

Item 3



**For Action
with Confidential Attachment**

Automatic Train Control Alstom Contract Amendment(s)

Date: January 27, 2020
To: TTC Board
From: Chief of Major Projects

Reason for Confidential Information

This report contains information related to the security of the property of the municipality or local board.

Summary

The purpose of this report is to request approval for a required contract amendment(s) for the Line 1 Automatic Train Control (ATC) project. ATC has been successfully implemented on 50% of Line 1 Yonge-University from Vaughan Metropolitan Centre Station to St Patrick Station, including the Wilson Yard mainline interface. The design, supply, testing and commissioning of the Line 1 ATC system is provided by Alstom Transport Canada Inc. (Alstom). To support the re-baselined schedule with an in-service date of September 2022 for 100% of Line 1 to Finch Station, as endorsed by the Board at its April 2019 Board meeting, the existing Alstom contract requires an increase to the contract amount and a contract extension.

Recommendations

It is recommended that the Board:

1. Approve the recommendations set out in the Confidential Attachment.
2. Authorize that the information in the Confidential Attachment remains confidential until such time as the negotiations with Alstom are finalized and a contract amendment(s) is issued.

Financial Summary

The financial details are contained within the confidential attachment. The Chief Financial Officer has reviewed this report and agrees with the financial impact information.

Equity/Accessibility Matters

A cornerstone of the TTC's Corporate Plan 2018-2022 is accessibility, and as a proud leader in providing accessible public transit in the city of Toronto, we are committed to ensuring reliable, safe and inclusive transit services for all our customers. This is supported through the continued work on the ATC project, which will allow increased capacity on the TTC's Line 1.

The TTC is working toward achieving a more inclusive and accessible transit system that meets the needs of all of its customers.

Decision History

At its meeting on March 26, 2015, the TTC Board approved the changes to the TTC's resignalling contract, transferring the previously contracted work to Alstom from Ansaldo. This change had no impact to the existing approved budget of \$563 million and scheduled completion date of 2020.

http://www.ttc.ca/About_the_TTC/Commission_reports_and_information/Commission_meetings/2015/March_26/Reports/5_2_Staff_Report_%26_Attachment.pdf

At its meeting on January 24, 2019, the TTC Board received the Financial Update for the period ended September 29, 2018, including the update on the ATC project identifying the requirement for an additional \$98 million.

http://www.ttc.ca/About_the_TTC/Commission_reports_and_information/Commission_meetings/2019/January_24/Reports/8_Financial_Update_for_the_Period_Ended_September_29_2018.pdf

At its meeting on January 24, 2019, the TTC Board approved the TTC 15-Year Capital Investment Plan and 2019-2028 Capital Budget and Plan, including an increase of \$98 million for the ATC project.

http://www.ttc.ca/About_the_TTC/Commission_reports_and_information/Commission_meetings/2019/January_24/Reports/10_TTC_15_Year_CIP_2019_2028_Capital_Budget.pdf

At the Special City Council Meeting on March 7, 2019, City Council approved the TTC's 2019-2028 Capital Budget, including an increase of \$98 million for the ATC project.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2019.EX2.5>

At its meeting on April 11, 2019, the TTC Board endorsed the re-baselining of the ATC project.

http://www.ttc.ca/About_the_TTC/Commission_reports_and_information/Commission_meetings/2019/April_11/Reports/Decisions/17_ATC_Rebaselining_and_TSE_Review_Decision.pdf

Issue Background

Line 1's conventional "fixed block" signal system has been in place since it opened on March 30, 1954, more than 65 years ago. A fixed block signal system divides the subway line into geographical blocks. Only one train at a time is allowed in each block, while the adjacent blocks provide a buffer zone. While this system remains safe for operations, and despite staff's significant focus on preventive and corrective maintenance, its reliability is diminishing. The replacement of the current signalling system is necessary to accommodate increased ridership demand and provide reliable customer service.

From 2006, the TTC has incrementally awarded contracts to address the immediate, Medium and long-term challenges related to the resignalling of Line 1 and the Toronto York Spadina Subway Extension (TYSSE) which opened in 2017.

The resignalling of Line 1 will improve reliability and increase capacity on Canada's busiest subway line. ATC provides the benefit of real-time central train control with precise train location. With ATC, train speed and separation between trains is controlled automatically, through a moving block system, as opposed to a fixed block system. This allows for reduced travel times and more reliable service.

Resignalling of Line 1 with ATC includes the design, installation, testing and commissioning of an upgraded Centralized Signalling System (CSS). It also includes the design, installation, testing and commissioning of ATC train-borne equipment on the Line 1 Toronto Rocket (TR) fleet.

The ATC system is very complex and the installation, testing and commissioning activities can only be performed during non-revenue hours or scheduled subway closures.

In Q2 2019, ATC was commissioned all the way to St Patrick Station. ATC is progressing well in the next phase on Line 1 (Phase 3B), from St Patrick to Queen station. Phase 3B is currently on schedule with a revenue service date of Q1 2020. Installation of ATC equipment in Phase 3C, from Queen to Rosedale station, is completed. Installation activities in Phase 4, from Rosedale to Eglinton station, is also currently underway. To date, five subway workcars have been equipped with Automatic Train Protection (ATP). This has resulted in improved maintenance windows for track maintenance activities in the segment of Line 1 operating in ATC.

In order to complete the remaining phases of the ATC project on Line 1, and commission the remaining workcars with ATP, Alstom's project management, engineering and testing teams are required to continue with the engineering, software development, implementation and commissioning activities as per the re-baselined schedule.

Comments

The ATC system is very complex and comprises of design, supply, testing and commissioning activities by Alstom. ATC has been successfully implemented on Phase 1, Phase 2, Phase 2A, Phase 2BC and Phase 3A, which accounts for 50% of Line 1. The ATC system has proven to have high reliability and availability levels with headway improvements.

Before the ATC project was re-baselined, the scheduled in-service date for 100% of Line 1 was Q4 2019, and the Alstom implementation plan included six phases. In order to meet the operational requirements to minimize customer impact and ensure the efficiency of the morning service runouts, the implementation strategy was revised to rearrange and increase the number of phases to nine. Five phases to date have been commissioned as outlined above.

The effort required per phase is dependent on a predefined set of activities rather than length or geographical area. Each additional phase requires a complete software development cycle that consists of three major deliverables including: low speed, high speed and revenue software, each of which must be thoroughly simulated through factory verification and validation as well as site tested. Application design, including updates to migration plans, equipment layouts and the system database are also impacted. Additional safety assessments are required for each new phase as well as commissioning and safety assurance activities.

In addition to the extra phases, additional scope was added to develop the ATC system to accommodate 15 types of workcar variations and the commissioning of 28 workcars with ATP. The current scope included a provision to start the development of ATP on workcars, but wasn't sufficient as many details on how the solution would be implemented was unknown. As a result of continuing the development of ATP on workcars, the first three families were introduced to the system with three workcars commissioned in Q2 2019. The effort required exceeded the initial provision and incurred costs of \$2.5 million have been spent and are required to be paid to Alstom.

The re-baselined schedule includes the implementation of three specific workcar types per phase starting with Phase 3A. Equipping workcars with ATP was deemed to be an operational requirement to increase the speed of these vehicles in the ATC territory of Line 1, such that work zones can be efficiently established during non-revenue hours resulting in greater maintenance windows to perform maintenance activities. In addition, the four-car TR trains that operate on Line 4 have ATC equipment installed, but the software for its use needs to be developed and commissioned to allow for efficient travel times when these trains are travelling through Line 1 to return to Wilson Yard for maintenance activities.

As a result of the changes above and delays noted in the ATC Re-Baselining and Transit Systems Engineering Review report as presented to the Board at its April 11, 2019 Board meeting, a contract schedule extension and increase to the contract amount as noted in the confidential attachment is required for Alstom to complete the implementation of ATC on Line 1. TTC continues to negotiate with Alstom to finalize

costing of the contract and the TTC is seeking approval for an authorized contract amount with Alstom not to exceed the amounts as noted in the confidential attachment.

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Signature

Gary Downie
Chief of Major Projects

Attachments

Confidential Attachment 1 – ATC - Alstom Contract Amendment(s) Recommendation