

April 18, 2017

Mayor Eisenberger and Councillors
Hamilton City Council

Dear Sirs/Mesdames:

Some of you on Council know me, and know also that I made a submission to Council (appended) and a presentation to GIC on rapid transit nearly three years ago. The full submission and PowerPoint presentation (both in colour) may be found on the City of Hamilton website at: hamilton.ca – City Hall – Council and Committee – View Agendas and Minutes – Archives for 2001 to 2015 – General Issues Committee 2014 – May 7, 2014 – Item 6.1 – two PDF’s as supporting materials. A video of the presentation and the subsequent Q & A period was recorded and posted to YouTube by Joey Coleman, and may be found at <http://www.youtube.com/watch?v=AcMiREDAOo8> .

For those who do not know me, I will provide a little background. I hold a Bachelor of Civil Engineering and a Master of Urban and Regional Planning, both with an emphasis on transportation planning. I was Acting Commissioner of Engineering and then Senior Director of Roads with the former Region of Hamilton-Wentworth for 11 years, from 1990 to the end of 2000. I was subsequently a transportation planning and engineering consultant until my retirement in early 2016, and have been involved in many Hamilton projects, including the Transportation Master Plan and many of the Rapid Transit Feasibility Studies. I was a founding member of the Sustainable Transportation Standing Committee of the Transportation Association of Canada, and served a term as its Chair. I was a member of the “Owner’s Engineer” consulting team for the York Region Rapid Transit Corporation working on planning and implementation of the VIVA bus rapid transit (BRT) system for several years.

Three years ago I recommended that Council direct staff to re-evaluate bus rapid transit (BRT) for use as an interim and/or permanent RT technology, in parallel with all existing efforts to obtain funding for LRT. That recommendation was not acted upon. Two years ago provincial funding was announced for LRT, and I have become increasingly concerned about the course that the project is taking. In my view, the main issues are the governance/procurement model and the choice of vehicle for the RT system, and those two factors are very much intertwined.

I believe that City officials should immediately meet with senior officials of the Province and Metrolinx to discuss the potential for a re-set of the terms between the City and the Province/Metrolinx, without prejudice to the ongoing LRT project. However, in the absence of any successful renegotiation of the terms between the City of Hamilton and the

Province/Metrolinx, it is absolutely imperative that the City proceed with the implementation of LRT, including a station at Bay Street. Any of the discussions/negotiations should be held immediately and should be absolutely without prejudice to the ongoing implementation of an LRT system in Hamilton. Any actions that would jeopardize the announced funding for Hamilton would be completely unacceptable. The EA Update should be submitted as proposed by staff.

The reasons for recommending a re-set of the terms are threefold: the benefits of LRT have been overstated in comparison to BRT; the choice of LRT as a rapid transit technology has had unwelcome consequences with respect to Hamilton spending priorities; and, BRT has a number of advantages over LRT in the Hamilton context.

The benefits of LRT have been overstated in comparison to BRT

In 2008, the decision was made to pursue LRT only. The process leading to that decision was set out in detail in my 2014 submission to Council (appended). I believe that the choice of RT technology was influenced by the robust pre-crash 2008 economy, projected growth trends and economic forecasts at that time, and also by the infectious enthusiasm for LRT displayed by many at the local and provincial levels.

The Hamilton King – Main Rapid Transit Benefits Case (February 2010) prepared for Metrolinx by Steer Davies Gleave (SDG) had several methodological shortcomings:

- A number of assumptions were made with respect to metrics for LRT and BRT that I believe inappropriately favoured LRT in the Hamilton context. Metrics from numerous jurisdictions where LRT and BRT have been planned and/or implemented were used in comparing the two modes. Because of those data sources, significant differences between the two modes were assumed.
- The most significant metric was average travel speed, with BRT at 25 km/hr (assuming traffic signal priority and headways of 2.5 minutes) and LRT at 34 km/hr (assuming traffic signal pre-emption and headways of 4 minutes). The implications of this difference in metrics cascades through into many others, such as reductions in private vehicle kilometres and collisions, ridership levels, and CO2 emissions. Another significant difference is that the impact of economic uplift at station locations was assumed to be within 400m for BRT and within 500m for LRT. The net result of all these factors is that the benefits of LRT come out way higher than BRT in the Multiple Account Evaluation (MAE).
- One factor that was not considered in detail was unfavourable economic impact during construction. The difference in impacts between LRT and BRT could result from duration and scope of construction, and the extra life-cycle cost of replacement of underground infrastructure prior to end-of-life. The difference in impacts may be significant.

- BRT technology is evolving to the extent that BRT vehicles can be more competitive with LRT vehicles than was assumed in the 2010 report. The BRT vehicles referenced in the analysis assumed articulated 18m diesel buses with a capacity of 90 passengers per vehicle. The LRT assumed one or two electric vehicle trains with lengths of 30/60m and capacities of 130/260 passengers per train. Because of the smaller capacity of the assumed BRT vehicles, BRT headways of 2.5 minutes are required for an estimated peak demand of up to 2,200 passengers per hour per direction. LRT headways of 4 minutes are required to serve 1,950/3,900 passengers per hour per direction. The report makes the case that the more frequent BRT would be more disruptive to cross-traffic at traffic signals. However, there are bus manufacturers building bi-articulated buses in lengths of 25m – 30m, with seated plus standing capacities of 180 – 250 passengers. Propulsion choices range from diesel, bio-diesel, diesel/electric hybrid, to emerging battery electric technologies.
- Even with the very favourable LRT assumptions in the SDG 2010 report, BRT provided a benefit/cost ratio of 1.4 versus 1.1 for LRT, at a discount rate of 5%. At a lower discount rate, the b/c ratios were projected to be higher for both technologies, but at a higher discount rate (7%), LRT would have a negative net benefit.

The issue is that, in reality, the only real difference between BRT and LRT systems in Hamilton would be the vehicles and propulsion infrastructure to support those vehicles, such as overhead wires and electrical sub-stations for LRT, and potentially battery swap or charge stations for BRT. The rest of the system infrastructure should be exactly the same – dedicated rapidways, stations, signal priority/pre-emption, average travel speeds, and headways. I believe that the rapid transit benefits case for BRT versus LRT is in reality very different than that set out in the 2010 SDG report.

The choice of LRT as a rapid transit technology has had unwelcome consequences with respect to Hamilton spending priorities

Hamilton is a sizeable, smart, sophisticated single-tier municipality that should have a much greater ability to direct the provincial funding to plan and execute Hamilton-based transit solutions. I believe that the City is quite frankly owed the \$1B provincial contribution for support and implementation of rapid transit in Hamilton, subject to meeting provincial/regional transportation criteria and involving Metrolinx in project management and procurement, based on the experience in other jurisdictions such as York Region. For example 100% of the capital cost of the BRT VIVA system in York Region is being funded by Metrolinx – over \$1.8B for 34.6 km of rapidway, 41 stations, and 53 articulated buses – and VIVA operates the system, not a third party. Hamilton is part of the GTHA, and deserves similar consideration.

As the City of Hamilton has no experience in operating a rail system, Metrolinx is assuming a lead role in determining local transit priorities, notwithstanding that Metrolinx is a regional transportation organization. Metrolinx will likely recommend a design-build-finance-operate-maintain (DBFOM) delivery model (see Report PED17030, GIC, March 28, 2017). The future City contribution to operating costs has not yet been determined, but could well include the operating deficit (costs less revenues), plus profit for the operator. If the City of Hamilton were the operator, a discussion on profit would not come into the picture.

Because of the greater initial cost in comparison to BRT, only a portion of the B-line will be built initially. A connection to the new GO station on James Street North was announced and then removed from consideration, with little or no City input. Consideration of potential funding for the A-line was announced instead, with little or no City input. The portion of the B-line between the Queenston traffic circle and Eastgate Square is not included in the initial project, notwithstanding that it probably has the potential for the least disruption and greatest economic uplift, not to mention its proximity to the announced GO train station at Centennial Parkway.

The City's priorities for spending on necessary system improvements to support rapid transit, as identified in Rapid Ready - Expanding Mobility Choices in Hamilton (January 2013), have not been respected. An application to the province for some \$300M in necessary transit improvements to support rapid transit was ignored, but funding for a portion of the B-line was approved. The cart is before the horse, my friends.

A significant portion of the \$1B funding is to go toward replacing underground infrastructure, because of the requirement to clear 1.5m – 3m below and beside the LRT rails. This is not sustainable, especially when Hamilton already has a huge infrastructure deficit. Much of this infrastructure still has years of useful life left, and much has already been refreshed, rehabilitated, repaired, or re-lined. While it is true that there are some capacity constraints, complete replacement of all of the infrastructure is unnecessary and unsustainable. A more cost-effective option would see at-source flow-metering implemented in new development.

Arterial road structures have been designed for heavy traffic, although it is true that bus axle loads are greater than those of large trucks. However, it is not necessary to replace the road surface with concrete if there are more cost-effective and potentially incremental flexible pavement (i.e. asphalt) and sub-base options that could be tailored block by block.

BRT has a number of advantages over LRT in the Hamilton context

Supporters of LRT have argued that BRT will not provide the same economic uplift. I disagree with that notion. In the context of Hamilton, where the only real difference between LRT and BRT would be the vehicles, there are many other factors that will be more important, such as planning and land use policies to support a sustainable transportation hierarchy...walking, cycling, all forms of transit, high-occupancy vehicles, and lastly, single-occupant vehicles.

The notion that BRT would not be as comfortable as LRT is incorrect. With BRT vehicles running in a reserved rapidway, there would be none of the weaving between lanes or the sudden braking because of interfering traffic that local bus service experiences.

I had a conversation with Mary-Frances Turner last week. She is the President of York Region Rapid Transit Corporation, and has been since inception in 2001. I asked if she had any regrets about York Region going with BRT initially (the system is designed so that it can be converted to LRT). She answered no, and also noted that the potential conversion to LRT has been postponed to beyond 2041 in the 2016 Transportation Master Plan, as they project that BRT will continue to operate satisfactorily. I also asked her if any developers had ever told her that they would have developed if only LRT were in place rather than BRT. Her answer was no, but noted that the decision to go with BRT was made many years ago.

It was reported on yorkregion.com by Metroland on March 2, 2017 that York Region beat Canada, Ontario, and GTA on job growth in 2016 over 2015 – 8X Canada’s rate, 6X Ontario’s rate, and 3X GTA’s rate. Regional Chair Wayne Emerson attributed some of that growth to the major investment in modern transit.

Supporters of LRT have argued that LRT provides long term certainty for investors and the development industry, while BRT is too uncertain; too flexible. I would argue that flexibility is both desirable and necessary. BRT can provide the same high-quality rapidway and stations as LRT, but as rails and electricity supply infrastructure would not be required, staging options or even controlled experiments can be implemented for BRT. For example, on King Street between Wellington and Mary, where the road allowance is narrower than the typical downtown 66 feet – 58 to 59 feet in fact – imagine an option where the surface is uninterrupted by curbs from building face to building face, half of the space is designed for pedestrian and cyclist priority, and the remaining space is designed for two-way BRT and vehicle priority, with the only traffic control measures being traffic signals and No Stopping signs. Another example is the CP rail crossing where an LRT grade separation is being recommended for 350m between Gage and Glendale. An at-grade crossing option would require all transit vehicles (including LRT or BRT) to stop before crossing, but LRT vehicles would need battery backup to cross because the catenary cannot be carried across the rail line because of current CP vertical clearance requirements. I

have been unable in the time available to unearth information on train traffic on that rail spur, but the cost saving of avoiding a grade separation would be substantial.

The LRT vehicles have a projected life expectancy of 30 years, with occasional refurbishments. BRT vehicles will likely be retired at about ten years. This difference can be seen as good or bad by others, but the ability to upgrade to newer technologies sooner is, I believe, a real benefit. In York Region, Mary-Frances Turner told me that their next priority in York Region is electric buses.

Supporters of LRT have argued that operating costs will be lower because fewer operators will be required. This argument has neither taken into account the availability of higher-capacity buses nor the future effect of autonomous buses. It is not hard to imagine the option of one bus being followed closely by one or more autonomous buses to form a “train” of buses in the relatively near future.

Future phases of the “BLAST network” network that cross the escarpment will almost certainly have to be BRT rather than LRT because of the grades involved. It would make sense that some of those routes utilize the B-line rapidway rather than requiring patrons to transfer to LRT, in keeping with the “one trip – one seat” route planning criterion.

Most of the investments made to date for LRT planning/design are applicable to BRT, and will not be wasted. For example, the subsurface utility engineering investigations (SUEI) will prove very valuable to City staff for either technology, and investigations for electrical supply can be parked until required at a future date, if BRT is ever converted to LRT. The planning, EA submission, and so on are applicable to both technologies, although there are opportunities to revisit some of the elements of the design because of the greater flexibility and staging opportunities of BRT.

Some last thoughts

It is very important for the future of Hamilton that the provincial contribution of \$1B toward rapid transit be realized. It is even more important that the investment be appropriately focused, sustainable, and in Hamilton’s best interests.

Your Mayor Fred tweeted a few months ago, “It takes some courage to stand up and speak; it takes even more courage to open your mind and listen” (unknown). I stood up and spoke...now it’s over to you.

Respectfully submitted,

