

LRT Crossing Assessment Framework

Recommendation:

That Executive Committee recommend to City Council:

That the LRT Crossing Assessment Framework identified in the June 6, 2017, Integrated Infrastructure Services report CR_4512, be approved.

Report Summary

To provide a consistent and objective process, this report proposes criteria for use when assessing LRT roadway crossing options and developing recommendations for Council's consideration.

Report

A Council-approved framework and assessment criteria is required in order to provide a consistent and objective process for determining the optimal configuration for LRT crossings and any adjacent LRT stations/stops.

Background

In 2009, Council adopted the long-term LRT Network Plan, which established the vision for an urban-style LRT network woven into local communities. This network integrates visual elements to aesthetically blend into the urban environment and mitigate intrusive impacts on neighbourhoods. This directly supports the City's goal to increase use of public transit ridership and active modes of transportation.

The philosophy for the urban-style system was supported by extensive public engagement activities and was incorporated into the Transportation Master Plan under *The Way We Move*. Consistent with this philosophy, subsequent route planning minimized grade separations to only be considered for the crossing of railways and the inner and outer ring roads. Building the LRT at-grade has not only aligned with the City's established vision of urban integration by minimizing infrastructure footprint and reducing negative visual impacts along the alignment, it also helps minimize construction costs. This vision is also built around the concept of maximizing the overall transportation corridor capacity in a smart and sustainable manner to meet the City's growing needs. This involves the prioritization of mass public transit over vehicles and the expectation that a manageable level of traffic congestion will occur.

As a result of the traffic-related concerns encountered on the existing Metro and Capital Lines, Council has directed Administration to re-examine LRT crossing options at critical arterial road crossings and other strategic locations. Specifically, at the September 2, 2015, Transportation Committee meeting, Administration was directed to provide reports on the feasibility of LRT grade separations at Princess

Elizabeth Avenue, 149 Street, 178 Street, and 137 Avenue and to engage with impacted stakeholders, including developers and landowners, to provide them with opportunities for input into grade separation assessments during the next level of design.

Grade separation has the potential to offer reduced traffic congestion and shorter travel times in the short term. However, this must be balanced with the long term implications on the broader transportation network and other Council-approved policies, strategies and initiatives related to land-use and compact urban form.

Weighted criteria have been developed to guide an objective decision-making framework for use on grade separation of current and future LRT projects. This framework is not a formula but rather a starting point to assess options for specific crossing locations. Considerations specific to a given location may include alignment with City strategic vision and policies, impacts to LRT and traffic operations (transit, pedestrian, goods, emergency and commuter), cost, schedule, aesthetics, approved land use plans, community integration and stakeholder feedback.

In addition to identifying the potential need for a grade separation, the evaluation framework needs to be sufficiently robust to explore, and potentially mitigate the underlying challenge that is triggering the need for grade separation consideration and determine whether recommended grade separations should go over or under the impacted intersection.

Intersections to be Assessed

The Institute of Transportation Engineers developed a methodology and graph to assess when LRT crossings:

- should remain at-grade
- should be grade-separated
- require additional analysis

The Institute of Transportation Engineers graph suggests that a comparison of LRT crossing frequency to the worst case per-lane traffic volumes be used as a starting point. Attachment 1 contains the Institute of Transportation Engineers grade separation graph, which has been overlaid with the City's existing and planned LRT crossings. This tool will be used as an initial screening for future LRT crossing assessments, specifically that any LRT crossings:

- to the left of the green line be at-grade
- to the right of the yellow and red lines be grade separated
- that fall on or between the green and yellow lines require site-specific assessment

Those crossings that fall to the right of the yellow and/or red lines are typically roads with higher order of operations such as, Yellowhead Trail, Whitemud Drive and Anthony Henday Drive. Within the City of Edmonton’s Transportation Master Plan, there are already requirements to grade-separate LRT lines from freeways, highways and the inner-ring loop, understanding that goods movement is a priority in these key corridors. LRT crossings that are not mandated to be grade separated via the Transportation Master Plan, and fall between the yellow and red lines will also be evaluated via the crossing assessment framework.

Proposed Process, Criteria and Weighting

Once a specific location is identified for assessment, LRT crossing option development should explore, at a minimum, the following options:

- At-grade with maximized roadway/intersection capacity
- Grade separation of LRT for both over and under scenarios
- Off-corridor improvements that may mitigate traffic delays at the crossing in question

Option development would also include assessment of impacts on any adjacent LRT stops/stations (i.e. does the option create the need to elevate, bury or relocate the station).

Once all options are developed, a comparative analysis of the options is completed using the following weighted criteria.

Criteria Category	Weighting
Accessibility <i>How the various transportation modes link between one another and with adjacent developments.</i>	4
Network Operations <i>How the surrounding and broader transportation network is impacted.</i>	4
Urban Design & Social Environment <i>How the surrounding communities and stakeholders are impacted.</i>	4
Feasibility & Construction <i>Feasibility, cost and risk assessments.</i>	2

To assist planning and design teams and ensure that the criteria are applied consistently, sub-criteria have been proposed and are presented in Attachment 2.

Policy

The Way We Move: Transportation Master Plan

- 4.1 Integrating Transit with Land Use - The City will integrate land use planning and transportation decisions to create an accessible, efficient and compact urban form.
- 5.1 Light Rail Transit (LRT) Network - The City will pursue expansion of the LRT to all sectors of the city with a goal to increase transit ridership and transit mode split, and spur the development of compact, urban communities.

The Way We Grow: Municipal Development Plan

- 3.3 Integrating Transit with Land Use - Edmonton's transit system becomes the primary framework for urban form.
- 5.3 Integrated Transit and Land Use - Ensure as development occurs around LRT stations and transit centres, high quality public spaces, streets and buildings emerge to support compact living and encourage transit ridership.

Optimization of the Transportation System Network - City Policy C569

This policy establishes the principles for development of a congestion management framework that considers all modes of transportation to assess the performance of transportation facilities. This provides a consistent approach to planning and design of transportation infrastructure to enable the City to respond to congestion using a multimodal approach that considers the quality of travel by roadway context for pedestrians, cyclists, transit users, auto and goods.

Corporate Outcomes

This report contributes to the following corporate outcomes:

- *Edmonton is attractive and compact* by ensuring that grade separated LRT structures are only used when absolutely necessary, so as to minimize visual barriers.
- *The City of Edmonton has sustainable and accessible infrastructure* by ensuring that LRT infrastructure is planned and designed with accessibility as a primary consideration.
- *Edmontonians use public transit and active modes of transportation* through consideration of delivering LRT infrastructure that is highly integrated into the surrounding urban environment.
- *The transportation system is integrated, safe and gives citizens choice to their mode of movement* by ensuring that overall multimodal transportation corridor is efficient with maximized capacity.
- *Goods and services move efficiently* by including goods, emergency and bus traffic as sub-criteria during the planning and design of LRT infrastructure.

Risk Assessment

Risk Element	Risk Description	Likelihood	Impact	Risk Score	Current Mitigations	Potential Future Mitigations
Inappropriate crossing assessment criteria	The assessment criteria has conflicting themes, or sub-criteria that is challenged to assess or identify differences between options.	3 - Possible	4 - Severe	12 - Medium	Complete test cases to ensure that sub-criteria have no gaps, redundancies or conflicting objectives with urban LRT principles of accessibility and land use integration.	Monitor future planning criteria and ensure alignment with the LRT crossing assessment criteria
Crossings are unnecessarily grade separated	Crossings are needlessly grade separated, leading to unnecessary increases in cost and construction schedule.	2 - Unlikely	4 - Severe	8 - Medium	Develop an assessment framework and criteria to ensure appropriate recommendations	Apply the assessment framework and criteria to all future LRT planning projects
Crossings are inappropriately placed at-grade	At-grade crossings do not provide an appropriate balance of urban integration and intersection operations.	2 - Unlikely	4 - Severe	8 - Medium	Develop an assessment framework and criteria to ensure appropriate recommendations	Apply the assessment framework and criteria to all future LRT planning projects

Traffic Impacts	Traffic analysis developed to support crossing assessments may not be reliable due to the methodology or data used.	2 - Unlikely	3 - Major	6 - Low	Utilize existing best practises by reputable agencies and institutes (e.g. ITE) to inform creations of the crossing assessment framework.	Work with Sustainable Development and Transportation Operations on model development.
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Public Engagement

Although public engagement was not part of developing the crossing assessment framework, it is based upon existing City policies, such as *The Way We Grow*, *The Way We Move* and *The Way We Green*, which were informed by comprehensive public consultation activities.

To assist with validation of the framework, Administration met with the Real Estate Advisory Committee to seek input. The predominant theme from that discussion was the Real Estate Advisory Committee’s concern about the City changing previously approved transportation plans. The Real Estate Advisory Committee advised that upon approval of transportation (and land use) plans, the development and real estate industries begin to invest based on those plans and begin to plan and design their developments accordingly. When transportation plans are amended there is a ripple effect to the development and real estate industries which must then adjust their developments, or to owners who bought property based on the approved plans. Essentially, the Real Estate Advisory Committee recommended that once the City approves a transportation plan there needs to be very strong rationale to amend the plan.

Public and key stakeholder engagement will be required as part of the assessment process for individual crossings. This engagement will assist Administration in understanding community-specific challenges, opportunities, and concerns. Public and stakeholder feedback will be included within the location-specific recommendation reports brought to Council for consideration.

Metrics, Targets and Outcomes

Metrics	Targets	Outcomes
Journey to Work Mode <i>(percent of survey)</i>	<i>The Way Ahead</i> identifies a target for 2018 25.0%	25.9% (2016)

respondents who select auto passenger, transit, walk, cycle, or other)		
Transit Ridership (Rates per capita)	<i>The Way Ahead</i> identifies a target for 2018 of 105.0	96.9 (2016)

Justification of Recommendation:

An initial screening tool will allow Administration to focus efforts on those LRT crossings where more detailed assessments are required. Council-approved assessment criteria will provide a consistent and objective process for determining the optimal configuration of those LRT crossings.

Attachments

1. LRT Crossing Assessment Framework- Initial Screening Graph
2. LRT Crossing Assessment Framework- Criteria and Weighting

Others Reviewing this Report

- T. Burge, Chief Financial Officer and Deputy City Manager, Financial and Corporate Services
- R. G. Klassen, Deputy City Manager, Sustainable Development
- C. Campbell, Deputy City Manager, Communications and Engagement
- D. Jones, Deputy City Manager, City Operations