Chapter 3

Section

3.07 Metrolinx—LRT Construction and Infrastructure Planning

1.0 Summary

Metrolinx is the regional transportation agency responsible for **planning** an integrated regional transit system for the Greater Toronto and Hamilton Area (GTHA), overseeing transit **capital projects**, and **operating** GO Transit trains and buses, the Union Pearson Express and the PRESTO fare payment system. Metrolinx's responsibilities are set out in the *Metrolinx Act, 2006* (Act).

In November 2008, Metrolinx formally adopted its first Regional Transportation Plan. It was a 25-year plan setting out the priorities, policies and programs for a regional transportation system for the GTHA. Among its top 15 transit priorities in the first 15 years were five "rapid transit" projects that would allow people to travel quickly in special vehicles that have "exclusive right of way" (other vehicles are not allowed on the lanes). The high capacity of the special vehicles and the exclusive right of way make this transport more "rapid," or faster, than transport like traditional buses and streetcars, which are smaller vehicles that travel on lanes shared with other vehicles.

Our audit looked at Metrolinx's regional planning responsibilities and work, and its oversight of a number of its rapid transit capital projects that have been designated as "light rail transit" (LRT): Eglinton Crosstown, Finch West, Sheppard East, Scarborough Rapid Transit, Hamilton and Hurontario. We focused on the Eglinton Crosstown, as this was the only project in construction during our audit.

We found that Metrolinx incurred about $436 million in sunk and additional costs between 2009 and 2018 because of problems with how the transit-planning process evolved for the GTHA and how Metrolinx carries out its responsibilities. **Figure 1** summarizes this based on the LRT projects our audit examined:

- *Sunk Costs Resulting from Project Changes.* After the LRT projects were announced or agreed on, the provincial and municipal governments changed their decisions on what to build and when to build, even though significant investments had already been made. For instance, the City of Toronto overrode previous decisions on the Scarborough transit project three times, ultimately resulting in the cancellation of the Scarborough RT project altogether. As well, the Sheppard LRT has been delayed for more than 10 years from its initial expected completion in 2013.
- *Costs Over and Above Original Contract Values*. Metrolinx had to spend extra money to get the consortium already designing and constructing the Eglinton Crosstown LRT (AFP consortium) to settle claims and commit to complete the project by its original completion date of 2021. As well, Metrolinx had to

Figure 1: Sunk and Additional Costs on the LRT Projects, 2009–2018

Prepared by the Office of the Auditor General of Ontario

	$ million
Sunk Costs Resulting from Project Changes[1]	
Cancellation of Scarborough RT project (see **Section 4.1**)	75
Delay in Sheppard LRT project (see **Section 4.1**)	50
Subtotal	**125**
Costs Over and Above Original Contract Values[2]	
Eglinton Crosstown LRT settlement (see **Section 4.4.2**)	237
Amendments to LRT vehicles contract (see **Section 4.6.1**)	49
Subtotal	**286**
Additional Contract Management Costs	
Oversight, administrative, contingency-plan and legal costs for vehicles contract[3] (see **Section 4.6.2**)	25
Potential increase to program management consultant contracts (see **Section 4.5**)	n/a[4]
Subtotal	**25**
Total	**436**

1. These costs resulted from problems with how the transit-planning process works in Ontario. Projects can be cancelled and delayed because of provincial and municipal government decisions. The investments made to that point lead to no result.
2. These costs resulted from how Metrolinx carried out its responsibilities. This required Metrolinx to spend money that it never planned to.
3. For the vehicles contract, these consist of oversight, administrative, contingency-plan and legal costs Metrolinx spent to manage the LRT vehicle supplier's slow response to quality and schedule issues that caused concerns for Metrolinx.
4. For the program management consultant contracts, these may entail amendments to increase their upper limits because significant portions of their values were spent earlier on in the contracts.

negotiate changes to the light rail vehicles contract with the vehicle supplier because of revised projects and timelines.

- *Additional Contract Management Costs.* Metrolinx incurred additional contract management costs after raising concerns about the vehicle supplier's poor performance in designing the vehicles. They included paying consultants and lawyers to help it try to cancel the contract and resolve the dispute. In addition, Metrolinx's current rate of use of program management consultants poses a risk that additional money will be needed to complete the delivery of the projects.

Regarding the **construction of the Eglinton Crosstown LRT**, our audit found that:

- **Under the Alternative Financing and Procurement (AFP) contract, Metrolinx had limited remedies available to it to hold the AFP consortium responsible for project delays as long as the consortium certified it would still finish the project on time.** The AFP consortium consists of ACS, AECON, EllisDon and SNC-Lavalin. Under an AFP contract awarded in July 2015, the AFP consortium was to provide Metrolinx with a detailed six-month work schedule and update it monthly. If it were to find that it was unable to meet the substantial completion date, it would have to submit a report identifying the reasons for the delay and a plan for eliminating or reducing the delay. The AFP consortium began falling behind schedule in 2017. Metrolinx had the right under the AFP contract to ask for additional information from the AFP consortium in order to perform a detailed assessment of the work schedule if the AFP consortium indicated that project completion would be delayed or if in Metrolinx's opinion the consortium had fallen significantly behind the work schedule; however, Metrolinx did not do so because the AFP consortium represented that it could still finish on time. The AFP consortium continued to submit schedules with increasing delays throughout 2017, and Metrolinx communicated its concerns about the delays, but the AFP consortium did not adequately address them. In December 2017, Metrolinx met with senior consortium management, at which time the AFP consortium was still certifying it would meet the contracted completion date of September 2021 and indicated that in February 2018 it would provide solutions to mitigate schedule delays. However, the AFP consortium instead filed a claim against Metrolinx in February 2018 for extension of the project completion date to October 2022. The claim also requested compensation because Metrolinx allegedly was not helping the AFP consortium overcome scheduling and cost challenges. The AFP contract with the consortium does not provide Metrolinx with adequate remedies to address project delays that it knows of early in the project; the remedies take effect only when the AFP consortium has declared that it will not meet the completion date.

- **The AFP contract did not fully transfer responsibility for the risks of project delays and cost overruns to the AFP consortium, as evidenced by Metrolinx having to pay the AFP consortium $237 million to hold it to the completion date of September 2021.** In an AFP project, a private-sector consortium is paid a premium to bear the risks of project delays and cost overruns. However, under the Eglinton Crosstown LRT AFP contract, the responsibility for these risks was not fully transferred to the AFP consortium. In August 2018, Metrolinx settled the AFP consortium's claim against it, paying the AFP consortium $237 million to hold the AFP consortium to the contracted completion date of September 2021. In addition, Metrolinx agreed to accept later delivery dates for the pedestrian bridges adjacent to the existing West Don River Bridge and a Salvation Army building.
- **Metrolinx and Infrastructure Ontario developed a risk register to negotiate the settlement to the claim, but Metrolinx did not have sufficient documentation of evidence linking the settlement amount to the AFP consortium's claims that Metrolinx was partially responsible for project delays.** We reviewed the settlement negotiation process and confirmed that Metrolinx and Infrastructure Ontario used a risk register, based on their analysis of the AFP contract, to estimate a settlement amount. However, Metrolinx could not provide us with sufficient documentation confirming whether the project delays were or were not in part its responsibility and factoring that assessment into the settlement amount. We noted as well that the AFP consortium also did not provide information that linked responsibility for project delays to compensation amounts, either before or when it initiated its claim.
- **Approvals of designs and the AFP consortium's delivery schedule were affected by the AFP consortium's late submission of designs and the designs' poor quality as reported by Metrolinx's technical advisors.** Deficiencies in the designs submitted by the AFP consortium included missing system elements (for example, signalling and fire detection equipment in tunnels). As well, the AFP consortium has constructed parts of the project before having the overall design approved by third parties, creating a risk that it will later need to make unplanned and less-than-optimal modifications because the completed work is not in compliance with the AFP contract (such modifications are made at the consortium's own cost). Metrolinx's technical advisors observed that if design issues are not resolved, the Eglinton Crosstown LRT may not be found at the end of scheduled

construction to be fully compliant with the requirements in the AFP contract and/or may not function properly. If elements of the project are found to be non-compliant, there is a risk that reworking will be necessary or that Metrolinx and the AFP consortium will have to negotiate a settlement to resolve the situation before substantial completion can be certified.

Regarding **program management services**, our audit found that:

- **Metrolinx did not adequately forecast the extent of program management services required, and there is a significant risk it will have to increase its consultant contract upper limits before contracts expire between 2020 and 2022.** Since 2010, Metrolinx has signed three major contracts with one consulting firm to provide program management services for the LRT and other major projects. The total value of the contracts is $272 million. Metrolinx did not formally identify before entering into the contracts the extent of work the consultants were to perform or reasonable costs for that work. The first contract had its term extended, with its end date going from 2015 to 2022, and had its value increased from $44 million to $127 million between 2010 and 2017. Over half has been spent on the other two contracts only two years into their initial five-year term, ending in 2020. Metrolinx has the option to extend the term of these two contracts up to five more years, that is, up to 2025.
- **Better value for money may be achieved with more competitive bidding for consulting services.** Consulting services above $100,000 that are obtained through a stand-alone contract should be competitively procured; however, consulting work assigned to subconsultants under a main consultant's contract are not subject to this requirement regardless of the amount. We noted a number of cases where Metrolinx requested that particular subconsultants be assigned to perform consulting services over a number of years. For example, Metrolinx paid a subconsultant firm $21 million between 2014 and 2018 (to support contract administration, reporting and scheduling for the LRT projects). In these cases, Metrolinx could not provide documentation showing why it did not consider competitive procurement, which could have resulted in obtaining the services at a potentially lower cost and given the opportunity for other qualified vendors to have access to the work. In addition, even though Metrolinx specifically requests the subconsultants be added to the contract, it pays fees to the main consultant to "administer" the subconsultants' work. Given the frequency with which the subconsultants were used and the amounts spent on some of them, it could have been more cost-effective for Metrolinx to have competitively procured these services itself.
- **Metrolinx assigned to the consulting firm approximately $1.5 million of work that did not relate to the projects specified in the contracts.** For example, Metrolinx spent about $1.2 million on unrelated project management services for the Union Pearson Express; and about $367,000 for advice on reorganizing Metrolinx's capital project group.
- **At the time of our audit, Metrolinx staff overseeing consultants did not adequately check that consultants performed the work to support the hours charged on their invoices.** Consultant invoices are reviewed only by contract administrators for basic compliance (for example, that the correct rate was charged for the type of consultant submitting the invoice). The staff overseeing consultants' work did not adequately review invoices for whether the hours charged were reasonable for the work performed.

- **Metrolinx has not addressed the consulting firm's underperformance in a timely manner.** By 2017, Metrolinx had worked with the consulting firm for seven years and had still not formally assessed its performance. In fall 2017, Metrolinx noted that the consulting firm was underperforming and worked with the firm to try to address the issues. Only after we were finishing our audit, in August 2018, did Metrolinx complete its first formal evaluation of the firm. The issues Metrolinx has dealt with could have been addressed earlier if consultant performance was properly evaluated and actions taken to address any underperformance.

Regarding **vehicle purchasing**, our audit found that:

- **Metrolinx committed to purchasing LRT vehicles and to delivery dates without adequate contract provisions addressing the possibility plans could change.** In 2010, Metrolinx signed a contract with Bombardier to receive 182 light rail vehicles for the Toronto LRT projects starting in 2013. A 2009 study commissioned by Metrolinx identified several uncertainties about the vehicle specifications that could cause delays. These uncertainties (such as whether the vehicles would be "low floor," with no steps between the entrance and the cabin, the size of the vehicles, and the technology to be used), were resolved and the specifications agreed upon before the vehicle contract was signed. However, the procurement of the vehicles was finalized before the main AFP contracts to design and build the LRT projects were in place. The vehicle procurement provisions did not adequately address the possibility of changes to project plans that would alter when and how many vehicles would be needed.
- **Contract changes resulting from changes in government direction cost Metrolinx about $49 million.** The Toronto LRT projects did change considerably after the contract with Bombardier was signed. The number of vehicles needed changed and the dates when the vehicles should be delivered were pushed back. As a result, Metrolinx had to negotiate extensively with Bombardier to postpone the initial delivery of the vehicles from 2013 to 2017 (subsequently deferred to 2018) and reduce the number of vehicles from 182 to 76. Metrolinx paid Bombardier $19 million for costs associated with the disrupted schedule. After the number of vehicles was reduced, the new total of 76 vehicles cost $30 million more than they would have under the initial contract.
- **Bombardier's slow response to quality and schedule issues cost Metrolinx about $25 million.** After Metrolinx completed its negotiations with Bombardier to revise the vehicle delivery schedule, it raised concerns about Bombardier's progress in designing the vehicles. In October 2014, Metrolinx's then CEO wrote Bombardier that "we are losing confidence in Bombardier's ability to deliver service-ready vehicles without a substantial change in approach." He cited problems like parts that were "out of dimension, patched and clearly without the quality to meet reliability and the required design life" for the vehicles. Metrolinx spent $25 million in oversight, administrative, contingency-plan and legal costs to manage the situation.

Overall Conclusion

Metrolinx's ability to cost effectively plan and deliver an integrated transportation system has been impacted by requested changes to plans by both municipal and provincial governments, resulting in project delays and unnecessary costs being incurred. As well, Metrolinx assumed financial risks associated with the purchasing of light rail vehicles without construction contracts in place.

The Eglinton Crosstown LRT is the only light rail transit project currently under construction. It is being built using the alternative financing and procurement (AFP) model, where risks are transferred to the private sector. However, under the contract with the AFP consortium, Metrolinx retained some responsibility for the risk that the project will not be delivered on time and on budget. Halfway through this project, Metrolinx settled a claim with the AFP consortium, using half of its contingency fund to continue to ensure that the project will be delivered on time. Metrolinx did not have sufficient documentation of evidence linking the settlement amount to the AFP consortium's claims that Metrolinx was partially responsible for project delays.

Furthermore, Metrolinx has been contracting program management consulting services (some of which pertain to the Eglinton Crosstown) without documenting what work is expected to be completed and the estimated cost of that work. Improvements can be made to Metrolinx's oversight and review of the consulting work performed.

This report contains 16 recommendations with 33 action items.

OVERALL METROLINX RESPONSE

The Metrolinx Light Rail Transit (LRT) program includes the largest transit infrastructure projects in the country. The Auditor General's recommendations will support our delivery of quality, cost effective and timely transit solutions for the region.

Actions taken by Metrolinx since mid-2018 that relate to the recommendations include the development of enhanced business case guidance and enhanced governance over the life of projects, the evaluation of our program management consultants through the vendor performance management system and appraisal program, and implementing enhanced invoice review and approval procedures for our program consultants.

The alternative financing and procurement (AFP) model is required to be used to procure and deliver large, complex transit projects. It is appropriate to continually review and improve the remedies within AFP contracts so that provincial agencies can use them to better manage these contracts.

Metrolinx resolves scope- and schedule-related claims arising during construction projects. We do this by following the dispute resolution process outlined in the project agreements, following standard legal practice. In order to quantify the Province's retained liability, we use an industry-best-practice approach to assign the probabilities and values to each claim, and we worked with an independent third party for the Eglinton Crosstown LRT claim. We are confident that the settlement represents value to taxpayers and the Province.

Metrolinx has adopted an integrated delivery team approach in managing and overseeing the LRT projects, using program management services consultants to manage the construction of the projects. This will ensure that Metrolinx is able to meet the demands of its capital program, while considering future resource needs. Also, we have implemented improvements to the contractual oversight of our consultants.

Further to the above actions, we will develop detailed action plans with timelines to fully address each of the report's recommendations.

2.0 Background

2.1 The Need for Transportation Planning

The Greater Toronto and Hamilton Area (GTHA) consists of two single-tier municipalities (Toronto and Hamilton), four regional municipalities (Durham, Halton, Peel and York) and 24 local municipalities. It is one of the fastest-growing regions in North America. Its population is expected to increase by 41% between 2016 and 2041, from 7.2 million to 10.1 million.

One-quarter of the new population growth and one-fifth of the growth in transit trips is projected to be in areas where travel has been dominated by people driving cars and other vehicles on roads. In these areas, only 4% of trips during the morning peak period are made on transit. The resulting increase in road congestion will pose challenges to the mobility of people and goods.

A 2006 Metrolinx study noted that road congestion in the GTHA cost commuters $3.3 billion a year. These costs arise from travel delays, environmental impacts, increased vehicle costs and greater likelihood of collisions. The same study estimated a further annual economic cost of $2.7 billion from workers stuck in traffic and on transit having less productive time. Looking ahead to 2031, these costs to GTHA commuters and the economy are projected to balloon to $7.8 billion and $7.2 billion annually—hence the need for and importance of transit planning.

2.2 Metrolinx's Role and Responsibilities

Metrolinx is an agency of the Government of Ontario mandated to do transportation planning for the GTHA and the GO Transit service area outside of the GTHA. Metrolinx was created by the *Greater Toronto Transportation Authority Act, 2006*, now the *Metrolinx Act, 2006* (Act).

According to Section 5(1)(a) of the Act, Metrolinx is to provide leadership in the co-ordination, planning, financing and development of an integrated transportation network in the GTHA.

To fulfill its leadership role in planning the network, Metrolinx released its first Regional Transportation Plan in 2008, called *The Big Move*. Metrolinx notes in *The Big Move* that the Plan is to:

- take into account all modes of transportation (for example, regular transit, rapid transit, bus, light rail and heavy rail, as well as vehicle travel on roads and highways);
- use "intelligent" transportation systems (that is, fit transportation infrastructure and vehicles with information and communication technology that makes travel more efficient);
- integrate local transit systems with each other and with the GO Transit system; and
- work toward easing congestion and commute times, and reducing transportation-related emissions that contribute to smog and greenhouse gases.

Under the Act, the transportation network itself must:

- conform with the transportation policies of the Province and municipalities, and their respective growth plans; and
- support a high quality of life, a sustainable environment and a strong, prosperous and competitive economy.

The Big Move identified 15 top transit priorities to be implemented in the first 15 years, shown in **Appendix 1**.

Under the Act, Metrolinx must update its Regional Transportation Plan at least every 10 years. In 2018, Metrolinx released the update, called the *2041 Regional Transportation Plan*. Like *The Big Move*, the *2041 Regional Transportation Plan* had the objective of building more frequent rapid transit routes to serve more people with transit that is fast, frequent and reliable.

2.2.1 Different Modes of Transit

Transit can be regular or rapid. Rapid transit carries commuters on high-capacity vehicles on lanes where, for at least part of the route, the vehicles have exclusive right of way—pedestrians and non-transit vehicles are not allowed on the lanes. The high capacity and the exclusive right of way make this transport more "rapid," or faster, than transport like traditional buses and streetcars, which are smaller vehicles in comparison and which travel on mixed-traffic lanes that are shared with other

Figure 2: Different Modes of Transit

Sources of data: York Region Rapid Transit Corporation presentation at the 4th Annual Urban Transit Infrastructure Conference 2018 and Metrolinx

Mode of Transit	Route Travelled	Capacity[1]	Capital Cost per Kilometre ($ million)
Regular bus	Mixed-traffic roads (i.e., sharing the lane with other vehicles)	900–3,000	<1
Bus rapid transit (BRT)[2]	• Mixed-traffic routes alongside arterial roads or expressways; and/or • Exclusive right of way (i.e., lanes where only transit vehicles are allowed to travel)	1,200–10,000	40–60
Streetcar[3]	Mixed-traffic lanes equipped with rail (usually sharing the lane with other vehicles like regular buses)	1,000–3,250	n/a
Regional rail (GO Transit)	Rail tracks with partially exclusive right of way (some tracks shared with freight trains)	2,200–20,000	n/a
Automated guideway transit (Scarborough rapid transit)[4]	Fully dedicated rail tracks with exclusive right of way	3,800–4,500	n/a
Light rail transit (LRT)[2]	Dedicated rail lanes with: • partially exclusive right of way on surface roads (typically stop for traffic at intersections); and/or • exclusive right of way underground	3,100–18,000	60–170
Subway	Fully dedicated rail tracks with exclusive right of way, mostly underground	13,000–30,000	300–500

1. Capacity is expressed as a range of the number of passengers that can be carried per hour past a given point in the busiest direction of the route. Ranges reflect different assumptions about factors such as the number of cars (if a train), the amount of time spent at stops and stations, and spacing between stops.
2. Bus rapid transit (BRT) and light rail transit (LRT) are both "rapid transit," with the following features to increase speed: high-frequency service, signal priority at intersections (green lights are longer and red lights are shorter for transit vehicles) and boarding through all doors (not just the frontmost door). A couple of features distinguish BRT from LRT: LRT vehicles typically travel at faster speeds than BRT vehicles, and LRT routes have fewer stops with longer distances between them (typically from 500 metres to one kilometre between stops).
3. Many streetcar lanes in Toronto have been changed from mixed-traffic to partially exclusive right of way. Starting in 2014, Toronto introduced low-floor light rail streetcars to further improve service. This puts much of Toronto streetcar service into the "rapid-transit" category, comparable to light rail transit (LRT).
4. Information on automated guideway transit is from Metrolinx's January 2009 Scarborough Rapid Transit Benefits Case.

vehicles. Another feature that makes this transport more rapid is "signal priority" at intersections: green lights are longer and red lights are shorter for transit vehicles.

Subways and heavy rail vehicles that travel on routes that are 100% exclusive right-of-way are the fastest mode of transit.

Figure 2 summarizes the characteristics of different modes of transit.

2.3 The Five Light Rail Transit Projects

2.3.1 The Original Intent in *The Big Move*

Five of *The Big Move's* priorities that were identified as rapid transit projects were subsequently funded as light rail transit (LRT) projects. Three were in Toronto:

- build Eglinton rapid transit from Pearson Airport to Scarborough Centre;
- build Finch/Sheppard rapid transit from Pearson Airport to Scarborough Centre and Meadowvale Road; and

Figure 3: Key Changes and Events Pertaining to Five LRTs, September 2018

Source of data: Metrolinx

	Eglinton	Finch/Sheppard		Scarborough	Hamilton	Hurontario
2010	Route shortened so western end begins at Weston Road, not Pearson Airport Completion date changed from 2016 to 2020	Project split into two LRTs		Completion date changed from 2015 to 2020		
		Finch West	**Sheppard East**			
		Completion date changed from 2013 to 2019	Completion date changed from 2013 to 2014			
2011, 2012	Tunnel work begins	Completion date changed to 2020	Completion date changed to 2021			
2013				Toronto changes project from LRT to subway*		
2015, 2016	Construction begins Completion date changed to 2021		Put on hold until **Finch West** completed			Brampton rejects LRT in its downtown, shortening route so northern endpoint Steeles Avenue, not downtown Brampton
2017						Request for proposals issued; construction expected to begin 2018
2018		Winning construction bidder announced; completion expected 2023			Request for proposals issued; construction expected to begin 2019	

* Toronto agreed in 2015 to reimburse Metrolinx $74.8 million for sunk costs from this cancelled LRT.

- upgrade and extend the existing Scarborough Rapid Transit line.

Two were outside Toronto:

- build rapid transit in downtown Hamilton from McMaster University to Eastgate Mall; and
- build Hurontario rapid transit from Port Credit to downtown Brampton.

2.3.2 Key Changes and Events

Appendix 2 presents a detailed timeline of announcements and decisions affecting both the original three Toronto rapid transit projects and the original two rapid transit projects outside Toronto. By 2009, all five projects were proceeding as LRTs. **Figure 3** shows the subsequent changes and events pertaining to each of the projects between 2010 and 2018.

Two key changes were the splitting of Finch/Sheppard into Finch West and Sheppard East, and the cancellation of the Scarborough LRT (Toronto replaced the project with a subway). As a result, the three Toronto LRTs are: Eglinton, Finch West and Sheppard East, along with the Hamilton LRT and the Hurontario LRT outside Toronto.

In 2009, the government directed Metrolinx to work with Infrastructure Ontario to deliver the projects using the alternative financing and procurement (AFP) approach. See **Appendices 3** and **4** for a description of the AFP approach and the issues that we identified in our 2014 audit of the AFP model and its impact on the LRT projects.

Figure 4 summarizes the current status of the five LRT projects.

2.3.3 Metrolinx's Responsibilities and Relationships with Other Key Players

Metrolinx is responsible for the planning and delivery of these projects. More specifically, Metrolinx is responsible for developing project cost estimates, proposing project budgets for approval and managing the cost once the proposed budget is approved by the Province's Treasury Board. In accordance with direction from Treasury Board and the Ministry of Transportation, Metrolinx is also responsible for approving the terms and conditions for owning, constructing, operating and maintaining the new assets created by these projects.

Since the projects were designated and beginning to proceed as LRTs in 2010, Metrolinx spent

Figure 4: Overview and Status of the LRT projects, September 2018

Source of data: Metrolinx and Infrastructure Ontario

Project Description	Status	Target In-Service Date	Private Sector To
Eglinton-Crosstown			
• Located along Eglinton Avenue • Connects Weston Road and the TTC Kennedy Station. • Length: 19 km (10 km underground) • 25 stations and stops, linking to and intersecting with 54 TTC bus routes, three TTC subway stations, the Union–Pearson Express, and three GO train lines (Kitchener, Barrie and Stouffville)	In construction	Late 2021	Design, build, finance and maintain for 30 years (TTC to operate)
Finch West			
• Located along Finch Avenue West • Connects the Finch West TTC station and Humber College • Length: 11 km	In construction	2023	Design, build, finance and maintain for 30 years (TTC to operate)
Hurontario			
• Located along Hurontario Street • Connects Port Credit GO Station and Steeles Avenue • Length: 20 km	Request for proposals issued, contract award expected in 2018	2023	Design, build, finance, operate and maintain for 30 years
Hamilton			
• Spans the lower city of Hamilton (along Main Street, King Street, and Queenston Road) • Connects McMaster University to Eastgate Square • Length: 14 km	Request for proposals issued, contract award expected in 2019	2025	Design, build, finance, operate and maintain for 30 years
Sheppard East			
• Located along Sheppard Avenue • Connects Don Mills TTC Station to Morningside Avenue • Length: 13 km	n/a (on hold pending completion of Finch West)	n/a	n/a

$3.9 billion on construction and $959 million on administering and managing the projects as of September 2018.

As of August 2018, 35 Metrolinx employees, 14 Infrastructure Ontario employees and 50 consultants were integrated with the Metrolinx LRT delivery project teams, with support from other employees and consultants from other areas such as finance.

To fulfil these responsibilities, Metrolinx must work with a number of other key players. As the Eglinton Crosstown LRT is the project furthest along, **Figure 5** outlines who those key players are and their relationships to each other and Metrolinx.

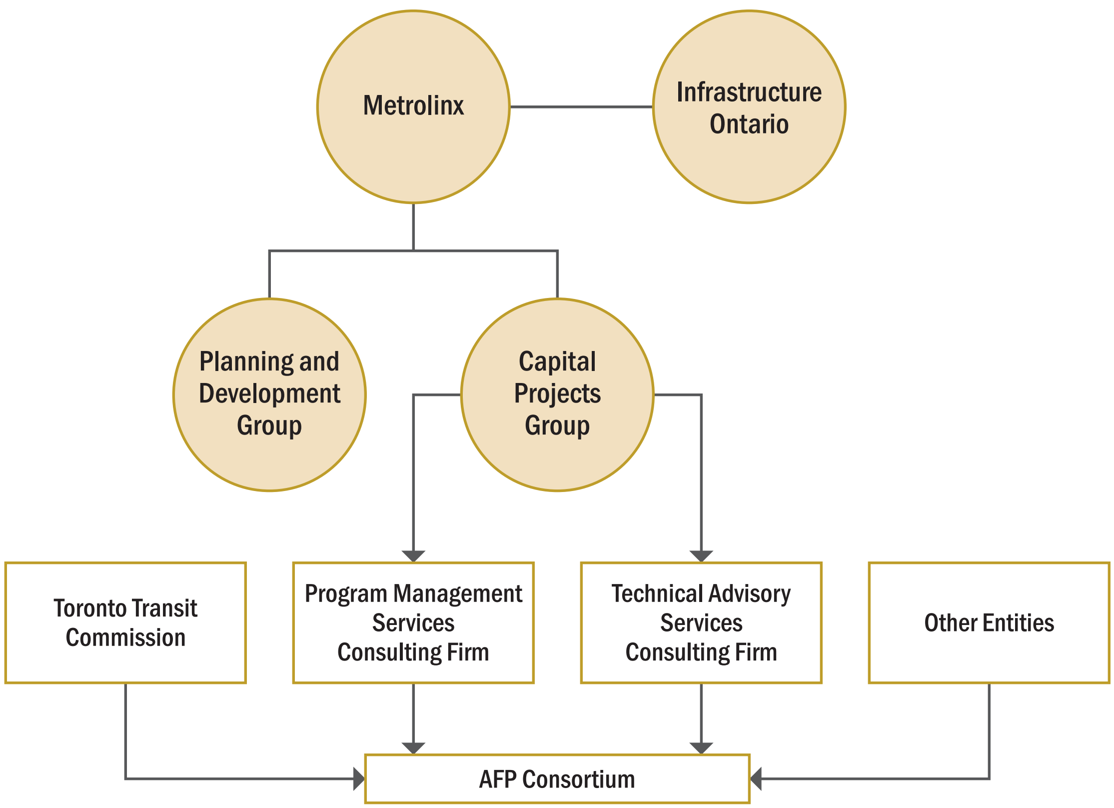
2.4 Eglinton Crosstown LRT

The Eglinton Crosstown LRT will be a 19-kilometre light rail corridor running along Eglinton Avenue from Weston Road in the west to the TTC Kennedy subway station in the east. Ten kilometres will be underground. The LRT will have 25 stations and stops, linking to 54 bus routes, three subway stations and various GO Transit lines. The Crosstown is expected to provide service that is up to 60% faster than bus service today.

Construction started with underground tunnels in 2011. The Crosstown Transit Constructors built the Western section (west of Yonge Street) and the

Figure 5: Key Players in the Eglinton Crosstown LRT Project

Prepared by the Office of the Auditor General of Ontario



- **Metrolinx**: undertakes the planning for the project and oversees its delivery through its Planning and Development Group and Capital Projects Group.
- **Infrastructure Ontario**: administers the AFP contract and provides legal support.
- **Toronto Transit Commission**: reviews and approves all designs submitted by the AFP Consortium that affect it. Will operate the light rail vehicles on the LRT.
- **Technical Advisory Services Consulting Firm:** reviews and approves all designs submitted by the AFP Consortium, and observes and audits construction activities.
- **Program Management Services Consulting Firm:** reviews project progress for compliance with the terms of the contract.
- **Other Entities**: Toronto City government issues permits to the AFP Consortium in compliance with bylaws. Telecommunications and utility companies work with the AFP Consortium during construction.
- **AFP Consortium**: under its contract with Metrolinx, it is designing and constructing the LRT and will maintain it for 30 years. It submits all designs to **Technical Advisory Services** consultants and submits those designs affecting the TTC to the **TTC**. It works with the **Other Entitities** noted above to get approvals and permits, and facilitate construction.

Aecon Dragados Joint Venture built the Eastern section (east of Yonge Street).

During this construction, Metrolinx, together with Infrastructure Ontario, issued a request for proposals for the Eglinton Crosstown project, including a maintenance facility, stations, rail lines, and all related systems and components. A competitive procurement process was followed, and a consortium made up of ACS, AECON, EllisDon and SNC-Lavalin submitted the winning bid for the AFP contract. (In this report, we refer to this consortium as the AFP consortium.) The contract was awarded to the AFP consortium in July 2015.

The underground tunnels were handed over to the AFP consortium once completed—the Western section was fully handed over to the AFP consortium by April 2017 and the Eastern section substantially handed over in August 2017, with one subsection still outstanding.

2.5 *2041 Regional Transportation Plan*

On March 8, 2018, the Metrolinx Board of Directors unanimously approved the *2041 Regional Transportation Plan*—successor to the 2008 plan, *The Big Move*. The 2041 Plan built on the original vision of *The Big Move*, which was to provide people with access to fast, frequent and reliable transit and make it easier to use transit or travel by bike or on foot.

The 2041 Plan reflects the advice of the Metrolinx Board to the Province on improving the co-ordination and integration of all modes of transportation in the GTHA. It is to guide Metrolinx's actions between now and 2041, as well as guide all stakeholders in setting transportation priorities. However, like *The Big Move*, it is not binding on the Province or municipalities, and there is no committed long-term funding for delivering the 2041 Plan.

As well, there is no legislative requirement for Metrolinx to develop a plan for how to implement its Regional Transportation Plan.

3.0 Audit Objective and Scope

The objective of our audit was to assess whether Metrolinx has effective systems and processes in place to:

- plan and deliver the Eglinton Crosstown and its other Light Rail Transit projects in a cost-effective and timely manner; and
- evaluate, monitor and report activities and progress toward achieving project deliverables and milestones.

Before starting our work, we identified the audit criteria we would use to address our audit objective (see **Appendix 5**). These criteria were established based on a review of applicable legislation, policies and procedures, and internal and external studies. Senior management at Metrolinx reviewed and agreed with the suitability of our audit objective and related criteria.

We focused on activities of Metrolinx in the nine-year period ending March 31, 2018, and considered relevant data and events subsequent to this period.

We conducted our audit between November 2017 and August 2018. We obtained written representation from Metrolinx that, effective November 9, 2018, it had provided us with all the information it was aware of that could significantly affect the findings or the conclusion of this report.

Our audit was conducted primarily at Metrolinx's head office and at the project office for the Eglinton Crosstown project. In conducting our work, we interviewed the Metrolinx staff and consultants responsible for planning and implementing the Light Rail Transit (LRT) projects. We reviewed pertinent information and analyzed relevant data since the 2009 announcement of these projects. We toured the Eglinton Crosstown project to understand the scope of the work being undertaken.

We interviewed staff from the Toronto Transit Commission (TTC) and obtained relevant information from them on the construction of the

Eglinton Crosstown at the interchange stations (that is, the stations that will serve both the Eglinton Crosstown LRT and a TTC subway line).

We also interviewed staff from Infrastructure Ontario and obtained pertinent information from them on the use of the alternative financing and procurement approach to deliver the LRT projects.

As well, we interviewed others on the delivery of LRT projects in their jurisdictions, including the City of Ottawa's Auditor General's Office, the BC Auditor General's Office, Partnerships BC and the Region of Waterloo.

Our audit included a review of complaints received by the Ontario Ombudsman and audits completed by the Ontario Internal Audit Division in the last five years. We considered these in determining the scope and extent of our audit work.

We conducted our work and reported on the results of our examination in accordance with the applicable Canadian Standards on Assurance Engagements—Direct Engagements issued by the Auditing and Assurance Standards Board of the Chartered Professional Accountants of Canada. This included obtaining a reasonable level of assurance.

The Office of the Auditor General of Ontario applies the Canadian Standards of Quality Control and, as a result, maintains a comprehensive quality control system that includes documented policies and procedures with respect to compliance with rules of professional conduct, professional standards and applicable legal and regulatory requirements.

We have complied with the independence and other ethical requirements of the Code of Professional Conduct of the Canadian Professional Accountants of Ontario, which are founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behaviour.

4.0 Detailed Audit Observations

4.1 Metrolinx Not Effectively Fulfilling Its Mandate to Lead Transportation Planning

Under the *Metrolinx Act, 2006*, Metrolinx is mandated to develop and adopt a transportation plan for the GTHA and plan, co-ordinate and set priorities for its implementation. *The Big Move* (the first transportation plan adopted by Metrolinx in 2008) was to serve as the blueprint for a more sustainable transportation future to guide and direct decision-making. The aim of the plan was to achieve a transportation system for the GTHA that is effective, integrated and multi-modal.

However, while the transportation plan guides Metrolinx's decisions and actions, there is no legislative requirement for the provincial government and municipalities to follow the plan. As well, the transportation plan is not linked to long-term funding and only serves to identify projects that should be funded to achieve the goals set out in the plan. It is at the discretion of the provincial government and municipalities to decide which project (if any), they want to fund from the plan.

For example, as shown in the timeline in **Appendix 2**, since the Province announced funding for the transit priorities in Toronto as LRT projects in 2009, there have been frequently changing circumstances and decisions of what to actually build on those priority routes that have not only delayed the implementation of the projects (that is no transit getting built to serve riders) but also wasted money that could have been used to build transit.

The cancellation of the Scarborough Rapid Transit project, for example, and the delay of the Sheppard LRT project cost $125 million:

- **Scarborough Rapid Transit project cancellation cost $75 million.** In July 2013, the City of Toronto decided to pursue a subway option to replace existing

Scarborough rapid transit rather than the approved LRT option. At the time of the cancellation, Metrolinx had already spent about $75 million on a Scarborough LRT, including preliminary engineering costs, design costs, and management and administrative costs. The City of Toronto has agreed to reimburse Metrolinx for these costs, and this amount will be offset against the provincial contribution to the Scarborough subway project.

- **Sheppard LRT project delay cost $50 million for professional services that would need to be procured again.** As of June 2018, Metrolinx had spent $101 million of provincial funding on the Sheppard East LRT: $51 million for route-preparation and infrastructure work, including the grade separation of the Stouffville GO line from Sheppard Avenue, and $50 million on professional services such as contract administration, early design work and site surveys. While the infrastructure work would have benefits for Metrolinx even though the project is delayed, we noted that the $50 million spent on professional services has little future benefit, since the work and services will likely have to be redone and procured again once the project is ready for construction. This money was spent under the understanding that the project would be completed in 2013 as intended. However, the project experienced significant delays and is now on hold until 2023.

In 2013, Metrolinx proposed an investment strategy to the provincial government whereby there would be a steady stream of annual funding for the Province or municipalities to use to support the planning and implementation of the unfunded projects in *The Big Move*. The strategy was intended to create dedicated resources to fund transit planned projects. However, the recommended funding tools were not established, and funding for transit projects continues to be at the discretion of the governments.

RECOMMENDATION 1

To effectively fulfill its mandate to implement the transportation plan for the GTHA, we recommend that Metrolinx consider securing provincial and municipal approval for the Regional Transportation Plan and work with the provincial government to agree on long-term funding for the projects in the Plan in order to minimize the risk of project delays and cancellations.

METROLINX RESPONSE

Metrolinx accepts the recommendation.

Metrolinx worked closely with municipalities and the provincial government in the development of the *2041 Regional Transportation Plan*. Most partner municipalities have already passed resolutions confirming their endorsement of the Plan.

Long-term sustainable funding would assist in the advancement of the delivery of the regional transportation network. Metrolinx will discuss options for long-term funding with the Ministry of Transportation.

4.2 The Province and Municipal Governments, Not Metrolinx, Decided on Light Rail for Five Rapid Transit Projects

In March 2007, Toronto announced the *Toronto Transit City Light Rail Plan*, proposing seven new light rail transit (LRT) lines throughout Toronto. Three months later, in June 2007, the Ontario Government announced MoveOntario 2020, a plan to build 52 rapid transit projects in the Greater Toronto and Hamilton Area (GTHA). MoveOntario 2020 included *Transit City's* seven LRT lines and identified other rapid transit projects as LRT projects. Thus, when Metrolinx issued its first Regional Transportation Plan for the GTHA in 2008, the Toronto City government and the provincial government had already decided on the LRT option for many of the projects.

4.2.1 Metrolinx Did Not Fully Assess Whether LRT Was the Best Option for the Projects

The Toronto City government and the provincial government decided from the beginning (as part of *Transit City*) that the Toronto rapid transit projects would be LRT. In February 2010, the City, the Province and Metrolinx reached a consensus to proceed with LRTs in Toronto using provincial funding of $8.15 billion. Metrolinx proceeded with planning the projects from that point on as LRTs without analyzing whether LRT was the best option.

Metrolinx stated that it completed a high-level analysis of ridership demand for the routes that forecast that ridership would range from 2,700 to 13,700 passengers per hour going in a single direction, which exceeds the capacity for bus rapid transit (BRT). For that reason, Metrolinx's initial business cases in 2009 did not include analysis comparing BRT and LRT. We noted, however, that BRT systems implemented in other cities (for example, Ottawa, Canada; Istanbul, Turkey; New Jersey, United States; and Bogota, Colombia) handle 7,300 to 40,000 passengers per hour.

In 2014, Metrolinx conducted further analyses to update the business cases for four of the LRT projects—Finch West, Sheppard East, Hurontario and Hamilton (an update to the Eglinton Crosstown was done in 2012, and no update was done on the Scarborough RT as it had been cancelled in favour of a subway). The analyses included evaluating the BRT option for all but the Hurontario project, which Metrolinx determined had too high a long-term capacity need for BRT.

We found that, despite the fact that the draft analyses clearly showed the need to further review whether it is appropriate to proceed with the LRT option for three of the four projects, Metrolinx took no action to address the results of its analysis. It indicated that it discussed these results with the Ministry of Transportation in meetings, but it was not able to provide details of what was shared or discussed at these meetings.

For the Finch West and Sheppard East rapid transit routes, Metrolinx found that of the options analysed (BRT, LRT, subway, or elevated light metro/skytrain), "while an LRT will provide improved reliability, crowding relief and [a more comfortable experience] for riders, these benefits could be accomplished to a similar degree at less cost with BRT." The reports also stated that further analysis and investment consideration should be done for BRT along the routes, and that the existing planned LRT service might not offer significant time savings for riders, particularly those making short trips.

However, Metrolinx also noted that "the sunk costs already invested in [these] project[s] and potential reputational risks facing Metrolinx as a result of changes in investment decision-making at this stage along the [corridors] should be carefully considered." The business cases state that these updates are a "health check" on the projects' existing scope and technology, and that they are part of the due diligence appropriate for a public investment of this magnitude (about $1 billion). Metrolinx added that it could learn from the reanalysis even if it did not result in changes to the project.

Similarly, for the Hamilton LRT, its evaluation of the BRT option concluded that BRT is the highest-performing investment option under a medium land-use-intensification scenario, although LRT has greater long-term capacity, which would be the best option under a higher-intensity land-use scenario. The relative success of both LRT and BRT depends on the level of land-use intensification expected on the corridor. While the LRT option was tested against all land-use scenarios, the BRT option was tested against only the medium intensification scenario.

Given this result, Metrolinx recommended in late 2014 that an intermediate business case, considering the changing context and alternative options, be completed before an investment decision was made. However, Metrolinx did not do any further analysis before the Province committed to funding the LRT in May 2015.

The results of these analyses were discussed internally with the then CEO in late 2014. However, Metrolinx did not act on its findings to then critically assess whether it was planning and building the transit projects that would best serve the region.

RECOMMENDATION 2

To ensure that future transit projects meet needs cost effectively and that maximum value is obtained from the money spent, we recommend that Metrolinx:

- objectively evaluate evidence to recommend—and obtain provincial and municipal government support for—transit projects and options that most cost effectively address the identified transit needs of Ontarians (e.g., ridership demand); and
- undertake these analyses in a timely manner to provide the best advice to decision-makers before significant investments are made on the projects.

METROLINX RESPONSE

Metrolinx accepts the recommendation.

Metrolinx's Business Case Guidance establishes standards in evaluating evidence to ensure that future transit projects meet transportation needs cost-effectively. Financial and economic analysis in business cases tests and confirms value for money. Metrolinx will publish the complete Business Case Guidance (v1) in spring 2019.

Metrolinx's project governance process requires that progressively detailed business cases for each project are prepared and approved prior to the next stage of project development. This process was approved by the Metrolinx Board of Directors in December 2017 and was implemented in March 2018. Metrolinx will publish a supporting procedure document to clarify how decision processes are informed by business cases throughout the project lifecycle.

4.3 Metrolinx's *2041 Regional Transportation Plan* Is Lacking Action Plans

4.3.1 No Timeline for Restoring Regional Connectivity Lost Due to Reduced Project Scope

One of Metrolinx's planning goals is regional connectivity. In its Regional Transportation Plan, Metrolinx is to consider and recommend to decision-makers a network where different modes of transportation come together seamlessly. However, changes driven by provincial and city governments' decisions have resulted in a less connected network, and the plan does not have timelines for restoring lost connections.

The original vision for the LRT projects was to connect major hubs and employment centres. Two key connections were lost in February 2010, when provincial funding was fixed at $8.15 billion. The Province, Metrolinx, the City of Toronto and the TTC reached a consensus to shorten two lines:

- On the Eglinton Crosstown, the connection to Pearson International airport was removed, so the westernmost point of the route will end at Weston Road. This changed Metrolinx's initial vision of this LRT connecting the airport, one of the largest employment centres in the GTHA, to Kennedy subway station, a major connection hub.

  The City of Toronto is now leading the planning to extend the Eglinton Crosstown west to the airport and east to Malvern. Metrolinx's role is to provide support when requested by the City and co-ordinate the planning for the section outside of Toronto—for example, it will update ridership forecasts and a business case it prepared in 2016 on the extension to the airport.

- On the Finch/Sheppard LRT, the connection between the Finch West and Don Mills subway stations was removed, so the originally envisioned continuous line became two separate LRTs that do not connect with each other.

A third connection was lost when Brampton City Council voted in October 2015 against the Hurontario LRT route running through its Main Street. The Hurontario project was intended to connect the Port Credit GO station to downtown Brampton through Mississauga. The LRT will now end at Steeles Avenue without connecting to the Kitchener line at the Brampton GO station.

These changes have forced Metrolinx to implement its plan in a piecemeal manner. The *2041 Regional Transportation Plan* issued in 2018 does not have timelines to restore the connections, so it is not known when or even if these projects will reach their full potential in serving transit users.

4.3.2 No Action Plan to Deliver the Projects in the *2041 Regional Transportation Plan*

The *2041 Regional Transportation Plan* was released as an update to Metrolinx's first transportation plan from 2008. It focuses on the priorities and projects that have been carried forward from the 2008 plan and identifies other potential projects to achieve by 2041 to improve transit. While it identifies where the GTHA's transit needs are, it does not rank the needs, and it does not propose an implementation plan to address the needs.

In March 2018, after releasing the *2041 Regional Transportation Plan*, Metrolinx published the paper, *Making it Happen*. It is intended to start a conversation among stakeholders on what actions need to be taken to implement the 2041 Plan. However, this paper is limited to discussing what needs to be done, without proposing a plan for *when* specific actions should be taken.

Metrolinx informed us that it will continue to work with stakeholders to plan the implementation of the *2041 Regional Transportation Plan* by holding Regional Roundtable meetings. The meetings bring together GTHA city managers and chief administrative officers. Metrolinx will report on these meetings and other planning activities in its five-year strategic plans and annual business plans.

Metrolinx has not prioritized projects in the 2041 Plan. Metrolinx first developed a project prioritization framework in 2010 and later updated it in 2015. This framework was used to rank unfunded projects in the 2008 Plan—*The Big Move*—and provide advice to the provincial government. However, it has not been used since 2015. One reason for this is that dedicated funding for transit that Metrolinx proposed in 2013 did not come to pass. Metrolinx had proposed that the provincial government pass legislation to provide a steady stream of funding for transit (e.g., a share of the HST and tolls charged for highway use, but none of the proposed funding streams was enacted.)

Metrolinx informed us it will be updating the prioritization framework as part of the implementation of the *2041 Regional Transportation Plan*.

RECOMMENDATION 3

To have transit projects planned and built with the greatest benefit to the Greater Toronto and Hamilton Area (GTHA) as a whole, we recommend that Metrolinx:

- develop an action plan to identify and address the growing connectivity needs of the GTHA regional transportation network as a whole, given that previously envisioned connections have been lost with changes in light rail transit project plans;
- update its prioritization framework to guide the delivery of the projects identified in the *2041 Regional Transportation Plan*;
- prepare and propose a funding strategy for approval by the Province and municipal governments;
- prepare an action plan with execution timelines correlated with the funding strategy; and

- publicly report on its status in meeting its action plan.

METROLINX RESPONSE

Metrolinx accepts the recommendation.

The *2041 Regional Transportation Plan* is a blueprint for creating an integrated and layered transit network that outlines comprehensive regional connectivity.

Metrolinx is developing a prioritization framework for projects identified in the *2041 Regional Transportation Plan*. The framework will take into account connectivity needs and emphasize completing network connections. Metrolinx is developing this prioritization framework in consultation with municipalities through the Regional Roundtable, a governance body consisting of heads of each regional municipality, Metrolinx and the Province.

Upon confirmation of funding, Metrolinx will work closely with the Province of Ontario to develop an action plan and publicly report on it.

4.4 Metrolinx Needs to Better Manage Risks in the Eglinton Crosstown LRT Project

The total budget for the Eglinton Crosstown LRT is about $11.3 billion, plus a contingency fund budget of $672 million. The budget includes the cost of the AFP contract (signed in July 2015) for designing, building and financing the project and maintaining the LRT for 30 years. Additional to the AFP contract cost are costs for tunnel construction, property acquisition, light rail vehicles, and professional services (mainly consultants).

Figure 6 shows the budget breakdown and what has been spent as of September 2018.

4.4.1 Metrolinx Had Limited Remedies Available to Hold the AFP Consortium Responsible for Project Delays As Long As the Consortium Certified It Would Still Finish the Project on Time

When Metrolinx awarded the AFP consortium the AFP contract in 2015, it expected the AFP consor-

Figure 6: Eglinton LRT Project Budget and Amounts Spent as of September 2018 ($ million)

Source of data: Metrolinx

	Budget[1]	Adjustments to Budget	Revised Budget	Amount Spent
AFP construction[2]	5,544	316	5,860	2,956
AFP maintenance	3,560	–	3,560	0
Subtotal	**9,104**	**316**	**9,420**	**2,956**
Tunnel construction	710	3	713	687
Property acquisition	256	–	256	245
Light rail vehicles	388	–	388	214
Professional services[3]	652	114	766	672
Subtotal	**2,006**	**117**	**2,123**	**1,818**
Contingency[2,4]	672	(262)	410	0
Total	**11,782[5]**	**171**	**11,953**	**4,774**

1. Budget figures are from Treasury Board submission in 2013 and the AFP contract in 2015.
2. Metrolinx reallocated $316 million, which comprises $262 million out of the contingency budget to the construction budget to account for the claim settlement ($237 million) and variations under construction ($25 million) plus $54 million from another group in capital prospects.
3. Metrolinx has allocated a portion of work from another group of capital projects to the Crosstown Project and intends to use the funds of $114 million to pay for the current budget overage of $20 million in professional services.
4. The adjustment of $262 million to the construction budget for the settlement ($237 million) and variations ($25 million).
5. This total does not include nonrecoverable HST of $254 million.

tium to complete the Eglinton Crosstown LRT by September 2021. Under the AFP contract, the AFP consortium is responsible to finish the project by this date and within budget. However, the AFP contract does not provide Metrolinx with strong remedies if the AFP consortium falls behind schedule while still maintaining it will finish the project on time.

Under the AFP contract, the AFP consortium is to provide Metrolinx with a detailed six-month work schedule and update it every month. When it finds it is unable to meet the substantial completion date, it must submit a report identifying the reasons for the delay and a plan for eliminating or reducing the delay.

The AFP consortium began falling behind schedule in 2017. Metrolinx had the right under the AFP contract to ask for additional information from the AFP consortium in order to perform a detailed assessment of the work schedule if the AFP consortium indicated that project completion would be delayed or if in Metrolinx's opinion the consortium had fallen significantly behind the work schedule; however, Metrolinx did not do so because the AFP consortium represented that it could still finish on time. The AFP consortium continued to submit schedules with increasing delays throughout 2017, and Metrolinx communicated its concerns about the delays (as shown in **Figure 7**), but the AFP consortium did not adequately address them.

In December 2017, Metrolinx met with senior consortium management, at which time the AFP consortium was still certifying it would meet the contracted completion date of September 2021 and indicated that in February 2018 it would provide solutions to mitigate schedule delays. However, the AFP consortium instead filed a claim against Metrolinx in February 2018 for extension of the project completion date to October 2022. The claim also requested compensation because Metrolinx should have done more to help the AFP consortium when, for example, in its view, the City of Toronto took too long to grant it permits, and Metrolinx and TTC technical experts repeatedly rejected the AFP consortium's unacceptable designs.

RECOMMENDATION 4

To better control the risk that AFP projects are not completed on time and within budget, we recommend that Infrastructure Ontario develop tools and remedies for incorporation into AFP contracts to address early indications of project delays.

INFRASTRUCTURE ONTARIO RESPONSE

Infrastructure Ontario (IO) is committed to continuously improving our processes and tools, including incorporating lessons learned from past projects to enhance the development and delivery of future projects.

For example, IO has implemented increased schedule reporting requirements based on lessons learned during the construction of the Eglinton LRT project. These requirements give IO and its partners (Metrolinx in this case) the ability to request more insight into construction schedules and enables earlier detection of potential project delays. These requirements also increase the obligation of consortia to report their plans and strategies to mitigate the effects of potential project delays. These requirements have already been applied to the Finch West LRT project and will be incorporated into future LRT projects.

Additionally, as part of IO's vendor performance program for AFP contracts (introduced in 2017), construction contractors may be assigned infractions that impact future procurement scores if satisfactory rectification plans and schedules are not delivered in accordance with the requirements of the project agreement.

We will continue to look for additional ways to further strengthen scheduling requirements and additional schedule reporting measures, and will add such measures to the AFP contracts, where appropriate. Additional

Figure 7: Timeline of Events Around Project Delays

Source of data: Metrolinx

Date	Description of Action/Event
July 2015	• Metrolinx and Infrastructure Ontario enter into an AFP contract for an amount of $9.1 billion for the completion of the Eglinton Crosstown LRT by September 2021.
December 2016	• Metrolinx's technical advisors report to Metrolinx senior management that the AFP Consortium is falling behind schedule.
January 2017	• Metrolinx issues a letter to the AFP Consortium requesting that it address the schedule slippage and provide an updated schedule for completing the project on time in accordance with the AFP contract.
March 2017	• The AFP Consortium provides updated schedule indicating they are still on track to meet the original substantial completion date.
June 2017	• Metrolinx informs the AFP Consortium that it is not meeting the updated schedule and needs to do more to address delays.
July 2017	• The AFP Consortium provides an updated schedule that changes the project completion date by eight weeks (November 2021 instead of September 2021). • The AFP Consortium tells Metrolinx that the delays are due to factors such as the City of Toronto taking too long to approve permits, issues with the Canadian Pacific/Metrolinx Agreement, and design changes requested by Toronto Hydro and telecommunication companies.
September 2017	• Metrolinx's technical advisors recommend a detailed review of the AFP Consortium's reasons for the delays and what can be done about them.
October 2017	• Metrolinx issues a letter to the AFP Consortium to correct schedule deficiencies on the critical path of the project.
November 2017	• Metrolinx's technical advisors formally communicate to Metrolinx's senior management that the AFP consortium has failed to provide complete, fully co-ordinated and timely design submissions.
December 2017	• Metrolinx sends another letter to the AFP Consortium requesting that it address delay concerns and requesting a meeting with the AFP Consortium senior management staff. • At the meeting held December 15, 2017, the AFP Consortium agrees that there are schedule concerns and that they will be addressed in the next update to the schedule, to be provided in February 2018.
February 2018	• The AFP Consortium provides an updated schedule that changes the completion date by a year (October 2022 instead of September 2021). • The AFP Consortium files a notice-of-delay event against Metrolinx as allowed under the terms of the AFP agreement. It requests a one-year extension of the schedule and compensation, alleging that Metrolinx has not met its obligations and not exerted enough effort to facilitate the processes for approving designs (especially the TTC's design approval) and obtaining city permits.
March 2018	• Metrolinx refutes the AFP Consortium's claims and requests that it comply with the AFP agreement by specifying the reasons for the delay, provide a recovery plan and updated its work schedules to eliminate or reduce the delay.
July 2018	• The AFP Consortium files a notice of action in the Ontario Superior Court of Justice requesting compensation for increased costs, damages and expenses; and a one-year extension to complete the project.
August 2018	• Metrolinx's technical advisors reiterate the concerns it noted to Metrolinx in their November 2017 communication and state that if these issues are not resolved, the finished Eglinton Crosstown LRT may not be fully compliant with the requirements of the AFP contract. • Metrolinx applies to the court to stay any claim by the AFP Consortium concerning delays until the project is substantially completed. • Metrolinx and the AFP Consortium settle the claim for $237 million plus other concessions described in **Section 4.4.2**.

requirements may include cost performance index reporting and resource loaded schedules to be included as appropriate, providing IO and Metrolinx with the ability to predict with greater certainty areas of potential future delay before a consortium files a claim.

4.4.2 Settlement to Hold the AFP Consortium to the Contracted Completion Date Cost Metrolinx $237 Million

In an AFP project, a private-sector consortium is paid a premium to bear the majority of the risks of project delays and cost overruns. Under the Eglinton Crosstown LRT AFP contract, the responsibility for some risks was not fully transferred to the AFP consortium, and Metrolinx eventually settled the claim against it based on its analysis of the risk allotment in the contract.

Metrolinx initially refuted the claim, noting that the AFP consortium failed to explain and provide support for the specific events or circumstances that might give it the right to request compensation for delay costs. Metrolinx also noted that, despite the delays the AFP consortium was experiencing, the AFP consortium was still certifying up until December 2017 that it would meet the contracted completion date of September 2021, despite a schedule slippage of about 13 weeks noted by Metrolinx.

In August 2018, Metrolinx settled the claim for $237 million, using a portion of the project contingency fund (which is included in the Treasury Board approval of about $12 billion for this project). In addition, Metrolinx agreed to accept later delivery dates for the pedestrian bridges adjacent to the existing West Don River Bridge and a Salvation Army building. Of the $237 million, $100 million was classified as incentive and acceleration compensation subject to clawback if the AFP consortium does not achieve substantial completion on or before September 29, 2021. In return, the AFP consortium committed to a clean slate for all claims known or ought to be known at the time of the settlement. Although this is supposed to protect Metrolinx from existing and future claims during construction, we will not be able to determine if this provision is kept until construction is completed.

As part of the government's decision to use the AFP approach on this project, Metrolinx, in conjunction with Infrastructure Ontario, completed a value-for-money (VFM) assessment that detailed the many risks (such as contamination and permit delays) the project could encounter. In its agreement with the AFP consortium, it retained responsibility for some, but not all, of these risks. At the time that the VFM assessment was performed (before the contract was signed), Metrolinx and Infrastructure Ontario determined that Metrolinx was retaining about $563 million of risks. When we reviewed this assessment in light of the claim, we determined, with input from Infrastructure Ontario, that approximately $66 million of those risks could relate to factors identified in the claim prior to the awarding of the contract. We confirmed the $66 million with Infrastructure Ontario. However, the settlement amount exceeded this amount.

In the claim, the AFP consortium identified areas where delays had occurred, holding Metrolinx responsible for them. However, the claim did not include support for the AFP consortium's position that Metrolinx was responsible for the delays. For example, for delays relating to design submissions, it did not provide evidence of how it had been ensuring that it was meeting TTC design standards. Also, Metrolinx noted that the AFP consortium had not followed appropriate procedures in case of delays, such as submitting information about each individual delay event as it occurred, to allow Metrolinx to investigate any problems associated with delays, monitor the AFP consortium's progress and take action where appropriate. Metrolinx agreed to a settlement amount that it determined to be a portion of estimated total risk exposure but did not ask the AFP consortium for documentation to support the claim amount.

We reviewed the settlement negotiation process and confirmed that Metrolinx and Infrastructure Ontario used a risk register, based on their analysis of the AFP contract, to estimate a settlement amount. We noted that Metrolinx did not have sufficient documentation of evidence linking the settlement amount to where it had determined that the delays were of its own making.

As noted earlier, it is understood that under an AFP contract, a private-sector contractor (the AFP consortium in this case) is responsible for managing the majority of the risks associated with delivering a project on time and on budget. By agreeing to settle the claim using a portion of its project contingency fund, Metrolinx accepted shared responsibility for the Eglinton Crosstown being completed on time and on budget.

RECOMMENDATION 5

To hold the AFP consortium to the requirements of the AFP contract that the Eglinton Crosstown Light Rail Transit project be completed on time and on budget, we recommend that Metrolinx:

- take prompt action as soon as it becomes aware of delays and hold the AFP consortium accountable for the contract requirement to submit action plans to eliminate or reduce delays;
- properly validate all future claims and only pay for costs that have been found to be its responsibility;
- in future instances where a claim is filed against it:
  - document its analysis linking the allegations in the claim to what actually happened and obtain evidence to support the claim, before entering into negotiations with the claimant; and
  - document the analysis and support associated with all aspects of the settlement arrived at.

METROLINX RESPONSE

Metrolinx accepts the recommendation.

In making use of the AFP model for the Eglinton Crosstown LRT, Metrolinx is provided with a different set of tools to drive contractor accountability than would be the case on a traditionally delivered construction contract. If the AFP consortium fails to deliver a project that is independently certified as compliant by the substantial completion date, it faces significant financial consequences, including the withholding of a substantial completion payment valued in the hundreds of millions of dollars. In exchange for assuming those risks, the consortium is afforded significant latitude to use means and methods of its choosing to complete the project by that date, including discretion to make and modify its own detailed work schedule, which may include slippage of some tasks and acceleration of others. With full awareness of these terms, the consortium provided a fixed substantial completion date of September 29, 2021.

Metrolinx will continue to hold the AFP consortium accountable for delay events. Further, Metrolinx will work with Infrastructure Ontario on future procurements to review specific contractual terms to strengthen the remedies available in the case of delays, claims and disputes.

The settlement with the consortium mitigates the risk of future claims. Should further claims be submitted, Metrolinx will ensure the claim review process linking the allegations to the details observed on the ground is thoroughly documented.

RECOMMENDATION 6

To provide for clarity and a shared mutual understanding of risk responsibility between public-sector and private-sector parties to AFP contracts, we recommend that Infrastructure

Ontario ensure AFP contracts are drafted reflecting the maximum feasible transfer of risk to the private sector established in the initial value-for-money assessment justifying the use of AFP for the project.

INFRASTRUCTURE ONTARIO RESPONSE

Infrastructure Ontario (IO) consistently reviews the drafting of its contracts, including AFP contracts, to ensure that the allocation of risks in the contract maximize value for money and that the risks are clearly apportioned to the party best suited to manage them. As an example, since the signing of the Eglinton LRT project agreement, IO has made drafting clarifications to the LRT template Project Agreement to better articulate the financial risks associated with site contamination and unknown or mislocated utilities.

The review process for IO contract drafting balances commercial feedback and lessons learned from projects with industry-standard risk assessments so that risks are shared or borne by the party best able to manage the risk, as appropriate.

IO will continue to look for additional ways to manage and mitigate the risks retained by the public sector.

4.4.3 Metrolinx Not Dealing Effectively with Delays and Risks Resulting from Poor Designs and Hasty Construction

As noted in **Figure 5**, Metrolinx and Infrastructure Ontario staff, together with its program management consultants and technical advisors, and other entities (the TTC, the City of Toronto and utility companies) review designs submitted to them by the AFP consortium for compliance with specifications. Metrolinx's technical advisors also provide technical expertise, observe and audit the AFP consortium's construction activities and produce monthly reports highlighting project risk areas. In addition, Metrolinx staff produce a separate monthly report highlighting progress, compliance and project risk areas.

Metrolinx staff and the technical advisors have noted in their reports that in many instances, the AFP consortium has failed to provide complete, fully co-ordinated or timely design submissions. The technical advisors formally communicated these concerns to Metrolinx in November 2017 and again in August 2018. The technical advisors observed that if these issues are not resolved, the Eglinton Crosstown LRT may not be found at the end of scheduled construction to be fully compliant with the requirements in the AFP contract and/or may not function properly. If elements of the project are found to be non-compliant, there is a risk that reworking will be necessary or that Metrolinx and the AFP consortium will have to negotiate a settlement to resolve the situation before substantial completion can be certified.

Metrolinx has limited contractual tools to hold the AFP consortium accountable to submit complete and fully co-ordinated designs. The extent of Metrolinx's involvement in addressing issues noted from design reviews was to hold discussions with the AFP consortium, track the issues, or request re-submissions. Metrolinx may address process deficiencies such as delays or incomplete documentation in the re-submissions of designs by issuing a non-conformance report.

These are reports that specify how the AFP consortium is not meeting requirements. Under the AFP contract, Metrolinx may also deduct fines from its payments to the AFP consortium if it identifies repeat instances where the AFP consortium is not meeting requirements (a failure that the AFP consortium self-reports is not eligible for payment deduction). Metrolinx informed us that, by April 2018, it had issued only one non-conformance report because of design issues and had not deducted any fines.

Issues noted from the review of the designs submitted by the AFP consortium include:

- **Incomplete designs missing technical details submitted for review.** We found that as of September 2018, of the 2,655 designs submitted, 1,663 (63%) had issues requiring the AFP consortium to either resubmit (for 254, or 10%, of the designs) or provide more information showing how it is addressing a noted problem (for the remaining 1,409, or 53%, of the designs). For example, missing details and deficiencies in the designs include system elements, such as signalling and fire detection equipment in the tunnels. The technical advisors noted that if the designs do not embed these elements properly, the elements may end up mounted on surfaces. This is not what the AFP contract requires, is not the ideal placement and can cause delays if additional work is required to, for instance, remove finished construction to embed the elements properly. As of September 2018, Metrolinx had not accepted the AFP consortium's designs in this case.
- **Designs not submitted in logical sequence or too fragmented.** In order to expedite construction on the project, the AFP consortium has submitted partial designs to Metrolinx for review. However, the technical advisors have noted that the submissions are sometimes provided in an illogical sequence or are too fragmented. This has necessitated inefficient extra reviews, which are undertaken without all required information provided. For example, the AFP consortium has submitted some station designs before submitted designs for excavation and shoring work (work to temporarily support or prop up structures in danger of collapse during construction), which precedes station construction. The AFP consortium has also submitted station designs before providing a complete hazard log, so the technical advisors cannot evaluate if the station designs are safe and control the risk of hazards.

  In addition, the TTC requires designs to be compliant and approved by it for all construction within 60 metres of TTC property. From the TTC's understanding in relation to the interchange stations (Kennedy, Cedarvale and Eglinton), the AFP consortium was to submit about 15 design packages. However, the AFP consortium has submitted over 60 initial designs for Kennedy station, 50 for Cedarvale and 70 for Eglinton, and has had to resubmit over 100 designs for Kennedy, 50 for Cedarvale and 100 for Eglinton. These resubmissions of designs for further review contributed to project delays and increased costs. For example, the AFP consortium submitted partial designs for water main, fire and sanitary work for Cedarvale Station and proceeded to install the elements needed for these parts of the station. However, the designs for these parts did not fit with the overall station design for utilities and mechanical services. As a result, the overall design needs to add redundant backflow preventers (devices to limit water flow from affecting equipment) that the AFP consortium did not initially plan for. The overall design also conflicted with the TTC's plans for installing its own maintenance equipment. The AFP consortium has resubmitted the overall design six times but, as of September 2018, the TTC had not approved it because it still was not meeting TTC requirements.
- **Commencing construction before completion of design review.** Metrolinx's technical advisors noted that commencing construction prior to design review creates the possibility of non-compliant construction, which may not accommodate the required functionality or meet the commitments in the AFP contract. Examples where the AFP consortium had started construction prior to completion of design review include construction of station-enabling works in advance of completion of station design and construction of the

maintenance and storage facility handover platform in advance of demonstration the design is viable and acceptable to the operator (i.e., TTC). In both cases, construction proceeded before Metrolinx's final design review. In response to this, Metrolinx is working with its technical advisors to identify and understand the risks associated with the AFP consortium choosing to proceed with construction prior to completion of the review of the final designs.

RECOMMENDATION 7

To rectify the design submission and content problems being experienced so that there are no undue delays in the future and to ensure that the Eglinton Crosstown Light Rail project is built according to agreed-upon requirements, we recommend that Metrolinx work with the AFP consortium to:

- promptly resolve issues identified by Metrolinx's technical advisors and the TTC regarding designs that do not meet project requirements and specifications; and
- minimize the number of partial designs submitted to facilitate design review and approval by Metrolinx's technical advisors and the TTC.

METROLINX RESPONSE

Metrolinx accepts the recommendation.

Metrolinx will continue to work with the AFP consortium to bring to its attention issues identified by our project team. Metrolinx will make clear that those issues must be addressed as part of the process for the AFP consortium delivering a project which is compliant with project requirements and certified as such by the Independent Certifier.

As permitted by the project agreement, Metrolinx will continue to encourage the AFP consortium to submit its designs in a size and sequence that optimizes the design process and conserves the resources of all parties. In the particular case of construction in close proximity to TTC assets, Metrolinx will continue to enforce the specific design review and approval provisions that were included in the AFP contract.

4.4.4 Metrolinx Underestimated Costs of Additional Bus Services

The Eglinton LRT project has caused and will continue to cause TTC service disruptions; Metrolinx agreed to pay the TTC the additional operating costs incurred by the TTC because of those disruptions, as provided for in the project budget. These additional costs are for the TTC to run buses on alternative routes while the LRT is being built.

Metrolinx did not consult the TTC when it initially budgeted these costs at $19 million in December 2014. This initial budget has been fully used up. In August 2016, Metrolinx asked the TTC to provide an estimate for the remainder of the project. The TTC projected costs of $72.5 million.

In October 2016, the TTC sent Metrolinx a letter explaining the cost estimate and breaking down costs by year from 2017 to 2021. In December 2016, the TTC provided Metrolinx a detailed report highlighting additional service requirements in all areas affected by the LRT construction.

RECOMMENDATION 8

To support accurate and transparent budgeting of costs on all transit projects, we recommend that Metrolinx continually consult with relevant stakeholders on cost estimates as part of the budget-setting and cost-monitoring processes.

METROLINX RESPONSE

Metrolinx accepts the recommendation.

Metrolinx works with local transit partners to ensure impacts are proportionately mitigated. While the TTC's chosen option in this circumstance was the augmentation of its bus operations to sustain existing service levels, here or elsewhere, other options with varying costs, benefits, customer impacts and feasibility merit consideration.

In order to address this recommendation, Metrolinx will develop a policy addressing the issue of disruptions to municipal transit service providers to provide itself and stakeholders with greater certainty on this issue.

4.5 Metrolinx's Use of Consultants for Program Management Services Is Not Cost-Effective

Since 2010, Metrolinx has signed three major contracts with one firm to provide program management services for the LRT and other major projects. **Figure 8** summarizes the contracts. The total value of the contracts is $272 million.

Figure 9 specifies the services the firm is providing under the three contracts and the amounts charged for those services as of June 2018.

4.5.1 Metrolinx Cannot Support the Contract Amounts with an Assessment of Expected Work and What that Work Should Cost

Metrolinx first contracted with the firm through a competitive procurement in 2010. As shown in **Figure 8**, the contract was for the firm to oversee the implementation and management of the Eglinton Crosstown, Finch West, Sheppard East and Scarborough LRT projects, as well as a bus rapid transit (BRT) project in York Region.

We noted that Metrolinx procured the consulting firm to provide program management services for the LRT projects without adequately detailed documentation to demonstrate that it had assessed the extent of the required services against the level and type of resources required to deliver the projects. The procurement was done and the initial contract value was determined under the direction of the then Vice President of Project Implementation, based on his past experience of transit projects in the United States. This was a task-based contract with an upper limit of $44 million; that is, it was understood that the contract was based on reimbursement for actual work requested by Metrolinx and performed by the consultant to the satisfaction

Figure 8: Three Contracts with One Firm for Program Management Services

Source of data: Metrolinx

	Contract #1	Contract #2	Contract #3	Total
Projects covered	• Eglinton Crosstown LRT • Finch West LRT • Sheppard East LRT • Scarborough Rapid Transit • York Viva BRT	• Hurontario LRT • Hamilton LRT • GO Bus Infrastructure Program	• Electrification projects for the GO Transit corridors under the Regional Express Rail initiative	
Contract term	2010–2022	2016–2020*	2015–2020*	
Contract value ($ million)	127	40	105	**272**
Contract value spent as of June 2018 ($ million)	103 (81%)	24 (59%)	73 (70%)	**200 (74%)**

* Metrolinx has the option to extend the contract until 2025.

of Metrolinx. Metrolinx made no guarantee or commitment to any minimum or maximum amount of work it would assign the consultant under the contract. The initial contract period was for five years, with an option to extend it for another five years, with the $44-million upper limit covering services only in the first five years.

However, by June 2014, Metrolinx was on track to spend all of the $44-million value of the contract. As noted in **Figure 8**, the contract was intended to cover consultant services for five major transit projects, but only two had commenced (the Eglinton Crosstown LRT was in procurement and the York Viva BRT was in construction, being managed by

Figure 9: Services Provided and Amounts Charged under the Three Contracts

Source of data: Metrolinx

Major Service Area	Description	Examples of Positions	Amounts Charged as of June 2018 ($ million)
Program Management and Controls	• Assist in the development and execution of the scope, schedule and budget of the projects, including risk management, cost estimates, scheduling and system administration.	• Senior schedulers • Senior estimators • Document controllers	102
Program Management Group Support	• Report project activities and financials, and ensure consistent reporting. • Produce or update project and program management documentation, such as implementation plans, processes and procedures.	• Program managers • Interface manager • Governance specialist	35
Compliance	• Ensure that compliance and safety are in line with municipal, provincial and federal regulations and ensure that agreements are updated and upheld.	• Technical compliance support—Quality co-ordinators • Deputy compliance managers • Safety assurance co-ordinators	16
Contract Administration Oversight	• Administer the Metrolinx electronic document management system and ongoing document controls to support Metrolinx and stakeholders, and provide document management oversight to Metrolinx.	• Document controllers • Senior contract administrators • Claims manager	16
Light Rail Vehicle Program Management Services and Dispute Resolution	• Support the procurement of the Bombardier and Alstom light rail vehicles and the dispute-resolution process.	• Transit vehicle engineers • Vehicle and systems manager • Assistant systems managers	8
P3/AFP Procurement Support	• Provide advice and support with the development of AFP project agreements, and ensure they align properly with other agreements.	• P3/AFP specialists • P3/AFP co-ordinators • P3/AFP lead	6
Other	• Program management services for the Union–Pearson Express. • Additional document control functions. • Advisory services for procuring an operator for the Regional Express Rail initiative.		17
Total			**200**

the York Region Rapid Transit Corporation). The Finch West and Sheppard East LRTs had not started procurement, and Scarborough Rapid Transit had been cancelled. Metrolinx explained that it spent the originally contracted amount faster than anticipated because of extra costs incurred when the TTC withdrew from the day-to-day management of the LRT projects in mid-2012. When we tried to confirm the nature and reasonableness of those extra costs, Metrolinx could not provide us with detailed evidence to show us what was done to justify paying the extra costs.

In 2014, the contract was extended, and $75 million was added to its upper limit to cover costs for this extension. The upper limit was increased again in 2017 by another $8 million to cover additional light rail vehicle–related work. Overall, the contract value almost tripled, with the two amendments adding $83 million to the original $44 million, and the contract was extended to 2022. Metrolinx did not re-tender for these extensions competitively as it valued vendor continuity and believed that at this point, introducing a potentially new consulting firm would cause delays. However, as noted earlier, only two projects were past the planning stage—this would have been an appropriate time for Metrolinx to assess the remaining work needed to be done and consider alternatives to having consultants do all of it. That is, it could have analyzed whether a mix of in-house staff, contracted temporary staff and/or consultants might be able to do the work better, faster or more cost effectively. Metrolinx indicated to us that it has assessed workforce planning to determine the configuration of in-house and consultant resources, but it was unable to clearly show how this work led to an amount of $75 million for the extension.

Similarly, for the two other contracts awarded to the same firm, identified in **Figure 8** as Contract #2 and Contract #3, valued at $145 million, to provide program management services on other capital projects, Metrolinx had not assessed in detail the extent of work that would be required and its cost. A little more than two years into the contracts, Metrolinx has spent more than half of the contract values, as noted in **Figure 8**. Based on the past spending trend for program management services, costs will likely exceed the current contract values, requiring amendments to increase the contract amounts and additional funds in the coming years for the projects to be completed.

RECOMMENDATION 9

To ensure that value for money is obtained from contracted services, we recommend that Metrolinx:

- evaluate if its current use of consultants in their current capacities is justified and adjust where appropriate to reduce the dependency on one consulting firm;
- establish the scope of work and budget before procuring consultants and use this to assess proposals from bidders;
- conduct a request-for-proposal process to procure defined program management services; and
- before extending contracts, evaluate and document whether it would be more appropriate to retender.

METROLINX RESPONSE

Metrolinx accepts the recommendation.

Metrolinx will evaluate how to use program management and engineering firms (including a variety of subconsultants) to fulfill the Owner's Engineer roles that are essential to the effective delivery of capital programs. The breadth of international expertise necessary to implement these large and complex capital programs is extensive, and program success requires the highly specialized knowledge of engineers and other technical experts. Metrolinx will routinely assess the optimal distribution of responsibility between in-house and contracted resources. Over the past few months, Metrolinx has been evaluating the use of its current consultant firm in its current capacities across all three contracts, all of which were competitively awarded between 2010 and 2016. This assessment will recommend a mix of in-house staff, contracted temporary staff and/or consultants that can optimally execute the capital program.

As part of this evaluation, Metrolinx will determine its future strategy for the program management services contracts, including consideration of whether to extend them. Metrolinx agrees to evaluate and document whether it would be more appropriate to retender. All contracts will have a clearly established scope of work and budget associated with them and will use this to assess proposals from future bidders.

4.5.2 Better Value for Money May be Achieved with More Competitive Bidding for Consulting Services

Under the contracts, the firm may subcontract other firms to do work on its behalf. For Contracts #2 and #3, the firm did identify subconsultants as part of its bid team. The firm has subcontracted $59 million worth of work, representing 30% of the total payments under the three contracts in the last seven years.

While the use of subconsultants is common practice in the industry, in cases where Metrolinx requests their services, it should be mindful of its procurement policy, which requires competitive procurement for services valued at over $100,000. Such competitive procurement creates the potential for Metrolinx to obtain the services at a lower cost and gives opportunities to other qualified vendors; however, we recognize that it is also necessary to ensure that newly competitively procured vendors achieve a good fit with the main consultant. We noted that in some cases, Metrolinx specifically requested the firm to engage subconsultants and has used a number of them regularly year over year. In these cases, Metrolinx could not provide documentation showing why competitive procurement was not considered. With its extensive use of subconsultants, Metrolinx may not be following the spirit of its procurement policy, whereby competitive bidding is required to allow other qualified consulting firms the opportunity to bid for them and increase the likelihood of procuring them at a lower cost.

For example:

- Between October 2015 and June 2018, Metrolinx paid about $7.9 million for one subconsultant firm to provide a range of services, including to advise on the functionality and skills required for a library of engineering and technical design data; develop procedures for schedule management, quality management, document control and other contract management functions; and support the alternative financing and procurement process for the projects.
- Between August 2013 and June 2018, Metrolinx paid about $7.4 million for another subconsultant firm to provide advice on areas such as engineering and design proposals, project cost estimates and risk mitigation. This subconsultant was initially brought on for work over a nine-month period at a cost of $50,000. However, this firm continued to be used under the three contracts.
- Between October 2014 and June 2018, Metrolinx paid about $21 million for another subconsultant firm to support contract administration, reporting and scheduling for the LRT projects. Metrolinx specifically requested that this subconsultant firm be added to the main consulting firm's contract. Metrolinx noted that this subconsultant was to be included in the main consulting firm's annual work plan because a separate contract that Metrolinx had with the subconsultant was about to expire. Metrolinx indicated to us that it believed the services could be provided more effectively if this firm was

procured as a subconsultant rather than if it continued under a separate contract directly with Metrolinx. However, given that this firm was already working closely with Metrolinx, there may not have been a need for this firm to become a subconsultant to the main firm.

The main consultant also charges Metrolinx a markup of 2.5% of the subconsultants' charges for it to administer subconsultant agreements. Metrolinx noted that the use of markup rates is in accordance with industry standards. Given the frequency with which the subconsultants were used and the amounts spent on some of them, it could have been more cost-effective for Metrolinx to have competitively procured these services itself than contracting for them in the way it did. As of June 2018, Metrolinx had paid the main consultant around $1.4 million in markup charges.

In addition, we noted that Metrolinx has assigned work to consultants through the contracts that does not relate to the projects specified in the contracts. This work should have been procured separately. For example:

- From 2011 to 2013, Metrolinx spent about $1.2 million on interim program management services for the Union Pearson Express, an unrelated project, while procurement was under way for a permanent program management consultant.
- In February 2018, Metrolinx spent about $367,000 for a subcontracted consultant's advice on reorganizing the group within Metrolinx that manages capital projects.

RECOMMENDATION 10

To ensure cost-effective planning for, and acquisition and management of, consulting services, we recommend that Metrolinx:

- thoroughly assess the nature of the work requirements under these contracts to determine whether a separate procurement, as per its policy, is warranted;
- review the rates of subconsultants to ensure they are reasonable; and
- document its review and approval that payments are only being made for work completed within the scope of the contract.

METROLINX RESPONSE

Metrolinx accepts these recommendations.

Subconsultants are always used on Metrolinx's major capital projects and are typically contracted by the main consultant to provide a wide range of technical skills and specialized knowledge.

Metrolinx will assess and review the extent and nature of consulting services required to determine the right resource to perform the work. Metrolinx will ensure that work requests are within the scope of the main contract and are appropriately procured (that is, assigned to subconsultants under the main contract or competitively procured, as appropriate).

In cases where subconsultants are used, Metrolinx will review the rates to ensure they are reasonable.

Metrolinx recently enhanced its invoice review practices for the program management services contracts, assigning invoice and timesheet review to staff directly responsible for the consultants' work. Metrolinx will ensure that all invoiced amounts relate only to work defined within the main contracts.

4.5.3 Payments Made and Work Requested through the Contracts Do Not Adhere to Best Practices

Under the contracts, the firm and Metrolinx are required to agree to an annual work plan each year, before proceeding with any work. Metrolinx can also request the firm to do work above and beyond the work plan. As noted in **Section 4.5.2**, this has led to the contracts paying for goods and services not related to the contracts. In this section, we note areas where best practices are not being followed in Metrolinx's work-requests process. For example:

- **Work not approved before it begins.** In a number of instances, we noted that Metrolinx issued requests for subconsultants to do work they had already started or even completed. For example, Metrolinx revised a work request on September 14, 2017, for work the subconsultant did between April 1, 2017, and September 30, 2017. In another example, Metrolinx issued a work request on December 17, 2015, for work the subconsultant did between August 2015 and October 2015.
- **Work requests vague on deliverables.** Metrolinx does not always specify the scope of and rationale for work in its work requests. The work request can be as vague as to provide the support services required in a particular area. The work done can range from attending meetings to providing input on different topics as requested by Metrolinx. In cases where Metrolinx brings a subconsultant on board to advise, there are no physical deliverables. Tracking the work done can occur only by tracking the time the subconsultant spends on key deliverables and assessing the subconsultant's performance. However, as discussed in **Section 4.5.5**, Metrolinx has not done this adequately.
- **No approval limits for spending through the contracts until December 2017.** Metrolinx has a policy that defines the approval limits for signing new contracts, but until December 2017 it did not have a policy on the limits for authorizing spending under contracts once they were approved. Under Metrolinx's policy for new contracts, a director, for example, could approve a new contract only if it was worth less than $250,000, but the same director could authorize spending for work requests under an existing approved contract for any amount. So, for example, under the consulting contracts, a director in 2011 approved a work request to purchase a cost management tool for almost $750,000; a director in 2016 approved contract administration work for $1.2 million and lead project accountant support for $1.1 million; and a director in 2017 approved a work request to develop work procedures for Regional Express Rail electrification projects for $595,000. In December 2017, changes were made to the new-contract-signing policy whereby individuals less senior than the Chief Capital Officer are held to the same maximum-dollar limits in approving work under existing contracts as they must follow in signing new contracts.

RECOMMENDATION 11

To improve accountability for payments made and work requested under the contracts, we recommend that Metrolinx establish rigorous and disciplined processes that:

- explicitly detail all deliverables for work requests before the requests are formally approved;
- require formal approval of work requests be documented before any work begins; and
- monitor compliance with the new policy on approval limits for spending.

METROLINX RESPONSE

Metrolinx accepts the recommendations.

Metrolinx implemented a new policy on work releases under approved contracts in 2017. Metrolinx will monitor compliance with this policy. Metrolinx is also implementing more rigorous processes for work requests that are aligned with the new time sheet review processes that will address this recommendation.

The program management services provider and its subconsultants form an integrated team with Metrolinx and Infrastructure Ontario staff and as such some of the work requests will be generalized and not include explicitly-detailed deliverables. For these instances, Metrolinx will develop guidelines for its staff on the required level of detail in work requests and monitor compliance.

4.5.4 Annual Work Plans Did Not Include Required Information

Under the three consulting contracts described in **Figure 8**, Metrolinx listed tasks for the consultant to perform, and the consultant uses that list to provide Metrolinx with a detailed annual work plan. It is to include at least: a description of the services or work to be performed; an itemized quote for the performance of the task, including the estimated hours for each Project Team Position to perform the required services or work; a schedule identifying key milestones and deliverables; any requirement for specialized services or subconsultants; and any other information Metrolinx may require. The annual work plan represents the scope of work for the year.

However, we noted that only the first annual work plan for the original contract, from August 10, 2010, to March 31, 2011, had these details. The subsequent annual work plans did not. Rather, they described tasks to be completed with no breakdown of the budgeted hours and costs per person, and no start and end dates.

Metrolinx Did Not Adequately Review the Reasonableness of Charges on Consultant Invoices

The contracts require the consultant to submit invoices and a progress report on the annual work plan every month. Until 2012, when the LRT projects transitioned from the TTC to Metrolinx and ramped up in effort and intensity, the monthly invoices included timesheets. Metrolinx stopped requiring this level of detail except if specifically requested. Its rationale was that Metrolinx staff would be supervising the consultants' work continuously, so a summary of the consultant's hours and staff submitted with the invoices would be sufficient to replace the timesheets.

However, we found that the contract administrators reviewing the monthly invoices for payment were not directly responsible for overseeing the consultant's work. The person consultants directly report to does not review if the consultant has done the work satisfactorily and that the hours charged for the work are reasonable.

Contract administrators' review of invoices is limited and mainly checks for compliance with contract terms and that the amounts are within the approved budgets.

There is an audit provision in the contract under which Metrolinx can ask for records including timekeeping data and associated documents, but Metrolinx has never exercised this right.

Our review of the monthly progress reports found only a high-level description of tasks performed (for example, providing support; starting discussions to improve reports and oversight; participation in meetings; and involvement in developing and finalizing documents). They do not specify resources used on the tasks or when each task is expected to be completed.

During our audit, Metrolinx improved its review of invoices. Starting with the June 2018 invoice, the Metrolinx personnel directly overseeing the consultant's work review and approve invoices for payment.

RECOMMENDATION 12

To provide for effective oversight of the work done by consultants, we recommend that:

- Metrolinx enforce the requirement that annual work plans contain complete details on time estimates, key milestones and deliverables; and
- Metrolinx staff directly overseeing the work of consultants verify invoices against the specific

requirements of the detailed annual work plans and assess the reasonableness of the hours charged before payments are approved.

METROLINX RESPONSE

Metrolinx accepts the recommendation.

Metrolinx will reconfirm with the consultant firm its expectation that annual work plans and terms of reference contain sufficient detail on the time of performance, milestones and deliverables, if any, and are consistent with the strategic objectives and the Metrolinx-approved Annual Capital Plan.

A recent reorganization of Metrolinx's Capital Projects group has distributed employees of the consultant firm such that multiple Metrolinx managers are responsible for day-to-day oversight of their performance. Metrolinx implemented a revised process of invoice review beginning with the June 2018 invoice.

For those annual work plans or terms of reference that include a deliverable in addition to services, Metrolinx staff directly overseeing the consultant will verify invoices against the specific requirements of the detailed annual work plan or work request and will assure that the hours charged are reasonable before payment is approved.

4.5.5 Metrolinx Has Not Addressed Consultant's Underperformance in a Timely Manner

Metrolinx did not formally assess the quality of services provided by the consulting firm before increasing the first contract's value and time period, and awarding it two other large contracts. The first increase in the initial contract was in 2014 for $75 million and the second increase was in 2017 for another $8 million.

Without timely evaluation of the quality of services provided by the consulting firm, Metrolinx cannot know if the consulting firm is meeting Metrolinx's requirements. For example, one of the first requirements under the initial contract was for the consultant to develop and maintain a comprehensive program cost-reporting system and a program Master Schedule using designated software. Between 2010 and 2014, Metrolinx spent about $1 million through the contract to procure and implement project management tools that track costs and schedules, and manage risks. However, it could not be demonstrated that the consultants had done the work to ensure the tools fully meet Metrolinx's needs, and no formal evaluations of the consulting firm were being conducted by Metrolinx.

In the absence of conducting formal evaluations itself, Metrolinx spent about $67,000 through another contract in December 2017 (Contract #3 in **Figure 8**) to have a subconsultant firm assess the tools and identify needs not being met. Its assessment found that the tools were not consistently used across all capital projects; there was no clear linkage to the data sources to support data for the tools; the tools lacked a system for conducting safety and quality management activities; much of the data needed to be manually prepared for reporting, increasing the risk of inaccurate data; and project managers were not accountable for the data included in the project reports.

Around this same time (fall 2017), a member of Metrolinx senior management observed that the consulting firm was "underperforming for Metrolinx, a situation which we are aggressively addressing." Metrolinx told us it worked with the consulting firm to implement several changes in the months following that observation, and that they substantially resolved those concerns. They included reorganizing the program team, changing how the consulting firm delivers services and reports to Metrolinx; requiring the consultant to develop a monthly Capital Delivery report; and selective changes and additions to consultant personnel.

In 2015, Metrolinx introduced formal Vendor Performance Review provisions. The first formal evaluation of the consulting firm under these provisions took place in mid-2018. While Metrolinx gave the consulting firm a "good" rating in the evaluation, it did note that many areas lacked required leadership; focus had been placed on meeting reporting requirements to senior management rather than supporting the delivery teams; and co-ordination between areas was sometimes lacking.

RECOMMENDATION 13

To help Metrolinx hold its consulting firms accountable for high-quality services delivered in a timely manner, we recommend that Metrolinx develop and include in all its contracts provisions to address and mitigate, in a timely manner, issues arising from poor performance of contractors.

METROLINX RESPONSE

Metrolinx accepts the recommendation.

Metrolinx will review the contracts from program management services and will consider whether any additional provisions are required or necessary to address poor performance of contractors.

4.6 Metrolinx Procured Vehicles Early, without Fully Addressing the Risk that Plans Could Change

In August 2009, Metrolinx commissioned a study to help it decide whether to purchase vehicles under an existing TTC contract with Bombardier or initiate a new procurement for vehicles to support the implementation of the four LRT projects in Toronto: Sheppard East LRT, Finch West LRT, Scarborough RT and Eglinton Crosstown LRT. The study, completed in October 2009, identified several uncertainties about the projects that had already caused delays, and the delays could continue. The uncertainties included:

- not yet knowing whether all of the vehicles would be 100% "low-floor" (with no stairsteps between the entrance and the cabin);
- what would be the best diameter size of tunnels;
- the specifics of the technology to be used; and
- how to work through the engineering challenges of LRT lines crossing GO train lines, TTC subway lines and TTC bus lines.

Until these issues were resolved, schedules were uncertain and subject to change. (As of September 2009, the schedule for infrastructure construction was already six months behind.)

Although the uncertainties about the vehicle specifications, such as the low-floor requirement, the size of the vehicles, and the technology to be used, were resolved before the vehicle contract was signed, the procurement for the main AFP contracts to design and build the LRT lines had not yet begun when the vehicle contract was signed.

In June 2010, Metrolinx signed an $870.5-million contract with Bombardier to design, produce and deliver 182 light rail vehicles, with delivery starting in 2013 for the Sheppard East LRT. Metrolinx signed the contract before the main AFP contracts to design and build the LRT projects were in place.

The date when the vehicles would be needed had changed before the contract was formally signed in June 2010 due to changes to the timing of the projects from the Ontario Government.

A few months before the contract was signed, the Ontario Government requested in its March 2010 budget that Metrolinx adjust the project plans to reduce the funds needed from the Province for the LRT projects in the first five years. This pushed back the dates when vehicles would be needed. **Figure 10** shows the new delivery dates Metrolinx projected for the different projects in the "As of 2010" column as a result of the Ontario Government's request.

Other changes that impacted the timeline for the need for the vehicles included the changing decisions by governments on what projects to build

Figure 10: Changes in Plan for When Vehicles Would Be Needed

Source of data: Metrolinx

Project and Vehicles	As of 2009	As of 2010	As of 2012	As of 2018
Eglinton Crosstown (76)	2016	2020	2020	September 2021
Finch West (23)	2013	2019	2020	October 2023
Sheppard East (35)	2013	2014	2021	n/a[1]
Scarborough (48)	2015	2020	2020	n/a[2]

1. In 2015, the Sheppard East LRT was put on hold until the completion of Finch West LRT.
2. The Scarborough LRT was cancelled in 2013.

in 2011 and 2012 as shown in **Appendix 2**, and the quality and schedule issues at Bombardier, which are further described in **Section 4.6.2**.

Despite not having the main AFP contracts in place to design and build the LRT projects, Metrolinx contracted with Bombardier for the vehicles in June 2010 without adequate provisions in the contract to address the risk of changes to plans.

4.6.1 Having To Change the Contract with Bombardier Cost Metrolinx about $49 Million

As a result of provincial and municipal government decisions that led to new completion dates for the LRT projects and the cancellation of the Scarborough LRT, Metrolinx had to negotiate extensively with Bombardier to change the contract. In 2012, it negotiated to postpone the initial delivery of the vehicles from 2013 to 2017 (with a subsequent further postponement changing delivery to 2018). It also ultimately reduced the number of vehicles from 182 to 76 because of the cancellation of the Scarborough LRT and concerns with Bombardier's ability to provide the contracted vehicles (see **Section 4.6.2** for details). These developments meant Metrolinx incurred the following costs:

- **$19-million cost to postpone delivery date.** In March 2013, Metrolinx and Bombardier agreed to the revised delivery schedule to accommodate Toronto's changing plans, and reached a final settlement in August 2014. It included Metrolinx having to make a prepayment of $65 million on the contract, covering the nine-year period from April 2013 to November 2021. This resulted in about $16 million of interest benefit accruing to Bombardier over this nine-year period, which represents a cost to Metrolinx for changing the contract. As well, Metrolinx had to pay Bombardier $3 million in schedule disruption costs, bringing the cost to Metrolinx of changing the delivery date to about $19 million.
- **$30-million cost to reduce the number of vehicles.** In December 2017, as part of a settlement discussed in detail in the following section, Metrolinx and Bombardier agreed to reduce the number of vehicles. In that settlement, the now 76 vehicles would cost Metrolinx $30 million more than what they were priced at in the original contract. The original contract price for just 76 of the original 182 vehicles would have been $443 million in present-day dollars ($392 million in 2010 dollars), or about $5.8 million per vehicle, but is now estimated at $473 million, or about $6.2 million per vehicle.

Metrolinx's purchases of vehicles separately for each project (as opposed to having the AFP consortiums that will build and design the LRT projects purchase the vehicles) means that Metrolinx assumes all vehicle purchase risks.

RECOMMENDATION 14

To help ensure that future transit projects are delivered as smoothly and cost-effectively as possible, we recommend that for each project Metrolinx produce a detailed, integrated plan that identifies the project's infrastructure and vehicle needs, and adequately addresses uncertainties around the project, before fixing the timelines and starting procurement.

METROLINX RESPONSE

Metrolinx accepts the recommendation.

Lessons learned from the Toronto light rail vehicle experience informed Metrolinx's decision to transfer additional vehicle interface responsibilities to the AFP consortium. This shift of responsibility into the AFP contract and scope is a process Metrolinx will adopt on projects going forward including the eventual Hurontario LRT consortium and in the AFP consortium's scope for the Hamilton LRT and GO rail expansion's major "on-corridor" procurements.

4.6.2 Bombardier's Slow Response to Quality and Schedule Issues Cost Metrolinx about $25 Million

Subsequent to Metrolinx completing its negotiations with Bombardier and executing an August 2014 amendment to revise the vehicle delivery schedule, it raised concerns about Bombardier's progress in designing the vehicles.

In October 2014, Metrolinx's then CEO wrote Bombardier that "we are losing confidence in Bombardier's ability to deliver service-ready vehicles without a substantial change in approach." He cited the concerns Metrolinx identified when it inspected Bombardier's design and construction program. The problems included parts that were "out of dimension, patched and clearly without the quality to meet reliability and the required design life" for the vehicles, as well as a general lack of preparedness of Bombardier staff for Metrolinx's inspections.

In 2015, Bombardier missed its deadline to provide a functional pilot vehicle for testing because of quality and manufacturing issues. It was only by the end of 2017, two years after the initial deadline, that pilot vehicles were ready for testing.

With problems and delays continuing, Metrolinx tried to cancel the contract in 2016. It issued Bombardier a Notice of Default in July 2016 and a Notice of Intent to Terminate the contract in October 2016. In response, in February 2017, Bombardier filed a statement of claim in the court disputing the Notice of Default, asserting that the problems and delays were due to Metrolinx changing the scope, timelines and technical qualifications for the vehicles.

In April 2017, the court ordered the two sides to undertake a dispute-resolution process, to begin in early 2018. Metrolinx and Bombardier reached a settlement before starting this process. The December 2017 settlement included: reducing the number of vehicles from 182 to 76, moving the delivery schedule to begin in November 2018 (for the Eglinton Crosstown LRT) and increasing the liquidated damages in the contract Bombardier will have to pay if it does not deliver the vehicles in time for the Eglinton Crosstown LRT.

As of June 2018, Metrolinx had incurred about $25 million in external costs (for consultants and lawyers), as shown in **Figure 11**.

Figure 11: External Costs Metrolinx Incurred to Monitor and Negotiate with Bombardier, September 2018 ($ million)

Source of data: Metrolinx

Cost	Amount
Oversight and administration	9.0
Contingency plan	10.3
External legal	5.6
Total	**24.9**

Note: Metrolinx did not provide an estimated cost for internal resources.

RECOMMENDATION 15

To encourage suppliers to meet their contract commitments, we recommend that Metrolinx include additional provisions in contracts to protect it from incurring additional costs because of delays.

METROLINX RESPONSE

Metrolinx accepts the recommendation.

Metrolinx, in consultation with Infrastructure Ontario, will conduct a review of the contract provisions in all future procurements to ensure that sufficient remedies for delays and costs are incorporated.

4.6.3 Metrolinx Exposed to New Risks by Procuring Additional Vehicles

When the court ordered Metrolinx into dispute resolution with Bombardier in April 2017, Metrolinx was not convinced that Bombardier could meet the deadline for the Eglinton Crosstown LRT (now set at 2021). So in May 2017, a month after the court order, Metrolinx did a single-source procurement of 60 vehicles from a second supplier, Alstom, for $530 million; 43 were intended for the Eglinton Crosstown and 17 for Finch West. If Bombardier meets the Eglinton Crosstown deadline, the 43 Alstom vehicles will be used for the Hurontario LRT.

Metrolinx's December 2017 settlement with Bombardier means that the Alstom vehicles will not be needed for the Eglinton Crosstown. Instead, as Metrolinx's contingency plan specified, they will be used for the Hurontario LRT.

This result runs counter to Metrolinx's original plan of having the winning bidder for the Hurontario project contract take on the responsibility of procuring and managing the delivery of Hurontario's light rail vehicles.

In addition, the Alstom procurement now means that the TTC will have to operate two types of vehicles on its LRTs—Bombardier on the Eglinton Crosstown and Alstom on Finch West. The TTC has not yet determined what additional costs will result from this. Its operational costs could increase as a result of having to run two different training programs and maintaining two different pools of operators.

The TTC informed us that Metrolinx could mitigate these potential cost increases by working with the AFP consortium and the winning bidder for the Finch West LRT to design common systems, tracks, signage and switches for the two LRTs. This would help the TTC develop a common base training program to qualify operators for both vehicle types rather than having to develop two separate training programs.

RECOMMENDATION 16

To effectively manage the increased risks and costs from Metrolinx's procurement of vehicles from the second supplier Alstom, we recommend that Metrolinx:

- assess the benefits and costs of transferring the responsibility of managing the delivery of Hurontario's light rail vehicles to the winning bidder for the Hurontario AFP contract; and
- work with the Toronto Transit Commission to manage the cost of operating two types of vehicles on its light rail transit lines.

METROLINX RESPONSE

Metrolinx is in the process of transferring significant responsibilities for managing Hurontario's light rail vehicle delivery to the winning AFP bidder. Metrolinx assessed the benefits and risks of alternative approaches to vehicle supply, and in its negotiations with Alstom, the vehicle provider, obtained contract terms to transfer the vehicle contract to project bidders.

Metrolinx will work with the TTC to finalize operating agreements and costs for the Toronto LRTs.

Appendix 1: Top Transit Priorities in the 2008 Regional Transportation Plan

Source of data: *The Big Move: Transforming Transportation in the Greater Toronto and Hamilton Area, 2008*

#	Top Transit Priorities Within the First 15 Years
1	Express Rail on the Lakeshore Line from Hamilton to Oshawa
2	**Rapid transit in Downtown Hamilton from McMaster University to Eastgate Mall**
3	Rapid transit on Dundas Street in Halton and Peel
4	403 Transitway from Mississauga City Centre to the Renforth Gateway
5	**Hurontario rapid transit from Port Credit to Downtown Brampton**
6	Brampton's Queen Street AcceleRide
7	Rail link between Union Station and Pearson Airport
8	VIVA Highway 7 and Yonge Street through York Region
9	Spadina Subway extension to Vaughan Corporate Centre
10	Yonge Subway capacity improvements and extension to Richmond Hill
11	**Eglinton rapid transit from Pearson Airport to Scarborough Centre**
12	**Finch/Sheppard rapid transit from Pearson Airport to Scarborough Centre and Meadowvale Road**
13	**Upgrade and extension of the Scarborough Rapid Transit line**
14	Rapid transit service along Highway 2 in Durham
15	Improvements to existing GO Rail services and extension of GO Rail service to Bowmanville

Note: The priorities are not ranked and are simply listed geographically, from west to east. Priorities that were later funded as LRT projects are in bold face.

Appendix 2: Timeline of Key Announcements/Decisions on Five Rapid Transit Projects

Prepared by the Office of the Auditor General of Ontario

Date	Announcement/Decision
Rapid Transit Projects in Toronto	
March 16, 2007	• Toronto and Chair of TTC announce the *Toronto Transit City Light Rail Plan*. The plan proposes seven new light rail transit (LRT) lines throughout Toronto: Don Mills Road, Eglinton-Crosstown, Finch West, Jane Street, Scarborough–Malvern, Sheppard East, and Waterfront West.
June 13, 2007	• TTC approves the work plan for its project management of *Transit City* [Note: In mid-2012, TTC will withdraw from the project managing the LRTs.]
June 15, 2007	• Province of Ontario announces MoveOntario 2020, a $17.5-billion plan to fund 52 rapid transit projects in the GTHA (including *Transit City*'s seven LRTs) over the next 12 years. • Province assigns Metrolinx to oversee MoveOntario 2020 as part of its Regional Transportation Plan to be issued in 2008.

November 28, 2008	• Metrolinx Board of Directors adopts its first Regional Transportation Plan—*The Big Move: Transforming Transportation in the Greater Toronto and Hamilton Area*.
	• The plan presents a roadmap to implement 52 rapid transit projects by 2020.
	• Top transit priorities within the first 15 years of the plan include:
	  • building Eglinton rapid transit from Pearson Airport to Scarborough Centre;
	  • building Finch/Sheppard rapid transit from Pearson Airport to Scarborough Centre and Meadowvale Road; and
	  • upgrading and extending the Scarborough Rapid Transit line.

April 1, 2009	• Province announces $8.6 billion in funding for:
	  • the three LRT priorities in Toronto ($7.2 billion); and
	  • a bus rapid transit (BRT) in York Region ($1.4 billion).

May 15, 2009	• Province announces joint funding with the federal government of $950 million that will fund the Sheppard part of Finch/Sheppard LRT line, bringing Toronto LRT program funding to $8.15 billion.
June 4, 2009	• Deputy Minister of Transportation informs Toronto City Manager that the LRT projects would proceed using the Alternative Financing and Procurement delivery model.

February 2010	• Province, Metrolinx, City of Toronto and TTC reach consensus to shorten the LRT lines because the cost had been estimated at $10.5 billion, while federal and provincial funding has been fixed at $8.15 billion:
	  • Finch/Sheppard LRT—remove connection between future Finch West subway station and Don Mills subway station, effectively splitting this LRT into two shorter LRTs, Finch West and Sheppard East.
	  • Eglinton LRT—remove connection to Pearson International airport and end the western terminus at Weston Road.

March 25, 2010	• Province announces that to manage expenditures, it will work with Metrolinx to phase construction of LRTs, delaying the construction of some of them.

May 19, 2010	• Metrolinx Board authorizes Metrolinx to proceed with revised LRT completion dates:
	  • Sheppard East from 2013 to 2014;
	  • Finch West from 2013 to 2019;
	  • Scarborough from 2015 to 2020;
	  • Eglinton from 2016 to 2020.

June 13, 2010	• Metrolinx and Bombardier enter into a formal contract for the design, production and supply of up to 182 light rail vehicles valued at $870.5 million (2010 $) for the Toronto LRTs.
December 2010	• Toronto announces it will cancel the LRTs and focus on planning for subways.

Date	Announcement/Decision
March 31, 2011	• Mayor of Toronto, Minister of Transportation and Chair of Metrolinx sign MOU for a revised transit plan: • Metrolinx responsible for Eglinton–Scarborough Crosstown: underground from Jane/Black Creek to Kennedy Station, then rapid transit to Scarborough City Centre; • Toronto responsible for Sheppard subway extensions: west to Downsview Station and east to Scarborough City Centre, and enhanced bus service on Finch Avenue.
February 8, 2012	• Toronto City Council overrides March 31, 2011, plan in favour of Metrolinx's May 19, 2010, plan.
April 25, 2012	• Metrolinx Board of Directors endorses allocating $8.4 billion in provincial funding across four LRTs, under the May 19, 2010, plan with some revisions to project timing.
June 29, 2012	• Province approves Metrolinx's transit plan with new timelines: Eglinton, Scarborough and Finch West to be completed by 2020 and Sheppard East by 2021.
October 3, 2012	• TTC and Metrolinx agree in principle that TTC will operate the LRTs under an agreement that they will jointly develop.
November 28, 2012	• Metrolinx, City of Toronto and TTC execute a Master Agreement for implementing the LRTs.
July 16, 2013	• Toronto City Council confirms its support for a Scarborough subway instead of an LRT and authorizes City Manager to amend the Master Agreement accordingly. • Provincial contribution to Scarborough transit: $1.8 billion (2010 $).
February 19, 2015	• City of Toronto agrees to reimburse Metrolinx $74.8 million for its sunk costs on now defunct Scarborough LRT.
April 27, 2015	• Sheppard East LRT put on hold until completion of Finch West LRT.
November 3, 2015	• Metrolinx and Infrastructure Ontario announce an AFP contract has been signed to deliver the Eglinton Crosstown LRT by September 2021.
March 3, 2016	• Construction begins on Eglinton Crosstown LRT with contract completion deadline of 2021 (tunnel work had begun in summer 2011).
May 7, 2018	• Winning bidder to construct Finch West LRT announced, with estimated completion date of 2023.
Rapid Transit Projects Outside Toronto	
June 15, 2007	• Province of Ontario announces MoveOntario 2020, a $17.5-billion plan to fund 52 rapid transit projects in the GTHA over the next 12 years. • Projects include a Hurontario light rail line and Hamilton rapid transit. • Province assigns Metrolinx to oversee MoveOntario 2020 as part of its Regional Transportation Plan to be issued in 2008.
November 28, 2008	• Metrolinx Board of Directors adopts its first Regional Transportation Plan—*The Big Move: Transforming Transportation in the Greater Toronto and Hamilton Area*. • Plan presents a roadmap to implement 52 rapid transit projects by 2020. • Top transit priorities within the first 15 years of the plan include: • building rapid transit in downtown Hamilton from McMaster University to Eastgate Square; and • building Hurontario rapid transit from Port Credit GO Station to downtown Brampton.
April 21, 2015	• Hurontario LRT receives a $1.4-billion (2014 $) funding commitment from Province.
May 26, 2015	• Province announces a commitment of up to $1 billion for the capital cost of a Hamilton LRT line with a revised scope, extending from McMaster University through downtown Hamilton to Queenston Circle (with plans to extend to Eastgate Square).
October 28, 2015	• Brampton rejects LRT route through its Main Street, effectively shortening Hurontario LRT from Port Credit GO Station to Steeles Avenue.
March 8, 2016	• Hamilton and Metrolinx sign a memorandum of agreement for a $1-billion LRT line.
July 6, 2016	• Mississauga and Brampton city councils approve MOU for Hurontario LRT between their respective cities and Metrolinx.
August 17, 2017	• Infrastructure Ontario and Metrolinx issue RFP for Hurontario LRT, expecting to award contract in 2018.
April 12, 2018	• Infrastructure Ontario and Metrolinx issue RFP for Hamilton LRT, expecting to award contract in 2019.

Appendix 3: Projects To Be Delivered Through Alternative Financing and Procurement

Prepared by the Office of the Auditor General of Ontario

Basics of the AFP Approach

Under the AFP approach, a public-sector entity (a ministry, agency or organization in the broader public sector, such as a hospital or college; in this case, Metrolinx) sponsors a project. The sponsor establishes the scope, budget and purpose of the project. A private-sector company is contracted to mainly finance and carry out construction. In some cases, the private-sector company will also be responsible for the maintenance and/or operation of a project for 30 years after completing construction.

Typically, the project sponsor pays the private-sector company the contracted price for the project only when it has been substantially completed. However, Infrastructure Ontario allows the use of progress payments on the contract in order to reduce long-term financing costs. That is, since private-sector companies pay higher rates of interest to finance the project than the public sector would, the progress payments reduce the amount the private-sector company has to borrow and pay the higher rate of interest on.

Value for Money Must Be Demonstrated to Justify AFP

Under *Building Better Lives* (Ontario's long-term infrastructure plan), positive value for money is an important principle for determining whether to deliver projects using the AFP model. The Treasury Board's funding approvals for AFP projects are contingent on Infrastructure Ontario demonstrating that using the AFP model will result in positive value for money.

A value-for-money (VFM) analysis compares the estimated project costs of the public sector delivering the project with the estimated cost of delivering the same project to the identical specifications using AFP. The AFP estimated cost has to be less than the estimated cost for public-sector delivery for value for money to be demonstrated and for the project to proceed under AFP.

Our 2014 Audit Identified Issues with the AFP Approach; Issues Persist for LRT Projects

Our Office completed an audit of the AFP approach in 2014 and identified issues with the VFM assessment model Infrastructure Ontario uses. The same issues exist for the VFM assessments Infrastructure Ontario, working with Metrolinx, undertook for the four LRT projects. These issues are explained in **Appendix 4**.

We continue to support our recommendations from 2014. Infrastructure Ontario should revise its VFM assessment methodology to ensure that all of the assumptions it is based on are well-supported and justified. Also, the lessons learned from when private-sector firms deliver AFP projects on time and on budget should be used to improve the public-sector delivery model, so that government-funded infrastructure projects are achieved at the lowest possible cost.

Appendix 4: Issues Identified in 2014 AFP Audit and Their Impact on LRT Projects

Prepared by the Office of the Auditor General of Ontario

Issue	Status and Impact on VFM Assessment of LRT Projects
Key assumptions used by Infrastructure Ontario (IO) to assign costs to risks: • are not supported by empirical data; and • are difficult to verify because they are based on the professional judgment and experience of external advisors. For example, IO used a sample of studies that suggested projects delivered by the public sector will have cost overruns of 18% to 47%, while AFP projects will have cost overruns of only up to 12%, with Ontario's experience closer to 5%.	For the Eglinton Crosstown LRT, IO estimated a 29% cost-overrun risk if delivered by the public sector and a 2.5% cost-overrun risk under the AFP model. There is no evidence justifying the low estimate of 2.5% for the AFP model.
The costs of delivering projects using AFP are higher than the public-sector-delivery costs. The higher costs mostly stem from private-sector companies having higher financing costs than the public sector. IO offsets these higher costs with its high estimates of the risk costs of having the public sector deliver projects. This results in AFP receiving a positive VFM assessment.	The VFM assessments estimate the costs of the four LRT projects will be $14.8 billion under AFP and $12.7 billion under public-sector delivery (with the $2.1 billion difference attributed mostly to higher private-sector financing costs). The higher AFP cost is offset by an estimate of $5.8 billion for the risk costs of public-sector delivery, resulting in a positive VFM assessment of $3.7 billion for AFP delivery.
IO estimates that the risk of having the projects not being delivered on time and on budget are about five times higher under public-sector delivery than under AFP.	For the LRT projects, IO estimates the cost of these risks to be about $5 billion under public-sector delivery and just $1 billion under AFP.
Because of IO's assumptions, no VFM assessment completed by IO since 2006 has shown a negative outcome for AFP.	None of the VFM assessments for the LRT projects show a negative outcome for AFP.
Two risks accounted for a significant portion of the difference between the values of the retained risks under AFP delivery versus public-sector delivery. The two risks were: • the risk that assets procured under public-sector delivery will not be maintained as well as assets procured under AFP; and • the risk that, under public-sector delivery, internal government approvals will be delayed and in turn will delay the issuance of tenders (a risk not assumed under AFP).	As a result of our 2014 audit, IO updated its VFM assessment approach, reducing the difference between AFP and public-sector delivery for the two risks. However, in 2015, IO did another update to the VFM assessment approach that offsets the reduced difference: IO assumes that if a private-sector contractor both designs and constructs a project, they will add value through innovative ideas that public-sector delivery would not have. IO quantifies this Innovation Factor as 12% of construction cost. This is based on two reports that noted innovative approaches to design and construction were worth anywhere from 10% to 15% in cost reductions. For the LRT projects, this added $997 million of value under AFP. Our two concerns about this Innovation Factor are: • The two reports it is based on used surveys and interviews with industry participants. One of them also compared the winning bid and unsuccessful bids for a sample of IO's past projects to justify the inclusion of innovation benefits for the AFP model. There was no measure of actual innovations on past projects in the reports. • Apart from the two reports, IO studied its own portfolio of projects to determine the value of innovation and arrived at a cost reduction of from 7% to 12%. However, this portfolio did not include any LRT projects. It is unclear whether innovation factors into LRT projects in the same way as it might, for example, into hospital projects.

Appendix 5: Audit Criteria

Prepared by the Office of the Auditor General of Ontario

1.	Roles and responsibilities are clearly defined and accountability requirements are established for an effective project prioritization process, based on sound criteria that consider economic, environmental and social needs.
2.	Comprehensive business cases clearly set out the project objectives and benefits, and a timetable for completion of the projects. Processes are in place to ensure and assess the completeness and reliability of cost estimates and other information used to support decision-making on the projects.
3.	Competitive, fair and transparent procurement processes are followed in awarding contracts, including the AFP contract, Light Rail Vehicle contract, property acquisition, and contracts for consultants and advisors to support Metrolinx's delivery of the projects. The cost and benefits of feasible procurement alternatives are thoroughly assessed.
4.	Contracts contain provisions to ensure that work is completed on a timely basis in accordance with project management best practices. For example, the provisions include: linking contractual payments to the achievements specified in the contract and appropriate dispute resolution arrangements.
5.	Oversight procedures and processes are carried out by qualified individuals to ensure contractors are complying with the performance and accountability requirements in the project agreements/contracts. Non-compliances and poor performance are properly documented and addressed in a timely manner to ensure the projects are completed as planned.
6.	Project timelines and costs are established, monitored and compared against actual results, and results are reported regularly. Where necessary, corrective action is taken on a timely basis when issues are identified.