

Transportation Report to  
SPC on Transportation and Transit  
2019 June 26

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TT2019-0638  
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## **Calgary Transit At-Grade LRT Crossing Safety**

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### **EXECUTIVE SUMMARY**

This report provides a review of the safety guidelines and protection measures of Calgary Transit at-grade Light Rail Transit (LRT) crossings in response to Notice of Motion C2018-1288.

Calgary's LRT system is safe and the design guidelines for at-grade crossings are based on applicable industry standards and best practices for safety. In addition to the design requirements, Calgary Transit follows the 5E's of transportation safety to minimize the risks to pedestrians at at-grade crossings - Engineering, Evaluation, Engagement, Education and Enforcement. Each safety measure is discussed in detail in this report and include:

- Crossing protection devices such as bells, gates, and flashing lights;
- LRT Crossing Committee – A technical review committee that assesses at-grade LRT crossing safety and accessibility which prioritizes improvements based on site specific issues and feedback from operations and users;
- Public education initiatives that raise awareness of at-grade LRT crossing safety;
- Stakeholder engagement to understand user experience; and
- Enforcement tools to enforce and educate safe behaviour at at-grade LRT crossings.

As part of this review, an external consultant examined the at-grade crossing protection measures employed by Calgary Transit, and benchmarked the effectiveness against comparable LRT systems in North America. This analysis found that Calgary Transit has implemented best practices in new designs and for making prioritized improvements to existing crossings. The rate of safety incidents on Calgary's LRT system is consistent with comparable systems in North America.

While these incidents are rare, detailed investigations and multi-disciplinary reviews are conducted to determine if further mitigation measures would be beneficial. Some general improvement opportunities have been recommended to address evolving societal issues such as distracted walking; these recommendations are currently being evaluated and prioritized by the LRT Crossing Committee based on risk and funding availability.

### **ADMINISTRATION RECOMMENDATION:**

That the Standing Policy Committee on Transportation & Transit recommends that Council:

- 1) Direct Administration to implement an updated public safety education campaign around at-grade LRT crossing safety; and
- 2) Direct Administration to return to the 2020 budget adjustments with a request for an annual dedicated capital funding stream for at-grade crossing safety improvement opportunities.

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- 3) Direct that Attachment 3 remain confidential pursuant to Section 17 (disclosure harmful to personal privacy) of the *Freedom of Information and Protection of Privacy Act*, and to remain confidential indefinitely.

### **PREVIOUS COUNCIL DIRECTION / POLICY**

At 2018 November 19 Regular Meeting of Council, Notice of Motion C2018-1288 was brought forth by Councillor Colley-Urquhart, Councillor Keating and Councillor Jones, to provide an At-grade LRT Crossing Report by Q2 2019 that includes:

- Inventory of crossings and treatments;
- Inventory of protection measures, what they target, constraints and costs;
- Best practices in design from across the industry;
- History of incidents;
- How The City studies, adapts and audits these crossings; and
- Recommendations for Council on additional programs or initiatives that will address crossing safety.

### **BACKGROUND**

Calgary Transit's light rail transit (LRT) system, known as the CTrain, began operations in 1981. Today, the entire system consists of 60 km of double track and 45 stations. Outside the downtown core, the LRT primarily operates at-grade with signal pre-emption, in a protected right-of-way with vehicle and pedestrian safety measures at crossings occurring at locations where access is required. In the downtown core, the Red Line and Blue Line connect within a downtown transit mall located on 7 Avenue SW between 11 Street SW and 3 Street SE. LRT operations along 7 Avenue SW are based on in-street operations. In-street operations require the LRT to follow traffic signals that also control cross street traffic and bus movements.

Calgary's LRT system has 92 at-grade crossings on its Red and Blue Lines, which includes the downtown crossings. There are inherent risks associated with an at-grade system but these risks are managed by following design guidelines and industry standards, installing appropriate protection measures, enforcement and education. The LRT system also has grade-separated pedestrian crossings at specific locations; these are provided where pedestrian access across the track is restricted by physical site constraints such as station access, road classification or environmental area. Pedestrian volumes, traffic volumes and transit operations are other considerations to grade separate crossings.

An LRT Crossing Committee is in place to ensure appropriate reviews and management of key issues and risks of at-grade LRT crossings, including safety and operational concerns. The group is made up of technical experts from Signals and Rail Systems, Track and Way, Public Safety and Enforcement, LRT Operations, Transit Planning and Communications and Marketing. An advisory group that includes Roads Safety, Calgary Police Services and Liveable Streets are consulted to provide a broader transportation safety perspective.

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### History of Incidents

In the 38 years since the LRT system opened in 1981, there have been 88 total fatalities with 42 unintentional fatalities occurring at at-grade crossings. In the past ten years (2009-2018), 19 unintentional fatalities have occurred at at-grade crossings. The locations are listed in the table below.

Approximately one-third of all pedestrian fatalities on the system were intentional fatalities, and the remaining fatalities were attributed to human error factors including intoxication, distracted walking and engaging in risk-taking behaviors.

A review by an external consultant found that Calgary Transit's recent four-year average of 2.5 fatalities per year at crossings is approximately the same as similar transit agencies in North America, with an average of 2.14 fatalities per year.

Locations of At-Grade Crossing Fatalities (2009-2018)

<b>Blue Line – Northeast</b>	<b>Blue Line – West</b>	<b>Red Line – South</b>	<b>Red Line – Northwest</b>
36 St and 8 Av NE		25 Av SE	14 Av and 14 St NW
36 St and 12 Av NE		50 Av SE	
36 St and 20 Av/Rundlehorn Dr NE		Chinook Station	
36 St and 26 Av NE		162 AV S	
36 St and 32 Av NE			
Whitehorn Station			
36 St and 39 Av NE			

## **INVESTIGATION: ALTERNATIVES AND ANALYSIS**

Calgary Transit uses the 5E's of Transportation Safety to ensure safety at at-grade LRT crossings. Attachment 1 reviews each of the safety criteria and how they relate to at-grade crossing safety.

<b>E's of Transportation Safety</b>	<b>Notice of Motion Requirements</b>
Engineering	Inventory of crossings and treatments.  Inventory of protection measures, what they target, constraints and costs.

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Evaluation	Best practices in design from across the industry.  How The City studies, adapts and audits these crossings.
Enforcement	Additional programs that support safe crossings.
Education	
Engagement	

#### Engineering and Evaluation

As part of this review, an external consultant conducted an independent examination of the at-grade crossing safety protection measures employed by Calgary Transit, and benchmarked the effectiveness against guidelines, standards, best practices and incident rates of comparable LRT systems in North America (Attachment 2). The key findings of this at-grade LRT crossing safety evaluation report are:

- Calgary Transit is employing applicable guidelines, standards and best practices in new design and has a process for capturing improvements reflected in these guidelines, standards and best practices into its own guidelines;
- The rate of collisions at at-grade crossings of the Calgary Transit LRT system is comparable to elsewhere in North America;
- The Calgary Transit at-grade crossing warning systems are adequate to provide for the safety of motorists, cyclists and pedestrians;
- Calgary Transit is experiencing the same factors contributing to at-grade crossing safety issues as are found elsewhere in North America; and
- Calgary Transit has implemented best practices in determining the at-grade crossings needing improvements to the warning systems.

As part of this evaluation, the external consultants conducted field assessments of a diverse set of seven at-grade crossings across the LRT network. It was determined that all locations conformed to industry standards, and some recommendations for pedestrian safety enhancements were provided for consideration. The evaluation also recommended additional general improvement opportunities for the LRT Crossing Committee to consider within its engineering toolbox; these include lowering the height of pedestrian warning signals, implementing second train warning signage at more pedestrian crossings, and further evaluating installing automatic gate arms at additional locations based on risk and site considerations. The LRT Crossing Committee is currently evaluating these improvement recommendations and will prioritize them within annual work plans based on risk and budget availability. An annual dedicated capital funding stream will be required to implement these improvement opportunities in a systematic manner and will be requested as part of the 2020 budget adjustments.

#### Education, Engagement and Enforcement

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Public education, engagement and enforcement are guided by a communication and marketing campaign for Safe At-Grade LRT Crossings, as well as reported incidences of risk-taking behaviour and non-compliance with safety devices. This campaign has been ongoing since 2016 but will be updated to reflect growing and evolving societal issues such as distracted walking and mental health issues. A comprehensive approach, beyond engineering measures, is important to improve awareness and promote safe behaviour at LRT crossings.

### **Stakeholder Engagement, Research and Communication**

For this report, the following internal stakeholders and city advisory groups were engaged:

#### **Internal Stakeholder list:**

- Calgary Transit
- Green Line
- Transportation Infrastructure
- Transportation Planning
- Roads
- Calgary Police Services
- Calgary Neighbourhoods

#### **City Advisory Groups:**

- Calgary Transit Customer Advisory Groups
- Access Design Sub Committee of Advisory Committee on Accessibility

The purpose of the engagement was to learn about the current processes and identify gaps and other improvement opportunities that can be implemented. The LRT Crossing Committee will continue to engage with internal stakeholders and city advisory groups to understand the operational and user safety at at-grade crossings.

The process of engagement can be found in Attachment 1.

### **Strategic Alignment**

This report is aligned with the goals of the following initiatives:

- One Calgary 2019-2022, Council and Citizen Priorities:
  - A city of safe & inspiring neighbourhoods
  - A city that moves
- Calgary Transportation Plan (CTP) Goals and Key Directions:
  - Transportation Goal #2: Promote safety for all transportation system users.
  - Transportation Goal #4: Enable public transit, walking and cycling as the preferred mobility choices for more people.
  - Transportation Goal #7: Ensure transportation infrastructure is well managed.
- RouteAhead, a 30-year Strategic Plan for Public Transit in Calgary and improving the objectives of the Calgary Transit Customer Experience.
- Calgary Transit Customer Commitment:
  - Safe
  - Reliable
  - Easy to use transit service.

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- Calgary Safer Mobility Plan – a five-year plan aimed at improving the safety of Calgary's transportation network

### **Social, Environmental, Economic (External)**

#### ***Social***

At-grade LRT crossings connect people with places they care about by providing a safe, accessible, reliable and easy to understand connection in the transportation network. Safety improvements, public education and internal training about at-grade crossings will improve quality of life for Calgarians.

#### ***Environmental***

Providing safe at-grade crossings encourages Calgarians to use transit, walk and or cycle. Reducing dependency on the automobile decreases greenhouse gas emissions and energy use.

#### ***Economic***

Reducing train and pedestrian incidents at at-grade crossings help support a reliable, attractive and convenient LRT system. The LRT helps promote an environment conducive to attracting, retaining and nurturing businesses and creates a city where Calgarians want to live, work and invest because of mobility choices.

### **Financial Capacity**

#### **Current and Future Operating Budget:**

There are no operating budget implications associated with the recommendations in this report.

#### **Current and Future Capital Budget:**

There is currently no capital budget specifically dedicated to implementing the at-grade LRT crossing safety improvement opportunities highlighted in this report. Immediate safety concerns and high priority improvements are addressed through the lifecycle and asset management budgets in the Calgary Transit. The Council-approved LRT Reliability fund was previously used to address priority improvement opportunities at LRT crossings between 2013-2018. Continuous and consistent implementation of further safety improvement opportunities identified in this report will require an annual dedicated capital funding stream.

### **Risk Assessment**

At-grade LRT systems have inherent safety risks and with changes in social behavior and increased incidents of distracted walking, it is important to continue reviewing and upgrading at-grade crossings using the 5E's of transportation safety.

Calgary Transit's LRT system is growing and changing with new lines, future extensions and crossing conversions. This will result in new and existing transit customers using the system. It is important to apply a consistent approach system wide to address safety measures to improve pedestrian legibility at at-grade crossings.

Without a dedicated annual funding stream, it will be challenging to systematically implement many improvement opportunities to at-grade LRT crossings highlighted in this report.

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Improvements will continue to be based on immediate safety concerns and risk, within available existing infrastructure budgets.

#### **REASON(S) FOR RECOMMENDATION(S):**

This review addresses the direction from Notice of Motion C2018-1288. The internal and external review identifies that Calgary Transit employs applicable guidelines, standards and best practices in at-grade crossing safety design, and has a robust process for incorporating evolving improvements in the industry.

Further improvement opportunities at at-grade LRT Crossings have been identified and require a dedicated annual funding stream to address in a systematic and consistent manner.

An updated public safety education campaign will be beneficial to address growing and evolving societal issues related to at-grade crossing safety, such as distracted walking and mental health issues.

#### **ATTACHMENT(S)**

Attachment 1: At-Grade LRT Crossing Safety Review: 5E's of Transportation Safety

Attachment 2: City of Calgary – LRT Crossing Safety Review

Attachment 3: Confidential – Fatality Data (confidential)