
Report

West Light Rail Transit Downtown to Lewis Estates

Prepared for



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Prepared by



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1. Introduction

1.1 Report Purpose

This report details the decision-making process conducted by the City of Edmonton (the City) to determine the recommended corridor for the West Light Rail Transit (West LRT). This report explains the project structure, alternatives identification, screening process, evaluation criteria, and a summary of the technical analysis key points that resulted in the recommended West LRT corridor linking downtown Edmonton and Lewis Estates.

1.2 Project Background

The West LRT study summarized in this report is a continuation of a process begun in 2006 to identify the optimum LRT corridor connecting the City's West neighbourhoods with downtown Edmonton. In October 2008, the City initiated a study to re-evaluate potential West LRT corridors in response to an overall shift in the City's strategic planning direction. The earlier component of the study was undertaken under the City's previous evaluation criteria: moving people, building and operating the line, and fitting it in. Additionally, the earlier effort was conducted before the City began development of an overall LRT network system plan, and before the City completed its work on strategic documents for municipal development and transportation.

The study process summarized in this report reflects the work initiated in December 2008 to reevaluate connections in the study area under the City's new guidance documents and strategic direction. While the City's development of an overall LRT Network Plan was concurrent with the West LRT corridor study, Network Plan recommendations were available by the time the Level 2 analysis was completed. Plan recommendations were incorporated in the final recommendations.

The West LRT study was led by the City of Edmonton Transportation Department to determine a recommended LRT corridor. The Transportation Department developed a cohesive project team including internal decision makers from the wide range of City departments involved in the project. Team members were selected to represent the positions of each of their departments. Given the diverse perspectives of the team members, the objective was to reach consensus among the project team members on key decisions. Consensus refers to concurrence and not unanimous agreement. The team included representatives from the following departments:

- Transportation Planning
- Transportation Operations
- Planning and Development
- Office of Natural Areas

- Parks and Recreation
- Edmonton Transit: Light Rail Transit, Service Development
- Capital Construction: LRT Design and Construction, LRT Expansion

The Transportation Department engaged CH2M HILL Canada Limited (CH2M HILL) as a transportation consultant to facilitate the group through its decision-making process and to provide technical analysis. This blended group of City department representatives and consultants formed the “project team.”

The project team and its alternatives analysis was one piece in a triad of influences that would ultimately determine the West LRT corridor recommended to City Council. **Figure 1** graphically displays the relationship of the following three key elements:

- **Technical Studies** – The work by the internal City project team. Project team representatives were responsible for conveying the work of the group back to their respective departments and obtaining input from their departments at each decision milestone.
- **Public Input** – The public consultation process conducted in parallel with the technical studies to understand the position of local stakeholders and the public at large.
- **LRT Network Plan** – The separate study conducted to examine the future growth and direction of the Edmonton LRT System as a whole. The West LRT is one component of this larger system.

The project began by first developing consensus on the process the team would follow to identify a recommended West LRT corridor. The project team agreed to a multi-step process with team decisions at each key milestone, following the process concurrently underway in the separate Southeast LRT corridor work. Using the previous West corridor study work as a basis, the process served to identify the range of potential corridors from downtown Edmonton to Lewis Estates. Multiple criteria were developed that represented the guiding principles of the project. The criteria became increasingly more detailed as the screening advanced. The criteria helped to screen out those corridors that did not compare favorably and to advance the most promising corridors for additional consideration. The process and criteria were presented to City Council for review and approval in December 2008. Details on the decision making process are provided in Section 2 of this document.

1.3 Project Study Area and Purpose Statement

Project Study Area

The West LRT study area encompasses the area of west Edmonton from downtown to the edge of current development. In general, the boundaries were 111 Avenue to the north, 109 Street to the east, Whitemud Drive to the south, and the outer edge of the Anthony Henday Drive Transportation and Utility Corridor (TUC) to the west. **Figure 2** provides a map of the study area and constituent neighbourhoods.

Purpose Statement

The project purpose statement identifies the key elements and reasons for completing the project. The statement also includes a series of supporting principles that address specific issues or objectives. As well, the statement is intended to be specific enough to include the key project elements, while being broad enough to ensure that the team can develop a reasonably wide range of corridor options. The team worked from examples of project purpose statements used on successful transit projects and reviewed the project study area specific issues and opportunities.

The resulting project purpose statement for the West LRT study was reached with the consensus of the entire project team:

Establish an LRT connection between Lewis Estates and downtown Edmonton in a manner that

- Is consistent with the City’s Strategic Vision, its Transportation Master Plan (TMP), and its Municipal Development Plan (MDP)
- Connects both existing and future activity centres
- Shapes land use to promote more compact urban form

The guiding principles supporting this purpose include the following:

- Maximize cost effectiveness
- Maximize use of existing transportation corridors
- Provide opportunities for future system expansion
- Increase transit system effectiveness
- Respect neighbourhoods
- Respect parklands, the river valley, and ravine systems
- Promote economic development and redevelopment

1.4 LRT Network Plan

The City’s Strategic Vision, the “Way Ahead”, identifies strategic goals to be accomplished over a ten-year plan that provides the guidance for the long term development of a sustainable City.

To support the City’s Strategic Vision, Administration staff have developed policy documents that provide direction on how the City should grow and how citizens should move around the City. The MDP, known as the “Way We Grow,” and the TMP, known as the “Way We Move,” offer the framework for developing a sustainable and livable City. Both plans identify that, for the City to grow in a sustainable way, LRT is a key tool to help in creating compact urban centres while offering a premium transit service and promoting a mode shift to transit.

To supplement the TMP, an LRT Network Plan has been developed for a long term LRT system serving the City of Edmonton and the region. The Network Plan creates a plan for the City and region when population approaches 3.2 million over the next century. The key elements of the LRT Network plan, which were endorsed by City Council and that assist in the corridor LRT definition, include the following:

- **System Style** – The LRT system should ultimately evolve into an urban-style system with shorter stop spacing and more community-based stops.
- **Technology** – New LRT lines not tying into the existing system should be developed with low-floor LRT vehicles.
- **Central Area Circulation** – An East-West LRT connection through the area of Strathcona should be developed to provide greater overall operational flexibility and to increase the carrying capacity of the network.

Implementing the recommended urban-style LRT system in the West Corridor would result in shorter stop spacing, enhancing opportunities to serve multiple activity centres and mature communities. As the recommended corridor does not interline with the existing LRT system, low-floor technology is recommended. This provides a better opportunity to integrate into mature neighbourhoods, improving the ability to fit within existing transportation corridors while minimizing the need for extensive property acquisition. The combination of the low-floor technology and the urban style offers the ability to reduce the scale of the infrastructure and create a more condensed LRT footprint.

The central area, including the downtown and University, is the most transit-supportive area of the City, as it is a high density activity zone for both population and employment. All of the LRT routes serve the central area and interconnect there to provide multiple transfer and destination opportunities. New routes will operate in the downtown at the surface (street level), with convenient walking connections to the existing underground LRT stations.

An additional East-West LRT connection through the Strathcona area can provide an improvement in overall operational flexibility and increase the carrying capacity of the network.

Understanding that the University is a major transit destination for residential, employment and education services, both the LRT Network Plan and the West LRT study identify a need to provide a supplemental transit service regardless of the route selected. If the southern LRT option were recommended, a premium transit service to the north would be required. With the recommendation to provide the LRT service to the north, a southern premium transit service will be required. The southern premium transit service is anticipated to be a premium or express service utilizing 87 Avenue, 170 Street, Whitemud Drive, and Fox Drive, with a connection to South Campus for access to the University. Major infrastructure components to facilitate the premium transit system will be available by 2011.

Figure 3 illustrates the LRT Network Plan.

2. Alternative Development and Evaluation Process

2.1 Process Overview

The Transportation Department chartered the project team to implement a multi-step comparative analysis. **Figure 4** diagrams the decision-making process. The project team met in a series of four team workshops during late 2008 and 2009. Each workshop focused on a specific step or decision milestone in the process of identifying the recommended corridor.

The process included identifying all reasonable corridor options for linking LRT from the downtown to Lewis Estates. **Figure 5** illustrates the initial corridors considered. Criteria were developed for two levels (Level 1/Level 2) of screening the corridor options. Screening involves comparing each of the corridors against one another. In many cases, the corridor comparisons were very close based on the criteria, and one corridor was just incrementally better than another. The criteria became increasingly more detailed as the screening advanced. The criteria helped to screen out those corridors that did not compare favorably and advanced the most promising corridors for additional consideration. These criteria were presented to City Council for review and approval in December 2008.

The process recognized that significant work had been completed based on the previous West LRT planning study. This information was supplemented to identify all reasonable corridor options for linking LRT from the downtown to Lewis Estates under the City's new Strategic Vision and guidance documents.

The project team's screening was guided by its Purpose Statement and the ultimate goal to identify a recommended West LRT corridor. Through the screening process, the project team worked to balance the key public and technical issues. The key issues included using land use to promote a more compact urban form; moving goods and people; technical feasibility and cost; impacts to parks and the river valley; and impacts to the social and natural environment. These issue areas are expressed by the Purpose Statement's guiding principles and the City Council approved criteria used to evaluate each corridor option.

Prior to each workshop, the project team developed appropriate levels of technical analysis and presented the findings to the group for feedback and direction. Following the major decision points, the results were provided to the public for their consideration and to further shape the process. Major project decisions were not finalized until public input was received to inform the project team's direction. The public consultation process included individual stakeholder surveys, on-line comment opportunities, and two rounds of public information workshops. The first public workshops were held on June 2 and 3, 2009, to present and describe the Level 1 analysis and the Level 2 corridor options. A second round of public information meetings were held on September 29 and 30, 2009, to present and describe the recommended corridor.

As noted previously, the recommended corridor was influenced by other studies and policy documents, such as the LRT Network Plan. The City has also conducted studies involving the desired future development patterns and the land use benefits of Transit Oriented Development (TOD). The potential land use effects and TOD opportunities were considered in the decision making process and the evaluation criteria. Other key policy documents, including the MDP and the TMP, established the City's strategic vision on how citizens of Edmonton will live in and move throughout the City in the future. These plans clearly informed the West LRT study. The bullets below provide specific excerpts from these plans that were considered in the decision-making process.

Municipal Development Plan

- Accommodate a 2040 population of over 1 million people
- Manage growth to become a sustainable, healthy, and compact city
- Grow within an evolving regional context
- Design complete, healthy, and livable communities
- Align medium and higher density development with key transit node and corridor locations including LRT
- Protect, preserve, and enhance the natural environment

Transportation Master Plan

- Provide a comprehensive transit system as a cornerstone of the transportation system, offering travel choice and encouraging a shift in the public's mode of transportation
- Expand LRT to all sectors of the city to increase ridership and spur the development of compact, urban communities
- Integrate transportation and land use to optimize transportation investment and create an accessible, efficient and urban city form
- Provide an effective regional transportation system, including transit, for the movement of people and goods

2.2 Level 1 Screening

The earlier component of the study was undertaken under the City's earlier performance criteria: moving people, building and operating the line, and fitting it in. To identify the full range of potential alternatives options to connect Lewis Estates and downtown Edmonton, the project team identified multiple options in addition to those previously examined. Figure 5 identifies the initial corridors considered.

Given the significant work of the previous West LRT study, this project was able to efficiently advance through the fatal flaw (Level 1) analysis. At Level 1 screening, the project team discussed each initial alignment option, identifying its general advantages and disadvantages compared to the others. Level 1 screening is performed to remove corridors from consideration that have severe feasibility, community, or environmental constraints.

For organizational purposes, the criteria were grouped under the general categories of feasibility, community, and environment. The categories and a few examples of the Level 1 criteria examined under each are provided below. This list does not include all criteria used in the analysis.

Feasibility

- Meets project purpose
- Is technically feasible
- Primarily uses existing transportation corridors (existing roadways and rail lines)

Community

- Is consistent with the TMP and MDP
- Connects to current and/or future activity centers
- Serves current and future population along alignment

Environment

- Does not create irresolvable social impacts
- Does not create irresolvable environmental impacts
- Is not adjacent to multiple parks, open spaces, river valley, or other protected areas

The project team also debated the challenges and benefits related to each corridor. Consensus was reached by the project team to advance three key corridors including a variety of potential design options. These design options were multiple options on specific segments of the corridors. **Figure 6** displays the corridors advanced from Level 1 to Level 2 screening.

2.3 Level 2 Evaluation

Figure 6 illustrates the alternative routes carried forward for refined definition and detailed evaluation as Level 2 alternatives. All Level 2 alternatives use 87 Avenue between Lewis Estates and 163 Street. At 163 Street, the three overall route options separate into distinct alternatives, each with sub-options:

107 Avenue Corridor

The corridor would follow 87 Avenue to 163 Street or to 156 Street, or to a combination of either 163 or 156 Street to Stony Plain Road and 149 Street, to 107 Avenue, to 104 Avenue via a new connection west of Molson Brewery.

102 Avenue Corridor

There are three possibilities for this routing:

- The corridor would follow 87 Avenue to either 163 Street or 156 Street, to Stony Plain Road, to 102 Avenue

- 87 Avenue to either 163 Street or 156 Street, to Stony Plain Road, to 102 Avenue/103 Avenue couplet
- 87 Avenue to either 163 Street or 156 Street, to Stony Plain Road, to 104 Avenue.

The 102 Avenue alternative later became known as the Stony Plain Road alternative.

87 Avenue Corridor

There are two possibilities for this routing:

- The corridor would follow 87 Avenue straight east across the river valley to the University Health Sciences connection to the existing South LRT line
- 87 Avenue east to either 159 or 149 Street, south to Whitemud Drive, to Fox Drive, to University South Campus and planned extension to the existing South LRT line

Level 2 Evaluation Criteria

The Level 2 criteria were reviewed and approved by City Council. These criteria not only apply the West LRT, but are now used as decision-making criteria for all new LRT corridor planning studies. The comparative evaluation criteria were grouped into six weighted categories to reflect the strategic direction inherent in the City's policies. City Council also approved weightings for each category of criteria.

Figure 7 illustrates the Council-approved evaluation criteria and weightings.

For the West LRT study, there were approximately 50 specific criteria to compare corridors against one another. The categories and a few examples of the criteria examined under each are provided below.

Land-use and Promoting Compact Urban Form (Weighting = 4)

- What is the existing/future population density (population per hectare [ha]) within 800 metres (m) of the station?
- What is the future mix of land use types within 800 m of stations?
- Number of future activity centres connected by the route?
- Is the route consistent with the TMP, MDP, and the City's strategic direction?

Movement of People and Goods (Weighting = 3)

- What percentage of the route is within existing public and railroad rights-of-way?
- What is the projected ridership for the route?
- What is the projected travel time for the route?
- Does the route include existing and future bicycle and pedestrian facilities?

Feasibility and Constructability (Weighting = 2)

- What are the estimated capital and operating costs per kilometre (km) for the route?

- How complex would it be to expand the system west and north in the future?
- How many km of the route are inside tunnel and protected from weather or other interference?
- How many at grade crossings (surface road crossings) are located along the route?

Parks, River Valley, and Ravine System (Weighting = 2)

- What are the impacts and benefits to parks, open space, and river valley accessibility (pedestrian, bike, vehicle, and other)?
- How many ha of public lands would be acquired for the route?

Social Environment (Weighting = 2)

- How many ha of private property (residential - single family/multifamily, commercial, and industrial) would be acquired for the route?
- What are the potential temporary employment opportunities related to construction?
- Does the route create physical barriers for neighbourhood residents?
- How many residences are within 150 m of the route alignment and may be impacted by noise or vibration impacts?

Natural Environment (Weighting = 2)

- How many ha of valuable riparian habitat would be acquired for the route?
- What are the number of stream and river crossings along the route?
- What are the total ha of area disturbed during construction?

Ridership Projections

Level 2 ridership projections were undertaken using an approach that considers three components to LRT patronage: the ability of adjacent land uses to support direct, walk-on trips; transfers from bus to LRT; and Park and Ride users. The technique is well suited to corridor selection studies where a comparative evaluation of alternatives is required.

Usage patterns from Edmonton's existing LRT system, along with experience from other similar cities, were used to estimate bus transfer and Park and Ride usage. To estimate the direct walk-on patronage, future (2041) population and employment forecasts from the City's Transportation Master Plan (TMP) were used. In consultation with City staff, the population and employment growth from the relevant "zones" or communities within the City was concentrated around the potential stations, to reflect development patterns in the presence of LRT and supportive land use policies. To provide a conservative yet reasonable estimate, no induced population or employment growth was assumed beyond that already anticipated in the TMP. This represents a re-allocation of the City's 2041 TMP growth forecasts.

Existing population and employment were also considered to approximate the ridership that could be expected on opening day. This analysis resulted in a similar relative ranking of ridership among the corridor alternatives.

2.4 Level 2 Evaluation Results

Based on the detailed analysis of the specific criteria, the following findings were presented to the internal project team. The issues and opportunities of each alternative were discussed by the project team through workshop sessions.

To assist in the evaluation under the Land Use and Compact Urban Form criterion, the project team consulted with City staff and representatives of the real estate and development communities. **Figure 8** illustrates the areas identified through those discussions as offering potential redevelopment opportunities within the West study area.

The table in Exhibit 2-1 below summarizes the project team's findings.

EXHIBIT 2-1
Summary of Key Considerations

Criteria Category	Advantage	107 Avenue Corridor	Stony Plain Road Corridor	87 Avenue Corridor
Land Use/Promoting Compact Urban Form	Stony Plain Road	<ul style="list-style-type: none"> Provides LRT at the edges of fully developed neighborhoods which border both north and south sides of 107 Avenue. Access to Stony Plain Road revitalization opportunities and potential redevelopment sites limited to 156 Street intersection area Access to multiple, large potential redevelopment sites along 104 Avenue and in the north edge of downtown (common to both northern alternatives) Access to potential redevelopment sites between Meadowlark and Lewis Estates (common to all routes). 	<ul style="list-style-type: none"> Integrates LRT within the central transportation core of Stony Plain Road neighborhoods LRT access along Stony Plain Road to the largest number of revitalization opportunities and potential redevelopment sites. Best supports the City's current plan and investment in the Stony Plain Road Business Zone revitalization. Access to multiple, large potential redevelopment sites along 104 Avenue and in the north edge of downtown (common to both northern alternatives) Access to potential redevelopment sites between Meadowlark and Lewis Estates (common to all routes). 	<ul style="list-style-type: none"> Provides LRT at the edges of fully developed neighborhoods which border both north and south sides of 87 Avenue No access to potential redevelopment sites along 104 Avenue and in the north edge of downtown or Stony Plain Road. Access to potential redevelopment sites between Meadowlark and Lewis Estates (common to all routes).

EXHIBIT 2-1
Summary of Key Considerations

Criteria Category	Advantage	107 Avenue Corridor	Stony Plain Road Corridor	87 Avenue Corridor
Movement of People/Goods	87 Avenue	<ul style="list-style-type: none"> Estimated Travel time: 23 to 24 minutes Projected future daily boardings 50,000 to 51,000 (year 2041) Route is longer and slightly out of direction in comparison to the other corridors Opportunity to connect to Southeast LRT via downtown Traffic impacts range from minor to major compared to other options 	<ul style="list-style-type: none"> Estimated Travel time: 22 to 24 minutes Projected future daily boardings 48,000 to 49,000 (year 2041) Direct route to downtown and opportunity to connect to Southeast LRT via downtown Traffic impacts range from moderate to major compared to other options 	<ul style="list-style-type: none"> Estimated Travel time: 17 to 33 minutes Projected future daily boardings 41,000 to 51,000 (year 2041) Direct route to University with opportunity to interline with the existing South Line without requiring a transfer Traffic impacts are minor compared to other options
Feasibility/Constructability	107 Avenue	<ul style="list-style-type: none"> Estimated Cost: \$900 million to \$1.0 billion Has significantly higher stations and trackway portion of total cost compared to 87 Avenue Less constrained right-of-way than 102 Avenue/SPR corridor 	<ul style="list-style-type: none"> Estimated Cost: \$1.1 to \$1.2 billion Has significantly higher stations and trackway portion of total cost compared to 87 Avenue. 	<ul style="list-style-type: none"> Estimated Cost: \$1.0 to \$1.2 billion Has significantly higher structural portion of total cost compared to other options Requires new river crossing
Parks, River Valley and Ravine System	102 Avenue/ Stony Plain Road and 107 Avenue	<ul style="list-style-type: none"> Lower impacts compared to 87 Avenue 	<ul style="list-style-type: none"> Lower impacts compared to 87 Avenue 	<ul style="list-style-type: none"> New river bridge and tunnel approaches impact river valley and parkland
Social Environment	No route has significant relative advantage	<ul style="list-style-type: none"> Impacts to neighborhood along transition from 107 Avenue to 104 Avenue Benefits more neighborhoods and activity areas compared to the 87 Avenue corridor 	<ul style="list-style-type: none"> Significant construction impacts for businesses along Stony Plain Road Benefits more neighborhoods and activity areas compared to the 87 Avenue corridor 	<ul style="list-style-type: none"> Significant construction impacts for neighborhood along tunnels and new river bridge Benefits fewer neighborhoods and activity areas compared to the other corridors
Natural Environment	102 Avenue/ Stony Plain Road and 107 Avenue	<ul style="list-style-type: none"> Lower impacts compared to 87 Avenue 	<ul style="list-style-type: none"> Lower impacts compared to 87 Avenue 	<ul style="list-style-type: none"> New river bridge and tunnel approaches in an area where a crossing does not currently exist causes impacts to riparian and surrounding areas

Various sub-options of the final alternatives were removed from consideration at the internal stakeholder workshop during the Level 2 evaluation process. 100 Avenue and Stony Plain Road/100 Avenue Couplet options were considered separately from Level 2 Screening based on stakeholder feedback. The key points forming the rationale for the removal of these options are summarized below.

163 Street

- A connection using 163 Street misses the opportunity to serve Meadowlark Mall and its surrounding transit supportive area, in comparison to connections using 156 Street.

Whitemud Drive to South Campus

- Compared to the option connecting directly across the river valley to the Health Sciences station, this option requires out of direction travel and results in increased travel time to downtown.
- South Campus redevelopment is already served by South LRT; additional development as a result of a Whitemud Drive option is limited.

102/103 Avenue Couplet

- In comparison to continuing along 104 Avenue, a couplet reduces the opportunity to serve potential redevelopment along and to the north of 104 Avenue.
- Constructing the two directions of LRT on separate blocks reduces system visibility for users, creating potential confusion compared to implementing both directions of LRT together.
- Separating the two directions of LRT introduces operational issues, reducing speed and increasing travel time due to additional 90 degree turns, compared to operating on Stony Plain Road with fewer turns.
- The couplet option would require construction on both streets, creating a larger neighbourhood construction footprint.

100 Avenue

- LRT on 100 Avenue provides less support to the Stony Plain Road Business Redevelopment Zone, reducing the physical benefit it would receive from the infrastructure investment.
- LRT on 100 Avenue would provide less traveler visibility for the Business Zone, reducing the opportunity to expand the area's customer market base.
- Compared to the Stony Plain Road alternative, LRT on 100 Avenue would introduce additional 90 degree turns, resulting in operational issues (reduced speed, increased travel time).
- LRT on 100 Avenue is less likely to result in densifying the predominantly single family residential area along 100 Avenue, limiting redevelopment areas to one side of the route, compared to the redevelopment opportunities along both sides of the Stony Plain Road Business Zone.

- Removal of a traffic lane on both 149 Street and 156 Street to implement LRT on 100 Avenue would impact two major north-south transportation corridors rather than one under the Stony Plain Road alternative.

Stony Plain Road/100 Avenue Couplet

- Compared to implementing LRT fully on Stony Plain Road, a couplet would reduce transit access to one-way, reducing the opportunity to support the Business Zone's customer market base expansion.
- The couplet option would require construction in both roadways, creating a larger, more widely-spaced construction footprint and impacting two roads rather than a single one on Stony Plain Road.
- Constructing the two directions of LRT on separate blocks limits system visibility for users, creating potential confusion compared to implementing both directions of LRT together.
- Separating the two directions of LRT introduces operational issues, reducing speed and increasing travel time due to additional 90 degree turns, compared to operating on Stony Plain Road with fewer turns required.
- One-way street networks are less supportive of convenience-type local businesses, limiting the upside potential for commercial redevelopment on the north side of 100 Avenue compared to two-way operation.
- LRT on 100 Avenue is less likely to result in densifying the predominantly single family residential area along 100 Avenue, limiting redevelopment areas to one side of the route, compared to the redevelopment opportunities along both sides of the Stony Plain Road Business Zone.
- Couplet operation would limit opportunities to mitigate traffic impacts due to the roadway network structure east of 149 Street, compared to operation solely on Stony Plain Road.

2.5 The Recommended Corridor

The technical studies, the public input, and the LRT Network Plan all influenced the recommendation to City Council for the West LRT corridor. This is a recommendation to City Council for its consideration.

The recommended West LRT Corridor is proposed to use low-floor LRT technology implemented with an urban-style operating regime, consistent with the City's LRT Network Plan recommendations. Station locations were developed by the internal stakeholders, in a process that examined several factors. These factors included existing and future land use patterns, existing transit and roadway infrastructure, known activity centres, and potential redevelopment opportunities.

The recommended West LRT route is described below. **Figure 9** shows a map of the recommended corridor with station locations that will be carried forward for further evaluation. The recommended route:

- Follows 87 Avenue from the new Lewis Estates transit center just east of Anthony Henday Drive/87 Avenue to Meadowlark Road. The existing right-of-way east of 170 Street accommodates two tracks of LRT and two lanes of traffic in each direction. Stations are proposed at Lewis Estates (terminal station with Park and Ride facilities), 182 Street, West Edmonton Mall, and Misericordia Hospital. From there, the recommended route:
- Turns north along Meadowlark Road to 156 Street, potentially along the east edge of the road and west edge of Meadowlark Mall. North of the existing transit centre, double-track LRT replaces two lanes of traffic, one in each direction. A station is proposed at Meadowlark Mall, integrated with the existing transit center.
- Within 156 Street, two lanes of traffic are replaced with two LRT tracks, leaving one lane of traffic in each direction. Stations are proposed at 95 Avenue and between 100 Avenue and Stony Plain Road.
- At the intersection of 156 Street and Stony Plain Road, the recommended route turns east onto Stony Plain Road, replacing two lanes of traffic with LRT. Stations are proposed along Stony Plain Road at 149 Street, 142 Street, and 124 Street. Potential property impacts are identified in the vicinity of the intersections of Stony Plain Road and 156 Street, 149 Street, 142 Street, and 124 Street.
- The recommended route continues as Stony Plain Road becomes 104 Avenue, with two traffic lanes and two LRT tracks, transitioning gradually back to three traffic lanes in each direction along 104 Avenue east of 109 Street. West of 116 Street, 104 Avenue is proposed to have one lane of traffic in each direction, adding a second lane in each direction at 116 Street, and a third east of 109 Street. Stations are proposed at 116 Street, 112 Street, and Grant MacEwan University.
- In the vicinity of Grant MacEwan, the West route is proposed to connect to the Southeast route using surface downtown streets. The downtown connection is under separate study by the City.

Figures 10 through 16 show the recommended alignment in more detail.

As with the other shortlisted corridors and as noted earlier, the recommended route has both advantages and disadvantages. All three final corridors accomplish the City's goals, but with different emphases. In reaching the final recommendation, two aspects of the City's strategic direction were felt to be of primary importance:

- Implementing a major transit upgrade where reinvestment is both planned and could be maximized to support the City's future growth in a more compact urban form
- Facilitating an overall mode shift to transit by maximizing the use of the existing right-of-way rather than expanding outside public right-of-way, providing opportunity to the way to carrying more of Edmonton's future population within less physical space

Both of these aspects address the City's future land use and development. In terms of overall land use, both northern alternatives serve more neighbourhoods and people (measured by existing and projected future population) and more activity centres than the 87 Avenue alternative. In comparing the 107 Avenue and Stony Plain Road alternatives, some very pragmatic differences became clear:

- When infrastructure conditions are addressed to the commercial revitalization efforts currently underway in the Stony Plain Road Business Zone, this segment of the West study area would appear to benefit the most from a comprehensive approach to redevelopment. Updating the infrastructure, signage, and public amenities in a planned, coordinated program could assist the area's revitalization and commercial as well as residential market enhancement. The project team felt that LRT and ancillary infrastructure improvements would greatly improve the chances for the commercial segment of Stony Plain Road's long term sustainability.

At the policy level, and as noted previously, 107 Avenue offers less constrained right-of-way and thus fewer traffic and access impacts. However, the neighborhoods on both sides of 107 Avenue were judged to have less propensity to redevelop in patterns consistent with the City's strategic direction. While opportunities do exist at key intersections, implementing LRT in 107 Avenue was felt to offer fewer opportunities to effect a substantial mode shift to transit.

In summary, the Stony Plain Road alternative was recommended for the following reasons:

- By maximizing opportunities for revitalization and redevelopment, it balances service to established West neighbourhoods with support for the City's top-weighted goal.
- Urban-style LRT integrates well with and supports the West's predominant land uses:
 - Mature residential neighborhoods
 - Neighbourhood-scale commercial nodes
- It provides direct connections to downtown (the West area's primary transit market), direct connections to both campuses of Grant MacEwan, and via downtown connections to the existing South line. It also connects to the University of Alberta.
- It upgrades transit access to mid-corridor destinations and non-work trips as well as peak period downtown work trips.

- It upgrades the existing Stony Plain Road transit spine with high-quality, high-capacity, and high-visibility transit service.

After significant discussion, the project team reached a general consensus. Individual members of the project team expressed their department's perspective, and while it was not unanimous, the project team agreed that the Stony Plain Road option would be presented as the recommended route for public information sessions in September and for City Council's consideration in November. It was also recognized that the benefits presented by LRT on the Stony Plain Road corridor would result in impacts to on-street parking. This is apparent in the commercial area on Stony Plain Road where on-street parking would be utilized to avoid property acquisition. However, possible mitigations for parking may include developing shared parking spaces on common lots, rear parking behind businesses, and additional side street parking with a change to angle parking.

In the final comparison, the Stony Plain Road corridor maximized potential for new development, reinvigorated development, and accessed an area that the City has already invested in renewing. It was viewed to best align with the City's strategic direction for future growth and development.

3. Next Steps

Future actions which are necessary for the project to proceed successfully include the need to continue to engage stakeholders, the need to advance concept engineering, the need to address environmental issues, and the need for further operational definition. Five key next steps are described below:

1. Work with community to refine station locations, area plans, access needs, and design elements to ensure efficient operations, community integration, and maximized ridership. This will entail further specific public involvement efforts to continue to build on dialogue with key stakeholders.
2. Evaluate potential environmental, geotechnical, noise and vibration, and historical resource impacts. Mitigation measures will be context-specific and based on industry best practices in response to results of technical analysis.
3. Further develop conceptual engineering to identify land requirements and refine capital costs. Future cost estimates will include more engineering detail and assessments of risks associated with implementation methods. Additional traffic studies will be performed to ensure a balanced transportation system integrated within existing conditions.
4. Conduct development planning to ensure maximum return on transit investment. Economic analysis at appropriate levels of scale will be key to ensuring infrastructure framework is conducive to stimulate desired further development.
5. Prioritize overall LRT network expansion. Multiple account evaluation will be presented to council for scheduling further planning and engineering work related to the overall network expansion.

Figures

FIGURE 1
LRT Corridor Planning Process

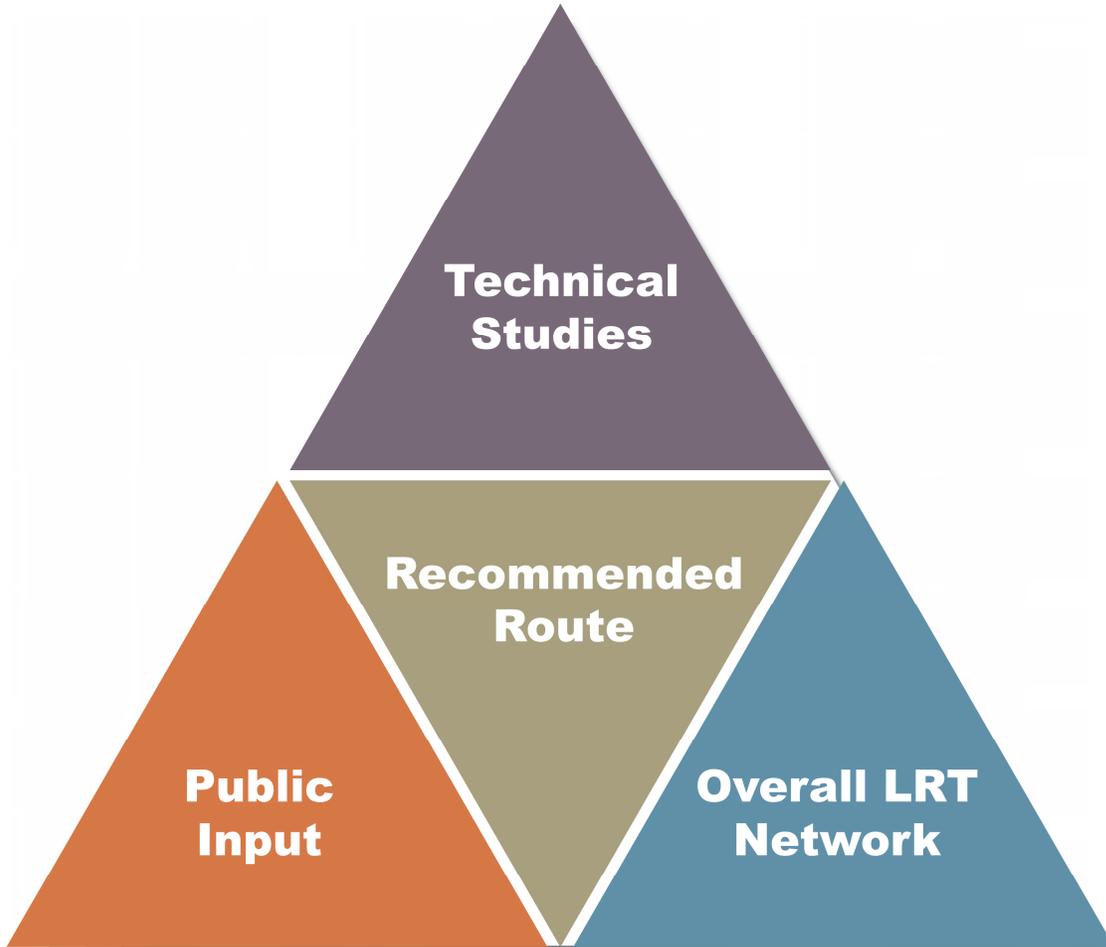


FIGURE 2
Study Area Overview

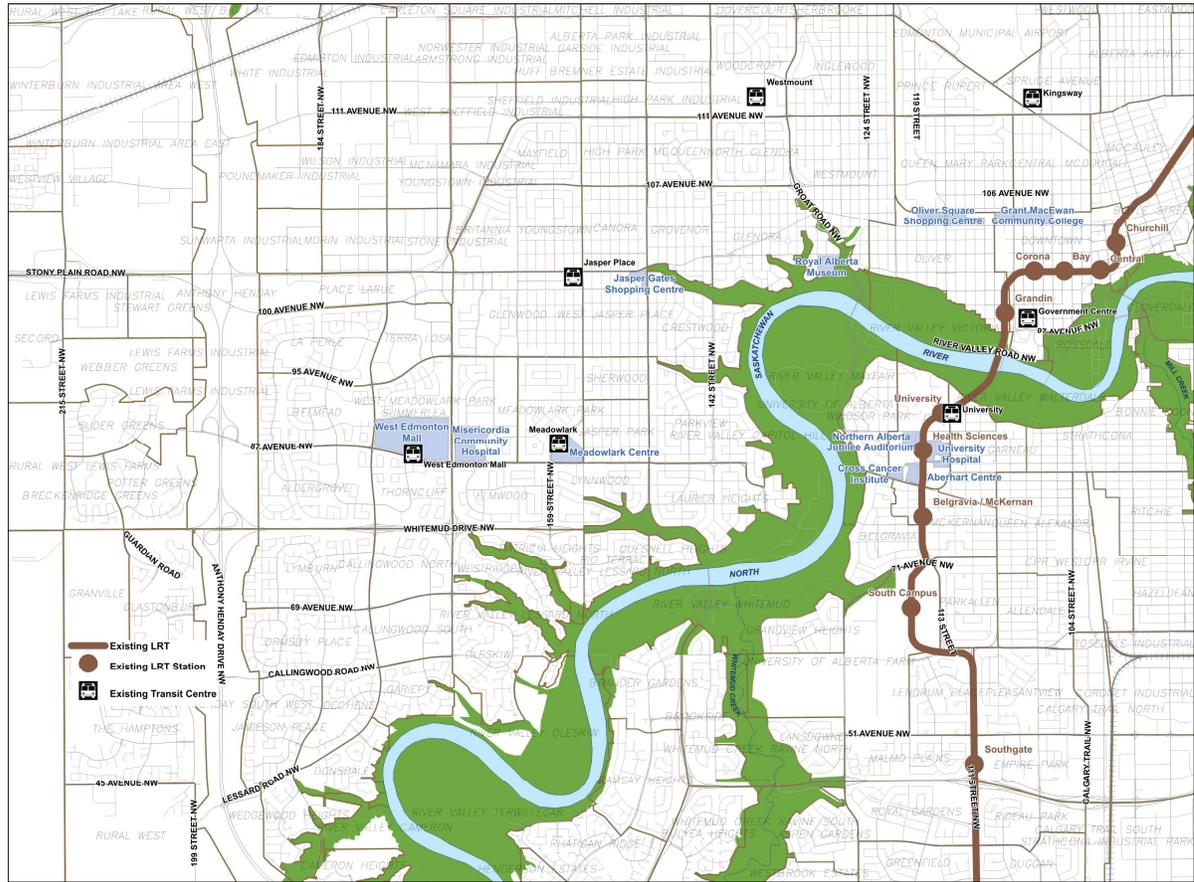


FIGURE 3
LRT Network Plan Findings

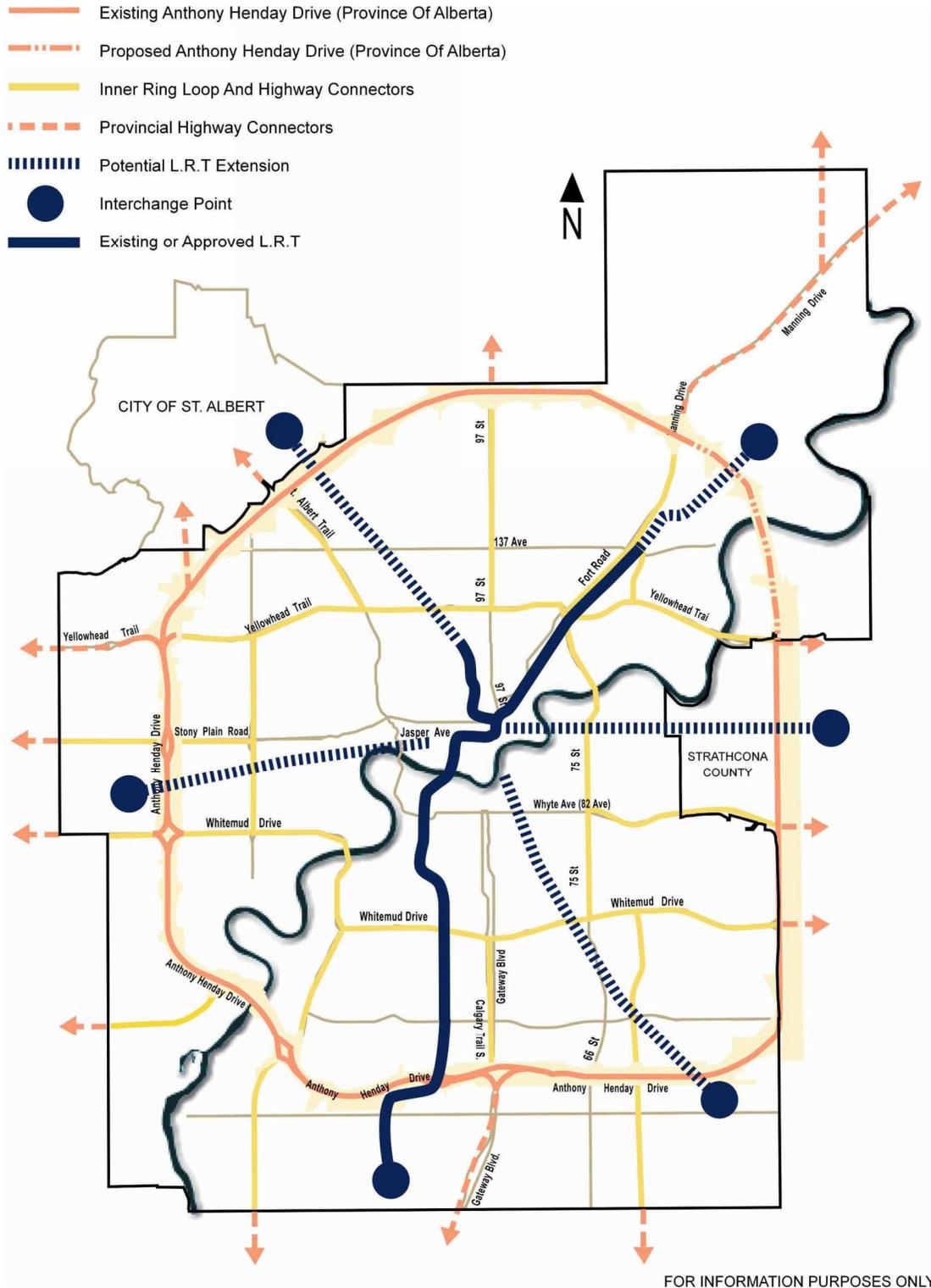


FIGURE 4
Alternatives Analysis Process

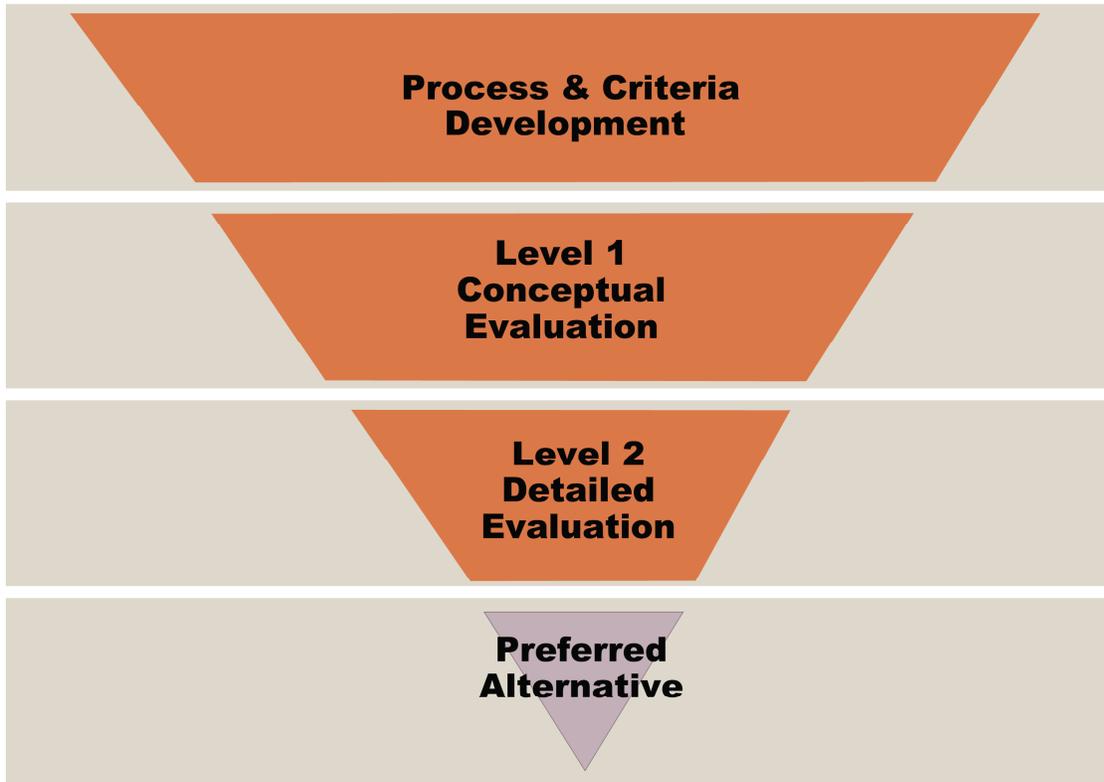


FIGURE 5
Initial Routes Considered

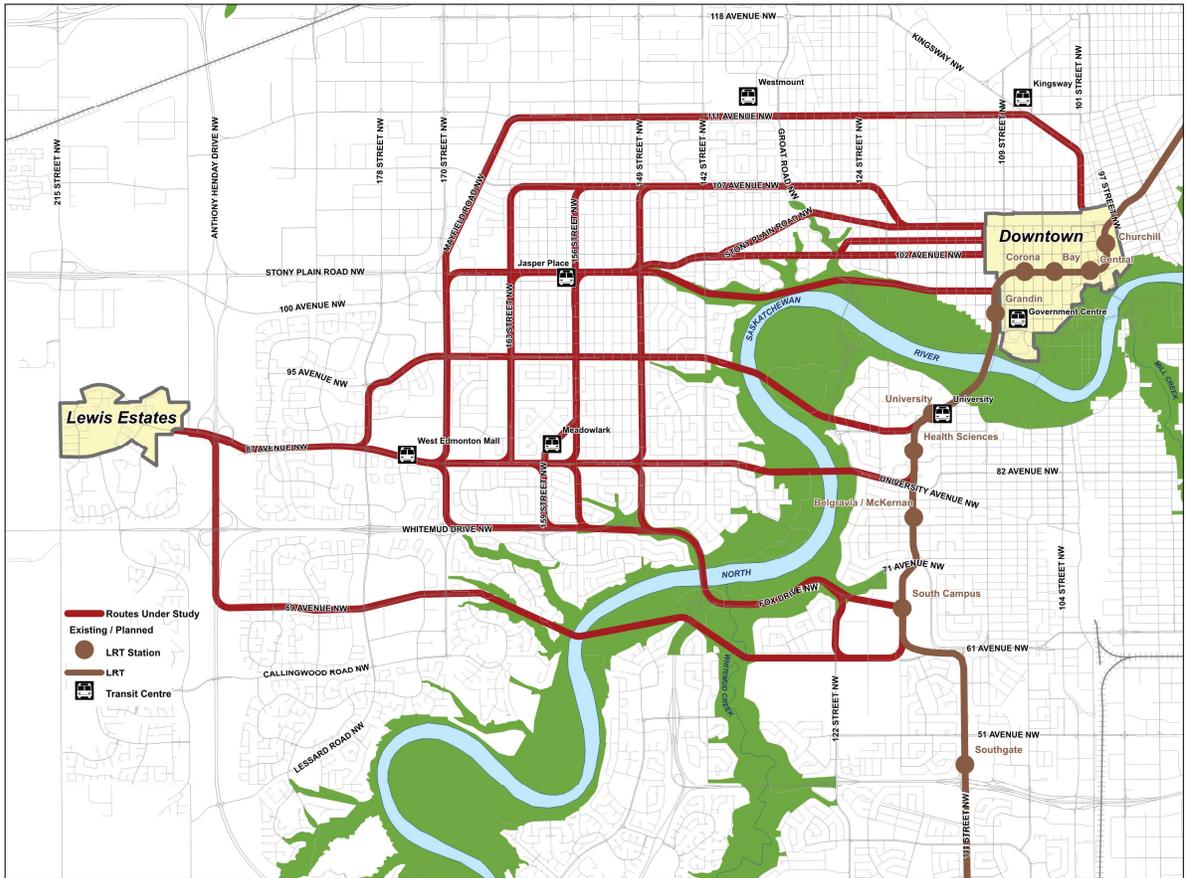


FIGURE 6
West LRT Route Options

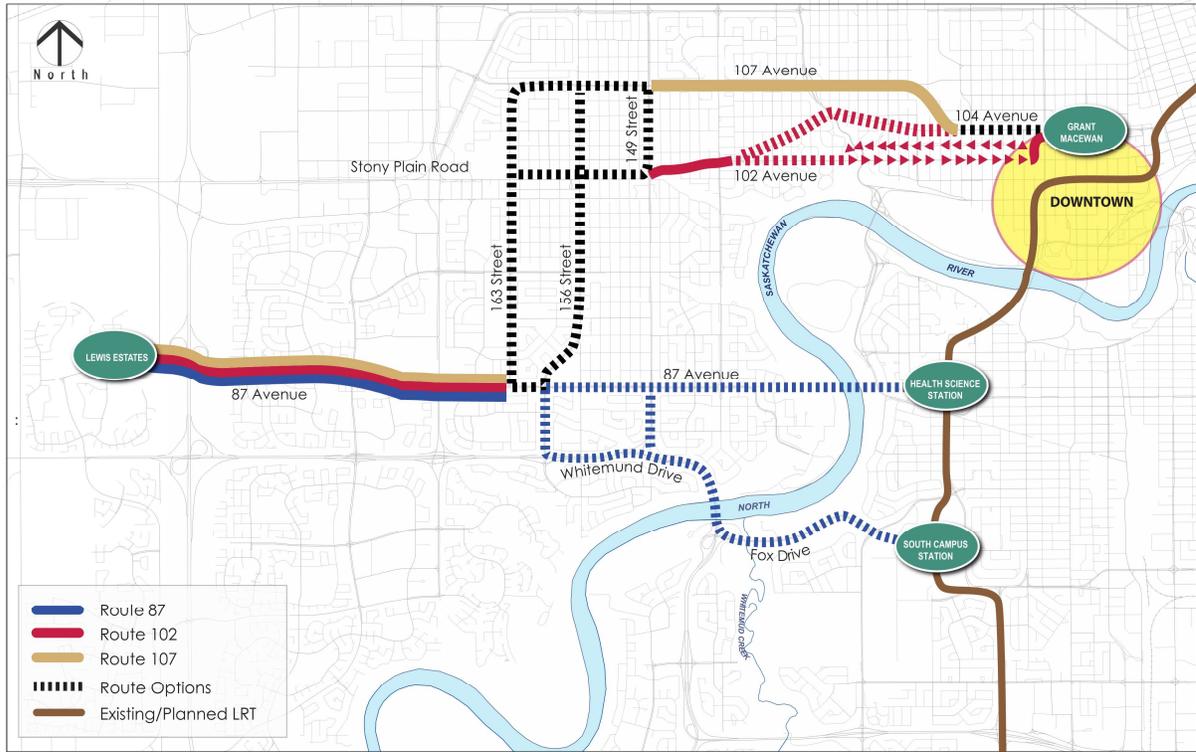


FIGURE 7
Level 2 Evaluation Criteria

Level 2 - Evaluation Criteria		
Grouping	Weighting	Criteria
Land Use/ Promoting Compact Urban Form	4	How many existing transit centres or park-n-ride locations are within 800 m of proposed stations?
		How many ha of vacant and/or underutilized properties are located within 800 m of stations?
		What is the existing/future population density (population per ha) within 800 m of the station?
		What is the existing/future employment density (jobs per ha) within 800 m of the station locations?
		What is the housing density (housing units per ha) within 800 m of the station locations?
		What is the existing mix of zoning types within 800 m of stations?
		What is the future mix of land use types within 800 m of stations?
		How many large development proposals are formally submitted for approval or under construction along the route?
		Number of existing activity centres connected by the route?
		Number of future activity centres connected by the route?
		Do the City land use plans and bylaws support development or redevelopment of the activity centres along the route?
		Would proposed activity centres development/redevelopment occur within a reasonable time frame (within 5 years)?
		Is the route consistent with the TMP, MDP, and the City's strategic direction?
		What percentage of the route is within existing public and railroad ROW?
Movement of People/ Goods	3	What is the projected ridership for the route?
		What is the estimated cost per rider for the route?
		What is the projected travel time for the route?
		What are the potential changes in roadway capacity (level of service or % capacity change) for routes proposed within existing transportation corridors?
		Does the route include existing and future bicycle and pedestrian facilities?
		Does the route allow for park-n-ride locations?
		What is the estimated capital and operating costs per kilometer (km) for the route?
Feasibility/ Constructability	2	How many km does the route require of track at grade, on structure, on retained fill, and in tunnel?
		How complex would it be to expand the system south and east in the future?
		If the route directly connects with the existing LRT system, what is the distance to the Maintenance Facility?
		How many km of the route are inside tunnel and protected from weather or other interference?
		How many at grade crossings are located along the route?
Parks, River Valley and Ravine System	2	What are the impacts/benefits to parks, open space, and river valley accessibility (pedestrian, bike, vehicle, etc.)?
		How many ha of public lands would be acquired for the route?
Social Environment	2	How many hectares (ha) of private property (residential - single family/multifamily, commercial, and industrial) would be acquired for the route?
		How many residences are located within 800 m of station sites that may benefit from increased property values?
		What are the potential temporary employment opportunities related to construction?
		Could neighbourhood impacts be avoided, minimized, or mitigated; or are they irremediable?
		Does the route create physical barriers for neighbourhood residents?
		How many residences are within 150 m of the route alignment that may be impacted by noise or vibration impacts?
		How many known cultural resource/heritage sites are adjacent to the route?
		What is the post secondary student population within 800 m of proposed station sites?
		What is the high school student population within 800 m of proposed station sites?
What is the number of low income, no car, and senior households within 800 m of proposed station sites?		
Natural Environment	2*	How many ha of valuable riparian habitat would be acquired for the route?
		What are the number of stream/river crossings along the route?
		What are the total ha of area disturbed during construction?

* Adjusted from 1 to 2 based on Council Motion on December 17, 2008

FIGURE 8
West LRT Redevelopment Overview



FIGURE 10
Map 1 – Lewis Estates to 184 Street

Key Features:

- New bridge over Anthony Henday Drive
- Park and ride site at Lewis Estates
- Maintaining existing traffic lanes on 87 Avenue
- Compatible with ultimate 87 Avenue/Anthony Henday Drive interchange design

Next Steps:

- Station location and area planning
- Neighbourhood access evaluation
- Route alignment refinement
- Property impact assessment
- Roadway configuration refinement

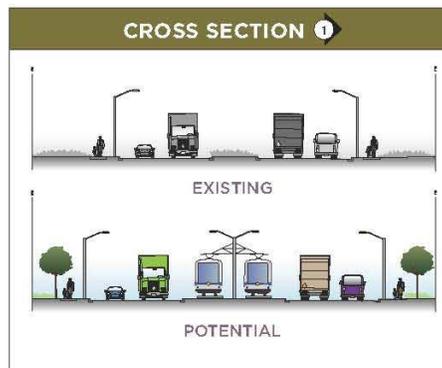
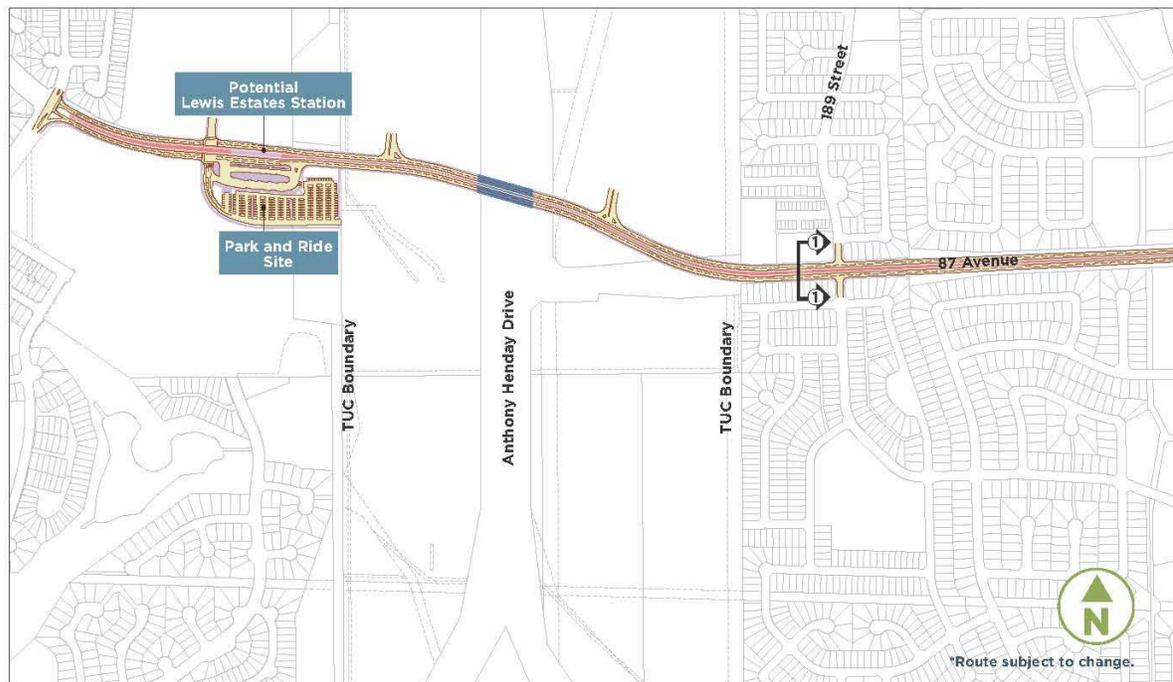


FIGURE 11
Map 2 – 87 Avenue from 182 Street to Misericordia

Key Features:

- Service to West Edmonton Mall and Misericordia Hospital
- Elevated LRT over 170 Street
- Maintaining existing traffic lanes on 87 Avenue

Next Steps:

- Station location and area planning
- Neighbourhood access evaluation
- Route alignment refinement
- Property impact assessment
- Roadway configuration refinement
- Confirm transit centre location

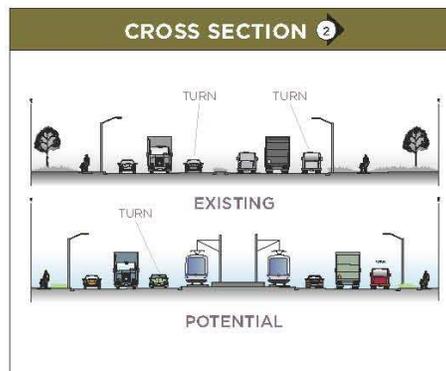


FIGURE 12
Map 3 – 87 Avenue at 156 Street

Key Features:

- Service to Meadowlark Mall
- Maintaining existing traffic lanes on 87 Avenue
- Traffic lanes reduced to one lane in each direction on 156 Street

Next Steps:

- Station location and area planning
- Neighbourhood access evaluation
- Route alignment refinement
- Property impact assessment
- Roadway configuration refinement
- Confirm transit centre location
- Traffic impact assessment

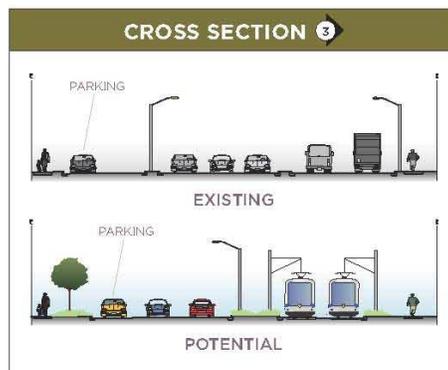


FIGURE 13
Map 4 – 156 Street from 92 Avenue to 99 Avenue

Key Features:

- Traffic lanes reduced to one lane in each direction on 156 Street

Next Steps:

- Station location and area planning
- Neighbourhood access evaluation
- Route alignment refinement
- Property impact assessment
- Roadway configuration refinement
- Traffic impact assessment

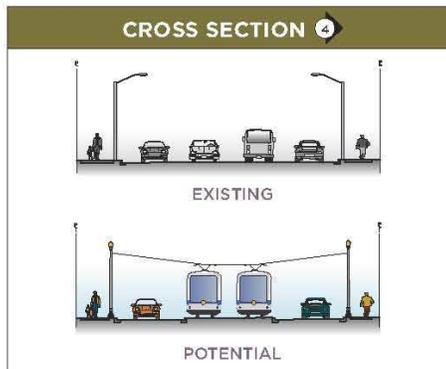
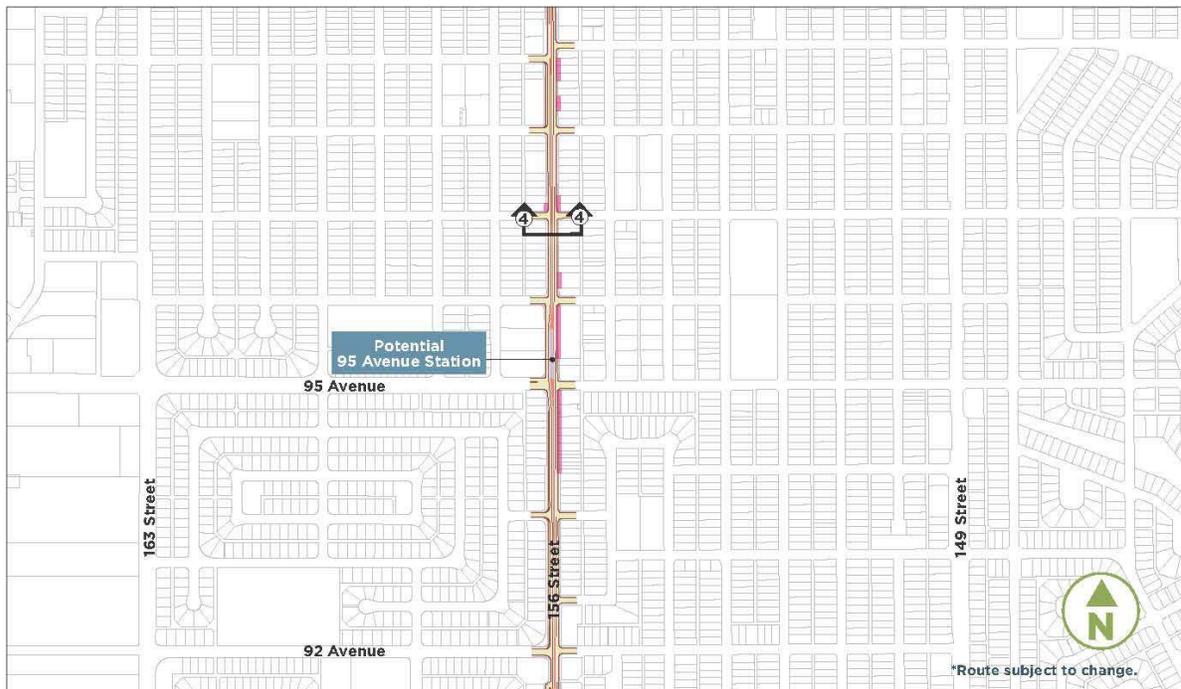


FIGURE 14
 Map 5 – 156 Street to Stony Plain Road and 146 Street

Key Features:

- Service to Grant MacEwan campus and Stony Plain Road businesses
- Traffic lanes reduced to one lane in each direction on 156 Street
- Traffic lanes reduced to one lane in each direction on Stony Plain Road

Next Steps:

- Station location and area planning
- Neighbourhood access evaluation
- Route alignment refinement
- Property impact assessment
- Roadway configuration refinement
- Confirm transit centre location
- Traffic impact assessment

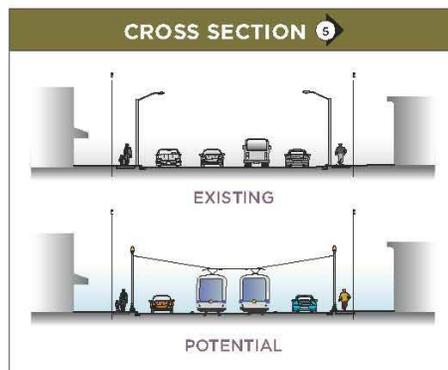
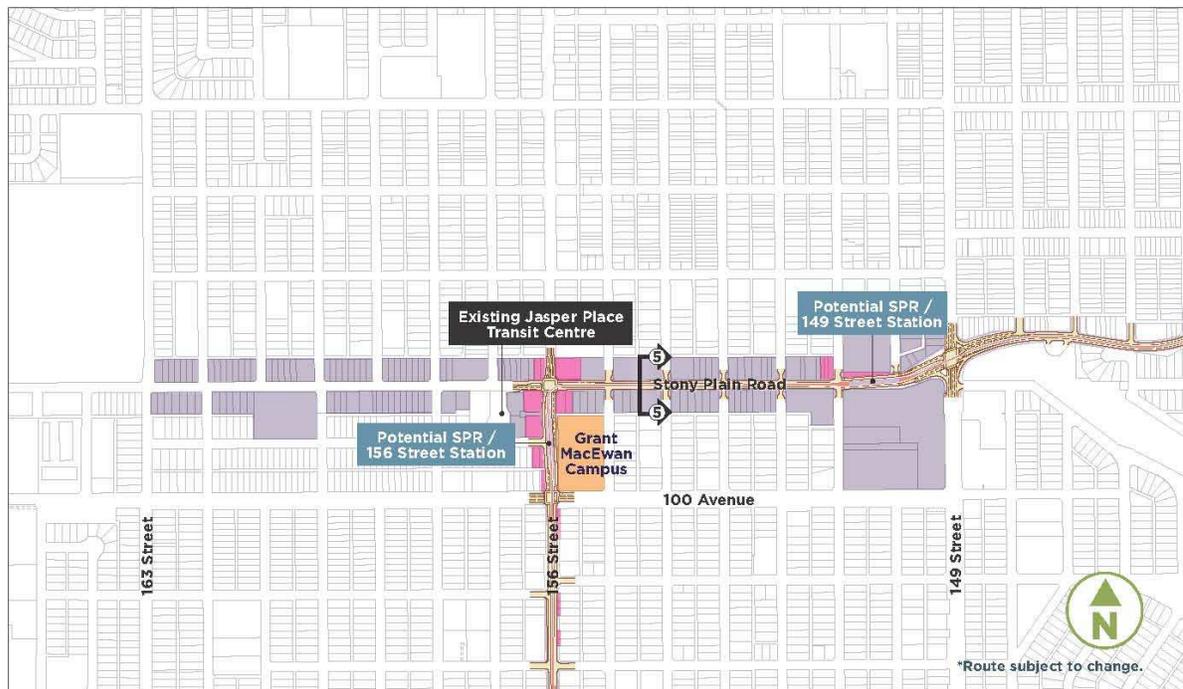


FIGURE 15
Map 6 – Stony Plain Road – 142 Street to Groat Road

Key Features:

- New bridge on Stony Plain Road over Groat Road
- Traffic lanes reduced to one lane in each direction on Stony Plain Road

Next Steps:

- Station location and area planning
- Neighbourhood access evaluation
- Route alignment refinement
- Property impact assessment
- Roadway configuration refinement
- Traffic impact assessment



FIGURE 16
Map 7 – Stony Plain Road – 124 Street to Grant MacEwan

Key Features:

- Service to Grant MacEwan Campus
- Traffic lanes reduced to one lane in each direction on Stony Plain Road
- Traffic lanes reduced to two lanes in each direction on 104 Avenue

Next Steps:

- Station location and area planning
- Neighbourhood access evaluation
- Route alignment refinement
- Property impact assessment
- Roadway configuration refinement
- At grade LRT connection from downtown to proposed Southeast LRT corridor
- Traffic impact assessment

