INFORMATION REPORT

TO:	Mayor and Members General Issues Committee
COMMITTEE DATE:	January 14, 2015
SUBJECT/REPORT NO:	King Street Transit Only Lane Pilot Project (PW11079g) - (City Wide) (Outstanding Business List Item)
WARD(S) AFFECTED:	City Wide
PREPARED BY:	Christine Lee-Morrison (905) 546-2424, Extension 6390
SUBMITTED BY: **SIGNATURE:**	Gerry Davis, CMA General Manager Public Works Department

Council Direction:

In 2008, the City of Hamilton received twenty nine million eight hundred thousand dollars ($29.8 million) from Metrolinx "Quick Wins", to be used for municipal capital expenditures for Transit Vehicles and Infrastructure, to support A-Line and B-Line improvements. A package of several projects was selected to build ridership along the A and B-Lines including a potential Transit Only Lane (TOL). As part of the Rapid Ready report, February 2013, a King Street TOL Pilot Project was recommended. On May 22, 2013 Council approved the establishment of the King Street TOL, to be funded from Metrolinx Quick Wins Reserve. Staff was directed to report back to the General Issues Committee at the conclusion of the one year pilot program.

The TOL became operational on October 23, 2013. The design includes utilization of one westbound travel lane for all-day dedicated transit only purposes. Beginning at Mary Street through to Bay Street, the second lane from the northerly curb is dedicated, allowing for parking, loading, bus stops and right turns in the northerly curb lane. At Bay Street, the TOL transitions to the northerly curb lane through to east of Dundurn. The project is described in more detail in Public Works Report PW11079d.

This report summarizes the pilot project results.

Information:

Transit Investment and Policy Implications

Strategic Objective 1.4 of the Corporate Strategic Plan is to "Improve the City's transportation system to support multi-modal mobility and encourage inter-regional connections". This includes the following Strategic Actions:

(i) Complete the design and develop an implementation and financial plan for the delivery of higher-order transportation and enhanced transit service, including all-day GO Transit service and rapid transit.

(iii) Develop an integrated, multi-modal, public transportation program, including implementation of rapid transit, conventional transit, active transportation (e.g. pedestrian, cycling) and the associated transportation demand management (TDM) plan.

(v) Development of a strategy to enhance conventional transit service levels within the A Line and B Line corridors.

This project also aligns with a number of public transportation and built environment initiatives. Of specific note are:

- HSR Transit Operational Review (2010), which recommends that the City implement transit priority measures to reduce transit vehicle travel time, improve schedule adherence and service reliability.
- The Big Move Regional Transportation Plan, which promotes the use of transit priority measures and identifies Quick Wins as a means to introduce A and B-Line improvements.
- Improving Health By Design in The Greater Toronto-Hamilton Area - A Report of Medical Officers of Health In The GTHA, May 2014 - Indicates that, for the GTHA: "Overall, it is estimated that increases in public transit use and modest increases in active transportation would result in the prevention of three hundred and thirty eight (338) premature deaths per year, with an associated economic benefit of two point two billion dollars ($2.2 billion)."
- Urban Hamilton Official Plan - Policy 4.4.9.1 Rapid transit may be developed in a staged manner whereby various transit priority measures may be implemented to improve the quality of transit service in terms of speed and reliability as an interim stage in the long-term development of a full rapid transit network.

The goal is a transportation network that maximizes quality of life with benefits that support a vibrant and equitable society, a complete and compact community form, a dynamic and efficient economy, and a healthy natural environment. The Transportation Master Plan 2007 (TMP) includes an approved transportation strategy which places a high emphasis on significantly improving transit services, providing options for "active transportation" in combination with road capacity optimization before looking to road expansion. Targets were set to measure modal split changes and transit ridership as per the following table.

Table 1 - Transportation Master Plan Targets

	Existing (2001)	Near-Term Target (2011)	Long-Term Target (2021-2031)	Current Status (2011 TTS)
Estimated daily vehicle kilometres of Travel	4.8 Million KM	4.3 Million KM	3.8 Million KM	n/a*
Share of daily trips made by single-occupant drivers	68%	58%	52%	**67%**
Share of daily trips made by using municipal transit	5%	9%	12%	**7%**
Share of daily trips made by using walking or cycling	6%	10%	15%	**6%**
Annual transit rides per capita	40	60	80-100	***45.1*** **

*The 2011 TTS has released limited data to give a current status update.
**Canadian Urban Transit Assoc. Statistic

Today, transit measures sit at approximately 45 rides per capita and 7% transit modal split. This suggests the City is lagging behind significantly in meeting its goals.

As documented in Rapid Ready (PW13014), increased investment in transit is essential moving forward if the City's goals and objectives are to be met. Not investing in public transportation poses a significant risk to the City. Not achieving modal share targets will result in increased congestion and associated delays, an even greater need to invest more in roads, and failure to realize health, social and environmental benefits. For example, based on modelling done for the 2007 TMP, if current auto mode share trends continue, most of the escarpment crossings in Hamilton will be well over capacity by 2031. In addition, many downtown streets including King Street would operate at a poor level of service with volume exceeding capacity.

A modern, attractive and cost-effective public transit system includes service that people can depend on and one that gets them to their destination as quickly as possible. When transit vehicles are caught in general traffic, the attractiveness and efficiency of the service can be significantly reduced. Transit Priority Measures give transit vehicles priority over general traffic. Completely segregated transit lanes provide the highest level of service, and are reflective of the ultimate plans for rapid transit in the City.

The purpose of the King Street TOL pilot is to evaluate the success, acceptance, and function of a transit only lane, to help assess the viability of future rapid transit. A number of technical and stakeholder aspects are part of this evaluation. Details are provided in the Appendices to this report.

Monitoring Activities

Transit Operations - Schedule adherence was tracked to determine if the TOL had a positive effect on transit service in the area. The data shows that the TOL had an overall positive impact on transit travel times along King Street. This is an encouraging result given that the TOL pilot is only two kilometres long. If the TOL were expanded along the Main-King-Queenston corridor these positive effects would be expected to increase, resulting in greater overall reliability. In addition, approximately thirty transit operators were surveyed to obtain feedback on the TOL operations. From the results, 93% of operators found that the TOL made transit operations easier. For more details see Appendix D.

Transit Ridership - The most recent ridership counts for the Main-King-Queenston corridor suggest that transit ridership along the corridor has grown by approximately 20% over five years (2009 to 2014), or an average of about 4% per year. Ridership in the Main-King-Queenston corridor accounts for approximately 42% of the system wide ridership. Between 2009 and 2013 transit ridership across the HSR system grew by 4% (from 20,930,770 to 21,817,842), an average of approximately 1% per year. Based on the data, the Main-King-Queenston corridor carries a significant proportion of transit ridership in the City and ridership in this corridor is growing at a faster rate than the overall system. There is evidence that, from a transit ridership perspective, greater investment in this corridor is warranted.

Traffic Analysis - An analysis of traffic impacts related to the TOL was undertaken and is included in Appendix E. To summarize, traffic along King Street has been affected by the installation of the TOL. The installation and the first 3 months had the greatest impact to the overall operations, however through assistance from Traffic Engineering and operational changes, overall improvements were able to be completed. Motorist delays still occur through the peak periods, however, during the afternoon rush hour (most congested time period), on average, it takes just over five minutes longer to drive through the corridor. Pending approval of this report, staff would evaluate potential improvements to signal operations to continue to improve the overall operations throughout the corridor.

Collision data was also collected for the pilot project (see Appendix F). Evaluation of this data revealed that collisions primarily followed the historical collision patterns for the designated segments. While some increase can be observed for 2014, this data is a small sample size and it is difficult to identify or correlate collision data specifically to the operation of the TOL.

On Street Parking - The TOL design resulted in a net gain in the number of parking spaces and included an upgrade to pay and display kiosks in the area west of Bay Street. In addition, parking west of Bay Street was relocated from the north curb lane to the south. Businesses have indicated that this relocation has had a negative impact on them. Limited data is available to determine if on-street parking usage was directly affected. Data available for the area on King Street from Caroline to Queen does suggest that parking usage is down significantly (69%) as

compared to the previous year). It is inconclusive if this is related to the installation of the new kiosks or the TOL, or a combination.

Enforcement and Driver Adherence - As part of the introduction of the TOL an education component was conducted during the first few weeks of operation. During the Winter of 2013 - 2014, the pavement markings for the TOL became compromised as a result of unfavourable weather conditions during the installation and post installation. This resulted in less than ideal driver adherence to the TOL. Pavement markings were reapplied and enhanced April 2014. Furthermore, additional signage was installed to improve driver awareness and adherence. The pavement markings for the TOL were applied using latex paint because it was a one year pilot project. Should the TOL remain or be expanded consideration should be given to using durable markings wherever possible. Hamilton Police Service advised verbally that their records indicate 21 violations of the TOL were issued to May 13, 2014. Generally, driver adherence to the TOL has been reasonable based on observations and bus operator input.

Literature Review and Survey of Other Transit Agencies - A literature review and survey of several North American transit agencies was undertaken investigating the impacts of TOLs on adjacent businesses, as detailed in Appendix E. There are many variations of TOLs in operation and measurable data on business impacts resulting from dedicated bus lanes was limited and often focused on impacts during construction. However, there is some evidence that businesses can benefit from sustainable street design improvements including TOLs.

Input from Stakeholders and Public Perception

Numerous public comments have been received during the operation of the TOL. All comments were documented and the following is a brief summary of the issues. Overall, 205 submissions were received, a summary of which is included in Appendix A.

Cyclists - 26 individual comments have been received asking why cyclists are not permitted to use the TOL. One submitter also included an online petition. The strategy during design was to encourage cyclists to use parallel routes. Cyclists were specifically not allowed in the TOL as the purpose is to test a fully dedicated transit lane. Furthermore, shared bus-bike lanes are not recommended where bus volumes exceed twenty buses/hour. There are over 31 HSR buses regularly using the TOL in a peak hour with potential for an additional 38 “Upper” route buses in some segments. In the design of shared bus-bike lanes it is also recommended that the lanes be wide enough for buses and cyclists to safely pass one another (i.e. four to five metre width). As the TOL varies from 3.5 to 4.2 metres in width it does not meet this condition. Accordingly, staff do not recommend shared bus-bike lanes. Completion of the downtown cycling network should continue to be reviewed and implemented through the Cycling Master Plan process. A summary of Cycling Issues is included as Appendix G.

Impacts to Traffic and Parking - 79 comments were submitted that traffic in the core was congested, particularly during the first few weeks of operation. An

analysis of traffic conditions is provided above. Sixteen comments were received with questions about changes to parking.

Businesses King Street West BIA - Businesses west of Bay Street have provided comments that they are opposed to the TOL, which is having an adverse impact on their businesses, particularly due to the relocation of parking to the south side of King Street, west of Bay Street. Comments and petitions from the King Street West BIA are attached as Appendix B. Fourteen comments from the general public were received in relation to this topic.

International Village BIA - Comments from the International Village BIA are attached as Appendix C. According to the submission, out of 38 businesses, nine businesses are in support of the bus lane, eight are unaffected and 21 are not in support.

Taxis - Prior to implementing the TOL, staff consulted with the two main taxi companies in the City. While the taxi companies would prefer unimpeded use of the TOL, the option to allow taxis to enter the TOL to load and unload passengers was determined to be the best compromise. Since the opening of the TOL the Ontario Taxi Workers Union has contacted the City to state that their preference is to have full use of the TOL.

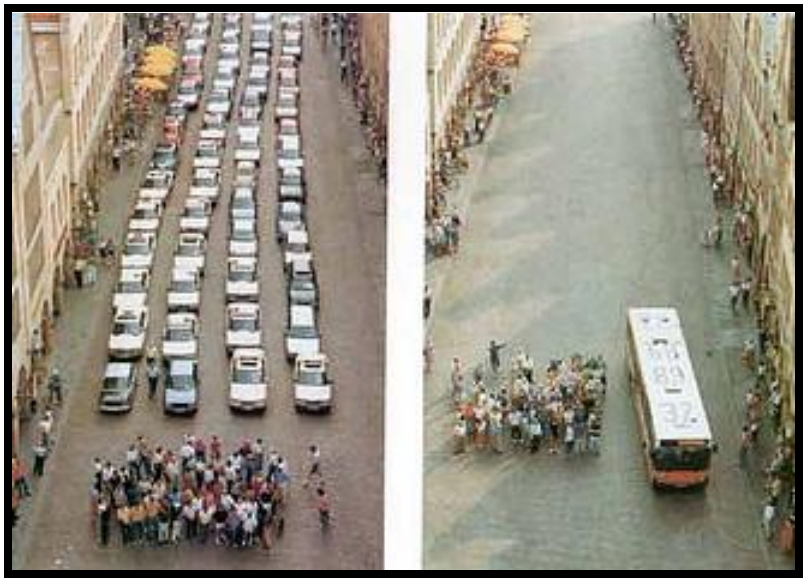
Transit Passengers - 61% of transit operators surveyed observed positive feedback from passengers (see Transit Operators Survey, included as Appendix D).

While positive feedback was received from transit passengers during the pilot project, general public acceptance of the TOL, particularly auto drivers and some business owners, has not been strong. This may be expected given the relatively low level of traffic congestion conditions in Hamilton currently. While there is growing evidence of improved Downtown vitality, including a greater focus on transit and pedestrian activity, businesses have expressed that they are still reliant upon access by private auto.

Analysis

With the adoption of the Rapid Ready report, Council endorsed moving forward with an integrated, multi-modal transportation strategy including a greater emphasis on transit investment and a complete streets approach. When designing and operating street networks this strategy requires that all modes of travel are accommodated. The philosophy requires us to think about how we move and accommodate people, not vehicles. The figure below illustrates this concept by showing the road capacity required to carry the same number of people in one bus as compared to single occupancy vehicles.

Figure 1 - Illustration of Road Capacity Required - Car Compared to Bus



Source: *Bus vs car road capacity,* n.d. photograph, viewed 10 December 2014, <http://www.planetizen.com/node/67722>.

According to data collected during the pilot, at the King Street and Bay Street intersection, during the morning rush hour, there was a volume of 1,190 vehicles recorded in three general purpose lanes. By comparison, there were approximately 1,104 passengers during the morning peak hour traveling in the one TOL. Therefore, one lane dedicated to transit can be as effective in moving people as two or three general vehicle lanes.

While the TOL pilot project has proven to be controversial, the TOL is an important and strategic step in developing the City's long term transportation network and accommodating growth and development. As the City and downtown core continue to grow and evolve public opinions will likely change to favour public transportation and transit oriented development. The TOL has shown positive results for transit operations and represents an important part of a proactive approach to travel demand, in advance of congestion due to growth.

In addition to the foregoing, as indicated earlier in this report, the City received twenty nine million eight hundred thousand dollars ($29.8 million) from Metrolinx for "Quick Wins" projects to grow ridership along the A and B Lines. Both the A and B-Line rapid transit projects are identified in the Big Move as fifteen year projects and the T-Line (Centre Mall, Limeridge Mall, Ancaster) is recognized as a 25 year project. The B-Line Light Rail Transit planning, design and engineering (30% design) work has been completed and submitted to Metrolinx. The TOL illustrates the City's long term commitment to growing transit in Hamilton which may better position the City for further funding.

Financial Effects

This project is funded from Metrolinx Quick Wins Reserve #108047. Overall, a budget of $300,000 was allocated to Transit Priority Measures. To date actual expenditures on the King Street TOL project have been approximately $184,000. Previous expenditures on Transit Priority Initiatives are $88,000, accounting for total expenditures of $272,000. Sufficient funds are available in Metrolinx Quick Wins Reserve #108047 to cover the revisions to the design recommended in this report.

Should Council decide to remove the TOL there would be an additional cost of $100,000. Sufficient funds are available in Metrolinx Quick Wins Reserve #108047 to cover the removal costs.

Alternatives

Alternative 1 - Maintain the TOL

The first alternative is to maintain the TOL. There are two variations of this alternative.

a) Retain With Refinements

Under this scenario, the TOL would remain status quo. Staff would continue to evaluate potential improvements such as to signal operations including transit priority, to improve the overall operations throughout the corridor. Staff would also report back to Committee in Q2 2016 with potential opportunities for extending the TOL.

Staff would support this option.

b) Modify the Design West of Bay Street:

As noted above, businesses in the area west of Bay Street have indicated that the relocation of parking to the south curb lane has had an adverse impact on business. Parking revenues have proven to be reduced in the area. The BIA has indicated that they would prefer the TOL to be located in the second lane from the north curb and parking reinstated in the north curb lane. While this design is not as preferred from an operational perspective, the TOL could be modified to the second lane from the north curb. Due to seasonal constraints for applying pavement markings, modifications couldn't be undertaken until the Spring 2015. Staff would also evaluate potential improvements to signal operations at the same time, including transit priority, to continue to improve the overall operations throughout the corridor.

Staff would support this option.

Alternative 2 - Extend the Pilot Period

The pilot project has resulted in an enhanced understanding of the challenges and opportunities relating to the implementation of transit priority measures in Hamilton. There are valuable lessons learned from the pilot that will be incorporated into ongoing transportation planning processes such as the Transportation Master Plan Review and the Ten Year Local Transit Strategy. The Ten Year Local Transit Strategy will be presented to Council in Q1 2015 in conjunction with the 2015 budget process. The

Transportation Master Plan Review is expected to be complete in Q1 2016. Given that these are two key transportation planning strategies, of which the TOL may have a significant influence, Council could extend the pilot period pending the outcome of these two initiatives. Under this scenario, Council would extend the pilot and direct staff to report back after the Transportation Master Plan Review.

Staff would support this option.

Alternative 3 - Discontinue the Transit Only Lane

The third Alternative is to direct staff to remove the TOL. As indicated in the Financial Section of this report, there would be an additional cost of $100,000 to remove the TOL. It should also be noted that there are seasonal constraints for removal of the TOL, due to the need to restore pavement markings. This cannot be done until the weather permits in the Spring 2015.

Staff would not recommend this option.

The 2015 Pan American /Para pan American Games will be occurring between July 11 and July 26, 2015**.** McMaster University will be used as an athletes' satellite location for the soccer tournament during the 2015 games. It is expected that as many as six hundred and forty (640+) athletes, training staff, officials, etc., involving sixteen teams will be housed at McMaster and will be travelling daily between the university campus, training sessions and the stadium. This could result in eight (8+) shuttle buses running along the Main-King corridor each day.

The TOL is supported by the Pan Am organizers, (TO2015), Ministry of Transportation of Ontario (MTO), who are undertaking the transportation organization for the games, and the City's Pan Am staff; as McMaster University will be an athlete's Satellite Village and access for training needs and games is part of the Games Route Network. Organizers have requested that Council consider allowing the TOL to remain, at least until after the July 2015 games.

If Council decides to discontinue the TOL, then staff could be directed to allow it to remain until after the 2015 Pan American/Parapan American Games to facilitate transport between satellite housing at McMaster University and the stadium.

Attachments to Report PW11079g

Appendix "A"	Stakeholder Comments Summary
Appendix "B"	King Street West BIA Submission
Appendix "C"	International Village BIA Submission
Appendix "D"	King Street Transit Only Lane Pilot Project Transit Analysis
Appendix "E"	Cole Engineering - Traffic and Travel Time Monitoring Report King Street Reserved Bus Lane
Appendix "F"	King Street Transit Only Lane Pilot Project Collision Data
Appendix "G"	King Street Transit Only Lane Pilot Project Cycling Issues

Hamilton
Public Works

KING STREET TRANSIT ONLY LANE PILOT PROJECT

Appendix "A"

Stakeholder Comments Summary

APPENDIX A

Date	*Comments/Notes*	2 lanes for buses	Buses slowed	Buses in other lanes	Congestion	Cycling	Deliveries	Diverts from downtown	Non-Adherence to TOL	Fading TOL markings	No parking	TOL Should be Part time	Reduced business	Safety	Signal timing	Speeding buses	TOL empty	Other
10-Oct-13	Cycling in TOL					X												
11-Oct-13	Bikes using TOL					X												
14-Oct-13	Requests full length TOL for B Line																	X
14-Oct-13	Safety; Inquiring about consideration for motorists merging onto Hwy 403 after the TOL; Concern about the new Tim Hortons drive thru at Dundurn.													X				
16-Oct-13	Pushing cyclists into another lane is dangerous.					X												
16-Oct-13	Inquiring about Cycling in TOL; Inquiring about alternate Cycling route					X												
18-Oct-13	Inquiring about Cycling in TOL; Recommends sharrows in general purpose lane					X												
19-Oct-13	Cycling in TOL					X												
21-Oct-13	Cyclists should be better integrated into the pilot project, Hamilton should accommodate Cycling					X												
21-Oct-13	Inquiring about emergency vehicles																	X
21-Oct-13	Inquiring about alternate Cycling route					x												
22-Oct-13	Cycling in TOL					X												
22-Oct-13	How much of the TOL pilot cost is for the new parking machines and other parking related costs																	X
22-Oct-13	Does not agree with banning cyclists from using TOL					X												

Date	*Comments/Notes*	2 lanes for buses	Buses slowed	Buses in other lanes	Congestion	Cycling	Deliveries	Diverts from downtown	Non-Adherence to TOL	Fading TOL markings	No parking	TOL Should be Part time	Reduced business	Safety	Signal timing	Speeding buses	TOL empty	Other
22-Oct-13	Frequently Cycling with 3-yr old son. The only safe route requires an illegal left turn from York onto a sidewalk on Bay that leads to Napier. Not for dismounting bicycle. Converting Bay to two-way would greatly improve Cycling routes through northern part of downtown. Raises concern of where bike lanes should be, such as Main but King is more convenient					X												
22-Oct-13	Cyclists must be able to access destinations on king, sharrows insufficient					X												
23-Oct-13	The bus lane starts where there is a lane end into a bus lane and where one turns right only - one lane through downtown to start				X													X
23-Oct-13	Congestion on King Street				X													
23-Oct-13	Tuesday at 2:30 PM: Congrats on another stupid idea; Complete disaster. Why does government cater to the minority? Would like to be on a panel to review information.																	X
23-Oct-13	Believes that bus drivers think they have the right of way. Believes that the downtown is not getting built up.					X								X				
23-Oct-13	Requests disability sticker exception for stopping in TOL										x							X
23-Oct-13	9:00- glad to hear we are addressing																	X

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23-Oct-13	Drives from Rosedale to McMaster (10-15mins) but took 40 mins instead and saw no bus drive by in that time. Would like to know how to fight this new lane				X													
23-Oct-13	12:30 PM: 10 minutes late because of congestion; 3 minutes for 6 blocks				X													
23-Oct-13	Confused at decision to ban cyclists on transit lane; Impedes city goal in Shifting Gears.					X												
23-Oct-13	185(2) and bike closest to curb					X												
23-Oct-13	Notified Coun. Jason Farr of the left turn lane at King and Catherine; advising for it to be changed																	X
23-Oct-13	Concerned about King between Mary and Catherine regarding the left turn lane onto Catherine.																	X
23-Oct-13	Traffic started at 7:30AM and is backing up to Wentworth st and the Clairmont access because they can't turn onto King St. Bus lane should start west of John St where King st widens to 4 lanes				X													
23-Oct-13	Inquiring about right turns																	X
23-Oct-13	John to King to 403 was 20 minutes and it not 45-50 minutes. Cannon now backlogged too, consider Charlton or LINC.				X													
23-Oct-13	Diverts from downtown							X										
23-Oct-13	Usually has a 7 minute commute from Ward 3 to 100 King St W and was now 30 mins. Will continue to find other routes but bussing is not an option				X													
23-Oct-13	Inquiring about the long-term plan for TOL																	X

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23-Oct-13	Inquiring about right turns; Buses in other lanes			X														
23-Oct-13	Police given wrong information about private cars dropping off passengers (i.e. okay). Right Turn education: $350.										X							X
23-Oct-13	Excited about the new bus lane but had difficulty driving in it. Recommends it to be fixed before Hunter and Charlton experience the traffic				X		X											
23-Oct-13	Got in 15 mins late to open store and customers had difficulty coming to the location. UPS and other courier trucks were unable to drop off packages				X		X											
23-Oct-13	Pavement marking for right turn lanes																	X
23-Oct-13	Recommends TOL be in north curb lane. Preliminary rate for transit riders in TOL. Rate decrease																	X
23-Oct-13	TOL Info																	X
23-Oct-13	No parking										X							
23-Oct-13	Congestion; TOL empty; Idling = pollution; No change to bus operations				X												X	
23-Oct-13	Cycling in TOL; Concern about dooring					X												
23-Oct-13	Speeding buses (reported in media)															X		
23-Oct-13	Congestion; Buses slowed		X		X													
23-Oct-13	Sheraton using extra lane. 500 vehicles exit Jackson Square daily																	X
23-Oct-13	Turns from King Street, using Transit Only Lane																	X
24-Oct-13	Inquiring about emergency vehicles																	X

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24-Oct-13	Disapproves of lane restrictions on streets such as Burlington, Barton and King Street. Took him 45 mins to travel from Wellington to Bay. Did not understand as to when Hamilton is growing, Council would impose lane restrictions downtown				X													
24-Oct-13	Has to cross 2 lanes to park underground and was almost rear-ended										X			X				
24-Oct-13	Vendors can't park in front of his store						X											
24-Oct-13	Hamilton is not like Toronto - We don't have wide streets or many buses				X													
24-Oct-13	Requesting additional signage at the exit from Jackson Square garage Motorists exiting the parking garage exit into the curb lane and get pulled over by police for driving in the bus lane																	X
24-Oct-13	Suggesting to turn Wellington into 2 way traffic and put a set of lights on West at King so cars can get across King to pick up elderly.																	X
24-Oct-13	Drove from Wellington to Dundurn (10mins; 8:46-8:56). Slow up to James, average speed of 50km/h after James				X													
24-Oct-13	Suggestion to remove parking at TimHortons due to sightlines										X							X
24-Oct-13	Cycling					X												
24-Oct-13	Congestion on King; drive times				X													
25-Oct-13	Police ticket for RT's																	X
25-Oct-13	congestion - no other options than driving				X													
25-Oct-13	TOL Inquiries																	X

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25-Oct-13	Taxi driver says that some of the cab drivers have been issued $65 tickets already.																	X
25-Oct-13	RTS? Ask public first. "Malaskey"																	X
25-Oct-13	Congestion				X													
25-Oct-13	Congestion; Diverts from downtown; Pushing car traffic into two lanes for the occasional bus is not a good solution.				X			X										
25-Oct-13	Received a call from Steve of TCS Legal Services about TOL. Told that Police would be enforcing it, with a $65. fine and 2 demerit points (and that it was part of the Highway Traffic Act).																	X
25-Oct-13	Congestion; Confusion; Deters from downtown; Inquiring about right turns				X													
25-Oct-13	Inquiring about right turns				X													
25-Oct-13	20 minutes late for work, 3 min with no buses in TOL				X												X	
27-Oct-13	Congestion; Deters from downtown; backed up to Wellington Sunday 2pm				X													
28-Oct-13	No parking at rush hour; Informed councillor McHattie that vehicles are parked on the left side of King past Locke.										X							
28-Oct-13	Bicycles and transit users do not bring money to city, only home owners drive and pay property taxes. Cars deserve lanes, not bicycles and buses because they use them all year					X												X

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28-Oct-13	Congestion; Reduces car use; Disapproves of transit; Trying to force us out of our cars. Transit has a schedule and is not as efficient. People continue driving their cars and get fines.				X													
28-Oct-13	Opposed																	X
28-Oct-13	Congestion				X													
28-Oct-13	Cyclists in TOL; No alternate Cycling route; Add sharrows; Speeding motorists; Current curb lane can accommodate motorists and cyclists. Add sharrows to indicate that the lane next to the transit lane is for cyclists. Lack of alternatives for getting from westdale to downtown. Parallel routes are complicated & doubles commute times for cyclists.					X												
28-Oct-13	Congestion; Bus Unreliability; Traffic from Queen St to Victoria St. 26 minute to 40 minute commute. Create buffer from Mary St and King St E where the bus-only lane starts currently.				X													
28-Oct-13	Congestion				X													
28-Oct-13	Construction at Queen blocking lane. Close company and leave Hamilton.																	X
28-Oct-13	Cycling in TOL; Winter maintenance; Cycling on King is dangerous; Witnessed road rage; Winter driving conditions on King Street will be a nightmare.					X												
28-Oct-13	Inquiring about taxi access to TOL																	X

Date	*Comments/Notes*	2 lanes for buses	Buses slowed	Buses in other lanes	Congestion	Cycling	Deliveries	Diverts from downtown	Non-Adherence to TOL	Fading TOL markings	No parking	TOL Should be Part time	Reduced business	Safety	Signal timing	Speeding buses	TOL empty	Other
28-Oct-13	Cars parked on left side of King Street, past Locke										X							
29-Oct-13	Infringement; Buses in other lanes; Great idea but not only 50% for general purpose and then buses use it!								X									
29-Oct-13	Inquiries about Sheraton, turning right, emergency vehicles																	X
29-Oct-13	Signal timing														X			
29-Oct-13	Tweeting that public works is intentionally congesting King between John and James				X													
29-Oct-13	Part time TOL											X						
29-Oct-13	Congestion; TOL empty				X												X	
29-Oct-13	Congestion; Buses slowed		X		X													
29-Oct-13	Waiting at John Street for 30 minutes. Queue started at the back of First Place.				X													
30-Oct-13	Requests justification, benefits, long term plan for TOL, ridership (current/projected); "Closing 2 lanes is not beneficial for anyone"	X																X

Date	*Comments/Notes*	2 lanes for buses	Buses slowed	Buses in other lanes	Congestion	Cycling	Deliveries	Diverts from downtown	Non-Adherence to TOL	Fading TOL markings	No parking	TOL Should be Part time	Reduced business	Safety	Signal timing	Speeding buses	TOL empty	Other
30-Oct-13	Several operators using the TOL are cutting over at MacNab. Many operators continue to make the left turn from John onto King from the left lane instead of from the second (right) lane (a greater risk of accident). Operators have suggested that we may want to see if a separate bus lane signal along King at James and MacNab. Also, delaying the light at Hughson for a minute after it has changed at James- allow for clearing of traffic. The King stop at Hughson was to move it back to east side mid block (Hughson and John for the King buses going to the Go Station). Allowing the 1A King buses to continue to use the stop on the west side of the intersection. Straight through on King to the west end is that while it has been an improvement. TOL from Bay St and on, Mary caused congestion and delays.			X														
30-Oct-13	Buses in other lanes; Congestion on Johnston			X	X													
30-Oct-13	Buses in other lanes; Deters from downtown			X														
30-Oct-13	Almost hit turning right by someone in bus lane								X					X				
30-Oct-13	Took him 18 green cycles, up from 2-3 pre-bus lane. 25 minutes for 1.7 km from Wellington to Queen				X										X			

Date	*Comments/Notes*	2 lanes for buses	Buses slowed	Buses in other lanes	Congestion	Cycling	Deliveries	Diverts from downtown	Non-Adherence to TOL	Fading TOL markings	No parking	TOL Should be Part time	Reduced business	Safety	Signal timing	Speeding buses	TOL empty	Other
30-Oct-13	Congestion; Part time TOL; Increased communication; Reduced business; Diverts from downtown; Requests radio ads that state "expect delays". Queues at 10 AM in front of store.				X			X				X	X					
31-Oct-13	Signal timing; Congestion turning onto King from Hughson				X										X			
31-Oct-13	Lives in Binbrook and works in downtown core. General comments regarding road work timing such as mountain access closures and the revitalization of the downtown core. Describes her experience of the TOL and how it is an accident waiting to happen.												X					
31-Oct-13	Congestion; No parking at rush hour; Safety				X						X			X				
31-Oct-13	Local resident- an ambulance. Police stopped her. Nervous about driving in TOL to get gas. Only PM rush?											X						
31-Oct-13	"Gridlock" from King St E to Wellington. Customers do not want to line up to drive into parking lot. Shoppers are complaining of wait times. Buses turn from John to King, they stay in vehicle lane. Rescind TOL from Wellington to Bay.				X													
31-Oct-13	Congestion; Deters from downtown; "2 lanes for buses"; Nobody knows how far back is legal to make lane change for RT	X			X													
31-Oct-13	Congestion; Speeding buses; Pay and display along walk for elderly				X											X		

Date	*Comments/Notes*	2 lanes for buses	Buses slowed	Buses in other lanes	Congestion	Cycling	Deliveries	Diverts from downtown	Non-Adherence to TOL	Fading TOL markings	No parking	TOL Should be Part time	Reduced business	Safety	Signal timing	Speeding buses	TOL empty	Other
1-Nov-13	Congestion				X													
1-Nov-13	Responded to by Bob Bratina				X								X					
1-Nov-13	Support of TOL and complete streets																	X
1-Nov-13	Congestion; No parking at rush hour; Right lane at Queen cannot turning on red now because of traffic saturation.				X						X							
1-Nov-13	Safety concern for drivers and pedestrians due to dual turning lanes from Queen; Congestion; TOL empty; Safety				X									X			X	
2-Nov-13	Quicker Commute				X													X
2-Nov-13	Congestion; Signal timing; Deters from downtown				X										X			
2-Nov-13	Support of TOL and LRT																	X
4-Nov-13	Congestion; Deters from downtown; Business reduced				X													
4-Nov-13	Fading TOL markings; Kelly Anderson wants to know if there will be a repaint in the spring.									X								
4-Nov-13	No parking at rush hour										X							
4-Nov-13	No parking at rush hour										X							
4-Nov-13	1 ¼ hours to drive downtown from King/Grays, up from 30 min				X													
4-Nov-13	Congestion; TOL empty; MacNab bus congestion; Buses in other lanes; Recommends TOL on Main Street E			X	X												X	
4-Nov-13	Inquiring about right turns																	X
4-Nov-13	Requests feedback on TOL from Christine																	X
4-Nov-13	Congestion; Buses slowed; Took the King bus this morning during the rush hour (8AM) and it took an extra 30+ min to get downtown		X		X													

Date	*Comments/Notes*	2 lanes for buses	Buses slowed	Buses in other lanes	Congestion	Cycling	Deliveries	Diverts from downtown	Non-Adherence to TOL	Fading TOL markings	No parking	TOL Should be Part time	Reduced business	Safety	Signal timing	Speeding buses	TOL empty	Other
4-Nov-13	Congestion				X													
4-Nov-13	Congestion; Diverts from downtown				X			X										
4-Nov-13	Congestion; Part time TOL				X							X						
5-Nov-13	Support of TOL and LRT																	X
5-Nov-13	One lane of traffic is ridiculous. Hughson to King: waited 4 lights to turn. Thinking of making one TOL not two. Snow will make it worse	X			X													
5-Nov-13	Congestion				X													
5-Nov-13	Buses abuse rights with TOL.																	X
5-Nov-13	Ancaster employees saw a 15min increase in commute.				X													
5-Nov-13	TOL is “taking away half of his business” and making it very difficult and dangerous for his suppliers to deliver product.						X						X					
5-Nov-13	Improper English on signs, should be ONLY BUS not BUSES ONLY																	X
5-Nov-13	Has been in contact with Coun. Farr regarding the congestion on King from Mary to Wellington. Main issue is not with the bus only lane, but with the congestion being caused. Has been notified that Al Fletcher would contact him, has not received contact.				X			X										
7-Nov-13	Requesting modifications planned for the TOL																	X
7-Nov-13	Survey for the BIA for the TOL: REFER TO EMAIL																	X

Date	*Comments/Notes*	2 lanes for buses	Buses slowed	Buses in other lanes	Congestion	Cycling	Deliveries	Diverts from downtown	Non-Adherence to TOL	Fading TOL markings	No parking	TOL Should be Part time	Reduced business	Safety	Signal timing	Speeding buses	TOL empty	Other
7-Nov-13	Caller who has a business at 2 King St. W. says this Transit Only Lane is slowing all traffic (including buses) on King Street during the daytime hours. He also says that's he's got some feedback from customers that they won't keep coming downtown (as the travel time has increased) if this experiment continues for very long.				X			X					X					
7-Nov-13	Claims sales have dropped 50-60% due to TOL. Other business owners along this strip are also losing sales. He said this can't go on for a year trial as many of the businesses will have to close down												X					
7-Nov-13	15-30 minutes slower				X													
7-Nov-13	Opposed to TOL and LRT																	X
7-Nov-13	Solution is to put transit only light at King & McNab and King & James. Pull Back stopping line for traffic			X														
8-Nov-13	No parking at rush hour										X							
11-Nov-13	Took from 6:10 to 6:50 to get from King & Wentworth to King & Dundurn.				X													
11-Nov-13	Suggested car-free downtown shopping streets																	X
12-Nov-13	Reduced business; Improved bus speed; People unaware of south side parking | Students are saying that bus only arrives at McMaster 3 min faster. Do something to identify parking, paint stalls?												X					

Date	*Comments/Notes*	2 lanes for buses	Buses slowed	Buses in other lanes	Congestion	Cycling	Deliveries	Diverts from downtown	Non-Adherence to TOL	Fading TOL markings	No parking	TOL Should be Part time	Reduced business	Safety	Signal timing	Speeding buses	TOL empty	Other
12-Nov-13	Hamilton does not have width of average street in Toronto & buses are driving fast in TOL.; Congestion; Speeding buses; Reduced business				X								X			X		
12-Nov-13	Opposed to TOL																	X
12-Nov-13	Opposed to TOL																	X
12-Nov-13	Support; Inquiring about use of bus lane																	X
13-Nov-13	Congestion; Reduced business				X													
13-Nov-13	Bus lane prevents Cycling to my bike shop					X												
14-Nov-13	Reduced business; Requests reduction in property tax; Increase awareness of relocated parking; sales are down 60-70%. Has been at location for 30 yrs. Wants a reduction in property tax to compensate. Wants Mayor and Councillors to be aware of his concerns. At the very least to do something about parking – large signs so that people know parking is relocated to the south side. Perhaps offer free parking vouchers for the municipal lot.												X					
15-Nov-13	Congestion; TOL empty				X												X	
16-Nov-13	Permit taxis in bus lane																	X

Date	*Comments/Notes*	2 lanes for buses	Buses slowed	Buses in other lanes	Congestion	Cycling	Deliveries	Diverts from downtown	Non-Adherence to TOL	Fading TOL markings	No parking	TOL Should be Part time	Reduced business	Safety	Signal timing	Speeding buses	TOL empty	Other
17-Nov-14	Caller called to say that the Transit Only Lane (especially during the rush hours) is causing severe congestion on King Street – causing many people to avoid King Street altogether. He feels that if things continue this way, many people (who have money, and drive cars) will move away from Hamilton.				X													
18-Nov-13	MacNab bus congestion; Buses in other lanes; Cycling in TOL; Create a dedicated left turn signal for buses into MacNab Terminal from the TOL			X		X												
20-Nov-13	Improving traffic flow; operating better now that Queen St Hill is open - not too bad, only adding about 3 min to my commute now				X													X
20-Nov-13	Requests shorter trial period; hopefully evaluated in less than 1 yr																	X
20-Nov-13	I've biked in the bus lane exclusively and have had zero conflict with buses yet					X												
20-Nov-13	Cycling in TOL					X												
20-Nov-13	Requests TOL promotion; City promote an image showing how many cars are avoided with a bus full of riders																	X
20-Nov-13	Cycling in TOL					X												
22-Nov-13	Congestion; Diverts from downtown; Insufficient education				X			X										
26-Nov-13	Insufficient parking at Queen; TOL empty; Diverts from downtown; Reduced business							X					X				X	

Date	*Comments/Notes*	2 lanes for buses	Buses slowed	Buses in other lanes	Congestion	Cycling	Deliveries	Diverts from downtown	Non-Adherence to TOL	Fading TOL markings	No parking	TOL Should be Part time	Reduced business	Safety	Signal timing	Speeding buses	TOL empty	Other
29-Nov-13	Inquiring whether disabled parking permit allows stopping in the bus lane to unload passenger										X							
29-Nov-13	Disabled Parking Permit - does this allow you to stop in the Transit Only Lane										X							X
2-Dec-13	Congestion; Part time TOL; Buses in other lanes; 15 min from Wellington to Queen			X	X							X						
3-Dec-13	Supports bus lanes, but concerned about business impact												X					
3-Dec-13	Reduced business												X					
4-Dec-13	Backed up to Victoria & Wentworth, waited 5 - 10 minutes at lights - 1 lane for busses is fair	X			X													
7-Dec-13	Narrow sidewalks too crowded (bus passengers + bicycles)																	X
9-Dec-13	Congestion; Idling = pollution; Reduced business; City is too sprawling for transit				X								X					
10-Dec-13	Inquiring about monitoring methodology, funding of LRT																	X
11-Dec-13	Opposed to TOL																	X
11-Dec-13	Congestion; Macnab bus congestion; Buses in other lanes			X	X													
11-Dec-13	Congestion - does not improve bus service				X													
12-Dec-13	Safety; "2 lanes for buses"; Frequent conflicts between Catherine and Bay	X												X				
12-Dec-13	Inquiring about monitoring details, parking usage, vibration, business input										X							X

Date	*Comments/Notes*	2 lanes for buses	Buses slowed	Buses in other lanes	Congestion	Cycling	Deliveries	Diverts from downtown	Non-Adherence to TOL	Fading TOL markings	No parking	TOL Should be Part time	Reduced business	Safety	Signal timing	Speeding buses	TOL empty	Other
18-Dec-13	Private vehicles using this lane at will weaving in and out which is making it a dangerous situation and requested more patrol								X					X				
18-Dec-13	must cross 4 lanes of traffic to deliver; The loading zones provided in that area are useless to me.						X											
19-Dec-13	Fading TOL markings									X								
23-Dec-13	An Anti-anti-bus lane campaign is now underway. King St businesses rallying FOR the TOL																	X
26-Dec-13	Congestion; "2 lanes for buses"	X			X													
5-Jan-14	10 new Cycling in TOL petition signatures					X												
6-Jan-14	Infringement; Fading TOL markings								X	X								
8-Jan-14	Fading TOL markings; Requests increased signage									X								
15-Jan-14	Inquiry about vibration																	X
21-Jan-14	Paint guide lines at Catherine (https://twitter.com/mkuplens/status/425820914958090240/photo/1)																	X
28-Jan-14	Inquiries about trial duration, project info																	X
29-Jan-14	Congestion; Buses in other lanes; Macnab bus congestion; Reduced business; Bus lane should start after Macnab			X	X								X					
30-Jan-14	Inquiry about project budget																	X
30-Jan-14	45 min from Bay to Dundurn				X													
3-Feb-14	Safety; Fading TOL markings; Infringement								X	X				X				
10-Feb-14	Requests additional signage																	X

Date	*Comments/Notes*	2 lanes for buses	Buses slowed	Buses in other lanes	Congestion	Cycling	Deliveries	Diverts from downtown	Non-Adherence to TOL	Fading TOL markings	No parking	TOL Should be Part time	Reduced business	Safety	Signal timing	Speeding buses	TOL empty	Other
12-Mar-14	Petition to end pilot and return parking to north side of street										X							X
20-Mar-14	Vibration; Pothole repair insufficient: there are major cracks in the wall																	X
9-Jun-14	Congestion at all hours in downtown; exhaust fumes from buses while idling; buses not using bus lane (for buses going to MacNab terminal)	X		X	X												X	
29-May-14	Customer said he represents a group of 30-50 retired seniors. They do not like the traffic congestion that is being caused by the bus only lane on King St. He said he will also call his counillor to voice the groups concerns and hopefully trigger them to decline a permanent placement of this lane when the one year trial period is over				X													
7-Jul-14	Congestion; bad signal timings; cars getting stuck in intersections				X									X	X			
10-Jul-14	Customer said it used to take her 15 minutes to get to work from Stoney Creek to downtown and not it's taking 45-60 minutes because of the traffic back up due to the bus only lane.				X													
10-Sep-14	back up of traffic on King St				X													
	3 lights at Dundurn. 10-15 min takes 40 min on Friday				X													
	Winter maintenance concern; Requests moving TOL to Burlington Street to revitalize it																	X
	Congestion				X													
	Vibration																	X

Date	*Comments/Notes*	2 lanes for buses	Buses slowed	Buses in other lanes	Congestion	Cycling	Deliveries	Diverts from downtown	Non-Adherence to TOL	Fading TOL markings	No parking	TOL Should be Part time	Reduced business	Safety	Signal timing	Speeding buses	TOL empty	Other
TOTALS		7	3	11	79	26	5	8	5	5	16	5	14	10	5	3	8	66

Hamilton
Public Works

KING STREET TRANSIT ONLY LANE PILOT PROJECT

Appendix "B"

King Street West BIA Submission

APPENDIX B

Bender, Daryl

From: Horzelenberg, Trevor
Sent: July-15-14 11:29 AM
To: Maloney, Eileen
Cc: Lee-Morrison, Christine; Curzi, Rae; Bender, Daryl
Subject: FW: King St. W. BIA Meeting (response to questions)

Eileen,

On behalf of Christine Lee-Morrison, below please find a response to all the questions from the King Street West BIA, we apologize for the delay in these responses, however we had to sort through all the submissions to date in order to acknowledge all the correspondence that we have received from the BIA:

I need to know exactly what is being used from us (meaning the BIA) in the 'report' that is being prepared regarding the bus lanes. I am afraid of being misquoted and that many of our points will be completely omitted.

- Attached are the submissions received by the City of Hamilton from the King Street West BIA that will be appended to the final monitoring report. Staff may summarize the issues from stakeholder submissions in the body of the monitoring report but do not misquote stakeholder submissions.

Do we need to prepare yet another report from the bia?

- If you have additional comments/issues to add, please feel free to forward them to me. If your comments have not changed then another submission is not necessary.

Please let us know the deadline for submissions for both the report and by what date we have to formalize the request to city council to have the lane removed.

- As indicated in our previous correspondence, a Committee date for the report has not yet been determined. You may continue to submit comments to this Department until October 22, 2014. It should be noted that there will be no Committee or Council meetings between mid-September and December of this year. As the pilot does not end until late October, it will not be possible to have the report scheduled until the new Council is in place as early as possible 2015. We will advise once a date has been confirmed.

- If you wish to make a formal request to appear before the Committee when the staff report on the Transit Only Lane monitoring is scheduled, please see the following information or contact the City Clerk's Office at (905) 546-4408.

  http://www.hamilton.ca/CityDepartments/CorporateServices/Clerks/Request+to+Speak+to+a+Committee+of+Council+2014.htm

thanks

Christine Lee-Morrison, MCIP, RPP
Manager, Mobility Programs and Special Projects
Transportation Division
Public Works Department
2200 Upper James Street,
Mt. Hope, ON L0R 1W0
Tel: (905) 546-2424 Ext. 6390

Fax: 905-546-4435
Cell: 905 977-8527
Christine.Lee-Morrison@hamilton.ca

From: Lia Hess [redacted]
Sent: June-12-14 3:18 PM
To: Maloney, Eileen
Cc: [redacted]
Subject: RE: King St. W. BIA Meeting - June 16th

sorry, you will be missed :(
I need to know exactly what is being used from us (meaning the BIA) in the 'report' that is being prepared regarding the bus lanes. I am afraid of being misquoted and that many of our points will be completely omitted.
Do we need to prepare yet another report from the bia?
Please let us know the deadline for submissions for both the report and by what date we have to formalize the request to city council to have the lane removed.
thanks
Lia

Transit Only Lane Feedback

King St W BIA

May 2013

Bender, Daryl

Subject: LRT and King West BIA

From: Lia Hess [mailto:kingwestbia@yahoo.ca]
Sent: Friday, May 17, 2013 2:58 PM
To: Farr, Jason; Maloney, Eileen
Cc: Norton, Glen; Lee-Morrison, Christine; McHattie, Brian; Merulla, Sam
Subject: LRT and King West BIA

Thank you for the update regarding this critical issue to the King West BIA.
I am just setting the date for our next meeting, and the future LRT will be the main issue. The meeting will be in the beginning of June, I will let you know of the date and details shortly.
My early commentary would reflect the sentiments of the merchants/businesses located on the North side of King. As you all recall we were severely impacted by the lack of parking when the construction barriers on the corner of Hess and King Street went up about 2 years ago. This means that there already has been and still is a full lane of traffic restriction in front of our businesses extending midway up from Caroline, past Hess and almost to Queen. We would very much welcome the proposal that this restricted lane be converted to full time parking. This additional parking would provide much needed relief to not only the merchants on King Street, but to those in Hess Village and also to the residents.
We have noticed no particular traffic slowdowns due to the fact that we had parking reinstated infront of our businesses, including parking during peak hours.
As a business owner who has 100% of my clients driving to my office, I depend on the availability of parking in front of my establishment during normal business hours and welcome the opportunity to have increased parking now on BOTH sides of King Street.
I see no reason to impose a dedicated bus lane as a "trial" as the conclusion is already obvious to all. There will little or no impact on the traffic, but the merchants and residents will feel the direct negative impact of reduced parking spaces. We would like to keep our parking as long as possible.
I will report back to you after our next BIA meeting as likely some of the other businesses will have commentary as well.
Lia Hess.

From: "Farr, Jason" <Jason.Farr@hamilton.ca>
To: "Maloney, Eileen" <Eileen.Maloney@hamilton.ca>; kingwestbia@yahoo.ca
Cc: "Norton, Glen" <Glen.Norton@hamilton.ca>; "Lee-Morrison, Christine" <Christine.Lee-Morrison@hamilton.ca>; "McHattie, Brian" <Brian.McHattie@hamilton.ca>; "Merulla, Sam" <Sam.Merulla@hamilton.ca>
Sent: Thursday, May 16, 2013 2:32:23 PM
Subject: Re: 2011 & 2012 Audit Requirements
Lia,

You may recall as chairperson of the King-West BIA that we had a BIA conversation on the dedicated bus transit lane through your BIA.

Today, Public Works committee debated the issue and one of the questions related around the feelings from your BIA on the matter. I was at the meeting and relayed the conversation as I recollected.

I told the committee about the BIA appreciating that the parking would go accross the street and likely expand in volume of autos able to park as we would go from meters to the parking boxes as we see on Locke.

I explained that we had also discussed loading zones would be located across the street as well.

It was my impression from that BIA meeting last year that you were interested in LRT and that you understood that a dedicated transit pilot was a necessary step toward this city building effort.

It would be helpful (infact crucial) to the dedicated transit lane pilot cause if you could confirm that we both had this conversation and that the BIA is comfortable with the added parking, albeit across the street.

Thanks, and I look forward to hearing from you again.

Jay

I have cc'd the supportive Councillors who where in attendance at Public Works Committee today.

PS - Part of the discussion hit on the horrendous hoarding you good people have been dealing with for some time. I had suggested to committee that we move a motion to have it taken down long before it interrupts our important dedicated bus lane pilot project.

Transit Only Lane Feedback

King St W BIA

June 2013

(a petition with 23 signatures)

Merchants, property owners and residents of King St.W. in opposition to the Bus Lane Only changes

June 18th 2013

Major and members of council

City of Hamilton ON.

We are **merchants, property owners and residents** of King St. West between Bay St. and Queen St. in **opposition** of the Bus Lane only changes in our neighborhood. As property owners, some of us have **30 or more years** of **experience** with the **characteristics of our neighborhood.** We deal with apartment rentals, store front rentals, business operations, parking problems, traffic problems and have **enough knowledge** to know how **negative** this application of a bus lane will be. For over 30 (or more) years we have adjusted to our surrounding to suit our present set up, now we are expected to evolve in a way which doesn't suit our **needs** anymore.

Please be **clear**, we are in complete opposition of application of this Bus Lane and expect the following letter not to be misunderstood. We are writing because we are now **forced** to accept its application, deal with its **effects** on us and suggest ways that the city will help us maintain some sort normalcy.

For the record, we are all frustrated in the **lack of information, warning and conduct** of the city in its sensitivity to our needs and issues.

We have **designed** the following letter in **point form** to address each problem which **will arise** and after each point we suggest possible solutions.

History

Since the time our buildings were built (approx. 100 years) parking out front in the curb lane has been a part of the natural access to businesses and has been working fine. It wasn't until recently where malls finally realize the value of ease for customers to access a business and its importance, hence the *BOX STORE* style malls. People naturally avoid doing business when too much is involved in gaining access to an establishment. The distance between where you park and the door you need to access is crucial. This option will no longer be available to us. We are struggling enough as it is. This Lane restriction will just fuel our hardships.

Solution

-We understand how parking is planned across the street and would suggest a maximum stay of 30 minutes and enforced until at least 7 pm. This will ensure the parking will be used for our businesses and not the mall or distant needs.

-Create a time frame for the bus lane only use, between 2pm and 6pm to accommodate the rush hour traffic needs and allow regular usage after 6pm and on weekends. The bus lane is designed to alleviate traffic; there is no need for it at other hours. This will allow the city to generate extra income during those hours and double our parking availability.

-Clearly explain to MPAC that our properties no longer have the same status and that our values will be reduced considerably.

Safety

FACT Buses move at a more rapid pace than they should. Being a good judge of speed, I'd say some buses travel down King St. and other parts of the city beyond 70 km per hour. My concern for safety is most important in this letter. Without a buffer zone or pedestrian protection the risk of bus/pedestrian collision is imminent.

Solution

-Prepare a road safety report outlining what would be needed to ensure safety.

-Change the speed limit on our street to 40 km per hour.

-Create a speed bump on each block half way down the block.

-Have radar set up, similar to the one at Cootes Paradise for students attending McMaster University and their cross walk safety.

-Set up cross walks half way through each block with button activation.

-Build a barrier between the sidewalk and road to protect pedestrians.

Peace and quiet

Buses come with annoying noise which will take away from the peaceful enjoyment of our space, especially the apartment dwellings above our stores. Noise includes BRAKES (air brake noise and worn brakes), ENGINE NOISE (while accelerating....very loud) HONKING OF HORN! This last item will happen often. People will still attempt to use the curb lane regardless of traffic laws. We can guarantee that when any bus driver encountering a driver parked in this lane will sound their horn and disturb the whole neighborhood during the evening and will constantly disturb peaceful business operations during the day.

Solution

-Consult with the HSR and find a method in which to create a quiet zone in our area. NO HORN BLOWING!

-Slow down acceleration noise by lowering the speed limit to 40 km /per hour.

-Penalize bus drivers for abusive horn habits.

Bus stops

In no way will we tolerate bus stops in front of our properties. This has been proven to create a place for loitering and trouble.

Solution

-Maintain present bus stop locations and do not add any more.

Loading zone

Access to our properties is limited. Our rear access will not accommodate deliveries by large vehicles. The overhead wires and tightness of space will restrict their ability for access. Imagine Ups and FedEx drivers zooming in and out of alleyways all day long....blocking access most of the time. The city hasn't even considered this problem from our observation. We need delivery access close to our front doors.

Solution

-Maintain the loading access as it is now for commercial vehicles or permit holders (merchants) only between 7am and 2pm, after 6pm on weekdays and all day on weekends.

Dust

From experience, we've noticed the amount of dust which is created between 4pm and 6pm (rush hour) due to racing buses and the dust storm they create while speeding by our stores. This type of dirt gets into everything and is very hard to remove, especially off of merchandise.

Solution

-Change the speed limit on our street to 40 km per hour.

-Create a speed bump on each block half way down the block.

-Have radar set up, similar to the one at Cootes Paradise for students attending McMaster University and their cross walk safety.

-Set up cross walks half way through each block with button activation.

Right to enjoyment

For years the description of King Street has been a Highway style road which is very unattractive. Now we are making is worse. Are the days of taking a stroll down an urban street with your family or lady gone? Will anyone be interested in visiting our establishments when this huge volume of bus traffic scares them off?

Solution

-Create curb appeal, something that will entice more business to our store fronts.

-Lower our taxes to compensate for our losses in rental appeal through MPAC

One year Pilot

Will our opinions matter during the pilot year or is this just a way to smooth over the permanent transition?

If opposition reaches a level which is obvious and we are affected considerably, will there be the option of cancelling the whole project?

Summary

We are all tax payers and follow the democratic way of doing business as you politicians do. We deserve to be heard and respected for our opinions. This application, by the city for a Bus Lane will change the way we've been doing business for decades, it will destroy the appeal of our rentals, it will disturb the peaceful enjoyment of our residential dwellings and it will risk the public's safety.

None of us are satisfied with the chain of events which have lead to these changes. We will protest with all our hearts to abolish the Bus Lane all together.

At the last council meeting which we attended it was clear by city officials that this application of a bus lane will not make a significant difference in travel time for commuters.

We are aware, that the main reason for installation is to use the funds that are offered by Metrolinx "Quick Wins" before the use of those funds expires.

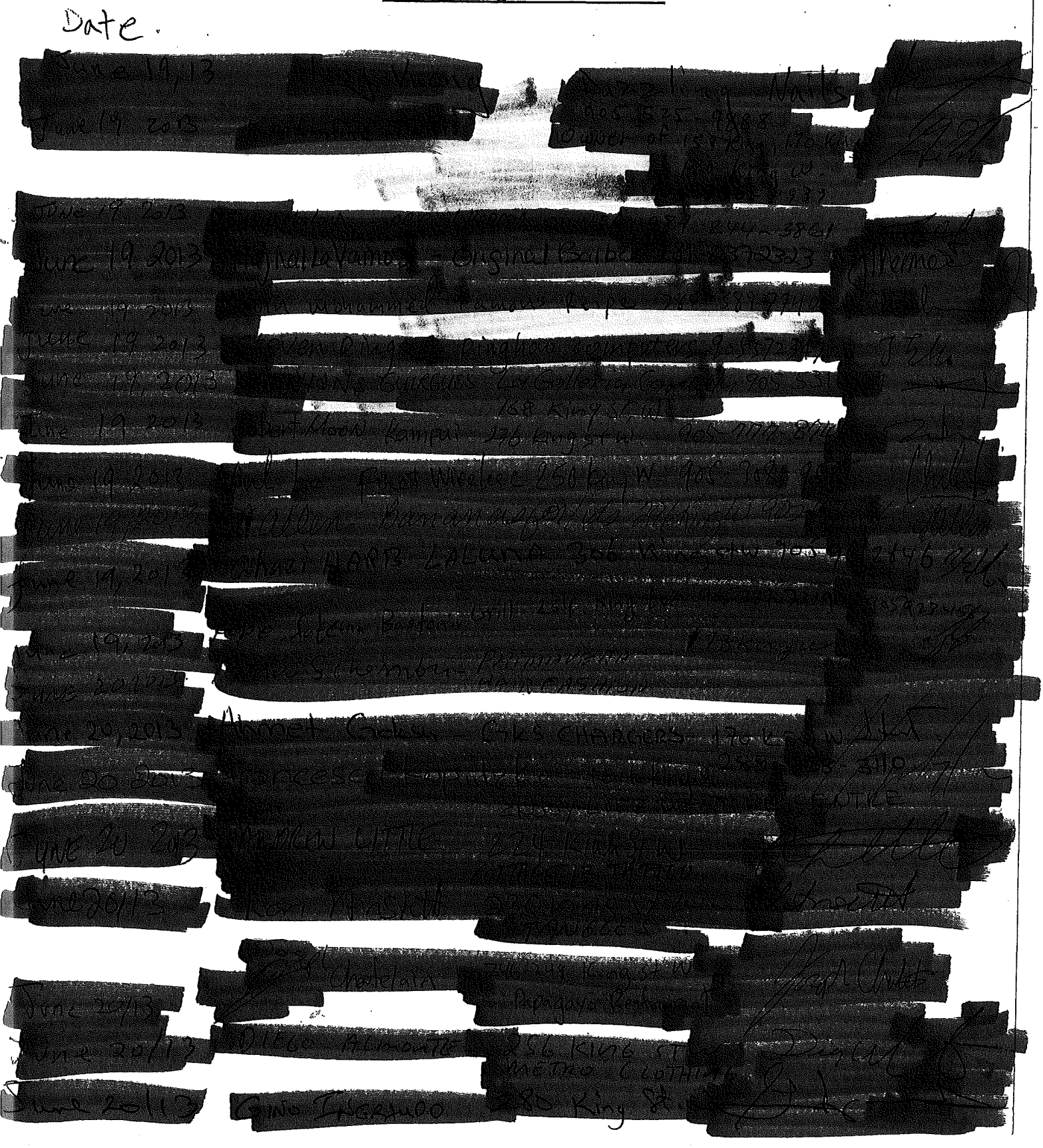
In the mean time we hope that our suggestions are heard, acknowledged and respected. We expect to meet with city officials to discuss some of the options we mentioned and hear their suggestions.

Please contact Konstantine Takis (head of this initiative) at 905-870-0939

Or by e-mail at NobuslaneL8P@Hotmail.com

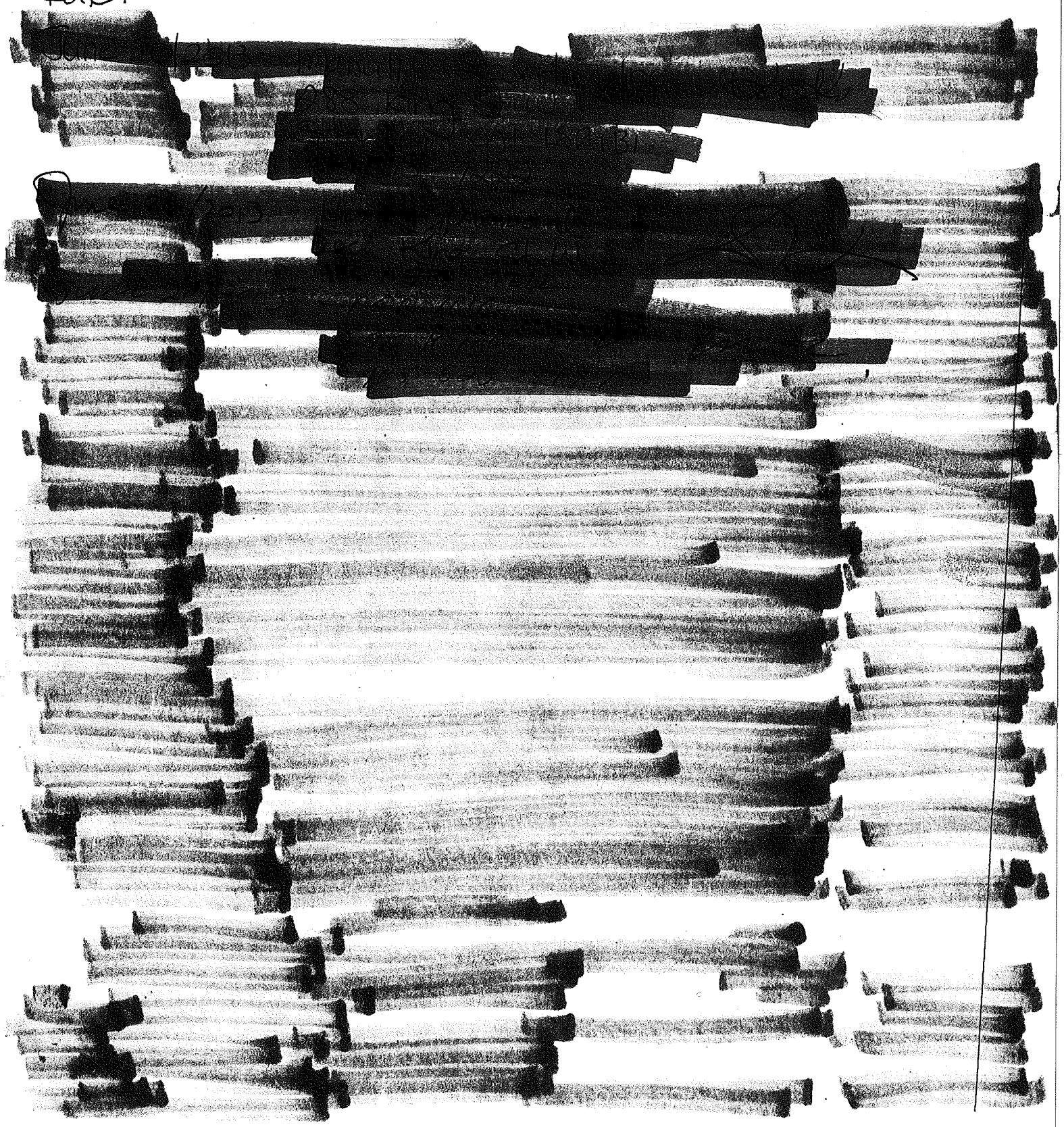
Attached is a petition by Property owners, business owners and residents of King St. West in Hamilton ON. Who have read and agreed with the contents of this letter and wish to address all their concerns.

Petition against bus lane



Petition against bus lane

Date:



Transit Only Lane Feedback

King St W BIA

July 2013

Horzelenberg, Trevor

From: Horzelenberg, Trevor
Sent: July-11-13 3:51 PM
To: Maloney, Eileen; 'Lia Hess'
Cc: Bender, Daryl; Lee-Morrison, Christine
Subject: RE: King St. W. BIA

Lia,

The LRT scheme (30% design) reflected both tracks (one eastbound, one westbound) on the southside of King St. through the core, with the remaining 2 northerly vehicular lanes running westbound for general purpose traffic and local bus service.

Furthermore, the City has completed the Environmental Project Report and the 30% design drawings for the B-Line LRT and Council has endorsed these plans to be sent off to Metrolinx in order to determine the funding formula and priority of this project. Therefore, at this stage it is up to the province via Metrolinx to come back to the City with timelines and funding of such a major project prior to the City making any final recommendations.

Eileen is correct, that you may want to touch base with Councillor Farr to identify any further discussions relating to LRT.

Should you have any further questions and/or concerns, please feel free to contact me.

Thank you

Trevor Horzelenberg, MCIP, RPP, CET | Senior Project Manager - Public Transportation | Mobility Programs & Special Projects | Transportation, Energy and Facilities Division | Public Works Department | City of Hamilton | 77 James St. N. Suite 400, Hamilton ON L8R 2K3 | 905.546.2424 xt. 2343 | mailto: Trevor.Horzelenberg@hamilton.ca | www.hamiltonrapidtransit.ca

-----Original Message-----
From: Maloney, Eileen
Sent: Thursday, July 11, 2013 3:39 PM
To: 'Lia Hess'
Cc: Bender, Daryl; Horzelenberg, Trevor
Subject: RE: King St. W. BIA

Hi Lia,

Daryl Bender and Trevor Horzelenberg, from Public Works were in attendance at your meeting. I have copied them on this email and ask that they provide the information in respect to the proposed LRT route.

I would suggest that you contact Councillor Farr as he may be able to advise when Council will be discussing LRT in the future.

Regards,
Eileen

From: Lia Hess [mailto:kingwestbia@yahoo.ca]
Sent: July-08-13 5:00 PM
To: Maloney, Eileen
Subject: Re: King St. W. BIA

Also for the record, what were the names of those two guys from the city who were at the June 13th meeting?..and also their title if you know it.
Also, when is the next council meeting where LRT is to be discussed?
Also, Im getting conflicting feedback from our members.. which side of the King street is the proposed LRT be constructed on? The right or left side?
Thanks
Lia

From: "Maloney, Eileen" <Eileen.Maloney@hamilton.ca>
To: Lia Hess <kingwestbia@yahoo.ca>
Sent: Monday, July 8, 2013 4:30:00 PM
Subject: RE: King St. W. BIA

Hi Lia,

Since you no longer have a vacancy, you can have another member added to your board upon the approval of your membership. Do you have a copy of your constitution/procedure by-law to reference?

Eileen

Transit Only Lane Feedback

King St W BIA

Sept 2013

Sept. 12, 2013 Jason Farr/Lia Hess

Background: These proposals were discussed and agreed to by members of the King Street West BIA on August 8 2013.

1. LRT- Dedicated Bus lane

In principal, we agree with the long term objective of a LRT along King Str, in front of our Businesses.

We have learned via the media and with direct consultation with LRT representatives that a dedicated bus lane will be implemented as a 1 year pilot project. July/Aug 2013. Thankfully, that has not yet happened.

Our position ideally, is that no dedicated bus lane be implemented as a pilot project and $300K dedicated for this interim measure be budgeted for the actual LRT.

The dedicated bus lane along King Street to Bay Str, is proposed to be beside the curb lane, not in the lane directly beside the curb.

The City/LRT committee proposal is: As if you are driving, from left to right

1. Parking 2. Traffic 3. Traffic 4. Dedicated Bus lane

We propose:

1.Traffic 2. Traffic 3. Dedicated Bus Lane 4. Parking

Advantage of our proposal:

- No change in parking lane, therefore no additional cost for installation of new meters and removal of old.
- Currently the busses use #3 lane and pick up passengers from the curb at Caroline and Hess (the only 2 bus stops between Bay and Queen). No change.
- No new adjustments or disruption to existing comfort, habits of clients and customers parking.
- Preserve loading/unloading/delivery during business hours for our businesses
- Maintain a safe place for the unloading of elderly, disabled/injured and children directly in front of the businesses they are intending to go to.
- No potential future danger of clients/customers crossing King Str. mid block
- Buses not travelling (likely at increased speed) directly beside the sidewalk. Cars act as a buffer for pedestrians
- Preserve 3 parking spaces in our BIA district.
- Although people in the process of parking their cars will briefly occupy the bus lane, the elimination of other traffic in that lane should enable quicker in and out from the parking spaces and present minimum delay (if any) to a bus.
- Dedicated bus lane only be enforced from 7-9am and 4-6pm

Result: **Still maintain 2 lanes of traffic, parking and dedicated bus lane(if necessary).**

1. Bus traffic

   The BIA was told that there was an abundance of Bus traffic on King Street which warrants a dedicated bus lane.

We propose:

That the GO bus consider a route change to reduce bus traffic and congestion Downtown.

Current:
A Go bus to Toronto leaves every hour during the day.
Route: Exit left onto James Street
Turn left onto King Street. Pick up at Jackson Square
Continue along King Street. Pick up at Caroline Street
Continue along King Street. Pick up just past Queen Street
Continue along King Street. Pick up at Dundurn
Exit onto 403/QEW

We propose
Route: Exit left onto James Street
Turn left onto York Street (now 2 way). Pick up at Jackson Square-Library
Continue along York Street. Pick up around Caroline Street (if necessary)
Turn Left up Queen Street, Turn Right on King and pick up at existing stop, at Queen/King.
Continue along King Street. Pick up at Dundurn
Exit onto 403/QEW

Advantages:

- Significant reduction of GO bus traffic through the core, which provide no benefit to existing businesses
- Improve local Hamilton bus service which can benefit BIA businesses.
- The passengers who board the GO busses downtown still receive service.
- The "detour" presents minimum delay in scheduling, as traffic generally moves quicker along York than along King.
- Currently Transport Trucks need to use "alternate route" and can not drive through the business district of downtown, apply similar rule to GO Transit.

Result: **Redirected GO bus traffic off of downtown King Street could improve the overall vehicle traffic through the downtown core, yet maintain service to commuters.**

Transit Only Lane Feedback

King St W BIA

Oct 2013

Bender, Daryl

Subject: Transit Only Lane communication

From: Bender, Daryl
Sent: Friday, October 04, 2013 10:28 AM
To: [redacted]
Cc: Farr, Jason; Hull, Don; Curzi, Rae; Anderson, Kelly; Scally, Maureen; Lee-Morrison, Christine
Subject: Transit Only Lane & King St West BIA Comments

Dear Ms. Hess:

Thank you for your very thorough comments regarding the design of the Transit Only Lane on King St through the King St West BIA. As part of the design process of the Transit Only Lane (TOL), we reviewed the pros and cons of continuing the Transit Only Lane in the "second lane out from the north curb" westerly of Bay St. Here is a summary of this review:

Advantages
- Maintain consistency and drivers expectation of the TOL in the second lane
- Improved operation of the TOL as loading buses would be out of the TOL

Disadvantages
- Transition of the TOL east of Bay St to west of Bay St will be complex (requires lane shifting for both autos and buses)
- Removal of existing pavement markings and restriping required to ensure second lane for TOL is 3.5 m wide. The existing curb lane width can accommodate the TOL
- A TOL is typically placed in the curb lane to minimize interaction (minimal weaving) between busses, right turning and parked vehicles
- Reduced capacity at Queen Street would result due to the loss of a left-turn lane (left-turning traffic would instead be mixed with through traffic)
- Signage for the temporary install would be less ideal (will require more overhead signage)
- Additional friction between driveways on the south side and general purpose through traffic in the south curb lane (turning vehicles can slow through traffic)

Given these factors, we have proceeded with a design that positions the TOL in the north curb lane west of Bay St. In addition, the current plan is to install the TOL in October, and that timeline could not be met if we decided to change the design at this stage of the pilot. A redesign the project would take a few additional months, which means installation could likely not happen until the spring and "Quick Wins" funding could be jeopardized.

However, as you know, the TOL will be evaluated after the one year period. We will commit to an evaluation process that will reconsider the scenario of the TOL positioned in the second lane from the curb as part of the post pilot evaluation. Since the pilot includes a portion of such a design (the TOL in the second lane out from the north curb), we will be able to compare the operations of these two different design scenarios.

With respect to the BIAs request to have GO buses rerouted to York Street, that suggestion is being conveyed to GO Transit staff for their consideration. It should be noted that use of the TOL by GO buses would be permitted should they choose to maintain the current route.

Regards,
Daryl Bender on behalf of

Christine Lee-Morrison, MCIP, RPP
Manager, Mobility Programs and Special Projects
Transportation Division

Public Works Department
2200 Upper James Street,

Mt. Hope, ON L0R 1W0
Tel: (905) 546-2424 Ext. 6390
Fax: 905-546-4435

Cell: 905 977-8527
Christine.Lee-Morrison@hamilton.ca

Transit Only Lane Feedback

King St W BIA

Post installation

(a sample of a petition with approx. 920 signatures)

1 of 92 sheets received
∴ approx. 920 signatures

PETITION:

Stop the King Street downtown transit only lane project now!

TO The Mayor and City of Hamilton :

WHEREAS the City of Hamilton has implemented a Transit-only lane on the North Side of King Street Downtown (Mary Street) to one block east of Dundurn St. (New St.); and

WHEREAS the lane designation has removed all opportunity for parking on the North Side of King Street, preventing access (and associated commerce) for customers of long-established, tax-paying businesses along King Street; and

WHEREAS many businesses in the Transit-only lane area have experienced steep declines in their sales and demand for service since the lane implementation - with some reporting losses in the area of 60-70 percent; and

WHEREAS some businesses are facing imminent closure should the transit-only lane conditions continue, and any municipal plan that produces these impacts is essentially putting people out of business ; and

WHEREAS businesses were not properly consulted to address concerns ahead of implementation

WE THE UNDERSIGNED PETITION THE CITY OF HAMILTON AS FOLLOWS:

Stop the King Street downtown transit only lane project now!

Restore public parking opportunities to accommodate customers of long establishment King Street businesses.

Restore economic opportunities that have been stripped from these businesses as a result of the loss of parking and customers in the wake of the King Street transit-only lane implementation.

Name (printed)	Address (printed)	Signature
[redacted]		

Hamilton
Public Works

KING STREET TRANSIT ONLY LANE PILOT PROJECT

Appendix "C"

International Village BIA Submission

APPENDIX C

Bus Lane Survey May-June 2014 Write-Up
International Village BIA

Number of businesses in support of the bus lane": 9/38
Comments/Reasons why they are "for the bus lane"

- Don't see any difference to our business
- People get a chance to see the store when they are sitting in their cars
- Most customers are pedestrians
- We are for multi-use transportation, it is convenient and useful
- Our customers use the bus and bikes
- In favour of LRT
- No customers have issues
- When traffic stops out front, people see our store and come back another time
- Having the pilot project for LRT means Hamilton is moving up and is an important city, places like Toronto have this in place
- We are bus users ourselves
- Hasn't affected our business
- There is always traffic during certain hours anyways, people just need to get used to it
- Our customers aren't drivers
- It's a good thing to pave the way for LRT
- We were only affected when the lane was first implemented
- We want to champ anything to help transportation infrastructure
- Better transportation will make it more livable down here, people can bike and walk more easily and use alternate transit
- Safer for pedestrians
- Drivers notice storefronts
- I am for having people using public transportation and improving it
- I would like people to stop using King Street as a highway

Number of businesses unaffected : 8/38
Comments/Reasons why they are "somewhere in the middle"

- Customers would drive by and never come in but now they do
- Its clogging up traffic but only during rush hour
- Unsure of the positives down the way, we only know what is happening down here
- The feedback from customers is negative, but they are stopped in front of businesses which is positive
- It's a problem for people coming down here for appointments, they don't want to fight traffic to come
- There needs to be an increase of residency in the neighbourhood for my business to survive
- Not too sure what LRT will bring for business but do know that we will suffer through the construction of LRT
- From a bus perspective: they have a hard time getting out from a parked position
- As a business owner, if cars cant get here and park here, no business
- As a commuter, to have to drive in 2 lanes because of bus lanes is upsetting and timely

- Should be Monday-Friday carpool lane
- Didn't really know there was a bus lane, just now there is a lot of traffic
- Doesn't affect us, we just see traffic and pollution
- Its beneficial for us because a lot of our clients take the bus
- Don't really know how elsewhere is affected because this is as far west as I go

Number of businesses not in support of bus lane: 21/38
Comments/Reasons why they are "against the bus lane"

- Many people don't want to come downtown
- Daily complaints from customers
- Should be timed bus lane, or allow for carpool lane at certain times
- It's toxic with cars sitting and idling all day, can't leave the door open
- Main street should have LRT
- Down 50% in sales
- Roads congested ¾ days
- Most customers have cars, have trouble finding parking spot or waiting in traffic in long time
- Busses basically have 2 lanes of King Street because they need to cross over to the McNab terminal
- I can't get home in decent time
- Busses are jamming up traffic, it doesn't save time at all
- Ambulances are even having a hard time getting through to where they need to go
- It seems when you take the bus it takes even longer because it has to cross over all the lanes
- Should have gotten people to vote, more communication to businesses
- Its hindering business, down 25%
- Customers come from all over, they will find an alternate store because they don't want to come downtown into the traffic
- This is a car town, they should be spending money on GO Transit
- Not enough traffic flow
- Bus lane project poorly handled because it s confusing to out of town drivers
- Not against LRT but bus lane is making it really congested
- Hard enough time getting people down here, should at least be free parking
- The rules are unclear, don't know if you can drive in bus lane to turn, don't know what people can and cannot do
- Not many people want to take the bus
- Bus lane is confusing, it shouldn't be in the second lane, it should be in the far right lane
- I don't have any clients that bus it is very hard for them to get downtown
- This is another negative aspect for downtown driving
- Customers prefer for me to mail my orders out to them so they don't have to drive here
- We should be making it as easy as possible, downtown is already too complicated with one way streets
- I like improving public transportation but I don't think it's saving time
- Bus lane doesn't make sense to us
- Its free advertising but it holds up the traffic way too much

Hamilton
Public Works

KING STREET TRANSIT ONLY LANE PILOT PROJECT

Appendix "D"

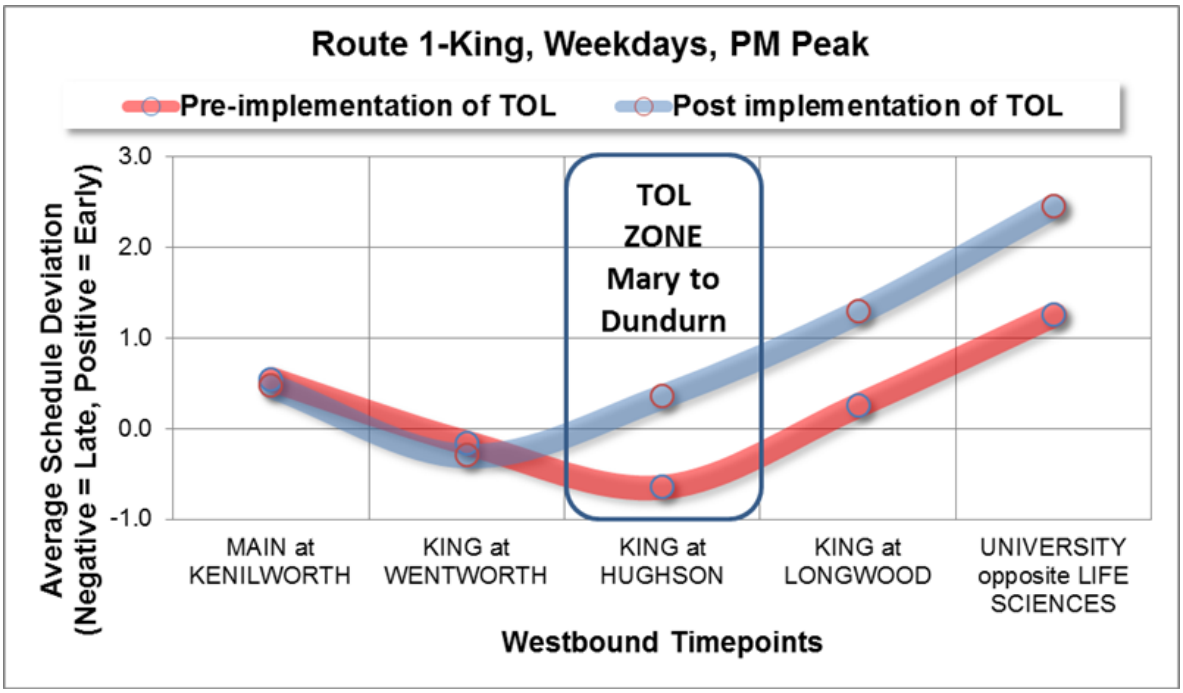
King Street Transit Only Lane Pilot Project Transit Analysis

APPENDIX D

King Street Transit Only Lane Pilot Project
Transit Analysis

Transit Schedule Adherence - During the AM peak period there are as many people riding the HSR along this segment of King St as there are cars and trucks driving this same route. Schedule adherence was tracked to determine if the TOL had a positive effect on transit service in the area. The chart below captures the difference between pre-TOL schedule adherence and post-TOL schedule adherence along the corridor from Kenilworth Avenue to McMaster University. A value greater than zero (0) depicts a positive effect on transit travel times through the corridor. The data shows that the TOL had an overall positive impact on transit travel times along King Street, particularly the western section of the corridor and downtown of the pilot.

Chart 1 - Difference Between Pre-TOL Schedule Adherence and Post -TOL Schedule Adherence (in minutes by one hour period)



Survey of Transit Operators - Approximately thirty (30) transit operators were surveyed to obtain feedback on the TOL operations. From the results, seventy two percent (72%) of operators found that the TOL made transit operations easier and only seventeen percent (17%) of the operators felt that the TOL made operations more difficult. In terms of passenger opinions, sixty one percent (61%) of operators observed positive feedback from passengers. The findings from the operators' survey substantiate the above noted findings on improved schedule adherence for transit.

With respect to private auto driver adherence to the dedicated lane, it is noted that about half the operators observed that they were delayed periodically by cyclists, stopped/parking autos or autos driving in the TOL. Should the TOL remain or be expanded consideration should be given to increased enforcement efforts.

Table 1 - Summary of Transit Operators Survey

Question 1: Did the TOL make bus operations easier?

YES	72%
NO	7%
SOMETIMES	21%

Question 2: Did the TOL make bus operations more difficult?

YES	17%
NO	55%
SOMETIMES	28%

Question 3: How did transit riders respond to the TOL?

Liked It	61%
Disliked it	13%
Feedback from riders was mixed	26%

Question 4: How frequently were you delayed behind a cyclist?

Rarely	50%
Once per week	0%
Once per day	32%
More than once per day	18%
	100%

Question 5: How frequently were you delayed with autos stopping/parking in the TOL?

Rarely	48%
Once per week	7%
Once per day	15%
More than once per day	30%

Question 6: How frequently were you delayed by autos driving in the TOL?

Rarely	48%
Once per week	11%
Once per day	19%
More than once per day	22%

Corridor Ridership - Table 2 below shows a comparison of transit ridership along King Street (all routes) in 2014 as compared to 2009.

Table 2 – Transit Ridership Weekday 7:00 a.m. to 6:00 p.m.

2014 Cordon

		Data		
SATION NAME	TIME	Sum of LOAD	Count of LOAD	Average of LOAD
KING @ CAROLINE	7 AM	570	23	25
	8 AM	1104	38	29
	9 AM	547	27	20
	10 AM	522	23	23
	11 AM	670	21	32
	12 PM	704	23	31
	1 PM	564	19	30
	2 PM	660	26	25
	3 PM	790	33	24
	4 PM	855	32	27
	5 PM	598	29	21
Grand Total		7584	294	26

2009 Cordon

		Data		
STATION NAME	TIME	Sum of LOAD	Count of LOAD	Average of LOAD
KING @ CAROLINE	7 AM	615	28	22
	8 AM	1063	33	32
	9 AM	564	23	25
	10 AM	614	22	28
	11 AM	484	21	23
	12 PM	535	19	28
	1 PM	420	22	19
	2 PM	504	23	22
	3 PM	516	27	19
	4 PM	544	31	18
	5 PM	455	25	18
Grand Total		6314	274	23

Difference

		Data		
STATION NAME	TIME	Sum of LOAD	Count of LOAD	Average of LOAD
KING @ CAROLINE	7 AM	-45	-5	3
	8 AM	41	5	-3
	9 AM	-17	4	-4
	10 AM	-92	1	-5
	11 AM	186	0	9
	12 PM	169	4	2
	1 PM	144	-3	11
	2 PM	156	3	3
	3 PM	274	6	5
	4 PM	311	1	9
	5 PM	143	4	2
Grand Total		1270	20	3

The most recent ridership counts suggest that transit ridership along the corridor through the downtown has grown by approximately 20% over 5 years, or an average of about 4% per year. Ridership in the Main-King-Queenston corridor accounts for approximately 42% of the system wide ridership. Between 2009 and 2013 transit ridership across the HSR system grew by 4% (from 20,930,770 to 21,817,842), an average of approximately 1% per year. Based on the data, the Main-King-Queenston corridor carries a significant proportion of transit ridership in the City and ridership in this corridor is growing at a faster rate than the overall system.

Hamilton
Public Works

KING STREET TRANSIT ONLY LANE PILOT PROJECT

Appendix "E"

Cole Engineering - Traffic and Travel Time Monitoring Report King Street Reserved Bus Lane

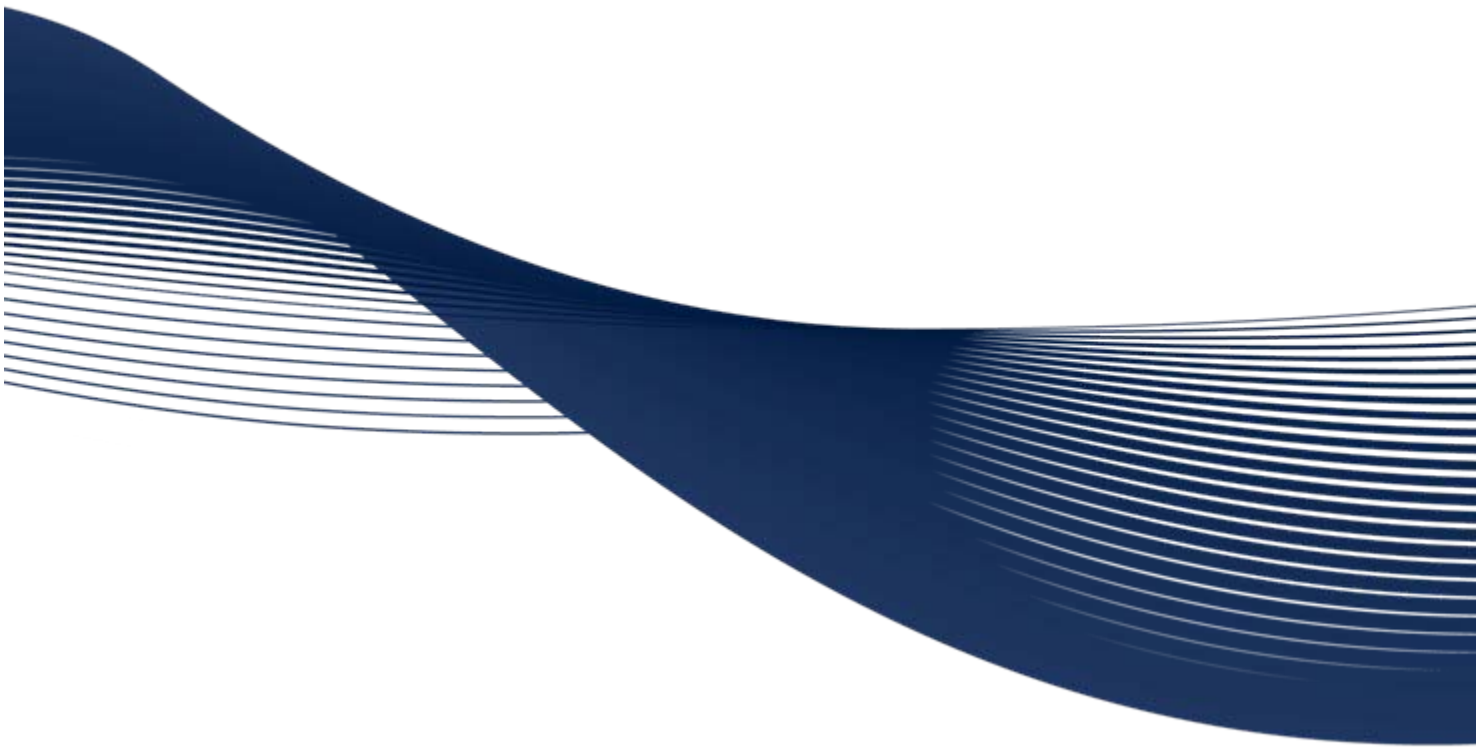
APPENDIX E

CITY OF HAMILTON

TRAFFIC AND TRAVEL TIME MONITORING REPORT

KING STREET RESERVED BUS LANE

Project No.: TR13-0252



NOVEMBER 2014

COLE ENGINEERING GROUP LTD.

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F. 905.364.6162

COLE ENGINEERING

Experience Enhancing Excellence

Date: November 14, 2014
Our Ref: TR13-0252

City of Hamilton
Public Works Department
77 James Street North, Suite 400
Hamilton, ON L8R 2K3

Attention: Mr. Daryl Bender, B.E.S
Project Manager, Alternative Transportation

Dear Mr. Bender:

Re: Traffic and Travel Time Monitoring Report
King Street Reserved Bus Lane

Cole Engineering Group Ltd. Is pleased to submit this report that summarizes the traffic monitoring, travel time monitoring for the implementation of the King Street Reserved Bus Lane.

Yours truly,

COLE ENGINEERING GROUP LTD.

Kamran Shah, P.Eng., PTOE
Transportation Engineer

MC:

Encl.

S:\2013 Projects\TR\TR13-0252 Hamilton_KingStreetBRT-DD\300-Design-Engineering\312-Deliverables\Project Deliverables\Combined Memo\King Street BRT Report v4.doc

PREPARED BY:

COLE ENGINEERING GROUP LTD.

Matthew Clark
Transport Planner

CHECKED BY:

COLE ENGINEERING GROUP LTD.

Kamran Shah, P.Eng., PTOE
Transportation Engineer

Issues and Revisions Registry

Identification	Date	Description of issued and/or revision
Draft Report	Feb 22, 2012	For internal review
Draft Report	Feb 23, 2012	For client review
Final Report	Nov 14, 2014	Submission

Statement of Conditions

This Report / Study (the "Work") has been prepared at the request of, and for the exclusive use of, the Owner / Client, and its affiliates (the "Intended User"). No one other than the Intended User has the right to use and rely on the Work without first obtaining the written authorization of Cole Engineering Group Ltd. and its Owner. Cole Engineering expressly excludes liability to any party except the intended User for any use of, and/or reliance upon, the work.

Table of Contents

LIST OF FIGURES

LIST OF TABLES

APPENDICES

1.0 Introduction

1.1. Background

Cole Engineering Group Ltd. (Cole Engineering) was retained by the City of Hamilton (City) to prepare a detailed design and traffic analysis for a 12-month pilot project for the installation of a Reserved Bus Lane (RBL) on King Street between Mary Street and Dundurn Street in the downtown core.

This report compiles both the traffic analysis before the bus lane was implemented (pre-installation) and three and seven months after implementation (post-installation). Also included and summarised in this report is the travel time monitoring undertaken pre-installation and post-installation (after one month, three months and seven months). Finally, a review of similar facilities in North America and a survey of the operators of the facilities were undertaken; the findings are summarised herein. Specific attention was given to the impact of a reserved bus lane on local businesses.

2.0 Traffic Analysis

A traffic model was developed using the Synchro 7 and8 software packages to assess the traffic operations at key intersections along the King Street study corridor for various scenarios. Based on discussions with City staff, the following King Street intersections were identified for analysis:

- Queen Street (signalized)
- Bay Street (signalized)
- MacNab Street (signalized)
- James Street (signalized)
- John Street (signalized)

The signalized intersection operations were assessed using the Synchro 8 software package which utilizes the Highway Capacity Manual 2010 methodologies. In addition, for comparison purposes, the existing signalized intersection operational analyses were also assessed using the Synchro 7 package. The signalized intersection analyses utilizes the following assumptions based on discussions with City staff and the City of Hamilton's ***Guidelines for Synchro Software***:

- Lane utilization based on Synchro default values;
- Saturation flow rate based on Synchro default value of 1,900 (vphpl);
- Lane width of 3.3 m for turning lanes and through lanes;
- Lost time adjustment of 0 seconds; and,
- Peak hour factors based on existing traffic count information.

2.1. Pre-installation Traffic Analysis

The lane configuration for the pre-installation scenario is illustrated in **Figure 1**. Pre-installation weekday peak hour turning movement counts were provided by the City as summarized in **Table 1**. The balanced pre-installation traffic volumes are illustrated in **Figure 2**.

Table 1: Pre-installation Traffic Counts

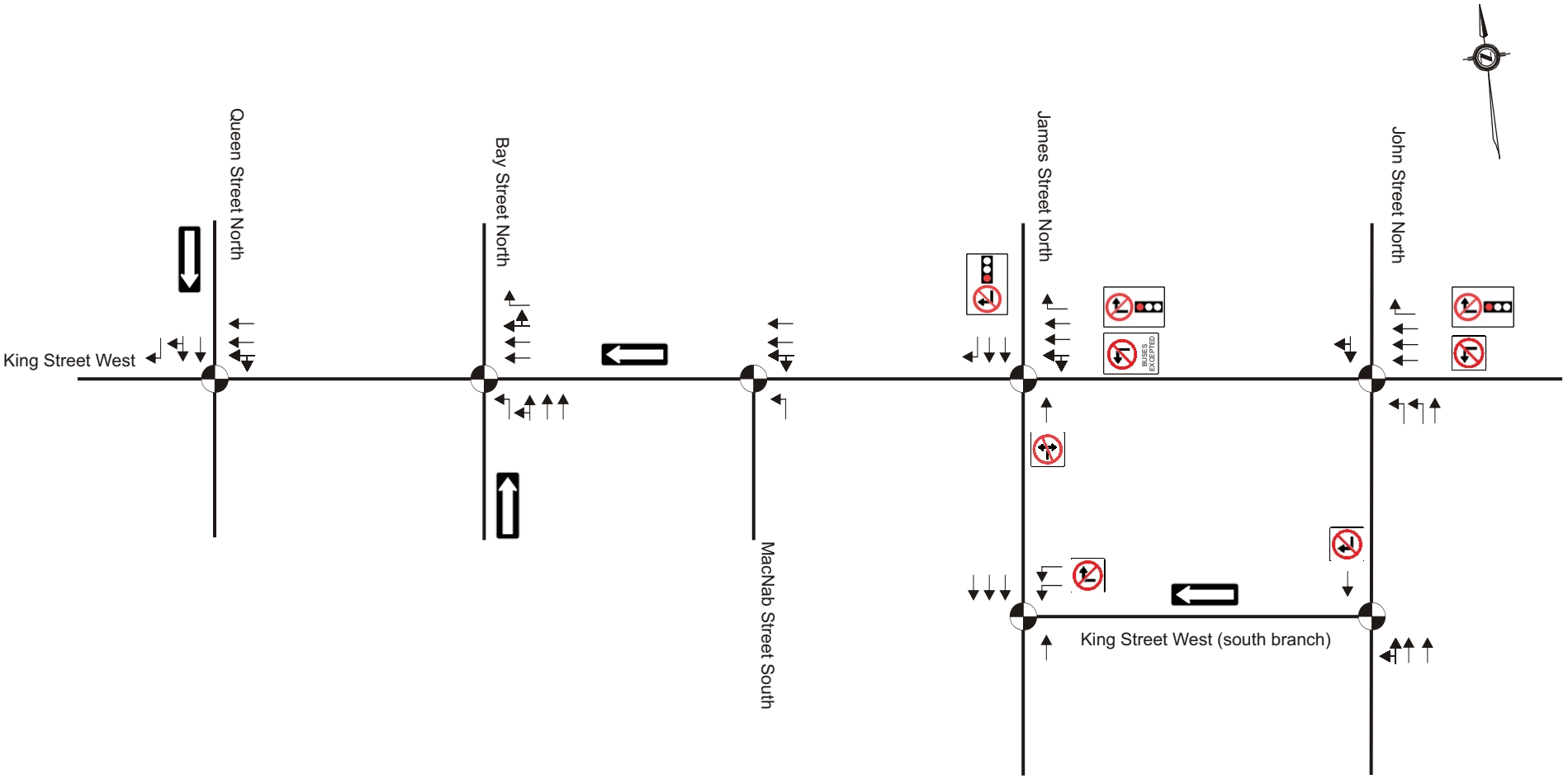
Location	Date
John Street / King Street	May 13, 2013
James Street / King Street	May 14, 2013
MacNab Street / King Street	May 16, 2013
Bay Street / King Street	May 14, 2013
Queen Street / King Street	May 15, 2013

Based on the road network and traffic controls shown in **Figure 1,** the pre-installation (balanced) traffic volumes shown in **Figure 2**, and the signal timings provided by the City, the pre-installation intersection operations and queues are summarized in **Table 2** and **Table 3**, respectively. The Synchro 7 and Synchro 8 outputs are provided in **Appendix A**.

The results of the analysis indicate that the signalized intersections within the study area are operating with residual capacity and acceptable Levels of Service (LOS) during the weekday AM, Midday, and PM peak periods. The results generated by Synchro 7 and Synchro 8 are comparable for all peak hours.

The results for the queuing analysis indicate that pre-installation queues can be accommodated by the available storage during all three peak hours with the exception of:

- The southbound through and southbound right-turn movements Queen Street / King Street during the PM peak hour; and,
- The southbound through movement at John Street / King Street during the PM peak hour.



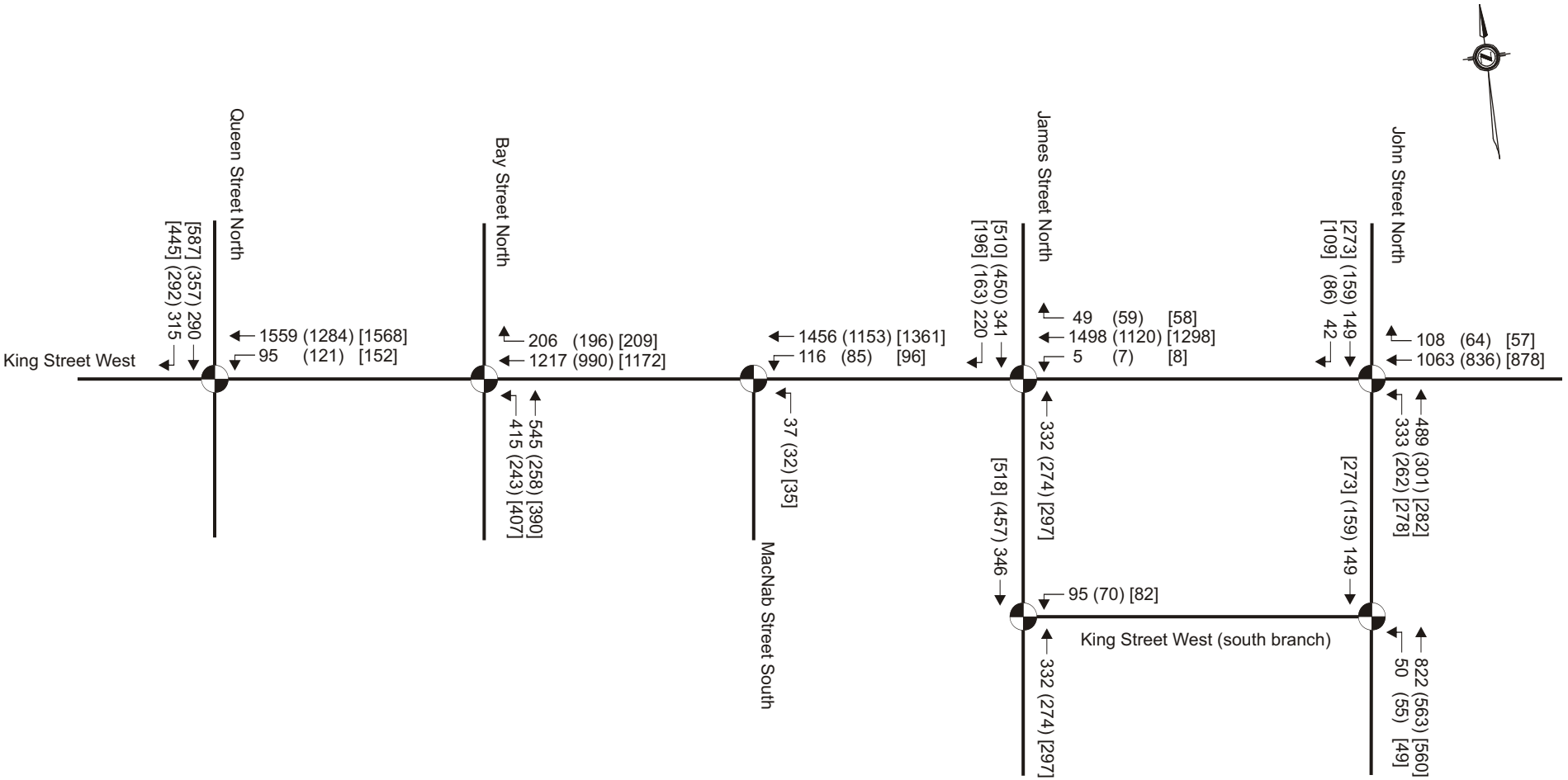
Legend

Traffic Control Signal

Lane Configuration

Not to Scale

Figure 1
Pre-Installation Lane Configuration (As Modelled in Synchro)



Legend

- Right-turn Movement
- Through Movement
- Left-turn Movement
- 99 (99) [99] Weekday AM (Midday Off-peak) [Weekday PM] Peak Hour Traffic Volumes

Not to Scale

Figure 2
Pre-Installation Traffic Volumes

Table 2: Pre-installation Intersection Operations

Intersection	Key Movement	AM Peak Hour				Off-Peak Hour				PM Peak Hour			
		LOS		v/c		LOS		v/c		LOS		v/c	
		Synchro 7	Synchro 8	Synchro 7	Synchro 8	Synchro 7	Synchro 8	Synchro 7	Synchro 8	Synchro 7	Synchro 8	Synchro 7	Synchro 8
Queen Street / King Street	Overall	B	B	0.58	0.57	B	B	0.58	0.56	B	B	0.73	0.72
	WB left-through	A	A	0.55	0.55	A	A	0.56	0.55	B	B	0.71	0.71
	SB through-right	C	C	0.64	0.65	C	C	0.57	0.59	C	C	0.72	0.72
	SB right	D	D	0.68	0.65	C	C	0.62	0.58	C	C	0.77	0.74
Bay Street / King Street	Overall	B	B	0.51	0.50	A	A	0.38	0.38	B	B	0.51	0.50
	WB through-right	A	A	0.46	0.46	A	A	0.37	0.37	A	A	0.45	0.44
	WB right	A	A	0.23	0.26	A	A	0.24	0.24	A	A	0.29	0.29
	NB left	C	C	0.63	0.59	C	C	0.34	0.35	C	C	0.65	0.63
	NB left-through	C	C	0.61	0.60	C	C	0.43	0.43	C	C	0.56	0.56
MacNab Street / King Street	Overall	A	A	0.43	0.43	A	A	0.40	0.40	A	A	0.43	0.43
	WB left-through	A	A	0.46	0.46	A	A	0.42	0.42	A	A	0.45	0.45
	NB left	D	D	0.24	0.24	C	C	0.23	0.23	D	D	0.23	0.23
James Street / King Street	Overall	B	B	0.62	0.65	B	B	0.49	0.52	B	B	0.53	0.55
	WB left-through	C	C	0.86	0.86	C	C	0.73	0.73	B	B	0.76	0.76
	WB right	B	B	0.12	0.12	B	B	0.18	0.18	B	B	0.15	0.15
	NB through	A	A	0.42	0.42	A	A	0.33	0.33	A	A	0.34	0.34
	SB through	B	B	0.25	0.25	B	B	0.30	0.30	B	B	0.33	0.33
	SB right	C	C	0.40	0.40	B	B	0.28	0.28	B	B	0.32	0.32
John Street / King Street	Overall	B	B	0.63	0.66	B	B	0.54	0.50	B	B	0.58	0.58
	WB through	B	B	0.52	0.52	B	B	0.44	0.44	B	B	0.41	0.41
	WB right	B	B	0.19	0.19	B	B	0.16	0.16	B	B	0.12	0.12
	NB left	A	A	0.50	0.50	A	A	0.38	0.38	A	A	0.55	0.55
	NB through	A	A	0.75	0.75	A	A	0.45	0.45	A	A	0.41	0.41
	SB through-right	C	C	0.44	0.44	C	C	0.61	0.62	D	D	0.87	0.87

LOS - level of service, v/c - volume to capacity ratio
Syn - Synchro;

Table 3: Pre-installation Queues

Intersection	Key Movement	Available Storage (m)	AM Peak Hour				Off-Peak Hour				PM Peak Hour			
			50th Percentile (m)		95th Percentile (m)		50th Percentile (m)		95th Percentile (m)		50th Percentile (m)		95th Percentile (m)	
			Syn 7	Syn 8	Syn 7	Syn 8	Syn 7	Syn 8	Syn 7	Syn 8	Syn 7	Syn 8	Syn 7	Syn 8
Queen Street / King Street	WB through	103	51	50	59	58	26	17	25	25	66	64	63	63
	SB through	75	36	37	45	45	30	30	36	36	61	62	77	77
	SB right	75	32	29	49	46	26	23	40	37	54	51	85	80
Bay Street / King Street	WB through	160	26	26	17	17	8	8	<7	<7	10	10	<7	<7
	WB right	160	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7
	NB left	58[1]	40	37	57	54	11	11	23	23	36	33	54	51
	NB through	80	43	42	47	46	16	16	21	21	36	35	40	39
MacNab Street / King Street	WB through	85	10	10	<7	<7	<7	<7	10	10	<7	<7	18	18
	NB left	130	<7	<7	13	13	<7	<7	9	9	<7	<7	13	13
James Street / King Street	WB through	87	48	48	69	69	57	57	73	73	42	42	48	48
	WB right	87	<7	<7	10	10	7	7	<7	<7	<7	<7	8	9
	NB through	15	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7
	SB through	80	19	19	28	28	19	19	28	28	29	29	40	40
	SB right	80	25	25	71	71	12	12	50	50	20	20	54	54
John Street / King Street	WB through	90	54	54	67	67	28	28	47	47	39	39	49	49
	WB right	30	12	12	24	24	<7	<7	16	16	<7	<7	13	13
	NB left	20	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7
	NB through	104	<7	<7	86	86	<7	<7	<7	<7	<7	<7	<7	<7
	SB through	85	26	26	45	45	26	26	40	40	59	59	104	104

LOS - level of service, v/c - volume to capacity ratio
Syn - Synchro
1. Average length of dual left turn lanes

2.2. Post-Installation Traffic Analysis (Month 3)

The Post-installation (Month 3) operational analysis was conducted to assess the operations of the general traffic lanes on King Street three months after the implementation of the RBL. The Post-installation (Month 3) weekday turning movement counts, as summarized in **Table 4,** were provided by the City.

Table 4: Post Installation (Month 3) Traffic Counts

Location	Date
John Street / King Street	January 30, 2014
James Street / King Street	February 3, 2014
MacNab Street / King Street	February 4, 2014
Bay Street / King Street	February 7, 2014
Queen Street / King Street	January 29, 2014

Synchro is unable to analyze vehicle-specific lanes such as the RBL. Therefore, the Synchro model provides an assessment of the remaining general purpose lanes only. From the Post-installation (Month 3) turning movement counts the bus volumes in the RBL and the RBL lane are not analyzed in the Synchro model.

However, buses that utilize the general purpose lanes ARE included in the Synchro model. Buses destined for the MacNab Street Terminal are observed to exit the RBL on the approach to James Street in order to weave to the left-turn lane at MacNab Street. Therefore, bus volume in the general purpose lanes are included in the Synchro Model at the intersection of James Street / King Street (as through movements) and at MacNab Street / King Street (as left-turn movements).

The Post-installation (Month 3) bus volumes in the King Street corridor are shown in

Figure 3. The Post-installation (Month 3) general purpose traffic volumes are illustrated in **Figure 4.** The Post-installation lane configuration is shown in

Figure 5. The lane configuration modelled in Synchro is shown in

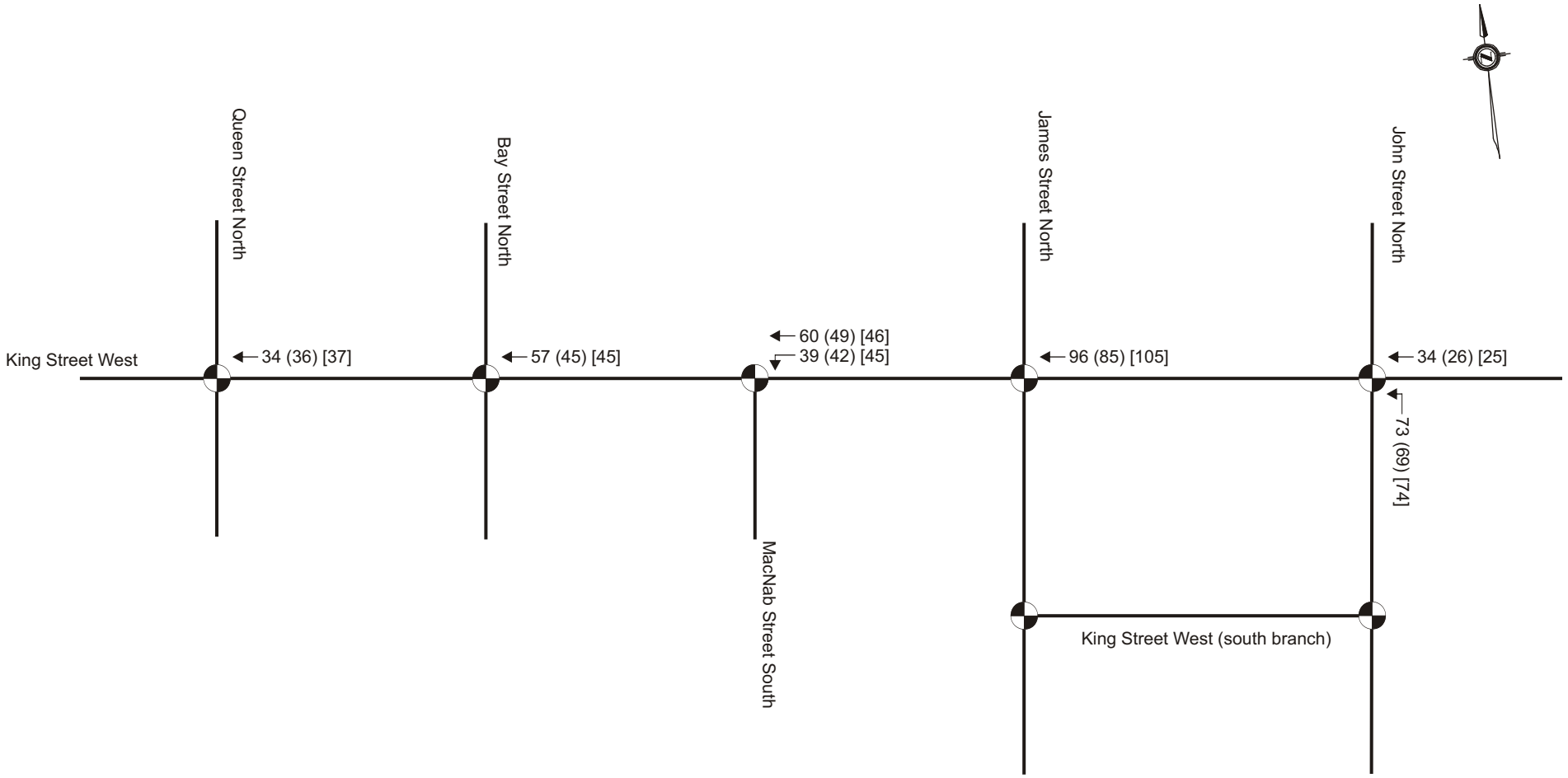
Figure 6 (i.e. excluding the RBL which Synchro cannot model).

Three analysis scenarios were developed to assess the impacts of the RBL:

- **Scenario 1** – pre-installation signal timing splits (provided by City staff)
- **Scenario 2** - modified signal timing splits
- **Scenario 3** - modified signal timing splits with transit signal priority (westbound left to MacNab Street Terminal)

Transit signal priority phasing at the intersection of James Street / King Street was not considered in Scenario 3 as this location has substantial pedestrian volumes. Another reason transit signal priority phasing was not considered at this location was that bus movements from

the RBL into the general purpose lanes to make the westbound left turn into MacNab Street could not be guaranteed due to the queues of westbound through traffic on King Street.

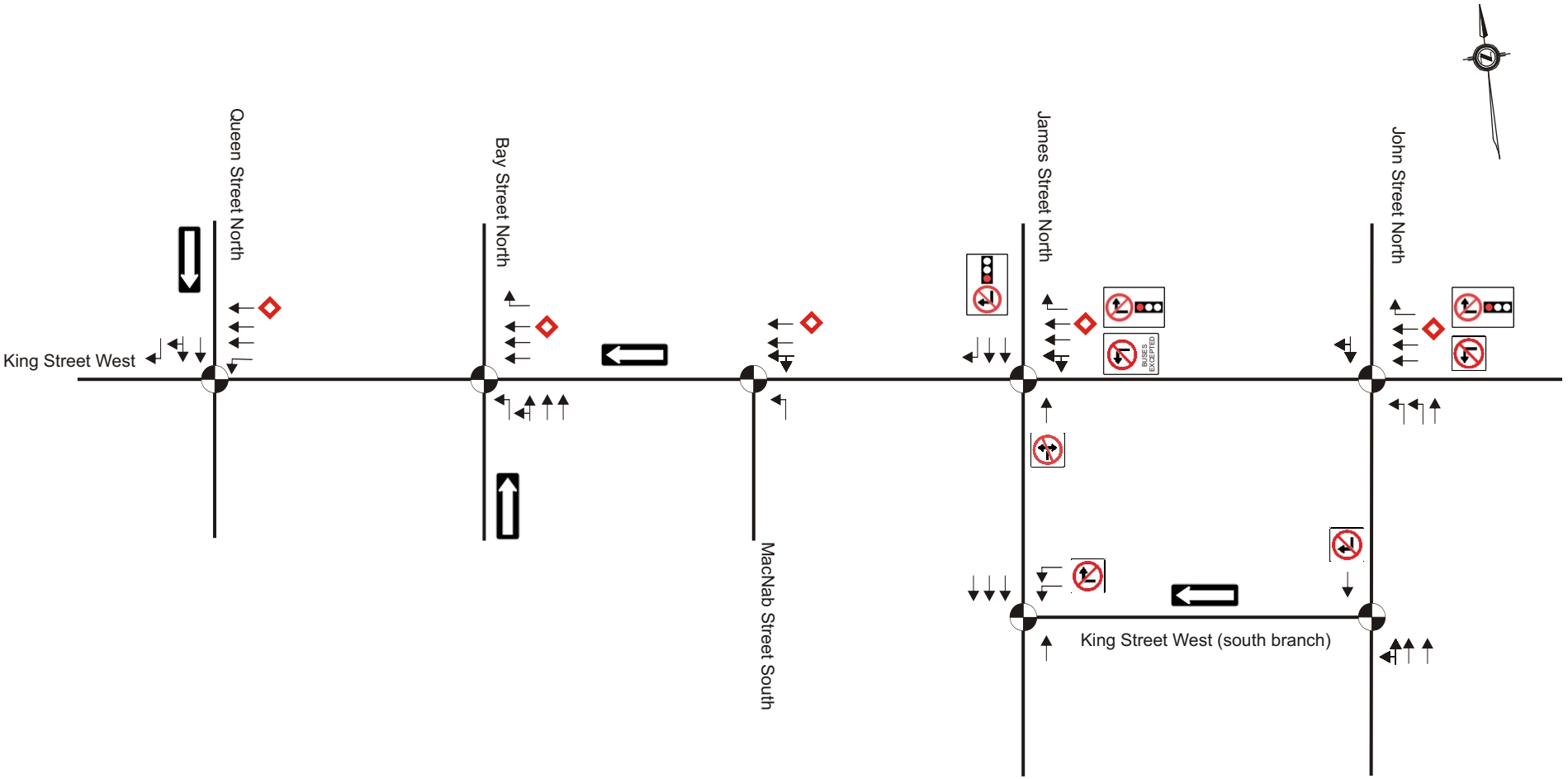


Legend

- Right-turn Movement
- Through Movement
- Left-turn Movement
- 99 (99) [99] Weekday AM (Midday Off-peak) [Weekday PM] Peak Hour Traffic Volumes

Not to Scale

Figure 3
Post-Installation (Month 3) Bus Volumes

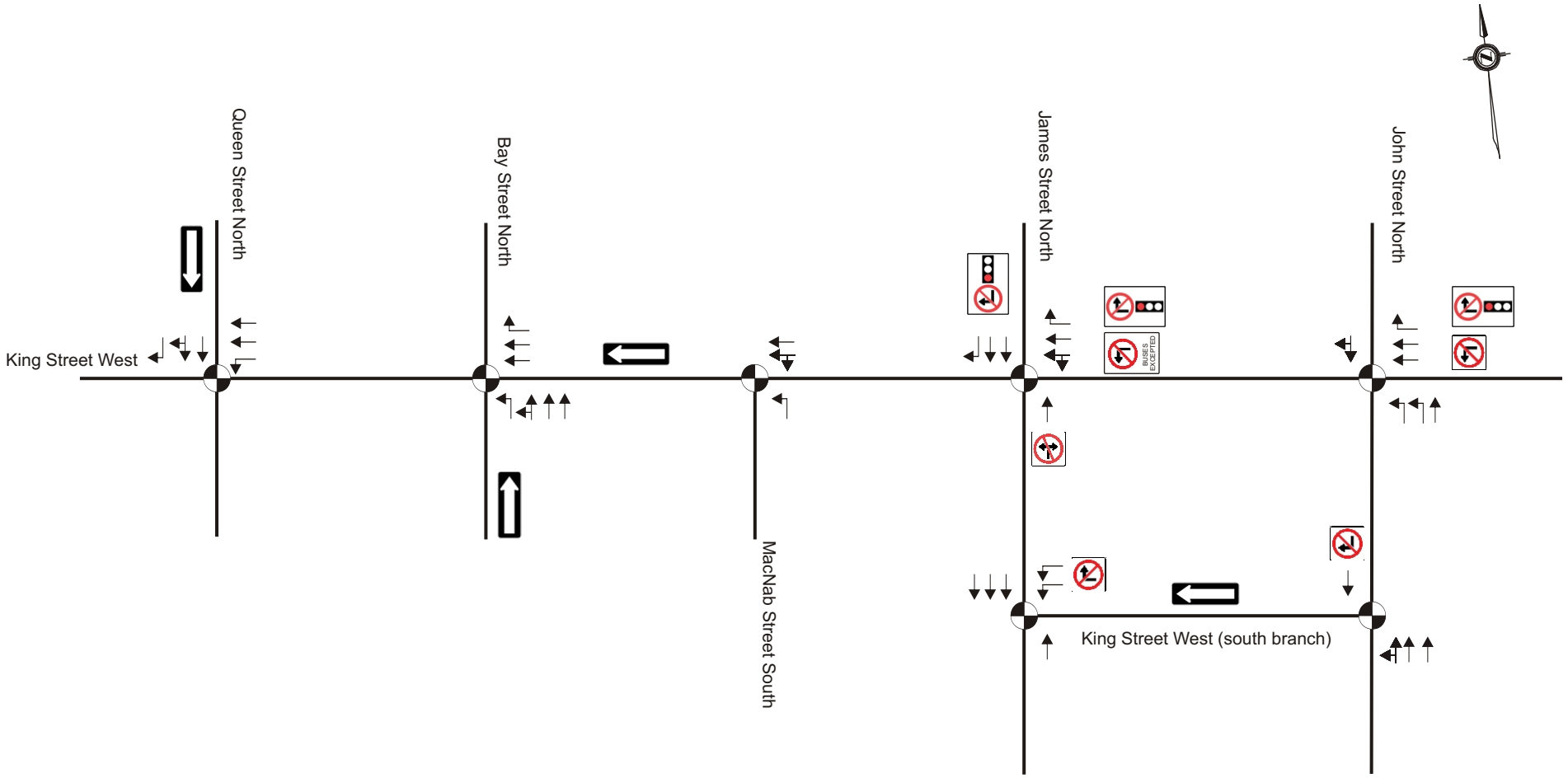


Legend

- Traffic Control Signal
- Lane Configuration
- Temporary Bus Lane

Not to Scale

Figure 5
Post-Installation (Month 3) Lane Configurations



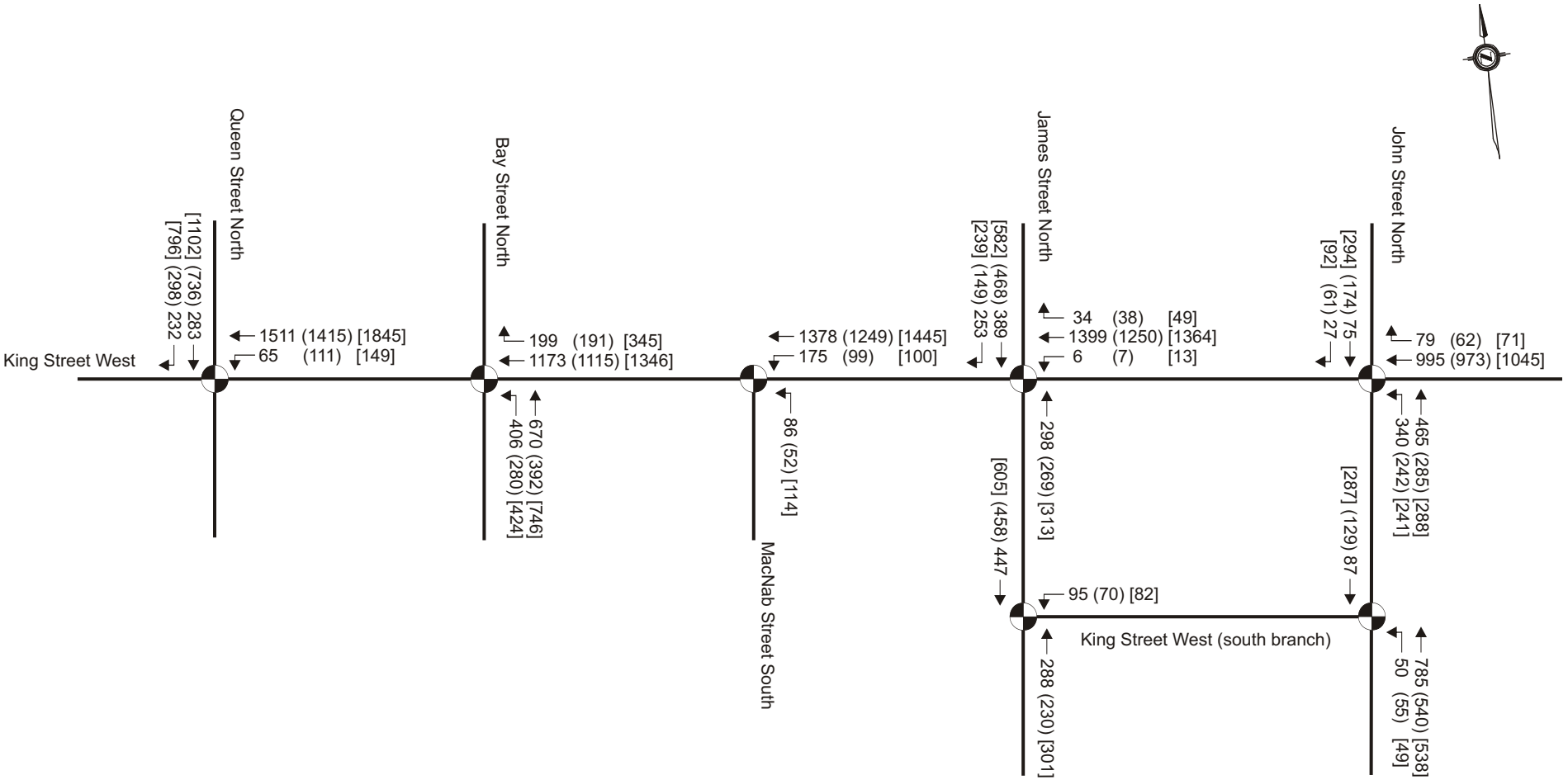
Legend

Traffic Control Signal

Lane Configuration

Not to Scale

Figure 6
Post-Installation (Month 3) Lane Configuration (As Modelled in Synchro)



Legend

- Right-turn Movement
- Through Movement
- Left-turn Movement
- 99 (99) [99] Weekday AM (Midday Off-peak) [Weekday PM] Peak Hour Traffic Volumes

Not to Scale

Figure 4
Post-Installation (Month 3) General Purpose Traffic Volumes

2.2.1. Traffic Operations

The results of the Post-installation (Month 3) intersection operations using Synchro 7 and Synchro 8 are summarized in **Table 5** and **Table 6**, respectively. The corresponding 50th and 90th percentile queues are provided in **Table 7** and **Table 8**, respectively. The Synchro 7 and Synchro 8 outputs are provided in **Appendix B**.

The results of the traffic analysis indicate that the intersections within the study area are operating with residual capacity and at acceptable LOS during the weekday AM, Midday and PM peak hours, with the exception of the westbound left-through movement at James Street / King Street, which operates with capacity constraints during all peak hours in Scenario 1. However, capacity issues at the intersection of James Street / King Street can be mitigated by improving the existing signal timing splits and increasing the cycle length in the AM peak to 100 seconds (see results for Scenario 2). The results of the Synchro analysis are summarized in **Table 5** and **Table 6.** The results generated by Synchro 7 and Synchro 8 are comparable for all peak hours.

It should be noted that the January 29, 2014, turning movement count for the intersection of Queen Street / King Street during the PM peak hour appears to be considerably higher than the previous count dated May 15, 2013. This may suggest traffic is diverting to avoid congestion and returning to King Street at Queen Street. **Section 2.4** discusses traffic diversion to parallel streets.

Table 5: Post-Installation (Month 3) Intersection Operations (Synchro 7)

Intersection	Movement	AM Peak Hour						Off Peak Hour						PM Peak Hour					
		LOS			v/c			LOS			v/c			LOS			v/c		
		Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3
Queen Street / King Street (Signalized)	Overall	C	B	B	0.85	0.83	0.83	B	B	B	0.80	0.80	0.80	F	F	F	1.14	1.14	1.14
	WBL	A	A	A	0.07	0.07	0.07	A	A	A	0.10	0.10	0.10	B	B	B	0.18	0.18	0.18
	WBT	B	B	B	0.91	0.86	0.86	B	B	B	0.87	0.87	0.87	F	E	E	1.15	1.12	1.12
	SBTR	C	D	D	0.62	0.67	0.67	C	C	C	0.70	0.70	0.70	E	F	F	1.08	1.12	1.12
	SBR	D	D	D	0.68	0.74	0.74	C	C	C	0.62	0.62	0.62	F	F	F	1.12	1.15	1.15
Bay Street / King Street (Signalized)	Overall	B	C	C	0.63	0.61	0.61	B	B	B	0.55	0.55	0.55	B	B	B	0.74	0.74	0.74
	WBTR	A	C	C	0.62	0.59	0.59	A	A	A	0.56	0.56	0.56	A	A	A	0.73	0.72	0.72
	WBR	A	B	B	0.28	0.27	0.27	A	A	A	0.26	0.26	0.26	B	B	B	0.62	0.61	0.61
	NBL	C	D	D	0.64	0.67	0.67	C	C	C	0.52	0.52	0.52	C	D	D	0.76	0.78	0.78
	NBLT	C	C	C	0.61	0.65	0.65	C	C	C	0.52	0.52	0.52	C	C	C	0.60	0.62	0.62
MacNab Street / King Street (Signalized)	Overall	A	A	B	0.64	0.63	0.68	A	A	B	0.58	0.58	0.64	A	A	C	0.65	0.65	0.73
	WBL[1]	-	-	F	-	-	0.73	-	-	D	-	-	0.53	-	-	D	-	-	0.57
	WBLT	A	A	B	0.68	0.66	0.74	A	A	B	0.63	0.63	0.73	A	A	C	0.69	0.69	0.80
	NBL	D	D	D	0.44	0.48	0.41	C	C	C	0.27	0.27	0.25	D	D	D	0.46	0.46	0.46
James Street / King Street[2] (Signalized)	Overall	D	C	C	0.77	0.76	0.74	D	C	C	0.65	0.65	0.63	C	C	C	0.69	0.69	0.68
	WBLT	F	D	D	**1.11**	0.99	0.96	E	D	D	**1.07**	**1.03**	0.99	D	D	D	**1.04**	0.99	0.98
	WBR	B	B	B	0.09	0.08	0.08	A	A	A	0.11	0.11	0.11	B	B	B	0.12	0.12	0.12
	NBT	A	A	A	0.47	0.51	0.51	A	A	A	0.33	0.34	0.34	A	A	A	0.38	0.39	0.39
	SBT	B	B	B	0.28	0.31	0.31	B	B	B	0.32	0.33	0.33	B	B	B	0.39	0.40	0.40
	SBR	C	C	C	0.46	0.50	0.50	B	B	B	0.27	0.28	0.28	C	C	C	0.42	0.43	0.43
John Street / King Street (Signalized)	Overall	B	B	B	0.66	0.65	0.65	B	B	B	0.70	0.70	0.70	C	C	C	0.76	0.76	0.76
	WBT	B	B	B	0.62	0.59	0.59	C	C	C	0.72	0.72	0.72	C	C	C	0.72	0.73	0.73
	WBR	B	B	B	0.12	0.12	0.12	B	B	B	0.15	0.15	0.15	B	B	B	0.14	0.14	0.14
	NBL	A	A	A	0.49	0.50	0.50	A	A	A	0.38	0.38	0.38	A	A	A	0.61	0.59	0.59
	NBT	A	A	A	0.72	0.73	0.73	A	A	A	0.43	0.43	0.43	A	A	A	0.44	0.44	0.44
	SBTR	C	C	C	0.22	0.22	0.22	C	C	C	0.61	0.61	0.61	D	D	D	0.88	0.86	0.86

LOS - level of service, v/c - volume to capacity ratio
Sc 1 - Existing signal timings; Sc 2 - Optimized signal timings; Sc 3 - Transit signal priority (westbound left to MacNab Street Terminal)
[1] Transit-Only lane
[2] Results for the AM peak hour in scenarios 2 and 3 are based on 100 seconds cycle length

Table 6: Post Installation (Month 3) Intersection Operations (Synchro 8)

Intersection	Movement	AM Peak Hour						Off Peak Hour						PM Peak Hour					
		LOS			v/c			LOS			v/c			LOS			v/c		
		Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3
Queen Street / King Street (Signalized)	Overall	C	B	B	0.83	0.82	0.82	B	B	B	0.80	0.80	0.80	F	F	F	1.13	1.13	1.13
	WBL	A	A	A	0.07	0.07	0.07	A	A	A	0.10	0.10	0.10	B	B	B	0.17	0.17	0.17
	WBT	B	B	B	0.90	0.86	0.86	B	B	B	0.87	0.87	0.87	F	E	E	1.15	1.12	1.12
	SBTR	C	D	D	0.64	0.69	0.69	C	C	C	0.70	0.70	0.70	E	F	F	1.08	1.11	1.11
	SBR	D	D	D	0.64	0.70	0.70	C	C	C	0.58	0.58	0.58	F	F	F	1.11	1.14	1.14
Bay Street / King Street (Signalized)	Overall	B	C	C	0.62	0.61	0.61	B	B	B	0.55	0.55	0.55	B	B	B	0.73	0.73	0.73
	WBTR	A	C	C	0.62	0.59	0.59	A	A	A	0.56	0.56	0.56	A	A	A	0.72	0.71	0.71
	WBR	A	B	B	0.27	0.26	0.26	A	A	A	0.25	0.25	0.25	A	A	A	0.59	0.58	0.58
	NBL	C	D	D	0.62	0.67	0.67	C	C	C	0.50	0.50	0.50	C	D	D	0.74	0.76	0.76
	NBLT	C	C	C	0.61	0.65	0.65	C	C	C	0.52	0.52	0.52	C	C	C	0.60	0.62	0.62
MacNab Street / King Street (Signalized)	Overall	A	A	B	0.64	0.63	0.63	A	A	B	0.58	0.58	0.56	A	A	C	0.65	0.65	0.65
	WBL[1]	-	-	F	-	-	0.75	-	-	D	-	-	0.52	-	-	D	-	-	0.57
	WBLT	A	A	B	0.68	0.66	0.74	A	A	B	0.63	0.63	0.73	A	A	C	0.69	0.69	0.80
	NBL	D	D	D	0.44	0.48	0.41	C	C	C	0.27	0.27	0.25	D	D	D	0.46	0.46	0.46
James Street / King Street[2] (Signalized)	Overall	D	C	C	0.80	0.78	0.77	D	C	C	0.68	0.68	0.67	C	C	C	0.72	0.72	0.71
	WBLT	F	D	D	**1.11**	0.99	0.96	E	D	D	**1.07**	**1.03**	0.99	D	D	D	**1.04**	0.99	0.98
	WBR	B	B	B	0.09	0.08	0.08	A	A	A	0.11	0.11	0.11	B	B	B	0.12	0.12	0.12
	NBT	A	A	A	0.47	0.51	0.51	A	A	A	0.33	0.34	0.34	A	A	A	0.38	0.39	0.39
	SBT	B	B	B	0.28	0.31	0.31	B	B	B	0.32	0.33	0.33	B	B	B	0.39	0.40	0.40
	SBR	C	C	C	0.46	0.50	0.50	B	B	B	0.27	0.28	0.28	C	C	C	0.42	0.43	0.43
John Street / King Street (Signalized)	Overall	B	B	B	0.69	0.67	0.67	B	B	B	0.64	0.64	0.64	C	C	C	0.76	0.76	0.76
	WBT	B	B	B	0.62	0.59	0.59	C	C	C	0.72	0.72	0.72	C	C	C	0.72	0.73	0.73
	WBR	B	B	B	0.12	0.12	0.12	B	B	B	0.15	0.15	0.15	B	B	B	0.14	0.14	0.14
	NBL	A	A	A	0.49	0.50	0.50	A	A	A	0.38	0.38	0.38	A	A	A	0.61	0.59	0.59
	NBT	A	A	A	0.72	0.73	0.73	A	A	A	0.43	0.43	0.43	A	A	A	0.44	0.44	0.44
	SBTR	C	C	C	0.22	0.22	0.22	C	C	C	0.61	0.61	0.61	D	D	D	0.88	0.86	0.86

LOS - level of service, v/c - volume to capacity ratio
Sc 1 - Existing signal timings; Sc 2 - Optimized signal timings; Sc 3 - Transit signal priority (westbound left to MacNab Street Terminal)
[1] Transit-Only lane
[2] Results for the AM peak hour in scenarios 2 and 3 are based on 100 seconds cycle length

Table 7: Post Installation (Month 3) 50th Percentile Queues

Intersection	Key Movement	Available Storage Length (m)	50th Percentile Queue Length (m)																	
			AM Peak Hour						Off Peak Hour						PM Peak Hour					
			Synchro 7			Synchro 8			Synchro 7			Synchro 8			Synchro 7			Synchro 8		
			Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3
Queen Street / King Street (Signalized)	WBL	30	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	11	10	10	10	9	9
	WBT	103	120	66	66	103	61	61	53	50	50	52	50	50	206	202	202	206	202	202
	SBT	75	40	45	45	41	45	45	47	47	47	47	47	47	149	153	153	147	151	151
	SBR	75	35	39	39	31	36	36	31	31	31	28	28	28	133	136	136	130	132	132
Bay Street / King Street (Signalized)	WBT	160	43	94	94	43	94	94	< 7	< 7	< 7	< 7	< 7	< 7	32	32	32	32	32	32
	WBR	30	7	24	24	< 7	23	23	< 7	< 7	< 7	< 7	< 7	< 7	15	16	16	13	13	13
	NBL	58[1]	44	49	49	42	49	49	20	20	20	18	18	18	48	48	48	45	45	45
	NBT	80	48	54	54	47	54	54	24	24	24	23	23	23	48	48	48	47	48	48
MacNab Street / King Street (Signalized)	WBL[2]	85	-	-	8	-	-	23	-	-	7	-	-	7	-	-	8	-	-	8
	WBT	85	20	67	111	20	67	111	11	11	85	11	11	85	< 7	< 7	126	< 7	< 7	126
	NBL	130	15	17	17	15	17	17	7	7	8	7	7	8	20	20	20	20	20	20
James Street / King Street (Signalized)	WBT	87	152	161	157	152	161	157	107	103	98	107	103	98	76	69	67	76	70	67
	WBR	87	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7
	NBT	15	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7
	SBT	80	23	28	28	23	28	28	20	21	21	20	21	21	35	36	36	35	36	36
	SBR	80	30	37	37	30	36	37	11	12	12	12	12	12	26	28	28	26	28	28
John Street / King Street (Signalized)	WBT	90	69	74	74	69	74	74	56	56	56	56	56	56	83	85	85	83	85	85
	WBR	30	8	9	9	8	9	9	< 7	< 7	< 7	< 7	< 7	< 7	8	8	8	8	8	8
	NBL	20	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7
	NBT	104	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7
	SBT	85	12	13	13	12	13	13	27	27	27	27	27	27	64	63	63	64	63	63

LOS - level of service, v/c - volume to capacity ratio
Sc 1 - Existing signal timings; Sc 2 - Optimized signal timings; Sc 3 - Transit signal priority (westbound left to MacNab Street Terminal)
[1] Average length of dual left turn lanes
[2]Transit-Only lane

Table 8: Post Installation (Month 3) 95th Percentile Queues

Intersection	Key Movement	Available Storage Length (m)	95th Percentile Queue Length (m)																	
			AM Peak Hour						Off Peak Hour						PM Peak Hour					
			Synchro 7			Synchro 8			Synchro 7			Synchro 8			Synchro 7			Synchro 8		
			Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3
Queen Street / King Street (Signalized)	WBL	30	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	18	17	17	17	16	16
	WBT	103	186	99	99	179	99	99	140	140	140	140	140	140	247	243	243	247	243	243
	SBT	75	39	48	48	40	48	48	64	64	64	64	64	64	192	195	195	190	194	194
	SBR	75	42	51	51	39	47	47	54	54	54	50	50	50	202	205	205	199	202	202
Bay Street / King Street (Signalized)	WBT	160	68	84	84	68	84	84	13	13	13	13	13	13	82	63	63	82	64	64
	WBR	30	13	35	35	< 7	33	33	< 7	< 7	< 7	< 7	< 7	< 7	51	39	39	21	19	19
	NBL	58[1]	65	75	75	62	74	74	35	35	35	34	34	34	79	83	83	75	78	78
	NBT	80	53	62	62	53	62	62	29	29	29	29	29	29	58	60	60	57	59	59
MacNab Street / King Street (Signalized)	WBL[2]	85	-	-	23	-	-	23	-	-	25	-	-	25	-	-	27	-	-	27
	WBT	85	7	54	120	7	54	120	11	13	148	11	13	148	26	169	130	26	169	130
	NBL	130	25	29	29	25	29	29	13	13	15	13	13	15	32	32	32	32	32	32
James Street / King Street (Signalized)	WBT	87	196	204	195	197	204	195	146	143	136	147	142	136	178	170	165	178	170	166
	WBR	87	8	< 7	< 7	8	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	8	7	7	8	7	8
	NBT	15	7	9	9	8	9	9	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7
	SBT	80	33	39	39	33	39	39	29	30	30	29	30	30	48	49	49	48	49	49
	SBR	80	88	98	99	88	98	99	45	48	49	45	48	49	76	83	80	76	83	80
John Street / King Street (Signalized)	WBT	90	97	103	103	97	103	103	109	109	109	109	109	109	108	110	110	108	110	110
	WBR	30	18	19	19	18	19	19	16	16	16	16	16	16	17	17	17	17	17	17
	NBL	20	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7
	NBT	104	72	82	82	73	82	82	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7
	SBT	85	23	25	25	23	25	25	41	41	41	41	41	41	112	108	108	112	108	108

LOS - level of service, v/c - volume to capacity ratio
Sc 1 - Existing signal timings; Sc 2 - Optimized signal timings; Sc 3 - Transit signal priority (westbound left to MacNab Street Terminal)
[1] Average length of dual left turn lanes
[2]Transit-Only lane

2.2.2. Queuing

The results for the 50th percentile (average queue) queuing analysis indicate that, in general, the queues for all movements will be accommodated in the available storage during the weekday AM peak, Midday and PM peak hours, with the exception of the following movements detailed below in **Table 9**.

Table 9: Post Installation (Month 3) 50th Percentile Queuing Issues

Month 3 Analysis - 50th Percentile Queuing	
Scenario 1	**Confirmed Obs and Notes**
@ Queen St – WBT: AM pk hr & PM pk hr – LOS B & LOS F	Occasionally
@ Queen St – SBTR & SBR: PM pk hr – LOS E & LOS F	Confirmed
@ James St – WBT: AM pk hr &: Off pk hr – LOS F & LOS E	Confirmed
Scenario 2	**Confirmed Obs and Notes**
@ Queen St – WBT: PM pk hr – LOS E	N/A
@ Queen St – SBTR & SBR: PM pk hr – LOS F & LOS F	N/A
@ James St – WBT: AM pk hr &: Off pk hr – LOS D & LOS D	N/A
Scenario 3	**Confirmed Obs and Notes**
@ Queen St – WBT: PM pk hr – LOS E	N/A
@ Queen St – SBTR & SBR: PM pk hr – LOS F & LOS F	N/A
@ MacNab St – WBT: AM pk hr & PM pk hr – LOS B & LOS C	N/A
@ James St – WBT: AM pk hr &: Off pk hr – LOS D & LOS D	N/A

The results for the 95th percentile (maximum queues) queuing analysis indicate that the queues for several movements will exceed the available storage during the weekday AM, Midday and PM peak hours. These movements are detailed below in **Table 10**.

Table 10: Post Installation (Month 3) 95th Percentile Queuing Issues

Month 3 Analysis - 95th Percentile Queuing	
Scenario 1	**Confirmed Obs and Notes**
@ Queen St – WBT: AM pk hr, Off pk hr & PM pk hr – LOS B , LOS B & LOS F	Occasionally
@ Queen St – SBTR & SBR: PM pk hr – LOS E & LOS F	Confirmed
@ Bay St – NBL: AM pk hr & PM pk hr – LOS C & LOS C	Occasionally
@ James St – WBT: AM pk hr, Off pk hr & PM pk hr – LOS F , LOS E & LOS D	Confirmed
@ James St – SBR: AM pk hr – LOS C	Occasionally
@ John St – WBT: AM pk hr, Off pk hr & PM pk hr – LOS B , LOS C & LOS C	Confirmed
@ John St – SBT: PM pk hr – LOS D	Occasionally
Scenario 2	**Confirmed Obs and Notes**
@ Queen St – WBT: AM pk hr, Off pk hr & PM pk hr – LOS B , LOS B & LOS E	N/A
@ Queen St – SBTR & SBR: PM pk hr – LOS F & LOS F	N/A

Month 3 Analysis - 95th Percentile Queuing	
@ Bay St – NBL: AM pk hr & PM pk hr – LOS D & LOS D	N/A
@ Bay St – WBR: AM pk hr & PM pk hr – LOS B & LOS B	N/A
@ MacNab St – WBT: PM pk hr – LOS A	N/A
@ James St – WBT: AM pk hr, Off pk hr & PM pk hr – LOS D , LOS D & LOS D	N/A
@ James St – SBR: AM pk hr & PM pk hr – LOS C & LOC C	N/A
@ John St – WBT: AM pk hr, Off pk hr & PM pk hr – LOS B , LOS C & LOS C	N/A
@ John St – SBT: PM pk hr – LOS D	N/A
Scenario 3	**Confirmed Obs and Notes**
@ Queen St – WBT: AM pk hr, Off pk hr & PM pk hr – LOS B , LOS B & LOS E	N/A
@ Queen St – SBTR & SBR: PM pk hr – LOS F & LOS F	N/A
@ Bay St – NBL: AM pk hr & PM pk hr – LOS D & LOS D	N/A
@ Bay St – WBR: AM pk hr & PM pk hr – LOS B & LOS B	N/A
@ MacNab St – WBT: AM pk hr, OFF pk hr & PM pk hr – LOS B, LOS B & LOS C	N/A
@ James St – WBT: AM pk hr, Off pk hr & PM pk hr – LOS D , LOS D & LOS D	N/A
@ James St – SBR: AM pk hr – LOS C	N/A
@ John St – WBT: AM pk hr, Off pk hr & PM pk hr – LOS B , LOS C & LOS C	N/A
@ John St – SBT: PM pk hr – LOS D	N/A

N/A – Not Applicable

Note, the LOS values for above noted movements in **Table 9** and **Table 10** are based on Synchro 7 results (**Table 5**). However, there is minimal or no difference in the LOS values between Synchro 7 and Synchro 8 results.

2.3. Post-Installation Traffic Analysis (Month 7)

The Post-installation (Month 7) operational analysis assessed the operations of the general purpose traffic lanes on King Street seven months after the implementation of the RBL. Post-Installation (Month 7) weekday turning movement counts, as summarized in **Table 11,** were provided by the City.

Table 11: Post Installation (Month 7) Traffic Counts

Location	Date
John Street / King Street	May 12, 2014
James Street / King Street	May 13, 2014
MacNab Street / King Street	May 12, 2014
Bay Street / King Street	May 14, 2014
Queen Street / King Street	May 15, 2014

The approach and methodology for the Post-installation (Month 7) traffic analysis is consistent with the analysis undertaken for the Post-installation (Month 3), i.e. only general purpose traffic lanes are assessed given the limitations of Synchro to model transit-only lanes.

The Post-installation (Month 7) bus volumes in the King Street corridor are shown in **Figure 7**. The Post-installation (Month 7) general purpose traffic volumes are illustrated in **Figure 8**. The Post-installation lane configuration is shown in

Figure 5. The lane configuration modelled in Synchro is shown in **Figure 6** (i.e. excluding the RBL which Synchro cannot model).

The three analysis scenarios to assess Post-installation (Month 7) impacts are:

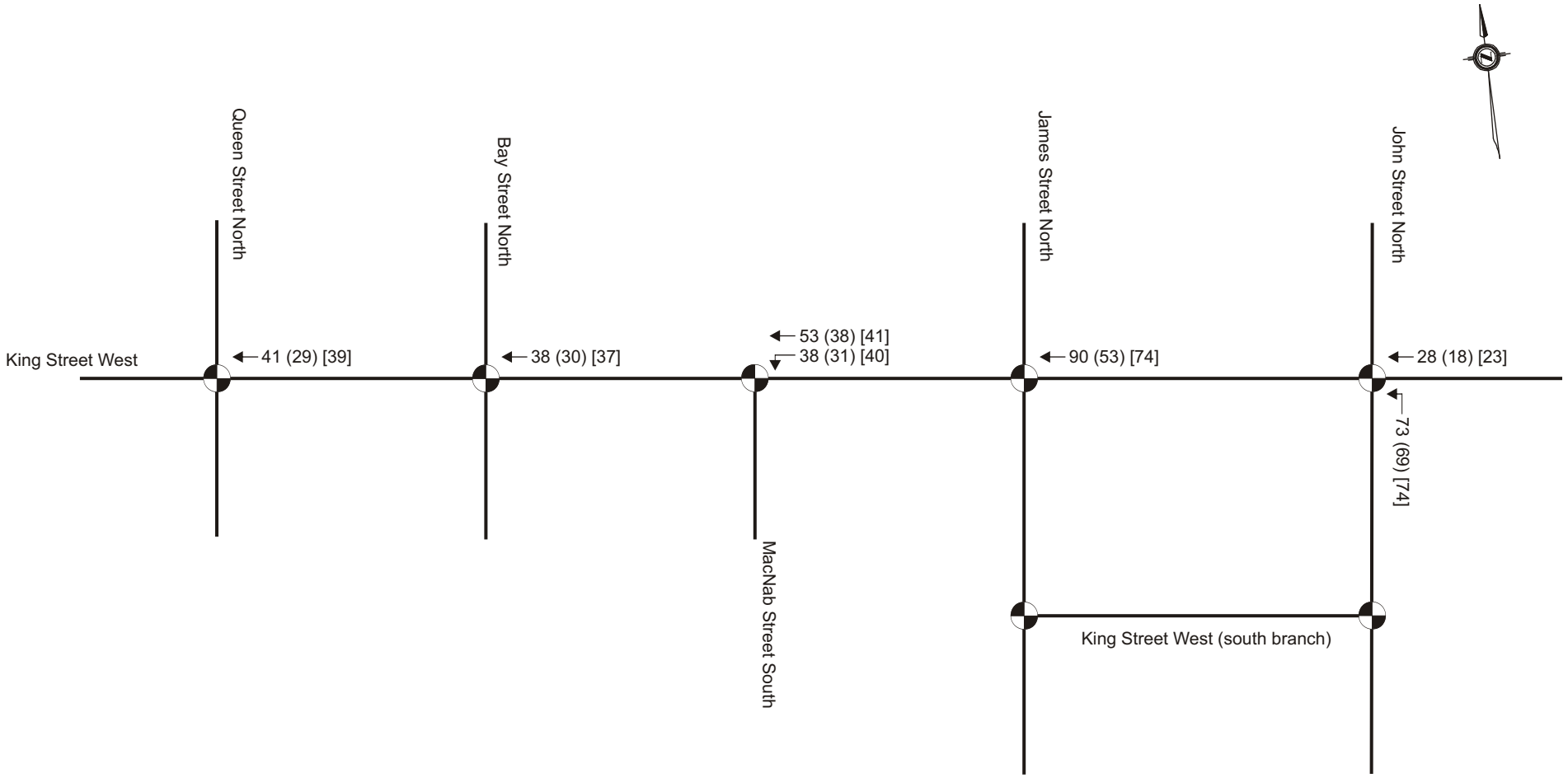
- **Scenario 1** – pre-installation signal timing splits (provided by City staff)
- **Scenario 2** - modified signal timing splits
- **Scenario 3** - modified signal timing splits with transit signal priority (westbound left to MacNab Street Terminal)

Transit signal priority phasing at the intersection of James Street / King Street was not considered in Scenario 3 as this location has substantial pedestrian volumes. Another reason transit signal priority phasing was not considered at this location was that bus movements from the RBL into the general purpose lanes to make the westbound left turn into MacNab Street could not be guaranteed due to the queues of westbound through traffic on King Street.

2.3.1. Traffic Operations

The results of the Post-installation (Month 7) intersection operations using Synchro 7 and Synchro 8 are summarized in **Table 12** and **Table 13,** respectively. The corresponding 50th and 90th percentile queues are provided in **Table 14** and **Table 15**, respectively. The Synchro 7 and Synchro 8 outputs are provided in **Appendix C**.

The results of the traffic analysis indicate that most movements within the study area are operating at acceptable LOS during the peak periods analyzed except for some movements at James Street and at Queen Street. The results generated by Synchro 7 and Synchro 8 are comparable for all peak hours.

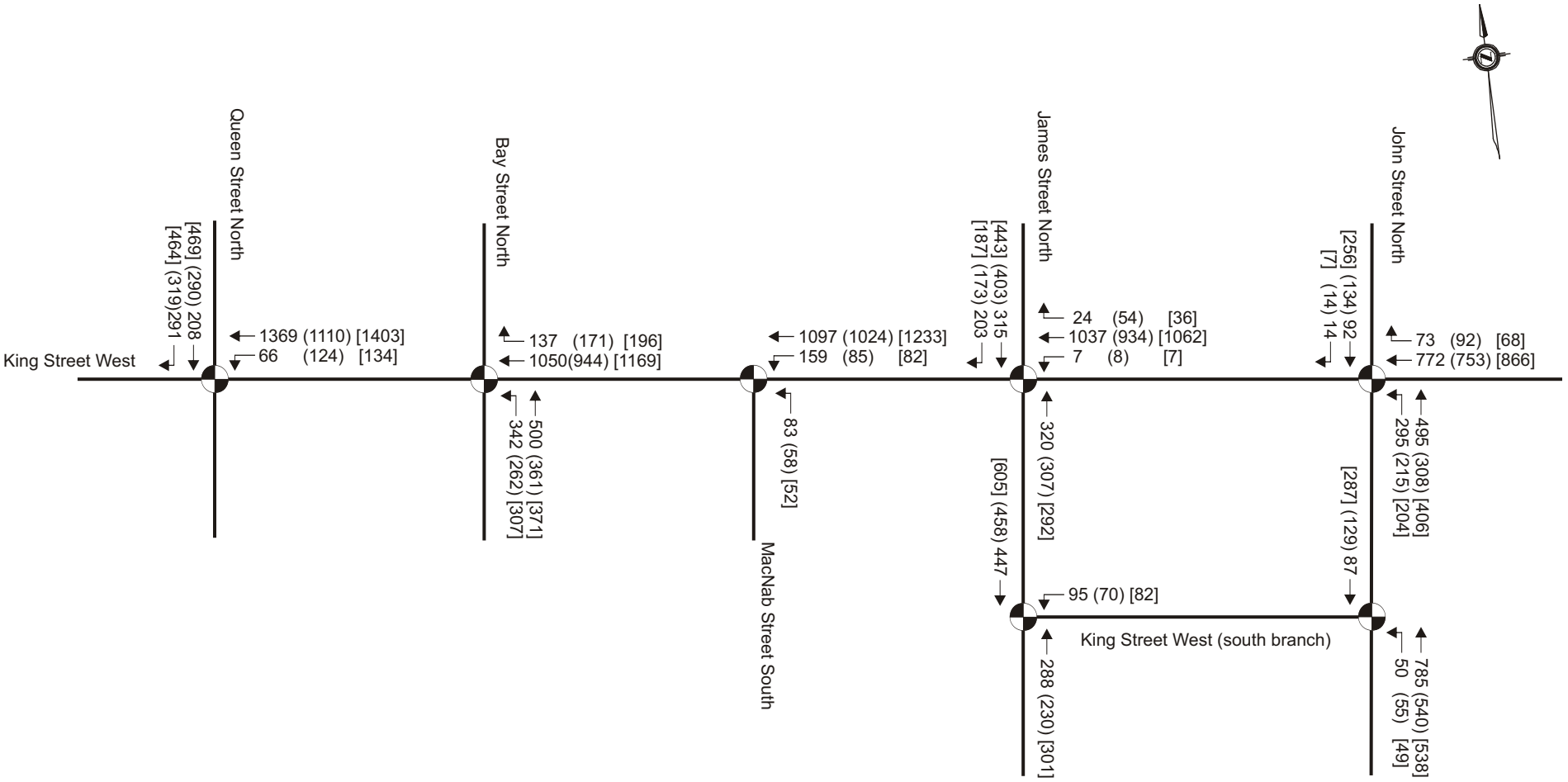


Legend

- Right-turn Movement
- Through Movement
- Left-turn Movement
- 99 (99) [99] Weekday AM (Midday Off-peak) [Weekday PM] Peak Hour Traffic Volumes

Not to Scale

Figure 7
Post-Installation (Month 7) Bus Volumes



Legend

- Right-turn Movement
- Through Movement
- Left-turn Movement
- 99 (99) [99] Weekday AM (Midday Off-peak) [Weekday PM] Peak Hour Traffic Volumes

Not to Scale

Figure 8
Post- Installation (Month 7) General Purpose Traffic Volumes

Table 12: Post-Installation (Month 7) Intersection Operations (Synchro 7)

Intersection	Movement	AM Peak Hour						Off Peak Hour						PM Peak Hour					
		LOS			v/c			LOS			v/c			LOS			v/c		
		Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3
Queen Street / King Street	Overall	B	B	B	0.78	0.78	0.78	B	B	B	0.56	0.56	0.56	B	B	B	0.73	0.72	0.72
	WBL	A	A	A	0.07	0.07	0.07	A	A	A	0.09	0.09	0.09	A	A	A	0.12	0.11	0.11
	WBT	B	A	B	0.82	0.81	0.80	A	A	A	0.57	0.57	0.57	B	B	B	0.74	0.71	0.71
	SBTR	C	C	C	0.63	0.65	0.66	C	C	C	0.56	0.56	0.56	C	C	C	0.68	0.73	0.73
	SBR	D	D	D	0.68	0.70	0.71	C	C	C	0.56	0.55	0.55	C	D	D	0.69	0.73	0.73
Bay Street / King Street	Overall	B	C	B	0.53	0.53	0.53	B	B	B	0.47	047	047	B	B	B	0.55	0.55	0.55
	WBTR	A	B	A	0.50	0.50	0.50	A	A	A	0.46	0.46	0.46	A	A	A	0.53	0.52	0.52
	WBR	A	A	A	0.17	0.17	0.17	A	A	A	0.22	0.22	0.22	A	A	A	0.28	0.29	0.29
	NBL	C	C	C	0.60	0.58	0.58	C	C	C	0.46	0.45	0.45	D	D	D	0.63	0.61	0.61
	NBLT	C	C	C	0.59	0.59	0.59	C	C	C	0.49	0.49	0.49	C	C	C	0.53	0.53	0.53
MacNab Street / King Street	Overall	A	A	B	0.53	0.53	0.60	A	A	B	0.49	0.49	0.54	A	A	C	0.52	0.52	0.60
	WBL[1]	-	-	E	-	-	0.70	-	-	D	-	-	0.59	-	-	D	-	-	0.55
	WBLT	A	A	B	0.54	0.55	0.63	A	A	B	0.53	0.52	0.59	A	A	C	0.54	0.54	0.66
	NBL	D	D	D	0.43	0.43	0.43	C	C	C	0.30	0.30	0.27	D	D	D	0.34	0.34	0.27
James Street / King Street[2]	Overall	B	C	C	0.65	0.65	0.64	B	B	B	0.56	0.57	0.55	B	B	B	0.57	0.57	0.55
	WBLT	C	C	C	0.86	0.86	0.84	C	C	C	0.83	0.84	0.81	C	C	C	0.84	0.84	0.82
	WBR	B	B	B	0.07	0.07	0.07	B	B	B	0.17	0.10	0.17	B	B	B	0.10	0.10	0.10
	NBT	A	A	A	0.49	0.49	0.49	A	A	A	0.36	0.35	0.36	A	A	A	0.34	0.35	0.34
	SBT	B	B	B	0.22	0.22	0.22	B	B	B	0.27	0.29	0.27	B	B	B	0.28	0.29	0.28
	SBR	B	C	B	0.35	0.36	0.35	B	B	B	0.30	0.31	0.30	B	B	B	0.31	0.31	0.31
John Street / King Street	Overall	B	B	B	0.61	0.61	0.61	B	B	B	0.51	0.51	0.51	B	B	B	0.62	0.62	0.62
	WBT	B	B	B	0.49	0.49	0.49	B	B	B	0.52	0.52	0.52	B	B	B	0.56	0.56	0.56
	WBR	B	B	B	0.12	0.12	0.12	B	B	B	0.22	0.22	0.22	B	B	B	0.12	0.12	0.12
	NBL	A	A	A	0.41	0.41	0.41	A	A	A	0.34	0.34	0.34	A	A	A	0.45	0.45	0.45
	NBT	A	A	A	0.74	0.74	0.74	A	A	A	0.50	0.50	0.50	A	A	A	0.69	0.69	0.69
	SBTR	C	C	C	0.24	0.24	0.24	C	C	C	0.44	0.44	0.44	D	D	D	0.67	0.67	0.67

LOS - level of service, v/c - volume to capacity ratio
Sc 1 - Existing signal timings; Sc 2 - Optimized signal timings; Sc 3 - Transit signal priority (westbound left to MacNab Street Terminal)
[1] Transit-Only lane

Table 13: Post-Installation (Month 7) Intersection Operations (Synchro 8)

Intersection	Movement	AM Peak Hour						Off Peak Hour						PM Peak Hour					
		LOS			v/c			LOS			v/c			LOS			v/c		
		Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3
Queen Street / King Street	Overall	B	B	B	0.78	0.77	0.77	B	B	B	0.56	0.56	0.56	B	B	B	0.73	0.72	0.72
	WBL	A	A	A	0.07	0.07	0.07	A	A	A	0.09	0.09	0.09	A	A	A	0.12	0.11	0.11
	WBT	B	A	B	0.82	0.80	0.80	A	A	A	0.57	0.57	0.57	B	B	B	0.74	0.71	0.71
	SBTR	C	C	C	0.63	0.67	0.67	C	C	C	0.56	0.56	0.56	C	C	C	0.68	0.73	0.73
	SBR	D	D	D	0.68	0.67	0.77	C	C	C	0.56	0.55	0.55	C	D	D	0.69	0.73	0.73
Bay Street / King Street	Overall	B	C	B	0.53	0.53	0.53	B	B	B	0.47	047	047	B	B	B	0.55	0.55	0.55
	WBTR	A	B	A	0.50	0.50	0.50	A	A	A	0.46	0.46	0.46	A	A	A	0.53	0.52	0.52
	WBR	A	A	A	0.17	0.16	0.16	A	A	A	0.22	0.22	0.22	A	A	A	0.28	0.29	0.29
	NBL	C	C	C	0.60	0.59	0.59	C	C	C	0.46	0.45	0.45	D	D	D	0.63	0.61	0.61
	NBLT	C	C	C	0.59	0.59	0.59	C	C	C	0.49	0.49	0.49	C	C	C	0.53	0.53	0.53
MacNab Street / King Street	Overall	A	A	B	0.53	0.53	0.55	A	A	B	0.49	0.49	0.54	A	A	C	0.52	0.52	0.60
	WBL[1]	-	-	E	-	-	0.70	-	-	D	-	-	0.59	-	-	D	-	-	0.55
	WBLT	A	A	B	0.54	0.55	0.63	A	A	B	0.53	0.52	0.59	A	A	C	0.54	0.54	0.66
	NBL	D	D	D	0.43	0.43	0.43	C	C	C	0.30	0.30	0.27	D	D	D	0.34	0.34	0.27
James Street / King Street[2]	Overall	B	C	C	0.68	0.68	0.67	B	B	B	0.59	0.59	0.55	B	B	B	0.59	0.59	0.55
	WBLT	C	C	C	0.86	0.86	0.84	C	C	C	0.83	0.83	0.81	C	C	C	0.84	0.84	0.82
	WBR	B	B	B	0.07	0.07	0.07	B	B	B	0.17	0.16	0.17	B	B	B	0.10	0.10	0.10
	NBT	A	A	A	0.49	0.49	0.49	A	A	A	0.36	0.37	0.36	A	A	A	0.34	0.35	0.34
	SBT	B	B	B	0.22	0.22	0.22	B	B	B	0.27	0.27	0.27	B	B	B	0.28	0.29	0.28
	SBR	B	C	B	0.35	0.36	0.35	B	B	B	0.30	0.31	0.30	B	B	B	0.31	0.31	0.31
John Street / King Street)	Overall	B	B	B	0.61	0.63	0.63	B	B	B	0.51	0.51	0.51	B	B	B	0.62	0.62	0.62
	WBT	B	B	B	0.49	0.49	0.49	B	B	B	0.52	0.52	0.52	B	B	B	0.56	0.56	0.56
	WBR	B	B	B	0.12	0.12	0.12	B	B	B	0.22	0.22	0.22	B	B	B	0.12	0.12	0.12
	NBL	A	A	A	0.41	0.41	0.41	A	A	A	0.34	0.34	0.34	A	A	A	0.45	0.45	0.45
	NBT	A	A	A	0.74	0.75	0.75	A	A	A	0.50	0.50	0.50	A	A	A	0.69	0.69	0.69
	SBTR	C	C	C	0.24	0.24	0.24	C	C	C	0.44	0.44	0.44	D	D	D	0.67	0.67	0.67

LOS - level of service, v/c - volume to capacity ratio
Sc 1 - Existing signal timings; Sc 2 - Optimized signal timings; Sc 3 - Transit signal priority (westbound left to MacNab Street Terminal)
[1] Transit-Only lane
[2] Results for the AM peak hour in scenarios 2 and 3 are based on 100 seconds cycle length

Table 14: Post-Installation (Month 7) 50th Percentile Intersection Queues

Intersection	Key Movement	Available Storage Length (m)	50th Percentile Queue Length (m)																	
			AM Peak Hour						Off Peak Hour						PM Peak Hour					
			Synchro 7			Synchro 8			Synchro 7			Synchro 8			Synchro 7			Synchro 8		
			Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3
Queen Street / King Street	WBL	30	<7	<7	< 7	<7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	<7	<7	<7	<7	<7	<7
	WBT	103	86	31	95	85	21	96	19	18	22	19	18	22	70	39	31	74	39	31
	SBT	75	38	37	38	38	38	38	27	27	27	27	27	27	54	54	54	55	54	54
	SBR	75	35	34	34	31	31	31	22	22	22	21	21	21	47	46	46	45	45	45
Bay Street / King Street	WBT	160	19	66	36	19	66	36	<7	<7	31	<7	<7	31	17	15	111	17	15	105
	WBR	30	< 7	13	<7	< 7	12	<7	< 7	< 7	8	< 7	< 7	7	<7	<7	28	<7	<7	26
	NBL	58[1]	34	33	33	33	33	33	15	15	15	15	15	15	28	27	27	26	26	26
	NBT	80	38	38	38	38	38	38	21	20	20	21	20	20	30	30	30	30	30	30
MacNab Street / King Street	WBL[2]	85	-	-	7	-	-	7	-	-	<7	-	-	<7	-	-	7	-	-	7
	WBT	85	17	47	91	17	47	91	13	13	61	13	13	61	7	7	105	7	7	105
	NBL	130	14	14	14	14	14	14	7	7	9	7	7	9	9	9	9	9	9	9
James Street / King Street	WBT	87	51	107	102	51	107	102	70	67	66	70	70	66	39	37	37	39	39	38
	WBR	87	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7
	NBT	15	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7
	SBT	80	18	18	18	18	18	18	16	16	20	16	16	20	25	25	25	25	25	25
	SBR	80	23	23	23	23	23	23	13	13	0	13	13	0	20	20	20	20	20	20
John Street / King Street	WBT	90	51	51	51	51	51	51	35	35	35	35	35	35	59	59	59	59	59	59
	WBR	30	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
	NBL	20	<7	<7	< 7	< 7	< 7	< 7	<7	< 7	< 7	< 7	< 7	<7	<7	<7	<7	<7	<7	<7
	NBT	104	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7
	SBT	85	13	13	13	13	13	13	18	18	18	18	18	18	44	44	44	44	44	44

LOS - level of service, v/c - volume to capacity ratio
Sc 1 - Existing signal timings; Sc 2 - Optimized signal timings; Sc 3 - Transit signal priority (westbound left to MacNab Street Terminal)
[1] Average length of dual left turn lanes
[2]Transit-Only lane

Table 15: Post-Installation (Month 7) 95th Percentile Intersection Queues

Intersection	Key Movement	Available Storage Length (m)	95th Percentile Queue Length (m)																	
			AM Peak Hour						Off Peak Hour						PM Peak Hour					
			Synchro 7			Synchro 8			Synchro 7			Synchro 8			Synchro 7			Synchro 8		
			Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3
Queen Street / King Street	WBL	30	<7	<7	<7	<7	<7	7	<7	<7	<7	<7	<7	<7	13	10	<7	13	10	<7
	WBT	103	138	100	112	131	100	112	41	41	67	42	42	66	113	67	42	112	67	42
	SBT	75	37	40	40	38	40	40	32	32	32	32	32	32	64	71	71	64	71	71
	SBR	75	41	44	44	38	41	41	34	34	34	33	33	33	69	75	75	66	74	74
Bay Street / King Street	WBT	160	27	67	57	27	67	7	<7	<7	58	<7	<7	58	12	8	138	13	9	138
	WBR	30	<7	22	18	<7	20	17	<7	< 7	21	< 7	< 7	20	<7	<7	56	<7	< 7	54
	NBL	58[1]	51	50	50	51	50	50	30	30	30	30	30	30	45	44	44	42	42	42
	NBT	80	43	43	43	43	43	43	26	26	26	26	26	26	35	35	35	34	34	34
MacNab Street / King Street	WBL[2]	85	-	-	20	-	-	20	-	-	18	-	-	18	-	-	24	-	-	24
	WBT	85	8	52	114	8	52	115	20	20	104	21	21	104	29	29	128	29	29	128
	NBL	130	24	24	24	24	24	24	14	14	16	14	14	16	17	17	17	17	17	17
James Street / King Street	WBT	87	74	133	128	75	133	128	94	58	31	94	75	31	64	60	61	64	64	61
	WBR	87	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7
	NBT	15	8	8	7	8	8	<7	10	10	11	10	10	11	<7	<7	10	<7	<7	10
	SBT	80	26	26	26	26	26	27	16	25	29	25	25	29	35	35	35	35	35	35
	SBR	80	64	64	64	64	64	64	54	54	<7	54	54	<7	53	53	53	53	53	53
John Street / King Street	WBT	90	70	70	70	70	70	70	68	68	68	68	68	68	86	86	86	86	86	86
	WBR	30	16	16	16	16	16	16	21	21	21	21	21	21	16	16	16	16	16	16
	NBL	20	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	<7	<7	<7	<7	<7	<7
	NBT	104	80	80	80	80	80	80	<7	<7	<7	<7	<7	<7	85	85	85	85	85	85
	SBT	85	25	25	25	25	25	25	27	27	27	27	27	27	65	65	65	65	65	65

LOS - level of service, v/c - volume to capacity ratio
Sc 1 - Existing signal timings; Sc 2 - Optimized signal timings; Sc 3 - Transit signal priority (westbound left to MacNab Street Terminal)
[1] Average length of dual left turn lanes
[2]Transit-Only lane

2.3.2. Queuing

The results for the 50th percentile (average queue) queuing analysis indicate that, in general, the queues for all movements will be accommodated in the available storage during the weekday AM, Midday and PM peak hours, with the exception of the movements detailed in **Table 16**.

Table 16: Post Installation (Month 7) 50th Percentile Queuing Issues

Month 7 Analysis - 50th Percentile Queuing	
Scenario 1	**Confirmed Obs and Notes**
No Queuing Storage Issues Identified	Field observations indicate issues at John St. during all three time periods and James St. during PM peak.
Scenario 2	**Confirmed Obs and Notes**
@ James St – WBT: AM pk hr – LOS C	N/A
Scenario 3	**Confirmed Obs and Notes**
@ MacNab St – WBT: AM pk hr & PM pk hr – LOS B & LOS C	N/A
@ James St – WBT: AM pk hr – LOS C	N/A

The results for the 95th percentile (maximum queue) queuing analysis indicate that the queues for several movements will exceed the available storage during the weekday AM, Midday and PM peak hours. These movements are detailed in **Table 17**.

Table 17: Post Installation (Month 7) 95th Percentile Queuing Issues

Month 7 Analysis - 95th Percentile Queuing	
Scenario 1	**Confirmed Obs and Notes**
@ Queen St – WBT: AM pk hr & PM pk hr – LOS B & LOS B	Field observations indicate issues at John St. during all three time periods and James St. during PM peak.
Scenario 2	**Confirmed Obs and Notes**
@ James St – WBT: AM pk hr – LOS C	N/A
Scenario 3	**Confirmed Obs and Notes**
@ Bay St – WBR: PM pk hr – LOS A	N/A
@ MacNab St – WBT: AM pk hr, OFF pk hr & PM pk hr – LOS B, LOS B & LOS C	N/A
@ James St – WBT: AM pk hr – LOS C	N/A

N/A – Not Applicable

Note, the LOS values for above noted movements in **Table 16** and **Table 17** are based on Synchro 7 (**Table 12**) results. However, there is minimal or no difference in the LOS values between Synchro 7 and Synchro 8 results.

2.4. Traffic Volumes Comparison

Month 3 traffic volumes on King Street indicate a slight reduction from Pre-Installation volumes. Month 7 Post-installation traffic volumes on King Street indicate more notable decrease in the AM peak period traffic volumes of 200 to 400 vehicles per hour in westbound direction. The parallel street traffic volumes were assessed by comparing Post-installation (Month 3) and (Month 7) AM, Midday and PM peak hour turning movement counts at the following intersections provided by the City:

- Cannon Street / John Street;
- Wilson Street / John Street;
- Hunter Street / John Street;
- Cannon Street / Bay Street; and
- Hunter Street / Bay Street.

There are some variations in the turning movements observed on the parallel streets to King Street however no definitive re-assignment of traffic can be traced or attributed to the installation of the RBL on King Street. As no pre-installation traffic data was provided for the parallel streets a conclusive comparison or analysis cannot be made.

2.5. Summary of Traffic Analysis

The analysis of the pre-installation conditions show that intersections within the study area are operating with residual capacity and acceptable LOS during the weekday AM, Midday and PM peak periods. Generally, queuing in the study corridor can be accommodated within the available storage.

The Post-installation (Month 3) operational analysis of the corridor indicate that the intersections within the study area for Scenarios 1, 2 and 3 are operating with residual capacity and at acceptable LOS during the weekday AM, Midday and PM peak hours, with the exception of the westbound left-through movement at the intersection of James Street / King Street that operates with capacity constraints during all peak hours for Scenario 1. The intersection is also over capacity in Scenario 2 Midday peak. Some queuing issues are experienced for the westbound through movements on King Street in all scenarios tested.

The results of the traffic analysis indicate that most movements within the study area are operating at acceptable LOS during the peak periods analyzed except for some movements at James Street and at Queen Street.

Pre installation, the intersection of Queen Street / King Street operates well within capacity with v/c ratios less than 0.90 and some minor queue storage issues for the southbound through and southbound right-turn movements. Post-installation (Month 7), this intersection experiences its greatest increase in v/c ratio in the AM peak for all analysis scenarios – the westbound through movement experiences an increase in v/c ratio and 95th percentile queues that exceed available storage.

Pre installation, the intersection of Bay Street / King Street operates well within capacity with v/c ratios less than 0.90 and no queue storage issues. Post-installation (Month 7), this intersection experiences its greatest increase in v/c ratio in the Midday peak for all analysis scenarios. In Scenario 3 of the PM peak, the westbound right-turn has a 95th percentile queue that exceeds available storage.

Pre installation, the intersection of MacNab Street / King Street operates well within capacity with v/c ratios less than 0.90 and no queue storage issues. Post-installation (Month 7), the intersection continues to operate with v/c ratios less 0.90 during the AM, Midday and PM peaks. The 50th and 95th percentile queue for the westbound through movement exceeds available storage in Scenario 3 mainly as a result of green time that has been taken away from the westbound through movement to facilitate the left-turn transit priority signal.

Pre installation, the intersection of James Street / King Street operates well within capacity with v/c ratios less than 0.90 and no queue storage issues. The overall intersection v/c ratio Post installation (Month 7) for the AM, Midday and PM peak hours are in a similar range to those experienced pre installation of the RBL. The westbound through-left movement experiences the greatest increase in v/c ratio during the Midday and PM peaks for all analysis scenarios. In the AM peak, the westbound through-left queues (50th and 95th percentile) in Scenarios 2 and 3 exceed available storage.

Pre installation, the intersection of John Street / King Street operates well within capacity with v/c ratios less than 0.90 but with southbound right queues (95th percentile) that exceed available storage. The intersection continues to operate with v/c ratios less than 0.90. The 95th percentile queues indicate near capacity conditions.

3.0 Travel Speed and Travel Time Runs

3.1. Pre-Installation and Post-Installation Travel Time

Travel speed and delay runs were conducted by Accu-Traffic Inc. during the weekday AM, Midday and PM peak periods before the RBL implementation on Thursday May 16, 2013 and for four periods following the installation of the RBL.

After implementation travel time runs for the one month monitoring interval were conducted during the AM, Midday and PM peak periods on Tuesday November 5, 2013. Concurrent with the implementation and opening of the RBL, unrelated construction activities were taking place on King Street which adversely affected the operations on King Street. Since construction activities occurred during the Midday hours on November 5, 2013, the after speed survey for the Midday peak period was redone on Thursday November 7, 2013 to obtain representative data.

It should be noted that, as of Thursday November 7, No Stopping regulation from 4:00 PM to 6:00 PM on the south side of King Street between Locke Street and Dundurn Street was implemented and on street parking will no longer be permitted during this time period.

The runs for the three month monitoring interval were conducted during the AM, Midday, and PM peak periods on Thursday January 30, 2014.

The runs for the seven month monitoring interval were conducted during the AM, Midday, and PM peak periods on Wednesday May 14, 2014. The travel time data collection dates are summarised in **Table 18** below.

Table 18: AM Peak Period Travel Time and Speed (Before and After Conditions Comparison)

Monitoring Period	Survey Date
Pre Installation of RBL	Thursday May 16 2013
Post installation (Month 1)	Tuesday November 5 and Thursday November 7 2013
Post installation (Month 3)	Thursday January 30 2014
Post installation (Month 7)	Wednesday May 14 2014

These surveys capture the typical automobile speed on King Street and the time to travel the King Street RBL. In addition the data also includes Wellington Street to Mary Street to capture queuing on the approach to the RBL. The findings from the before and after travel time surveys are summarized in **Table 19** to **Table 21**.

Detailed travel time plots for the before and after conditions are provided in **Appendices D** to **G**.

The survey results indicate that the average travel time has generally increased with a corresponding decrease in the average speed during the AM, Midday and PM peak periods one month after the RBL implementation. The increase in average travel times for the one month monitoring interval is 3 minutes 24 seconds during the AM peak period, 1 minute 34 seconds during the Midday peak period and 1 minute and 11 seconds during the PM peak period. With all periods resulting in similar travel times of approx 8-9 minutes

The survey results for the three month monitoring interval show average travel time's improvements during the AM and Midday peak periods compared to the pre installation runs. The decrease in average travel times observed for the 3 month monitoring interval is 32 seconds during the AM peak period and 1 minute 52 seconds during the Midday peak period. For the PM peak period, an increase of 1 minute 4 seconds in average travel time was observed. This is due to diverting traffic and abuse of the RBL.

The survey results for the seven month monitoring interval compared to pre installation show average travel times have generally increased with a corresponding decrease in the average speed during the AM, Midday and PM peak periods seven months after the RBL implementation. The increase in average travel times for the seven month monitoring interval is 1 minutes 43 seconds during the AM peak period, 2 minute 24 seconds during the Midday peak period and 5 minute and 19 seconds during the PM peak period.

Table 19: AM Peak Period Travel Time and Speed (Before and After Conditions Comparison)

Run	King Street WB AM Peak (Pre-Installation Runs)					King Street WB AM Peak (Post-Installation Runs - Month 1)					King Street WB AM Peak (Post-Installation Runs - Month 3)					King Street WB AM Peak (Post-Installation Runs - Month 7)				
	Average Speed (km/h)	Travel Time (min)	No. of Stops	Stopped Time (min)	Congested Time (min)	Average Speed (km/h)	Travel Time (min)	No. of Stops	Stopped Time (min)	Congested Time (min)	Average Speed (km/h)	Travel Time (min)	No. of Stops	Stopped Time (min)	Congested Time (min)	Average Speed (km/h)	Travel Time (min)	No. of Stops	Stopped Time (min)	Congested Time (min)
1	42.2	4.37	1	0.53	0.85	28.9	7.77	4	2.16	3.96	36.2	4.85	1	0.73	1.02	34.08	5.40	2	1	1.45
2	32.5	6.10	4	1.53	2.26	32.5	9.23	11	3.70	5.99	33.6	5.15	2	0.73	1.18	37.65	5.26	2	0.90	1.58
3	32.0	6.38	4	1.79	2.44	26.8	9.39	10	3.31	5.73	35.6	5.04	2	0.84	1.13	39.17	4.96	3	1.11	2
4	35.6	6.70	3	2.12	2.95	26.5	10.68	9	4.17	7.17	32.7	4.87	3	1.45	2.19	31.94	7.84	6	2.08	4.20
5	33.5	6.43	5	1.86	2.60	29.6	7.85	9	2.59	4.03	45.6	4.06	1	0.73	0.83	32.06	8.34	7	2.88	4.63
6	43.9	3.88	1	0.33	0.44	25.1	7.75	5	2.24	3.17	38.5	5.04	3	1.27	2.05	26.59	10.77	13	4.76	7.42
7	38.5	4.83	1	0.63	0.86	-	-	-	-	-	-	-	-	-	-					
8	37.8	4.69	2	0.68	0.98	-	-	-	-	-	-	-	-	-	-					
9	36.1	5.04	2	0.84	1.05	-	-	-	-	-	-	-	-	-	-					
Avg.	36.9	5.38	3	1.15	1.60	28.2	8.78	8	3.03	5.01	37.0	4.84	2	0.96	1.40	33.58	7.10	5.50	2.12	3.55

Note 1: Travel time surveys were conducted along King Street from east of Wellington Street to west of Dundurn Street.
Note 2: Congested time represents the time on each interval the vehicles spent at or below the 20 km/h speed limit. This also includes the stopped time.

Table 20: Midday Peak Period Travel Time and Speed (Before and After Conditions Comparison)

Run	King Street WB Midday Peak (Pre-Installation Runs)					King Street WB Midday Peak (Post-Installation Runs - Month 1)					King Street WB Midday Peak (Post-Installation Runs - Month 3)					King Street WB Midday Peak (Post-Installation Runs - Month 7)				
	Average Speed (km/h)	Travel Time (min)	No. of Stops	Stopped Time (min)	Congested Time (min)	Average Speed (km/h)	Travel Time (min)	No. of Stops	Stopped Time (min)	Congested Time (min)	Average Speed (km/h)	Travel Time (min)	No. of Stops	Stopped Time (min)	Congested Time (min)	Average Speed (km/h)	Travel Time (min)	No. of Stops	Stopped Time (min)	Congested Time (min)
1	30.6	6.69	4	1.32	2.57	22.8	9.51	11	3.18	5.67	30.9	5.87	3	1.31	1.64	31.86	8.08	8	2.63	4.64
2	28.1	6.96	4	1.59	2.56	28.7	7.25	5	2.16	3.02	34.8	5.20	2	1.02	1.33	28.74	8.47	7	2.72	4.71
3	26.2	7.94	5	1.99	3.65	31.6	6.00	4	1.57	1.92	31.7	5.88	2	1.34	1.84	28.73	8.99	8	4.26	6.04
4	28.9	8.07	6	2.12	4.40	25.8	10.50	11	4.93	6.72	33.0	5.83	3	1.40	2.04	25.76	11.51	13	5.09	7.80
5	27.7	8.48	8	2.84	4.41	22.1	11.70	15	5.27	8.27	31.2	5.69	3	1.00	1.58	31.19	12.40	16	6.09	9.37
6	31.6	7.06	8	1.83	3.13	24.6	9.63	14	3.31	6.42	32.9	5.52	2	1.05	1.50	33.57	10.18	12	4.79	6.79
Avg.	28.9	7.53	6	1.95	3.45	25.9	9.10	10	3.40	5.34	32.4	5.67	3	1.19	1.66	29.98	9.94	10.67	4.26	6.56

Note 1: Travel time surveys were conducted along King Street from east of Wellington Street to west of Dundurn Street.
Note 2: Congested time represents the time on each interval the vehicles spent at or below the 20 km/h speed limit. This also includes the stopped time.

Table 21: PM Peak Period Travel Time and Speed (Before and After Conditions Comparison)

Run	King Street WB PM Peak (Pre-Installation Runs)					King Street WB PM Peak (Post-Installation Runs - Month 1)					King Street WB PM Peak (Post-Installation Runs - Month 3)					King Street WB PM Peak (Post-Installation Runs - Month 7)				
	Average Speed (km/h)	Travel Time (min)	No. of Stops	Stopped Time (min)	Congested Time (min)	Average Speed (km/h)	Travel Time (min)	No. of Stops	Stopped Time (min)	Congested Time (min)	Average Speed (km/h)	Travel Time (min)	No. of Stops	Stopped Time (min)	Congested Time (min)	Average Speed (km/h)	Travel Time (min)	No. of Stops	Stopped Time (min)	Congested Time (min)
1	32.4	6.15	4	1.14	2.15	27.0	7.91	5	2.38	3.47	31.2	5.82	2	0.79	1.67	17.93	14.98	20	6.56	11.73
2	30.8	6.81	3	1.83	2.39	21.8	12.15	13	6.22	8.39	25.0	9.73	10	3.79	6.22	21.07	12.47	13	5.53	8.35
3	25.9	8.52	8	2.56	4.47	29.5	9.06	8	3.75	5.25	21.2	11.92	18	5.30	8.11	22.57	11.97	11	4.93	8.08
4	24.8	9.47	13	3.08	7.04	27.4	7.76	6	2.48	3.64	29.7	6.18	2	1.17	2.11	21.43	12.72	11	5.61	8.73
5	39.2	6.01	3	1.91	2.38	32.3	6.00	3	1.45	2.08	23.1	8.67	4	2.56	4.37	21.07	11.38	11	3.91	7.49
Avg.	30.6	7.39	7	2.10	3.69	27.6	8.58	7	3.26	4.57	26.0	8.50	7	2.70	4.50	20.81	12.70	13.20	5.31	8.88

Note 1: Travel time surveys were conducted along King Street from east of Wellington Street to west of Dundurn Street.
Note 2: Congested time represents the time on each interval the vehicles spent at or below the 20 km/h speed limit. This also includes the stopped time.

The Post installation (Month 1) travel times and average speeds on King Street indicate that the worst conditions were experienced during the Midday peak. The congested time experienced is 5.34 minutes. Further details are provided in **Appendices E**.

The Post installation (Month 3) travel times and average speeds on King Street indicate that the worst conditions were experienced during the PM peak The congested time experienced is 4.50 minutes. Further details are provided in **Appendices F**.

The Post installation (Month 7) travel times and average speeds on King Street indicate that the worst conditions were experienced during the PM peak. The congested time experienced is 8.88 minutes. Further details are provided in **Appendices G**.

The travel time data collected throughout the pilot study of RBL on King Street shows that the operation of the RBL impacts the average speed and travel time of general purpose traffic due to increases in stopped and congested time during the AM, Midday and PM peak hours.

3.2. Google Maps Monitoring

Post-installation traffic flow monitoring along the King Street study segment was supplemented using the Google Maps online "live traffic feature". Google Maps monitoring was conducted during the weekday AM, Midday and PM peak periods at one month, three months and seven months post installation. The King Street study segment extended from east of Wellington Street to west of Dundurn Street.

Google Maps is untested data intended to ensure a breadth of data for comparison purposes. The methodology is uncertain and the data should be used with caution.

The travel times from Google Maps "live traffic feature" are shown in **Table 22**. Detailed travel time screenshots from Google Maps are provided in **Appendix H**.

Based on the results in **Table 22**, the travel times recorded using Google Maps show fairly consistent patterns during the weekday AM, Midday and PM peak periods with the exception of the November 2013 travel times recorded during temporary construction activities on the King Street corridor as noted above. During the January 2014 PM peak period, one high travel time was recorded; however, the cause of congestion is not known.

The uncongested travel time in Google Maps along the King Street West study segment is 5 minutes. However, it should be noted that the uncongested travel time is for off peak time periods rather than pre-installation peak periods travel time. The results indicate that the average post RBL implementation travel times during the three peak periods are generally 2 to 3 minutes higher compared to the off peak travel time of 5 minutes.

Table 22: Google Maps Monitored Travel Time

Time	Travel Time from Google Maps (minutes)														
	Post –installation Month 1 (2013) – 30 minute interval					Post –installation Month 3 (2014) – 60 minute interval					Post –installation Month 7 (2014) – 60 minute interval				
	Nov 1	Nov 4	Nov 5	Nov 6	Nov 7	Jan 27	Jan 28	Jan 29	Jan 30	Jan 31	May 12	May 13	May 14	May 15	May 16
AM Peak Period															
8:00	6	6	6	6	6	6	6	7	6	6	6	6	7	6	6
8:30	6	6	8	6	7	-	-	-	-	-					
9:00	6	7	7	7	6	7	7	6	6	8	7	8	10	9	5
9:30	6	6	6	6	6	-	-	-	-	-					
Average	6	6.25	6.75	6.25	6.25	6.50	6.50	6.50	6	7	6.5	7	8.5	7.5	5.5
Midday Peak Period															
11:00	-	-	-	-	-	6	10	6	7	6	7	6	7	8	7
12:00	7	6	10*	7	7	7	7	7	7	8	8	8	9	11	8
12:30	8	6	12*	7	7	-	-	-	-	-					
13:00	8	7	8	7	7	7	7	7	8	8	7	15	9	9	11
13:30	7	7	7	7	8	-	-	-	-	-					
14:00	8	7	7	7	7	-	-	-	-	-					
Average	7.60	6.60	7.33	7.00	7.20	6.67	8.00	6.67	7.33	7.33	7.33	9.66	8.33	9.33	8.66
PM Peak Period															
15:00	-	-	-	-	-	6	7	9	7	8	10	9	9	10	11
16:00	9	6	7	7	7	6	6	7	6	8	8	8	11	9	10
16:30	8	6	7	8	7	-	-	-	-	-					
17:00	8	6	8	8	7	7	7	15**	9	8	9	8	9	12	10
17:30	7	6	7	9	7	-	-	-	-	-					
18:00	6	6	6	6	6	6	6	7	6	7	7	6	8	12	9
Average	7.60	6.00	7.00	7.60	6.80	6.25	6.50	9.50	7.00	7.75	8.5	7.75	9.25	10.75	10

*Travel times recorded during construction activities along the King Street corridor not included in average travel time calculation

** Travel time congestion cause not known (occurred during 2-hour period from 16:00 to 18:00) and included in average travel time calculation

3.3. Queue Observation

Queue clearance observations during the weekday AM and PM peak periods were conducted by City staff following the implementation of the RBL in the segment of King Street between Mary Street and James Street, where queues appeared to be most problematic. The observations were conducted during three monitoring periods – Post-install Month 1, Post-install Month 3, and Post-install Month 7. As noted previously, the RBL was opened on Wednesday October 23, 2013. The queue clearance observations recorded what percent of traffic in a queue did not clear the intersection on the first cycle of green time. The dates of the queue observations are summarized in **Table 23**. Some of the latter observations also included notes regarding the level of adherence to the RBL by drivers. This additional data is also summarized in this Section.

Table 23: Queue Observation Dates

Segment	Monitoring Period	Survey Date
King Street (between Mary Street and James Street)	Post –Installation Month 1	Friday October 25, 2013
		Monday October 28, 2013
		Tuesday October 29, 2013
		Monday November 4, 2013
		Tuesday November 5, 2013
	Post –Installation Month 3	Wednesday February 19, 2014
		Monday February 24, 2014
		Monday February 25, 2014
		Monday February 26, 2014
	Post –Installation Month 7	Monday June 16, 2014
		Tuesday June 17, 2014
		Thursday July 24, 2014

Queues were observed at the westbound approaches for each of the five signalized intersections between Mary Street and James Street. At each of these intersections, approximately 10% of queues were observed during the peak periods when the data was being collected as the person collecting the data circulated between the five intersections. Additionally, the northbound approach at John Street was also surveyed. A summary of the queue observations is provided in **Table 24**,
Table 25 and **Table 26**.

Table 24: Queue Observation Summary – Post-Installation Month 1

Intersection at King Street	AM Peak Period Queues			PM Peak Period Queues		
	Total Cycles	No. of Cycles with Residual Queues	% of Cycles with Residual Queues	Total Cycles	No. of Cycles with Residual Queues	% of Cycles with Residual Queues
Catherine Street	67	21	31%	86	33	38%
Hughson Street	64	10	16%	88	13	15%
James Street	32	3	9%	44	8	18%
John Street	68	32	47%	88	60	68%
John Street NB	68	1	1%	88	1	1%
Mary Street	42	13	31%	50	19	38%
Grand Total	341	80	23%	444	134	30%

Table 25: Queue Observation Summary – Post-Installation Month 3

Intersection at King Street	AM Peak Period Queues			PM Peak Period Queues		
	Total Cycles	No. of Cycles with Residual Queues	% of Cycles with Residual Queues	Total Cycles	No. of Cycles with Residual Queues	% of Cycles with Residual Queues
Catherine Street	28	0	0%	29	0	0%
Hughson Street	26	0	0%	31	1	3%
James Street	14	0	0%	16	0	0%
John Street	28	0	0%	35	1	3%
John Street NB	14	0	0%	16	0	0%
Mary Street	16	0	0%	19	0	0%
Grand Total	126	0	0%	146	2	1%

Table 26: Queue Observation Summary – Post-Installation Month 7

Intersection at King Street	AM Peak Period Queues			Midday Peak Period Queues			PM Peak Period Queues		
	Total Cycles	No. of Cycles with Residual Queues	% of Cycles with Residual Queues	Total Cycles	No. of Cycles with Residual Queues	% of Cycles with Residual Queues	Total Cycles	No. of Cycles with Residual Queues	% of Cycles with Residual Queues
Catherine Street	16	2	13%	14	0	0%	18	0	0%
Hughson Street	16	2	13%	14	0	0%	18	1	6%
James Street	16	0	0%	15	0	0%	20	5	25%
John Street	16	5	31%	14	6	43%	18	12	67%
John Street NB	16	0	0%	14	0	0%	18	0	0%
Mary Street	8	1	11%	8	0	8%	10	0	0%
Grand Total	88	10	11%	79	6	0%	102	18	18%

Post-installation (Month 1) observations had the highest rates of residual queues, thus they demonstrated the largest delays to auto traffic. It is expected that the largest delays would be during the initial installation period as auto traffic has not yet had an opportunity to rebalance itself through the network, adjusting times and routing of trips to avoid congestion. The highest rate observed was for westbound traffic approaching John St, with 47% of queues not clearing on the first cycle during the AM peak hour and 68% of queues not clearing on the first cycle during the PM peak hour. Other notable residual queues of 30% to 40% were noted during both the AM and PM peak periods at Catharine Street and Mary Street, demonstrating that the John Street intersection was a critical bottleneck. No data was collected regarding adherence, but it was noted that adherence to the RBL regulations appeared to be good.

Post-installation (Month 3) observations had the lowest rates of residual queues, thus they demonstrated minimal delays to auto traffic. It is recognized that residual queues were lowest during this monitoring period due to rebalanced auto traffic (adjusting times and routing of trips to avoid congestion) combined with the faded pavement markings. It is suggested that the faded pavement markings resulted in drivers adhering to the RBL regulations less strictly. Virtually zero residual queues were noted – only two queues of the over 300 queues observed. Observations of adherence to RBL regulations show that adherence was low. Of the 53 AM queues observed, 68% had auto traffic in the RBL and during the PM, 91% of the 32 queues observed included auto traffic in the RBL. Many of these queues in the RBL, approximately 30%, were three or more vehicles in length.

Post-installation (Month 7) observations demonstrate that auto traffic is rebalancing itself (adjusting times and routing of trips to avoid congestion). Midday queue data was also collected to further investigate the King Street traffic operations. John Street continues to be the intersection approach (westbound) with the highest rates of residual queues. These rates are 31% during the AM peak, 43% during the Midday peak, and 67% during the PM peak period. James Street westbound queues are also significant during the PM peak period, with 25% of queues observed having a residual queue that did not clear the intersection during the first green phase. All other rates were observed to be less than 15%.

Post-installation (Month 7) observations of adherence to the RBL regulations were much reduced from Post-installation (Month 3) observations. Auto traffic in Month 3 was observed violating the RBL regulation in 19% of AM queues, 14% of Midday queues, and 19% of PM queues. The Post-installation (Month 7) observations of autos queues in the RBL (violations) of three or more vehicles in length was only 1% of all queue observations.

3.4. Summary of Findings

Travel time and average speed data recorded on King Street during the AM, Midday and PM peak periods shows travel time increases of between 2 to 5 minutes and average speeds dropping as low as 20 km/hr.

As previously stated the Google Maps data and methodology is untested and should be used cautiously, however it does show the King Street corridor experiencing delay during the AM, Midday and PM peak periods.

The queuing observations data collection post install month 1, 3 and 7 shows that residual queuing was present after the install of the RBL, the lowest level of residual queuing was recorded 3 months after the install however driver adherence to the RBL was low during this period. The post install month 7 queue observations note residual queuing occurring at King Street and John / James Street intersections. RBL violation was recorded to be far less than recorded post install month and 3.

4.0 Literature Review - North American Transit Only Lanes

An online literature review was conducted to identify any associated impact to existing businesses post implementation of a transit only lane (TOL) through a commercial area. The review focused on projects where mixed traffic lanes were converted to dedicated bus lanes through the downtown of North American municipalities rather than a widening of the roadway to create an additional lane for transit only.

This online review was conducted using various sources including the Transportation Research Board's (TRB) Transportation Research International Documentation (TRID). TRID is an integrated database that contains records from both TRB and International Transport Research Documentation (ITRD). The search also looked at the National BRT Institute (www.nbrti.org) and the Center for Urban Transportation Research (CUTR) and www.cutr.usf.edu.

The online search revealed that numerous evaluation studies were completed which measure transit performance such as travel time and reliability; however, limited publications were sourced from the online search where the economic impact of the TOL on local businesses in a commercial area was evaluated.

The key findings from the online literature are documented below.

4.1. Schaller et al. (2013), The Economic Benefit of Sustainable Streets

A study by Schaller et al. (2013) developed a methodology to evaluate the economic impact of street design improvements including transit only lanes on neighbourhoods in New York City. The study was commissioned by the New York City Department of Transportation (DOT) with input from the New York City Department of Finance (DOF).

The project team considered several data sources to evaluate economic impact to businesses and found that retail sales to be the most reliable and direct indicator. Retail sales data for street-level retail and restaurant/food service businesses was obtained from New York sales tax data provided by the DOF. The DOF is responsible for the collection of sales tax in New York City. A majority of the businesses included in the analysis are local small stores (mom-and-pop stores) and independently operated franchises.

To evaluate the impact to businesses using retail sales data sales, businesses impacted by the street design improvements were identified along with businesses from comparison sites. The comparison sites chosen have similar characteristics to the impacted/improvement site. It is

important that the comparison sites have similar characteristics to the improvement site since this will isolate site-specific differences.

The changes in retail sales before and after implementation were compared for the improvement site and the comparison sites. The evaluation time periods for the improvement sites (and their comparison sites) were identified based on the dates of project implementation. A baseline ("before") period was considered to be the four quarters (one year) prior to the implementation while the post-improvement ("after") period was defined to be the twelve quarters (three years) after the improvement was implemented.

The study documented several case studies which evaluated the impact of street design improvements on the economic health of local businesses. The Fordham Road Select Bus Service case study is the most relevant, since the street design improvement provided a dedicated bus lane from the Inwood neighbourhood in Manhattan to Co-Op City in the Bronx. **Figure 9** shows the urban make up of the corridor around the Fordham Road route similar to that found in Hamilton.

Figure 9: Fordham Road TOL Location

Source: Schaller et al. (2013)

Given the size of the Fordham Road Select Bus Service route, the analysis focused on a dense retail corridor along a five block segment between two busy north/south avenues. Changes in retail sales for the improvement site were compared to changes recorded at four comparison sites.

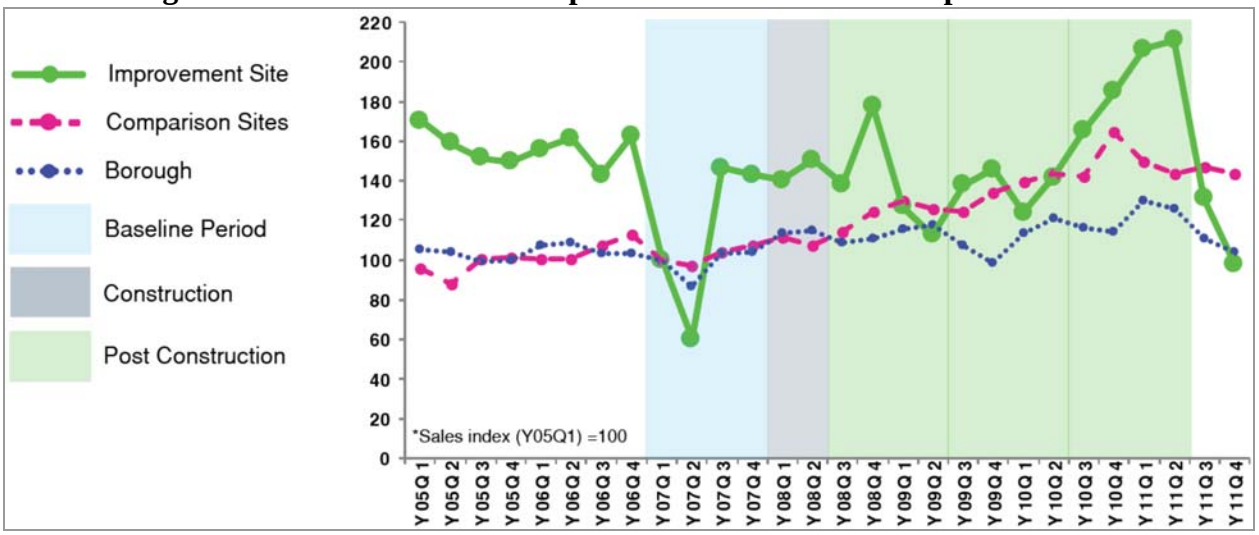
The results from the business sales analysis indicated that the improvement site showed strong performance where sales rose consistently in each of the three years post implementation of the dedicated transit only lane. In the third year post implementation business sales increased by 71% compared to the baseline. The recorded increases in retail sales occurred even though parking was prohibited during peak periods; a major issue for local businesses before implementation. It is noted that there was a decline in sales during the baseline period and at the end of the 3 year post implementation period; however, in general, the improvement site performed better than three of the four comparison sites as shown in **Figure 10**. A combined sales comparison between the improvement site, Bronx Borough and the comparison sites is illustrated in **Figure 11**.

Figure 10: Changes in Baseline and Post Improvement Sales

Area	Baseline Quarterly Sales	Δ Sales Post-Improvement		
Improvement Site		1st Year	2nd Year	3rd Year
Bx12	$ 7,439,735	24%	22%	71%
Borough				
Bronx	$ 362,097,700	15%	12%	23%
Neighborhood Comparisons				
Average	$ 1,328,357	16%	25%	38%
Kingsbridge	$ 2,735,121	-24%	-36%	-34%
Grand Concourse	$ 661,370	22%	43%	51%
Jerome	$ 504,943	46%	71%	96%
Webster	$ 1,411,994	21%	24%	39%

Source: Schaller et al. (2013)

Figure 11: Combined Sales - Improvement Site versus Comparison Sites



Source: Schaller et al. (2013)

4.2. NCHRP Research Results Digest 336 (2009)

The NCHRP Research Results Digest 336 (2009) documents the findings from Task 21 of NCHRP Project 20-65. Task 21 researched the cost benefit of converting a mixed flow travel lane to a lane for bus rapid transit (BRT).

The research comprised of a detailed literature review of BRT projects to identify candidate projects, evaluation criteria for BRT proposals, and benefit/cost approaches. The research team also conducted interviews with BRT project representatives.

Based on a review of BRT systems worldwide, the research team identified thirty-eight (38) BRT projects of significance. However, the team noted that converting mixed-flow traffic lanes for exclusive transit use was not the norm and the list was reduced to six (6) locations where a mixed-flow traffic lane was converted to transit only lane. All other locations added new lanes or used parking lanes during peak period travel to accommodate BRT.

Interviews conducted with the agencies of the shortlisted six locations confirmed that only two (2) locations converted a mixed-flow traffic lane to transit only lane for BRT. These two locations were: Cleveland, OH (operational in 2008) and Eugene, OR (operational in 2007).

The study noted that increased economic activity resulting from the conversion of a mixed-flow traffic lane to BRT only is considered an indirect benefit and may be omitted from the evaluation process by agencies since it is often difficult to measure. The impact on adjacent mixed-flow lanes traffic operations due to the conversion is an important consideration for most agencies.

Cleveland, OH conducted an evaluation study for the mixed-flow lane conversion to BRT only. The evaluation study included forecasts for economic developments and land use analysis. The results show that redevelopment targets were surpassed at the time of evaluation and developments in some areas were stabilised; however, a breakdown for the downtown core is not provided in the literature.

Eugene, OR reported that impacts to surrounding development did not meet the levels anticipated since developers were a bit nervous to invest as BRT ridership is less certain than rail. The study did not specify the location of the developments.

4.3. Nelson et al. (2013), Bus Rapid Transit and Economic Development: Case Study of the Eugene-Springfield BRT System

Nelson et al. (2013) conducted a study to evaluate economic performance in metropolitan Eugene-Springfield, OR following the implementation of a BRT system. The study looked at change in share of jobs in an urban area and determined if there is a relationship between this change and the implementation of a BRT system.

The analysis using employment data covered a three year period before and after implementation of the BRT system. The construction for the BRT system called EmX started in 2004 and began operation in 2007. The first EmX route connected downtown Eugene with Springfield, Oregon and converted mixed-flow traffic lane to BRT only lane.

The EmX BRT system was evaluated based on its economic development outcomes in terms of employment change within 0.25 and 0.50 miles (400 and 800 m) of BRT stations. The employment data came from the Local Employment Dynamics (LED) database. LED data are assembled by the Census Bureau through a voluntary partnership among 45 states. The data provide details about jobs, workers, and the structure of local economies.

The study found that jobs stayed around the same level between 400 and 800 metres from BRT station areas. Jobs increased by around 10% within 400 metres from BRT stations while jobs beyond 800 metres from stations fell about 5%.

While some job types increased more than others closer to BRT station locations, the study could not conclude that there is a cause-and-effect relationship between station proximity and job types. The study did not provide a breakdown for the downtown core.

4.4. Schimek et al. (2005), Boston Silver Line Washington Street BRT Demonstration Project Evaluation

The Schimek et al. (2005) report provides a detailed evaluation of the first phase of Silver Line Washington Street BRT which began operation in July 2002. The BRT was evaluated based on the system performance including travel time, reliability, identity and image, safety and security, and capacity. The report also assessed system benefits including higher ridership, capital costs effectiveness, operating cost efficiency, transit-supportive land development, and environmental quality. It is indicated in the report that one of the BRT initiative's goals is to provide positive impacts on local businesses. However, the report does not evaluate any impacts on businesses specifically.

4.5. Summary of Literature Review Findings

The majority of the available online literature for transit only lane post implementation evaluation do not consider economic impact as a direct measure due to difficulty in quantifying this impact in a robust and defendable manner. Most studies will measure improvements in transit travel time and reliability and congestion impacts to mixed-flow traffic lanes.

The most robust study to measure economic impact on businesses through a downtown core was conducted by Schaller et al. (2013) for the New York City Department of Transportation. This study used sales tax data to evaluate the economic impact on businesses and concluded that the conversion of a mixed-flow traffic lane transit only lane resulted in sales growth over a three year post implementation period.

Nelson et al. (2013) concluded that BRT through a metropolitan area resulted in job growth, including a 4% growth in the retail sector, for areas within 400 m (walking distance) from BRT stations.

Other studies reviewed looked at the impact of transit only lanes attracting development to transit oriented development (TOD) and not at the impact on existing businesses.

It is recommended that a survey be conducted for transit agencies which converted mixed-traffic flow lane to transit only lane through a commercial corridor for additional information on the impact to businesses and results are in section 4.7.

4.6. Other Studies

The literature review looked at several other studies (listed in **Section 5.3)**. These studies did not evaluate impacts of BRT on local businesses. Topics discussed in these studies include information regarding the design, change in ridership and travel time before and after, enforcement, and system costs.

5.0 North American Transit Agency and City Survey

Based on the literature review, several potential North American transit agencies were identified for a telephone survey to obtain additional information on the impact on transit only lanes to businesses in a downtown core. A list of the potential transit agencies and the corresponding transit project recommended for the telephone survey is provided in **Table 27**.

Table 27: North American Transit Agencies for Survey

Agency	Transit Project
City of Toronto	W.R. Allen Road RBL and Various Streetcar routes
City of Ottawa	Albert Street, Slater Street, Rideau Street and Montreal Road
Greater Cleveland Regional Transit Authority	HealthLine (Euclid Corridor, Cleveland, OH)
Lane Transit District (Eugene, OR)	EmX Line (Franklin Corridor, Eugene, OR)
Tri Met (Portland, OR)	The Portland Transit Mall (downtown Portland, OR)
Metropolitan Transit Authority of Harris County (Houston, TX)	Downtown Transit Route, Houston, TX
City of Seattle	Downtown Seattle, WA
Translink (Vancouver, BC)	Marine Drive Bus Lane, West Vancouver, BC
Edmonton Transit System	Various Bus lanes, Edmonton, AB
San Francisco Municipal Transport Agency	Various Bus lanes, San Francisco, CA

5.1. North American Transit Agency and City Survey

A survey was developed for the North American transit agencies that operate a similar facility to what the city is piloting. The survey is aimed at obtaining additional information regarding the impact on existing businesses from converting a mixed-flow traffic lane to transit only lane through a downtown core.

The survey was sent to the transit agencies via email with responses to the questions below being sent back via email. The questions are:

a) Can you please confirm that you have a transit route through a commercial area which operates on a transit only lane?

b) Did you convert a mixed-flow traffic lane to become a transit only lane? Or did you provide an additional lane for transit (construct a new lane or convert a parking lane to transit lane during peak periods?)

c) Were parking spaces and/or loading areas reduced, relocated or modified due to the implementation of the transit only lane?

d) Did you evaluate the impact to existing businesses following the implementation of the transit only lane? If yes, did you carry out a formal data driven analysis (e.g. using sales data, business closures and economic transition data) or was a survey of business owners conducted?

e) Can you please provide a brief summary of your findings regarding the impact to existing businesses?

5.2. North American Transit Agency and City Survey Findings

Table 28 below summarizes the transit agencies responses to the survey in a matrix form with further details summarized beyond this table and **Appendix I** along with transit agency contact information.

Table 28: North American Transit Agencies Answers Matrix

	Toronto, ON	Ottawa, ON	Cleveland, OH	Eugene, OR	Portland, OR	Seattle, WA	Vancouver, BC	Edmonton, AB	San Francisco, CA
a) Can you please confirm that you have a transit route through a commercial area which operates on a transit only lane?	Y	Y	Y	Y	Y	Y	Y	Y	Y
b) Did you convert a mixed-flow traffic lane to become a transit only lane? Or did you provide an additional lane for transit (construct a new lane or convert a parking lane to transit lane during peak periods?)	Y	Y	Y	Y	Y	Y	Y	Y	Y
c) Were parking spaces and/or loading areas reduced, relocated or modified due to the implementation of the transit only lane?	N	Y	Y	Y	Y	Y	N	Y	Y
d) Did you evaluate the impact to existing businesses following the implementation of the transit only lane? If yes, did you carry out a formal data driven analysis (e.g. using sales data, business closures and economic transition data) or was a survey of business owners conducted?	N	N	N	Y	Y	N	N	N	Y
e) Can you please provide a brief summary of your findings regarding the impact to existing businesses?	N	N	N	Y	Y	N	N	N	Y

City of Toronto, Nazzareno Capano, Manager of Transportation Infrastructure Management – Operational Planning and Policy.

The City of Toronto operates a number of transit only facilities within the City:

- Allen Road Bus Only Lane;
- Spadina Avenue Streetcar;
- St Clair Avenue Streetcar; and
- Queens Quay Streetcar;

An HOV lane was converted to create the Bus Only Lane. A general purpose traffic lane was converted to provide the streetcars with their own dedicated ROW. Parking was restricted during the construction of the dedicated ROW. Businesses were impacted during the construction of the dedicated ROWs but everything returned to normal activity once construction was complete.

City of Ottawa, Colin Leech, Senior Engineer, Transit Priority

Ottawa has two locations where in the downtown-commercial area Rideau Street / Montreal Road and Albert / Slater Street. Other Bus Only Lanes exist on suburban arterials and highways. Theses bus lanes were created through lane conversation, with many areas of parking/loading reduced or modified to accommodate the bus lanes. In Vanier bus lanes operate in the peak direction allowing the public to park in the off peak direction to access shops and local businesses.

Greater Cleveland Regional Transit Authority, Michael Schipper

The Healthline BRT runs in the center of the street downtown on Euclid Avenue, a general purpose traffic lane was converted. On street parking was reorganized and grouped to maintain most of the existing parking allocation whilst also creating larger sidewalks for outdoor dining. The downtown transit zone has a 24 hours day bus only lane on Superior Avenue with a general purpose traffic lane being converted and parking reorganized in the vicinity of hotels, a peak hour bus lane on St Clair was.

There was no formal study into business impact on Euclid Avenue, local businesses reported that during construction they lost up to 30% of there gross sales. The Healthline has seen over $5 billion of construction along its entire length since it opened.

Lane Transit District (LTD), Dan Tutt, Planning and Development Department

LTD's EmX has a BRT system that operates in general purpose traffic lanes and a variety of lane types including transitways, curbed lanes which are not traversable by general traffic. The EmX also runs in exclusive curb side and median transit lanes which are traversable. The EmX also runs in BAT Lanes (Business Access and Transit) accommodating right and left turning general traffic. Parking has been replaced by the transit lanes in certain areas, as part of the environmental review process parking utilization studies was undertaken and the removal of parking has been strategic in lower demand areas were other parking is available.

Trimet, Alan Lehto, Director of Planning and Policy

Trimet operates transit only lanes SW 5th and SW 6th Avenues serving north-south through the heart of downtown business district. Two general purpose traffic lanes were converted to create the transit only lanes. Parking was reduced from most curbs with exceptions to area where businesses (such as hotels) needed short term parking. Over the past five years since construction work has been completed on the transit mall substantial new development and redevelopment has occurred. Construction is always an impact to businesses; we have provided programs and small business assistance to minimize impacts.

Metropolitan Transit Authority of Harris County

A response to the survey was not received from the Metropolitan Transit Authority of Harris County.

City of Seattle Department of Transportation, Bill Bryant, Manager Transit System Development

The City of Seattle confirmed that they have several transit only lanes in commercial areas. These lanes were provided by converting a general purpose lane or provide an additional lane through new construction or peak hour parking restrictions. Parking spaces and / or loading areas were reduced, relocated or modified to facilitate the implementation of the transit only lanes. The City of Seattle did not evaluate the impact to local businesses before or after the implementation of the transit only lanes.

Translink, South Coast British Columbia Transportation Authority, Rachel Jamieson, Senior Transportation Engineer

The Marine Drive bus lanes are a queue jumper to the Lions Gate bridge from both the east and west, and a bus lane in front of a shopping mall with off street parking. We converted a right turn only lane to a right turn and bus lane and widened the street to provide a bus queue jump lane and a transit priority signal at a busy intersection approaching the Lion's Gate Bridge from the west. We removed a left turn lane, banned left turns and restriped Marine Drive on a section approaching the Lions Gate Bridge from the east. The local businesses have off street parking.

City of Edmonton, Jim Bryant, General Supervisor of Development and Technical Review, Edmonton Transit

Edmonton operates Bus Only Lanes on Jasper Avenue, 109 Street and 97 Street in the downtown area. Edmonton has converted general purpose traffic lanes and where feasible they add an additional lane. Parking spaces and / or loading areas were reduced, relocated or modified in the west downtown area. No significant business impact analysis was performed as our main objective was to address bus delays due to traffic congestion. The impact to parking was not considered of great impact as parking capacity was still maintained during off-peak time periods. Edmonton transit plans to engage the public over future bus lane plans in more mature areas of the city.

City of San Francisco, Lulu Feliciano, Outreach Manager, San Francisco Municipal Transportation Agency (SFMTA)

SFMTA runs a transit only lane on Market Street which forms the backbone of the city's transit network. Geary Boulevard also operates a transit only lane which has a different surface color (Red) to the other general purpose traffic lanes to remind the public it is transit only. SFMTA has not recently converted a general purpose traffic lane and plans to construct an additional lane for the Van Ness rapid transit. Parking spaces and / or loading areas were reduced, relocated or modified for the Van Ness rapid transit. An evaluation of impact to existing businesses was carried out in the planning and EIR phase.

Transit Survey Records and Contact Lists are provided in **Appendix I**.

5.3. North American Literature Review References

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6.0 Conclusion and Recommendations

- This report summarizes the traffic and travel time monitoring analysis undertaken as part of the implementation of a Reserved Bus Lane on King Street in the City of Hamilton as a one year pilot project.
- The results of the traffic analysis indicate that most movements within the study area are operating at acceptable LOS during the peak periods analyzed except for some movements at James Street and at Queen Street.
- Post-installation (Month 7) observations demonstrate that auto traffic is rebalancing itself (adjusting times and routing of trips to avoid congestion). John Street continues to be the intersection approach (westbound) with the highest rates of residual queues at all time periods and James Street westbound queues are also significant during the PM peak period.
- The deployment of scenario 3 benefits public transit riders and may also improve conditions for vehicles in the general purpose through lanes at King Street and James Street as buses will not be required to weave from the RBL to position themselves to successfully turn into MacNab transit terminal.
- The travel time analysis and monitoring confirms that implementation of the RBL has increased travel times along King Street corridor by approximately 2 minutes during AM and Midday peak periods and by approximately 5 minutes in PM peak period. This should be compared to potentially improved transit times experienced by services that use the RBL given the significant transit ridership along King Street corridor.
- There are a number of similar facilities in operation across North America, some have been in place for many years and others installed more recently. The literature review indicates existing RBLs across North America with minimal documentation of impacts to adjacent businesses.

APPENDIX A
Existing Operational Analysis

NOTE:

APPENDIX NOT INCLUDED DUE TO VOLUME

APPENDIX B
Month Three Operational Analysis

NOTE:

APPENDIX NOT INCLUDED DUE TO VOLUME

APPENDIX C
Month Seven Operational Analysis

NOTE:

APPENDIX NOT INCLUDED DUE TO VOLUME

APPENDIX D
Travel Time Runs Existing

NOTE:

APPENDIX NOT INCLUDED DUE TO VOLUME

APPENDIX E
Travel Time Runs Month One

NOTE:

APPENDIX NOT INCLUDED DUE TO VOLUME

APPENDIX F
Travel Time Runs Month Three

NOTE:

APPENDIX NOT INCLUDED DUE TO VOLUME

APPENDIX G
Travel Time Runs Month Seven

NOTE:

APPENDIX NOT INCLUDED DUE TO VOLUME

APPENDIX H
Google Maps Travel Time Monitoring

NOTE:

APPENDIX NOT INCLUDED DUE TO VOLUME

APPENDIX I
Transit Agency Surveys And Contacts

North American Transit Agency Survey Responses and Contact Details

1.Can you please confirm that you have a transit route through a commercial area which operates on a transit only lane?

2.Did you convert a mixed-flow traffic lane to become a transit only lane? Or did you provide an additional lane for transit (construct a new lane or convert a parking lane to transit lane during peak periods)?

3.Were parking spaces and/or loading areas reduced, relocated or modified due to the implementation of the transit only lane?

4.Did you evaluate the impact to existing businesses following the implementation of the transit only lane? If yes, did you carry out a formal data driven analysis (e.g. using sales data, business closures and economic transition data) or was a survey of business owners conducted?

5.Can you please provide a brief summary of your findings regarding the impact to existing businesses?

City of Toronto

Nazzareno Capano, Manager of Transportation Infrastructure Management – Operational Planning & Policy, ncapano@toronto.ca , 416 392 5348

The city of Toronto has a number of transit only facilities.

Bus Only Lane Allen Road northbound north of Sheppard Avenue to just north Finch Avenue were it meets the York University Busway
St Clair Avenue Streetcar
Spadina Avenue Streetcar
Queens Quay Streetcar

Bus Only Lane on Allen Road North was converted from a HOV Lane

Streetcars went from mixed flow lanes to dedicated ROW's

Parking was restricted during the construction of the dedicated streetcar ROW's

No evaluation of business impacts

During construction businesses were impacted but once construction was finished business as usual.

City of Ottawa

City of Ottawa, Colin Leech, Colin.Leech@Ottawa.ca Senior Engineer, Transit Priority

Question 1:

Yes, we do have two locations where bus lanes are in operation on streets in a "downtown-commercial" context: Rideau St./Montreal Road, and Albert/Slater St. We also have several bus lanes on suburban arterial roads and on highways. The context of each is as follows:

Rideau St. is a traditional "main street" arterial in the core of downtown Ottawa with individual stores facing the street as well as larger developments. Rideau St. continues east of the Rideau River as Montreal Road where the street serves a similar function as the core of the former City of Vanier. These streets are generally two lanes in each direction with additional left turn lanes at some cross-streets. There are very high transit volumes on Rideau St. (by traditional standards) which taper off to lower volumes on Montreal Road as various routes diverge onto other streets. The bus lanes are curbside and they end just west of St. Laurent Blvd.

The bus lanes are in operation 24/7 for several blocks of Rideau St. in the heart of downtown. The eastern section of Rideau St. has peak-period bus lanes in both directions which are used for on-street parking off-peak. Montreal Road currently has peak-period bus lanes only in the peak direction. Many years ago the peak period bus lanes operated in both directions during both peaks on Montreal Road.

Rideau St., full-time bus lanes: http://goo.gl/maps/oDioP
Montreal Road, peak-period bus lanes: http://goo.gl/maps/RjAt1

Albert and Slater Streets are a one-way pair in downtown Ottawa which form the central portion of the Transitway. Bus volumes are up to 180 buses/hr/direction. The adjacent development generally consists of large office buildings and hotels with very few individual stores. The streets are four lanes each with the bus lane being the second lane from the right curb. The right curb lane is used for activities such as loading zones, taxi zones, right turn lanes, larger platform areas at bus stations/stops, and full-time parking. This leaves two lanes available for general traffic during peak periods. Off-peak perking is allowed in the left curb lane. Due to the (lack of) connectivity at each end, Albert/Slater are not as important for E-W vehicular traffic as one might initially assume.

In the 1990s, New York City Transit analyzed many different types of bus lanes and stated a conclusion which was familiar to us from our experience on Albert/Slater, but which I don't think was ever documented in Ottawa. There are many legitimate users of the road space such as kiss&ride, taxis, loading, turns, etc. If you don't provide suitable space for these activities to occur, they will occur in places where you don't want them (i.e. in the bus lane) and they are very difficult/expensive to control. By providing space for these activities in the curb lanes, the bus lanes are effectively self-enforcing. (Except in NYC where double-parking is practically a national sport.)

Albert St.: bus lane with right turn lane beside it (the white STO bus is turning right): http://goo.gl/maps/TyyRk
Albert St.: bulbout in curb lane for station platform, with parking (and RT entrance into a parking garage) in the curb lane beyond the bus stop: http://goo.gl/maps/2s7QN

Unfortunately, the bus lanes on Rideau/Montreal were created in approximately 1973 and various different kinds of bus lanes were tried on Albert/Slater during the 1970s and 1980s, so any impact studies done at the time are no longer available.

King Edward Ave. is a long-standing political hot potato in downtown Ottawa. It is a six-lane arterial that feeds the Macdonald-Cartier Bridge and Autoroute 5 in Gatineau QC and is a major route for heavy truck traffic. The surrounding community has lobbied for decades for the street to become four lanes and have truck traffic banned, but the alternatives are extremely limited until such time as a new interprovincial bridge is constructed. A new interprovincial bridge is studied approximately every decade, but political wrangling inevitably bogs down the process and it is highly unlikely that anything will change in the next 5-10 years.

There is currently a SB bus lane on King Edward Ave. during the PM peak period that benefits STO (Société de transport de l'Outaouais) buses. In my opinion, this lane is ideally suited to multiple usage: traffic capacity during the AM peak when it is most required (and when benefits to STO would be small), off-peak parking, and STO bus lane during the PM peak when they most need it (when SB traffic volumes don't really require the extra lane). There are not many businesses along King Edward Ave. so the demand for parking is not comparable to the commercial areas along Rideau/Montreal.

Question 2 (and part of Question 3):

I believe the bus lanes on Albert, Slater, and Rideau were created through lane conversions since road widening is not feasible in the context of the surrounding environment. A long-retired transportation planner once told me that (at least part of) Montreal Road used to be somewhat nebulous, i.e. perhaps more of a shoulder than a travel lane, so there was no loss of traffic capacity when the road was rebuilt and the bus lanes formalized. Grainy air photos from 1965 are consistent with this but not conclusive. In practice, I think the situation has been similar for decades: both Rideau St. and Montreal Road have effectively only had one full-time travel lane in each direction along most of their length as the curb lanes functioned for parking and/or bus lanes.

Question 3:

Modifications to parking and loading definitely would have occurred on Albert and Slater as several different types of bus lane arrangements were tried before the current arrangement was implemented.

As noted above, I believe that parking has been a core use of the curb lanes on Rideau/Montreal for many decades. Therefore, the main questions with respect to bus lanes are the hours of operation for buses and for parking, but not really a question of affecting traffic capacity.

Many (about 20?) years ago the merchants in Vanier requested additional parking so the bi-directional bus lanes were reduced to operate only in the peak direction with the non-peak direction available for parking.

We are currently considering extending the hours of operation of the peak-period bus lanes on Rideau/Montreal. This information is not yet public and we have not consulted either the businesses or the local city councillor. Since we know that parking will be a major issue for the businesses, we have conducted a parking study along Rideau/Montreal and the adjacent side streets to determine availability and usage during the time periods which might be impacted.

Questions 4 and 5:

Due to the age of the bus lanes, I do not have access to any reports or analyses that may have been done at the time they were created.

Beyond the formal questionnaire, I can provide the following information based on past experience.

In an urban downtown context, often the two largest objections you'll get to implementation of a bus lane are traffic capacity and parking/loading. There are many traditional tools to deal with the traffic capacity issue (eg. diversion to other nearby streets, long-term modal split objectives (i.e. moving more people per lane via bus/HOV than via SOV), etc.) If your bus volumes are high enough and buses are stopping frequently, the loss of traffic capacity from restricting other vehicles is minimal since the other vehicles are caught behind the buses anyway.

Parking will often be perceived by nearby businesses as a larger issue than what your data actually show it to be, so consultation and communication becomes vital to ensure that it doesn't become a huge political issue. I would note that many businesses in traditional "main street" settings aren't even open before 9:00 am so the PM should be more problematic than the AM (although perception doesn't always match reality).

There are many legitimate uses of road space (pedestrians, cyclists, transit, auto traffic, parking, loading, etc.) that are often competing for a limited amount of available space in urban environments, and it is important to look at the larger picture when attempting to make trade-offs among uses. Since you generally won't be able to provide superior facilities for all modes on every street, it is often appropriate to consider prioritizing transit, cycling, traffic, etc. on different nearby streets. We need to optimize the use of the existing limited infrastructure by prioritising the sustainable transportation modes (pedestrians, cycling, transit) that use less space per person, while recognizing that cars also have an important and legitimate role in the transportation mix.

Curbside lanes that are used for transit during peak periods and parking off-peak are often an appropriate joint-use of available space, but it depends on the context. If transit volumes are high off-peak, and/or if the City's Transportation Master Plan prioritises transit use, then full-time bus lanes are certainly appropriate for achieving these goals. Loading zones can easily be

incorporated into off-peak parking but they become more problematic with full-time bus lanes. In the case of the Spadina LRT in Toronto, TTC built (or was planning to build) an off-street parking garage to accommodate on-street parking that was eliminated by the redesign of the road (Spadina previously had angle parking which accommodates more cars than parallel parking).

As one time I had data to show that bus travel times were faster on Montreal Road during peak periods than they were during off-peaks, despite much higher passenger loads and traffic. The reason is that the off-peak parking effectively turned every bus stop into a bus bay, from which buses would be delayed when they tried to re-enter the traffic stream, whereas the continuous bus lanes eliminated this delay during peak periods.

It is important to consider the locations of bus stops as part of the transit improvements. Often there are too many stops located in the wrong places. I know that the transportation planners of the era worked with the adjacent landowners along Albert/Slater so that large stations/stops could be located in suitable places that minimized the impact on businesses and non-transit pedestrians, and where proper amenities (large shelters etc.) could be provided.

A recent example from Ottawa which may be much more useful to you than a bus lane example is the segregated bike lanes on Laurier Ave. downtown which were implemented a couple of years ago. See, for example: http://goo.gl/maps/4PFQf. A four-lane road with off-peak parking was converted into two traffic lanes plus two segregated cycling lanes, with left turn lanes, loading zones, and full-time parking wherever possible in the remaining space. Changes to the parking and loading zones were very controversial in certain areas with the adjacent businesses and residents. In some cases more parking spaces were created on nearby streets than the number of spaces removed from Laurier itself, but it can be difficult to overcome the perception of the usefulness of a parking space right in front of a business even though the reality is that it can only be occupied by one car at a time and all the other customers must walk a block or two anyway. Loading zones become very important when permanent full-time changes are being considered for a roadway.

The Laurier segregated bike lanes were the subject of extensive public consultation and analysis before and after their implementation. See: http://ottawa.ca/en/city-hall/public-consultations/segregated-bike-lane-pilot-project. If you require more information than what is available on that website, you could contact Colin Simpson at Colin.Simpson@Ottawa.ca or 613-580-2424, ext. 27881. Segregated cycling lanes and cycle tracks have been a hot topic in many cities in recent years and I'm sure that other cities must have done similar consultations and analyses. In particular, New York City and Montreal have aggressively expanded their cycling facilities in recent years.

I hope this information has been helpful. If I can be of further assistance, please don't hesitate to call or e-mail me.

Greater Cleveland Transit Authority

Michael Schipper, MSCHIPPER@gcrta.org

When we built the HealthLIne BRT on Euclid Avenue we did include a Bus Only BRT lane in the center of the street in downtown that replaced a general use automobile lane. In this section we also reconfigured and grouped the on-street parallel parking. By organizing the parking we actually maintained most of the parking and created some zones with larger sidewalks for outdoor dining with no parking.

We also constructed a downtown Transit Zone as part of the project and created a 24/7 Bus Only lane on Superior Avenue. It also replaced a lane of general use traffic. We also organized some parking and valet zones in front of a couple of hotels.

We also created a peak hour Bus Only lane on St. Clair which for the most part was used for parking. Now the parking is restricted in the morning and afternoon peak periods for a couple of hours.

All three of these streets basically run east-west through our downtown.

On impact to businesses. On Euclid there was a not a formal study on business activity. We had reports that many businesses lost about 30% of there gross sales during the time that we were working in there block. Only three businesses closed and they were in bad shape before the project started. For the most part we tried to restrict that period to one construction season. On the other two streets the work was less extensive and had minimal impact.

On Euclid we also had a number of properties with no business activity during the construction. Many of these have now been renovated and contain thriving businesses. Others are being planned for future renovation. We have documented over $5 Billion of construction along the entire length of the HealthLine since it has opened.

Lane Transit District (Eugene)

Dan Tutt, Planning and Development Department, Dan.Tutt@ltd.org

See attached Bus only lane 05-27-14.pdf and EmX Handout (whole document).pdf

1. Can you please confirm that you have a transit route through a commercial area which operates on a transit only lane?
    - LTD's EmX BRT system operates in mixed traffic and a variety of lane types including
    - Transitways, curbed lanes. Not traversable by traffic.

- 

- Transit lanes, traversable, curb side and median, but not shared with other vehicles.
- 

- 

- BAT Lanes, Business Access & Transit, traversable, used by bus and right or left turning vehicles depending on which side of the street the BAT lane is on.

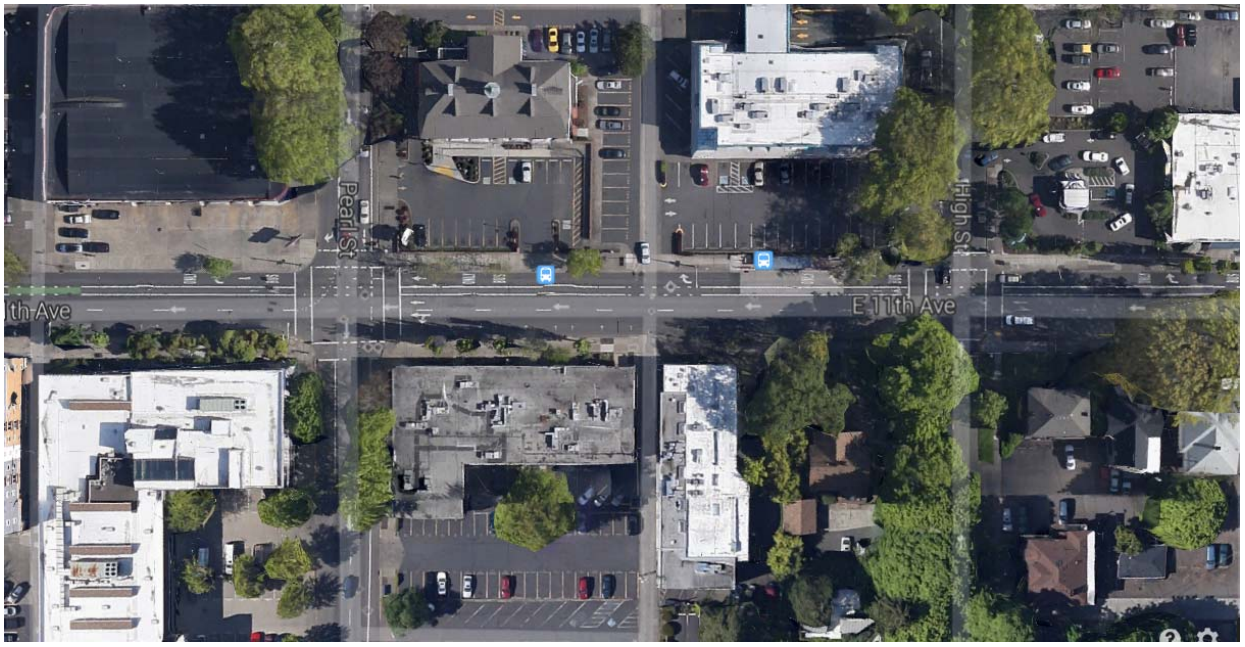
- 

BAT lane traffic sign

- 

- BAT lane, downtown Eugene. Used by EmX and fixed route service approaching Eugene Station. 3 ½ blocks on E 11th Ave. Through travel lane was converted to a BAT lane.

- When LTD constructs bus lanes as part of our EmX system, we build them out of concrete. The exception is this section where a general purpose travel lane was converted to a BAT lane. We did construct a concrete pad for the EmX station in the BAT lane. See stop on right side of image.

- 

2. Did you convert a mixed-flow traffic lane to become a transit only lane? Or did you provide an additional lane for transit (construct a new lane or convert a parking lane to transit lane during peak periods)?
   - We have done both.
   - Our transit lanes have replaced on street parking in certain sections. Bus lanes are dedicated to buses all day, not just at peak periods. You may have to talk to other cities that use only "peak hour bus lanes" to see how they perform.

3. Were parking spaces and/or loading areas reduced, relocated or modified due to the implementation of the transit only lane?
   - Parking utilization studies were conducted as part of the environmental review process.
   - In the image below, the loading area was inset to accommodate the convenience store.

   - Parking removal has been strategic, in lower use areas with alternative parking available.

4. Did you evaluate the impact to existing businesses following the implementation of the transit only lane? If yes, did you carry out a formal data driven analysis (e.g. using sales data, business closures and economic transition data) or was a survey of business owners conducted?
   - No.
   - Our transit only lanes, with the exception of the BAT lane approaching the Eugene Station, are part of our Bus Rapid Transit System (EmX).

5. Can you please provide a brief summary of your findings regarding the impact to existing businesses?

Below is a link to the environmental documents for our third corridor, West Eugene EmX Extension. It contains extensive review of property and business impacts.
Link:
http://www.ltd.org/search/showresult.html?versionthread=5846cd084b147a3da05d11d5fa2c4eff

This is kind of a tough question to summarize because it depends on your definition of “impact”. If the impact is property acquisition, then the first two EmX corridors had little impact to existing businesses.
The type of acquisition is usually a narrow strip of property to accommodate the expansion of the roadway for the EmX lane or EmX stations. Where on-street parking has been removed to accommodate the EmX lane, it is in areas of relatively low utilization with alternative parking available across the street or on cross streets.
Since EmX began operations in 2007 there have been business closings along the route as well as business openings. We opened just before the great recession, which we are still slowly recovering from and small businesses have had a rough time. I don’t believe any business closed as a result of the EmX project.
Businesses, in general, are concerned with the impacts of construction. We are frequently asked if we will compensate a business for lost revenue during construction. We cannot. We do have a robust business outreach program during construction. We commit to always keeping business access open during construction. We provide advance communications about construction in specific locations. We provide business signage to direct customers to a location or entrance. We have a dedicated staff person who works directly with the business community and construction company to assure we have the best communications and information available. For our next corridor we are offering business assistance classes for businesses on the corridor. We also build sections in short 2-3 block increments to minimize the disruption for businesses.
In my opinion, once construction is complete and a corridor is open, it’s pretty hard to remember what it was like prior to the corridor being developed. People and businesses adjust and life goes on, but with better transit service.
It should be noted that many businesses are resistant to change. They have been at their location for a long time. Many do not see transit users as their customers and consider increased transit investment as a boondoggle. However, organizations that are forward thinking recognize the changing demographics like aging and reduced mobility, young people not married to the automobile and looking for communities that have excellent transit systems, those concerned with climate change and sustainability, those organizations recognize the benefit of developing a system like our EmX.
Also, companies that recognize these trends are seeking development opportunities adjacent to developed or developing corridors. Existing businesses also have started marketing that they are next to an EmX line or station, especially to college students.

Our first EmX corridor opened in 2007. The second corridor opened in 2011. These two corridors operate as one continuous route and today represent 25% of LTD’s ridership (boardings).

To get the full picture of our Bus Rapid Transit system, please go to LTD’s web site and click on the EmX link on the main page. You will find that it is much more than just exclusive lanes.
Link: www.ltd.org

Tri Met (Portland)

Alan Lehto, Director of Planning & Policy, LehtoA@trimet.org

See attached Portland Mall Sidewalk and Lane Widths evolution 1978-2009.pdf

Yes. We have transit only lanes on SW 5th and SW 6th Avenues serving generally north-south through the heart of our downtown business district. Though the details vary depending on exactly where it is along the 1.5 mile stretch, the general configuration is that there are wide sidewalks on both sides, two transit lanes on the right (one for serving passengers on the curb and one for passing) and a single mixed-traffic lane on the left. A little history on the Mall is available at http://trimet.org/about/history/portlandmall.htm
More details on the architectural design at http://www.asla.org/2011awards/091.html

Yes, two lanes were converted, but the original conversion was completed in 1978 as part of an overall vision of downtown revitalization. In 2009, we reopened the Mall after two years of construction with both light rail and buses operating in two transit-only lanes.

Parking was reduced from most curbs to specific locations that most needed it (for businesses that needed short-term parking like hotels)

Only anecdotally. In the five years since the final conversion, there has been substantial development along the transit mall, including both new stores and renovation of existing stores to have more visibility from the street.

Construction is always an impact, but we have provided programs and small business assistance to minimize the impacts and help businesses stay in business and be ready for the increased interest in the long run. However, the benefits come as part of the package – it isn't just the increased transit access, it is also the sidewalk improvements that make a difference at the individual property level.

City of Seattle

City of Seattle Department of Transportation, Bill Bryant, Manager Transit System Development, Bill.Bryant@seattle.gov

1. Can you please confirm that you have a transit route through a commercial area which operates on a transit only lane?
   Yes, several.

2. Did you convert a mixed-flow traffic lane to become a transit only lane? Or did you provide an additional lane for transit (construct a new lane or convert a parking lane to transit lane during peak periods)?
   Both.

3. Were parking spaces and/or loading areas reduced, relocated or modified due to the implementation of the transit only lane?
   Yes.

4. Did you evaluate the impact to existing businesses following the implementation of the transit only lane? If yes, did you carry out a formal data driven analysis (e.g. using sales data, business closures and economic transition data) or was a survey of business owners conducted?
   No.

5. Can you please provide a brief summary of your findings regarding the impact to existing businesses?
   No before/after analysis that I'm aware of.

Translink (BC)

Rachel Jamieson, Senior Transportation Engineer, Bicycle & Road Network Initiatives, Rachel.Jamieson@translink.ca

The Marine Drive bus lanes are a queue jumper to the Lions Gate bridge from both the east and west, and a bus lane in front of a shopping mall with off street parking.

We converted a right turn only lane to a right turn and bus lane and widened the street to provide a bus queue jump lane and a transit priority signal at a busy intersection approaching the Lion's Gate bridge from the west. We removed a left turn lane, banned left turns and restriped Marine Drive on a section approaching the Lions Gate Bridge from the east.

No parking spaces and/or loading areas reduced, relocated or modified

No evaluation of business impacts

The businesses nearby have off-street parking.

Edmonton Transit System

Jim Bryant, General Supervisor of Development & Technical Review, Edmonton Transit, jim.bryant@edmonton.ca

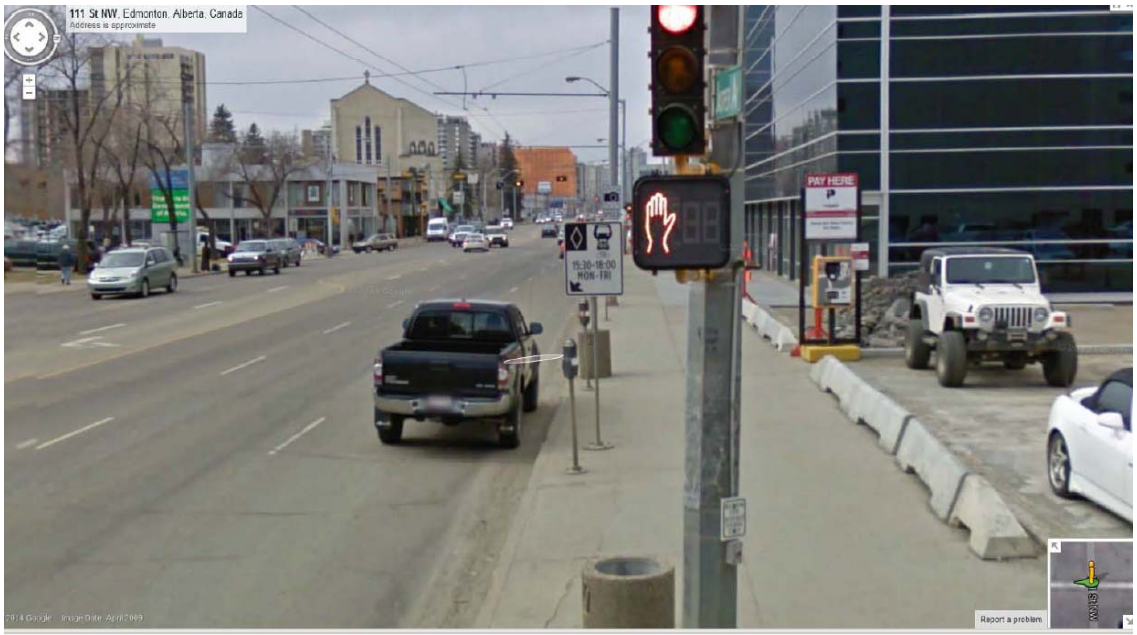
1. Can you please confirm that you have a transit route through a commercial area which operates on a transit only lane? Yes, for example, bus lanes are operational along Jasper Avenue in Oliver (west downtown), along 109 Street northbound between Whyte Avenue and the river and along 97 Street north of Yellowhead Trail. There are also several other bus lanes that do not operate through a commercial area.

2. Did you convert a mixed-flow traffic lane to become a transit only lane? Or did you provide an additional lane for transit (construct a new lane or convert a parking lane to transit lane during peak periods)? Both; usually add an additional lane where feasible. Some peak bus lanes allow for parking during off-peak hours.

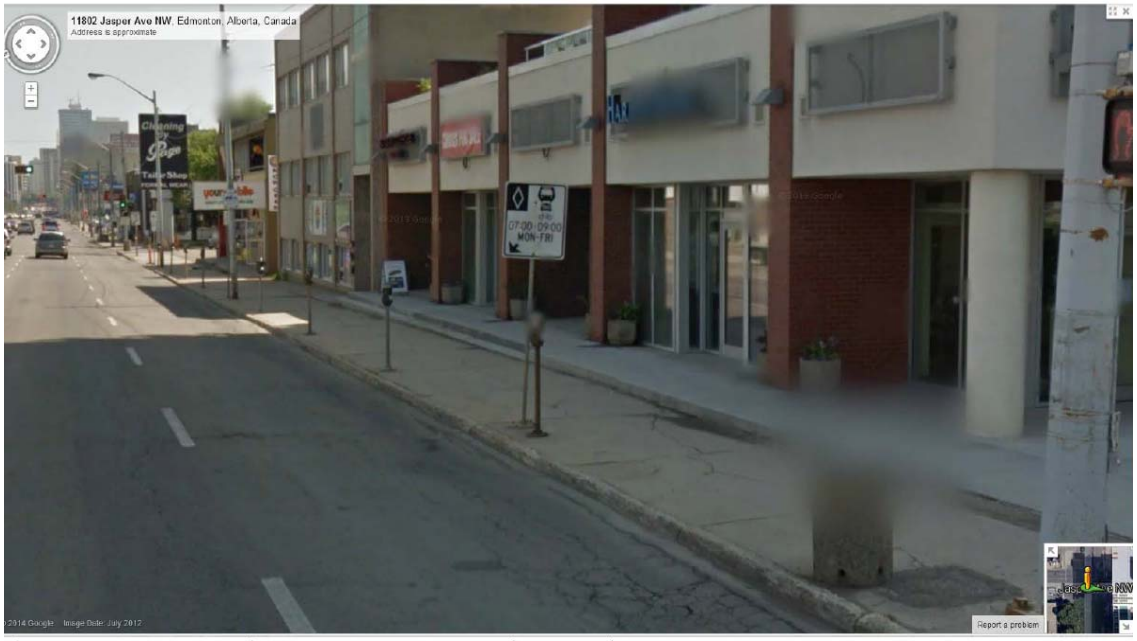
3. Were parking spaces and/or loading areas reduced, relocated or modified due to the implementation of the transit only lane? Yes, in Oliver (west downtown).

4. Did you evaluate the impact to existing businesses following the implementation of the transit only lane? If yes, did you carry out a formal data driven analysis (e.g. using sales data, business closures and economic transition data) or was a survey of business owners conducted? No significant analysis was performed as our main objective was to address bus delays due to traffic congestion. The impact to parking was not considered of great impact as parking capacity was still maintained during off-peak time periods.

5. Can you please provide a brief summary of your findings regarding the impact to existing businesses? Parking issues have been recently emergent in Edmonton. Some opposition due to loss of parking availability in areas of high utilization as occurred in recent years. When Edmonton Transit proposes future bus lanes in mature areas, we will most likely undertake extensive public consultation and review prior to implementation.
6.

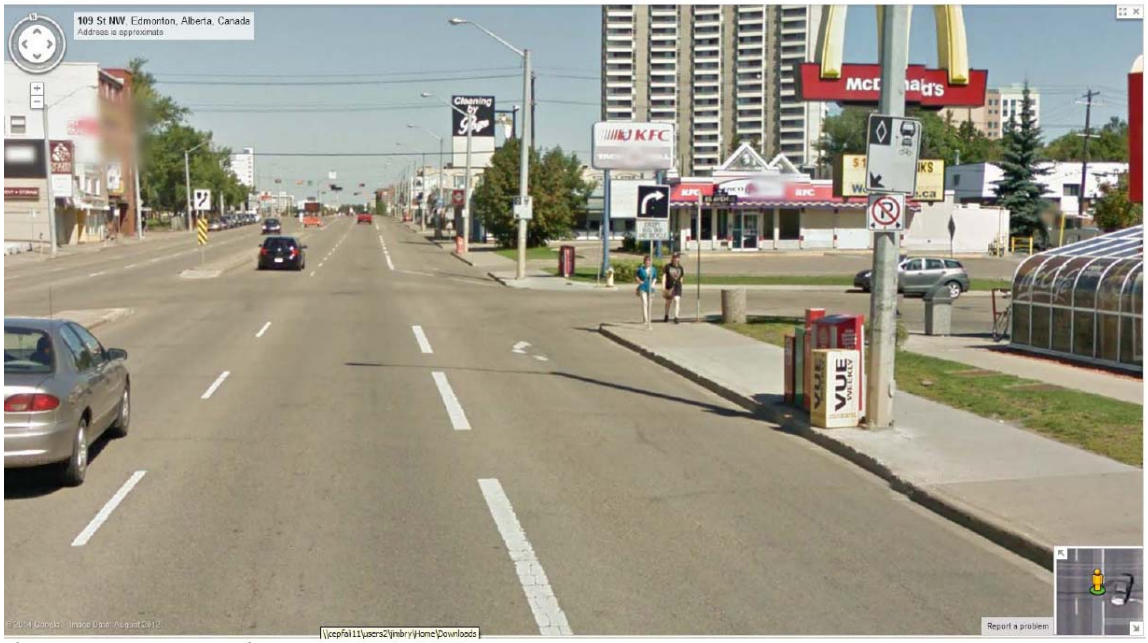


Edmonton Bus Lanes Example – Jasper Avenue Bus Lane WB for PM Peak



Edmonton Bus Lanes Example – Jasper Ave Bus Lane EB for AM Peak

Edmonton Bus Lanes Example – 97 Street Bus Lane NB for PM Peak



Edmonton Bus Lanes Example – 109 Street Bus Lane NB

San Francisco Municipal Transport Agency

City of San Francisco, Lulu Feliciano, Outreach Manager, San Francisco Municipal Transportation Agency, Lulu.Feliciano@sfmta.com

1. Can you please confirm that you have a transit route through a commercial area which operates on a transit only lane?
   We have several routes that operate on transit only lanes –
   Market Street is the backbone of our surface transit service and has a dedicated transit only lane.
   Geary Blvd, from downtown to Van Ness, also operates on transit only lanes (in fact we just applied a red surface treatment to remind auto drivers that this lane is for public transit only)

2. Did you convert a mixed-flow traffic lane to become a transit only lane? Not recently. Or did you provide an additional lane for transit (construct a new lane – this application will be utilized for Van Ness Ave corridor when we build and implement the rapid transit service or convert a parking lane to transit lane during peak periods)?

3. Were parking spaces and/or loading areas reduced, relocated or modified due to the implementation of the transit only lane? Yes, for the Van Ness Bus rapid transit

4. Did you evaluate the impact to existing businesses following the implementation of the transit only lane? This analysis was completed during the planning and EIR phase. If yes, did you carry out a formal data driven analysis (e.g. using sales data, business closures and economic transition data) or was a survey of business owners conducted?

5. Can you please provide a brief summary of your findings regarding the impact to existing businesses?

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KING STREET TRANSIT ONLY LANE PILOT PROJECT

Appendix "F"

King Street Transit Only Lane Pilot Project Collision Data

APPENDIX F

King Street Transit Only Lane Pilot Project

Collision Data

Collision Data Comparison along King St Transit Only Lane									
	January to September Data only*								
segment	2008	2009	2010	2011	2012	2013	2014		Average
Victoria -Wellington	9	7	5	6	5	2	7		5.7
Wellington-Mary	7	12	6	17	7	10	13		9.8
Mary-James	14	18	21	23	17	21	23	TOL	19.0
James-Bay	10	10	8	17	17	6	7	TOL	11.3
Bay-Queen	12	16	14	13	18	12	20	TOL	14.2
Queen-Locke	5	4	4	4	11	5	8	TOL	5.5
Locke-Dundurn	11	14	22	16	18	17	18	TOL	16.3
TOTAL	68	81	80	96	93	73	96		
** above data does not include self-reported collisions*									

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KING STREET TRANSIT ONLY LANE PILOT PROJECT

Appendix "G"

King Street Transit Only Lane Pilot Project Cycling Issues

APPENDIX G

King Street Transit Only Lane Pilot Project

Cycling Issues

1. Background

King Street is the arterial road which travels westbound through the centre of downtown Hamilton. A pilot project to implement a Transit-Only Lane (TOL) is in effect from October 2013 to October 2014. The purpose of the pilot is to test rapid transit service, so the lane is reserved exclusively for buses at all times. The city has received feedback from citizens indicating that prohibiting cycling in the TOL makes King Street excessively dangerous and unpleasant for cycling. A petition to permit cycling in the TOL has reached 322 signatures as of February 2014.

The 2013 City of Hamilton Bike Routes, Trails & Parks map marks King Street between Dundurn Street and Ferguson Avenue as a high volume and/or narrow lane cycling route, which indicates that while it should be used with caution, it provides a useful network connection. The *Shifting Gears* cycling master plan does not designate King Street as a cycling route, with the nearest routes being Napier - York - Cannon/Wilson to the north, and Hunter Street to the south. As of 2014, the northern route is not continuous in either the eastbound or westbound directions due to gaps caused by one-way restrictions. Hunter Street is scheduled to have bi-directional bicycle lanes installed in two separate segments in Spring 2014, with the third connecting segment to be completed at a later date. Figure 1 displays the existing bicycle network as of summer 2014.

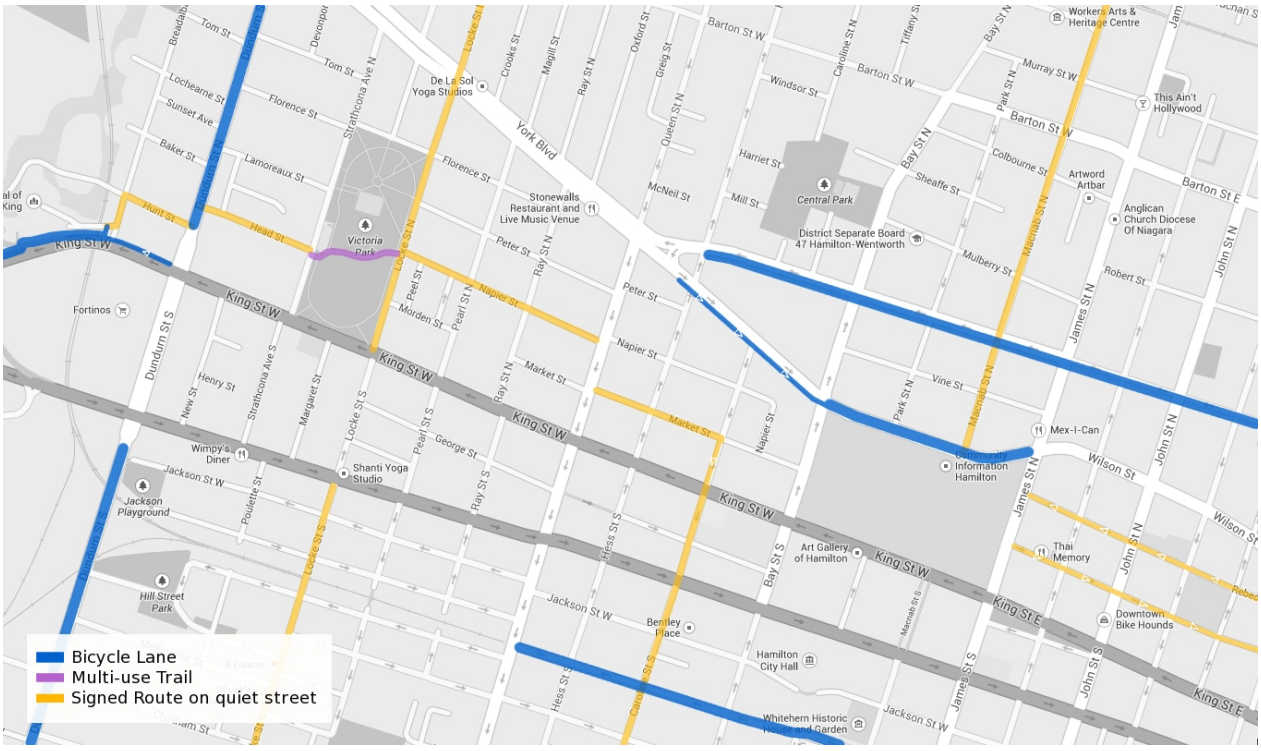

Figure 1: Existing Bicycle Network as of Summer 2014

The City of Hamilton's Transportation Master Plan (2007) aims to attain a 15% active transportation modal share by 2031, and the cycling routes through the centre of downtown may have a significant effect on this goal.

2. Lane Width Standards

Table 1 displays the relevant standards for lane widths on arterial roads, from City of Hamilton - Traffic Signal and Pavement Marking Design Drawings (2009):

Table 1: City of Hamilton lane width standards

Lane Type	Absolute Minimum	Recommended Minimum	Desireable/ Optimum
Arterial	3.0	3.5	-
Turning	3.0	3.5	3.5
Bicycle	1.2	1.5	1.8
Parking	2.5	2.5	-
Shared Car/Bike	4.0	4.3	4.5

The absolute minimum width of a bus lane can be considered to be 3.5 metres, based on the TAC Geometric Design Guide for Canadian Roads, which indicates:

> "Where [transit] lanes are provided in the same direction of travel as the adjacent through lanes, the width of the transit lane should be the same as the adjacent through lane or 0.2m less, but not less than 3.5m"

Shared bus-bicycle lanes (SBBLs) are not specifically mentioned in the TAC manual, but in the Ministry of Transport of Ontario (MTO) Operational Design Guidelines for High Occupancy Vehicles on Arterial Roadways, it states that:

> "If the [transit] lane is to be used as a bicycle facility as well, it should be at least 4m wide"

The City of Hamilton Design Guidelines for Bikeways states:

> "A minimum width of 4.3 m is recommended [for SBBLs]. However, it is desirable to provide a 4.5 m width to accommodate buses and interaction with other vehicles."

Table 2: Assumed bus lane width standards

Lane Type	Absolute Minimum	Recommended Minimum	Desirable/ Optimum
Bus	3.5	3.75	4.0
Bus + Bicycle	4.0	4.3	4.5

The recommended widths shown here for a bus-only lane are identical to those assumed by Cole Engineering in the design of the King Street Transit-Only Lane.

Despite the desirable/optimum SBBL width above, the American Association of State Highway and Transportation Officials (AASHTO) notes that in order for a bus to pass a

cyclist within the lane while maintaining safe operating spaces, a SBBL must be at least 16' 7'' (5m) wide. This is equivalent to the sum of the recommended minimum widths for a bicycle lane (1.5m) and a bus lane (3.5m). Because the ideal width for a SBBL is the same as the combined width of a bicycle lane and a bus lane, separate lanes should be provided wherever possible, and where there is not space for separate lanes, the SBBL should be as wide as possible.

3. Shared Bus-Bicycle Lane Guidelines

The MTO does not provide guidance on additional characteristics of bus bicycle lanes, such as maximum bicycle and bus volumes.

The general consensus among SBBL guideline documents is that SBBLs become increasingly dangerous and ineffective as the volumes of cyclists and buses increases, due to frequent conflicts. The City of Ottawa indicates that SBBLs are not suitable on corridors with more than 20 buses per hour. The scheduled weekday hourly volumes for HSR, GO, Greyhound and Coach Canada buses are summarized in Figure 1 below. Note that unscheduled buses may also use the King Street TOL.

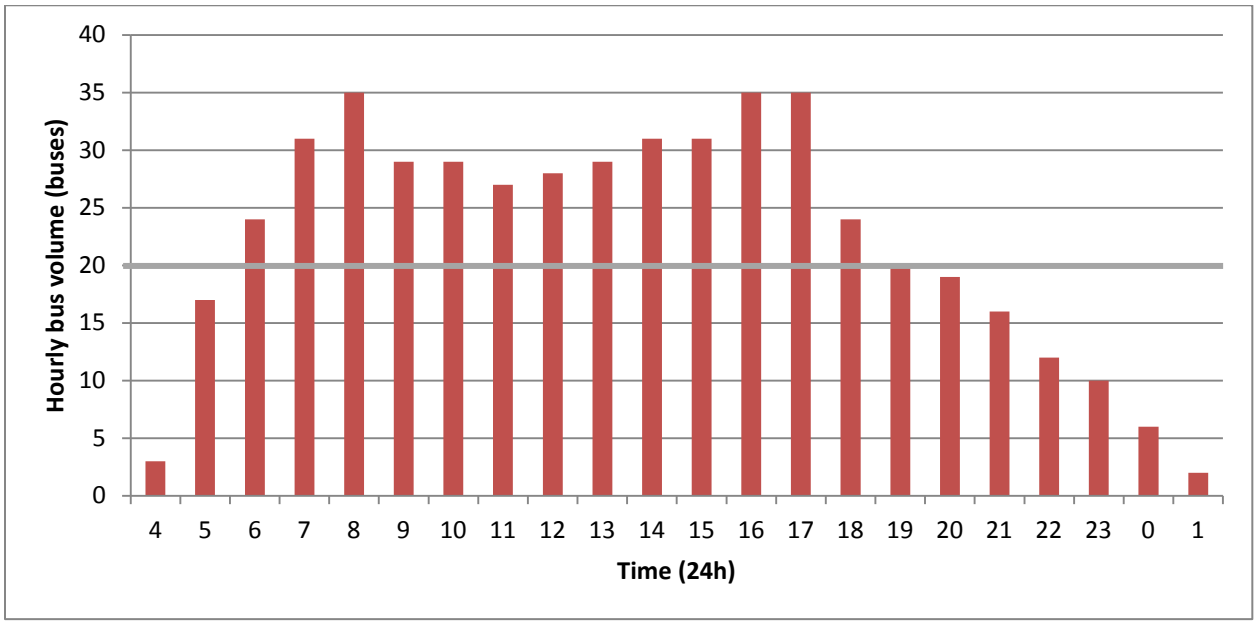

Figure 2: Weekday hourly scheduled bus volumes on King Street at Hess Street, January 2014

Between 6:00 AM and 7:00 PM, the number of scheduled buses on King Street exceeds the maximum recommended volume of 20 buses per hour for an SBBL.