

Chapter 3
Section
3.09

Metrolinx—Regional Transportation Planning

Background

Metrolinx, an agency of the government of Ontario, was created by the *Greater Toronto Transportation Authority Act, 2006*, now the *Metrolinx Act, 2006* (Act). According to the Act, one of Metrolinx's key objectives is to provide leadership in the co-ordination, planning, financing and development of an integrated, multi-modal transportation network in the Greater Toronto and Hamilton Area (GTHA). The GTHA consists of two single-tier municipalities (Toronto and Hamilton), four regional municipalities (Durham, Halton, Peel and York) and 24 local municipalities.

In November 2008, Metrolinx formally adopted a Regional Transportation Plan (RTP)—also known as “The Big Move”—that sets out the priorities, policies and programs for implementing a transportation system within the GTHA. The RTP, which was the result of two years of public consultation, was adopted by Metrolinx's Board of Directors (Board), which at that time included representatives from the GTHA municipalities.

Among the RTP's more significant proposals is to build more than 1,200 km of rapid transit with the aim of getting 80% of GTHA residents within 2 km of rapid transit. The timeline for implementing the RTP is 25 years. Its estimated cost of \$50 billion

relates only to upgrading and expanding the regional transportation network but does not include the estimated maintenance that is expected to be required to keep the additional transportation infrastructure in a state of good repair over its useful life.

In the first 15 years, Metrolinx plans to implement the priority transit projects listed in Figure 1. Metrolinx's estimate of the cost of these projects is approximately \$33 billion, of which approximately \$3 billion had been spent by the province as of March 31, 2012. For about half of these projects, the majority of the funding comes from a 2007 provincial commitment of \$11.5 billion, along with previously announced project funding. The remaining priority projects that are funded—such as the Air Rail Link between Union Station and Pearson International Airport and projects to revitalize Union Station—are being funded from the province's capital budget for GO Transit (the commuter rail and bus system serving the GTHA, a division of Metrolinx). At the time it made the 2007 commitment, the province asked the federal government to contribute \$6 billion toward the RTP's implementation. To date, the federal government has committed \$1.93 billion on a project-by-project basis. The combined funding is expected to sustain the RTP's implementation until about 2018. By 2013, Metrolinx must provide the province with recommendations for funding the implementation of the

Figure 1: List of Priority Transit Projects in the Regional Transportation Plan's First 15 Years

Source of data: Metrolinx

Transit Priorities	Estimated ¹ Capital Cost (\$ million)	Funded	Provincial Spending as of March 31, 2012 (\$ million)
Express rail service from Hamilton to Oshawa	5,970	No ²	—
Rapid transit line in downtown Hamilton	830	No ²	—
Rapid transit on Dundas Street in Halton and Peel	650	No ²	—
403 transitway from Mississauga City Centre to Renforth Gateway	259	Yes ³	89
Hurontario rapid transit from Port Credit to downtown Brampton	1,350	No ²	—
Brampton's Queen Street AcceleRide (now Züm)	259	Yes ³	95
Air Rail Link (ARL) between Union Station and Pearson Airport ⁴	456	Yes ³	40
Upgrades to Georgetown South line	1,501	Yes ³	407
VIVA bus rapid transit on Highway 7 and Yonge Street through York Region	1,755	Yes ³	295
Yonge Street subway capacity improvements and extension to Richmond Hill	2,380	No ²	—
Spadina subway extension to Vaughan Metropolitan Centre	2,600	Yes ³	891
Rapid transit on Eglinton Avenue	4,600	Yes ³	
Finch/Sheppard rapid transit	2,150	Yes ³	471
Upgrade and extension of Scarborough rapid transit line	1,400	Yes ³	
Rapid transit service along Highway 2 in Durham	500	No ²	—
Improvements to existing GO rail services and extension of GO rail service to Bowmanville	4,300	No ²	—
Other Projects			
Presto fare card	701	Yes ³	364
Union Station revitalization (a combination of projects)	1,393	Yes ³	355
Total	33,054		3,007

1. Estimated capital costs were established in 2008, 2009 or 2010 depending on the project.

2. Funding is pending, so work has not yet been started on these projects.

3. Funding is in place for these projects, so in most cases work has begun.

4. The ARL will benefit from the upgrades to the Georgetown South line (see following row, beneath dotted line).

remaining projects contemplated under the RTP's first 15 years as well as the projects contemplated in years 16 through 25.

- regularly report on activities and progress toward achieving the RTP.

Senior management of Metrolinx reviewed and agreed to our objective and associated audit criteria.

We looked at the delivery to date of three major capital projects contemplated within the RTP's first 15 years, whose construction or development was under way at the time of our audit—the Air Rail Link, the Presto fare card and two significant projects that form part of the Union Station revitalization (restoring the train shed and replacing the switches in the Union Station Rail Corridor).

Audit Objective and Scope

The objective of our audit was to assess whether Metrolinx had adequate systems and procedures in place to:

- cost-effectively implement the initial stages of the Regional Transportation Plan (RTP); and

Our audit also assessed the processes followed and progress made in implementing the RTP since its adoption in 2008.

The audit was primarily conducted at Metrolinx's head office in Toronto, where we interviewed staff and reviewed pertinent documents. We also interviewed representatives from many of the regions and municipalities within the GTHA, along with representatives of their respective transit agencies, to obtain their perspective on various aspects of the RTP, its overall implementation and the individual projects currently being implemented within the plan. As well, we researched transportation planning in other jurisdictions similar to the GTHA to identify best practices and lessons learned that could be applied to implementing the RTP within the GTHA.

Our audit also included a review of the relevant audit reports issued by Metrolinx's internal audit department and the province's internal audit division, which were helpful in determining the scope and extent of our audit work.

Summary

In the Greater Toronto and Hamilton Area (GTHA), congested roads and highways and public transit systems that are increasingly unable to meet the transportation needs of a growing population support Metrolinx's mandate of expanding and improving regional transportation across the area. We noted that other jurisdictions facing this problem have used similar stand-alone agencies to co-ordinate regional transportation planning. Accordingly, creating a co-ordinating agency like Metrolinx is a reasonable strategy toward implementing an effective, integrated and sustainable transportation network in a large urban centre.

To successfully deliver on its challenging mandate, Metrolinx must ensure that:

- individual projects under a regional transportation plan deliver transportation that is

“seamless, coordinated, efficient, equitable and user-centred”;

- a credible analysis of costs and benefits, based on objective and sound data, exists for each project;
- the project management process ensures that risks are managed and that projects are delivered cost-effectively and on time;
- key stakeholders are sufficiently consulted with; and
- clear targets are in place for achieving the transportation plan, and there is regular reporting on progress in relation to these targets.

Our review of the more significant projects in the early stages of the Regional Transportation Plan (RTP) identified a number of issues that must be addressed by Metrolinx, if it is to follow the best practices outlined above. Specifically:

- We believe that Metrolinx's initial assumptions about projected annual ridership on the Air Rail Link (ARL) may well be overly optimistic. Although a final decision has not been made on whether the ARL must recover its annual operating costs and any of its capital construction costs, if operating the ARL on a break-even basis is indeed the objective, achieving that objective may not be feasible. Ministry of Transportation documentation indicated that a private-sector group that previously was the successful proponent for designing, building and operating the ARL was unable to secure financing for the venture because prospective lenders felt that despite all reasonable efforts to attract riders, the service might not generate enough revenues to be a viable business. A market assessment conducted by Metrolinx also suggests that ARL ridership may not meet the initial assumptions about ridership growth.
- A region-wide integrated transit fare system is one of the RTP's key strategies. The Presto fare card now sponsored by Metrolinx is regarded as a key component in implementing

this strategy. Metrolinx's view is that the Presto fare-card system creates the underlying technology platform needed for fare integration. But to date the card has not facilitated fare integration within GTHA transit systems because the fares across these systems are themselves not integrated. We noted the following additional issues with respect to the Presto fare-card system:

- When the Presto fare card was initially developed, the Toronto Transit Commission (TTC), which has over 80% of the GTHA's transit ridership, had not agreed to implement Presto on its system. Along with the city of Ottawa, the TTC has now conditionally approved Presto's adoption subject to satisfactory resolution of some key issues. However, to meet the requirements of Ottawa and Toronto, Presto Next Generation (PNG) is currently being developed at an anticipated cost of \$498 million. In total, more than \$700 million could be paid to the contractor for developing the original Presto system and PNG. We acknowledge that Presto is intended to be the primary fare collection system on GO Transit and municipal transit agencies in the GTHA and therefore must be flexible enough to meet the needs of agencies and to adjust to new technologies as they become available; however, it will be among the more expensive fare-card systems in the world.
- Rather than competitively tendering the development of PNG, Metrolinx decided to develop it by way of open-ended change orders under the existing vendor's contract. We believe that tendering would, at the very least, have informed Metrolinx of potential new developers and whether other vendors might have had more cost-effective technology solutions.
- Since going into service approximately two years ago, Presto's overall usage within

participating GTHA transit systems as of March 31, 2012, was only about 18%. Although seven of the eight municipal transit agencies in the 905 area code have implemented Presto, overall Presto usage on those systems was even lower, at only 6%. These transit agencies currently cannot completely eliminate their old fare systems in favour of Presto because of some of the fare card's limitations.

- The contract for the Presto base system contains 22 measures designed to gauge the contractor's performance in such areas as system availability and customer management. In 2011, the contractor failed to meet the set standard in nearly a third of the measures, but Metrolinx did not seek any of the related penalties stipulated in the contract. The contract also contains reliability measures for the devices used by the Presto base system, but neither the contractor nor Metrolinx tracks this information.
- The two major projects related to the revitalization of Union Station have experienced significant cost increases over their initial cost estimates. For instance, the cost of restoring the train shed could now reach \$270 million—25% over Metrolinx's initial estimate. Similarly, the cost of replacing the switches in the Union Station Rail Corridor could be more than twice the amount of the original purchase order, which totalled about \$38 million. Although those GTHA municipalities and transit agencies we talked to questioned the priority given to some of the RTP's projects, they generally supported the plan as currently conceived. However, some GTHA municipalities indicated that Metrolinx needs to provide more regular updates on the major projects under the RTP and on the RTP's overall status, including the strategies being considered to fund projects contemplated under the plan that are not yet funded.

OVERALL METROLINX RESPONSE

Metrolinx welcomes the Auditor General's observations and recommendations. We have already taken action to address many of the Auditor General's recommendations, and we will continue our efforts to improve on our processes.

The audit acknowledges that there is a pressing need to deal with congestion and improve our transportation system. Metrolinx appreciates the Auditor General's observation that creating Metrolinx was a reasonable strategy toward implementing an effective, integrated and sustainable transportation network.

The Greater Toronto and Hamilton Area (GTHA) is Canada's largest and fastest-growing urban region. With the GTHA generating 25% of Canada's GDP, the productivity impacts of congestion are significant. Today, GTHA commute times are among North America's longest. With population in the area growing by 100,000 people per year, the GTHA is at risk of seeing commute times continue to increase.

Metrolinx was created less than six years ago with a mandate to transform the way the region moves and a mission to champion and deliver solutions for the GTHA. Our Regional Transportation Plan ("The Big Move") is intended to lead integrated region-wide transit and transportation planning.

We are committed to bringing forward new solutions to boost economic growth and help people and businesses move more easily throughout the region. This transformation has begun through a number of projects, such as the Mississauga bus rapid transit/403 transitway, the Toronto–York Spadina subway extension, York VIVA rapidways, and Toronto light-rail transit projects, as well as improvements on GO Transit's Kitchener line and the construction of the Air Rail Link between Pearson International Airport and Union Station.

With nine transit systems in the GTHA, all with various payment methods, Presto introduced a new fare-payment system that gives riders the convenience of being able to travel within the GTHA seamlessly and conveniently. As a regional fare card serving many transit providers, Presto is a unique product and one of the world's most advanced fare-card systems (similar to London's Oyster card, The Netherlands' OV-chipkaart and the Chicago Card). Today, throughout the GTHA, Presto is deployed among eight transit agencies and on GO Transit systems. As of October 2012, more than 350,000 people were using the Presto card to travel throughout the multiple transit systems, and we have added an average of 22,000 customers per month over the last six months. When Presto is fully deployed on the TTC, its usage will grow to 2.5 million customers.

Detailed Audit Observations

The Greater Toronto and Hamilton Area (GTHA) is Ontario's most populous region, with over 6 million people—a total that is expected to grow to 8.6 million by 2031. Currently, regional transportation within the GTHA primarily is served by several major expressways and by 10 different public transit agencies, each with its own separate fare and infrastructure systems.

Symptoms such as congested roads and highways and public transit systems that are increasingly challenged to meet the needs of ever-growing population levels suggest that there is undoubtedly a pressing need within the GTHA to expand and improve the transportation system across the region, because the existing system may no longer be meeting the needs of the area's residents and businesses. Creating a co-ordinating agency like Metrolinx is a reasonable first step toward implementing an

effective, integrated and sustainable transportation network within the GTHA. Our research indicated that other major urban centres around the world have used similar agencies to co-ordinate regional transportation planning.

There are a number of best practices that such agencies must follow to ensure the successful implementation of effective transportation within their jurisdiction. Some of the key principles contained in Metrolinx's Regional Transportation Plan (RTP) that guide the delivery of the individual projects within the plan and the delivery of the overall plan itself include:

- the individual projects should deliver transportation that is “seamless, coordinated, efficient, equitable and user-centred”;
- the projects should be subject to a fair, clear and rigorous benefits case analysis process that considers financial, economic, environmental and social needs and impacts to ensure that the most optimal investment decisions are made;
- the project delivery process should ensure that risks are managed and that projects are delivered cost-effectively and on time;
- there should be sufficient consultation with key stakeholders; and
- there should be clear targets for achieving the RTP and regular reporting on progress in relation to these targets.

In reviewing several of the major priority transit projects contemplated within the RTP's first 15 years and in discussion with GTHA municipalities and transit agencies, we noted that Metrolinx has encountered challenges in successfully implementing some of these practices. The following are our specific observations.

AIR RAIL LINK

One of the more significant RTP projects currently under construction is the Air Rail Link (ARL). As Figure 2 shows, the completed ARL will provide rail service between Canada's two busiest transporta-

tion hubs: Union Station in downtown Toronto and Toronto Pearson International Airport. The ARL's target completion date is spring 2015, in time for the Pan/Parapan American Games to be held in Toronto in summer 2015.

The 25 km line will primarily use GO Transit's existing Georgetown South rail corridor. A new 3.3 km branch line (“spur”) connecting the Georgetown South line with the airport is also being constructed. The ARL will have four stops: Union Station, the Bloor GO station, the Weston GO station, and Terminal 1 at the airport. Trains are expected to run every 15 minutes, seven days a week. A one-way trip is expected to take 25 minutes. Metrolinx expects the ARL to be a premium rail service: some of the features being considered include on-board refreshments, Wi-Fi, power outlets for laptops, screens with flight information, self-service airline check-in machines and luggage facilities. Metrolinx has not yet determined the fare range for this service. (Fares will probably vary according to how far along the ARL a rider travels—that is, one, two, or three stops—but the specific fares have not yet been determined.)

As Figure 3 shows, the ARL's estimated cost is about \$456 million. A significant number of enhancements are also under way on the Georgetown South rail corridor, primarily to support an increase in the level of service for GO Transit on that line; but the ARL will also benefit from these enhancements. The estimated total cost of the enhancements on the Georgetown South rail corridor is about \$1.5 billion.

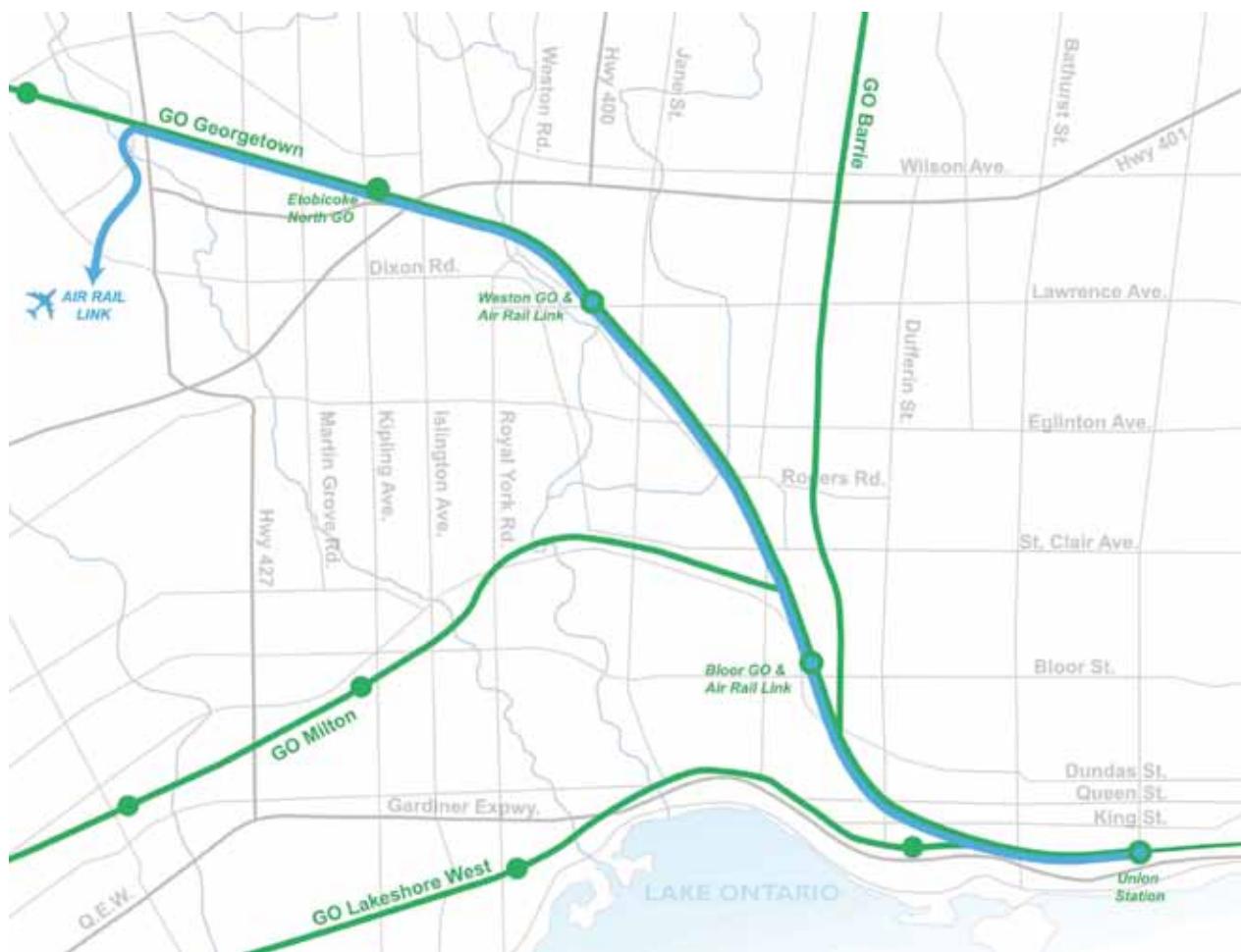
Cost Recovery

At the time of our audit, the province had not specifically required that Metrolinx recover the cost of operating the ARL from revenues that the service generates. The Ministry of Transportation (Ministry) informed us that Metrolinx would set the ARL's fare in consultation with the province.

If operating the ARL on a break-even basis is indeed the objective, this may prove to be

Figure 2: Map of the Air Rail Link

Source of data: Metrolinx

**Figure 3: Estimated Cost of the Air Rail Link (\$ million)**

Source of data: Metrolinx

Description	Estimated Cost
"Spur" and station in Terminal 1 at Pearson Airport	168
Trains	98
Other (stations, tracks and signals, etc.)	190
Total	456

a challenge for Metrolinx. In 2003, Transport Canada announced a private-sector group as the successful Public–Private Partnership (P3) proponent that would design, build and operate the ARL. However, the group was unable to secure

financing for the venture because its lenders did not feel that they had sufficient protection from “no market” risk (that is, from a situation where, despite all reasonable efforts to attract riders, the service does not generate enough revenues to be a viable business). They perceived this project to be riskier than other infrastructure projects because there was no “pre-existing demonstrated revenue stream.” The group proposed that the province assume the lenders’ risk by purchasing ARL assets if the “no market” scenario arose. The province rejected this proposal, so the group walked away from the project. In 2010, the government decided that the province, through Metrolinx, would build and operate the ARL itself.

Metrolinx's preliminary estimate of the ARL's annual operating cost is approximately \$30 million. However, according to Metrolinx, the cost could well be higher, because the service's exact nature has not been finalized, so some relevant costs may not have been identified yet. For example, the estimate does not include the annual access fee of approximately \$5 million that GO Transit was going to charge the private-sector group for using the GO-owned Georgetown South rail corridor. As well, if the fare was to recover the capital cost of the project over time, we estimate this would approximate \$20 million annually over a period of 20 years. If that amount is included as part of the ARL's operating cost, the total cost to be recovered from fares each year would rise to about \$50 million.

Metrolinx's projection of annual ridership for the nine-month period of April 2015 to December 2015 is 1.35 million (based on the assumption that the one-way fare for riding the full distance would be \$20), and its estimate for the full first year is 1.8 million riders. The agency expects that ridership will increase by more than 65% to nearly 3 million by year 3, capturing 10.3% of the surface access market—primarily travellers using taxis or those travelling by car who either park at the airport or are dropped off and/or picked up. If the aim was for the ARL to break even in its first year (a goal that has not yet been decided on), Metrolinx would have to charge about \$28 for the full distance (based on current ridership projections and estimated annual operating costs, including capital amortization). Under the private-sector group's proposal, the fare for a full one-way ARL trip was expected to be \$27. If ARL ridership increases as projected by Metrolinx, the break-even fares over the longer term would be lower. But the following factors lead us to question whether ridership will actually grow as currently projected:

- Although the projected capture rate of 10.3% is comparable to that of other North American airport rail services, these services differ significantly from the premium downtown-to-airport rail service that Metrolinx anticipates offering.

Their one-way ticket prices range from only \$1.60 to \$13.00, compared to a ticket price for the ARL that may well cost \$20 to \$30. We believe that the ARL's high fare will negatively affect the projected ridership capture rate.

- The results of a market assessment of GTHA residents conducted in November 2011 by Metrolinx revealed the following:
 - More than 90% of GTHA residents leave from and return to their home when travelling, so the added cost and inconvenience of getting to and from one of the three ARL stations with their luggage would probably discourage some residents from using the ARL.
 - The ARL's likely price point may also be a concern. Although nearly 70% of potential riders currently using Union Station as an airport access or egress point indicated that they would probably use the ARL, nearly 75% of those respondents who were GTHA residents also indicated that they would not be willing to take the ARL at a cost of \$22.50 or more. As well, 60% of visitors and 90% of airport employees would not use the ARL at a cost of \$22.50 or more. As would be expected, the percentages who would not use the ARL increased as the proposed price increased.

Metrolinx advised us that it did take these factors into consideration but still concluded that its ridership projections at these premium fare levels would be achieved.

RECOMMENDATION 1

Metrolinx should work with the Ministry of Transportation to clearly define the business model under which the Air Rail Link (ARL) should operate to ensure that the ARL will be a viable and sustainable operation. Given the importance of having a reliable estimate of projected ridership at the various possible fare levels, Metrolinx should periodically update its ridership forecast.

METROLINX RESPONSE

The Air Rail Link (ARL) will provide direct, reliable express service connecting Canada's two busiest transportation hubs: Union Station and Pearson International Airport. It is a priority project of the Regional Transportation Plan ("The Big Move") and is scheduled to open in 2015.

Metrolinx agrees with the Auditor General on the importance of reliable ridership forecasts, and independent analysis has been obtained to create ridership projections.

As the ARL launch approaches, a number of significant decisions need to be made. Metrolinx will continue to use best-in-class ridership information to guide our internal decision-making and to inform our business model, and we will continue working with the Ministry of Transportation to finalize the business model.

As we would with any new service, Metrolinx will closely monitor the ARL over its first years of operation and make adjustments based on customer feedback we receive.

The "Spur" Line

As noted earlier, the ARL requires the construction of a new 3.3 km branch line, commonly referred to as the "spur," off of GO Transit's Georgetown South rail corridor connecting to a new passenger station in Pearson International Airport's Terminal 1. In July 2010, when Metrolinx became responsible for ARL development, the government directed it to evaluate options for the delivery of the "spur" line and any related station work, including possibly using the Public–Private Partnership (P3) model—which in Ontario is called the Alternative Financing and Procurement (AFP) model. Generally, AFPs are contractual agreements between the government and the private sector under which the private-sector businesses provide assets and deliver services, and the various partners share the

responsibilities and business risks. A Crown Agency, Infrastructure Ontario (I/O), oversees the delivery of all AFP projects in the province.

Before deciding on the delivery model for a particular project, I/O assesses which delivery model will provide the most value for money (VFM). This VFM assessment compares the total project costs of two different delivery models (that is, AFP versus a traditional delivery method). Four basic categories of cost make up the total project costs under each delivery model: base project costs (for example, construction costs), financing costs, the monetary value of the risks that will be retained under each delivery model, and any ancillary costs (such as legal, project management or engineering advisory fees). Any positive difference between the AFP and the traditional delivery model represents the estimated monetary benefit from using the AFP.

On the basis of a positive VFM assessment, I/O decided to use the AFP model in the delivery of the "spur"; a \$128.6 million contract was subsequently awarded to a private-sector consortium. With respect to the procurement of the AFP contractor, we found that the process was competitive and fair to all respondents.

In evaluating the VFM of procuring assets either in the traditional manner or by way of the AFP model, it is often the value of the risks retained under each delivery model that tends to tip the scale in favour of the AFP model. The VFM assessment concluded that using the AFP model for delivery of the "spur" would result in a net savings of about \$20 million. While the total of the base project costs and ancillary costs under the AFP approach was estimated to be about \$22 million higher, this was offset by an estimated \$42 million in savings related to the transfer of risks under the AFP model. As Figure 4 shows, the two largest risks retained under the traditional delivery model are construction risk (the cost associated with construction delays) and design and tender risk (the cost incurred because of omissions in the original design and changes that are required after construction has started). These two risks account

Figure 4: Valuation of the Retained Risks

Source of data: Infrastructure Ontario

Retained Risks	Traditional Delivery ¹		AFP Delivery ²	
	(\$ 000)	(%)	(\$ 000)	(%)
Construction	21,160	42	1,327	15
Design and tender	12,618	25	1,525	18
Policy/strategy	6,518	13	1,688	20
Site conditions/environmental	5,428	10	1,107	12
Project agreement	871	2	581	7
Permits and approvals	354	1	64	1
Other	3,722	7	2,310	27
Total	50,671	100	8,602	100

1. Under the traditional delivery model, the province bears all the risks.

2. Under the AFP delivery model, risks are shared between the province and the contractor.

for two-thirds of total risk retained under the traditional delivery model.

Of concern to us is the process used to assign values to the various risks seen as being retained under the two delivery models. Specifically:

- The values assigned to the risks seen as retained under both delivery models were derived based on the judgment of I/O staff, Metrolinx staff and a consulting firm that devised the probabilities and impacts associated with the various risks. While we acknowledge that I/O has significant experience in capital projects such as hospitals, courthouses and other buildings, we saw no evidence that the estimates of the risks of delivering the “spur” under traditional procurement were based on actual experience of similar, traditionally procured transportation projects. For instance, over the past eight years GO Transit has completed a number of large and complex rail and grade-separation projects. The actual experience from these could have been used to assess the reasonableness of the values assigned to the risks that are seen as being retained under the traditional delivery model, especially given the significant \$42 million risk differential between the two procurement

alternatives, which was the deciding factor in going with the AFP approach.

- Because Metrolinx would be locked in very early on the specifications of the project under the AFP model, the additional cost that could be incurred as planning and design progress because of subsequent changes identified and considered necessary could also have been considered in the allocation and valuation of the risk retained under the AFP delivery model.
- I/O’s procedures allowed the consulting firm that devised the project’s risk allocation matrix to later bid on a contract to provide engineering and technical advisory services to support the planning and procurement of the “spur” line under the AFP delivery model. The contract was subsequently awarded to this firm.

RECOMMENDATION 2

When assigning values to transferable risks in the evaluation of value for money between procuring assets by way of the traditional method or by way of the Alternative Financing and Procurement (AFP) model, actual experience from recent traditional infrastructure procurements and AFPs should be thoroughly assessed.

INFRASTRUCTURE ONTARIO RESPONSE

The process for developing the value-for-money analysis was robust and based on current best practices. An experienced transportation consulting firm created a standard transportation risk matrix based on the firm's analysis of industry data and on its own in-house experience. The matrix values were then further reviewed and revised by Metrolinx and Infrastructure Ontario in consultation with the external advisers. Given the design and construction risks and the scheduling risk for this project, the Alternative Financing and Procurement (AFP) model was determined to deliver value for money compared to traditional delivery.

Infrastructure Ontario ensured that strict controls were in place to maintain objectivity of the firm conducting the value-for-money analysis and the engineering advisory services. For future projects contemplated under the Regional Transportation Plan, Infrastructure Ontario and Metrolinx will continue to use risk workshops to fully assess the actual experience of transportation projects procured under traditional methods, including new developments in procuring large transportation projects both in and outside of Canada.

PRESTO FARE SYSTEM

Currently, there are 10 public transit agencies in the GTHA, each with its own fare structure and a separate system for collecting fares. As a result, for example, a person travelling from a local bus in one GTHA municipality to the GO Train and then to the City of Toronto transit system must pay three different fares. One of the RTP's key strategies is to "implement a region-wide integrated transit fare system by 2012 that allows users to pay a seamless, integrated fare for all transit systems across the region."

In 2002, the Ontario Ministry of Transportation, in conjunction with GO Transit and the GTHA municipalities, began researching the development of a regional fare card, now called Presto. Presto, which is now one of Metrolinx's priority transit projects, allows transit riders to load amounts onto a reloadable plastic card (the size of a credit card) and pay their fares by tapping the card on electronic card readers. Amounts ranging from \$10 to \$1,000 can be loaded onto the card online or in person at participating customer service outlets.

A number of guiding principles for Presto's development and implementation were identified in 2002, including the following:

- The fare system should, where possible, use off-the-shelf products whose components can be purchased from multiple sources.
- The fare system needs to have the ability to add new transit participants of any size without major modifications to its core operational structure.

Project Cost

In October 2006, the Ministry of Transportation signed a 10-year, \$250-million contract with a vendor to design, develop and operate Presto for the GTHA. The \$250 million is composed of about \$150 million in capital development costs, \$82 million in operating costs, and taxes of about \$20 million. The province anticipated that all GTHA transit systems, including GO Transit, would use this card. To encourage this, the province has indicated that the transfer of gas-tax funding to municipalities would be contingent on their adopting and staying with Presto.

However, when the agreement was signed the Toronto Transit Commission (TTC), which has over 80% of the GTHA's transit ridership, had not agreed to implement Presto on its system. Anticipating that the TTC would eventually opt in, the agreement with the vendor stipulated that the original base system would be built with the capability to expand to meet the needs of all Ontario transit

providers without the need for significant modifications to core systems. The agreement also stated that full rollout of the Presto base system was to be completed by October 2010. Although GO Transit started adopting Presto on its system in November 2009, followed by the GTHA municipalities in the 905 area code in May 2010, full rollout (meaning that Presto base was implemented on all intended transit systems, and the fare system was functioning as planned) did not occur until February 2012.

In 2007, the City of Ottawa approved the implementation of the fare card on its transit system based on an agreed functionality to be provided by Presto. In November 2009, the TTC also conditionally approved the adoption of the fare card subject to the satisfactory resolution of some key issues (such as the system meeting the TTC's business needs and being affordable from both a capital and an operating perspective). Rather than expanding the Presto base system to meet the requirements of Ottawa and Toronto, as had originally been planned, the Ministry of Transportation decided to develop a new system, Presto Next Generation (PNG).

The Presto base system, contrary to the guiding principles established for its development, works on a closed proprietary model: that is, the contractor provides and controls the central system and other infrastructure for the fare-card operation. Changes can be made only through change orders

after direct negotiation with the contractor. The Ministry and Metrolinx believe that developing PNG on an open architecture framework, as had been originally intended in 2002, will allow for more procurement options should there be a need to add additional functionalities in the future. At the time of our audit, PNG was initially expected to be rolled out in Ottawa in July 2012, but the rollout was postponed to February 2013. Metrolinx was also negotiating with the TTC to become a fully participating PNG member in time for the 2015 Pan/Parapan American games.

As Figure 5 shows, PNG's anticipated cost includes \$498 million specifically for the system's development and \$152 million to be paid to the vendor for operating the system and running a call centre until 2016, for an anticipated total of \$650 million. The total cost of developing Presto base and PNG could well reach \$700 million. As of March 31, 2012, about \$360 million of this amount had been spent on system development costs, including about \$40 million in internal charges incurred by the Presto office at Metrolinx, which has a staff of about 60. Additionally, although one of the key reasons for the new PNG is to meet the TTC's needs, at the time of our audit the TTC had not yet formally signed on to using the fare card. The TTC indicated to us that one of its main reasons for not yet signing on was that Metrolinx and the TTC had not yet finalized the TTC's service-level requirements and how the service levels will be achieved through PNG.

Figure 5: Estimated Presto Project Costs (\$ million)

Source of data: Metrolinx

	Capital			Operating		
	Presto Base	PNG	Total	Presto Base	PNG	Total
Original contract (2006)	149.0	—	149.0	82.5	—	82.5
Nine separate requests to Metrolinx Board (August 2009–February 2012)	54.0	154.0	208.0	19.0	—	19.0
Additional request (April 2012)*	—	344.0	344.0	—	152.0	152.0
Total	203.0	498.0	701.0	101.5	152.0	253.5

* At the time of our audit, the Board had approved only \$48.5 million of this additional amount and had asked Metrolinx management to carry out further due diligence on whether value for money is being received with respect to this expenditure.

RECOMMENDATION 3

Metrolinx should ensure that it formally considers the risks of continuing with the development of Presto Next Generation (PNG), given that the specific business requirements of the Toronto Transit Commission (TTC) for using PNG on its transit system and the costs for which the TTC would be responsible have not yet been formally agreed to.

METROLINX RESPONSE

Metrolinx has been working with the TTC since 2009 to define the business requirements of Presto. The TTC approved the implementation of Presto on November 23, 2011, and authorized the execution of all necessary agreements. This was reaffirmed on May 1, 2012, and we anticipate completing a master agreement with the TTC in 2012. The discussions regarding the master agreement have included both the operating requirements and financial arrangements; thus, these discussions have informed the development of Presto Next Generation. As well, Presto has been installed at 14 of the TTC's highest-volume subway stations and it is used daily by more than 8,000 riders. It should be also noted that the TTC has estimated that when Presto is fully operational, costs for fare collection could be reduced by up to \$10 million annually from current levels.

Fare Integration

As noted earlier, a key success factor of the RTP was to develop a seamless and integrated fare for all transit systems across the GTHA that would allow riders to cross regional and municipal boundaries using different transit systems by paying just one fare rather than having to pay an individual fare for every system travelled on. The Presto base system, apart from facilitating fare arrangements between GO Transit and bus systems in municipalities within

the 905 area code, has not in itself facilitated the integration of fares across GTHA transit systems. Currently, it is being used only as an “e-purse” that allows users to tap the card to the Presto card reader and automatically be billed the individual fares of the participating GTHA transit systems.

GTHA municipalities and transit systems indicated to us that as long as transit funding remains a municipal responsibility, fare integration will be difficult to achieve, because GTHA municipalities are not willing to absorb the cost of the subsidies that an integrated fare system may entail. For example, the fare arrangement between GO Transit and transit systems in the 905 area code costs GO Transit approximately \$7 million annually, because GO Transit riders pay a reduced local transit fare to encourage these riders to use local transit instead of cars to arrive at their respective GO stations, with GO Transit paying the difference to the respective municipalities.

Presto Usage

As Figure 6 shows, at the time of our audit, the Presto card was accepted within the GTHA as follows: on seven of the eight municipal transit systems within the 905 area code, as well as on GO Transit (both rail and bus) and at 14 of the 69 TTC subway stations (but not on any TTC buses or streetcars). As of March 31, 2012, despite the substantial investment in the Presto base system and despite Metrolinx being six years into a 10-year contract for the system’s development and operation, Presto’s overall usage within participating GTHA transit systems was only about 18%.

Overall Presto usage was even lower—only 6%—within the participating GTHA transit agencies in the 905 area code. Several of these agencies indicated to us that a good portion of their ridership (nearly a third in some regions and municipalities) are considered low-income and either cannot afford to load the minimum \$10 currently required by the Presto card or do not have bank accounts or credit cards and therefore cannot load the cards

Figure 6: Presto Usage Rate for March 2012

Source of data: Metrolinx and GTHA transit systems

Transit Systems	In-service Date	System Ridership	Presto Ridership	Presto Ridership (%)
GO Transit System				
Rail	Aug. 8, 2011	4,169,337	1,788,037	43
Bus	Sept. 12, 2011	1,506,716	242,335	16
GO Transit System Subtotal		5,676,053	2,030,372	36
TTC (at select subway stations)	Jan. 1, 2011	—	252,025	—
905 Transit Systems				
Mississauga	Apr. 4, 2011	3,315,817	140,655	4
Brampton	Apr. 4, 2011	1,593,637	231,770	15
York*	Apr. 4, 2011	1,755,264	64,843	4
Hamilton	Apr. 4, 2011	1,969,218	67,258	3
Durham	Apr. 4, 2011	964,168	31,669	3
Burlington	May 10, 2010	204,729	35,179	17
Oakville	May 10, 2010	258,310	41,614	16
905 Transit Systems Subtotal		10,061,143	612,988	6
Overall Total		15,737,196	2,895,385	18

* Because of a transit strike and its effect on ridership for March 2012, we used April 2012 data for York Region.

online. The initial \$6 charge for the card also acts as a disincentive for these riders to migrate to Presto. For these reasons, GTHA transit systems within the 905 area code may need to maintain some form of disposable fare media (defined as media that are good for only a short term—either a single trip or multiple trips over the course of a day—such as tickets, tokens or day passes). These agencies cited the following additional reasons why they cannot completely eliminate their existing fare systems and force their ridership to migrate to Presto:

- Not all Presto-related transactions can be done online. For instance, to load monthly passes or if a student or senior wants to register for a card, the rider must physically go to a Presto location. But many municipal transit systems have only one location where in-person Presto transactions can be carried out. GTHA municipalities and transit systems within the 905 area code indicated to us that point-of-sale terminals installed in such locations as convenience stores would provide riders with greater access, but given the cur-

rent low demand and the nearly \$5,000 cost of installing a single terminal, very few are being installed.

- One region contracts out routes used by about 30% of its ridership to the TTC, but the TTC currently does not accept the Presto card on its buses.
- GTHA municipalities within the 905 area code that have a significant population of university students and offer students a special transit pass for the university term under their own fare system cannot currently do so on Presto.

These transit agencies also raised concerns about the quality of the Presto equipment installed on their vehicles and the repair costs for what are deemed “out-of-warranty” damages. Because the equipment is proprietary, if “out-of-warranty” repairs are needed, municipal transit agencies can turn to only one approved supplier under the existing contract. The contract does not provide specific pricing for the different types of repairs. In our discussions, municipal transit agencies cited examples of quotes for repairs that they had

received from the contractor that they felt were unreasonably high.

Lastly, the transit agencies indicated to us that the system currently lacks back-end support for reporting and financial reconciliation of transactions. To obtain ridership information, many transit agencies have had to design their own programs for extracting information from a data dump provided by Presto. The transit agencies also indicated that they have little assurance that the system is capturing all riders who use their respective systems.

RECOMMENDATION 4

To ensure that the Presto base system and the Presto Next Generation system meet the objective of facilitating a seamless, integrated fare for all transit systems across the GTHA, Metrolinx should:

- work with the provincial government and GTHA municipalities to resolve the issue of subsidizing fare integration so that progress can be made on implementing an integrated fare system; and
- work with GTHA municipalities and regions to resolve outstanding issues related to the operation of Presto that inhibit riders' use of the fare card within their respective transit systems.

METROLINX RESPONSE

The Presto system is a foundational step toward developing an integrated fare system across the GTHA. The system is currently being deployed across the GTHA and in Ottawa. A staged deployment provides the least amount of risk as the system is implemented.

As the Presto system grows, Metrolinx will continue to work with the province and with the municipalities involved to develop strategies for increasing customer usage as well as to enhance the level of integration, up to and including the development of a common fare structure.

For instance, Metrolinx is working closely with Brampton Transit to retire that municipality's current payment systems in 2013. In Durham, we are also working to convert student riders to Presto in 2013. Similar strategies are being developed for each municipality in the GTHA.

On GO Transit, Presto usage will increase further in 2013 with the retirement of the GO monthly pass.

Project Procurement

As noted earlier, in October 2006 the Ministry of Transportation signed a 10-year, \$250 million contract with a vendor to design, develop and operate the Presto base system. This contract was procured through a competitive process and subjected to a fairness review that concluded that the process was conducted in a procedurally fair, open and transparent manner. However, with respect to the development of the PNG system, Metrolinx was unable to provide evidence supporting its 2009 decision to develop this system through change orders to the existing Presto contract rather than through a competitive tender. As noted in Figure 5, earlier, at the time of our audit, Metrolinx had Board approval to spend an additional \$227 million (\$208 million capital plus \$19 million operating); of this amount, \$154 million was for PNG. In April 2012, Metrolinx went to the Board for approval of an additional \$496 million (\$344 million capital plus \$152 million operating) for PNG.

After deciding to develop PNG using change orders, Metrolinx hired Ontario's former Integrity Commissioner to review the appropriateness of this decision. In September 2011, Metrolinx also hired a consulting firm to assess this additional investment in PNG and to assess whether value for money (VFM) would be achieved. The commissioner's February 2012 letter concluded that there was no compelling reason to restart the procurement process on PNG if the results of the VFM review were positive. The VFM review compared the per capita

cost of fare-card systems around the world with the per capita cost of the Presto base system and PNG after considering the capital portion of the \$227 million in the first set of change orders and concluded a positive VFM on the basis that Presto's per capita cost ranked in the middle. However, if the capital portion of the additional \$496 million expected to be incurred had been included in the analysis, Presto base and PNG combined would turn out to be one of the more expensive fare-card systems in the world.

In April 2012, citing concerns about the request for an additional \$496 million in spending authority for PNG, the Board asked Metrolinx's management to carry out further due diligence on PNG. In response, Metrolinx asked the same consulting firm for a second VFM review of PNG. This second review concluded that, although reprocurement "may drive pricing benefits," it incurred a significant risk of not meeting the timelines for the development of a new fare card, because procuring, developing and implementing a new system would take more than 24 to 48 months. Furthermore, having a new vendor build the system would introduce significant other project and operational risks that could hinder the efficient delivery of the entire system.

We note with respect to these concerns about reprocurement that the existing plan for developing and implementing PNG, having begun in 2009, will take about four years anyway because rollout of the system in the City of Ottawa is not expected until February 2013. We also note that there may have been value in considering the possibility of alternative procurement options. In this regard, for example, the TTC had an agreement in principle with a company in 2011 to develop an open-fare payment system. Under the terms of the agreement, the TTC would not have had to pay any capital costs up front. Instead, the vendor was willing to take a percentage of the revenues collected by the open-fare system. In its proposal to the TTC, the vendor had also agreed to make its system compatible with the existing Presto base system. The TTC abandoned this option after the province confirmed that provincial gas-tax funding and provincial

funding for the purchase of new streetcars and the rapid transit system on Eglinton Avenue would be contingent on the TTC signing on to Presto.

As noted earlier, at the time of our audit, Metrolinx was unable to provide evidence that it had explored alternative procurement options at the time the decision was made to develop PNG. We questioned whether tendering the new system's development would have, at the very least, informed Metrolinx of the range of options and what a reasonable cost would be for developing PNG.

RECOMMENDATION 5

To ensure that Metrolinx complies with the intent of the government's policy of open, competitive procurement, all value-for-money considerations and an appropriate business-case justification should be completed and approved by Metrolinx's Board and the Ministry of Transportation before any decision on the procurement of significant transportation projects is finalized, especially if retendering the projects is not considered to be a viable option.

METROLINX RESPONSE

A comprehensive review of Presto Next Generation (PNG) technology was undertaken by independent advisers, who confirmed that the development of PNG was fair and created value for money (VFM). The VFM analysis identified concerns with retendering the work, including increased project costs and risks associated with the introduction of new vendors, increased project timelines and the loss of efficiency. As we move forward, we are reducing the role of the contractor, increasing the amount of work to be procured in separate competitive processes by about \$200 million. As the technology continues to advance, more functionality and conveniences will be added for Presto customers, including additional services and other payment methods.

Metrolinx complies with all provincial requirements for an open, competitive procurement process, and has ensured that VFM considerations as well as appropriate business-case justification are part of the decision-making process. However, Metrolinx does agree with the Auditor General's recommendation that VFM considerations and an appropriate business-case justification should be completed and approved before making any decision on a project's procurement strategy. Metrolinx has implemented this recommendation with the expansion of Presto to the TTC.

With respect to Metrolinx's \$700 million investment in Presto, approximately \$275 million is expected to be recovered from the TTC, OC Transpo and the GTHA transit agencies in the 905 area code for assets specifically used in the provision of service to their customers.

Change-order Management

The \$250 million contract for the original Presto base system is a 10-year fixed-price contract to deliver an electronic fare-card system for GO Transit and the seven participating GTHA municipalities in the 905 area code. However, since the contract's execution in 2006, a total of 330 change requests, adding \$146 million to total costs, have been made under the contract. Of these, 281 change orders totalling \$45 million relate to fixes or enhancements to the Presto base system that were requested by either Metrolinx or the participating transit agencies, with the balance relating to PNG. For example, in one case, the contractor charged \$7 million to make nine enhancements to the Presto base system and at the same time fix 40 defects that had been identified in the system's original development. It is reasonable for a contractor to charge for change orders that enhance or alter the system from its original agreed-upon design specifications, but the contractor should not be charging for change orders that correct identified defects

in the system's original development. In the case of the above example, the documentation was not clear enough to determine whether the payment related to enhancements to the system or to the correction of defects, which should have been done at no cost.

GTHA transit systems in the 905 area code that we met with indicated that changes to the Presto base system often seemed too costly and that change requests were not always completed on what they felt was a reasonably timely basis. The consulting firm mentioned previously that was hired to assess PNG noted in its December 2011 report that Metrolinx's change-order process lacks detailed cost breakdowns and pricing methodologies and that no formal budget estimates had been prepared for requested changes that could be used to assess the reasonableness of the amount being billed for each change order.

RECOMMENDATION 6

In order to effectively manage the cost of change orders related to the Presto base and Presto Next Generation systems, Metrolinx should:

- implement a process that distinguishes between change orders that amend the systems from their original specifications in the contract and those that correct identified defects in the systems' original development, and allow the contractor to charge for only those change orders that pertain to requested changes or enhancements to the original design specifications; and
- prepare internal cost estimates for each change order to enable the reasonableness of the amount charged by the contractor to be knowledgeably assessed.

METROLINX RESPONSE

Metrolinx agrees with the Auditor General on the importance of effectively managing the cost of change orders.

A consulting firm recently completed a review of the change-order process. Although this process was found to be efficient and effective, opportunities for improvement were identified. Metrolinx has now implemented controls over the change-order process, including generating internal cost estimates before completing negotiations on change orders and increasing documentation of each change order's purpose and scope.

Metrolinx is in the process of implementing additional accountability measures, which will be independently reviewed to ensure that these additional measures have been implemented and to identify whether any further improvements are necessary.

With regard to the \$7 million charges noted by the Auditor General, Metrolinx has reviewed these charges and has confirmed that they were related to system enhancements rather than to the correction of defects.

it was finalizing the negotiation of a letter of intent to secure ownership in Canada of intellectual property relating to these systems.

- The contract for the Presto base system contains 22 measures designed to gauge the contractor's performance in such areas as system availability, customer management and the management of the Presto devices (for example, the card reader). In 2011, the contractor failed to meet the set standard in nearly a third of the measures. However, Metrolinx did not seek any of the remedies stipulated in the contract for these failures and indicated to us that it will just continue to monitor performance until system usage reaches maturity. The contract also contains reliability measures for the equipment used by the Presto base system, but neither the contractor nor Metrolinx tracks this information. Therefore, Metrolinx cannot determine whether the equipment is meeting the reliability measures, which is all the more important because some municipalities we talked to expressed concerns about equipment reliability.

- During the period May 1, 2007, to April 30, 2012, independent contractors were used in senior positions with signing authority to supervise other consultants. The amount paid to these contractors was \$4.2 million. But the government's procurement directive specifies that "consultants must not perform functions normally assumed by management, including supervising and hiring staff and other consultants." At the time of our audit, Metrolinx was in the process of terminating these relationships.

RECOMMENDATION 7

To ensure that the Presto base and Presto Next Generation systems remain available for use after the end of the existing contract, Metrolinx needs to finalize its current negotiations with

the contractor to ensure that it secures ownership of these two systems. If the contractor fails to meet the performance standards stipulated in the contract, Metrolinx should have a valid justification for not applying the available remedies and penalties set out in the contract.

METROLINX RESPONSE

Metrolinx is in advanced negotiations with the contractor to safeguard ownership rights of the intellectual property created and expects these negotiations to be successfully concluded in October 2012. The expected agreement provides for the use of the current and future system in perpetuity.

As the system has matured, Metrolinx has been engaged in an extensive internal review of contractor performance and has developed a plan that provides for a more rigorous monitoring of key service measures, as well as appropriate remedies and penalties for situations where these measures are not met.

UNION STATION REVITALIZATION

Union Station, federally designated as a National Historic Site and a Heritage Railway Station, is Canada's busiest rail transportation facility, serving more than 250,000 passengers daily who use the services of the TTC, GO Transit, Via Rail and Amtrak. In August 2000, GO Transit and the City of Toronto bought the facility from Toronto Terminals Railway Company. Specifically, GO Transit bought the three-mile rail corridor leading in to the station, the platforms and the train shed, and Toronto bought the heritage building, including the GO Transit concourse area.

Revitalizing Union Station is one of the priorities in the RTP's first 15 years: it consists of a series of projects. Two of the more significant projects include restoring the train shed and replacing switches in the Union Station Rail Corridor (USRC).

We reviewed these two projects and made the following observations.

Train Shed Restoration

Under the federal *Heritage Railway Stations Protection Act*, Parks Canada must approve all rehabilitation work planned for Union Station, including its train shed (the structure that shelters the station's platforms and the tracks alongside them). For instance, between 2005 and 2010, Parks Canada approved the replacement of approximately 20% of the centre portion of the train shed roof with a glass atrium. Approval was also received to replace the existing roof with an eco-friendly green roof on either side of the atrium. Although the initial estimate for the cost of restoring the train shed—including design, administration and construction—was \$215 million, when the bids for the work came in, the lowest bids totalled \$242 million. The majority of the difference was in the construction work, for which the initial estimate had been \$165 million, but the lowest bid was \$196 million.

The project was initially scheduled to be completed in November 2014, but delays experienced during the design and construction phases could push completion to December 2016. We noted that the construction contract contained no incentives for on-time completion or liquidating damages in the case of delays. Metrolinx chose not to include such clauses because it felt that the contractor did not have full control of the site (that is, Union Station would be fully functioning during construction, and no more than two tracks or platforms would be taken out of service at any time).

In the construction contract for the restoration of the train shed, Metrolinx retained, among other risks, the risk associated with concealed or unknown conditions that may arise during construction. It was felt that if such risks were transferred to the contractor, either contractors would not bid on the work or the premium charged to cover unforeseen risks would be cost-prohibitive. Metrolinx included a \$15 million contingency in the

contract's original price (8% of its total value) for any unforeseen situations. Metrolinx then approved an increase in this contingency to \$36 million (18% of the contract's total value) by not requiring the contractor to carry out work originally stipulated in the contract totalling \$21 million and moving this amount to the contingency. As of May 2012, \$30 million of this contingency had been allocated to the contractor, leaving approximately \$6 million. In April 2011, Metrolinx had also received Board approval to increase the construction contract's price by an additional \$30 million by way of change orders. As of August 2012, change orders totalling \$18.1 million had been issued to the contractor. Most of this amount was requested by the contractor to cover any additional overheads caused by extending the project completion date by another two years. The cost of restoring the train shed could now reach \$270 million—25% more than Metrolinx's initial estimate. We note that nothing in the current agreement prevents the contractor from coming to Metrolinx for even more funds over the remaining term of the contract.

Metrolinx informed us that as a hedge against unforeseen situations, construction contracts commonly provide for contingencies of 5% to 15% of the contract's original value. This contract's contingencies and the change orders totalled nearly \$55 million, or 28% of the construction contract's original price—almost twice the high end of the norm. Significant price changes in contracts can occur because of poor planning, inadequate processes for estimating the initial cost projections,

weak monitoring of the project or a combination of these problems. In 2011, the province's Internal Audit Division reviewed Metrolinx's budgeting and forecasting process and found that the capital budgeting and forecasting processes were not well established, and also that recent years' budget-to-actual results suggest that Metrolinx may need to re-evaluate how project costs and/or contingencies are determined.

Switch Replacement Project

Since June 2000, GO Transit (a division of Metrolinx) has had a single-sourced agreement with Toronto Terminals Railway Company (TTR)—which previously owned the Union Station Rail Corridor (USRC)—to conduct routine USRC maintenance and rail traffic control services for an annual fee. In June 2006, a new agreement with TTR for a further six years, at approximately \$7 million annually, was entered into. Under this agreement, in 2006, GO Transit issued a purchase order totalling nearly \$38 million to replace about 100 switches within the USRC over a six-year period. According to GO Transit, the new switches allow trains to run faster into and out of Union Station, thereby providing additional train capacity and more efficient train operation. As Figure 7 shows, beyond the initial 2006 purchase order issued for switch replacement, three additional purchase orders totalling over \$50 million were also issued (in 2008, 2010 and 2011, respectively). Metrolinx advised us that the significant cost increases

Figure 7: Approved Purchase Orders for Switch Replacement Project (\$ million)

Source of data: Metrolinx

PO #	Date	Description	Amount
1	June 9, 2006	Removal and installation of approximately 100 new switches	37.6
2	Nov. 5, 2008	Cost increases for changes in regulations and standards, staff training and material costs	14.0
3	July 20, 2010	Cost increases for delays due to testing and need for redesign and staff costs	15.0
4	Mar. 14, 2011	Cost increases associated with the more complicated switches to be installed in 2011 and 2012	23.0
Total			89.6

resulted primarily from changes in regulations and safety standards, delays due to the switches being replaced because of their age, and the installation of the more complicated switches later in the project. As of May 2012, TTR had installed approximately 90 switches at a total cost to date of \$76.1 million—more than twice the total amount of the original purchase order.

This project was managed by an external consulting firm under a contract that expired in 2010. Although the firm handed over information on the project to Metrolinx before ceasing to work on the project, the information was not well organized, making the search for details on this project very difficult and time-consuming. As a result, other than requests forwarded to Metrolinx's Board for funds to pay for cost increases related to the project, no other documentation was available to support the reasonableness of such significant cost increases. TTR also works on other projects within the USRC for Metrolinx, and we noted that the contractor's invoices did not always clearly specify which project the work relates to, making monitoring of project costs very difficult.

In our 2007 report on GO Transit, we expressed concern over the fact that for work in the USRC, GO had not actively sought other qualified suppliers or considered the feasibility of developing in-house expertise to prevent becoming overly dependent on the USRC's previous owner. We continue to have this concern.

RECOMMENDATION 8

To ensure that projects under the Regional Transportation Plan are delivered cost-effectively and on time, Metrolinx should ensure that contracts have firm ceiling prices, whenever possible. Contracts should then be monitored for adherence to the original ceiling price. For work in the Union Station Rail Corridor, Metrolinx should also consider seeking other qualified suppliers or obtaining in-house expertise.

METROLINX RESPONSE

Union Station is Canada's busiest passenger transportation hub. Balancing operations and the safety of the 250,000 passengers who rely on it daily while renovating a National Historic Site's structure provides unique challenges. For example, when renovating an 82-year-old, 8.6-acre train shed roof, it is difficult to anticipate all structural issues. Co-ordination with the federal government and with the City of Toronto, who are developing new concourses below the train shed, was also challenging.

When determining procurement options, Metrolinx assesses the potential for risk transfer, whether the contractor is in a better position to manage risks, and the potential cost premium for that risk transfer. Metrolinx balances these factors to determine the most appropriate procurement option under the circumstances, recognizing that no contract type is right for all projects. At the time of procuring the contract for the restoration of the train shed, GO Transit determined that the best way to address the significant risks associated with this project was to use a modified stipulated-price contract. GO Transit subsequently engaged an independent fairness officer to review the process and consider the change orders involved. The review confirmed that the process was fair.

With regard to the Union Station Rail Corridor, Metrolinx continues to take additional steps to reduce its future reliance on existing suppliers, including obtaining in-house expertise to carry out similar work in the future. Metrolinx will apply a different model upon the completion of the Union Station revitalization, which is expected in 2016.

Double slip switches are a complex section of rigid and movable railway tracks more than 50 metres long and weighing more than 55 tonnes. They are very rare in the railway industry, and the switches in use at Union Station today date back to the 1920s. The renewal program

includes upgrading tracks and switches to increase their reliability and allow for faster train speeds, but replacing this type of switch while continuing to operate GO trains was a difficult process. With changed construction assumptions and the added complexity brought on by extensive signal-testing requirements, Metrolinx found that switch replacement was going to be more time-consuming and expensive than we had first estimated.

REGIONAL TRANSPORTATION PLAN

Although those GTHA municipalities and transit agencies we talked to questioned the priority given to some of the RTP's projects, they generally supported the plan as currently conceived. One transit agency indicated that the plan focuses only on new projects and that perhaps some consideration should have been given in the plan to maintaining existing transit assets.

Role of Metrolinx

As noted earlier, one of Metrolinx's key objectives is to provide leadership in the co-ordination, planning, financing and development of an integrated, multi-modal transportation network within the GTHA. In order to effectively carry out this mandate, Metrolinx's decisions regarding transportation and transit planning must be made on the basis of a credible business case supported by objective and sound data. As well, some of the municipal stakeholders we spoke to said that it is important for Metrolinx to remain objective and independent of any decisions of a political nature made by the governments of the municipalities within the GTHA and by the federal and provincial governments.

In the recent debate over the City of Toronto's transit projects within the RTP, Metrolinx could have been perceived as not being a strong enough advocate of what its own analysis suggested was

the right course of action for these projects. Specifically, when the RTP was adopted, the City of Toronto's "Transit City" plan—a plan for developing public transportation in the city—included light-rail transit (LRT) projects on three major arteries within the city: Sheppard Avenue East, Finch Avenue West and Eglinton Avenue. These three projects were adopted into the RTP, and Metrolinx prepared benefits case analyses (BCAs) to evaluate the costs and benefits of all reasonable alternatives so that the best version of each project could be built, taking cost and service to riders into consideration. Metrolinx's analyses concluded that the most cost-effective strategy was a mix of light rail with traffic on two of the lines (Sheppard and Finch) and a fully grade-separated rail system on Eglinton Avenue. However, the Eglinton project was approved only as a partially grade-separated project, because there wasn't enough provincial funding for a fully grade-separated system.

In March 2011, soon after the election of a new mayor, the province and Metrolinx entered into a Memorandum of Understanding (MOU) with the new mayor to revise these projects within the RTP. The MOU called for a subway on Sheppard Avenue—a decision that would have resulted in sunk costs of \$65 million—as well as bus rapid transit (BRT) on Finch Avenue and a fully grade-separated LRT system on Eglinton Avenue. However, Metrolinx's analysis concluded that, for Sheppard Avenue, the ridership projections did not warrant using the higher-cost subway technology along the entire corridor. Similarly, forecast ridership for Finch Avenue was found to be too large to be effectively served by BRT. But for Eglinton Avenue, the decision reflected in the MOU supported the BCA's conclusion that transit/auto conflicts along any at-grade sections would affect service reliability on the entire line, so that a fully grade-separated LRT system would serve the area best.

Before the MOU was signed, the Sheppard Avenue LRT was considered a top priority, and construction had already begun. But after the MOU was signed, the majority of the provincial funding

would now be taken up by the fully grade-separated transit line on Eglinton Avenue, so the City of Toronto became responsible for funding the Sheppard Avenue and Finch Avenue lines. Because the City of Toronto did not have sufficient funds at the time to construct a subway on Sheppard Avenue, the City initially decided to cease work on the Sheppard Avenue line. The Sheppard Avenue project, previously considered a top priority, would now be delayed.

In February 2012, however, Toronto's City Council rejected the revised plans under the MOU for Sheppard Avenue, Finch Avenue and Eglinton Avenue and directed the City Manager to work with Metrolinx on developing these projects as previously planned—that is, before the MOU was signed. On April 25, 2012, Metrolinx formally accepted this decision, which will result in approximately \$4 million in sunk costs.

Some GTHA municipalities and transit agencies that we talked to used the debate over the City of Toronto transit projects as an example to question Metrolinx's ability to objectively act as the GTHA's central transit planning authority to ensure that the most cost-effective and value-added transit infrastructure decisions are being undertaken.

RECOMMENDATION 9

Metrolinx should ensure that all projects contemplated under the Regional Transportation Plan are subjected to a rigorous cost/benefit analysis that considers financial, economic, environmental and social needs and impacts and that transit infrastructure investment decisions are made on the basis of that analysis.

METROLINX RESPONSE

Metrolinx has completed a cost/benefit analysis on all of the projects included in the first stage of the Regional Transportation Plan ("The Big Move"). This approach will also be applied when considering future projects.

Plan Funding

Without long-term sustainable funding, the RTP as currently contemplated cannot be implemented. The RTP's \$50 billion cost estimate may well prove low, because it is a high-level estimate derived for the most part using average costs per kilometre to construct various transit technologies based on Canadian and international historical data. The record of cost overruns to date on the priority projects we examined also suggests that fully implementing the RTP will cost more than estimated.

When the RTP was adopted, the detailed planning and design work that would yield a more precise cost estimate had understandably not yet begun for the majority of the projects contemplated under the plan. Detailed planning and design for proposed transit projects can take at least two to four years before any construction can begin. Although planning and design work is necessary before decision makers can be advised on project costs and schedule, the costs of doing this necessary upfront work may not be fully realized if the project is subsequently shelved for a long time due to lack of funding.

Funding has been committed for more than half of the priority transit projects within the RTP's first 15 years. By June 1, 2013, Metrolinx must report back to the province on an investment strategy to fund the remaining projects within the RTP's first 15 years, as well as the projects contemplated in years 16 through 25 of the RTP. Some examples of revenue tools that Metrolinx is contemplating using to raise funds for implementing the balance of the RTP include an increase in sales and payroll taxes specifically for GTHA residents, land value capture for GTHA residents whose property value has increased or will increase when new transit is introduced, and a transit fare surcharge. To this end, Metrolinx informed us that one of the key issues it faces in formulating a funding strategy is identifying the beneficiaries within the region of the investment in public transit.

Some GTHA municipalities indicated to us that Metrolinx has not consulted with them on the options being considered. They felt that being consulted while the strategy is being formulated—specifically on options that will affect local residents and businesses (for example, payroll and sales taxes specific to GTHA residents and businesses that could reduce GTHA competitiveness and job creation)—would be beneficial in encouraging timely adoption of the investment strategy. Better co-ordination by the province and municipalities in formulating strategies for raising funds would also help avoid duplication. For instance, the City of Toronto's January 2012 report "Sheppard Subway Development and Financing Study" identified a number of revenue tools that may be available to the city to finance its proposed transit expansion. The options anticipated were similar to those contemplated by Metrolinx to fund the RTP. Metrolinx advised us that it expected to start the public consultation phase of developing the funding strategy in fall 2012.

Metrolinx has developed a project prioritization framework for ranking unfunded priority projects using such criteria as the project's contribution to quality of life, environmental health and economic prosperity. This framework was not used for already funded projects, because those projects were approved under previous funding agreements and subsequently adopted into the RTP.

Plan Progress Reporting

Apart from the timelines covering the first 15 years and years 16 through 25, Metrolinx has no other defined targets for the overall achievement of the RTP. Although there is an urgency to complete certain funded projects—such as the Air Rail Link and projects associated with the revitalization of Union Station—in time for the summer 2015 start of the Pan/Parapan American Games, the remaining projects have no clearly defined timelines for completion. As noted earlier, funding dictates the completion of these projects for the most part.

In our discussions with GTHA municipalities, some indicated that Metrolinx should more regularly update their respective councils on the RTP's overall status, including the status of initiatives contemplated under the RTP that are not yet funded. These updates would help municipalities to better prioritize local projects. For instance, one municipality indicated that the impact of the uncertainty of funding on the timing of local projects under the RTP was making it difficult for the municipality to co-ordinate certain of its public works infrastructure projects.

Metrolinx plans to release an update to the RTP in June 2013. This update will be an addendum to the current plan, and will reflect any new information that has come to light since the plan was adopted. However, no changes are expected to the RTP's current vision, goals and objectives, policies and actions.

RECOMMENDATION 10

To ensure that provincial, regional and municipal stakeholders are kept up to date on the funding requirements and progress of the Regional Transportation Plan (RTP), Metrolinx should:

- regularly consult with GTHA municipalities and other key stakeholders as the funding strategies are being formulated, especially on options that affect local residents; and
- have clearly defined targets for the RTP's more significant projects and regularly report on costs and progress toward completion.

METROLINX RESPONSE

Metrolinx agrees on the importance of regular input and consultation on the Regional Transportation Plan ("The Big Move"). Since the plan was launched, Metrolinx has been regularly engaging municipal officials and key stakeholders on the RTP and related initiatives. Recently, Metrolinx has increased its engagement with municipal officials (such as chief

accounting officers and treasurers) as well as transit managers.

We have also sought input from municipalities' chief planning officials through regular meetings as we move forward with our work on the investment strategy.

Metrolinx is committed to working with our partners and stakeholders and will continue to engage in regular dialogue with municipal and transit-agency representatives.

OTHER MATTER

Project Management Information System

In 2008, Metrolinx purchased a program management system to plan, record and monitor capital projects and report project information. The system downloads information from Metrolinx's procurement and financial systems and also relies on input from project managers for budget and actual information.

We noted that in order to effectively monitor projects, project managers often supplemented the information provided by the system with manual spreadsheets maintained outside the system. This approach was necessary because the system did not have adequate functionality in areas such as scheduling and forecasting. Specifically, the system has the following limitations:

- *Limited scheduling capability.* The system cannot support the scheduling of tasks on multiple projects, especially if the projects are on the same corridor. For example, we noted that the system was unable to provide sufficient support for the scheduling of interrelated tasks on multiple projects on the Georgetown South rail corridor. To compensate, project managers had to maintain spreadsheets and other scheduling tools outside the system to effectively manage their projects; and
- *Limited forecasting capability.* The system allows users to compare only the year-to-date

budget to actual results. But to facilitate timelier project monitoring, users must be able to make such comparisons for shorter terms (that is, monthly or quarterly).

In addition, information on disbursements related to various projects is downloaded to the system from Metrolinx's financial system each night. These disbursements are supposed to match the commitments set up in the system for the respective projects. However, we noted that the system was not properly distributing all costs incurred to the appropriate commitment. This impacts the project managers' ability to reliably compare the projects' actual costs to their respective budgets.

RECOMMENDATION 11

Metrolinx should ensure that its project management information system provides the functionality needed to facilitate the effective monitoring of individual projects.

METROLINX RESPONSE

Metrolinx will continue to introduce project management tools and training to support its project managers in ensuring that projects are completed on time and on budget. For instance, some of the anticipated and implemented tools include:

- project and program dashboards to allow project managers and senior management to track project performance on key indicators;
- new functionality to be added to the existing project management information system to allow for monthly forecasting with associated dashboards and reports; and
- more scheduled training for user access and integration with additional project management systems, where there is value added, to have greater overall functionality in scheduling, cost control and risk management.