G.W. THOMPSON JEWELLER & PAWNBROKER INC.

Denninger's FOODS OF THE WORLD

Black Forest Inn

Meeting with General Issues Committee – Tuesday, October 25, 2016 @ 10:30pm
Agenda Item 4.1

In Attendance – Members of the General Issues Committee, Wolfgang Schoen, Owner Black Forest Inn; Troy Thompson, Owner Thompson Pawnbrokers & Jewellers, Mary A-z, CEO, Sonja Pichler, Office Manager and Mateos Kucuqi, Accountant of R Denninger Limited

- Clarification of our position – we support the Light Rail Transit (LRT) project for Hamilton

- Do have concerns though – specifically the route of King Street versus Main Street and why 1 was chosen over the other

- Have reviewed various Reports and Studies on LRT – specifically
  (1) City of Hamilton Information Report from Public Works dated April 2, 2009 which on page 3 contemplated 5 different alternatives for the route and did not conclude on the preferred route (copy attached)

  (2) Metrolinx "Hamilton King-Main Benefits case" dated February 2010 – the name is a bit of a misnomer as it compares BRT, LRT and phased in LRT along King Street in the City Centre rather than a comparison of King Street versus Main Street which would include a complete economic analysis of the 2 routes (2 page cover sheet attached)

- A study linking these 2 reports together as suggested in the April 2, 2009 Information report does not appear to exist including a Cost Benefit Analysis on the King Street versus Main Street route (Institutional versus a Retail Business Street) – specifically the economic effect of the "collateral damage" that businesses on King Street will experience (impact on sales and employees as there are more of them on King Street that depend on "walk in and drive in" business than Main Street), the shorter route (½ km), and possible use (with widening and reinforcing) of the Main Street bridge over Highway 403 versus building a dedicated LRT bridge from King Street

- We has been looking for this report for several weeks and City staff were asked for rationale on the decision King Street versus Main Street @ the LRT information session on Wednesday, June 15 @ 8am – no information was forthcoming

- 2 articles in the Hamilton Spectator dated June 14, 2016 by Matthew Van Dongen and June 20, 2016 by Andrew Dreschel identified the gap (copy of each attached) – both articles refer to a 2009 Information Report that "Internal City Staffers" considered and rejected Main Street before making a recommendation to Council – little documentation on why though

- We met with Councillor Farr together with City and Metrolinx staffers on June 22, 2016 and confirmed the following (1) no study or cost benefit analysis was ever completed on the route

of Main or King Streets between the Delta and Dundurn Street to support the decision to run the LRT on King Street, (2) that the economic benefits that will accrue to the City will occur regardless of the King versus Main Street route due to the proximity of the 2 streets, (3) the Main Street route is ½ kilometer shorter than King Street, (4) there is a "pinch point" on King Street between Spring and Ferguson Avenues where King Street is a full 11 feet or 3.4 meters narrower than Main Street not the 1.5 meters previously stated (5) costing comparison of reinforcing or widening the Main Street Bridge versus building a dedicated LRT bridge over Highway 403 has not been done and (6) we were told that the project is too far along to change the route now

- Met with the LRT SubCommittee on Tuesday, July 26th, 2016 – statement from Patrick Brown and mention of the MOA deadline – later reviewed the MOA and could not find a reference to the June 2018 deadline when shovels have to be in the ground

- Met with Mayor Fred Eisenberger + Chief of Staff Drina Omazic on Thursday, August 4, 2016 – reviewed our position, our concern for the businesses in the King Street corridor during the extended construction period + the fact that we had not been able to find the economic justification for King Street over Main Street – Mayor Eisenberger undertook to provide us with the rationale – we still await receipt of this information

- In conclusion – the LRT project @ $1 billion is the single largest infrastructure project ever undertaken by the City – it will affect the City for generations to come – the Stadium @ $142 million pales in comparison

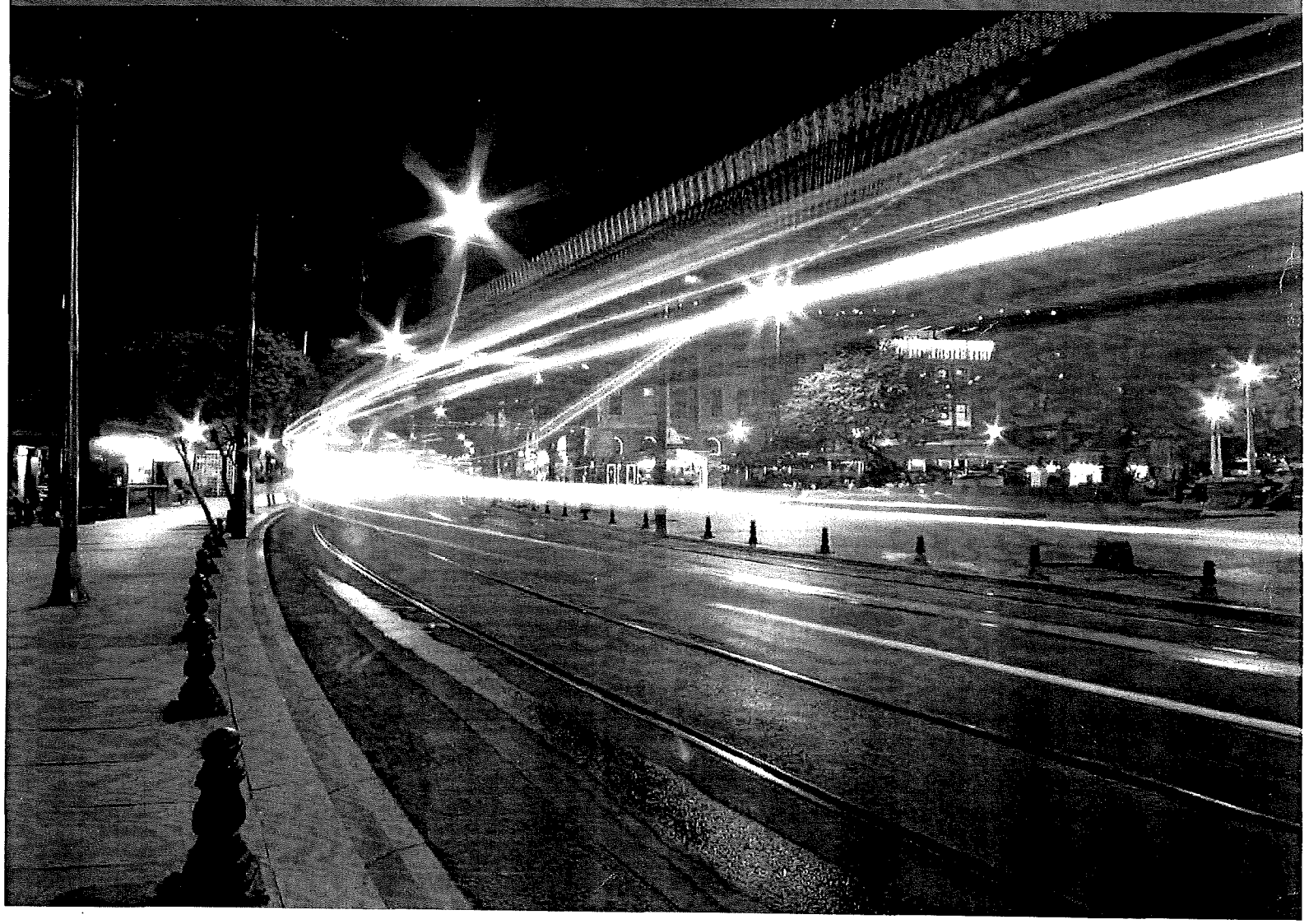
- As affected businesses in the proposed construction area, we believe that the cost benefit analysis of the Main versus King route should be done before further work continues – we therefore respectfully request that the Council direct the LRT staff group to complete the Cost benefit Analysis of King Street versus Main Street prior to the going out for and awarding of the tender

- Hamilton should "Do It Once and Do It Right"

METROLINX

HAMILTON KING-MAIN BENEFITS CASE

February 2010



METROLINX
LINKING PEOPLE TO PLACES · ON Y VA

Hamilton King-Main
Rapid Transit
Benefits Case

February 2010

Prepared for:

Metrolinx
20 Bay Street, Suite 901
Toronto ON M5J 2N8

Prepared by:

Steer Davies Gleave
1000 - 355 Burrard Street
Vancouver, BC V6C 2G8

In Association with:
Economic Development Research Group
Metropolitan Knowledge International

CONTENTS

FIGURES

TABLES

APPENDICES

INPUT VARIABLES AND ASSUMPTIONS

Executive Summary

In 2006 the Province of Ontario created the Greater Toronto Transportation Authority, renamed Metrolinx in December 2007. The primary responsibility of the new organisation is to provide leadership in the planning, financing and development of the Greater Toronto and Hamilton Area's (GTHA) multi-modal transportation network and to conform to the objectives and vision set out in the Places to Grow Act, 2005.

Part of Metrolinx' mandate and one of its first deliverables was the development of the Regional Transportation Plan (RTP), known as *The Big Move*, a 25-year plan that presents the road map for the implementation of the Province's MoveOntario 2020 vision of 52 new rapid transit projects in the GTHA by 2020.

As the rapid transit projects contemplated in *The Big Move* progress closer to implementation, a Benefits Case will be prepared for each project. The purpose of the Benefits Case is to undertake a comparative analysis of feasible options for a specific rapid transit project and present the results in such a way that it will assist decision makers to select a preferred option for implementation.

The Hamilton B-Line Rapid Transit project is one of the projects contemplated in MoveOntario 2020, and was identified as a Top 15 priority project in *The Big Move*. The project involves the provision of rapid transit between Eastgate Square and McMaster University along the Main Street/King Street corridor.

The city believes that rapid transit in Hamilton, starting with the B-Line corridor, will help achieve the goals of *The Big Move*, the Provincial Growth Plan, the Hamilton Transportation Master Plan and City's new Official Plan and result in enhanced prosperity, environmental sustainability and improved quality of life in the City of Hamilton. Rapid transit service along the B-Line corridor will deliver:

- Accessible rapid transit within 800 metres to close to 20 percent of the City's residents and employment including important government facilities in the downtown;
- Access to McMaster University and Hospital, one of Canada's top teaching and research institutions boasting a full and part-time student population of over 23,000 and having a significant economic impact on the Hamilton area;
- Improved access to the downtown and regional rail facilities; and
- An enhanced image and prosperity for the city.

Three options have been identified for this corridor. They are:

- **Option 1:** Full BRT
- **Option 2:** Full LRT
- **Option 3:** Phased LRT

Each of the options is compared to the Base Case, which is defined as the committed municipal bus network and GO Transit services (namely planned and funded existing and proposed services) that serve Hamilton. The table below summarizes the key characteristics of the options.

SUMMARY OF OPTIONS

	Option 1	Option 2	Option 3
Opening Year	2015	2015	2015/2030
Headway	2.5 min	4 min	4 min
Capacity (phpd)[1]	2200	1950/ 3900	1950 /3900
LRT Vehicles	n/a	30	20/30
BRT Vehicles	36	n/a	n/a
Travel time (end-to-end)	34	26	17[2]

The assessment of the options is done using a Multiple Account Evaluation (MAE) methodology. The MAE is a framework that provides a systematic identification and analysis of broader public policy implications and criteria of an option, not only costs and user benefits. The MAE framework is based on a number of evaluation "accounts" that together address the most significant project performance and policy considerations for a specific project:

- Transportation User Benefits
- Financial Impacts
- Environmental Impacts
- Economic Development Impacts
- Socio-Community Impacts

[1] Per Peak Hour Peak Direction capacities for LRT are shown for both one-car and two-car trains.

[2] Approximately 30 minute travel time from McMaster University to Eastgate Square, with BRT service connecting the eastern LRT terminus to Eastgate Square.

The assessment is done by comparing each option to the Base Case and identifying any incremental impacts, costs or benefits that are generated by each option. The analysis is done over a 30-year period (2009-2038). In order to compare the options on a "like-to-like" basis the monetized values are discounted to today's value. The values are discounted at a real discount rate of 5% and expressed in net present value in 2008 dollars.

The table below summarizes the results from the MAE.

MULTIPLE ACCOUNT EVALUATION SUMMARY

	Option 1	Option 2	Option 3
Transportation User Account			
Transportation User Benefits (PV $m)	313	**852**	748
Qualitative User Benefits	✓	✓✓✓	✓✓
Financial Account			
Costs (PV $m)	**(220)**	(784)	(655)
Benefits Less Costs (PV $m)	93	**69**	93
Benefit-Cost Ratio	**1.4**	1.1	1.1
Environmental Account			
GHG Emissions (PV $m)	0.6	**2.6**	2.5
Economic Development Account			
Economic Impacts During Construction			
Employment (person-years)	1,837	5,793	4,308
GDP ($m)	129.4	487.5	362.5
Income ($m)	53.4	201.3	149.7
Long-term Economic Impacts			
Employment (person-years)	48	187	187
GDP ($m)	4.1	15.8	15.8
Income ($m)	1.7	6.5	6.5
Development Potential ($m)	38 - 77	50 - 144	38 - 106
Social Community Account			
Land Use Shaping	✓	✓✓✓	✓✓
Road Network	✓✓✓	✓	✓✓
Construction Implications	✓✓✓	✓✓	✓

The analysis of the Hamilton rapid transit options reveals that the highest cost option (the full LRT along the Main Street-King Street corridor), with estimated capital and operating costs of $784 million in net present value terms, also generates the highest Transportation User Benefits.

These are estimated at more than $850 million resulting in a benefit-cost ratio of 1.1. By comparison, Option 1 (the full BRT option), generates an estimated $313 million in Transportation User Benefits less than one-half of that generated by of Option 2. However the estimated cost of $220 million for Option 1 in net present value terms is also much lower than either LRT option, resulting in a strong benefit-cost ratio of 1.4. By deferring a portion of the capital investment, the net present value of Option 3 is reduced by almost $130 million from the cost of the full LRT option. The Transportation User Benefits of this option are also lower than the full LRT option resulting in the same benefit-cost ratio (1.1).

For each option, the majority of benefits are derived from the travel time savings thus highlighting the importance of the operating speed of the rapid transit system to the success of the project. Given the supportive transit signal priority/pre-emption measures proposed under each of the options, the City of Hamilton has an opportunity to establish a new performance standard for the region to fully realize the benefits from the rapid transit investment.

None of the options generate sufficient incremental fare revenues to cover the incremental operating cost associated with the introduction of the new rapid transit line. The greatest incremental fare revenues are generated by Option 2 which is also the most costly to operate on an annual basis. However, the operating costs used in this comparative analysis are considered to be conservative and estimated at the higher end of the range. Lowering these costs would result in better revenue to cost ratios for all three options. The relatively low incremental fare revenues however indicate that much of the travel time savings are associated with improved travel times for existing riders which does not contribute to additional fare revenue for the operator.

All of the options are somewhat effective in attracting people out of their cars and reducing automobile usage. Option 2, which has the largest effect, will result in a reduction of greenhouse gas emissions by approximately 3,449 tonnes annually by 2021 increasing to 8,532 tonnes by 2031. In net present value terms, this equates to $2.6 million for Option 2 compared to $0.6 million and 2.5 million for Options 1 and 3 respectively.

As expected the options with the highest capital costs generated the most significant economic development effects. Option 2, which has the highest capital cost will have the largest impact on employment, income and GDP during construction, is estimated to generate approximately 5,793 person-years of employment[3]. Option 3 defers some of the capital and on-going operating costs but still generates relatively strong employment, income and construction GDP effects. By contrast, the lower cost BRT option produces the lowest overall economic development and employment benefits during construction as well as during the on-going operations.

[3] Includes both direct and indirect impacts.

All of the options support the City of Hamilton's land use and economic development objectives to revitalize the corridor by enhancing and supporting complementary planning and densification initiatives. LRT demonstrates a greater ability to attract investment and redevelopment than the BRT alternative and consequently provides higher property value uplift. At the upper end of the range of estimated uplift, Option 2 produces double the uplift of Option 1 at $144 million versus $77 million. At the lower end of the range, the difference is less dramatic with Option 1 producing an estimated $38 million in property value uplift versus $50 million for Option 2. Option 3 by comparison defers the implementation of a portion of the line and postpones potential development opportunities in the vicinity of up to five of the proposed LRT stations. As a consequence the potential uplift is constrained and is estimated to be in the range of between $38 million and $106 million.

Finally, the results of the comparative analysis presented in this report are based on the assumption that the current one-way street system through the downtown core is converted to a two-way traffic system where both Main Street and King Street are converted to two-way streets. In the absence of this conversion, the incremental benefits generated by the introduction of a rapid transit system are greater than those presented in this report, reflecting the different trip characteristics under each scenario. The one-way system typically supports longer cross town trips rather than the shorter trips encouraged by the two-way streets. As a consequence, the travel time savings resulting from the introduction of rapid transit under a two-way street scenario are less significant than under a one-way scenario as individual trip patterns already reflect the shorter trip distances. However, as the results show, the introduction of rapid transit under the two-way scenario does present positive travel savings as rapid transit is able to offer faster and more competitive travel times for the shorter trips. Furthermore, the two-way street system is more supportive of the City's objective to create a healthy, more pedestrian-friendly downtown.

In addition to the merits of the two-way conversion, the ability of the rapid transit system to compete with the automobile and generate travel time benefits is directly related to the operating speed of the rapid transit system. For each option assessed in this study, the majority of the benefits are derived from the travel time savings. If the City of Hamilton provides the supportive transit signal priority/pre-emption measures proposed under each of the options, the results indicate that the city can leverage the benefits from a rapid transit investment while establishing a new performance standard for rapid transit in the region.

Part A Project Rationale

Introduction

Purpose of Report

In 2006 the Province of Ontario created the Greater Toronto Transportation Authority, renamed Metrolinx in December 2007. The primary responsibility of the new organization is to provide leadership in the planning, financing and development of the Greater Toronto and Hamilton Area's (GTHA) multi-modal transportation network and to conform to the objectives and vision set out in the *Places to Grow Act*, 2005.

Part of Metrolinx' mandate and one of its first deliverables was the development of the *Regional Transportation Plan* (RTP), known as The Big Move, a 25-year plan that presents the road map for the implementation of the Province's *MoveOntario 2020* vision of 52 new rapid transit projects in the GTHA by 2020.

As the rapid transit projects contemplated in The Big Move move closer to implementation, a Benefits Case will be prepared for each project. The Benefits Case will describe a range of feasible options for each project, be it different technology, capacity or length of alignment, and demonstrate the benefits and costs associated with each of the options.

The Hamilton B-Line Rapid Transit initiative is one of the projects contemplated in *MoveOntario 2020* and was identified as a Top 15 priority project in The Big Move. The project involves the provision of a higher order rapid transit service along the existing B-line corridor which currently runs from a western terminus at University Plaza, a privately owned retail mall west of McMaster University, eastward via the King Street / Main Street corridor to an eastern terminus at the Eastgate Square shopping mall. The Bus Rapid Transit lite version which is currently in-service is scheduled for short term improvements as a result of "Quick-Wins" funding from Metrolinx.

Three options were identified for this corridor and this document presents the comparison of these options against the Base Case. The assessment of the options includes the relative strengths and weaknesses of each option on people, the economy and the environment compared to the cost of implementing the option. The objective of the assessment is to clearly outline the trade-offs among the criteria to enable decision makers to make an informed decision.

Report Structure

This report is structured as follows:

- **Part A - Project Rationale**: This section describes the policy context, the broader regional and project objectives, the characteristics of the corridor and the issues and opportunities to be addressed by the proposed project.

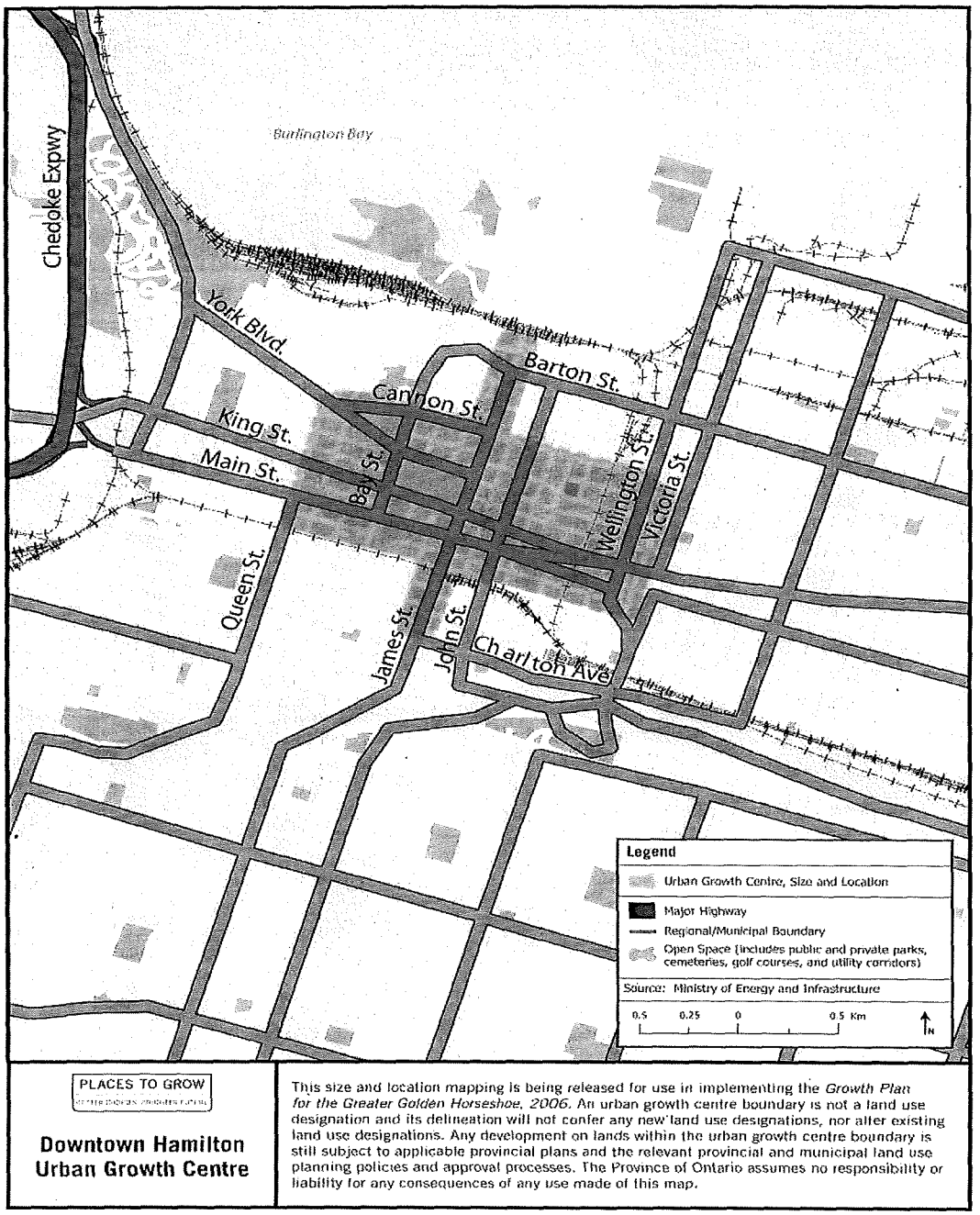
- **Part B - Project Options:** This section describes the options that are evaluated.
- **Part C - Project Assessment:** This section describes the evaluation methodology, the analysis and the summary results.

Project Rationale

Context and Need

The City of Hamilton is forecast to experience significant population growth over the next 20 years. The population of the city is planned to grow from the current 500,000 residents to an anticipated population of 660,000 residents while employment is expected to grow to 300,000 jobs by 2031. Much of this residential and employment growth is expected to occur in the Downtown Hamilton Urban Growth Centre and is illustrated in Figure 1. It is anticipated this growth will primarily be focused around specific development nodes and along the major urban corridors.

FIGURE 1 DOWNTOWN HAMILTON URBAN GROWTH CENTRE[4]



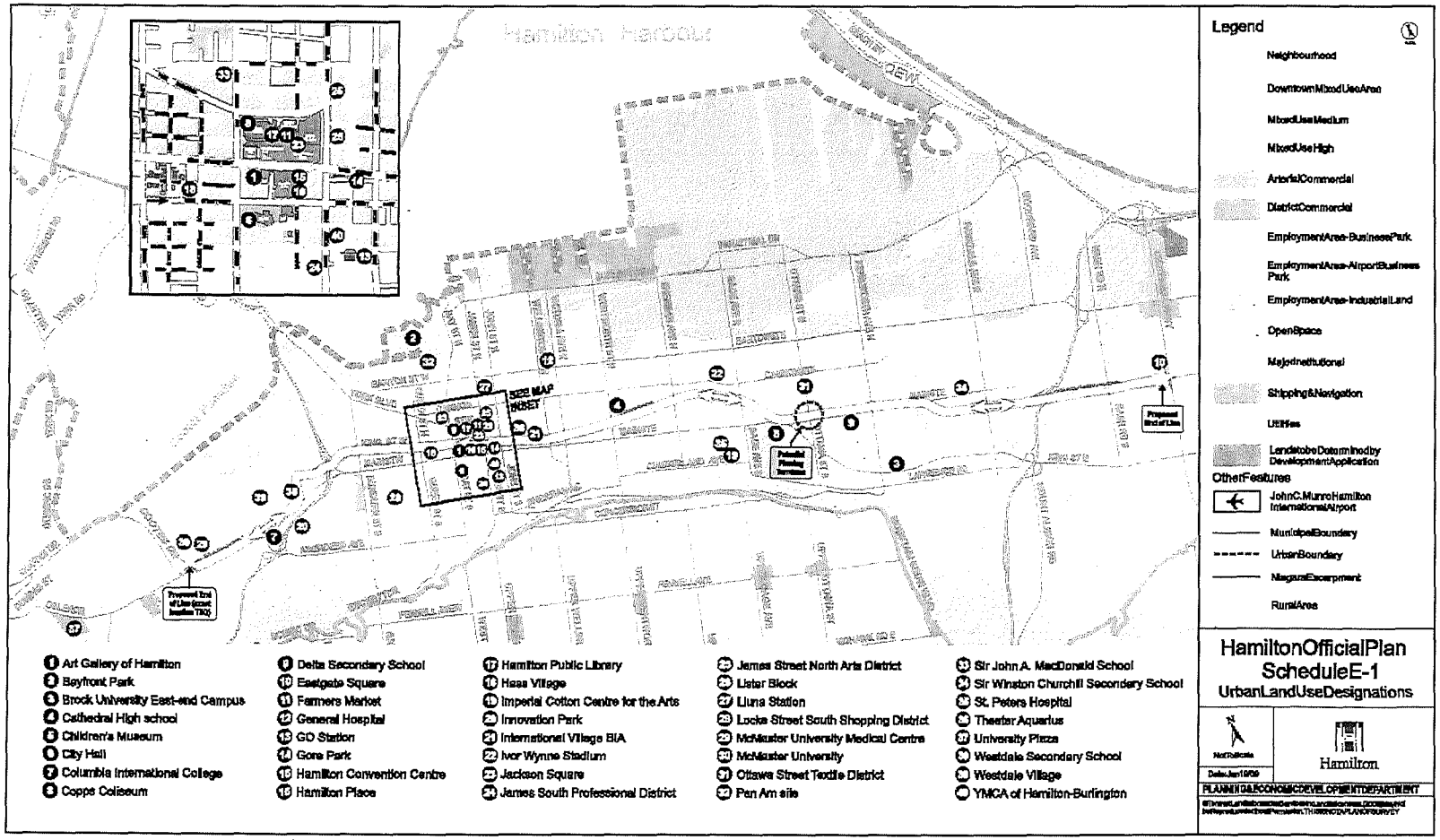
[4] SOURCE: 'Size and Location of Urban Growth Centres in the Greater Golden Horseshoe' (2008), Ministry of Energy and Infrastructure

In addition to the challenges associated with the anticipated growth, the City of Hamilton is also experiencing economic and cultural change as it transitions to relying less on traditional industrial activities in favour of a more knowledge-based economy. This transition, combined with external economic factors, has caused some short term challenges for the City, particularly in the downtown core, where redevelopment is necessary to support the City's plan to rejuvenate the downtown core and aid the transition.

In response to the planned growth, and to assist in the city's transition, the City embarked on a series of technical studies to examine the role of transit to promote, support and manage the growth of Hamilton in a sustainable manner. This culminated in February 2007 when the city's Public Works Committee and Council endorsed the Hamilton Transportation Master Plan (TMP) which defined a transit strategy that included for the provision of "higher order transit" within the City of Hamilton.

In June 2007, the Province of Ontario announced the MoveOntario 2020 vision, a multi-year rapid transit action plan for the GTHA. The B-Line corridor was one of the 52 projects identified by MoveOntario 2020, and was subsequently identified as a Top 15 "early implementation" priority project in the Metrolinx Regional Transportation Plan known as *The Big* Move. Figure 2 illustrates the B-Line corridor and activity centres.

FIGURE 2 B-LINE CORRIDOR AND ACTIVITY CENTRES

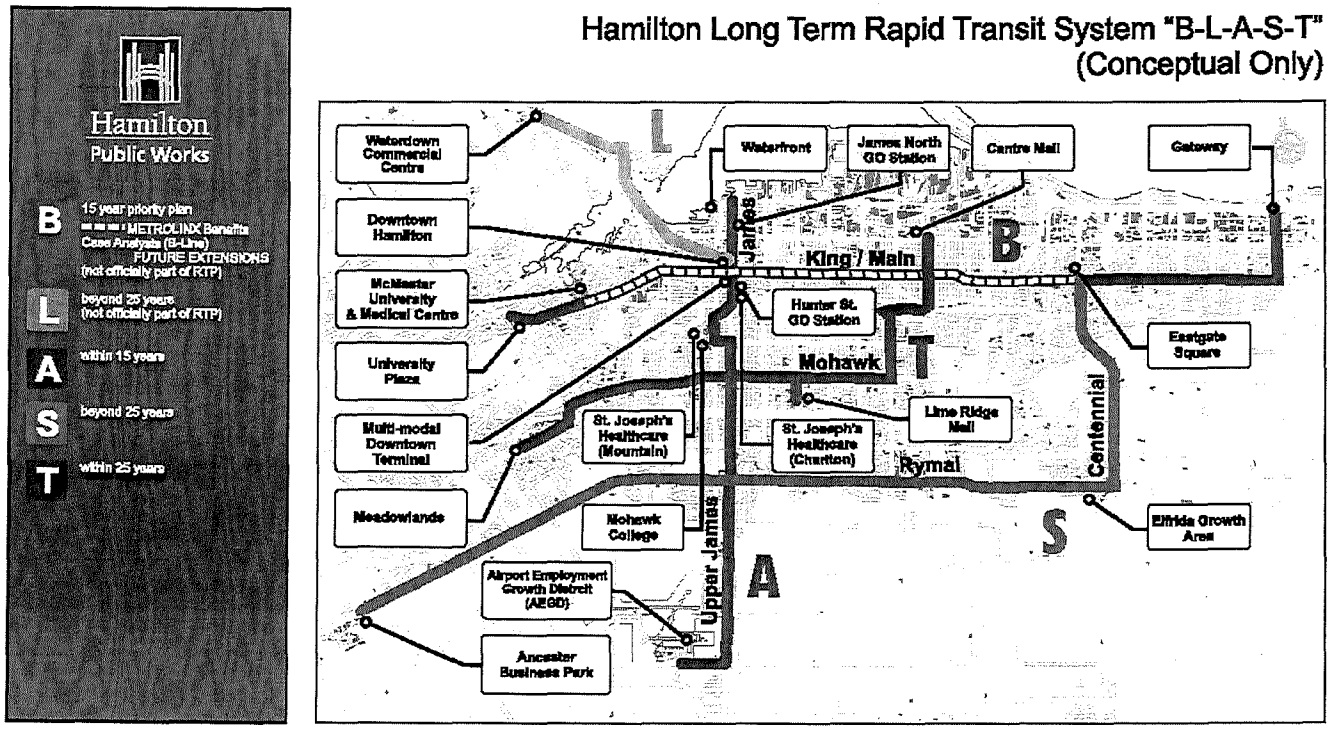


METROLINX
LINKING PEOPLE TO PLACES • ON Y VA

The existing B-Line (BRT-lite) bus service was introduced in 1982 to serve demand along the east-west corridor of the lower city. The westbound service runs west from the eastern terminus at Eastgate Square along Queenston Road/Main Street and King Street East through the Downtown core connecting with Main Street West at Paradise Road where it continues westward to a western terminus at University plaza (west of McMaster University). Eastbound service runs along Main Street from University Plaza, past McMaster University and through the downtown core to the eastern terminus at Eastgate Square. Success of this service has lead to increased service levels and the recognition that the function of this Main/King Corridor is key to the daily operation of the city. Ridership on the B-Line has grown over the years reaching almost 850,000 passenger trips in 2008. In addition to the B-line service along King Street/Main Street, the city's most significant transit corridor, there are a number of other regular local bus services that provide integrated services along the B-Line corridor or portions thereof. When combined, a very frequent service is provided and it is estimated that the B-Line and local bus services carry some 10 million passengers per year. Furthermore, transit ridership in general, and specifically along the corridor, can also be expected to increase as the city is redeveloped and land uses in the urban centre are intensified. As a consequence of this intensification, it is anticipated that the current supply of parking in the urban core will decrease while the cost of the remaining stalls increases, thus providing an additional incentive to find an alternative to the automobile.

The B-line corridor fits into a long range vision that the City of Hamilton has for a rapid transit network referred to as the B-L-A-S-T network. This proposed long term rapid transit network is illustrated in Figure 3.

FIGURE 3 PROPOSED B-L-A-S-T RAPID TRANSIT NETWORK



METROLINX
LINKING PEOPLE TO PLACES

As part of its rapid transit strategy, the City has also embarked on a significant public consultation program to determine public opinion regarding the rapid transit initiative. Among the findings, the feedback received during the public consultation sessions revealed strong support for the proposed enhancement of the existing B-Line service to provide rapid transit service along the B-Line corridor.

The city believes that rapid transit in Hamilton, starting with the B-Line corridor, will help achieve the goals of The Big Move, the Provincial Growth Plan, the Hamilton Transportation Master Plan and City's Official Plan and will result in enhanced prosperity, environmental sustainability and improved quality of life in the City of Hamilton. Rapid transit service along the B-Line corridor will deliver:

- Accessible rapid transit within 800 metres to close to 20 percent of the City's residents and employment including important government facilities in the downtown;
- Access to McMaster University, one of Canada's top teaching and research institutions boasting a full and part-time student population of over 23,000 and having a significant economic impact on the Hamilton area;
- Improved access to the downtown and regional rail facilities; and
- An enhanced image and prosperity for the city.

Located at the western corner of Lake Ontario, Hamilton is positioned uniquely as the western centre of the Greater Golden Horseshoe, and functions as a western gateway to the Greater Toronto Region. Hamilton is well positioned to exploit its geographical proximity to Toronto, the largest business centre in the country, particularly considering the proposed electrification of the GO Lakeshore Line and improved travel experiences for the estimated 92,000 commuters that travel between Toronto and Hamilton. The B-line rapid transit in conjunction with the GO Lakeshore improvements will provide Hamilton strong transit-oriented commuting options as well as provide the opportunity to revitalize the city as an attractive, dynamic, and environmentally sound community for people and businesses to visit, work and live.

An investment in rapid transit is also an important piece of the City's plan to rejuvenate the urban core and support its economic and cultural transition. Hamilton's traditional and pedestrian friendly street grid, combined with its stock of heritage and older buildings, waterfront and escarpment topography, make for an urban fabric that is well-suited to a transit-oriented and sustainable lifestyle. Given these natural and historic characteristics, Hamilton is well positioned to attract and accommodate the significant growth expected in the Greater Toronto Region over the next 25 years. A higher-order transit corridor will connect key activity centres, destinations, and link key areas of future economic development. However, such an investment must be made within the context of an overall strategy where a transit investment alone is not sufficient to fully capitalize on this advantage. Together with appropriate city

planning and economic development initiatives, rapid transit can play an important role in the transition to a knowledge-based and sustainable community and economy.

The City of Hamilton also has a number of documents, previously developed, that support rapid transit with policies, by-law and strategies that are all complementary to the implementation of rapid transit. These documents include:

- Corporate Strategic Plan - "To be the best place to raise a child, promote innovation, engage citizens and provide diverse economic opportunities";
- Public Works Business Plan - "Innovate Now";
- Corporate Energy Policy;
- Air Quality and Climate Strategic Plan;
- Vision 2020;
- GRIDS (Growth Related Integrated Development Strategy);
- Official Plan (June 2009);
- Zoning By-laws (in process);
- Residential Intensification Study;
- Commercial Strategy Study;
- Ridership Growth Plan;
- Transportation Master Plan;
- Rapid Transit Feasibility Study (Phase 1, 2 & 3); and
- Long Term Conceptual Rapid Transit Vision ("B-L-A-S-T").

The City of Hamilton has made an effort to ensure all plans and strategies are pro-active in enhancing the city as a successful urban centre. In addition to the documents listed above, the City of Hamilton is in the process of updating its economic development strategy. The strategy will target multiple areas of city-building, including business development, community revitalization, and attracting a 21st century labour force. A rapid transit line could contribute to all of these goals. Aside from the obvious community and quality of life impacts, an investment in rapid transit also fits particularly well with the approach to infrastructure for innovation, which will link the existing and future nodes of research and technology commercialization in Hamilton. By facilitating such linkages along the city's primary east-west corridor, an investment in rapid transit is likely to enhance the attractiveness of the city to potential developers who will benefit from the marketability and increased demand for prospective development sites along the corridor. Overall, a rapid transit line has the potential to generate many synergies with other complementary initiatives in the City of Hamilton.

Project Objectives

The City of Hamilton Rapid Transit Initiative has several broad objectives in conjunction with MoveOntario 2020 and Metrolinx RTP including:

- To promote new development and investment along its key corridors and at strategic nodes (GRIDS);
- To support opportunities to redevelop and / or intensify existing developments;
- To support and revitalize existing and future development areas (McMaster University, West Hamilton Innovation Park, Downtown Area including the Central Library, Farmer's Market, Hamilton Art Gallery, Copps Coliseum, potential new stadium etc.) and businesses;
- Provide a choice of travel modes that support and inter-connect to each other at both a local (trails, cycling, walking) and inter-regional level (GO);
- Improve access to key activity centres such as recreation/sporting facilities, arts centre and convention centre;
- To achieve local and regional environmental objectives; and
- To promote a sustainable community.

In addition to these broad objectives, the proposed enhancements to the rapid transit network, beginning with the implementation of rapid transit service along the B-Line corridor, also aim to achieve more specific goals including:

- To increase transit ridership;
- To put pedestrians and transit first in planning the corridor by enhancing the streetscape and creating a more pedestrian-friendly environment;
- To improve the City's business, tourist and development appeal; and
- To provide effective connections to neighbouring transit systems.

Project Overview

Context

As indicated above the City of Hamilton has undertaken considerable work on the rapid transit initiative and specifically the B-Line Corridor. Since 2007 the City has completed a three-phase Rapid Transit Feasibility Study (RTFS) that compared BRT and LRT technologies and discussed what BRT and LRT could potentially look like. The primary purpose of the study was to provide Council, staff and the public with the initial view of the opportunities that rapid transit can

present, and the constraints that need to be addressed in making a decision to pursue either an LRT or BRT rapid transit option.

As a part of the Hamilton Transportation Master Plan, the Metrolinx Regional Transportation Plan and Phases 1, 2 and 3 of the RTFS, different potential alternative technologies were initially considered. The list was screened based on best practices, safe and efficient operation, potential impacts and expected investment. Based on these studies the City of Hamilton focused its efforts and planning on three options: an enhanced and expanded version of the existing Bus Rapid Transit, one-way LRT operation in reserved lanes and two-way median LRT in reserved lanes.

Rapid transit along the B-Line corridor could be a contributing component to revitalization and development. Increased transit use goes hand in hand with enhanced economic opportunities, better land use, intensification, improved urban design, healthier, more active lifestyles and a more pedestrian-friendly urban environment. Through consultation conducted by the City of Hamilton, the public has expressed a preference for LRT over enhancing the existing BRT service.

Transit Corridor Considerations

In addition to the B-line service along King Street/Main Street, the city's most significant transit corridor, there are a number of other regular local bus services that provide integrated services along the B-Line corridor or portions thereof. When combined, a very frequent service is provided and it is estimated that the B-Line and local bus services carry some 10 million passengers per year. The existing limited stop express service ("BRT-lite") along the B-Line corridor operates on a 10 minute headway during peak periods and afternoons, and headways of approximately 15 minutes in the off-peak period. It alone attracts almost 850,000 trips per year as the express service within the most popular transit corridor in the city. The City's initiative to develop a rapid transit network is aimed at providing an alternative to the single occupancy vehicle, making non-auto-oriented lifestyles possible for existing and future residents and workers. Such a transit facility would build on Hamilton's heritage and mixed-use fabric, while promoting population and employment growth along the King-Main spine which runs through the centre of Hamilton's Lower City.

Opportunities and Issues

Improvements to the B-line could not only enhance transit service along this corridor, but also provide many related direct and indirect opportunities for urban transformation and revitalization of developments in the area as described in the Context and Needs section of this report. The main features that will be directly impacted by improvements to the B-line are outlined below with relation to the presented opportunities and related issues (See Figure 2 for the locations of these features).

GO Transit

Connectivity is a key piece to transit network planning. A convenient passenger connection between Hamilton's rapid transit network and the GO regional rail service could improve and facilitate the regional connectivity envisioned by The Big Move. The GO Lakeshore West line to Hunter Street in downtown Hamilton is relatively close to the proposed B-Line corridor and may warrant a direct connection. At the present time, GO Transit provides peak hour commuter rail service to Toronto for Hamilton residents along with regular GO Bus services that depart from the station and provide regional bus services to other destinations. The proposal to electrify the GO Lakeshore corridor could greatly enhance the commuter rail service and provide frequent and reliable two-way service to and from Hamilton. This service would improve service frequencies and travel times making GO Transit an even more attractive alternative to the automobile.

Increasing connectivity by creating a convenient transfer point between Hamilton's rapid transit network and the GO service will further enhance the attractiveness of transit. However, it should be recognized that one trade-off with this deviation from the main route is the impact to the operating speed of the line resulting in longer travel time. In addition to the Hunter Street GO station, there are other opportunities in central Hamilton for new GO stations and/or multi-modal transit facilities that could include local buses and new/additional inter-regional rail. These opportunities should be examined as part of more detailed design phase to identify possible locations for such facilities and to determine whether they could generate additional significant benefits to both local communities and the wider region. Given the overall strategy to grow transit use and maximize ridership, any effort to integrate local rapid transit with regional service such as the GO Train must balance the benefits of improved connectivity with the objectives of the new rapid transit line. These aspects should be considered during the route level design stage of this project's development.

McMaster University & McMaster University Medical Centre

As one of Canada's leading education and research institutions, McMaster University is a significant part of the economic landscape of Hamilton. With over 23,000 students, plus faculty and staff, the university campus is a key place of interest and trip generator for transit particularly because students make up a large portion of the transit market. Additionally, the student union has incorporated transit passes into the McMaster student fees making transit service to the campus more integral. McMaster also has a university medical centre that has a significant flow of patients, visitors and employees that would also benefit from the introduction of rapid transit to this location.

At the present time, the university administration policy restricts transit vehicles movement on campus to the perimeter of the property. As a consequence, for many of the transit patrons, bus facilities for both HSR and GO Transit are located a considerable distance from their ultimate destinations, which can be viewed as a poor service.

Given the desire to increase transit ridership, it is important that the passenger access to this important activity centre be optimised. More detailed investigation should be undertaken to determine the best long-term options for transit access to the campus as part of a more detailed design phase.

West Hamilton Innovation District

West Hamilton Innovation District (WHID) is a 15 acre site located halfway between McMaster University and Mohawk College, and in the future is planned to be a significant trip generator. Specifically, the site is located to the south of Main Street West, west of Dundurn Street South and the CP railway line, north of Aberdeen Avenue, and east of Highway 403. The site is the former location of Camco/Westinghouse and includes the McMaster Innovation Park which welcomed its first tenants, Trivaris Ltd. into the first renovated building in April 2009. The federal government has also committed a $60M investment to build a new 155,000 square foot materials technology laboratory, scheduled to open in 2010. McMaster Innovation Park expects to complete 14 buildings and be the workplace for 3,000 people over the next 15 years. The entire WHID has the capacity to house as many as 6,000 workers once completed. This development has the potential to become an important activity centre which has merit for transit service.

The City of Hamilton has investigated opportunities to provide door-to-door service to the site with rapid transit. However, similar to the GO Transit connection, there are operational trade-offs, such as longer operating times, and vehicle operating costs. As well, access to the site will also require a substantial additional capital investment including the need for more vehicles resulting from the longer travel times. All options examined in this Benefits Case include a stop at Longwood Road and Main Street. The Innovation Park falls within a comfortable catchment area of the stop. However, appropriate pedestrian-friendly links between WHID facilities and the proposed rapid transit corridor should be further explored at the detailed design level.

Maintenance Facility

The new rapid transit line will require a new or enhanced operations and maintenance facility. The specific location of this facility can vary depending on the rapid transit technology and the end points of the new line.

Hamilton Street Railway (HSR) currently maintains and stores the existing fleet of B-Line buses at its bus maintenance facility, Mountain Transit Centre, on Upper James Street, some 9 kilometres from the B-Line corridor. It is anticipated that in the short term HSR will be able to accommodate the enhanced fleet proposed for implementation in September 2009 at this existing facility. However, in the event that the new rapid transit line is BRT, it is likely that HSR may have to expand existing facilities or build additional capacity at a new location (ideally close to the B-Line corridor).

In the event that LRT is selected as the rapid transit technology, HSR will require a new operations and maintenance facility to accommodate the LRT vehicles. In anticipation of this requirement, the City of Hamilton investigated potential sites near the corridor that provided sufficient capacity and were within an appropriate distance to the mainline to minimize the cost of providing infrastructure to connect the mainline to the yard and also to limit the operating costs associated with the necessary connection.

Under either technology scenario, the exact location of the storage and maintenance facility will be determined as part of the more detailed project definition phase.

Road Operations (One Way versus Two Way)

At present one way traffic in the downtown core on Main Street and King Street provides efficient traffic flow entering and leaving downtown Hamilton with traffic flowing eastbound on Main Street and westbound along King Street. While this one-way street configuration facilitates efficient traffic flow for passenger vehicles and longer trips traveling through the downtown, it is not ideal for pedestrians, transit users, and people generally using and experiencing the downtown area. Recognizing these challenges, the City of Hamilton established a corporate working team to undertake an assessment of the rapid transit options within this street environment. The team concluded that a two-way system on King Street is the preferred rapid transit route alternative for the following reasons:

- Greater potential and concentration of community development, which will revitalize Downtown Hamilton, resulting in greater increase in property values and greater potential for economic spin-offs;
- Improved accessibility for residents, workers and visitors, allowing them to travel in both directions on both King and Main Streets creating a better urban experience;
- Safer pedestrian environment, as a median transit way allows sidewalk improvements in both directions and bi-directional LRT results in slower and less traffic on King Street;
- Lower costs as less LRT infrastructure is required;
- Less disruption during construction as only one corridor is directly affected; and
- Fewer negative impacts to properties abutting the corridor as there would be less need to close driveways and create cul-de-sacs on local streets at non-signalized intersections.

The City of Hamilton Corporate Working Team also evaluated potential corridor-wide impacts and while several were identified and mitigation proposed, there are no significant impediments that would prevent the City from pursuing rapid transit along the B-Line corridor via King Street.

In addition to the reasons given by the Corporate Working Team, additional issues relating to the construction and on-going operation of a rapid transit line arise when considering a one-way system on King and Main Streets.

From a construction perspective, a one-way system will incur greater construction costs and public inconvenience as two major routes through the downtown core will be interrupted for the duration of construction. Specifically a split rapid transit corridor will result in:

- Greater utility impacts (two corridors);
- Additional electrical substations if constructed over an extended distance (1.5/2km);
- Additional overhead line infrastructure (support poles);
- Separate cabling system for each route (power and communications);
- A duplication of stop control equipment as it is required on each line; and
- Increases the cost of providing crossovers, which are emergency turn back locations for LRT vehicles, as these would need to be along connecting streets.

From an operations perspective, one of the most significant deterrents to a split corridor is passenger legibility. Under a split corridor scenario, transit passengers utilizing the system to travel between their home and work would be required to access and exit the system from geographically distinct stations. Furthermore given the distance between Main Street and King Street this would imply that at some points on the corridor (with walking distances as much as 500m between the inbound and outbound stations) would create a significant deterrent for some passengers. Similarly, the split corridor is likely to dilute the positive impacts from economic development that may be motivated by the introduction of the new rapid transit line.

In addition to the passenger deterrent, the split route would also present challenges for the system operator. These include:

- Splitting of the routes would operationally hinder service recovery and short working due to limited turn back locations;
- The unfeasibility of temporary service operation along a single track section while the other track section is out of service; and
- Parallel routes would affect consecutive crossing arterial road intersections which would make mitigation of LRT priority on arterial road traffic more difficult.

Also, the interchange system connecting the 403 to Main and King Streets is about to undergo significant rehabilitation and reconstruction. There is an opportunity, with the potential implementation of a rapid transit service and reconfiguring of King and Main Streets into two-way arterials, to simplify this interchange.

In a central downtown location there are cases where parallel routes and small loops may function reasonably well where more than one route runs through the centre. However this would not be the case over an extended length as would be required on the King and Main Street corridors.

Clearly, the need for two-way operation is essential for the successful operation of this transit line given the findings presented above. Therefore, the conversions of King Street and Main Street to two-way operations have been assumed for the purposes of this analysis.

Part B Options

Project Options

The following three options have been identified for the Hamilton Rapid Transit Project for comparison against the Base Case. A summary description of each option is provided below.

- **Base Case:** Business as usual
- **Option 1:** Full BRT
- **Option 2:** Full LRT
- **Option 3:** Phased LRT

Base Case

The Base Case assumes that the City of Hamilton will re-orient the current one-way operations of King Street and Main Street to two-way streets for the reasons already detailed in Part A of this report. Within this new street configuration, the Base Case is defined as an expanded B-Line Lite Express Service as proposed for September 2009 with buses operating in the curb lanes of King Street. This represents a change from the existing BRT Lite service which currently operates in the curb lanes of both King Street and Main Street in the direction of the one-way traffic.

This BRT Lite service runs westward from Eastgate Square through downtown and continues west past McMaster University to a western terminus at University Plaza. There are 15 stations along the B-Line route between University Plaza and Eastgate Square including a station adjacent to McMaster University campus.

Under this Base Case scenario Hamilton Street Railway (HSR) operates articulated buses in mixed traffic with no signal priority. Bus operations vary within segments of the B-Line alignment. Between University Plaza and McMaster University, buses operate with peak headways of 15 minutes. Buses on the segment between McMaster University and Eastgate Square operate more frequently in the peak operating with peak headways of 7.5 minutes. The segment between University Plaza and McMaster University adds another 5 minutes to the one way trip.[5]

[5] Travel times are based on the current one-way street operations and may change under the two-way street operating scenario where travel times will likely increase. For the purposes of this analysis both a one-way and two-way street configuration were modelled for the Base Case to provide the range of costs and benefits associated under each option. The results of the different scenarios are summarized on pages 47-48.

There are a number of local bus services that operate along the corridor that are assumed to remain in-service under the Base Case scenario. These include route numbers 1, 5, 51, 52 and 55. These bus routes remained in service under the Option scenarios as well.

Options

Option 1 – Full BRT

This option includes an on-street exclusive BRT system running along a median within the existing road right of way from an eastern terminus at Eastgate Square to a western terminus on the McMaster University campus. In total, the alignment is approximately 14 kilometres in length and is proposed to be operational in 2015.

Unlike the current BRT system defined by the Base Case, the Full BRT will operate within an exclusive right-of-way. Specifically the Full BRT alignment proposed for this assessment is described as follows:

- **East Section** - turning from a segregated terminus adjacent to Eastgate Square the alignment travels westward in a median transitway via Queenston Road to the Main Street / Ottawa Street Intersection.
- **Downtown Section** - the alignment continues westward from the Main Street/Ottawa Street Intersection along a median of King Street East across John Street and James Street through downtown. [6] The alignment continues along King Street West across Highway 403 to Longwood Road South where it provides convenient access to Westdale Village and the McMaster Community. At Longwood Road South the alignment runs southbound to Main Street.
- **West Section** - From Longwood Road South the alignment transitions into the centre of Main Street and continues westward towards the McMaster University Medical Centre before turning north towards the terminus station on the McMaster University campus.

Since when decided →

At the present time, King Street and Main Street operate as one-way streets. Given the operational challenges and passenger inconvenience associated with operating a rapid transit line along a split corridor, it is assumed for the purpose of this comparative assessment that the BRT route would run on King Street utilizing existing rights-of-way. Under this scenario both Main Street and King Street would be converted to two-way streets for general purpose traffic. However, as a result of the reduced number of traffic lanes on both streets, traffic capacity on both streets would decrease. In addition to these traffic capacity constraints, there may also be

[6] During a more detailed project definition phase, consideration should be given to providing a more direct connection to the GO Transit station on Hunter Street in downtown Hamilton. This could be accomplished by rerouting the proposed King Street alignment via John Street, Hunter Street and James Street. This would add up to 4 minutes to the travel time.

physical limitations along specific sections of King Street, where the existing right-of-way is too narrow to enable two-way traffic operations alongside a two-way rapid transit service. The design and right-of-way requirements for the reoriented streets will be addressed during the more detailed project definition phase. However, for the purpose of this comparative analysis it is assumed that King Street can accommodate two-way traffic and a two-way BRT service. The Full BRT line includes 17 stations at the following proposed locations that are to be confirmed as part of a more detailed design exercise:

TABLE 1 OPTION 1 STOPS (BRT)

	Station Locations (East to West)	
East Section (Eastgate to Ottawa Street)	1. Eastgate Square 2. Nash Road 3. Parkdale Road	4. Queenston Traffic Circle 5. Kenilworth Avenue
Downtown (Ottawa street to Longwood Road South)	6. Ottawa Street 7. Gage Avenue 8. Sherman Avenue 9. Wentworth Street 10. First Place	11. Gore Park 12. Bay Street 13. Queen Street 14. Dundurn Road
West Section (Longwood Road South to University)	15. Westdale 16. Longwood Road/Main Street	17. McMaster University

The physical location and configuration of each station will vary depending upon the specific characteristics and constraints at each location.

The average speed of the BRT along the 14 kilometre alignment is assumed to be 25 kph. Assuming 17 stations with average dwell times of 20 seconds, the estimated travel time from end to end of the BRT line is approximately 34 minutes via Longwood Road South. The segregated operations combined with signal priority at major intersections will be required and will help minimize the potential delays to the BRT service. However, despite these measures, at-grade crossings at intersections may still result in service delays. The average speeds and travel times for each section are provided in the following table:

TABLE 2 OPTION 1 – BRT AVERAGE SPEED AND TRAVEL TIMES

	Distance	Average Speed	Station Spacing	Travel Time
East Section (Eastgate to Ottawa Street)	4.9 km	25 kph	≈900 m	12 min
Downtown (Ottawa Street to Longwood Road South)	7.2 km	25 kph	≈800 m	17 min
West Section (Longwood Road South to University)	2.1 km	25 kph	≈1,150 m	5 min
TOTAL ROUTE	**14.2 km**			**34 min**

For the purposes of this assessment, it is assumed that articulated buses are 18 metres in length and have a capacity of 90 passengers per vehicle. This is consistent with service planning guidelines elsewhere in the region and would provide a high-level service to the passengers. The service has been assumed to provide a 2.5 minute peak frequency, which would provide a peak design load of 2,200 passengers per hour per direction which is projected to be sufficient to meet the anticipated demand along the corridor.

The minimum operable frequency of a BRT service would be approximately 2 minutes based upon the priority and effect on intersection capacity. This would provide a peak capacity of 2,700 passengers per hour per direction and would require significant levels of priority at intersections that are beyond those envisioned for the Hamilton BRT.

TABLE 3 OPTION 1 – VEHICLE REQUIREMENTS AND CAPACITY

Headway	Number Vehicles	Capacity
5 minutes	18	1,100
4 minutes	23	1,350
3 minutes	30	1,800
2.5 minutes	36	2,200
2 minutes	45	2,700

Based upon the 2.5 minute headways planned for the BRT service, a total of 36 BRT vehicles would be required including spares. As this new BRT service represents a significant expansion and improvement over the current B-Line service, it is assumed that, in the long term with the expanding fleet of BRT and regular service buses, the additional BRT vehicles could not be accommodated at the existing bus maintenance and storage facilities. It is anticipated that there would likely be sufficient storage to accommodate the BRT fleet for the first few years of operation, however, as the bus fleet expands, Hamilton will be required to build additional storage facilities. Therefore, for the purpose of this assessment it is assumed that the introduction of the new BRT Line as proposed under this option would require a new or expanded bus storage and maintenance facility within approximately 10 years of opening or earlier.

Option 2 – Full LRT

This option includes an on-street segregated LRT system operating along the same alignment as described for Option 1. As with Option 1, the 17 station locations proposed for that BRT option are also assumed for this LRT option. Similarly, as proposed, the introduction of the LRT along the King Street corridor will be accompanied by the re-orientation of traffic operations on both King Street and Main Street such that both streets operate as two-way streets. LRT will operate along the median of the King Street corridor alongside two lanes of traffic. As discussed under Option 1, the design and right-of-way requirements for the reoriented streets will be addressed during the more detailed project definition phase. However, for the purpose of this comparative analysis it is assumed that King Street can accommodate two-way traffic and a two-way LRT service. The Full LRT Option is also planned to be in service in 2015. Main Street is also assumed to function as a two-way arterial road.

Similar to the Full BRT Option, the physical location and configuration of each LRT station will vary depending upon the specific characteristics and constraints at each station location.

The estimated travel time from end to end of the LRT line is 26 minutes via Longwood, assuming 17 stations, and an overall average speed of 34 kph with appropriate signal priorities and/or pre-emption. The average speeds and travel times for each section are provided in the following table:

TABLE 4 OPTION 2 – LRT AVERAGE SPEEDS AND TRAVEL TIMES

	Distance	Average Speed[7]	Station Spacing	Travel Time
East Section Eastgate to Ottawa Street	4.9 km	35 kph	≈900 m	9 min
Downtown Ottawa Street to Logwood Road South	7.2 km	33 kph	≈800 m	13 min
West Section Longwood Road South to University	2.1 km	35 kph	≈1,150 m	4 min
TOTAL ROUTE	**14.2 km**			**26 min**

For the purposes of this assessment, it is assumed that 30 metre LRT vehicles with a capacity of approximately 130 per vehicle are used providing a capacity of 1,950 as a one car train and 3,900 as a two car train. The service has been assumed to provide a peak 4 minute service frequency requiring 30 LRT vehicles. Operation of a route at as low as a 2 minute headway is achievable, but would require significant levels of priority at intersections and could result in an increased travel time with greater LRT delays at intersections. However, this level of LRT service is not envisioned as required and so the operational risk of such tight LRT headways is low.

As discussed in Section A, the introduction of an LRT service in Hamilton will require the construction of a new LRT operations and maintenance facility. While the precise location of such a facility will be studied as part of the more detailed project definition phase, it is assumed that the facility will be located close to the LRT corridor so as to minimize the costs to connect the facility with the mainline. As part of the detailed analysis, it is also assumed that operating costs and deadheading requirements, balanced by neighbourhood impacts, will be considered as part of the site selection process.

Option 3 – Phased LRT

Under this option the implementation of the eastern section of the full LRT alignment is delayed until such time that the capital investment required to expand LRT eastward is warranted to support and encourage complementary re-development activities along the corridor. In doing so, this option examines the implications of deferring some of the costs and benefits attributable to the full LRT to provide an opportunity for the eastern section of the corridor to mature to a point

[7] Travel speeds vary along the length of the corridor with operating conditions. The average speed in the downtown section is shown as 33 kph however travel speeds in the downtown core are assumed to be somewhat slower in the range of 25 kph.

where such an extension could generate greater benefits and re-development up-lift from the LRT investment. For the purpose of this assessment, the downtown and western sections are assumed to be in service in 2015 while the implementation of the eastern section is postponed until 2030.

The interim eastern terminus of the LRT line will be at the intersection of King Street East and Ottawa Street. This eastern terminus was chosen because of the established Business Improvement Area (BIA) for the area's textile and home décor district. As with Option 2, this option will ultimately include 17 station locations as shown in Table 1 above. Of these, 5 stations including Eastgate Square, Nash Road, Parkdale Road, Queenston Traffic Circle and Kenilworth, are deferred until 2030. Again, as with the other options, traffic operations on King Street and Main Street are assumed to operate as two-way streets with the LRT operating along the median of King Street alongside the vehicle traffic lanes.

Similar to the other options, the physical location and configuration of each station will vary depending upon the specific characteristics and constraints at each station location.

The estimated travel time from end to end of the first phase of the LRT line between McMaster University and the eastern terminus is 17 minutes assuming 10 stations, and an overall average speed of 33 kph and appropriate signal priorities. The average speeds and travel times for each section are provided in the following table:

TABLE 5 OPTION 3 – PHASED LRT AVERAGE SPEEDS AND TRAVEL TIMES

	Distance	Average Speed[8]	Station Spacing	Travel Time
East Section - BRT-Lite Eastgate to Ottawa Street	4.9 km	25 kph	≈980 m	12 min
Downtown Ottawa Street to Logwood Road South	7.2 km	33 kph	≈800 m	13 min
West Section Longwood Road South to University	2.1 km	35 kph	≈1,150 m	4 min
TOTAL ROUTE	**14.2 km**			**30[9] min**

Under this option, a passenger traveling between McMaster University and Eastgate Square will be required to transfer between the new LRT line and an improved BRT-lite service at Ottawa Street. Including the transfer time, the travel time from McMaster University to Eastgate Square

[8] See footnote 7

[9] A one minute transfer is assumed at Ottawa Street bringing the total time for the route to 30 minutes

is estimated to be approximately 30 minutes. The vehicle capacity and proposed operating frequencies for this first phase on the LRT line are assumed to be the same as proposed for the Full LRT scenario. Given the reduced length of the alignment however, the number of vehicles required to provide this level of service is lower than under Option 2.

With the phased introduction of LRT as proposed under this option, it is assumed that the existing B-Line service will continue to serve the Queenston Road corridor between the easternmost LRT station near Ottawa Street and Eastgate Square. It is expected that the current B-Line service will be extended beyond Eastgate Square to a future proposed transit hub at Fifty Road with connections to GO Transit and as such, Eastgate Square will no longer function as the terminus point. It is also assumed that the local buses currently connecting to the existing BRT-Lite service at Eastgate Square will be rerouted as appropriate to a new connection at the Ottawa Street LRT station. As a result of these changes, the level of service along the eastern segment of the ultimate B-Line LRT corridor is expected to improve relative to today's level as the number of new buses and interlined routes operating along the corridor will result in a dramatic increase in the frequency of bus service.

As with Option 2, Option 3 will require the construction of a new operations and maintenance facility. Although the location of this facility will be the subject of a more detailed study in the future, it is assumed that the facility will be near to the LRT corridor and will accommodate operational issues. Given the truncated LRT line proposed for this option, locations for the operations and maintenance facility are constrained to be within the reasonable limits of the line. Although the immediate fleet requirements under this option are less than that required under Option 2, the size of the facility is assumed to be the same as that envisioned for Option 2 in order accommodate the fleet expansion at some point in the future.

In 2030, the second phase of the B-Line LRT would be introduced to extend LRT eastward to Eastgate Square as described in Option 2. At that time the fleet would be expanded to 30 vehicles in order to continue to provide 4 minute headways along the extended route.

Summary of Options

The options to be examined are summarized in the table below.

TABLE 6 SUMMARY OF OPTIONS

	Option 1	Option 2	Option 3
Opening Year	2015	2015	2015/2030
Headway	2.5 min	4 min	4 min
Capacity (phpd)[10]	2200	1950/ 3900	1950 /3900
LRT Vehicles	n/a	30	20 /30
BRT Vehicles	36	n/a	n/a
Travel time (end-to-end)	34	26	30[11]

[10] Per Peak Hour Peak Direction capacities for LRT are shown for both one-car and two-car trains.

[11] Approximately 17 minute travel time from McMaster University to Ottawa Street on phase I LRT segment.

Part C Assessment

Evaluation Framework

The comparative analysis uses a Multiple Account Evaluation (MAE) methodology. The MAE is a framework that provides a systematic identification and analysis of broader implications and criteria of an option. It systematically compares the impacts on costs, users, environment, economy and community and shows the trade-offs among the often conflicting criteria.

The MAE framework includes a number of evaluation accounts that together address the most significant project performance and policy considerations for a specific project. The criteria and the accounts can be tailored for a project. The relevant accounts for the analysis of the Hamilton Rapid Transit project are:

- Transportation User Benefits
- Financial Impacts
- Environmental Impacts
- Economic Impacts
- Socio-Community Impacts

It is important to note that the options defined in this report have only been developed to a level of technical detail sufficient to enable a comparative analysis for the purpose of selecting a preferred option. Project scope, costs and service plans need to be developed in more detail for funding and implementation.

The assessment is done by comparing each option to the Base Case and identifying any incremental costs or benefits that are generated by each option. Hence, the results should not be interpreted as "total" values, but as the incremental impact compared to the Base Case.

The analysis is done over a 30-year period (2009-2038). Where possible the impacts are monetized and quantified. In order to compare the options on a "like-to-like" basis and to reflect time value of money the monetized values are discounted to today's value at a real discount rate of 5%. These values, and other input variables used in this analysis are shown in Appendix A.

Transportation User Benefits

This account considers the incremental benefits to the transportation users as a result of the investment in the Hamilton Rapid Transit project. The monetized benefits are measured in travel time savings for both transit users and road users; automobile operating cost savings achieved by

individuals as their trip times or overall automobile usage declines; and reduction in accidents as a result of declining automobile usage.

In addition to the monetized benefits, there are qualitative user impacts which may include passenger comfort, accessibility and reliability. In most instances they are captured in the ridership and travel time savings, but in some instances they can be isolated and identified separately if significantly different among the options.

All transportation user benefits described below are incremental to the Base Case.

Travel Time Savings

Travel time savings are included for both transit and non-transit users. With the improvement of transit services along the Main Street / King Street corridor in Hamilton, the analysis shows that the investment will generate significant time savings for existing transit users (those that currently travel on buses), new transit users and auto users. The value of time is estimated at an average of $13 per hour[12] and is expected to grow, in real terms, by 1.6% per year over the period.

The present value of travel time savings for both transit and auto users over the evaluation period (2009-2038) is largest for Option 2 and estimated at $647 million and approximately 15 percent greater than the travel time savings generated by Option 3 at $553 million. Option 1, the Full BRT option, generated the lowest travel time savings of the three options resulting in a present value savings of $269 million.

Under all three options, the majority of the benefits result from the travel time savings which reflect the proposed operating speeds and consequent competitive travel times offered by transit. The higher transportation benefits for Option 2, for example, are a combination of higher transit ridership resulting from the relatively competitive travel times and the continuity of the LRT line along the entire corridor, as well as greater automobile user time savings resulting from reduced congestion along the realigned Main Street / King Street corridor. These travel time benefits however are dependent upon the ability of the new rapid transit system to achieve the proposed operating speeds which in turn is dependent upon the implementation of the necessary transit priorities.

Option 3 has the second highest transit user benefits of the three options with higher transit and automobile user savings than Option 1. The higher transit user benefits are associated with the faster travel times for the LRT versus the BRT. Option 1 has the lowest travel time savings of the three options.

[12] See Appendix A for details.

Automobile Operating Cost Savings

Automobile operating costs savings are derived from a reduction in auto kilometres as a result of the transit investment. The analysis shows that the Hamilton Rapid Transit project will result in reduced auto usage and that the degree of the decline is related to the rapid transit technology. It is estimated that the reduction in auto kilometres by 2021 ranges from a low of close to 5 million vehicle kilometres for Option 1 to more than 17 million kilometres for Option 2. By 2031, the annual reduction in auto use grows to more that 7.5 million kilometres for Option 1 and more than 42 million kilometres annually for both Options 2 and 3, which are the same by that date.

Translating these savings into monetary terms, the present value of the automobile operating cost savings over the period are $40 million, $187 million and $178 million for Options 1, 2 and 3 respectively. The estimates for all options are shown in Table 7.

The automobile operating cost savings are greatest for the LRT options reflecting the ability for LRT to draw a greater number of auto users to transit than BRT for at least a portion of their journey or an occasional trip.

Safety Benefits

The reduction in collisions is based on fewer vehicle kilometres driven. The monetary savings resulting from a reduction in collisions is calculated based on an assumed value of 7 cents per kilometre in reduced road travel (see Appendix A). The present value of safety benefits over the period ranges between $4 million for Option 1 up to $18 million for Option 2. The estimates for all options are shown in Table 7.

Qualitative Transportation Benefits

The major differences among the Hamilton Rapid Transit options from a user's perspective are travel time, reliability, need for transfer and passenger comfort. Travel time and transfer requirements are largely captured in the travel time savings estimates. Therefore, from a user's perspective, the options are differentiated by the degree to which service and schedule reliability are achieved and by passenger comfort.

Under all three of the Hamilton Rapid Transit options, the operating assumptions include significant signal priority / pre-emption at intersections along the corridor. Despite these priority measures, the at-grade alignments proposed for both BRT and LRT will create challenges for both technologies. While transit only lanes will enhance the reliability of all three options, both technologies will likely experience some variability in travel time depending on traffic congestion and cross-traffic at intersections as well as accidents.

The comparatively strong benefits generated by LRT are in large part driven by the higher average travel speeds, and consequently lower travel times, relative to BRT. For the purpose of this comparative assessment, average speeds for LRT were assumed to be between 33 and 35 kph

as compared to 25 kph for BRT. While these average speeds are achievable, as demonstrated in other jurisdictions, the LRT will likely require signal pre-emption along much of the corridor as opposed to the less specific signal priority in order to ensure that these average speeds can be maintained. As indicated earlier, the majority of the benefits are related to travel time savings which in turn is related to the operating speeds and travel time.

The regional ridership model does not capture the difference in reliability among modes. While empirical evidence suggests that transit users put a high value on reliability, to the extent that all three options are subject to similar reliability constraints, none of the Hamilton Rapid Transit options will provide a significant reliability benefit relative to one another. However, to the extent that BRT will have more flexibility versus LRT to divert from its alignment in the event of a significant congestion delay, BRT may be considered to have a very slight advantage. On the other hand, the proposed 2.5 minute headway for the BRT as compared to 4 minutes for LRT options may present operational challenges as the short headway required to deliver the required capacity limits the operational flexibility for the BRT.

Options 1 and 2 both serve the entire rapid transit corridor as described for the purpose of this analysis. The phased LRT alignment proposed for Option 3 will force a transfer for passengers travelling along the eastern segment of the corridor in the short and medium term. Therefore Options 1 and 2 are more desirable from a user's perspective. In addition to the convenience of not having to transfer, the LRT is also likely to be perceived as a more comfortable technology. Option 2 therefore is likely to be the most preferred from a transit user's perspective.

Summary

Table 7 summarizes the incremental transportation user benefits associated with the Hamilton Rapid Transit project.

TABLE 7 INCREMENTAL TRANSPORTATION USER BENEFITS

All Values in NPV $m	Option 1	Option 2	Option 3
Travel Time Savings	269	647	553
Automobile Cost Savings	40	187	178
Accident / Collision Reductions	4	18	17
Transportation User Benefits	**313**	**852**	**748**

Financial Account

This account includes the assessment of the direct incremental "cash" items, primarily costs and revenues from the owner's perspective, for each option over the assessment period. Costs include the incremental capital and operating costs incurred by each option compared to the Base Case. Incremental revenues may also include fare revenues, advertising, and proceeds from disposal of assets. Any savings resulting from the implementation of the options are also included in this account.

Ridership and Revenues

Annual ridership and fare revenues have been projected using Greater Golden Horseshoe Travel Forecasting Model[13]. The ridership estimates indicate that Option 2 generates the highest demand with an AM peak hour demand of 1946 passengers in 2021 in the westbound direction. Option 1 generates the second highest ridership at 1560 passengers while Option 3 carried an estimated 1496 passengers during the AM peak hour. These passenger flows increase to almost 2100 passengers by 2031 (for Options 2 and 3) while Option 1 shows over 1700 passengers.

Based on these ridership estimates, the analysis shows that in 2021 (from a system-wide perspective) Option 2 would generate incremental annual fare revenues of close to $600,000 million versus $200,000 and $100,000 for Options 1 and 3 respectively. In net present value terms over the period of the analysis, incremental revenues are $5.7 million, $15.6 million and $12.5 million for Options 1, 2 and 3 respectively.

[13] This model has been used for the development of the Regional Transportation Plan (RTP) and ensures consistency with that work. The model is strategic in nature and the effect of small projects can be minimal. However the main purpose of the benefits case work is of a comparative nature and we consider the model adequate for this purpose.

Capital and Operating Costs

The capital costs include all costs associated with the construction and acquisition of the infrastructure, revenue collection, vehicles, and maintenance centre. The estimates also include, design, management & administration, insurance, environmental permitting, property, and contingencies. Costs also include a preliminary estimate to make the King Street/Highway 403 bridge crossing compatible with LRT. Interest during construction is not included.

The construction period is assumed to be the same for all three options with start in 2011 and completion by 2014 for opening of service in 2015. Predictably, Option 1 has the lowest capital cost of the three options with an estimated cost of $218 million. The full LRT proposed under Option 2 is estimated to cost $829 million while the estimated capital cost for the truncated LRT alignment, as proposed under Option 3, is $605 million for the initial phase with the balance of $223 million being deferred until 2030.

Table 8 shows the capital costs and operating costs for each option. All values are expressed in 2008 dollars.

TABLE 8 CAPITAL AND OPERATING COSTS

All Values in 2008 $m	Option 1	Option 2	Option 3
Capital Costs	218	829	605
Annual incremental operating costs 2031	4.8	12.5	12.5

The operating costs used for this comparative assessment are considered conservative as they do not take into account any potential bus operating cost savings that may be realized with the introduction of the new rapid transit line. Savings could be anticipated from replacing the current BRT-Lite service with the new service as well as from other potential operating efficiencies that could be achieved by removing or rerouting buses to leverage the new rapid transit line. Furthermore, the operating costs used for this assessment are based on experience in other jurisdictions[14]. If operating costs in Hamilton could be reduced relative to these other jurisdictions, the on-going cost of the new rapid transit service would decrease.

[14] LRT operating costs based on TTC operating costs and BRT costs from York Region.

Summary

Table 9 shows the capital costs, operating costs and incremental fare revenues expressed in present value for the period 2009-2038.

A comparison of capital costs in present value terms shows that Option 2 has the highest cost of $655 million followed by the truncated LRT option, Option 3, with a cost of $563 million expressed in present value terms. Option 1, the full BRT option, has lowest present value cost estimated at $171 million.

Over the period of the analysis, none of the options generate sufficient incremental fare revenues to cover the incremental operating costs associated with the introduction of the new rapid transit line. However, as indicated earlier, the operating costs used in this comparative analysis are considered to be conservative. Furthermore, the relatively low incremental fare revenues likely indicate that much of the travel times savings described earlier are associated with improved travel times for existing riders which does not contribute to additional fare revenue for the operator.

TABLE 9 INCREMENTAL COSTS AND REVENUES

All Values in NPV $m	Option 1	Option 2	Option 3
Capital Costs	171	655	563
Operating Costs	49	129	92
Total Incremental Costs	**220**	**784**	**655**
Incremental Fare Revenues	5.7	15.6	12.5

Comparing Benefits and Costs

Table 10 compares the results from the Transportation User Benefits and Financial accounts. As illustrated in the table, all of the proposed rapid transit options generate positive net benefits resulting in a benefit cost-ratio that is greater than 1. Option 1 is the lowest cost option and generates the highest benefit-cost ratio of 1.4. Both LRT options are more costly than the BRT option but also generate greater benefits than the BRT option. The benefit-cost ratio for Options 2 and 3 are 1.1.

TABLE 10 COMPARISON BENEFITS AND COSTS

All Values in NPV $m	Option 1	Option 2	Option 3
Transportation User Benefits	313	852	748
Incremental Costs	(220)	(784)	(655)
Net Benefit (Cost)	**93**	**69**	**93**
Benefit-Cost Ratio	1.4	1.1	1.1

Environmental Impacts

This account examines the environmental impacts of the Hamilton Rapid Transit options. The major environmental impact with respect to urban transit projects is the ability of the project to reduce greenhouse gas emissions from reduced automobile usage.

Greenhouse Gas Emissions

As mentioned in the Transportation User Benefits section, all three options lead to an annual decline in automobile usage. By 2021, it is estimated that the number of kilometres travelled by automobile will decline by almost 4.8 million kilometres annually under Option 1. The annual reduction anticipated under Options 2 and 3 are approximately 17 million and 15 million kilometres respectively in 2021. As shown in Table 11, this translates into an annual reduction of CO_2 emissions of approximately 970 tonnes, 3,450 tonnes and 3,000 tonnes in 2021 respectively for Options 1, 2 and 3. These annual reductions increase by 2031 to more than 1,470 tonnes for Option 1 and more than 8,500 tonnes for Options 2 and 3.

The present value of the reduction in CO_2 emissions over the period 2009-2038, based on an average value of $0.01 per kilometre (see Appendix A), is estimated at $0.6 million for Option 1, $2.6 million for Option 2 and $2.5 million for Option 3. The value of a tonne of CO_2 is currently a subject of debate. These figures, regardless of the value assigned per tonne of CO_2, are still very useful for comparison purposes among the options.

TABLE 11 REDUCTION IN CO_2 EMISSIONS

	Option 1	Option 2	Option 3
2021 Reduction in CO_2 tonnes	970	3,449	3,003
2031 Reduction in CO_2 tonnes	1,471	8,532	8,532
NPV Value ($ m)	0.6	2.6	2.5

Economic Development Impacts

This account measures the economic impacts for each scenario relative to the Base Case, including impacts from construction and economic impacts incurred from implementation of project options. These impacts are reported in terms of GDP, the change in jobs and the change in the associated labour income, and are stated in 2008 dollars. Results reflect how the implementation of the Hamilton Rapid Transit Project will directly affect both households and businesses in the regional economy, and total provincial economic impacts that are derived by applying Ontario specific multipliers to derive indirect affect of employment, wages and GDP generated by the direct impacts of construction and improvements to the transportation network.

This account also includes an assessment of the incremental impacts the options will have on land values and development in the corridor.

Temporary Economic Impacts During Construction

The implementation of the Hamilton Rapid Transit Project will generate both direct and indirect economic benefits that are temporary in nature and span the schedule of construction. As shown in Table 12, the construction is estimated to create between 990 and 3,729 person-years of employment and between 847 and 2,064 person-years of employment indirectly as a result of increased economic activity for suppliers[15]. The impact on employment, wages and GDP is driven by the capital cost required to build each option. Option 2, which has the highest capital cost of the three options, also has the largest employment and income impacts.

[15] Based on Province of Ontario Multipliers, 2004.

TABLE 12 EMPLOYMENT AND INCOME IMPACTS DURING CONSTRUCTION

	Direct Impacts			Regional (Indirect) Impacts		
	Employment (person years)	Wages ($m)	GDP ($m)	Employment (person years)	Wages ($m)	GDP ($m)
Option 1	990	34.4	83.3	847	19.0	46.1
Option 2	3,729	129.6	313.8	2,064	71.7	173.7
Option 3	2,773	96.4	233.4	1,535	53.3	129.1

Long-term Economic Impacts

In the long-term there will be ongoing economic benefits as a result of the Hamilton Rapid Transit Project. These benefits reflect both households' freed up vehicle operating expenditures and transportation cost savings to area businesses. The former effect is simply a redirected consumption demand by households away from purchases of gas, parking, automotive parts and services and into other consumer goods/services.

The latter reflects improved regional competitiveness for Hamilton businesses that now have lower costs of doing business, including access to a larger labour market and encountering less congestion on roadways because people are choosing to use the transit system instead of driving. The impact of the Hamilton Rapid Transit project will be different for each business.

Implementation of the Hamilton Rapid Transit project will also generate social benefits that can be monetized, including valuing time savings and emission benefits. These have already been captured above under transportation user benefits.

As shown in Table 13, the Hamilton Rapid Transit project is also expected to have an on-going and positive impact on jobs, wages and the GDP once it is in operation. The impacts for each option are driven by transit and auto travel time savings provided by each option. Option 2 has the greatest employment and income impact with an estimated 81 direct jobs and 35 indirect jobs created in 2021. By 2031 the operating scenarios for Options 2 and 3 are similar with the eastward extension of the LRT line proposed under Option 3 in place. Therefore the impacts are the same for both options with 132 direct and 35 indirect jobs being created.

TABLE 13 EMPLOYMENT AND INCOME IMPACTS

	Direct Annual Impacts			Indirect Annual Impacts		
	Employm. (Jobs)	Wages ($m)	GDP ($m)	Employm. (Jobs)	Wages ($m)	GDP ($m)
2021						
Option 1	32	1.1	2.7	14	0.5	1.2
Option 2	81	2.8	6.9	35	1.2	2.9
Option 3	61	2.1	5.1	25	0.9	2.2
2031						
Option 1	34	1.2	2.9	14	0.5	1.2
Option 2	132	4.6	11.2	55	1.9	4.6
Option 3	132	4.6	11.2	55	1.9	4.6

Land Value Changes

There is evidence from a number of different jurisdictions around the world that investment in rapid transit can have a positive impact on property values in the general area of a new rapid transit line and particularly within close proximity to station areas.[16] This evidence also suggests that the specific rapid transit technology is also a determining factor in the degree to which property values may be influenced. For example, a more permanent, rail-based, higher capacity technology such as LRT will typically capture a larger area of property within their area of influence than lower capacity bus-based transit facilities. As shown in Table 14, the catchment area around at-grade LRT is typically 500 metres as compared to the slightly smaller catchment area around a BRT station estimated to be 400 metres.

As indicated in the table, the introduction of rapid transit will provide a modest lift in percentage terms to land values within the applicable area of station impact. Based upon the ranges shown, BRT has significant modest influence on vacant residential properties within the station catchment areas with an estimated property price premium of between 1 and 7 percent versus a

[16] The estimates are based on a 2002 comprehensive review of land value and public transport literature that references approximately 150 studies. The studies show that the premium placed on property values fluctuates widely for different transit projects with the same technology. The estimates included above represent the mid-range of the premiums found in the reference material.

range of between 4 and 6 percent for LRT. With respect to the potential impacts on commercial property, BRT provides a potential lift of between 2 and 6 percent, significantly lower than the potential uplift to vacant commercial properties within the station catchment area for LRTestimated to be within 8 to 14 percent.

TABLE 14 PROPERTY VALUE UPLIFT FACTORS

Technology		BRT	LRT
Station Impact Area (m)		400	500
Premium %			
Vacant Residential	Low	1	4
	High	7	6
[illegible]	Low	2	8
	High	6	14
Residential	Low	1	2
	High	2	4
Commercial	Low	2	2
	High	4	4
Industrial	Low	0	0
	High	0	0
Institutional	Low	0	0
	High	0	0

While it is possible for property values within the catchment area of new rapid transit lines to experience much greater increases than those shown in the table, it is not necessarily possible to directly attribute the increase to any one factor. For example, in addition to the introduction of rapid transit, local planning policies, density and land-use intensification objectives, and other zoning changes will also influence property values and are important to the overall success of the rapid transit project.

The ranges presented in the table represent only the estimated property value uplift that can be specifically attributed to the introduction of a new rapid transit line based upon experiences elsewhere. Hence do not take into account the potential property value uplift that may arise from the City of Hamilton's current support for a mix of higher density uses along arterial roads, including retail, residential, employment, entertainment and institutional uses. It is arguable that the introduction of a new rapid transit line along the Main Street-King Street corridor will better enable the planned density resulting in greater property values. However, for the purpose of this comparative assessment, this potential benefit has not been specifically included. Nonetheless, an investment in rapid transit, made in conjunction with supportive planning and other initiatives, is a key component to the realization of land use intensification plans and property value uplift.

For the purpose of this analysis, land value uplift in the mid-ranges of those shown in the table is used for existing residential and commercial uses. For vacant lands under residential and commercial uses it is estimated that higher uplift may be potentially possible.

For the purpose of land value estimation, an analysis of the Hamilton Official Plan (OP) was undertaken to determine the breakdown of land use by high-level type within each of the three segments of the corridor; namely, the eastern, downtown and western segments. The uplift in property value under each option was determined based on the total assessment of lands within the station catchment area and the estimated increase in values based on experiences in other jurisdictions. The value estimates for each option are as follows:

Option 1

Based upon a station catchment area of 400 metres, it is estimated that the implementation of BRT will result in an average uplift of between *1.2% and 2.3%.* It is estimated that the potential uplift in assessment value as a result of this BRT option could result in *approximately $38 million to $77 million.*

Option 2

Based upon a station impact area of 500 metres, the full LRT option will create a larger overall impact area than the BRT option and therefore implies that more land value uplift benefits will accrue to the project. Within the area impacted under this option, the average uplift is between *1.5% and 3.2%* It is estimated that the potential uplift in assessment value as a result of this Option may result in between *$50 million to $144 million.*

Option 3

Option 3 defers the opening of five of the 17 stations until 2030. Within the area impacted for the stations to be implemented as part of the first phase of this LRT proposal, the average uplift is estimated in the range of *1.1% and 3.2%.* It is estimated that the potential uplift in assessment value as a result of this Option may result in *almost $38 million to $106 million.*

Although the number of stations is reduced in Option 3 as compared to Options 1 and 2, the impact area for LRT is expected to be larger than that for BRT hence offering an increased uplift as compared to Option 1. However, when compared to Option 2, the smaller number of stations and hence lower total impact area is estimated and result in less land/property being subject to uplift effect. Overall, the average uplift in Option 2 is estimated to be the highest among the options primarily due to a larger area of the uplift impact and a higher percentage uplift factors using LRT. Although the station impact area is 500 metres for both Option 2 and 3, the lower number of stations contemplated for the first phase of Option 3 is expected to result in a smaller impact area and hence a lower potential uplift as compared to Option 2.

Summary

Table 15 summarizes the economic development impacts including direct and indirect impacts along with the land value uplift for each option.

TABLE 15 ECONOMIC DEVELOPMENT IMPACTS

	Option 1	Option 2	Option 3
Total Impacts During Construction Period:			
Employment (Person-years)	1,837	5,793	4,308
GDP ($m)	129.4	487.5	362.5
Income ($m)	53.4	201.3	149.7
Impacts in 2031[17]:			
Employment (jobs)	48	187	187
GDP ($m)	4.1	15.8	15.8
Income ($m)	1.7	6.5	6.5
Land Value Increase ($m)			
Low Estimate	38	50	38
High Estimate	77	144	106

Social Community Impacts

This account examines each option from the community perspective with specific consideration given to the ability of each option to enhance the quality of life within a local community. This may result from land use changes or developments that can occur in response to the introduction of a new rapid transit line, as well as the improvements brought about by the enhanced accessibility, both locally and regionally, offered by the new transit alternative. This account also considers the ability of each option to positively affect the overall health of the local community and its residents through reduced auto congestion on local streets as well as the ability of transit to support a more balanced lifestyle for local residents and enhance personal safety. Visual impacts and noise are also assessed as part of this account.

Land Use Shaping

Experience in other jurisdictions demonstrates that when combined with complementary local planning initiatives the implementation of transit can positively support and influence development, particularly around rapid transit stations, and promotes more compact, mixed use

[17] Option 2 extended to replicate Option 3 in 2031 and therefore options are effectively the same

communities. The type and magnitude of the development is dependent upon a number of factors including the general nature of the transit corridor and the surrounding neighbourhoods.

As shown in the land value uplift section above, the Main Street / King Street corridor in Hamilton is a well establish corridor within the city consisting of a mix of residential, commercial, retail, industrial, recreational (parks) and institutional uses. Densities also vary along the corridor with more concentrated development occurring closer to the city centre and within the downtown section of the proposed rapid transit alignment.

For the purpose of this analysis, it is assumed that, consistent with the land value uplift estimates presented earlier in this report, all three transit options are capable of promoting land use changes to support the local planning initiatives and changes to the local zoning. While it is difficult to quantify, it is generally accepted that investments in rail rapid transit initiatives are more likely to attract complementary land development investments compared to bus-based transit initiatives, provided that the transit investment is undertaken in concert with other complementary planning initiatives. With this in mind, the investment associated with the fixed rail infrastructure proposed under Options 2 and 3 is more likely to result in the redevelopment of the corridor and therefore achieve the city's objective to revitalize the city's core and create a more densely developed, less car-dependent urban environment.

Road Network

As proposed, the new rapid transit line will impact the local road network in two significant ways. Firstly, based on the average transit speeds proposed for the corridor, particularly LRT which is proposed to operate at an average speed of between 33 and 35 kph, a significant level of signal pre-emption will be required to support the transit operation. Depending on the extent of signal pre-emption required, there is the potential to negatively impact north-south traffic at intersections where they are likely to experience longer delays while priority is given to the east-west traffic. While the average travel speeds are lower for BRT than LRT, the frequency of the BRT service along the corridor will also require some signal priority / pre-emption which would also negatively affect north-south traffic.

The proposal to implement rapid transit along the Main Street / King Street corridor is also based on the assumption that the City of Hamilton will convert the current one-way operation of King Street and Main Street through the downtown segment with two-way traffic. The implications of this two-way conversion are included in the sensitivity analysis section; conversion is considered a positive move from a city-building perspective that will create a more pedestrian and transit-friendly environment.

Construction

All three options will involve a certain degree of disruption to traffic, neighbouring commercial, retail and residential properties during construction as King Street is realigned to accommodate a

dedicated two-lane rapid transit right-of-way. While the specific construction impacts associated with the implementation of each option cannot be determined until the project is defined in more detail, it is assumed that the LRT construction will be more disruptive than the BRT option. Given that the length of the alignment proposed for Option 2 is greater than initial alignment proposed under Option 3, it is assumed that the construction impacts for Option 2 will be greater. However, under the current proposal, the alignment defined as Option 3 is to be extended eastward in 2030 to a terminal station at Eastgate Square. Therefore, the disruption required to construct Option 3 is similar to that anticipated under Option 2 but is split into two construction phases. Under any scenario, it is also assumed that careful planning and appropriate construction methods will mitigate some of this potential disruption.

Sensitivity Analysis

Direct Connection to Hunter Street GO Station

A sensitivity analysis was conducted as part of this comparative analysis to determine whether a deviation of the LRT alignment proposed under Option 2 to create a direct connection with the Hunter Street GO Transit Station would provide greater transportation benefits than the King Street alignment through the downtown area.

The results show that providing a direct connection to the Hunter Street GO Transit Station would generate slightly higher peak point ridership but that the increased travel time associated with this deviation would result in fewer transportation user benefits as compared to the more direct King Street alignment. Specifically, the GO Transit deviation results in substantially lower travel time savings of only $367 million. This represents a decline of $280 million from the travel time savings estimated for the King Street alignment. Similarly, as shown in Table 16 below, the deviation also results in a lower automobile operating cost savings and safety benefit. Given these findings, an alignment that deviates from King Street to more directly serve the Hunter Street GO Station is less preferred.

Notwithstanding this result, it is likely that the importance of a convenient transit connection to the GO rail network will increase over time as the GO service continues to be enhanced and bi-directional travel within the region increases. Additional work that would improve the connectivity of the GO rail network and the Hamilton Rapid Transit project therefore should be undertaken as it will likely be beneficial to the regional transit network, the community of Hamilton, and the broader region.

TABLE 16 DETOUR EFFECTS OF DIRECT CONNECTION TO HAMILTON HUNTER STREET STATION

All Values PV $m	Option 2	Option 2a	Difference
Travel Time Savings	647	367	-280
Automobile Operating Cost Savings	187	156	-31
Safety Benefits	18	5	-3
Total Transportation User Benefits	**852**	**538**	**-314**

One-Way Base Case

For the purpose of the comparative analysis presented in this report it was assumed that Main Street and King Street in downtown Hamilton were converted from one-way to two-way streets prior to the implementation of the proposed rapid transit system. As a consequence, the results presented in this report only reflect the incremental transportation benefits generated by the introduction of the new rapid transit line into the two-way street environment. The results do not capture any transportation benefits that may have resulted from the two-way conversion itself.

To better understand the potential implication of the two-way conversion, a sensitivity analysis was undertaken as part of the comparative assessment to measure the transportation benefits associated with the combined two-way conversion along with the introduction of a new rapid transit line.

As shown in Table 17, this comparison of the changes to traffic and transit ridership relative to the current conditions reveals significantly higher transportation benefits than those estimated assuming the two-way streets were in place in the Base Case. Under the two-way street system, existing traffic patterns change significantly as the current one-way streets tend to encourage longer cross-town trips while the two-way streets tend to support short trips. The lower incremental benefits associated with the introduction of transit under the two-way configuration indicates that there are likely transportation benefits to be gained from the two-way conversion itself. The introduction of a time-competitive rapid transit system following the conversion to two-way streets provides additional incremental benefits.

TABLE 17 TWO-WAY VERSUS ONE-WAY STREETS

All values in NPV $m	Travel Time Savings	Auto Operating Cost Savings	Safety Benefits	Total Transportation Benefits
		Option 1		
2-way Base	269	40	4	313
1-way Base	315	361	34	710
Difference	**(46)**	**(321)**	**(30)**	**(397)**
		Option 2		
2-way Base	647	187	18	852
1-way Base	828	500	48	1,376
Difference	**(181)**	**(313)**	**(30)**	**(524)**
		Option 3		
2-way Base	553	178	17	748
1-way Base	703	482	46	1,057
Difference	**(150)**	**(304)**	**(29)**	**(309)**

Discount Rate

Since the analysis is based on discounted cash flow and subject to changes as the discount rate changes, the robustness of the ranking of the options with respect to the benefit-cost ratio was tested under two alternative discount rates - 3% and 7%. As shown in Table 18, with a discount rate of 3%, all three options continue to provide a positive net present value and benefit-cost ratios greater than 1.0. The ranking is also unaltered by the lower discount rate as the timing of the cash flow is assumed to be the same among the options. When subjected to a higher discount rate of 7% however the relative ranking remains unchanged but the net benefits of Options 2 and 3 become negative with benefit-cost ratios of 0.9. The benefit-cost ratio for Option 1 drops to 1.2 for the 7% discount rate scenario with net benefits remaining positive but declining to $38 million.

TABLE 18 DISCOUNT RATE SENSITIVITY ANALYSIS

Discount Rate	3%		5%		7%	
	NPV ($m)	BCR	NPV ($m)	BCR	NPV ($m)	BCR
Option 1	181	1.7	93	1.4	38	1.2
Option 2	338	1.4	69	1.1	(91)	0.9
Option 3	325	1.4	93	1.1	(44)	0.9

Summary of Results

The analysis of the Hamilton rapid transit options reveals that the highest cost option (the full LRT along the Main Street-King Street corridor), with estimated capital and operating costs of $784 million in net present value terms, also generates the highest Transportation User Benefits. These are estimated at more than $850 million resulting in a benefit-cost ratio of 1.1. By comparison, Option 1 (the full BRT option), generates an estimated $313 million in Transportation User Benefits less than one-half of that generated by of Option 2. However the estimated cost of $220 million for Option 1 in net present value terms is also much lower than either LRT option, resulting in a strong benefit-cost ratio of 1.4. By deferring a portion of the capital investment, the net present value of Option 3 is reduced by almost $130 million from the cost of the full LRT option. The Transportation User Benefits of this option are also lower than the full LRT option resulting in the same benefit-cost ratio (1.1).

For each option, the majority of benefits are derived from the travel time savings thus highlighting the importance of the operating speed of the rapid transit system to the success of the project. Given the supportive transit signal priority/pre-emption measures proposed under each of the options, the City of Hamilton has an opportunity to establish a new performance standard for the region to fully realize the benefits from the rapid transit investment.

None of the options generate sufficient incremental fare revenues to cover the incremental operating cost associated with the introduction of the new rapid transit line. The greatest incremental fare revenues are generated by Option 2 which is also the most costly to operate on an annual basis. However, the operating costs used in this comparative analysis are considered to be conservative and estimated at the higher end of the range. Lowering these costs would result in better revenue to cost ratios for all three options. The relatively low incremental fare revenues however indicate that much of the travel time savings are associated with improved travel times for existing riders, which does not contribute to additional fare revenue for the operator.

All of the options are somewhat effective in attracting people out of their cars and reducing automobile usage. Option 2, which has the largest effect, will result in a reduction of greenhouse gas emissions by approximately 3,449 tonnes annually by 2021 increasing to 8,532 tonnes by 2031. In net present value terms, this equates to $2.6 million for Option 2 compared to $0.6 million and 2.5 million for Options 1 and 3 respectively.

As expected the options with the highest capital costs generated the most significant economic development effects. Option 2, which has the highest capital cost will have the largest impact on employment, income and GDP during construction and is estimated to generate approximately 5,793 person-years of employment[18]. Option 3 defers some of the capital and on-going operating costs but still generates relatively strong employment, income and construction GDP effects. By contrast, the lower cost BRT option produces the lowest overall economic development and employment benefits during construction as well as during the on-going operations.

All of the options support the City of Hamilton's land use and economic development objectives to revitalize the corridor by enhancing and supporting complementary planning and densification initiatives. LRT demonstrates a greater ability to attract investment and redevelopment than the BRT alternative and consequently provides higher property value uplift. At the upper end of the range of estimated uplift, Option 2 produces double the uplift of Option 1 at $144 million versus $77 million. At the lower end of the range, the difference is less dramatic with Option 1 producing an estimated $38 million in property value uplift versus $50 million for Option 2. Option 3 by comparison defers the implementation of a portion of the line and postpones potential development opportunities in the vicinity of up to five of the proposed LRT stations. As a consequence the potential uplift is constrained and is estimated to be in the range of between $38 million and $106 million.

Overall, the results indicate that an investment in LRT in Hamilton will generate significant benefits and support the City's broader objectives to revitalize, redevelop and reshape its most significant east-west corridor. While the lowest cost option, Option 1, produces the highest benefit-cost ratio of 1.4, both LRT options generated benefit-cost ratios that are greater than 1.0. The highest cost option, Option 2, also produced the greatest benefits in all accounts, all of which make an important contribution towards achieving the objectives and goals of both the City and the Province.

Finally, the results of the comparative analysis presented in this report are based on the assumption that the current one-way street system through the downtown core is converted to a two-way traffic system where both Main Street and King Street are converted to two-way streets. In the absence of this conversion, the incremental benefits generated by the introduction of a rapid transit are greater than those presented in this report, reflecting the different trip

[18] Includes both direct and indirect impacts.

characteristics under each scenario. The one-way system typically supports longer cross town trips rather than the shorter trips encouraged by the two-way streets. As a consequence, the travel time savings resulting from the introduction of rapid transit under a two-way street scenario are less significant than under a one-way scenario as individual trip patterns already reflect the shorter trip distances. However, as the results show, the introduction of rapid transit under the two-way scenario does present positive travel savings as rapid transit is able to offer faster and more competitive travel times for the shorter trips. Furthermore, the two-way street system is more supportive of the City's objective to create a healthy, more pedestrian-friendly downtown.

In addition to the merits of the two-way conversion, the ability of the rapid transit system to compete with the auto and generate strong travel time benefits is directly related to the operating speed of the rapid transit system. For each option assessed in this study, the majority of the benefits are derived from the travel time savings. If the City of Hamilton provides the supportive transit signal priority/pre-emption measures proposed under each of the options, the results indicate that the city can leverage the benefits from a rapid transit investment while establishing a new performance standard for rapid transit in the region.

The table below summarizes the results from the MAE.

TABLE 19 MAE SUMMARY

	Option 1	Option 2	Option 3
Transportation User Account			
Transportation User Benefits (PV $m)	313	**852**	748
Qualitative User Benefits	✓	✓✓✓	✓✓
Financial Account			
Costs (PV $m)	**(220)**	(784)	(655)
Benefits Less Costs (PV $m)	93	**69**	93
Benefit-Cost Ratio	**1.4**	1.1	1.1
Environmental Account			
GHG Emissions (PV $m)	0.6	**2.6**	2.5
Economic Development Account			
Economic Impacts During Construction			
Employment (person-years)	1,837	5,793	4,308
GDP ($m)	129.4	487.5	362.5
Income ($m)	53.4	201.3	149.7
Long-term Economic Impacts			
Employment (person-years)	48	187	187
GDP ($m)	4.1	15.8	15.8
Income ($m)	1.7	6.5	6.5
Development Potential ($m)	38 - 77	50 - 144	38 - 106
Social Community Account			
Land Use Shaping	✓	✓✓✓	✓✓
Road Network	✓✓✓	✓	✓✓
Construction Implications	✓✓✓	✓✓	✓

APPENDIX

A

INPUT VARIABLES AND ASSUMPTIONS

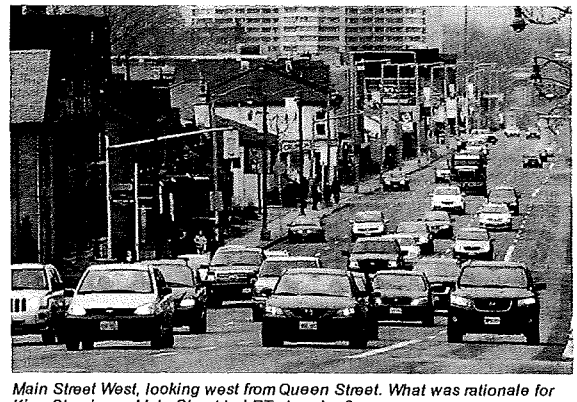
Factor	Value	Source
Discount Rate Sensitivity Analysis	5% (real terms) 3% and 7%	Province of Ontario
Value of Time Business Other Weighted Average	 $35.16 (2008$) $10.82 $13.02	Transport Canada, Greater Golden Horseshoe Model
Value of Time Growth	1.6% per annum	Based on GDP per capita increases, GDP/ Population estimates from www.greatertoronto.org
Average Accident Cost	$0.07 per km	Collision Statistics: 2004 Canadian Motor Vehicle Traffic Collision Statistics, TP3322. Vehicle Kilometers: Statistics Canada, Catalogue No. 53-223-XIE, "Canadian Vehicle Survey"
Greenhouse Gas Emissions 2006 2021 2031	 2.39 kg /l or 0.23 kg per km 2.35 kg /l or 0.21 kg per km 2.35 kg /l or 0.20 kg per km	Urban Transportation Emissions Calculator, Transport Canada, Greater Golden Horseshoe Model
Average Cost of CO_2	$0.01 per km $40/tonne (median cost)	Several literature sources, Transport and Environment Canada, Greater Golden Horseshoe Model and http://envirovaluation.org/index.php/2007/09/06/university_of_hamburg_forschungsstelle_n_1
Auto Operating Costs	In 2008$ + 2.0% p.a. increase 2007 - $0.50/km 2021 - $0.65/km 2031 - $0.79/km	Data in 2007 based on CAA calculation of average driving costs and includes operating and ownership costs (long-term costs). Increase based on Greater Golden Horseshoe Model
Annualisation Factors: Metro / LRT Road	Peak-daily/Daily-Annual 3 / 300 10 / 300	Greater Golden Horseshoe Model

metrolandmedia
THE HAMILTON SPECTATOR

Your questions answered: Why not a Main Street-only LRT route?

Matthew Van Dongen

Hamilton Spectator | Jun 13, 2016



Main Street West, looking west from Queen Street. What was rationale for King Street over Main Street in LRT planning?

King Street has been a fixture in the city's preferred LRT route for years — even if arguing about alternatives never goes out of style.

The latest 11-kilometre proposal starts and ends on Main Street, but travels King in the middle from Dundurn Street to the Delta. Variations on that east-west route have been discussed in public meetings, news stories and technical reports since 2008.

The rationale for ruling out a Main-only alignment, though, is not as well-documented. And with LRT planning in high gear — thanks to $1 billion in provincial cash — businesses and even some councillors are resurrecting questions about the route.

For example: why squeeze LRT through the narrow International Village — shrinking car traffic to one lane — when wider Main Street follows a parallel downtown path? Why build a dedicated LRT span over Hwy 403 when Main boasts a built-in bridge?

Raise the Hammer website founder Ryan McGreal, a vocal LRT booster, was once a fan of an all-Main alignment. But call him a King Street convert now.

"There are going to be trade-offs no matter where you put it. And frankly, I can't see Main being so much better that it would make sense to scrap all the work we've done and set the project back years," said McGreal, who also embraces the proposition that King is the best bet to maximize transit-spurred economic development.

Coun. Terry Whitehead, by contrast, approved the King Street design along with the rest of council in 2013 as part of a funding request to the province.

But the councillor now says his own research casts doubt on lofty "economic uplift" predictions for King. Both he and new Coun. Donna Skelly have publicly questioned why Main Street was ruled out in the first place.

So when did the Main versus King debate actually happen?

A 2009 information report shows a working group of city staffers internally considered and rejected Main-only rapid transit routes before making a recommendation to council. It doesn't say much about the rationale.

But the report does list public meetings that year and a special gathering of B-line businesses where project work to date was presented.

Paul Johnson, the city's LRT point person, said early planners saw Main Street as a better bet for maintaining vehicle traffic flow. Having LRT travel on King through the "true downtown" — think Gore Park — was also considered a plus.

Later, a Metrolinx analysis picked the Main-King combo as the clear winner to spur dense residential and economic development. (That's if we convert Main Street to two-way traffic — a debate that deserves its own story.)

Johnson said some arguments in favour of revisiting a Main-only route are built on bad information.

For example, the width of the municipal right-of-way on both streets is actually identical aside from the infamous King pinch point, which is narrower by 1.5 metres. (Wider sidewalks and bump-outs on King play tricks on the eyes, he said, while Main Street traffic lanes are numerous but notably narrow.)

That means LRT on Main would likely spur similar complaints about lost on-street parking and slower vehicle traffic. "Main looks wider to people, but in reality the amount of space we have to work with is pretty much the same," Johnson said.

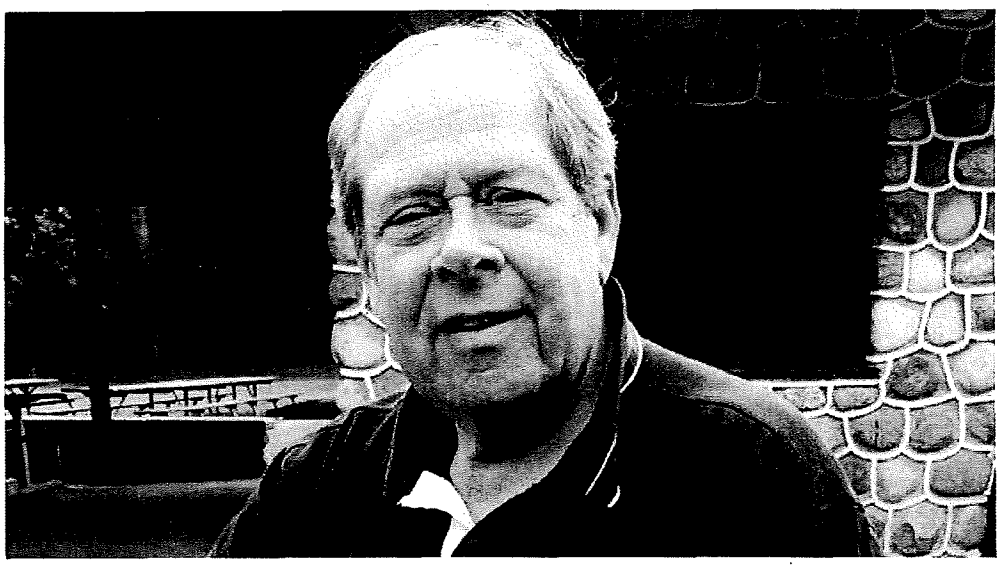
Using the Main Street bridge wouldn't be simple, either. Johnson said that structure would need to be "significantly" bolstered or even rebuilt to allow LRT tracks.

Ontario's Ministry of Transportation also has concerns about how LRT tracks would affect Main Street ramps to and from Hwy 403. It has already signed off on a new LRT-only bridge to King Street via environmental assessment.

In theory, council could still ask Metrolinx — LRT project manager and holder of the purse strings — to re-examine a possible Main Street-only route.

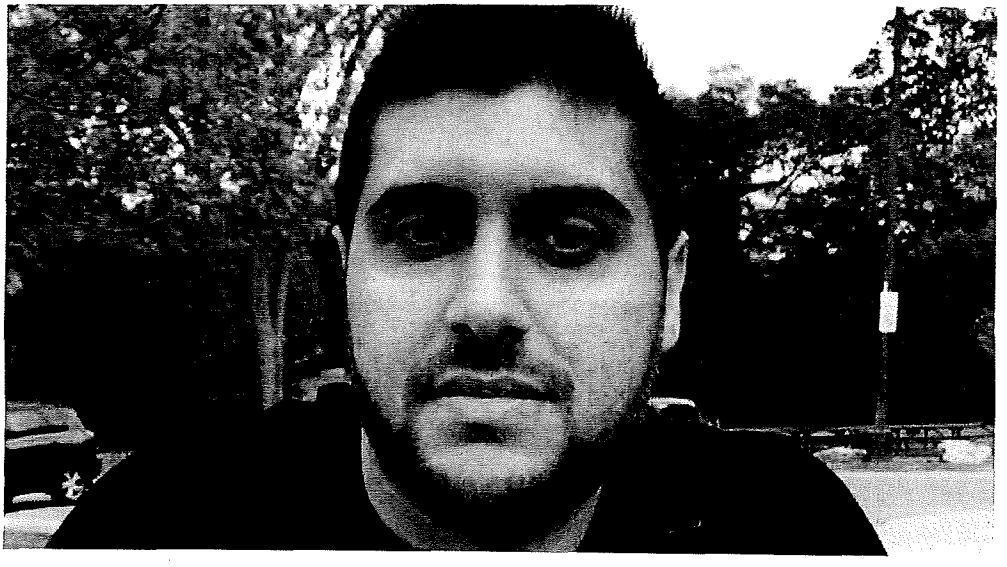
But if that happens, stick a fork in the already ambitious schedule to sign a design-build contract by 2018, otherwise known as election year.

Johnson said starting new design work and redoing parts of the environmental assessment "would mean significantly more time and probably significantly more dollars."



"You have got to go right to Stoney Creek. If you're going to do it, do it appropriately. (My) preference would be Main because that bridge is not an expense you need."

"Have it on Main Street and have it cater to (Gage) park. Hopefully it brings more cafes and shops to the area. I don't drive and that has been hard for me."



"I came to Hamilton from Toronto six months ago, and I think we don't need it all. It's going to create some huge traffic problems. If the community gets bigger and bigger, we may need it."

"I would prefer it to go down both Main and King, one way up and one way back, but as long as they are keeping more buses off the road that's good."

mvandongen@thespec.com

905-526-3241 | @Mattatthespec

Matthew Van Dongen is the city hall reporter for the Hamilton Spectator. Email: mvandongen@thespec.com . Twitter: @Mattatthespec .

COUNCIL CUT AND THRUST

LRT debate? Just call it a game of blitz chess

Among the latest ploys: Run it down Main East instead of King East

ANDREW DRESCHEL
The Hamilton Spectator

The LRT debate is starting to resemble a game of blitz chess in which each move is rapidly countered by the other side.

Consider some of the latest ploys.

Coun. Chad Collins, who believes LRT is a misguided project, asked staff to investigate the claim that some $80 million of city money would be freed up as a result of Metrolinx picking up the cost of replacing aging infrastructure along the route.

Collins was skeptical about the claim and didn't like the fact there was talk of redirecting the presumed savings to suburban and Mountain infrastructure projects to lure council doubters and fence-sitters back aboard.

It turns out Collins is right.

After reviewing the 10-year capital forecast, staff did not find any significant capital projects along the LRT corridor that would result in budget savings that could be used elsewhere.

In other words, there is no $80 million to be freed up because no money has been earmarked for work along the route.

"I guess it's important to do your homework," says Collins.

Not so fast, ripostes Coun. Sam Merulla, who happily admits he's orchestrating efforts to dangle inducements before vacillating councillors.

Merulla says there may not be any immediate savings but there will be avoided costs down the road, which still saves local taxpayers money.

In other words, even though replacing things like water and sewer lines along the LRT corridor is not part of the 10-year capital budget, those services will still eventually need attention.

"Whether we're saving it today or we're saving it years from now, it's all taxpayers' money," says Merulla. "The difference is we don't have to budget for the local taxpayer to pay for it, the province will."

Not surprisingly, Collins has a countermove.

Avoiding costs 15 or 20 years down the road still doesn't free up money to redirect elsewhere, he says.

For the record, the estimated $80 million stems from the 2013 Rapid Ready report, which notes that replacing roads and water lines along the LRT corridor may not be in the capital budget but are part of the overall infrastructure repair backlog.

Additionally, general manager of finance Mike Zegarac says staff have yet to calculate what the avoided costs along the current corridor will be, but he figures there's likely a financial benefit to extending the life and value of some of the infrastructure pieces.

In any event, Merulla is already working on another line of attack.

During the LRT construction phase, he wants to divert to the Mountain and suburbs all the money that would normally be spent on infrastructure projects across Wards 1 through 4.

Since LRT will go through those four lower city wards, he says they won't be able to close down other streets for major road or sewer work because of traffic disruptions and displacements. So why not redirect that money as an "incentive" to shore up LRT support?

Incentive is one word for it. Buyoff is another. Other equivalents abound.

Meanwhile, Coun. Terry Whitehead is plotting a new offensive of his own.

Whitehead, who says he'll support LRT "if it meets the right conditions," is drafting a motion to study the merits of running the line down Main East instead of King East.

Arguing there is no "empirical data" showing which route is better, Whitehead wants council to consider hiring an independent consultant to report on the potential cost of moving the route to Main.

"We've got one chance to get this right and I think we owe it to the taxpayers to do that."

According to a 2009 report, city staffers internally considered and rejected Main before making a recommendation to council. But there's little documentation on why.

Whitehead last week withdrew a similar motion because some councillors thought the wording was provocative. He says he's not trying to be "obstructionist."

"I want to be on solid ground.

"If we're stuck with LRT, I want to make sure it's the best it can be.

"I think we need to ask the right questions, and I think the community expects us to ask the tough questions so we can come back with the best product under the circumstances."

Come to think of it, the debate is actually more like a multiplayer chess variant than simple blitz chess.

Andrew Dreschel's commentary appears Monday, Wednesday and Friday.
adreschel@thespec.com 905-526-3495
@AndrewDreschel

THE HAMILTON SPECTATOR
WEDNESDAY, JANUARY 13, 2010

Downtown businesses reject King-only LRT

BY MEREDITH MacLEOD

Business owners in downtown Hamilton are opposed to a plan to run light rail transit east and west on King Street.

Board members of both the Downtown Hamilton Business Improvement Area and the International Village BIA want the east and west B-line between Eastgate Square and McMaster split between Main and King streets.

The proposed $650-million project has yet to be approved by Metrolinx or the province.

The BIAs are reacting to a city proposal that would mean no on-street parking from Eastgate Square to University Plaza, a pedestrian and transit-only section of King west of Wellington, and no left turns except at lights.

It could also mean converting Main Street to two-way traffic.

The business owners fear the moves will make it less convenient for people to frequent downtown stores and restaurants, says Kathy Drewitt, executive director of the Downtown Hamilton BIA.

She said the downtown BIAs are "very supportive of LRT and we want to see it in the downtown but we can't see it all down King Street."

The city hopes to use the LRT as an economic stimulus for the corridor. Transit experts say the benefits of rapid transit to users and area businesses are intensified when lines are close together and riders can get on and off in the same location.

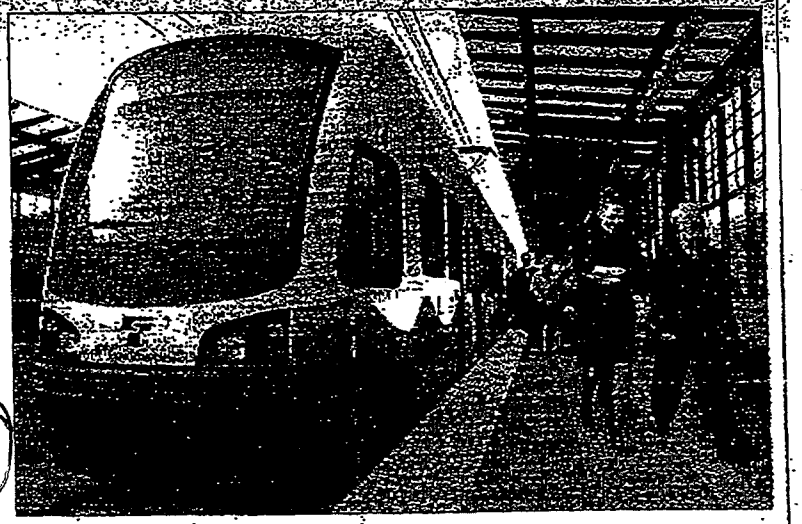
City staff argue Main Street is better able to handle car traffic and that King is more suitable for business intensification.

Drewitt says King and Main are only a block apart and that economic benefits could be spread along both — and the north-south streets in between — if the lines were split.

Tim Bullock, chairperson of the Downtown Hamilton BIA, said putting the LRT on King Street alone could make things too crowded there. "It's difficult to figure out how everyone will live together in there — cars, pedestrians and LRT," he said. "They're cramming a lot into that corridor."

He said business owners are generally supportive of the LRT concept but worried about the practical details, such as getting deliveries and whether the system will mean unsightly overhead wires.

"When you talk about closing down (King Street) from Wellington, that's the entrance to the business area and that scares the hell out of us," said Gord Thompson, whose downtown jewellery and pawn shop is a King Street fixture.



ASSOCIATED PRESS FILE PHOTO

Light rail transit, seen here in Seattle, could be coming to King Street.

Downtown Councillor Bob Bratina thinks both LRT lines should run along Main. He says the street is less meandering, wider and doesn't require any property expropriation.

Two streetcar lines used to run along Main years ago, with cars sharing the road.

"I can't see why we can't revisit Main again," said Bratina, adding he worries many King Street businesses might not survive two years of construction.

Jill Stephen, the city's director of strategic and environmental planning, isn't worried the opposition will affect Metrolinx's views of the Hamilton project. She says the concerns are being raised at a good time.

"We're not so far into the planning and design process that we can't adjust, mitigate or change things."

The BIAs have asked Stephen to walk King Street and meet with merchants.

"This is a huge plan ... and there will be growing pains and things people have to get used to," she said.

"Change is hard, we know that, but it's not impossible ... The long-term benefits will outweigh the short-term inconveniences."

The Metrolinx decision about whether Hamilton will get LRT or bus rapid transit is expected Feb. 19.

mmacleod@thespec.com
905-526-3408

MEMORANDUM OF AGREEMENT

This Memorandum of Agreement (the "Agreement") is made and shall be effective as of the • day of •, 2016

BETWEEN:

METROLINX
("Metrolinx")

and

CITY OF HAMILTON
("Hamilton")

(Metrolinx and Hamilton, collectively the "Parties")

BACKGROUND

A. Metrolinx has a mandate to develop a Regional Transportation Plan to identify and prioritize transportation and transit projects and create an integrated transportation and transit system in the Greater Toronto and Hamilton Area.

B. Hamilton and Metrolinx engaged in and undertook initial assessments, including the Rapid Transit Feasibility Study (2008), the B-Line Benefits Case Analysis (2009), which indicated that there was a strong case for investment in a light rail transit ("LRT") project. Subsequently Hamilton initiated preliminary design and engineering work and public consultation. Metrolinx provided technical support.

C. In 2011 Hamilton, as the proponent, initiated a Transit Project Assessment Process ("TPAP") and engaged in public consultation culminating in the filing of an Environmental Project Report ("EPR") with the Ministry of the Environment and Climate Change ("MOECC") in 2012 which resulted in approval for a 13.9 km LRT line extending from the western terminus at McMaster University along Main Street to Highway 403, along King Street between Highway 403 and the junction of King Street and Main Street, and along Main Street and Queenston Road to the eastern terminus at Eastgate Square.

D. On May 26, 2015, the Province of Ontario announced a commitment of up to $1.0 billion for the capital cost of an LRT line with a revised scope, extending from McMaster University through downtown Hamilton to Queenston Circle. The LRT line will connect directly to the West Harbour GO Station and provide for a future, high-order pedestrian connection to the Hamilton GO Centre GO Station as a component of the LRT project, and will include a maintenance and storage facility with a connection to the LRT corridor. Metrolinx and Hamilton have further agreed to examine whether an extension to the waterfront at West Harbour and rectification of negative traffic impacts, through measures such as road widening and traffic signals, can be accommodated within the approved project budget of up to $1 billion (the "Project").

E. Based on the May 26th announcement by the Province and the change in scope, it is intended that Hamilton facilitate an amendment to the EPR and/or an additional TPAP, including by undertaking all preparatory and ancillary work required for such EPR amendment and/or additional TPAP, and that Metrolinx will reimburse Hamilton for the costs incurred by it in this

regard. The Parties agree to be co-proponents of the EPR process and to work collaboratively on the EPR amendment and/or additional TPAP technical work plan.

F. The Project will be designed, built and owned by Metrolinx and operated by or on behalf of Metrolinx on lands in the City of Hamilton which Metrolinx will either own or in which it will have real property interests.

G. The Project will be designed to allow for the use of the PRESTO farecard.

H. The Parties wish to establish protocols and procedures that will lead to effective and efficient delivery of the Project and optimize existing resources and expertise while, at the same time, respecting both Metrolinx's ownership and control of the Project and Hamilton's ownership and control of its infrastructure and assets and its authority as municipal regulator.

I. This Memorandum sets out the key terms, timelines and conditions for the Project and is intended to constitute the basis for definitive agreements for the Project dealing with the matters set out herein. The Parties affirm their commitment to proceed expeditiously, diligently and in good faith and in a co-operative and collaborative manner to negotiate and enter into the a definitive agreement or agreements to include, among other things, the matters set forth in this Memorandum of Agreement to facilitate and expedite the construction and completion of the Project. It is anticipated that Metrolinx will provide a draft of the first such definitive agreement to Hamilton during the first quarter of 2016 with the others to follow.

NOW THEREFORE, the Parties hereby agree to the following:

1. Roles and Responsibilities

This Agreement and any definitive agreements contemplated by this Agreement are not intended to waive, amend or derogate from the rights of Metrolinx as Crown agent and owner of the Project, or Hamilton as owner of infrastructure and assets affected by the Project and as municipal regulatory authority.

(a) Metrolinx

- Metrolinx is the owner and developer of the Project with responsibility for and control over: (i) scope, (ii) budget, (iii) scheduling, (iv) planning, design, and construction, (v) acquisition of the real property required for the Project except as otherwise specified, and (vi) engaging in public consultation. The determination of who will operate and maintain the vehicles and be responsible for certain matters ancillary thereto, including maintenance and operating costs, will be determined at a later date and included in future definitive agreements.

- Metrolinx will pay for the Project including the costs to design, construct and commission infrastructure and assets owned by Hamilton that need to be relocated to build the Project and any taxes exigible thereon, the costs to obtain permits, licenses, and approvals on the terms set out herein and the costs to repair and restore any damage caused by reason of construction of the Project except, in each case, as otherwise specified and subject to the amount provided by the Province to fund the Project, including any designation and allocation of such funds or any portion thereof for specific components of the Project (the "Project Budget") and any restrictions as to "Eligible Costs" set forth in the document pertaining to funding of the Project from the Ministry of Transportation entitled Capital Cost Eligibility Criteria for Metrolinx Owned Rapid Transit Projects dated September 21, 2010, a copy of which is attached as Schedule A (the "Capital Cost Eligibility Criteria"). For clarity, Hamilton shall not be responsible for the costs of relocating infrastructure owned by it that is required to be relocated as a result of the Project unless otherwise specified herein or agreed to by the Parties.

- Metrolinx will construct the Project in compliance with all laws that are applicable to it and binding on Metrolinx including collective agreements, if any, that are binding on Metrolinx as owner and developer of the Project.

- Consistent with the provisions of Section 4 hereof, if Metrolinx in its discretion chooses to acquire a property for a maintenance and storage facility for the Project that is owned and used by Hamilton, Metrolinx will pay for such property consistent with the principles set out for compensation in the *Expropriations Act,* Ontario. The Parties will work co-operatively, collaboratively and in good faith in an effort to arrive at a negotiated agreement before resorting to expropriation.

(b) Hamilton

- Hamilton is the owner of infrastructure and assets that may be affected by the construction of the Project and has regulatory authority over construction activities and the use of its roads and property.

- Nothing in this Agreement is intended to derogate from or waive the rights of Hamilton as owner of its infrastructure and assets or the rights and obligations it has as municipal planning authority. Furthermore, the Parties acknowledge that Hamilton has the unfettered right, authority and discretion to fulfill its statutory obligations under applicable law (including without limitation those prescribed under the *Planning Act* (Ontario), *Building Code* (Ontario), *the Fire Protection and Prevention Act* (Ontario),the *Emergency Management and Civil Protection Act* (Ontario), the *Health Protection and Promotion Act, Smoke Free Ontario Act* (Ontario) and the Business Licensing By-law) and the Parties understand and agree that nothing in this Agreement: (i) shall preclude Hamilton from performing, discharging or exercising its duties, responsibilities and powers under applicable law including the foregoing, or (ii) be deemed to be an attornment by Metrolinx to any applicable law including the foregoing that is not binding upon it.

- Notwithstanding Metrolinx's obligations as set forth in Section 1(a), if infrastructure and assets owned by Hamilton that are required to be relocated by Metrolinx to facilitate construction of the Project are scheduled for repair and/or upgrade and/or replacement by Hamilton, as reflected in any existing capital expenditure budget of Hamilton (whether current or future planned repair/replacement), Hamilton will reimburse Metrolinx for the costs to replace or modify such infrastructure and assets either in the amount allocated in the applicable Hamilton budget in respect of such repair, upgrade and replacement, as the case may be, or in a reasonable and equitable amount as determined by Metrolinx and Hamilton having regard to the age of such infrastructure

- Without derogating from or in any way fettering the discretion of Hamilton City Council, Hamilton agrees:

(i) to implement transit-supportive land use policies and provisions in any relevant municipal Official Plans, Secondary Plan and Zoning By-laws, and in doing so, shall be guided by the Ministry of Transportation's Transit-Supportive Guidelines;

(ii) to support Metrolinx in the delivery and implementation of the Project by, among other actions, minimizing and/or streamlining municipal approvals where possible and reasonable to ensure Project delivery timelines are achieved, and for ease of Project implementation; and

(iii) Hamilton will support requests submitted by the Government of Ontario to acquire funding contributions from the Government of Canada for the Project. At the request of

Metrolinx, Hamilton will make resources and Project information available, where necessary, to support the development of such funding requests.

2. Project Delivery

- The Project may be delivered by Metrolinx and Infrastructure Ontario as sponsors by way of Alternate Finance Procurement that may include Design, Build, Finance, Operate, Maintain depending on, among other things, value for money assessment and Provincial direction. At the request of Metrolinx, as directed by Metrolinx and at no cost to Metrolinx, Hamilton will assist by providing information, responding to inquiries and attending meetings with the proponents and with the successful proponent but Hamilton will not otherwise meet or liaise with or respond to the proponents and the successful proponent on any aspect of the Project.

- The Parties will work collaboratively to develop a protocol of processes and approvals that will apply to infrastructure and assets owned by Hamilton that will be affected by construction of the Project.

- Metrolinx acknowledges that Hamilton has unique knowledge of local conditions and considerations related to the Project that will be important inputs in the development of the Project Agreement including the Project Specific Output Specifications ("PSOS"). Accordingly, Metrolinx shall provide Hamilton with opportunities to review the Project Agreement or components thereof and specifically the PSOS or components thereof. In the case of infrastructure and assets owned by Hamilton that are affected by or are required to be rebuilt/replaced by Metrolinx as a result of the Project Hamilton shall review, approve and accept provided that Hamilton City standards have been met. In respect of other components of the Project, Hamilton may provide input and assistance to Metrolinx and Metrolinx will use reasonable efforts to implement Hamilton's suggestions where appropriate and reasonable to do so having regard to, among other things, cost and scheduling.

- During the in-market period after issuance of the Request for Proposal and before bid submissions have been received, Metrolinx will request Hamilton to attend design consultation meetings and may request Hamilton to attend commercially confidential meetings with proponents from time to time and provide input to it and to assist in responses to various requests for information by proponents.

- During the evaluation process, Metrolinx will request a member Hamilton staff to participate in a component or components of bid evaluations.

- After award and during implementation of the Project, Hamilton will have the right to review and comment (through Metrolinx) on the design of infrastructure and assets owned by Hamilton that are being rebuilt/replaced as a result of the Project to ensure compliance with the PSOS and Hamilton standards and the right to inspect and accept such infrastructure and assets provided that the PSOS and Hamilton standards have been complied with. Metrolinx will ask Hamilton to attend working groups from time to time as required.

3. Project Scope

- It is intended that the Project as initially described in and approved by the EPR will be varied and amended by amendment to the EPR to take into account and reflect the May 26, 2015 project funding announcement by the Province of Ontario, which referred to an LRT corridor as described in Recital D. Additional technical studies will be undertaken to form the basis of the submission for EPR amendment.

- "Material Change" to the Project means a change to the Project as described in the amended EPR that (i) eliminates a station, (ii) significantly changes the distance between stations, or (iii) requires an amendment to an EPR. If Metrolinx proposes a Material Change, Metrolinx will provide particulars to the Project Steering Committee. Metrolinx will endeavour to arrive at a solution that is consistent with comments provided by Hamilton and acceptable to Metrolinx.

4. Real Estate Matters

- Metrolinx will own or have a real property interest in all lands on which the Project infrastructure is located and will be responsible, unless otherwise agreed, for acquiring such lands or interest therein.

- Hamilton will provide an exclusive easement for nominal consideration to Metrolinx over that portion of the right-of-way(s) on which the Project infrastructure will be built and located. The permitted uses under the easement are transit purposes and ancillary uses conducted from time to time by Metrolinx. Until the easement is transferred to Metrolinx (which may be on completion of designs or on completion when as-built drawings and surveys are available) Hamilton will grant to Metrolinx and persons authorized by it a license to use and occupy the easement lands sufficient to permit construction of the Project and otherwise on reasonable terms as agreed to by the Parties, subject to permits, licenses and approvals, if required.

- Hamilton will transfer any other property owned by it (and by its boards, agencies and commissions if and to the extent that Hamilton has jurisdiction to do so) upon which the Project infrastructure will be built and located to Metrolinx for nominal consideration save and except only if any such lands are occupied and in use and generate revenue, in which case Metrolinx will pay fair market value (referable to the revenue generated from such lands) for such lands.

- Hamilton will provide to Metrolinx and persons authorized by it a temporary construction license for lands owned by it (and by its boards, agencies and commissions if and to the extent that Hamilton has jurisdiction to do so), to facilitate construction of the Project. The license fee will be nominal save and except only if any such lands are occupied and generate revenue, in which case Metrolinx will re-imburse Hamilton or its boards, agencies and commissions, as the case may be, for lost revenue. For clarity, the use of parks will be dealt with as aforesaid and there will be no additional parks fee.

- The Parties will work together to identify the required lands, the transfer date or the commencement date, duration and term of any license, as the case may be. Hamilton will determine whether Council approval is required for the transfers and licenses and for exemptions or waivers of fees, and ensure that the appropriate applications are brought to Council or other committees and persons whose approval is required in a timely manner to ensure that the identified commencement dates are achieved and that the fees are exempted or waived, as aforesaid.

- At the request of Metrolinx, Hamilton will make resources available to acquire real property from third parties identified as being required for the Project, including appraisers, surveyors and legal personnel. The properties may be acquired using Metrolinx's expropriating powers.

5. Permits, Licenses and Approvals Protocol

- The Parties will work together to establish a process and timelines for (i) review and approval by Hamilton of design and other matters requiring their approval pertaining to infrastructure and assets owned by them that are affected by the Project, and (ii) review and approval of applications for permits, licenses and approvals required to construct the Project and the issuance of such permits, licenses and approvals.

- Infrastructure and assets owned by Hamilton that are required to be replaced to facilitate construction of the Project will be built to the existing standard on a specified, agreed-upon date. Metrolinx will consider any request by Hamilton to exceed such standard or to build additional infrastructure and assets provided that there is no adverse impact on cost or completion of the Project by the anticipated completion date and on the basis that all additional costs associated with any such request will be paid for by Hamilton.

- Metrolinx, and Hamilton will work together to identify fees and approval times and requirements for applicable permits, licenses and approvals. Hamilton, will seek delegated authority to staff in respect of permits, licenses and approvals that would otherwise require Council approval and will seek an exemption or waiver of fees where such fees are more than nominal review fees, in each case on a blanket basis for the Project as a whole and any such delegated authority and exemption is subject to approval by Hamilton Council, whose discretion is unfettered.

6. Third Party Utilities

- Metrolinx will be responsible for relocation costs of third party utilities that need to be relocated and/or replaced as a result of and to facilitate construction of the Project.

- Hamilton will endeavor to exercise its rights under and enforce any cost sharing or similar agreements that it has with utility companies requiring utility companies to relocate or share the cost of relocation of utilities, and will provide Metrolinx with copies of any such agreements.

7. Hamilton Dedicated Staff

- Hamilton will provide dedicated staff to facilitate reviews and approvals, and other matters to expedite the delivery of the Project. A list of the positions identified to fulfill these functions will be based on Schedule B attached hereto The positions on the list may be changed from time to time with the approval of Metrolinx or the list may be decreased or expanded as agreed to by the Parties. It is intended that Metrolinx will pay for the time expended by staff holding these positions to fulfill these functions at rates to be agreed to by the Parties.

- Metrolinx will work together with Hamilton to identify and approve costs incurred by Hamilton after May 26, 2015 to plan and develop the Project including but not limited to the costs related to consultants, staff and consultations with community groups and stakeholders with the intent that Metrolinx will reimburse Hamilton for such costs. In payment of such costs Metrolinx has advanced $2,000,000 to Hamilton to be retained by Hamilton subject only to substantiation of such costs by Hamilton and verification by Metrolinx.

8. Public Communications and Engagement

- Metrolinx and Hamilton will jointly develop and adhere to a public communications and public engagement protocol which will provide for the basis upon which Metrolinx will communicate with the media and the public, other agencies and advertisers, and the

manner in which it will engage with the public including community relations, and stakeholder engagement and consultation, in each case for matters pertaining to the Project.

9. Public Realm

- Metrolinx will allocate funds to public realm (the "Public Realm Amount") which it anticipates will be in accordance with the Capital Cost Eligibility Criteria. Hamilton, in its discretion, may request Metrolinx to construct improvements to streetscape that are in addition to Metrolinx's obligations to repair and restore damage to the agreed upon standard. For clarity, Hamilton will determine the location of such additional streetscape improvements requests. Metrolinx will endeavor to accommodate any such request provided that the Public Realm Amount is not exceeded in the aggregate, any such additional streetscape is constructed in the immediate vicinity of the Project, and is acceptable to Metrolinx, acting reasonably.

10. Access to Information

- Subject to any legal limitations including any limitations under the *Municipal Freedom of Information and Protection of Privacy Act,* Hamilton will provide Metrolinx with access to such information as Metrolinx may reasonably require from time to time in conjunction with the design and construction of the Project, including without limitation, the location of its infrastructure and assets and its requirements in respect of relocation and preservation with a view to including such information and requirements in any request for qualifications and/or proposal to design, construct and/or maintain the Project.

11. Revenue and Service Integration

- It is anticipated that when a determination has been made regarding the operator and/or maintainer of the Project, the revenue arrangements (including without limitation arrangements for the fares and costs) and matters pertaining to service integration will be documented in future definitive agreements. Hamilton has an expectation that any negative impact on the Provincial gas tax received by it as a result of the LRT will be taken into consideration in discussions on operating and maintenance costs.

12. Governance and Dispute Resolution

- The Parties intend to establish a Project Steering Committee and an Executive Committee.

- The Project Steering Committee is intended to meet at regular intervals or as-needed to endeavour to resolve issues related to the Project on a consensual basis.

- Matters that cannot be resolved by the Project Steering Committee are intended to be escalated to the Executive Committee which will meet as needed to endeavor to resolve disputes. The Parties will consider establishing a dispute resolution protocol for the resolution of certain disputes, primarily pertaining to the standard to which infrastructure and assets owned by Hamilton that needs to be relocated for the Project should be built.

- The Project Steering Committee and the Executive Committee are not intended to circumvent or override the rights of Metrolinx as owner of the Project or the rights of Hamilton as owner of its infrastructure and assets or as municipal regulatory authority.

13. Confidentiality

- Each Party shall keep information provided by another Party confidential and secure and limit the disclosure to those persons who have a need to know it and who are bound by agreement or otherwise to keep the information in confidence substantially on the terms of hereof.

- Each Party shall not directly or indirectly disclose, destroy, exploit or use any such information (except for the purpose of delivering the Project, or except if required by law), without first obtaining the written consent of the disclosing party and in respect of any Confidential Information about any third-party, the written consent of such third-party and shall provide confidential information to disclosing party on demand.

- If a receiving party becomes legally compelled to disclose any confidential information, it will notify the disclosing party in order to allow disclosing party the option of seeking a protective order to prevent disclosure.

- The provisions of this Section shall survive termination of this Agreement and remain in full force and effect.

- The Parties acknowledge and agree that: (i) they are subject to privacy legislation including in the case of Metrolinx, the *Freedom of Information and Protection of Privacy Act,* Ontario and in the case of Hamilton, the *Municipal Freedom of Information and Protection of Privacy Act,* Ontario, and (ii) they may be required to disclose information on as set out in the Acts, but will not otherwise do so in contravention of this Agreement.

- The Parties acknowledge and agree that Hamilton may make this Agreement and the definitive agreements available to Council and the public and may discuss the terms at Council meetings or meetings with the public other than confidential information, if any, contained therein.

14. <u>General Provisions</u>

- With the exception of the obligations under Section 13 (Confidentiality), this Agreement is an expression is intended to form the basis of negotiations between the Parties in an effort to arrive at definitive agreements and is not binding on them.

- This Agreement is governed by and shall be construed in accordance with the laws of the Province of Ontario and the laws of Canada as applicable therein. The parties hereby attorn to the jurisdiction of the courts of Ontario for any legal proceedings arising out of this Agreement.

Executed by the Parties on the date written above.

METROLINX	**CITY OF HAMILTON**
By: _____	By: _____
Name:	Name:
Title:	Title:
By: _____	By: _____
Name:	Name:
Title:	Title:
I/we have the authority to bind the corporation	I/we have the authority to bind the corporation

Schedules:

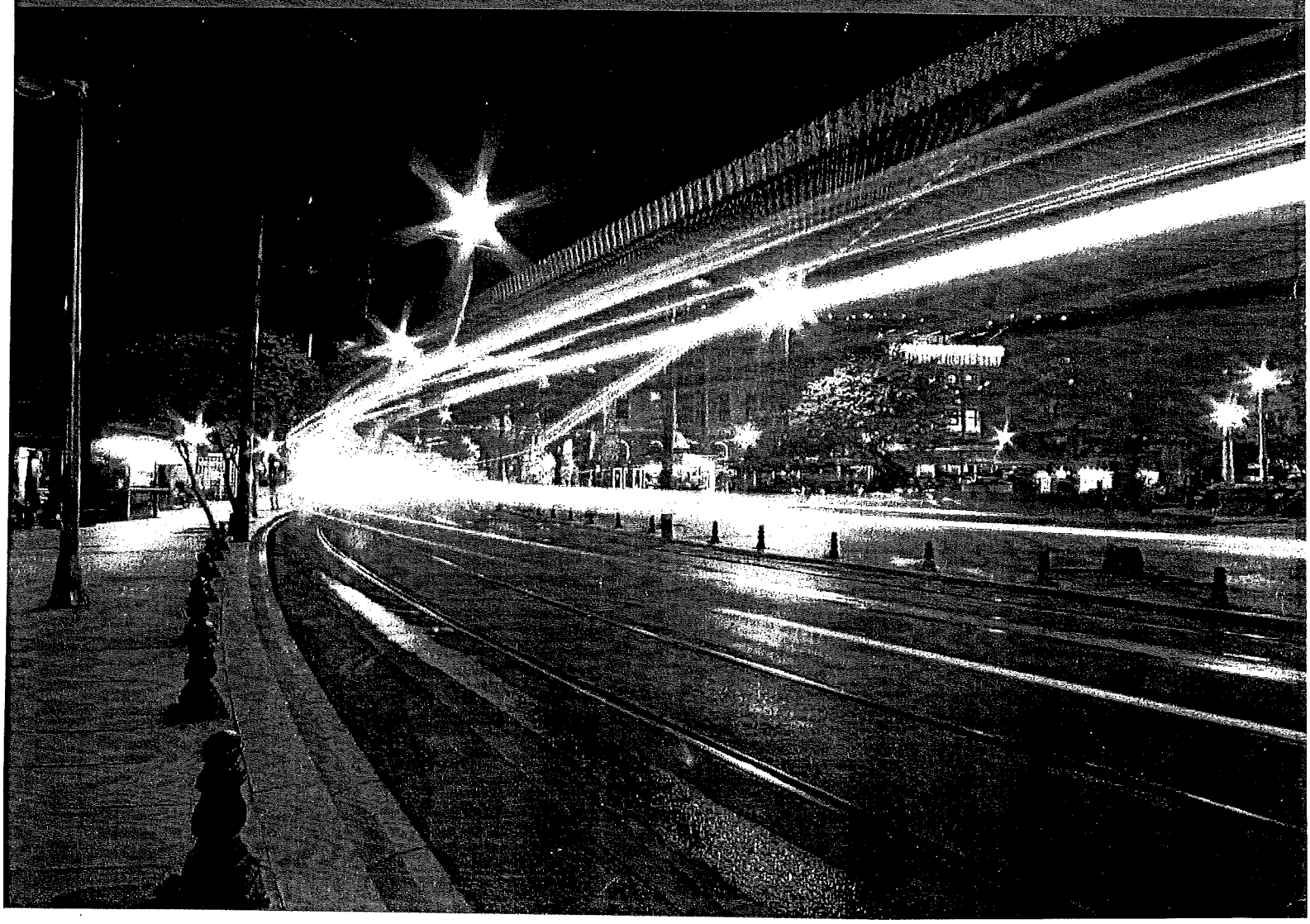
A Capital Cost Eligibility Criteria

B Proposed Hamilton Dedicated Staff

METROLINX

HAMILTON KING-MAIN BENEFITS CASE

February 2010



METROLINX
LINKING PEOPLE TO PLACES · ON Y VA

Hamilton King-Main Rapid Transit Benefits Case

February 2010

Prepared for:

Metrolinx
20 Bay Street, Suite 901
Toronto ON M5J 2N8

Prepared by:

Steer Davies Gleave
1000 - 355 Burrard Street
Vancouver, BC V6C 2G8

In Association with:
Economic Development Research Group
Metropolitan Knowledge International

Hamilton

INFORMATION REPORT

CITY WIDE IMPLICATIONS

To:	Chair and Members Public Works Committee		
From:	Gerry Davis, CMA Acting General Manager Public Works Department	**Telephone:** **Facsimile:** **E-mail:**	905 546-2313 905 546-4481 Gerry.Davis@hamilton.ca
Date:	April 3, 2009		
Re:	**Rapid Transit Corporate Working Team Workshop, Technical Advisory Committee and Corridor Property Owner Meetings PW09034 (City Wide)**		

Council Direction:

As part of the City's Rapid Transit initiative, the Rapid Transit Team has brought forward numerous reports for Council consideration, endorsement and information, as staff work towards securing Provincial funding for Rapid Transit in Hamilton. This Information Report outlines the results of the City's Rapid Transit Corporate Working Team (CWT) Workshop # 2 and the Rapid Transit Team's first meetings with the Rapid Transit Technical Advisory Committee (TAC) and B-Line Corridor Property Owners (CPO). The CWT Workshop focused on reviewing rapid transit routing alternatives along the B-Line corridor and the first meeting with the TAC and CPO groups focused on introducing Hamilton's Rapid Transit Initiative and identifying the potential rapid transit routing alternatives along the B-Line corridor (Eastgate Square to University Plaza).

Information:

Background

In June 2007, the Province of Ontario released their MoveOntario 2020 plan, which was a multi-year rapid transit action plan for the Greater Toronto Hamilton Area (GTHA). The plan, which was developed in response to concerns over transportation issues, focused on tackling gridlock throughout the GTHA and includes rapid transit projects in Hamilton, as defined by the Regional Transportation Plan (RTP) (November 2008), developed by Metrolinx. Metrolinx, the governing agency for the implementation of the RTP, has set the wheels in motion to build and fund a rapid transit system across the GTHA. Ultimately, the improved GTHA rapid transit network will move people and goods quickly and efficiently and will ensure the GTHA continued prosperity, as a result of minimizing both the environmental and social impacts of increased congestion.

The Province's MoveOntario 2020 vision and associated funding commitments has both allowed and required that Hamilton accelerate rapid transit planning in our community. As a result of the initial phases of the City's Rapid Transit Feasibility Study and public consultation program, Council endorsed a recommendation to focus on Light Rail Transit (LRT) as the preferred mode of rapid transit for Hamilton, as part of report PW08043d (October 2008). Subsequent to this endorsement, Hamilton's existing B-Line corridor (Eastgate Square to McMaster University) has been identified as a top 15 priority project for implementation within the first 15 years of the Regional Transportation Plan by Metrolinx.

In order to provide an evidence-based platform for prioritization of the Top 15 projects, Metrolinx will undertake a Benefits Case Analysis (BCA), for each of the projects which are not already completed or substantially underway, or already funded through previous agreements. The Benefits Case Analysis will ultimately determine what technology (LRT or Bus Rapid Transit (BRT)) and routing is the optimum for Hamilton's B-Line corridor; based on a "triple-bottom-line" analysis of the proposed investment (environmental, economic and social / community).

For Hamilton, the B-Line BCA will be initiated April 2009, with Metrolinx leading the project. All background studies presently being undertaken or already completed by the City of Hamilton's Rapid Transit Team will feed into the B-Line BCA. Specific Information required by Metrolinx includes a transportation impact evaluation of potential routing scenarios, rapid transit mode (LRT and BRT) impact review and an economic impact analysis.

Prior to providing study results to Metrolinx for use in the Benefits Case Analysis, the Rapid Transit Team staff presented the potential route alternatives to the City's Rapid Transit Corporate Working Team on February 5, 2009 for evaluation. The Corporate Working Team is comprised of staff from six City Departments including representatives from Public Works, Planning & Economic Development, Corporate Services, Community Services, Emergency Services and Public Health Services and Hamilton Police Services. The February 2009 session was a follow-up to the first Corporate Working Team session held in November 2008, at which time the following vision statement was developed and subsequently endorsed by Council at its meeting of January 28, 2009, as part of report PW09-007.

> ***Rapid Transit is more than just moving people from place to place. It is about providing a catalyst for the development of high quality, safe, environmentally sustainable and affordable transportation options for our citizens, connecting key destination points, stimulating economic development and revitalizing Hamilton.***

The rapid transit alternatives for the B-Line corridor that were discussed as part of the second meeting of the Corporate Working Group focused on the area between Paradise Road (west of Hwy 403) and the Delta (Main/King Split at Gage Park):

- LRT in exclusive curb lanes on one-way streets
  - focus of Rapid Transit Feasibility Study (RTFS) Phases 1 and 2

- LRT and one-way traffic on both Main and King
- Contra-flow on Main Street (maintain one-way traffic with two-way LRT) - one-way traffic eastbound with two-way LRT operation
- Contra-flow on King (maintain one-way traffic with two-way LRT) - one-way traffic westbound with two-way LRT operation
- LRT on Main Street with two-way traffic on both Main Street and King Street
- LRT on King Street with two-way traffic on both Main Street and King Street

In addition to a discussion on rapid transit alternatives, staff was also updated on the findings of each of the studies being undertaken as part of the RTFS Phase 3 (BCA prep studies). These studies were utilized for route evaluation purposes in order to identify potential areas of impact of the above noted rapid transit alternatives. The results of all rapid transit studies undertaken to date have been summarized as study fact sheets and are included in Appendix A. In addition to the Rapid Transit Feasibility Study Phases 1 & 2, Phase 3 studies include:

- Transportation Modeling (building on RTFS Phases 1 & 2)
- Economic Uplift Potential
- Subsurface Infrastructure Review
- Technology Review
- Archeology
- Built Landscapes & Cultural Heritage
- Natural Environment
- Terrestrial & Avian
- Hydrogeology
- Air Quality & Noise
- Water Resources & Storm Water MP Impact
- Consultation (building on RTFS Phases 1 & 2)

As part of the on-going public and stakeholder consultation that has been an integral part of Rapid Transit planning to date, the Rapid Transit Team commenced the first meeting of the Rapid Transit Technical Agency and Rapid Transit B-Line Corridor Property Owners on February 23, 2009. These meetings were meant to officially introduce the rapid transit initiative to these key stakeholders, to introduce the potential rapid transit routing alternatives along the B-Line corridor (Eastgate Square to University Plaza) and to listen to initial concerns and questions that both these groups have in regards to the initiative and future processes. At this stage, without knowing the results of the Benefits Case Analysis or having an endorsement from Council in regards to Rapid Transit implementation, these meetings were held to provide general information on the initiative and to provide an early opportunity for those that will be most greatly impacted to meet with the Rapid Transit Team.

Although members of Council were advised of the Corporate Working Group, studies underway and B-Line rapid transit alternatives through Information Update CPI.09.05 (attached as Appendix B), and the Technical Advisory Committee and Corridor Property Owner Meetings through Information Update CPI.09.03 (attached as Appendix C), this

information has not been brought forward for Council consideration, given Provincial timelines and process as it relates to the Benefits Case Analysis to be undertaken by Metrolinx. It is the Metrolinx BCA that will evaluate all viable alternatives through a multiple accounts evaluation process and identified a recommended rapid transit scenario, including mode and routing, for implementation. The results of the BCA (recommended rapid transit scenario for Hamilton), anticipated funding amounts and proposed construction timing will be brought forward for Council consideration and ultimate project approval in late summer/early fall 2009. Information to be presented at that time for Council's consideration and approval will include the recommendations of the Benefits Case Analysis, overall impact analysis and results of the on-going public consultation process on the aforementioned alternatives, being undertaken Winter 2008 through Summer 2009.

Corporate Working Team Workshop

On February 5, 2009 the Rapid Transit Team held a City-wide cross-departmental workshop, which was attended by 38 City staff personnel representing six City Departments, including Public Works, Planning & Economic Development, Emergency Services, Corporate Services, Community Services and Public Health. The purpose of the Corporate Working Team (CWT) workshop #2 was to:

- Provide information to City staff on the status and next steps of the rapid transit initiative;
- Present the data that has been collected for the B-Line corridor and route alternatives;
- Obtain input on the potential impacts of a route alternatives between the Delta and Paradise Road; and
- Review the benefits and challenges associated with rapid transit within the B-Line corridor.

The workshop commenced with presentations by the Rapid Transit Team staff and Rapid Transit Consultants, followed by a question and answer period at the end of each presentation topic. Presentations and discussions throughout the morning focused on:

- Project overview – Rapid Transit Team
- Visual fly through of the corridor (using Google Earth and noting areas of significance) – Rapid Transit Team
- Road Network Impacts - McCormick Rankin Corporation
- Impacts to Subsurface Infrastructure – Rapid Transit Team
- Economic Uplift Potential – IBI Group
- Technology Considerations – Rapid Transit Team

Building on the Rapid Transit Vision Statement and evaluation criteria that was developed at the first Corporate Working Team Workshop, the afternoon of the February 2009 session focused on reviewing the potential routing alternatives and identification of potential benefits and impacts. The evaluation criteria used is in line with Class EA evaluation criteria and Metrolinx Benefits Case Analysis evaluation factors. The key focus areas are noted below:

- Social / Community Impacts
- Natural Environment
- Technical Considerations
- Financial Considerations
- Economic Potential
- Transportation User Benefits

Overall, although staff participating in the workshop understood that the Benefits Case Analysis will be the mechanism by which the preferred routing will be determined, the Corporate Working Team unanimously agreed that the impact of rapid transit and more specifically LRT would be minimized and result in the most benefits to the City as a whole, if the two-way LRT scenario on King Street were to be implemented. This preferred scenario also focuses on and requires the conversion of two-way traffic on Main Street and King Street, to be implemented.

Technical Advisory Committee

In early February 2009, the Rapid Transit Team invited 99 technical agencies and stakeholders to form the City's Rapid Transit Technical Advisory Committee (TAC). The first meeting was held in the morning of February 23, 2009 and was attended by 25 different representatives from 20 different organizations. Invitations were sent to all utility companies that utilize the City's ROW, all applicable Provincial Ministries, Conservation Authorities, City Departments, GO Transit, Metrolinx and First Nations. As rapid transit planning in Hamilton continues to move forward the Technical Advisory Committee will be important in dealing with and addressing key issues and project co-ordination as it relates to the future design of rapid transit and its associated infrastructure impacts. The purpose of the initial meeting was to provide background information about rapid transit history in Hamilton, identify results of specific studies undertaken as part of the process to date, and discuss how various aspects of the implementation of rapid transit may impact the agencies themselves. As the project progresses, it is anticipated that the TAC will meet on a regular basis, particularly during more detailed design of any future rapid transit system and through future construction phases.

Overall, the members of the TAC were very interested in the logistics surrounding the implementation of rapid transit in Hamilton and did not identify a clear preference for routing, although minimizing the impact to existing infrastructure is a significant concern and should be considered when evaluating the route alternatives.

B-Line Corridor Property Owners

In early February 2009, the City's Rapid Transit Team mailed out nearly 1800 invitations for the first meeting of the B-Line Corridor Property Owners (CPO). The invitations were mailed out, based on available tax role information, to all addresses of properties located within 30m on either side of the existing right-of-way of the B-Line corridor (Eastgate Square to University Plaza). This included all properties on both Main Street and King Street between Paradise Road (west of Highway 403) and the Delta (Main/King split). A copy of the invitation and mailing list key map are also included in

Appendix C as part of Information Update CPI.09.03. The invitations asked property owners and their tenants to attend one of two sessions of the first Corridor Property Owners meeting, February 23, 2009, between either 2pm – 4pm or 6pm – 8pm. These meetings were meant to be the first formal meeting between Corridor Property Owners and the Rapid Transit Team.

Although there has been general public consultation undertaken as part of the initiative to date, the Rapid Transit Team believed that it is critical to provide an early opportunity and avenue for those most greatly impacted by the changes that rapid transit may bring. The CPO sessions were tailored to provide the history of rapid transit Hamilton, identify results of specific studies undertaken as part of the process to date (particularly the potential for economic uplift as a result of the introduction of rapid transit), present the routing alternatives and discuss how various aspects of the implementation of rapid transit may impact the corridor. Although at this stage, many details are not available, the opportunity to discuss and identify potential benefits, challenges and concerns rapid transit for property owners; identify questions that they would like answered as information becomes available and as studies are completed; and identify how Corridor Property Owners wish to be engaged in the future, is valuable information for the Rapid Transit Team.

The February 23, 2009 afternoon session was attended by 47 people. The evening session was attended by 26 people.

Overall, there was support for the implementation of rapid transit and more specifically LRT, although there did not appear to be a specific preference for one routing alternative over the other at this time. The Corridor Property Owners are cautious and concerned about impacts to their properties and businesses, particularly during the various construction phases and early transition years of rapid transit in Hamilton. Staff ensured all those in attendance that there would be significant public and Corridor Property Owner consultation and outreach throughout the planning, design and implementation phases of any approved rapid transit project and that there would also be opportunities for one-on-one consultation as the initiative moves forward.

All information related to the CWT, TAC and CPO meetings is being summarized by the Rapid Transit Team as part of an overriding Rapid Transit Consultation Document. This document will be posted to the Rapid Transit website www.hamilton.ca/rapid-transit in Spring 2009.

Next Steps

The Metrolinx Benefits Case Analysis for Hamilton will undertake a comprehensive review of all viable routing alternatives, for both LRT and BRT rapid transit, in Spring 2009. All information gathered to date will be utilized as part of the BCA. The results of the BCA will identify the most viable option for rapid transit in Hamilton, using a multiple accounts evaluation process and identify the proposed Provincial strategy for rapid transit in Hamilton. The results of the BCA, identification of mode and routing for the B-Line corridor will then be brought forward for Council consideration and ultimate project approval late summer 2009/early fall 2009. At this time Council will be required to either

accept or reject the recommended Provincial plan for rapid transit in Hamilton. In order to aid in Council's decision, the forthcoming staff report will outline the results of the BCA, as well as identify all known impacts related to the implementation of the recommended rapid transit plan for the B-line.

In addition to the meetings of the Corporate Working Team, Technical Advisory Committee and Corridor Property Owners meeting at key milestones in the rapid transit planning process, the Rapid Transit Team will be taking the route alternatives to the public and stakeholders for their consideration over the coming months. Rapid Transit Team staff continue to believe that public consultation plays a key role in this initiative. The Rapid Transit Team is working on scheduling full public meetings regarding these route alternatives for Spring 2009 and will carry this public consultation exercise through the summer months, prior to reporting back to Council in late summer/early fall 2009. Information to be presented at that time for Council's consideration and approval will include the recommendations of the Benefits Case Analysis and results of the on-going public consultation process on the aforementioned alternatives, being undertaken Winter 2008 through Summer 2009.

Gerry Davis, CMA
Acting General Manager
Public Works Department

Hamilton
Public Works

Cultural Heritage Resource and Archaeological Assessment Fact Sheet

Rapid Transit
MOVING HAMILTON FORWARD

Cultural Heritage Resource Assessment

- The proposed City of Hamilton Rapid Transit Initiative B-Line Corridor travels in an east-west direction, passing through the original City of Hamilton downtown core and into areas that retain a wide number of structures and landscapes that date back to the late 19th century and early to mid 20th century;

- To identify aboveground heritage sensitive areas in the Main Street and King Street corridors the following data collection methods were undertaken: review of 1876, 1893, 1898, and 1914 historic mapping and fire insurance plans; compilation and organization of properties designated under the *Ontario Heritage Act* and previously identified by the City of Hamilton's culture department; completion of a windshield/pedestrian survey of the entire study corridor to conduct photographic documentation, confirm previously identified properties, and to identify properties of potential cultural heritage interest that have been previously unrecognized;

- Data collection and analysis results indicated that large portions of the study corridor, between Paradise Road and the Delta retain cultural heritage resources, set in close proximity to the right-of-way. The following data is preliminary and does not reflect comments that were received from the Culture Dept. on February 3rd. Please also note the following calculations are approximate:

    - A total of **450** cultural heritage resource properties were identified on King Street, between Paradise Road and the Delta;
    - **49%** of the King Street corridor's frontage (Paradise to the Delta) was identified as retaining heritage sensitivities;

    - A total of **286** cultural heritage resource properties were identified on Main Street, between Paradise Road and the Delta;
    - **41%** of the Main Street corridor's frontage (Paradise to the Delta) was identified as retaining heritage sensitivities;

- As the study advances the following issues should be addressed:

    - When more detailed concepts are available, a follow-up field review should be undertaken to examine impacts area in greater detail. The field review completed to date was conducted at a 'high' level, focusing on capturing general information rather than focusing on individual properties;

    - Property acquirements should avoid identified cultural heritage resources; and

    - Proximity of structures to right-of-way. Many structures are very close to the current road right-of-way, as such indirect impacts such as visual impacts of overhead LRT infrastructure; noise/vibration, appropriate buffering, health and safety concerns, and access to properties needs to be assessed.

Stage 1 Archaeological Assessment Preliminary Findings

- The City of Hamilton has a cultural history which begins approximately 10,000 years ago and continues to the present;

- The study corridor meets five of the eleven criteria used by the Ministry of Culture for determining archaeological potential:

    - Known archaeological sites within 250 m;
    - Primary water source within 300 m;
    - Indications of early Euro-Canadian settlement;
    - Associated with historic transportation routes; and
    - Contains property designated under the Ontario Heritage Act.

These criteria characterize the study corridor as having both Aboriginal and Euro-Canadian archaeological potential.

- The field review of the study corridor determined that the Main, King, and James Street ROWs have been previously disturbed by typical road construction and modern development;

- However, there are several areas adjacent to the disturbed ROW that remain undisturbed and contain archaeological potential:

    - 28 areas (or 39,833M^2) of archaeological potential are present along the Main Street corridor (between Paradise Road and the Delta);

    - 32 areas (or 30, 704M^2) of archaeological potential are present along the King Street (between Paradise Road and the Delta)

Preliminary conclusions and recommendations include:

- The Main, King, and James Street ROWs do not retain archaeological site potential due to previous disturbances. Additional archaeological assessment is not required within the ROWs, and those portions of the study corridor can be cleared of further archaeological concern;

- A Stage 2 archaeological assessment should be conducted on lands determined to have archaeological potential, if the proposed project is to impact these lands. This work will be done in accordance with the MCL's draft Standards and Guidelines for Consultant Archaeologists (MCL 2006), in order to identify any archaeological remains that may be present; and

- If the proposed undertaking is to impact the areas noted as "Vacant Lots" to the point of below-grade excavations, these activities should be subject to further archaeological investigation (i.e. detailed archival research) in order to document any significant archaeological features that may be present.

Hamilton
Public Works

Air Quality and Noise Fact Sheet

February 2009

Rapid Transit
MOVING HAMILTON FORWARD

Air Quality

Modelling was completed for 4 cases:

- 2008 – Existing conditions;
- 2031 – No-Build (no LRT);
- 2031 – with-LRT Scenario 1: 1-way LRT on Main and King and 1-way traffic on Main and King; and
- 2031 – with-LRT Scenario 2: 2-way LRT and 2-way traffic on King with 2-way traffic only on Main.

Findings:

1. The modelling results indicate that on an overall basis, both downtown LRT alignments (i.e. 2031 with-LRT Scenarios 1 and 2) result in a reduction of ambient CO, NO_x and $PM_{2.5}$ concentrations when compared to 2031 no-build case. This reduction is due to reduction in vehicular traffic volumes.

2. The study indicates that on an overall basis, a greater reduction was observed in the case of 2031 with-LRT scenario 1, versus the 2031 with-LRT scenario 2.

3. Reductions in CO, NO_x and $PM_{2.5}$ concentration was also observed for the 2031 no-build case when compared to the 2008 (existing) case. This is attributed to a reduction in vehicular emissions which are factored into the MOBILE6.2 *vehicular emission model. The reduction in vehicular emission is based on advancement in* engine and emission control technologies as well as expected improvement in fuel consumption.

4. Based on the results presented above, no air quality mitigation measures are required.

Noise

Modelling was completed for 4 cases:

- 2008 – Existing conditions;
- 2031 – No-Build (no LRT);
- 2031 – with-LRT Scenario 1: 1-way LRT on Main and King and 1-way traffic on Main and King; and
- 2031 – with-LRT Scenario 2: 2-way LRT and 2-way traffic on King with 2-way traffic only on Main.

The City has a Transportation and Noise Policy Paper which provides a guideline in assessing noise impacts for capital projects. The Policy Paper has recommended adoption of the MOE/MTO Noise Protocol for such assessments. The methodology is based on the change in the average 24-hour noise level from the future "build" and "no-build" scenarios. Low impact of the "build" scenario is defined as an increase of 5 dB above the "no-build" scenario, moderate impact is an increase of 5 to 10 dB, and a high impact is an increase of more than 10 dB.

Findings:

1. For 2031 with-LRT Scenario 1, the hourly sound level equivalent (Leq) at intersections along Main St. ranged from 71 to 77 dBA, and along King St. ranged from 68 to 79 dBA. In comparison to the 2031 No-Build case, the with-LRT Scenario 1 resulted in a slight overall decrease in noise levels long both Main St. as well as King St.

2. For 2031 with-LRT Scenario 2, the Leq (1-hr) at intersections along Main St. ranged from 71 to 77 dBA, and along King St. ranged from 69 to 77 dBA. In comparison to the 2031 No-Build case, the with-LRT Scenario 2 resulted in a slight overall decrease in noise levels long both Main St. as well as King St.

3. Based on the assumptions made in the acoustic modelling and the location of the receptors chosen for this acoustic impact study, the 2031 with-LRT Scenario 1 resulted in a slightly better (lower) noise environment in comparison to 2031 with-LRT Scenario 2. However, it must be noted that the difference between the Scenarios would not be perceptible as it is less than 3 dBA. The differences between the LRT Scenarios and the No-Build condition would also be imperceptible as the mean difference is less than 3 dBA.

4. Although it is anticipated that for both 2031 with-LRT Scenarios there will be a slight reduction in traffic noise when compared to the 2031 No-Build case, no noticeable impact, as defined by the joint MOE/MTO Noise Protocol, is anticipated.

5. Based on the findings presented above, no noise mitigation measures are required.

Note: The findings of the air quality and noise studies presented above are based on the modelling assumptions and information provided to Dillon at the time of completing this study.

Hamilton
Public Works

Consultation Fact Sheet

February 2009

Rapid Transit
MOVING HAMILTON FORWARD

Consultation

The City of Hamilton embarked on a vigorous public consultation program in the spring of 2008 to obtain the public's opinion on the Rapid Transit Initiative. The public consultation program approach reflected a two-way, open and proactive process for providing information to stakeholders. During the course of the consultation program, information about the Rapid Transit Initiative was presented on the project web site and local radio stations, and in municipal publications, newsletters, and local newspaper articles. In addition, surveys were developed and distributed to residents at fairs, in workshops and on the website. The following outlines the consultation activities that were undertaken.

Municipal Staff Consultation

Consultation with municipal staff, including Public Works (Transit, Capital Planning & Implementation, Energy, Fleet & Facilities, and Operations & Maintenance), Planning and Economic Development (Development Planning, Community Planning, Downtown and Community Renewal, Strategic Services and Special Projects, Real Estate, Parking and By-law Services), Corporate Services, Community Services, Emergency Services and Public Health Services included two Lunch and Learn sessions and two workshops. In the summer of 2008, Lunch & Learn sessions were held to educate City staff and to capture downtown commuters who are potential riders of a rapid transit system, many of whom presently commute to work using a single occupancy vehicle.

In the fall of 2008, a workshop was undertaken with municipal staff to update and engage staff, determine key contacts, understand any opportunities or challenges, and develop a vision statement that would guide rapid transit planning through to implementation. A follow-up workshop was held with municipal staff in February 2009 to provide an update on the information that has been gathered to date and to obtain comments on potential corridor and route alternative impacts.

Rapid Transit Vision Statement

Rapid Transit is more than just moving people from place to place. It is about providing a catalyst for the development of high quality, safe, environmentally sustainable and affordable transportation options for our citizens, connecting key destination points, stimulating economic development and revitalizing Hamilton.

Public Information Centres

Several Public Information Centres (PICs) were held between April 2008 and March 2009. Two public workshops were scheduled in May of 2008 following the completion of the Rapid Transit Feasibility Study (RTFS) Phase 1. The purposes of the PICs were to present information about the project and to receive public feedback on the type of Rapid Transit that should be pursued. In December 2008, two community

update meetings were held to provide the public with an update on Hamilton's Rapid Transit Initiative, Metrolinx' Regional Transportation Plan (RTP). Rapid Transit Team were also looking on input into the draft Vision Statement and how the public would like to participate in the planning process as the project moves forward.

Consultation with Corridor Property Owners

February 2009 marked the beginning of formal consultations with property corridor owners along the B-Line corridor. These sessions established a foundation and a positive working relationship to facilitate an information exchange which will continue over the course of the project. The workshops not only provided information about the project, but also engaged property owners to ask questions and provide comments in order for the City to better understand stakeholder issues and concerns.

Consultation with Technical Agencies

February 2009 also marked the beginning of consultations with technical agencies and organizations. Agencies included federal and provincial departments and ministries within an interest in the project, members of the Government Review Team and First Nations. A workshop was held on February 23, 2009 to establish a foundation and a positive working relationship to facilitate an information exchange which will continue over the course of the project. The workshop not only provided information about the project, but also engaged technical agencies to ask questions and provide comments in order for the City to better understand stakeholder issues and concerns. As the project proceeds, the City will continue its vigorous consultation program and continue collaboration with key agencies.

Consultation with Other Key Stakeholders

Between the May 2008 and March 2009, the Rapid Transit Initiative Team consulted with key stakeholders within the community. Consultations were undertaken with Metrolinx, a local realtors association, Hamilton International Airport, the Chambers of Commerce, St. Joseph's Hospital, Business Improvement Areas, tourism groups, local interest groups, anti-poverty groups, colleges and universities, and resident's associations. In addition, Rapid Transit Team members have attended numerous community events to discuss the initiative, have made presentations at Ward meetings, meet with community groups and other special interest groups.

A comprehensive communications plan has been developed in order to keep rapid transit momentum high and at the forefront of public interest and participation. The communications plan includes:

- Commitment to extensive two-way proactive consultation
- Meet early and often during the process
- Use of numerous communication channels to reach the widest audience possible
  - Web (FAQ's, Fact Sheets, Videos, Photos, comment forms, etc)
  - Media (PSA's, radio, tv, print, etc)
  - Newsletters and Project Updates
  - Targeted Meetings and Workshops (Technical Agency Committee, Stakeholder Groups {property owners, corridor tenants, community groups/organizations, et)
  - General Meetings and Workshops (Public Information Centres, Design Charettes etc)
  - Rapid Transit Team presence at Community Events, Fairs, Educational Events etc

Questions and comments on the Rapid Transit Initiative are welcome at any time either through the project website www.hamilton.ca/rapid-transit, direct project e-mail to rapidtransit@hamilton.ca or in person.

Hamilton
Public Works

Economic Potential Fact Sheet

February 2009

Rapid Transit
MOVING HAMILTON FORWARD

Supportive policies are in place to help shape corridor

Over the past decade a number of integrated transportation and land-use plans and policies have been put in place to enhance the economic potential of the B-Line rapid transit corridor. This includes the Downtown Transportation Master Plan, Downtown Secondary Plan, City-wide Transportation Master Plan, the Environmental Remediation and Site Enhancement Plan (ERASE) and the Draft Urban Structure Plan. The goals and objectives of these plans could be enhanced significantly by the introduction of corridor common binding physical element such as rapid transit.

Investments in corridor transportation capacity enhancements are required to serve growth

With an estimated capital cost of $540 million, the B-Line LRT represents a significant investment. Similarly, it is likely that the enhanced service will result in increased operating costs, in particular those related to maintaining a new type of vehicle (e.g. LRT vehicles), track and station infrastructure, and specialized maintenance facilities. However, it is to be expected that investments in transit would be required in the future regardless if Hamilton is to meet the objectives set out for Urban Growth Centres. The proposed LRT system should be able to address transportation capacity needs for at least 50 years.

All Hamilton residents benefit from rapid transit

Approximately 17% of the City's population and 20% of the City's employment are within 800 m of the B-Line corridor. Additionally, 80% of HSR's current routes connect to the B-Line corridor. This means that the probability of Hamilton residents benefiting from rapid transit is high. These benefits include travel time savings, increased travel time predictability and potentially reduced auto ownership and operating costs (currently estimated at more than $9000 per year by CAA). Less direct but still significant benefits include reduced accident costs, the value of which is some $2 million per year when comparing the rapid transit scenario to the base case scenario.

The potential for intensifying development in the corridor is significant

While the downtown core of Hamilton is already at the minimum target density of 200 persons plus jobs per hectare specified for Urban Growth Centres, the average density for the entire corridor is just 25 persons plus jobs per hectare. At the same time, there are close to 500 vacant parcels of land within a two kilometre radius of the corridor and a number of other developments such as strip plazas, gas stations, and private parking lots which could be easily re-developed into more transit supportive land uses. In addition to generating additional property taxes, it is estimated that the potential development charges from new development could be in the order of several hundred million dollars.

With rapid transit comes jobs

The implementation of rapid transit would have a direct effect on job creation in the initial design and construction stage, as well as in the ongoing operations and maintenance phase. It is estimated based on accepted industry multipliers that some 6,000 jobs would be created due to construction expenditures combined with over 1,000 ongoing jobs due to on-going operations and maintenance.

Economic Potential Fact Sheet

February 2009

Environmental benefits translate into economic benefits

The net impact of rapid transit on reducing air emissions is expected to be positive, although somewhat offset by reduced auto speeds and localized congestion. Preliminary modelling results suggest that the annual emissions costs due to travel in the study area could be reduced by approximately 7.5% equating to some $2 million annually.

An exceptional mix of land uses in the corridor will enhance economic activity

Due to its evolution over the past century, land uses in the corridor are highly mixed and include restaurants, places of worship, shopping, post secondary institutions, museums and public schools as well as a variety of office and residential uses. In addition to contributing to a very cost-efficient transit service (i.e. travel patterns bi-directional and spread out over the day) it also suggests that rapid transit could contribute to increased opportunities for economic and other activities.

The proposed rapid transit corridor covers areas of relatively high social need

Persons with social needs may include those who are unemployed, lone parent families, low educational attainment, low income or high rates of government assistance. The B-Line corridor stands out within Hamilton as well as regionally, provincially, and nationally in every category except for its proportion of seniors. For example, 35% of people living in the corridor are classified as low income compared to the national average of 15%. The implementation of rapid transit should be positive in that it provides these individuals with greater access to employment opportunities and health and wellness activities, but cautioned must be exercised so as not to displace these individuals from the corridor.

Economic potential should be maximized by constructing a single corridor

Notwithstanding any differences in construction and operating costs, which should be lower for a single corridor, there may be other less direct economic impacts of a single versus split corridor. For example a developer may be less attracted to a site with direct access to only one direction of rapid transit with the other direction being several hundred meters away in some cases.

Economic benefits are contingent on significantly changing land-use

The B-Line corridor is generally well served by transit today and there are many enhancements such as transit signal priority measures, increased service frequencies and improved passenger amenities that could be made to increase overall transportation accessibility and attractiveness. Similarly, development activity will continue in the corridor under the status quo scenario. Therefore, in order to realize significant net positive economic impacts compared to the base case, land uses within the corridor must be permitted to, and encouraged to, change and intensify significantly. Fortunately, the City of Hamilton has already started to move in this direction with its policies and plans. Rapid transit has the potential to define economic development in the city over the coming decades.

Hamilton
Public Works

Hydrogeology Fact Sheet

February 2009

Rapid Transit
MOVING HAMILTON FORWARD

Existing Conditions

- The majority of the study area alignment is heavily urbanized with significant building structures along the central corridor. The topography is typically flat, with the exception of Coldwater Creek, the Chedoke Creek Area (403 corridor) and the Red Hill Creek Valley.
- Both Main Street and King Street are heavily encumbered with underground utilities, which can be found at depths ranging from 1.6 - 9.0 m below ground surface. These may act as a conduit for water due to use of granular backfill around the utilities;
- Historical water wells were not identified directly adjacent to the proposed B-Line route, with the exception of a few wells to the east of the Red Hill Creek Valley, and on the west end near Cootes Drive. These wells are unlikely to be connected or utilized. No information pertaining to septic systems was reviewed;
- The geology and hydrogeology of the alignment can be divided into three sections:
    1. West of Highway 403 (including Chedoke Valley). This area consists of a 6 to 8 m thick zone of interbedded silts and silty sand. The silty sand units are expected to hold perched groundwater that may require groundwater control during construction.
    2. East of Highway 403 to approximately Parkdale Ave. This area is characterized by a subsurface silty sand unit and an underlying coarser sand unit that stretches from the Chedoke Valley towards Ottawa Street, where it pinches out. These sand units are expected to contain a groundwater table, which in the core area will require dewatering to accommodate movement of deep infrastructure.
    3. East of Parkdale Avenue, including Red Hill Creek Valley. This area, with the exception of localized areas associated with the Red Hill Creek, generally consists of clay till, and as such, is not expected to be hydraulically active.

Potential Impacts and Mitigation Considerations

The construction of the LRT will be completed at existing grade, such that no significant excavation will occur along the corridor.

- On the basis of the above, no significant hydrogeological impacts are expected;
- Potential for lateral movement of infrastructure (eg. deeper excavations) will require consideration of short term hydrogeological impacts
- We expect dewatering to be required where silty sand and coarse sand is present within the study area.
- There were references to soil and groundwater contamination in some of the environmental reports for both Main Street and King Street. A Phase I review of available information should be conducted to identify actual and potential sources of contamination along the selected route, followed by development of contingency plans to handle the contaminated materials during construction

Preliminary Input regarding Downtown Alignment Alternatives

Based on what we have reviewed to date, there are no downtown alignment preferences based on hydrogeology. We suggest that the potential for encountering impacts from adjacent potentially contaminated sites be assessed.

Hamilton
Public Works

Potential Market for Made-in-Hamilton Light Rail Transit Vehicles and Systems Fact Sheet

March 2009

Rapid Transit
MOVING HAMILTON FORWARD

Overview

Hamilton has a long history in the steel and manufacturing industries. While the city's economy has become more diversified since the 1970s, manufacturing still pays a prominent role in the city's economic and social development. The newly relocated CANMET Materials Research Laboratory (2010) at the McMaster Innovation Park recognizes the prominent role Hamilton plays in the province's manufacturing industry. The potential use of light rail technology in the City of Hamilton, and across the Greater Toronto Hamilton Area (GTHA) market provides an opportunity for the local manufacturing industry to diversify its manufacturing base and build light rail vehicles (LRVs) and supporting components. This builds on Hamilton's steelmaking base and supporting industries such as National Steel Car.

Locally Designed and Built

Portland Iron Works

A resurgence of Light Rail and Streetcar projects throughout the United States has sparked interest among key stakeholders to consider developing light rail technologies locally and to facilitate local design and construction. The first effort occurred in 2007 in Portland, Oregon with a $4 million contract to build streetcars similar to the ones supplied by Skoda of the Czech Republic, by United Streetcar, a subsidiary of Portland Iron Works Inc. This streetcar contract was the first of its kind in the United States. However, in Canada, parts of the Vancouver Skytrain and TTC streetcars are designed and built locally by Bombardier (Burnaby, BC, Thunder Bay, ON & Quebec), a Canadian company.

European Experience

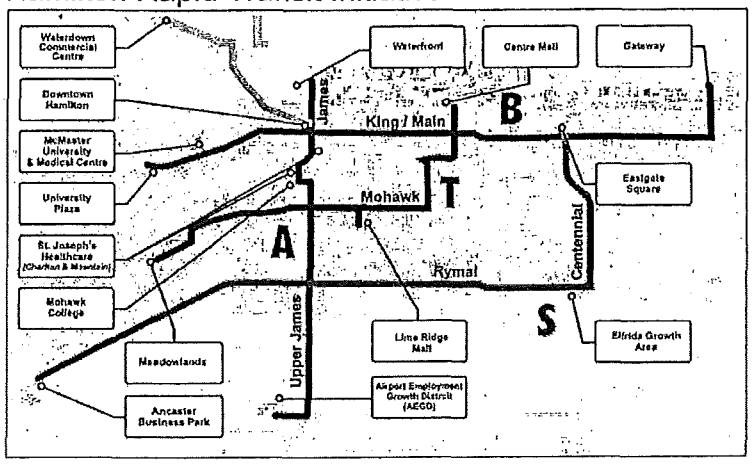
Even with the resurgence of rail technology in North America, streetcars are still much more popular in Europe, one of the largest markets for rail technology in the world. The major light rail manufacturers, Bombardier, Siemens and Alstom manufacture most of their trains and components in Europe. Bombardier also has manufacturing facilities in Thunder Bay, which make TTC streetcars and components of the SkyTrain. Siemens, based in Germany, has a manufacturing plant in Sacramento California, which builds much of Portland and Calgary's rolling stock. However, there is a large potential to build more LRVs in the GTHA, especially with the province's MoveOntario 2020 initiative currently underway, representing an initial investment of $11.5 billion in rapid transit projects.

MoveOntario 2020, Regional Transportation Plan (RTP) and LRT

The Big Move represents a potentially large light rail vehicle demand when the TTC's Transit City, the proposed Hamilton Rapid Transit system and York Region transit plans are taken into account. In addition, according to the RTP, as the regional transportation system matures and ridership increases, those regions running bus rapid transit (BRT) systems may be considered as potential areas for LRT upgrades. The potential demand for LRT is anticipated to grow, beyond the initial investment, as additional potential LRT rapid transit lines in Toronto and Hamilton are built and Canadian content policies are applied to the implementation of these systems.

GTHA Rapid Transit Plans & Timing

Hamilton Rapid Transit Initiative



Top 15 priority projects

- B-Line (East-West): McMaster to University Plaza
- A-Line (North-South): Waterfront to Airport

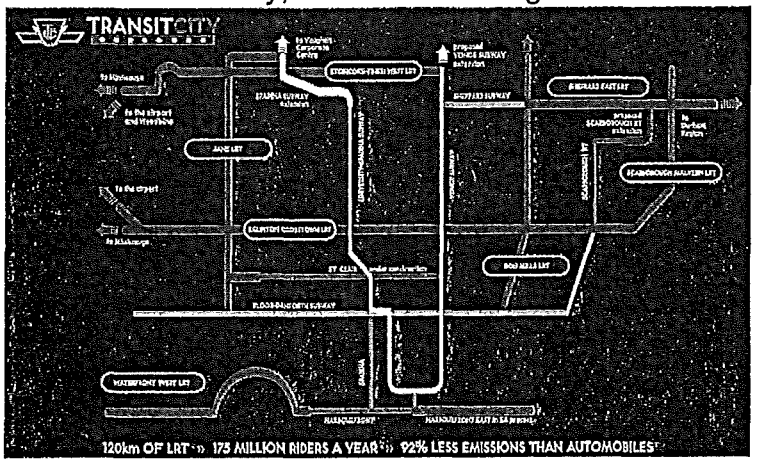
16 - 25 Year Projects

- T-Line: Centre Mall to Meadowlands

Beyond 25 Years

- S-Line: Eastgate Square to Ancaster Business Park
- L-Line: Downtown to Waterdown

Toronto Transit City, GO and York Region Connections



Top 15 priority projects

- Rail link between Union Station and Pearson Airport
- Spadina Subway extension to Vaughan
- Corporate Centre
- Yonge Subway capacity improvements and
- extension to Richmond Hill
- Eglinton rapid transit from Pearson Airport
- to Scarborough Centre
- Finch/Sheppard rapid transit from Pearson Airport to Scarborough Centre and Meadowvale Road
- Upgrade and extension of the Scarborough Rapid Transit line
- Extension of GO Rail service to Bowmanville

25 Year Projects

- A new subway service in the King/Queen corridor in Downtown Toronto
- Durham, Toronto and York will be connected by a new rapid transit service

Beyond 25 Years

- A direct Express Rail link between Mississauga City Centre and Union Station
- East-west Express Rail connecting the GTA

Further opportunities may also exist for a Hamilton based manufacturer to service future LRT lines across Canada. This would include commuter lines, such as those operated by GO transit, which could use smaller, lighter vehicles for high speed lines.

Opportunities for Hamilton Manufacturing

Hamilton's manufacturing base, along with its green energy potential could be coupled together to:

- **Work with local steel and manufacturing expertise to design and manufacture light rail vehicle (LRVs) and light rail transit (LRT) system components:**
  - Bogies (wheel base, axels, suspension systems, breaking system and drives)
  - Metal track components and wheels
  - Exterior metal/fiberglass/alumni shells
  - Concrete and polymers for embedded track and power supply poles
  - DC motors for propulsion systems
  - Electricity supply systems and wires
  - Electricity collection systems on-board the train
  - Passenger information systems and display screens
  - Station design and construction with passenger information systems, metal framing, lighting, concrete, local art and advanced urban and transit oriented design features
- **Provide engineering services for signaling and train automation systems**
- **Produce local green energy to supply electricity to the LRT**

An Inclusive Process

Overall this concept has merit, with extensive potential; however, it requires an in-depth knowledge of the current state of LRT manufacturing on the continent. Companies such as National Steelcar could be leaders in understanding what needs to be taken into consideration when designing manufacturing processes for steel rails and wheels, fiberglass bodies and other key components.

Fixed Infrastructure means Sustainable Prosperity

Gauging the amount of manufacturing expertise that currently exists in Hamilton is the first step to building a sustainable LRV manufacturing base. Hamilton manufacturers could develop a business case that promotes and builds on existing expertise and its existing capacity to begin manufacturing immediately, distinguishing it from other GTHA neighbors. In addition, maintenance parts for LRVs will be important renewable components to manufacture for all North America's transit systems. The benefit of fixed infrastructure ensures that the market for replacement parts and train body upgrades will be sustained over time. This market is further stabilized by a LRV customer base consisting mainly of local and regional governments or public-private partners.

Hamilton
Public Works

Operating Costs Fact Sheet

February 2009

Rapid Transit
MOVING HAMILTON FORWARD

What are Operating and Maintenance Costs?

Modern light rail transit (LRT) vehicles, like all mechanized devices, have costs associated with their operation. These costs include the maintenance of the vehicle, tracks, stations and power infrastructure. They also include the costs to operate the vehicle, such as driver salaries and electric power supply. Many of these costs are similar to those incurred by other transit vehicles such as busses and heavy trains. Proper operating and maintenance is vital to ensuring a high level of reliability and to maximizing the operating life expectancy of the system. It also helps protect the city's investment by maintaining a positive image and high level of service.

Costing Issues

The majority of the capital costs for the Hamilton Rapid Transit project will be funded by the province. Therefore, it is important to project realistic operating and maintenance costs for the system, since it represents the greatest on-going cost to the city. Some transit literature and research indicates that LRT systems are less expensive to operate then bus-based systems. Others have concluded that the opposite is true. It is important to be cautious as to how this comparison is made and what is being compared. For instance, basing the comparison on a per-vehicle factor, may bias the results because each LRT holds as many passengers as 2 - 4 busses (depending on the length of the train). Furthermore, one must ensure that the comparison is fair. As an example, if station maintenance is included in the LRT costs then it should also be included in the cost of bus operation.

Examining Transit Data

One way to estimate operating and maintenance costs is to examine the data from other cities which operate both LRT and bus systems. The United States National Transit Database collects the capital, operating and maintenance costs for all transit operators in the country. Data for Portland, OR, Minneapolis, MN, and other major North American cities which operate multiple modes of transit were analyzed (see table 1). The results were compiled as direct costs, cost per passenger mile traveled (PMT) and costs per unlinked passenger trip (UPT). Passenger Miles Traveled (PMT) is the cumulative sum of the distances traveled by each passenger; Unlinked Passenger Trips (UPT) is the total number of passengers who board transit vehicles per mode. These measures allow a fair comparison to be made between different transit modes by making the data relative to the usage rate of each system.

Results

As illustrated in Table 1, it is clear that on average the operating and maintenance costs for LRT systems throughout North America are significantly less than the costs to operate bus systems. The savings are as high as 60% (Houston TX) and in some cases, bus costs were less than LRT costs (Pittsburgh). Results

were not always similar between the PMT and UPT measures. For instance, in Pittsburgh, there was savings per passenger mile, but extra costs when the data was analyzed per unlinked passenger trip. In Pittsburgh, the low population may also have an effect, given the data, which indicates that populations of less than 300,000 may not efficiently support an LRT system.

Table 1: Operating and Maintenance Costs for Selected North American Cities by Passenger Miles Traveled and Unlinked Passenger Trips

City, State	Population	Per PMT		% Diff*	Per UPT		% Diff*
		Bus	LRT		Bus	LRT	
Denver, CO	588,349	$0.67	$0.34	**-49%**	$3.60	$2.17	**-40%**
Houston, TX	2,208,180	$0.55	$0.53	**-4%**	$3.18	$1.29	**-59%**
Minneapolis, MN	377,392	$0.72	$0.42	**-42%**	$3.20	$2.41	**-25%**
Pittsburgh, PA	311,218	$0.90	$1.23	**-37%**	$4.29	$6.00	40%
Portland, OR	550,396	$0.93	$0.39	**-58%**	$3.27	$2.04	**-38%**
San Diego, CA	1,266,731	$0.71	$0.27	**-62%**	$2.62	$1.59	**-39%**

*The % Difference indicates the difference between the LRT and BRT values. If the LRT value is less than the BRT value, then a negative percentage is shown.

Hamilton's population is similar to that of Portland's and Denver's, and therefore would be well suited for BRT or LRT. Also, many of the cities which demonstrated low LRT operating costs have complimentary planning policies that support transit oriented development. When comparing the operating costs for bus and LRT in the same corridor, it is clear that based on the NTD data, an LRT system would have reduced costs and a lessened burden on taxes than a bus service. However, upon further analysis there may be reasons for this trend that clarify the outcomes, as demonstrated below.

Analysis

The evidence presented is inconclusive because the bus system, by its very nature, operates in corridors of low ridership to feed the major transit trunk lines. Bus Rapid Transit (BRT) and LRT systems are usually placed in areas with the highest potential for ridership. Since ridership is the variable which effects the cost per rider trip measure, costs measured per trip would favor LRT and BRT trunk lines. A better comparison would be to evaluate BRT and LRT in the same corridor. This cannot be done in practice, because a trunk line usually contains one mode or the other. However, one can do this theoretically by varying parameters and mathematically modeling a sample transit system.

Eric Bruun (2005) performed one such study published in the Transportation Research Record in 2005. His study estimated operating cost differences for BRT and LRT using a parametric cost model and National Transit Database (NTD) information. The study assumed train sizes of 28 m and bus sizes of 18 m. Marginal cost estimates were included to more accurately describe peak hour demand costs, when additional vehicles are required to meet demand. The study was completed for a medium sized city, based on Dallas Texas and using the data from all cities reporting in the NTD. It was also assumed that the cost to operate one light rail vehicle (LRV) per year is $1.4 million; the cost for one bus per year is $600 000; and the cost for one BRT is between $835,000 to $934,000 per vehicle per year, depending on the upgrades over a standard articulated vehicle the bus has. This extra cost for BRT was assumed given its train like operation such as dedicated right of way, possible variation in power supply from traditional busses, cost to maintain a fleet that differs from the standard, and emissions and drive technologies.

While it is clear that on a per vehicle basis, LRT systems are the more expensive, the findings indicate that if the peak ridership demand of the system is 1556 passenger spaces (both seated and standing

passengers) per hour or less, then BRT provides a better cost effectiveness than LRT. However, as peak demand increases, the LRT system becomes significantly less costly to operate than a bus or BRT system (24% less expensive). BRT costs increase at a constant rate as ridership grows since each bus needs an additional driver. However, LRT systems only increase in cost when a new driver is needed for an additional train, which is equivalent to 2 to 4 busses. LRT also becomes more attractive and less costly to operate than BRT, as service becomes more frequent and headways decrease, to provide increased capacity. Using the NTD data, as outlined in Figure 1 the marginal cost increase for LRT is significantly less than busses or BRT. This gives LRT the advantage if off peak demand is expected to increase in the future.

This data analysis agrees with the previous findings that LRT was less expensive to operate in most cities because it operates in areas of high ridership potential and short headways. The converse is also true; installing LRT systems in areas of low ridership, larger headways and slow growth will make them very costly to operate. In order to determine if Hamilton would benefit from LRT or BRT, solely on the basis of operating costs, this same parameterized analysis could be done for Hamilton specific information. We can also use this research in conjunction with research completed by IBI Group to develop general rules which can guide our decision making.

Other Research

Additional research conducted by the United States General Accounting Office (GAO) and the City of Houston, Texas, provide additional balanced research comparing the cost of LRT and BRT. According to the GAO results are mixed when comparing LRT and BRT operating costs. Results varied between cities which could possibly be attributed to the configuration of the transit network, urban planning strategies, types of vehicles used, the financial climate of the region and several other factors. While this evidence does not provide a definitive answer as to which technology is cheaper, it confirms that, depending on the system characteristics, operating and maintenance costs for LRT can be less costly than BRT and vice versa (GAO, 2001)

The Houston Evaluation for Build Alternatives: Major Investment Study/Environmental Assessment, Conducted by the Metropolitan Transit Authority of Harris County, Texas in 1999 found that the benefits of LRT over BRT were quite numerous, while the operating costs were similar (MTAHC, 1999).

Conclusion

The examination of gross operating costs for transit vehicles looks at one aspect of a much larger and more intricate analysis. The net operating costs are of particular interest and depend on a variety of factors including ridership. In addition to costing data, the projected economic spin-offs, increase in property values, and increase in transit oriented development all play a role in the success of the system and its cost over its entire life-cycle. When analyzing costing data or deciding between two alternatives, the overall benefits of the system will play a much larger role in decision making than a focus on operating costs, especially when these benefits off-set the costs immensely.

This analysis focused on gross operating costs in order to examine one piece of the overall puzzle. It identified that at 1800 passenger spaces per hour the cost to operate BRT is higher than the cost of operating LRT. The specific number for Hamilton, in terms of passenger spaces per hour, may differ from this value, as it is based on averaged data from a variety of American cities. While this acts as a solid guideline; Hamilton specific data may be helpful in obtaining a more definitive result. However, it is clear from the analysis that LRT, given the proper amount of transit oriented development and ridership numbers, can be a viable option over other forms of transit.

Figure 1 - Costing Data from Eric Brunn's Mathematical Paramaterization Research (Bruun, 2005)

TABLE 6 Trunk Line Service Comparison with Peak Service Added for 6 h per Weekday

Service Condition	h (min.)	*N*	Line Capacity (spaces/hour)	Annual Cost (1000)	Cost per Space-km	If Added Off-Peak	Cost per Space-km
LRT							
Base service	15	5	744	$6,907	$0.038	N/A	N/A
Add 1st car to each consist	15	10	1488	$2,285	$0.054	$470.9	$0.011
Add 2nd car to each consist	15	15	2232	$2,285	$0.054	$470.9	$0.011
Add 3-car train to line	12.5	18	2678	$1,513	$0.059	$424.7	$0.017
Add 2nd train to line	10.7	21	3125	$1,513	$0.059	$424.7	$0.017
Add 3rd train to line	9.4	24	3561	$1,513	$0.059	$424.7	$0.017
BRT $Z = 1.2$							
Base service for equal budget	9.25	8	778	approx. $6,907	$0.037	N/A	N/A
Add to double capacity	4.6	16	1556	$2,524	$0.057	$1,257	$0.029
Add to triple capacity*	3.1	24	2334	$2,524	$0.057	$1,257	$0.029
Same capacity as LRT h = 12.5*	2.68	28	2687	$1,262	$0.057	$628.3	$0.029
BRT $Z = 1.4$							
Base for equal budget	10.6	7	679	approx. $6,907	$0.041	N/A	N/A
Add to double capacity	5.3	14	1358	$2,576	$0.067	$1,466	$0.038
Add to triple capacity*	3.5	21	2037	$2,576	$0.067	$1,466	$0.038
Same capacity as LRT h = 12.5*	2.68	28	2687	$2,576	$0.067	$1,466	$0.038
Tangential bus							
Unit cost for 18-h service	15	1	320	$593.5	$0.056	$593.5	$0.056
Base network costs							
LRT	15	20		$27,600			
BRT $Z = 1.2$	15	32		$27,600			
BRT $Z = 1.4$	15	28		$27,600			
Tangential bus	15	258		$153,100			

*Headway and revenue speed may not be maintainable.

References

Bruun, E. (2005). Bus Rapid Transit and Light Rail: Comparing Operating Costs with a Parametric Cost Model. *Transportation Research Record: Journal of the Transportation Research Board.* 1927 (11–21).

General Accounting Office [GAO]. (2001). Mass *Transit: Bus Rapid Transit Shows Promise*. Washington, DC: United States General Accounting Office.

Metropolitan Transit Authority of Harris County [MTAHC]. (1999). *The Houston Evaluation for Build Alternatives: Major Investment Study/Environmental Assessment.* Houston, TX: MTHAC.

National Transit Database. (2007). TS 2.1: Service Data and Operating Expenses Time-Series by Mode (Self-extracting xls). Washington, DC: National Transit Database, Federal Transit Adiministration.

Hamilton
Public Works

Rapid Transit Feasibility Study Phase 1 & 2 Fact Sheet

November 2008

Rapid Transit
MOVING HAMILTON FORWARD

RAPID TRANSIT FEASIBILITY STUDY (PHASE 1)

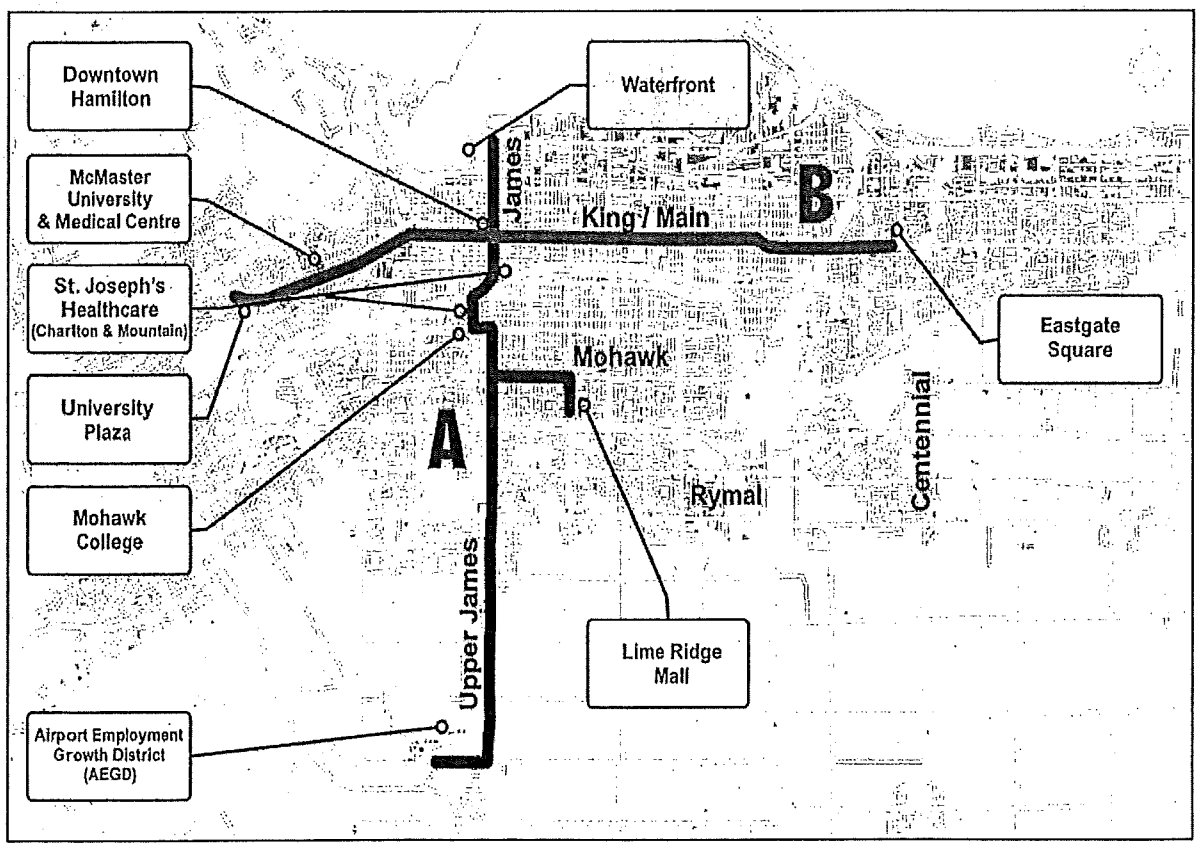
- Initiated Rapid Transit Feasibility Study Phase 1 in November 2007 as a result of Province's MoveOntario 2020 announcement in anticipation of Provincial Funding for Rapid Transit in Hamilton.
- The study focused on the two corridors identified for Rapid Transit in Hamilton's Transportation Master Plan (May 2007) and the Province's MoveOntario 2020 Vision (June 2007):
  - East – West from Eastgate Plaza to University Plaza (B-Line)
  - North-South from the Waterfront to Hamilton International Airport (A-Line)
- Focused on opportunities and constraints in regards to technologies (BRT vs. LRT), parking and loading impacts, traffic impacts, built form, environment, capital cost estimates and operating requirements.
- Assumes that the existing right-of-way widths would not be significantly changed.
- Study identified specific areas for future considerations including the escarpment grade (A-line), impacts to lane widths, impacts to existing structures, impacts to parking/loading, pros/cons of both LRT and BRT and considerations specific to each corridor, including potential cross-sections.
- The Study confirmed that both LRT and BRT are feasible to implement in Hamilton along both the B-Line and the A-line, provided engineering solutions are introduced to address constraints identified.

RAPID TRANSIT FEASIBILITY STUDY (PHASE 2)

- Initiate Rapid Transit Feasibility Study Phase 2 in July 2007 to further review the opportunities and constraints of implementing rapid transit in Hamilton along the proposed corridors (A-Line and B-Line).

- Phase 2 focused on light rail transit (LRT), given strong community support for the system in Hamilton.
- Phase 2 investigated the Claremont Access as an alternative route for LRT to traverse the escarpment (A-Line), lane reduction impacts along the B-Line and a staging analysis for implementing LRT in Hamilton
- Staging Analysis suggests the east-west corridor (B-line) would be the best initial investment in terms of cost effectiveness and benefit to the community
- Along the B-line, land impacts are anticipated to be minimal (stations and intersections) and opportunities exist for exclusive transit lane operation for the entire length of the B-Line.
- Along the A-line, it is feasible to use the Claremont Access to traverse the escarpment but further study is recommended given the impacts of using the Claremont Access on the overall system (increased travel time, longer track required, missing key nodes, etc).
- Prepared Terms of Reference for future studies and functional design

Phase 1 & 2 Rapid Transit Corridor Map (B & A Line)



Hamilton
Public Works

Route Alternatives Fact Sheet

February 2009

Rapid Transit
MOVING HAMILTON FORWARD

Route Alternatives between Paradise Road and the Delta

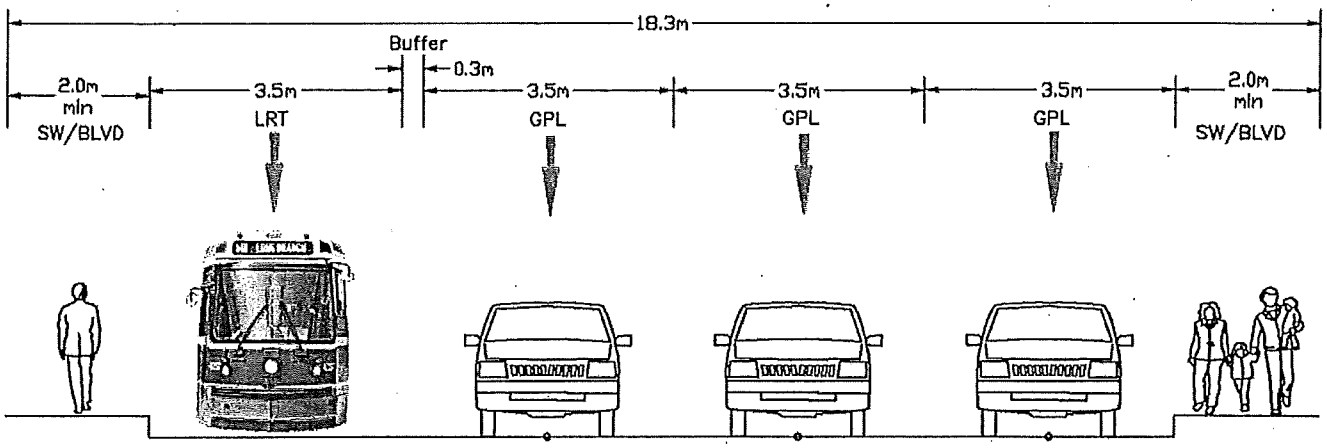
- Purpose of the investigation - to examine the range of service and route location options for the B-Line corridor, particularly between Paradise Road and the Delta
- LRT planning guidelines include exclusive operation with dedicated lanes wherever possible, increased stop spacing with larger vehicles, proof of payment fare system, raised pedestrian platforms at stops, median operation on two way streets, local road and driveway access restrictions for curb LRT service, physical separation from GPL's if possible
- At-grade operation investigated to minimize costs and maximize economic benefits
- Recap – median LRT operation proposed on Main Street between University Plaza and Paradise Road and on Queenston Road between Eastgate Square and the Queenston Traffic Circle with essentially the same number of general purpose lanes (GPL's) retained
- Confirm - median LRT operation proposed on Main Street between the Delta and the Queenston Traffic Circle with a reduction in GPL's from two to one in each direction
- Two options for the corridor segment between Paradise Road and the Delta
    - Option A – convert both King Street and Main Street to two-way operation, with median LRT operation on King Street
    - Option B – retain one-way operation with LRT in curb lane or in second lane
    - Contra-flow schemes not recommended for safety reasons
- Common issues and implications – constricted ROW, requirements for widening at stations and where left-turn lanes required, limitations on stopping, parking and loading, need for context-sensitive design and even shared space alternatives in some sections
- Current traffic volumes in the King-Main Corridor will have to reduce by 30-40% through increased use of transit, TDM, and diversions to alternate routes
- A doubling of current transit usage is necessary, supported by changes in parking policies and costs, road and traffic control changes including the Hwy 403 ramps, supportive land use policies, and suburban park'n'ride facilities
- Improvements in transit service cannot wait – they must start shaping demand now
- Construction staging will be very important to limit mobility impacts up to system commissioning
- It would be prudent to limit reductions in arterial road capacities prior to LRT system implementation

Rapid Transit Route Alternatives Fact Sheet

MOVING HAMILTON FORWARD

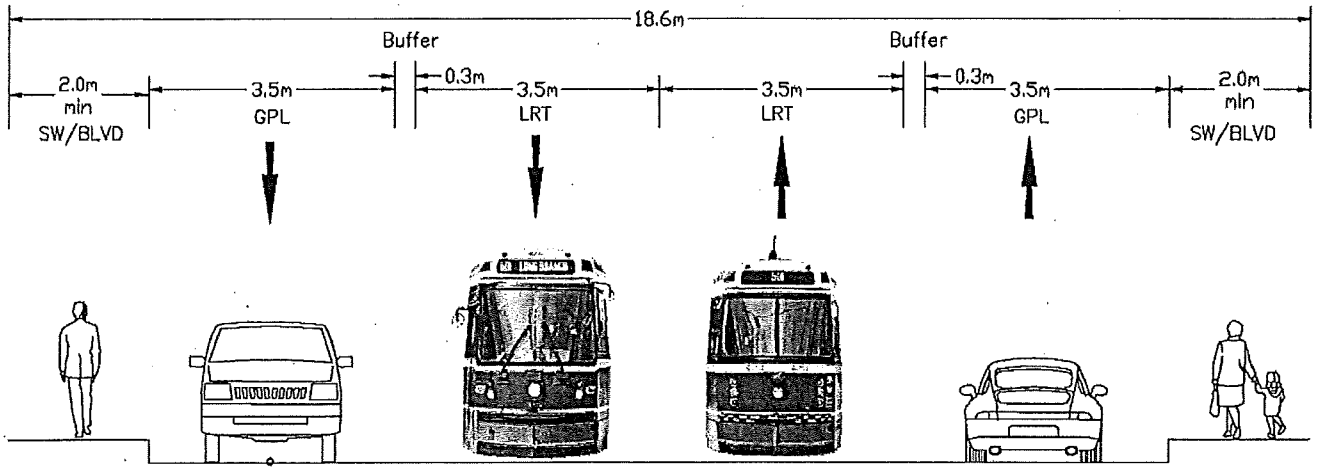
February 2009

Typical Cross-section (LRT on Main and King, One-way)



ALTERNATIVE:
ONE–WAY LRT OPERATION

Typical Cross-section (LRT on King Street Only, Two-way)



ALTERNATIVE:
TWO–WAY LRT OPERATION

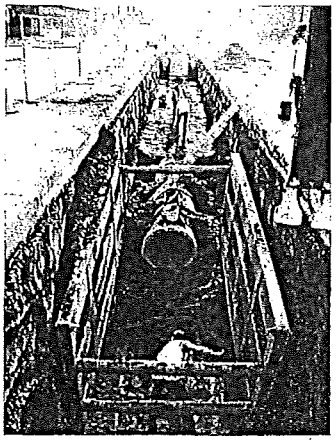
Hamilton
Public Works

Subsurface Infrastructure Costing Fact Sheet

April 2009

Rapid Transit
MOVING HAMILTON FORWARD

Subsurface Infrastructure and Cleareances



In terms of Rapid Transit system design and construction, Hamilton's subsurface infrastructure is comprised of all buried serviced in the transit corridor. This includes watermains, sewers, gas lines, electrical utilities and communications infrastructure, as well as the track bed which supports the light rail vehicle. In most recent LRT system designs in North America, clearance areas of 5 to 10 feet below and adjacent to the tracks, have been established where no parallel infrastructure should be located.

Clearance zones are established for a variety of reasons. The most important reason being that LRT service must be interrupted when subsurface infrastructure parallel to the tracks require servicing. To avoid disruption, the underground network should be configured so that delays to the LRT system are minimized or eliminated. In this case any direct physical conflict, such as a manhole in the right-of-way or operational encroachment in the clearance envelope of the LRT should be eliminated. This ensures the safety of road workers and ensures that the LRT corridor is not disrupted by adjacent road work. Subsurface infrastructure must also be moved out of the train clearance envelope to minimize degradation from the light rail vehicle's load and vibration forces and to minimize the possibility of corrosion from stray currents along the LRT track flowing to municipal infrastructure.

Utility Free Zone

Transport Canada and other authorities have guidelines regarding the clearance envelope surrounding rail tracks, which defines the utility-free zone where no infrastructure can be installed. Only infrastructure which crosses perpendicular to the track should be maintained in the utility-free zone, provided it is protected from surface loading and stray current. While most utilities parallel to the tracks would have to be abandoned or relocated, many of the sewers which are deep enough to be out of the utility-free zone can be accessed by offset manholes. These manholes do not lie directly over the sewers; rather they are located diagonally sideways from the sewer line. However, it may still be desirable to relocate the sewers entirely.

The depth of the utility-free zone takes into account the vehicle weight loading on the tracks. In a typical LRT design, the weight of the LRV is concentrated at the track which transmits forces downward and sideways from the point where the wheel makes contact with the track. In the Subsurface Infrastructure (SI) Report (AECOM, 2009), it was determined that for flexible and rigid buried pipe the underground clearance (from the surface to the top of pipe) is 11 ft (3.35 m) and 10 ft (3.05 m), respectively. A pipe located within this zone would suffer damage from the train's loading forces over time. Horizontally, pipes within 3 to 5 m

of the LRT centreline should be evaluated for risk factors, including possible hazards to the LRT or workers, if the pipe needs to be repaired.

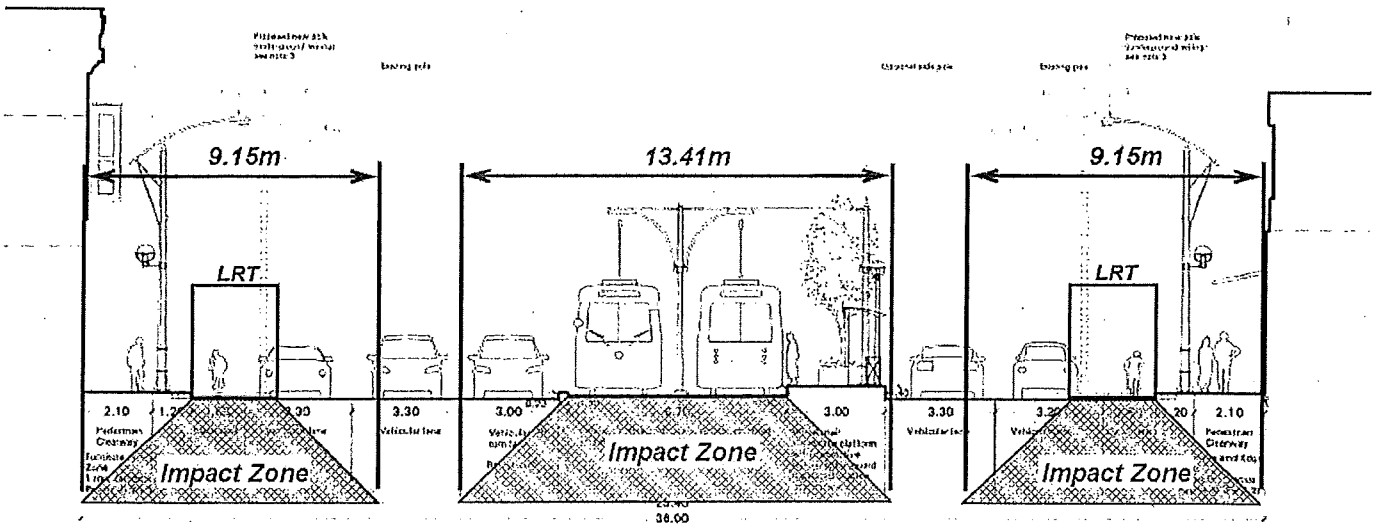


Figure 1: Impact zones for typical LRT street configurations which outline the utility free zone

Optimal LRT Corridor

Traditionally water pipe and sewer lines are installed in the centre of the road and other utilities to the sides of the road. An LRT system with a median right of way would impact municipal infrastructure to a greater extent than it would impact other utility relocations. In modern street designs, infrastructure is generally built near the curbside rather than the median. In Hamilton's case, building the LRT in the median of Main or King Street in the downtown core, where there are one way streets, could possibly be more expensive, given the age of the road network in the core. However, a median right of way on Main Street West and Queenston Road after the Delta would generally be considered a more feasible configuration.

The SI Report (AECOM, 2009) confirms this hypothesis. An LRT configuration which consists of the LRT traveling west along King Street at the curbside and east along Main Street at the curbside, from the Delta to Highway 403, is less expensive to build then if the LRT runs exclusively along King Street in the median from the Delta to Highway 403. An examination of figure 1 visually confirms that the impact zone along the median is larger, impacting more infrastructure in the CBD.

Cost of Infrastructure Impacts

The cost of impacted infrastructure relocation depends on the complexity of the corridor, ease of access to subsurface infrastructure, amount of disruption to transit service that can be tolerated and the inherent safety risks in accessing the infrastructure. It is generally 10% to 20% of the total project cost. The costing data contained in the SI Report (AECOM, 2009) was based on the following assumptions:

- All sewer and water infrastructure within the LRT right-of-way that parallels the LRT must be relocated because access to maintain the asset will be severely or completely restricted.
- All "branch" sewer mains that currently enter the LRT right-of-way and connect to a "trunk" sewer within the LRT right-of-way must be reconnected when the trunk sewer is relocated. For simplicity, it

is assumed that each affected branch sewer will require an extension or replacement of 7.5m. It is also assumed that half of those branch sewers will extend through to the other side of the LRT, and that any passing through the structural impact zone will require structural assessment.

- All sewer mains that cross completely through the LRT right-of-way, are below the structural impact zone, and are readily accessible via manholes on both sides of the LRT right-of-way, will remain in place. Of course, inspection may reveal that some of these assets are deteriorated and must be repaired or replaced, but these costs are not included in this projection.
- All sewers that cross completely through the LRT right-of-way as above, but are within the structural impact zone, must undergo structural assessment. Costs to perform these assessments are included in the projection. Costs of pipe replacements required due to insufficient strength are not included in the projection.
- All water mains that cross into or through the LRT right-of-way must be replaced and installed in a casing pipe. Since it may be prudent to replace aged water mains within the right-of-way, each replacement is assumed to be 15m in length.
- All sewer and water services entering the LRT right-of-way must be replaced within the right-of-way.
- Each replacement is assumed to be 15m in length. Any structural assessments are considered to be included in the construction design cost.
- All water main valve and hydrant relocations are considered inclusive in the costs of main relocation.
- All catch basins within the LRT right-of-way must be relocated (AECOM, 2009).

The City also completed work on the impacts of moving water and wastewater infrastructure on other utilities that are not directly affected but may need to move when water/wastewater infrastructure is relocated. The utilities are not responsible for paying the full price of relocation. If no agreement between the utility and the city exists then the city and utility share the costs of labour and labour saving devices, 50% each and the utility covers the cost of materials at 100%. Where an agreement exists the breakdown is as follows: gas lines installed after 1981, 35% City, 65% Union Gas; gas lines installed before 1981, 100% Union Gas; municipal water & sewer = 100% of costs to the City.

Based on these assumptions and the data collected by the city, the total cost impact on subsurface infrastructure is estimated to be $70 million in the one-way street configuration in the CBD; and $100 million for the two-way street configuration and LRT only on King Street in the CBD (AECOM, 2009). The full breakdown can be found in the table 1 and includes the costs to relocate utilities that are disrupted as other municipal piping is moved to clear the right of way.

Table 1: Projected Costs to Mitigate the Impact of LRT Development

	Configuration of the CBD (Hwy 403 to Delta)	
Infrastructure Type	1 way on Main St and 1 Way on King Street (Curbside)	2 way on King Street Only (Median)
Municipal Service (water & wastewater)	$50 800 000.00	$73 500 000.00
Utility Relocations	$36 000 000.00	$51 480.00
Utility Relocations (after cost sharing)	$15 300 000.00	$21 879.00
Total (rows 1 & 3)	**$66 100 000.00**	**$95 379 000.00**

Hamilton
Public Works

Subsurface Infrastructure (SI) Fact Sheet

February 2009

Rapid Transit
MOVING HAMILTON FORWARD

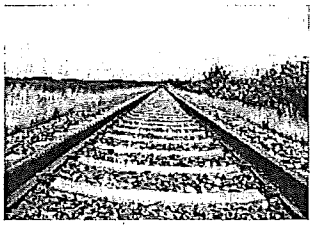
Subsurface Infrastructure Defined

In terms of Rapid Transit system design and construction, Hamilton's subsurface infrastructure includes all buried service in the transit corridor. This includes water mains, sewers, gas lines, electrical utilities and communications infrastructure, as well as the track bed which supports the light rail vehicle.

LRT Track Components

Ballasted Track

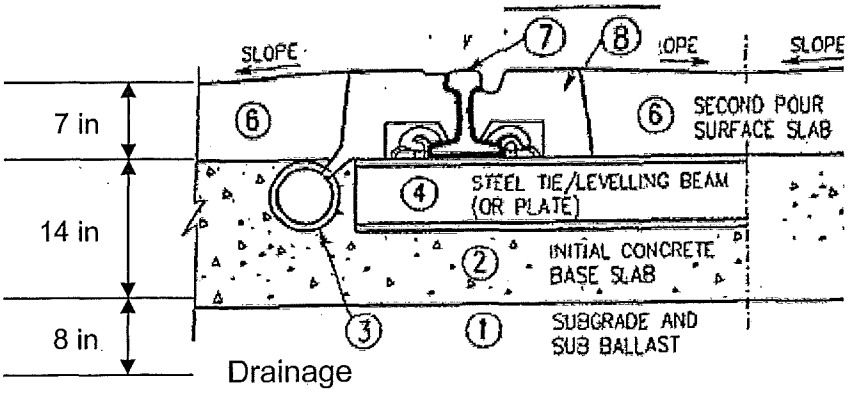
This is the traditional method for constructing rail. In older cities, concrete was poured over the tracks to provide a street level system which could blend with the asphalt.



- Ballast is required to support the weight of the train
- Can be laid as a stone base or a concrete slab platform
- Crossties are required to maintain the track gauge of 1.435 m
- Ensures that the rails do not buckle
- Provides water absorption and drainage

Resilient Embedded Track (most common for street level systems):

These modern systems require materials that distribute load, mitigate vibration and are electrically resistant, as the tracks are embedded in the street.



29 in.
(Total Ballast Depth)

Embedded Components

- Uses a concrete base and no top ballast (1, 2)
- Drainage pipes to the sewer system (3)
- Steel ties or gauge rods are used to maintain gauge between tracks, rather than ties (4)
- Incorporates insulating and vibration mitigating materials into the concrete pour (6, 7, 8)
- The insulating barrier can be located at the rail boot (7) or around the concrete base (8)

Subsurface Challenges and Mitigation Stragegies

Clearance Requirements: In order to provide un-interrupted LRT service and preserve the track bed, it is recommended that no parallel infrastructure lay under the track. An additional horizontal clearance of 5 feet on either side of the track is also required for safe access to the infrastructure. For piping and wiring that crosses the track perpendicularly, a clearance of 10 feet (3m) below the track is required due to the weight of the vehicle and the track base.

Mitigation Strategy: Research alternatives to traditional track bed design and use of traditional light rail vehicles. This would include using a lighter vehicle in order to lessen the 3 m, worst case, under-track burial requirement. It may also lessen the need to move some infrastructure.

Stray Current and Corrosion: Electrolytic corrosion can be occur in underground infrastructure due to leakage (stray) currents from the track rails, especially with DC power systems. The running track provides a path for electricity to flow from the catenary wires; however, electricity can stray from the rails and flow to other infrastructure. Leakage currents can cause and accelerate corrosion in underground piping, steel reinforcement in concrete structures and may damage underground utilities.

Mitigation Strategy:

- Cathodic Protection of piping with the use of galvanic anodes to attract electric currents away from the piping
- Electrical insulation of piping
- Electrical isolation of embedded track from earth with plastic/concrete encasement

Relocation and Cost: Relocating and replacing infrastructure is time consuming and costly; however, it provides an opportunity for infrastructure renewal and reorganization. The costs would be shared with the local utility providers as such:

- Municipal water & sewer = 100% of costs to the City
- Gas (lines after 1981) = 35% city, 65% gas utility; (lines before 1981) = 100% gas utility's cost
- Electricity = 50% City, 50% Horizon (includes cost of labour and labour saving devices, not materials)
- Bell and other telecommunications = City in process of developing agreements for 100% cost to the utility (with Bell services, anything before the agreement is 50/50)

Mitigation Strategy:

- Identify and confirm the location of existing subsurface infrastructure to determine impacts
- Identify the condition of existing infrastructure to determine the replacement need and risk of not relocating it
- Select the optimal transit corridor location. This is typically the median of the road way because most infrastructure is located at the curbside.
- An LRT system running in the median of the roadway would avoid the need to relocate some infrastructure

Hamilton
Public Works

Technical Fact Sheet

February 2009

Rapid Transit
MOVING HAMILTON FORWARD

Hamilton's Definition of Light Rail Transit (LRT)

LRT is a lightweight metropolitan electric railway system characterized by its ability to operate single cars or short trains along exclusive right-of-way at street level. These vehicles are usually powered by overhead electrical wires, and offer a frequent, fast, reliable, comfortable and high quality service that is environmentally sustainable.

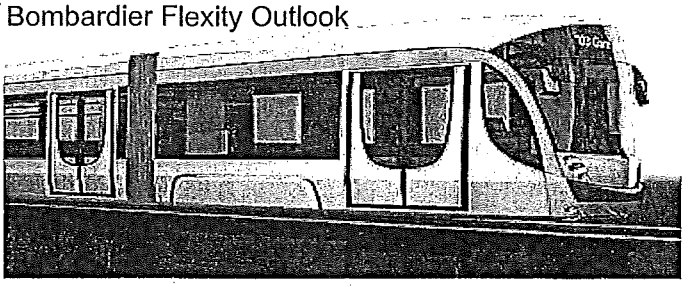
Draft Technical Specifications

Infrastructure and Rolling Stock

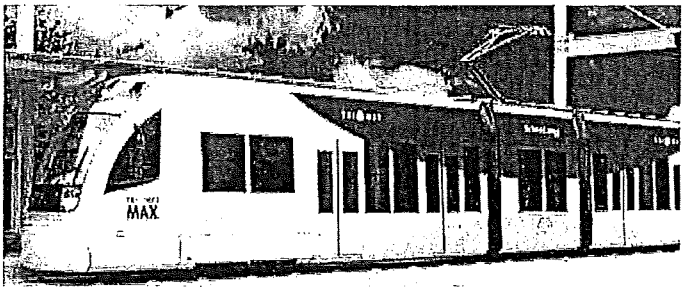
It is anticipated that Hamilton LRT vehicles and track systems will most closely resemble Portland Oregon's and Minneapolis Minnesota's systems which use trains supplied by Siemens and Bombardier, respectively. While their design can vary, our trains will resemble the following specifications:

Track Gauge (Standard) *	1.435 m
Vehicle Weight (Empty, average)	41 000 kg
Vehicle Weight (Full, average)	63 000 kg
Single Vehicle Height (may vary according to pantograph height)	3.9 m
Single Vehicle Length (average) (constrained by intersection spacing)	28 m
Single Vehicle Width	2.65 m
Horizontal Vehicle Clearance (total)	1.0 m
Vertical Vehicle Clearance (minimum)	4 m
Ballast/Track Bed Depth (average)	0.74 m
Passengers (seated/standing, average)	60/130

Bombardier Flexity Outlook

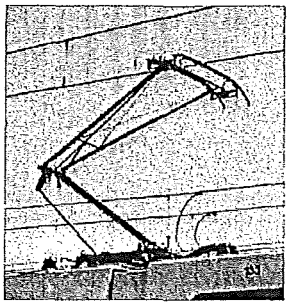


Siemens Combino Plus



* The TTC does not use standard gauge; they use a 1.49 m TTC gauge, the only one of its kind in the world.

System Power Supply



Catenary System: The electric traction system anticipated for Hamilton could be powered by an overhead, one or two-wire catenary current collector system, using pantographs with the return circuit provided by running rails. Hamilton's system could be similar to Portland's where stations are rated for 1MW, connected to an 13.8 kV AC three phase power supply, delivered by the municipal power utility company (Horizon Utilities) at a distance of one 1 to 1.6 km apart. The trains will receive 750 V DC power to drive the traction system and will therefore require AC and DC switchgear, traction power transformers, power rectifiers and programmable logic controllers (PLCs) to automate the process.

PRIMOVE Induction System: Alternative technology exists that could allow the trains to be powered without the use of catenaries using an embedded third rail or an induction power system. This option uses induction, which incorporates electromagnets to achieve a contactless power transfer as the train's current collector passes over a buried wire. The system, developed by Bombardier, can accommodate all weather conditions since it has no physical contacts, but it has not yet been incorporated in a commercial vehicle.

Technological Challenges

The proposed B-Line corridor encounters some complicated geographical challenges due to the city's existing infrastructure and extensive grade changes. Particular challenges include: the highway 403 crossing in the City's west end, which may require a flyover; the roadway under the TH&B bridge (at Hunter Street) and the pedestrian walkway over James Street, which may need to be lowered to accommodate the train's catenary system; acquisition for station locations and issues with corrosion and vibration.

Overcoming these challenges will include research into each vehicle. The measurements of some vehicles make them more ideal for the under-bridge crossings, requiring only minimal road lowering. Catenary-free vehicle technologies also help solve the problem of bridge crossings while minimizing visual impacts and maintenance costs. In terms of corrosion and vibration control, various resilient technologies and materials exist to soften metal-on-metal forces, isolate running rails from surrounding infrastructure and extend the life of rails and wheels in the process.

Benefits of Light Rail Transit Technologies

- Catalyst for development and revitalization of downtown cores
- Improved accessibility to major city areas and services
- Creation of new housing, offices and shops
- Increased values of properties along LRT corridors and stations
- Reduction in auto use, congestion and noise/air pollution

Terrestrial and Avian Ecology Fact Sheet

February 2009

Hamilton
Public Works

Rapid Transit
MOVING HAMILTON FORWARD

Existing Conditions

- The majority of the study area alignment is urban with existing infrastructure displacing all natural environment components with exception to young landscaped trees. Generally few natural areas occur along the proposed LRT alignment.
- The proposed LRT B-Line route crosses three watercourses including:
  - Coldwater Creek (also known as Ancaster Creek) at the west end of the alignment
  - Chedoke Creek at Highway 403; at the point of crossing the creek is covered (conveyed via a large culvert)
  - Red Hill Creek at the Red Hill Valley Parkway.
- The study area is in close proximity or overlaps designated natural features at each of the three watercourse crossings. These include, the Red Hill Creek Escarpment Valley (ESA) and Cootes Paradise (ESA, Provincially Significant Wetland and Life Science ANSI) associated with the Chedoke Creek crossing, and the Ancaster Valley Life Science ANSI, Dundas Valley ESA associated with Coldwater (Ancaster) Creek crossing.
- Gage Park and a small portion adjacent to Coldwater Creek are classified as Urban Area in the Niagara Escarpment Plan.
- NHIC database indicates several historical occurrences of rare species. This includes 12 plant species, 1 mammal, 1 bird, 3 herptiles and 1 fish. Ontario Breeding Bird Atlas indicates 11 species of concern have been observed. Also, 90 conservation priority species (Couturier 1999) for the Hamilton-Wentworth region were documented.

Potential Impacts and Mitigation Considerations

- It is our understanding that minimal expansion of the current right-of-way is planned in order to facilitate the construction and operation of the LRT system. Based on this, we do not anticipate impacts to the natural environment. The proposed B-Line route is an urbanized area and has limited habitat value for vegetation communities and wildlife. No direct impact to vegetation, wildlife, wildlife habitat or Species at Rick is anticipated.
- If the removal of some streetscape trees is necessary, provisions should be made for their replacement. The removal of vegetation could affect nesting habitat for migratory birds and mitigation measures may be required.
- The temporary increase in the anthropogenic disturbance during the construction period is unlikely to result in a significant increase in indirect impacts (i.e., habitat degradation, noise disturbance, etc.) to habitat features or wildlife along the LRT route as many of them are situated in a high noise, high traffic area.
- Should one of the downtown alignments result in the need for a new crossing of the Chedoke Creek/Hwy 403 area, additional detailed study would be required to ensure appropriate design and mitigation to minimize impacts; there may be a need for additional agency consultation and further approvals.

Preliminary Input regarding Downtown Alignment Alternatives

Based on background information reviewed and fieldwork completed, there are no downtown alignment preferences as they relate to terrestrial and avian features.

Hamilton

INFORMATION UPDATE

To:	Mayor Eisenberger and Members of Council		
From:	Jill Stephen, P.Eng Director, Strategic & Environmental Planning (Temporary) Capital Planning & Implementation Public Works Department	**Telephone:** **Facsimile:** **E-mail:**	905.546.2424, ext. 4621 905.546.4435 jillian.stephen@hamilton.ca
Date:	February 6, 2009		
Re:	**Rapid Transit – Technical Agency and Corridor Property Consultation (CPI.09.05)**		

This Information Update is to advise that the City's Rapid Transit Corporate Working Team met February 5, 2009. This session was set-up by the Rapid Transit team to review and discuss various rapid transit system alternatives and provide an update on study progress in preparation for the Metrolinx Benefits Case Analysis expected to be undertaken Spring 2009. The Corporate Working Team is comprised of staff from six City Departments including representatives from Public Works, Planning & Economic Development, Corporate Services, Community Services, Emergency Services and Public Health Services and Hamilton Police Services. The February 5th session was a follow-up to the first Corporate Working Team session held in November 2008, at which time the following vision statement was developed and subsequently endorsed by Council at its meeting of January 28, 2009.

Rapid Transit is more than just moving people from place to place. It is about providing a catalyst for the development of high quality, safe, environmentally sustainable and affordable transportation options for our citizens, connecting key destination points, stimulating economic development and revitalizing Hamilton.

The rapid transit alternatives that were discussed as part of the second meeting of this group included the following transportation options for the Main/King corridor of the proposed B-Line, (primarily between Paradise Road,west side of Hwy 403 to the Delta, Main/King Split at Gage Park):

- RTFS Phases 1 and 2 identified LRT could operate in exclusive curb lanes on one-way streets
  - LRT and one-way traffic on both Main and King
- Other alternative alignments for consideration through downtown
  - Contra-flow on Main (one-way traffic eastbound with two-way LRT operation)
  - Contra-flow on King (one-way traffic westbound with two-way LRT operation)
  - LRT on Main Street with two-way traffic
  - LRT on King Street with two-way traffic

In addition to a discussion on rapid transit alternatives, staff were also updated on the various studies that are underway in preparation for the upcoming Benefits Case Analysis. These studies include:

- Transportation Modeling
- Economic Uplift Potential

- Subsurface Infrastructure Review
- Technology Review
- Archeology
- Built Landscapes & Cultural Heritage
- Natural Environment
  - Terrestrial & Avian
  - Hydrogeology
  - Air Quality & Noise
  - Water Resources & Storm Water MP Impact
- Facilitation (Dillon)
  - Staff Workshop
  - Technical Agencies Meeting #1
  - Corridor Properties Meeting #1
  - Preliminary EA prep

The Rapid Transit Study Team will update Council on the feedback received at these meetings in addition to the findings of these studies in the near future as well as keep Council informed in regards to the feedback staff receive at the upcoming Technical Agencies and Corridor Properties Meetings scheduled for February 23, 2009 (information on these sessions provided in Information Update CPI.09.03).

For more information, please contact Lisa Zinkewich at ext. 1473 or lisa.zinkewich@hamilton.ca

Jill Stephen, P.Eng
Director, Strategic & Environmental Planning (Temporary)
Capital Planning & Implementation
Public Works Department
lz

Copy to: Chris Murray, City Manager
Gerry Davis, Acting General Manager, Public Works
Tony Tollis, Acting General Manager, Finance & Corporate Services
Tim McCabe, General Manager, Planning and Economic Development
Jim Kay, General Manager, Emergency Services
Joe-anne Priel, General Manager, Community Services
Elizabeth Richardson, Medical Officer of Health
Kevin Christenson, City Clerk
Rose Caterini, Deputy Clerk/Manager of Legislative Services and Records
Phil Homerski, Public Affairs Coordinator, Public Works
Kelly Anderson, Public Affairs Coordinator, Public Works
Carolyn Biggs, Legislative Assistant, City Clerks
Alan Kirkpatrick, Acting Manager, Strategic Planning
Don Hull, Director, Transit
David Adames, Executive Director, Planning & Economic Development
Neil Everson, Director, Economic Development & Real Estate
Ron Marini, Director, Downtown & Community Renewal
Bill Janssen, Acting Director, Planning & Economic Development
Jim Dahms, Manager, Transit Planning & Customer Services
John Howe, Metrolinx
Chief Brian Mullen, Hamilton Police Services

Hamilton

INFORMATION UPDATE

To:	Mayor Eisenberger and Members of Council		
From:	Jill Stephen, P.Eng Director, Strategic & Environmental Planning (Temporary) Capital Planning & Implementation Public Works Department	**Telephone:** **Facsimile:** **E-mail:**	905.546.2424, ext. 4621 905.546.4435 jillian.stephen@hamilton.ca
Date:	February 3, 2009		
Re:	**Rapid Transit – Technical Agency and Corridor Property Consultation (CPI.09.03)**		

As the Rapid Transit Initiative moves forward, the City's Rapid Transit Team continues to implement an extensive stakeholder outreach and engagement program.

In addition to the general public meetings that have been held to date, the Rapid Transit Team is now targeting specific stakeholders to consult with at this stage of the planning process. In February, staff will be meeting with appropriate technical agencies and other key organizations who should be involved in the planning for this initiative, as well as property owners along the Main/King corridor between McMaster University and Eastgate Square.

The meetings are being held to ensure that those who will be most greatly impacted by the proposed Rapid Transit Initiative are given an opportunity to meet with the Rapid Transit Team early in the planning process, to learn more details on the initiative and provide their direct input into the process. Although staff have already met with key primary node stakeholder representatives along the proposed Rapid Transit corridors, including McMaster University, Eastgate Square and Yale (Jackson Square), these meetings are intended to initiate dialogue between the Rapid Transit Team and all adjacent property land owners and their tenants.

Notice of the upcoming meetings will be delivered to an extensive Technical Agency list that was developed following the Class EA process and will be mailed to all corridor property owners within 30 metres of the existing Right of Way along the B-Line corridor (the notices and a map identifying the corridor properties is attached for your information). Meeting times are as follows:

Technical agencies/organizations:
Monday, February 23rd
9:00 a.m. – 12:00 p.m.
Hamilton Convention Centre, Room 314

Property owners along Main/King Corridor:
Monday, February 23rd
2:00 p.m. – 4:00 p.m. OR 6:00 p.m. – 8:00 p.m.

Information to be presented at these meetings will include:

- Rapid Transit Project Background
- Rapid Transit Feasibility Study Phases 1 & 2 results

- Metrolinx (including the Regional Transportation Plan, Capital Budget Process and next steps including the required Benefits Case Analysis)
- Public Engagement and Results
- Rapid Transit Initiative Next Steps

The Rapid Transit Team continues to meet with Metrolinx representatives to discuss plans for moving rapid transit ahead for the City of Hamilton and have begun the process of initiating the required studies that will feed into Metrolinx's Benefits Case Analysis, anticipated to take place in spring 2009. Rapid Transit Team staff are continuing to move forward in an aggressive manner in order to secure Provincial funding for rapid transit in Hamilton and more specifically for Light Rail Transit (LRT) funding, for construction to begin as early as 2011 along the B-Line corridor.

Public consultation has been an important part of this process to date, and will continue to play an integral role in the development of the overall system. As always, the Rapid Transit Team is available to speak to community groups or ward meetings, or to provide updates to ward newsletters. Comments are always welcome at rapidtransit@hamilton.ca.

The Rapid Transit Study Team will update Council on the feedback received at these meetings in a future Information Report to Public Works Committee

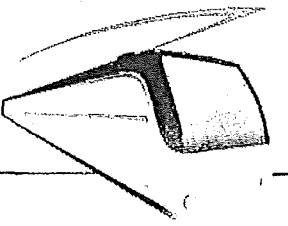
For more information, please contact Lisa Zinkewich at ext. 1473 or lisa.zinkewich@hamilton.ca

Jill Stephen, P.Eng
Director, Strategic & Environmental Planning (Temporary)
Capital Planning & Implementation
Public Works Department
lz

Copy to: Chris Murray, City Manager
Gerry Davis, Acting General Manager, Purblic Works
Tony Tollis, Acting General Manager, Finance & Corporate Services
Tim McCabe, General Manager, Planning and Economic Development
Jim Kay, General Manager, Emergency Services
Joe-anne Priel, General Manager, Community Services
Elizabeth Richardson, Medical Officer of Health
Kevin Christenson, City Clerk
Rose Caterini, Deputy Clerk/Manager of Legislative Services and Records
Phil Homerski, Public Affairs Coordinator, Public Works
Kelly Anderson, Public Affairs Coordinator, Public Works
Carolyn Biggs, Legislative Assistant, City Clerks
Alan Kirkpatrick, Acting Manager, Strategic Planning
Don Hull, Director, Transit
David Adames, Executive Director, Planning & Economic Development
Neil Everson, Director, Economic Development & Real Estate
Ron Marini, Director, Downtown & Community Renewal
Bill Janssen, Acting Director, Planning & Economic Development
Jim Dahms, Manager, Transit Planning & Customer Services
John Howe, Metrolinx

Rapid Transit

MOVING HAMILTON FORWARD



Help shape the future of Rapid Transit in Hamilton

The City of Hamilton is moving forward with plans to implement rapid transit along the Main/King Corridor (see map below) from Centennial Parkway (Eastgate Square) to McMaster University/University Plaza, with studies currently focusing on Light Rail Transit (LRT) as the preferred mode of technology.

City of Hamilton staff would like to meet with you and your organization/agency to exchange ideas, listen to concerns and identify potential issues. Please join us at the meeting time noted at right to receive material related to this initiative and meet with Rapid Transit Team staff. An agenda will be provided closer to the date.

We hope that you will attend. Your participation and feedback on this exciting initiative is an important part of the process.

Please complete the attached (on back) fax-back form to confirm your involvement in this initiative and appropriate contact person.

To help us with our planning, we would appreciate it if you could please RSVP to the Project Team so we can ensure the appropriate number of materials are available.

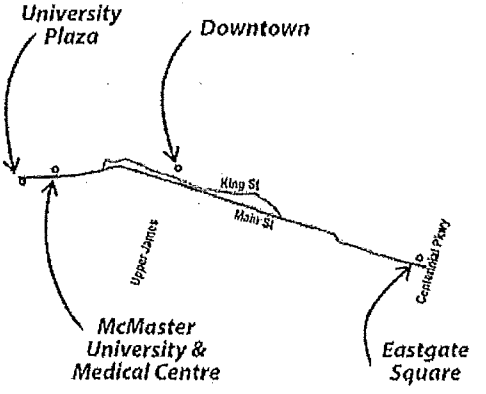
For more information about the Rapid Transit initiative, including newsletters, studies, Council minutes and route maps, please visit **www.hamilton.ca/rapid-transit**

When

Monday, February 23rd, 2009
Hamilton Convention Centre,
1 Summers Lane, Hamilton, ON
Room 314
9:00am – 12:00pm

Contact

Rapid Transit Initiative
Public Works Department
City of Hamilton
77 James Street North, Suite 320
Hamilton, ON L8R 2K3
905-546-2424, ext. 2553
rapidtransit@hamilton.ca



Hamilton
Public Works

Fax Back Form

Hamilton
Public Works

Please respond by **Wednesday, February 18th, 2009**
To: Lisa Zinkewich, Senior Project Manager, Rapid Transit
Fax: 905-546-4435
Re: Technical Agencies Committee – City of Hamilton Rapid Transit Initiative

Name:_____

Title:_____

Organization/Agency:_____

Address:_____

Postal Code:_____

Phone:_____

Fax:_____

Email:_____

Please indicate the appropriate response:

☐ My organization/agency will be attending the City of Hamilton's Rapid Transit meeting for technical agencies on **Monday, February 23rd** and would like to be added to the Technical Agencies Mailing List.

☐ My organization/agency is NOT able to attend the City of Hamilton's Rapid Transit meeting for technical agencies on **Monday, February 23rd** but would like to be added to the Technical Agencies Mailing List.

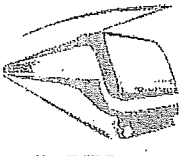
☐ Please take my organization/agency off the City of Hamilton's mailing list as we have no interest in the current planning for rapid transit along the East-West corridor.

Please feel free to provide any comments, areas of interest or concerns.

_____

_____

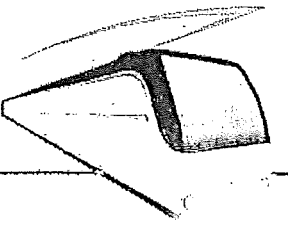
_____



Rapid Transit
MOVING HAMILTON FORWARD

Rapid Transit

MOVING HAMILTON FORWARD



Help shape the future of Rapid Transit in Hamilton

The City of Hamilton is moving forward with plans to implement rapid transit along the Main/King Corridor from Centennial Parkway (Eastgate Square) to McMaster University/University Plaza, with studies currently focusing on Light Rail Transit (LRT) as the preferred mode of technology.

Your property is located directly adjacent to this corridor (see map) therefore City of Hamilton staff would like to meet with you and your neighbours to discuss this exciting initiative.

This is the first of many meetings the Rapid Transit Team will hold specifically with corridor property owners in order to exchange ideas, listen to concerns and identify potential issues. Please join us at one of the meeting times noted at right to receive material related to this initiative and meet with Rapid Transit Team staff.

We hope that you will attend. Your participation and feedback on this exciting initiative is an important part of the process.

To help us with our planning, we would appreciate it if you could please RSVP to the Project Team so we can ensure the appropriate number of materials are available.

If you are unable to attend but are interested in learning more about the initiative, or sharing your opinions with the Rapid Transit Team, please feel free to contact us at rapidtransit@hamilton.ca or 905-546-2424 ext. 2553.

For more information about the Rapid Transit initiative, including newsletters, studies, Council minutes and route maps, please visit **www.hamilton.ca/rapid-transit**

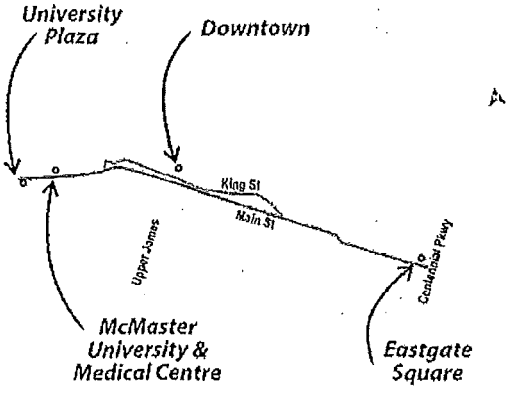
When

Monday, February 23rd, 2009
Hamilton Convention Centre,
1 Summers Lane, Hamilton, ON
Room 314
2:00pm – 4:00pm; presentation at 2:30
OR
6:00pm – 8:00pm, presentation at 6:30

The same information will be shared at both meetings.

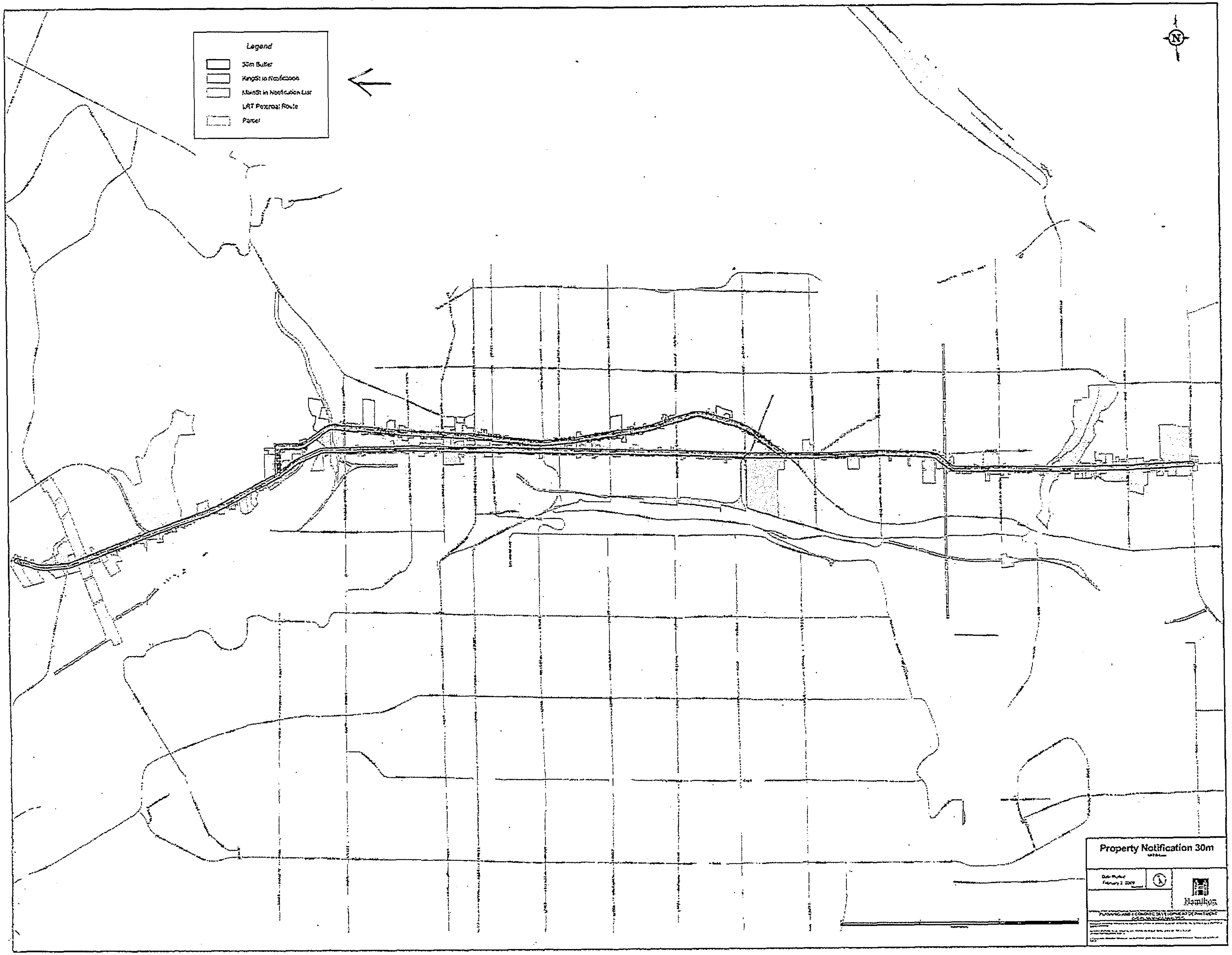
Contact/RSVP

Rapid Transit Initiative
Public Works Department
City of Hamilton
77 James Street North, Suite 320
Hamilton, ON L8R 2K3
905-546-2424, ext. 2553
rapidtransit@hamilton.ca



Hamilton
Public Works

Please share this notice with all the tenants in your building.


Legend
30m Buffer
KingSt in Notification
MainSt in Notification List
LRT Potential Route
Parcel
N
Property Notification 30m
Hamilton