



## **New Streetcar Program - Request for Information (RFI) for 60 Additional Streetcars**

**Date:** June 12, 2018  
**To:** TTC Board  
**From:** Chief Service Officer

### **Summary**

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On June 22, 2015, TTC staff submitted a report to the Board providing a status update on the TTC's contract with Bombardier Transportation Canada Inc. relating to the design and supply of 204 new low floor streetcars. In summary, of the 14 streetcars forecasted for delivery on August 31, 2014, the inaugural launch of the new fleet, only two were supplied. The report went on to say that the streetcars attained a high level of reliability and customer satisfaction.

The contract with Bombardier included options for up to 100 additional streetcars and at that time there was a reported need for 60 of those vehicles to be supplied following Bombardier's delivery of the 204 streetcars in order to meet future ridership growth projections. Due to slippage in Bombardier's delivery schedule, the TTC Board requested a Request for Information (RFI) be issued to gauge the market's interest in delivering the additional required streetcars.

On September 12, 2017, staff issued a RFI document and invited known rail manufacturers to assess the interest of the marketplace to design and supply additional accessible low floor streetcars in response.

This report provides the following:

1. Snapshot of new streetcar deliveries;
2. Confirmation of need for 60 additional streetcars;
3. Summary of RFI responses; and
4. Next steps.

### **Financial Summary**

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This report has no immediate financial impact as the purpose is to provide a status update on the Board-directed assessment of market interest in supplying new streetcars to the TTC.

Funding for the additional 60 streetcars of \$360.885 million has been submitted through previous budget requests; however, the request remains unfunded in 2018. The TTC's 2019 budget submission will include a request for funds believed to be sufficient to procure 60 additional streetcars, regardless of the supplier. Funding for facility and track modifications to accommodate additional streetcars will also be requested through the 2019 budget process.

This report does not address vehicle, storage, or funding requirements to accommodate currently unfunded streetcar expansion programs.

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

## **Equity/Accessibility Matters**

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All vehicles procured by the TTC are accessible and meet or preferably exceed requirements of the *Accessibility for Ontarians with Disabilities Act*.

There are no accessibility or equity matters arising specifically from this report.

## **Decision History**

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April 2006 - A Board decision was made to procure accessible streetcars to replace the streetcar fleet (ALRV and CLRV) that was approaching the end of its design life.

January 2008 - A Request for Proposal was posted on the TTC's Web site. Nineteen companies were issued copies of the proposal document out of which two submissions were received. Based on the review of each submission, it was determined that neither proponent had provided a proposal that complied with the TTC requirements as set out in the Request for Proposal documents. This decision was supported by an independent fairness monitor retained to oversee the procurement process. As a result the TTC cancelled the Request for Proposal.

At the August 27, 2008 Board Meeting staff were directed to proceed with a Structured Multi-Phase Bid Process (SMPBP) with three car builders that had demonstrated experience in producing 100% low floor light rail vehicles. These companies were Alstom Transportation Inc. (Alstom), Bombardier Transportation Canada Inc. (Bombardier) and Siemens Canada Limited (Siemens). Refer to Board meeting highlight item 1 in the following link:

[http://www.ttc.ca/About the TTC/Commission reports and information/Commission meetings/2008/Aug 27 2008/Highlights/index.jsp](http://www.ttc.ca/About%20the%20TTC/Commission%20reports%20and%20information/Commission%20meetings/2008/Aug%2027%202008/Highlights/index.jsp)

At its April 27, 2009 meeting, the TTC Board approved a staff recommendation to award to Bombardier the contract for the supply of streetcars to replace the aging fleet and accommodate marginal future growth. Toronto City Council's approval of the Contract

was, amongst other conditions, subject to a commitment of funding from the Province of Ontario. Refer to the Board meeting highlights item 1 in the following link:

[http://www.ttc.ca/About\\_the\\_TTC/Commission\\_reports\\_and\\_information/Commission\\_meetings/2009/Apr\\_27\\_2009/Highlights/index.jsp](http://www.ttc.ca/About_the_TTC/Commission_reports_and_information/Commission_meetings/2009/Apr_27_2009/Highlights/index.jsp)

On June 19, 2009, the Province of Ontario announced funding of up to \$416,300,000.00 towards 1/3 of the Eligible Costs for the TTC's procurement of the new low floor streetcar fleet. Subsequently, in a special meeting on June 26, 2009, Toronto City Council approved the funds required to complete the purchase of 204 low floor streetcars. The TTC and Bombardier executed the Contract on June 30, 2009 for a total Contract price of \$993 million inclusive of taxes but before foreign exchange.

Subsequent Contract Amendment costs have not been included. The procurement documents were structured to reflect a minimum award of 204 vehicles. The procurement documents included an option to purchase up to 400 additional vehicles for use by the TTC for future growth requirements and in any approved Transit City projects (subsequently 300 option vehicles were assigned to Metrolinx based on a Board authority at the May 6, 2010 Board meeting.)

Refer to the Deferred from Last Meeting to Permit Debate/Public Presentation Item 8 in the following link:

[http://www.ttc.ca/About\\_the\\_TTC/Commission\\_reports\\_and\\_information/Commission\\_meetings/2010/June\\_2\\_2010/Minutes/index.jsp](http://www.ttc.ca/About_the_TTC/Commission_reports_and_information/Commission_meetings/2010/June_2_2010/Minutes/index.jsp)

On January 21, 2013 an agreement was established between the Province of Ontario, City of Toronto and the Toronto Transit Commission regarding Ontario's and Toronto's contribution toward the TTC's low floor streetcar fleet replacement project. City funding will be sourced through a combination of debt and the application of gas tax funding.

On June 22, 2015, a status update report was provided to the Board outlining the status of the delivery of the new streetcars.

At the June 22, 2015 meeting, the Board requested that staff report back with respect to a range of options available to the TTC based on Bombardier's poor performance to deliver the streetcars within the time specified in the Contract Schedule.

[http://www.ttc.ca/About\\_the\\_TTC/Commission\\_reports\\_and\\_information/Commission\\_meetings/2015/June\\_22/Reports/Board\\_Report\\_with\\_Confidential\\_Attachment\\_New\\_Streetcar.pdf](http://www.ttc.ca/About_the_TTC/Commission_reports_and_information/Commission_meetings/2015/June_22/Reports/Board_Report_with_Confidential_Attachment_New_Streetcar.pdf)

In response to the Board's motion, staff provided a report back to the Board on July 29, 2015. The report was deferred to September 28, 2015. At the September 28, 2015 Board meeting, the report was referred to the December 16, 2015 Board meeting. This report should be read together with the previously deferred and referred report (July 29, 2015 and September 28, 2015).

[http://www.ttc.ca/About\\_the\\_TTC/Commission\\_reports\\_and\\_information/Commission\\_meetings/2015/September\\_28/Reports/Board\\_Request\\_Staff\\_Review\\_of\\_Options\\_to\\_Exclude\\_Bombardier\\_.pdf](http://www.ttc.ca/About_the_TTC/Commission_reports_and_information/Commission_meetings/2015/September_28/Reports/Board_Request_Staff_Review_of_Options_to_Exclude_Bombardier_.pdf)

## Issue Background

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At the June 22, 2015 Board meeting, the Board received a report outlining the status of the delivery of the new streetcars. In accordance with the Contract delivery schedule (as adjusted), 14 streetcars were forecasted for delivery by August 31, 2014, the inaugural launch of the new fleet; however, only two were supplied. By the end of 2014, the TTC was expecting to receive 37 new streetcars and in 2015 an additional 36 were expected by contract. The actual number of streetcars delivered as of December 31, 2014 was three and Bombardier revised their projection for 2015 down from 36 to 27 streetcars.

At the June 2, 2015 meeting, the Board requested that staff report back with respect to a range of options available to the TTC based on Bombardier's poor performance to deliver the streetcars within the time specified in the Contract Schedule.

[http://www.ttc.ca/About\\_the\\_TTC/Commission\\_reports\\_and\\_information/Commission\\_meetings/2015/June\\_22/Reports/Board\\_Report\\_with\\_Confidential\\_Attachment\\_New\\_Streetcar.pdf](http://www.ttc.ca/About_the_TTC/Commission_reports_and_information/Commission_meetings/2015/June_22/Reports/Board_Report_with_Confidential_Attachment_New_Streetcar.pdf)

## Comments

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On June 22, 2015, TTC staff submitted a report to the Board providing a status update on the TTC's contract with Bombardier Transportation Canada Inc. relating to the design and supply of 204 new low floor streetcars. In summary, of the 14 streetcars forecasted for delivery on August 31, 2014, the inaugural launch of the new fleet, only two were supplied. The report went on to say that the streetcars attained a high level of reliability and customer satisfaction.

The contract with Bombardier included options for up to 100 additional streetcars and at that time there was a reported need for 60 of those vehicles to be supplied following Bombardier's delivery of the 204 streetcars in order to meet future ridership growth projections. Due to slippage in Bombardier's delivery schedule, the TTC Board directed that a RFI be issued to gauge the market's interest in delivering the additional required streetcars.

On September 12 2017, staff issued a public RFI document and invited known rail manufacturers to assess the interest of the marketplace to design and supply additional accessible low floor streetcars in response.

This report provides the following:

1. Snapshot of New Streetcar Deliveries;
2. Confirmation of Need for 60 Additional Streetcars;
3. Summary of RFI Process and Responses; and
4. Next steps.

## 1. Snapshot of New Streetcar Deliveries

The figure below (Figure 1) depicts the number of new streetcars received each year from 2014 through May 29, 2018 and targets for the remaining deliveries.

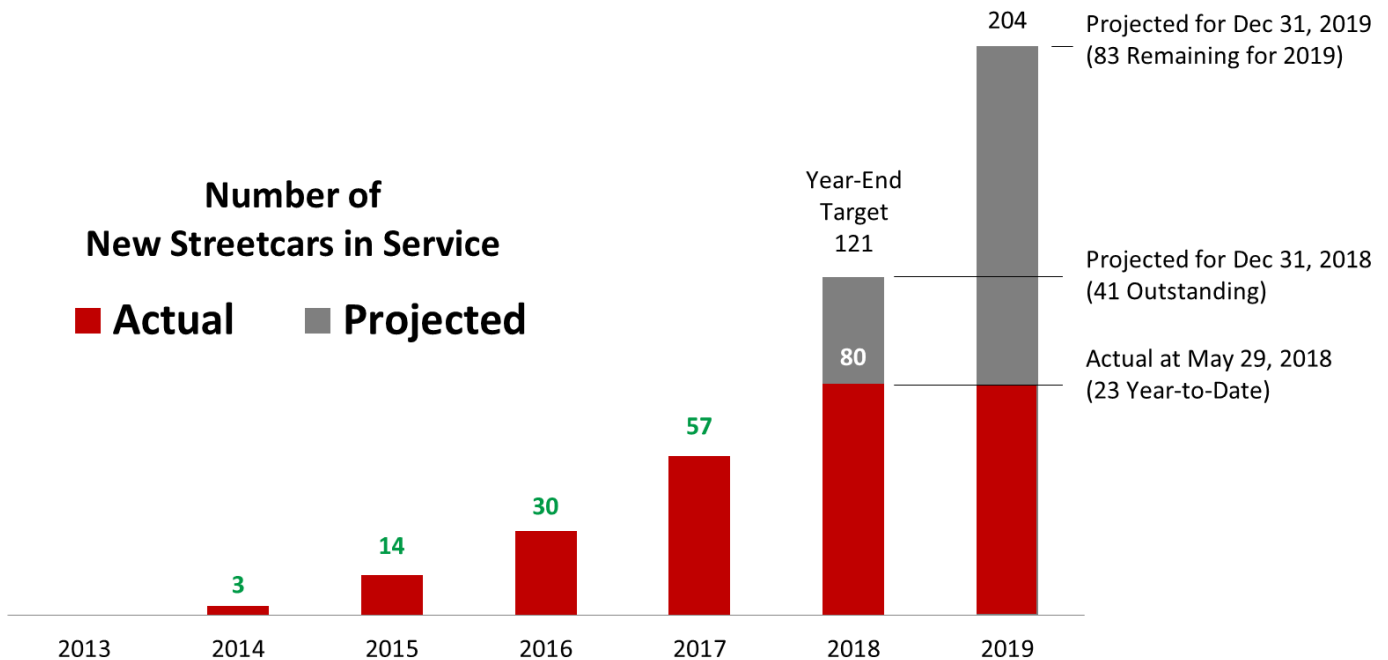


Figure 1: New Streetcar Deliveries to Date

### Recent Progress:

In Q1 of 2018, 11 of the 12 vehicles projected were approved to be shipped from Thunder Bay. One vehicle was damaged on-route and was returned for repair at the Bombardier plant resulting in 10 of 12 entering service in the first quarter (Figure 2).

The target for Q2 2018 is 16 new streetcars in service. As of May 29, 2018, seven streetcars had been shipped, eight had entered service; and of the 204 streetcars ordered, 80 streetcars had been shipped and 75 were in revenue service.

### 2018 New Streetcar Delivery Schedule

	Q1	Q2	Q3	Q4	Total
<b>Actual</b>	<b>10</b>	<b>8*</b>	TBA	TBA	<b>18*</b>
v/s 2018 latest Schedule	12	16	15	21	64

Figure 2: 2018 New Streetcar Delivery Schedule

## **Future Performance:**

TTC's project team is embedded at Bombardier's plants in Thunder Bay; Kingston; La Pocatiere, QC, and Sahagun, Mexico. Recent observations suggest that the production rate continues to increase and quality continues to improve, particularly in Thunder Bay where streetcars are completed.

While challenges continue, TTC and Bombardier remain committed in working together to identify areas of constraint, improved efficiencies and the implementation of corrective actions that affect production and delivery of vehicles.

Bombardier continues to prepare for a second production line out of their Kingston ON plant with the first car due in October. Achievement of this objective will add confidence that Bombardier will recover and meet the original commitment for 204 new streetcars by the end of Q4 2019.

## **2. Confirmation of Need for 60 Additional Streetcars**

Downtown is the heart of transportation activity in the City of Toronto and the surrounding region. It encompasses a 17-square-kilometre area from Bathurst Street to the Don River and from the waterfront to the CP rail corridor/Rosedale Valley Road. The streetcar network is the backbone of the Downtown transportation system. On a typical weekday, about 810,000 transit trips are made in and out of Downtown. This is an area where streetcars provide virtually all transit except for one bus route and a subway line.

In 2009, the original order for 204 new high-capacity, fully-accessible streetcars was based on growth patterns and factors which were available in 2008. Based on those facts, it was then projected that the 204 LFLRVs would accommodate projected ridership on the TTC's eleven streetcar routes through to 2027.

Since 2009, development patterns, ridership growth and other ridership determinants have changed significantly. This has advanced the need for the additional 60 streetcars to 2020.

### ***Additional Streetcars to Accommodate Population and Employment Growth***

Toronto's Downtown area has for the last 12 years been increasing at a rate of approximately four times greater than the rest of the City of Toronto and about 40% faster than the Greater Toronto Area as a whole. Population and employment projections developed by the Provincial Office of the GTA forecasted that the large majority of the regional growth would occur between 1996 and 2011 with limited growth thereafter to 2031. The projections anticipated approximately 200,000 residents Downtown in 2011 and approximately 480,000 jobs Downtown in 2016. Population growth from 1996 to 2016 has matched those expectations but employment growth has exceeded them by approximately 4%.

Much of the residential growth Downtown between 2012 and 2016 took place south of Queen Street. Almost 50% of all Downtown growth occurred in the King-Spadina and Waterfront West neighbourhoods. The Bay Corridor, King-Parliament and Waterfront Central saw moderate increases accounting for 36% of new residents. As a result of the increase in development in Toronto's Downtown area, TTC streetcar ridership increased by 20% between 2008 and 2018 which is much higher than what was anticipated back in 2008. Transit mode share across the City has also increased from 23% (2006) to 27% (2016), putting additional pressure on the system.

Recent revision of the projected employment and population growth for Downtown Toronto has introduced higher forecasts which now extend to 2041. The revised estimate of number of new residents in the Downtown is 500% greater than originally projected. The revised estimate of new jobs in the Downtown is 200% greater than originally projected.

The recent and anticipated population and employment growth in the Downtown is putting tremendous pressure on transportation and transit infrastructure. As a result, the City of Toronto initiated the TOCore study. TOCore is an initiative to prepare a new plan for Toronto's Downtown to be incorporated into the City's Official Plan. As part of the plan, a Downtown Mobility Strategy was developed to guide the implementation of the Downtown Plan. The plan prioritizes surface transit with strong policies such as: *"Priority for surface transit will be implemented on all routes to favour public transit over private automobiles"*

Planned enhancements could include increasing service levels, implementing transit priority measures and expanding the streetcar network with new routes (for example, East Bayfront) in the 2020s. As Downtown and nearby neighbourhoods continue to grow, there will be more demand on already busy transit routes.

### ***Additional Streetcars to Accommodate Latent Demand***

The size of the TTC's streetcar fleet has been unchanged for almost 30 years, during a period of continuously-increasing ridership growth. This has resulted in streetcar capacity, during peak periods, being completely exhausted more than 10 years ago, with no ability to accommodate additional ridership during peak periods. Experience with deployment of the new LFLRVs on the first few streetcar routes has shown that there is an existing unmet, latent demand for peak-travel on the TTC's streetcar routes. King Street is an excellent example of this. Over the first few months of operation the route experienced an increase of all-day weekday ridership of 16%. There are other factors that have contributed to the ridership increase (such as priority treatments and increased reliability); however, latent demand is one factor driving the ridership increase.

### ***Additional Streetcars to Accommodate Traffic Congestion in the Downtown***

The increase in population and employment has also resulted in increases in traffic congestion. Traffic congestion within the city is the highest in the Downtown core where the TTC's streetcar network is in operation. In September 2015, the City of Toronto released a report on Congestion Trends in the City of Toronto (2011-2014). The report showed that Downtown congestion increased significantly between 2011 and 2014. The mean Downtown vehicle speeds were four and seven kilometers per hour slower in the morning and evening peak hours in 2014 when compared to 2011. Increasing traffic congestion, high passenger volumes and adjustments in traffic signal timings create a number of operating challenges which influences service reliability. Streetcar routes have required schedule adjustments to reflect additional travel time required to operate a reliable service. To maintain appropriate service levels extra vehicles are required to improve service quality, reduce short turns, improve on-time departures / arrivals, and reduce missed trips.

In summary, the TTC 2019-2033 Streetcar Fleet Plan is shown in Figure 3. As seen, the TTC will have taken receipt of the 204 LFRVs in 2020. Depending on the life expectancy of the legacy fleet, the TTC requires the additional 60 streetcars between 2020 and 2023. Higher utilization of Hillcrest is required to accommodate the additional 60 streetcars.

The additional 60 streetcars will satisfy demand until approximately 2023. Beyond 2023, the TTC will require additional streetcars and a facility to accommodate this growth and expansion of the streetcar network. TTC staff to begin evaluation of options for additional storage and maintenance facility in 2025 – funding permitting.

The additional 60 streetcars will help to achieve one of the TTC's corporate objectives of moving more people reliably. This additional capacity is also key to achieving Toronto's objectives of more environmentally-sustainable development and a more-liveable central area.



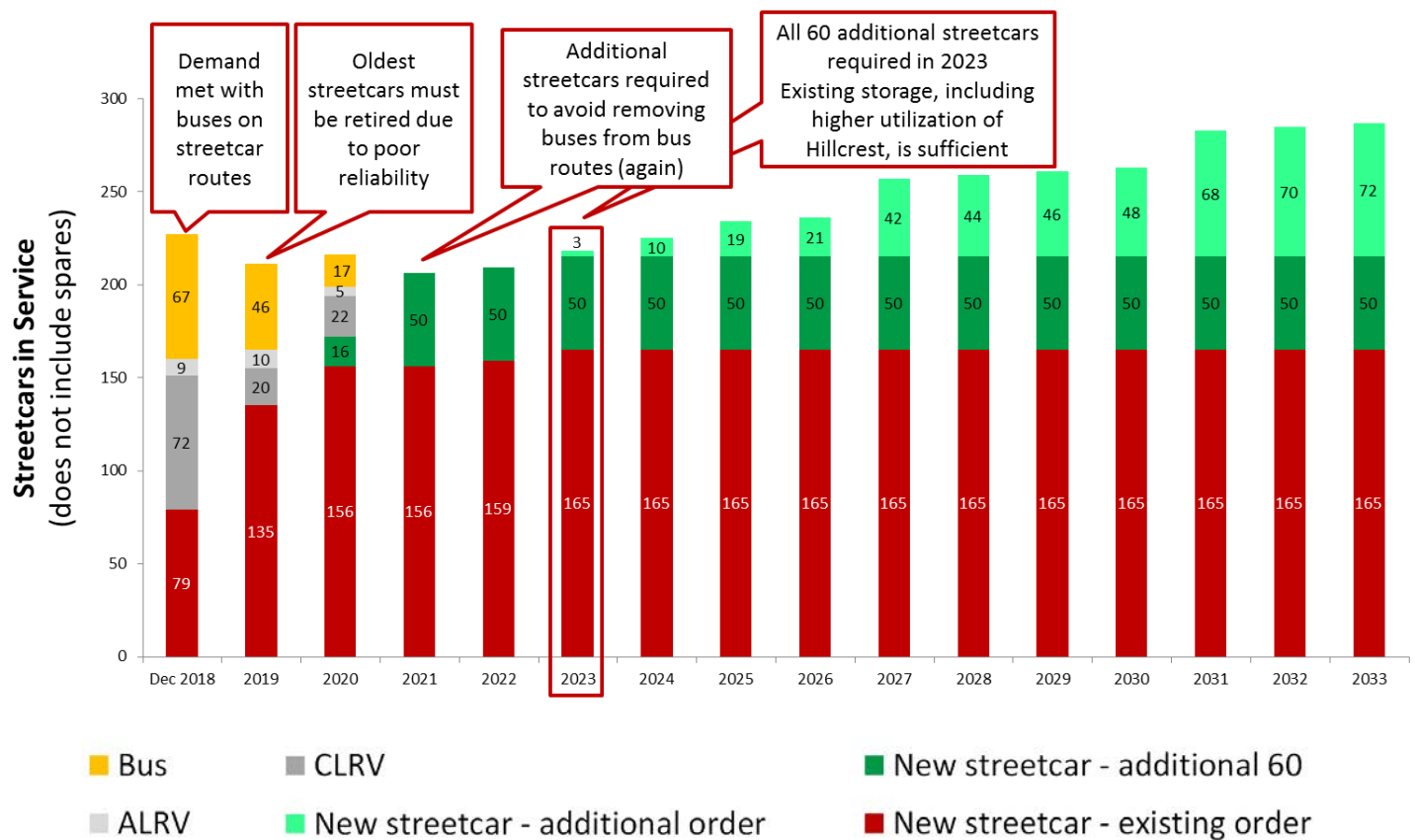


Figure 3: Demand for Additional Streetcars

### 3. Summary of RFI Process and Responses

#### Process

On September 12, 2017, staff issued a RFI document and invited known rail manufacturers to assess the interest of the marketplace to design and supply additional accessible low floor streetcars in response.

In accordance with the Board motion, staff prepared a RFI document. The RFI outlined the must-comply requirements relating to:

- Safe operation in the TTC’s mature streetcar network comprising tight radius curves and loops, single point track switches, steep gradients;
- Noise and vibration limits;
- TBD Liquidated Damage and LD cap;
- Accessibility ramp; and
- Compatibility with the Bombardier Flexity vehicles in terms of collision strength, brake rate and emergency recovery.

In an attempt to draw responses from as many manufactures as possible, the RFI was as general as possible and asked only five questions as follows:

1. Industry background and company history
2. Are you willing to produce/modify a vehicle that meets the TTC technical requirements, 100% low floor, 25% Canadian Content, and the technical Pass/Fail criteria?
3. How soon can you perform a Safety Against Derailment analysis and a 25% CanCon plan?
4. How soon can you engage in a Structured Multi-Phase Bid Process RFP process?
5. What are your vehicle manufacturing capacity, prototype vehicle and production line availability timelines?

The RFI was issued at Merx on September 12, 2017, closed on November 14, 2017 with a pre-closing meeting and streetcar network tour on October 31, 2017.

The complete RFI timeline was:

September 12, 2017:	Issued on MERX
October 31, 2017:	Pre-closing meeting & streetcar network tour
November 14, 2017:	RFI Submission Close Date
March 2018:	Re-Confirmed Service Need
April 2018:	Realigned Fleet Plan and 2019 Budget
June 2018:	Report RFI results to TTC Board <a href="#">Timeline</a>

## Responses

Ten companies responded to the RFI, representing carbuilders from Canada, Germany, Spain, China, the Czech Republic, Korea, Switzerland, and the Ukraine.

Staff conducted a thorough review of the responses and believes that four or five of the companies would be good candidates for the TTC's Structured Multi-phase Bid Process (SMPBP).

The SMPBP process allows staff to review the detailed general conditions and technical specifications with each carbuilder separately for a common agreeable contract document that several carbuilders can bid on, without compromising the TTC's interests.

#### **4. Next steps**

Over the coming months, staff will undertake the following:

1. Request funding approval through 2019 budget process;
2. Update contract documents based on stakeholder input, contract changes, and lessons learned;
3. Engage consultant to validate RFI responses (e.g. technical and commercial performance, on-time delivery performance, etc.);
4. Develop scope and budget for additional maintenance capacity at Hillcrest; and
5. Report back to the TTC Board in Q1 2019 with recommendations.

#### **Contact**

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#### **Signature**

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Collie Greenwood  
Chief Service Officer (Acting)

#### **Attachments**

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Presentation



# New Streetcar Program

Request for Information (RFI) for 60 Additional Streetcars

Bem A. Case, TTC Head of Vehicle Programs



# | Contents

1. Background & Context
2. Request for Information (RFI) Timeline and Process
3. RFI Results
4. Next Steps



# Background & Context

## TTC Board Direction

June 22, 2015, staff reported New Streetcar Program status as:

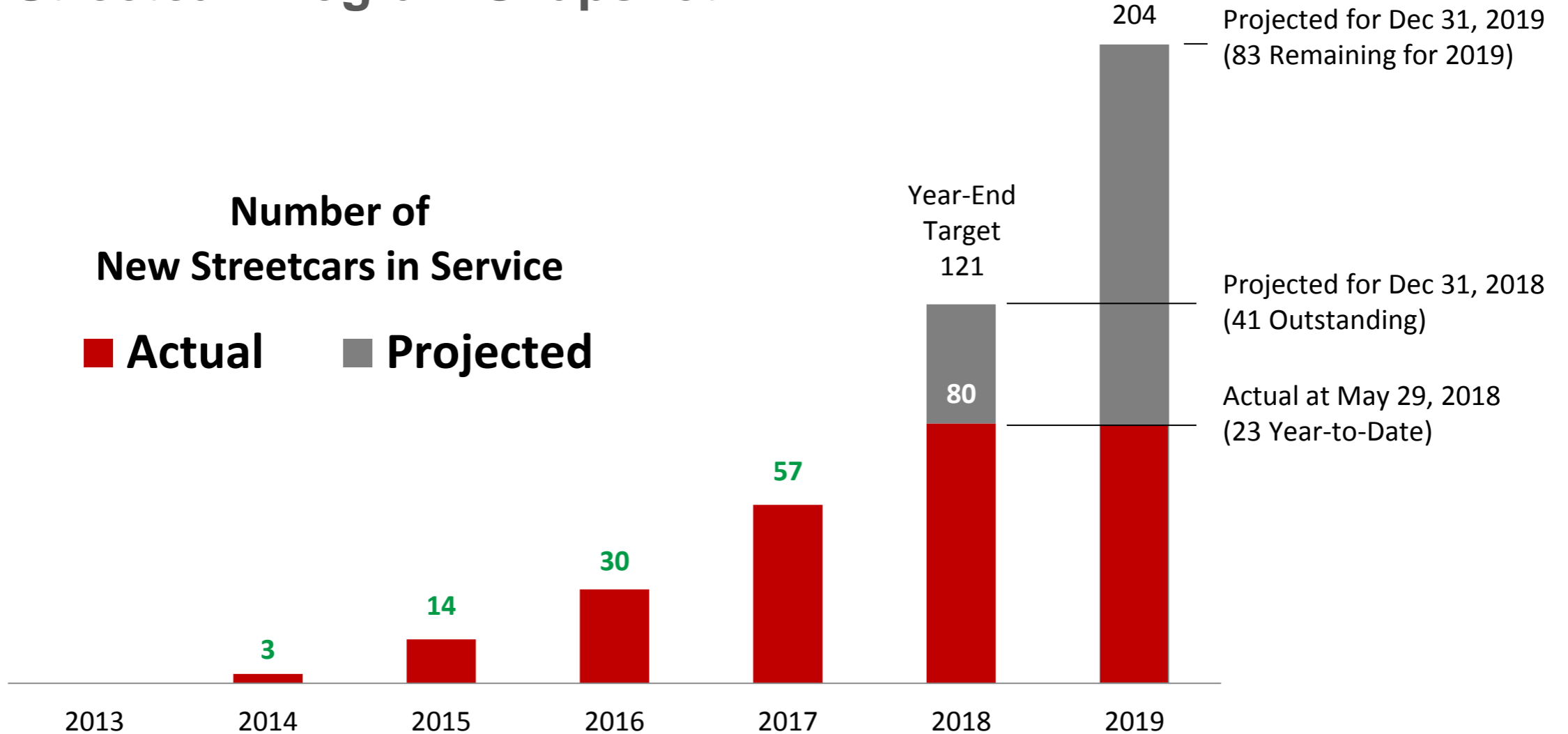
- On Aug 31, 2014, fourteen new streetcars were forecasted. Two were delivered.
- New streetcars attained a high level of reliability and satisfaction from customers.

The contract included options for up to 100 additional streetcars; however, due to slippage in Bombardier's delivery schedule, TTC Board requested an RFI be issued to gauge the market's interest in delivering the required additional streetcars.



# Background & Context

## New Streetcar Program Snapshot



# Background & Context

## Demand for Additional Streetcars

- Original order placed was based on growth patterns and factors which were available in 2008
- Since that time, development patterns, ridership growth and other ridership determinants have changed significantly
- Additional streetcars needed to accommodate:
  - new population and employment growth projections
  - latent demand
  - traffic congestion in the Downtown





# Background & Context

## Demand for Additional Streetcars



# Background & Context

## Demand for Additional Streetcar Service

Summary of Service Need and Operational Constraints:

1. Additional 60 streetcars required starting in 2021 and will serve through 2024;
2. Higher utilization of Hillcrest is required to accommodate the additional 60 streetcars. Storage and maintenance constraints limit the next procurement;
3. TTC staff to begin evaluation of options for additional storage and maintenance facility in 2025 – funding permitting.



# RFI Timeline & Process

## Timeline

September 12, 2017:	Issued on MERX
October 31, 2017:	Pre-closing meeting & streetcar network tour
November 14, 2017:	RFI Submission Close Date
March 2018:	Re-Confirmed Service Need
April 2018:	Realigned Fleet Plan and 2019 Budget
June 2018:	Report RFI results to TTC Board



# RFI Timeline and Process

## Questions to Respondents

1. Industry background and company history
2. Are you willing to produce/modify a vehicle that meets the TTC technical requirements, 100% low floor, 25% Canadian Content, and the technical Pass/Fail criteria?
3. How soon can you perform a Safety Against Derailment analysis and a 25% CanCon plan?
4. How soon can you engage in the RFP process?
5. What is your vehicle manufacturing capacity, and what is your timeline for delivery of prototype vehicles and production vehicles?



# RFI Timeline and Process

## Technical Pass/Fail Criteria

- Willingness to conduct safety against derailment analysis prior to formal bid
- Acceleration & brake rates, adhesion, turning radius, gradeability, ramp-to-wayside interface, and clearance envelope)
- Noise & vibration to be no worse than Bombardier's New Streetcar
- Stainless steel underframe and trucks
- Compatibility with New Streetcar (e.g. buff strength, emergency recovery, and crash energy management)



# RFI Results

## Number of High Potential Respondents

Of the 10 respondents, as many as five may prove technically and commercially compliant in a formal RFP

### Respondents included:

1. Bombardier, Canada / Germany
2. CAF, Spain
3. CRRC Dalian, China
4. CRRC Qingdao, China
5. CRRC Tangshan, China
6. Hyundai Rotem, Korea
7. Innekon, The Czech Republic
8. Siemens, US / Germany
9. Stadler, Switzerland
10. Tatra-Yug, Ukraine



# RFI Results

## Number of High Potential Respondents

### Bombardier, Canada / Germany

- Poor contract performance, but improving
- Vehicle is proven to meet technical requirements
- Options priced at \$3.6 million ea. + escalation, tax, and amendments
- Delivery of additional 60 would start in Q3 2020
- Various efficiencies (e.g. common parts, maintenance, operations, reduced material/warehousing requirements, standard contract management, and standard customer experience)



# RFI Results

## Number of High Potential Respondents

### Others:

- Contract performance unknown
- Vehicle likely to meet technical requirements after modifications to the carbuilders' base vehicle platform to meet TTC's mature network requirements
- Best price believed to be in range of Bombardier options pricing
- Delivery of additional 60 anywhere from Q1 2023 for Prototype to Q1 2025 for completed delivery





# RFI Results

## Typical Timeline for Delivery

Approx Timeline for Procurement of New Streetcars																													
Year (Elapsed)	1		2				3				4				5				6				7				8		
Year (Assumed Q3 2018 start)	2019		2020				2021				2022				2023				2024				2025				2026		
Quarter	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	
2019 Funding Approval	█																												
Consult & Update New Streetcar Spec		█	█																										
Structured Multi-phase Bid Process			█	█																									
Issue Request for Proposal (RFP)					█																								
Evaluation, Approvals, Contract Award						█																							
Design Review, Cab & Car Module Mock-up							█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	
Evaluate Prototype and Approve Baseline Vehicle																					█	█	█	█					
New Car Delivery (assumed approx. 100 cars)																										█	█	█	█



## **Next Steps**

### **Request Budget Approval and Prepare for Procurement**

1. Request funding approval through 2019 budget process;
2. Update contract documents based on stakeholder input, contract changes, and lessons learned;
3. Engage consultant to validate RFI responses (e.g. technical and commercial performance, on-time delivery, etc.);
4. Develop scope and budget for additional maintenance capacity at Hillcrest; and
5. Report back to the TTC Board in Q1 2019 with recommendations



