Region of Waterloo

Transportation Services

Transit Services

To:	Sustainability, Infrastructure, and Development Committee
Meeting Date:	October 8, 2024
Report Title:	GRT Interim Bus Acquisition Strategy

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1. Recommendation

That the Regional Municipality of Waterloo direct staff to prepare the 2026-2030 conventional bus procurement to consider all viable propulsion options (e.g., clean-diesel, clean-diesel hybrid, and battery-electric) for standard 12-metre (40-foot) and articulated 18-metre (60-foot) vehicles as outlined in report TSD-TRS-24-011, dated October 8, 2024.

2. Purpose / Issue:

Significant annual investment in transit vehicles will be required over the next five years to maintain and expand GRT's fleet to deliver transit services that help achieve both the Region's Strategic Plan priorities and reduce community transportation emissions.

It is not feasible to rely on current e-bus technologies to meet the 2025-2030 bus replacement or expansion schedules required to maintain and enhance GRT service levels.

This report recommends the Region consider all fleet propulsion options in the next bus procurement based on the current state of the transit vehicle manufacturing industry, as well as the operational, infrastructure, and financial limitations of current electric bus technologies.

No commitment to a specific engine type or vehicle model is required at this time.

3. Strategic Plan:

Climate Aligned Growth / Resilient and Future Ready Organization – investing in the most technologically viable and fiscally resilient transit fleet available today enables GRT to deliver frequent, reliable transit services that support the Region's commitment to reduce community emissions and foster car-alternative options for the community.

This strategy helps ensure GRT remains well-equipped to achieve the TransformWR plan endorsed by Regional Council (Strategic Action 1.2.3 - Continue to expand access

to public transit across cities and townships).

4. Report Highlights:

- In May 2020, Regional Council approved GRT's recommended transition towards low and zero emission vehicles (TES-TRS-20-12). The approach recommended ending procurement of diesel buses, relying on hybrid buses as the bridging technology well beyond the 2-year battery-electric bus (e-bus) pilot until e-bus technology matured.

- GRT's current bus Vendor of Record (Nova Bus Inc.) announced it will no longer produce hybrid buses as of 2024 (COR-TRY-24-004), limiting GRT's replacement and expansion options to new e-bus technologies, which are not a viable direct replacement for hybrid or diesel buses at this time.

- As part of GRT's commitment to decarbonization, the purpose of the e-bus pilot program is to understand the feasibility of integrating and scaling up an electric fleet (see companion Report TSD-TRS-24-010). Preliminary findings from the e-bus pilot have highlighted operational challenges with the new technology. Diesel and hybrid buses have a range of over 1,000 km before refuelling is required. The reliable revenue service range for an e-bus on GRT routes is around 200 km. Most current GRT service blocks are over 300 km to reduce labour and vehicle costs, and to improve system efficiency. For example, some 201 iXpress service blocks are over 420 km and currently served by one bus, but would need to be split into three blocks to be reliably completed by three e-buses. At present, any fuel cost savings from e-bus operations are not realized because of the additional labour and vehicle service block costs. Further, an e-bus currently requires up to four hours to fully recharge, limiting options for redeployment on the same service day. While staff have mitigated some of these issues through operational adjustments to dedicate Route 7 for the e-bus pilot fleet, the operational and financial impacts of current vehicle and charging technologies compound if the e-bus fleet expands.

- GRT partnered with the Region's Energy Conservation Office in Facilities to conduct a feasibility study to determine if GRT's sites could support rapid, dedicated electrification based on GRT's vehicle replacement and expansion schedule for the next 5-10 years, and current e-bus charging technologies. The feasibility study found that only four additional chargers (8 extra e-buses) can be accommodated across the three garages (Strasburg: 3; Cambridge: 1; Northfield: 0), without significant service upgrades estimated at or above $11.6 million and flagged as operationally difficult to execute with significant lead times.

- GRT must replace 82 buses from 2026-2030 to maintain current service reliability, and current fleet expansion is estimated at 10 new buses annually to meet growth-related demand. It is not feasible to rely on current e-bus and charging

technologies to meet the bus replacement or expansion schedule required to maintain or enhance service levels.

- In order to achieve Strategic Plan priorities and community transportation emissions reduction targets endorsed by Regional Council, significant investments in transit services will be required and recommended in the upcoming 2025-2030 GRT Business Plan. A mix of new conventional 40-foot and articulated 60-foot vehicles are anticipated to be required to meet demand.

- Since the pandemic, the North American bus manufacturing industry has been significantly impacted by a variety of factors. Supply issues and market uncertainty continue to delay the production, delivery, and propulsion options available for new vehicles, and are anticipated to impact pricing for any new orders.

- In recognition of the short-term operational and infrastructure limitations of e-buses, and volatility in the bus manufacturing industry, staff request permission to consider all fleet options in the next bus procurement. This will best equip GRT to respond to market pressures and vehicle technology improvements to ensure sustained and efficient operations.

- GRT will continue to evaluate emerging low-carbon technology and remains committed to fleet decarbonization with proven technology to achieve net zero emissions by 2050. In 2025, GRT will kick off preliminary planning for a new Cambridge transit garage, which is envisioned to be equipped with the necessary energy capacity and infrastructure to support scaling up a future zero-emission fleet as new bus technologies mature.

- GRT staff have prepared the proposed interim vehicle strategy in collaboration with the Region's teams coordinating the Corporate Climate Action Plan (CorCAP), Corporate Energy Plan, and TransformWR. The proposed strategy will likely result in a short-term increase in corporate emissions when GRT's fleet operations are maximized to meet community demand. However, GRT's operations represent less than 1% of total community emissions, and are one of the few dedicated, scalable programs the Region can use to reduce passenger vehicle trip emissions (31% of total community emissions). Increasing transit service with any kind of vehicle can contribute to a significant reduction in community emissions by reducing personal vehicle use. For example, it is estimated that GRT's 2023 diesel and hybrid bus service and ridership prevented over 7,000 tonnes of transportation-related community emissions that would otherwise have been passenger vehicle trips. Sustained investment in frequent, reliable, and expanded transit services increases ridership, improves transportation equity, promotes transit-supportive development, unlocks access to affordable housing options, and reduces car dependency and associated emissions

5. Background:

GRT will operate and maintain a fleet of approximately 340 buses by 2025 with an anticipated lifespan of approximately 14 years. The fleet size is anticipated to expand annually in response to service increases related to population growth and strategic priorities.

Regional Council approved the purchase of eleven battery electric buses to pilot integrating electric vehicles into GRT's fleet as part of its strategy to reduce corporate emissions from operating transit services (TES-TRS-20-12, TES-TRS-22-03).

Nova Bus Inc. was named Vendor of Record (VOR) for hybrid and electric buses for an initial two-year period ending December 31, 2025 (COR-TRY-23-035).

6. Communication and Engagement with Area Municipalities and the Public

Area Municipalities: GRT staff participate in the Region's Climate and Energy Transition working group, which shares updates with local municipal representatives.

Public: Preliminary feedback from GRT's ongoing 2025-2030 Business Plan engagement suggests public support for a consistent, frequent transit network that serves the community every day including late evenings and weekends. Financially and operationally sustainable improvements to frequency and hours of service requires more buses that will need to be in service for longer periods of time.

7. Financial Implications:

Preliminary estimates for the cost of a new conventional bus are approximately $900,000 (diesel), $1.2 million (hybrid), and $1.6 million (e-bus). Staff were recently advised to budget for an e-bus battery replacement (estimated at $450,000 per e-bus) midway through the vehicle lifecycle to maintain performance and range.

The approved Transit Services Capital Program has been prepared to reflect incremental vehicle replacement, expansion, and equipment costs (excluding battery replacement) associated with the preliminary electric bus strategy.

No changes to the Capital Program are recommended at this time. Vehicle purchase recommendations and any related program budget updates will be presented to Regional Council for consideration once the bus procurement is complete.

8. Conclusion / Next Steps:

Subject to Regional Council approval, staff will prepare a 2026 bus procurement strategy that considers all viable propulsion options (e.g., clean-diesel, clean-diesel hybrid, and battery-electric) for standard 40-foot and articulated 60-foot vehicles.

Attachments: None.

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