



Line 1 State-of-Good Repair Capital Works

Date: April 11, 2019

To: TTC Board

From: Deputy Chief Executive Officer - Operations

Summary

The purpose of this report is to seek the Board's endorsement of the Line 1 State-of-Good Repair (SOGR) four-year capital program outlining the TTC's plan to undertake on going rehabilitation of key subway infrastructure assets and lays the foundation of a long-term program approach to SOGR projects. The projects within the program are sequenced to align with the deliverables of major corporate strategic initiatives which include completing the implementation of Automatic Train Control (ATC) on Line 1 by September 2022 and Line 1 Capacity Requirements.

A preliminary draft of the four-year capital program spanning 2019-2022 has been developed identifying key Line 1 SOGR projects and their relationship with the ATC implementation dates, along with high level cost estimates for each project.

Recommendations

It is recommended that:

1. The Board endorse the proposed program approach of the Line 1 Subway State-of-Good Repair capital work projects; and
2. The Board direct staff to continue to report on an annual basis in the Major Projects Update of the Financial Update.

Financial Summary

Funding is available to support the projects in the four-year plan, however, staff are finalizing resourcing requirements to support the execution of some of the projects within the targeted timelines. The Wayside Signalling Decommissioning and Substructure and Drainage Rehabilitation projects are not yet fully scoped or funded. Subsequent updates will be provided throughout 2020 budget process.

The following projects are currently funded under the following capital programs:

Project	2019-2022 Budget	Estimated 2019-2022 Line 1 Costs
Replace LV Feeder Cables	\$ 14,513,000	\$ 14,076,000
Replace Electrically Operated Isolating Switches and Switchstands	\$ 2,000,000	\$ 1,500,000
Subway/SRT Track Rehabilitation Program	\$ 99,031,000	\$ 27,000,000
Subway/SRT Turnout Rehabilitation Program	\$ 44,390,000	\$13,000,000
Switch Machine Replacement/Refurbishment	\$ 2,872,000	\$ 1,226,000
Tunnel and Station Leak Remediation Program	\$ 18,600,000	\$7,520,000

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

Equity/Accessibility Matters

One of the cornerstones of the TTC is accessibility and ensuring the customer journey is easy, frictionless and barrier-free, regardless of accessibility needs. This approach will be supported and will continue with the work of Line 1 SOGR Capital Works.

The TTC is working toward making Toronto's transit system barrier-free by implementing changes that will make its services and facilities more inclusive and accessible to everyone by 2025, thereby attracting more customers to the system.

Decision History

At its meeting of January 24, 2019, the TTC Board approved the TTC 15-Year Capital Investment Plan & 2019 - 2028 Capital Budget & Plan:

[January 24, 2019 TTC Board Meeting- Capital Investment Plan](#)

Issue Background

Increased subway ridership over the past 10 years has resulted in capacity constraints on Line 1. At the same time, unpredictable infrastructure failures as a result of the age and condition of many key Line 1 track and wayside assets have led to service delays

and increased travel times for customers. The current infrastructure and signalling system, although safe, is no longer reliable, designed for or capable of supporting increased ridership to the planned 2026 and 2031 service horizons. As demonstrated this past winter, infrastructure asset failures can lead to lengthy delays leading to concerns over station crowding at many of the passenger station access points.

The ATC signalling system offers increased asset reliability and its implementation will make the assets less susceptible to delays, thus improving the performance of the overall system. This has been the experience along the portion of Line 1 from Vaughan Metropolitan Centre (VMC) to Dupont Stations, where ATC has been implemented.

In order to ensure delivery of ATC and support efforts of Line 1 Capacity, SOGR projects need to be closely coordinated to ensure that the sequencing of work can be completed to align with key milestones of the ATC and Line 1 Capacity programs. Work must be properly sequenced and include enough lead time to avoid ripple effects to other projects, initiatives and overall programs.

One of the main challenges and possible risk to the SOGR efforts aligning with ATC is finding an adequate drainage solution along the track side. Water enters the subway tunnels through the concrete subway tunnel structures and through open portions of the track. Though there are drains along the tracks drainage has been a challenge, due to the volume of waterflow and age of the infrastructure, and has caused track components to deteriorate and fail. The root cause of drainage issues is often site specific and requires unique design solutions so as not to adversely impact subway service.

Staff have been reviewing different strategies to channel water away from track side to improve drainage on Line 1. Throughout 2019 and 2020, staff will be working to develop design solutions that align with the ATC project implementation dates. Depending on the solution proposed, an analysis of workforce availability will be undertaken. Given scope uncertainties, it is possible that the full complement of trackside drainage solutions may not be fully implemented by 2022 and will continue beyond this timeframe.

Another significant risk to completing the necessary work to align with ATC by 2022 is successful implementation of the Automatic Train Protection (ATP) on the workcars used for the SOGR activities. The TTC workcars are specifically designed vehicles to enable crews to carry out work within the subway system. The workcars vary in size and are currently not ATC enabled. The TTC is in the process of retrofitting five workcars to be ATC enabled by the end of 2019. By doing this, we will speed up work as ATC-enabled workcars are more efficient and reliable. Workcars that are not ATC enabled operate through procedure and line of sight operation when in ATC territory adding additional time that could otherwise be used to execute on work activities.

Comments

The intent of the SOGR program approach developed is to ensure that no project is singularly managed, but rather considered as part of a broader program with the customer experience given priority consideration as part of the implementation process. The goal of the program is to ensure that all infrastructure assets that need to be rehabilitated or renewed are complete and performing in an optimal manner to support the successful implementation of ATC to output optimal service levels and to help achieve Line 1 Capacity initiatives of operating 31 trains per hour by 2026 (subject to service level review).

ATC requires substantial traction power to operate. Traction power exists, however, there will be an increase in demand and modernization to the system is required. Staff have utilized industry best practices and consultants to guide rehabilitation targets. Traction power simulation exercises have been undertaken to ensure future service demands have the necessary traction power to perform, and that resources are available to continue to execute ATC construction activities in order to remain on schedule.

The ATC and SOGR projects listed in this report cannot be performed expediently using simply the short overnight work window. Early service closures and full weekend closures are required to accelerate the completion of this critical work.

The current 2019 Line 1 closure schedule includes the following:

- 16 full or partial weekend closures dedicated to ATC construction or testing works;
- Five full or partial weekend closures dedicated to SOGR repair work;
- Nine early closures, staged over two to four consecutive nights, dedicated to ATC construction or testing works, over a seven-month period; and
- 13 early closures, staged over three to four consecutive nights dedicated to SOGR repair work, over a seven-month period.

Early and weekend closures offer opportunities for both the ATC and SOGR workforces to significantly improve their productivity over a traditional night shift.

The workload is extensive and despite the execution of work through system closures and realized synergies amongst the work groups, there may still be significant work that will proceed beyond the 2022 ATC full implementation timeframe (i.e., traction power cable upgrades, legacy wayside signalling decommissioning, trackside drainage solutions). Although additional work will be required on an on-going basis as part of the overall program which will require the use of early or full/partial weekend closures, it is anticipated that the overall system need will significantly drop on Line 1 beyond the 2022 horizon and the number of early or full/partial closures should decrease.

It is critical that all subway infrastructure assets are in a state-of-good repair and in alignment with the targeted ATC system implementation dates. Achieving this will ensure a decrease in service delay incidents for our customers and provide confidence

that many of the repeat defects are corrected with medium to long-term practical sustainable solutions.

An overview of the 2019 - 2022 Capital SOGR Program Schedule is attached to this report.

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Signature

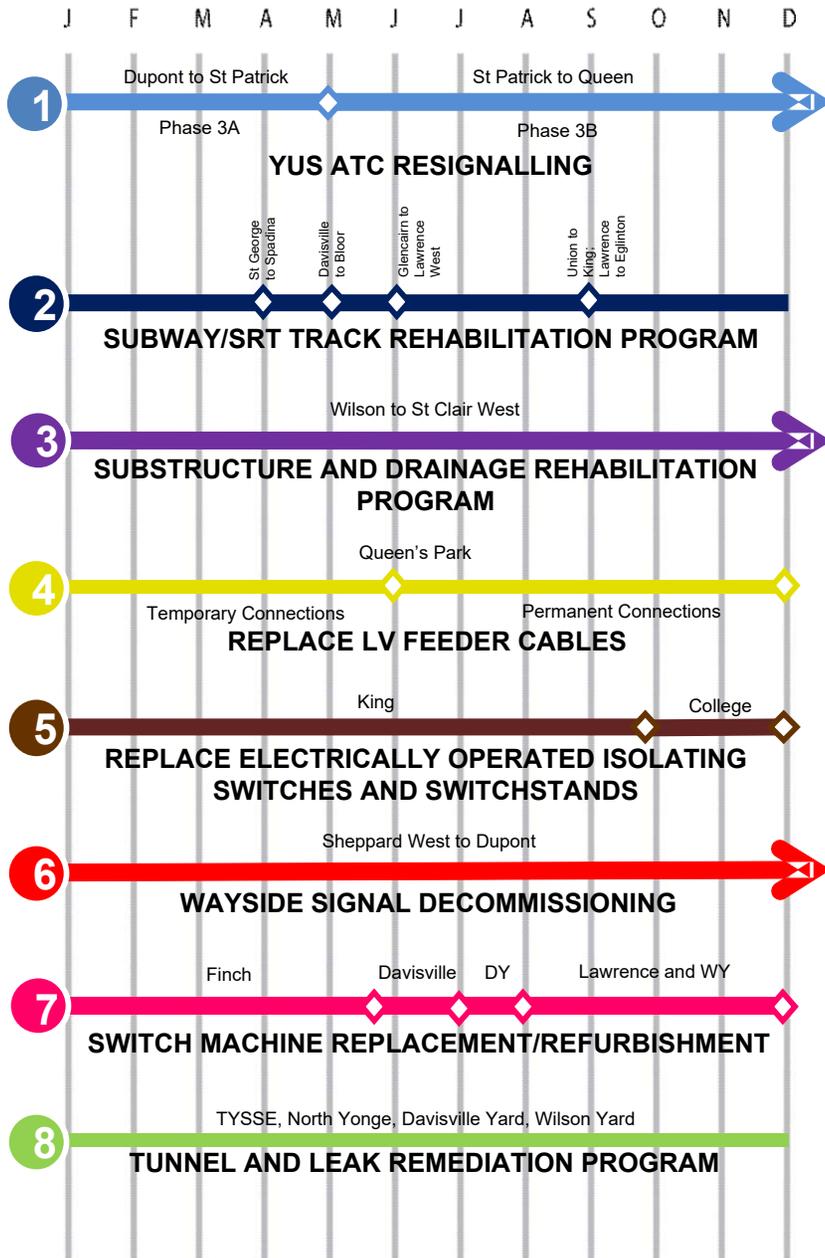
Kirsten Watson
Deputy Chief Executive Officer - Operations

Attachment

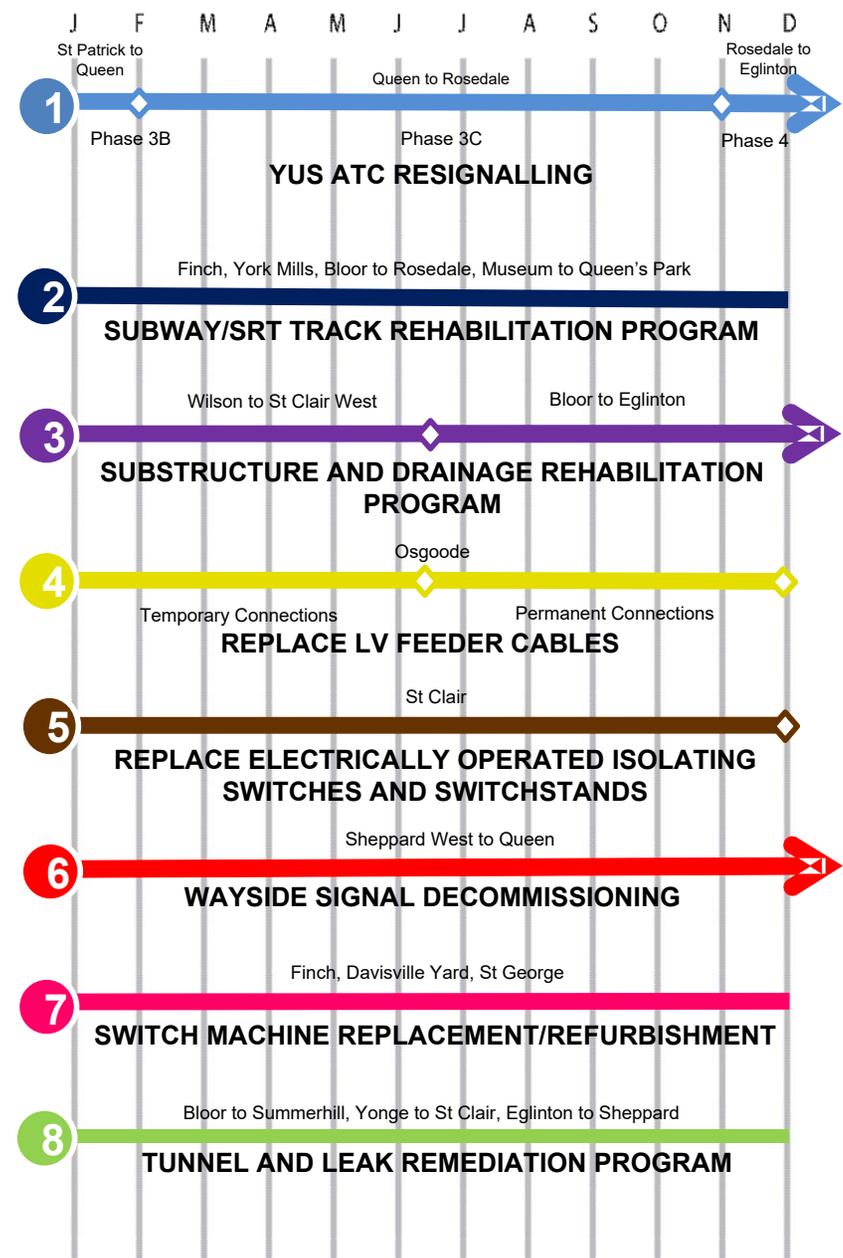
Attachment 1 – 2019-2022 Capital SOGR Program Schedule

Attachment 1 - 2019-2022 CAPITAL SOGR PROGRAM SCHEDULE

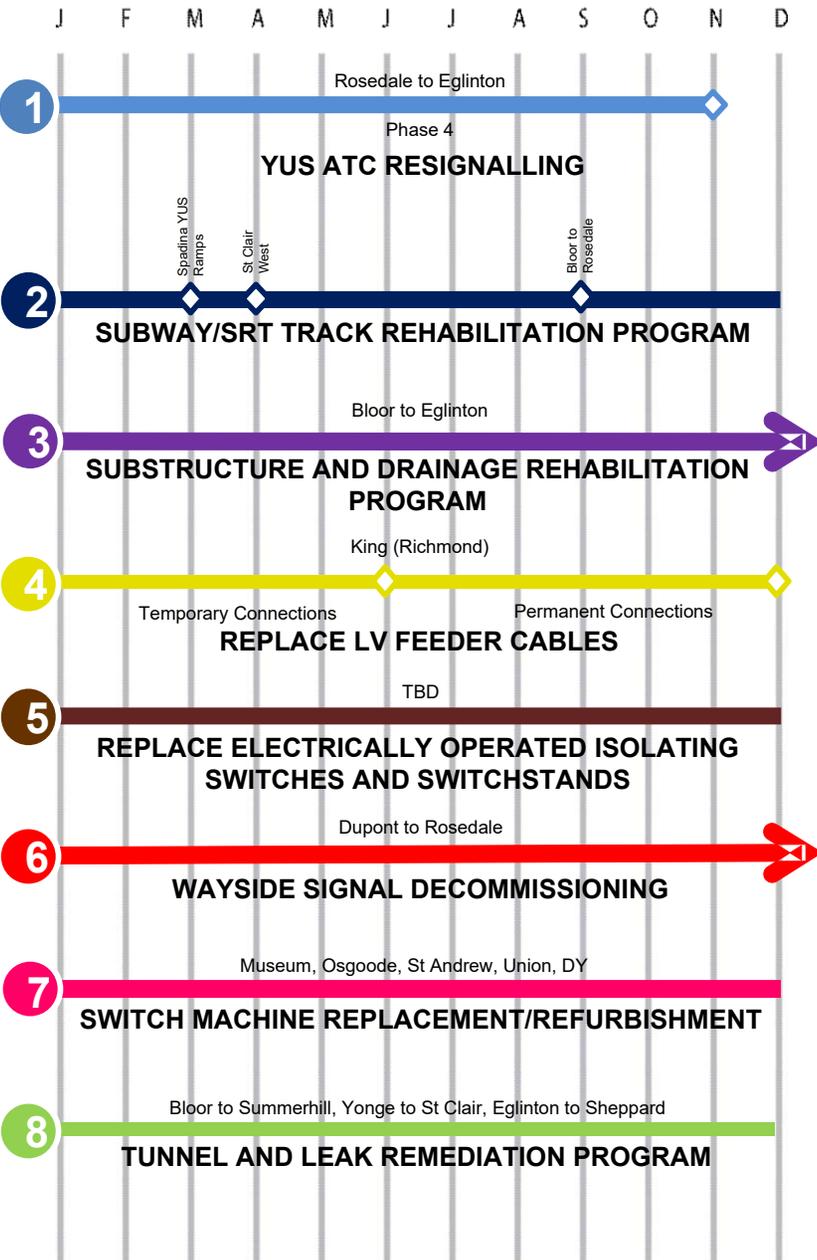
2019



2020



2021



2022

