

MEETING DATE: April 9, 2003

SUBJECT: Subway Expansion Plan

RECOMMENDATION

It is recommended that the Commission:

1. Receive this report for information;
2. Endorse this report as supplementary to the Ridership Growth Strategy Report; and
3. Forward this report to the Budget Advisory Committee.

FUNDING

Funds in the amount of \$5 Million are identified, in the 2003-2007 Capital Program, for work related to the Environmental Assessments of the Sheppard Subway Extension to Scarborough Centre, and the Spadina Subway Extension to Steeles Avenue. These studies are subject to costs being equitably shared by the TTC, the Government of Ontario and the Government of Canada. The TTC previously submitted this project to the Province in January 2002 under the Golden Horseshoe Transit Investment Partnerships (GTIP) program responding to the Province's call for expressions of interest. This project was one of six relating to new and innovative ways of improving transit in the GTA but which was, and still is, beyond the scope of TTC base program needs. No funding has been announced by the Province or recommended by the Province to the Federal Government for this expansion initiative.

Both the Region of York and York University may have an interest in assisting with the funding for further study of an extension of the Spadina Subway.

BACKGROUND

The Commission, at its meeting of March 19, 2003, approved the Ridership Growth Strategy (RGS), a report which lays out plans for increasing ridership on the TTC. There are four levels of priority for increasing ridership of which subway expansion is included as the fourth at an average annual expenditure of \$175 Million/year.

Also, the Budget Advisory Committee, at its December 5, 2002 meeting, "requested the Chief General Manager, Toronto Transit Commission, to advise the Budget Advisory Committee on what expansion of the Spadina Line to York University, the Sheppard Line to Scarborough Town Centre and the Bus Rapid Transit initiatives (as indicated in the

new Official Plan), could begin for an additional average of \$100 million per year over the current TTC state of good repair capital budget".

DISCUSSION

At its meeting of August 29, 2001, the Toronto Transit Commission considered the Rapid Transit Expansion Study (RTES) and confirmed that "if all of the TTC's base capital needs were to be fully funded, the TTC's highest priority for rapid transit expansion would be either a northerly extension of the Spadina Subway to York University/Steeles Avenue, or an easterly extension of the Sheppard Subway to Victoria Park, CN/CP or the Scarborough City Centre". Exhibit 'A' depicts the two subway extension projects. The RTES report had considered other subway projects, but these were screened out, including the Bloor-Danforth Westerly Extension project, as part of the analysis which short-listed the two above noted projects (Exhibit 'B'). These two priority projects are included in the RGS Report, which was approved by the Commission at its March 19, 2003 meeting.

Subway Construction Overview

Subway construction takes significant time and funds to complete. The design and construction sequencing for a typical subway construction project would include the following key elements:

1. Environmental Assessment
2. Alignment Design/Property Impact Assessment and Acquisition
3. Tunnel Design and Construction
 - Concrete Tunnel Liners
 - Tunnel Boring Machines
 - Cut and Cover Structures
1. Station/Special Structures Design and Construction
2. Systems Design and Construction
 - Track
 - Power (Traction & AC) / Substations
 - Signals
 - Communications
1. Vehicle Acquisition
2. Vehicle Maintenance and Storage Facilities

Generally, these elements are completed in the above noted order. Some of these elements can be advanced or delayed; however the first element that must be completed is the Environmental Assessment work.

Environmental Assessment (EA)

The EA's for the Sheppard Subway Extension and the Spadina Subway Extension were approved by the Minister of the Environment on March 24, 1994 and April 27, 1994, respectively. The EA's have no expiry date. Prior to the approval of these EA's, an EA amending procedure was agreed upon between the MOE and TTC. This amending procedure outlines the steps required to address; (a) minor modifications; (b) significant modifications; and (c) lapse of time between approval and construction, for these two approved EA's.

The effect of this amending procedure on the projects is as follows:

I. Sheppard Subway Extension

As the proposed alignment does not significantly vary from that in the approved EA, this project would be subject to a minor modifications change process. Given the lapse of time since Sheppard EA submission in 1992, TTC would be expected to determine whether or not environmental conditions have changed and undergo public/agency consultation. A report would be filed with MOE for the public record. If there have been no substantive changes to the conditions described in the EA, and no negative public comments received by the MOE or the TTC, then the EA approval would be reaffirmed, with no further work. It should be noted however that the longer TTC waits to review this project's EA status, the more likely a new EA will be required.

II. Spadina Subway Extension

Due to the substantive alignment/station location changes from the approved EA, staff have assumed that a new EA is required.

For the purposes of this report, the duration for EA activities for the Sheppard Subway Extension and the Spadina Subway Extension has been assumed to be one (1) and two (2) years, respectively.

Design & Construction Costs and Implementation

The two projects have an estimated cost of:

Project Cost (2003\$'s)

Sheppard Subway Extension \$1,750M

Spadina Subway Extension \$1,230M

Total \$2,980M

SAY \$3 Billion (2003\$'s)

The Budget Advisory Committee recently requested staff to advise as to what could be constructed for an average annual expenditure rate of \$100 Million/year. At this expenditure rate, the \$3 Billion program of two subway extensions would be implemented in 30 years; 17+ years for Sheppard and 12+ years for Spadina. These projects can be constructed in 10 years and 8 years respectively at an average annual expenditure rate of approximately \$175 Million/year.

As these two projects are extensions of the existing subway system, the most effective way in which these projects can be added to the system is by minimum operating segments. Each segment consists of a length of running structures and stations that can be operated as an extension to the existing system without relying on the next segment to be constructed. Generally speaking, the terminal station of each minimum operating segment would have track crossovers in front of the station, tail tracks extending beyond the station, as well as various surface amenities (bus terminal and if appropriate, commuter parking lots and passenger pick-up & drop-off facilities).

This methodology combines the design and construction activities of all of the previous mentioned elements of subway construction in a manner so that there is no design/construction schedule conflict and it allows the work to be done in the shortest time possible on a minimum operating segment basis. The two projects can be constructed concurrently or sequentially. The greater the overlap of the two projects, the greater the annual average expenditure rates.

I. Sheppard Subway Extension

This 8.0 kilometre, 7-station extension to the existing Sheppard subway line would be implemented in 10 years after notice of project approval. This includes one (1) year of EA work followed by nine years of design and construction activities. The project would be implemented in three minimum operating segments (Exhibit C).

<u>Minimum Operating Segment</u>	<u>Number of Stations</u>	<u>Length</u>	<u>Years to Open</u>	<u>Cost (2003\$'s)</u>
• Don Mills to Victoria Park	2	2,000m	6-7	\$470M
• Victoria Park to CN/CP	3	3,710m	8-9	\$730M
• CN/CP to Scarborough Centre	2	2,320m	9-10	<u>\$550M</u>
				\$1,750M

Exhibit D depicts the proposed schedule for this project. In segment 1, design and construction of Victoria Park Station would be concurrent with the tunneling activities from Don Mills Station to Victoria Park Station. Construction of Consumers Road Station (a "tunneled-through" station) would commence after tunneling had been completed in that area. All systems work (precast concrete ties, track, signals, communications, traction power) would follow the tunneling work and would be completed when the subway station's systems rooms have been constructed and made available.

Similar logic has been applied to all other operating segments in both subway extension projects to optimize the construction schedule, thereby reducing overall cost while minimizing both projects' duration.

II. Spadina Subway Extension

This 6.2 kilometre, 4-station extension of the existing Spadina Subway line would be implemented 9 years after project approval in two minimum operating segments, including two (2) years for EA activities (Exhibits E and F). Similar to the Sheppard Subway Extension project, each segment can be added to the existing line without the operational need to construct the next segment.

<u>Minimum Operating Segment</u>	<u>Number of Stations</u>	<u>Length</u>	<u>Years to Open</u>	<u>Cost (2003\$'s)</u>
• Downsview to Keele/Finch	2	3,420m	7	\$600M
• Keele/Finch to Steeles	2	2,770m	9	<u>\$630M</u>
				\$1,230M

Staff have also been requested to review the design and construction of the tunnels in totality before the commencement of the other works (stations/structures/systems). The above noted implementation includes continuous tunneling. The only issue is the timing of the subsequent stations/structures/systems work, which has been scheduled concurrently with the tunneling work.

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SUMMARY

A construction program based on minimum operating segments is recommended. The projects could be implemented concurrently or sequentially. Assuming sequential construction with the Sheppard Subway Extension being built first, the average annual expenditure rate would be \$175 Million/year (2003\$). This would result in the Sheppard Subway Extension project opening 10 years after, and the Spadina Subway Extension project opening 18 years after commencement.

JUSTIFICATION

This report responds to the request by the Budget Advisory Committee.

March 25, 2003

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Attachments

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