APPENDIX 1

CITY OF MISSISSAUGA

BUS RAPID TRANSIT (BRT) – MISSISSAUGA SEGMENT IMPLEMENTATION PLAN

Executive Summary

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Introduction

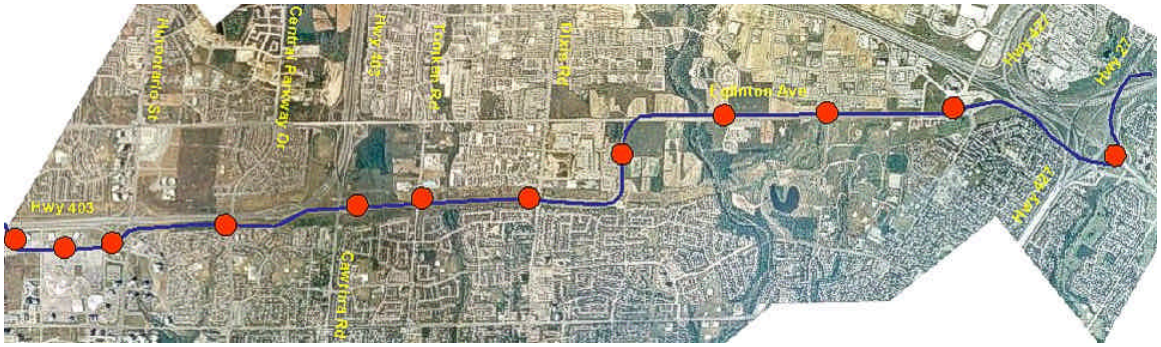
This executive summary highlights the findings and recommendations of a comprehensive update of the Mississauga Transitway approved under the Environmental Assessment Act in 1992. The Transitway was proposed as a fully grade-separated roadway for exclusive transit operations with on-line stations similar to rail transit systems. This concept is referred to as Bus Rapid Transit (BRT). The Ridgeway Drive to Hurontario Street section is illustrated below.

Figure 1 –Mississauga Transitway Proposal: Ridgeway Drive to Hurontario Street

Six stations were proposed on the Transitway west of the City Centre with park 'n' ride lots being provided at the two most westerly stations. Access ramps were developed at most of the stations to permit buses to enter and leave the facility. East of Mavis Road, the Transitway crossed Highway 403 in tunnel to connect with the City Centre station.

The Hurontario to Renforth section of the proposed Transitway is illustrated below.

Figure 2 –Mississauga Transitway Proposal: Hurontario Street to Renforth Drive



From Hurontario Street, the Transitway continued on the south side of Highway 403, then adjacent to Eastgate Parkway, then parallel to the north side of Eglinton Avenue terminating at a station at Renforth Drive south of LBPIA. There were nine stations proposed east of the City Centre; several with park 'n' ride and bus access.

Since 1992, there have been a number of land use changes and policy decisions which have occurred that have affected the funding and the development of the project. However, recent announcements by the Province suggest that significant financial assistance maybe forthcoming shortly. This possibility underlined the need for the City, in conjunction with GO Transit, to be in a position to respond quickly to the opportunity with an up-to-date proposal.

The Purpose of the Investigation

The focus of this investigation was:

- To update the passenger demand forecasts to ensure consistency with current forecasts of development, other rapid transit proposals and selected ridership targets;
- To update the past scope of work for the Transitway including station development to reflect the changes in the adjacent development, current design standards and adopted road network planning;
- To undertake a value-engineering analysis of the approved Transitway to identify potential economies; and
- To prepare a comprehensive staging plan for the implementation of the facility together with the preparation of a sound base line budget recognizing the planned construction schedule.

A Key Element of the City's Transit Strategy

The City recently approved the "Mississauga Transit Strategy – 2002" to provide a revised overall direction for transit planning within the City. The Strategy focused its recommendations on major transit corridors, community transit services, GO Transit integration and marketing. The Strategy emphasized establishing targets for ridership growth to respond to increased traffic congestion and the City's sustainable growth objectives.

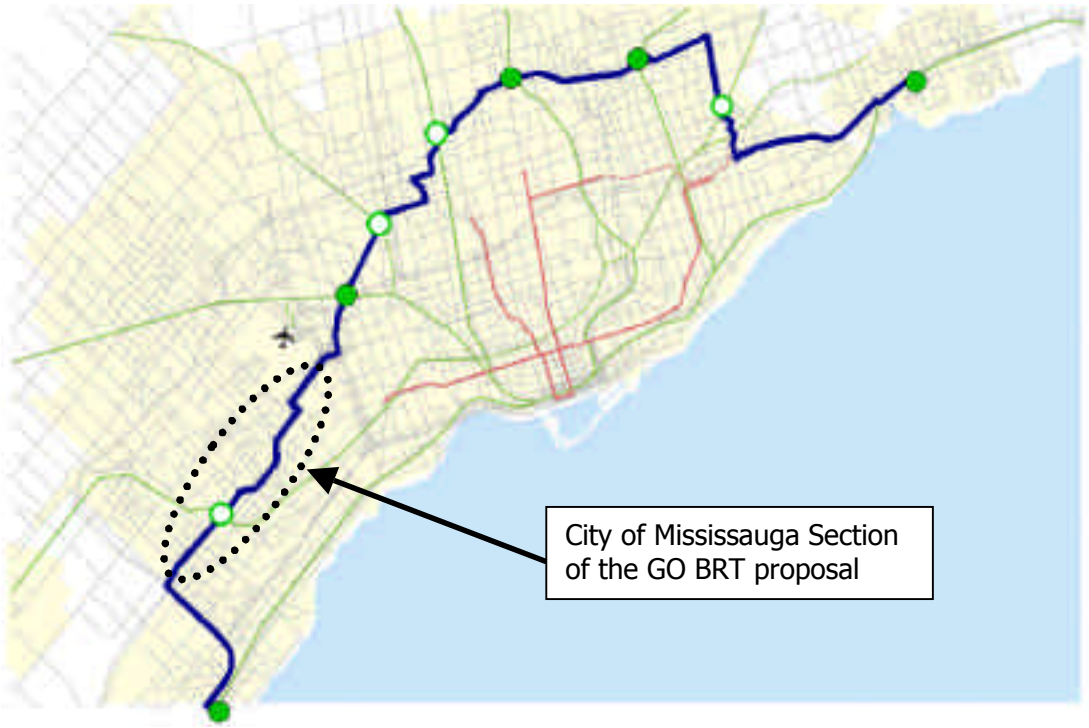
Currently, the per capita ridership rate in Mississauga is approximately 40 annual transit trips per capita. Preliminary analysis suggests that higher rides per capita are possible with significant service enhancements. A key influence on attracting higher ridership is providing reliable schedules and system travel times that are competitive with auto use to access the major travel destinations within the GTA. Consistent with the experience in other municipalities, a separate right-of-way transit facility is an essential component in achieving these aggressive ridership objectives.

With the Transitway in place, the analysis conducted in this investigation forecasts a conservative 20% increase in transit ridership, equivalent to an annual rate of 48 transit trips per capita. The population within a 20-minute travel time of the City Centre and a 30-minute travel time of the TTC Islington station would increase from 64,000 to 140,000 residents.

A Priority Component of the GO BRT Network

In December 2002, GO Transit announced a proposal to introduce a 100 km BRT Spine facility extending from the Oakville GO Station to the Pickering GO Station. The rationale for the initiative was to arrest the trend of increasing urban sprawl and traffic congestion by complementing the existing radial commuter rail and subway systems with a circumferential rapid transit system to serve the suburb to suburb travel demand. The proposal is illustrated below.

Figure 3 – GO BRT Proposal



There are several examples of BRT already in operation that demonstrate the BRT concept has merit including Ottawa, Pittsburgh, Houston, Brisbane and Adelaide. BRT proposals are currently under development in Winnipeg and Edmonton. In its most developed form, BRT operates on an exclusive two-lane roadway with on-line stations completely isolated from general traffic flows.

BRT may also operate on freeway shoulder lanes and in arterial bus lanes. Intersection priority may be provided through various forms of signal priority or by limited grade separation. Because the BRT bus can operate both on and off the busway, the busway can be built in discontinuous sections linked by bus lanes or other priority treatments such as signal pre-emption and queue jumps on arterial roads or freeways. This means that the busway can be built incrementally, with priority being given to the construction of the busway sections that produce the highest initial benefit and rate of return.

The typical BRT operating configuration consists of a high frequency all-stops service running the full length of the corridor and stopping at each station. Passengers access this service as they would an LRT service by walking or cycling to the stations, transferring from feeder buses and by using park-and-ride and kiss-and-ride facilities.

Supplementing the all-stops service are other high frequency bus routes that typically pick up and drop off the majority of their passengers at on-street locations away from the busway corridor. The most common example of this type of service is an express or limited stop bus route that picks up in a residential community, travels to the busway and then operates express or skip stop on the busway before exiting to serve an employment centre. This type of

operation offers direct no transfer service between origins and destinations well beyond walking distance of the actual busway, making BRT an ideal technology for suburban operations.

The concept plan for the initial Spine Line and connecting links builds on previously identified projects and knits them into an integrated system. Within Mississauga, the proposal has incorporated the approved Mississauga Transitway facility in its entirety. The 2011 peak hour demand attracted to the GO BRT network section through Mississauga ranges up to 9,800 passengers per hour in the peak direction immediately west of Renforth Drive. Accordingly, this section represents a high priority for the initial stages of the GO BRT network.

Modifications to Project Scope Have Reduced Costs

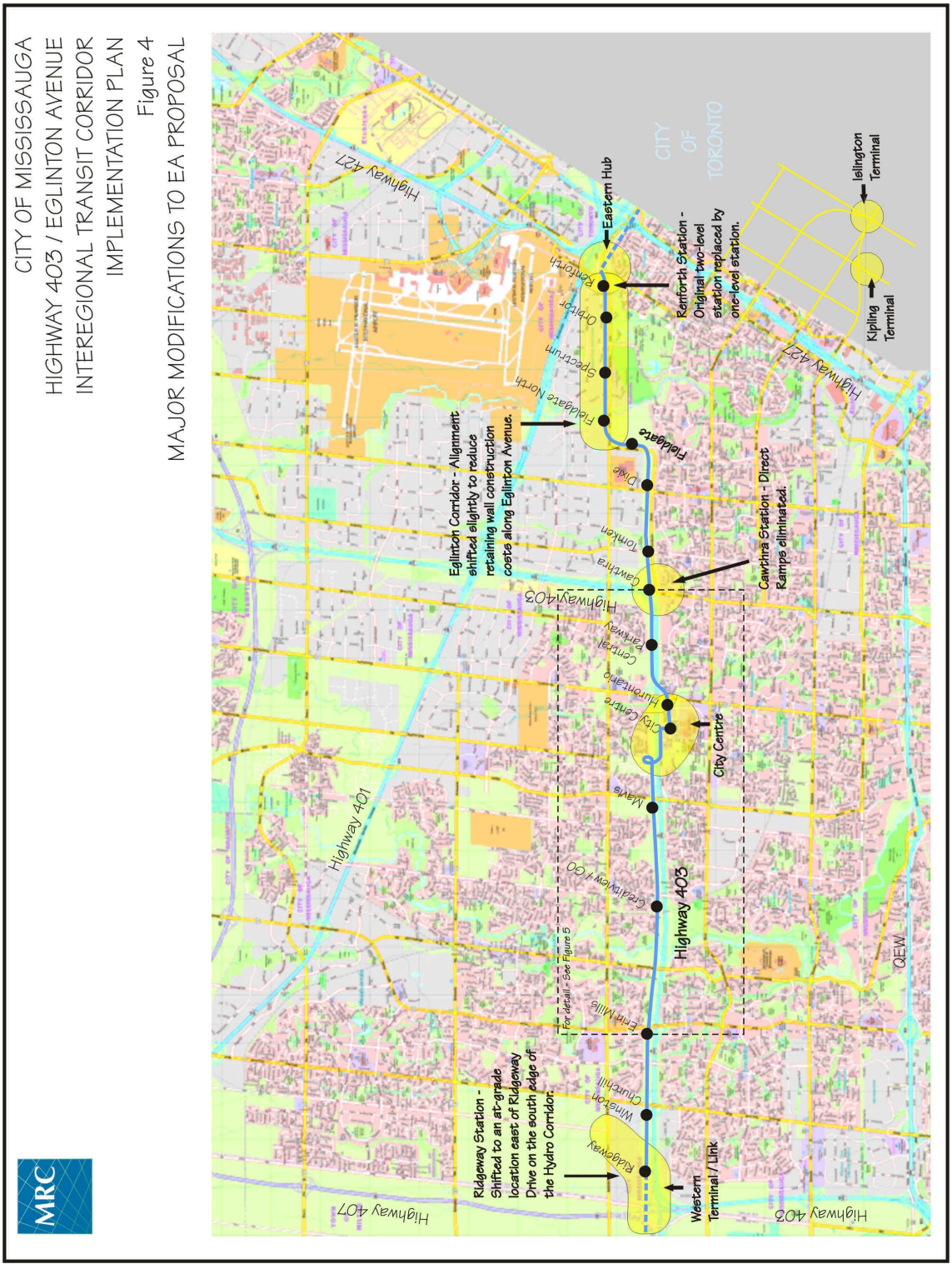
The Transitway proposal was examined in detail firstly to identify refinements in the alignment and infrastructure to reduce costs and impacts on adjacent development and secondly to update the design standards to current practice. In general, the overall concept adopted in 1992 remains intact. The recommended changes focus on the reduction of tunnel sections, modified station development proposals and the interim use of the bus shoulder bypass lanes provided on Highway 403 between Erin Mills Parkway and Mavis Road rather than an exclusive right-of-way facility. The total capital costs resulting from the alignment and design standard changes are compared below with the costs presented in the 1992 EA Study.

Capital Cost Comparison ($Millions)

	EA	Proposed
Guideway Cost	$246.8	$161.1
Station Cost	$96.1	$33.8
Total Construction Cost	$342.9	$194.9
Project Management (10%)	$34.3	$22.4
Design (10%)	$34.3	$19.5
Project Contingency (20%)	$68.5	$39.0
Total Capital Cost	$480.0	$275.7

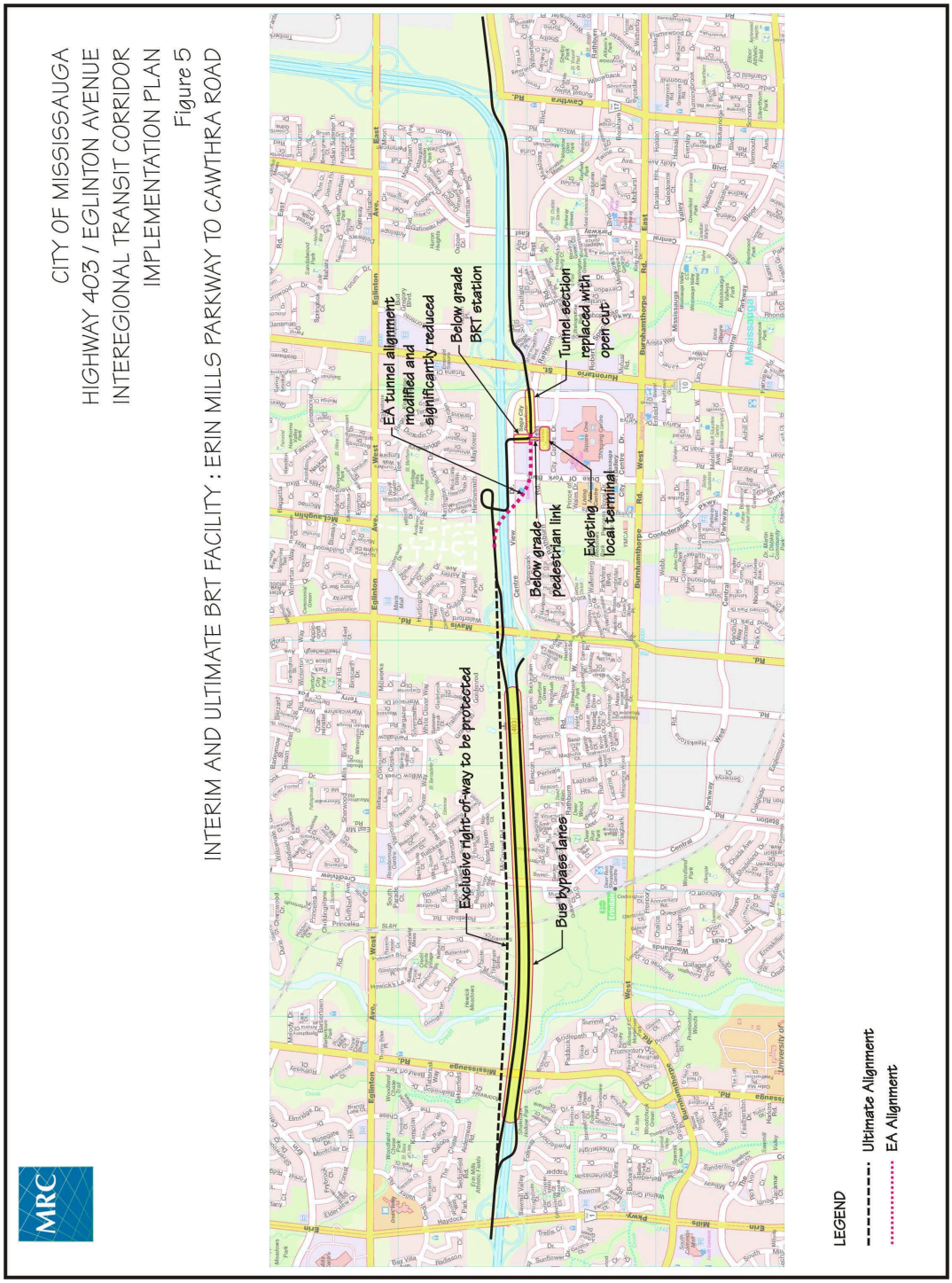
The major modifications to the EA proposal are illustrated in Figure 4 and are highlighted in the remainder of this section.

Figure 4


CITY OF MISSISSAUGA
HIGHWAY 403 / EGLINTON AVENUE
INTEREGIONAL TRANSIT CORRIDOR
IMPLEMENTATION PLAN
Figure 4
MAJOR MODIFICATIONS TO EA PROPOSAL
MRC
Eastern Hub
Renforth Station - Original two-level station replaced by one-level station.
Islington Terminal
Kipling Terminal
Eglinton Corridor - Alignment shifted slightly to reduce retaining wall construction costs along Eglinton Avenue.
Cawthra Station - Direct Ramps eliminated.
City Centre
Ridgeway Station - Shifted to an at-grade location east of Ridgeway Drive on the south edge of the Hydro Corridor.
Western Terminal / Link
Highway 403
Highway 401
Highway 427
Highway 407
QEW
CITY OF TORONTO
Renforth
Dixie
Tomken
Cawthra
Central Parkway
Hurontario
City Centre
Mavis
Creditview / GO
Tenth Mille
Winston Churchill
Ridgeway
Fieldgate
Fieldgate North
Spectrum
Orbitor
For details - See Figure 5

- The Ridgeway Station has been shifted to an at-grade location on the east side of Ridgeway Drive on the south edge of the Hydro Corridor. It is assumed that this will be the western terminus of the Transitway. The revised design incorporates a bus turn-a round and layover area for Transitway buses as well as a ramp connection to Ridgeway Drive for local service access. A future westerly extension of the facility would be achieved by extending the at-grade Transitway under an elevated Ridgeway Drive. A small 200-space park and ride facility is provided for local use.
- The EA proposal originally located the BRT to the north of the Hydro corridor to reduce costs has been modified to reflect the change in land use to residential from industrial/commercial. In order to reduce the construction and operating impact of the Transitway, the facility has been realigned to the south edge of the Hydro Corridor. In addition, the proposal provides for 200 park 'n' ride spaces at this location with protection in the proposed design to expand the number of park and ride spaces in the future.
- Between Winston Churchill Boulevard and Erin Mills Parkway, the Transitway follows the same alignment as proposed in the 1992 EA Study. At Erin Mills, a 200-space park and ride lot is proposed to be added to this station. East of Erin Mills Parkway direct bus only ramps connect the Transitway to the eastbound and westbound bus bypass shoulders on Highway 403. These bus bypass shoulders represent an interim alternative to the exclusive right-of-way facility between Erin Mills Parkway and Mavis Road. However, the property allowance designated in the EA will be protected. The Creditview station is provided as a freeway shoulder station with elevator and stair access to Creditview Road.
- At the Mavis interchange eastbound buses would exit from the bus bypass shoulders using the existing general purpose ramp to Centre View Drive where they will enter an exclusive eastbound bus lane. East of Confederation Parkway, buses will cross the westbound lanes of Centre View Drive to enter an exclusive Transitway between Centre View Drive and Highway 403. Westbound buses on the Transitway between Centre View Drive and Highway 403 would exit from the Transitway onto an exclusive lane on the east side of the proposed Confederation Parkway Bridge over Highway 403 and then into an exclusive westbound single lane Transitway on the north side of Highway 403 passing under the various Highway 403 ramps to merge with the westbound Highway 403 bus bypass shoulder. The proposed station at Mavis Road would be deferred pending the introduction of the ultimate BRT facility in this area (Phase 3). This arrangement for the east and westbound operation replaces the originally proposed Transitway tunnel under Highway 403. (See Figure 4)
- The two components of the revised City Centre Station included the existing City Centre Terminal and a depressed busway station immediately to the north of the terminal between Rathburn Road and Centre View Drive. An underground pedestrian link would connect the Transitway station with the existing Bus Terminal. The busway continues to the east in a depressed alignment on the north side of Rathburn Road, under Centre View Drive and Hurontario Street and into the previously proposed Transitway alignment between Hurontario Street and Cawthra Road. The Hurontario Station proposed in the EA is replaced with a bus layover area. A walk-in station with on-street bus bays for local service access is provided at Central Parkway. (see Figure 5)

Figure 5 – Interim and Ultimate BRT Facility: Erin Mills Parkway to Cawthra Road



- The proposed direct ramps linking the Cawthra station to Cawthra Road, Highway 403 and Eglinton Avenue have been eliminated as these ramps were not required for bus access and the cost could not be justified solely for parking lot access.

- From the Cawthra Station to the Renforth Station, the busway follows the same alignment as originally proposed with adjustments where necessary to accommodate development that has occurred since the EA Study in 1992.
- To minimize the amount of retaining wall needed on the Transitway in the Eglinton Corridor, the alignment has been moved to one side to minimize retaining wall construction. Where possible the profile has been raised to reduce excavation costs.
- At the Renforth Station, the proposed two-level station has been replaced by a single level station with traffic circles at either end of the local bus area to facilitate all possible bus movements.
- Operating experience during the past decade has resulted in several revisions to Transitway design standards. From a capital cost perspective, these changes have substantially reduced the scale of Transitway shoulder treatments, the length of the station acceleration and deceleration lanes and the overall sizing of the stations. These modifications in design standards have significantly reduced costs.
- An overall 25% construction contingency was added to all the construction costs to recognize the level of detail available on the scope of the project. As was assumed in the EA investigation, a further 40% was added to cover project management, engineering and project contingencies.

Mechanisms to Modify EA Proposal Are In-Place

The ability to undertake modifications to the approved 1992 scope of work was provided for in the original EA document. This applies to both changes in station location/layout and Transitway alignment. The proponent is required to prepare an addendum dealing with the specifics of the proposed change and undertake a public review involving local residents.

Key Inter-Regional Linkages Are Under Development

"Higher order" transit links to extend rapid transit service into the Airport and Toronto have been approved and/or are under consideration. The Eglinton West Rapid Transit EA Report, approved in 1993, included a Transitway link between Renforth Drive and Martin Grove Road consistent with the recommendations provided in this investigation.

In addition, City of Mississauga Transportation and Works Department personnel have developed a proposal in association with MTO staff to introduce transit priority operations within the 427 corridor scheduled for rehabilitation beginning next year. This represents a key development given the need to integrate the Transitway facility into the TTC subway network at Islington Avenue.

Next Steps in Transitway Program Development

A strategy was prepared for the implementation of the Transitway facility including the estimated annual cash flows. The staging plan recognized the other major capital works projects that could influence the timing of construction. These projects included the 403 widening contract due to start in 2003/2004, the 427 rehabilitation project scheduled for 2004 and possible local road development within the City Centre.

The Transitway should be considered a continuous project in the section from Renforth/427 to Ridgeway Drive. In other words, there is no assumed gap in the construction activity between the various sections of the project. However, a three-phase approach, deferring construction of the Erin Mills Parkway to Ridgeway Drive segment (Phase 2) and the ultimate section of the BRT between Mavis Road and Erin Mills Parkway (Phase 3), would be possible without significant implications on the performance of the transit system.

The above provided the overall framework for the project in the development of the construction staging and the associated cash flow forecast. The project development was broken into the following specific phases and allocated over a 5-year timeframe commencing in 2003. The Table 1 summarizes the activities and cash flow in each year of the forecast schedule for completion of the project from Ridgeway Drive to Renforth/427.

- Approvals/EA addenda, right-of-way acquisition/corridor control
- Preliminary design
- Detailed design, tendering, contract award, vehicle acquisition
- Construction and commissioning

Table 1 - Preliminary Scheduling and Cash Flow

Phase One - Mississauga Section of GO BRT System
Erin Mills Parkway to Renforth Drive

Year	Description of Activity	Expenditure
2003	i. Preparation of EA Addendum ii. Commencement of preliminary design iii. Commencement of operational planning iv. ROW acquisition and corridor control v. Project management/administration vi. Project contingency	$4.7M
2004	i. Finalize preliminary design ii. Finalize planning iii. Complete row acquisition (see Note 1) iv. Develop vehicle specifications/standards v. Project management/administration vi. Park'n'ride lots – Erin Mills/Winston Churchill vii. Design of Eglinton to Renforth viii. Project contingency	9.1M
2005	i. Construction of Eglinton to Renforth ii. Construction of Renforth/427 segment (see note 5) iii. Design of City Centre – Cawthra segment iv. Tender and award of vehicle procurement contract v. Project management/administration vi. Project contingency	69.0M
2006	i. Construction of City Centre- Cawthra segment ii. Design of Cawthra to Eglinton iii. Vehicle commissioning (see note 2) iv. Project management/administration v. Project contingency	115.4M
2007	i. Complete construction of Cawthra-Eglinton segment ii. Construction of Winston Churchill Blvd. and Erin Mills Pkwy. Stations. iii. Project management/administration iv. Project contingency	77.5M
	Total	275.7M

Table 1- Preliminary Scheduling and Cash Flow (continued)

Notes:

1 The expenditures do not include an assumed nominal amount of $5,000,000 for property acquisition
2 A fleet of 30 articulated Mississauga Transit vehicles @ $750,000 each = $22.5 million is not included.
3 No capital contribution for road expansion costs in the City Centre or 427
4 The design, project management and contingencies have been allocated in proportion to the total of the other annual expenditures
5 Does not include $19.8 million for design and construction, and project management and contingency of exclusive busway segment between Renforth and Highway 427 in City of Toronto. In the interim buses would use Eglinton Avenue to access bus-only ramps to 427.
6 Does not include $19.5 million for the completion of the full busway west of Erin Mills Parkway (Stations only included)
7 Assumed majority within City Centre
8 Does not include ultimate grade separated busway from Erin Mills to Mavis

Total Costs Not Included

Note 1	Property Acquisition	$5 million
Note 2	Fleet of 30 Articulated Mississauga Transit Buses @ $750,000 each	$22.5 million
Note 5	Renforth to Highway 427 Segment	$19.8 million
Note 6	Completion of full busway west of Erin Mills Parkway – Phase 2	$19.5 million
	Total Costs Not Included	$66.8 million

Summary Statement of Project Rationale

Based on the comprehensive investigation undertaken and documented in this report, the City of Mississauga has demonstrated that implementation of the Mississauga Transitway as a component of GO Transit's GTA BRT Spine is the most desirable course of action to respond to the long-term transportation requirements in a sustainable fashion. The principal merits of the project include the following:

i. The facility provides an effective means of accommodating the transportation demand generated by the continued growth of the community;
ii. The facility will attract substantial demand and is essential in order to achieve the City's transit mode share objectives and will assist in optimizing the operating costs of Mississauga Transit;
iii. The total capital costs have been substantially reduced and with funding support from the Province and opportunities to stage the construction over an extended period of time, the financial impact on the City will be further mitigated;
iv. The proposal is consistent and complimentary to the other major rapid transit proposals being put forward by the Province, GO Transit and the adjacent municipalities; and
v. The advance planning undertaken previously by the City will allow the facility to be implemented without any significant delay in schedule and with little impact on adjacent development either in terms of construction and/or operation.