



## **Fleet Life Extension – Line 3 Scarborough**

**Date:** May 08, 2018  
**To:** TTC Board  
**From:** Chief Operating Officer

### **Summary**

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The purpose of this report is to request the Board's approval to complete inspection and reconditioning of the SRT fleet's trucks (undercarriage wheel assembly) as part of the Line 3 Scarborough life extension program by amending current Original Equipment Manufacturer (OEM) Bombardier Transportation contract.

The repair work is urgently required as the SRT trucks are now past their design life, have experienced wear in previously repaired areas, and are required to operate in service through the Scarborough Subway Extension dictated date of 2026. If the vehicle wear is not repaired, the ongoing stress of operations may result in damage that will jeopardize the ability to safely continue Line 3 operations.

The SRT system does not have sufficient spare trucks to postpone repairs and perform them on failure at a later date. The proposed preventive maintenance "Inspection and Reconditioning Plan" (The Plan) combined with ongoing periodic analysis of the operating loads through strain gauging, offers the best option for successful continued operation on the SRT system. Executing "The Plan" concurrently with the ongoing carbody repair provides an opportunity to complete the fleet as fast as possible, while minimising cars out of service.

### **Recommendations**

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It is recommended that:

1. The Board authorize an amendment to the Bombardier Transportation Contract XL5004 "Repair and Replacement of SRT Carbody", by \$5,303,979.88 (Incl. HST) to complete reconditioning of the fleet's 58 trucks, bringing the overall contract price to \$13,942,448.33. This will also extend the contract expiry date to December 31, 2020 on the basis of an amendment to TTC PO C31PA16912 (OEM Bombardier Transportation contract XL5004) of which:
  - i. \$3,566,023.49 is set as base repair costs including the machining, welding, and mechanical repair of the truck components by the OEM approved vendor;
  - ii. \$482,393.05 is set as condition dependant repair costs by OEM vendor;

- iii. \$1,255,563.34 is set for component evaluation, project oversight, repair inspection, quality control, and non-labour OEM items, (i.e. freight, travel, supplies, insurance).

## **Implementation Points**

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- TTC staff to remove SRT trucks from the vehicles, which have been in service for 5+ years since last overhaul.
- OEM Bombardier Transportation Millhaven Facility to pickup trucks from McCowan Carhouse, inspect the damage/wear, and select the most appropriate repair method given the condition and previous repairs performed to the problem areas.
- OEM to recondition and recertify the truck frame and structural components, and perform a complete Non Destructive Test on all parts.
- Parts to be returned to TTC Greenwood Shop for truck overhaul re-assembly with new suspension components.
- McCowan Carhouse to install the reconditioned trucks back on vehicles, coordinated as part of structural carbody repair schedule.

## **Financial Summary**

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Sufficient funds for this expenditure are included in the TTC's 2018 – 2027 Capital Budget and Plan for the Scarborough Subway Extension (SSE) Capital Budget (WO 6914) as approved by the Board on November 28, 2017 and approved by City of Toronto Council on February 12, 2018.

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

## **Equity/Accessibility Matters**

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This report has no accessibility or equity issues.

## **Decision History**

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The following links and table provide history and background related to the decision process for the SRT Life Extension Program.

Decision of Transit City Plan:

[https://www.ttc.ca/About the TTC/Commission reports and information/Commission meetings/2007/Mar 21 2007/Other/Toronto Transit City.pdf](https://www.ttc.ca/About%20the%20TTC/Commission%20reports%20and%20information/Commission%20meetings/2007/Mar%2021%202007/Other/Toronto%20Transit%20City.pdf)

Decision of revised Transit City Plan and maintain SRT service until the proposed Scarborough RT Line opening in 2016:

[https://www.ttc.ca/About the TTC/Commission reports and information/Commission meetings/2010/May 6 2010/Supplementary Reports/Transit City Implica.pdf](https://www.ttc.ca/About%20the%20TTC/Commission%20reports%20and%20information/Commission%20meetings/2010/May%206%202010/Supplementary%20Reports/Transit%20City%20Implica.pdf)

Decision of LFLRV Plan Changed to Scarborough Subway Extension (SSE) and maintain the SRT service until SSE opening in 2023:

[https://www.ttc.ca/About the TTC/Commission reports and information/Commission meetings/2014/June 24/Reports/Scarborough Subway Extension Update.pdf](https://www.ttc.ca/About%20the%20TTC/Commission%20reports%20and%20information/Commission%20meetings/2014/June%2024/Reports/Scarborough%20Subway%20Extension%20Update.pdf)

Scarborough Subway Extension to be in operation by Q2 2026:

<http://www.scarboroughsubwayextension.ca/fast-facts.html>

## **Issue Background**

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To obtain expert advice on how to safely operate the SRT past end of life, the TTC hired Bombardier Transportation to conduct a fatigue life assessment based on analysis of an instrumented car, review of past maintenance practices, and condition of the fleet in order to recommend appropriate actions.

Bombardier Transportation developed comprehensive truck recommendations for immediate implementation, and recommended ongoing maintenance practices, to meet the life extension request. These recommendations were delivered as part of an "Integrity Assessment for life Extension/Continued Operation" report, for which an independent expert consultant (WSP Canada Inc.) was hired by the TTC to provide oversight. Truck recommendations included repair of worn components, inspection and conditional repair or replacement of critical parts, and specific modifications to reduce stress that had proven successful on similar Detroit vehicles.

To further refine the scope of work and repair strategy, the TTC engaged Bombardier Transportation to tear down eight trucks, conduct non-destructive testing to look for hidden cracks on key structural components, assess each part for conformance and develop and execute a plan for each component, based on individual condition, and to recondition parts for additional service life. This work was done under previously approved amendments to Bombardier Transportation Contracts XL5003 and XL5004.

Expert consultant CH2MH was engaged to review Bombardier Transportation's original analysis, findings, and recommendations. The feasibility and effectiveness of recommended actions to achieve the desired result of continued operations was evaluated, as well as ensuring the repair methods conform with industry standards, and are the most appropriate to achieve the desired life extension.

## **Scope of Work**

The scope of fleet repair is broken into two parts: base repairs that will be completed on every truck, and condition dependant repairs that may be completed on each truck as required. The base repair will consist of cleaning, teardown, inspection, measurement, machining and associated component repair. During the inspection, Bombardier will identify the condition dependant repairs that are needed for each of the specified truck components. Bombardier has provided repair prices for defined repairs of the specified components.

## Comments

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Carbody repair recommendations are already underway, which are scheduled to be completed by Q1 2020. This request to repair trucks represents a key element of returning the SRT fleet baseline to OEM operational standards. Quoted pricing in this recommendation represents a 4% reduction in cost per truck (due to economy of scale efficiencies) from \$110,409.05 (approved 7 truck amendment) to \$106,079.60.

Going forward, the TTC intends to follow the OEM recommendations of ongoing monitoring and future overhauls, as practically as possible, since they represent a defined path toward maximising life extension of the SRT vehicles. If the above trucks were unable to complete the above life extension inspection and reconditioning, the SRT vehicles will not be able to continue in revenue service operation through 2026 as planned.

## Contact

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## Signature

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James Ross  
Chief Operating Officer (Acting)

## Attachments

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None