



STAFF REPORT ACTION REQUIRED

Procurement Authorization Amendment to Implement Pre-Boarding Announcements (PBA) on TTC Subway Trains

Date:	November 23, 2015
To:	TTC Board
From:	Chief Executive Officer

Summary

As part of the TTC's long-term commitment to achieving a transit system which is accessible to customers of all abilities by 2025, the TTC intends to retrofit all its modes with electronic systems to externally announce, at a minimum in the short term, the route, direction, destination, or next major stop as a Pre-Boarding Announcement (PBA). This is consistent with the goals and objectives of the *2014-2018 TTC Multi-Year Accessibility Plan*. This report addresses the TTC subway fleet. Another report addressing the requirements on the TTC bus fleet is part of this Board agenda. An approach for the TTC existing streetcar fleet will come to a future Board meeting.

Using input gained through consultation with the TTC's Advisory Committee on Accessible Transit (ACAT), this report seeks authorization to proceed with design and implementation of a vehicle-based PBA solution for the TTC subway fleet, consisting of both audio announcements and visual LED displays. This PBA arrangement will be consistent with section 51 of the *Accessibility for Ontarians with Disabilities Act (AODA)*, *Integrated Accessibility Standards Regulation (IASR)*, which comes into effect on January 1, 2017.

Owing to the fact that external Pre-Boarding Announcements were not standard or common in the transit market when the Toronto Rocket (TR) contract was awarded, nor had the AODA regulations pertaining to this area been developed at that time, PBA requirements were not part of the original scope of that train. In order to not invalidate the terms of the TR fleet warranty, TTC staff requested the car-builder, Bombardier Transportation Canada Inc. (Bombardier), to prepare a PBA proposal which could be retrofitted onto all subway fleets including TR, T1, and SRT vehicles.

A Purchase Authorization Amendment to Bombardier in the amount of \$11,762,510.13, inclusive of all applicable taxes, is required to implement these modifications to one TR trainset as a pilot for the proof-of-concept, as well as to supply the materials required

to subsequently retrofit all T1, TR, and SRT trains. Upon successful completion of the pilot, TTC forces will retrofit the PBA onto the remaining fleets.

Recommendations

It is recommended that:

1. The Board authorize a Purchase Authorization Amendment to Bombardier, in the amount of \$11,762,510.13, inclusive of all applicable taxes, for the installation of PBA equipment on one TR trainset and for the supply of all materials required for the modification of all TTC subway and SRT vehicles.

Financial Summary

Sufficient funds for this expenditure are included in the TTC's 2015-2024 Capital Budget & Plan as approved by Council on March 10/11, 2015 under:

- 4.16, work order 6408, AODA Requirements for the TR fleet: CAD\$8.062M
- 4.16, work order 6337, T1 Pre-Boarding Announcement System: CAD\$4M
- Work order (TBA), Scarborough Subway Extension for the SRT fleet: CAD\$1M

The Chief Financial & Administration Officer has reviewed this report and agrees with the financial impact information.

Accessibility Issues

The TTC has a strong organizational commitment to accessibility and is making continuous progress towards making all of its vehicles, facilities, and services accessible, consistent with Provincial AODA legislation. The TTC's implementation of accessibility improvements is guided by the *2014-2018 TTC Multi-Year Accessibility Plan*, which was adopted by the Board in April, 2014. This document outlines the TTC's long-term vision for an accessible transit system. Item 6.4.1 of the *Multi-Year Accessibility Plan* explains the TTC's commitment to provide PBAs on all vehicle modes by 2017. PBAs are currently provided on the TTC's new generation of low-floor accessible streetcars. Work will begin in 2016 to implement PBAs for bus and legacy streetcar modes, which will be the subject of separate reports to the Board.

The recommendations in this report have been influenced by the advice provided by ACAT, and such consultation will continue during the pilot to ensure that the selected arrangement will meet the needs of all customers, including people with disabilities and seniors.

Decision History

In 2006, the TTC awarded a contract to Bombardier for the purchase of 39 TR trainsets to replace the existing H4 and H5 subway vehicles that were approaching the end of their

service life. Minutes of the meeting are available on the TTC website. Refer to agenda item 4 in the following link:

http://www.ttc.ca/About_the_TTC/Commission_reports_and_information/Commission_meetings/2006/Sept_20_2006/Minutes/index.jsp

In 2010, the Board approved the execution of Option 1(B) in the contract for the purchase of 21 TR trainsets to replace the H6 subway vehicles, which were also approaching the end of their service life, and Option 1(A) for the purchase of 10 TR trainsets to support the Toronto York Spadina Subway Extension (TYSSE) program. Minutes of the meeting are available on the TTC website. Refer to agenda item 5b in the following link:

http://www.ttc.ca/About_the_TTC/Commission_reports_and_information/Commission_meetings/2010/June_2_2010/Minutes/index.jsp

In 2014, the Board approved the execution of Option 1(C) for the purchase of 10 TR trainsets to address revised forecasts of future ridership levels, as well as the increased levels of service that will be achievable with Automatic Train Control (ATC). Minutes of the meeting are available on the TTC website. Refer to agenda item 5a in the following link:

http://www.ttc.ca/About_the_TTC/Commission_reports_and_information/Commission_meetings/2014/March_26/Agenda/index1.jsp

In March 2015, the Board authorized a change directive to Bombardier in the amount of \$2,734,822.98, including taxes, for the engineering design to facilitate the modifications of TR trainsets for a Train Door Monitoring (TDM) system as part of One Person Train Operation (OPTO). The report describes the conversion of 6-car TR trainsets to 4-car trainsets that would be the subject of a future Board report. Minutes of the meeting are available on the TTC website. Refer to agenda item 5a in the following link:

http://www.ttc.ca/About_the_TTC/Commission_reports_and_information/Commission_meetings/2015/March_26/Agenda/index.jsp

In June 2015, the Board approved a purchase order amendment to modify four TR trainsets for services on Line 4 to facilitate the OPTO pilot program and to mitigate the 2015 Fleet Plan forecasted shortage of trains on Line 2. Minutes of the meeting are available on the TTC website. Refer to agenda item 13 in the following link:

http://www.ttc.ca/About_the_TTC/Commission_reports_and_information/Commission_meetings/2015/June_22/Agenda/index.jsp

This resulted in the purchase of a total of 82 TR trainsets from Bombardier under the existing contract. Table A outlines the Board approved authority for these trainset orders.

Table A: Board Approved Authority for Bombardier TR Trainsets

Item		Vehicle Cost	Allowances	Total Authorization
Original Contract	Base Order (39 Trainsets – H4/H5 Replacement)	\$ 624,567,602.52	\$ 50,220,000.00	\$ 674,787,602.52
Previous Amendments	Option 1(A) (10 Trainsets - TYSSE)	\$128,551,071.30	\$34,157,000	\$162,708,071.30
	Option 1(B) (21 Trainsets – H6 Replacement)	\$ 269,957,249.73	\$ 47,255,000.00	\$ 317,212,249.73
	Option 1(C) (10 Trainsets – ATC/Forecast Growth)	\$ 176,567,020.00	\$ 40,221,850.00	\$ 216,788,870.00
	ATC Integration (70 Trainsets)	\$ 31,517,892.92	\$ 3,266,971.00	\$ 34,784,863.92
	ATC DTO Mod (80 Trainsets)	\$1,176,072.96	NIL	\$1,176,072.96
	Spares, Special Tools and Test Equipment (Option 1(A) and 1(B) Trainsets)	\$ 27,242,504.43	\$ 757,495.57	\$ 28,000,000.00
	Engineering for TDM System Modification	\$2,734,822.98	NIL	\$2,734,822.98
	Modify 4 Trainsets for Service on Line 4	\$ 25,938,299.89	\$ 12,371,982.65	\$ 38,310,282.54
	All Other Amendments (Design changes, etc.)	\$ 34,509,275.08	NIL	\$ 34,509,275.08
Current Amendment	Subway Fleet Mods for AODA Compliance	\$ 11,762,510.13	NIL	\$ 11,762,510.13
Total Authorization Amount		\$ 1,334,524,321.94	\$ 188,250,299.22	\$ 1,522,774,621.16

These amounts include all applicable taxes. Exclusive of base order vehicle price, all other vehicle pricing is prior to a one-time adjustment for foreign currency exchange rate variance and net project costs will include tax recoveries under HST from the contract authorized amounts.

Issue Background

As part of the TTC's long-term commitment to achieving a transit system which is accessible to customers of all abilities, the TTC intends to retrofit all of its modes to provide external PBAs. This is consistent with the goals and objectives of the *2014-2018 TTC Multi-Year Accessibility Plan*, and section 51 of the *AODA Integrated Accessibility Standards Regulation (IASR)*. Presently, TTC subway and SRT trains do not have provisions for the installation of a PBA system and we must rectify this in order to meet our corporate commitment to implement PBAs, and to comply with the PBA legislative requirements of the AODA IASR, which take effect on January 1, 2017.

Benefits of Pre-Boarding Announcement Systems

Audible PBA systems are a recent and increasingly standard component of public transit vehicles. Similar to the Pre-Boarding Announcement system currently in operation on the TTC's new low-floor accessible streetcars, PBAs on subway trains will provide audible route and destination information to customers in a manner that, until now, could not be accommodated, given that employees operate subway trains from compartments separated from customers and are not available to verbally provide such information.

Pre-Boarding Announcements improve the boarding experience for all customers, and are an important accessibility feature for customers who cannot see the visual destination information posted in a transit station or on the front destination sign of an approaching transit vehicle. Emitted from speakers located above or beside each train doorway, audible PBAs also assist people with vision impairments to locate the train doorway. New visual side LED signs, which are also part of the proposed scope of work, will further assist all customers with locating their intended subway train.

PBAs will also benefit customers during crowded situations where it may be difficult to locate or read fixed station signage, as well as reassure tourists and other customers who are unfamiliar with the TTC that they are travelling on the correct line, in the correct direction. In short, PBAs will enable all customers to reliably ascertain that the vehicle they are about to board will be travelling to their intended destination.

Comments

Consultation

In order to design a PBA solution that delivers a consistent wayfinding experience across TTC modes for all customers, and is also consistent with IASR requirements, consultations were held with ACAT's Design Review Subcommittee. During the consultations, ACAT recommended that the PBA solution for the subway fleet have similar functions to that of the prototype PBA system currently being tested on four TTC buses. The prototype bus system is comprised of both audio announcements externally to customers waiting to board the vehicle, and visual LED displays that indicate route, direction, or destination information for embarking passengers.

To date, favourable feedback has been received from ACAT, customers with disabilities, and the general public on the prototype bus PBA system. The TTC intends to continue consultations with stakeholders, including ACAT, when the prototype subway PBA system becomes available.

Technical and Cost Considerations

At the time when the TR contract was awarded in 2006, vehicle-based external PBA announcement systems were not common or standard in the transit or railway market, nor had the AODA regulations been developed in this area. Therefore, PBA functionality did not form part of the original contract scope for that train.

Bombardier is the Original Equipment Manufacturer (OEM) for the TR trains. In order to not invalidate the terms of the warranty of the TR fleet, TTC staff requested Bombardier to develop a technical solution which could be retrofitted onto all TTC subway fleets: a total of 480 TRs on Line 1, 370 T1s on Line 2, and 28 SRT vehicles. A Request for Quotation (RFQ) was prepared and issued to Bombardier for the implementation of the necessary provisions on TR trains to accommodate PBA features. Bombardier has provided a proposal which includes modifying one TR trainset as a pilot for the proof-of-concept, and the supply of materials for TTC forces to retrofit the remaining subway and SRT fleets by the end of 2016. Approximately 15% of the quoted cost is for design, engineering work and pilot for proof of concept.

TTC staff evaluated Bombardier's quotation and sought clarification from them for both technical and commercial issues. Bombardier subsequently responded with a revised quotation in the amount of \$11,762,510.13 inclusive of all applicable taxes. Detailed assessment of the proposal by TTC staff confirm that the quoted engineering hours for the prototype developments, preparation of production drawings, and testing and modification instructions are equivalent to previous change orders of similar scope and complexities. The costs for this design have been verified by the TTC as reasonable for the level of effort required in completing the change, and all rates have been verified per the contract documents. The remaining approximately 85% of the costs are for materials.

TTC staff have reviewed Bombardier's overall proposal and concluded that it is comparable to quotations obtained from another potential supplier of similar scope and customized applications. The adoption of standardized parts across the TTC subway fleet would permit asset management in a more cost-effective manner. Without the design expertise of Bombardier (OEM of the TR train), it would be very difficult, costly, and time consuming to determine the required space, install the required wiring and mounting facilities, and make the necessary electrical circuit modifications without voiding warranties. Bombardier's engineering design would allow for a simple and expedient installation of the PBA equipment on the pilot TR train and, subsequently, the entire subway fleet. It will also result in reduced costs by the use of standardized parts across the all TTC subway fleets.

TTC staff consider Bombardier's proposal to be both technically and commercially acceptable. For this reason, the proposed Purchase Authorization Amendment, in the amount of \$11,762,510.13, inclusive of all applicable taxes, is reasonable and should be approved.

Future Improvements

TTC staff and ACAT believe that additional PBA functionality, which is not included in this initial scope of work -- such as external announcements of short-turned subway train services -- should be implemented as part of the overall PBA system, to deliver a consistent and high-quality customer experience across transit modes. The PBA solution recommended in this report will be robust and adaptable, and will have the capability to integrate such future improvements. However, the scope of these expanded functionalities is still being determined, and the funding requirements to implement these are not yet known. A funding request for these additional requirements will be presented to the Board when they become known, possibly as part of the 2017 Capital Budget process.

Conclusion

As part of the TTC's long-term commitment to achieving a transit system which is accessible to customers of all abilities, the TTC intends to retrofit all of its modes to provide external PBAs. This is consistent with the goals and objectives of the *2014-2018 TTC Multi-Year Accessibility Plan*, and section 51 of the *AODA Integrated Accessibility Standards Regulation (IASR)*. Presently, TTC subway and SRT trains do not have provisions for the installation of the PBA system, and this must be rectified in order to meet our corporate commitment to implement PBA, and to comply with the PBA legislative requirements of the AODA IASR which take effect on January 1, 2017.

Pre-Boarding Announcements improve the boarding experience for all customers, and are an important accessibility feature for customers who cannot see the visual destination information posted in a transit station or on the front destination sign of an approaching transit vehicle.

Bombardier has provided a proposal which includes modifying one TR trainset as a pilot for the proof-of-concept, and the supply of materials for TTC forces to retrofit the remaining subway and SRT fleets. TTC consider the proposal to be both technically and commercially acceptable. For this reason, the proposed Purchase Authorization Amendment, in the amount of \$11,762,510.13, inclusive of all applicable taxes, is reasonable and should be approved.

Contact

Gary Shortt
Chief Operating Officer
Phone: 416-393-3392
Email: gary.shortt@ttc.ca

Mike Palmer
Deputy Chief Operating Officer
Phone: 416-393-4356
Email: mike.palmer@ttc.ca

Raffaele Trentadue
Head of Rail Cars & Shops
Phone: 416-393-4126
Email: raffaele.trentadue@ttc.ca