

**From:** "Johnston, Sadhu" <Sadhu.Johnston@vancouver.ca>

**To:** "Direct to Mayor and Council - DL"

**CC:** "City Manager's Correspondence Group - DL"

"Dobrovolny, Jerry" <jerry.dobrovolny@vancouver.ca>

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**Date:** 5/6/2019 4:05:44 PM

**Subject:** Memo - SkyTrain and Competitive Bidding Process

**Attachments:** ENG - RTO - Memo to Mayor and Council - SkyTrain and Competitive Bidding....pdf

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Greetings Mayor and Council,

Please see attached above a memo from Jerry Dobrovolny regarding the SkyTrain, SNC Lavalin, and the competitive bidding process. In recent months, questions have been raised regarding SkyTrain technology and competitive procurement practices. In response, TransLink provided a memo dated April 25, 2019 to the Mayors' Council with further information related to these concerns. TransLink's memo has been attached to this memo as an appendix.

- SkyTrain is the brand name used for grade-separated automated rail rapid transit in Metro Vancouver.
- The Expo and Millennium Lines use technology that can be provided by several companies.
- Although SNC Lavalin and Bombardier have delivered infrastructure and vehicles for SkyTrain in the past, they do not hold patents for the technologies.

Should you have any questions or concerns, please contact Jerry Dobrovolny at 604.873.7331 or [jerry.dobrovolny@vancouver.ca](mailto:jerry.dobrovolny@vancouver.ca).

Best,  
Sadhu

**Sadhu Aufochs Johnston** | City Manager  
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604.873.7627



*The City of Vancouver acknowledges that it is situated on the unceded traditional territories of the Musqueam, Squamish, and Tsleil-Waututh peoples.*

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## MEMORANDUM

May 6, 2019

**TO:** Mayor and Council

**CC:** Sadhu Johnston, City Manager  
Paul Mochrie, Deputy City Manager  
Lynda Graves, Administration Services Manager, City Manager's Office  
Rena Kendall-Craden, Civic Engagement and Communications Director  
Katrina Leckovic, City Clerk  
Neil Monckton, Chief of Staff, Mayor's Office  
Alvin Singh, Communications Director, Mayor's Office  
Anita Zaenker, Chief of Staff, Mayor's Office  
Cheryl Nelms, Deputy General Manager, Engineering Services  
Lon LaClaire, Director, Transportation  
Karima Mulji, Director, Engineering Projects and Development Services  
Chris Robertson, Assistant Director, City-Wide and Regional Planning  
Alexander Ralph, Manager, Supply Chain Management Operations  
Steve Brown, Manager, Rapid Transit Office

**FROM:** Jerry Dobrovolny, General Manager, Engineering Services

**SUBJECT:** SkyTrain and Competitive Bidding Processes

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In recent months concerns have been raised regarding SkyTrain technology and the ability to ensure competitive procurement practices. In response, TransLink provided a memo dated April 25, 2019 to the Mayors' Council with further information related to these concerns. TransLink's memo is attached with a summary as follows:

- SkyTrain is the brand name used for grade-separated automated rail rapid transit in Metro Vancouver and includes the Expo, Millennium and Canada Lines.
- The Expo and Millennium Lines are based on technology that uses linear induction motors (LIM) and are controlled by a communications-based train control (CBTC) system, neither of which is proprietary.
- SNC Lavalin and Bombardier do not hold patents for either LIM or CBTC, and these systems can be provided by several other companies.
- Besides the initial Expo Line order of vehicles from Urban Transportation Development Corporation (purchased by Bombardier in 1991), all vehicles for the Expo and

Millennium Lines have been procured from Bombardier as they were the only bidding company. Other potential suppliers declined submitting proposals due to the relatively small number of vehicles ordered.

- While SNC Lavalin has led, co-led or been a part of a team for many contracts awarded for delivery of guideway structure and rail engineering and construction in our region, they are not required to build future SkyTrain extensions.
- The next procurement of SkyTrain vehicles, funded by the Mayors' Plan, is almost three times larger than the last SkyTrain vehicle order procured by TransLink; it is expected to attract increased interest.

In addition there have been questions about the procurement relationship with SNC Lavalin. Attached is a summary provided from our procurement group of purchase orders from 2010 to 2018. Services include environmental testing, seawall design and inspection, and other design elements. Approximately \$1 million of the total noted in the table below represents 1.26% of the total professional and commercial services category awarded by the City from 2017-2018. During this time span a total of 716 professional and commercial services category contracts were awarded.

If you have any questions or require additional information, please do not hesitate to contact me.

Sincerely,



Jerry W. Dobrovolny, P.Eng., MBA  
General Manager, Engineering Services  
604.873.7331 | [jerry.dobrovolny@vancouver.ca](mailto:jerry.dobrovolny@vancouver.ca)

## Purchase Order Report of Projects by SNC Lavalin

PO#	Vendor	Name	Date	Year	CAD	Type of Work
4500460203	120626	SNC-Lavalin Inc. (Vancouver)	3/8/2010	2010	\$ 56,300	supplemental drilling and investigation
4500463267	120626	SNC-Lavalin Inc. (Vancouver)	4/14/2010	2010	\$ 62,666	Water Quality Monitoring Prog
4500465646	120626	SNC-Lavalin Inc. (Vancouver)	5/11/2010	2010	\$ 107,933	550 Commodore Road
4500475526	120626	SNC-Lavalin Inc. (Vancouver)	8/25/2010	2010	\$ 24,900	4894 Knight-Environmental
4500475912	120626	SNC-Lavalin Inc. (Vancouver)	8/31/2010	2010	\$ 6,497	Stormwater treat Sys Rev
4500477691	120626	SNC-Lavalin Inc. (Vancouver)	9/22/2010	2010	\$ 130,426	environmental consulting services
4500484659	120626	SNC-Lavalin Inc. (Vancouver)	12/8/2010	2010	\$ 1	Deleted - Consulting Services
4500485359	120626	SNC-Lavalin Inc. (Vancouver)	12/15/2010	2010	\$ 253,886	environmental consulting services
4500490567	120626	SNC-Lavalin Inc. (Vancouver)	2/14/2011	2011	\$ 65,550	COV Water Qual Mnthly Annual Rev
4500510754	120626	SNC-Lavalin Inc. (Vancouver)	9/27/2011	2011	\$ 58,547	Soil Characterization Program
4500521738	120626	SNC-Lavalin Inc. (Vancouver)	3/6/2012	2012	\$ 485,063	550 Commodore Next Phase Environmental
4500530456	120626	SNC-Lavalin Inc. (Vancouver)	9/19/2012	2012	\$ -	Deleted - Consulting Services
4500533607	120626	SNC-Lavalin Inc. (Vancouver)	1/15/2013	2013	\$ 559,506	Landfill Hydrogeological Review
4500533762	120626	SNC-Lavalin Inc. (Vancouver)	1/21/2013	2013	\$ 367,196	Water Quality Monitoring Program Review
4500536855	120626	SNC-Lavalin Inc. (Vancouver)	5/16/2013	2013	\$ 19,400	Detailed Site Investigation 3510 Fraser
4500543417	120626	SNC-Lavalin Inc. (Vancouver)	2/17/2014	2014	\$ 255,206	Environmental Services
4500549634	120626	SNC-Lavalin Inc. (Vancouver)	10/22/2014	2014	\$ 1,825	Finning - after hours load bank test
4500551471	120626	SNC-Lavalin Inc. (Vancouver)	1/9/2015	2015	\$ 167,028	111 Princess - Post remedial monitoring
4500553028	126009	SNC-Lavalin O & M	3/17/2015	2015	\$ 1,825	Finning - after hours load bank test
4500553352	120626	SNC-Lavalin Inc. (Vancouver)	3/30/2015	2015	\$ 21,332	Environmental Investigation - 688 Cambie
4500558094	106217	SNC-Lavalin Inc. (Burnaby)	10/2/2015	2015	\$ 482,832	Waterfront Design and Inspection
4500561144	120626	SNC-Lavalin Inc. (Vancouver)	2/11/2016	2016	\$ 4,845	SNC Lavalin Geotech for Knight St
4500561837	120626	SNC-Lavalin Inc. (Vancouver)	3/9/2016	2016	\$ 24,800	Environmental Investigation
4500562283	120626	SNC-Lavalin Inc. (Vancouver)	3/29/2016	2016	\$ 84,267	Environmental/Geotechnical for FH 17
4500563607	120626	SNC-Lavalin Inc. (Vancouver)	5/16/2016	2016	\$ 9,580	Golf Course Toilets - Geotechnical
4500565788	120626	SNC-Lavalin Inc. (Vancouver)	7/29/2016	2016	\$ 51,767	Enviro Investigation - 3510 Fraser
4500567102	120626	SNC-Lavalin Inc. (Vancouver)	9/19/2016	2016	\$ 9,707	Chemical cleaning environmental impact
4500569902	120626	SNC-Lavalin Inc. (Vancouver)	1/11/2017	2017	\$ 27,183	Guardrail Design Study
4500570909	120626	SNC-Lavalin Inc. (Vancouver)	2/27/2017	2017	\$ 9,969	Geophys Investigation: Cambie Works Yard
4500571382	120626	SNC-Lavalin Inc. (Vancouver)	3/16/2017	2017	\$ 24,362	VMS Annual Monitoring - 111 Princess Ave
4500571504	120626	SNC-Lavalin Inc. (Vancouver)	3/21/2017	2017	\$ 61,663	Eductor System O&M and Performance Eval.
4500572572	106217	SNC-Lavalin Inc. (Burnaby)	5/3/2017	2017	\$ 25,000	W10 3d-design&constructability assesment
4500573248	120626	SNC-Lavalin Inc. (Vancouver)	5/26/2017	2017	\$ 306,910	Monitoring Program
4500573753	106217	SNC-Lavalin Inc. (Burnaby)	6/13/2017	2017	\$ 220,194	10th Ave - detailed design services
4500574767	106217	SNC-Lavalin Inc. (Burnaby)	7/19/2017	2017	\$ 56,446	PHSA Parking Lot Study - Phase 1
4500576000	120626	SNC-Lavalin Inc. (Vancouver)	9/6/2017	2017	\$ 4,750	Temporary Modular Housing - Env. Reviews
4500576839	120626	SNC-Lavalin Inc. (Vancouver)	10/10/2017	2017	\$ 39,000	Fire Hall UST Removals & Env Support
4500577137	120626	SNC-Lavalin Inc. (Vancouver)	10/19/2017	2017	\$ 10,750	Geotechnical Services
4500577872	120626	SNC-Lavalin Inc. (Vancouver)	11/16/2017	2017	\$ 58,810	599 W 2nd Ave - Human Health Risk
4500578663	120626	SNC-Lavalin Inc. (Vancouver)	12/13/2017	2017	\$ 68,745	Maintenance Yard for Vancouver Landfill
4500578939	106217	SNC-Lavalin Inc. (Burnaby)	1/2/2018	2018	\$ 76,720	10th Ave - EOR Services Const Phase
4500580960	120626	SNC-Lavalin Inc. (Vancouver)	3/27/2018	2018	\$ 24,790	2018 VMS - 111 Princess Avenue
4500581082	120626	SNC-Lavalin Inc. (Vancouver)	4/4/2018	2018	\$ 24,200	8324 Granville St - Eductor System O+M
4500583382	120626	SNC-Lavalin Inc. (Vancouver)	6/29/2018	2018	\$ 23,200	8324 Granville St - Eductor System O+M
4500587253	120626	SNC-Lavalin Inc. (Vancouver)	12/7/2018	2018	\$ 24,900	8324 Granville St - Eductor System O+M
		<b>TOTAL</b>			<b>\$ 4,400,477</b>	

**TO:** TransLink’s Mayors’ Council

**FROM:** Sany Zein, Vice President, Infrastructure Management & Engineering  
Derrick Cheung, Vice President, Strategic Sourcing and Real Estate

**DATE:** April 25, 2019

**SUBJECT:** **ITEM 3.2 – SkyTrain Technology and Procurement**

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**RECOMMENDATION:**

That the Mayors’ Council receive this report.

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**PURPOSE:**

The purpose of this report is to respond to the Mayors’ Council direction that TransLink staff report back with information on SkyTrain technology and TransLink’s practices to ensure competitive procurement processes.

**BACKGROUND:**

On February 15 the Mayors’ Council received a report on Rail to UBC and endorsed SkyTrain as the technology basis to advance to the next stage of development for a rail project from Arbutus to UBC. During discussion, comments were raised about SkyTrain technology and questions were asked about whether SkyTrain is proprietary and how TransLink can increase competition for future SkyTrain procurement efforts. A motion was passed requesting additional information in response to these comments and questions.

This report provides a factual overview of the history, technology, procurement methods and market competitiveness related to SkyTrain.

**DISCUSSION:**

**SkyTrain launched in 1986 for Expo ’86**

“SkyTrain” is the brand name used for grade-separated automated rail rapid transit in Metro Vancouver and includes the Expo, Millennium, and Canada lines. When SkyTrain was launched in 1986 for Expo, it was one of the world’s first driverless, automated rapid transit systems. Since that time, our automated SkyTrain system has served the region well, with 79 kilometres of track, 53 stations, and a record 160 million boardings in 2018.

**Driverless, automated vehicles are the new norm for rapid transit**

SkyTrain was one of only three automated systems in 1986 but now there are more than 65 fully-automated lines in 42 cities worldwide that account for 1,052 kilometres in operation. In addition, major systems, including the Metro in Paris and Underground in London, are upgrading their busiest lines to be automated and driverless. Being an early adopter of this technology has paid off in several ways.

First, automation is economical. Without the need to staff trains over the past 30 years, the region has invested additional resources into the maintenance and expansion of the system. Second, driverless technology promotes rail safety because it reduces the potential for human error. Third, automation increases capacity because trains can run more frequently than conventional rapid transit, which allows the system to move more people, more quickly.

**SkyTrain is a brand name, not a technology—there are multiple technologies working together to make the system work**

Statements made that SkyTrain is “proprietary” to SNC Lavalin and Bombardier (or any other specific manufacturer) are false. SkyTrain is the brand name associated with grade-separated automated rail rapid transit in Metro Vancouver.

The technology underlying SkyTrain consists of trains powered by a linear induction motor (LIM) and controlled by a communications-based train control (CBTC) system. Neither LIM nor CBTC are proprietary. The SkyTrain technology combining LIM and CBTC was conceived in the 1970s as the Intermediate Capacity Transit System (ICTS) by the Urban Transportation Development Corporation (UTDC), an Ontario Crown Corporation. UTDC was subsequently privatized and sold to Bombardier in 1991, however Bombardier does not hold patents that would prevent other suppliers from bidding on any of SkyTrain’s key equipment or components.

The multiple technologies and components working together to make SkyTrain function—power, communications equipment, trains, guideway structure and rail—could each be supplied by several different companies.

***Automated control system***

The automated control system technology at the heart of making SkyTrain driverless and automated is called Communications-Based Train Control (CBTC). The specific CBTC system used by SkyTrain is known as SelTrac and was originally developed by Standard Elektrik Lorenz. It was subsequently sold to Alcatel and is currently owned, maintained and updated by Thales Rail Signaling Solutions. It is not a requirement that SkyTrain use the SelTrac system. There are several manufacturers with systems that can deliver CBTC of similar size and complexity. However, changing the automated control system would be a multilayered task and complexities exist in upgrading the existing 79 kilometres of SkyTrain or transitioning from one major control system to another.

***LIM propulsion vehicles***

The Expo and Millennium lines run on conventional metal rails and use power from a third rail.<sup>1</sup> The trains are powered by a linear induction motor (LIM), and use a fourth induction rail placed between the running rails to propel the vehicle. LIM propulsion was originally chosen when SkyTrain technology was conceived in the 1970s because of its superior performance on steep grades and in snowy and icy conditions, as well as its reduced operating and maintenance costs. Linear induction motors capable of powering transit systems are not proprietary. Multiple suppliers can provide vehicles that use linear induction motor technology. While theoretically SkyTrain can be converted to run using conventional rotary motors, this fundamental change would practically require significant technologically conversion resources.

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<sup>1</sup> The Canada Line also runs on conventional metal rails and uses power from a third rail, but uses an electric rotary traction motor, which is a more common propulsion technology. Because Canada Line uses different power technology, it is not interoperable with the Expo and Millennium Lines—Canada Line trains cannot be used on the other two lines, and vice versa. The original order of 20 2-car trains was delivered by Rotem, a division of Hyundai Motor Group. Twelve additional 2-car trains are currently being procured by TransLink.



The original fleet of LIM vehicles were supplied by Urban Transportation Development Corporation. Subsequent vehicle procurements were open to competition, but only Bombardier Transportation provided proposals.<sup>2</sup> Follow-up with other potential suppliers found that the region's orders for additional new cars were too small for them to submit proposals.

**SNC-Lavalin has led or been on the team for previous construction and engineering services to build SkyTrain, but has no proprietary role in its function or delivery**

Procurement for engineering and construction services are made on a project-by-project basis. Past procurement efforts for delivering large SkyTrain expansion projects have been led by the provincial government, with the exception of Canada Line. The firm SNC-Lavalin has either led, co-led, or was on a team that was awarded past contracts to deliver guideway structure and rail engineering/construction for SkyTrain. However, SNC-Lavalin holds no proprietary technology related to SkyTrain. In addition, SkyTrain does not require SNC-Lavalin to build future extensions. Most major construction and engineering firms could assemble teams to deliver the infrastructure for SkyTrain. Below is a history of past major infrastructure procurement efforts and SNC-Lavalin's involvement:

- **Expo Line.** Procurement was led by the Province and was delivered by the Urban Transportation Development Corporation (UTDC), an Ontario Crown Corporation. Pacific Liaison and Associates Inc. (which became a Division of SNC-Lavalin as part of a merger in 2001) was part of this team and performed design management for the Expo Line.
- **Millennium Line.** Procurement for construction and engineering was led by the Province through a provincial agency called RTP 2000. The consortium that delivered the project included the firms ND Lea, SNC-Lavalin, and Stantec.
- **Evergreen Extension of the Millennium Line.** Procurement for construction and engineering was led by the Province. A team led by SNC-Lavalin was selected from three qualified proponents.
- **Canada Line.** Procurement for construction and engineering services was led through Canada Line Rapid Transit Inc. (formerly RAVCO), a wholly-owned subsidiary of TransLink. During procurement and construction, Canada Line Rapid Transit Inc. was governed by a Board of Directors composed of representatives appointed by various funding agencies. A consortium led by SNC-Lavalin and Serco was selected from three qualified proponents to design, build, finance, operate and maintain the Canada Line for a 30-year period.

**TransLink's Strategic Sourcing Department leads procurement to ensure open and fair competition within national and international trade rules**

TransLink uses an open and transparent procurement process and is dedicated to increasing competition and getting the best value for money. The Strategic Sourcing and Contract Management department at TransLink handles all capital and operational procurement requirements for projects delivered by TransLink (and in some instances, leading collaborative procurements together with other public sector agencies) and must follow provincial, federal, and international laws governing procurement. Additionally, TransLink abides by all relevant trade agreements, including the Comprehensive Economic and Trade Agreement (CETA), which specifically prohibits preferential treatment for local/national suppliers.

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<sup>2</sup> Subsequent vehicle procurements supplied by Bombardier Transportation for vehicles running on the Expo and Millennium lines include 150 Mark I trains, 108 Mark II trains, and 28 Mark III trains. Additionally, 56 Mark III trains have been procured and are in the process of being delivered and introduced into service.

TransLink procurement efforts must also adhere to any additional rules set as a condition of funding by funding partners.

Multiple tools and methods are used to increase competition. Annual supplier forums, market sounding events and industry presentation events are held to connect suppliers with internal needs and generate greater interest in TransLink projects. TransLink recently upgraded our procurement software to Ariba Discovery, which we can use to reach a wide group of local, national and international suppliers. Ariba Discovery has a positive impact on competition, price, quality, and exposure to “best in class” products and services. TransLink also has checks and balances in place to regularly gauge competition and fairness—the procurement team monitors the projects with advice and assistance from project boards, steering committees, and legal counsel.

**TransLink is beginning the procurement process for its largest order of SkyTrain vehicles**

The next procurement of SkyTrain vehicles is funded in the Mayors’ Plan for at least 203 cars. The size of this order is more than three times bigger than any previous SkyTrain car order procured by TransLink, and therefore is expected to attract increased interest. The procurement strategy is to ensure competitiveness, and has included ongoing market sounding, an open Request for Information (RFI), and an upcoming open Request for Proposals (RFP). In response to the RFI, multiple responses and expressions of interest were received.

Efforts will continue to be made to broaden the potential pool of proponents.