



## **Wheel-Trans Green Bus Program - Procurement Amendment Authorization for the Purchase of Wheel-Trans Vehicles**

Date: May 8, 2023

To: TTC Board

From: Executive Director – Innovation and Sustainability Group  
Chief Transportation and Vehicles Officer

### **Summary**

---

This report requests the TTC Board's approval to procure fifty-two, six-metre long, gasoline-powered Wheel-Trans buses. They are to be delivered in 2024 and 2025 as part of the approved 2023-2032 Wheel-Trans Green Bus Program.

The Wheel-Trans fleet currently consists of 257 buses. This procurement will utilize an existing contract with Creative Carriage, which was competitively sourced through Metrolinx's Transit Procurement Initiative. These vehicles will replace the oldest vehicles in the fleet, including the nine-metre long, diesel-fuelled 'Friendly' buses (9m Friendly) and the first generation six-metre ProMaster buses (6m ProMaster), which have all reached the end of their design life at an average age of 10 years and six years, respectively.

In addition, to replacing older vehicles at the end of their life in accordance with asset management best practices, this procurement makes progress towards achievement of other strategic objectives. This procurement furthers TTC's sustainability goals by reducing greenhouse gas emissions 33% replacing 9m Friendly buses with 6m ProMaster buses. Further, as each new procurement incorporates lessons learned since the last, these new Wheel-Trans buses also continue to advance the TTC's efforts to improve the accessibility and quality of service to the Wheel-Trans customers through the Wheel-Trans' 10-year Transformation Program.

To meet the requirements of the Accessibility for Ontarians with Disabilities Act by 2025 and to address the expected increase in demand for accessible transit, the TTC developed a 10-year Wheel-Trans Strategy that makes all conventional transit accessible under a new delivery model called "Family of Services".

Included in this report is a summary of TTC's ongoing Wheel-Trans Transformation Program and information regarding the TTC's strategy to transition to a zero-emissions fleet by 2040, in line with the TransformTO Net Zero Strategy.

## Recommendations

---

It is recommended that the TTC Board:

1. Approve a contract amendment with Creative Carriage for the supply and delivery of 52, 6m ProMaster Wheel-Trans buses in the amount of up to \$14,022,402.00 inclusive of all estimated costs, including contract change allowances and applicable taxes.

## Financial Summary

---

Funds for this expenditure are included in the TTC's 2023-2032 Capital Budget and Plan under Program 4.11 Purchase of Buses, which was approved by the TTC Board at its meeting on January 9, 2023 and by City Council on February 15, 2023.

The 10-year Capital Plan includes a total of \$40.3 million for the purchase of gasoline Wheel-Trans vehicles comprising of cashflow funding as follows:

Project Name	2023 Budget	2024	2025	2026	2027	2028	2029	2030	2031	2032	10-Year Total
Purchase of gasoline WT Vehicles	\$26,979	\$9,906	\$2,093	\$1,345	-	-	-	-	-	-	\$40,323

*Table 1: Approved Capital Funding (in thousands)*

The following table summarizes the cash flow requirements by year based on the planned delivery schedule. Should the delivery schedule change, an in-year budget adjustment will be submitted for City Council approval to reflect the revised timing of the approved cash flow funding between 2024 and 2026 to maintain alignment with the fleet delivery schedule.

	<b>2024 Forecast</b>	<b>2025 Forecast</b>	<b>Total Contract Amount</b>
Number of Units	42	10	52
Contract Expenditure	\$10,021,923	\$2,387,292	\$12,409,205
Non-Rebateable HST 1.76%	\$176,386	\$42,016	\$218,402
<b>Total Contract Expense</b>	<b>\$10,189,299</b>	<b>\$2,429,308</b>	<b>\$12,627,607</b>
Rebateable HST	\$1,126,463	\$268,332	\$1,394,795
<b>Total Authority (including HST)</b>	<b>\$11,324,762</b>	<b>\$2,697,640</b>	<b>\$14,022,402</b>

Table 2: Vehicle Funding (2024-2025)

Approval of the recommendation contained in this report will enable the TTC to procure 52, 6m ProMaster buses for approximately \$12.6 million, net of the rebateable portion of HST. Based on vehicle deliveries anticipated in 2023 under the existing contract with Creative Carriage, the 2023 Operating Budget includes \$2.0 million in operating savings, with \$1.2 million to be achieved through the expanded use of zone buses made possible by maximizing the use of a mixed fleet and \$0.8 million in vehicle maintenance savings.

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

**Equity/Accessibility Matters**

The TTC is deeply committed to making its transit system barrier-free and accessible to all so all customers can enjoy the freedom, independence, and flexibility to travel anywhere on the public transit system. One of the cornerstones of the Capital Investment Plan is accessibility, ensuring the customer journey is easy and barrier-free, regardless of accessibility needs.

The 2023-2032 Capital Budget and Plan provides funding to complete the TTC’s Easier Access program, which is underway to make all subway stations accessible with elevators, wide fare-gates, and automatic sliding doors. The program also provides funding for several improvements elsewhere across the system, including Warden and Islington stations, new low-floor streetcars, new 40-foot and 60-foot TTC city buses and new Wheel-Trans vehicles, as well as making an additional 322 bus and streetcar stops accessible.

Procuring new Wheel-Trans vehicles provides an opportunity to improve designs through the systematic identification and removal of barriers. Throughout the design and development process, the TTC: 1) verifies that vehicles meet or exceed all relevant standards under the Accessibility for Ontarians with Disabilities Act (AODA); 2) leverages regional and international best practices; and 3) works closely with the Procurement Authorization Amendment - Purchase of Wheel-Trans Vehicles

Advisory Committee on Accessible Transit (ACAT) to address the unique needs of as many persons as practicable.

## **Decision History**

---

At its meeting on April 11, 2018, the Board received the Wheel-Trans 10-Year Strategy Update with fleet replacement being one of the focal points - 20 new mini vehicles were delivered and 60 additional were due for delivery throughout 2018.

Report: [Wheel-Trans 10-year Strategy – April 2018 Update](#)

At its meeting on January 27, 2020, the Board had before it a report on the TTC's 2020-2029 Key Capital Priorities, which included recommendations on how to allocate the recent allocation of the City's Building Fund according to the TTC's state-of-good-repair backlog. The TTC Board approved the allocation of:

- \$686 million, representing approximately one third of the estimated 10-year cost, toward procurement of 614 vehicles; and
- \$64 million, for eBus charging system infrastructure and \$22 million to fully fund the next four years of Wheel-Trans vehicle procurements.

Report: [TTC's 2020-2029 Key Capital Investment Priorities: Subway Infrastructure and Accelerated Vehicle Procurements](#)

Decision: [TTC's 2020-2029 Key Capital Investment Priorities: Subway Infrastructure and Accelerated Vehicle Procurement](#)

At its meeting on February 25, 2020, the Board authorized the award of a contract to Creative Carriage Ltd. for \$28,780,000.00 inclusive of all taxes for the supply and delivery of the following:

- 20, 6-metre ProMasters in the amount of \$3,750,000.00 inclusive of all estimated costs including contract change allowances, and applicable taxes for delivery between 2020 and 2022.
- 91, 7-metre ProMasters in the amount of \$25,030,000.00 inclusive of all estimated costs including contract change allowances

Report: [Procurement Authorization – Purchase of Wheel-Trans Buses](#)

Decision: Procurement

At its meeting on October 22, 2020, the Board considered a report on the TTC's Fleet Procurement Strategy and Plan which included strategies for the acceleration of transit vehicle procurements, and highlighted promising technologies from the TTC's vehicle innovation pipeline. Through this report, the Board delegated authority to the TTC Chief Executive Officer to issue a contract change through Metrolinx's Joint Procurement Initiative to Creative Carriage Ltd. for the supply and delivery of approximately 70 ProMasters at an estimated cost of \$20 million, inclusive of all project delivery costs, based on the following:

- Written approval by the Advisory Committee on Accessible Transit (ACAT) of the 7-metre ProMaster pilot vehicle that is currently being evaluated; and
- All vehicles are to be delivered between 2022 and 2023.

Report: [TTC Fleet Procurement Strategy and Plan](#)  
Decision: [TTC Fleet Procurement Strategy and Plan](#)

At its meeting on July 14, 2022, the Board considered a report which provided updates and next steps on the Green Bus Program and Green Wheel-Trans Bus program emphasizing the with emphasis on status of e-Bus procurements, Canadian content requirements and the economics of advancing the e-Bus adoption.

Report: [Green Bus and Wheel-Trans Green Bus Program Update](#)  
Decision: [Green Bus and Wheel-Trans Green Bus Program Update](#)

At its meeting on January 9 2023, the Board considered the TTC's Operating and Capital budgets, and were presented a report which laid out a comprehensive view of the TTC's capital needs and priorities over a 15-year period.

Report: [TTC 15-Year Capital Investment Plan, Real Estate Investment Plan Update and 2023 – 2032 Capital Budget & Plan](#)

## **Issue Background**

---

In accordance with asset management best practices, the TTC develops fleet plans to ensure vehicles are replaced at the end of their design life. There are currently three different models of bus in the Wheel-Trans fleet, including: the nine-metre long, diesel-fuelled "9m Friendly" bus with a design life of 10 years; the six-metre long, gasoline-fuelled "6m ProMaster" bus with a design life of 5 years; and the seven-metre long, gasoline-fuelled "7m ProMaster" bus with a design life of 6 years. Between 2023 and 2025, 157 of the 257 vehicles in the fleet will reach the end of their design life.

In 2023, TTC is scheduled to receive twenty-three 6m ProMasters and 76 7m ProMasters to commence the replacement of the 157 vehicles due for decommissioning. The fifty-two 6m ProMasters to be procured through this report, along with a future procurement of the TTC's first ten battery electric buses, will complete the replacement of these vehicles by the end of 2025.

The following table provides a summary of retirements and procurements over the next three years:

## EXTRACT FROM WHEEL-TRANS FLEET PLAN (2023- 2025)

Retirements				
Vehicle Model	2023	2024	2025	Total
9m Friendly Bus (purchased in 2012)	35	0	0	35
6m ProMaster Bus (purchased in 2017 through 2019)	59	48	15	122
Procurements				
Vehicle Model	2023	2024	2025	Total
7m ProMaster Bus Active procurement 2020 - 2023	76	0	0	76
6m ProMaster Bus Active procurement 2020 - 2023	23	0	0	23
<b>6m ProMaster Bus</b> <b>Pending approval of this report 2024 - 2025</b>	<b>0</b>	<b>42</b>	<b>10</b>	<b>52</b>
Battery-Electric Wheel-Trans Bus Pilot Program Contract award pending Board approval in 2024	0	0	10	10

*Table 3: Approved 2023 Wheel-Trans Fleet Plan*

In support of TTC’s 10-year Wheel-Trans Transformation Program (WTTP), the 9m Friendly buses are currently being replaced by 6m and 7m ProMaster buses. The transition to smaller vehicle was approved in consultation with the Advisory Committee on Accessible Transit (ACAT).

The smaller vehicles are used for short and more frequent trips as part of the new Family of Services (FOS) delivery model. This new FOS delivery model is part of the 10-year WTTP which encourages Wheel-Trans customers to utilize the accessible conventional service (bus, streetcar and subway) as part of their journey when possible. Currently, approximately 28% of Wheel-Trans customers are utilizing the FOS delivery model which equates to approximately 120 FOS trips per week.

Smaller vehicles support the FOS delivery model in a number of ways. The smaller vehicles, in comparison to the historical 9m Friendly buses, are easier to maneuver throughout the City. This allows more flexibility in where the buses operate and decreases both trip times and response times. In addition, with more customers using the FOS delivery model, the smaller vehicles match capacity to demand. Shorter and more frequent trips increases Wheel-Trans’ passenger per hour count, which leads to a higher asset utilization.

From a maintenance perspective, transitioning from the 9m Friendly buses to the new 6m and 7m ProMaster buses also provides benefits. The 9m Friendly buses were significantly modified to arrive at the final design, which included moving away from the

Original Equipment Manufacture (OEM) drivetrain to a customized designed front axle and transfer case. It also included attaching an oversized passenger compartment onto the chassis and frame. These modifications resulted in the need for intensive preventative maintenance programs and a relatively low reliability.

While up fitting OEM vehicles is still required on the ProMaster fleets, there are no modifications to the OEM drive train and minimal changes to structure. This has proven to greatly improved reliability of the fleet. By way of comparison, the reliability of the 9m Friendly fleet is currently 13,600 kilometres mean distance between failures (MDBF), while the combined reliability of the 6m and 7m ProMaster fleet is 65,000 kilometres MDBF.

Further the replacement of diesel-fuelled buses with gasoline-fuelled buses is serving as an interim step along our path to fully decarbonize the fleet.

Service, environmental, financial benefits of this procurement of 6m ProMasters includes the following:

Benefit	Description
Service Impact	Increases reliability, with the 6m vehicles having a Mean Distance Between Failures (MDBF) of 65,000 km which is approximately five times that of the 9m diesel Friendly fleet being replaced.
Environmental Impact	Reduces greenhouse gas emissions by ~33% or ~4,200kg/vehicle/year.
Financial Impact	Reduces fuel cost by ~20% or ~\$4,500/vehicle/year
Others	<ul style="list-style-type: none"> <li>○ Improved drivability in the city</li> <li>○ OEM product (e.g. no significant structural modifications required)</li> <li>○ Continued operation of the Community Bus Program</li> <li>○ Vehicle size meets ridership target</li> <li>○ Lower capital cost due to the elimination of the mid-life overhaul that was previously required for the 9m Friendly fleet.</li> <li>○ Meets or exceeds all requirements laid out in CSA Standard D409-16 for accessible vehicles.</li> </ul>

*Table 4: 6m Vehicle Benefits*

The 7m ProMaster delivers similar benefits, but also has space to accommodate multiple passengers with larger mobility devices and can be used for the Community Bus service. TTC’s Community Bus service connects customers of all abilities to a variety of popular destinations along a unique neighbourhood route. The Community Bus stops at the front door of various buildings and landmarks, including local shops,

community centres, health care facilities and seniors' residences. While this service utilizes a 7m ProMaster, anyone can ride a Community Bus.

## **Comments**

---

### Wheel-Trans 10-year Strategy

Established in 2017, the Wheel-Trans 10-year Strategy provides the guidance and direction for the service and operational improvements and necessary changes essential for the TTC and Wheel-Trans to ensure long-term sustainability. It was developed in response to the acknowledged need to offer customers spontaneity of travel; to be inclusive and part of the community; to help ensure and foster dignity; expand their opportunities for travel; improve customer service for what is a growing customer base; all the while seeing significant cost avoidance for the TTC and, ultimately, the City.

In addition, new legislative requirements contained within the AODA regulations, the recommendations provided by the City of Toronto Auditor General and the Demand Forecast drove the need for change. If Wheel-Trans were to continue to provide this valuable service under the existing service model, annual subsidy increases would be required which would place significant pressures on the TTC's Operating Budget and City funding that are unsustainable over the long-term. With the TTC's conventional transit services becoming increasingly accessible, with targets for 100% accessibility by 2025, changes were made to the service delivery model for Wheel-Trans to make better use of limited resources while also adapting and adhering to new provincial legislation through the implementation of a Family of Services approach. Family of Services being the utilization of Wheel-Trans and conventional transit modes (bus, subway or streetcar services) for a portion of a trip.

The Wheel-Trans 10-year Strategy includes facility and vehicle improvements that need to be made to accommodate Wheel-Trans customers of the future who will also be travelling on the accessible conventional fixed route network. A detailed update on the Wheel-Trans 10-year Strategy will be provided in a report to the TTC Board at its June 2023 meeting.

### Procurement of 6m ProMaster Buses

The 2023 approved Wheel-Trans Fleet Plan requires the procurement of 52, 6m Wheel-Trans vehicles for delivery in 2024 and 2025, in keeping with asset management practices. These units are scheduled to replace vehicles reaching the end of their useful life.

The procurement of these 52, 6m ProMaster Wheel-Trans buses will be executed through a contract amendment of the TTC's existing contract with Creative Carriage. This contract was completed as a joint procurement through Metrolinx's Transit Procurement Initiative (TPI) with other Transit Agencies across Ontario. Since the inception of the program with the Ministry of Transportation in 2006, and subsequent transfer to Metrolinx in 2008, TPI has helped small, medium and large transit systems



across the province save money through joint procurements. Synergies are created by combining the experience and knowledge of bus fleet managers with vehicle specification, procurement and operational experts, creating a performance-based specification to maximize operational efficiency, increase purchasing power, and decrease capital and operational costs.

The opportunity to leverage existing mini-van contracts through the City of Toronto or Province of Ontario was not an option as paratransit vehicles require specialized design and up-fitting.

### Wheel-Trans Green Bus Program Update

The TransformTO Net Zero Strategy defines a pathway to achieve net zero greenhouse gas (GHG) emissions in Toronto by 2040. In 2017, the TTC took its first step to replace its diesel-fuelled 9m Friendly buses through the introduction of 6m, and later 7m, gasoline-fuelled ProMaster buses.

As a next step in the transition to a zero-emissions Wheel-Trans fleet, the TTC is planning to procure up to 10 battery-electric buses (eBuses) from multiple vendors to:

- Evaluate the eBuses through a pilot program within the TTC's operating environment;
- Leverage lessons learned from the pilot program to inform technical and commercial specifications for future procurements; and
- Share our findings with the broader transit community through a peer exchange of best practices to assist with the planning and adoption of zero-emissions vehicles.

These Wheel-Trans eBuses will be procured through a new competitive procurement process with vehicles planned for delivery in 2025. Once this competitive procurement is completed, TTC will present the findings and recommendations of the RFP for Board approval. An overview of the plan for the electrification of the Wheel-Trans fleet is provided in Table 5 below.

<b>Milestone Date</b>	<b>Activity Description</b>
Q1 2023	Post RFI (completed)
Q3 2023	Post RFP for up to ten (10) battery-electric Wheel-Trans vehicles
2024	Board report - procurement of up to ten (10) battery-electric Wheel-Trans vehicles
2025	Delivery of pilot battery-electric Wheel-Trans vehicles
2025- 2027	Evaluation of pilot battery-electric Wheel-Trans vehicles
2027	Issue RFP for bulk procurement of battery-electric Wheel-Trans vehicles
2030	Steady state procurement of battery-electric Wheel-Trans vehicles
2040	Zero emissions Wheel-Trans fleet

*Table 5: Wheel-Trans Electrification Timeline*

To gauge market availability of electric vehicles in the 6 to 8 metre range, a Request for Information (RFI) was issued in February 2023. The RFI and subsequent market engagements will help the TTC identify what vehicle options exist in the market place that meets the requirements of the TTC and will inform the procurement of up to 10 battery-electric Wheel-Trans vehicles. By 2026, a report will be provided to the Board which will summarize preliminary results of the TTC’s head-to-head evaluation of these pilot vehicles, and by 2027 final results of the head-to-head evaluation which will outline resulting ‘must-have’ requirements for bulk procurement will be presented to the Board.

A key interdependency to the electrification of the Wheel-Trans fleet is the associated charging infrastructure. The TTC currently has an agreement in place with PowerON Energy Solutions LP to install the charging infrastructure required to support the Wheel-Trans eBuses. On August 19, 2022, the Principal Agreement between the TTC and PowerON Energy Solutions LP was executed. Under this agreement, the engineering, design, procurement, construction, installation, testing, and commissioning will be undertaken by PowerON to deliver the TTC’s electrification Infrastructure.

A detailed update on the electrification of the Wheel-Trans fleet will be provided as part of the Green Fleet Procurement Strategy and Plan in 2024.

**Contact**

---

Roy Park, Head - Vehicle Programs  
 416-393-6977  
[roy.park@ttc.ca](mailto:roy.park@ttc.ca)

Cameron Penman, Head - Wheel-Trans  
416-393-3095  
[cameron.penman@ttc.ca](mailto:cameron.penman@ttc.ca)

## **Signature**

---

Bem Case, Executive Director - Innovation and Sustainability Programs  
647-393-2385  
[bem.case@ttc.ca](mailto:bem.case@ttc.ca)

Rich Wong, Chief Transportation and Vehicles Officer  
416-393-3564  
[rich.wong@ttc.ca](mailto:rich.wong@ttc.ca)