



EDMONTON LRT EXPANSION
DOWNTOWN LRT CONNECTOR
CONCEPT PLAN



Downtown LRT Connector

Concept Planning Report - Draft

Report

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1 Introduction

Study Purpose

- 1.1 The purpose of this study is to develop plans for a 2.1-km addition to the City of Edmonton's Light Rail Transit (LRT) system to connect the proposed West and Southeast LRT with a street-running alignment in downtown Edmonton.

Background

- 1.2 In June 2009, the City Council adopted the long-term LRT Network Plan that defined the future size, scale, and operation of the regional LRT system. The Network Plan makes downtown Edmonton the focal point of the system, with the determination that a street-level LRT system would be needed in the downtown core to serve future system expansion separate from the existing LRT system in the downtown tunnel.
- 1.3 This report builds upon the earlier works undertaken to identify the LRT corridor through the downtown which was approved on 21 June 2010 at a statutory public hearing of the City Council in conjunction with the Capital City Downtown Plan (CCDP). The corridor approved by City Council identified the streets and avenues the LRT would follow through the downtown. This report further refines the approved corridor, identifying the specific concept alignment and station stop details.
- 1.4 The document describes the process used in the development of the concept alignment for the Downtown LRT Connector. It outlines the approach taken to develop and assess the potential options and presents a summary of the technical analysis that resulted in the recommended Downtown LRT Connector.
- 1.5 The recommended Downtown LRT Connector complements, and links the proposed West and Southeast LRT corridors and is also consistent with the Capital City Downtown Plan (CCDP). In combination, these initiatives provide a major opportunity for the City of Edmonton to introduce a series of major improvements to the downtown. In particular, the introduction of a new (surface level) LRT route can be a significant "city shaper" providing a focus for new development, and changing the way in which people access and use the downtown and its many facilities.
- 1.6 The report consists of the following five sections:
 - I Introduction
 - I Project context
 - I Option development and evaluation
 - I Recommended corridor
 - I Next steps

Urban Style - City Scale LRT

The City of Edmonton has adopted a new long-term LRT network plan and style of system that differs from the current LRT line. The focus of future LRT expansion will be to provide an Urban Style - City Scale system, an approach that will provide closer stop spacing and improved links to communities, supporting the City's vision for a more compact, sustainable and liveable city. An Urban Style - City Scale system is defined in the LRT Network Plan as:

Urban Style:- *A style of System that offers: reduced scale platforms and stops; modern low floor LRT vehicles; frequent stops; transit priority; serving dense urban corridors.*

City Scale:- *Distinctive design that provides: identity; seamless integration; easily accessible; supportive of land use plans, and walkable communities.*

- 1.7 Figure 1.1 provides an examples of Urban Style - City Scale LRT in Dublin and Amsterdam, showing related transit oriented development (TOD) and the integration of LRT into an existing city streetscapes.

FIGURE 1.1 EXAMPLES OF URBAN STYLE - CITY SCALE LRT



LRT/Stop - Dublin, Ireland

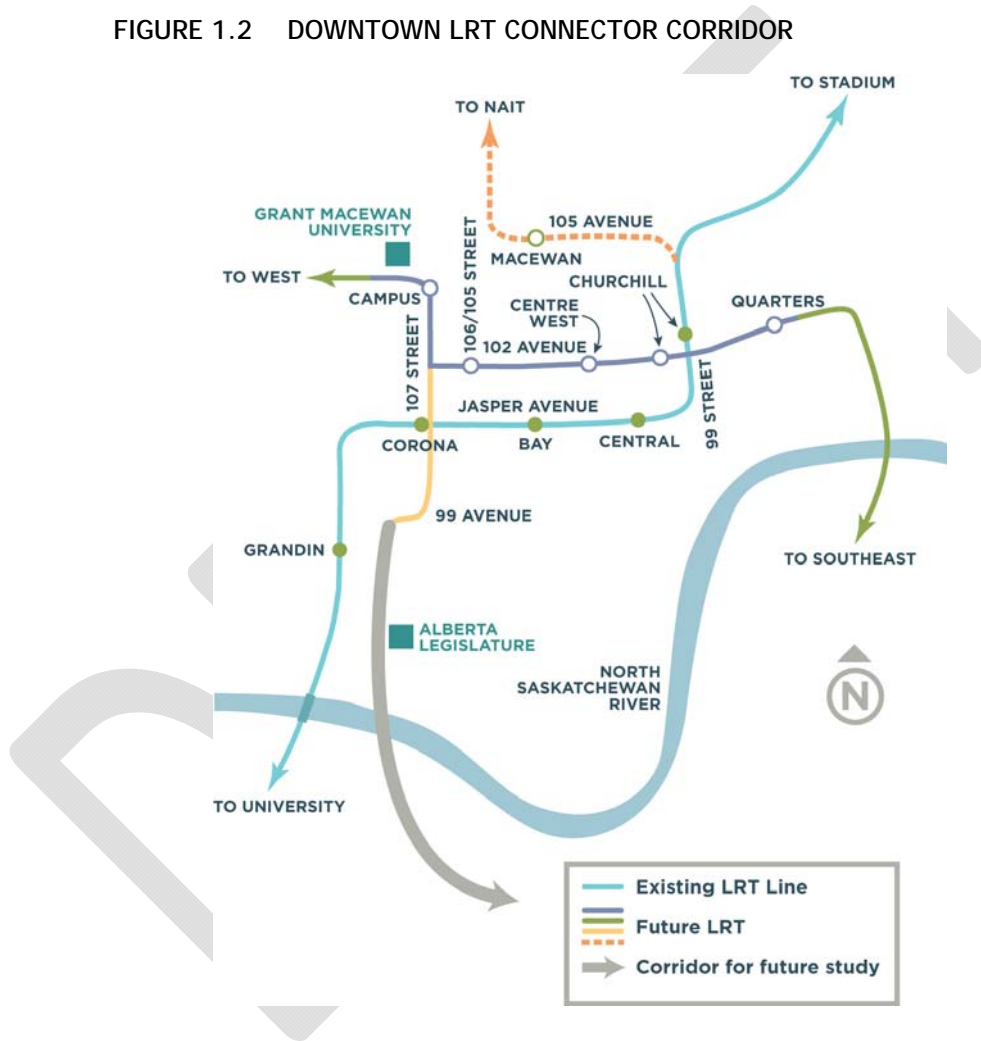


Alignment - Amsterdam, Netherlands

Study Boundary

- 1.8 The development of the Concept Plan for the Downtown LRT Corridor builds upon the earlier work undertaken to identify the LRT corridor through the downtown, as approved by City Council.
- 1.9 The route runs from a connection to the West LRT line on 104 Avenue, running south on 107 Street before turning east on 102 Avenue through the Warehouse Campus District and through Churchill Square, connecting to the Southeast line in the Quarters. Figure 1.2 provides an illustration of the Downtown LRT Connector.

FIGURE 1.2 DOWNTOWN LRT CONNECTOR CORRIDOR



- 1.10 The corridor encompasses both the Downtown, including the Warehouse Campus, Commercial, and Capital City districts, and the Quarters (a development area close to the eastern boundary of the Downtown).

2 Project Context

City Plans

2.1 The development and assessment of the recommended corridor for LRT through the downtown has been influenced by The City of Edmonton's strategic vision, which aims for a more compact, livable and sustainable city, where people have the opportunity to choose and use alternative transportation modes. In turn, this approach is also set out in the following City Plans:

- | "The Way Ahead", the Strategic Plan;
- | "The Way We Grow", the Municipal Development Plan (MDP);
- | "The Way We Move", the Transportation Master Plan (TMP);
- | The LRT Network Plan; and,
- | The "Capital City Downtown Plan" (CCDP).

The Way Ahead

2.2 The City of Edmonton's Strategic Plan provides a framework to establish priorities and make informed decisions for the future. This plan sets a vision for Edmonton 30 years in the future. Created with input from citizens, the vision sets direction for the City by establishing a descriptive target of a vibrant, sustainable city that builds on Edmonton's cherished assets. Recognizing the critical role that public transportation plays in the viability and success of Edmonton, the Plan serves to guide City Council's decision making with strategic goals and progress checkpoints.

The Way We Grow

2.3 The MDP represents the City's strategic growth and development plan. Clear direction on municipal and regional planning is critical given the anticipated population growth of over 1 million residents by 2040. The realization of many goals and objectives of the MDP will shape the city's urban form and direct the development in conjunction with key transit node and corridor locations including LRT. This approach serves to manage growth and ultimately create a sustainable, healthy, and compact City.

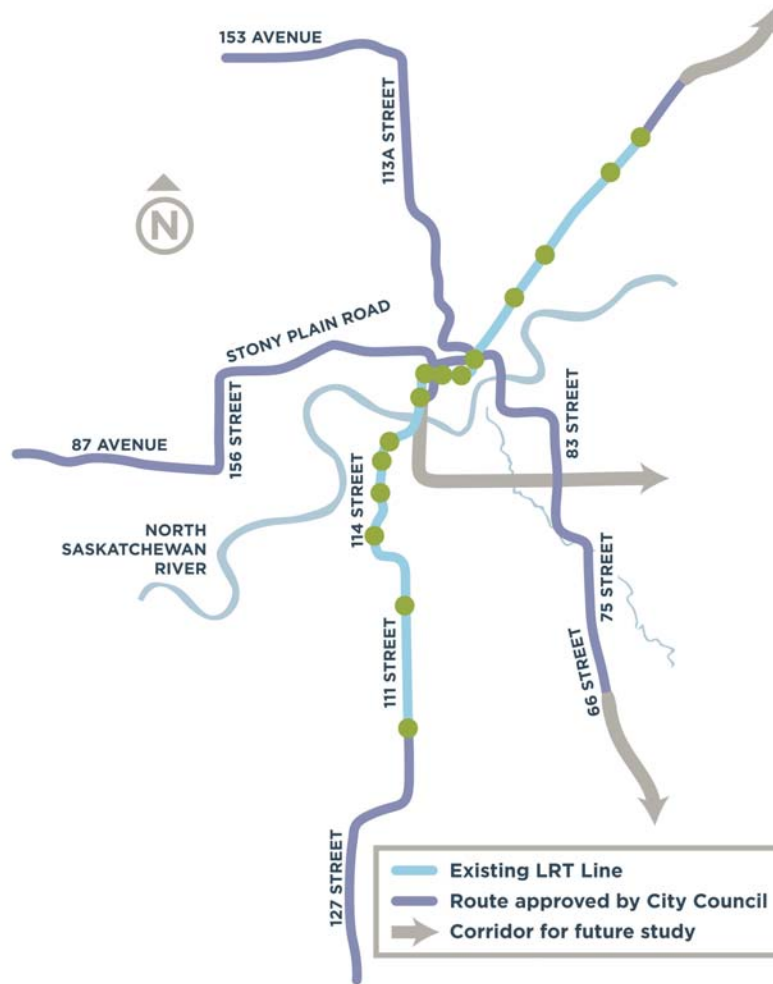
The Way We Move

2.4 The TMP re-prioritized the transportation network towards transit and goods movement, providing private automobile trips with a lower priority. At the same time, the City has followed through with its policy direction to coordinate land use and transportation planning by directly linking the TMP to the MDP and vice versa. The new TMP also promotes a more compact urban form, the creation of transit-oriented development and a significant investment in public transportation.

2.5 The TMP establishes a number of strategic goals for the City's transportation network and planning. These cover areas including:

- | Transportation and Land Use Integration;
 - | Access and Mobility;
 - | Sustainability ;
 - | Health and Safety;
 - | Transportation Mode Shift;
 - | Well-Maintained Infrastructure; and,
 - | Economic Vitality.
- 2.6 The new TMP sets out how a larger, more integrated LRT network could be used to meet the goals set out within the TMP and help the City deliver it's wider objectives set out in the City's Strategic, Municipal and Capital City Downtown Plans.
- The LRT Network Plan*
- 2.7 Expansion of the Light Rail Transit (LRT) network has a significant role to play in helping to shape future city development and supporting the City's strategic objectives.
- 2.8 New LRT stops, developed in conjunction with surrounding land use plans encouraging appropriate density, provide the catalysts for the development of more compact urban communities. The new LRT lines also provide the opportunity to incorporate urban realm improvements, integrating the routes and stop with the communities they serve. The use of surface routes and stops offer improved accessibility, help to promote greater use of transit, and increase mode share. The stops also help to generate increased local vibrancy through the pedestrian movement to and from the stops.
- 2.9 Recognising the importance of transit's role in helping to meet the City's strategic goals and the role that the existing and future development of LRT can play in this effort, the City has developed an LRT Network Plan to guide the long term expansion of the network.
- 2.10 The Plan is based on an assessment of long term population and employment growth, capacity requirements, and an evaluation of potential LRT catchments and corridors. The plan proposes a six line LRT system extending from the Downtown to the Northwest, Northeast, East, Southeast, South and West, as illustrated in Figure 2.1.

FIGURE 2.1 EDMONTON'S PROPOSED FUTURE LRT NETWORK



2.11 Key elements of this plan include:

- | Serving communities only where future land use and demand warrants it;
- | Street level operation of new LRT lines;
- | An Urban Style, City Scale approach to guide any future LRT development; and,
- | Low-floor LRT technology for new lines that do not connect to the existing system.

Capital City Downtown Plan

2.12 In the development of the Downtown LRT Connector a critical influence has been the CCDP, which sets out the proposals for the ongoing development of the downtown area. Within this plan, the Downtown LRT Connector is identified as one of the nine catalyst projects, as it will provide opportunities to improve access through the

downtown, with the LRT stops providing opportunities to focus development and support new activity centres and existing and new communities.

2.13 The Capital City Downtown Plan was prepared in parallel with the Downtown LRT corridor study, which provided the ideal opportunity to integrate the two studies. In turn, this ensures the LRT network is integrated into the CCDP to maximise the proposals for land use, urban realm and street use (which include pedestrian, cycling, transit and general traffic).

2.14 The CCDP also set four key policies which help guide the development of the downtown LRT alignment, Under these policies, the development of the LRT will help support and facilitate all the objectives under the four policies:

| Sustainable

- Healthy natural environment
- Reduced energy and emissions and improved air quality
- Stewardship of natural and material resources
- Healthy communities
- A sense of place

| Vibrant

- Additional downtown housing
- Commercial, retail and educational activities
- Diverse arts, culture and entertainment

| Well-Designed

- Well designed built and urban forms
- Defined street framework
- Additional connected parks and open spaces
- Historic preservation

| Accessibility

- Efficient roadway system
- Enhanced pedestrian circulation
- Improved cycling
- Superior transit

3 OPTION DEVELOPMENT & EVALUATION

Concept Plan Process Overview

- 3.1 The City Transportation Department and the project team, in conjunction with stakeholders, have used a multi-stage process to review, develop, assess and identify the preferred Concept Plan for the Downtown LRT Connector.
- 3.2 The approved Downtown LRT Corridor formed the starting point for the study team. The development of the preferred alignment of the Downtown LRT Connector was then approached in two stages. The first stage included the development of “Initial Options” for alignment features, such as stop location options and the location of track within the alignment. The second stage identified the most promising components of each option to form the final “Concept”. A detailed concept plan for this single option was developed to further identify impacts, benefits, and methods of mitigation. Each step is described in detail below.

Initial Options Development

- 3.3 Using the approved LRT corridor through the downtown, the associated LRT stop locations were reviewed to ensure that they best served the City and fit with the objective set out in the “Project Context”. At each of the stop locations a number of objectives were identified to support the development of options that would meet each locations objectives.
- 3.4 The options were drawn up in conceptual form and used to produce a consultation booklet (“Concept Plan for the Downtown LRT Connector - Design Options”). The booklet was used in meetings with Downtown Stakeholders in September 2010 to highlight the issues and opportunities with the differing options and to help facilitate stakeholder involvement and feedback.
- 3.5 The feedback from the stakeholder events was used in combination with the objective set out in the “Project Context” to evaluate the options against the City’s LRT assessment criteria. The top level criteria are:
 - | LRT Alignment
 - | Catchment
 - | Land Use Integration
 - | Transportation Network Integration
 - | Urban Design
 - | Urban Form
- 3.6 This approach resulting in a preferred stop arrangement for each of the identified locations.

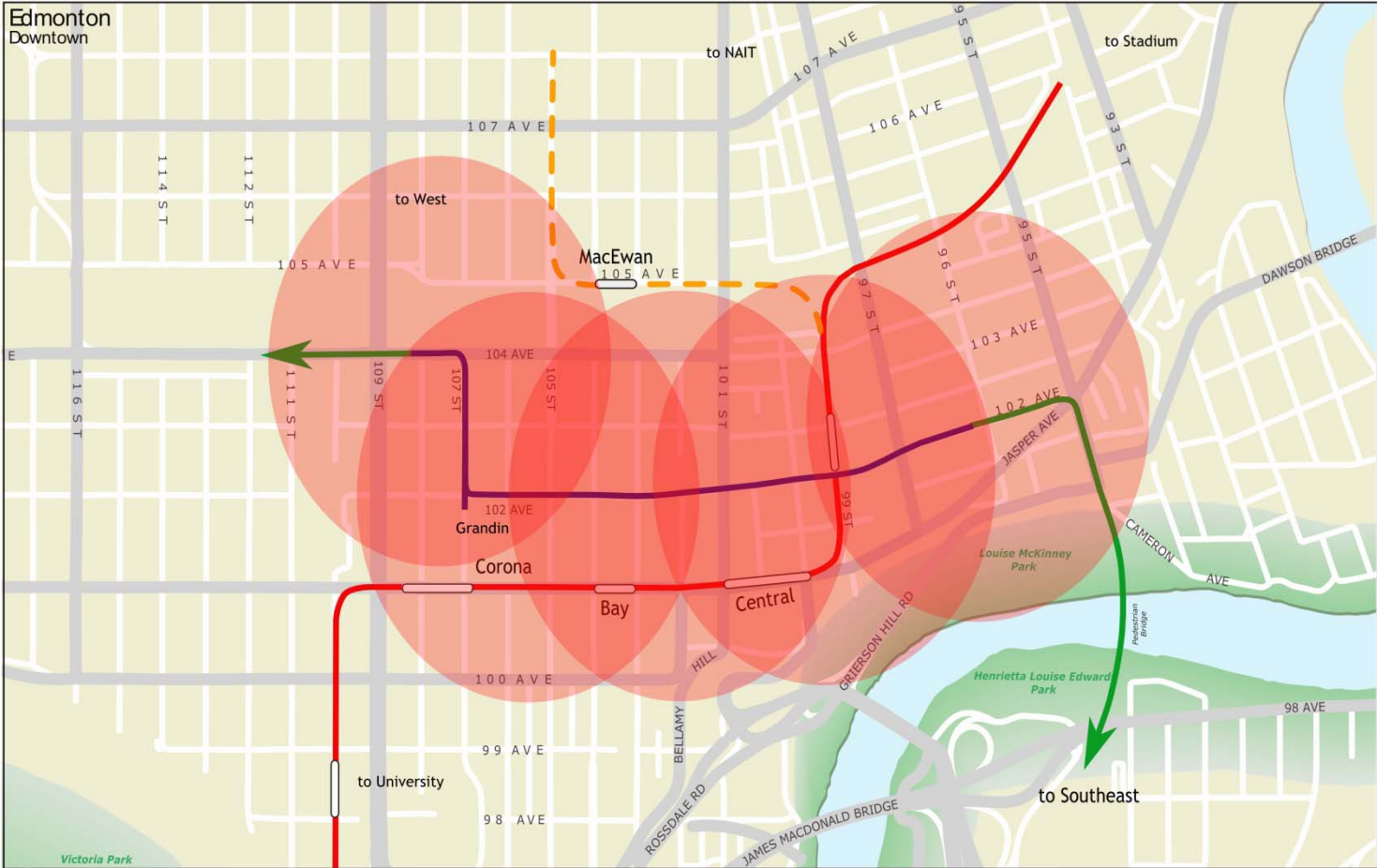
Single Option Concept Plan

- 3.7 The preferred option were further refined. An additional public consultation booklet was produced focused on the single concept (“Downtown LRT Connector - Draft Concept Plan”). This document was used for the public open house session undertaken in early November 2010 to help facilitate public involvement and feedback.
- 3.8 In parallel to the development of the public consultation booklet and materials, the development of the draft concept design continued, examining:
- | Pedestrian and cycle integration;
 - | Traffic assessment and identification of complimentary measures;
 - | Utilities and drainage
 - | Geotechnical issues;
 - | Environmental issues including
 - Landscape;
 - Historic resources; and
 - Noise and Vibration.
 - | Cost estimates
- 3.9 The public consultation and the further development of the Concept Plan for the Downtown LRT Corridor has been used refine the alignment design.

Option Development

- 3.10 During the development, assessment and recommendations of the corridor, a number of potential stop locations were identified along the proposed corridor, Campus, 105/106 Street, Centre West, Churchill Square, and the Quarters. These stop locations were reviewed on commencement of the Concept Plan development.
- 3.11 The platforms for each stop will be approximately 30 to 35 centimetres high and 80 metres long, effectively the length of the block. Access for passengers is via a shallow ramps from the intersections at each end of a block.
- 3.12 The identified stops locations would provide an average stop spacing of approximately 500 metres along the 2.1 kilometre route. The 400 metre catchment of the proposed stop locations is shown in Figure 3.1 below, the diagram shows that the identified stop locations maximise the close walking accessibility and catchment along the proposed corridor.

FIGURE 3.1 400 METRE STOP CATCHMENT



Edmonton LRT Expansion
Concept Plan - Downtown LRT Connector - Stop Catchment

Drawn by: IZS	Revision: V0	Last updated: 01 Nov 10

Campus

3.13 The objective of this stop location in this area is to provide a direct and convenient transit service to Grant MacEwan University, NorQuest College, the Warehouse Campus Neighbourhood identified in the CCDP, and 108 Street. The stop locations that would meet these objectives are potentially more widely spaced than other stop locations being considered along the alignment, as opportunities exist at a greater number of locations on this section of the route.

3.14 A single stop location is proposed to serve both Grant MacEwan and NorQuest. A number of stop locations have been identified and evaluated between 102 Avenue/ 107 Street and 104 Avenue and 109 Street. The stop location would also serve part of the Warehouse Campus district.

105/106 Street

3.15 The objective for this stop location is to provide a stop as far west as possible on 102 Avenue to provide walking links through to Jasper Avenue and Corona Station prior to the potential future wider downtown LRT circulator. The stop would also provide local walk links within the Warehouse Campus District and walking links to the Provincial Government building to the southwest.

Centre West

3.16 The objective for this stop location is to provide connectivity to the commercial core within the downtown, walking links through to Jasper Avenue, interchange with transit on 101 Street and future connectivity to the potential arena development.

3.17 The stop location is proposed between 101 and 103 Streets on 102 Avenue. The location will provide connectivity and accessibility to the core business district, Downtown shopping and amenities, Pedway and potential future arena.

Churchill Square

3.18 The objective for this stop location is to provide connectivity to the arts and entertainment district within the downtown, interchange with the existing LRT line, walking links through to Jasper Avenue and the river valley, interchange with transit on 100 Street, and connectivity to the municipal government.

3.19 The stop location is proposed to be between 99 and 100 Street on 102 Avenue. The stop will provide connectivity to both the west and east side of Churchill Square, and provides the opportunity to integrate the stop platform with the existing sidewalks and surfacing. The location will provide the connectivity between the existing LRT system and the new lines. A new dedicated accessible entrance at the southeast corner of Churchill Square would provide a direct connection between the two LRT systems, and a further connection to the existing Pedway.

Quarters

3.20 The objective of this stop location is to serve the Quarters area and provide an eastern most stop in the Downtown before the LRT descends into a short tunnel to turn south to connect to the Southeast LRT line.

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- 3.21 The proposed stop location is just west of 96 Street on 102 Avenue. The stop would be sited on a long block, with one end of the stop adjacent to 96 Street, which will become the focal street through the Quarters area. The identified location provides a stop as far east as practicable and will best serve the heart of the Quarters area. The location also provides walking connectivity to the river valley.
- 3.22 The identified stop locations were used as the basis for the development of a number of alternative stop designs. The following options were used as a starting point for evaluation
- | Campus Options
 - Option 1: stop on the north side of 104 Avenue
 - Option 2: Stop located on a diagonal alignment between 108 to 107 Streets
 - | Following discussions with stakeholders a number of further options were developed and evaluated. “Dialog” options were developed in consultation with NorQuest College and their consultants.
 - Option 3: Stop on the east side of 107 Street between 103 and 102 Avenues
 - Dialog Option 1: stop on the west side of 107 Street between 103 and 102 Avenues
 - Dialog Option 2: stop on the west side of 107 Street between 103 and 102 Avenues,
 - Dialog Option 3: stop on the west side of 107 Street between 103 and 102 Avenues
 - | 105/106 Street Options
 - Option 1: Stop between 105 and 106 Street retains two traffic lanes
 - Option 2: Stop between 105 and 106 Street retains single eastbound traffic lane with dedicated two way cycle lanes
 - Option 3: Stop between 105 and 106 Street closes a section of 102 Avenue to all traffic, dedicated two way cycle lanes would be provided
 - | Centre West Options
 - Option 1: Stop between 102 and 101 Street, retains two traffic lanes
 - Option 2: Stop between 102 and 101 Street, closes a section of 102 Avenue to all traffic, dedicated two way cycle lanes would be provided
 - Option 2a: Stop between 102 and 101 Street, single traffic lane, dedicated two way cycle lanes would be provided
 - Option 3: Stop between 103 and 102 Streets, closes a section of 102 Avenue to all traffic, dedicated two way cycle lanes would be provided
 - Option 3a: Stop between 103 and 102 Streets, single traffic lane, dedicated two way cycle lanes would be provided

I Churchill Square Options

- Option 1: Stop between 100 and 99 Streets, retains two traffic lanes
- Option 2: Stop between 100 and 99 Streets, with single eastbound lane and dedicated cycle lanes
- Option 3 : Stop between 100 and 99 Streets, closes a section of 102 Avenue to all traffic, dedicated two way cycle lanes would be provided

I The Quarter Option

- Option 1: Stop between 97 and 96 Streets, with single eastbound access lane (no through traffic).
- This stop location was developed in conjunction with the Quarters planning team and best represents the ultimate development goals of the Quarters plan. As this option was developed through the Quarters planning process, it is the only option in this location and was not evaluated further by this team.

3.23 The options were evaluated against the City's LRT assessment criteria taking note that within the Downtown, the primary role of the LRT is somewhat different from the radial LRT corridors which feed it, as the route will provide access to major destinations within the downtown, serve the increasing residential catchment area within the downtown, and provide a link to the existing transit network. The evaluation of the downtown route has taken account of the LRT route being one of the nine catalyst projects included within the CCDP. Development of the Downtown LRT Connector supports the associated policies under the CCDP's four key themes (Sustainable, Vibrant, Well Designed and Accessible).

3.24 In addition, the development of the Downtown LRT Connector is based on the design vision and associated design criteria set out in the LRT System Design Report (Steer Davies Gleave, May 2010). That report described the Urban Style - City Scale LRT system being developed in Edmonton, with recommendations and examples related to stop design, alignment design, and operational principles, all aimed at improving user accessibility and convenience.

3.25 The evaluation of the options therefore focused on the following assessment criteria:

- I LRT Alignment
- I Catchment
- I Land Use Integration
- I Transportation Network Integration
- I Transit network impacts
- I Urban Design
- I Property Impacts
- I Urban Form

Stakeholder Involvement

3.26 Stakeholder sentiment and feedback served as a critical input to the Options Development and ultimately the Single Option Concept Plan. Outreach to stakeholders included two primary components. The first component included focused discussions with key stakeholder organizations such as major downtown employers, the Downtown Community League, and major civic attractions. The second component included broad outreach to public stakeholders. To provide clear and concise information on the project, process, and options, a workbook of the concept plan options was produced and used to support the stakeholder consultation sessions held in September 2010. The team consulted with approximately 250 stakeholders, including:

Building Owners and Managers Association	Downtown Community League
Winspear Center	Citadel Theatre
MacEwan College	Edmonton Public Library
Manulife Place	Katz Group
Canada Place	Downtown YMCA
City Centre Mall	Downtown Market
	NorQuest College

Recommended Concept Plan

3.27 Based upon the technical evaluation and stakeholder consultation the recommended concept alignment was identified as best meeting the assessment / evaluation criteria and the objectives of the City’s Plans, particularly the CCDP. Table 3.2 below details the recommended concept alignment option for each stop location and provides key information regarding the selection of each.

TABLE 3.1 RECOMMENDED CONCEPT ALIGNMENT

Campus	105/106 Street	Centre West	Churchill Square	Quarters
Option 2: Diagonal alignment with stop between 108 to 107 Street	Option 2: Stop between 105 & 106 street with a single eastbound traffic lane	Option 2a: Stop between 102 and 101 Street, with a single eastbound traffic lane	Option 3 : Stop between 100 and 99 Streets, with no traffic lanes	Option 1: Stop between 97 and 96 Streets, with single eastbound access lane (no through traffic)
Rated highest due to its high pedestrian and bicycle access, linkages to nearby activity centers including the two campuses, urban design integration, TOD potential and consistency with the CCDP, and operational flexibility.	Provides the optimum LRT and cycle arrangement while retaining local traffic access eastbound. The arrangement provides the highest level of local walking and cycle accessibility. The arrangement is supportive of the CCDP policies related to Sustainable, Vibrant, Well Designed, and Accessibility.	Rated higher than the other options due its proximity to transit connections on 101 Street and its connectivity within the heart of the downtown core (shopping, offices and leisure). The option reduces the traffic impacts on vehicle egress from 102 Street by providing an eastbound traffic lane through to 101 Street and a westbound traffic lane and dedicated right turn lane through to 103 Street. The option would be supportive of the CCDP policies to create a Sustainable, vibrant, Well-Designed and Accessible Downtown.	Provides a quality arrangement for the LRT at what is the heart of the City. The arrangement would provide greater platform space and the highest level of accessibility and integration with Churchill Square and the associated precinct. Stop platforms would be integrated with the sidewalks providing an opportunity reinforce the sense of place, to enhance and complement the square and support all year round street vibrancy. This approach would support the CCDP.	This stop location was developed in conjunction with the Quarters planning team and best represents the ultimate development goals of the Quarters plan.

3.28 The detailed evaluation of the stop options is in provided in Appendix A.

4 RECOMMENDED CORRIDOR

- 4.1 The review, development and assessment of the potential Downtown LRT Corridor Design Options, and the consultation undertaken with stakeholders identified the Recommended Concept Plan detailed below that would best meet both the objectives for the future LRT and be the most supportive of the CCDP, as well as the wider City objectives.
- 4.2 In summary the Downtown LRT route's prime functions are:
- | To both serve the downtown itself and to connect the proposed West and Southeast LRT routes;
 - | To make provision for a Central Area Circulator LRT (for future assessment) providing LRT links to the University and Strathcona area; and,
 - | To reflect and advance the wider City and downtown objectives, including support for development, reducing auto use and making Edmonton a more liveable city.

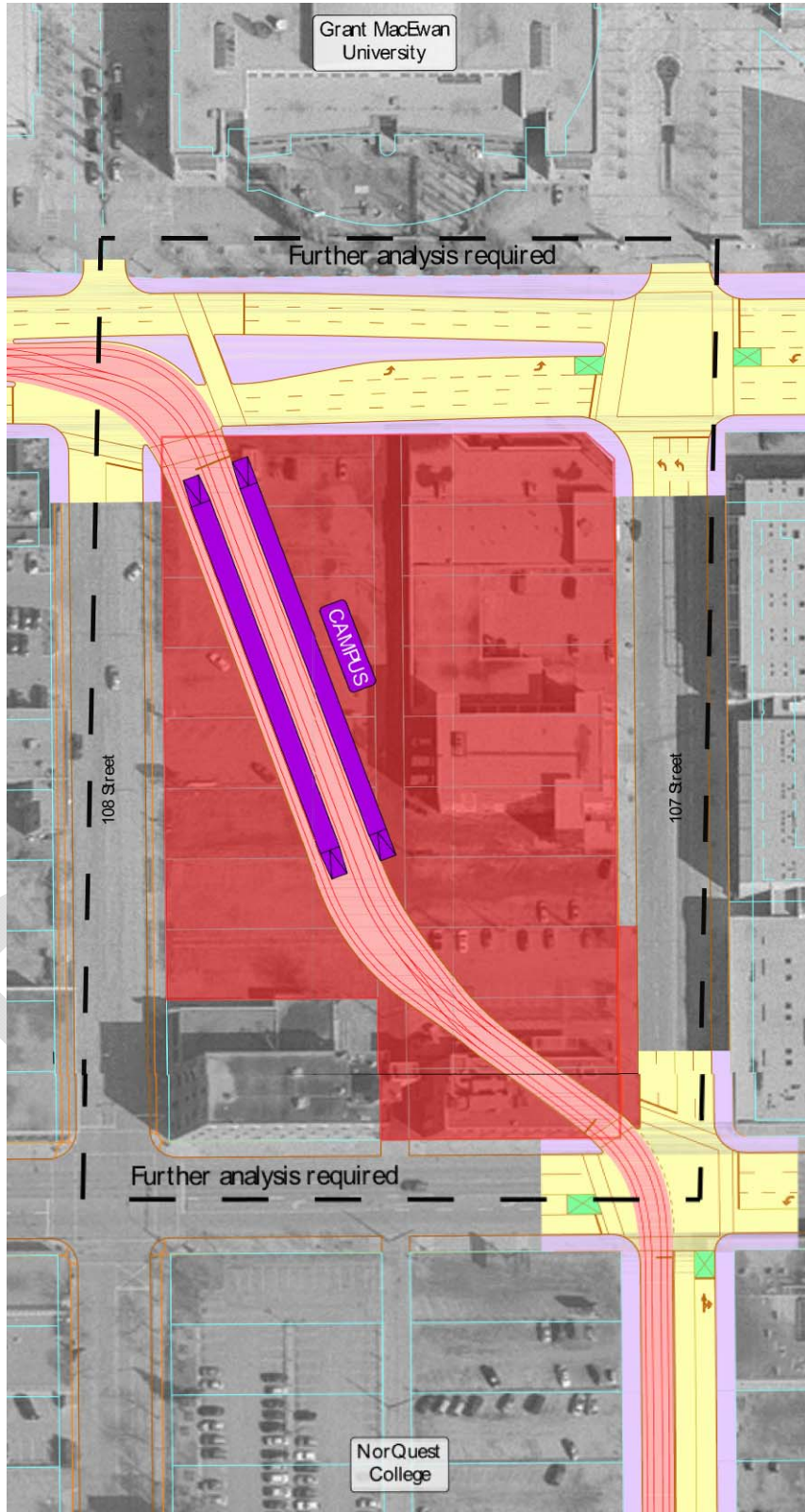
Recommended Concept Plan

- 4.3 The recommended alignment of the Downtown LRT connector starts at the connection to the West LRT line in the centre of 104 Avenue at its intersection with 109 Street. The alignment continues in the centre of 104 Avenue for one block to 108 Street where the alignment turns south crossing into the block on the eastern side of 108 Street.

Campus Stop

- 4.4 The alignment crosses through the whole city block on an angle (N to SE) through to the intersection of 103 Avenue and 107 Street. The stop is sited within the city block, with a three-track arrangement serving two platforms.
- 4.5 The three-track arrangement will provide operational flexibility, allow the service frequency through the downtown to be regulated, providing space for trains to be turned back in the event of any disruption and enabling an extra vehicle to be stored close to the heart of the downtown (to provide extra capacity to cater for events within the downtown).
- 4.6 The alignment turns from the stop to run on the west side of 107 Street through to the intersection with 102 Avenue, two traffic lanes is maintained in each direction on this section of 107 Street. Provision for the Central Area Circulator LRT is provided at this intersection. The LRT alignment turns east running on the north side of the 102 Avenue. A single traffic lane in each direction is retained through to 106 Street.

FIGURE 4.1 CAMPUS STOP



105/106 Street Stop

- 4.7 The stop is sited on the north side of 102 Avenue between 106 and 105 Street with side platforms and with the westbound platform integrated with the sidewalk. Dedicated cycle lanes are provided in both directions along with an eastbound traffic lane. Improved sidewalks would be provided on 106 and 105 Streets between 103 Avenue and Jasper to offer enhanced pedestrian routes.
- 4.8 The LRT alignment continues on the north side of 102 Avenue with a single traffic lane provided in each direction between 105 and 103 Street.
- 4.9 To facilitate the egress of traffic from 102 Street and the associated parkades, a westbound traffic lane, with a dedicated left turn onto 103 Street, is provided westbound between 102 and 103 Street.

FIGURE 4.2 105/106 STREET STOP



Centre West Stop

- 4.10 The stop is sited on the north side of 102 Avenue between 102 and 101 Street with side platforms, with the westbound platform integrated with the sidewalk. Dedicated cycle lanes are provided in both directions along with an eastbound traffic lane, to help facilitate vehicle egress from 102 Street.
- 4.11 The LRT alignment continues on the north side of 102 Avenue with a single traffic lane provided in both directions between 101 and 100 Street.

FIGURE 4.3 CENTRE WEST STOP



Churchill Square Stop

- 4.12 The road between 100 and 99 Street would be closed to traffic with the stop integrated with Churchill Square. This would create a continuous public space from City Hall to the Stanley A. Milner Library. A dedicated cycle lane would be provided in each direction. A new connection to the existing LRT would be provide at the southeast corner of Churchill Square to ensure that there is a high quality connection between the two LRT systems.
- 4.13 To complement the development of the LRT and the connectivity to Churchill Square, 99 Street between 102A and 102Avenues would be closed. The LRT alignment then continues on the north side of 102 Avenue with a single traffic lane provided in an eastbound direction and two-way dedicated cycle lanes between 99 and 97 Street.
- 4.14 The alignment continues across 97 Street through the "Chinese Arch" through to the Quarters stop, and a single eastbound access lane would be provided with on-street parking.

FIGURE 4.4 CHURCHILL SQUARE STOP

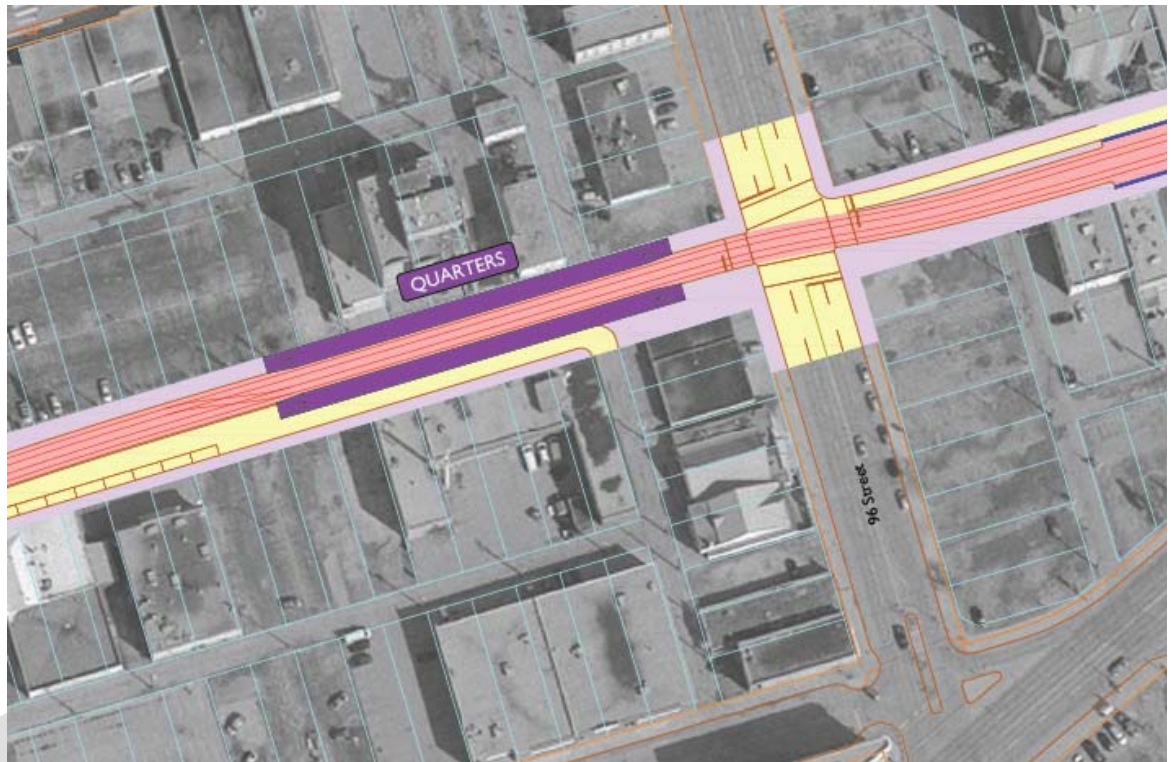


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Quarters Stop

- 4.15 The Quarters stop would be sited close to 96 Street with side platforms, the westbound platform integrated with the sidewalk.
- 4.16 The route crosses 96 Street before descending into a tunnel portal to connect to the southeast LRT.

FIGURE 4.5 QUARTERS STOP



LRT OPERATIONS

- 4.17 The principle for the operation of the proposed low floor urban style LRT routes are:
- | Driver operated;
 - | Maximise the proportion of segregated alignment;
 - | Line-of-sight operation on street, with segregated track;
 - | Use of dedicated LRT signalling aspects at intersections;
 - | Speed restrictions will be imposed in enclosed alignments (tunnels, cuttings) where the horizontal or vertical curvature limits sighting distances, and/or a form of local LRT signalling installed to indicate a clear route;
 - | Bi-directional running over other than a short clearly visible section will be controlled by the use of an LRT signalling system to indicate the route is clear and to detect and visually indicate two vehicles on a single line section; and,
 - | Vehicle Speed within the downtown
 - In the downtown, the LRT vehicle would not exceed the posted speed limit for the street where it is traveling (typically 50kph in the downtown)
 - The average speed would vary, depending on the opportunity for priority over other traffic.
 - Each train would typically spend approximately 20 seconds at each stop.

Vehicle Operation

- 4.18 The vehicles (either single or coupled vehicles) will be driver-operated using line-of-sight operation. Similar to a bus driver, the individual LRT operators would control of the train, responding to the street conditions including adjacent traffic, pedestrians, weather, etc. Operating rules and training will be developed to ensure the LRT vehicles are driven in a confident but defensive manner, ensuring drivers are aware of pedestrians and other road users, and when approaching a pedestrian crossings or signalled intersections, speed is reduced to ensure the vehicle can stop if it is not given priority over the other movements.
- 4.19 The operation will be supported by a central control and vehicle timetabling system using automatic vehicle location. The system monitors vehicle positions, typically based upon GPS and the vehicle's odometer, reporting this to the central system via a radio data channel. The system then responds real time to the source LRT vehicle and adjacent services to show if the LRT vehicle is ahead or behind schedule. The schedule status is then used to prioritise each vehicles priority at road intersections. Vehicle running on time or behind schedule are afforded the highest level of priority and the vehicles running ahead of schedule less priority.

Intersection priority

- 4.20 The signalling through each intersections for low floor LRT vehicle would be controlled by the local traffic signal controller, with the light rail system placing a demand for the signalled movement as required. The highest level of priority should be afforded to the LRT wherever this is achievable. The priority is adjusted depending on each vehicle's performance to the timetable, highway conditions and time of day. The intersection signal controller compensates for any movements cut short on subsequent signal cycles.
- 4.21 When the LRT is given a proceed signal, all the conflicting traffic movements would be set to red.
- 4.22 A peak service 5 minute headway has been assumed for the LRT system resulting in for both directions approximately 24 LRT movements through each intersection during peak periods.

TRANSPORTATION NETWORK

GENERAL

- 4.23 The development of in-street LRT will necessitate the reallocation of road space away from general traffic within the identified corridors to the LRT. However this is not necessarily to the detriment of the network because overall people moving capacity will be increased. An example of this is 102 Avenue, where the use of the street will change to being primarily LRT and local traffic. The capacity of this street will increase significantly over the current peak capacity today of approximately 900 people (600 vehicles with 1.5 people per vehicle). With the LRT the corridors capacity would increase to approximately 5,000 per direction plus local traffic based upon a 5-minute LRT peak period headway, assuming trains are at least 70% full. Traffic within the downtown will likely decrease as more people use the LRT, with the remaining traffic rerouting onto parallel corridors in the existing grid network. The individual user of the Downtown Road network are considered further below.

PEDESTRIANS

- 4.24 The inclusion of a surface level LRT within the Downtown, especially around stop locations will significantly increase pedestrian activity. The pedestrian links to the stop locations have been assessed to ensure easy pedestrian navigation and wayfinding. Pedestrian crossings of the adjacent roads will be provided and controlled at the adjacent intersections.

CYCLES

- 4.25 The CCDP identifies 102 Avenue as an east-west cycle route through the downtown. The development of the LRT will either provide or retain this cycle route if already in place, and where possible enhance it with dedicated or additional space for cyclists. With the development of the LRT 102 Avenue will become a slower traffic street more focused on local access rather than through movements. This will reduce traffic and improve the road environment for both cyclists and pedestrians.

TRANSIT

- 4.26 The provision of an additional LRT corridor through the downtown will significantly improve capacity and provide improved connectivity within the downtown and the wider city. However LRT on 102 Avenue will necessitate the removal of bus services on the corridor. To provide additional bus routes within the Downtown it is recommended that 103 Avenue between 103 Street and 100 Street be converted to two way traffic flow.
- 4.27 The bus network would be revised to complement the LRT routes, minimise service duplication, maximise the return on the LRT investment and improve network efficiency. This reduction and revision in service will help mitigate the loss of buses on 102 Avenue.
- 4.28 A complementary bus network plan will need to be developed within the downtown to support and facilitate the introduction of the LRT network. This may need to provide complementary transit priority for other service particularly to provide good transit network integration on 101 and 100 Street with the retained bus services.

ROAD

TRAFFIC ASSESSMENT

- 4.29 The road network within the downtown consists of a typical grid network, providing traffic with multiple routes. The main arterial routes running north/south within the downtown include 101, 105 and 109 Streets, the later providing connectivity to the High Level bridge over the North Saskatchewan River. In the east/west direction 104 and Jasper Avenue are the main arterial routes into the downtown.
- 4.30 Traffic simulations were completed to determine overall adjustments and impacts to traffic movement in the downtown, related to the introduction of the new LRT. The simulations were developed using the City's 2010 Synchro model, updated to reflect the inclusion of the proposed LRT (Downtown, West and Southeast) using data from the City's Emme2 model for 2016.
- 4.31 The development of the LRT routes and the use of existing road space within the identified corridors, results in reduced traffic volumes within the LRT corridors, with some reassignment of traffic to other routes. The new LRT routes themselves will provide people with improved and new journey opportunities, reducing the use of the private car into the downtown.
- 4.32 The simulations show the road network within the downtown currently provides a high level of service, the inclusion of the future LRT will result in some increase in delay and congestion but within acceptable levels.
- 4.33 As the development of the LRT continues further work will need to be undertaken to continue to optimise the priority afforded to the LRT system and to ensure the impacts on remaining traffic within the downtown are minimised. Consideration should be given to the conversion of the single direction sections of 103 Avenue to two-way operation, to provide a more complete parallel corridor to that of 102 Avenue.

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ACCESS AND LOADING

- 4.34 In developing the concept plan for the LRT route through the downtown, existing building access and egress arrangements have been reviewed. The arrangement of the LRT within each of the identified downtown roads, does not directly impact upon any existing building accesses directly. A number of lanes are closed on the north side of 102 Avenue, in all cases other points of access and egress are available.
- 4.35 The proposals for the Norquest campus development include access to a parkade across the LRT on 107 Street, it would improve the operability of the LRT if this could be moved from the proposed location.

EMERGENCY SERVICES Access and Egress

- 4.36 The proposed LRT route runs on 107 Street, the location of Fire Station number 2. The LRT alignment is on the far side of the street from the Fire Station, with two-way traffic retained on 107 Street to enable emergency vehicles to egress as today to the north or the south.
- 4.37 In addition the LRT tracks within the downtown will be constructed to enable emergency vehicle access along the LRT alignment as required.

UTILITIES

- 4.38 The development of any LRT line within the City will necessitate the relocation of utilities along the proposed corridor from under the proposed route of the LRT. This work will need to be coordinated and planned in advance to ensure an optimal construction process is achieved for the LRT.

DRAINAGE

- 4.39 There are no major concerns relating to the existing drainage system along the proposed LRT alignment. A recent report from Stantec confirmed that the downtown drainage system along the proposed route is in relatively good condition with adequate capacity. The development of the Downtown LRT Connector will not increase significantly the stormwater runoff volume that currently gets into the system, thus it should not impact the current drainage condition or improvements recommended by Stantec. The LRT alignment where it is within existing road corridors will not add impervious land.
- 4.40 Where feasible, future levels of project design will examine opportunities to enhance water quality off the road and track areas

GEOTECHNICAL

- 4.41 There are no major concerns related to the geotechnical analysis along the proposed LRT alignment that cannot be addressed through appropriate design measures. An initial geotechnical assessment has been undertaken. The primary areas of concern that could impact the performance of the proposed track system from a geotechnical perspective include subgrade non-uniformity and frost heave potential

- 4.42 The design of the track construction will need to take account of these issues as the design for the LRT alignment are developed.

ENVIRONMENTAL

- 4.43 Because this alignment is located within an urban, fully built environment, limited impacts to the natural environment are anticipated. However, in the downtown, natural elements (such as trees) take on an even more important role to offset the heavily urbanized environment. A detailed inventory of vegetation and trees was completed along the alignment. Guidelines for tree evaluation are derived from the City of Edmonton's Asset Management and Public Works Department, Parks Branch Bylaw 7829 Appendix A "Guidelines for Evaluation of Trees", February 2010.
- 4.44 The most common species within the Connector corridor are ash species. Oak, elm, spruce, cherry and pine were also located within the corridor. There are also vegetation islands that may be disturbed depending on final design. These were not assigned a monetary value.
- 4.45 Approximately 181 trees were measured along the alignment. The tree's environmental and monetary value will be considered as design progresses. All efforts will be made to maintain existing mature vegetation (where possible).

LANDSCAPE

- 4.46 The development of the alignment, and in particular the stop locations will impact upon existing trees within the corridor. The development and construction of the LRT would provide the opportunity to provide infill tree planning along the corridor to provide more consistent tree lines street. The lane ends closed could also be used to provide replacement tree planting.

HISTORICAL RESOURCES

- 4.47 The Register of Historic Resources was reviewed to identify any resources currently listed as Designated Municipal Resources (legally protected) or Historic Resources (merit conservation, but not legally protected). One Designated Municipal Resource and five Historic were identified along the project corridor. None of these resources are directly impacted by development of the Downtown LRT Connector. As design progresses, additional examinations will be completed to verify these resources are not adversely affected.

Property Impacts

- 4.48 The concept planning for the downtown LRT has focused where possible, on limiting the need for property acquisitions.
- 4.49 A small strip of property would be required from the frontage of properties/lots between 106 and 105 Street (currently hard standing and surface parking) and the Northeast corner of 107 Street and 102 Avenue.
- 4.50 The only stop requiring any degree of property acquisition is the Campus stop, which would require the acquisition of a number of surface parking lots and one building, the

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remaining site following the development of the LRT would provide significant redevelopment opportunities.

- 4.51 An additional property at 9611 102 Avenue, west of 96th Street may be effected depending on the design criteria used for the further development of the LRT system.

Land Use Impacts

- 4.52 The Downtown LRT is a catalyst project within the CCDP and as such the corridor and the LRT alignment have been developed to support the four policies of the CCDP:

- | Sustainable
- | Vibrant
- | Well-Designed
- | Accessibility

- 4.53 The proposed LRT alignment will help support development along the corridor, such as Grant MacEwan University and Norquest College. The Campus and 106/105 Street stops are both centred on areas of the downtown that are currently less well developed, which should increase the desirability of development around these two locations, helping to generate development within the Warehouse/ Campus District.

- 4.54 The location of the Campus stop, will provide the City with the opportunity to instigate TOD development in combination with the LRT Stop.

NOISE AND VIBRATION

- 4.55 Currently the background level of noise and vibration within the downtown are high during the day due to the existing levels of traffic operating within the proposed LRT and cross corridors. This will reduce the impact of the LRT during the day as it is likely to be within the current background noise levels. At times of the day where there are currently reduced volumes of traffic the operation of the LRT may become more pronounced.

- 4.56 The team has looked at the potential locations that would be noise receptors and potentially be affected by the LRT corridor. These include:

- | Residential Buildings
- | Norquest College
- | YMCA
- | Edmonton Library
- | Winspear Theatre
- | Citadel Theatre

- 4.57 The operation of the LRT vehicles on straight track with good design, construction and maintenance should minimise potential noise issues. An identified location where additional measures will need to be considered is alongside the Winspear and Citadel

Theatres, at this location consideration should be given to the use of a form of track construction that reduces ground borne vibration (Floating track slab design).

- 4.58 Operation of LRT vehicles through sharp turns in the track can generate noise. This type of track arrangement is required on the route at 102 Avenue and 107 Street. To alleviate the potential impact the LRT vehicle would operate at slow speeds and can if required be fitted with a wheel dampening system to reduce wheel noise. These measures, in conjunction with good design and maintenance of the alignment should reduce the generation of noise and the associated impacts.

COST ESTIMATES

- 4.59 The estimate of the cost of the alignment is a critical component of the planned LRT corridor and the routes connectivity through the downtown for the Southeast and West routes. The cost estimates include property acquisitions are detailed in Table 4.1 below.

TABLE 4.1 COST ESTIMATE

	Cost Estimate
LRT Construction	\$115
Road and Trackwork	\$65
Signals	\$35
Stations	\$15
Land & property	\$25
Engineering and Construction Admin	\$15
Total	\$155

5 Next Steps

- 5.1 The draft Downtown LRT Connector plan is presented as an update to City Council.
- 5.2 The draft Downtown LRT Connector and the associated concept plans provide the basis for further development of the future LRT alignment between Lewis Estates in the West and Millwoods in the Southeast.
- 5.3 Additional work will be required to optimise the design, to mitigate issues and to maximise the route's benefits both in terms of the transportation network and land use integration.
- 5.4 The parallel development of the Capital City Downtown Plan and the LRT route through the downtown provides a real opportunity for the City to coordinate transit and land use investment decisions and deliver its stated sustainable City Vision objectives.
- 5.5 Works will need to include:
 - | Continued development and integration with the draft Capital City Downtown Plan
 - | Coordination with the LRT corridor studies
 - | Optimisation of stop locations
 - Stop area plans
 - Urban realm design
 - Pedestrian and cycle connections
 - Transit integration
 - Integration with development
 - | Alignment development
 - Building access and egress arrangements
 - Detailed assessment of local and network traffic impacts
 - Intersection priority and traffic arrangements
 - Urban realm design
 - | Coordination with the development of the Central Area Circulator LRT Network
 - | Coordination with High Speed Rail plans
 - | Coordination with ongoing land use planning both in the Downtown and the LRT corridors
 - | Downtown road network assessment (all users, pedestrians through to general traffic)

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APPENDIX

A

STOP OPTION EVALUATION

A1 STOP OPTION EVALUATION

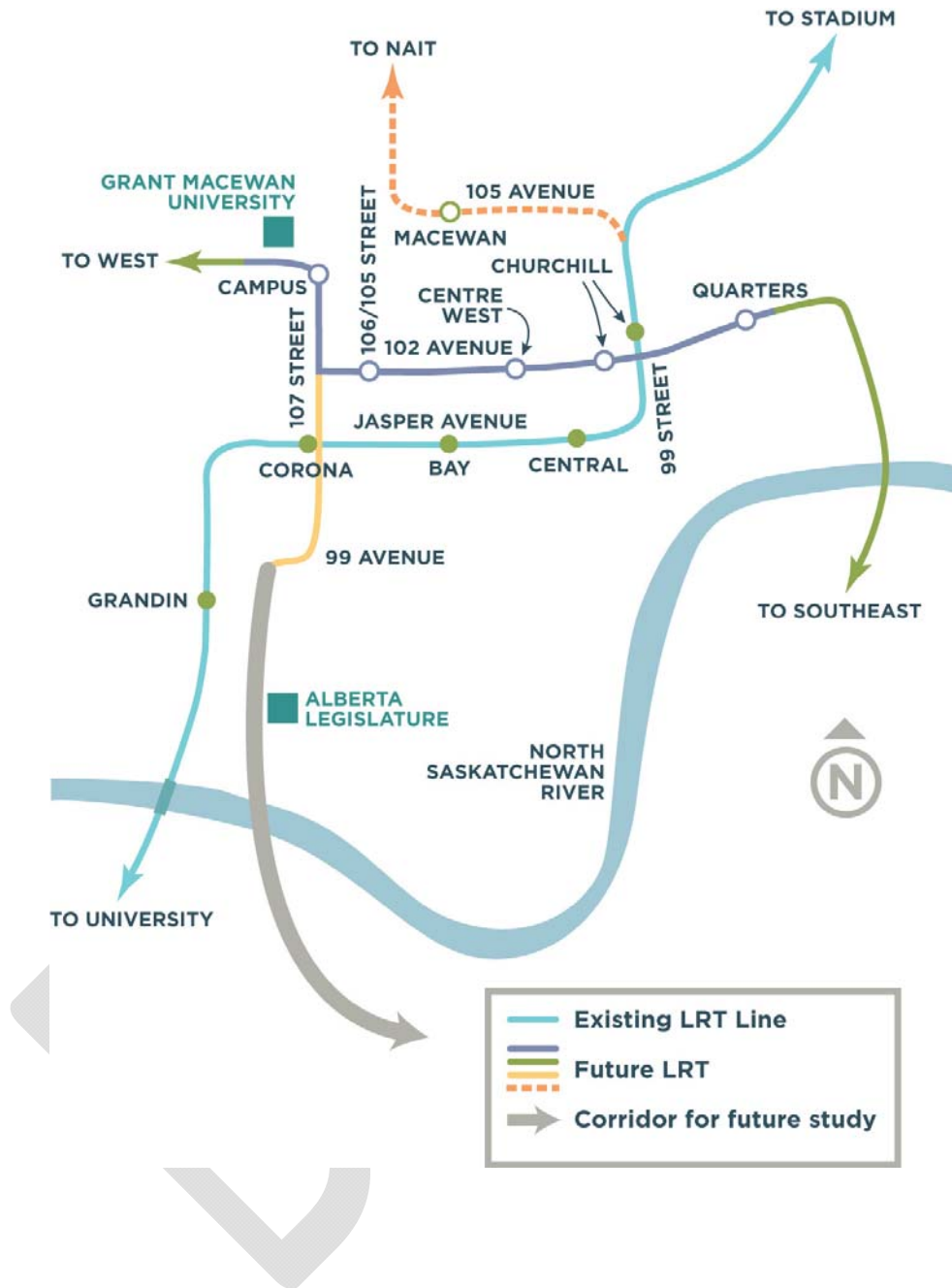
Introduction and Purpose

- A1.1 The City of Edmonton has adopted plans to develop a long term light rail transit (LRT) network providing new and extended routes to serve the City. The first of the new routes to be developed through to concept design are the West route serving Stony Plain Road and West Edmonton Mall through to Lewis Estates and the Southeast route through Bonnie Doon to Mill Woods. To connect these new LRT routes, a new connector route through the City's Downtown is also being progressed in parallel.
- A1.2 The route of the Downtown LRT Connector was approved on 21st June 2010 at a statutory public hearing of the City Council. The route runs from a connection to the Southeast line in the Quarters west on 102 Avenue through Churchill Square, past Centre West, through the Warehouse Campus Neighbourhood, turning north onto 107 Street before turning west on 104 Avenue to connect to the West LRT line. Figure 1.1 provides an illustration of the Downtown LRT Connector.
- A1.3 The further development of the Downtown LRT Connector is currently ongoing to identify the detailed alignment of the route and the associated stop locations and arrangement. As part of the development of the line, a number of options for each stop location have been developed and reviewed with stakeholders. This memo details the initial analysis of the downtown LRT stop options, and variants identified following stakeholder discussions, using the City's agreed assessment criteria.

Evaluation Methodology

- A1.4 The assessment framework uses the more detailed measures set out under the Council approved assessment criteria.
- A1.5 Within the Downtown, the primary role of the LRT is somewhat different to the radial LRT corridors which feed it, as the route will provide access to major destinations within the downtown, serve the increasing residential catchment area within the downtown, and provide a link to the existing transit network in the downtown. The development of the downtown route has also been developed in conjunction with the Capital City Downtown Plan (CCDP), being one of the catalyst projects to assist in the achievement of the associated policies.

APPENDIX FIGURE A.1 DOWNTOWN LRT CONNECTOR



A1.6 The CCDP outlined several key factors that help guide the development of the downtown LRT alignment:

I Sustainable

- Healthy Natural Environment
- Reduced Energy and Emissions and Improved Air Quality
- Stewardship of Natural and Material Resources
- Healthy Communities
- A Sense of Place

I Vibrant

- Additional Downtown Housing
- Commercial, Retail and Educational Activities
- Diverse Arts, Culture and Entertainment

I Well-Designed

- Well designed Built and Urban Forms
- Defined Street Framework
- Additional Connected Parks and Open Spaces
- Historic Preservation

I Accessibility

- Efficient Roadway System
- Enhanced Pedestrian Circulation
- Improved Cycling
- Superior Transit

A1.7 In addition, the development of the Downtown LRT Connector is based on the design vision and associated design criteria set out in the LRT System Design Report (Steer Davies Gleave, May 2010). That report described the urban-style, city-scale LRT system being developed in Edmonton, with recommendations and examples related to stop design, alignment design, and operational principles, all aimed at improving user access and convenience.

A1.8 Those two documents guided the development of a set of core assessment criteria for evaluating stop options, as detailed in the table below.

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Assessment Criteria	Associated Measures
LRT Alignment	Route Length, number of stops, average stop spacing, Downtown integration, connection to West and Southeast LRT routes.
Catchment	Population and employment within 400 metre catchment of each LRT stop
Land Use Integration	Number of key destinations (employment, theatres, colleges, residences, shopping, etc.), integration with development, supportive of Edmonton City Plans (especially CCDP)
Transportation Network Integration	Integration with other transit modes, bicycle and/or pedestrian access, road network impacts, Transit network impacts
Urban Design	Identification of any urban design opportunities created, such as streetscape improvements, improved boundary treatment, landscaping / planting / trees, community identity through the linking of CCDP-designated zones or neighbourhoods, ability to facilitate TOD, impetus for redevelopment, facilitation of increased density/mixed use development
Property Impacts	Property and land impacts required for construction
Urban Form	Creation of physical barriers or severance Support of CCDP core policies (sustainable, vibrant, well-designed, accessibility)

A1.9 Each criterion will be given a best/worst ranking using graphic 'circle' ratings (with a full circle being the best and/or least impactful, an empty circle being the worst and/or most impactful, and with a half circle being average or neutral) - see below. Note that the stop options are compared against each other.



Negative



Neutral



Positive

Concept Options Evaluated

A1.10 A workbook of the concept design options was produced to support the stakeholder consultation sessions held in September 2010. These options were used as a starting point for evaluation, with additional options as discussed and proposed during the stakeholder meetings. The resulting options are:

| Grant MacEwan / Campus Options

- Option 1: North side of 104 Avenue
- Option 2: Diagonal Alignment 108 to 107 Streets
- Option 3: 107 Street between 103 and 102 Avenues

| In addition, the following options were developed by Dialog Architects for the proposed NorQuest College development in addition to or in lieu of the original options for the Grant MacEwan/Campus stop:

- Dialog Option 1: West side of 107 Street between 103 and 102 Avenues
- Dialog Option 2: West side of 107 Street between 103 and 102 Avenues,
- Dialog Option 3: West side of 107 Street between 103 and 102 Avenues

| 105/106 Street Options

- Option 1: Retains two traffic lanes
- Option 2: Retains single eastbound traffic lane
- Option 3: Closes section of 102 Avenue

| Centre West Options

- Option 1: Stop between 102 and 101 Street, retains two traffic lanes
- Option 2: Stop between 102 and 101 Street, no traffic lanes
- Option 2a: Stop between 102 and 101 Street, single traffic lane
- Option 3: Stop between 103 and 102 Streets, no traffic lane
- Option 3a: Stop between 103 and 102 Streets, single traffic lane

| Churchill Square Options

- Option 1: Stop between 100 and 99 Streets, retains two traffic lanes
- Option 2: Stop between 100 and 99 Streets, with single eastbound lane
- Option 3 : Stop between 100 and 99 Streets, with no traffic lanes

| The Quarter Option

- Option 1: Stop between 97 and 96 Streets, with single eastbound access lane (no through traffic).

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- This stop location was developed in conjunction with the Quarters planning team and best represents the ultimate development goals of the Quarters plan. As this option was developed through the Quarters planning process, it is the only option in this location and was not evaluated further by this team.

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Campus Options

- A1.11 The objective of the stop location in this area is to provide a direct and convenient transit service to Grant MacEwan University, NorQuest College, the Warehouse Campus Neighbourhood identified in the CCDP, and 108 Street. The stop locations that would meet these objectives are potentially more widely spaced than other stop locations being considered along the alignment, as opportunities exist at a wider number of locations on this section of the route
- | Option 1: This option is a modification of the option reviewed by stakeholders in September by moving the platform farther west to be as close to 109 Street as possible, along with elimination of the 3rd track to reduce the need for extensive right-of-way along the north side of 104 Avenue.
 - | Option 2: Same as workbook option (diagonal between 104 and 103 to intersect west side of southbound 107 Street).

APPENDIX TABLE A.1 CONCEPT OPTION EVALUATION - CAMPUS STOP

Concept Evaluation Criteria	Option 1	Option 2
LRT Alignment	Longer Alignment, Even stop Spacing	Shortest route length, Even stop spacing, Operating flexibility improved alignment geometry
		
Catchment	Walk links to to Grant Mac Ewan and associated residential	Walk links to to Grant Mac Ewan, NorQuest, development around stop and Warehouse Campus district
		
Land Use Integration	Serves primarily Grant Mac Ewan	Grant Mac Ewan & NorQuest and Surrounding redevelopment, very supportive of the CCDP
		
Transport Network Integration	Provides direct pedestrian link to Grant Mac Ewan Potential Impact on 109 Street Intersection	Provides pedestrian link to Grant Mac Ewan and NorQuest via road crossings
		
Urban design integration potential	Impact on frontage of Grant Mac Ewan, Would support	Would support significant redevelopment of 108 street to

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	redevelopment to the south	107 street block. Support NorQuest development	
Property acquisition	Minimal property acquisition required at corner of 107 St and 102 Ave	Potentially single property impact at 107 St and 103 Ave Significant surface parking impact Minimal property acquisition required at corner of 107 St and 102 Ave	
Urban form	Potential severance of vehicle access to Grant MacEwan and proposed NorQuest development	Potential severance of vehicle access to proposed NorQuest development	
	Negative	Neutral	Positive

APPENDIX TABLE A.2 POSITIVE ELEMENTS AND POTENTIAL ISSUES

	Option 1	Option 2
Positive Elements	Direct walk link to Grant Mac Ewan	Provides walking link to both Grant Mac Ewan and NorQuest Potential catalyst for redevelopment Increased operational flexibility (3 track stop) Stop within Warehouse Campus District Mitigates Grant Mac Ewan impacts
Potential Issues	Impact to Grant Mac Ewan frontage Impact on vehicle access to Grant Mac Ewan Proximity to Campus day care facility Impact on 109 Street intersection Need to cross 109 into Warehouse Campus District Impact on NorQuest site access	Significant property / land impact Walking connectivity to Grant Mac Ewan across 104 Avenue and NorQuest across 103 Avenue Impact on NorQuest site access

Summary of Options













- A1.12 Option 1 - Provides excellent linkage to Grant MacEwan. The option is likely to impact upon the site frontage, and it provides reduced connectivity to the Warehouse Campus district and NorQuest development.
- A1.13 Option 2 - Serves Grant MacEwan, Warehouse Campus district and NorQuest development. It does involve significant land and property acquisition impacts, though these could be mitigated through a redevelopment plan for the block in parallel to the stop development. This has potential to be developed into a major TOD opportunity and “gateway” to the neighbourhoods designated by the CCDP. The location is the only one that could be used for a three-track stop to provide operational flexibility in the downtown.
- A1.14 **Summary of evaluation:** Option 2 is rated highest due to its high degree of pedestrian and bicycle access, linkages to nearby activity centers including the two campuses, urban design integration and TOD potential, consistency with the CCDP, and its operational flexibility.

Additional Campus Concept Option Evaluation

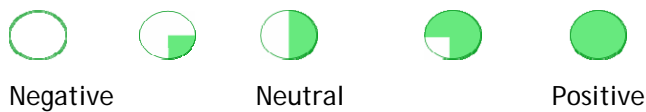
- A1.15 Following consultation on the options with stakeholders in September 2010, a number of further options have been evaluated. These are:
 - | **Option 3:** A new platform adjacent to the east side of 107 Street between 103 and 102 Avenues. The option could provide either a single southbound traffic lane or a traffic lane in each direction depending on property impacts.
- A1.16 The following options were developed by Dialog Architects for the proposed NorQuest College development:
 - | **Dialog Option 1:** A platform on the west side of 107 Street between 103 and 102 Avenues, impacting on NorQuest vehicle access. The option retains a single traffic lane southbound.
 - | **Dialog Option 2:** A platform on the west side of 107 Street between 103 and 102 Avenues, mitigating NorQuest vehicle access. The option retains a single traffic lane southbound.
 - | **Dialog Option 3:** A platform on the west side of 107 Street between 103 and 102 Avenues, mitigating NorQuest vehicle access and moving the alignment on 102 Avenue to the south of the street. The option retains a single traffic lane southbound.
 - | **Dialog Option 4:** A platform on the east side of the street. The option retains a single traffic lane southbound.
- A1.17 Dialog Option 2 is not discussed further in this assessment of options, as the proposed stop arrangement is not technically deliverable as it does not include sufficient length of tangent track beyond the south end of the stop platforms to accommodate operational safety needs; the arrangement would cause LRT vehicles to hit the platform ends with significant likelihood of vehicle damage and derailment.

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APPENDIX TABLE A.3 ADDITIONAL CONCEPT OPTION EVALUATION -CAMPUS STOP

Concept Evaluation Criteria	Option 3	Dialog Opt 1	Dialog Opt 3	Dialog Opt 4
LRT Alignment	Longer alignment, Stop close to 106 Street stop and distant from Grant MacEwan Irregular LRT Stop spacing potentially impacting on adjacent stop provision	Longer alignment, Stop close to 106 Street stop and distant from Grant MacEwan Irregular LRT Stop spacing impacting on adjacent stop provision Stop arrangement substandard	Longer alignment, Stop close to 106 Street stop and distant from Grant MacEwan Irregular LRT Stop spacing impacting on adjacent stop provision Stop arrangement substandard	Longer alignment, Stop close to 106 Street stop and distant from Grant MacEwan Irregular LRT Stop spacing impacting on adjacent stop provision Stop arrangement substandard
				
Catchment	Links to NorQuest and Warehouse Campus district Close Proximity to 105/106 Street Stop overlapping catchment area Could impact on Grant MacEwan accessibility	Links to NorQuest and Warehouse Campus district Close Proximity to 105/106 Street Stop overlapping catchment area Could impact on Grant MacEwan accessibility	Links to NorQuest and Warehouse Campus district Close Proximity to 105/106 Street Stop overlapping catchment area Could impact on Grant MacEwan accessibility	Links to NorQuest and Warehouse Campus district Close Proximity to 105/106 Street Stop overlapping catchment area Could impact on Grant MacEwan accessibility
				
Land Use Integration	Supportive of with NorQuest and Warehouse Campus District plans	Supportive of with NorQuest and Warehouse Campus District plans	Supportive of with NorQuest and Warehouse Campus District plans	Supportive of with NorQuest and Warehouse Campus District plans
				
Transport Network Integration	Provides Pedestrian links to NorQuest Significant Impact on Fire Station (Fire station would have to be relocated)	Provides Pedestrian links to NorQuest Impact on Traffic lanes Significant Impact on Fire Station (Only a single	Provides Pedestrian links to NorQuest Impact on Traffic lanes Significant Impact on Fire Station (Only a single	Provides Pedestrian links to NorQuest Impact on Traffic lanes Significant Impact on Fire Station (Fire station

		southbound exit lane retained, and impact on vehicle turning movements) Severance of vehicle access to proposed NorQuest development	southbound exit lane retained, and impact on vehicle turning movements) Substandard access arrangement to NorQuest development	would have to be relocated)
Urban design integration potential	Would support surrounding development and NorQuest development Impact on Property (Could affect all properties on east side of Street)	Would support surrounding development and NorQuest development	Would support surrounding development and NorQuest development	Would support surrounding development and NorQuest development Impact on Property (Could affect all properties on east side of Street)
Property acquisition	Significant property impacts on 107 Street between 103 Street and Jasper	Minimal property acquisition required at corner of 107 St and 102 Ave	Minimal property acquisition required at corner of 107 St and 102 Ave	Significant property impacts on 107 Street between 103 Street and Jasper
Urban form	Significant impact to Fire Station Access and properties fronting onto East side of the street	Severance of vehicle access to proposed NorQuest development		Significant impact to Fire Station Access and properties fronting onto East side of the street



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APPENDIX TABLE A.4 POSITIVE ELEMENTS AND POTENTIAL ISSUES

	Option 3	Dialog Opt 1	Dialog Opt 3	Dialog Opt 4
Positive Elements	<p>Provides connectivity to NorQuest</p> <p>Stop within Warehouse Campus District</p> <p>Mitigates Grant Mac Ewan impacts</p> <p>Mitigates vehicle access to new NorQuest building</p> <p>Alignment could be developed to provide for future stop (issue of adjacent stop proximity)</p>	<p>Provides integration with the NorQuest College Development</p> <p>Stop within Warehouse Campus District</p> <p>Mitigates Grant Mac Ewan impacts</p>	<p>Provides integration with the NorQuest College Development</p> <p>Stop within Warehouse Campus District</p> <p>Mitigates Grant Mac Ewan impacts</p>	<p>Provides integration with the NorQuest College Development</p> <p>Alignment retained on north side of 102 Avenue</p> <p>Alignment continues on east side of 107 Street through to 104 Avenue</p> <p>Stop within Warehouse Campus District</p> <p>Mitigates vehicle access to new NorQuest building</p>
Potential Issues	<p>Poor connectivity to Grant Mac Ewan</p> <p>Close to 106 Street Stop (Stop spacing)</p> <p>Impacts on Fire Station access / egress requiring relocation</p> <p>Property / land impact at eastern corners of 102 Avenue and 107 Street</p> <p>Potential property impacts on either west or east side of 107 Street between 103 and 102 Avenues</p> <p>Loss of three track</p>	<p>Poor connectivity to Grant Mac Ewan</p> <p>Close to 106 Street Stop (Stop spacing)</p> <p>Impacts on Fire Station exit northbound, likely to require relocation</p> <p>Stop impacts on proposed NorQuest access</p> <p>Substandard ramps on ends of platform</p> <p>Proximity to other stops and distance from Grant MacEwan</p> <p>Only single southbound traffic lane provided</p>	<p>Poor connectivity to Grant Mac Ewan</p> <p>Close to 106 Street Stop (Stop spacing)</p> <p>Impacts on Fire Station exit northbound, likely to require relocation</p> <p>Substandard ramps on ends of platform</p> <p>Safety issue with pedestrian crossing arrangement of NorQuest access</p> <p>Vehicle crossing at end of platform</p> <p>Proximity to other stops and distance from</p>	<p>Poor connectivity to Grant Mac Ewan</p> <p>Close to 106 Street Stop (Stop spacing)</p> <p>Impact on Fire Station requiring closure</p> <p>Impact on property on 107 Street east side</p> <p>Substandard ramps on ends of platform (could be revised to provide improved arrangement)</p> <p>NorQuest Parkade access right in/right out arrangement for vehicles may be substandard for</p>

arrangement	Grant MacEwan LRT alignment moved to southside of 102 Avenue, requiring alignment to move back to north side prior to 103 Street.	larger vehicles
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Summary of Options

- A1.18 Option 2 - was rated highest of the two initial options. It serves Grant MacEwan, the Warehouse Campus Neighbourhood, and NorQuest development. It does involve significant land and property impacts, though these could be mitigated through a redevelopment plan for the block in parallel to the stop development. The location is the only one that could be used for a three-track stop to provide operational flexibility in the downtown.
- A1.19 Option 3 - Provides excellent connectivity to NorQuest and surrounding Warehouse Campus District. The location could impact on the feasibility of the 106 Street stop as the catchments for the two stops will overlap. An additional stop at a Grant MacEwan on 104 Street may also be required due to the extended walking link required to access the campus from Option 3. The addition of a stop would impact on the capital and operating costs and the LRT system, and runtimes would be increased, particularly impacting upon passengers travelling through downtown. The stop would significantly impact on the operability of the fire station, with the platform blocking the station access to the street, which would likely result in the need for its relocation.
- A1.20 Dialog Option 1 - Provides excellent connectivity to NorQuest and surrounding Warehouse Campus District. However, the stop design is substandard since it can provide only minimal pedestrian ramps connecting to the adjacent sidewalk, and reduces 107 Street to a single southbound traffic lane. The reduction of this section of the street is likely to impact on the fire station, as emergency vehicles would be prevented from going north and the turning movement out of the fire station could be too tight to accommodate the vehicles. The stop location could impact on the feasibility of the 106 Street stop as the catchments for the two stops will overlap. An additional stop at Grant MacEwan on 104 Street may also be required due to the extended walking link that would be required to access that campus. The addition of a stop would impact on the capital and operating costs of the system, and the LRT runtimes would be increased, particularly impacting upon passengers travelling through downtown.
- A1.21 Dialog Option 2 - Technically not feasible for reasons listed above.
- A1.22 Dialog Option 3 - Provides excellent connectivity to NorQuest and surrounding Warehouse Campus District. However, the stop design is substandard (minimal stop ramps connecting to sidewalk), with the pedestrian crossing at the north end of the stop in close proximity to the proposed parkade access to the NorQuest development. This arrangement is likely to be unacceptable due to the numbers of pedestrians, traffic and LRT movements. Vehicles

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crossing the LRT could also impact on LRT operation. The option again reduces 107 Street to a single south bound traffic lane. The reduction of this section of the street is likely to impact on the fire station, as emergency vehicles would be prevented from going north and the turning movement out of the fire station could be too tight. The stop location could impact on the feasibility of the 106 Street stop, as the catchments for the two stops will overlap. An additional stop at Grant Mac Ewan on 104 Street may also be required due to the extended walking link this option would require to access that campus. The addition of a stop would impact on the capital and operating costs of the overall system, and the LRT runtimes would be increased, particularly impacting upon passengers travelling through downtown.

- A1.23 Dialog Option 4 - Provides excellent connectivity to NorQuest and surrounding Warehouse Campus District. However, the stop design is substandard due to minimal stop ramps connecting to the adjacent sidewalk, and it reduces 107 Street to a single south bound traffic lane. The location could impact on the feasibility of the 106 Street stop, and a separate Grant Mac Ewan stop on 104 Street may also be required due to the extended walking link required to access that campus from this option. The stop would significantly impact on the operability of the fire station, with the platform blocking the station access to the street, which would likely result in the need for its relocation.
- A1.24 **Summary of evaluation:** Option 2 continues to be rated highest due to its high pedestrian and bicycle access, linkages to nearby activity centers including the two campuses, urban design integration and TOD potential, consistency with the CCDP, and its operational flexibility.
- A1.25 The location impacts on land and one property, but mitigates the property impacts associated with the other stop locations (frontage of Grant MacEwan, fire station). The resulting stop and surrounding lands would provide a significant opportunity to provide urban design integration and TOD associated with the stop and the adjacent campus developments. The stop location would contribute to the built environment unlike the other options considered, which have potentially greater impact on existing buildings. The stop would be consistent with the CCDP, creating a sense of place, minimising the impact on the existing built environment, create a vibrant focal point within the area between the two campus sites, building upon the existing built environment, and creating a pedestrian focused area while minimising traffic impacts. The proposed location would also provide a third track, resulting in operational flexibility allowing LRT vehicles to be turned back (turned short on a service to mitigate problems) and short term storage of vehicles (which would help regulate service, store defective vehicles, and feed additional vehicles into the downtown to provide additional transit capacity for events within the downtown).

105/106 Street Options

A1.26 The objective for the stop location is to provide a stop as far west as possible on 102 Avenue to provide walking links through to Jasper Avenue and Corona Station prior to the potential future wider downtown LRT circulator. The stop would also provide local walk links within the Warehouse Campus District and walking links to the Provincial Government building to the southwest.

- | Option 1: reduces the street right-of-way along 102 Avenue from four through lanes to two with shared bicycle access in those two lanes. The stop platform and guideway are almost entirely within the street right-of-way
- | Option 2: reduces auto access to one lane westbound, with adjacent dedicated bicycle lanes.
- | Option 3: provides no auto through traffic and includes wider platforms and two-way bicycle lanes.

APPENDIX TABLE A.5 CONCEPT OPTION EVALUATION - 105/106 STREET STOP

Concept Evaluation Criteria	Option 1	Option 2	Option 3
LRT Alignment	Minimum platform widths are provided, LRT passengers would have to cross a signalled intersection when walking south through to Jasper	Minimum platform widths are provided, LRT passengers would have to cross a signalled intersection when walking south to Jasper	Additional platform space can be provided, walk link are more seamless through to Jasper Avenue as the traffic lanes are removed
Catchment	Catchment will be similar for all options. Future development around the stop will be an important generator of catchment	Catchment will be similar for all options Future development around the stop will be an important generator of catchment	Catchment will be similar for all options Future development around the stop will be an important generator of catchment, this stop option potentially providing for greater development integration
Land Use Integration	Would be supportive of CCDP policies, supporting development and accessibility	Would be supportive of CCDP policies, supporting development and accessibility	The option would be most supportive of CCDP accessibility policies, supporting development, create a sense of place and

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			accessibility
Transport Network Integration	Stop provides walking links to Corona	Stop provides walking links to Corona. Provides improved cycle provision	Stop provides improved walking links to Corona over the other options Provides improved cycle provision
Urban design integration potential	The stop location within the Warehouse Campus district will support existing development and help promote new development around the stop	The stop location within the Warehouse Campus district will support existing development and help promote new development around the stop	The stop location would provide greater pedestrian focus and provide additional space to create a sense of place, increasing the potential for surrounding development. Potentially supportive all four of the CCDP policy areas.
Property acquisition	Limited, possible small section of existing open ground on north side	Limited, possible small section of existing open ground on north side	Limited, possible small section of existing open ground on north side
Urban form	Supportive of the CCDP accessibility policies, through improve walking and cycle	Supportive of the CCDP accessibility policies, through improve walking and cycle	Supportive of the CCDP accessibility policies, through improve walking and cycle
 Negative Neutral Positive			

APPENDIX TABLE A.6 POSITIVE ELEMENTS AND POTENTIAL ISSUES

	Option 1	Option 2	Option 3
Positive Elements	Provides walk links to Corona Station and the surrounding Warehouse Campus District, including NorQuest College development	Provides walking links to Corona Station and the surrounding Warehouse Campus District, including NorQuest College development Provides improved cycle lanes adjacent to stop	Provides walking accessibility to Corona Station and the surrounding Warehouse Campus District, including NorQuest College development Provides improved cycle lanes adjacent to stop Provides improved LRT stop provision and an opportunity to create a focal point within the area Improved walk links Potential for improved urban realm
Potential Issues	Limits available space for the stop platforms Pedestrians would need to cross traffic lanes to access routes to the south	Limits available space for the stop platforms Pedestrians would need to cross traffic lanes to access routes to the south Impacts on westbound traffic	Impacts on all through traffic, could impact on access to tyre replacement business

Summary of Options

- A1.27 Option 1 - Attempts to mitigate the impacts of the stop on traffic but would result in cyclists riding in front of other road vehicles over this section as cycle lanes can't be provided. The stop platforms are minimal with the option due to the space constraints, local accessibility is good but pedestrians going south have to cross traffic lanes at the adjacent intersections. Although supportive of some of the CCDP policies, the impact of the LRT on promoting these may be reduced as the quality of stop and the associated walk links are reduced.
- A1.28 Option 2 - Reduces the traffic lanes to east-bound only, the space being used to provide improved cycle facilities alongside the stop. The walking accessibility would be similar to option one, with a significant number of people having to cross traffic lanes at the adjacent intersections. As with option 1, the arrangement would be supportive of some of

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the CCDP policies, though the impact of the LRT on promoting some of these may be reduced as the quality of stop and the associated walk links are reduced.

- A1.29 Option 3 - Removes traffic from this section of 102 Avenue, impacting on traffic movements along 102 Street, although this is also likely to be the case due to other stop locations further east. The arrangement would provide greater space for the LRT stop and potential to create a focal point around the stop with associated urban realm improvements. The accessibility of the stop would be greatly increased with walk links to Jasper improved though the removal of the pedestrian crossings at the ends of the stop. The proposed arrangement is supportive of all the CCDP policies and is the most likely to have the most positive effect on delivering these.











Traffic Impacts

- A1.30 The use of 102 Avenue will with all options have an effect on traffic, the LRT excluding stop locations will reduce the road lanes from two lanes in each direction with left turn lanes, to a single lane in each direction. In capacity terms the road currently has a capacity of approximately 800 vehicles * 1.6 passengers per car, per lane, which equates to 2,500 people per hour, per direction. The new LRT with a 5 minute service, a 70% load factor, would provide a capacity of approximately 5,000 per direction. The LRT would also replace a number of bus services currently operating on the same street reducing some of the current traffic.
- A1.31 The route in removing two lane and with the inclusion of the proposed cycle lanes will effectively slow the operation of the street. This is likely to necessitate the removal of bus services due to the slower nature of the street and the impact of buses stopping in a single traffic lane.
- A1.32 102 Avenue will therefore become more focused on local traffic accessibility and servicing than being a through route over any distance.
- A1.33 **Summary of evaluation:** Option 2 would provide the optimum LRT and cycle arrangement while retaining local traffic access eastbound. The arrangement provides the highest level of local walking and cycle accessibility. The stop arrangement is supportive of the CCDP policies related to "Sustainable" (creating a sense of place and promoting air quality and healthy communities), "Vibrant" (supportive of housing development on surrounding land), "Well Designed" (improving and integrating with in a high quality urban realm), and "Accessibility" (providing excellent walking and cycle links and quality transit).

Centre West Options

- | Option 1 is located along 102 Avenue between 102 and 101 Street, with the street right-of-way narrowed to two shared auto/bicycle lanes.
- | Option 2 is in the same location with no auto access and includes two-way bicycle lanes.
- | New Option 2a is in the same location as Option 1 but with one (likely eastbound) auto lane and, if right-of-way allows, adjacent bicycle lanes.
- | Option 3 moves the platform farther west (between 103 and 102 Streets) with no auto access and two-way bicycle lanes.
- | New Option 3a is in the same location as Option 3 but includes one (likely westbound) auto lane along with adjacent bicycle lanes if right-of-way allows.

APPENDIX TABLE A.7 CONCEPT OPTION EVALUATION - CENTRE WEST STOP

Concept Evaluation Criteria	Option 1	Option 2	Option 2a	Option 3	Option 3a
LRT Alignment	Minimal platform width are provided	Maximum platform width and integration	Improved platform width over option 1	Maximum platform width and integration	Improved platform width over option 1
					
Catchment	Connectivity to Downtown Core an associated shopping, employment and leisure	Connectivity to Downtown Core an associated shopping, employment and leisure	Connectivity to Downtown Core an associated shopping, employment and leisure	Edge of Downtown Core, proximity to new arena, shopping, and leisure	Edge of Downtown Core, proximity to new arena shopping, and leisure
					
Land Use Integration	Connectivity to Downtown Core shopping, employment and leisure	Connectivity to Downtown Core shopping, employment and leisure	Connectivity to Downtown Core shopping, employment and leisure	Edge of Downtown Core, proximity to new arena Potential to instigate development at southwest corner of 103 St and 102 Avenue	Edge of Downtown Core, proximity to new arena Potential to instigate development at southwest corner of 103 St and 102 Avenue

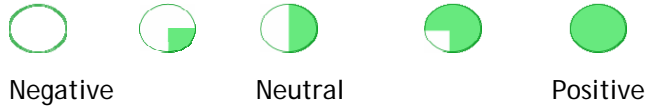
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Transport Network Integration	<p>Access to bus services on 101 Street</p> <p>Bidirectional cycle route provided</p> <p>Links to Pedway</p>	<p>Access to bus services on 101 Street</p> <p>Bidirectional cycle route provided</p> <p>Links to Pedway</p> <p>Road Network impact between 103 and 102 street</p> <p>Impact on parkade traffic</p>	<p>Access to bus services on 101 Street</p> <p>Bidirectional cycle route provided</p> <p>Links to Pedway</p> <p>Reduced Road network impact over option 2</p> <p>Impact on parkade traffic</p>	<p>Bidirectional cycle route provided</p> <p>Road Network impact between 103 and 102 street</p> <p>Links to Pedway</p> <p>Impact on parkade traffic</p>	<p>Bidirectional cycle route provided</p> <p>Reduced Road network impact over option 3</p> <p>Links to Pedway</p> <p>Impact on parkade traffic</p>
Urban design integration potential	Connectivity to Downtown destinations	Connectivity to Downtown destinations and greatest potential for urban improvements	Connectivity to Downtown destinations and potential for urban improvements	Connectivity to Downtown destinations and greatest potential for urban improvements	Connectivity to Downtown destinations and potential for urban improvements
Property impacts	None	Potential impact on parkade traffic access and egress	Potential impact on parkade traffic access and egress	Potential impact on parkade traffic access and egress	Potential impact on parkade traffic access and egress
Urban form	Minimum space for stop with more limited ability to enhance urban form	Greatest space for platform integration and public space Most supportive of the accessibility policies of the CCDP	Space for platform integration and public space Supportive of the accessibility policies of the CCDP	Greatest space for platform integration and public space Most supportive of the accessibility policies of the CCDP	Space for platform integration and public space Supportive of the accessibility policies of the CCDP



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Appendix Table A.8 Positive Elements and Potential Issues

	Option 1	Option 2	Option 2a	Option 3	Option3a
Positive Elements	<p>Walk link to 101 Street and associated transit</p> <p>Connectivity to core downtown</p> <p>Minimises impact on vehicle traffic</p>	<p>Improved pedestrian focus</p> <p>Connectivity to core downtown</p> <p>Greatest space for stop</p> <p>Walk link to 101 Street and associated Transit</p> <p>Most supportive of the accessibility policies of the CCDP</p>	<p>Retains pedestrian focus whilst partially mitigating 102 access issues</p> <p>Connectivity to core downtown</p> <p>Improved space for stop</p> <p>Walk link to 101 Street and associated Transit</p> <p>Supportive of the accessibility policies of the CCDP</p>	<p>Improved pedestrian focus</p> <p>Greatest space for stop</p> <p>Proximity to new arena development improved</p> <p>Most supportive of the accessibility policies of the CCDP</p>	<p>Proximity to new arena development improved</p> <p>Retains pedestrian focus whilst partially mitigating 102 access issues</p> <p>Improved space for stop</p> <p>Supportive of the accessibility policies of the CCDP</p>
Potential Issues	<p>Reduced space for stop</p>	<p>Impact on 102 Avenue access and egress</p>	<p>Reduced impact on 102 Avenue access and egress</p>	<p>Slightly reduced proximity to core downtown</p> <p>Impact on 102 Avenue access and egress</p>	<p>Slightly reduced proximity to core downtown</p> <p>Reduced impact on 102 Avenue access and egress</p>

Summary of Options:

- A1.34 Option 1 - Minimizes the impact on traffic lanes but reduces the space available for the stop. This reduces the potential for improved public realm and limits the ability to deliver the highest quality pedestrian links to the stop location at what will become one of the principle stops within the downtown core. The location does provide good walking connectivity to the bus services on 101 Street.
- A1.35 Option 2 - Maximizes the space available for the stop and hence the potential for improved public realm and pedestrian circulation to the stop. The arrangement would support the creation of a location specific stop integrated within the local environment, creating a

focal point for the catchment area. However, the arrangement would impact on access and egress from 102 Street. The location provides good walking connectivity to the bus services on 101 Street.










- A1.36 Option 2a - Is a compromise between Option 1 and Option 2, mitigating some of the traffic impacts, whilst retaining some increased space for the stop, urban realm and pedestrian links. The location provides good walking connectivity to the bus services on 101 Street.
- A1.37 Option 3 - Moves the stop location west to provide proximity to the new arena development. As with Option 2, the stop arrangement maximizes the space available for the stop and hence the potential for improved public realm and pedestrian circulation to the stop. The arrangement would support the creation of a location specific stop integrated within the local environment, creating a focal point for the catchment area. However, the arrangement would impact on access and egress from 102 Street. It also increases the walking link to 101 street and the associated bus services.
- A1.38 Option 3a - Is a compromise between Option 1 and Option 3, mitigating some of the traffic impacts, whilst retaining increased space for the stop, urban realm and pedestrian links. The location continues to provide improved access to the new arena development, but continues to increase the walking link to 101 street and the associated bus services.
- A1.39 **Summary of evaluation:** Option 2a is rated higher than the other options primarily due its proximity to transit connections on 101 Street and its connectivity within the heart of the downtown core (shopping, offices and leisure). It provides the highest level of accessibility at one of the two core downtown stops.
- A1.40 The option reduces the traffic impacts on vehicle egress from 102 Street by providing an eastbound traffic lane through to 101 Street and a westbound traffic lane and dedicated right turn lane through to 103 Street.
- A1.41 The option would be supportive of the CCDP policies to create a Sustainable, vibrant, Well-Designed and Accessible Downtown.

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Churchill Square Options

- | Option 1 is located between 100 and 99 Streets and reduces the auto lanes to two with shared bicycle access.
- | Option 2 is located in the same area with one westbound auto lane and adjacent bicycle lanes.
- | Option 3 is located in the same area with no auto access but with two-way bicycle lanes.

APPENDIX TABLE A.9 CONCEPT OPTION EVALUATION - CENTRE WEST STOP

Concept Evaluation Criteria	Option 1	Option 2	Option 3
LRT Alignment	Minimum platform widths are provided Good connectivity to existing LRT	Minimum platform widths are provided Good connectivity to existing LRT Potential to move LRT alignment slightly farther south away from Winspear Theatre	Additional platform space can be provided Good connectivity to existing LRT Potential to move LRT alignment slightly farther south away from Winspear Theatre
			
Catchment	Similar on all options	Similar on all options	Similar on all options
			
Land Use Integration	Good connectivity to surrounding downtown amenities	Improved connectivity to surrounding downtown amenities through improved cycle provision	Greatest connectivity to surrounding downtown amenities through more seamless walk links
			
Transport Network Integration	Connection to existing LRT LRT passengers would have seamless connectivity north through the Square but have to cross a signalled intersection when walking south	Connection to existing LRT LRT passengers would have seamless connectivity north through the Square but have to cross a signalled intersection when walking south Improved cycle provision Potential impact on retained bus service	Connection to existing LRT Walking connectivity to and from the stop is improved with a greater number of seamless walk links Improved cycle provision Improved accessibility Potential impact on retained bus service routing

		routing	
Urban design integration potential	The provision and integration of the stop with Churchill Square will provide an opportunity to enhance and integrate the stop with the public realm	The provision and integration of the stop with Churchill Square will provide an opportunity to enhance and integrate the stop with the public realm	The provision and integration of the stop with Churchill Square will provide a significant opportunity to enhance and integrate the stop with the public realm, the library and amenities to the south
Property impacts	None	None	None
Urban form	Supportive of the CCDP accessibility policies, would improve walking and cycle connectivity	Supportive of the CCDP accessibility policies, would improve walking and cycle connectivity	Supportive of all four CCDP policy areas. Provides the highest level of walking and cycle connectivity
	Negative	Neutral	Positive

APPENDIX TABLE A.10 POSITIVE ELEMENTS AND POTENTIAL ISSUES

	Option 1	Option 2	Option 3
Positive Elements	<p>Provides a stop at the heart of the city's administration and connectivity to the surrounding arts district amenities and shopping</p> <p>Integration with the existing LRT</p> <p>Supportive of CCDP policies</p>	<p>Provides a stop at the heart of the city's administration and connectivity to the surrounding arts district amenities and shopping</p> <p>Integration with the existing LRT</p> <p>Improved cycle provision</p> <p>Supportive of CCDP policies</p>	<p>Provides a stop at the heart of the city's administration and connectivity to the surrounding arts district amenities and shopping</p> <p>Integration with the existing LRT</p> <p>Improved cycle provision</p> <p>Improved accessibility and integration with the urban realm</p> <p>Supportive of all four</p>

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			CCDP policy areas.
Potential Issues		Impact on traffic and potentially retained bus movements within the downtown	Impact on traffic and potentially retained bus movements within the downtown Potential impact on library drop off

Summary of Options:

- A1.42 **Option 1** - Attempts to mitigate the impacts of the stop on traffic, but would result in sub-standard cycle provision and potentially impact on the stop provision. Local accessibility would be reduced compared to option 3, with pedestrians having to cross traffic lanes at the adjacent intersections to walk south of the stop. The stop would be integrated with the adjacent Pedway and the existing LRT networks. The provision of the stop would be supportive of some of the the CCDP policies, though the impact of the LRT delivering these may be less than other options. Retained traffic would not be able to stop adjacent to the stop due to the effect on other through traffic. Retention of lanes is therefore unlikely to provide a drop off location for the library, it would allow through bus movement, although bus operation with cyclists may not be desirable at this location.
- A1.43 **Option 2** - Improves the cycle provision, but pedestrian accessibility to the south remains effected. The stop would be integrated with the Pedway and the existing LRT. The provision of the stop would be supportive of the CCDP policies, though the impact of the LRT delivering these may be reduced. The reduction of traffic lane could impact on the retained bus routes and there circulation within the downtown.
- A1.44 **Option 3** - Improves the cycle provision and accessibility to the south providing seamless walking connections to an additional side of Churchill Square and the library building. The stop would be integrated with the Pedway and the existing LRT networks. The potential stop arrangement, local integration potential, and ability to create a sense of place would be most supportive of the CCDP policies. The reduction of traffic lanes could impact on the retained bus routes and circulation within the downtown.
- A1.45 **Summary of evaluation:** Option 3 would provide an location appropriate quality arrangement for the LRT at what is the heart of the City. The arrangement would provide greater platform space and the highest level of accessibility and integration with Churchill Square and the associated precinct. Stop platforms would be level with both Churchill Square and the sidewalks and library to the south. The arrangement would provide the greatest opportunity to provide a feature stop reinforcing the sense of place, to enhance and complement the square and support all year round street vibrancy. This approach would support the CCDP and help support future proposals for the development of the square.

- A1.46 An issue that may impact on the ability to deliver this option is the future routing of the retained bus network. As detailed above 102 Avenue along the length of the LRT corridor will become a slow traffic street, with greater focus on cycling into and through the downtown. The route is unlikely to support bus operation due to the slower nature of traffic and the limited stopping opportunities for buses. The operation of buses on a proposed cycle route may also not be desirable.
- A1.47 The retention of through traffic at Churchill Square is unlikely to help facilitate bus movement within the downtown and alternative routing, priority and stop arrangements should be identified.

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CONTROL SHEET

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