Building Rapid Transit in Mississauga

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Abstract

The City of Mississauga is continuing its transformation from a suburb of Toronto to a large urban centre. As part of this transformation, the City is working in partnership with Metrolinx to plan, build and operate bus rapid transit and light rapid transit (also in partnership with the City of Brampton).

Mississauga is substantially developed and both rapid transit facilities will be retrofitted into or along the existing transportation network and development. This paper will give a high level overview of both projects and will focus on some of the major geometric challenges faced by designers.

Introduction

Mississauga was incorporated as a City in 1974 and since that time has evolved into Canada's sixth largest City. It is home to 741,000 residents and more than 54,000 businesses, including more than 60 Fortune 500 companies with Canadian head offices or major divisional head offices. Mississauga is a relatively new City and has experienced some rather unique growth that has helped shape the way things are today. During earlier growth, the car was the primary form of transportation. In more recent years, the City has embraced the ideals of urban form and has ambitions to transform strategic areas into destinations by taking an approach that combines multi-modal planning and place making. This is a dramatic about face from a more traditional suburban development tendency. From a transportation perspective, the City is transitioning from a practice of moving traffic to one of moving people and goods. It is this paradigm shift that supports the shift to a more multi-modal and sustainable transportation system. This paper will give a high level overview of the Hurontario-Main LRT (HMLRT) and Mississauga Transitway (Transitway) projects and will focus on some of the major geometric challenges faced by designers.

Photo of modern Mississauga

Background

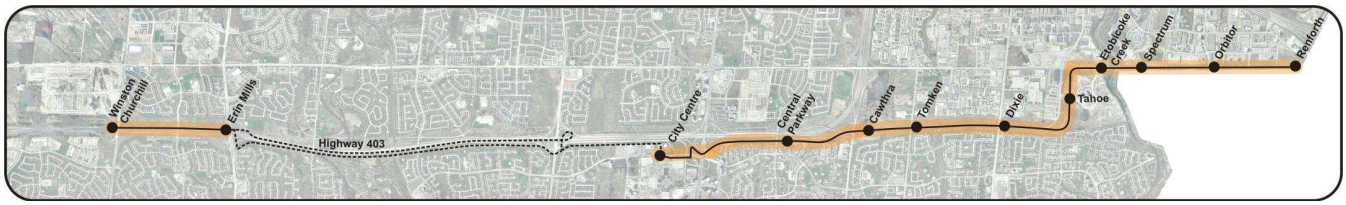
During the next 30 years, an additional four million people are expected to call the Greater Toronto Hamilton Area (GTHA) home. In 2007, Mississauga initiated the Mississauga Strategic Plan that made the development of a more transit oriented City a key pillar for our future. To support this objective, the City is in different levels of development for two very different Rapid Transit Projects with their own unique geometric challenges. .

Mississauga Transitway

One of the rapid transit systems currently under construction is the Mississauga Transitway, which is an efficient bus system that travels on a dedicated corridor. The transitway will provide east-west service supporting thousands of riders per day, making it faster for commuters to travel to, from and through Mississauga and across the region.

The transitway is funded through a joint partnership between the Government of Canada, the Province of Ontario, Metrolinx (through their GO Transit subsidiary), and the City of Mississauga. The Mississauga Transitway is an example of Metrolinx's Big Move in action.

When complete, the 18 km transitway will have 12 stations beginning at Winston Churchill Boulevard in the west and ending at Renforth Drive in the east. From the west, passengers will travel on a dedicated transitway from Winston Churchill Boulevard to Erin Mills Parkway. Buses will then travel on an existing bus-only lane on Highway 403 from Erin Mills Parkway to Mississauga's downtown core via Centreview Drive and Rathburn Road. The transitway then continues along a dedicated corridor that runs parallel to Highway 403, Eastgate Parkway and Eglinton Avenue to Renforth Station. From there, buses will continue to Toronto Pearson International Airport and the Toronto Transit Commission's Islington subway station.



Map of Mississauga Transitway

Mississauga is responsible for constructing the easterly corridor in two phases. Phase 1 includes Central Parkway, Cawthra, Tomken and Dixie Stations, and Phase 2 includes Tahoe, Etobicoke Creek, Spectrum and Orbitor Stations. Metrolinx is responsible for construction of the westerly corridor of the transitway from Winston Churchill Boulevard to Erin Mills Parkway and the final easterly stop at Renforth Station, including connections to Highway 427.

Transitway Geometric Challenges

The challenges are taken from a City of Mississauga viewpoint and therefore will be high level for the transitway as a whole and will provide more specific details from the Mississauga portion of the project.

The City of Mississauga is fortunate to have a robust freeway system that traverses around and through the City. There is an international airport in its northeast and Lake Ontario is on the southern border, which provides a spectacular waterfront. There are numerous rivers and creeks, and national railway lines that also traverse the City. Though these features have many positive aspects, they also present barriers to new facilities, including new roadways, transit facilities and multi-use trails. The transitway is intended to ultimately provide a dedicated facility for buses that traverses the City east-west. The City is substantially built out. To build such a facility, many of the locations require retrofit and sharing of corridors with other essential infrastructure such as utilities.

The original environmental assessment for the transitway included building a new dedicated facility paralleling and to the north of Highway 403. It also included a new bridge crossing of the Credit River. During a value engineering review, it was decided to take advantage of the existing Highway 403 corridor to convert the shoulders to dedicated bus lanes. In times of congestion, buses can use the dedicated bus shoulders to bypass queued traffic. This is a vast improvement to the status quo, though there are challenges for buses when they must pass through congested ramps and acceleration lanes at interchanges.

The transitway is under construction to the west and to the east of the downtown area. The downtown section is the missing link in the transitway and currently buses must traverse it in mixed traffic. The downtown area is rapidly developing and will progressively be one of the more congested areas. The original environmental assessment included an alignment for the transitway through the downtown and a portion of it was to be grade separated below ground level in a trench. The downtown area is complicated and will also host the HMLRT. A separate section of this report will focus on the downtown area.

Much of the transitway alignment to the east of the downtown area parallels Highway 403 and two arterial roadways. It is outside the travelled portion of the roadways and is grade separated at roadway crossings. The lands on which the transitway is built are host to a plethora of utilities, including national and airport pipelines, gas lines, water, sanitary and storm sewer facilities, power transmission lines, and numerous communication lines (including fibre optics lines with many dependent customers). The alignment and grade of the transitway was designed to minimize major and expensive utility relocations. The design was further challenged by the presence of shale rock at a relatively shallow depth along much of the route. The design includes sections of transitway that grade separate over local roadways and sections that are located in a trench that go under local roadways.

As a side note, the utility relocations proved to be quite complex and it was difficult to get accurate relocation forecasts from the various utility companies. Delays in relocating some of the utilities have resulted in significant delays in the project, which have resulted in significant cost increases due to project prolongation. It is ideal to have all utility and property issues finalized prior to construction but given the timing and conditions of funding, this was not possible.

Other transitways have converted from bus operation to light rail transit (Ottawa is a good example of one currently being converted). The Mississauga Transitway was designed to allow for conversion to light rail transit with minor modifications. That being said, the pattern of grade separations over and under local roadways results in regular changes in vertical alignment, which is not ideal for rail operation (the more level the better).

The transitway has two major horizontal bends, located near Fieldgate Drive and at the intersection of Eastgate Parkway and Eglinton Avenue East. The curve at Fieldgate Drive is located adjacent to a residential area. Given the combination of major utility locations and horizontal alignment, finding a reasonable solution was a challenge. The residents that back onto the utility corridor had become accustomed to being adjacent to what appeared to be green field. During the environmental assessment phase, residents expressed a desire to have the transitway located as far from the houses as possible. Accommodations were made to tighten the horizontal curve (resulting in the transitway being further from the houses) but in doing so, the super-elevation of the transitway increased resulting in a higher elevation of facility. The earlier concepts included putting the transitway in a trench at this location but a raised design was preferred in order to avoid costly relocation of major petroleum transmission pipelines. The compromise resulted in a raised transitway passing relatively close to their homes. After much consultation with the residents, it was finally agreed to install a privacy fence along the top of the berm that the transitway was built on.

At Eastgate Parkway and Eglinton Avenue East, the transitway crossed the intersection at a diagonal and was designed to be grade separated under the busy intersection. Because the transitway passed radially under the intersection, the tunnel length was long and required special design techniques and treatments in order to satisfy fire/safety regulations. Signs will be installed at each entrance to the tunnel and can be remotely illuminated advising buses not to enter in the event of an emergency.

The transitway passes many high tech facilities, including divisions of Blackberry and Bell Canada. Removing large quantities of shale rock to create the trench for the transitway was a challenge. Special vibration monitoring was put in place to ensure that disruption levels did not exceed reasonable thresholds for local business.

Construction of the transitway traversed the Airport Corporate Centre, which is a large collection of businesses in the vicinity of the airport and Highway 401. There are a limited number of access points to this area and planning for the four major grade separations (crossing local roads that access the area) required special coordination to ensure that access to

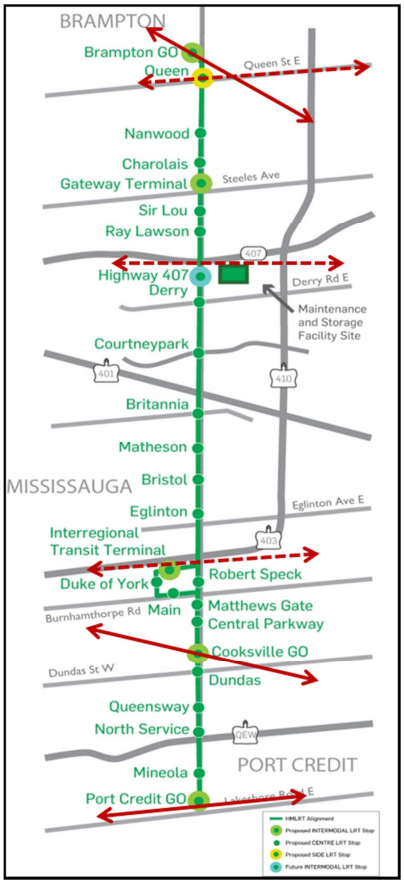
the area for vehicles, cyclists and pedestrians is minimized. A condition was made in the contract to prevent adjacent local roads to being closed at the same time.

At the intersection of Eglinton Avenue East at Orbitor Drive there was a hotel being renovated. It was decided to take advantage of the hotel closure to advance some of the utility relocations in order to minimize the disruption that construction would have on hotel operations once it opened again. To complete this, an advance contract to relocate the utilities at this location was undertaken.

The City's portion of the transitway ends at Commerce Boulevard in the east end of the city. Metrolinx will be constructing the Renforth Gateway portion, which is immediately to the east of this location and includes connection to Highway 427. Utilities are continuous through this area and coordination was required to ensure that utility relocations were completed and compatible for both sections of the transitway. Utility relocations were further complicated by jurisdiction change as this area borders the City of Toronto and many of the utility works required permits and permissions from Toronto.

Hurontario-Main LRT

The current Preliminary Design/Transit Project Assessment Process (TPAP) Phase of the Hurontario-Main Light Rail Transit (HMLRT) project in the cities of Mississauga and Brampton follows the vision for the Hurontario-Main Street Corridor as set out in the Hurontario/Main Street Master Plan Study (2008 - 2010). The Master Plan study had a goal of developing a Corridor Master Plan integrating rapid transit, land use and enhanced urban design for the approximate 21-kilometre corridor between downtown Brampton in the north and Port Credit in the south of Mississauga.



Map of Hurontatio-Main LRT

The Hurontario/Main Street Master Plan, identifies a vision for the corridor as one of a unified concept for mobility in the 21st Century, which complements and complies with both the Province of Ontario's Places to Grow legislation and Metrolinx's The Big Move Regional Transportation Plan.

The Preferred Light Rail Transit (LRT) Option

Central to the Hurontario/Main Street Master Plan was the conclusion that LRT technology is the preferred form of transit on the corridor. The HMLRT system, as envisaged in the Master Plan, will link two Urban Growth Centres (as designated in Places to Grow) and interface with five Mobility Hubs identified as locations for multi-modal, inter-regional transit connections and enhanced transit-oriented development.

The HMLRT system is intended to be a catalyst for economic development, residential intensification, improved quality of life and long-term municipal sustainability.

The HMLRT differs significantly from the transitway in that it is built at grade within the travelled portion of the roadway. In most instances, it is located in the centre of the roadway with general traffic travelling in either side. The many linkages to other transit, pedestrian and cycling facilities make the HMLRT ideal for people moving. It is designed to eventually accommodate up to 600 passengers per train with headways of as little as 5 minutes.

HMLRT Geometric Challenges

The Hurontario/Main corridor is fortunate to have a large right-of-way along much of the route. Given the ambitions of providing an urban realm, the actual travelled portion of the roadway is somewhat constrained to the existing curb to curb location. In order to facilitate the LRT, two through lanes will be converted to dedicated rapid transit lanes throughout most of the route. This will effectively have a substantial impact of reducing regular vehicle capacity. In addition, vehicle turns across the path of the LRT will be restricted by dedicated phases at signalized locations. The key premise here is that the project is intended to move more people and foster place making not encourage general traffic movement (which tends to be mainly single occupant vehicles).

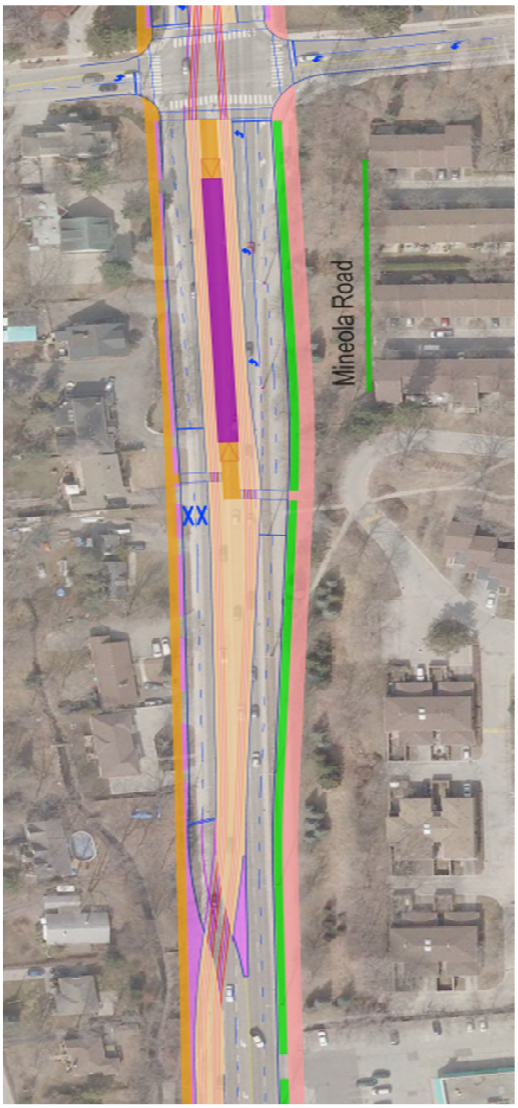
There are numerous geometric challenges on a project of this size and only a few of the major ones will be discussed in this report.

The southern terminus of the HMLRT is at the Port Credit GO Station (PCGO). The PCGO is located on the northwest corner of Hurontario Street at Park Street and the actual station is recessed from Hurontario Street by about a block. It is ideal to locate transfer points for transit as close as possible to each other to make it as convenient as possible for customers. There was a strong desire to locate the HMLRT platform as close to the PCGO station as possible. This combined with the challenge of crossing the Lakeshore West CN/GO railway tracks at the existing grade separation on Hurontario Street resulted in a diversion of the LRT to the west side of the roadway, rather than in the centre of the roadway, by means of a new bridge span constructed underneath the railway tracks. Due to a signalized intersection located immediately south of the LRT stop and to meet the clearance requirements under the existing railway tracks, the LRT platform is located on a gradient of approximately 2.5%. This would be the maximum grade allowable by our accessibility standards. There is also a storm water channel to the north-west of the LRT stop which creates challenges for constructing the new bridge span under the railway corridor while resolving hydraulic and grading issues. This is also one of the few locations where the HMLRT is not located in the centre of the roadway and the stop is side running platforms compared to central island platform. Port Credit is a popular destination and given that the Lakeshore West CN/GO rail line is an all-day service, it is

projected to be a very popular location. Having the HMLRT platform located on the west side of the roadway also enables the LRT to be melded into the place making efforts on the west side of the roadway.

Rendering of HMLRT Port Credit Stop

Located a short distance to the north of the Port Credit stop is a transition point where the LRT locates to the centre of the roadway. There is a rail basket weave where the HMLRT diverts from the west side of Hurontario Street to the centre of the roadway. In order for the LRT to cross the southbound traffic lanes safely, the southbound lanes are signalized at this location. An existing signal and bridge north of the PCGO at Inglewood Drive would be relocated south, closer to the LRT stop to ensure sufficient space for a stopped train between the signals. This allows for the transition of the LRT alignment from the west side to the centre to occur about 100m north of the relocated signalized intersection so that a 90m long LRT can safely stand between these two points. When an LRT is traveling northbound, the traffic signal will be pre-empted and southbound traffic stopped while the LRT crosses into the middle of the roadway. Northbound traffic is not impeded by the LRT at this location and can continue to flow as usual.



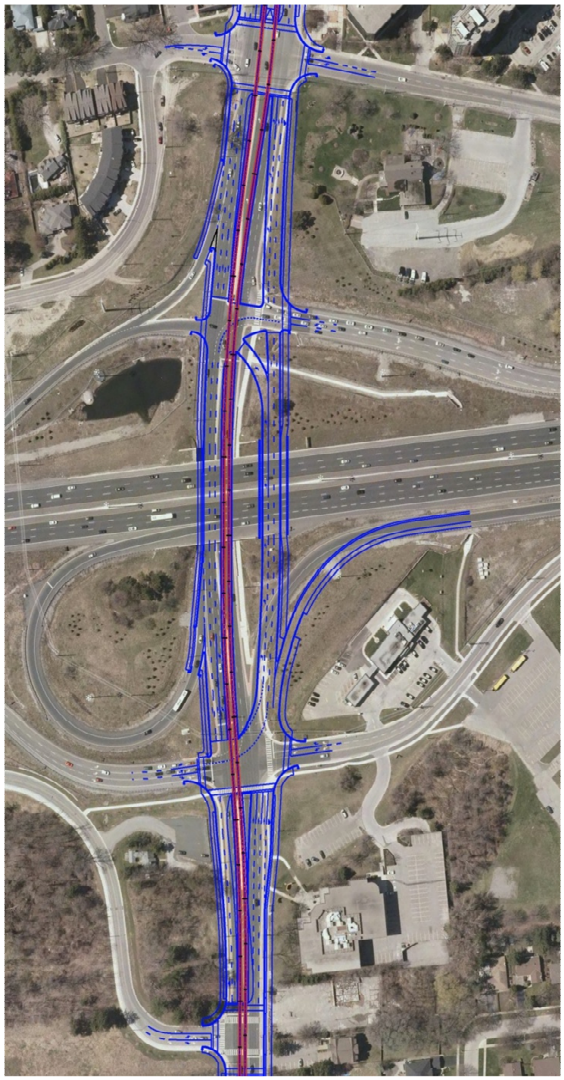
HMLRT Basket Weave Near Mineola Stop

The HMLRT is in dedicated lanes throughout most of the route (a small section of the route in Brampton's historical district is in mixed use lanes) and is protected by a curb throughout, except through intersections where the tracks are flush with the roadway. There are numerous driveways along Hurontario Street south of the QEW where mid-block driveways will be limited to right-in right-out movements once the HMLRT is built. Dedicated left/U turn lanes are being provided for the northbound and southbound traffic at key signalized locations. The alternative for those wishing to emulate a left turn is to do a right turn followed by a U-turn upstream. This is not ideal but for safety reasons, is a necessity.

The section south of the QEW is currently four lanes and it is planned to keep four lanes, while introducing dedicated LRT lanes. In order to accommodate the widening, some minor property acquisitions and compromises to the width of streetscape zones are needed.

QEW

The crossing of the QEW presents many challenges for the HMLRT project. The QEW is a freeway and it is important for safety to avoid contributing to situations where traffic congests in the core lanes of the freeway. The interchange of the QEW at Hurontario Street was reconstructed recently and clover-leaf ramps were converted to T-ramps. This helped to provide a safer environment for pedestrians and cyclists (they don't have to cross fast free-flow ramps), and improved on what were tight cloverleaf ramps. Overall, traffic operations tend to be safer but arguably, traffic capacity was reduced, particularly for movements that utilized the free flow ramps (the northbound to westbound left turn was one of the movements impacted the most). During the construction, the surrounding neighbourhood did express frustration regarding traffic operations and are likely still sensitive to any further changes that may occur to the road layout.



HMLRT QEW Interchange Proposed Improvements

The northbound left turn lane accessing the QEW westbound ramp is limited in length and often backs up into the northbound through lanes. It is not possible to widen Hurontario under the existing structure to accommodate the LRT without losing through lanes and further constraining left turn movements. It is therefore planned to construct a new underpass structure and effectively maintain four through lanes and introduce new dedicated LRT lanes. The existing northbound travel lanes would be moved into the new structure and replaced in the existing structure by the dedicated LRT infrastructure. The widening should mitigate the impact of the LRT on the interchange and would provide more storage length for the northbound left turn movement. The works here are likely relatively expensive but are deemed worth the expenditure.

Cooksville GO Station

The Cooksville GO Station and surrounding area are currently the subject of much review for improvements and urban development. The City has a visioning exercise underway to help guide future development and place making. Metrolinx is also planning the addition of a large parking garage on the site, which will help foster increased ridership. The addition of parking also increases the potential for development uplift in the area.

The LRT will have a stop at this location and given the link with GO Transit and the development potential, this stop is expected to be a popular one. The LRT Stop could not be moved to one side of the corridor as with Port Credit and there was a desire the build the LRT stop as close to the existing rail corridor as possible to facilitate transfers. There were geometric challenges to be overcome with the grade, sightlines and need to provide pedestrian connections. In addition, there was also a need for improved local roadway connections through the westward extension of John Street to serve the GO station and future growth. Although it was determined through the preliminary design that an overhead pedestrian connection from the LRT stop to the GO Rail commuter station could be accommodated, the geometric challenges of dealing with the available width under the existing railway structure did not seem to provide sufficient platform width to accommodate an elevator and make this connection point fully accessible.

Rendering of HMLRT Cooksville Stop

Downtown Mississauga

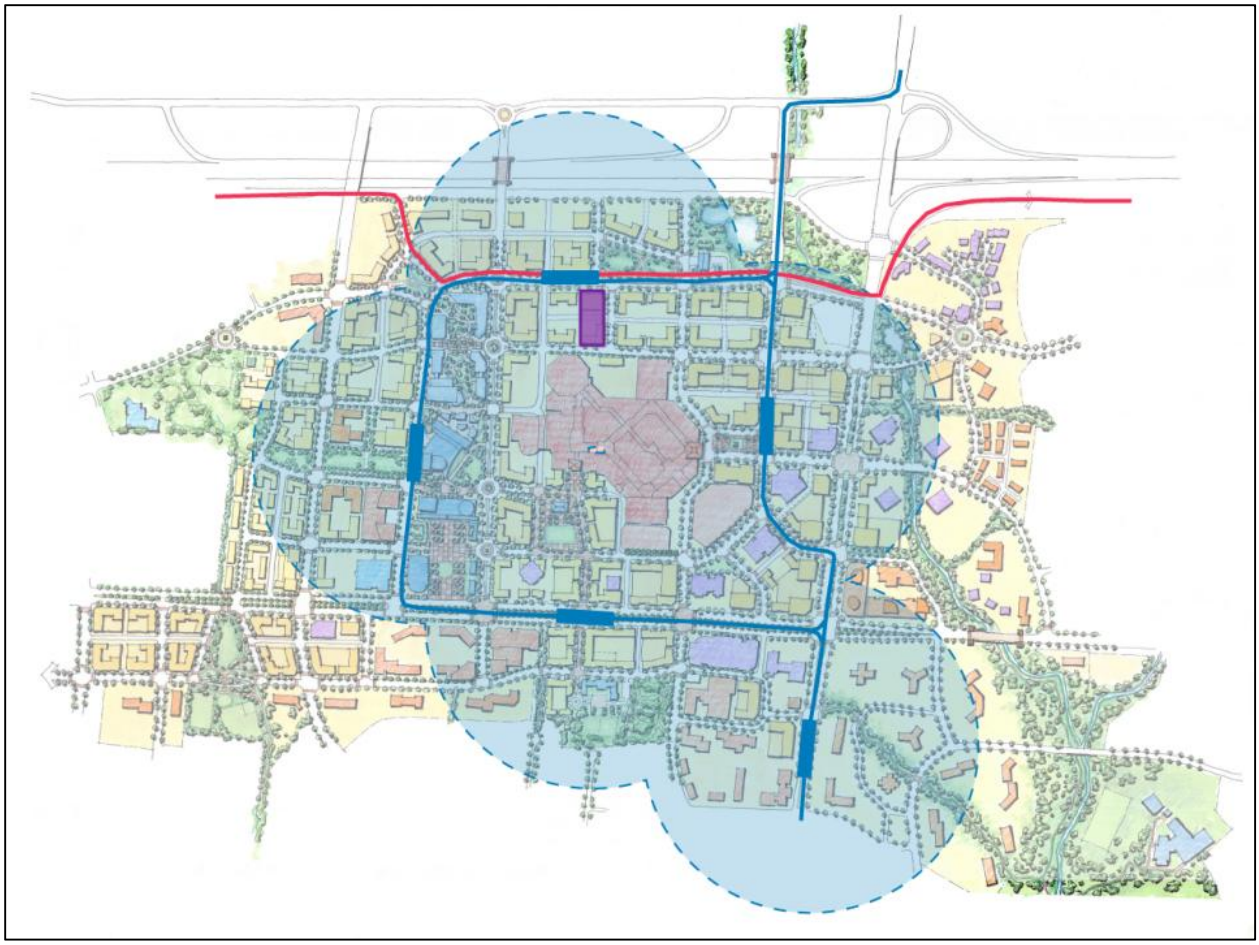
Downtown Mississauga is the most challenging area of the City with regard to rapid transit. The downtown is going through a lot of change and there are many competing interests all wanting to take a prominent position in the ultimate development. The competing interests include regular vehicular traffic and trucks, pedestrians, cyclists, local transit and inter-regional transit. The big challenge is accommodating the ambitious growth while not creating insurmountable barriers for existing residents, business, and commuters.

It was determined to keep one leg (east side) of the LRT system on Hurontario Street through this segment. Absolute Drive was part of an earlier draft routing for the LRT but was not selected in the end due to decisions on how the system would cross Highway 403; its impact on future development opportunities; and a number of operational issues, including tight rail turns, grading and delivery issues (driveways impeded etc.) and time efficiency when trying to

minimize run times for trains. This does require the introduction of two significant railway junctions at Burnhamthorpe Road and at Highway 403 for services to access the Downtown core areas.

Both the transitway and HMLRT have relatively good certainty outside the downtown area. They meet in the downtown area and both need to integrate with each other there. They must also integrate with all other competing interests noted above, all of which are in a state of change. The challenge is most pronounced on Rathburn Road, which is located to the north of the downtown between Highway 403 and the Square One regional mall. MiWay and GO Transit both have major transit facilities here and integration is essential to ensure an efficient and cost effective solution. The original transitway environmental assessment showed a desire line through the downtown area and included a section of the transitway grade separated in a trench. Given the multiple competing demands on the Rathburn Road area, it is likely that the transitway ultimate solution will include a significant portion of grade separated underground. This would likely include a significant transit terminal and operations area underground and may include connections to local businesses. Planning and execution of the downtown area has many stakeholders and requires further communication and review prior to the detailed design stage.

The LRT use of the north side of Rathburn Road, requires a delta junction south of Highway 403 on Hurontario Street. Horizontal and vertical alignments of LRT along Rathburn Road possess great challenges when crossing the City Centre Drive intersection at-grade while meeting the vertical clearance requirements for Centre View Drive ramp and Cooksville Creek located immediately to the east of the City Centre Drive intersection. Immediately to the north of the LRT guide way on Rathburn Road, the future transitway will most likely run in a tunnel approximately 7m deep and cross underneath the LRT guideway at City Centre Drive intersection. Some of the components of the transitway may need to be integrated into the LRT construction to minimize impacts to future LRT operations.



Rendering of the early optional routings of Transitway and HMLRT in the Downtown

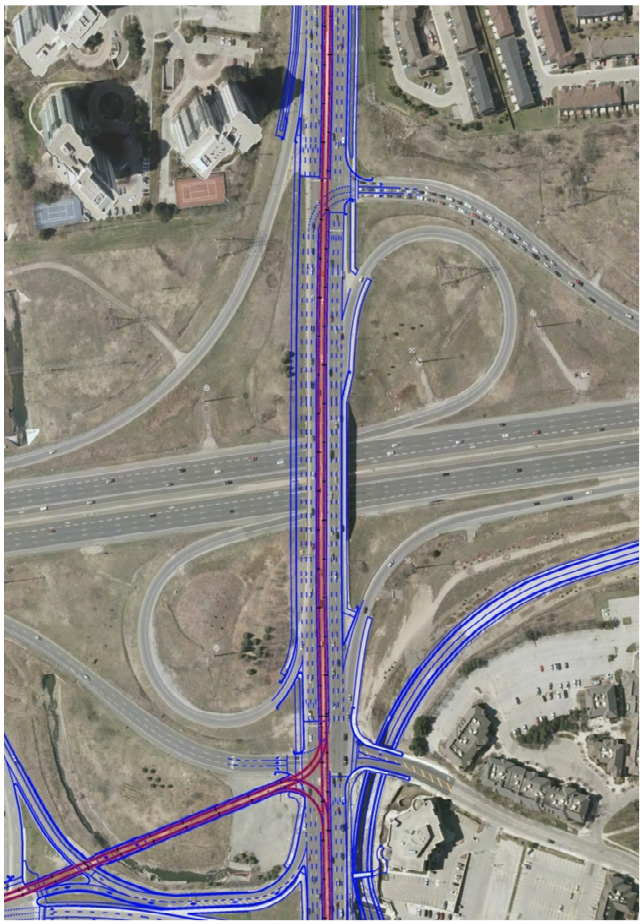
Duke of York Boulevard

Duke of York Boulevard is located on the west side of the downtown loop and will host the LRT. It is proposed to have an east side running train/road alignment which will limit motor vehicle turning movements to protected signal phases only. The geometric challenges when interacting with the roadway network especially for transitioning between the downtown legs of the LRT alignment and with accommodating right turning movements adjacent to the LRT require protected phases for turning the LRT vehicles and will also limit motor vehicle turning movements to protected signal phases only. The roadway also has an existing roundabout at Square One Drive, which will need to be removed in order to facilitate LRT operations.

HMLRT Duke of York Routing

Highway 403

The crossing of Highway 403 presents a number of challenges as the interchange with Hurontario Street is very busy and the necessity to mitigate disruption to the highway core lanes is important. To further complicate the issue, the LRT is planned to enter the downtown area close to the interchange, which makes traffic operations analysis very challenging. The option of utilizing the existing Hurontario bridge alignment (existing bridge widened on the west side to provide 3 lanes of traffic in each direction over Highway 403) versus a new bridge crossing to the west was evaluated and given the grades, utility impacts and preliminary costing, it was determined that the Hurontario Bridge alignment was the preferred option.



HMLRT at Highway 403

Highway 407 ETR

Highway 407 ETR is a privatized toll highway and has similar issues with Highway 403 and the QEW regarding operations of the core highway lanes. The 407 ETR highway operators have expressed a concern that the introduction of the LRT may impede access to and from the highway causing impacts to the toll revenues realized. The study did take the highway operations into consideration maintaining existing general purpose and transitioning these lanes back into the reduced lane configuration north and south of the structure.

Brampton Heritage Area

The Main Street Heritage area is located in Brampton north of Steeles Avenue. The road has a relatively narrow road right-of-way and given the heritage designation of the roadway, significant change to the look or operation would not be an easy task. The HMLRT study determined that this routing was the preferred one. In order to minimize disruption to local

driveways and to maintain four vehicle lanes of general use traffic, it was decided to share the LRT lane with general traffic along this stretch or roadway. Further, in order to minimize disruption of local driveways, it was also decided to allow for vehicular turns mid-block across the LRT tracks. To further add to the uniqueness of this area's special requirements, it was also provisioned that alternate forms of train propulsion would be reviewed (the standard form of propulsion is to use Catenary wires). It was felt by some stakeholders that the overhead wires were not suitable for a heritage area. Another potential advantage of the wireless solution through this segment related to the low headroom clearance beneath the existing CN Rail bridge. If Catenary wires were provided, it would be necessary to lower the road profile to achieve the clearance for road traffic to pass beneath the CN Rail Bridge.

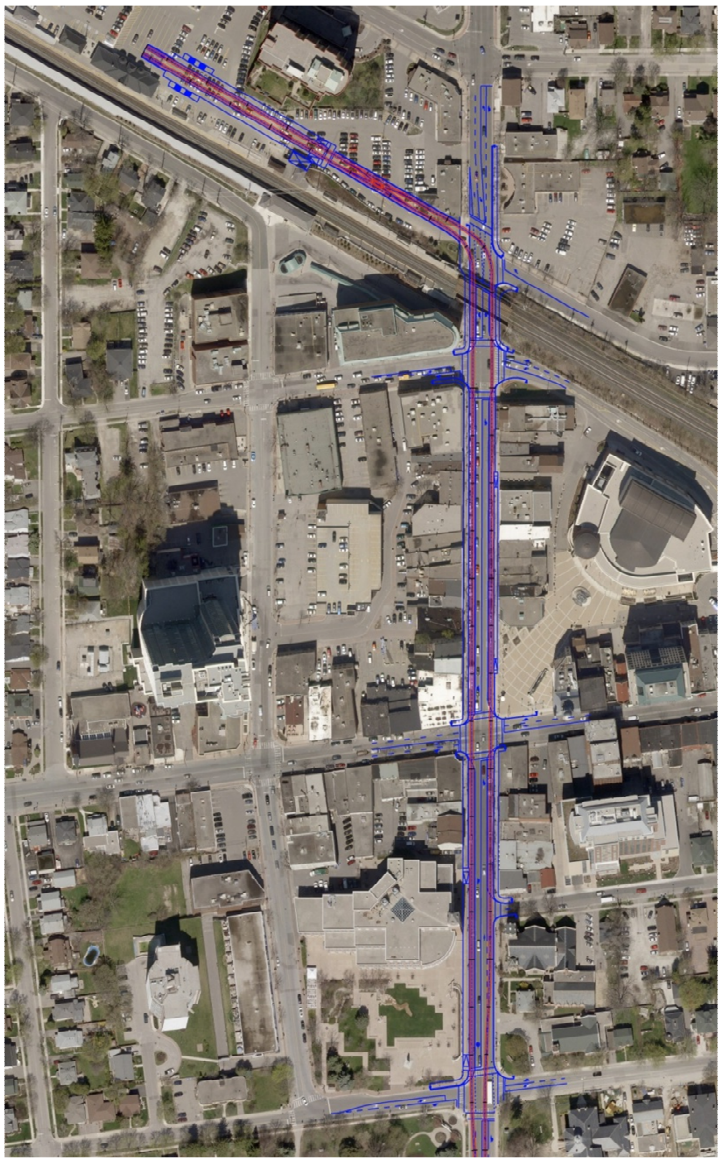
Brampton Downtown

Main Street in Downtown Brampton has a relatively narrow road right-of-way and close proximity to adjacent buildings. Retrofitting an LRT through the downtown would require removing parking and dedicating a lane to the LRT, which would leave one lane in each direction for general traffic. There are strong proponents and opponents for the introduction of the LRT through the downtown; however final recommendation was to support the study recommendation to include it.

The preferred option through this segment recommends the LRT tracks move from centre running to side (gutter) running with two traffic lanes in the centre of the street. This option allowed only narrow sidewalks on both sides and though it maintains some through traffic on Main Street, there is no space for vehicles to stop or park within this segment.

Brampton GO Station

The Brampton GO Station is located just off Main Street to the north of the existing rail grade separation. The challenge here was to enable a tight turn of the train to the west into the GO property to ensure an efficient integration with the GO rail service at this station. There are also major grading issues given the close proximity of the rail grade separation.



HMLRT Brampton Downtown and GO Station Stop

Cycling Facilities

Cycling and cycling facilities are evolving in Mississauga. The City recently completed a Cycling Master Plan and compendium Cycling Implementation Action Plan. The Hurontario Corridor was a desired route to have some form of cycling facility included in the plans and was identified as a Special Study Area. The challenge was to accommodate cyclists along with all the other competing traffic interests, including LRT. It was hoped to minimize the reconstruction of Hurontario Street, particularly the travelled portion of the roadway. The LRT would be retrofitted in existing travel lanes and given the need to maintain two lanes of traffic thorough most sections of Hurontario Street, it was finally decided to recommend one-way cycle track behind the curb on each side of Hurontatio Street combined with intersection crossing

treatments including markings and bike boxes. The LRT stations are also planned to have bike parking integrated into the stop design.

Traffic Operations

The HMLRT will have a number of impacts on traffic operations and special applications and techniques are required to help ensure a fast reliable LRT operation, while mitigating any negative effects on general traffic operations. The LRT operates within the road right-of-way and predominantly in the middle of the roadway. Any vehicle traffic turning across the path of the LRT must be signalized and operate only on a protected phase. This helps to ensure that vehicles and LRT don't cross paths and create a safety concern. For LRT's operating in the centre of the roadway, left turns are impacted. For LRT's operating at the side of the roadway, both left and right turns are impacted.

The LRT platforms are being designed to accommodate up to three low floor light rail vehicles and an ultimate LRT stop length of 90m. It is likely that in the short term, 60m LRT vehicles will be operated. In addition, there would be approximately 8m on each side to transition the platform to the roadway grade. Geometric challenges of incorporating 26 of these stops along the corridor are significant. The LRT platforms will be located at signalized intersections and are primarily single centre island platforms to reduce the property and traffic impacts of additional signals. A platform length of 60m is considered a reasonable walk distance for riders to walk to the signalized intersection crossing. In the future, 90m is considered a relatively long distance and riders may be tempted to cut their walk short by crossing the roadway away from the signalized intersection. It is for this reason that a second signal may be considered in the future at the non-intersection side of the platform in order to accommodate pedestrians. Two signals located in close proximity are never desirable, but safety is paramount. The impact on traffic of closely spaced signals can be mitigated by synchronizing the timing of the signals to maximize efficiency.

In order to promote consistent headways and travel times for LRT operations, traffic signal priority for the LRT vehicles will be required. The headways at busy times are likely going to be around 5 minutes and the regular priority given to the LRT will have an impact on side street traffic. Again, the traffic management system will need to be programmed to maximize signal timing efficiency and to mitigate any negative effects on regular traffic.

There is a trend for increased competition of road corridor space for competing interests. The existing roadway bridges were designed and built mainly for cars and trucks, and retrofitting to better accommodate pedestrians, cyclists and transit is extremely difficult and very expensive.

Conclusion

The City of Mississauga is continuing to grow and the municipalities around it are also growing quickly. Rapid transit is needed to help support this growth and will also help Mississauga realize its many ambitions, including the desire to be sustainable, environmentally responsible, and competitive. There are many competing interests and challenges in successfully integrating rapid transit into the City fabric, but the strong desire and willing partnerships make the journey possible.

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