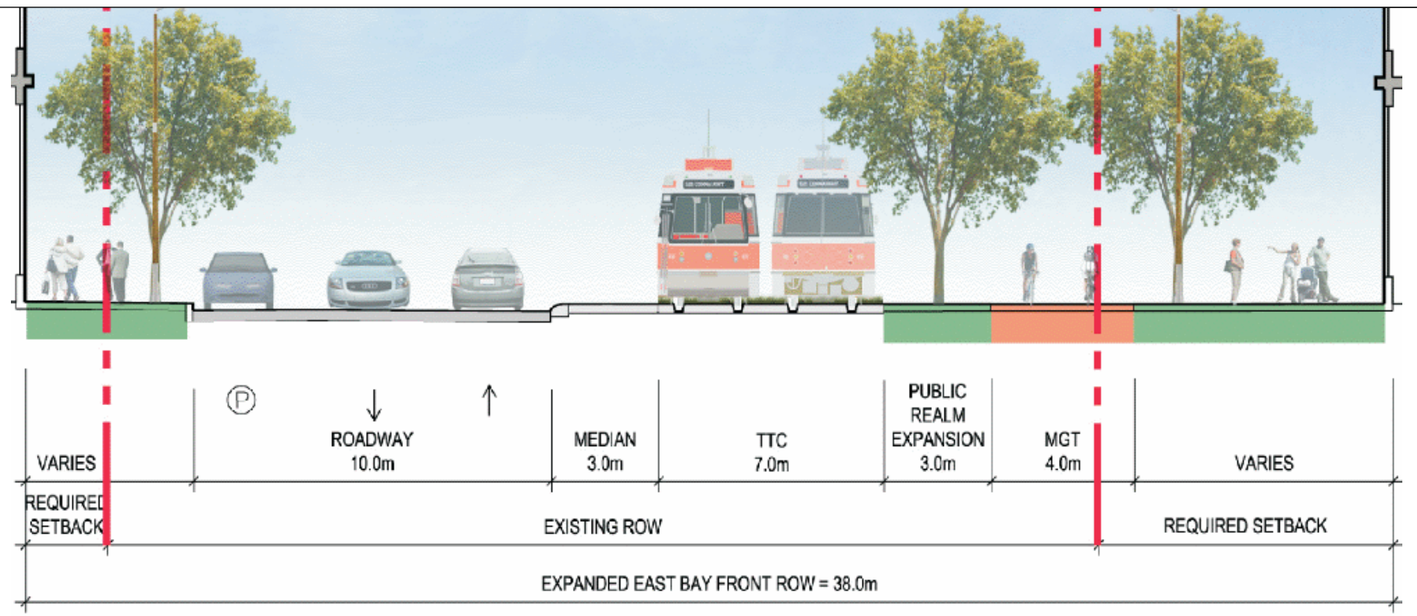
a) the development of a common set of forecasts of traffic activity across the Toronto waterfront for use in both studies; and

b) the identification of distinct study areas to be considered in traffic assessment studies being undertaken by BA Group as part of the East Bayfront Transit Environmental Assessment and by Arup Canada Inc. as part of the Queens Quay Revitalization Environmental Assessment.

   The 'break' point between the two studies is the proposed portal location just west of Freeland Street. As such, this study, prepared as part of the East Bayfront Transit Environmental Assessment, will review traffic operations from Freeland Street eastwards.



Option 1 - Dedicated Transit in the Centre Median



Option 2 - Dedicated Transit on the South Side

QUEENS QUAY DESIGN ALTERNATIVES

Source: EBF Class EAReport, Figure E9-1, Prepared by MRC, August 2009

1.3.2 Lower Don Lands Planning

The Class Environmental Assessment Master Plan for the Lower Don Lands which will include a planned extension of Queens Quay East to Cherry Street and also, logically, the easterly extension of the East Bayfront transit facility being evaluated as part of this environmental assessment is currently ongoing. Based on the latest available information, the ESR will soon be finalized and the preferred design for road, transit, bridge, stormwater, wastewater and water supply systems will be available for the review.

While the East Bayfront Transit Environmental Assessment is seeking approvals for modifications along the Queens Quay East corridor only as far east as the Parliament Street, this study considers from a traffic perspective the ultimate extension of Queens Quay East to Cherry Street. This is to ensure that new traffic activity generated by development within the Lower Don Lands that is reliant upon Queens Quay East for access (i.e. Lower Don Lands areas west of Cherry Street) is captured within future waterfront traffic volume forecasts developed for the section of the Queens Quay East corridor considered as part of the East Bayfront Transit Environmental Assessment study.

The design of the extension of Queens Quay East east of Parliament Street has not been considered in detail as part of this study. However, traffic operations analyses have been undertaken for an anticipated signalized T-intersection at Lower Parliament Street created following the extension of Queens Quay East to Cherry Street. This analysis is intended to provide general information with respect to the operation of Queens Quay East and appropriateness of the selected preferred design alternative from a traffic operations perspective.

1.3.3 Gardiner Expressway

Waterfront Toronto and the City of Toronto are currently undertaking an environmental assessment and integrated urban design study for the Gardiner Expressway east of Jarvis Street. This study is to determine the treatment of this section of elevated highway, whether it is removed or not and what, if it is demolished, facilities will replace it. A Terms of Reference for the study has been recently completed.

The East Bayfront Transit Environmental Assessment study is being undertaken independently from the broad Gardiner Expressway study. The preferred design that will logically be identified through the East Bayfront Transit Environmental Study will be incorporated into future analyses and evaluations that will form part of the comprehensive traffic and transportation evaluation exercise that forms a significant part of the Gardiner Expressway study.

As such, future traffic volumes forecasts considered for the purposes of the East Bayfront Transit Environmental Assessment reflect the existing Gardiner Expressway condition.

1.4 This Study

This Traffic Assessment study has been prepared as part of the third phase of the Environmental Assessment process and the evaluation of design options for the Queens Quay East corridor.

It is intended to provide a review of traffic operations along the Queens Quay East corridor for the two design options being considered for input into the evaluation of alternatives. It is also intended to provide an assessment of the sufficiency and appropriateness of the proposed design arrangements from a traffic operations perspective and their ability to appropriately support existing and planned development within the central waterfront area of Toronto.

1.4.1 Traffic Assessment Study Area

The broad study area for the East Bayfront Transit Environmental Assessment study is shown on Figure 1.

Future traffic volume forecasts have been established in detail as part of this study for a portion of the overall study area focussing upon the Queens Quay East and Lake Shore Boulevard East corridors east of Freeland Street.

Detailed traffic operations analyses have been undertaken for the section of the Queens Quay East corridor east of the proposed portal location where the transit facility is to be located at-grade generally to the easterly limit of the East Bayfront Precinct. The limits are as follows:

- Westerly limit of analyses:
  - Queens Quay East / Freeland Street intersection
- Easterly limit of analyses:
  - assumed T-intersection that will be created at the Queens Quay East / Parliament Street following the planned extension of Queens Quay East to Cherry Street

Traffic operations within other existing or planned sections of Queens Quay east and west of the analysis area will be addressed through other ongoing or forthcoming studies.

1.4.2 Study Scope

The scope of this traffic assessment study includes the following:

- An overview of the existing and proposed transportation system within the study area and future area road planning initiatives that relate to this Environmental Assessment.

- An overview description of the two design options being considered for sections of Queens Quay East where the proposed exclusive LRT / streetcar facility is to be located at-grade (i.e. east of the proposed portal).

- A detailed review of existing traffic activity levels within study area and development of future weekday morning and afternoon peak hour traffic volume forecasts for the two design alternatives.

  Future traffic forecasts incorporate a comprehensive series of allowances for new and planned developments across the Central and Eastern waterfront areas of Toronto and take into account the planned extension of Queens Quay East from its current terminus at Parliament Street to Cherry Street.

- Development of preliminary signal timing plans at planned signalized intersections for both alternative design options for analysis purposes based on planned lane configurations, transit priority considerations and turn restrictions / prohibitions incorporated into each option.

- A detailed review of intersection traffic operations along the Queens Quay East corridor under future forecast traffic activity levels during the morning and afternoon peak hours for both the options under evaluation.

- A review of traffic queuing activity along the Queens Quay East corridor for the two options under consideration based upon future forecast traffic activity levels and recognizing the relative location of signalized intersections incorporated into each alternative.

1.6 Summary and Key Findings

BA Group is retained, as part of a multi-disciplinary consultant team led by McCormick Rankin Corporation, by the Toronto Transit Commission (TTC) and Waterfront Toronto to provide transportation consulting advice and input into the East Bayfront Transit Class Environmental Assessment study.

This Traffic Assessment study has been prepared as part of the evaluation of design options for the Queens Quay East corridor and is intended to:

- provide a review of traffic operations along the Queens Quay East corridor for the two design options under considerations as part of the Environmental Assessment; and
- assess the sufficiency and appropriateness of the proposed design arrangements from a traffic operations perspective and their ability to appropriately support existing and planned development within the central waterfront area of Toronto.

Key study findings are as follows:

Study Area

1. Traffic operations along the Queens Quay East corridor have been assessed in detail for the section of the Queens Quay East corridor east of the proposed portal location where the transit facility is to be located at-grade. This area extends between Freeland Street and the easterly limit of the East Bayfront Precinct at Parliament Street.

Design Alternatives Under Consideration

2. Two basic design option alternatives are under consideration as part of the East Bayfront Transit Environmental Study for the at-grade portions of the dedicated streetcar / LRT facility. The two options differ in the location of the dedicated transit facility within the proposed Queens Quay East right-of-way and the treatment provided for cycling facilities. The options are:

   - Transit in the middle of Queens Quay East ("*Centre Transit*" option)
   - Transit on the south side of Queens Quay East ("*South Side Transit*" option)

3. The *Centre Transit* option locates the exclusive transit facility within the centre of the Queens Quay East roadway as is typical of similar facilities across Toronto. It also incorporates cycling facilities within on-street bicycle lanes.

4. The *South Side Transit* option locates the exclusive transit facility on the south side of the Queens Quay East roadway. Cycling facilities are provided off-street within a wide boulevard area south of the LRT / streetcar tracks as an extension / enhancement of the Martin Goodman Trail.

5. Both arrangements provide a basic one vehicular travel-lane in each direction on Queens Quay East typically with turn lanes at intersections as well as accommodating continuous cycling facilities across the waterfront and pedestrian boulevard spaces / sidewalks. The portal linking between the below and at grade components of the new LRT/streetcar facility is located just west of Freeland Street in both options.

6. Both options incorporate signalized intersections at key existing and planned public street and private driveway intersections where turning movements are to be permitted across the streetcar / LRT tracks.

7. The arrangement of the cross-sectional elements of the design option are consistent with those being considered within the Queens Quay Revitalization Environmental Assessment, which is evaluating the configuration of the Queens Quay corridor west of the East Bay front Transit Class Environment Assessment study area.

8. To optimize transit operations along the corridor, the signal phasing strategies and, notably, related lane configurations, have been developed based upon enabling east-west transit movements to occur at the same time as the main east-west traffic phases. For safety reasons and to avoid conflicts between turning vehicles and streetcars / LRT vehicles, this phasing strategy requires that turning movements across the transit tracks (left or right turns) operate only during protected turn phases and from an exclusive lane. No permissive left or right turn or 'right turns on red' movements across the tracks are permitted.

9. Pedestrian crossing facilities are provided at all public street signalized intersections along the Queens Quay East corridor. Typically north-south pedestrian crosswalks provide crossing facilities over the roadway and exclusive transit elements of the cross-section. In the *South Side Transit* option, however, two-stage pedestrian crossing arrangements are adopted at T-intersections where no roadway extends south of Queens Quay East to reduce potential delays to transit operations at these intersections while maintaining appropriate

pedestrian crossing facilities. The arrangement separates the activation of pedestrian crossing facilities over the roadway portion of Queens Quay East and the streetcar / LRT tracks. Pedestrian crossing timings consider current City of Toronto policies regarding pedestrian walk time / count down time allocations.

Traffic Volume Forecasts

10. Forecasts of future weekday morning and afternoon peak hour traffic forecasts have been developed on a comprehensive basis for the Queens Quay East corridor and surrounding area road system for each of the two alternative design options being evaluated.

11. Future traffic volume forecasts maintain the existing levels of activity in the area and also incorporate a comprehensive series of specific net new traffic assignments related to new and planned development across the Lake Ontario waterfront including:

- build-out of the East Bayfront Precinct;
- build-out of the West Don Lands Precinct;
- development within the westerly portions of the Lower Don Lands Precinct that rely upon Queens Quay East for access;
- new and planned development within the Railway Lands; and
- development proposals along the Queens Quay East corridor including Phase III of Waterpark Place and a proposed residential development on the MT27 lands.

12. Combined, future traffic activity forecasts consider development of over 18,000 residential units and 615,000 sq. metres of commercial floor space across the central and eastern areas of the City of Toronto waterfront.

13. Conservatively, for the purpose of this evaluation, future traffic volume forecasts maintain the existing levels of traffic activity in the area including the notable existing commuter use of the Queens Quay East corridor. A modest diversion of westbound volume from the Queens Quay East corridor to the Lake Shore Boulevard East corridor has been assumed during the morning peak hour. This redistribution reflects a re-routing of a proportion of the high number of motorists that currently turn from Lake Shore Boulevard East onto Queens Quay East at the Parliament Street intersection due to:

- the reconfiguration and normalization of Parliament Streets' intersections with Lakeshore Boulevard East and Queens Quay East related to the extension of Parliament Street and its connection to connect to a realigned and extended Queens Quay East;
- the reduction in the number of lanes provided on Queens Quay East (4 to 2 through lanes); and
- the introduction of a number of new signalized intersections along the Queens Quay East corridor to serve emerging development within the East Bayfront Precinct.

14. Traffic volume forecasts for each of the two options along the Queens Quay East corridor take account of the number and location of signalized intersections, turn lane provisions and various turn restrictions / prohibitions specific to each of the two options.

15. Future traffic volume forecasts adopted for analysis purposes are considered to be reflective of "upper-end" traffic activity levels that may occur in the area ultimately in that they presume that current commuter usage levels of the Queens Quay East and Lake Shore Boulevard East corridors are maintained following full development of the waterfront areas.

16. It is considered unlikely that these volume levels will ultimately be realized over-time given planned local roadway and transit facility changes and, in fact, broader changes planned across the City with respect to the provision of enhanced local and regional transit service and facilities.

17. These volumes have, notwithstanding the above, been adopted as a reasonable (and conservative) basis for the traffic operations analyses undertaken as part of the evaluation of the two alternative options under consideration for the Queens Quay corridor, demonstrating the general sufficiency of the design alternatives to support area traffic demands and for road network planning and infrastructure needs assessment purposes.

Traffic Operations Analyses

18. Traffic operations analyses have been undertaken at the intersections along the Queens Quay East corridor between Freeland Street and Parliament Street based upon the methodologies outlined in the Highway Capacity Manual (HCM) and using the Synchro (version 6) software package.

19. The results of traffic operations analyses undertaken under future forecast traffic conditions at the key signalized intersections along the Queens Quay East corridor indicate that acceptable levels of operation will be maintained in the future for both design alternatives under consideration recognizing the urban, downtown context of the corridor, development plan in the area and that the volume forecasts adopted for evaluation and analysis purposes are considered to be conservatively high.

20. The overall intersection levels of service (LOS) provided for the *Centre Transit* option range between LOS C and LOS D during both the morning and afternoon peak hour periods. Intersection volume-to-capacity (V/C) ratios range between 0.60 and 0.85 during the same periods. The levels of service provided for individual turning movements range between LOS A and LOS F with through movement V/C ratios of 0.99 or less and certain eastbound left turn movements operating at V/C ratios of 0.96 or less during both the peak hours.

21. The overall intersection levels of service (LOS) provided for the *South Side Transit* alternative range between LOS A and LOS C during both the morning and afternoon peak hour periods. Intersection volume-to-capacity (V/C) ratios range between 0.49 and 0.83 during the same periods. The levels of service provided for individual turning movements range between LOS A and LOS E with V/C ratios of 0.91 or less.

22. Forecast future traffic volumes can, based upon the above, be acceptably accommodated from a capacity perspective at each of the signalized intersections located along the Queens Quay East corridor within the study area for both design alternatives. Traffic operations are likely modestly better under the *South Side Transit* overall in that the heavier eastbound left turn movements from Queens Quay East to the north operate under a permissive-protected

signal phasing strategy rather than only during fully protected phases as required in the *Centre Transit* option.

Queuing Considerations

23. The extent of queuing activity along the Queens Quay East corridor between signalized intersections for both design alternatives was reviewed under future forecast traffic conditions during the morning and afternoon peak hours using the SimTraffic software package.

    The SimTraffic micro-simulation modelling software, compared to the Synchro methodology, considers the operation of the system of signals along the Queens Quay East corridor as a whole. The SimTraffic analysis provides a better indication of queuing characteristics of a corridor in that it considers the effects of vehicle platooning, flow metering by upstream signals, queue spill-back and other signal timing measures that can enhance or impact vehicle progression along the corridor.

24. The extent of queues that occur on the through and turning movements at the signalized intersections along the Queens Quay East corridor for both design options during both the morning and afternoon peak hours are generally and appropriately accommodated within the storage distances available between intersections.

25. For both options, the calculated average and maximum queue lengths at intersections along the Queens Quay East corridor are generally less than the available upstream storage distances to the adjacent full traffic signal and can, generally, be appropriately accommodated without affecting upstream signal operations.

26. It is possible that queues may, on occasion, extend modestly beyond the available storage distances. If this circumstance is realized, such occurrences will only occur for short periods and will dissipate over subsequent signal cycles.

27. The extent of queuing activity is similar in each of the two options and can, based upon the above analysis, be reasonably and appropriately accommodated in both the *Centre Transit* and *South Side Transit* design alternatives under consideration.

Summary Findings

28. Acceptable traffic operating conditions are maintained along the Queens Quay East corridor with either of the two design alternatives under consideration as part of the East Bayfront Transit Environmental Assessment.

29. Both design arrangements for Queens Quay East will acceptably accommodate future forecast traffic activity levels across the Waterfront area from a traffic capacity and queuing perspective and will appropriately support emerging and future development within these area.

2. Area Road Context

2.1 Study Area

East Bayfront Transit Environmental Assessment

The broad study area considered for the East Bayfront Transit Environmental Assessment extends from York Street in the west to Cherry Street in the east and from the main CP / CN rail line in the north and Lake Ontario to the south. The study area encompasses the East Bayfront Precinct area and potential routing alternatives considered for a facility linking between Union Station and future connections to the transit services on Cherry Street in the West Don Lands and within the Lower Don Lands area east of the Parliament Street.

The East Bayfront Transit Environmental Assessment is seeking approval for modifications to the Queens Quay East corridor only as far east as the Parliament Street (plus a temporary streetcar / LRT loop facility) and the easterly limit of the East Bayfront Precinct. A likely easterly extension of Queens Quay East and the East Bayfront transit facility to the Port Lands (as contemplated in the Central Waterfront Secondary Plan) will be addressed within a Class Environmental Assessment Master Plan being undertaken by Waterfront Toronto for the Lower Don Lands area.

The study area for the East Bayfront Transit Environmental Assessment is shown in Figure 1 (See page 2).

Traffic Assessment Study Area

This study is focussed upon a portion of the overall study area considering the section of the Queens Quay East corridor where the planned dedicated transit facility is to be located at-grade. Detailed traffic operations analyses have been undertaken between the planned portal location (just west of Freeland Street) in the west and a presumed T-intersection that will be created at the Queens Quay East / Parliament Street intersection following the planned extension of Queens Quay East to Cherry Street.

Traffic operations within other existing or planned sections of Queens Quay east and west of the analysis area will be addressed through other ongoing or forthcoming studies.

Adjacent Land Uses – Traffic Assessment Study Area

Lands on the north and south sides of Queens Quay East within the traffic assessment study area (Freeland Street to Parliament Street) are currently utilized for a variety of commercial and industrial uses including:

<u>North Side of Queens Quay East</u>

- the Toronto Star building on the west side of Freeland Street;
- the LCBO building and related surface parking areas on the east and west sides of Cooper Street;
- a Loblaws food store located in the north-west quadrant of the Queens Quay East / Lower Jarvis Street intersection;

South Side of Queens Quay East

- the Redpath Sugar plant located just west of the Jarvis Street Slip;
- a number of commercial uses on the north side of Queens Quay east of Lower Jarvis Street such as the Guvernment nightclub and Purolator depot;
- lands under development as part of the first phases of construction within the East Bayfront Precinct that will accommodate the Corus Entertainment office building and George Brown College facility;
- a surface parking lot located on the MT27 lands that are planned to be redeveloped for residential uses.

Other lands on the south side of Queens Quay East within the East Bayfront Precinct are now largely vacant but are anticipated (primarily) , as other lands are, to be redeveloped as part of the ongoing revitalization of the Toronto waterfront.

2.2 Existing Road Network

The existing road network, lane configurations and turn restrictions within the study area are shown on Figure 3.

A description of the key streets and roadways in the study area is provided in the following sections.

Expressways

- **Gardiner Expressway**

The Gardiner Expressway is an east-west oriented, basic 6-lane elevated roadway with on / off ramps at Lower Sherbourne Street and Lower Jarvis Street in the traffic assessment study area.

The Gardiner Expressway is one of the principal roadways providing regional access to the central area of Toronto and links to the Queen Elizabeth Way (QEW) west of the City and in the east, to both the Don Valley Parkway and Lake Shore Boulevard East. It carries high traffic volumes and operates as a controlled access, free-flow facility. The posted speed limit is 90 km/h.

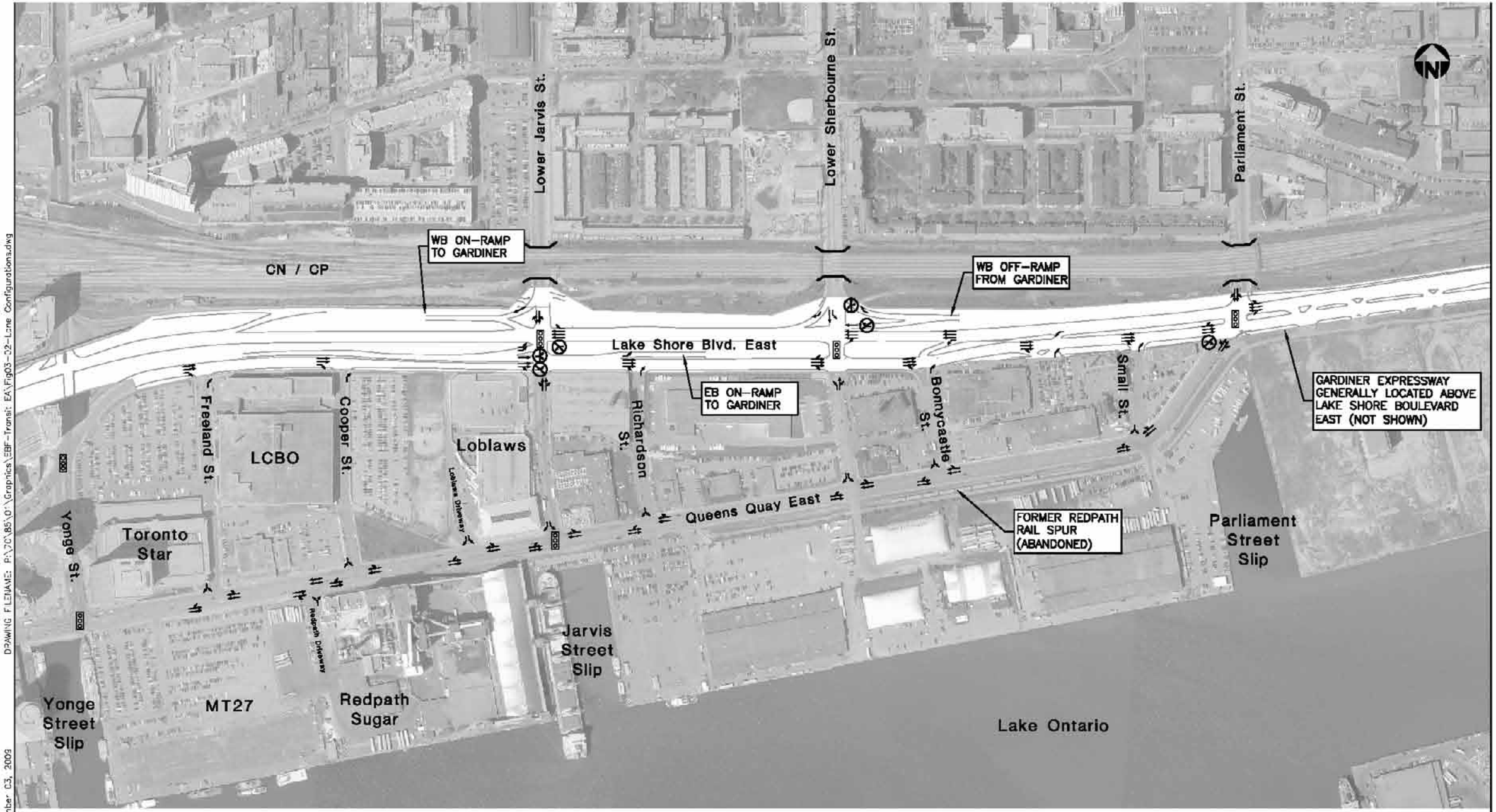
The section of the Gardiner Expressway within the Study Area (east of Jarvis Street) is the subject of an Environmental Assessment study that will determine the treatment of this section of elevated highway, whether it is removed or not and what, if it is demolished, facilities will replace it.

This study is ongoing and a Terms of Reference for the study has been recently completed. The study is scheduled to be completed in 2010/2011.

Major Arterial Streets

- **Lake Shore Boulevard East**

Lake Shore Boulevard East is an east-west oriented, basic 6-lane divided roadway that runs through the East Bayfront Precinct parallel to and either beneath or to the south of the Gardiner Expressway. Lake Shore Boulevard East carries relatively large volumes of traffic.



EXISTING ROAD NETWORK, LANE CONFIGURATIONS / TURN RESTRICTIONS

Notes: 1. Lake Shore Boulevard East shown below the Gardiner Expressway.

Intersection lane configuration

Turn Restriction

Existing Traffic Signal

DRAWING FILENAME: P:\7085\01\Graphics\EBF-Transit EA\Fig03-02-Lane Configurations.dwg

DATE PLOTTED: September 03, 2009

Lake Shore Boulevard East connects with each of the main north-south streets in the study area (Bay Street, Yonge Street, Lower Jarvis Street, Lower Sherbourne Street, Parliament Street and Cherry Street) at a series of signalized intersections. The local streets north of Queens Quay East also connect with Lake Shore Boulevard East. The posted speed limit is 60 km/h.

The future configuration of the Lake Shore Boulevard East corridor, including lane provisions, intersection locations and streetscape will also be reviewed and determined as part of the Gardiner Expressway Environmental Assessment study.

- **Jarvis Street (North of Lake Shore Boulevard East)**

Jarvis Street north of Lake Shore Boulevard East is a basic 4-lane, arterial street that extends northwards from Lakeshore Boulevard East, through an underpass structure below the main rail-line ultimately to Bloor Street East. Jarvis Street provides a key linkage between the waterfront and the downtown areas of Toronto. The posted speed limit is 50 km/h.

Minor Arterial Streets

- **Queen Quay (East & West)**

Queens Quay is an east-west oriented, basic 4-lane roadway that runs parallel to Lake Shore Boulevard across central Toronto. Queens Quay connects from Lake Shore Boulevard West at Bathurst Street and back to Lake Shore Boulevard East at Parliament Street. The posted speed limit is 50 km/h.

There are on-street bicycle lanes provided in each direction on Queens Quay East through the traffic assessment study area as well as the multi-use Martin Goodman Trail that runs, east of Lower Jarvis Street, on the south side of the street.

- **Lower Sherbourne Street**

Lower Sherbourne Street is a north-south oriented, basic 4-lane roadway (3 lanes south of Lake Shore Boulevard East) that extends from Queens Quay East northwards to just north of Bloor Street East. There are on-street bicycle lanes provided in each direction. The posted speed limit is 50 km/h.

- **Parliament Street**

Parliament Street is another north-south oriented, basic 4-lane roadway that extends from Lake Shore Boulevard East, passing beneath the main rail-line, to Bloor Street East. Parliament Street has a posted speed limit of 50 km/h.

Collector Streets

- **Lower Jarvis Street (south of Lake Shore Boulevard East)**

The section of Lower Jarvis Street south of Lake Shore Boulevard East and within the East Bayfront Precinct is a 4-lane collector road. The intersection of Queens Quay East and Lower Jarvis Street is

signalized today and is located just over 200 metres south of the Lake Shore Boulevard East traffic signal. The posted speed limit is limit is 50 km/h.

- **Cherry Street**

Cherry Street is a north-south oriented, basic 2-lane roadway located east of the East Bayfront Precinct Plan area. Cherry Street extends northwards from a signalized intersection on Lake Shore Boulevard East to connect to King Street East (as Sumach Street) as well as southwards from another signalized intersection across the Keating Channel into the Port Lands. The posted speed limit is 50 km/h.

Local Streets

There are five local north-south oriented streets linking between Lake Shore Boulevard East and Queens Quay East within the study area considered as part of the traffic assessment. These are as follows:

- Freeland Street
- Cooper Street
- Richardson Street
- Bonnycastle Street
- Small Street

These road are all currently 2-lane roads within. The posted speed limits are 50 km/h. Their intersections with Lake Shore Boulevard East and Queens Quay East operate under two-way (side street) STOP control . Access to Lake Shore Boulevard East is limited to right turns only except a Bonnycastle Street where the westbound (inbound) left turn is also permitted.

Local Private Access

There are a limited number of direct access driveways provided onto Queens Quay East that need to be considered upon full redevelopment of the East Bayfront Precinct and surrounding areas.

Key amongst these are the following.

- Redpath Sugar Plant
  - Currently served by 3 existing driveways onto Queens Quay East
  - The westerly driveway forms the primary access routing serving the plant and is the focus of the majority of heavy trucking traffic
  - The centre and eastern driveways are used as secondary facilities during plant peak or special periods of activity
- Loblaws Food Store
  - served by two driveways, one onto Lower Jarvis Street and another onto Queens Quay East just west of Lower Jarvis Street
- MT 27 Parking Lots
  - served by driveways directly onto Queens Quay East located to the west of Freeland Street

- access will be reconfigured and to be consolidated upon redevelopment via a single driveway aligned opposite Freeland Street

2.3 Planned Road Modifications

Several new future road connections are contemplated in the East Bayfront Precinct area.

2.3.1 Committed Modifications and New Roads

1. Lower Sherbourne Street Realignment and Extension

Lower Sherbourne Street is to be realigned (and straightened) south of Lake Shore Boulevard East to route to the west of planned Sherbourne Park. It will also be extended south of Queens Quay East into the Dockside area of the East Bayfront Precinct.

2. Dockside – Jarvis Street Slip to Sherbourne Park

A system of new public roads is to be constructed in conjunction with the development of the Dockside area of the East Bayfront Precinct between the Jarvis Street slip and Sherbourne Park. A 'U-shaped' system of three roads is planned including the extension of Sherbourne Street south of Queens Quay East (as noted above), a new public street extension of Richardson Street south of Queens Quay East and an east-west road (Street F) that connects between the two north-south links. The 'U-shaped' road serves the Corus Entertainment, George Brown College and other development parcels within the Dockside area as well as providing access to the waterfront promenade.

3. Freeland Street Extension – MT27 Lands

Freeland Street is to be extended across Queens Quay East to connect into the MT27 lands as a new public street. This new facility will provide access to a future residential redevelopment proposal on those lands.

2.3.2 Planned Major Street Linkages

4. Queens Quay East Extension and Parliament Street Realignment

The Central Waterfront Secondary Plan contemplates a realignment and extension of Queens Quay East eastwards from its current terminus at Lakeshore Boulevard East opposite Parliament Street to a new connection with Cherry Street through the westerly portions of the Lower Don Lands.

As part of this extension, Parliament Street is to be extended southwards across Lakeshore Boulevard East to connect with Queens Quay East at a new 'T-intersection' located just to the north of the Parliament Street.

This realignment and two extensions will remove the 'angled' section of Queens Quay East that connects back to Lake Shore Boulevard East and normalize the road fabric in this area of the East Bayfront and Lower Don Lands Precincts.

The configuration of the Queens Quay East and Parliament Street extensions are the subject of further work that will be undertaken as part of the Lower Don Lands Class EA Master Plan study.

2.3.3 Potential New Development Related Connections

There are also a number of local public street linkages planned as part of future development plans within the East Bayfront Precinct to provide access to those areas. The arrangement of these facilities has not, at this point, been established and will be the subject of future redevelopment related studies and submissions to the City.

Basic provisions have, however, been incorporated into the analyses undertaken as part of this traffic assessment based upon the latest information available as representative of the arrangement of public street connections that may emerge in the area.

These linkages include:

1. Street A – Queens Quay East to Lake Shore Boulevard East

A new public street (Street A) is contemplated on the north side of Queens Quay East approximately mid-block between Richardson Street and Lower Sherbourne Street and will link between Queens Quay East and Lakeshore Boulevard East.

2. Bayside – Sherbourne Park to Parliament Street

A series of new roads are contemplated serving the Bayside development area located to the south of Queens Quay East between Sherbourne Park and the Parliament Street within the East Bayfront Precinct.

While the arrangement of the public road system has not been determined at this time, the basic system is currently contemplated as including three north-south roadways interconnected south of Queens Quay East within the development area. Two of these links are to be aligned opposite Bonnycastle Street and Small Street. The third is located approximately mid-block between these two links.

It is assumed within this traffic assessment, and based upon current plans, that Street D will connect to Queens Quay East at a signalized intersection in both design alternatives under consideration as part of the East Bayfront Transit Environmental Assessment. In the *South Side Transit* option, no connections are assumed between Queens Quay East and Bonnycastle Street / Small Street (with Street D providing the only access to the Bayside area) to reduce the number of signalized crossings of the dedicated streetcar / LRT facility. With the *Centre Transit* option, the Bonnycastle Street and Small Street extensions south of Queens Quay East may connect to Queens Quay East.

3. Street D - Queens Quay East to Lake Shore Boulevard East

A new public street (Street D) is contemplated on the north side of Queens Quay East approximately mid-block between existing Bonnycastle Street and existing Small Street.

3. Proposed Queens Quay East Options

Two design alternatives have been developed as part of the Environmental Assessment for the at-grade portions of an exclusive LRT / streetcar facility running along Queens Quay East between Union Station and a temporary streetcar loop located just east of the Parliament Street.

The two alternative design considered as part of the Environmental Assessment are:

- Transit in the middle of Queens Quay East ("*Centre Transit*" option)
- Transit on the south side of Queens Quay East ("*South Side Transit*" option)

Illustrative plans prepared by the consulting team for the two alternatives are shown in Figures 4 and 5.

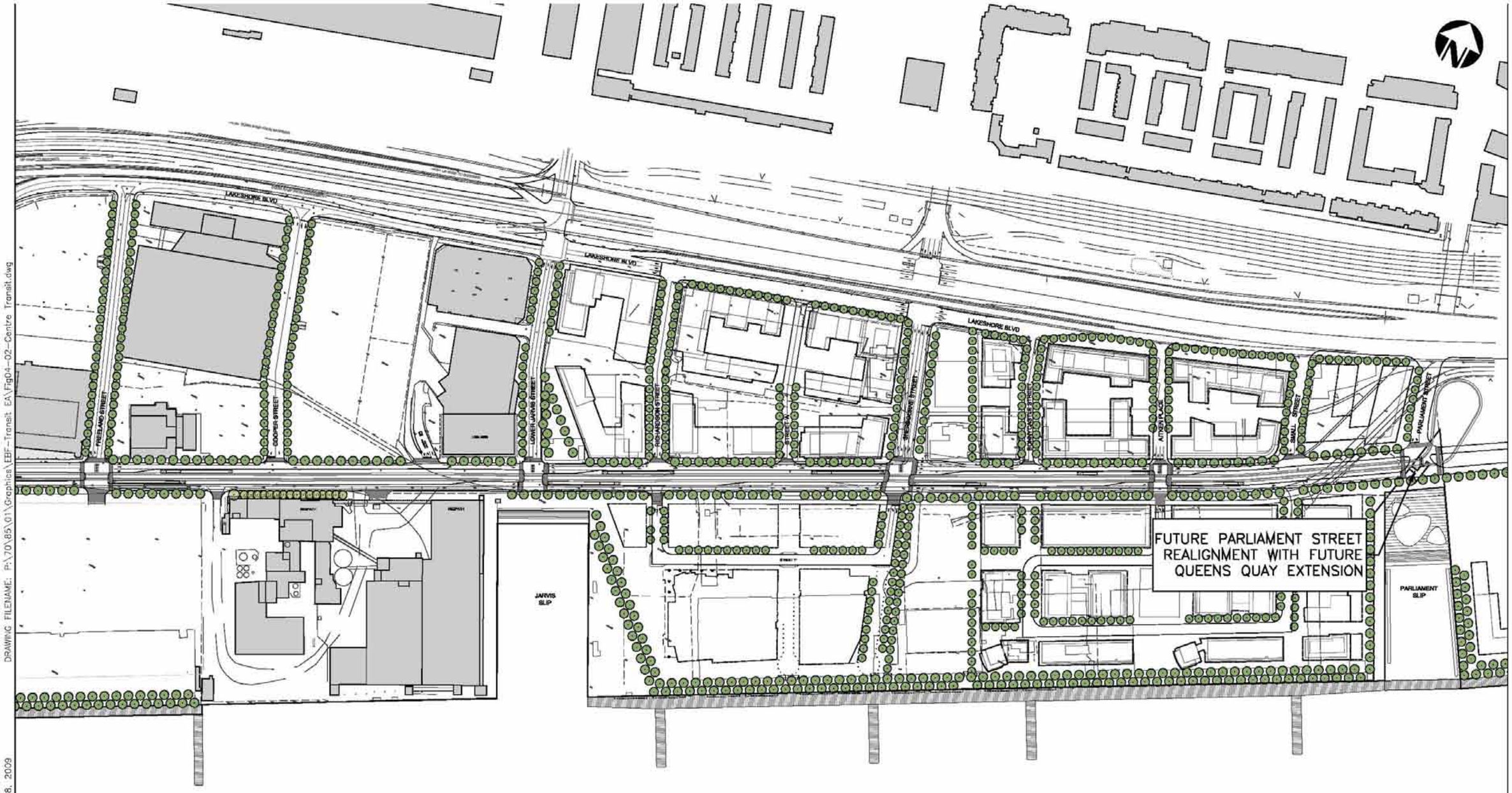
Both plans incorporate the following:

- A basic 1 vehicular travel lane in each direction plus turn lanes at intersection on the Queens Quay East;
- Existing and planned road connections to Queens Quay East between the portal and Parliament Street;
- The planned exclusive transit facility;
- Bicycle facilities; and
- Enhancements to the pedestrian / public realm along Queens Quay East.

The East Bayfront Transit Environmental Assessment is only seeking approval, at this time, for changes to infrastructure provisions along the Queens Quay East corridor to the easterly limit of the East Bayfront Precinct. As such, the plans also reflect, at this time, a retention of the existing easterly connection of Queens Quay East to Lake Shore Boulevard East at Parliament Street and provision of a temporary TTC streetcar / LRT loop to the east of the Parliament Street. Modifications to the easterly section of Queens Quay East related to its extension to Cherry Street, the extension of the East Bayfront transit service eastwards and the southerly extension of Parliament Street will be addressed through other studies undertaken as part of the planning approvals process for the Lower Don Lands.

It is noteworthy that, while the physical plans being considered within the East Bayfront Transit Environment Assessment do not include for the extension of Queens Quay East to Cherry Street, this traffic assessment considers the traffic implications and volume demands of the longer term plan that includes the extension and development within the westerly portions of the Lower Don Lands between Parliament Street and Cherry Street.

Details of the two alternatives are outlined in the following sections.



DRAWING FILENAME: P:\70\85\01\Graphics\EBF-Transit EA\Fig04-02-Centre Transit.dwg

DATE PLOTTED: September 08, 2009

CENTRE TRANSIT CONCEPT PLAN

Source: DTAH Plan, Dated June 25, 2009. Modified to reflect lane configurations based on BA Group's Assessment Report, September 2009.

Note: There is flexibility for connections for Bonnycastle Street & Small Street as right turns only intersections south of Queens Quay East.

DRAWING FILENAME: P:\70\85\01\Graphics\EBF-Transit EA\Fig05-03-South Side Transit.dwg

DATE PLOTTED: January 13, 2010

SOUTH SIDE TRANSIT CONCEPT PLAN

Source: DTAH Plan, Dated June 25, 2009. Modified to reflect lane configurations and proposed traffic signal location based on BA Group's Assessment Report, September 2009.

3.1 Centre Transit Option

3.1.1 Queens Quay East Cross-Section

The *Centre Transit* arrangement locates a basic 6.7 to 7.0 metre wide dedicated, and typically raised, streetcar right-of-way within the centre of Queens Quay East as is typical of similar facilities across Toronto (i.e. Spadina Avenue and St. Clair Avenue West). A pair of 3.0 metre wide medians are located on either side of the streetcar / LRT facility providing space for landscaping, transit stop platforms / shelter facilities and for left turn lanes at intersections where required.

One vehicular travel lane is provided in both the westbound and eastbound directions on either side of the transit right-of-way. The travelled pavement width on either side of the transit right-of-way is in the order of 5.3 metres wide and comprises of a 3.5 metre travel lane and a 1.8 metre wide on-street bicycle lane adjacent to the curb. There is little opportunity to provide on-street parking within the basic cross-section and additional lay-by facilities would be required for such purposes if pursued.

Separate 3.0 metre wide left turn lanes are provided at intersections utilizing and cutting out space available within the median adjacent to the transit right-of-way to minimize the extent of any 'shift' required to the outer roadway curbline to accommodate the left turn lane. The left turn lanes also provide for 'U'-turns at these intersections given that the raised transit right-of-way will restrict access at a number of public streets and driveways to right turn movements only.

The travel lane width, including the bicycle lane, provided on either side of the raised transit right-of-way provides sufficient space to enable a vehicle to pass another vehicle that may be stopped errantly or in an emergency / breakdown circumstance.

Pedestrian sidewalk and boulevard facilities are provided on both sides of Queens Quay East.

A typical *Centre Transit* cross-section is shown on Figure 2 (see page 5).

3.1.2 Signalized Intersections

It is necessary with the *Centre Transit* option arrangement to introduce traffic signal control at intersections where vehicle movements are to cross the streetcar / LRT tracks (i.e. left turns to / from Queens Quay East and north-south through movements). This relates to safety considerations and the need to avoid potential conflicts between left turning vehicles and streetcar / LRT operations on the TTC transit right-of-way.

The following four intersections along Queens Quay East are proposed to operate under traffic signal control in the *Centre Transit* option within the section of the corridor reviewed as part of this traffic assessment and where the streetcar / LRT facility is located at grade.

- Freeland Street
- Lower Jarvis Street
- Lower Sherbourne Street
- Street 'D'

A traffic signal will also, ultimately, be located at a future Parliament Street / Queens Quay East T-intersection following the extension of Queens Quay East to Cherry Street and the southerly extension of Parliament Street to connect to it. The reconfiguration of this intersection and extension of Queens Quay East is not being pursued as part of the East Bayfront Transit Class Environmental Assessment and the existing Queens Quay East connection to Lake Shore Boulevard East will remain in place until the appropriate studies are completed as part of the planning work being undertaken within the Lower Don Lands.

Eastbound and westbound left turn lanes are provided (as appropriate) at the above mentioned signalized intersections. A protected left turn signal phasing strategy is to be adopted at all signalized locations to avoid any potential conflicts / safety issues arising between left turning vehicles turning from Queens Quay East and streetcars / LRT vehicles on the TTC transit right-of-way given that TTC vehicles are to travel through these intersections coincident with the main east-west green main phase.

Pedestrian crossing facilities are provided across all sides of these signalized intersections. North-south crosswalks are provided across the entire width of the Queens Quay East including the roadway and transit right-of-way portions of the cross-section.

Pedestrian crossings will be activated through the use of push-button facilities as is standard across new signalized intersections within the City of Toronto. Visual and audible signals will also be installed in accordance with typical standards. Appropriate pedestrian crossing times will be provided to facilitate single stage north-south crossings of Queens Quay East in accordance with typical City of Toronto standards.

3.1.3 Unsignalized Intersections

The following public street and driveway intersections to north and south other than signals are maintained as side-street STOP controlled intersections.

- North Side of Queens Quay East

- Cooper Street
- Loblaws driveway
- Street A
- Bonnycastle Street
- Small Street

- South Side of Queens Quay East

- Redpath Sugar Plant Driveways

- North and South Sides of Queens Quay East

- Richardson Street

It is noted that there is flexibility for connections for Bonnycastle Street and Small Street as right turns only intersections south of Queens Quay East.

3.1.4 Turning Movement Prohibitions

Left turns to / from the unsignalized STOP controlled public street and driveway intersections located between the traffic signals located on Queens Quay East will be prohibited due to the presence of the raised transit right-of-way in the centre of the street.

Motorists looking to enter / exit these public streets and driveways will, however, be able to 'U-Turn' at the downstream signalized intersections in order to travel back in the opposite direction and complete what would effectively be a left turn movement either in or out of the street or driveway.

Left turns movements would be prohibited as follows:

- Cooper Street - southbound and eastbound left turns
- Redpath Sugar Plant driveways - northbound and westbound left turns
- Loblaws driveway - southbound and eastbound left turns
- Richardson Street - all left turns
- Street A - southbound and eastbound left turns
- Bonnycastle Street - southbound and eastbound left turns
- Small Street - southbound and eastbound left turns

3.1.5 Emergency Vehicle Access

Emergency vehicle access is maintained to land-holdings and buildings located on either side of Queens Quay East through use of Queens Quay East and the existing and planned north-south streets within the study area.

The total travel lane width provided on Queens Quay East on either side of the raised transit right-of-way is 5.3 metres including the on-street bicycle lane width and is designed to meet emergency services access requirements for roads separated by raised transit rights-of-way.

3.2 South Side Transit Option

The *South Side Transit* option locates the exclusive transit facility on the south side of the Queens Quay East roadway. Cycling facilities are provided off-street within a wide boulevard area south of the LRT / streetcar tracks as an extension / enhancement of the Martin Goodman Trail multi-use facility.

3.2.1 Queens Quay East Cross-Section

3.2.1.1 Road and Transit

Queens Quay East comprises of a basic 1 vehicular travel lane in each direction with auxiliary turn lanes at signalized intersections and other intersections / driveways along the corridor. On street parking is provided at mid-block locations, where possible, along the north side of the street.

The roadway pavement width is generally 10 metres from the north side curb line to the centre median which accommodates a basic two (one 3.5 to 3.75 metre wide through lane in each direction plus on-street parking) to three lane cross-section (one 3.5 metre wide through lane in each direction plus one 3.0 metre wide left or right turn lane depending upon the location). At certain intersections,

where both a left turn and a right turn lane are provided, the roadway width is increased to 13 metres to provide for both auxiliary turn lanes.

A 6.7 to 7.0 metre wide dedicated transit right-of-way facility is located to the south of the roadway portion of Queens Quay East separated from it, generally, by a 3.0 metre wide median facility.

3.2.1.2 Bicycle and Pedestrian

Pedestrian sidewalks and boulevards are provided on both sides of Queens Quay East.

The Martin Goodman Trail is located on the south side of the dedicated transit facility separated from it by a 3.0 metre wide landscaped strip pedestrian sidewalk and boulevard areas are located south of the Martin Goodman Trail facility.

A typical cross-section for the *South Side Transit* option is shown on Figure 2 (see page 5).

3.2.2 Signalized Intersections

It is necessary with the *South Side Transit* option, for safety reasons and to avoid potential conflicts between turning vehicles and streetcars / LRT vehicles on the TTC transit right-of-way, to introduce traffic signal control at road crossings of the streetcar / LRT tracks.

The following seven intersections along Queens Quay East within the traffic assessment study area are proposed to operate under traffic signal control in the *South Side Transit* option.

- Freeland Street
- Westerly Redpath Sugar Plant driveway
- Centre Redpath Sugar Plant driveway (Redpath peak usage only - no pedestrian crossings)
- Lower Jarvis Street
- Richardson Street
- Lower Sherbourne Street
- Street ‘D’

As for the *Centre Transit* option a traffic signal will also, ultimately, be located at a future Parliament Street / Queens Quay East T-intersection following the extension of Queens Quay East to Cherry Street and the southerly extension of Parliament Street. As noted earlier, the reconfiguration of this intersection and extension of Queens Quay East is not being pursued as part of the East Bayfront Transit Class Environmental Assessment and the existing Queens Quay East connection to Lake Shore Boulevard East will remain in place until the appropriate studies are completed as part of the planning work being undertaken within the Lower Don Lands.

It is also notable that based upon the a memo prepared by Arup Canada Inc. dated August 26, 2009 regarding the Redpath signal operation analysis with the *South Side Transit* option, the easterly Redpath Sugar Plant minor access point will become flagged entrance operated only during peak period of the Redpath plant operation. The existing westerly access will be retained and will operate under full traffic signal control with pedestrian crossings provided. The existing centre driveway will also be retained and operated on a called basis (Redpath entrance) under complete transit pre-emption, and will be controlled independently from the adjacent traffic signal at the west entrance to

the Redpath Sugar plant. The use of this driveway would be restricted to trucks only. No pedestrian crossings are proposed at the centre driveway intersection.

To optimize transit operations at the signalized intersections along Queens Quay East and, notably, to increase the available green time for transit vehicles operating along Queens Quay East, signal phasing strategies at have been developed to enable east-west transit movements to occur at the same time as the east-west main traffic phases.

This phasing strategy requires, for safety reasons and to avoid potential conflicts between turning vehicles and streetcars on the TTC transit right-of-way, that turning movements that cross the streetcar / LRT tracks at the various intersections along the corridor (i.e. eastbound right turn and westbound left turn movements) operate only during protected turn phases and from exclusive turn lanes (left or right).

No permissive movements or right turns on red will be permitted on turning movements across the streetcar / LRT tracks (i.e. westbound and northbound right turns movements) due to safety and operational considerations and the potential for collisions to occur.

3.2.2.1 Pedestrian Crossing Considerations

Single Stage Crossing at 4-Way Intersections

Pedestrian crossing facilities are provided across all sides of the following four-leg signalized intersections along the corridor. North-south crosswalks extend, in these locations, across the road and transit portions of Queens Quay East.

- Freeland Street
- Westerly Redpath Sugar driveway
- Richardson Street
- Lower Sherbourne Street
- Street ‘D’

The pedestrian crossings will be activated through the use of push-button facilities as is standard across new signalized intersections within the City of Toronto. Visual and audible signals will also be installed in accordance with typical standards. Appropriate pedestrian crossing times will be provided in accordance with typical City of Toronto standards based upon the crossing width of the pedestrian facility.

Two-Stage Crossings at T-Intersections

A two-stage crossing arrangement has been developed for use at T-intersections along the Queens Quay East corridor where no roadway extends south of Queens Quay East. Suitable candidate locations within the section of the study area where the dedicated transit facility is located at-grade include the Lower Jarvis Street intersection. It also will, ultimately, also include the Parliament Street intersection.

This two-stage crossing arrangement has been developed to, primarily, reduce potential delays to transit operations on the south side of the street by separating the activation of the pedestrian crossing

facilities over the roadway and streetcar / LRT portions of Queens Quay East. This recognizes and takes advantage of there being no vehicular movements that cross the streetcar / LRT tracks on the south side of Queens Quay East that would require transit services to stop.

The arrangement also serves to reduce the roadway width that pedestrians are required to cross as part of a single crossing and the related pedestrian minimum green signal times that are required to be provided for the north south main green phases at such intersections. The reduction in north-south pedestrian signal times will, at certain intersections within the traffic assessment study area where levels of traffic turning to / from the side streets are relatively small, improve east-west traffic flow and reduce delays.

The 'split' arrangement includes for full traffic signal control of the roadway portion of Queens Quay East with pedestrian crossings on the east and west sides of these T-intersections extending between the north side of Queens Quay East and the 3.0 metre median facility located between the road and the streetcar / LRT tracks. It also includes for a separate and single pedestrian crossing of the streetcar tracks that operates independently of the main road traffic signal but provides a protected crossing facility for pedestrians. This crossing is offset from the two standard north-south cross-walks that extend over the road to the north and centred within the intersection. Physical measures, standard curbing and related features will be located on the median to guide pedestrians, including the visually impaired, between the two sets of crossing facilities.

The pedestrian crossings of the roadway portion of Queens Quay East will be activated through the use of push-button facilities as is standard across new signalized intersections within the City of Toronto. Visual and audible signals will also be installed in accordance with typical standards. Appropriate pedestrian crossing times will be provided in accordance with typical City of Toronto standards.

The pedestrian crossing of the transit facility will, given the relative frequency of transit vehicles on the streetcar / LRT tracks, operate with standard visual 'walk' and 'don't walk' signals but will, similar to a railroad pedestrian crossing arrangement, adopt a suitable audible 'don't walk' (rather than 'walk') warning, such as a ringing bell sound, advising pedestrians of the presence of an approaching streetcar / LRT vehicle and that they should wait until the tracks are cleared. The use of a railroad style warning system provides an audible signal for the pedestrian crossing that is distinct from the typical road crossing audible indicators that will be in use over the adjacent roadway portion of Queens Quay East and also avoids the continuous sounding of a 'walk' signal for extended periods between streetcar / LRT vehicle movements.

3.2.3 Unsignalized Intersections

Public street and driveway intersections that connect to the north side of Queens Quay East between the main signalized intersections within the traffic assessment study area are maintained as side-street STOP controlled intersections. These include:

- *North Side of Queens Quay East*
- Cooper Street
- Loblaws driveway
- Street A
- Bonnycastle Street

- Small Street

  - South Side of Queens Quay East
- None

All public street or driveway intersections to the south of Queens Quay East are signal controlled to avoid conflicts between turning vehicles and TTC vehicles operating on the transit right-of-way. No unsignalized facilities are permitted except, potentially, for emergency vehicle access over the tracks at select locations as required by emergency services to be able to appropriately respond to incidents that occur within the development lands located on the south side of Queens Quay East (i.e. the Bayside development lands).

3.2.4 Turning Movement Prohibitions

The signal phasing strategies at the signalized intersections along the Queens Quay East corridor has been developed to enable east-west transit movements to occur simultaneously with the east-west main traffic phases to increase the extent of green times available for transit vehicles to operate within and reduce potential delays to transit vehicles running on Queens Quay East.

This adopted phasing strategy requires, for safety reasons, that turning movements from Queens Quay East that cross the streetcar / LRT tracks at the signalized intersections (i.e. eastbound right turn and westbound left turn movements) operate only during protected turn phases and from an exclusive turn lane (left or right). No permissive movements or right turns on red will be permitted on turning movements across the streetcar / LRT tracks (i.e. northbound and eastbound right turns movements) due to safety and operational considerations.

For the most part, the proposed 10.0 to 13.0 metre wide roadway cross-section proposed on Queens Quay East permits the provision of a separate, exclusive turn lane for either the eastbound right turn or westbound left turn movements from Queens Quay East but not both. The exception is the Street D intersection where both the eastbound right and westbound left turning movements are accommodated given that this intersections forms the only connection point serving the Bayside development area.

Turning movements across the streetcar / LRT tracks that are not provided with an exclusive turn lane are to be prohibited. Prohibited movements within the traffic assessment study area where the dedicated transit facility is located at-grade are as follows:

- Freeland Street intersection - eastbound right turn
- Richardson Street intersection - westbound left turn
- Lower Sherbourne Street intersection - eastbound right turn

Potential eastbound left turn restrictions / prohibitions may be required at the unsignalized STOP controlled intersections at Cooper Street, Street A, Bonnycastle Street and Small Street depending upon whether an eastbound left turn lane is provided on Queens Quay East. The ability and need to provide an appropriate eastbound left turn lane at these intersections will be subject to further review as part of detailed design exercise. A key consideration in this regard is the desirability of providing on-street mid-block parking on the north side of Queens Quay East within the proposed road cross-section.

3.2.5 Emergency Vehicle Access

Emergency access is maintained to land holdings and buildings on the north side of Queens Quay East from the 10.0 to 13.0 metre wide roadway portion of Queens Quay East and the series of existing and planned north-south streets extending northwards from Queens Quay East.

Emergency access to land-holdings on the south side of Queens Quay East can be provided either directly from the transit right-of-way, via public streets that cross the transit right-of-way and, as secondary facilities if required, via emergency vehicle only access locations at selected locations.

Access to the properties / land holdings located on the south side of Queens Quay East would be provided as follows:

- MT27 property - via the Freeland Street traffic signal
- Redpath Sugar Plant - via traffic signal at existing western driveway and partial signal for inbound/outbound truck traffic at centre driveway
- Dockside area - via traffic signals at Richardson Street and Lower Sherbourne Street
- Bayside area - via traffic signal at Street D with provision for emergency vehicle only accesses opposite Bonnycastle Street or Small Street

Emergency vehicle access to development lands east of Parliament Street will be established as part of future studies relating to the extension of Queens Quay East to Cherry Street. Emergency vehicle access would, at a minimum, be provided via a traffic signal located at Trinity Street (as reviewed herein from a traffic perspective) with provision for secondary emergency vehicle only access at one or two other locations as required.

3.2.6 Potential Future Pedestrian Crossings

Additional two-stage pedestrian only crossings facilities may be considered at proposed Street A, Bonnycastle Street and Small Street in the future. The installation of such facilities at these locations is not considered as part of this assessment and will be the subject of further review as appropriate.

4. Traffic Volume Forecasts

BA Group has developed, in conjunction with Arup Canada Inc., a comprehensive series of future traffic volume forecasts for the Queens Quay and Lakeshore Boulevard corridors for use in the evaluation of the Queens Quay East configuration options.

Forecast volumes incorporate assignments of new traffic related to emerging and planned new development within the waterfront areas of Toronto (East Bayfront, West Don Lands and Lower Don Lands), the Railway Lands and other approved development proposals along the Queens Quay East and Lake Shore Boulevard corridors.

Forecasts have been developed for the following concept options under evaluation reflecting the cross-sectional characteristics, intersection locations and turn restriction / prohibitions inherent to each option.

- Transit in the middle of Queens Quay East ("*Centre Transit*" option)
- Transit on the south side of Queens Quay East ("*South Side Transit*" option)

4.1 Approach

4.1.1 Road Network Assumptions

The traffic volumes forecasts have been developed for the two configuration options for Queens Quay East incorporating the planned road modifications outlined in Section 2.3 of this study including, notably, the planned extension of Queens Quay East to Cherry Street and the specific lane configurations and turning movement restrictions / prohibitions inherent to each option.

4.1.2 Traffic Volume Forecasting Methodology

Traffic volume forecasts have been developed for the weekday morning and afternoon peak hour periods based upon a 4 step approach as outlined below.

1. Establish existing traffic volumes on the study area road network..

2. Adjust existing traffic volumes and patterns to take into account routing opportunities / constraints inherent within the planned area future road network. These include the following:
   - New road network connections including, principally, the planned extension of Queens Quay East to Cherry Street.
   - A diversion of a proportion of the existing westbound volume from the Queens Quay East corridor (i.e. currently turning at Parliament Street) to the Lake Shore Boulevard East corridor recognizing its reduced attractiveness for commuter use.
   - Turn restrictions and specific intersection arrangements along the Queens Quay East corridor inherent to each design option under consideration.

3. Establish a comprehensive series of net new traffic volume allowances for the Lake Shore Boulevard East and Queens Quay East corridors related to the build-out of emerging and committed area development across the Central Waterfront area. These net additional traffic allowances reflect:
   - the planned future area road network including the planned extension of Queens Quay East to Cherry Street; and
   - the intersection configurations and turn restrictions incorporated into the two alternatives under evaluation.

4. Development of future total traffic forecasts for the two options under evaluation (*Centre Transit* and *South Side Transit* options) incorporating:
   - adjusted existing baseline volumes (item 2); and
   - new area development traffic volumes (item 3).

4.1.3 Coordination with Queens Quay Revitalization EA

The East Bayfront Transit Environmental Assessment project team has worked closely with Waterfront Toronto and its consulting team working on the Queens Quay Revitalization Environmental Assessment.

Key in this regard has been the development of a common set of comprehensive forecasts of traffic activity across the Toronto waterfront area for use in both studies. These forecasts have been developed jointly in conjunction with Arup Canada Inc. adopting the forecasting methodology outlined in Section 4.1.2 and the following sections to ensure that the traffic volume base considered in each study is consistent and reflects:

- the same level of existing traffic activity on the area road network;
- the same level of future development activity and related allowances; and
- road network assumptions and related reassignments of existing traffic activity.

4.2 Existing Baseline Traffic Volumes

4.2.1 Intersection / Driveway Traffic Count Information

Existing traffic volumes were established for the morning and afternoon peak hours at the area intersections on Queens Quay East and Lake Shore Boulevard East corridors within the study area based upon recent traffic count information collected by the City of Toronto and Arup Canada Inc.

The morning and afternoon peak hour periods were adopted for evaluation / analysis purposes as they typically reflect the busiest periods of activity on the Study Area road network given prevailing and anticipated area land-uses in and around the East Bayfront Precinct and typical commuter traffic patterns.

The following existing intersection turning movement count information was adopted for the public street intersections and private driveways within the Study Area:

Queens Quay East Intersections

- Freeland Street (Arup Canada Inc., October 11, 2007)
- Cooper Street (Arup Canada Inc., October 11, 2007)
- Lower Jarvis Street (City of Toronto, June 25, 2007)
- Lower Sherbourne Street (City of Toronto, December 1, 2003)
- Redpath Sugar Plant driveways (Arup Canada Inc. October 11, 2007)
- Loblaws Food store driveway (Arup Canada Inc. October 11, 2007)

Lake Shore Boulevard East

- Lower Jarvis Street (City of Toronto, December 19, 2006)
- Lower Sherbourne Street (City of Toronto, August 8, 2007)
- Parliament Street / Queens Quay East (City of Toronto, June 21, 2007)

Existing area traffic volumes for the morning and afternoon peak hours are provided on Figure 6.

4.2.2 Volume Balancing – Queens Quay East Corridor

The existing traffic count information along the Queens Quay East corridor was also reviewed in detail to ensure a general consistency between intersections.

Modest adjustments were made to the through volumes on Queens Quay East to provide a balanced and representative traffic volume base for the intersections along this corridor that forms the focus of traffic operations analyses undertaken in the evaluation of the two design options being considered (as outlined in Section 5).

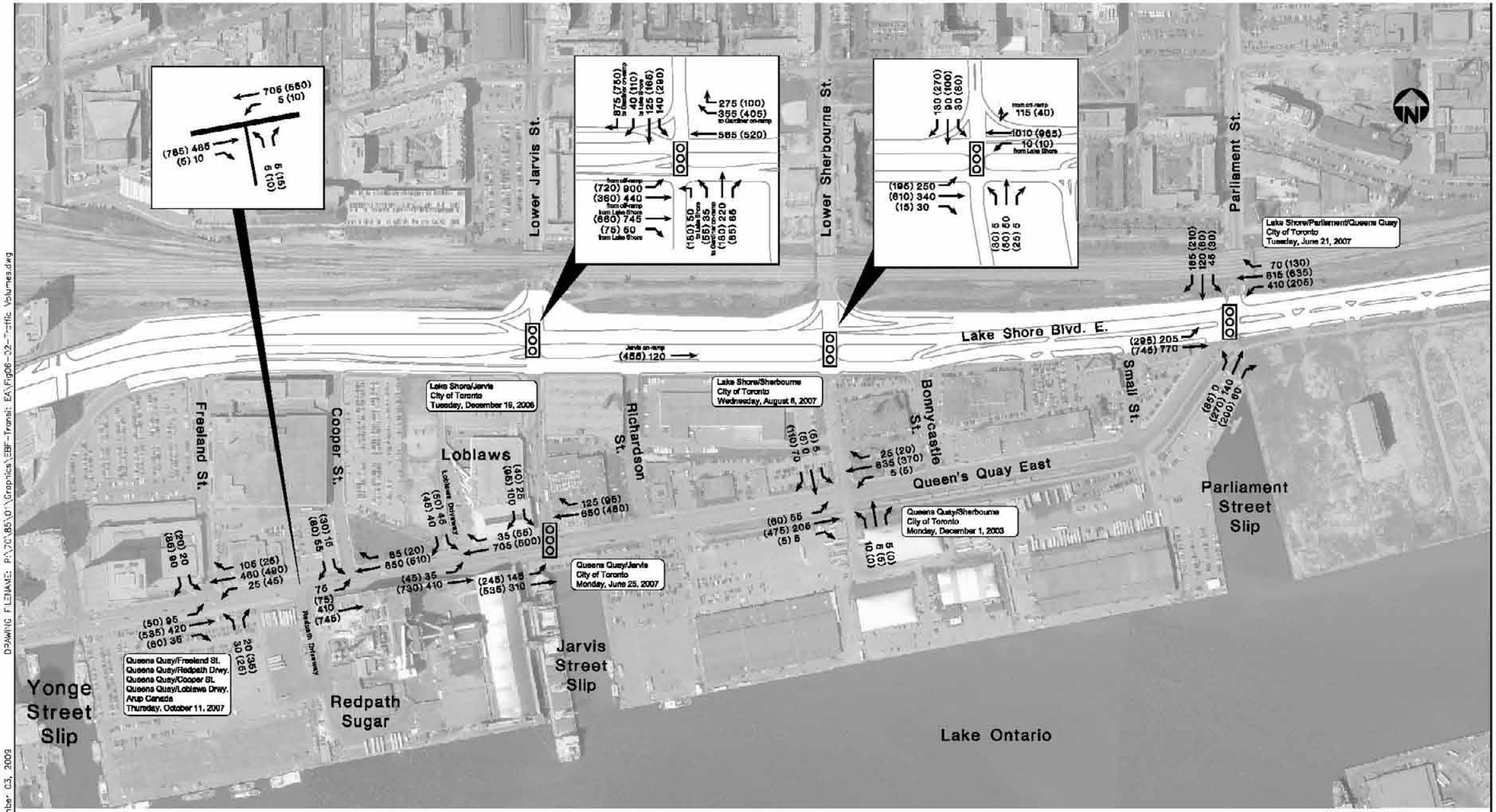
The Queens Quay West / York Street intersection (located within Queens Quay Revitalization EA Study Area) was identified, based upon a comparison of historical traffic counts information, as the 'master' area intersection to which volumes along the Queens Quay corridor are balanced.

Existing balanced traffic volumes are provided for the morning and afternoon peak hours in Figures A1(i) and A1(ii) in Appendix A, respectively.

4.2.3 Existing Traffic Redistribution: Planned Area Road Network

Existing traffic volumes are redistributed on the planned future area road network to reflect, notably, the extension of Queens Quay East eastwards to connect with Cherry Street.

This notably includes a diversion of existing traffic volumes orientated to / from the east that currently connects between the Lake Shore Boulevard East and Queens Quay East corridors using the Parliament Street and Sherbourne Street intersections onto the Queens Quay East extension. This assumes that such traffic will take advantage of the additional capacity and utility of this connection in routing to / from the Queens Quay East corridor.



EXISTING TRAFFIC VOLUMES

00 AM Peak Hour

(00) PM Peak Hour

Existing Traffic Signal

Notes: 1. All traffic volumes are rounded to the nearest 5 vehicles.
2. Lake Shore Boulevard East shown below the Gardiner Expressway.

4.2.4 Existing Traffic Diversion: Queens Quay East to Lake Shore Boulevard East

Substantial volumes turn from the Lake Shore Boulevard East corridor at the Parliament Street / Queens Quay East intersection during the morning peak hour period to use Queens Quay East as a routing alternative into the downtown areas of Toronto. Existing westbound left turn volumes exceed 400 vehicles during the morning peak hour.

This level of turning activity reflects the availability of capacity on the existing and under-utilized 4-lane wide section of Queens Quay East linking through the East Bayfront precinct area and that there is only one traffic signal between Parliament Street and Yonge Street (i.e. the Lower Jarvis Street signal).

The attractiveness of the Queens Quay East corridor as a commuter routing will be reduced over time as the East Bayfront Precinct develops and due to:

a) the logical reduction in through movement capacity on Queens Quay East compared to today given the planned reduction from the existing 4-lane cross-section (2 in each direction) to a basic 2 lane cross-section under both of the design options under evaluation;
b) the rationalization of the Lake Shore Boulevard East / Parliament Street / Queens Quay East intersection;
c) the introduction of a number of new traffic signals along the Queens Quay East corridor in both options;
d) the increase in turning traffic activity levels at intersections along the corridor and consequential reduction in available through capacity; and
e) the ability of Lakeshore Boulevard to handle additional existing traffic

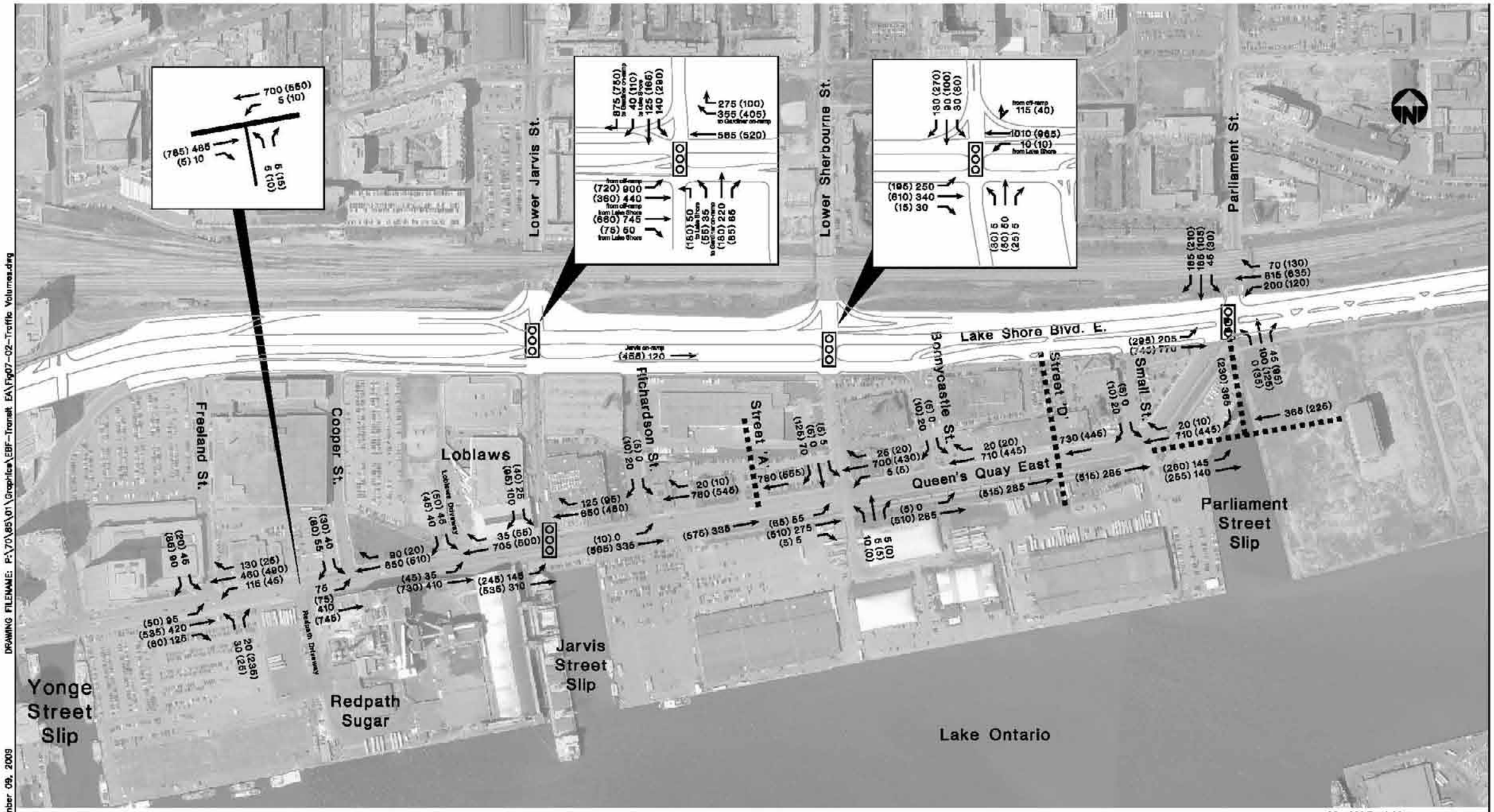
Given the above, a proportion of the heavy existing westbound left turn volume currently turning onto Queens Quay East at Parliament Street during the morning peak hour has been diverted to remain on Lake Shore Boulevard East and access downtown Toronto utilizing that corridor in preference to using Queens Quay East.

Some 125 existing westbound left turn vehicles have been ‘diverted’ during the morning peak hour at the Lake Shore Boulevard East / Parliament Street / Queens Quay East intersection to remain on Lake Shore Boulevard East. These trips have been routed to travel into downtown Toronto via the Bay Street and Yonge Street corridors directly from the Lake Shore Boulevard East corridor rather than using Queens Quay East.

No diversion has, however, been adopted for the afternoon peak hour given that westbound turning volumes at the Lake Shore Boulevard / Parliament Street / Queens Quay East intersection are lower during this period and that traffic operations at the Lakeshore Boulevard East / Lower Jarvis Street intersection are more constrained during that period.

4.2.5. Baseline (Adjusted) Existing Volumes

Reassigned and balanced existing morning and afternoon peak hour traffic volumes on the planned future area road network within the Study Area are shown on Figure 7.



BASELINE EXISTING TRAFFIC VOLUMES

00 AM Peak Hour

(00) PM Peak Hour

Existing Traffic Signal

Proposed Roads

Notes: 1. All traffic volumes are rounded to the nearest 5 vehicles.
2. Lake Shore Boulevard East shown below the Gardiner Expressway.

4.3 New Development Related Traffic Allowances

A comprehensive series of traffic volume allowances have been made to account for the construction of a number of emerging and approved area development proposals across the City of Toronto waterfront.

These include the following planned developments.

- Build-Out of the East Bayfront Precinct.
- Build-Out of the West Don Lands Precinct.
- Development of the portion of Lower Don Lands between Parliament Street and Cherry Street that is reliant upon the extension of Queens Quay East for access.
- Blocks with the Railway Lands east and west of York Street.
- The Water Park Place development proposal located just west of Bay Street.
- The Pier 27 condominium building on the MT27 lands located on the south side of Queens Quay East opposite Freeland Street.
- The Pinnacle Centre (Phase 3) proposal at 33 Bay Street.

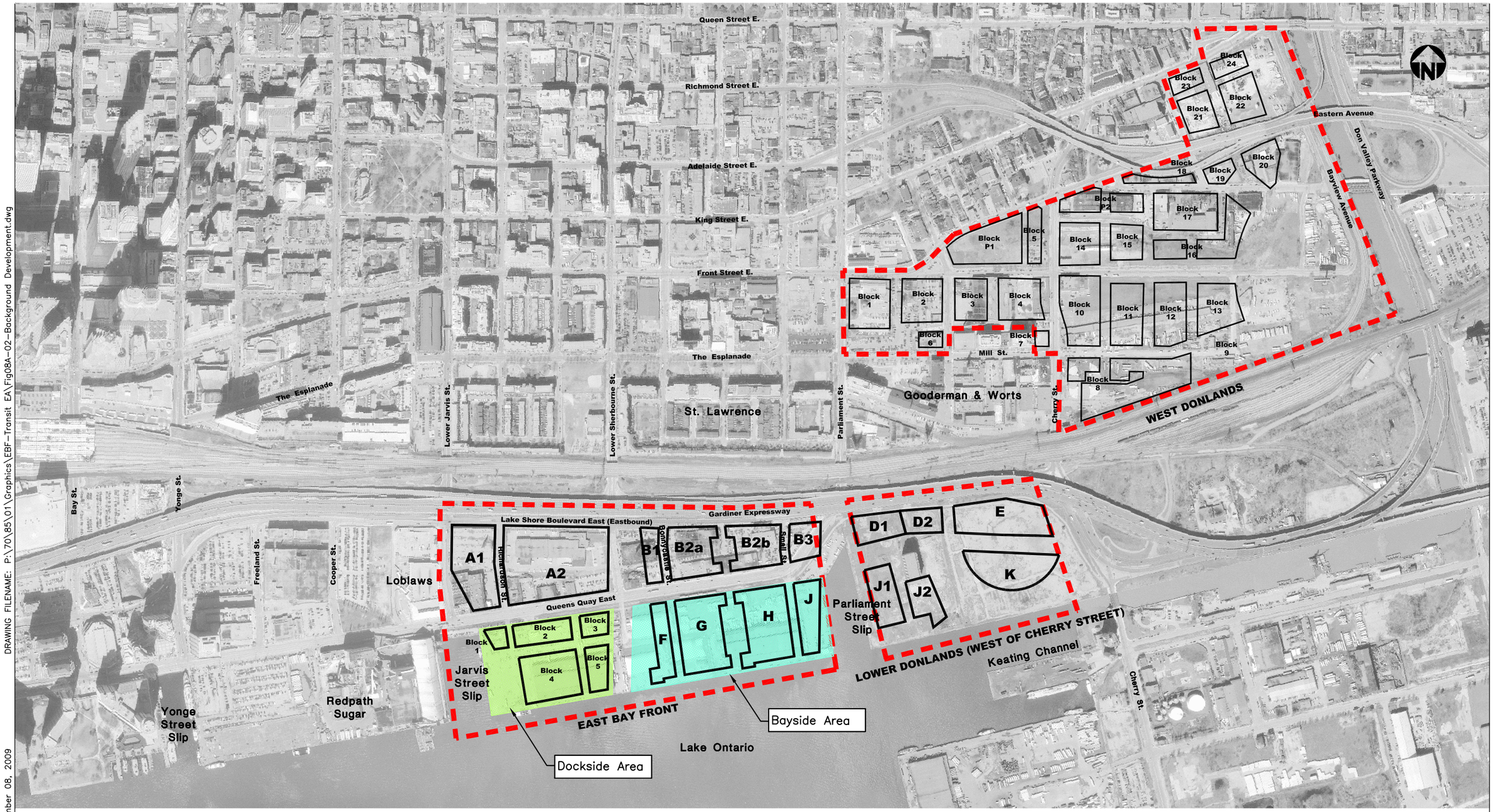
Net new traffic volume allowances for the above mentioned waterfront and area development proposals were established, where possible, based upon prior traffic studies prepared as part of the municipal approvals processes for these development applications as noted in Section 4.3.

Prior traffic volume allowances for the East Bayfront Precinct and the western portions of the Lower Don Lands Precinct have been modified and refined to reflect the current development plans being considered for these lands and, notably, intersection locations and turn restrictions inherent in the two options under evaluation for the Queens Quay East corridor.

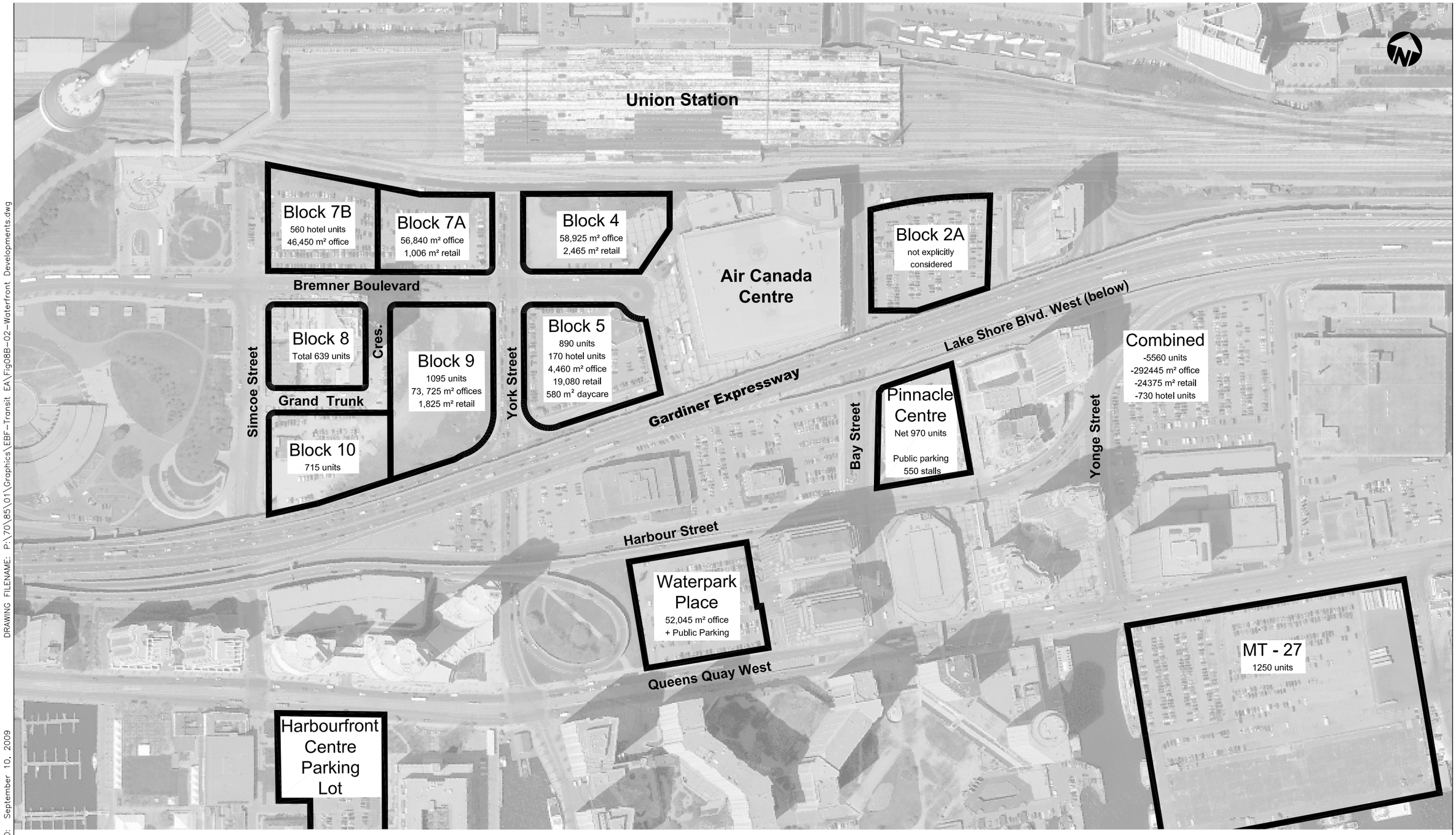
No allowances were made for new traffic activity related to new development within the Port Lands and eastern areas of the Lower Don Lands. Key in this regard is that Queens Quay East is not anticipated to play a notable role in the accommodating traffic activity related to these areas.

The location of the planned area development proposals considered within the forecasting outlined herein are shown on Figures 8a and 8b. Figure 8a shows approved development considered across the Central Waterfront area. Figure 8b shows the parcel and block areas considered within the East Bayfront Precinct, the West Don Lands Precinct and the westerly portions of the Lower Don Lands Precinct.

A discussion related to the key development programme and traffic generation parameters considered for area development within the future traffic volume forecasts established as part of this study is provided in the following sections.



EAST BAY FRONT / LOWER DON LANDS (WEST AREA) / WEST DON LANDS - BACKGROUND DEVELOPMENTS



OTHER CENTRAL WATERFRONT AREA DEVELOPMENTS

DRAWING FILENAME: P:\70\85\01\Graphics\EBF-Transit EA\Fig08B-02-Waterfront Developments.dwg

DATE PLOTTED: September 10, 2009

4.3.1 Traffic Allowances - East Bayfront Precinct

Travel demand forecasts developed as part of this study for the East Bayfront Precinct are based upon those outlined in the *East Bayfront Precinct Plan of Subdivision Transportation Analysis* report prepared by BA Group in May 2007 and the *East Bayfront Precinct, Traffic Operations Analysis Update* report prepared by BA Group in January 2006.

The volume forecasts outlined in these reports have been refined to reflect:

- current development plan for the emerging Dock Side development area (i.e. the Corus and George Brown College developments in the Jarvis Slip to Sherbourne Park area); and
- the intersection locations and turn restrictions inherent in each of the two design options under evaluation.

Forecasts have, as before, been developed on a block by block basis from first principles using person trip making characteristics adopted by the City for the anticipated uses within the Precinct.

The derivation of the traffic volume forecasts for the East Bayfront Precinct is outlined below.

4.3.1.1 Development Plans

Dock Side – Plan of Sub-Division Area

The Plan of Subdivision application for the Dock Side development area relates to the lands south of Queens Quay East between the Jarvis Slip and planned Sherbourne Park.

Traffic volume allowances have been developed for the development parcels identified in the Plan of Subdivision application (Blocks 1 to 5) and reflect the emerging development of the Corus Entertainment building (Block 4) and the George Brown College campus (Blocks 3 and 5). Development allowances on the remaining land parcels (Blocks 1 and 2) reflect density permissions outlined in the Zoning By-Law for the Dock Side area and, notably, an assumed commercial land-use scenario.

Balance of the East Bayfront Precinct

Development parameters for the balance of the blocks and development parcels within the East Bayfront Precinct reflect those established within the East Bayfront Precinct Plan and, notably, those adopted in prior transportation assessment studies prepared for the Precinct.

It is assumed, consistent with prior general assumptions, that three-quarters of the total floor area proposed within each block / development parcel will be developed for residential purposes with the remaining one-quarter developed for non-residential or commercial purposes. The Precinct Plan development allowances adopted herein contemplate a build-out of approximately 671,825 sq. metres of total new floor area within the Precinct between Lower Jarvis Street and Small Street). Of this, approximately 167,955 sq. metres is assumed to be developed for commercial uses.

Development Statistics

A breakdown of the proposed floor areas and equivalent assumed number of residential units within the East Bayfront Precinct by each of the 9 development parcels is provided in Table 1.

Table 1
East Bayfront Precinct Plan, Development Floor Areas

Dock Side (1st Plan of Sub-Division Lands)				
Parcels between Jarvis Street and Sherbourne Street [1]	**Block Area Sq. Metres**	**Commercial Area Sq. Metres**		
Corus Building Block 4	9,960	42,500		
George Brown College-Block 3 & 5	8,295	46,450		
Block 1	1,284	15,410		
Block 2	3,313	39,755		
Balance of East Bayfront Precinct				
Parcels between Sherbourne Street & Parliament Street [2]	**Total GFA Sq. Metres**	**Residential**		**Commercial GFA Sq. Metres**
		GFA Sq. Metres	**Equiv. No. Units [3 5]**	
A1	102,168	76,626	807	25,542
A2	185,651	139,238	1466	46,413
B1	51,102	38,327	404	12,775
B2	111,505	83,629	881	27,876
B3	58,760	44,070	464	14,690
F	26, 812	20,109	212	6,703
G	47,683	35,762	377	11,921
H	56,125	42,094	443	14,031
J	32,017	24,013	253	8,004
Total [4]	671,825	503,870	5310	167,955

Notes
1. Based upon latest statistics available for Dock Side lands.
2. Development statistics are based upon *East Bayfront Precinct, Traffic Operations Analysis Update* report prepared by BA Group, January 2006.
3. Based upon 95 sq. metre average unit size consistent with trip generation assumptions.
4. Rounded to nearest 5 sq. metres or units.
5. Equivalent number of units rounded up to the nearest unit.

4.3.1.2 Vehicular Trip Generation

A brief description of the traffic generation assumptions and parameters adopted in establishing traffic volume forecasts for new development within the East Bayfront Precinct is outlined below.

A. Dock Side

Forecasts for the Corus and George Brown College proposals within the Dock Side area are based upon the use of parking discharge factors and the total proposed parking supply currently contemplated to support these facilities.

A traffic generation allowance is made to account for new traffic related to prospective commercial development on Blocks 1 and 2.

The following assumptions are made in establishing the traffic generation forecasts:

Block 4 - Corus Building

- 150 parking spaces.
- Parking discharge factor of 0.40 and 0.55 two-way trips / stall during the morning and afternoon peak hours respectively based upon typical discharge rates for commercial / office building parking facilities.

Blocks 3 and 5 - George Brown College

- Up to 500 parking spaces are expected to be provided on Blocks 3 and 5 for George Brown College and public parking use, of which 150 spaces are assumed for school residence use.
- Parking discharge factor of 0.40 and 0.55 two-way trips / stall during the morning and afternoon peak hours respectively for public parking and College parking based upon typical discharge rates for commercial / office building parking facilities.
- Parking discharge factor of 0.10 trips/stall was assumed for school residence peak outbound trips during the morning peak hour. Since inbound traffic activity assumed to be negligible, an allowance of 5 trips were made for the inbound trips during morning peak hour , which translates in to discharge factor of 0.03 trips/stall. Parking discharge factor of 0.10 trips/stall were assumed during the afternoon peak hour for peak inbound/outbound trips, which translate in to 0.20 two-way trips / stall for residence parking. These discharge rates are reflective of a relatively low level of activity at residence facilities given that students are, for the most part, will attend classes at this site.

Blocks 1 and 2 - commercial use to be determined

- A total volume allowance of 60 two-way trips for both of these blocks is assumed.

The trip generation characteristics for the Dock Side development blocks is summarized in Table 2.

B. Balance of East Bayfront Precinct

Forecasts of new traffic generated by development within the balance of the East Bayfront Precinct have been established consistent with the previously adopted trip generation parameters outlined in the *East Bayfront Precinct Traffic Operations Analysis Update* report prepared by BA Group in January 2006.

C. Consolidated Forecasts

New traffic volumes generated by emerging and planned development within the East Bayfront Precinct (Lower Jarvis Street to Small Street) during the morning and afternoon peak hours are outlined in Table 3.

Table 2
Trip Generation
Dock Side (South of Queens Quay East, Lower Jarvis Street to Sherbourne Park)

Parcel	Morning Peak Hour			Afternoon Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Block 4 – Corus						
• Underground Parking (150 stalls)						
▪ Discharge Rate / Stall	0.35	0.05	0.40	0.20	0.35	0.55
▪ Total Trips	50	10	60	30	50	80
Block 3 & 5 –George Brown College						
• School / Public Parking (350 Stalls)						
▪ Discharge Rate / Stall	0.35	0.05	0.40	0.20	0.35	0.55
▪ Total Trips	120	20	140	70	120	190
• School Residence Parking (150 stalls)						
▪ Discharge Rate / Stall	0.03	0.10	0.13	0.10	0.10	0.20
▪ Total Trips	5	15	20	15	15	30
Blocks 1 & 2						
▪ Total Trips	50	10	60	10	50	60
Total Trips	**225**	**55**	**280**	**125**	**235**	**360**

Notes:
1. Site statistics for George Brown College are based upon Staff Report dated October 24, 2008

Table 3
Traffic Volumes – East Bayfront Precinct

Parcel	Trip Generation					
	Morning Peak Hour			Afternoon Peak Hour		
	In	Out	Total	In	Out	Total
Dock Side (1st Plan of Sub-Division Lands)						
Corus Building	50	10	60	30	50	80
George Brown College	125	35	160	85	135	220
Block 1 & 2	50	10	60	10	50	60
Subtotal	225	55	280	125	235	360
Balance of East Bayfront Precinct						
A1	68	127	195	193	153	346
A2	124	231	355	352	279	631
B1	34	63	97	97	77	174
B2	74	139	213	211	167	378
B3	39	73	112	111	88	199
F	18	33	51	51	40	91
G	32	59	91	90	72	162
H	38	70	108	106	84	190
J	21	40	61	61	48	109
Subtotal	448	835	1283	1272	1008	2280
Total	**673**	**890**	**1563**	**1397**	**1243**	**2640**

4.3.1.3 Traffic Assignment

Forecast traffic volumes generated by emerging and new development within the East Bayfront Precinct are assigned to the area road system based on directional assignment parameters outlined in prior studies undertaken within the Precinct and, notably, as outlined in the *East Bayfront Precinct, Traffic Operations Analysis Update report* prepared by BA Group in January 2006.

Link assignment parameters established as part of this previous report are outlined in Table 4.

Table 4
Traffic Distribution Patterns – East Bayfront Precinct

Street	Morning Peak Hour		Afternoon Peak Hour	
	Inbound	Outbound	Inbound	Outbound
To / from the North				
Jarvis Street	4%	10%	5%	6%
Sherbourne Street	10%	12%	11%	15%
Parliament Street	13%	22%	12%	28%
Cherry Street	10%	0%	9%	0%
To / from the South				
Cherry Street	0%	0%	0%	0%
To / from the West				
Gardiner Expressway Westbound On-Ramp @ Jarvis Street	0%	16%	0%	18%
Gardiner Expressway Eastbound Off-Ramp @ Jarvis Street	19%	0%	17%	0%
Lake Shore Boulevard East	11%	16%	13%	13%
Queens Quay East	16%	23%	20%	15%
To / from the East				
Gardiner Expressway Eastbound On-Ramp @ Jarvis Street	0%	0%	0%	0%
Gardiner Expressway Westbound Off-Ramp @ Sherbourne Street	0%	0%	0%	0%
Lake Shore Boulevard East	17%	1%	13%	5%
Total	100%	100%	100%	100%

Traffic assignments for East Bayfront Precinct total traffic have been prepared for both options under consideration as part of this evaluation reflecting intersection locations, lane provisions and turn restrictions inherent and specific to each option. Traffic volume assignments for the *South Side Transit* option are shown on Figures B1(i) and B1(ii) for the morning and afternoon peak hours respectively attached in Appendix B. Traffic volume assignments for *Centre Transit* option are summarized on Figures C1(i) and C1(ii) for the morning and afternoon peak hours respectively attached in Appendix C.

4.3.1.4 Existing Land-Use Traffic Volumes Eliminated

Allowances have been made to account for the elimination of traffic activity related to current uses situated on lands to be redeveloped within the East Bayfront Precinct that is included in the base existing traffic count information outlined in Section 4.2.

This includes traffic activity on development lands located on the north and south side of Queens Quay East within the East Bayfront Precinct between Lower Jarvis Street and Parliament Street. For analysis purposes, all existing traffic activity turning to / from private driveways serving these lands and the local streets within the Precinct (Richardson Street, Bonnycastle Street and Small Street) are assumed to be predominantly related to existing local development and have been assumed to be eliminated with redevelopment of the East Bayfront Precinct.

Existing land-use related traffic volumes removed from the area road network for the morning and afternoon peak hours are illustrated in Figures A2(i) and A2(ii) respectively and are attached in Appendix A.

4.3.2 Travel Demand Forecasts – Western Portions of Lower Don Lands

Travel demand forecasts have been developed for the westerly portions of the Lower Don Lands area between Parliament Street and Cherry Street. Forecasts have been incorporated into this analysis in that these development parcels are expected to be reliant, for the most part, upon the Queens Quay East extension for access. A proportion of the traffic related to this section of the Lower Don Lands, as distinct from the broader Lower Don Lands and Port Lands areas which are not anticipated to rely upon Queens Quay East to any significant degree for access, is likely to route along the Queens Quay East corridor through the East Bayfront Precinct under consideration as part of this study.

For the purposes of this study, forecasts for the Lower Don Lands parcels west of Cherry Street (which were previously part of the East Bayfront Precinct) are based upon those outlined in the *East Bayfront Precinct, Transportation Assessment – Status Report* prepared by BA Group in March 2004 as part of the assessment of the then current East Bayfront Precinct Plan.

A breakdown of the floor areas and number of residential units assumed for the purposes of this analysis within the western portions of the Lower Don Lands is provided in Table 5.

The established trip generation parameters and forecasts of travel demands related to development within the Lower Don Lands Precinct west of Cherry Street for the morning and afternoon peak hours are outlined in Table 6.

Traffic Distribution

Directional traffic distribution parameters adopted in the assignment of traffic from the westerly portions of the Lower Don Lands are consistent with those adopted in *East Bayfront Precinct, Transportation Assessment – Status Report* prepared by BA Group in March 2004 which considered these lands. This distribution is similar to that adopted for the East Bayfront Precinct west of Parliament Street (see Section 4.3.1.3) but reflects the differing locational characteristics of this Precinct area compared to the lands located further west.

Table 5
Lower Don Lands- West of Cherry Street- Development Floor Areas

Parcel [1]	Total GFA Sq. Metres [1]	Residential		Commercial GFA Sq. Metres
		GFA Sq. Metres	Equiv. No. Units [2 4]	
D1	34,248	25,686	286	8,562
D2	19,170	14,378	312	4,793
E	89,362	67,022	264	22,341
J1	26,796	29,097	201	6,699
J2 [3]	9,200	-	-	10,219
K	29,082	21,812	218	7,271
Total	**207,858**	**157,995**	**1,281**	**59,885**

Notes
1. Based upon statistics outlined in the East Bayfront Precinct, Transportation Assessment – Status Report prepared by BA Group in March 2004.
2. Based upon 95 sq. metre average unit size consistent with trip generation assumptions.
3. Commercial floor areas include elementary school on Block J1 (10,219 sq. metres or 109,995 sq. ft).
4. Equivalent number of units rounded up to the nearest unit.

Table 6
Trip Generation – Lower Don Lands – West of Cherry Street

Parcel	Residential Units	Commercial GFA Sq. Metres	Trip Generation					
			Morning Peak Hour			Afternoon Peak Hour		
			In	Out	Total	In	Out	Total
D1	286	8,562	22	41	63	15	25	40
D2	312	4,793	13	23	36	22	17	39
E	264	22,341	59	106	165	100	25	125
J1	201	6,699	18	32	50	50	75	125
J2	-	10,219	0	0	0	0	0	0
K	218	7,271	19	35	54	20	15	35
Total	**1,281**	**59,885**	**131**	**237**	**368**	**207**	**157**	**364**

Link assignment parameters established as part of the March 2004 report are outlined in Table 7.

Assignments of traffic generated by the western portions of the Lower Don Lands Precinct for both options under evaluation (same assignment) and for the morning and afternoon peak hours are outlined in Figures A3(i) and A3(ii) attached in Appendix A.

Table 7
Traffic Distribution Patterns – Western Portions of Lower Don Lands Precinct

Street	Morning Peak Hour		Afternoon Peak Hour	
	Inbound	Outbound	Inbound	Outbound
To / from the North				
Jarvis Street	0%	0%	0%	0%
Sherbourne Street	0%	0%	0%	0%
Parliament Street	19%	22%	19%	25%
Cherry Street	18%	22%	18%	24%
To / from the South				
Cherry Street	0%	0%	0%	0%
To / from the West				
Gardiner Expressway Westbound On-Ramp @ Jarvis Street	0%	16%	0%	18%
Gardiner Expressway Eastbound Off-Ramp @ Jarvis Street	19%	0%	17%	0%
Lake Shore Boulevard East	11%	16%	13%	13%
Queens Quay East	16%	23%	20%	15%
To / from the East				
Gardiner Expressway Eastbound On-Ramp @ Jarvis Street	0%	0%	0%	0%
Gardiner Expressway Westbound Off-Ramp @ Sherbourne Street	0%	0%	0%	0%
Lake Shore Boulevard East	17%	1%	13%	5%
Total	100%	100%	100%	100%

4.3.3 Travel Demand Forecasts – West Don Lands

Travel demand forecasts adopted within this assessment for new development within the West Don Lands Precinct are based upon those outlined in the *West Don Lands, Plan of Subdivision Phase 2, Transportation Analysis* report prepared by BA Group in December 2008.

The report provides a detailed breakdown of the forecast future build-out traffic activity levels in the area considering full build-out of the West Don Lands area.

A breakdown of planned floor area and development programme allowances is provided on a block-by-block basis in Table 8. Traffic generation forecasts for each block are provided in Table 9.

Traffic assignments for the morning and afternoon peak hours for the West Don Lands Precinct extracted from the December 2008 report within the East Bayfront Transit Class EA Study Area are outlined in Figures A4(i) and A4(ii) attached in Appendix A.

Table 8
West Don Lands – Block Statistics Development Floor Area / Units

Block Reference	Residential GLA		Retail	Office
	Sq. ft.	Equivalent Units	Sq. ft.	Sq. ft.
Phase 1 Plan of Subdivision Lands (prior application)				
19	139,446	152		
20	311,511	341	9,756	4,878
21	71,483	78	-	-
22	203,535	222	-	-
23	87,435	96	10,258	5,129
24	175,258	192	11,477	5,739
Sub-total Phase 1	***988,708***	***1,081***	***31,491***	***15,745***
Phase 2 Plan of Subdivision Lands (current application)				
8	628,645	584	35,867	17,933
9	-	-	66,353	33,177
10	331,098	362	16,499	8,249
11	330,452	361	17,073	8,536
12	303,542	332	16,212	8,106
13	434,216	475	14,921	7,460
14	352,615	328	15,708	7,854
15	152,105	141	10,111	5,055
15n	108,511	101	-	-
16e	475,617	425	32,113	16,056
16w	152,105	141	10,104	5,052
17	-	-	55,723	27,861
18	-	-	10,330	5,165
P2	184,278	162	-	-
P3	129,824	138	-	-
Sub-total Phase 2	***3,583,008***	***3,549***	***301,011***	***150,506***
Phase 3 Plan of Subdivision Lands (future application)				
1	508,057	555	23,529	11,764
2	255,105	279	10,545	5,272
3	210,650	230	8,608	4,304
4	107,639	118	103,439	51,720
5	159,844	175	14,203	7,102
6	-	-	19,368	9,684
7	54,465	60	4,806	2,403
Sub-total Phase 3	***1,295,760***	***1,416***	***184,498***	***92,249***
Grand Total	**5,867,476**	**6,046**	**517,000**	**258,500**

Notes
1. Based upon statistics in *West Don Lands Phase 2 Transportation Analysis* report prepared by BA Group in December 2008

Table 9
West Don Lands Precinct – Forecast Traffic Volumes

Block Reference	Morning Peak Hour (Vehicles)			Afternoon Peak Hour (Vehicles)		
	In	Out	2-Way	In	Out	2-Way
Phase 1 Plan of Subdivision Lands (prior application)						
19	5	16	21	16	8	24
20	13	42	55	40	17	54
21	2	9	12	8	2	10
22	7	29	36	24	7	31
23	5	12	18	16	10	26
24	8	25	33	24	11	35
Sub-total Phase 1	***40***	***131***	***176***	***128***	***55***	***183***
Phase 2 Plan of Subdivision Lands (current application)						
8	30	87	117	92	47	139
9	-	-	-	-	-	-
10	15	45	59	46	23	69
11	15	45	59	46	23	70
12	14	41	55	43	22	65
13	18	58	76	57	25	81
14	16	51	67	51	24	74
15	7	21	28	23	12	35
15n	4	14	18	12	4	15
16e	21	62	83	66	34	100
16w	7	21	28	23	12	35
17	13	4	17	34	40	74
18	-	-	-	-	-	-
P2	6	24	30	20	6	26
P3	4	17	21	14	4	18
Sub-total Phase 2	***170***	***489***	***659***	***527***	***275***	***802***
Phase 3 Plan of Subdivision Lands (future application)						
1	22	68	91	70	33	103
2	11	34	45	34	16	50
3	9	28	37	28	13	41
4	28	22	50	75	78	152
5	9	22	31	26	15	42
6	5	1	6	12	14	26
7	3	7	10	9	5	14
Sub-total Phase 3	***87***	***183***	***270***	***254***	***175***	***429***
Grand Total ***Rounded***	**297** ***300***	**803** ***805***	**1105** ***1105***	**909** ***910***	**505** ***505***	**1414** ***1415***

Notes
1. Based upon statistics in *West Don Lands Phase 2 Transportation Analysis* report prepared by BA Group in December 2008

4.3.4 Travel Demand Forecasts – Other Central Waterfront Area Developments

A series of allowances have been made for the purposes of this analysis to account for net new traffic activity related to a number of planned development proposals within the Central Waterfront area.

These are outlined in the following.

4.3.4.1 Waterpark Place Phase 3

The Waterpark Place Phase 3 proposal is located on the north side of Queens Quay East to the east of the York Street Gardiner Expressway access ramp. The site is currently occupied by a parking lot.

Traffic volumes allowances are incorporated into the traffic volume forecasts adopted for the purposes of this assessment based upon forecasts and assignments of net new traffic for the proposal outlined in the *Waterpark Place Phase 3 Traffic Impact Analysis* report prepared by BA Group in April 2002 for the now approved development proposal. The following provides a summary of the basis upon which site related traffic volumes have established for the purposes of this evaluation:

- It is assumed that the existing commercial parking lot (approximately 325 spaces) is retained and relocated underground on the site.

- Site volumes reflect development of approximately 52,045 sq. metres (560, 200 sq. ft.) of office use on the site and supporting 450 space parking garage facility.

- The Phase 3 development site is assumed to be served by one (existing) signalized access onto Queens Quay West. There may be an opportunity to inter-connect the existing Waterpark Place Phase 1 / 2 (10 and 20 Bay Street buildings) and the Phase 3 garages which will better distribute site related traffic. No inter-connection has been assumed in these analyses.

Traffic generation characteristics for the Waterpark Place Phase 3 development proposal considered as part of this evaluation are outlined in Table 10. It is noteworthy that volumes considered reflect a 'worst case' 'office' development scenario for the Waterpark Place Phase 3 lands retaining public parking uses on the property.

Table 10
Trip Generation – Waterpark Place Phase 3

Development Site	Morning Peak Hour			Afternoon Peak Hour		
	In	Out	2 Way	In	Out	2 Way
Waterpark Place Phase 3 450 Parking Spaces						
• Office						
▪ Trip rates	0.60	0.05	0.65	0.08	0.50	0.58
▪ Net New Trips	270	25	295	35	225	260

Notes.
1. Source: Waterpark Place Phase 3 Traffic Impact Study prepared by BA Group in April 2002

Traffic assignments for the morning and afternoon peak hours related to development of the Waterpark Place Phase 3 proposal are outlined in Figures A5(i) and A5(ii) attached in Appendix A.

4.3.4.2 Railway Lands East Blocks

Traffic generated by approved new and proposed development within the Railway Lands area located generally between Yonge Street and Simcoe Street were considered within the traffic forecasts adopted for evaluation of the Queens Quay East design alternatives.

Net new traffic volume forecasts for each of the blocks within the Railway Lands were based upon transportation study reports prepared by BA Group and others as part of approvals processes for development applications within the area.

Net new traffic volume assignments were most recently developed for the build-out of the Railway Lands as part of the *Proposed development York Centre, 16 York Street City of Toronto, Urban Transportation Considerations* report prepared by BA Group in January 2008 for the redevelopment of the 16 York Street property (Block 9A & 9B). These assignments are incorporated into the forecasts considered for the purposes of this analyses and incorporate net new traffic activity related to following development proposals that were either under construction of not yet built at the time of the traffic surveys used as a basis for all analyses:

- Development of Blocks 4 and 5 on the east side of York Street (now under construction).
- Development of the final phase of the Pinnacle Centre east of Bay Street (now under construction).
- Development of Block 7A (now under construction).
- Development of Block 7B (proposal).
- Full occupancy of Block 8 (existing condominium development).
- Development of Blocks 7B and Block 10 (proposals).
- Development of Blocks 9A and 9B on the west side of York Street (proposal).

Trip generation characteristics and net new traffic volumes generated by proposed development within the Railway Lands area (as noted above) are summarized in Table 11.

Morning and afternoon street peak hour traffic assignments of net new traffic related to new development within the Railway Lands East are outlined on Figures A6(i) and A6(ii) attached in Appendix A respectively. These net traffic volume changes take into account the elimination of existing traffic activity related to current land-uses that will be replaced by the new development proposals.

4.3.4.3 MT27 Condominium Proposal

New traffic generated by a proposed redevelopment of the MT27 land parcel located on the south side of Queens Quay East opposite the Freeland Street intersection has been incorporated into the traffic volumes forecasts used for the purposes of this evaluation.

Development of a 1250 unit condominium development proposal has been considered on the site with access being provided from Queens Quay East via a driveway connection located opposite Freeland Street. The site is currently occupied by a surface parking lot.

Table 11
Trip Generation – Railway Lands Blocks, Yonge Street to Simcoe Street

Block	Development Programme	Morning Peak Hour			Afternoon Peak Hour		
		In	Out	2-Way	In	Out	2-Way
Block 5 – Maple Leaf Square	• Residential (890 Units)						
	▪ Trip Rates	0.04	0.12	0.16	0.12	0.07	0.19
	▪ Total Trips	35	105	140	105	60	165
	• Hotel (172 Rooms)						
	▪ Trip Rates	0.09	0.09	0.18	0.12	0.12	0.24
	▪ Total Trips	15	15	30	20	20	40
	• Commercial Parking (369 Stalls)						
	▪ Trip Rates	0.35	0.05	0.40	0.20	0.35	0.55
	▪ Total Trips	130	20	150	75	130	205
	• Total Site Traffic	180	140	320	200	210	410
	• Existing Parking Lot Traffic	60	0	60	40	60	100
	• Net Site Traffic	120	140	260	160	150	310
Block 4 – 25 York Street	Retail (GFA 2,464 sq. m)						
	Office (GFA 58,925 sq. m)						
	• Commercial Parking (259 Stalls)	90	15	105	50	90	140
	▪ Trip Rates	0.35	0.05	0.40	0.2	0.35	0.55
	▪ Total Site Traffic	90	15	105	50	90	140
Pinnacle Centre – 33 Bay Street	• Residential (1770 Units – 799 Units constructed/occupied net 971 Units)						
	▪ Trip Rates	0.04	0.12	0.16	0.12	0.07	0.19
	▪ Total Trips	40	115	155	115	70	185
	• Commercial Parking (548 Stalls)						
	▪ Trip Rates	0.35	0.05	0.40	0.20	0.35	0.55
	▪ Total Trips	190	25	215	110	190	300
	• Total Site Traffic	230	140	370	225	260	485
Block 7A – 18 York Street	Office (GFA 56, 839 sq. m)						
	Retail (GFA 1,006 sq. m)						
	• Commercial Parking (191 Stalls)						
	▪ Total Site Traffic	115	5	120	20	95	115
Block 7B	Office (GFA 46,450 sq. m)						
	Hotel (560 Rooms)						
	Commercial Parking (155 Stalls)						
	▪ Total Site Traffic	105	55	160	95	125	220
Block 8 – 185 Bremner Blvd	• Residential (639 Units)						
	▪ Trip Rates	0.04	0.12	0.16	0.12	0.07	0.19
	▪ Total Site Traffic	25	75	100	75	45	120
Block 9A & 9B – 16 York Street	• Residential (1,096 Units)						
	▪ Trip Rates	0.04	0.12	0.16	0.12	0.07	0.19
	▪ Total Trips	45	130	175	130	80	210
	• Commercial Parking (377 Stalls)						
	▪ Trip Rates	0.35	0.05	0.40	0.15	0.25	0.40
	▪ Total Trips	130	20	150	55	95	150
	• Total Site Traffic	175	150	325	185	175	360
	• Existing Parking Lot Traffic	60	5	65	5	70	75
	• Net Site Traffic	115	145	260	180	105	285
Block 10 – 25 Lower Simcoe St.	• Residential (715 Units)						
	▪ Trip Rates	0.04	0.12	0.16	0.12	0.07	0.19
	▪ Total Site Traffic	30	85	115	85	50	135

Notes
1. Source: Traffic Impact Study report prepared by BA Group in January 2008 for the redevelopment of Blocks 9A and 9B (16 York Street)

Traffic generation characteristics and related volumes for the proposed condominium development considered as part of this evaluation are outlined in Table 12. Existing traffic activity levels related to the existing parking lot operation on the site that will be eliminated with redevelopment of the site are also shown.

Table 12
Trip Generation – MT27 Condominium Development

Development Site	Morning Peak Hour			Afternoon Peak Hour		
	In	Out	2 Way	In	Out	2 Way
MT27						
• Residential (1250 Units)						
▪ Trip rates	0.036	0.144	0.18	0.138	0.041	0.18
▪ Total Trips	45	180	225	175	50	225
Existing Traffic Removed [1]	242	50	292	105	260	365

Notes
1. Volumes reflect review of the existing driveway volumes recorded by Arup Canada Inc. (October 11, 2007) and available traffic counts on both the sides of the existing parking lot for traffic volume balancing.

Directional traffic distribution patterns for new condominium building related traffic are based upon those established for the East Bayfront Precinct as outlined in Section 4.3.1.3.

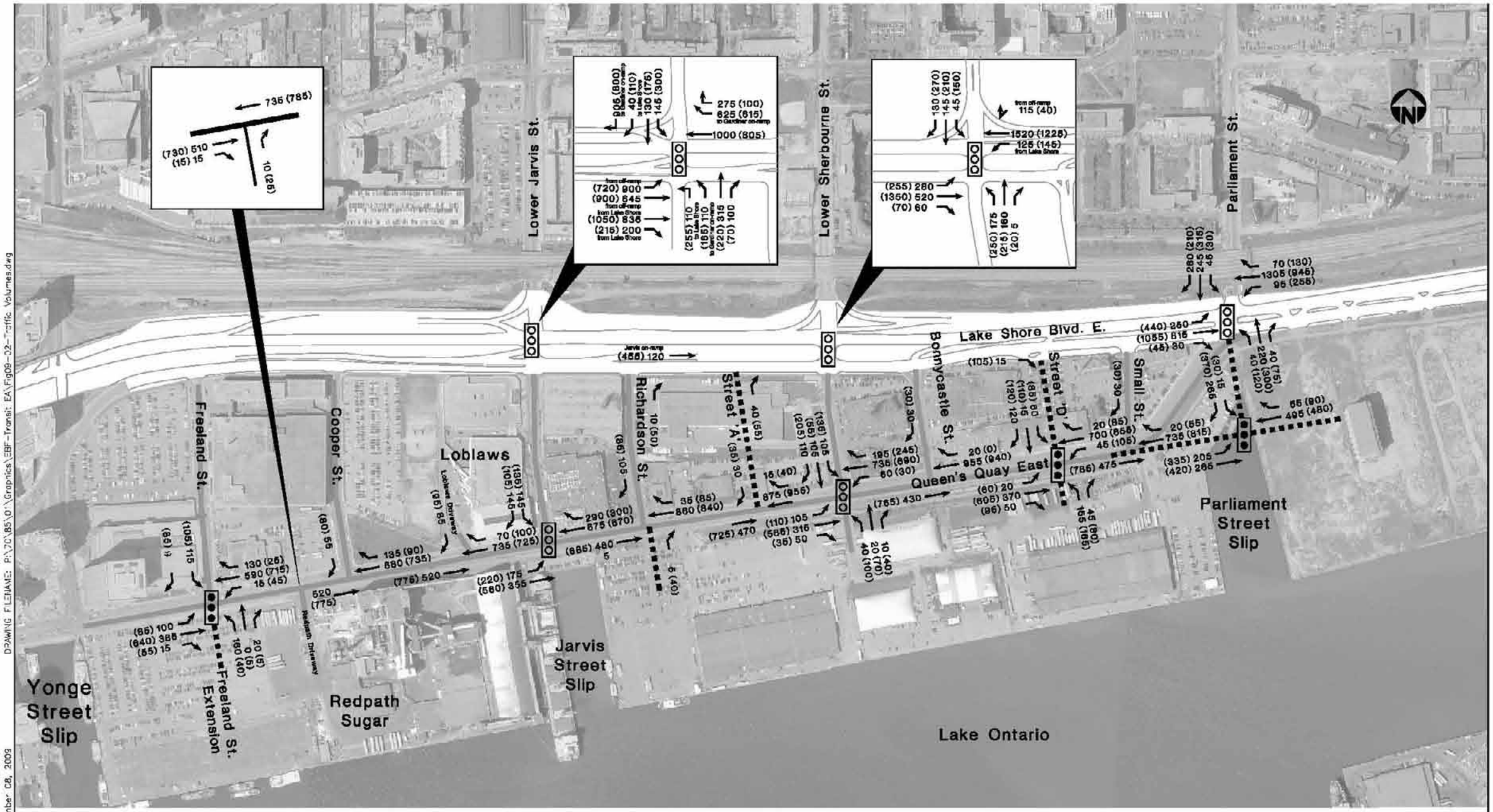
Traffic assignments of new traffic volumes generated by the MT27 condominium proposal for the morning and afternoon peak hours are summarized for the *South Side Transit* option on Figures B2(i) and B2(ii) respectively attached in Appendix B. Traffic volume assignments for *Centre Transit* option are summarized on Figures C2(i) and C2(ii) for the morning and afternoon peak hours respectively attached in Appendix C.

4.4 Design Option Volume Forecasts

Traffic volume forecasts have been established for the two design options (*Centre Transit* and *South Side Transit* options) based upon consideration of the following:

- baseline existing volumes adjusted to reflect the planned area road network;
- the elimination of existing traffic activity related to existing land uses within the East Bayfront area as well as on other land parcels (i.e. MT27 property) that will be removed with redevelopment of these areas;
- new area development traffic volumes; and
- the specific intersection locations, lane configurations and turn prohibitions / restrictions incorporated into each design option.

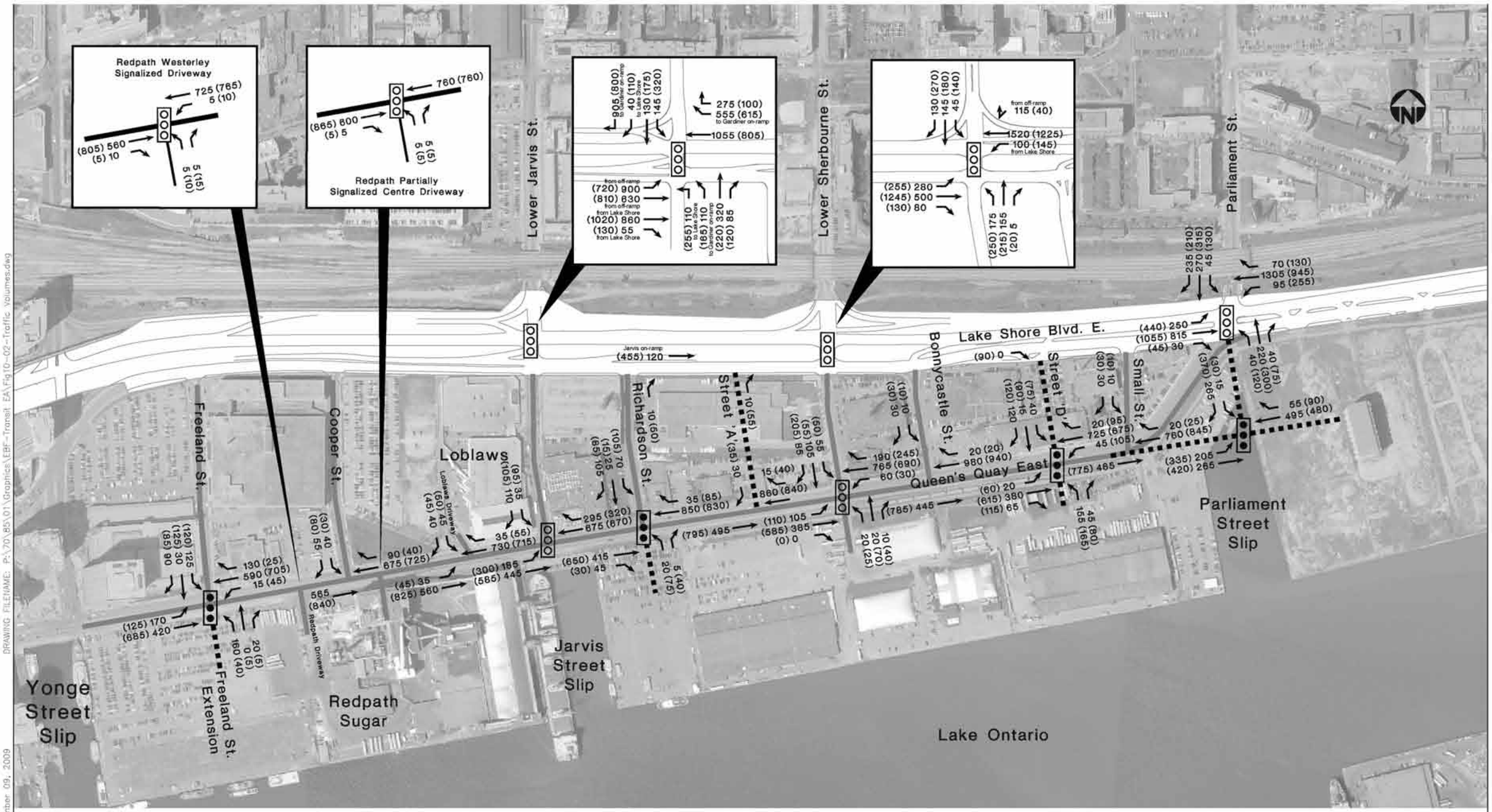
Morning and afternoon street peak hour traffic volume forecasts for each of the two design options are illustrated on Figures 9 and 10. These volumes are used as a basis for the traffic operations analyses undertaken as part of the evaluation of the two design options under review for Queens Quay Easy within the Study Area.



CENTRE OPTION FUTURE TRAFFIC VOLUMES

00 AM Peak Hour
(00) PM Peak Hour
Proposed Roads
Existing Traffic Signal
Proposed Traffic Signal
Existing Roads

Notes: 1. All traffic volumes are rounded to the nearest 5 vehicles.
2. Lake Shore Boulevard East shown below the Gardiner Expressway.



SOUTH SIDE OPTION FUTURE TRAFFIC VOLUMES

00 AM Peak Hour
(00) PM Peak Hour
Proposed Roads
Existing Traffic Signal
Proposed Traffic Signal
Existing Roads

Notes: 1. All traffic volumes are rounded to the nearest 5 vehicles.
2. Lake Shore Boulevard East shown below the Gardiner Expressway.

DATE PLOTTED: September 09, 2009
DRAWING FILENAME: P:\7085\01\Graphics\EBF-Transit EA\Fig10-02-Traffic Volumes.dwg

It is noteworthy that the future traffic volume forecasts outlined herein along the Queens Quay East corridor are likely reflective of high-end traffic activity levels given that they continue to include for a notable 'through' traffic component presuming that the prior levels of existing commuter usage of the Queens Quay East corridor will continue in the longer term after full development of the area.

It is considered unlikely that these traffic activity levels will ultimately be realized over time given the changes in the road system planned as part of the build-out of the East Bayfront Precinct and other areas and, in particular, broader changes across the City with respect to the provision of enhanced local and regional transit service and facilities.

Notwithstanding the above, the traffic volume forecasts developed are adopted as a reasonable basis for an evaluation of the two design options under consideration for the Queens Quay East corridor within the East Bayfront Precinct Transit Class EA Study Area and for road network planning purposes.

5.0 Traffic Operations Analysis

5.1 Methodology

5.1.1 Analysis Methodology

Traffic operations analyses have completed using the Synchro (version 6.0) capacity analysis software in accordance with the City of Toronto's *Guidelines for Using Synchro Software, January 2004*. Capacity analyses were undertaken for both the morning and afternoon peak hours under future traffic conditions reflecting build-out of the East Bayfront Precinct and other development across the Central Waterfront and surrounding areas.

Analyses have been undertaken in accordance with the methodologies outlined in Highway Capacity Manual (HCM) which provides a 'level of service' (LOS) indicator for each turning movement / approach at the intersection. The LOS indicator provides a measure of the average delay that a motorist may experience when travelling through an intersection and ranges from LOS A (little delay) to LOS F (extended delay).

A complementary measurement that is also provided is a 'volume-to-capacity' ratio (V/C) for each movement which provides a relative measure of the demand volumes at an intersection to the capacity available to process that demand. A V/C ratio of 1.0 reflects 'at-capacity' conditions.

Queuing analyses have also been undertaken along the Queens Quay East corridor within the traffic assessment study area using the SimTraffic software package. The SimTraffic simulation software considers the operation of roadways and intersections taking into account the effects of upstream and downstream intersection operations. This is distinct from the Synchro software methodology which considers intersections as if they are operating in isolation and does not take into the account the effects of a coordinated traffic signal system. Recorded maximum and average queues length characteristics calculated by the SimTraffic analyses are reported for assessment purposes.

5.1.2 Options Under Evaluation

Traffic operations analyses have been undertaken for the two options under evaluation as part of this study as follows:

- Transit on the south side of Queens Quay East (*South Side Transit Option*)
- Transit within the centre of Queens Quay East (*Centre Transit* option)

Traffic operations have been considered under the future traffic conditions established for each option as illustrated on Figures 9 and 10.

5.1.3 Road Network and Lane Configurations

Road network and lane configuration adopted within the traffic operations analyses are based upon the intersection locations and lane configurations illustrated for each option as outlined in Section 3 (Figures 4 and 5).

For the purposes of this analysis the extension of Queens Quay East to Cherry Street is assumed with the Parliament Street / Queens Quay East intersection considered as a signalized T-intersection.

5.1.4 Intersections Analysed

Traffic operations analyses have been undertaken for both design options at the following signalized intersections along the Queens Quay East corridor within the traffic assessment study area:

- Freeland Street
  - full signal both options
- Redpath Sugar Plant West Driveway
  - full signal *South Side Transit* option
- Redpath Sugar Plant Centre Driveway
  - partial signal *South Side Transit* option
- Lower Jarvis Street
  - full signal *Centre Transit* option
  - two-stage pedestrian crossing T-intersection in *South Side Transit* option
- Richardson Street
  - full signal *South Side Transit* option
- Lower Sherbourne Street
  - full signal both options
- Street 'D'
  - full signal both options
- Parliament Street (assuming Queens Quay East extension to Cherry Street)
  - full signal *Centre Transit* option
  - two-stage pedestrian crossing T-intersection in *South Side Transit* option

5.1.5 Signal Timings

A cycle length of 103 seconds is adopted at all signalized intersections for both of the options under evaluation based upon the anticipated streetcar headway on the Queens Quay East transit service and to optimize transit operations along the corridor.

Transit priority signalling strategies have been incorporated into the assumed signal phasing plans developed for the two options under evaluation. Signal plans adopted in the analyses are attached in Appendices B and C.

Signal timing plans consider the introduction of protected left and / or right turn phasing strategies (dependent upon intersection and option under consideration) for intersection turning movements that cross the TTC streetcar / LRT tracks to:

a) respond to safety considerations relating to potential conflicts between turning vehicles and streetcars / LRT vehicles on the TTC transit right-of-way; and
b) enable transit to run coincident with the east-west traffic green phases on Queens Quay East to assist in optimizing transit operations along the corridor.

'No right turns on red' prohibitions are incorporated on turning movements that cross the streetcar / LRT tracks in the *South Side Transit* option within the analyses.

Pedestrian minimum walk times and clearance intervals for intersections along Queens Quay East are calculated based upon the City of Toronto current policies with regard to pedestrian signal timings. These are outlined in the following:

- The minimum duration of the pedestrian walk phase will be 7 seconds.
- The minimum duration of the pedestrian clearance (flashing don't walk and countdown) phase will be timed for a 1.2 metre per second walk speed across the full crossing distance (measured along the centreline of the crosswalk).
- The total of the above two times must provide sufficient time for a full crossing to be completed at 1.0 metres per second.
- The pedestrian clearance phase ends at the beginning of the amber phase. (i.e. the amber and / or all red phases are not included in the pedestrian clearance time calculation).

5.1.6 Pedestrian Activity Assumptions

Preliminary pedestrian crossing volumes are incorporated into the analyses of the signalized intersections within the East Bayfront Precinct. An allowance of 100 pedestrians crossing each leg of each of the signalized intersections is assumed.

5.1.7 Peak Hour Factor - Synchro

A peak hour factor of 1.0 has been adopted in the traffic operations analyses undertaken herein as appropriate for future, long term transportation planning purposes considering a phased development of the area consistent with the City's *Guidelines for Using Synchro Software, January 2004.*

5.1.8 Heavy Vehicle Assumptions

A 2 percent heavy vehicle allowance was used for the east-west through movements on Queens Quay East and turns to and from side streets serving the adjacent local development areas.

5.1.9 Base Saturation Flow Rate Assumptions

A base through lane saturation flow rate of 1900 pcu/hour was adopted in the analyses consistent with the City of Toronto guidelines. The "Area" type input into the Synchro software was selected as "CBD" recognizing the location of the East Bayfront Precinct within District 1 and typical roadway characteristics. It is considered that adoption of the CBD saturation flow rate parameters may be conservative in this circumstance.

5.2 Analysis Findings – South Side Transit Option

5.2.1 Traffic Operations Analyses

The results of traffic operations analyses undertaken for the *South Side Transit* option at signalized intersections within the traffic assessment study area under future traffic conditions are summarized in Table 13.

Table 13
Traffic Operations Analysis Summary – Transit on South Side of Queens Quay

Intersection/ Movement	Morning Peak Hour			Afternoon Peak Hour		
	V/C	Delay Sec.	LOS	V/C	Delay Sec.	LOS
Queens Quay East/Freeland Street	**0.77**	**23**	**C**	**0.67**	**24**	**C**
▪ EBL	0.66	21	C	0.50	16	B
▪ EBT	0.46	16	B	0.79	28	C
▪ WBL	0.29	59	E	0.47	69	E
▪ WBTR	0.86	20	C	0.84	14	B
Queens Quay East / Redpath Sugar Plant West Driveway	**0.49**	**9**	**A**	**0.67**	**9**	**A**
▪ EBT	0.59	11	B	0.85	13	B
▪ EBR	0.03	41	D	0.02	52	D
▪ WBL	0.04	44	D	0.07	60	E
▪ WBT	0.62	7	A	0.65	2	A
Queens Quay East / Redpath Centre Driveway	**0.52**	**8**	**A**	**0.58**	**3**	**A**
▪ EBT	0.42	8	A	0.61	4	A
▪ EBR	0.07	56	E	0.08	33	C
▪ WBT	0.54	8	A	0.53	1	A
Queens Quay East / Lower Jarvis Street	**0.56**	**15**	**B**	**0.65**	**20**	**C**
▪ EBL	0.51	29	C	0.79	42	D
▪ EBT	0.39	16	B	0.51	19	B
▪ WBT	0.74	12	B	0.77	14	B
▪ WBR	0.44	6	A	0.48	7	A
Queens Quay East / Richardson Street	**0.76**	**14**	**B**	**0.83**	**19**	**B**
▪ EBT	0.40	7	A	0.62	9	A
▪ EBR	0.37	63	E	0.24	66	E
▪ WBTR	0.86	10	B	0.91	18	B
Queens Quay East / Lower Sherbourne Street	**0.72**	**23**	**C**	**0.68**	**22**	**C**
▪ EBL	0.48	26	C	0.41	11	B
▪ EBT	0.47	12	B	0.83	19	B
▪ WBL	0.45	47	D	0.23	43	D
▪ WBT	0.88	26	C	0.79	22	C
▪ WBR	0.18	12	B	0.22	16	B
Queens Quay East / Street D	**0.68**	**20**	**B**	**0.73**	**26**	**C**
▪ EBL	0.10	13	B	0.31	10	B
▪ EBT	0.52	14	B	0.83	16	B
▪ EBR	0.48	64	E	0.77	74	E
▪ WBL	0.29	55	D	0.76	61	E
▪ WBTR	0.78	12	B	0.82	20	C
Queens Quay East / Parliament Street	**0.53**	**21**	**C**	**0.64**	**18**	**B**
▪ EBL	0.39	23	C	0.61	11	B
▪ EBT	0.23	9	A	0.37	5	A
▪ WBT	0.65	26	C	0.68	29	C
▪ WBR	0.08	16	B	0.14	19	B
Lake Shore Boulevard East / Lower Jarvis Street	**0.95**	**69**	**E**	**0.99**	**93**	**F**
▪ EBL (Gardiner off Ramp)	0.98	92	F	0.89	70	E
▪ EBT (Gardiner off Ramp)	0.72	50	D	0.98	104	F
▪ EBTR (Lakeshore)	0.83	47	D	0.99	92	F
▪ WBT (Lakeshore)	0.82	45	D	0.65	43	D
▪ WBR (Gardiner on Ramp)	0.91	66	E	0.99	113	F
▪ NBL	0.45	56	E	0.95	125	F
▪ NBLTR	0.98	120	F	0.95	99	F
▪ SBL	0.82	100	F	1.01	172	F
▪ SBTR	0.99	190	F	0.94	116	F

Results of a supplementary analysis of the key Lake Shore Boulevard East / Lower Jarvis Street intersection are also provided for context purposes and to confirm that Lake Shore Boulevard East corridor can acceptably accommodate the diversion of existing volume from the Queens Quay East corridor during morning peak hour incorporated into the traffic forecasts (see Section 4).

Detailed Synchro analyses worksheets and Simtraffic queuing reports are attached in Appendix B.

A summary discussion of the operational characteristics of the intersections within the traffic assessment study area is provided in the following sections.

Key findings:

- Based on the results of the capacity analyses, all the signalized intersections in the traffic assessment study area will operate acceptably for the *South Side Transit* option for future total traffic conditions during the morning and afternoon peak hours.
    - Overall intersection Levels of Service (LOS) are acceptable and range between LOS A and LOS C during both the peak hours
    - Overall intersection volume to capacity (V/C) ratios are acceptable and range between 0.49 and 0.83 during the peak hours.
- Analyses results suggest that key westbound through movement at the signalized intersections located on Queens Quay East will operate at or below a V/C ratio of 0.91 during the peak hour periods. Other movements at the study area intersections will operate at or below a V/C ratio of 0.85 during both the peak hours.
- Forecast future traffic volumes can be acceptably accommodated from a capacity perspective at each of the signalized intersections located along the Queens Quay East corridor within the traffic assessment study area under the *South Side Transit* option.

5.2.2 Queuing Considerations

Queuing activity characteristics have been reviewed for the Queens Quay East corridor within the traffic assessment study area considering the network of signalized intersections contemplated under the *South Side Transit* option.

Queue length forecasts calculated using the Simtraffic software package are summarized in Table 14 for the morning and afternoon peak hours. The following observations are made based upon the queuing analysis results.

- The extent of queuing activity at intersections on Queens Quay East is generally within the available storage distances provided between intersections. For short periods of time during the peak periods there is potential for queues to extend modestly beyond the available storage distances. These occurrences will occur, if realized, for only short periods of time during morning and afternoon peak hours.
- Based upon the above, queuing activity along the Queens Quay East corridor can be reasonably accommodated with the functional road configuration outlined for the *South Side Transit* option.

Table 14
Calculated Queue Length Summary (SimTraffic) – South Side Transit Option

Intersection/Movement	Approx. Storage (metres)	Morning Peak Hour		Afternoon Peak Hour	
		Max	Avg.	Max	Avg.
Queens Quay East / Freeland Street					
▪ EBL	30	38	28	38	19
▪ EBT	150	120	51	130	106
▪ WBL	30	35	6	38	12
▪ WBTR	110	88	75	81	40
Queens Quay East / Redpath Sugar Plant West Driveway					
▪ EBR	30	19	3	17	1
▪ EBT	110	83	39	83	47
▪ WBL	25	24	2	23	4
▪ WBT	270	45	35	35	18
Queens Quay East / Lower Jarvis Street					
▪ EBL	50	58	32	60	51
▪ EBT	270	73	52	90	67
▪ WBT	105	92	70	96	81
▪ WBR	20	30	17	32	18
Queens Quay East / Richardson Street					
▪ EBT	105	39	16	81	35
▪ EBR	15	34	14	34	10
▪ WBTR	215	88	72	110	104
Queens Quay East / Lower Sherbourne Street					
▪ EBL	50	46	18	59	21
▪ EBT	215	64	27	100	75
▪ WBL	50	58	21	58	12
▪ WBT	225	97	91	98	90
▪ WBR	50	60	27	60	33
Queens Quay East / Street D					
▪ EBL	110	20	5	33	15
▪ EBT	225	77	33	96	66
▪ EBR	55	28	13	68	36
▪ WBL	35	43	14	43	28
▪ WBTR	250	103	91	104	99
Queens Quay East / Parliament Street					
▪ EBL	45	64	27	56	26
▪ EBT	130	58	25	35	17
▪ WBT	195	100	86	96	90
▪ WBR	25	34	10	33	11

Notes
1. Storage for through lane is approximate distance to next signalized intersection.
   Storage for a turn lane indicates amount of physical storage within turn lane.
2. All values are in metres.

5.3 Analysis Findings – Centre Transit Option

5.3.1 Traffic Operations Analyses

The results of traffic operations analyses undertaken for the *Centre Transit* option at signalized intersections within the traffic assessment study area under future traffic conditions are summarized in Table 15.

Results of a supplementary analysis of the key Lake Shore Boulevard East / Lower Jarvis Street intersection are also provided for context purposes and to confirm that Lake Shore Boulevard East corridor can acceptably accommodate the diversion of existing volume from the Queens Quay East corridor during morning peak hour incorporated into the traffic forecasts (see Section 4).

Detailed Synchro analyses worksheets and Simtraffic queuing reports are attached in Appendix C.

A summary discussion of the operational characteristics of the intersections within the traffic assessment study area is provided in the following sections.

Key findings:

- Based on the results of the capacity analyses, all the signalized intersections in the traffic assessment study area will operate acceptably for the *Centre Transit* option for future total traffic conditions during the morning and afternoon peak hours.

  - Overall intersection Levels of Service (LOS) are acceptable and range between LOS C and LOS D during both the peak hours
  - Overall intersection volume to capacity (V/C) ratios are acceptable and range between 0.60 and 0.85 during the peak hours.

- Analyses results suggest that the westbound through movements will operate close to capacity at certain intersections at V/C ratios between 0.93 of 0.99 during the morning and afternoon peak hours. Other through movements operate at V/C ratios of 0.85 or less during both the peak hours except for eastbound through movement at Street 'D' and Freeland Street which operate at a V/C ratios of 0.93 and 0.88 respectively during the afternoon peak hour. All left turn movements operate at or below a V/C ratio of 0.96 during both the peak hours.

- Forecast future traffic volumes can, based upon the above and recognizing the area context, be acceptably accommodated from a capacity perspective at each of the signalized intersections located along the Queens Quay East corridor within the traffic assessment study area under the *Centre Transit* option.

5.3.2 Queuing Considerations

Queuing activity characteristics have been reviewed for the Queens Quay East corridor within the traffic assessment study area considering the network of signalized intersections contemplated under the *Centre Transit* option.

Queue length forecasts calculated using the Simtraffic software package are summarized in Table 16 for the morning and afternoon peak hours. The following observations are made based upon the queuing analysis results.

Table 15
Traffic Operations Analysis Summary – Centre Transit Option

Intersection/ Movement	Morning Peak Hour			Afternoon Peak Hour		
	V/C	Delay Sec.	LOS	V/C	Delay Sec.	LOS
Queens Quay East / Freeland Street	**0.84**	**35**	**D**	**0.71**	**43**	**D**
▪ EBL	0.72	65	E	0.66	59	E
▪ EBTR	0.48	19	B	0.88	40	D
▪ WBL	0.21	64	E	0.43	50	D
▪ WBTR	0.97	43	D	0.95	49	D
Queens Quay East / Lower Jarvis Street	**0.71**	**34**	**C**	**0.74**	**49**	**D**
▪ EBL	0.96	134	F	0.96	101	F
▪ EBT	0.36	17	B	0.56	22	C
▪ WBT	0.93	33	C	0.99	76	E
▪ WBR	0.47	7	A	0.53	26	C
Queens Quay East / Lower Sherbourne Street	**0.76**	**36**	**D**	**0.76**	**32**	**C**
▪ EBL	0.76	68	E	0.73	63	E
▪ EBTR	0.49	13	B	0.82	28	C
▪ WBL	0.43	58	E	0.22	44	D
▪ WBT	0.96	51	D	0.92	39	D
▪ WBR	0.26	9	A	0.33	18	B
Queens Quay East / Street D	**0.72**	**28**	**C**	**0.78**	**48**	**D**
▪ EBL	0.27	37	D	0.52	45	D
▪ EBTR	0.56	25	C	0.93	40	D
▪ WBL	0.33	52	D	0.76	56	E
▪ WBTR	0.87	27	C	0.97	70	E
Queens Quay East / Parliament Street	**0.63**	**29**	**C**	**0.77**	**42**	**D**
▪ EBL	0.76	40	D	0.95	98	F
▪ EBT	0.27	15	B	0.42	9	A
▪ WBT	0.78	38	D	0.88	54	D
▪ WBR	0.10	21	C	0.18	26	C
Lake Shore Boulevard East / Lower Jarvis Street	**0.96**	**72**	**E**	**1.00**	**101**	**F**
▪ EBL (Gardiner off Ramp)	0.98	93	F	0.81	59	E
▪ EBT (Gardiner off Ramp)	0.73	51	D	0.99	107	F
▪ EBTR (Lakeshore)	0.91	56	E	1.01	106	F
▪ WBT (Lakeshore)	0.82	45	D	0.65	43	D
▪ WBR (Gardiner on Ramp)	0.91	66	E	0.99	113	F
▪ NBL	0.45	56	E	0.99	169	F
▪ NBLTR	1.00	135	F	0.99	135	F
▪ SBL	0.82	100	F	1.01	169	F
▪ SBTR	0.99	190	F	0.98	146	F

The following observations are made based upon queuing analysis.

- The extent of queuing activity at intersections on Queens Quay East is generally within the available storage distances provided between intersections. For short periods of time during the peak periods there is potential for queues to extend modestly beyond the available storage distances. These occurrences will occur, if realized, for only short periods of time during morning and afternoon peak hours.

- Based upon the above, queuing activity along the Queens Quay East corridor can be reasonably accommodated with the functional road configuration outlined for the *Centre Transit* option.

Table 16
Calculated Queue Length Summary (SimTraffic) – Centre Transit Option

Intersection / Movement	Approx. Storage	Morning Peak Hour		Afternoon Peak Hour	
		Max	Average	Max	Average
Queens Quay East / Freeland Street					
▪ EBL	45	53	30	53	26
▪ EBTR	150	106	43	125	115
▪ WBL	20	17	4	27	11
▪ WBTR	360	117	78	116	88
Queens Quay East / Lower Jarvis Street					
▪ EBL	50	58	44	60	54
▪ EBT	360	101	57	100	96
▪ WBT	305	109	106	110	106
▪ WBR	20	45	30	48	30
Queens Quay East / Lower Sherbourne Street					
▪ EBL	45	53	29	55	33
▪ EBT	305	105	42	108	88
▪ WBL	45	54	18	42	9
▪ WBT	220	114	111	116	111
▪ WBR	25	33	16	35	18
Queens Quay East / Street "D"					
▪ EBL	35	33	6	43	17
▪ EBTR	220	94	45	110	91
▪ WBL	35	43	13	43	27
▪ WBTR	240	114	111	115	113
Queens Quay East / Parliament Street					
▪ EBL	45	53	35	53	51
▪ EBT	240	90	31	129	87
▪ WBT	195	99	91	98	94
▪ WBR	25	35	7	33	15

Notes
1. Storage for through lane is approximate distance to next signalized intersection. Storage for a turn lane indicates amount of physical storage within turn lane.
2. All values are in metres.

Appendix A

Traffic Volume Figures

1. Rounded Existing Balanced Traffic
2. Existing Traffic Elimination with Redevelopment of EBF
3. Lower Don Lands Traffic
4. WDL Total Traffic
5. Waterpark Place Traffic
6. Railway Lands Total Traffic

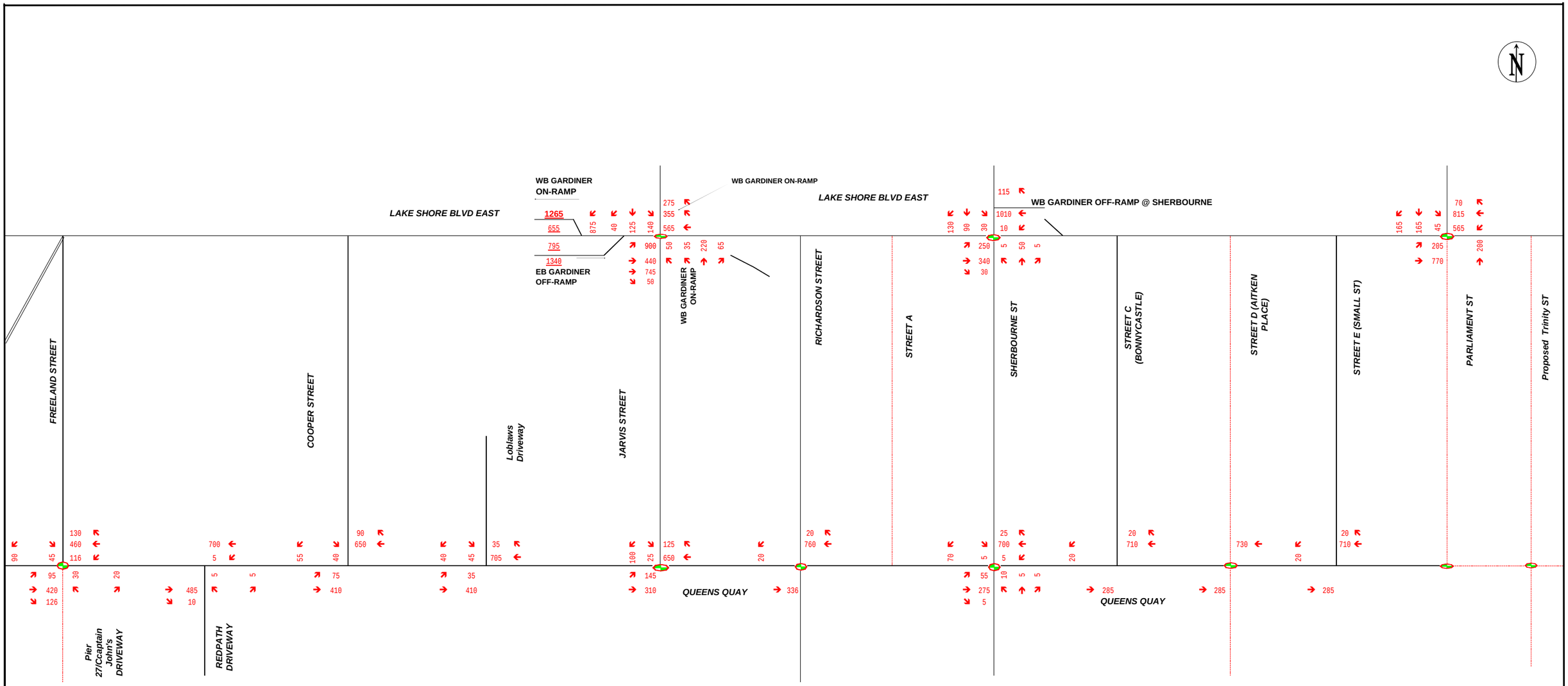


FIGURE A1(i) : ROUNDED BALANCED EXISTING

TIME PERIOD : Weekday AM

Signalized Intersection

Proposed Road

EAST BAYFRONT TRANSIT CLASS EA, TRAFFIC ASSESSMENT

PROJECT NO: 7085-01

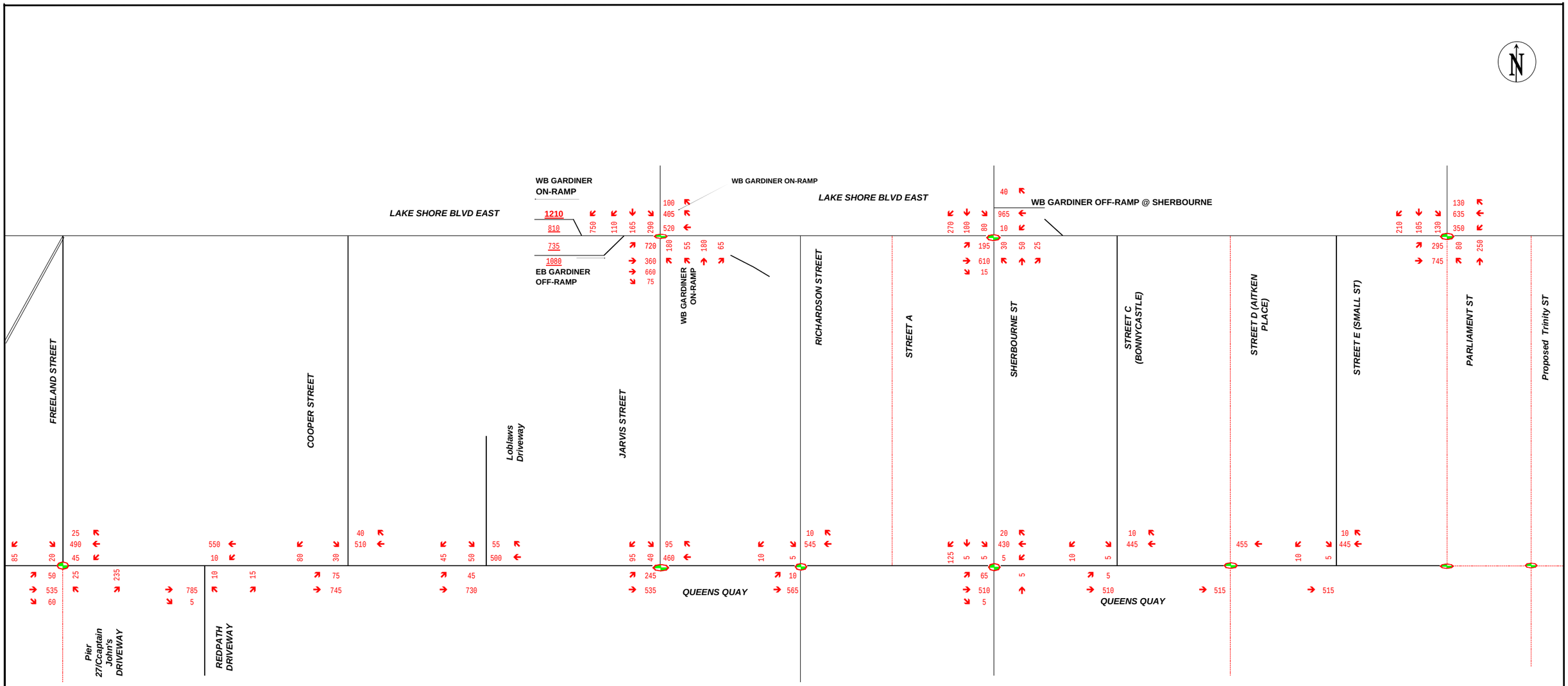


FIGURE A1(ii) : ROUNDED BALANCED EXISTING

TIME PERIOD : Weekday PM

Signalized Intersection

---- Proposed Road

EAST BAYFRONT TRANSIT CLASS EA, TRAFFIC ASSESSMENT

PROJECT NO: 7085-01

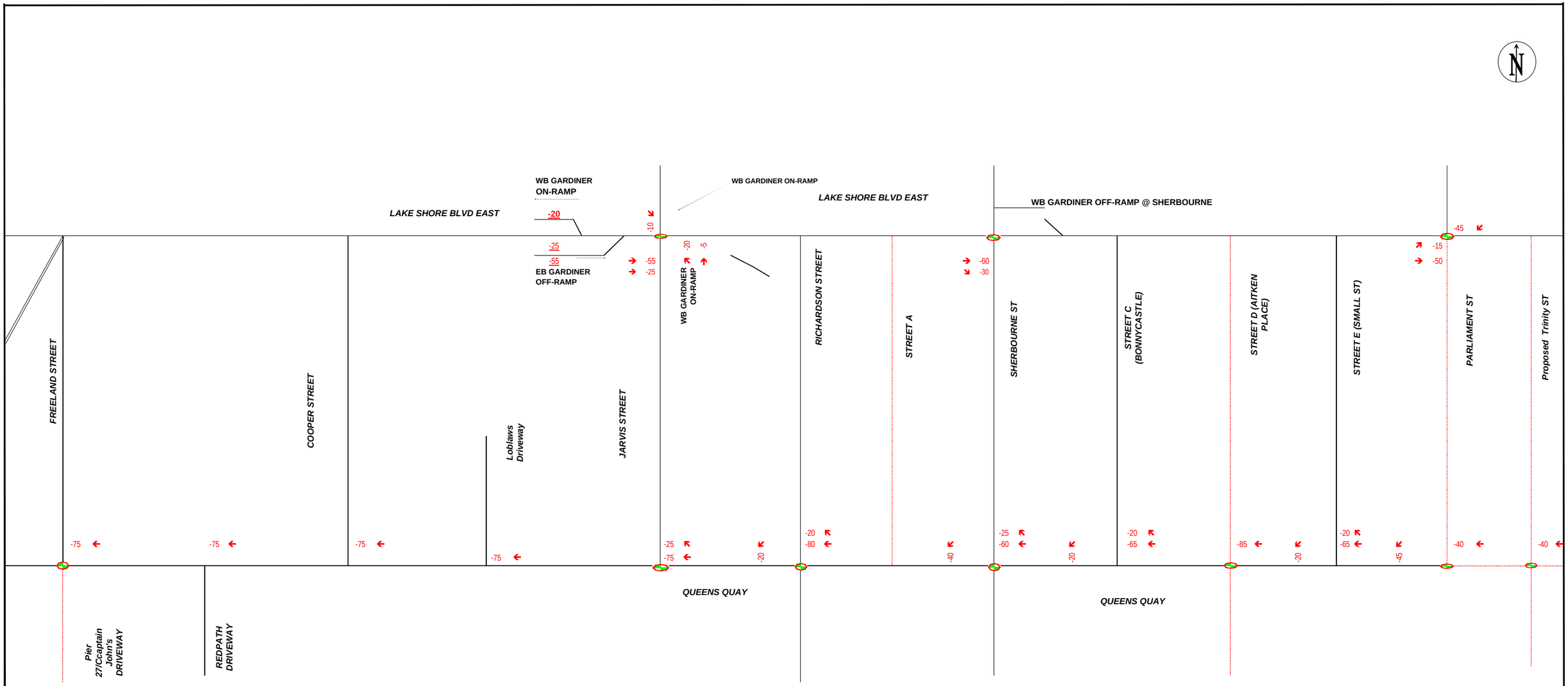


FIGURE A2(i) : EXISTING TRAFFIC ELIMINATION WITH REDEVELOPMENT OF EBF

TIME PERIOD : Weekday AM

Signalized Intersection

---- Proposed Road

EAST BAYFRONT TRANSIT CLASS EA, TRAFFIC ASSESSMENT

PROJECT NO: 7085-01

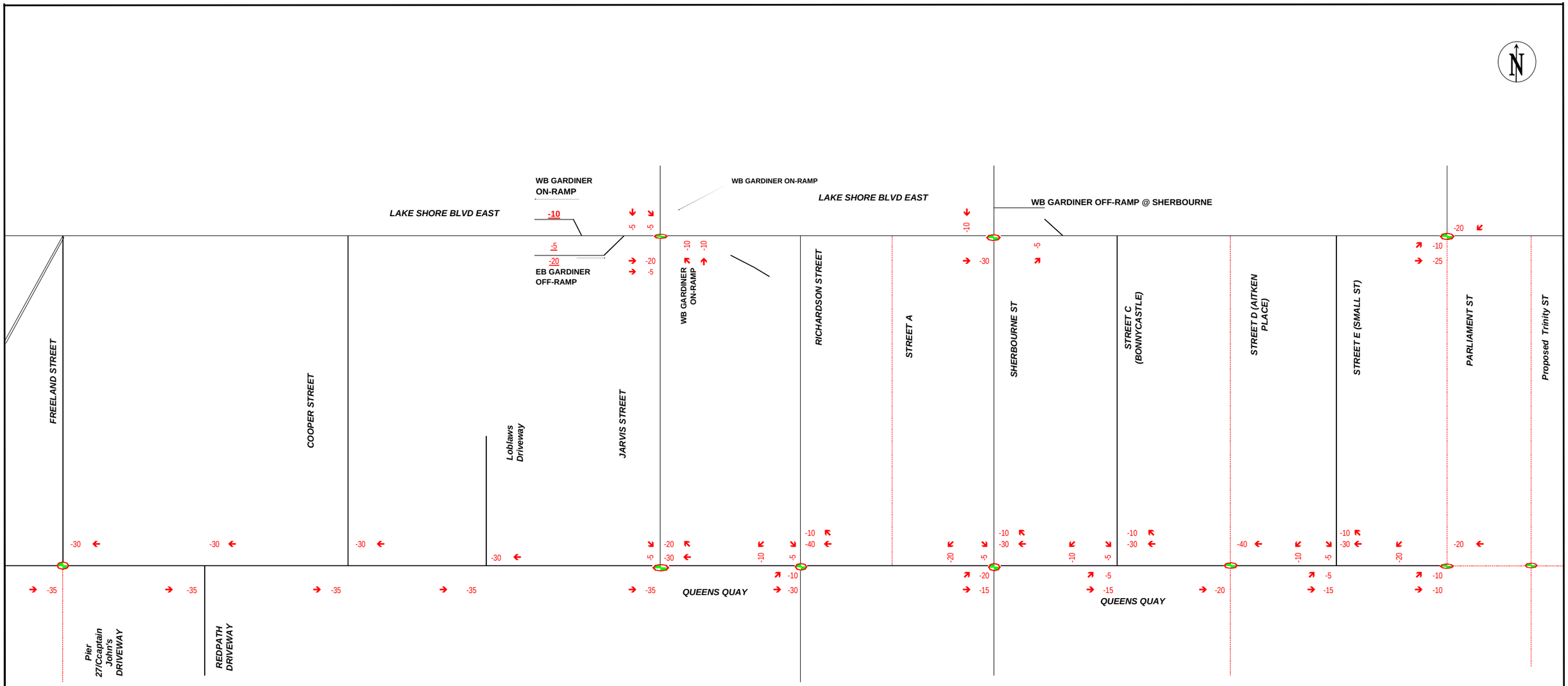


FIGURE A2(ii) : EXISTING TRAFFIC ELIMINATION WITH REDEVELOPMENT OF EBF

TIME PERIOD : Weekday PM

Signalized Intersection

Proposed Road

EAST BAYFRONT TRANSIT CLASS EA, TRAFFIC ASSESSMENT

PROJECT NO: 7085-01

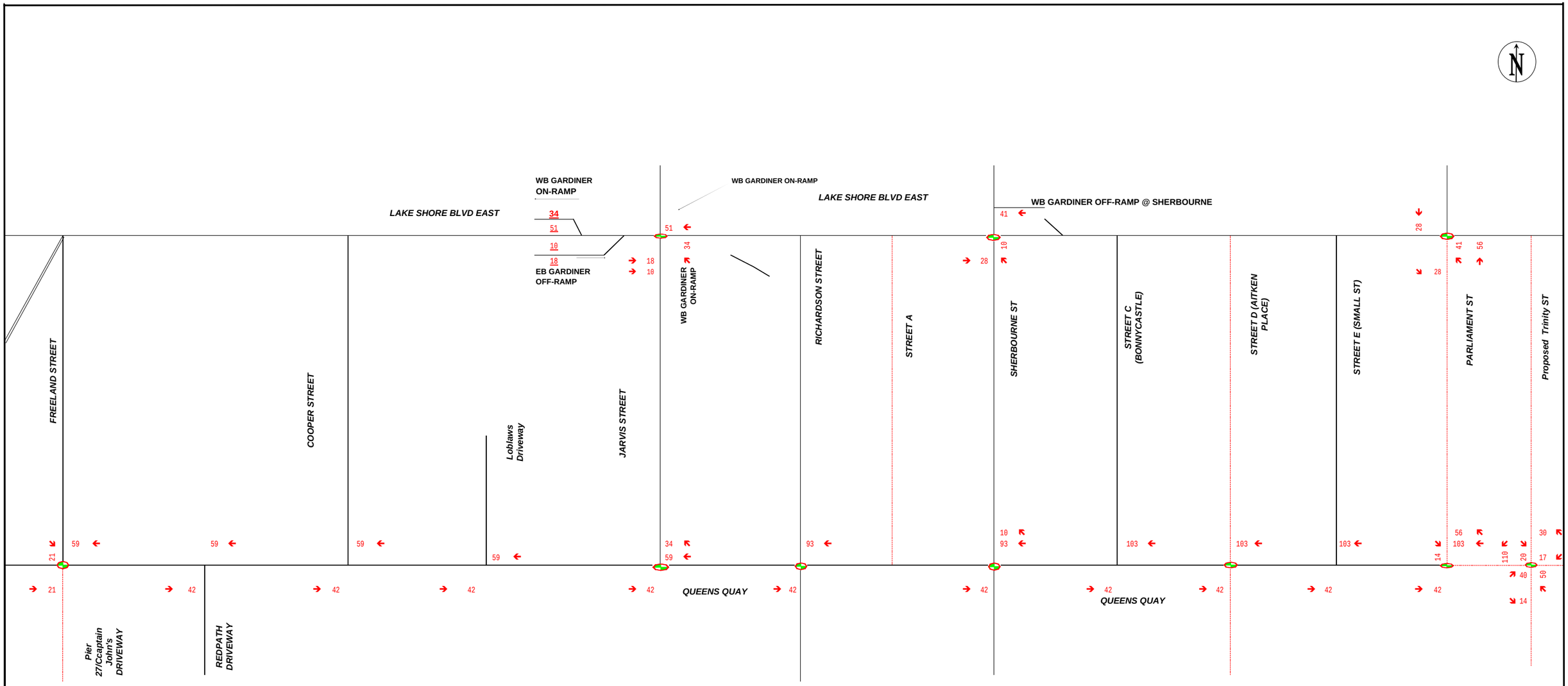


FIGURE A3(i) : LOWER DON LANDS TRAFFIC

TIME PERIOD : Weekday AM

Signalized Intersection

---- Proposed Road

GROUP Transportation Consultants

EAST BAYFRONT TRANSIT CLASS EA, TRAFFIC ASSESSMENT

PROJECT NO: 7085-01

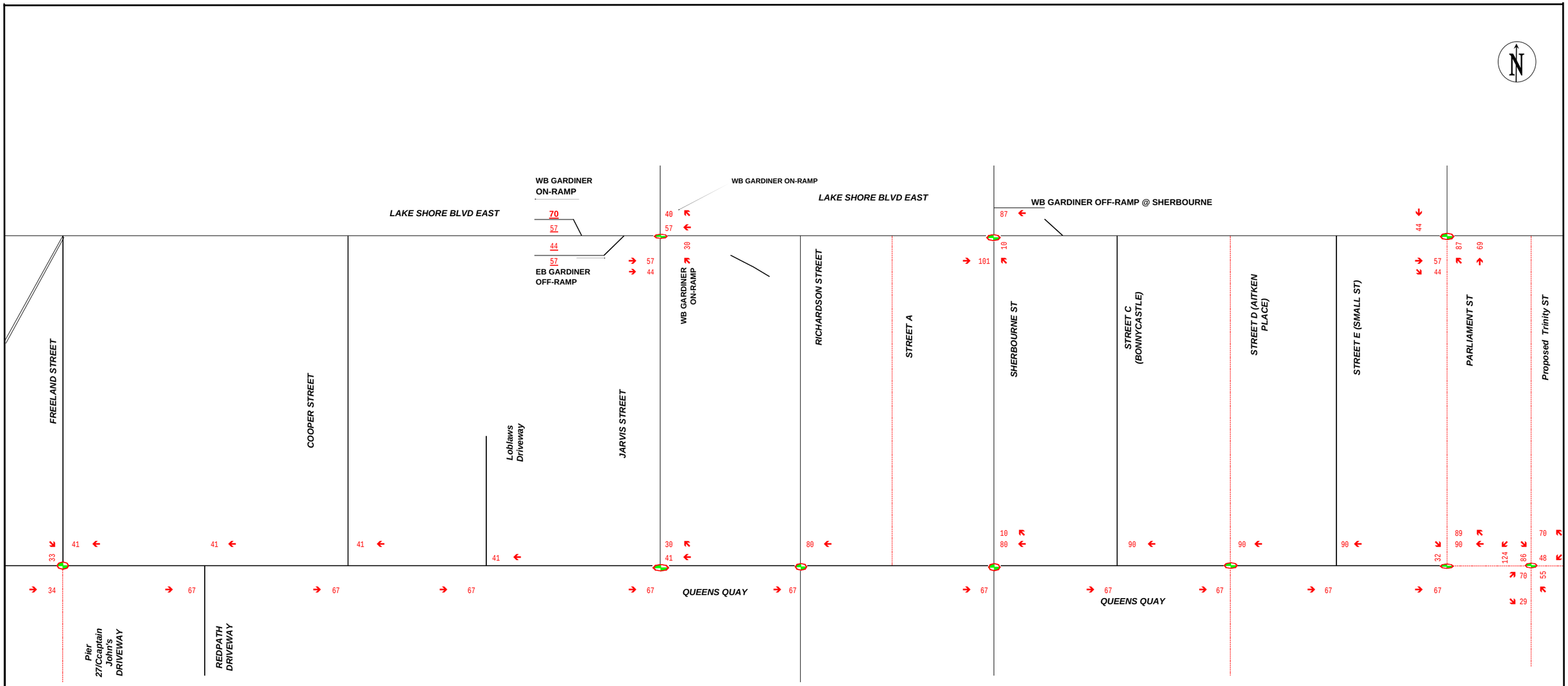


FIGURE A3(ii) : LOWER DON LANDS TRAFFIC

TIME PERIOD : Weekday PM

Signalized Intersection

---- Proposed Road

EAST BAYFRONT TRANSIT CLASS EA, TRAFFIC ASSESSMENT

PROJECT NO: 7085-01

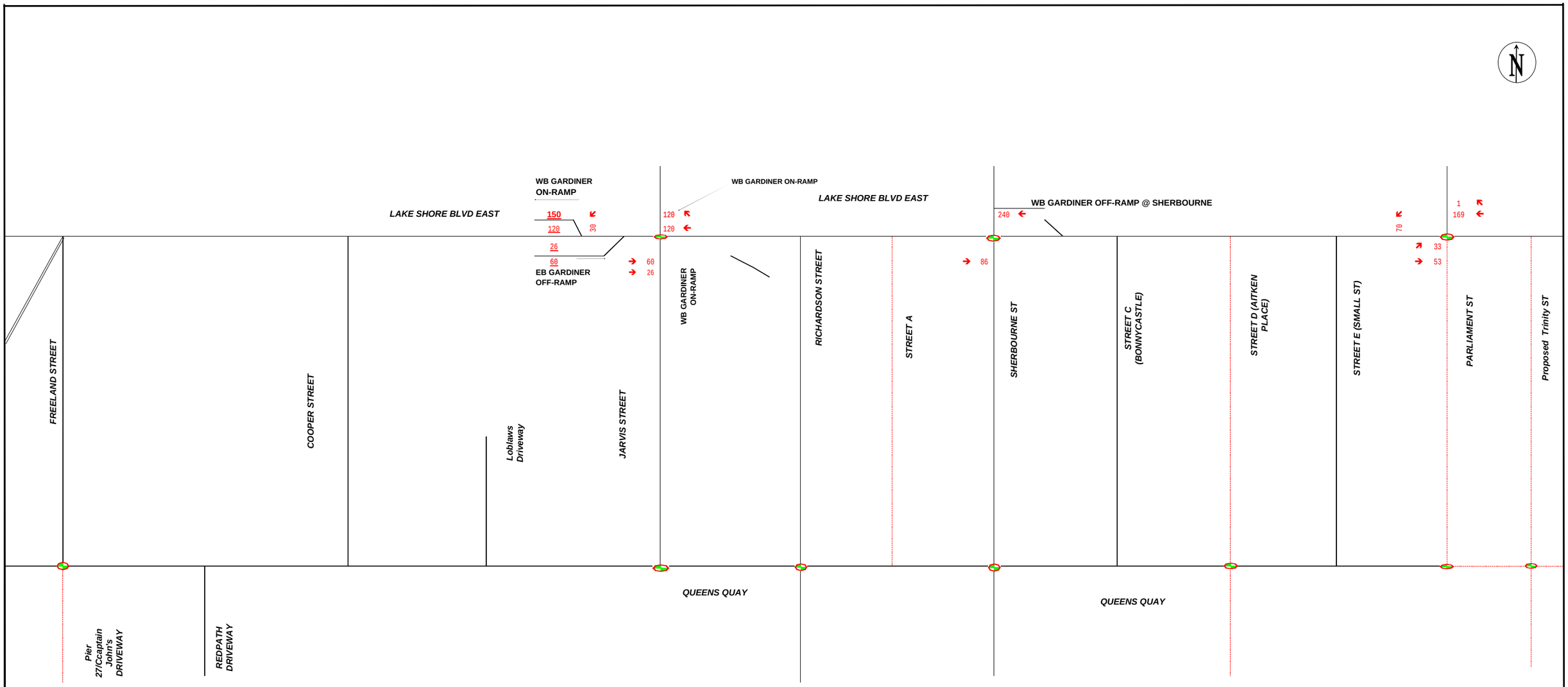


FIGURE A4(i) : WDL Total Traffic

TIME PERIOD : Weekday AM

Signalized Intersection

Proposed Road

EAST BAYFRONT TRANSIT CLASS EA, TRAFFIC ASSESSMENT

PROJECT NO: 7085-01

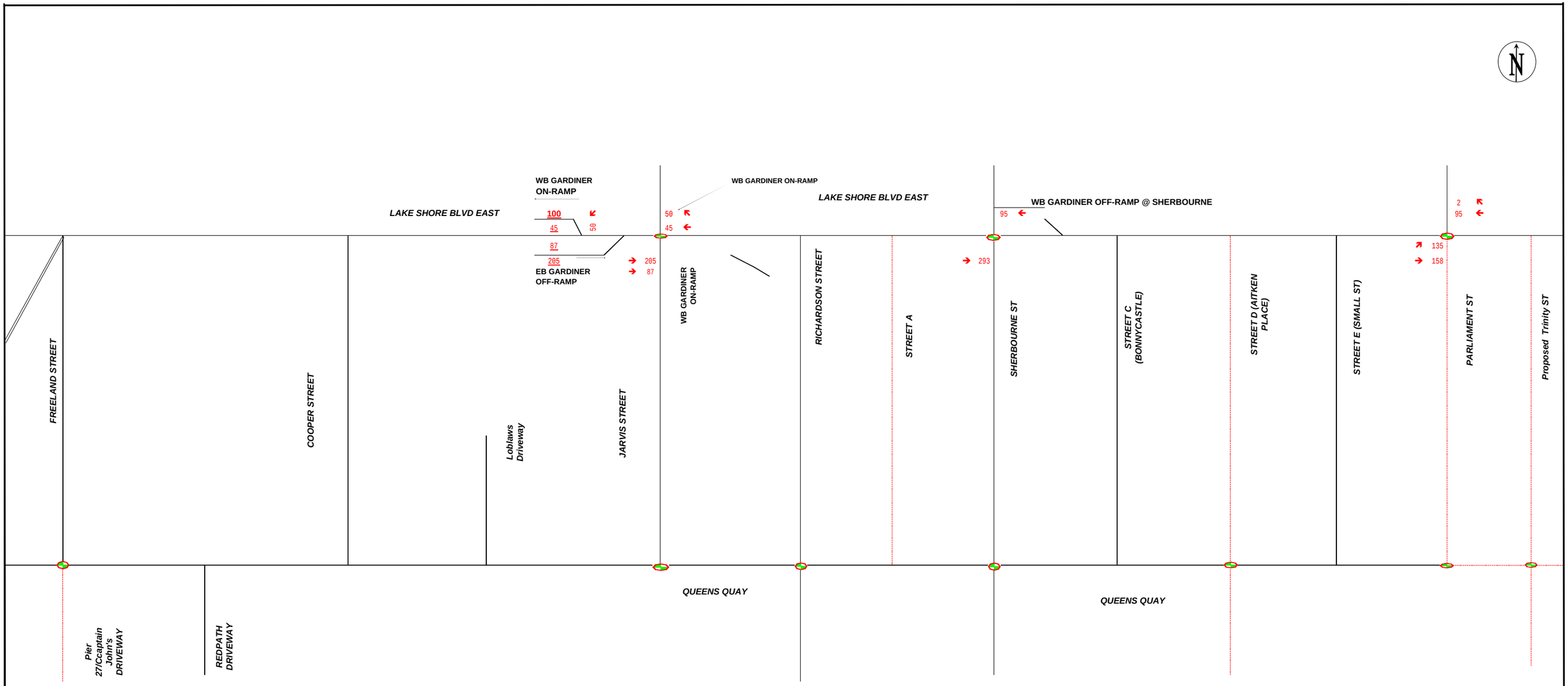


FIGURE A4(ii) : WDL Total Traffic

TIME PERIOD : Weekday PM

Signalized Intersection

---- Proposed Road

EAST BAYFRONT TRANSIT CLASS EA, TRAFFIC ASSESSMENT

PROJECT NO: 7085-01

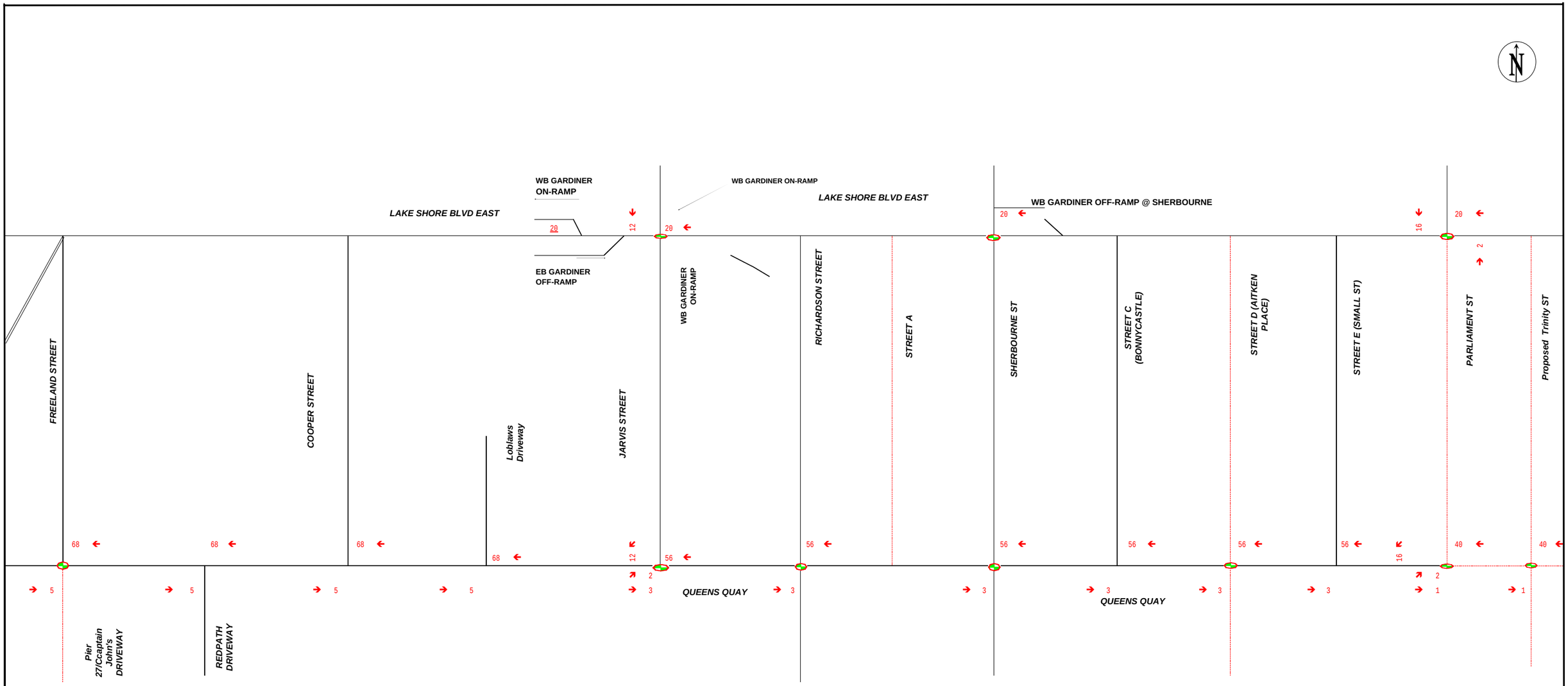


FIGURE A5(i) : Waterpark place Traffic

TIME PERIOD : Weekday AM

Signalized Intersection

Proposed Road

EAST BAYFRONT TRANSIT CLASS EA, TRAFFIC ASSESSMENT

PROJECT NO: 7085-01

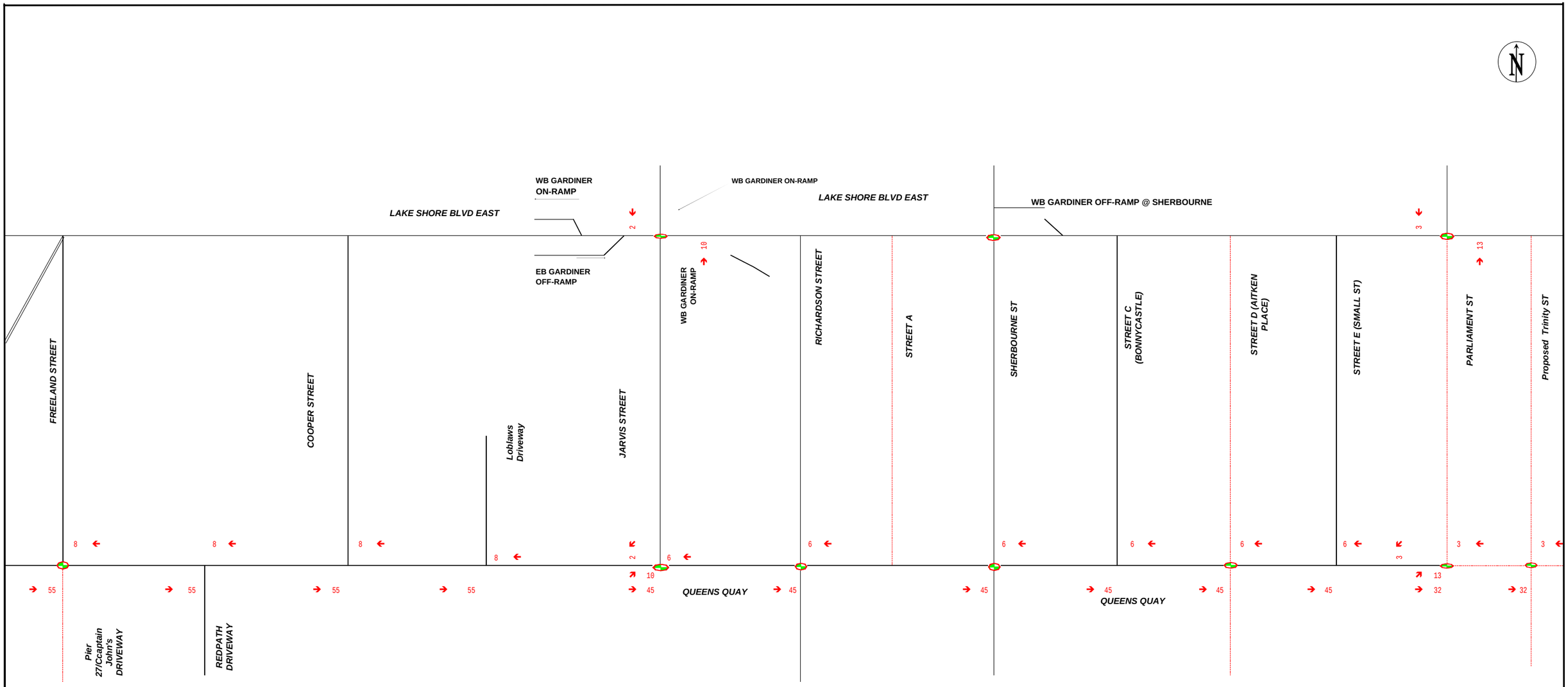


FIGURE A5(ii) : Waterpark place Traffic

TIME PERIOD : Weekday PM

Signalized Intersection

Proposed Road

EAST BAYFRONT TRANSIT CLASS EA, TRAFFIC ASSESSMENT

PROJECT NO: 7085-01

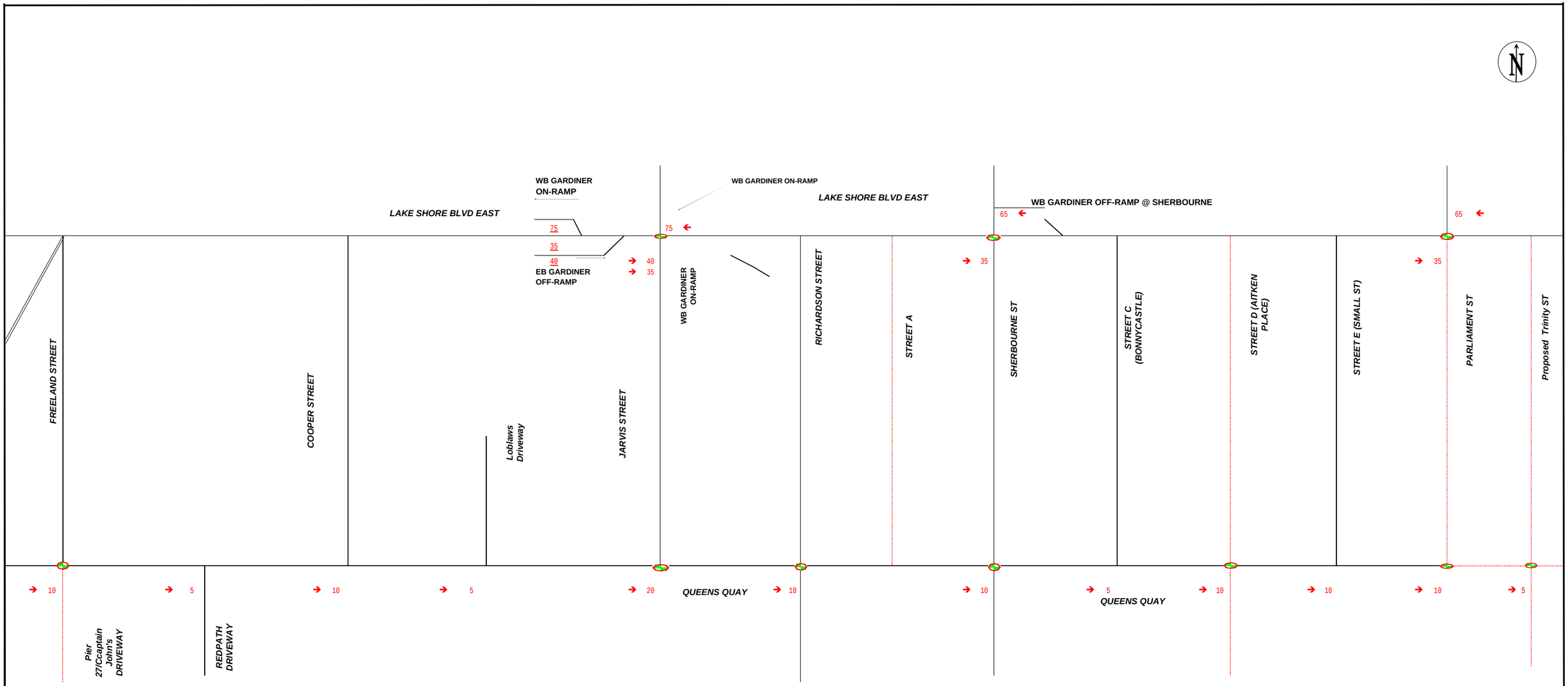


FIGURE A6(i) : Railway Lands Total Traffic

TIME PERIOD : Weekday AM

Signalized Intersection

---- Proposed Road

EAST BAYFRONT TRANSIT CLASS EA, TRAFFIC ASSESSMENT

PROJECT NO: 7085-01

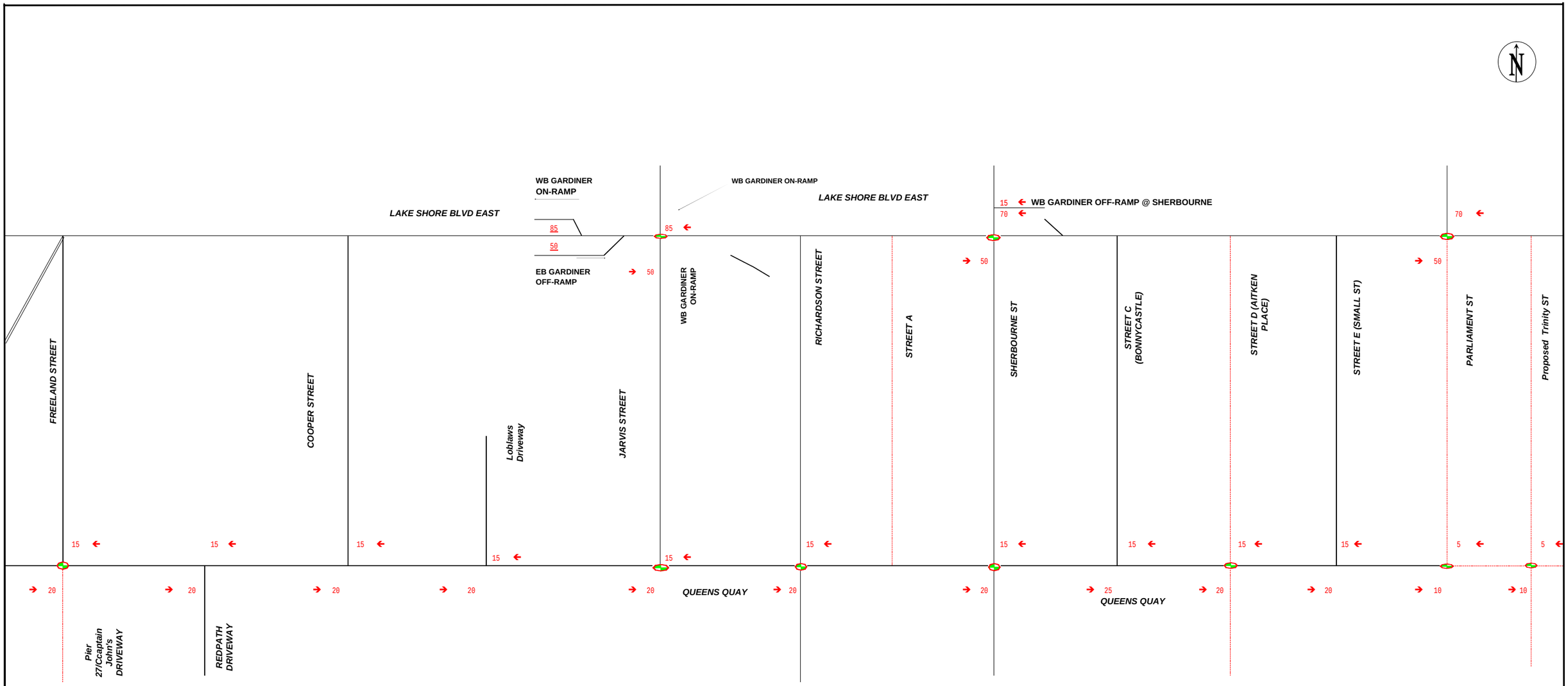


FIGURE A6(ii) : Railway Lands Total Traffic

TIME PERIOD : Weekday PM

Signalized Intersection

Proposed Road

GROUP Transportation Consultants

EAST BAYFRONT TRANSIT CLASS EA, TRAFFIC ASSESSMENT

PROJECT NO: 7085-01

Appendix B
Transit on South Side of Queens Quay

Traffic Figures

1. East Bayfront Traffic(South side Transit Configurations)
2. MT 27 Condominium Traffic (South side Transit Configurations)
3. Signal Timing Plans

Synchro/Simtraffic Worksheets

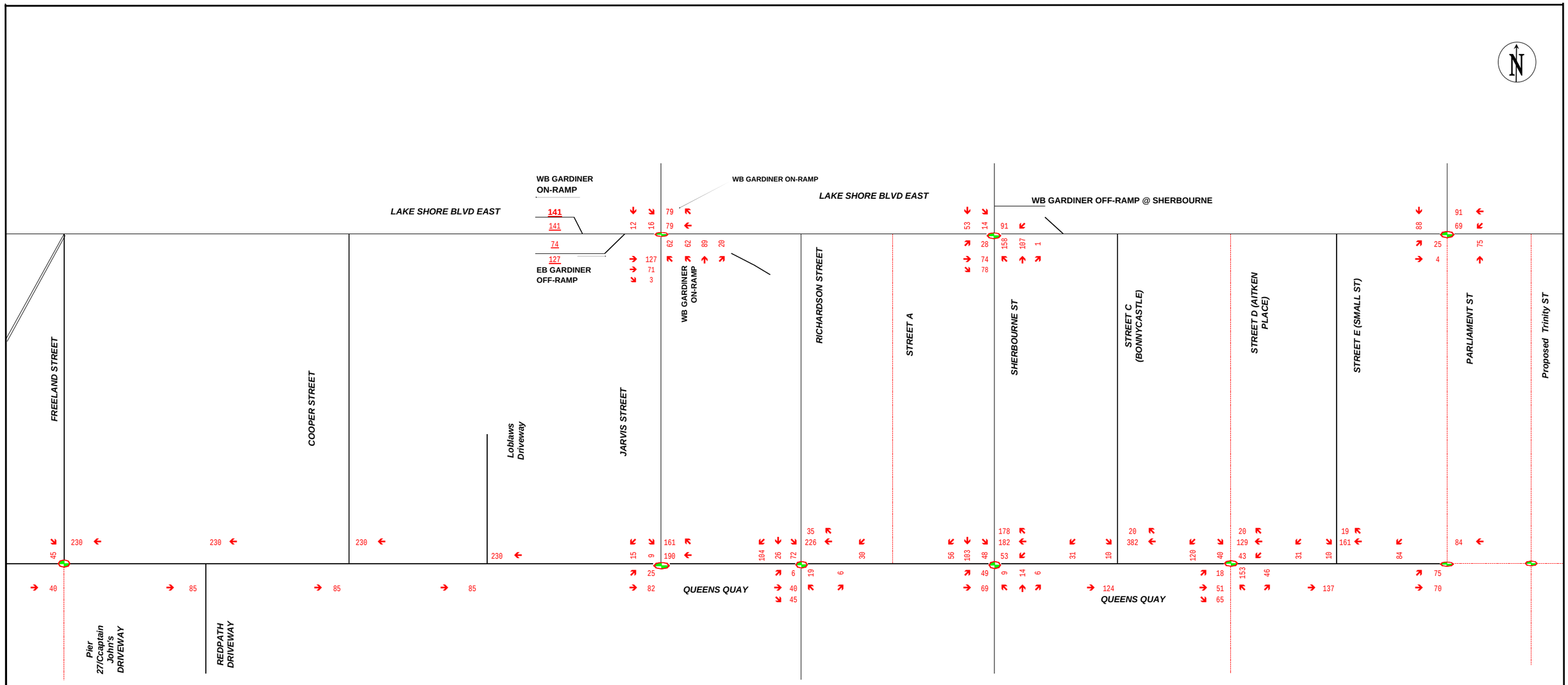


FIGURE B1(i) : TOTAL EBF TRAFFIC (Parcels west of Parliament Street)

TIME PERIOD : Weekday AM

Signalized Intersection

---- Proposed Road

EAST BAYFRONT TRANSIT CLASS EA, TRAFFIC ASSESSMENT

PROJECT NO: 7085-01

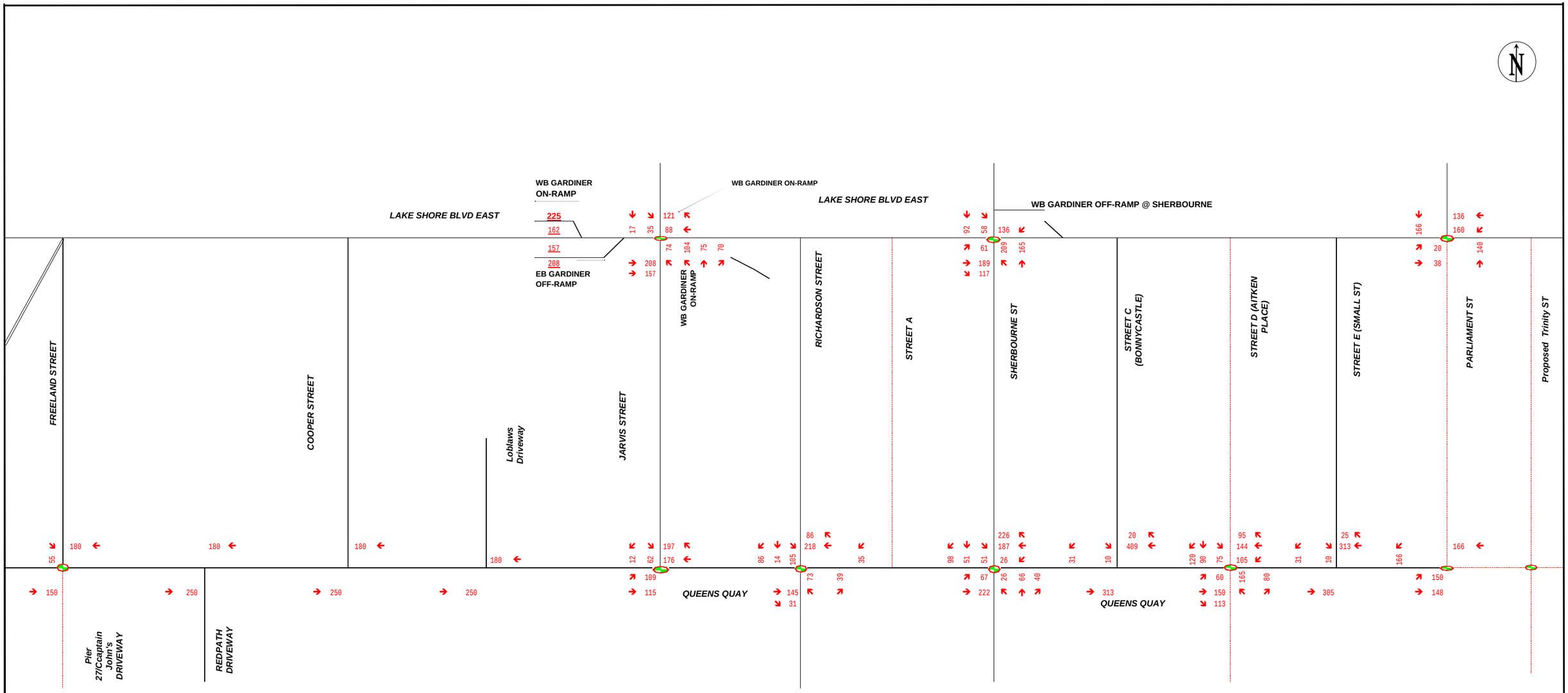


FIGURE B1(ii) : East Bayfront Total Traffic

TIME PERIOD : Weekday PM

Signalized Intersection

Proposed Road

EAST BAYFRONT TRANSIT CLASS EA, TRAFFIC ASSESSMENT

PROJECT NO: 7085-01

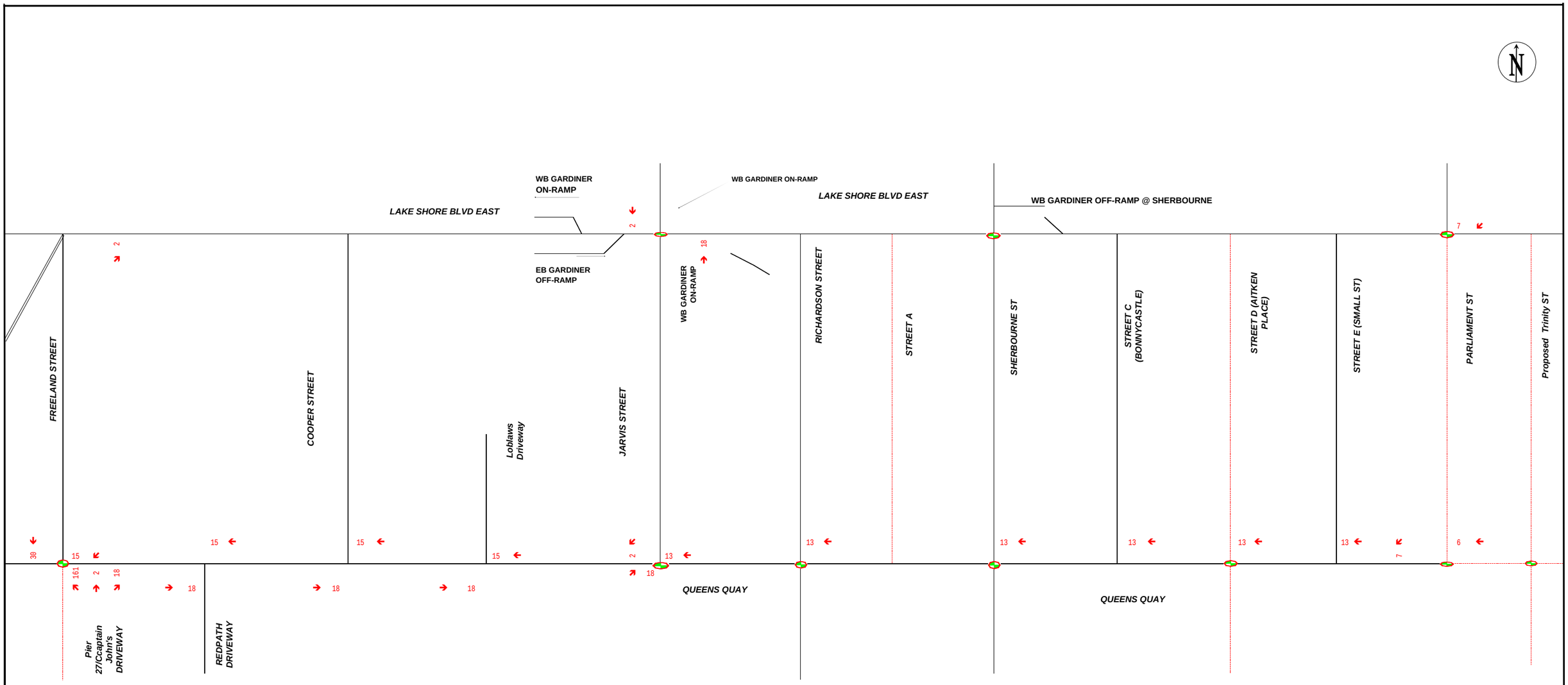


FIGURE B2(i) : MT-27 Condominium Traffic

TIME PERIOD : Weekday AM

Signalized Intersection

Proposed Road

EAST BAYFRONT TRANSIT CLASS EA, TRAFFIC ASSESSMENT

PROJECT NO: 7085-01

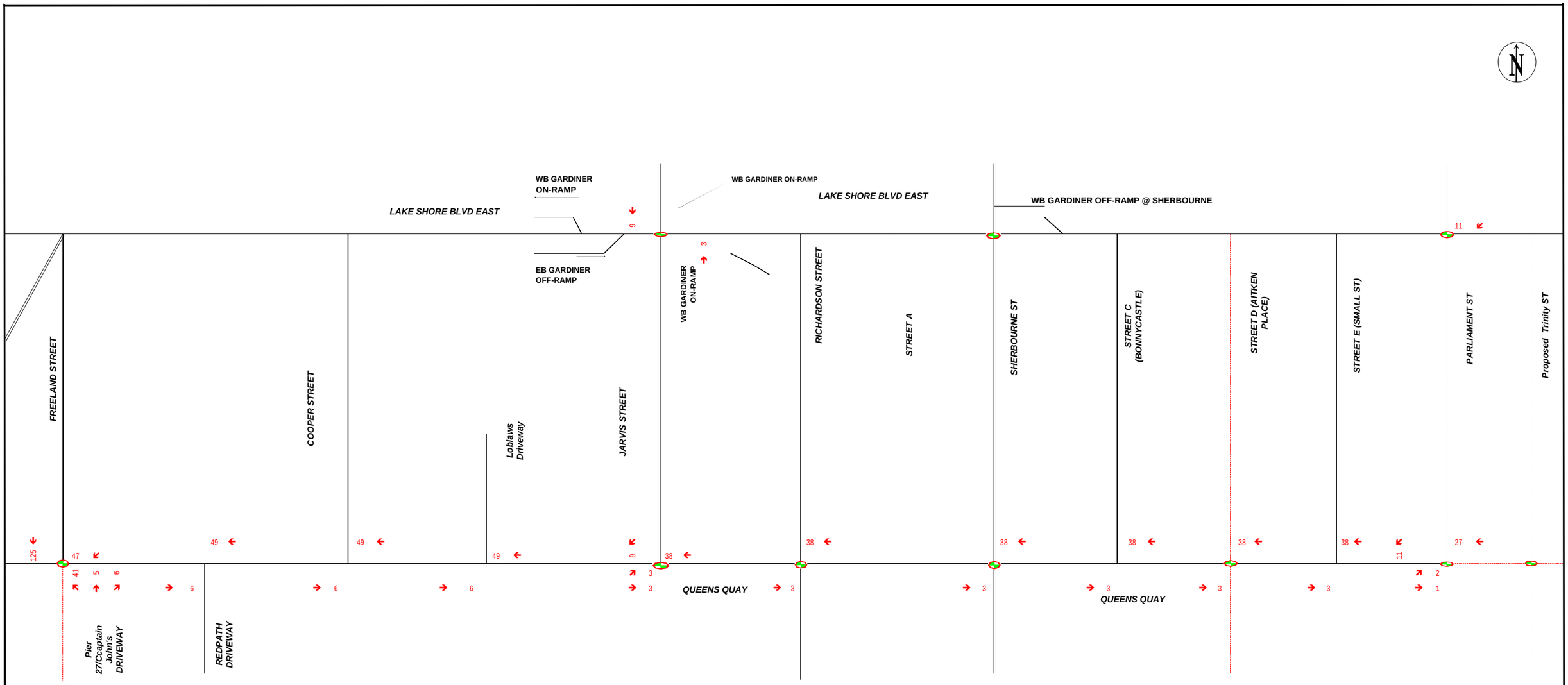


FIGURE B2(ii) : MT-27 Condominium Traffic

TIME PERIOD : Weekday PM

Signalized Intersection

Proposed Road

EAST BAYFRONT TRANSIT CLASS EA, TRAFFIC ASSESSMENT

PROJECT NO: 7085-01

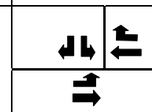
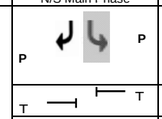
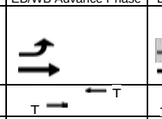
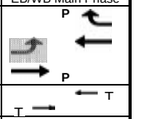
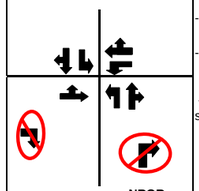
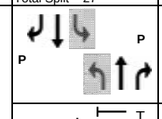
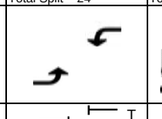
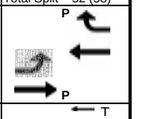
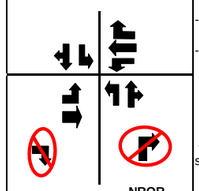
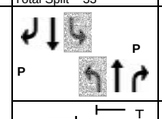
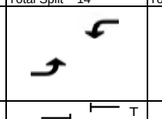
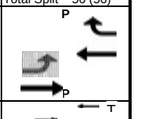
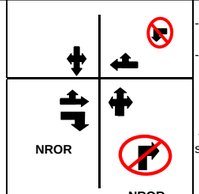
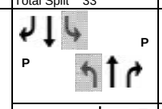
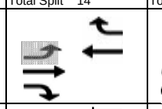
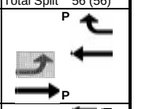
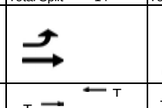
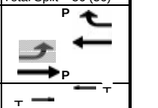
East Bayfront Transit EA

Appendix B Table 1:

Queens Quay Streetcar South Side Option Typical Signal timings/ Phasing Summary - AM/PM Peak

Project Number: 7085-01

DRAFT

Sr. No.	Intersection	Lane Configuraions/turn restrictions	Assumptions/comments	N/S Ped Crossing Distance (m)	Sec.	N/S Ped Phase	Sec.	E/W Ped Crossing Distance (m)	Sec.	E/W Ped Phase	Sec.	Cycle Length Sec.	Phasing/Timings N/S Main Phase	EB/WB Advance Phase	EB/WB Main Phase
1	Queens Quay/Parliament		- Two Stage Crossing - EBL actuated by vehicle - E-W Transit phase timings are shown in bracket	Pavement width& curb Median/Platform Total	11.5 3 14.5	Walk FDW 15m / 1.2m/s = 13s Total Green Amber All Red Min. Split	7 13 20 4 2 26	Pavement width& curb Total	18 18	Walk FDW 18m / 1.2m/s = 15s Total Green Amber All Red Min. Split	7 15 22 4 2 28	103	 Green 20 Amber 4 All Red 3 Total Split 27	 Green 18 Amber 4 Red (EBL only) 2 Total Split 24	 Green 46 (45) Amber 4 (4) All Red 2 (3) Total Split 52 (58)
2	Queens Quay/Freeland Street	 NROR	- Single Stage Crossing - WBL actuated by vehicle - E-W Transit phase timings are shown in bracket	Pavement width& curb Median/Platform Tracks Total	11.5 3 8.2 22.7	Walk FDW 23m / 1.2m/s = 19s Total Green Amber All Red Min. Split	7 19 26 4 3 33	Pavement width& curb Total	17 17	Walk FDW 17m / 1.2m/s = 14s Total Green Amber All Red Min. Split	7 14 21 4 2 27	103	 Green 26 Amber 4 All Red 3 Total Split 33	 Green 7 Amber 4 Red (WBL only) 3 Total Split 14	 Green 50 (49) Amber 4 (4) All Red 2 (3) Total Split 56 (56)
3	Queens Quay/Sherbourne Street	 NROR	- Single Stage Crossing - WBL actuated by vehicle - E-W Transit phase timings are shown in bracket	Pavement width& curb Median/Platform Tracks Total	11.5 3 8.2 22.7	Walk FDW 23m / 1.2m/s = 19s Total Green Amber All Red Min. Split	7 19 26 4 3 33	Pavement width& curb Total	17 17	Walk FDW 17m / 1.2m/s = 14s Total Green Amber All Red Min. Split	7 14 21 4 2 27	103	 Green 26 Amber 4 All Red 3 Total Split 33	 Green 7 Amber 4 Red (WBL only) 3 Total Split 14	 Green 50 (49) Amber 4 (4) All Red 2 (3) Total Split 56 (56)
4	Queens Quay/ Richardson Street	 NROR NROR	- Single Stage Crossing - EBR actuated by vehicle - E-W Transit phase timings are shown in bracket	Pavement width& curb Median/Platform Tracks Total	11.5 3 8.2 22.7	Walk FDW 23m / 1.2m/s = 19s Total Green Amber All Red Min. Split	7 19 26 4 3 33	Pavement width& curb Total	16 16	Walk FDW 16m / 1.2m/s = 13s Total Green Amber All Red Min. Split	7 13 20 4 2 26	103	 Green 26 Amber 4 All Red 3 Total Split 33	 Green 7 Amber 4 Red (EBR only) 3 Total Split 14	 Green 50 (49) Amber 4 (4) All Red 2 (3) Total Split 56 (56)
5	Queens Quay/Jarvis Street		- Two Stage Crossing - EBL actuated by vehicle - E-W Transit phase timings are shown in bracket	Pavement width& curb Median/Platform Total	11.5 3 14.5	Walk FDW 15m / 1.2m/s = 13s Total Green Amber All Red Min. Split	7 13 20 4 2 26	Pavement width& curb Total	17 17	Walk FDW 17m / 1.2m/s = 14s Total Green Amber All Red Min. Split	7 14 21 4 2 27	103	 Green 26 Amber 4 All Red 3 Total Split 33	 Green 9 Amber 3 Red (EBL only) 2 Total Split 14	 Green 50 (49) Amber 4 (4) All Red 2 (3) Total Split 56 (56)

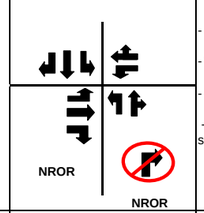
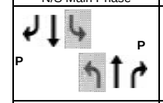
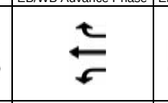
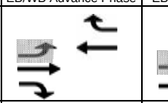
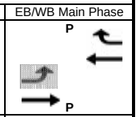
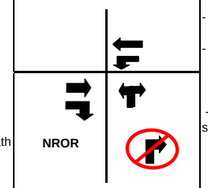
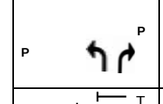
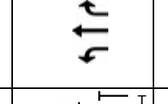
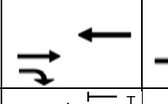
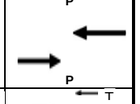
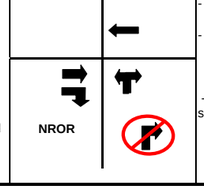
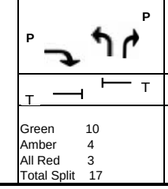
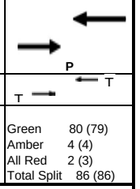
East Bayfront Transit EA

Appendix B Table 1:

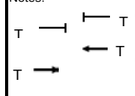
Queens Quay Streetcar South Side Option Typical Signal timings/ Phasing Summary - AM/PM Peak

Project Number: 7085-01

DRAFT

Sr. No.	Intersection	Lane Configuraions/turn restrictions	Assumptions/comments	N/S Ped Crossing Distance (m)	Sec.	N/S Ped Phase	Sec.	E/W Ped Crossing Distance (m)	Sec.	E/W Ped Phase	Sec.	Cycle Length Sec.	Phasing/Timings N/S Main Phase	EB/WB Advance Phase	EB/WB Advance Phase	EB/WB Main Phase
6	Queens Quay/Street D		- Single Stage Crossing - WBL actuated by vehicle - EBR actuated by vehicle - E-W Transit phase timings are shown in bracket	Pavement width& curb Median/Platform Tracks Total	11.5 3 8.2 22.7	Walk FDW 23m / 1.2m/s = 19s Total Green Amber All Red Min. Split	7 19 26 4 3 33	Pavement width& curb Total	18 18	Walk FDW 18m / 1.2m/s = 15s Total Green Amber All Red Min. Split	7 15 22 4 2 28	103	 Green 31 Amber 4 All Red 3 Total Split 38	 Green 8 Amber 4 Red (WBL only) 3 Total Split 15	 Green 8 Amber 4 Red (EBR only) 3 Total Split 15	 Green 29 (28) Amber 4 (4) All Red 2 (3) Total Split 35 (35)
7	Queens Quay/Westerly Signalized Redpath Driveway		- Single Stage Crossing - WBL actuated by vehicle - E-W Transit phase timings are shown in bracket	Pavement width& curb Median/Platform Tracks Total	11.5 3 8.2 22.7	Walk FDW 23m / 1.2m/s = 19s Total Green Amber All Red Min. Split	7 19 26 4 3 33	Pavement width& curb Total	17 17	Walk FDW 17m / 1.2m/s = 14s Total Green Amber All Red Min. Split	7 14 21 4 2 27	103	 Green 26 Amber 4 All Red 3 Total Split 33	 Green 7 Amber 4 Red (WBL only) 3 Total Split 14	 Green 7 Amber 4 Red (EBR only) 3 Total Split 14	 Green 36 (35) Amber 4 (4) All Red 2 (3) Total Split 42 (42)
8	Queens Quay/Centre Partially Signalized Redpath Driveway		- No Pedestrian Crossing - NBL actuated by vehicle - E-W Transit phase timings are shown in bracket					Pavement width& curb Total	17 17	Walk FDW 17m / 1.2m/s = 14s Total Green Amber All Red Min. Split	7 14 21 4 2 27	103	 Green 10 Amber 4 All Red 3 Total Split 17			 Green 80 (79) Amber 4 (4) All Red 2 (3) Total Split 86 (86)

Notes:

 ALL Red- Transit / Green - Transit

 = Permissive turn

 = Protected or fully protected turn

NROR No Right Turn on Red

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	170	420	15	590	160	0	125	30
Turn Type	pm+pt		Prot		Perm		Perm	
Protected Phases	5	2	1	6		8		4
Permitted Phases	2				8		4	
Detector Phases	5	2	1	6	8	8	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	27.0	14.0	27.0	33.0	33.0	33.0	33.0
Total Split (s)	11.0	56.0	14.0	59.0	33.0	33.0	33.0	33.0
Total Split (%)	10.7%	54.4%	13.6%	57.3%	32.0%	32.0%	32.0%	32.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	3.0	2.0	3.0	3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	None	C-Max	None	C-Max	Ped	Ped	Ped	Ped
Act Effct Green (s)	63.4	62.2	8.3	54.1	28.0	28.0	28.0	28.0
Actuated g/C Ratio	0.62	0.60	0.08	0.53	0.27	0.27	0.27	0.27
v/c Ratio	0.61	0.42	0.12	0.86	0.63	0.04	0.46	0.30
Control Delay	20.2	13.5	52.3	21.5	46.6	0.2	38.0	12.1
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.2	13.6	52.3	21.6	46.6	0.2	38.0	12.1
LOS	C	B	D	C	D	A	D	B
Approach Delay		15.5		22.2		41.5		25.3
Approach LOS		B		C		D		C

Intersection Summary

Cycle Length: 103
Actuated Cycle Length: 103
Offset: 14 (14%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 22.4 — Intersection LOS: C
Intersection Capacity Utilization 89.0% — ICU Level of Service E
Analysis Period (min) 60

Splits and Phases: 1: Queen's Quay & Freeland Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.98		1.00	0.79		1.00	0.84	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.83	1.00		0.81	1.00	
Frt	1.00	1.00		1.00	0.97		1.00	0.85		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1575	1658		1575	1580		1313	1107		1272	1235	
Flt Permitted	0.18	1.00		0.95	1.00		0.67	1.00		0.74	1.00	
Satd. Flow (perm)	304	1658		1575	1580		927	1107		996	1235	
Volume (vph)	170	420	0	15	590	130	160	0	20	125	30	90
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	170	420	0	15	590	130	160	0	20	125	30	90
RTOR Reduction (vph)	0	0	0	0	8	0	0	15	0	0	66	0
Lane Group Flow (vph)	170	420	0	15	712	0	160	5	0	125	54	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	pm+pt			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2						8			4		
Actuated Green, G (s)	63.5	55.6		1.4	53.1		26.0	26.0		26.0	26.0	
Effective Green, g (s)	62.5	56.6		3.4	54.1		28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.61	0.55		0.03	0.53		0.27	0.27		0.27	0.27	
Clearance Time (s)	3.0	6.0		7.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	257	911		52	830		252	301		271	336	
v/s Ratio Prot	c0.04	0.25		0.01	c0.45			0.00			0.04	
v/s Ratio Perm	0.36						c0.17			0.13		
v/c Ratio	0.66	0.46		0.29	0.86		0.63	0.02		0.46	0.16	
Uniform Delay, d1	14.9	14.0		48.6	21.1		33.0	27.4		31.2	28.6	
Progression Factor	1.00	1.00		1.16	0.49		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.4	1.7		2.4	10.0		5.3	0.0		1.2	0.2	
Delay (s)	21.3	15.7		58.6	20.4		38.3	27.5		32.5	28.8	
Level of Service	C	B		E	C		D	C		C	C	
Approach Delay (s)		17.3			21.2			37.1			30.7	
Approach LOS		B			C			D			C	

Intersection Summary			
HCM Average Control Delay	22.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	89.0%	ICU Level of Service	E
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	ø6
Lane Configurations						
Volume (vph)	560	10	5	725	5	
Turn Type		custom	Prot			
Protected Phases	2 6	2	1	1 2 6		6
Permitted Phases					8	
Detector Phases	2 6	2	1	1 2 6	8	
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		12.0	12.0		33.0	25.0
Total Split (s)	56.0	14.0	14.0	70.0	33.0	42.0
Total Split (%)	54.4%	13.6%	13.6%	68.0%	32.0%	41%
Yellow Time (s)		4.0	4.0		4.0	4.0
All-Red Time (s)		3.0	3.0		3.0	2.0
Lead/Lag		Lag	Lead			
Lead-Lag Optimize?		Yes				
Recall Mode		C-Max	None		Ped	None
Act Effct Green (s)	59.0	20.9	9.0	73.0	20.0	
Actuated g/C Ratio	0.57	0.20	0.09	0.71	0.19	
v/c Ratio	0.59	0.03	0.04	0.62	0.05	
Control Delay	13.3	45.6	44.2	8.3	34.7	
Queue Delay	0.2	0.0	0.0	0.6	0.0	
Total Delay	13.6	45.6	44.2	8.9	34.7	
LOS	B	D	D	A	C	
Approach Delay	14.1			9.1	34.7	
Approach LOS	B			A	C	

Intersection Summary	
Cycle Length: 103	
Actuated Cycle Length: 103	
Offset: 8 (8%), Referenced to phase 2:EBWB, Start of Green	
Natural Cycle: 85	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 11.5	Intersection LOS: B
Intersection Capacity Utilization 65.7%	ICU Level of Service C
Analysis Period (min) 60	

Splits and Phases: 2: Queen's Quay & Red Path Westerly Signalized Driveway

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.85	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	0.86	
Frt	1.00	0.85	1.00	1.00	0.93	
Flt Protected	1.00	1.00	0.95	1.00	0.98	
Satd. Flow (prot)	1658	1409	1575	1658	1098	
Flt Permitted	1.00	1.00	0.95	1.00	0.98	
Satd. Flow (perm)	1658	1409	1575	1658	1098	
Volume (vph)	560	10	5	725	5	5
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	560	10	5	725	5	5
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	560	10	5	725	10	0
Confl. Peds. (#/hr)		100	100		100	100
Turn Type		custom	Prot			
Protected Phases	2 6	2	1	1 2 6		
Permitted Phases					8	
Actuated Green, G (s)	58.0	18.9	7.0	72.0	18.0	
Effective Green, g (s)	59.0	20.9	9.0	73.0	20.0	
Actuated g/C Ratio	0.57	0.20	0.09	0.71	0.19	
Clearance Time (s)		7.0	7.0		7.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)	950	286	138	1175	213	
v/s Ratio Prot	0.34	0.01	0.00	c0.44		
v/s Ratio Perm					c0.01	
v/c Ratio	0.59	0.03	0.04	0.62	0.05	
Uniform Delay, d1	14.2	33.0	43.0	7.8	33.7	
Progression Factor	0.73	1.24	1.01	0.75	1.00	
Incremental Delay, d2	0.9	0.2	0.1	0.9	0.1	
Delay (s)	11.3	41.1	43.6	6.7	33.8	
Level of Service	B	D	D	A	C	
Approach Delay (s)	11.8			6.9	33.8	
Approach LOS	B			A	C	

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBT	EBR	WBT	NBL
Lane Configurations				
Volume (vph)	600	5	760	5
Turn Type		custom		
Protected Phases	4	2	8	2
Permitted Phases		2		
Detector Phases	4	2	8	2
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	25.0	17.0	25.0	17.0
Total Split (s)	86.0	17.0	86.0	17.0
Total Split (%)	83.5%	16.5%	83.5%	16.5%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	3.0	2.0	3.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	C-Max	None	C-Max	None
Act Effct Green (s)	95.3	8.3	95.3	8.3
Actuated g/C Ratio	0.93	0.08	0.93	0.08
v/c Ratio	0.39	0.04	0.50	0.08
Control Delay	7.7	51.6	7.2	44.8
Queue Delay	0.1	0.0	0.1	0.0
Total Delay	7.8	51.6	7.3	44.8
LOS	A	D	A	D
Approach Delay	8.2		7.3	44.8
Approach LOS	A		A	D

Intersection Summary	
Cycle Length: 103	
Actuated Cycle Length: 103	
Offset: 29 (28%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.50	
Intersection Signal Delay: 8.0	Intersection LOS: A
Intersection Capacity Utilization 56.1%	ICU Level of Service B
Analysis Period (min) 60	

Splits and Phases: 3: Queen's Quay & Red Path Partially Signalized Driveway

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.93	
Flt Protected	1.00	1.00		1.00	0.98	
Satd. Flow (prot)	1658	1409		1658	1508	
Flt Permitted	1.00	1.00		1.00	0.98	
Satd. Flow (perm)	1658	1409		1658	1508	
Volume (vph)	600	5	0	760	5	5
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	600	5	0	760	5	5
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	600	5	0	760	10	0
Turn Type		custom				
Protected Phases	4	2		8	2	
Permitted Phases		2				
Actuated Green, G (s)	87.1	2.9		87.1	2.9	
Effective Green, g (s)	88.1	4.9		88.1	4.9	
Actuated g/C Ratio	0.86	0.05		0.86	0.05	
Clearance Time (s)	6.0	7.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1418	67		1418	72	
v/s Ratio Prot	0.36	0.00		c0.46	c0.01	
v/s Ratio Perm						
v/c Ratio	0.42	0.07		0.54	0.14	
Uniform Delay, d1	1.7	46.9		2.0	47.0	
Progression Factor	4.47	1.18		3.27	1.00	
Incremental Delay, d2	0.8	0.4		1.1	0.9	
Delay (s)	8.3	55.7		7.6	47.9	
Level of Service	A	E		A	D	
Approach Delay (s)	8.7			7.6	47.9	
Approach LOS	A			A	D	

Intersection Summary			
HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	60		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	185	445	675	305	35	110
Turn Type	pm+pt			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Detector Phases	5	2	6	6	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	14.0	12.0	27.0	27.0	27.0	27.0
Total Split (s)	14.0	73.0	59.0	59.0	30.0	30.0
Total Split (%)	13.6%	70.9%	57.3%	57.3%	29.1%	29.1%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	3.0	3.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	C-Max	C-Max	C-Max	Ped	Ped
Act Effct Green (s)	71.0	71.0	56.9	56.9	22.0	22.0
Actuated g/C Ratio	0.69	0.69	0.55	0.55	0.21	0.21
v/c Ratio	0.54	0.39	0.74	0.48	0.10	0.36
Control Delay	20.5	16.2	12.9	4.5	33.7	10.3
Queue Delay	0.0	0.5	5.8	0.7	0.0	0.2
Total Delay	20.5	16.7	18.7	5.3	33.7	10.5
LOS	C	B	B	A	C	B
Approach Delay		17.8	14.5		16.1	
Approach LOS		B	B		B	

Intersection Summary

Cycle Length: 103
Actuated Cycle Length: 103
Offset: 87 (84%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 15.8 Intersection LOS: B
Intersection Capacity Utilization 80.0% ICU Level of Service D
Analysis Period (min) 60

Splits and Phases: 4: Queen's Quay & Lower Jarvis St

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.74	1.00	0.73
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1575	1658	1658	1042	1575	1025
Flt Permitted	0.23	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	374	1658	1658	1042	1575	1025
Volume (vph)	185	445	675	305	35	110
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	185	445	675	305	35	110
RTOR Reduction (vph)	0	0	0	54	0	87
Lane Group Flow (vph)	185	445	675	251	35	23
Confl. Peds. (#/hr)	100			100	100	100
Turn Type	pm+pt			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Actuated Green, G (s)	70.0	70.0	55.9	55.9	20.0	20.0
Effective Green, g (s)	71.0	71.0	56.9	56.9	22.0	22.0
Actuated g/C Ratio	0.69	0.69	0.55	0.55	0.21	0.21
Clearance Time (s)	3.0	6.0	6.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	364	1143	916	576	336	219
v/s Ratio Prot	c0.04	0.27	c0.41		0.02	
v/s Ratio Perm	0.31			0.24		c0.02
v/c Ratio	0.51	0.39	0.74	0.44	0.10	0.11
Uniform Delay, d1	10.7	6.8	17.4	13.6	32.6	32.6
Progression Factor	2.55	2.18	0.52	0.34	1.00	1.00
Incremental Delay, d2	1.1	1.0	3.0	1.3	0.1	0.2
Delay (s)	28.5	15.8	12.1	6.0	32.7	32.8
Level of Service	C	B	B	A	C	C
Approach Delay (s)		19.5	10.2		32.8	
Approach LOS		B	B		C	

Intersection Summary			
HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT	ø6
Lane Configurations								
Volume (vph)	415	45	860	20	0	70	25	
Turn Type		custom		Perm		Perm		
Protected Phases	2	5	5 6		8		4	6
Permitted Phases		5		8		4		
Detector Phases	2	5	5 6	8	8	4	4	
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	14.0	14.0		33.0	33.0	33.0	33.0	43.0
Total Split (s)	70.0	14.0	70.0	33.0	33.0	33.0	33.0	56.0
Total Split (%)	68.0%	13.6%	68.0%	32.0%	32.0%	32.0%	32.0%	54%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	3.0		3.0	3.0	3.0	3.0	2.0
Lead/Lag		Lead						Lag
Lead-Lag Optimize?		Yes						Yes
Recall Mode	C-Max	Max		Ped	Ped	Ped	Ped	C-Max
Act Effct Green (s)	65.0	9.0	65.0		27.0		28.0	
Actuated g/C Ratio	0.63	0.09	0.63		0.26		0.27	
v/c Ratio	0.40	0.37	0.86		0.09		0.58	
Control Delay	7.4	63.9	11.2		29.9		31.5	
Queue Delay	0.3	0.0	3.0		0.0		0.0	
Total Delay	7.7	63.9	14.2		29.9		31.6	
LOS	A	E	B		C		C	
Approach Delay	13.2		14.2		29.9		31.6	
Approach LOS	B		B		C		C	

Intersection Summary

Cycle Length: 103
Actuated Cycle Length: 103
Offset: 89 (86%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 16.4 Intersection LOS: B
Intersection Capacity Utilization 83.7% ICU Level of Service E
Analysis Period (min) 60

Splits and Phases: 6: Queen's Quay & Richardson

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0			6.0			5.0	
Lane Util. Factor		1.00	1.00		1.00			1.00			1.00	
Frpb, ped/bikes		1.00	1.00		1.00			0.96			0.89	
Flpb, ped/bikes		1.00	1.00		1.00			0.90			0.93	
Frt		1.00	0.85		0.99			0.97			0.93	
Flt Protected		1.00	1.00		1.00			0.96			0.98	
Satd. Flow (prot)		1658	1409		1643			1335			1254	
Flt Permitted		1.00	1.00		1.00			0.77			0.88	
Satd. Flow (perm)		1658	1409		1643			1065			1125	
Volume (vph)	0	415	45	0	860	35	20	0	5	70	25	105
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	415	45	0	860	35	20	0	5	70	25	105
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	0	0	39	0
Lane Group Flow (vph)	0	415	45	0	894	0	0	25	0	0	161	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type			custom				Perm			Perm		
Protected Phases		2	5		5 6			8			4	
Permitted Phases			5				8			4		
Actuated Green, G (s)		64.0	7.0		64.0			26.0			26.0	
Effective Green, g (s)		65.0	9.0		65.0			27.0			28.0	
Actuated g/C Ratio		0.63	0.09		0.63			0.26			0.27	
Clearance Time (s)		6.0	7.0					7.0			7.0	
Vehicle Extension (s)		3.0	3.0					3.0			3.0	
Lane Grp Cap (vph)		1046	123		1037			279			306	
v/s Ratio Prot		0.25	0.03		c0.54							
v/s Ratio Perm								0.02			c0.14	
v/c Ratio		0.40	0.37		0.86			0.09			0.53	
Uniform Delay, d1		9.4	44.3		15.4			28.7			31.9	
Progression Factor		0.66	1.24		0.25			1.00			1.00	
Incremental Delay, d2		1.1	7.9		6.2			0.1			1.7	
Delay (s)		7.2	62.9		10.1			28.9			33.5	
Level of Service		A	E		B			C			C	
Approach Delay (s)		12.7			10.1			28.9			33.5	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	14.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	105	385	60	775	180	20	20	55	105
Turn Type	pm+pt		Prot		Perm	Perm		Perm	
Protected Phases	5	2	1	6			8		4
Permitted Phases	2				6	8		4	
Detector Phases	5	2	1	6	6	8	8	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	28.0	14.0	57.0	57.0	33.0	33.0	33.0	33.0
Total Split (s)	11.0	56.0	14.0	59.0	59.0	33.0	33.0	33.0	33.0
Total Split (%)	10.7%	54.4%	13.6%	57.3%	57.3%	32.0%	32.0%	32.0%	32.0%
Yellow Time (s)	2.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0	3.0	2.0	2.0	3.0	3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag				
Lead-Lag Optimize?	Yes			Yes	Yes				
Recall Mode	None	C-Max	Min	C-Max	C-Max	Ped	Ped	Ped	Ped
Act Effct Green (s)	56.6	51.3	8.7	54.7	54.7	27.0	27.0	28.0	28.0
Actuated g/C Ratio	0.55	0.50	0.08	0.53	0.53	0.26	0.26	0.27	0.27
v/c Ratio	0.50	0.47	0.45	0.88	0.25	0.10	0.08	0.20	0.46
Control Delay	20.6	12.7	54.2	27.8	4.5	30.5	29.5	31.5	29.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.6	12.7	54.2	27.8	4.5	30.5	29.5	31.5	29.0
LOS	C	B	D	C	A	C	C	C	C
Approach Delay		14.4		25.2			29.9		29.5
Approach LOS		B		C			C		C

Intersection Summary

Cycle Length: 103
Actuated Cycle Length: 103
Offset: 73 (71%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 23.0 Intersection LOS: C
Intersection Capacity Utilization 86.8% ICU Level of Service E
Analysis Period (min) 60

Splits and Phases: 7: Queen's Quay & Lower Sherbourne

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	6.0	6.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.89	1.00	0.93		1.00	0.90	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.86	1.00		0.81	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.95		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1575	1658		1575	1658	1251	1353	1463		1276	1398	
Flt Permitted	0.17	1.00		0.95	1.00	1.00	0.55	1.00		0.74	1.00	
Satd. Flow (perm)	279	1658		1575	1658	1251	779	1463		991	1398	
Volume (vph)	105	385	0	60	775	180	20	20	10	55	105	85
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	105	385	0	60	775	180	20	20	10	55	105	85
RTOR Reduction (vph)	0	0	0	0	0	60	0	0	0	0	28	0
Lane Group Flow (vph)	105	385	0	60	775	120	20	30	0	55	162	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	pm+pt			Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2					6	8			4		
Actuated Green, G (s)	57.6	50.3		6.7	53.7	53.7	26.0	26.0		26.0	26.0	
Effective Green, g (s)	56.6	51.3		8.7	54.7	54.7	27.0	27.0		28.0	28.0	
Actuated g/C Ratio	0.55	0.50		0.08	0.53	0.53	0.26	0.26		0.27	0.27	
Clearance Time (s)	3.0	6.0		7.0	6.0	6.0	7.0	7.0		7.0	7.0	
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)	220	826		133	881	664	204	384		269	380	
v/s Ratio Prot	0.02	0.23		c0.04	c0.47			0.02			c0.12	
v/s Ratio Perm	0.24					0.10	0.03			0.06		
v/c Ratio	0.48	0.47		0.45	0.88	0.18	0.10	0.08		0.20	0.43	
Uniform Delay, d1	15.8	16.9		44.9	21.3	12.5	28.8	28.6		28.9	30.9	
Progression Factor	1.55	0.63		1.01	0.73	0.89	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	1.8		1.8	10.8	0.4	0.2	0.1		0.4	0.8	
Delay (s)	26.0	12.4		47.3	26.2	11.6	29.0	28.7		29.3	31.6	
Level of Service	C	B		D	C	B	C	C		C	C	
Approach Delay (s)		15.3			24.9			28.8			31.1	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM Average Control Delay	23.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR	ø3
Lane Configurations											
Volume (vph)	20	380	65	45	725	155	0	40	15	120	
Turn Type	Perm		custom	Prot		Perm		Perm		Perm	
Protected Phases		2 3	2	1	1 2 3		4		4		3
Permitted Phases	2 3		2			4		4		4	
Detector Phases	2 3	2 3	2	1	1 2 3	4	4	4	4	4	
Minimum Initial (s)			4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)			12.0	12.0		33.0	33.0	33.0	33.0	33.0	27.0
Total Split (s)	50.0	50.0	15.0	15.0	65.0	38.0	38.0	38.0	38.0	38.0	35.0
Total Split (%)	48.5%	48.5%	14.6%	14.6%	63.1%	36.9%	36.9%	36.9%	36.9%	36.9%	34%
Yellow Time (s)			4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)			2.0	3.0		3.0	3.0	3.0	3.0	3.0	2.0
Lead/Lag			Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lead
Lead-Lag Optimize?			Yes			Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode			None	None		Max	Max	Max	Max	Max	C-Max
Act Effct Green (s)	45.0	45.0	9.9	10.0	60.0	32.0	32.0	33.0	33.0	33.0	
Actuated g/C Ratio	0.44	0.44	0.10	0.10	0.58	0.31	0.31	0.32	0.32	0.32	
v/c Ratio	0.10	0.52	0.48	0.29	0.78	0.50	0.13	0.13	0.03	0.28	
Control Delay	14.6	16.0	73.5	59.1	14.2	35.8	26.9	26.3	24.3	6.6	
Queue Delay	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	14.6	16.0	73.5	59.1	15.2	35.8	26.9	26.3	24.3	6.6	
LOS	B	B	E	E	B	D	C	C	C	A	
Approach Delay		23.9			17.7		33.8		12.6		
Approach LOS		C			B		C		B		

Intersection Summary	
Cycle Length: 103	
Actuated Cycle Length: 103	
Offset: 97 (94%), Referenced to phase 3:EBWB, Start of Green	
Natural Cycle: 85	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 20.9	Intersection LOS: C
Intersection Capacity Utilization 88.4%	ICU Level of Service E
Analysis Period (min) 60	

Splits and Phases: 8: Queen's Quay & Street D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		6.0	6.0		5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	0.79		1.00	1.00	0.79
Flpb, ped/bikes	0.96	1.00	1.00	1.00	1.00		0.81	1.00		0.81	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1518	1658	1409	1575	1647		1269	1107		1282	1658	1107
Flt Permitted	0.29	1.00	1.00	0.95	1.00		0.75	1.00		0.73	1.00	1.00
Satd. Flow (perm)	471	1658	1409	1575	1647		999	1107		982	1658	1107
Volume (vph)	20	380	65	45	725	20	155	0	45	40	15	120
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	20	380	65	45	725	20	155	0	45	40	15	120
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	0	0	0	82
Lane Group Flow (vph)	20	380	65	45	744	0	155	45	0	40	15	38
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		custom	Prot			Perm			Perm		Perm
Protected Phases		2 3	2	1	1 2 3			4			4	
Permitted Phases	2 3		2				4			4		4
Actuated Green, G (s)	44.0	44.0	8.9	8.0	59.0		31.0	31.0		31.0	31.0	31.0
Effective Green, g (s)	45.0	45.0	9.9	10.0	60.0		32.0	32.0		33.0	33.0	33.0
Actuated g/C Ratio	0.44	0.44	0.10	0.10	0.58		0.31	0.31		0.32	0.32	0.32
Clearance Time (s)			6.0	7.0			7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)			3.0	3.0			3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	206	724	135	153	959		310	344		315	531	355
v/s Ratio Prot		0.23	0.05	0.03	c0.45			0.04			0.01	
v/s Ratio Perm	0.04						c0.16			0.04		0.03
v/c Ratio	0.10	0.52	0.48	0.29	0.78		0.50	0.13		0.13	0.03	0.11
Uniform Delay, d1	17.1	21.2	44.1	43.2	16.4		29.0	25.5		24.8	24.0	24.6
Progression Factor	0.77	0.62	1.38	1.25	0.51		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	0.6	2.5	0.9	3.5		5.8	0.8		0.8	0.1	0.6
Delay (s)	13.3	13.7	63.6	55.0	11.8		34.7	26.3		25.6	24.1	25.3
Level of Service	B	B	E	D	B		C	C		C	C	C
Approach Delay (s)		20.7			14.2			32.8			25.2	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	19.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	88.4%	ICU Level of Service	E
Analysis Period (min)	60		

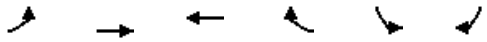
c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	205	265	495	55	15	265
Turn Type	pm+pt			Perm		pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2			6		4
Detector Phases	5	2	6	6	4	5
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	15.0	12.0	28.0	28.0	27.0	15.0
Total Split (s)	24.0	76.0	52.0	52.0	27.0	24.0
Total Split (%)	23.3%	73.8%	50.5%	50.5%	26.2%	23.3%
Yellow Time (s)	3.0	3.0	4.0	4.0	4.0	3.0
All-Red Time (s)	0.0	2.0	2.0	2.0	3.0	0.0
Lead/Lag	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes	Yes		Yes
Recall Mode	Max	C-Max	C-Max	C-Max	Ped	Max
Act Effct Green (s)	71.0	71.0	47.0	47.0	22.0	41.0
Actuated g/C Ratio	0.69	0.69	0.46	0.46	0.21	0.40
v/c Ratio	0.40	0.23	0.65	0.11	0.04	0.47
Control Delay	15.9	9.2	26.9	9.3	32.8	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	9.2	26.9	9.3	32.8	11.9
LOS	B	A	C	A	C	B
Approach Delay		12.1	25.1		13.0	
Approach LOS		B	C		B	

Intersection Summary

Cycle Length: 103
Actuated Cycle Length: 103
Offset: 68 (66%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.65
Intersection Signal Delay: 17.8 Intersection LOS: B
Intersection Capacity Utilization 70.7% ICU Level of Service C
Analysis Period (min) 60

Splits and Phases: 9: Queen's Quay & Parliament Street



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.75	1.00	0.85
Flpb, ped/bikes	0.98	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1551	1658	1658	1058	1575	1203
Flt Permitted	0.29	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	466	1658	1658	1058	1575	1203
Volume (vph)	205	265	495	55	15	265
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	205	265	495	55	15	265
RTOR Reduction (vph)	0	0	0	17	0	87
Lane Group Flow (vph)	205	265	495	38	15	178
Confl. Peds. (#/hr)	100			100	100	100
Turn Type	pm+pt			Perm		pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2			6		4
Actuated Green, G (s)	71.0	71.0	46.0	46.0	20.0	41.0
Effective Green, g (s)	71.0	71.0	47.0	47.0	22.0	41.0
Actuated g/C Ratio	0.69	0.69	0.46	0.46	0.21	0.40
Clearance Time (s)	3.0	5.0	6.0	6.0	7.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	521	1143	757	483	336	537
v/s Ratio Prot	c0.07	0.16	c0.30		0.01	c0.06
v/s Ratio Perm	0.20			0.04		0.09
v/c Ratio	0.39	0.23	0.65	0.08	0.04	0.33
Uniform Delay, d1	8.7	5.9	21.7	15.8	32.2	21.5
Progression Factor	2.36	1.45	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.0	0.4	4.5	0.3	0.1	0.4
Delay (s)	22.6	9.0	26.2	16.1	32.2	21.9
Level of Service	C	A	C	B	C	C
Approach Delay (s)		14.9	25.2		22.4	
Approach LOS		B	C		C	

Intersection Summary			
HCM Average Control Delay	20.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	WBR2	NBL2	NBT	SBL	SBT	NER
Lane Configurations										
Volume (vph)	900	630	1055	555	275	110	320	145	130	860
Turn Type	Split			Prot	Perm	Split		Split		custom
Protected Phases	1	1	2	2		4	4	3	3	2
Permitted Phases					2					
Detector Phases	1	1	2	2	2	4	4	3	3	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	4.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	10.0	10.0	25.0
Total Split (s)	37.0	37.0	50.0	50.0	50.0	25.0	25.0	18.0	18.0	50.0
Total Split (%)	28.5%	28.5%	38.5%	38.5%	38.5%	19.2%	19.2%	13.8%	13.8%	38.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max	Max	C-Min	C-Min	Max	Max	Max
Act Effct Green (s)	32.0	32.0	45.0	45.0	45.0	20.0	20.0	13.0	13.0	45.0
Actuated g/C Ratio	0.25	0.25	0.35	0.35	0.35	0.15	0.15	0.10	0.10	0.35
v/c Ratio	0.98	0.72	0.82	0.91	0.41	0.45	0.98	0.82	0.99	0.83
Control Delay	92.4	50.3	45.8	66.9	10.2	56.7	118.5	99.9	190.3	46.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	92.4	50.3	45.8	66.9	10.2	56.7	118.5	99.9	190.3	46.7
LOS	F	D	D	E	B	E	F	F	F	D
Approach Delay		75.1	46.8				107.6		148.7	
Approach LOS		E	D				F		F	

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 4:NBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.99
Intersection Signal Delay: 68.3 Intersection LOS: E
Intersection Capacity Utilization 104.2% ICU Level of Service G
Analysis Period (min) 60

Splits and Phases: 3: Lake Shore Blvd E & Lower Jarvis St

Movement	EBL	EBT	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.7	3.7	3.7	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Util. Factor	*1.00	0.95	*1.00	1.00	1.00	0.91		*1.00		1.00	*1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.98	1.00		0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00	1.00	1.00	0.85	1.00		0.98		1.00	0.96	
Flt Protected	1.00	1.00	1.00	1.00	1.00	0.95		1.00		1.00	1.00	
Satd. Flow (prot)	3730	3579	3694	1762	1564	1592		3314		1756	1710	
Flt Permitted	1.00	1.00	1.00	1.00	1.00	0.95		1.00		1.00	1.00	
Satd. Flow (perm)	3730	3579	3694	1762	1564	1592		3314		1756	1710	
Volume (vph)	900	630	1055	555	275	110	110	320	85	145	130	40
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	900	630	1055	555	275	110	110	320	85	145	130	40
RTOR Reduction (vph)	0	0	0	0	137	0	0	14	0	0	0	0
Lane Group Flow (vph)	900	630	1055	555	138	110	0	501	0	145	170	0
Confl. Peds. (#/hr)					5				30	30		30
Heavy Vehicles (%)	3%	2%	4%	9%	2%	2%	15%	9%	2%	7%	4%	2%
Turn Type	Split			Prot	Perm	Split	Split			Split		
Protected Phases	1	1	2	2		4	4	4		3	3	
Permitted Phases					2							
Actuated Green, G (s)	29.0	29.0	42.0	42.0	42.0	17.0		17.0		10.0	10.0	
Effective Green, g (s)	32.0	32.0	45.0	45.0	45.0	20.0		20.0		13.0	13.0	
Actuated g/C Ratio	0.25	0.25	0.35	0.35	0.35	0.15		0.15		0.10	0.10	
Clearance Time (s)	8.0	8.0	8.0	8.0	8.0	8.0		8.0		8.0	8.0	
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)	918	881	1279	610	541	245		510		176	171	
v/s Ratio Prot	c0.24	0.18	0.29	c0.31		0.07		c0.15		0.08	c0.10	
v/s Ratio Perm					0.09							
v/c Ratio	0.98	0.72	0.82	0.91	0.26	0.45		0.98		0.82	0.99	
Uniform Delay, d1	48.7	44.8	38.9	40.6	30.5	50.0		54.8		57.4	58.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	43.8	5.1	6.5	25.7	1.1	6.0		65.4		42.2	132.1	
Delay (s)	92.5	49.9	45.4	66.3	31.6	55.9		120.2		99.6	190.5	
Level of Service	F	D	D	E	C	E		F		F	F	
Approach Delay (s)		74.9	49.5					108.9			148.7	
Approach LOS		E	D					F			F	

Intersection Summary			
HCM Average Control Delay	69.3	HCM Level of Service	E
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	104.2%	ICU Level of Service	G
Analysis Period (min)	60		

c Critical Lane Group

Movement	NER	NER2
Lane Configurations		
Ideal Flow (vphpl)	1900	1900
Lane Width	3.7	3.7
Total Lost time (s)	5.0	
Lane Util. Factor	*1.00	
Frpb, ped/bikes	1.00	
Flpb, ped/bikes	1.00	
Frt	0.95	
Flt Protected	1.00	
Satd. Flow (prot)	3186	
Flt Permitted	1.00	
Satd. Flow (perm)	3186	
Volume (vph)	860	55
Peak-hour factor, PHF	1.00	1.00
Adj. Flow (vph)	860	55
RTOR Reduction (vph)	4	0
Lane Group Flow (vph)	911	0
Confl. Peds. (#/hr)		
Heavy Vehicles (%)	15%	8%
Turn Type	custom	
Protected Phases	2	
Permitted Phases		
Actuated Green, G (s)	42.0	
Effective Green, g (s)	45.0	
Actuated g/C Ratio	0.35	
Clearance Time (s)	8.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	1103	
v/s Ratio Prot	0.29	
v/s Ratio Perm		
v/c Ratio	0.83	
Uniform Delay, d1	38.9	
Progression Factor	1.00	
Incremental Delay, d2	7.6	
Delay (s)	46.5	
Level of Service	D	
Approach Delay (s)		
Approach LOS		

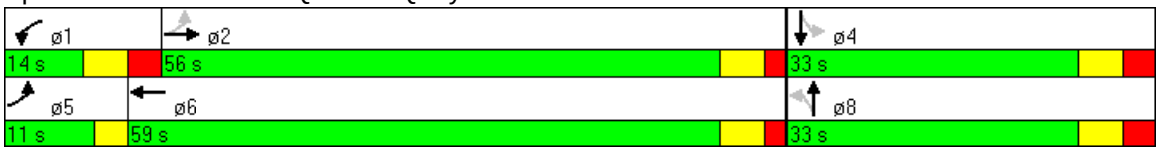
Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	125	685	45	705	40	5	120	125
Turn Type	pm+pt		Prot		Perm		Perm	
Protected Phases	5	2	1	6		8		4
Permitted Phases	2				8		4	
Detector Phases	5	2	1	6	8	8	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	27.0	14.0	27.0	33.0	33.0	33.0	33.0
Total Split (s)	11.0	56.0	14.0	59.0	33.0	33.0	33.0	33.0
Total Split (%)	10.7%	54.4%	13.6%	57.3%	32.0%	32.0%	32.0%	32.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	3.0	2.0	3.0	3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	None	C-Max	None	C-Max	Ped	Ped	Ped	Ped
Act Effct Green (s)	60.2	56.6	8.7	54.4	28.0	28.0	28.0	28.0
Actuated g/C Ratio	0.58	0.55	0.08	0.53	0.27	0.27	0.27	0.27
v/c Ratio	0.49	0.75	0.34	0.84	0.20	0.03	0.44	0.51
Control Delay	14.9	26.5	68.7	15.4	32.1	21.4	37.3	31.7
Queue Delay	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0
Total Delay	14.9	26.5	68.7	16.2	32.1	21.4	37.3	31.7
LOS	B	C	E	B	C	C	D	C
Approach Delay		24.7		19.2		29.9		33.7
Approach LOS		C		B		C		C

Intersection Summary

Cycle Length: 103
Actuated Cycle Length: 103
Offset: 57 (55%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 24.2 — Intersection LOS: C
Intersection Capacity Utilization 96.5% — ICU Level of Service F
Analysis Period (min) 60

Splits and Phases: 5: Queen's Quay & Freeland Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.89		1.00	0.91	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.87	1.00		0.80	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.92		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1575	1658		1575	1643		1364	1369		1267	1422	
Flt Permitted	0.19	1.00		0.95	1.00		0.52	1.00		0.75	1.00	
Satd. Flow (perm)	314	1658		1575	1643		742	1369		1002	1422	
Volume (vph)	125	685	0	45	705	25	40	5	5	120	125	85
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	125	685	0	45	705	25	40	5	5	120	125	85
RTOR Reduction (vph)	0	0	0	0	1	0	0	4	0	0	24	0
Lane Group Flow (vph)	125	685	0	45	729	0	40	6	0	120	186	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	pm+pt			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2						8			4		
Actuated Green, G (s)	60.4	52.8		4.2	53.4		26.0	26.0		26.0	26.0	
Effective Green, g (s)	59.4	53.8		6.2	54.4		28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.58	0.52		0.06	0.53		0.27	0.27		0.27	0.27	
Clearance Time (s)	3.0	6.0		7.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	250	866		95	868		202	372		272	387	
v/s Ratio Prot	0.03	0.41		c0.03	c0.44			0.00			c0.13	
v/s Ratio Perm	0.26						0.05			0.12		
v/c Ratio	0.50	0.79		0.47	0.84		0.20	0.02		0.44	0.48	
Uniform Delay, d1	14.6	20.0		46.8	20.6		28.9	27.4		31.0	31.4	
Progression Factor	1.00	1.00		1.41	0.29		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	7.7		2.8	8.0		0.5	0.0		1.1	0.9	
Delay (s)	16.2	27.7		69.1	14.1		29.3	27.5		32.2	32.4	
Level of Service	B	C		E	B		C	C		C	C	
Approach Delay (s)		25.9			17.3			29.0			32.3	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	23.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	96.5%	ICU Level of Service	F
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	ø6
Lane Configurations						
Volume (vph)	805	5	10	765	10	
Turn Type		custom	Prot			
Protected Phases	2 6	2	1	1 2 6		6
Permitted Phases					8	
Detector Phases	2 6	2	1	1 2 6	8	
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		12.0	12.0		33.0	25.0
Total Split (s)	56.0	14.0	14.0	70.0	33.0	42.0
Total Split (%)	54.4%	13.6%	13.6%	68.0%	32.0%	41%
Yellow Time (s)		4.0	4.0		4.0	4.0
All-Red Time (s)		3.0	3.0		3.0	2.0
Lead/Lag		Lag	Lead			
Lead-Lag Optimize?		Yes				
Recall Mode		C-Max	None		Ped	None
Act Effct Green (s)	59.0	17.0	9.0	73.0	20.0	
Actuated g/C Ratio	0.57	0.17	0.09	0.71	0.19	
v/c Ratio	0.85	0.02	0.07	0.65	0.11	
Control Delay	15.9	48.2	60.8	3.8	22.1	
Queue Delay	0.2	0.0	0.0	0.3	0.0	
Total Delay	16.0	48.2	60.8	4.1	22.1	
LOS	B	D	E	A	C	
Approach Delay	16.2			4.8	22.1	
Approach LOS	B			A	C	

Intersection Summary	
Cycle Length: 103	
Actuated Cycle Length: 103	
Offset: 64 (62%), Referenced to phase 2:EBWB, Start of Green	
Natural Cycle: 95	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 10.8	Intersection LOS: B
Intersection Capacity Utilization 70.4%	ICU Level of Service C
Analysis Period (min) 60	

Splits and Phases: 6: Queen's Quay & Red Path Westerly Signalized Driveway

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.82	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	0.89	
Frt	1.00	0.85	1.00	1.00	0.92	
Flt Protected	1.00	1.00	0.95	1.00	0.98	
Satd. Flow (prot)	1658	1409	1575	1658	1084	
Flt Permitted	1.00	1.00	0.95	1.00	0.98	
Satd. Flow (perm)	1658	1409	1575	1658	1084	
Volume (vph)	805	5	10	765	10	15
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	805	5	10	765	10	15
RTOR Reduction (vph)	0	1	0	0	12	0
Lane Group Flow (vph)	805	4	10	765	13	0
Confl. Peds. (#/hr)		100	100		100	100
Turn Type		custom	Prot			
Protected Phases	2 6	2	1	1 2 6		
Permitted Phases					8	
Actuated Green, G (s)	58.0	15.0	7.0	72.0	18.0	
Effective Green, g (s)	59.0	17.0	9.0	73.0	20.0	
Actuated g/C Ratio	0.57	0.17	0.09	0.71	0.19	
Clearance Time (s)		7.0	7.0		7.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)	950	233	138	1175	210	
v/s Ratio Prot	c0.49	0.00	0.01	c0.46		
v/s Ratio Perm					c0.01	
v/c Ratio	0.85	0.02	0.07	0.65	0.06	
Uniform Delay, d1	18.3	36.0	43.2	8.1	33.8	
Progression Factor	0.41	1.43	1.37	0.14	1.00	
Incremental Delay, d2	5.4	0.1	0.2	1.2	0.1	
Delay (s)	12.9	51.7	59.5	2.4	34.0	
Level of Service	B	D	E	A	C	
Approach Delay (s)	13.2			3.1	34.0	
Approach LOS	B			A	C	

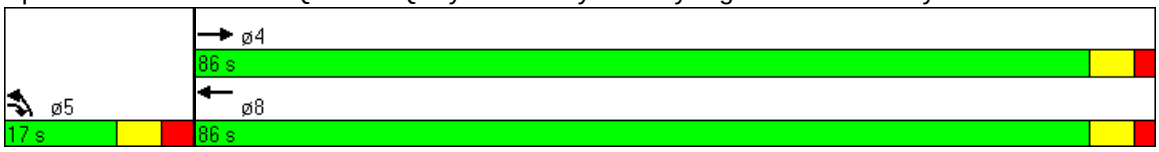
Intersection Summary			
HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBT	EBR	WBT	NBL
Lane Configurations				
Volume (vph)	865	5	760	5
Turn Type		custom		
Protected Phases	4	5	8	5
Permitted Phases		5		
Detector Phases	4	5	8	5
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	86.0	17.0	86.0	17.0
Total Split (s)	86.0	17.0	86.0	17.0
Total Split (%)	83.5%	16.5%	83.5%	16.5%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	3.0	2.0	3.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	C-Max	None	C-Max	None
Act Effct Green (s)	95.5	8.1	95.5	8.1
Actuated g/C Ratio	0.93	0.08	0.93	0.08
v/c Ratio	0.56	0.05	0.49	0.08
Control Delay	3.3	30.6	1.0	34.7
Queue Delay	0.0	0.0	0.1	0.0
Total Delay	3.3	30.6	1.1	34.7
LOS	A	C	A	C
Approach Delay	3.5		1.1	34.7
Approach LOS	A		A	C

Intersection Summary	
Cycle Length: 103	
Actuated Cycle Length: 103	
Offset: 36 (35%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Natural Cycle: 105	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.56	
Intersection Signal Delay: 2.6	Intersection LOS: A
Intersection Capacity Utilization 62.3%	ICU Level of Service B
Analysis Period (min) 60	

Splits and Phases: 7: Queen's Quay & Easterly Partialy Signalized Driveway



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.93	
Flt Protected	1.00	1.00		1.00	0.98	
Satd. Flow (prot)	1658	1409		1658	1508	
Flt Permitted	1.00	1.00		1.00	0.98	
Satd. Flow (perm)	1658	1409		1658	1508	
Volume (vph)	865	5	0	760	5	5
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	865	5	0	760	5	5
RTOR Reduction (vph)	0	0	0	0	5	0
Lane Group Flow (vph)	865	5	0	760	5	0
Turn Type		custom				
Protected Phases	4	5		8	5	
Permitted Phases		5				
Actuated Green, G (s)	87.3	2.7		87.3	2.7	
Effective Green, g (s)	88.3	4.7		88.3	4.7	
Actuated g/C Ratio	0.86	0.05		0.86	0.05	
Clearance Time (s)	6.0	7.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1421	64		1421	69	
v/s Ratio Prot	c0.52	c0.00		0.46	0.00	
v/s Ratio Perm						
v/c Ratio	0.61	0.08		0.53	0.08	
Uniform Delay, d1	2.2	47.1		1.9	47.1	
Progression Factor	1.09	0.69		0.09	1.00	
Incremental Delay, d2	1.2	0.3		1.1	0.5	
Delay (s)	3.6	32.8		1.2	47.5	
Level of Service	A	C		A	D	
Approach Delay (s)	3.7			1.2	47.5	
Approach LOS	A			A	D	

Intersection Summary			
HCM Average Control Delay	2.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	60		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	300	585	670	320	95	105
Turn Type	pm+pt			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Detector Phases	5	2	6	6	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	14.0	12.0	27.0	27.0	27.0	27.0
Total Split (s)	14.0	73.0	59.0	59.0	30.0	30.0
Total Split (%)	13.6%	70.9%	57.3%	57.3%	29.1%	29.1%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	3.0	3.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	C-Max	C-Max	C-Max	Ped	Ped
Act Effct Green (s)	71.0	71.0	54.0	54.0	22.0	22.0
Actuated g/C Ratio	0.69	0.69	0.52	0.52	0.21	0.21
v/c Ratio	0.79	0.51	0.77	0.53	0.28	0.35
Control Delay	33.9	19.5	14.9	4.7	36.6	10.4
Queue Delay	0.0	0.4	47.1	1.0	0.0	0.0
Total Delay	33.9	19.9	61.9	5.8	36.6	10.4
LOS	C	B	E	A	D	B
Approach Delay		24.6	43.8		22.8	
Approach LOS		C	D		C	

Intersection Summary

Cycle Length: 103
Actuated Cycle Length: 103
Offset: 28 (27%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 33.6 Intersection LOS: C
Intersection Capacity Utilization 86.8% ICU Level of Service E
Analysis Period (min) 60

Splits and Phases: 8: Queen's Quay & Lower Jarvis St

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.74	1.00	0.73
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1575	1658	1658	1042	1575	1025
Flt Permitted	0.21	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	345	1658	1658	1042	1575	1025
Volume (vph)	300	585	670	320	95	105
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	300	585	670	320	95	105
RTOR Reduction (vph)	0	0	0	60	0	83
Lane Group Flow (vph)	300	585	670	260	95	22
Confl. Peds. (#/hr)	100			100	100	100
Turn Type	pm+pt			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Actuated Green, G (s)	70.0	70.0	53.0	53.0	20.0	20.0
Effective Green, g (s)	71.0	71.0	54.0	54.0	22.0	22.0
Actuated g/C Ratio	0.69	0.69	0.52	0.52	0.21	0.21
Clearance Time (s)	3.0	6.0	6.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	381	1143	869	546	336	219
v/s Ratio Prot	c0.09	0.35	0.40		c0.06	
v/s Ratio Perm	c0.45			0.25		0.02
v/c Ratio	0.79	0.51	0.77	0.48	0.28	0.10
Uniform Delay, d1	13.5	7.7	19.6	15.5	33.9	32.6
Progression Factor	2.39	2.26	0.56	0.32	1.00	1.00
Incremental Delay, d2	9.6	1.4	3.4	1.4	0.5	0.2
Delay (s)	41.8	18.8	14.3	6.5	34.4	32.8
Level of Service	D	B	B	A	C	C
Approach Delay (s)		26.6	11.8		33.5	
Approach LOS		C	B		C	

Intersection Summary			
HCM Average Control Delay	20.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT	ø6
Lane Configurations								
Volume (vph)	650	30	850	75	0	105	15	
Turn Type		custom		Perm		Perm		
Protected Phases	2	5	5 6		8		4	6
Permitted Phases		5		8		4		
Detector Phases	2	5	5 6	8	8	4	4	
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	14.0	14.0		33.0	33.0	33.0	33.0	43.0
Total Split (s)	70.0	14.0	70.0	33.0	33.0	33.0	33.0	56.0
Total Split (%)	68.0%	13.6%	68.0%	32.0%	32.0%	32.0%	32.0%	54%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	3.0		3.0	3.0	3.0	3.0	2.0
Lead/Lag		Lead						Lag
Lead-Lag Optimize?		Yes						Yes
Recall Mode	C-Max	Max		Ped	Ped	Ped	Ped	C-Max
Act Effct Green (s)	65.0	9.0	65.0		27.0		28.0	
Actuated g/C Ratio	0.63	0.09	0.63		0.26		0.27	
v/c Ratio	0.62	0.24	0.91		0.48		0.67	
Control Delay	9.1	67.3	19.5		40.2		40.4	
Queue Delay	0.1	0.0	104.9		0.0		0.1	
Total Delay	9.2	67.3	124.5		40.2		40.5	
LOS	A	E	F		D		D	
Approach Delay	11.8		124.5		40.2		40.5	
Approach LOS	B		F		D		D	

Intersection Summary

Cycle Length: 103
Actuated Cycle Length: 103
Offset: 24 (23%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 71.0 Intersection LOS: E
Intersection Capacity Utilization 86.8% ICU Level of Service E
Analysis Period (min) 60

Splits and Phases: 9: Queen's Quay & Richardson

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0			6.0			5.0	
Lane Util. Factor		1.00	1.00		1.00			1.00			1.00	
Frpb, ped/bikes		1.00	1.00		0.99			0.93			0.91	
Flpb, ped/bikes		1.00	1.00		1.00			0.92			0.92	
Frt		1.00	0.85		0.99			0.95			0.94	
Flt Protected		1.00	1.00		1.00			0.97			0.98	
Satd. Flow (prot)		1658	1409		1623			1301			1277	
Flt Permitted		1.00	1.00		1.00			0.68			0.79	
Satd. Flow (perm)		1658	1409		1623			911			1037	
Volume (vph)	0	650	30	0	850	85	75	0	40	105	15	85
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	650	30	0	850	85	75	0	40	105	15	85
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	25	0
Lane Group Flow (vph)	0	650	30	0	932	0	0	115	0	0	180	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type			custom				Perm			Perm		
Protected Phases		2	5		5 6			8			4	
Permitted Phases			5				8			4		
Actuated Green, G (s)		64.0	7.0		64.0			26.0			26.0	
Effective Green, g (s)		65.0	9.0		65.0			27.0			28.0	
Actuated g/C Ratio		0.63	0.09		0.63			0.26			0.27	
Clearance Time (s)		6.0	7.0					7.0			7.0	
Vehicle Extension (s)		3.0	3.0					3.0			3.0	
Lane Grp Cap (vph)		1046	123		1024			239			282	
v/s Ratio Prot		0.39	0.02		c0.57							
v/s Ratio Perm								0.13			c0.17	
v/c Ratio		0.62	0.24		0.91			0.48			0.64	
Uniform Delay, d1		11.5	43.8		16.5			32.1			33.0	
Progression Factor		0.55	1.42		0.35			1.00			1.00	
Incremental Delay, d2		2.5	4.2		12.3			1.5			4.8	
Delay (s)		8.8	66.3		18.0			33.6			37.9	
Level of Service		A	E		B			C			D	
Approach Delay (s)		11.4			18.0			33.6			37.9	
Approach LOS		B			B			C			D	

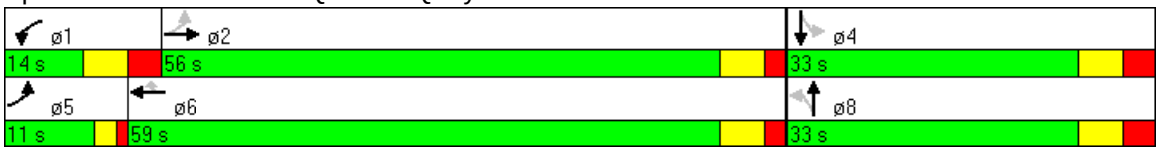
Intersection Summary			
HCM Average Control Delay	18.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	110	690	30	700	235	25	70	50	55
Turn Type	pm+pt		Prot		Perm	Perm		Perm	
Protected Phases	5	2	1	6			8		4
Permitted Phases	2				6	8		4	
Detector Phases	5	2	1	6	6	8	8	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	28.0	14.0	57.0	57.0	33.0	33.0	33.0	33.0
Total Split (s)	11.0	56.0	14.0	59.0	59.0	33.0	33.0	33.0	33.0
Total Split (%)	10.7%	54.4%	13.6%	57.3%	57.3%	32.0%	32.0%	32.0%	32.0%
Yellow Time (s)	2.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0	3.0	2.0	2.0	3.0	3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag				
Lead-Lag Optimize?	Yes			Yes	Yes				
Recall Mode	None	C-Max	Min	C-Max	C-Max	Ped	Ped	Ped	Ped
Act Effct Green (s)	56.7	51.4	8.6	54.8	54.8	27.0	27.0	28.0	28.0
Actuated g/C Ratio	0.55	0.50	0.08	0.53	0.53	0.26	0.26	0.27	0.27
v/c Ratio	0.42	0.83	0.23	0.79	0.31	0.15	0.29	0.19	0.56
Control Delay	9.8	19.9	45.0	23.1	4.9	32.2	32.9	31.4	16.0
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.8	20.0	45.0	23.1	4.9	32.2	32.9	31.4	16.0
LOS	A	B	D	C	A	C	C	C	B
Approach Delay		18.6		19.3			32.8		18.5
Approach LOS		B		B			C		B

Intersection Summary	
Cycle Length: 103	
Actuated Cycle Length: 103	
Offset: 9 (9%), Referenced to phase 2:EBTL and 6:WBT, Start of Green	
Natural Cycle: 105	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 19.8	Intersection LOS: B
Intersection Capacity Utilization 84.1%	ICU Level of Service E
Analysis Period (min) 60	

Splits and Phases: 10: Queen's Quay & Lower Sherbourne



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	6.0	6.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.89	1.00	0.92		1.00	0.83	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.88	1.00		0.83	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.95		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1575	1658		1575	1658	1251	1390	1445		1307	1215	
Flt Permitted	0.23	1.00		0.95	1.00	1.00	0.43	1.00		0.69	1.00	
Satd. Flow (perm)	375	1658		1575	1658	1251	627	1445		944	1215	
Volume (vph)	110	690	0	30	700	235	25	70	40	50	55	205
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	110	690	0	30	700	235	25	70	40	50	55	205
RTOR Reduction (vph)	0	0	0	0	0	88	0	0	0	0	130	0
Lane Group Flow (vph)	110	690	0	30	700	147	25	110	0	50	130	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	pm+pt			Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2					6	8			4		
Actuated Green, G (s)	57.6	50.4		6.6	53.8	53.8	26.0	26.0		26.0	26.0	
Effective Green, g (s)	56.6	51.4		8.6	54.8	54.8	27.0	27.0		28.0	28.0	
Actuated g/C Ratio	0.55	0.50		0.08	0.53	0.53	0.26	0.26		0.27	0.27	
Clearance Time (s)	3.0	6.0		7.0	6.0	6.0	7.0	7.0		7.0	7.0	
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)	267	827		132	882	666	164	379		257	330	
v/s Ratio Prot	c0.02	c0.42		0.02	c0.42			0.08			c0.11	
v/s Ratio Perm	0.21					0.12	0.04			0.05		
v/c Ratio	0.41	0.83		0.23	0.79	0.22	0.15	0.29		0.19	0.39	
Uniform Delay, d1	14.1	22.1		44.1	19.5	12.8	29.2	30.3		28.8	30.6	
Progression Factor	0.70	0.47		0.95	0.84	1.19	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	8.4		0.6	5.6	0.6	0.4	0.4		0.4	0.8	
Delay (s)	10.8	18.7		42.5	22.0	15.8	29.6	30.8		29.2	31.3	
Level of Service	B	B		D	C	B	C	C		C	C	
Approach Delay (s)		17.6			21.1			30.6			31.0	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM Average Control Delay	21.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR	ø3
Lane Configurations											
Volume (vph)	60	615	115	105	675	165	0	75	90	120	
Turn Type	Perm		custom	Prot		Perm		Perm		Perm	
Protected Phases		2 3	2	1	1 2 3		4		4		3
Permitted Phases	2 3		2			4		4		4	
Detector Phases	2 3	2 3	2	1	1 2 3	4	4	4	4	4	
Minimum Initial (s)			4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)			12.0	12.0		33.0	33.0	33.0	33.0	33.0	27.0
Total Split (s)	50.0	50.0	15.0	15.0	65.0	38.0	38.0	38.0	38.0	38.0	35.0
Total Split (%)	48.5%	48.5%	14.6%	14.6%	63.1%	36.9%	36.9%	36.9%	36.9%	36.9%	34%
Yellow Time (s)			4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)			3.0	3.0		3.0	3.0	3.0	3.0	3.0	2.0
Lead/Lag			Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lead
Lead-Lag Optimize?			Yes			Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode			None	None		Max	Max	Max	Max	Max	C-Max
Act Effct Green (s)	45.0	45.0	10.0	10.0	60.0	32.0	32.0	33.0	33.0	33.0	
Actuated g/C Ratio	0.44	0.44	0.10	0.10	0.58	0.31	0.31	0.32	0.32	0.32	
v/c Ratio	0.31	0.85	0.84	0.69	0.82	0.56	0.23	0.24	0.17	0.28	
Control Delay	13.1	21.3	98.4	61.0	23.0	38.3	28.7	28.5	26.3	6.6	
Queue Delay	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	
Total Delay	13.1	21.3	98.4	61.0	23.5	38.3	28.7	28.5	26.3	6.6	
LOS	B	C	F	E	C	D	C	C	C	A	
Approach Delay		31.9			28.0		35.2		18.6		
Approach LOS		C			C		D		B		

Intersection Summary	
Cycle Length: 103	
Actuated Cycle Length: 103	
Offset: 39 (38%), Referenced to phase 3:EBWB, Start of Green	
Natural Cycle: 85	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 29.0	Intersection LOS: C
Intersection Capacity Utilization 91.8%	ICU Level of Service F
Analysis Period (min) 60	

Splits and Phases: 11: Queen's Quay & Street D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		6.0	6.0		5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99		1.00	0.79		1.00	1.00	0.79
Flpb, ped/bikes	0.97	1.00	1.00	1.00	1.00		0.83	1.00		0.82	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.85		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1521	1658	1409	1575	1606		1300	1107		1296	1658	1107
Flt Permitted	0.27	1.00	1.00	0.95	1.00		0.70	1.00		0.70	1.00	1.00
Satd. Flow (perm)	437	1658	1409	1575	1606		956	1107		962	1658	1107
Volume (vph)	60	615	115	105	675	95	165	0	80	75	90	120
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	60	615	115	105	675	95	165	0	80	75	90	120
RTOR Reduction (vph)	0	0	0	0	5	0	0	0	0	0	0	82
Lane Group Flow (vph)	60	615	115	105	765	0	165	80	0	75	90	38
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		custom	Prot			Perm			Perm		Perm
Protected Phases		2 3	2	1	1 2 3			4			4	
Permitted Phases	2 3		2				4			4		4
Actuated Green, G (s)	44.0	44.0	8.0	8.0	59.0		31.0	31.0		31.0	31.0	31.0
Effective Green, g (s)	45.0	45.0	10.0	10.0	60.0		32.0	32.0		33.0	33.0	33.0
Actuated g/C Ratio	0.44	0.44	0.10	0.10	0.58		0.31	0.31		0.32	0.32	0.32
Clearance Time (s)			7.0	7.0			7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)			3.0	3.0			3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	191	724	137	153	936		297	344		308	531	355
v/s Ratio Prot		c0.37	0.08	0.07	c0.48			0.07			0.05	
v/s Ratio Perm	0.14						c0.17			0.08		0.03
v/c Ratio	0.31	0.85	0.84	0.69	0.82		0.56	0.23		0.24	0.17	0.11
Uniform Delay, d1	18.9	26.0	45.7	45.0	17.1		29.6	26.4		25.8	25.2	24.6
Progression Factor	0.50	0.43	1.30	0.89	0.91		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.6	6.5	29.1	10.1	4.6		7.5	1.6		1.9	0.7	0.6
Delay (s)	10.1	17.8	88.5	50.2	20.2		37.1	28.0		27.7	25.8	25.3
Level of Service	B	B	F	D	C		D	C		C	C	C
Approach Delay (s)		27.5			23.8			34.1			26.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	26.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	91.8%	ICU Level of Service	F
Analysis Period (min)	60		

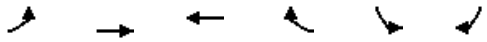
c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	335	420	480	90	30	370
Turn Type	pm+pt			Perm		pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2			6		4
Detector Phases	5	2	6	6	4	5
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	15.0	12.0	28.0	28.0	27.0	15.0
Total Split (s)	24.0	73.0	49.0	49.0	30.0	24.0
Total Split (%)	23.3%	70.9%	47.6%	47.6%	29.1%	23.3%
Yellow Time (s)	3.0	3.0	4.0	4.0	4.0	3.0
All-Red Time (s)	0.0	2.0	2.0	2.0	3.0	0.0
Lead/Lag	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes	Yes		Yes
Recall Mode	Max	C-Max	C-Max	C-Max	Ped	Max
Act Effct Green (s)	71.0	71.0	44.0	44.0	22.0	44.0
Actuated g/C Ratio	0.69	0.69	0.43	0.43	0.21	0.43
v/c Ratio	0.62	0.37	0.68	0.19	0.09	0.62
Control Delay	8.7	5.4	29.8	10.5	33.4	18.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	8.7	5.4	29.8	10.5	33.4	19.0
LOS	A	A	C	B	C	B
Approach Delay		6.8	26.8		20.1	
Approach LOS		A	C		C	

Intersection Summary

Cycle Length: 103
Actuated Cycle Length: 103
Offset: 83 (81%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 16.5 Intersection LOS: B
Intersection Capacity Utilization 77.9% ICU Level of Service D
Analysis Period (min) 60

Splits and Phases: 12: Queen's Quay & Parliament Street



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.75	1.00	0.86
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1552	1658	1658	1058	1575	1217
Flt Permitted	0.27	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	449	1658	1658	1058	1575	1217
Volume (vph)	335	420	480	90	30	370
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	335	420	480	90	30	370
RTOR Reduction (vph)	0	0	0	28	0	75
Lane Group Flow (vph)	335	420	480	62	30	295
Confl. Peds. (#/hr)	100			100	100	100
Turn Type	pm+pt			Perm		pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2			6		4
Actuated Green, G (s)	71.0	71.0	43.0	43.0	20.0	44.0
Effective Green, g (s)	71.0	71.0	44.0	44.0	22.0	44.0
Actuated g/C Ratio	0.69	0.69	0.43	0.43	0.21	0.43
Clearance Time (s)	3.0	5.0	6.0	6.0	7.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	545	1143	708	452	336	579
v/s Ratio Prot	c0.13	0.25	c0.29		0.02	c0.11
v/s Ratio Perm	0.29			0.06		0.13
v/c Ratio	0.61	0.37	0.68	0.14	0.09	0.51
Uniform Delay, d1	10.2	6.7	23.8	17.9	32.5	21.6
Progression Factor	0.67	0.69	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.6	0.6	5.3	0.6	0.1	0.7
Delay (s)	10.5	5.2	29.1	18.6	32.6	22.3
Level of Service	B	A	C	B	C	C
Approach Delay (s)		7.6	27.4		23.1	
Approach LOS		A	C		C	

Intersection Summary			
HCM Average Control Delay	17.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	WBR2	NBL2	NBT	SBL	SBT	NER
Lane Configurations										
Volume (vph)	720	810	805	615	100	255	220	320	175	1020
Turn Type	Split			Prot	Perm	Split		Split		custom
Protected Phases	1	1	2	2		4	4	3	3	2
Permitted Phases					2					
Detector Phases	1	1	2	2	2	4	4	3	3	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	35.0	35.0	51.0	51.0	51.0	25.0	25.0	29.0	29.0	51.0
Total Split (%)	25.0%	25.0%	36.4%	36.4%	36.4%	17.9%	17.9%	20.7%	20.7%	36.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize?										
Recall Mode	Max	Max	C-Max	C-Max	C-Max	Min	Min	Max	Max	C-Max
Act Effct Green (s)	30.0	30.0	46.0	46.0	46.0	20.0	20.0	24.0	24.0	46.0
Actuated g/C Ratio	0.21	0.21	0.33	0.33	0.33	0.14	0.14	0.17	0.17	0.33
v/c Ratio	0.89	0.98	0.65	0.99	0.18	0.97	0.94	1.01	0.94	0.99
Control Delay	70.5	104.0	43.1	113.2	13.2	144.4	93.3	170.6	115.5	91.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.5	104.0	43.1	113.2	13.2	144.4	93.3	170.6	115.5	91.6
LOS	E	F	D	F	B	F	F	F	F	F
Approach Delay		88.3	69.5				110.4		144.7	
Approach LOS		F	E				F		F	

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 59 (42%), Referenced to phase 2:WBT, Start of Green	
Natural Cycle: 140	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 93.0	Intersection LOS: F
Intersection Capacity Utilization 112.2%	ICU Level of Service H
Analysis Period (min) 60	

Splits and Phases: 3: Lake Shore Blvd E & Lower Jarvis St

Movement	EBL	EBT	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.7	3.7	3.7	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Util. Factor	*1.00	*1.00	*1.00	1.00	1.00	*1.00		*1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.98	1.00		0.98		1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00	1.00	1.00	0.85	1.00		1.00		1.00	1.00	
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Satd. Flow (prot)	3767	3842	3767	1883	1562	1842		3608		1842	1771	
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Satd. Flow (perm)	3767	3842	3767	1883	1562	1842		3608		1842	1771	
Volume (vph)	720	810	805	615	100	255	165	220	120	320	175	110
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	720	810	805	615	100	255	165	220	120	320	175	110
RTOR Reduction (vph)	0	0	0	0	46	0	0	23	0	0	0	0
Lane Group Flow (vph)	720	810	805	615	54	255	0	482	0	320	285	0
Confl. Peds. (#/hr)					5				30	30		30
Heavy Vehicles (%)	2%	0%	2%	2%	2%	2%	0%	2%	5%	2%	3%	2%
Turn Type	Split			Prot	Perm	Split	Split			Split		
Protected Phases	1	1	2	2		4	4	4		3	3	
Permitted Phases					2							
Actuated Green, G (s)	27.0	27.0	43.0	43.0	43.0	17.0		17.0		21.0	21.0	
Effective Green, g (s)	30.0	30.0	46.0	46.0	46.0	20.0		20.0		24.0	24.0	
Actuated g/C Ratio	0.21	0.21	0.33	0.33	0.33	0.14		0.14		0.17	0.17	
Clearance Time (s)	8.0	8.0	8.0	8.0	8.0	8.0		8.0		8.0	8.0	
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)	807	823	1238	619	513	263		515		316	304	
v/s Ratio Prot	0.19	c0.21	0.21	c0.33		c0.14		0.13		c0.17	0.16	
v/s Ratio Perm					0.03							
v/c Ratio	0.89	0.98	0.65	0.99	0.10	0.97		0.94		1.01	0.94	
Uniform Delay, d1	53.4	54.8	40.1	46.9	32.7	59.7		59.4		58.0	57.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	17.0	49.6	2.7	66.5	0.4	81.8		34.7		113.9	58.4	
Delay (s)	70.4	104.4	42.8	113.4	33.1	141.5		94.1		171.9	115.7	
Level of Service	E	F	D	F	C	F		F		F	F	
Approach Delay (s)		88.4	70.7					110.0			145.4	
Approach LOS		F	E					F			F	

Intersection Summary			
HCM Average Control Delay	93.5	HCM Level of Service	F
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	112.2%	ICU Level of Service	H
Analysis Period (min)	60		

c Critical Lane Group

Movement	NER	NER2
Lane Configurations		
Ideal Flow (vphpl)	1900	1900
Lane Width	3.5	3.5
Total Lost time (s)	5.0	
Lane Util. Factor	*1.00	
Frpb, ped/bikes	1.00	
Flpb, ped/bikes	1.00	
Frt	0.95	
Flt Protected	1.00	
Satd. Flow (prot)	3508	
Flt Permitted	1.00	
Satd. Flow (perm)	3508	
Volume (vph)	1020	130
Peak-hour factor, PHF	1.00	1.00
Adj. Flow (vph)	1020	130
RTOR Reduction (vph)	7	0
Lane Group Flow (vph)	1143	0
Confl. Peds. (#/hr)		
Heavy Vehicles (%)	2%	0%
Turn Type	custom	
Protected Phases	2	
Permitted Phases		
Actuated Green, G (s)	43.0	
Effective Green, g (s)	46.0	
Actuated g/C Ratio	0.33	
Clearance Time (s)	8.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	1153	
v/s Ratio Prot	0.33	
v/s Ratio Perm		
v/c Ratio	0.99	
Uniform Delay, d1	46.8	
Progression Factor	1.00	
Incremental Delay, d2	45.3	
Delay (s)	92.1	
Level of Service	F	
Approach Delay (s)		
Approach LOS		

Intersection Summary

Intersection: 1: Queen's Quay & Freeland Street

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	L	TR	L	TR	L	TR
Maximum Queue (m)	38.4	119.8	35.4	87.5	78.9	8.4	56.7	35.2
Average Queue (m)	28.0	50.8	6.3	74.8	35.7	2.9	26.3	15.6
95th Queue (m)	42.5	96.9	19.8	101.9	65.3	8.8	47.2	29.6
Link Distance (m)		137.2		81.3	77.0	77.0	207.7	207.7
Upstream Blk Time (%)		0		7	1			
Queuing Penalty (veh)		0		53	0			
Storage Bay Dist (m)	30.0		30.0					
Storage Blk Time (%)	11	12	0	23				
Queuing Penalty (veh)	48	21	0	3				

Intersection: 2: Queen's Quay & Red Path Westerly Signalized Driveway

Movement	EB	EB	WB	WB	NB
Directions Served	T	R	L	T	LR
Maximum Queue (m)	83.1	19.1	23.8	44.7	10.5
Average Queue (m)	38.7	2.9	2.0	34.8	2.1
95th Queue (m)	67.7	11.4	11.8	42.5	7.3
Link Distance (m)	81.3			33.7	58.1
Upstream Blk Time (%)	1		0	20	
Queuing Penalty (veh)	3		0	147	
Storage Bay Dist (m)		25.0	35.0		
Storage Blk Time (%)	13		0	20	
Queuing Penalty (veh)	1		0	1	

Intersection: 3: Queen's Quay & Red Path Partially Signalized Driveway

Movement	EB	EB	WB	NB
Directions Served	T	R	T	LR
Maximum Queue (m)	48.5	11.4	52.5	10.5
Average Queue (m)	12.9	2.7	20.2	1.7
95th Queue (m)	44.2	9.7	55.2	7.5
Link Distance (m)	44.3		47.2	51.6
Upstream Blk Time (%)	1		2	
Queuing Penalty (veh)	6		14	
Storage Bay Dist (m)		45.0		
Storage Blk Time (%)	1			
Queuing Penalty (veh)	0			

Intersection: 4: Queen's Quay & Lower Jarvis St

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	57.6	72.6	92.4	29.8	17.1	28.4
Average Queue (m)	31.5	51.8	70.1	16.6	5.1	9.3
95th Queue (m)	56.0	78.4	110.0	32.5	12.9	18.8
Link Distance (m)		66.7	82.6		172.5	172.5
Upstream Blk Time (%)		3	7			
Queuing Penalty (veh)		17	66			
Storage Bay Dist (m)	50.0			20.0		
Storage Blk Time (%)	1	7	36	1		
Queuing Penalty (veh)	2	12	111	6		

Intersection: 6: Queen's Quay & Richardson

Movement	EB	EB	WB	NB	SB
Directions Served	T	R	TR	LR	LTR
Maximum Queue (m)	38.6	33.8	88.3	13.6	72.6
Average Queue (m)	15.7	14.0	71.7	4.8	35.1
95th Queue (m)	32.5	27.4	107.5	12.9	63.5
Link Distance (m)	82.6		81.6	80.2	160.9
Upstream Blk Time (%)			13		
Queuing Penalty (veh)			119		
Storage Bay Dist (m)		35.0			
Storage Blk Time (%)	1	0			
Queuing Penalty (veh)	0	1			

Intersection: 7: Queen's Quay & Lower Sherbourne

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	L	T	R	L	TR	L	TR
Maximum Queue (m)	46.3	64.2	57.6	96.5	59.8	18.8	22.9	24.2	49.8
Average Queue (m)	17.9	27.1	21.2	90.7	26.5	5.2	5.5	9.6	27.3
95th Queue (m)	34.7	52.6	49.4	102.5	64.7	13.9	15.1	21.0	46.7
Link Distance (m)		82.9		87.7		130.5	130.5	213.5	213.5
Upstream Blk Time (%)				27					
Queuing Penalty (veh)				276					
Storage Bay Dist (m)	50.0		50.0		50.0				
Storage Blk Time (%)	0	1	0	37	0				
Queuing Penalty (veh)	0	1	0	88	0				

Intersection: 8: Queen's Quay & Street D

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	TR	L	T	R
Maximum Queue (m)	20.0	77.3	28.2	42.7	103.1	81.0	20.5	21.6	53.3	27.8
Average Queue (m)	4.7	33.3	12.6	13.8	90.7	33.8	6.1	8.1	6.8	17.5
95th Queue (m)	16.8	59.0	24.7	34.3	122.3	63.2	15.4	18.2	28.9	28.9
Link Distance (m)		89.9			94.4	145.5	145.5	84.1	84.1	
Upstream Blk Time (%)		0			33					
Queuing Penalty (veh)		0			262					
Storage Bay Dist (m)	25.0		55.0	35.0						20.0
Storage Blk Time (%)		24		0	47				0	12
Queuing Penalty (veh)		21		3	21				0	2

Intersection: 9: Queen's Quay & Parliament Street

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	63.9	57.8	100.2	34.2	12.3	62.3
Average Queue (m)	27.4	25.0	85.9	9.9	3.6	29.6
95th Queue (m)	50.7	46.2	113.2	31.7	10.5	53.5
Link Distance (m)		101.3	89.8		156.2	156.2
Upstream Blk Time (%)			44			
Queuing Penalty (veh)			0			
Storage Bay Dist (m)	60.0			25.0		
Storage Blk Time (%)	1	0	59	0		
Queuing Penalty (veh)	2	0	32	0		

Intersection: 20: Queen's Quay & Existing Cooper Street

Movement	EB	WB	SB
Directions Served	T	TR	LR
Maximum Queue (m)	35.5	48.9	50.1
Average Queue (m)	4.9	23.0	20.8
95th Queue (m)	23.5	51.7	44.4
Link Distance (m)	33.7	44.3	192.5
Upstream Blk Time (%)	1	4	
Queuing Penalty (veh)	4	31	
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 1: Queen's Quay & Existing Cooper Street

Movement	EB	WB	SB
Directions Served	T	TR	LR
Maximum Queue (m)	24.0	24.5	74.8
Average Queue (m)	4.1	1.9	22.2
95th Queue (m)	22.4	11.7	55.5
Link Distance (m)	32.7	43.6	192.2
Upstream Blk Time (%)	2		
Queuing Penalty (veh)	12		
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Queen's Quay & Lowlaws Driveway

Movement	EB	EB	WB	SB	SB
Directions Served	L	T	TR	L	R
Maximum Queue (m)	31.5	53.0	10.8	50.2	31.5
Average Queue (m)	8.1	28.7	0.7	25.4	8.6
95th Queue (m)	23.7	62.1	4.9	51.7	20.3
Link Distance (m)		47.3	66.7	45.6	45.6
Upstream Blk Time (%)		6		22	0
Queuing Penalty (veh)		56		0	0
Storage Bay Dist (m)	25.0				
Storage Blk Time (%)	0	11			
Queuing Penalty (veh)	0	5			

Intersection: 5: Queen's Quay & Freeland Street

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	L	TR	L	TR	L	TR
Maximum Queue (m)	37.7	130.1	37.6	80.8	28.8	14.1	48.6	64.8
Average Queue (m)	19.2	106.2	12.1	39.7	8.6	2.6	23.4	32.0
95th Queue (m)	37.8	159.0	26.4	73.2	20.3	9.5	42.5	56.0
Link Distance (m)		123.6		77.9	77.0	77.0	207.6	207.6
Upstream Blk Time (%)		17		0				
Queuing Penalty (veh)		0		3				
Storage Bay Dist (m)	30.0		30.0					
Storage Blk Time (%)	1	37	0	15				
Queuing Penalty (veh)	8	46	2	7				

Intersection: 6: Queen's Quay & Red Path Westerly Signalized Driveway

Movement	EB	EB	WB	WB	NB
Directions Served	T	R	L	T	LR
Maximum Queue (m)	83.2	16.6	22.6	35.0	16.5
Average Queue (m)	47.1	1.4	3.7	17.6	4.7
95th Queue (m)	83.0	9.6	14.0	35.6	12.2
Link Distance (m)	77.9			32.7	57.9
Upstream Blk Time (%)	3		0	2	
Queuing Penalty (veh)	21		0	16	
Storage Bay Dist (m)		25.0	35.0		
Storage Blk Time (%)	22	0	0	2	
Queuing Penalty (veh)	1	0	0	0	

Intersection: 7: Queen's Quay & Easterly Partialy Signalized Driveway

Movement	EB	EB	WB	NB
Directions Served	T	R	T	LR
Maximum Queue (m)	52.9	28.5	13.3	10.9
Average Queue (m)	21.7	1.9	1.6	2.0
95th Queue (m)	55.3	12.5	8.0	7.4
Link Distance (m)	43.6		47.3	55.6
Upstream Blk Time (%)	4	0		
Queuing Penalty (veh)	38	0		
Storage Bay Dist (m)		40.0		
Storage Blk Time (%)	6	0		
Queuing Penalty (veh)	0	0		

Intersection: 8: Queen's Quay & Lower Jarvis St

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	59.9	90.1	95.5	31.6	38.0	24.3
Average Queue (m)	50.5	67.1	81.0	18.2	15.2	9.3
95th Queue (m)	68.2	94.4	109.7	33.4	32.4	18.8
Link Distance (m)		66.7	82.6		172.5	172.5
Upstream Blk Time (%)	0	12	11			
Queuing Penalty (veh)	0	104	109			
Storage Bay Dist (m)	50.0			20.0		
Storage Blk Time (%)	19	8	31	1		
Queuing Penalty (veh)	110	23	100	7		

Intersection: 9: Queen's Quay & Richardson

Movement	EB	EB	WB	NB	SB
Directions Served	T	R	TR	LR	LTR
Maximum Queue (m)	80.7	33.8	109.8	50.1	96.5
Average Queue (m)	34.9	9.6	104.1	24.2	41.6
95th Queue (m)	70.9	23.5	123.9	44.5	76.0
Link Distance (m)	82.6		86.0	80.2	160.9
Upstream Blk Time (%)	1		42		
Queuing Penalty (veh)	10		374		
Storage Bay Dist (m)		35.0			
Storage Blk Time (%)	7	0			
Queuing Penalty (veh)	2	0			

Intersection: 10: Queen's Quay & Lower Sherbourne

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	L	T	R	L	TR	L	TR
Maximum Queue (m)	59.3	100.4	57.7	98.0	59.8	22.5	55.0	66.5	122.1
Average Queue (m)	21.4	74.6	12.2	90.3	32.7	7.2	21.3	13.5	57.2
95th Queue (m)	49.4	115.9	37.5	105.4	69.4	18.4	42.1	46.1	112.0
Link Distance (m)		78.6		87.7		130.5	130.5	213.6	213.6
Upstream Blk Time (%)		18		32					
Queuing Penalty (veh)		141		314					
Storage Bay Dist (m)	50.0		50.0		50.0				
Storage Blk Time (%)	0	26	0	42	0				
Queuing Penalty (veh)	0	29	0	110	0				

Intersection: 11: Queen's Quay & Street D

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	TR	L	T	R
Maximum Queue (m)	32.6	96.4	67.8	42.7	104.1	72.3	32.7	31.4	50.8	29.7
Average Queue (m)	15.0	65.7	35.9	27.8	98.6	38.0	10.9	13.9	16.6	18.6
95th Queue (m)	31.4	109.5	66.9	50.7	112.7	68.7	23.4	25.4	36.6	31.5
Link Distance (m)		89.9			94.4	149.2	149.2	84.1	84.1	
Upstream Blk Time (%)		4			43					
Queuing Penalty (veh)		36			375					
Storage Bay Dist (m)	25.0		60.0	35.0						20.0
Storage Blk Time (%)	1	41	3	4	51				7	14
Queuing Penalty (veh)	9	71	20	34	53				8	12

Appendix C
Transit in Middle of Queens Quay

Traffic Figures

1. East Bayfront Traffic(Centre Transit Configurations)
2. MT 27 Condominium Traffic (Centre Transit Configurations)
3. Signal Timing Plans

Synchro/Simtraffic Worksheets

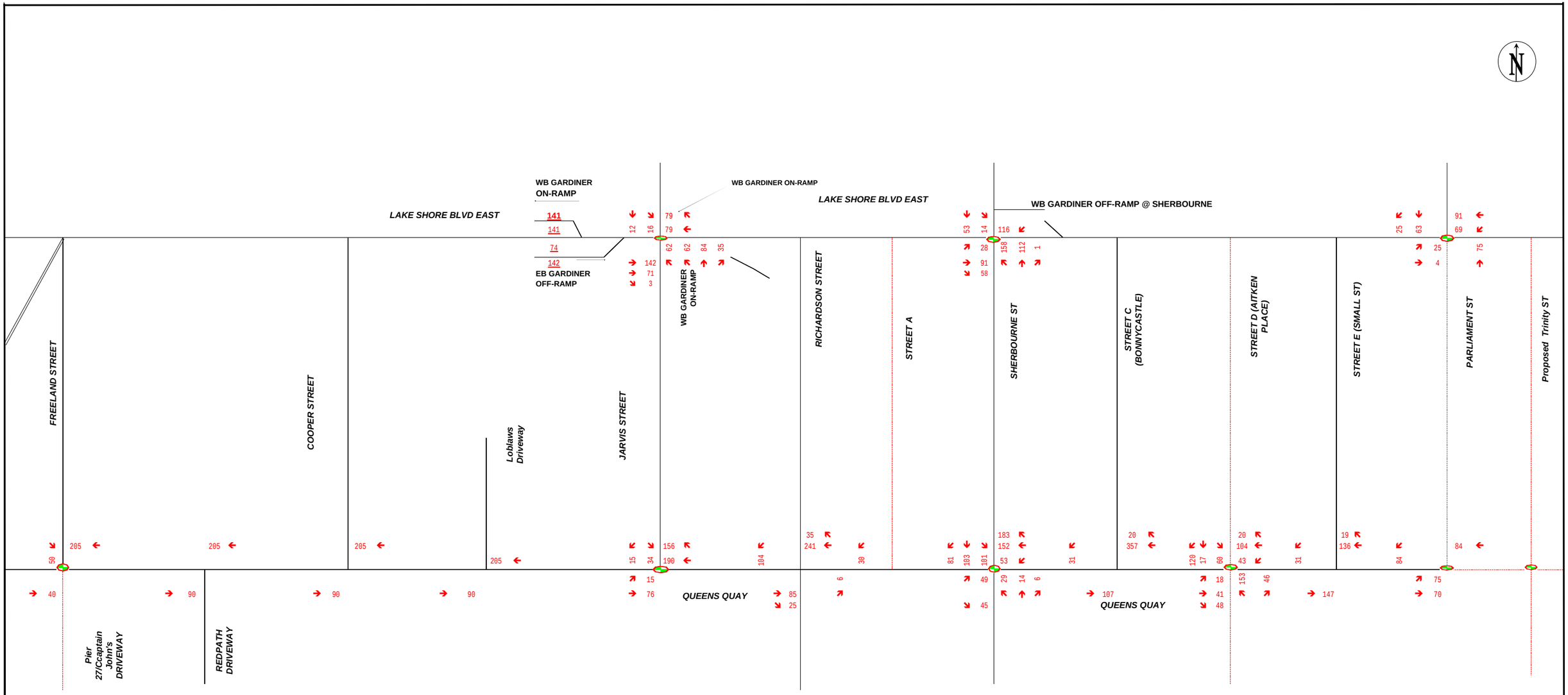


FIGURE C1(i) : TOTAL EBF TRAFFIC

TIME PERIOD : Weekday AM

Signalized Intersection

Proposed Road

EAST BAYFRONT TRANSIT CLASS EA, TRAFFIC ASSESSMENT

PROJECT NO: 7085-01

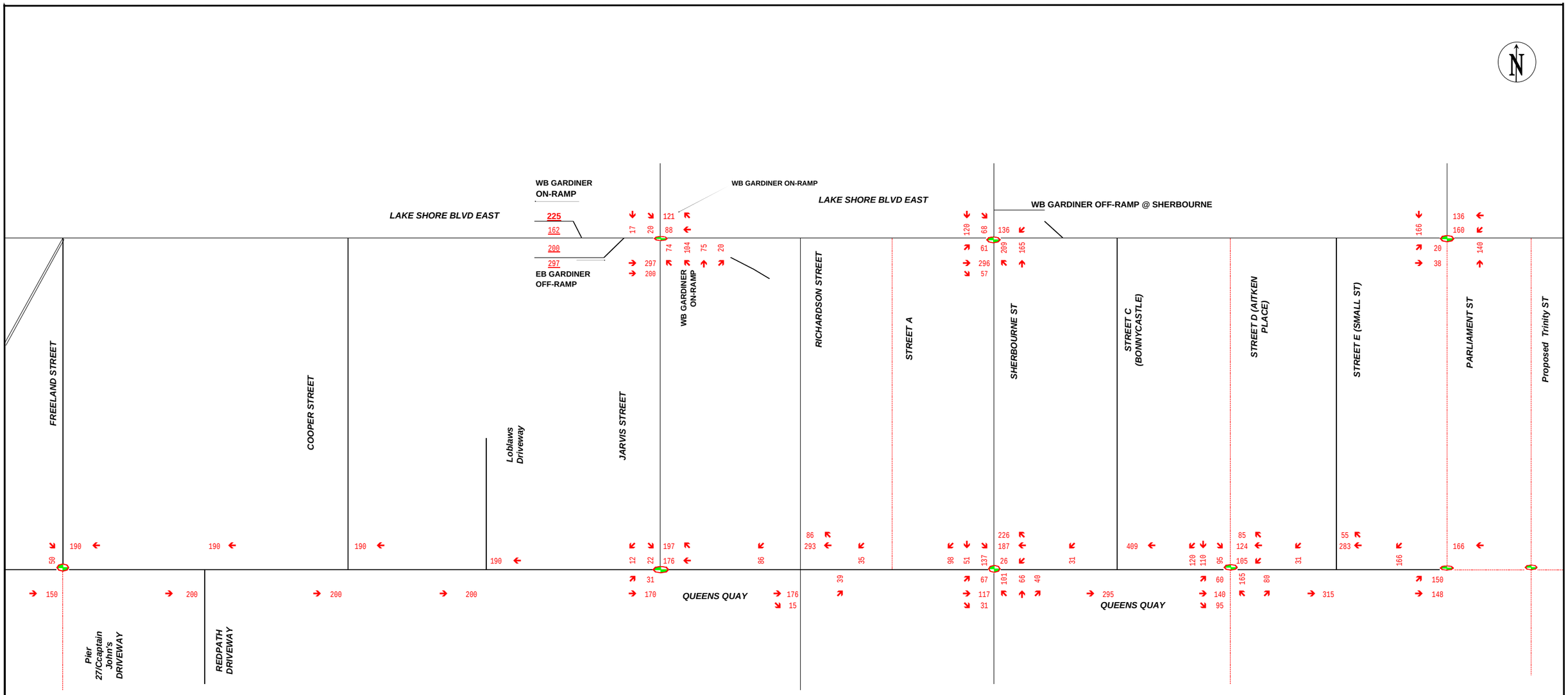


FIGURE C1(ii) : TOTAL EBF TRAFFIC

TIME PERIOD : Weekday PM

Signalized Intersection

Proposed Road

EAST BAYFRONT TRANSIT CLASS EA, TRAFFIC ASSESSMENT

PROJECT NO: 7085-01

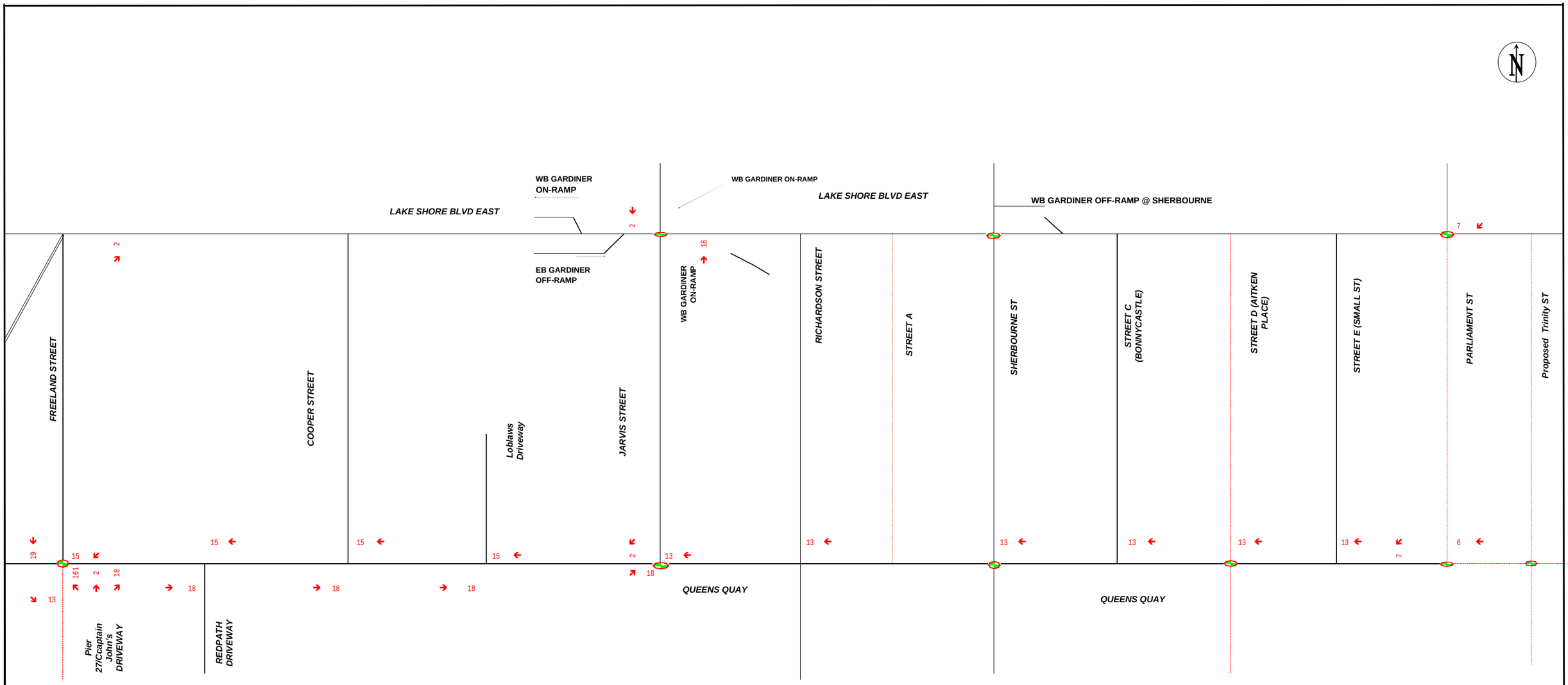


FIGURE C2(i) : MT-27 Condominium Traffic

TIME PERIOD : Weekday AM

Signalized Intersection

Proposed Road

EAST BAYFRONT TRANSIT CLASS EA, TRAFFIC ASSESSMENT

PROJECT NO: 7085-01

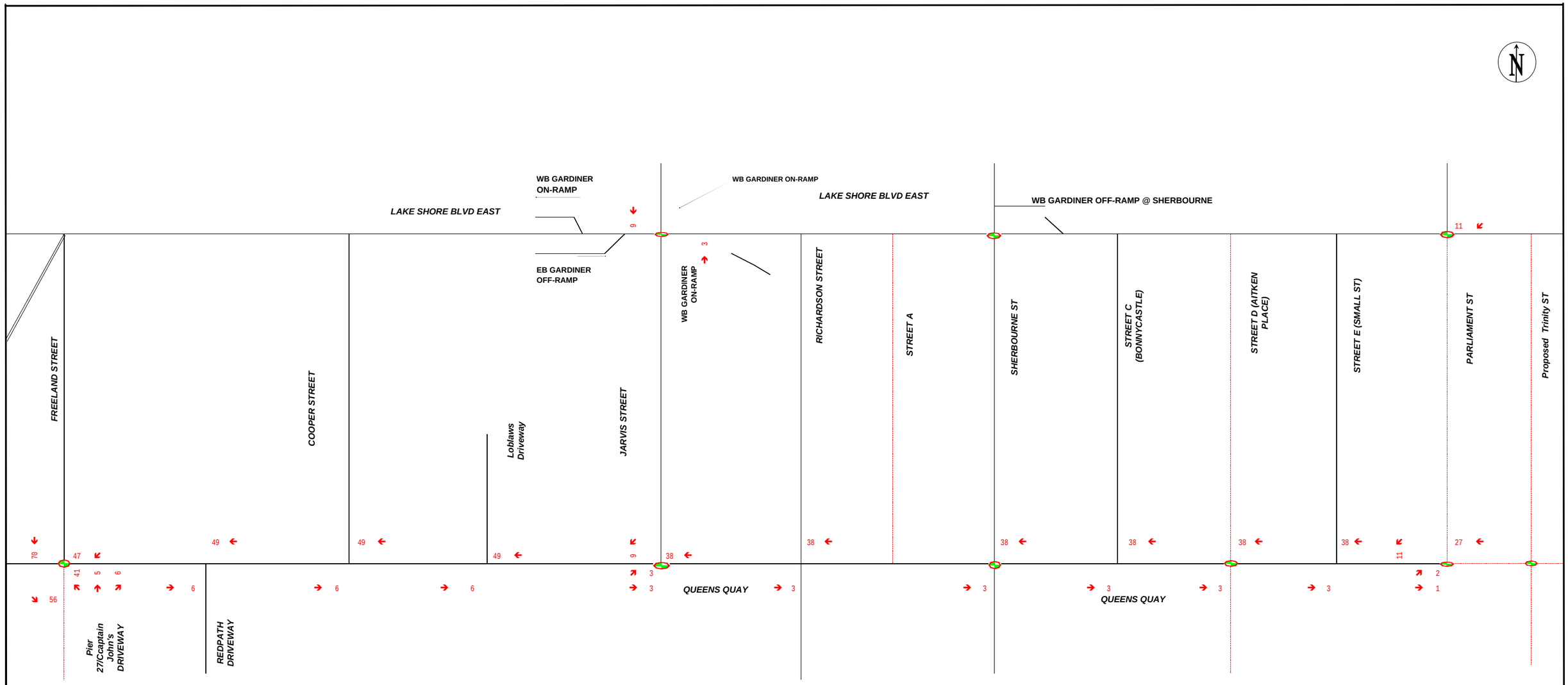


FIGURE C2(ii) : MT-27 Condominium Traffic

TIME PERIOD : Weekday PM

Signalized Intersection

Proposed Road

EAST BAYFRONT TRANSIT CLASS EA, TRAFFIC ASSESSMENT

PROJECT NO: 7085-01

East Bayfront Transit EA

Appendix C Table 1:

Queens Quay Streetcar Centre Transit Option Typical Signal timings/ Phasing Summary - AM Peak Hour

DRAFT

Project Number: 7085-01

Sr. No.	Intersection	Lane Configuraions/turn restrictions	Assumptions/comments	N/S Ped Crossing Distance (m)	N/S Ped Phase	E/W Ped Crossing Distance (m)	E/W Ped Phase	Cycle Length	Phasing/Timings
1	Queens Quay/Parliament		- Single Stage Crossing -E-W Transit Phase timings are shown in bracket	Crossing distance 27 Excluding MGT Total 27	Walk 7 FDW 22 23m / 1.2m/s = 19s Total Green 29 Amber 4 All Red 3 Min. Split 36	Pavement width& curb 18 Total 18	Walk 7 FDW 15 18m / 1.2m/s = 15s Total Green 22 Amber 4 All Red 2 Min. Split 28	103	 Green 29 Amber 4 All Red 3 Total Split 36 Green 17 Amber 4 All Red 3 Total Split 24 Green 37 (36) Amber 4 (4) All Red 2 (3) Total Split 43
2	Queens Quay/Sherbourne Street		- Single Stage Crossing -E-W Transit Phase timings are shown in bracket	Crossing distance 27 Excluding MGT Total 27	Walk 7 FDW 22 27m / 1.2m/s = 22s Total Green 29 Amber 4 All Red 3 Min. Split 36	Pavement width& curb 17 Total 17	Walk 7 FDW 14 17m / 1.2m/s = 14s Total Green 21 Amber 4 All Red 2 Min. Split 27	103	 Green 29 Amber 4 All Red 3 Total Split 36 Green 7 Amber 4 All Red 3 Total Split 14 Green 47 (46) Amber 4 (4) All Red 2 (3) Total Split 53
3	Queens Quay/Jarvis Street		- Single Stage Crossing -E-W Transit Phase timings are shown in bracket	Crossing distance 27 Excluding MGT Total 27	Walk 7 FDW 22 27m / 1.2m/s = 22s Total Green 29 Amber 4 All Red 3 Min. Split 36	Pavement width& curb 17 Total 17	Walk 7 FDW 14 17m / 1.2m/s = 14s Total Green 21 Amber 4 All Red 2 Min. Split 27	103	 Green 29 Amber 4 All Red 3 Total Split 36 Green 10 Amber 4 All Red 3 Total Split 17 Green 44 (43) Amber 4 (4) All Red 2 (3) Total Split 50
4	Queens Quay/Freeland Street		- Single Stage Crossing -E-W Transit Phase timings are shown in bracket	Crossing distance 26 Excluding MGT Total 26	Walk 7 FDW 22 26m / 1.2m/s = 22s Total Green 29 Amber 4 All Red 3 Min. Split 36	Pavement width& curb 17 Total 17	Walk 7 FDW 14 17m / 1.2m/s = 14s Total Green 21 Amber 4 All Red 2 Min. Split 27	103	 Green 29 Amber 4 All Red 3 Total Split 36 Green 7 Amber 4 All Red 3 Total Split 14 Green 47 (46) Amber 4 (4) All Red 2 (3) Total Split 53
5	Queens Quay/Street 'D'		- Single Stage Crossing -E-W Transit Phase timings are shown in bracket	Crossing distance 26 Excluding MGT Total 26	Walk 7 FDW 22 23m / 1.2m/s = 19s Total Green 29 Amber 4 All Red 3 Min. Split 36	Pavement width& curb 17 Total 17	Walk 7 FDW 14 17m / 1.2m/s = 14s Total Green 21 Amber 4 All Red 2 Min. Split 27	103	 Green 29 Amber 4 All Red 3 Total Split 36 Green 7 Amber 4 All Red 3 Total Split 14 Green 47 (46) Amber 4 (4) All Red 2 (3) Total Split 53

Notes:
1. Single stage pedestrian crossing
2. North-south pedestrian walk time is 7 seconds plus crossing distance times 1.2m/s walking speed
3. Shaded eastbound lefts are permissive
4.  = Permissive turn (all rights destinted to the north are Permissive)
5.  = Protected or fully protected turn

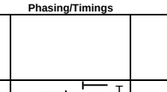
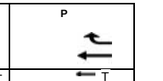
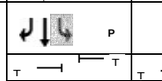
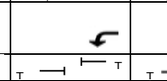
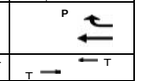
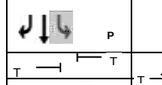
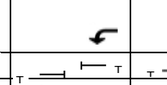
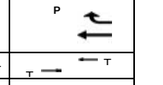
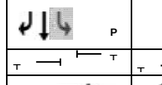
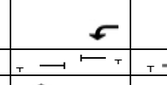
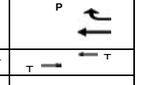
East Bayfront Transit EA

Appendix C Table 1:

Queens Quay Streetcar Centre Transit Option Typical Signal timings/ Phasing Summary - PM Peak Hour

Project Number: 7085-01

DRAFT

Sr. No.	Intersection	Lane Configuraions/turn restrictions	Assumptions/comments	N/S Ped Crossing Distance (m)	N/S Ped Phase	E/W Ped Crossing Distance (m)	E/W Ped Phase	Cycle Length	Phasing/Timings
1	Queens Quay/Parliament		- Single Stage Crossing -E-W Transit Phase timings are shown in bracket	Crossing distance 27 Excluding MGT Total 27	Walk 7 FDW 22 23m / 1.2m/s = 19s Total Green 29 Amber 4 All Red 3 Min. Split 36	Pavement width& curb 18 Total 18	Walk 7 FDW 15 18m / 1.2m/s = 15s Total Green 22 Amber 4 All Red 2 Min. Split 28	103	 Green 29 Amber 4 All Red 3 Total Split 36  Green 21 Amber 4 All Red 3 Total Split 28  Green 33 (32) Amber 4 (4) All Red 2 (3) Total Split 39
2	Queens Quay/Sherbourne Street		- Single Stage Crossing -E-W Transit Phase timings are shown in bracket	Crossing distance 27 Excluding MGT Total 27	Walk 7 FDW 22 27m / 1.2m/s = 22s Total Green 29 Amber 4 All Red 3 Min. Split 36	Pavement width& curb 17 Total 17	Walk 7 FDW 14 17m / 1.2m/s = 14s Total Green 21 Amber 4 All Red 2 Min. Split 27	103	 Green 30 Amber 4 All Red 3 Total Split 37  Green 7 Amber 4 All Red 3 Total Split 14  Green 46 (45) Amber 4 (4) All Red 2 (3) Total Split 52
3	Queens Quay/Jarvis Street		- Single Stage Crossing -E-W Transit Phase timings are shown in bracket	Crossing distance 27 Excluding MGT Total 27	Walk 7 FDW 22 27m / 1.2m/s = 22s Total Green 29 Amber 4 All Red 3 Min. Split 36	Pavement width& curb 17 Total 17	Walk 7 FDW 14 17m / 1.2m/s = 14s Total Green 21 Amber 4 All Red 2 Min. Split 27	103	 Green 29 Amber 4 All Red 3 Total Split 36  Green 13 Amber 4 All Red 3 Total Split 20  Green 41 (40) Amber 4 (4) All Red 2 (3) Total Split 47
4	Queens Quay/Freeland Street		- Single Stage Crossing -E-W Transit Phase timings are shown in bracket	Crossing distance 26 Excluding MGT Total 26	Walk 7 FDW 22 26m / 1.2m/s = 22s Total Green 29 Amber 4 All Red 3 Min. Split 36	Pavement width& curb 17 Total 17	Walk 7 FDW 14 17m / 1.2m/s = 14s Total Green 21 Amber 4 All Red 2 Min. Split 27	103	 Green 29 Amber 4 All Red 3 Total Split 36  Green 8 Amber 4 All Red 3 Total Split 15  Green 46 (45) Amber 4 (4) All Red 2 (3) Total Split 52
5	Queens Quay/Street 'D'		- Single Stage Crossing -E-W Transit Phase timings are shown in bracket	Crossing distance 26 Excluding MGT Total 26	Walk 7 FDW 22 23m / 1.2m/s = 19s Total Green 29 Amber 4 All Red 3 Min. Split 36	Pavement width& curb 17 Total 17	Walk 7 FDW 14 17m / 1.2m/s = 14s Total Green 21 Amber 4 All Red 2 Min. Split 27	103	 Green 29 Amber 4 All Red 3 Total Split 36  Green 7 Amber 4 All Red 3 Total Split 14  Green 47 (46) Amber 4 (4) All Red 2 (3) Total Split 53

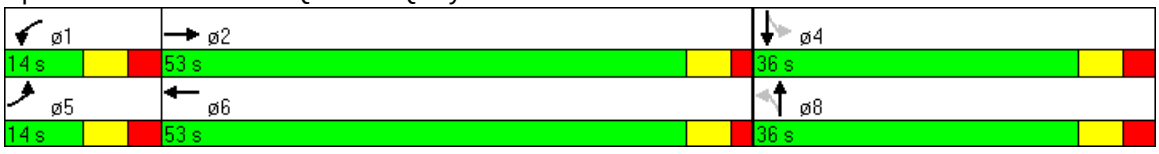
Notes:
1. Single stage pedestrian crossing
2. North-south pedestrian walk time is 7 seconds plus crossing distance times 1.2m/s walking speed
3. Shaded eastbound lefts are permissive
4.  = Permissive turn (all rights destinted to the north are Permissive)
5.  = Protected or fully protected turn

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	100	385	15	590	160	0	115	20
Turn Type	Prot		Prot		Perm		Perm	
Protected Phases	5	2	1	6		8		4
Permitted Phases					8		4	
Detector Phases	5	2	1	6	8	8	4	4
Minimum Initial (s)	7.0	4.0	7.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	14.0	37.0	14.0	37.0	36.0	36.0	36.0	36.0
Total Split (s)	14.0	53.0	14.0	53.0	36.0	36.0	36.0	36.0
Total Split (%)	13.6%	51.5%	13.6%	51.5%	35.0%	35.0%	35.0%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	3.0	2.0	3.0	3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	None	C-Max	None	C-Max	Ped	Ped	Ped	Ped
Act Effct Green (s)	9.0	56.4	9.0	48.0	31.0	31.0	31.0	31.0
Actuated g/C Ratio	0.09	0.55	0.09	0.47	0.30	0.30	0.30	0.30
v/c Ratio	0.72	0.45	0.11	0.97	0.55	0.04	0.37	0.26
Control Delay	79.4	17.4	59.3	45.7	39.0	0.1	32.8	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.4	17.4	59.3	45.7	39.0	0.1	32.8	9.9
LOS	E	B	E	D	D	A	C	A
Approach Delay		29.8		46.0		34.6		21.6
Approach LOS		C		D		C		C

Intersection Summary

Cycle Length: 103
Actuated Cycle Length: 103
Offset: 52 (50%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 36.5 Intersection LOS: D
Intersection Capacity Utilization 87.2% ICU Level of Service E
Analysis Period (min) 60

Splits and Phases: 1: Queen's Quay East & Freeland Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.98		1.00	0.81		1.00	0.84	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.85	1.00		0.83	1.00	
Frt	1.00	0.99		1.00	0.97		1.00	0.85		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1575	1632		1575	1576		1335	1136		1303	1223	
Flt Permitted	0.95	1.00		0.95	1.00		0.69	1.00		0.74	1.00	
Satd. Flow (perm)	1575	1632		1575	1576		964	1136		1021	1223	
Volume (vph)	100	385	15	15	590	130	160	0	20	115	20	90
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	100	385	15	15	590	130	160	0	20	115	20	90
RTOR Reduction (vph)	0	1	0	0	7	0	0	14	0	0	63	0
Lane Group Flow (vph)	100	399	0	15	713	0	160	6	0	115	47	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	7.0	51.2		2.8	47.0		29.0	29.0		29.0	29.0	
Effective Green, g (s)	9.0	52.2		4.8	48.0		31.0	31.0		31.0	31.0	
Actuated g/C Ratio	0.09	0.51		0.05	0.47		0.30	0.30		0.30	0.30	
Clearance Time (s)	7.0	6.0		7.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	138	827		73	734		290	342		307	368	
v/s Ratio Prot	c0.06	c0.24		0.01	c0.45			0.01			0.04	
v/s Ratio Perm							c0.17			0.11		
v/c Ratio	0.72	0.48		0.21	0.97		0.55	0.02		0.37	0.13	
Uniform Delay, d1	45.8	16.6		47.3	26.8		30.2	25.3		28.4	26.2	
Progression Factor	1.00	1.00		1.33	0.30		1.00	1.00		1.00	1.00	
Incremental Delay, d2	18.8	2.0		1.0	35.1		2.3	0.0		0.8	0.2	
Delay (s)	64.6	18.6		63.7	43.1		32.5	25.3		29.1	26.3	
Level of Service	E	B		E	D		C	C		C	C	
Approach Delay (s)		27.8			43.6			31.7			27.8	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	35.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	87.2%	ICU Level of Service	E
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	175	355	675	300	145	145
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Detector Phases	5	2	6	6	4	4
Minimum Initial (s)	7.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	14.0	12.0	27.0	27.0	36.0	36.0
Total Split (s)	17.0	67.0	50.0	50.0	36.0	36.0
Total Split (%)	16.5%	65.0%	48.5%	48.5%	35.0%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0	2.0	3.0	3.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	C-Max	C-Max	C-Max	Ped	Ped
Act Effct Green (s)	12.0	62.0	45.0	45.0	31.0	31.0
Actuated g/C Ratio	0.12	0.60	0.44	0.44	0.30	0.30
v/c Ratio	0.96	0.36	0.93	0.55	0.31	0.33
Control Delay	140.4	17.5	34.9	5.1	29.9	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	140.4	17.5	34.9	5.1	29.9	6.8
LOS	F	B	C	A	C	A
Approach Delay		58.1	25.7		18.4	
Approach LOS		E	C		B	

Intersection Summary

Cycle Length: 103
Actuated Cycle Length: 103
Offset: 28 (27%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 34.1 — Intersection LOS: C
Intersection Capacity Utilization 86.9% — ICU Level of Service E
Analysis Period (min) 60

Splits and Phases: 2: Queen's Quay East & Lower Jarvis St

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.74	1.00	0.81
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1575	1658	1658	1042	1575	1136
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1575	1658	1658	1042	1575	1136
Volume (vph)	175	355	675	300	145	145
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	175	355	675	300	145	145
RTOR Reduction (vph)	0	0	0	87	0	101
Lane Group Flow (vph)	175	355	675	213	145	44
Confl. Peds. (#/hr)	100			100	100	100
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	10.0	61.0	44.0	44.0	29.0	29.0
Effective Green, g (s)	12.0	62.0	45.0	45.0	31.0	31.0
Actuated g/C Ratio	0.12	0.60	0.44	0.44	0.30	0.30
Clearance Time (s)	7.0	6.0	6.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	183	998	724	455	474	342
v/s Ratio Prot	c0.11	0.21	c0.41		c0.09	
v/s Ratio Perm				0.20		0.04
v/c Ratio	0.96	0.36	0.93	0.47	0.31	0.13
Uniform Delay, d1	45.2	10.4	27.6	20.5	27.7	26.2
Progression Factor	1.02	1.56	0.49	0.24	1.00	1.00
Incremental Delay, d2	87.6	0.9	19.1	2.2	0.4	0.2
Delay (s)	133.9	17.1	32.6	7.1	28.1	26.3
Level of Service	F	B	C	A	C	C
Approach Delay (s)		55.7	24.8		27.2	
Approach LOS		E	C		C	

Intersection Summary			
HCM Average Control Delay	34.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	60		

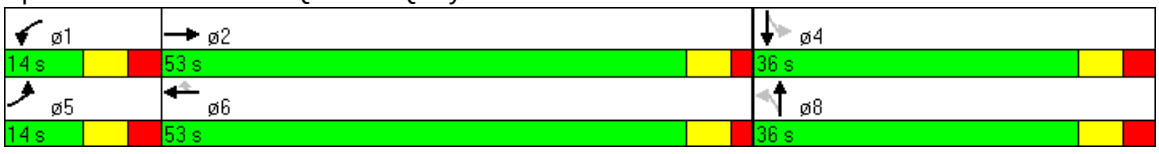
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	105	315	60	745	185	40	20	105	105
Turn Type	Prot		Prot		Perm	Perm		Perm	
Protected Phases	5	2	1	6			8		4
Permitted Phases					6	8		4	
Detector Phases	5	2	1	6	6	8	8	4	4
Minimum Initial (s)	7.0	4.0	7.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	14.0	28.0	14.0	36.0	36.0	36.0	36.0	36.0	36.0
Total Split (s)	14.0	53.0	14.0	53.0	53.0	36.0	36.0	36.0	36.0
Total Split (%)	13.6%	51.5%	13.6%	51.5%	51.5%	35.0%	35.0%	35.0%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	3.0	2.0	2.0	3.0	3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag				
Lead-Lag Optimize?	Yes			Yes	Yes				
Recall Mode	None	C-Max	Min	C-Max	C-Max	Ped	Ped	Ped	Ped
Act Effct Green (s)	9.0	48.0	9.0	48.0	48.0	30.0	30.0	31.0	31.0
Actuated g/C Ratio	0.09	0.47	0.09	0.47	0.47	0.29	0.29	0.30	0.30
v/c Ratio	0.76	0.50	0.43	0.96	0.30	0.18	0.07	0.34	0.48
Control Delay	82.5	13.4	64.2	53.1	6.4	30.0	27.1	32.1	26.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.5	13.4	64.2	53.1	6.4	30.0	27.1	32.1	26.1
LOS	F	B	E	D	A	C	C	C	C
Approach Delay		28.9		45.1			28.8		28.1
Approach LOS		C		D			C		C

Intersection Summary

Cycle Length: 103
Actuated Cycle Length: 103
Offset: 5 (5%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 37.4 — Intersection LOS: D
Intersection Capacity Utilization 98.2% — ICU Level of Service F
Analysis Period (min) 60

Splits and Phases: 3: Queen's Quay East & Lower Sherbourne



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	6.0	6.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.96		1.00	1.00	0.87	1.00	0.94		1.00	0.90	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.88	1.00		0.83	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.95		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1575	1566		1575	1658	1233	1385	1473		1307	1379	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.52	1.00		0.74	1.00	
Satd. Flow (perm)	1575	1566		1575	1658	1233	764	1473		1015	1379	
Volume (vph)	105	315	50	60	745	185	40	20	10	105	105	110
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	105	315	50	60	745	185	40	20	10	105	105	110
RTOR Reduction (vph)	0	5	0	0	0	37	0	0	0	0	36	0
Lane Group Flow (vph)	105	360	0	60	745	148	40	30	0	105	179	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Prot			Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8			4		
Actuated Green, G (s)	7.0	47.0		7.0	47.0	47.0	29.0	29.0		29.0	29.0	
Effective Green, g (s)	9.0	48.0		9.0	48.0	48.0	30.0	30.0		31.0	31.0	
Actuated g/C Ratio	0.09	0.47		0.09	0.47	0.47	0.29	0.29		0.30	0.30	
Clearance Time (s)	7.0	6.0		7.0	6.0	6.0	7.0	7.0		7.0	7.0	
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)	138	730		138	773	575	223	429		305	415	
v/s Ratio Prot	c0.07	0.23		0.04	c0.45			0.02			c0.13	
v/s Ratio Perm						0.12	0.05			0.10		
v/c Ratio	0.76	0.49		0.43	0.96	0.26	0.18	0.07		0.34	0.43	
Uniform Delay, d1	45.9	19.1		44.6	26.7	16.7	27.3	26.4		28.1	28.9	
Progression Factor	0.96	0.58		1.25	0.76	0.51	1.00	1.00		1.00	1.00	
Incremental Delay, d2	23.5	2.3		1.6	31.0	0.8	0.4	0.1		0.7	0.7	
Delay (s)	67.7	13.4		57.5	51.2	9.4	27.7	26.5		28.8	29.6	
Level of Service	E	B		E	D	A	C	C		C	C	
Approach Delay (s)		25.5			43.8			27.2			29.3	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	36.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	98.2%	ICU Level of Service	F
Analysis Period (min)	60		

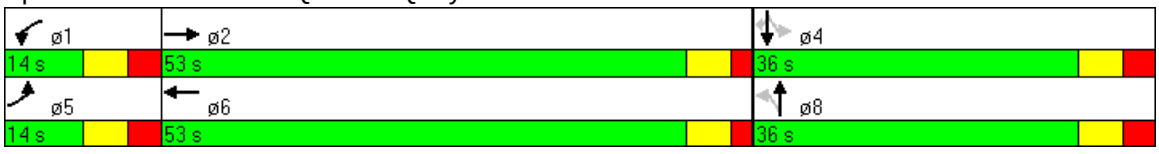
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	20	370	45	700	155	0	60	15	120
Turn Type	Prot		Prot		Perm		Perm		Perm
Protected Phases	5	2	1	6		8		4	
Permitted Phases					8		4		4
Detector Phases	5	2	1	6	8	8	4	4	4
Minimum Initial (s)	7.0	4.0	7.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	14.0	37.0	14.0	29.0	36.0	36.0	36.0	36.0	36.0
Total Split (s)	14.0	53.0	14.0	53.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	13.6%	51.5%	13.6%	51.5%	35.0%	35.0%	35.0%	35.0%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	3.0	2.0	3.0	3.0	3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	Min	C-Max	Ped	Ped	Ped	Ped	Ped
Act Effct Green (s)	9.0	48.0	9.0	56.4	31.0	31.0	31.0	31.0	31.0
Actuated g/C Ratio	0.09	0.47	0.09	0.55	0.30	0.30	0.30	0.30	0.30
v/c Ratio	0.14	0.56	0.33	0.80	0.50	0.08	0.20	0.03	0.28
Control Delay	34.2	25.4	56.2	23.1	36.6	0.3	29.0	25.7	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.2	25.4	56.2	23.1	36.6	0.3	29.0	25.7	6.9
LOS	C	C	E	C	D	A	C	C	A
Approach Delay		25.8		25.0		28.4		15.2	
Approach LOS		C		C		C		B	

Intersection Summary

Cycle Length: 103
Actuated Cycle Length: 103
Offset: 91 (88%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 24.5 Intersection LOS: C
Intersection Capacity Utilization 88.7% ICU Level of Service E
Analysis Period (min) 60

Splits and Phases: 4: Queen's Quay East & Street D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.81		1.00	1.00	0.81
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.83	1.00		0.83	1.00	1.00
Frt	1.00	0.98		1.00	1.00		1.00	0.85		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1575	1604		1575	1639		1301	1136		1312	1658	1136
Flt Permitted	0.95	1.00		0.95	1.00		0.75	1.00		0.73	1.00	1.00
Satd. Flow (perm)	1575	1604		1575	1639		1024	1136		1005	1658	1136
Volume (vph)	20	370	50	45	700	20	155	0	45	60	15	120
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	20	370	50	45	700	20	155	0	45	60	15	120
RTOR Reduction (vph)	0	5	0	0	1	0	0	31	0	0	0	84
Lane Group Flow (vph)	20	415	0	45	719	0	155	14	0	60	15	36
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Prot			Prot			Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		4
Actuated Green, G (s)	2.8	47.0		7.0	51.2		29.0	29.0		29.0	29.0	29.0
Effective Green, g (s)	4.8	48.0		9.0	52.2		31.0	31.0		31.0	31.0	31.0
Actuated g/C Ratio	0.05	0.47		0.09	0.51		0.30	0.30		0.30	0.30	0.30
Clearance Time (s)	7.0	6.0		7.0	6.0		7.0	7.0		7.0	7.0	7.0
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)	73	747		138	831		308	342		302	499	342
v/s Ratio Prot	0.01	0.26		c0.03	c0.44			0.01			0.01	
v/s Ratio Perm							c0.15			0.06		0.03
v/c Ratio	0.27	0.56		0.33	0.87		0.50	0.04		0.20	0.03	0.11
Uniform Delay, d1	47.4	19.8		44.2	22.3		29.7	25.5		26.8	25.4	26.0
Progression Factor	0.73	1.14		1.14	0.74		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.9	2.7		1.1	10.3		1.3	0.0		0.3	0.0	0.1
Delay (s)	36.6	25.3		51.5	26.8		31.0	25.5		27.1	25.4	26.1
Level of Service	D	C		D	C		C	C		C	C	C
Approach Delay (s)		25.8			28.3			29.7			26.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	205	265	495	55	15	265
Turn Type	Prot			Perm		pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				6		4
Detector Phases	5	2	6	6	4	5
Minimum Initial (s)	7.0	4.0	4.0	4.0	4.0	7.0
Minimum Split (s)	14.0	12.0	43.0	43.0	36.0	14.0
Total Split (s)	24.0	67.0	43.0	43.0	36.0	24.0
Total Split (%)	23.3%	65.0%	41.7%	41.7%	35.0%	23.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0	2.0	3.0	3.0
Lead/Lag	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes	Yes		Yes
Recall Mode	None	C-Max	C-Max	C-Max	Ped	None
Act Effct Green (s)	17.6	62.0	39.4	39.4	31.0	48.6
Actuated g/C Ratio	0.17	0.60	0.38	0.38	0.30	0.47
v/c Ratio	0.76	0.27	0.78	0.13	0.03	0.42
Control Delay	47.0	15.7	39.5	14.2	25.8	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.0	15.7	39.5	14.2	25.8	11.8
LOS	D	B	D	B	C	B
Approach Delay		29.4	36.9		12.6	
Approach LOS		C	D		B	

Intersection Summary

Cycle Length: 103
Actuated Cycle Length: 103
Offset: 56 (54%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 29.0 — Intersection LOS: C
Intersection Capacity Utilization 78.2% — ICU Level of Service D
Analysis Period (min) 60

Splits and Phases: 5: Queen's Quay East & Parliament Street

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.75	1.00	0.88
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1575	1658	1658	1058	1575	1235
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1575	1658	1658	1058	1575	1235
Volume (vph)	205	265	495	55	15	265
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	205	265	495	55	15	265
RTOR Reduction (vph)	0	0	0	16	0	46
Lane Group Flow (vph)	205	265	495	39	15	219
Confl. Peds. (#/hr)	100			100	100	100
Turn Type	Prot			Perm		pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				6		4
Actuated Green, G (s)	15.6	61.0	38.4	38.4	29.0	44.6
Effective Green, g (s)	17.6	62.0	39.4	39.4	31.0	48.6
Actuated g/C Ratio	0.17	0.60	0.38	0.38	0.30	0.47
Clearance Time (s)	7.0	6.0	6.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	269	998	634	405	474	643
v/s Ratio Prot	c0.13	0.16	c0.30		0.01	c0.06
v/s Ratio Perm				0.04		0.12
v/c Ratio	0.76	0.27	0.78	0.10	0.03	0.34
Uniform Delay, d1	40.7	9.7	28.0	20.4	25.4	17.1
Progression Factor	0.69	1.52	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.7	0.6	9.9	0.5	0.0	0.3
Delay (s)	39.8	15.4	37.9	20.9	25.4	17.4
Level of Service	D	B	D	C	C	B
Approach Delay (s)		26.0	36.2		17.9	
Approach LOS		C	D		B	

Intersection Summary			
HCM Average Control Delay	28.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	WBR2	NBL2	NBT	SBL	SBT	NER
Lane Configurations										
Volume (vph)	900	645	1055	555	275	110	315	145	130	835
Turn Type	Split			Prot	Perm	Split		Split		custom
Protected Phases	1	1	2	2		4	4	3	3	2
Permitted Phases					2					
Detector Phases	1	1	2	2	2	4	4	3	3	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	4.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	10.0	10.0	25.0
Total Split (s)	37.0	37.0	50.0	50.0	50.0	25.0	25.0	18.0	18.0	50.0
Total Split (%)	28.5%	28.5%	38.5%	38.5%	38.5%	19.2%	19.2%	13.8%	13.8%	38.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max	Max	C-Min	C-Min	Max	Max	Max
Act Effct Green (s)	32.0	32.0	45.0	45.0	45.0	20.0	20.0	13.0	13.0	45.0
Actuated g/C Ratio	0.25	0.25	0.35	0.35	0.35	0.15	0.15	0.10	0.10	0.35
v/c Ratio	0.98	0.73	0.82	0.91	0.41	0.45	1.00	0.82	0.99	0.92
Control Delay	92.4	51.0	45.8	66.9	10.1	56.7	133.0	99.9	190.3	55.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	92.4	51.0	45.8	66.9	10.1	56.7	133.0	99.9	190.3	55.7
LOS	F	D	D	E	B	E	F	F	F	E
Approach Delay		75.1	46.8				119.8		148.7	
Approach LOS		E	D				F		F	

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 4:NBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 71.1 Intersection LOS: E
Intersection Capacity Utilization 104.2% ICU Level of Service G
Analysis Period (min) 60

Splits and Phases: 3: Lake Shore Blvd E & Lower Jarvis St

Movement	EBL	EBT	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.7	3.7	3.7	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Util. Factor	*1.00	0.95	*1.00	1.00	1.00	0.91		*1.00		1.00	*1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.98	1.00		0.98		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00	1.00	1.00	0.85	1.00		0.97		1.00	0.96	
Flt Protected	1.00	1.00	1.00	1.00	1.00	0.95		1.00		1.00	1.00	
Satd. Flow (prot)	3730	3579	3694	1762	1564	1592		3301		1756	1710	
Flt Permitted	1.00	1.00	1.00	1.00	1.00	0.95		1.00		1.00	1.00	
Satd. Flow (perm)	3730	3579	3694	1762	1564	1592		3301		1756	1710	
Volume (vph)	900	645	1055	555	275	110	110	315	100	145	130	40
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	900	645	1055	555	275	110	110	315	100	145	130	40
RTOR Reduction (vph)	0	0	0	0	137	0	0	17	0	0	0	0
Lane Group Flow (vph)	900	645	1055	555	138	110	0	508	0	145	170	0
Confl. Peds. (#/hr)					5				30	30		30
Heavy Vehicles (%)	3%	2%	4%	9%	2%	2%	15%	9%	2%	7%	4%	2%
Turn Type	Split			Prot	Perm	Split	Split			Split		
Protected Phases	1	1	2	2		4	4	4		3	3	
Permitted Phases					2							
Actuated Green, G (s)	29.0	29.0	42.0	42.0	42.0	17.0		17.0		10.0	10.0	
Effective Green, g (s)	32.0	32.0	45.0	45.0	45.0	20.0		20.0		13.0	13.0	
Actuated g/C Ratio	0.25	0.25	0.35	0.35	0.35	0.15		0.15		0.10	0.10	
Clearance Time (s)	8.0	8.0	8.0	8.0	8.0	8.0		8.0		8.0	8.0	
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)	918	881	1279	610	541	245		508		176	171	
v/s Ratio Prot	c0.24	0.18	0.29	0.31		0.07		c0.15		0.08	c0.10	
v/s Ratio Perm					0.09							
v/c Ratio	0.98	0.73	0.82	0.91	0.25	0.45		1.00		0.82	0.99	
Uniform Delay, d1	48.7	45.1	38.9	40.6	30.5	50.0		55.0		57.4	58.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	43.8	5.5	6.5	25.7	1.1	6.0		80.0		42.2	132.1	
Delay (s)	92.5	50.6	45.4	66.3	31.6	55.9		135.0		99.6	190.5	
Level of Service	F	D	D	E	C	E		F		F	F	
Approach Delay (s)		75.0	49.5					121.3			148.7	
Approach LOS		E	D					F			F	

Intersection Summary			
HCM Average Control Delay	72.3	HCM Level of Service	E
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	104.2%	ICU Level of Service	G
Analysis Period (min)	60		

c Critical Lane Group

Movement	NER	NER2
Lane Configurations		
Ideal Flow (vphpl)	1900	1900
Lane Width	3.7	3.7
Total Lost time (s)	5.0	
Lane Util. Factor	*1.00	
Frpb, ped/bikes	1.00	
Flpb, ped/bikes	1.00	
Frt	0.95	
Flt Protected	1.00	
Satd. Flow (prot)	3212	
Flt Permitted	1.00	
Satd. Flow (perm)	3212	
Volume (vph)	835	200
Peak-hour factor, PHF	1.00	1.00
Adj. Flow (vph)	835	200
RTOR Reduction (vph)	18	0
Lane Group Flow (vph)	1017	0
Confl. Peds. (#/hr)		
Heavy Vehicles (%)	15%	8%
Turn Type	custom	
Protected Phases	2	
Permitted Phases		
Actuated Green, G (s)	42.0	
Effective Green, g (s)	45.0	
Actuated g/C Ratio	0.35	
Clearance Time (s)	8.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	1112	
v/s Ratio Prot	c0.32	
v/s Ratio Perm		
v/c Ratio	0.91	
Uniform Delay, d1	40.7	
Progression Factor	1.00	
Incremental Delay, d2	15.8	
Delay (s)	56.4	
Level of Service	E	
Approach Delay (s)		
Approach LOS		

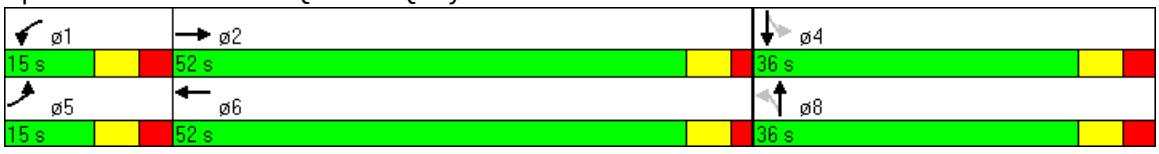
Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	85	640	45	715	40	5	105	70
Turn Type	Prot		Prot		Perm		Perm	
Protected Phases	5	2	1	6		8		4
Permitted Phases					8		4	
Detector Phases	5	2	1	6	8	8	4	4
Minimum Initial (s)	7.0	4.0	7.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	14.0	37.0	14.0	37.0	36.0	36.0	36.0	36.0
Total Split (s)	15.0	52.0	15.0	52.0	36.0	36.0	36.0	36.0
Total Split (%)	14.6%	50.5%	14.6%	50.5%	35.0%	35.0%	35.0%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	3.0	2.0	3.0	3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	None	C-Max	None	C-Max	Ped	Ped	Ped	Ped
Act Effct Green (s)	9.8	53.0	9.6	50.0	31.0	31.0	31.0	31.0
Actuated g/C Ratio	0.10	0.51	0.09	0.49	0.30	0.30	0.30	0.30
v/c Ratio	0.57	0.84	0.31	0.93	0.15	0.02	0.34	0.34
Control Delay	60.7	35.4	49.4	42.9	28.3	19.7	31.9	19.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.7	35.4	49.4	42.9	28.3	19.7	31.9	19.2
LOS	E	D	D	D	C	B	C	B
Approach Delay		38.2		43.3		26.6		24.3
Approach LOS		D		D		C		C

Intersection Summary

Cycle Length: 103
Actuated Cycle Length: 103
Offset: 36 (35%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 38.1 Intersection LOS: D
Intersection Capacity Utilization 96.8% ICU Level of Service F
Analysis Period (min) 60

Splits and Phases: 1: Queen's Quay East & Freeland Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	0.90		1.00	0.89	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.86	1.00		0.82	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.92		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1575	1604		1575	1643		1356	1385		1299	1360	
Flt Permitted	0.95	1.00		0.95	1.00		0.62	1.00		0.75	1.00	
Satd. Flow (perm)	1575	1604		1575	1643		886	1385		1027	1360	
Volume (vph)	85	640	55	45	715	25	40	5	5	105	70	85
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	85	640	55	45	715	25	40	5	5	105	70	85
RTOR Reduction (vph)	0	3	0	0	1	0	0	3	0	0	43	0
Lane Group Flow (vph)	85	692	0	45	739	0	40	7	0	105	112	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	6.4	49.2		4.8	47.6		29.0	29.0		29.0	29.0	
Effective Green, g (s)	8.4	50.2		6.8	48.6		31.0	31.0		31.0	31.0	
Actuated g/C Ratio	0.08	0.49		0.07	0.47		0.30	0.30		0.30	0.30	
Clearance Time (s)	7.0	6.0		7.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	128	782		104	775		267	417		309	409	
v/s Ratio Prot	c0.05	0.43		0.03	c0.45			0.00			0.08	
v/s Ratio Perm							0.05			c0.10		
v/c Ratio	0.66	0.88		0.43	0.95		0.15	0.02		0.34	0.27	
Uniform Delay, d1	45.9	23.8		46.2	26.1		26.4	25.3		28.0	27.4	
Progression Factor	1.00	1.00		1.03	0.88		1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.0	16.4		2.1	26.0		0.3	0.0		0.7	0.4	
Delay (s)	58.9	40.2		49.9	49.1		26.6	25.3		28.7	27.8	
Level of Service	E	D		D	D		C	C		C	C	
Approach Delay (s)		42.2			49.1			26.4			28.2	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	42.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	96.8%	ICU Level of Service	F
Analysis Period (min)	60		

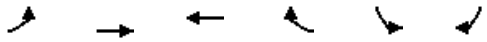
c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	220	560	670	320	135	150
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Detector Phases	5	2	6	6	4	4
Minimum Initial (s)	7.0	4.0	7.0	7.0	4.0	4.0
Minimum Split (s)	14.0	12.0	27.0	27.0	36.0	36.0
Total Split (s)	20.0	67.0	47.0	47.0	36.0	36.0
Total Split (%)	19.4%	65.0%	45.6%	45.6%	35.0%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0	2.0	3.0	3.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	C-Max	C-Max	C-Max	Ped	Ped
Act Effct Green (s)	15.0	62.0	42.0	42.0	31.0	31.0
Actuated g/C Ratio	0.15	0.60	0.41	0.41	0.30	0.30
v/c Ratio	0.96	0.56	0.99	0.62	0.28	0.34
Control Delay	106.5	22.6	77.9	15.8	29.6	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	106.5	22.6	77.9	15.8	29.6	6.8
LOS	F	C	E	B	C	A
Approach Delay		46.3	57.9		17.6	
Approach LOS		D	E		B	

Intersection Summary

Cycle Length: 103
Actuated Cycle Length: 103
Offset: 31 (30%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.99
Intersection Signal Delay: 47.9 — Intersection LOS: D
Intersection Capacity Utilization 89.4% — ICU Level of Service E
Analysis Period (min) 60

Splits and Phases: 2: Queen's Quay East & Lower Jarvis St



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.74	1.00	0.81
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1575	1658	1658	1042	1575	1136
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1575	1658	1658	1042	1575	1136
Volume (vph)	220	560	670	320	135	150
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	220	560	670	320	135	150
RTOR Reduction (vph)	0	0	0	94	0	105
Lane Group Flow (vph)	220	560	670	226	135	45
Confl. Peds. (#/hr)	100			100	100	100
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	13.0	61.0	41.0	41.0	29.0	29.0
Effective Green, g (s)	15.0	62.0	42.0	42.0	31.0	31.0
Actuated g/C Ratio	0.15	0.60	0.41	0.41	0.30	0.30
Clearance Time (s)	7.0	6.0	6.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	229	998	676	425	474	342
v/s Ratio Prot	c0.14	0.34	c0.40		c0.09	
v/s Ratio Perm				0.22		0.04
v/c Ratio	0.96	0.56	0.99	0.53	0.28	0.13
Uniform Delay, d1	43.7	12.3	30.3	23.1	27.5	26.2
Progression Factor	0.84	1.65	0.86	0.98	1.00	1.00
Incremental Delay, d2	64.4	1.6	50.1	3.3	0.3	0.2
Delay (s)	101.0	21.9	76.2	25.9	27.9	26.4
Level of Service	F	C	E	C	C	C
Approach Delay (s)		44.2	59.9		27.1	
Approach LOS		D	E		C	

Intersection Summary			
HCM Average Control Delay	49.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
Analysis Period (min)	60		

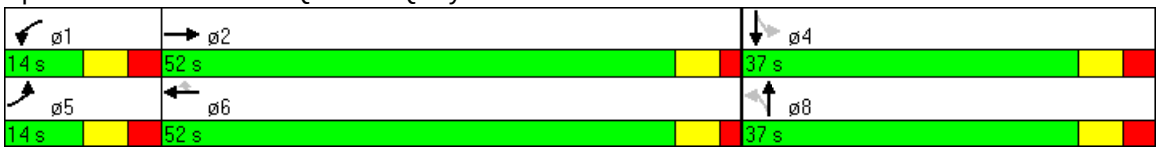
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	110	585	30	700	235	100	70	135	55
Turn Type	Prot		Prot		Perm	Perm		Perm	
Protected Phases	5	2	1	6			8		4
Permitted Phases					6	8		4	
Detector Phases	5	2	1	6	6	8	8	4	4
Minimum Initial (s)	7.0	4.0	7.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	14.0	28.0	14.0	36.0	36.0	37.0	37.0	37.0	37.0
Total Split (s)	14.0	52.0	14.0	52.0	52.0	37.0	37.0	37.0	37.0
Total Split (%)	13.6%	50.5%	13.6%	50.5%	50.5%	35.9%	35.9%	35.9%	35.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	3.0	2.0	2.0	3.0	3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag				
Lead-Lag Optimize?	Yes			Yes	Yes				
Recall Mode	None	C-Max	Min	C-Max	C-Max	Ped	Ped	Ped	Ped
Act Effct Green (s)	9.8	47.8	9.0	47.0	47.0	30.2	30.2	31.2	31.2
Actuated g/C Ratio	0.10	0.46	0.09	0.46	0.46	0.29	0.29	0.30	0.30
v/c Ratio	0.73	0.82	0.22	0.92	0.38	0.50	0.26	0.46	0.51
Control Delay	76.1	28.6	46.6	40.1	11.9	40.3	29.8	35.3	12.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.1	28.6	46.6	40.1	11.9	40.3	29.8	35.3	12.7
LOS	E	C	D	D	B	D	C	D	B
Approach Delay		35.8		33.4			34.8		20.4
Approach LOS		D		C			C		C

Intersection Summary

Cycle Length: 103
Actuated Cycle Length: 103
Offset: 21 (20%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.92
Intersection Signal Delay: 32.1 Intersection LOS: C
Intersection Capacity Utilization 97.7% ICU Level of Service F
Analysis Period (min) 60

Splits and Phases: 3: Queen's Quay East & Lower Sherbourne



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	6.0	6.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.87	1.00	0.93		1.00	0.85	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.89	1.00		0.85	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.95		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1575	1620		1575	1658	1230	1404	1457		1335	1238	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.46	1.00		0.69	1.00	
Satd. Flow (perm)	1575	1620		1575	1658	1230	676	1457		964	1238	
Volume (vph)	110	585	35	30	700	235	100	70	40	135	55	205
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	110	585	35	30	700	235	100	70	40	135	55	205
RTOR Reduction (vph)	0	2	0	0	0	51	0	0	0	0	132	0
Lane Group Flow (vph)	110	618	0	30	700	184	100	110	0	135	128	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Prot			Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8			4		
Actuated Green, G (s)	7.8	46.8		7.0	46.0	46.0	29.2	29.2		29.2	29.2	
Effective Green, g (s)	9.8	47.8		9.0	47.0	47.0	30.2	30.2		31.2	31.2	
Actuated g/C Ratio	0.10	0.46		0.09	0.46	0.46	0.29	0.29		0.30	0.30	
Clearance Time (s)	7.0	6.0		7.0	6.0	6.0	7.0	7.0		7.0	7.0	
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)	150	752		138	757	561	198	427		292	375	
v/s Ratio Prot	c0.07	0.38		0.02	c0.42			0.08			0.10	
v/s Ratio Perm						0.15	c0.15			0.14		
v/c Ratio	0.73	0.82		0.22	0.92	0.33	0.51	0.26		0.46	0.34	
Uniform Delay, d1	45.3	23.9		43.7	26.3	17.9	30.2	27.8		29.1	27.9	
Progression Factor	1.02	0.74		1.00	0.85	0.97	1.00	1.00		1.00	1.00	
Incremental Delay, d2	16.8	9.7		0.5	16.1	1.0	2.0	0.3		1.2	0.5	
Delay (s)	63.2	27.5		44.2	38.5	18.4	32.2	28.2		30.3	28.5	
Level of Service	E	C		D	D	B	C	C		C	C	
Approach Delay (s)		32.8			33.8			30.1			29.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	32.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	97.7%	ICU Level of Service	F
Analysis Period (min)	60		

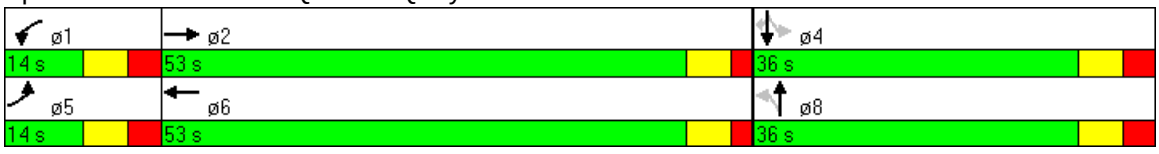
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	60	605	105	655	165	0	85	110	120
Turn Type	Prot		Prot		Perm		Perm		Perm
Protected Phases	5	2	1	6		8		4	
Permitted Phases					8		4		4
Detector Phases	5	2	1	6	8	8	4	4	4
Minimum Initial (s)	7.0	4.0	7.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	14.0	37.0	14.0	29.0	36.0	36.0	36.0	36.0	36.0
Total Split (s)	14.0	53.0	14.0	53.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	13.6%	51.5%	13.6%	51.5%	35.0%	35.0%	35.0%	35.0%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	3.0	2.0	3.0	3.0	3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	None	C-Max	Ped	Ped	Ped	Ped	Ped
Act Effct Green (s)	9.0	48.0	9.0	50.8	31.0	31.0	31.0	31.0	31.0
Actuated g/C Ratio	0.09	0.47	0.09	0.49	0.30	0.30	0.30	0.30	0.30
v/c Ratio	0.43	0.93	0.76	0.94	0.57	0.16	0.29	0.22	0.28
Control Delay	48.7	41.6	68.5	58.5	39.7	0.7	30.9	28.5	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.7	41.6	68.5	58.5	39.7	0.7	30.9	28.5	6.9
LOS	D	D	E	E	D	A	C	C	A
Approach Delay		42.1		59.7		26.9		20.9	
Approach LOS		D		E		C		C	

Intersection Summary

Cycle Length: 103
Actuated Cycle Length: 103
Offset: 17 (17%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 44.2 — Intersection LOS: D
Intersection Capacity Utilization 91.5% — ICU Level of Service F
Analysis Period (min) 60

Splits and Phases: 4: Queen's Quay East & Street D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	0.97		1.00	0.81		1.00	1.00	0.81
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.85	1.00		0.84	1.00	1.00
Frt	1.00	0.98		1.00	0.98		1.00	0.85		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1575	1597		1575	1583		1335	1136		1325	1658	1136
Flt Permitted	0.95	1.00		0.95	1.00		0.69	1.00		0.70	1.00	1.00
Satd. Flow (perm)	1575	1597		1575	1583		964	1136		983	1658	1136
Volume (vph)	60	605	95	105	655	85	165	0	80	85	110	120
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	60	605	95	105	655	85	165	0	80	85	110	120
RTOR Reduction (vph)	0	5	0	0	4	0	0	56	0	0	0	84
Lane Group Flow (vph)	60	695	0	105	736	0	165	24	0	85	110	36
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Prot			Prot			Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		4
Actuated Green, G (s)	5.6	47.0		7.0	48.4		29.0	29.0		29.0	29.0	29.0
Effective Green, g (s)	7.6	48.0		9.0	49.4		31.0	31.0		31.0	31.0	31.0
Actuated g/C Ratio	0.07	0.47		0.09	0.48		0.30	0.30		0.30	0.30	0.30
Clearance Time (s)	7.0	6.0		7.0	6.0		7.0	7.0		7.0	7.0	7.0
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)	116	744		138	759		290	342		296	499	342
v/s Ratio Prot	0.04	0.44		c0.07	c0.46			0.02			0.07	
v/s Ratio Perm							c0.17			0.09		0.03
v/c Ratio	0.52	0.93		0.76	0.97		0.57	0.07		0.29	0.22	0.11
Uniform Delay, d1	45.9	26.0		45.9	26.1		30.4	25.7		27.5	27.0	26.0
Progression Factor	0.92	0.79		0.84	1.40		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.6	19.7		17.8	33.5		2.6	0.1		0.5	0.2	0.1
Delay (s)	45.1	40.4		56.3	70.1		32.9	25.8		28.1	27.2	26.1
Level of Service	D	D		E	E		C	C		C	C	C
Approach Delay (s)		40.7			68.4			30.6			27.0	
Approach LOS		D			E			C			C	

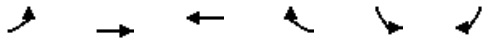
Intersection Summary			
HCM Average Control Delay	48.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	335	420	480	90	30	370
Turn Type	Prot			Perm		pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				6		4
Detector Phases	5	2	6	6	4	5
Minimum Initial (s)	7.0	4.0	4.0	4.0	4.0	7.0
Minimum Split (s)	14.0	12.0	28.0	28.0	36.0	14.0
Total Split (s)	28.0	67.0	39.0	39.0	36.0	28.0
Total Split (%)	27.2%	65.0%	37.9%	37.9%	35.0%	27.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0	2.0	3.0	3.0
Lead/Lag	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes	Yes		Yes
Recall Mode	None	C-Max	C-Max	C-Max	Ped	None
Act Effct Green (s)	23.0	62.0	34.0	34.0	31.0	54.0
Actuated g/C Ratio	0.22	0.60	0.33	0.33	0.30	0.52
v/c Ratio	0.95	0.42	0.88	0.24	0.06	0.54
Control Delay	99.7	9.5	55.2	16.3	26.3	14.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	99.7	9.5	55.2	16.3	26.3	14.5
LOS	F	A	E	B	C	B
Approach Delay		49.5	49.1		15.4	
Approach LOS		D	D		B	

Intersection Summary	
Cycle Length: 103	
Actuated Cycle Length: 103	
Offset: 41 (40%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 41.5	Intersection LOS: D
Intersection Capacity Utilization 85.4%	ICU Level of Service E
Analysis Period (min) 60	

Splits and Phases: 5: Queen's Quay East & Parliament Street



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.75	1.00	0.89
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1575	1658	1658	1058	1575	1252
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1575	1658	1658	1058	1575	1252
Volume (vph)	335	420	480	90	30	370
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	335	420	480	90	30	370
RTOR Reduction (vph)	0	0	0	28	0	32
Lane Group Flow (vph)	335	420	480	62	30	338
Confl. Peds. (#/hr)	100			100	100	100
Turn Type	Prot			Perm		pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				6		4
Actuated Green, G (s)	21.0	61.0	33.0	33.0	29.0	50.0
Effective Green, g (s)	23.0	62.0	34.0	34.0	31.0	54.0
Actuated g/C Ratio	0.22	0.60	0.33	0.33	0.30	0.52
Clearance Time (s)	7.0	6.0	6.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	352	998	547	349	474	717
v/s Ratio Prot	c0.21	0.25	c0.29		0.02	c0.11
v/s Ratio Perm				0.06		0.16
v/c Ratio	0.95	0.42	0.88	0.18	0.06	0.47
Uniform Delay, d1	39.5	10.9	32.5	24.5	25.7	15.5
Progression Factor	1.48	0.78	1.00	1.00	1.00	1.00
Incremental Delay, d2	39.5	0.8	21.5	1.1	0.1	0.5
Delay (s)	97.7	9.3	54.0	25.7	25.7	16.0
Level of Service	F	A	D	C	C	B
Approach Delay (s)		48.5	49.5		16.7	
Approach LOS		D	D		B	

Intersection Summary			
HCM Average Control Delay	41.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	WBR2	NBL2	NBT	SBL	SBT	NER
Lane Configurations										
Volume (vph)	720	900	805	615	100	255	220	305	175	1050
Turn Type	Split			Prot	Perm	Split		Split		custom
Protected Phases	1	1	2	2		4	4	3	3	2
Permitted Phases					2					
Detector Phases	1	1	2	2	2	4	4	3	3	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	38.0	38.0	51.0	51.0	51.0	23.0	23.0	28.0	28.0	51.0
Total Split (%)	27.1%	27.1%	36.4%	36.4%	36.4%	16.4%	16.4%	20.0%	20.0%	36.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize?										
Recall Mode	Max	Max	C-Max	C-Max	C-Max	Min	Min	Max	Max	C-Max
Act Effct Green (s)	33.0	33.0	46.0	46.0	46.0	18.0	18.0	23.0	23.0	46.0
Actuated g/C Ratio	0.24	0.24	0.33	0.33	0.33	0.13	0.13	0.16	0.16	0.33
v/c Ratio	0.81	0.99	0.65	0.99	0.18	0.99	0.99	1.01	0.98	1.01
Control Delay	59.4	107.0	43.1	113.2	13.2	169.3	133.5	167.4	145.3	104.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.4	107.0	43.1	113.2	13.2	169.3	133.5	167.4	145.3	104.4
LOS	E	F	D	F	B	F	F	F	F	F
Approach Delay		85.8	69.5				145.3		156.7	
Approach LOS		F	E				F		F	

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 59 (42%), Referenced to phase 2:WBT, Start of Green	
Natural Cycle: 140	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 100.3	Intersection LOS: F
Intersection Capacity Utilization 116.9%	ICU Level of Service H
Analysis Period (min) 60	

Splits and Phases: 3: Lake Shore Blvd E & Lower Jarvis St

Movement	EBL	EBT	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.7	3.7	3.7	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Util. Factor	*1.00	*1.00	*1.00	1.00	1.00	*1.00		*1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.98	1.00		0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00	1.00	1.00	0.85	1.00		1.00		1.00	1.00	
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Satd. Flow (prot)	3767	3842	3767	1883	1562	1842		3647		1842	1771	
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Satd. Flow (perm)	3767	3842	3767	1883	1562	1842		3647		1842	1771	
Volume (vph)	720	900	805	615	100	255	165	220	70	305	175	110
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	720	900	805	615	100	255	165	220	70	305	175	110
RTOR Reduction (vph)	0	0	0	0	46	0	0	10	0	0	0	0
Lane Group Flow (vph)	720	900	805	615	54	235	0	465	0	305	285	0
Confl. Peds. (#/hr)					5				30	30		30
Heavy Vehicles (%)	2%	0%	2%	2%	2%	2%	0%	2%	5%	2%	3%	2%
Turn Type	Split			Prot	Perm	Split	Split			Split		
Protected Phases	1	1	2	2		4	4	4		3	3	
Permitted Phases					2							
Actuated Green, G (s)	30.0	30.0	43.0	43.0	43.0	15.0		15.0		20.0	20.0	
Effective Green, g (s)	33.0	33.0	46.0	46.0	46.0	18.0		18.0		23.0	23.0	
Actuated g/C Ratio	0.24	0.24	0.33	0.33	0.33	0.13		0.13		0.16	0.16	
Clearance Time (s)	8.0	8.0	8.0	8.0	8.0	8.0		8.0		8.0	8.0	
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)	888	906	1238	619	513	237		469		303	291	
v/s Ratio Prot	0.19	c0.23	0.21	0.33		c0.13		0.13		c0.17	0.16	
v/s Ratio Perm					0.03							
v/c Ratio	0.81	0.99	0.65	0.99	0.10	0.99		0.99		1.01	0.98	
Uniform Delay, d1	50.6	53.4	40.1	46.9	32.7	60.9		60.9		58.5	58.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	8.5	53.9	2.7	66.5	0.4	108.1		73.9		109.9	87.5	
Delay (s)	59.0	107.3	42.8	113.4	33.1	169.1		134.9		168.4	145.8	
Level of Service	E	F	D	F	C	F		F		F	F	
Approach Delay (s)		85.9	70.7					146.2			157.4	
Approach LOS		F	E					F			F	

Intersection Summary			
HCM Average Control Delay	101.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	116.9%	ICU Level of Service	H
Analysis Period (min)	60		

c Critical Lane Group

Movement	NER	NER2
Lane Configurations		
Ideal Flow (vphpl)	1900	1900
Lane Width	3.7	3.7
Total Lost time (s)	5.0	
Lane Util. Factor	*1.00	
Frpb, ped/bikes	1.00	
Flpb, ped/bikes	1.00	
Frt	1.00	
Flt Protected	1.00	
Satd. Flow (prot)	3779	
Flt Permitted	1.00	
Satd. Flow (perm)	3779	
Volume (vph)	1050	215
Peak-hour factor, PHF	1.00	1.00
Adj. Flow (vph)	1050	215
RTOR Reduction (vph)	13	0
Lane Group Flow (vph)	1252	0
Confl. Peds. (#/hr)		
Heavy Vehicles (%)	2%	0%
Turn Type	custom	
Protected Phases	2	
Permitted Phases		
Actuated Green, G (s)	43.0	
Effective Green, g (s)	46.0	
Actuated g/C Ratio	0.33	
Clearance Time (s)	8.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	1242	
v/s Ratio Prot	c0.33	
v/s Ratio Perm		
v/c Ratio	1.01	
Uniform Delay, d1	47.0	
Progression Factor	1.00	
Incremental Delay, d2	58.7	
Delay (s)	105.7	
Level of Service	F	
Approach Delay (s)		
Approach LOS		

Intersection Summary

Intersection: 1: Queen's Quay East & Freeland Street

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	52.6	106.3	16.9	116.8	54.3	7.4	29.6	69.0
Average Queue (m)	29.9	42.5	4.1	78.2	31.2	2.1	18.5	17.8
95th Queue (m)	53.7	83.5	13.4	128.8	51.1	7.4	31.0	43.9
Link Distance (m)		113.9		94.8	76.6	76.6		207.5
Upstream Blk Time (%)		0		8				
Queuing Penalty (veh)		0		56				
Storage Bay Dist (m)	45.0		20.0				20.0	
Storage Blk Time (%)	8	5	0	48			15	5
Queuing Penalty (veh)	32	5	3	7			16	5

Intersection: 2: Queen's Quay East & Lower Jarvis St

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	57.7	100.8	108.6	44.8	46.1	34.9
Average Queue (m)	43.7	57.1	105.5	29.6	23.9	13.9
95th Queue (m)	67.8	110.9	117.0	56.5	42.3	26.7
Link Distance (m)		77.0	82.1		149.7	149.7
Upstream Blk Time (%)		15	46			
Queuing Penalty (veh)		77	447			
Storage Bay Dist (m)	50.0			35.0		
Storage Blk Time (%)	23	3	48	0		
Queuing Penalty (veh)	82	6	143	1		

Intersection: 3: Queen's Quay East & Lower Sherbourne

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (m)	52.6	105.3	54.4	114.3	32.8	25.5	18.6	41.6	76.1
Average Queue (m)	28.5	41.8	17.8	111.4	16.3	9.9	4.8	16.9	30.2
95th Queue (m)	49.7	82.0	42.2	120.1	36.6	21.3	13.7	33.1	58.4
Link Distance (m)		84.3		91.0		130.5	130.5	110.5	110.5
Upstream Blk Time (%)		1		39					
Queuing Penalty (veh)		6		380					
Storage Bay Dist (m)	45.0		45.0		25.0				
Storage Blk Time (%)	2	5		48	1				
Queuing Penalty (veh)	8	6		117	5				

Intersection: 4: Queen's Quay East & Street D

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	T	R
Maximum Queue (m)	33.0	94.4	42.8	114.1	76.9	15.1	37.9	45.4	27.7
Average Queue (m)	6.1	45.3	12.8	110.7	36.6	6.3	13.5	5.6	18.4
95th Queue (m)	20.0	77.5	33.2	131.8	65.4	14.2	27.4	24.1	31.2
Link Distance (m)		88.3		90.6	131.4	131.4	87.7	87.7	
Upstream Blk Time (%)		1		56					
Queuing Penalty (veh)		3		432					
Storage Bay Dist (m)	35.0		35.0						20.0
Storage Blk Time (%)		13		58				0	15
Queuing Penalty (veh)		3		26				0	2

Intersection: 5: Queen's Quay East & Parliament Street

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	52.6	89.6	98.8	34.8	13.5	83.6
Average Queue (m)	35.4	30.7	90.5	6.7	2.3	44.4
95th Queue (m)	56.0	62.9	107.4	26.7	9.0	77.9
Link Distance (m)		105.1	88.4		82.8	82.8
Upstream Blk Time (%)		0	60			2
Queuing Penalty (veh)		1	0			0
Storage Bay Dist (m)	45.0			25.0		
Storage Blk Time (%)	4	1	68	0		
Queuing Penalty (veh)	11	2	38	0		

Intersection: 10: Queen's Quay East & Red path Driveway

Movement	EB	WB	NB
Directions Served	TR	T	R
Maximum Queue (m)	33.3	33.5	9.9
Average Queue (m)	2.4	6.8	2.1
95th Queue (m)	26.5	27.2	8.0
Link Distance (m)	94.8	13.4	72.0
Upstream Blk Time (%)	1	3	
Queuing Penalty (veh)	3	26	
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 1: Queen's Quay East & Freeland Street

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	52.6	124.8	27.4	115.7	28.9	9.7	29.4	70.9
Average Queue (m)	25.7	115.3	11.4	88.1	9.4	1.6	19.1	28.1
95th Queue (m)	54.4	141.8	24.1	123.1	20.5	6.7	33.3	55.5
Link Distance (m)		116.4		94.2	77.0	77.0		207.5
Upstream Blk Time (%)		41		10				
Queuing Penalty (veh)		0		81				
Storage Bay Dist (m)	45.0		20.0				20.0	
Storage Blk Time (%)	1	48	7	47			14	19
Queuing Penalty (veh)	9	41	50	21			21	20

Intersection: 2: Queen's Quay East & Lower Jarvis St

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	60.4	99.8	110.3	48.4	49.6	35.5
Average Queue (m)	53.7	95.6	105.5	30.2	21.9	14.1
95th Queue (m)	70.9	106.2	116.3	55.4	40.3	26.7
Link Distance (m)		76.2	82.1		149.7	149.7
Upstream Blk Time (%)		47	44			
Queuing Penalty (veh)		360	444			
Storage Bay Dist (m)	50.0			35.0		
Storage Blk Time (%)	44	17	47	0		
Queuing Penalty (veh)	247	38	152	1		

Intersection: 3: Queen's Quay East & Lower Sherbourne

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (m)	54.5	108.2	41.7	116.3	34.7	97.3	35.7	61.7	74.3
Average Queue (m)	32.6	88.0	9.3	110.8	17.5	45.2	15.7	25.4	34.7
95th Queue (m)	60.8	125.0	29.2	123.0	38.4	104.0	31.9	49.5	63.1
Link Distance (m)		82.2		91.0		130.5	130.5	110.5	110.5
Upstream Blk Time (%)		34		42					
Queuing Penalty (veh)		257		410					
Storage Bay Dist (m)	45.0		45.0		25.0				
Storage Blk Time (%)	9	40		51	1				
Queuing Penalty (veh)	56	44		135	5				

Intersection: 4: Queen's Quay East & Street D

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	T	R
Maximum Queue (m)	42.6	109.6	42.8	114.6	76.1	23.6	32.3	54.6	29.4
Average Queue (m)	16.8	91.2	26.9	113.1	38.3	9.4	17.9	20.3	18.9
95th Queue (m)	38.4	130.9	50.0	122.7	65.6	18.0	31.2	40.7	31.9
Link Distance (m)		88.3		90.6	136.0	136.0	87.7	87.7	
Upstream Blk Time (%)		29		62					
Queuing Penalty (veh)		223		520					
Storage Bay Dist (m)	35.0		35.0						20.0
Storage Blk Time (%)	0	46	2	61				11	7
Queuing Penalty (veh)	0	27	15	64				13	8

Intersection: 5: Queen's Quay East & Parliament Street

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	52.9	129.1	98.4	32.9	39.8	89.6
Average Queue (m)	50.5	87.2	94.3	14.9	5.7	70.9
95th Queue (m)	59.6	155.2	100.1	36.2	21.9	110.5
Link Distance (m)		102.9	90.0		83.0	83.0
Upstream Blk Time (%)		21	71		0	45
Queuing Penalty (veh)		166	0		0	0
Storage Bay Dist (m)	45.0			25.0		
Storage Blk Time (%)	45	1	76	0		
Queuing Penalty (veh)	188	4	69	0		

Intersection: 10: Queen's Quay East & Red path Driveway

Movement	EB	WB	NB
Directions Served	TR	T	R
Maximum Queue (m)	103.6	36.3	33.8
Average Queue (m)	41.4	4.2	10.6
95th Queue (m)	113.1	20.5	32.2
Link Distance (m)	94.2	14.6	69.9
Upstream Blk Time (%)	6	2	0
Queuing Penalty (veh)	42	18	0
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			