West LRT Corridor Analysis

Final Report

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prepared for: The City of Edmonton

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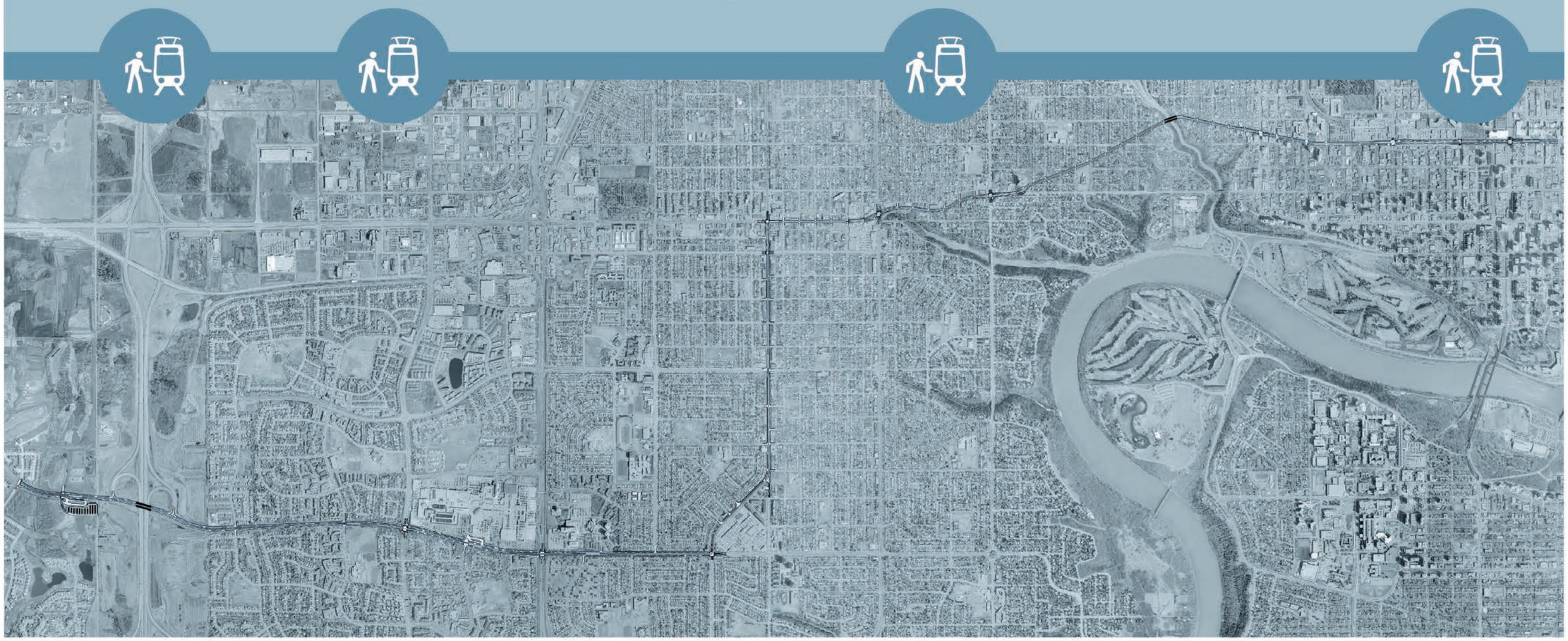

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Executive Summary

The City of Edmonton (the City) has worked diligently towards the identification of a Light Rail Transit (LRT) corridor linking downtown Edmonton to the neighbourhoods of west Edmonton. The City's efforts produced an initial corridor option in 2006, connecting at the Health Sciences station on the existing LRT system, then extending directly west across the river valley along 87 Avenue. While this corridor had many merits, it was not well received by stakeholders. Since the development of the 2006 corridor recommendation, the City has updated its strategic vision that influenced the policies affecting land use, urban form, and the benefits of LRT. The City has adopted policy documents, the new Transportation Master Plan and Municipal Development Plan, that support LRT as a means to shape urban form, encourage density around transit stations, and ultimately create a more sustainable city. With these new concepts in place the City commissioned this study, in 2008, to re-evaluate the options for a West LRT corridor to tie west Edmonton to the downtown.

The City has developed a plan for the long term expansion of LRT to ultimately serve all quadrants of Edmonton (See 2.1 LRT Network Plan). The West LRT project represents a critical link in the overall expansion to connect key destinations in the City with LRT and enhanced bus transit service. A critical goal of the system expansion seeks to provide simple, accessible, and sustainable transportation alternatives for the City's residents. As the City continues to grow the existing transportation infrastructure will be pushed beyond its capacity. Transit is one method to move more people, more efficiently, within the constraints of the urbanized areas of Edmonton. The West LRT is also key to the recent policy direction supporting more sustainable land use patterns through transit infrastructure development. Directly supporting the City's updated policy direction, the West LRT corridor has strong potential to enhance redevelopment activities at key locations along the corridor.

The West LRT is also planned to operate as an urban-style LRT system, with more stations spaced closer together in conjunction with the development of transit-supportive communities. This includes the introduction of low floor LRT trains to the City. Following a detailed examination of different train technologies that was done as part of the network study, low floor LRT was selected to allow smaller scale stations and to best integrate LRT into the existing neighbourhoods. Low floor trains can operate with less station infrastructure, similar to enhanced bus stops.

The West LRT project was structured to engage with the full range of City departments, as well as public and citizen stakeholders. The multi step approach set out to develop general consensus on this recommended LRT corridor through a structured decision making process. Key project activities included:

- Confirmation of the decision making process
- Development of a project purpose statement
- Identification of project issues and objectives
- Confirmation of criteria to compare potential corridor options against one another
- Identification of the full range of corridor options to extend LRT from the Lewis Estates to downtown Edmonton
- Basic design concept drawings of corridor options
- Technical analysis on key project elements
- Two levels of screening to remove corridors from consideration and only advance those corridors that were the most promising for further analysis
- Consideration of the City's concurrent LRT Network planning to inform the corridor selection
- Activities to inform and obtain input from project stakeholders to help shape the decision process
- Identification of the recommended corridor with approval by City Council

The detailed analysis completed under the 2006 study provided a strong basis for launching the West LRT project. The previous study allowed the team to quickly identify the range of potential corridor options and complete a high level screening to remove any options that were not viable options. Through detailed analysis, screening, and public consultation the team continued to narrow down the corridor options to the most promising. Corridors primarily utilizing 107 Avenue, 102 Avenue/Stony Plain Road, and 87 Avenue were advanced into the second level of screening analysis for final consideration. Exhibits 5-2 through 5-4 provide graphic representations of these corridors. Corridors advanced to the second level of project screening were required to show significant merit and the ability to achieve the goals and objectives of the project.

All of these corridors were strong contenders and the purpose of the second level of screening was to draw out the unique attributes of each for comparison. Ultimately, the technical studies (screening), public input, the LRT Network Studies, the City policy documents, and finally the City Council review identified the 102 Avenue corridor, with the Stony Plain Road option as the recommended corridor. (Exhibit 7-1 provides a graphic image of this corridor.)

This was not a simple decision. The 107 Avenue corridor (following the 156 Street option) and the 102 Avenue corridor (following the Stony Plain Road option), scored similarly when analyzed through the second level of project screening, while 87 Avenue results trailed behind. Both 107 and 102 Avenue corridors would result in strong ridership and benefits for the local neighbourhoods they would serve. The final selection was influenced by the corridor's ability to best meet the City's goals for supporting redevelopment opportunities, encouraging density, and implementing a more compact urban form.

The 102 Avenue corridor (following the Stony Plain Road option):

- Best supports the City's strategic vision of promoting compact urban form
- Best serves the majority of potential redevelopment areas
- Is the most direct corridor to downtown
- Results in strong potential ridership (similar to 107 Avenue)
- Has less property impacts then 107 Avenue
- Reinforces current major transit patterns from to the downtown

The adoption of the recommended corridor by City Council set the general location of the project's path from Lewis Estates to downtown. The next steps in the project are to refine the corridor and identify the specific track and station locations and layouts. This process will involve ongoing consultation with the local communities where the recommended corridor is located.

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1 Introduction

1.1 Purpose of the Report

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 extending from Lewis Estates to downtown Edmonton.

To assist the reader, the following list of acronyms is provided:

LRT light rail transit

MDP Municipal Development Plan

ROW right-of-way

TMP Transportation Master Plan

TOD Transit Oriented Development

Please note, the terms "route" and "corridor" are used interchangeably throughout the report.

1.2 Background

The West LRT study described 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. Based on public interest and an increased emphasis on sustainability, recent City policy has begun to look differently at Edmonton's development patterns, the transit network, and development of major transportation infrastructure. This shift in the City's Strategic Vision, supplemented by the Municipal Development Plan (MDP) *The Way We Grow* and the Transportation Master Plan (TMP) *The Way We Move*, provides the framework for developing a sustainable and livable city and outlined the importance of LRT as a key tool in creating compact urban centres, offering premium transit service and promoting a mode shift to transit.

The West LRT study was given a directive to identify an appropriate LRT corridor that moves citizens efficiently, helps to shape the land use and form of the City in a more sustainable fashion, and integrates into established neighbourhoods with less impact.

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 described in this report reflects the work initiated in December 2008 to re-evaluate 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. The Network Plan recommendations were incorporated in the final recommendations.

1.3 Decision Making Structure

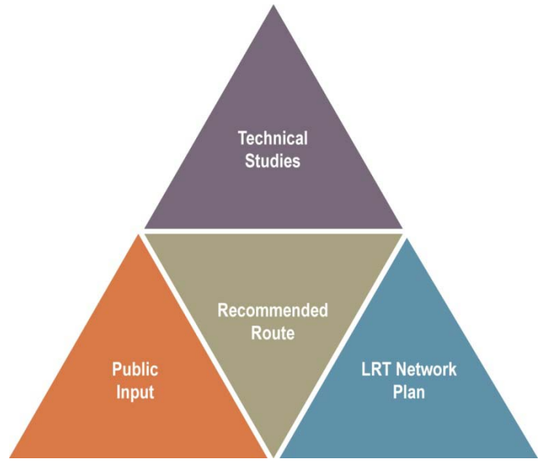
The West LRT study was led by the City of Edmonton Transportation Department to determine a recommended LRT corridor. The department developed a cohesive project team including internal decision makers from the wide range of City departments involved in the project. Team members were selected to represent the positions of each of their departments. This blended group of City department representatives and consultants formed the "project team." 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 project team and its technical studies were one piece in a triad of influences that would ultimately determine the West LRT corridor recommended to City Council. Exhibit 1-1 graphically displays the relationship of the following three key elements.

- Technical Studies – The work by the project team and City representatives. The representatives were responsible for conveying the work of the group back to their respective departments and obtaining input from their departments to inform each decision milestone.
- Public Input – The public involvement process conducted in parallel with the technical studies to understand the impact and benefit to 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.

EXHIBIT 1-1
LRT Route Planning Process



The public involvement process included individual stakeholder meetings, on-line comment opportunities, and workshops and public information sessions. The first public workshops were held on June 3 and 4, 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. City Council reviewed and debated the corridors in two public hearings. They approved the recommended corridor on December 15, 2009. Additional details on the public involvement and specific input received is included later in Section 6.

As noted previously, the corridor recommendation was influenced by other studies and policy documents, including 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 Transportation Master Plan (TMP) and the Municipal Development Plan (MDP), established the City's strategic vision for 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 and strategic objectives from these plans that were considered in the decision-making process.

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 form
- Provide an effective regional transportation system, including transit, for the movement of people and goods

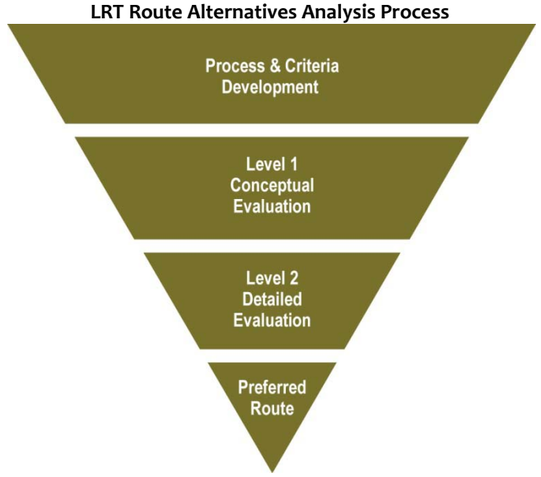
Municipal Development Plan

- Accommodate a 2040 City of Edmonton 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 liveable communities
- Align medium and higher density development with key transit node and corridor locations including LRT
- Protect, preserve, and enhance the natural environment

1.4 Analysis Approach

The City of Edmonton Transportation Department chartered the project team to implement the multi-step decision-making process. Exhibit 1-2 details the steps in the process, including the City's internal team steps and public consultation. Building off of the West LRT analysis completed under previous studies by the City, the project team met in a series of four team workshops during 2008 and 2009.

EXHIBIT 1-2
LRT Route Alternatives Analysis Process



Each workshop focused on a specific step or decision milestone in the process of identifying the preferred corridor. The process served to identify the range of potential corridors from the downtown to Lewis Estates. Multiple criteria were developed that represented the guiding principles of the project.

The project team utilized the two levels (Level 1/Level 2) of screening criteria developed through the concurrent West LRT project and adopted by City Council for new LRT corridor selections. The criteria were developed organically using the objectives and challenges identified during development of the purpose and need statement and is consistent with approaches used in Canada and United States.

Screening involved comparing each of the corridors against one another. In many cases, the corridors 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 as favourably, and advanced the most promising corridors for additional consideration. The process and criteria were presented to City Council for review and approval in December 2008.

1.5 Project Purpose and Need

The project team developed a purpose and need 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 addressed specific issues or objectives. The purpose statement is intended to be specific enough to include the key project elements, while being broad enough to ensure that the team developed a reasonable range of corridor options.

The project team brainstormed all of the potential opportunities and issues related to the West LRT project. Using these opportunities and issues as a basis, the team crafted the project purpose statement to identify the key points of focus for the project. The resulting project purpose statement for the West LRT study was reached with the consensus of the entire project team:

Purpose Statement

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

- Is consistent with the City's Strategic Vision, its TMP and its 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 parklands, the river valley, and ravine systems
- Respect neighbourhoods
- Promote economic development and redevelopment

2 Initial Corridor Identification

2.1 LRT Network Plan

City staff is planning for the long-term mobility needs of Edmonton residents. Future mobility will include a mix of all modes, some shifts in land use, and will ultimately provide Edmonton residents with multiple options to move in and around the city. Transit, and LRT in particular, is a critical component of this vision. In recognition of the role transit will play, city staff developed an overall LRT Network Plan and a comprehensive technical review of its approach to LRT system planning and operation. This plan guides the future development of LRT. The LRT Network Plan was developed independently but concurrently with the West LRT project. As new information and direction was available from the LRT Network Plan, results were integrated into the West LRT project.

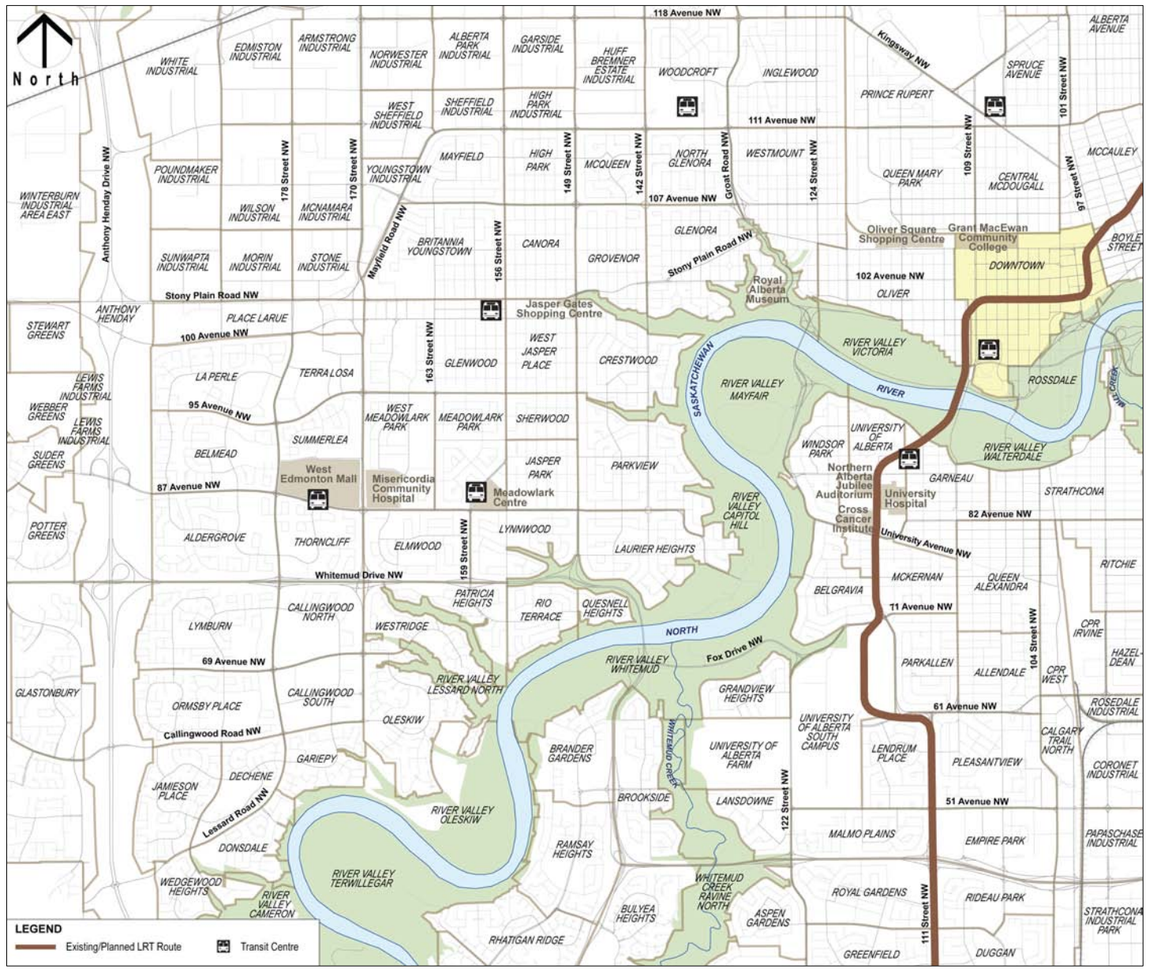
The LRT Network Plan, in conjunction with past West LRT planning studies, identified the demand for an LRT connection between the downtown and Lewis Estates, providing the basis for this project. Its findings confirmed the project purpose, that corridors should connect these two termini. Additionally, the LRT Network Plan recommends that the Edmonton LRT network should move towards an urban-style LRT system, with more stations spaced closer together in conjunction with the development of transit-supportive communities. All of these factors were considered by the project team in the development of corridor options for the West LRT.

2.2 Study Area

The project team identified the project study area as encompassing 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.

Exhibit 2-1 provides a map of the study area and constituent neighbourhoods.

EXHIBIT 2-1
Study Area Overview



The study area includes major commercial centres at West Edmonton Mall, Meadowlark Mall, Stony Plain Road, and Oliver Square. Major parkland and recreational landmarks in the area included the North Saskatchewan River Valley, Hawrelak Park, Buena Vista Park, MacKinnon Ravine, Fort Edmonton Park, and the Edmonton Valley Zoo. Significant educational, transportation, and health facilities were also located within the study area. These facilities included the Park and Ride facility at Lewis Estates, West Edmonton Mall Transit Centre, Meadowlark Transit Centre, Jasper Place Transit Centre, the University of Alberta and University Hospital, University of Alberta South Campus, Grant MacEwan University (Arts Campus & Main Campus), and the Misericordia Hospital.

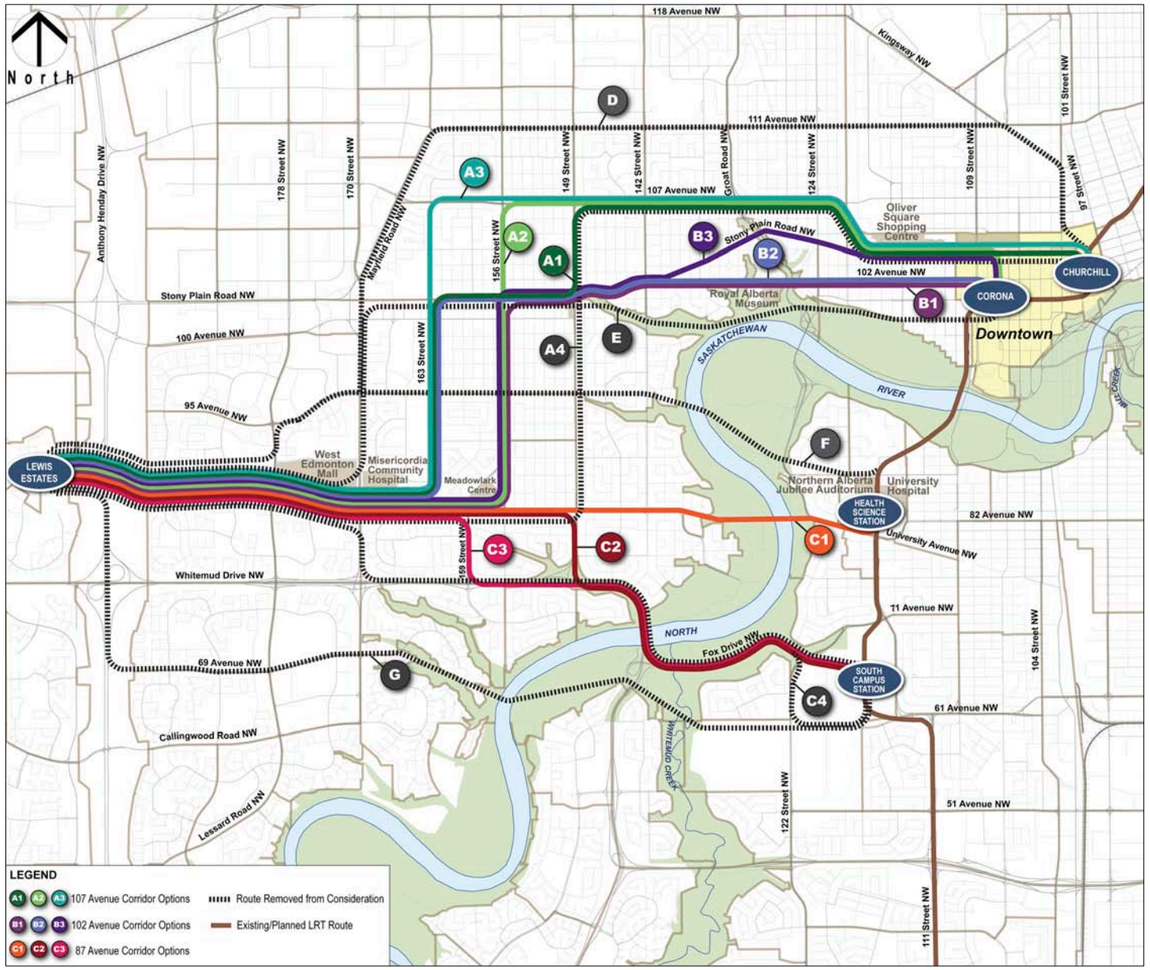
2.3 Initial Corridors Identified

This new examination of LRT corridors built off of the previous analysis completed in a 2006 West LRT study. The earlier component of the 2006 study, viewed at the time as an extension of the existing system, was completed under the City's earlier performance criteria: moving people (ridership), building and operating the line (constructability/cost), and fitting it in (fit within corridor). Under this criteria, the 87 Avenue corridor was preferable.

In the reassessment of corridors to connecting Lewis Estates and downtown Edmonton with the new criteria that reflects the vision from the TMP and MDP, the project team identified multiple options in addition to those previously examined. Given the significant work of the 2006 West LRT study, this project was able to efficiently advance through the fatal flaw (Level 1) analysis. During Level 1 screening, the project team agreed with corridors removed from consideration under the 2006 West LRT study. Remaining alignment options were described, and their general advantages and disadvantages compared to the others. Those corridors studied, but not included in this analysis, are identified in Exhibit 2-2 in the grey color.

Corridors considered viable through the 2006 West LRT study, as well as multiple new design options for each, were advanced to Level 2 analysis; these options are shown in colour on Exhibit 2-2.

EXHIBIT 2-2
Initial Corridors Considered



3 Level 1 – Corridor Screening

3.1 Screening Criteria (Level 1)

Level 1 criteria were included as a fatal flaw comparison and to validate those corridors resulting from the 2006 West LRT study, completing a basic fatal flaw analysis of new design options. Level 1 criteria were primarily qualitative, based on knowledge from past projects and the professional judgment of the project team's planners and engineers; as well as input received through the public consultation process. The Level 1 criteria were organized in three general categories of Feasibility, Community, and Environment. While there is considerable overlap in the categories, organizing the Level 1 criteria in this manner provided a simple format to present the criteria to the project stakeholders. The tables below present the basic objectives paired with the specific criteria used as the measurement of each objective.

Feasibility

Corridors were evaluated to determine whether they met the basic technical needs of the project. The complexity of implementation and construction were considered for each corridor.

TABLE 3-1
Corridor Evaluation

Objective	Criteria (Method of Measurement)
Address the issue or purpose of the project.	Does the corridor meet the project purpose statement?
Constructability.	Is the corridor technically feasible?
Minimize private property impacts and cost.	Does the corridor use existing transportation corridors?
Minimize impacts to logistics of business and industry.	Does the corridor create irresolvable conflicts with goods movements?
Maximize connectivity and accessibility.	Does the corridor connect directly to major bus service?
	Does the corridor connect (direct or transfer) to the existing LRT system?
Minimize capital cost and constructability issues.	Does the corridor require significant length of structure or tunnel (20% or greater)?
	Is the corridor primarily within existing public ROW (80% or greater)?
Maintain viable options for future expansion.	Is the terminus aligned appropriately to not preclude a future extension?
	Is the corridor aligned appropriately to not preclude a future extension?

Community

Corridors were evaluated both for their potential benefits and for their ability to minimize neighbourhood and social impacts.

TABLE 3-2
Community Evaluation

Objective	Criteria (Method of Measurement)
Connect people to destinations where they live, work, and play.	Does the corridor connect to existing activity centres?
	Does the corridor connect to future activity centres?
	What is the existing/future population within 150 meters (m) of the corridor alignment? (existing / future)
	What is the existing/future employment within 150 m of the corridor?
Capitalize on land use plans and policies encouraging transit and density.	Do the future land use plans along the corridor include transit supportive policies and policies to encourage density?
Capitalize on transportation plans and policies encouraging transit.	Is the corridor consistent with the TMP, MDP and the City's strategic direction?
Identify opportunities to enhance neighbourhood connectivity and cohesion.	Does the corridor create physical barriers for neighbourhood residents?
	Could stations be integrated and fit with the surrounding neighbourhood?

Environment

Corridors were evaluated for their ability to minimize impacts on the natural environment or to enhance the community.

TABLE 3-3
Environmental Evaluation

Objective	Criteria (Method of Measurement)
Minimize social and environmental impacts.	Does the corridor present irresolvable social and environmental impacts?
Minimize impacts to parks and open space, while maximizing access (where appropriate).	Is the corridor consistent with City plans, bylaws, provincial and federal regulations addressing parks, open space, and the river valley?
	What is the number of parks, open space, or river valley area adjacent to the corridor?
Support revitalization through LRT.	Does the corridor connect priority revitalization locations based on City plans and/or bylaws?

3.2 Corridor Screening (Level 1)

Level 1 screening was completed to validate those corridors resulting from the 2006 West LRT study and new options. The project team debated the challenges and benefits related to each.

For purposes of the Level 1 screening, the corridors were grouped by the primary roadway corridors. 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
- 102 Avenue /Stony Plain Road Corridor
- 87 Avenue Corridor

Table 3-4 provides the details of the Level 1 validation of corridors for advancing to Level 2. Significant overlap in corridors existed. Therefore, while a single corridor from end to end may not have been desirable in its current configuration, specific portions did have merit. Therefore, portions of several corridors were incorporated as design options into other corridors. These conclusions are reflected in Table 3-4.

TABLE 3-4
Level 1 Screening Summary

Grouping	Corridor	Decision	Primary Conclusions	(Primary Conclusions continued)	(Primary Conclusions continued)
107 Avenue	A1	**Advance**	Corridor is technically feasible. Strong Redevelopment opportunities. Connects to multiple activity centers.	Service to high density market. Possible future system expansion conflicts Opportunity for new low floor technology.	Connection from 104 Avenue to 107 Avenue. Long connection from existing line to desired service area. Possible disruptions to Stony Plain Road commercial district.
107 Avenue	A2	**Advance**	Corridor is technically feasible. Strong Redevelopment opportunities. Connects to multiple activity centers. Service to high density market.	Possible future system expansion conflicts. Opportunity for new technology. Connection from 104 Avenue to 107 Avenue.	Downtown transfer required for University service. Long connection from existing line to desired service area. Possible longest travel time.
107 Avenue	A3	**Advance**	Corridor is technically feasible. Strong Redevelopment opportunities. Service to high density market.	Possible future system expansion conflicts. Opportunity for new technology. Downtown transfer required for University service.	Long connection from existing line to desired service area. Possible longest travel time. Misses multiple activity centers.
107 Avenue	A4	Do not advance	Service to high density market Possible future system expansion conflicts. Opportunity for new technology.	Downtown transfer required for University service. Long connection from existing line to desired service area. Possible longest travel time.	Misses multiple activity centers. Neighbourhood severance. Possible disruptions to commercial district.
102 Avenue	B1	**Advance**	Corridor is technically feasible. Most direct service to Central Business District. Developed transit route. Redevelopment opportunities.	Connects to multiple activity centers. Opportunity for new technology. Downtown transfer required for University service. Community and Neighbourhood severance.	Possible traffic congestion and rerouting. Ravine area disturbance. Possible disruptions to Stony Plain Road commercial district.
102 Avenue	B2	**Advance**	Corridor is technically feasible. Most direct service to Central Business District. Developed transit market. Redevelopment opportunities.	Opportunity for new technology. Downtown transfer required for University service. Community and Neighbourhood severance. Possible traffic congestion and rerouting.	Ravine area disturbance. Misses multiple activity centers. Possible disruptions to Stony Plain Road commercial district.
102 Avenue	B3	**Advance**	Corridor is technically feasible. Second most direct service to Central Business District. Developed transit market. Most significant redevelopment opportunities.	Opportunity for new technology. Downtown transfer required for University service. Some neighbourhood severance. Possible traffic congestion and rerouting.	New ravine crossing required. Accesses north downtown redevelopment area. Disruptions to Stony Plain Road commercial district.
87 Avenue	C1	**Advance**	Corridor is technically feasible. Shortest connection from existing line to desired service area. Possible system capacity conflicts.	Provides direct service to University. Community and Neighbourhood severance. New river crossing required.	Possible traffic congestion and rerouting. Limited redevelopment opportunities. Not along existing transportation corridors.
87 Avenue	C2	**Advance**	Corridor is technically feasible. Reduced neighbourhood severance. Higher possible running speed. Possible system capacity conflicts.	Community and Neighbourhood severance. Whitemud Drive operational impacts. Possible traffic congestion and rerouting. Out of direction travel.	River valley disturbance. Limited redevelopment opportunities. Impacts to University Lands.
87 Avenue	C3	Do not advance	Corridor is technically feasible. Reduced neighbourhood severance. Higher possible running speed. Opportunity for integrations with future development.	Possible system capacity conflicts. Community and Neighbourhood severance. Possible conflicts with traffic on Whitemud Drive.	Out of direction travel. River valley disturbance. Limited redevelopment opportunities.
87 Avenue	C4	Do not advance	Reduced neighbourhood severance. Higher possible running speed. Possible system capacity conflicts.	Community and Neighbourhood severance. Possible conflicts with traffic on Whitemud Drive and Inner Ring Road.	Out of direction travel. River valley disturbance. Limited redevelopment opportunities.

Grouping	Corridor	Decision	Primary Conclusions	(Primary Conclusions continued)	(Primary Conclusions continued)
Other	D	Do not advance	Higher possible running speed. Reduced neighbourhood severance. Possible system capacity conflicts (NAIT line). Future Northwest system expansion conflicts	Conflicts on 170 Street with Inner Ring Road goods movement. Far north option does not serve central and south areas of West corridor service area. Service to low density market.	Long connection from existing line to desired service area. Service to auto oriented commercial along 170 Street and Mayfield Road.
Other	E	Do not advance	Strong public perception of feasibility as found in previous study. Possible conflicts with traffic on Inner Ring Road.	Conflict with Natural Areas Planning principles and River Valley bylaws.	Service to auto oriented commercial.
Other	F	Do not advance	Service to River Valley. Difficult grades to connect to existing infrastructure.	Service to auto oriented commercial. New river crossing required.	Misses multiple activity centers. Community and neighbourhood severance.
Other	G	Do not advance	Service to South West Edmonton. Out of study area. Possible service to Fort Edmonton.	Integration with existing transit system and infrastructure. No service to West Edmonton Mall. Feasibility of ravine and river crossing.	Possible community severance. Large environmental disturbance. Out of direction travel.

3.2.1 Overview of Key Issues

The project team reviewed and validated each corridor. Specific issues related to each corridor were questioned by the team for technical feasibility and merit to advance into Level 2 analysis. The sections below provide a summary of some of the key issues considered by the team in their screening analysis.

Multiple Travel Markets

The project team recognized this study area included two distinct travel markets; a northern market and a southern market. The northern market is focused around Stony Plain Road, 104 Avenue, and 107 Avenue as major commuter arteries into downtown. The southern market is focused on 87 Avenue and the Whitemud Freeway as major arteries serving the University of Alberta area and south Edmonton. The West Edmonton Mall is an anomaly in the study area, as a major attraction throughout Edmonton and the region.

The City's travel demand forecasting shows that commuters and transit patrons traveling from the western portion of Edmonton are primarily drawn to downtown for employment and recreation opportunities. However, the University of Alberta and surrounding development is also a close secondary destination for residents of the west end. Previous studies of LRT linking the neighbourhoods of west Edmonton identified the University of Alberta as the future connection point, with onward service through the existing LRT to downtown.

Both markets are important to the efficient functioning of Edmonton's transportation system and both require premium transit service. Concern was expressed by the project team that a major capital investment of LRT would only serve one corridor (and one travel market) through west Edmonton. It was clarified that while only one LRT line would be implemented for west Edmonton; all travel markets would be served by enhanced bus service. With this information as a basis, the project team advanced corridors along both travel markets to directly compare the benefits of each.

River Valley Impacts

Questions surfaced regarding impacts to the river valley associated with a new river valley crossing. Options associated with the 87 Avenue corridors include a new river crossing through the Laurier Heights and Parkview neighbourhoods passing through Hawralek Park and Buena Vista Park. This area contains both actively programmed park space and preservation lands. The project team debated the merits of providing direct access with a station in this area that would encourage use of river valley. Corridor options following the Quesnell Bridge and Fox Drive would also result in impacts to river valley lands. The team ultimately agreed that the impacts would be significant but could be mitigated and the corridor should be examined in more detail through the Level 2 screening process. While river valley impacts could be mitigated, the project team believed fully utilizing large areas of MacKinnon Ravine was a fatal flaw. Corridors following MacKinnon Ravine were removed from consideration due to the significant parkland impacts.

Compact Urban Form

The project team discussed the City's focus on encouraging development and redevelopment in urbanized areas with a goal of creating a more compact and sustainable city. Fixed guideway transit like LRT has been proven to have the ability to significantly impact land use, density, and development.

The City's guiding planning policies all focus on tools and incentives to achieve greater densities, activity centres, and access through various modes (pedestrian, auto, bicycle, transit):

- Transportation Master Plan
- Municipal Development Plan
- Draft Transit Oriented Development Guidelines

These plans were developed through the leadership of City Council and City residents to create the desired future vision for what Edmonton should be in the future. Implementation of the West LRT is viewed as a catalyst for development, supporting the overall goals of the City. The project team noted the location of the West LRT will impact long term land use and development. To varying degrees, the corridors advanced to Level 2 screening include multiple opportunities for densification and redevelopment around station locations. The team also recognized that encouraging greenfield development (construction on previously undeveloped land) does not work to achieve the sustainability goals of the City.

Trade-offs were apparent in maximizing the development potential of each corridor. Corridors passing through urbanized areas better support the redevelopment and sustainability goals of the City; however, their implementation may result in greater impacts to existing neighbourhoods and businesses. Corridors passing through lesser developed areas, low density neighbourhoods, and the river valley would result in less neighbourhood and business impacts, but would serve less population, impact sensitive river valley lands, and encourage less sustainable growth patterns. The project team advanced corridors with both attributes to compare and contrast these corridors through Level 2 screening.

Traffic

Concern was expressed regarding potential traffic impacts, specifically along Stony Plain Road, 104 Avenue, 149 Street, 156 Street, 163 Street, and 87 Avenue. The project team examined basic traffic operations to determine what impacts may result. The examination looked at major intersections along all arterial roads where LRT corridor options exist. In general, the analysis identified that introduction of the LRT would present significant traffic impacts at several intersections.

City direction on the West LRT study has been to minimize private property acquisitions where possible. At its core, this is a significant trade off for the City. Recognizing that it is not possible to develop LRT through communities without some impacts, the City has chosen to focus some roadway corridors as transit corridors. As traffic congestion continues to grow, transit will become critically important to moving the citizens of Edmonton. To minimize private property impacts, lanes of traffic, service roads, and/or parking lanes may be removed to fit the LRT, as LRT has the ability to carry a greater number of people than automobiles in a more efficient manner.

Traffic patterns along the major arterials would be directly impacted by the introduction of LRT. Primarily, full movements of traffic would be limited to signalized intersections. The capacity of some corridors could be maintained if on-street parking or service roads were removed. The project team determined that although there were impacts, they were not fatally flawed and would require more detailed assessment in Level 2 screening.

3.3 Level 1 – Summary of Results (Level 1)

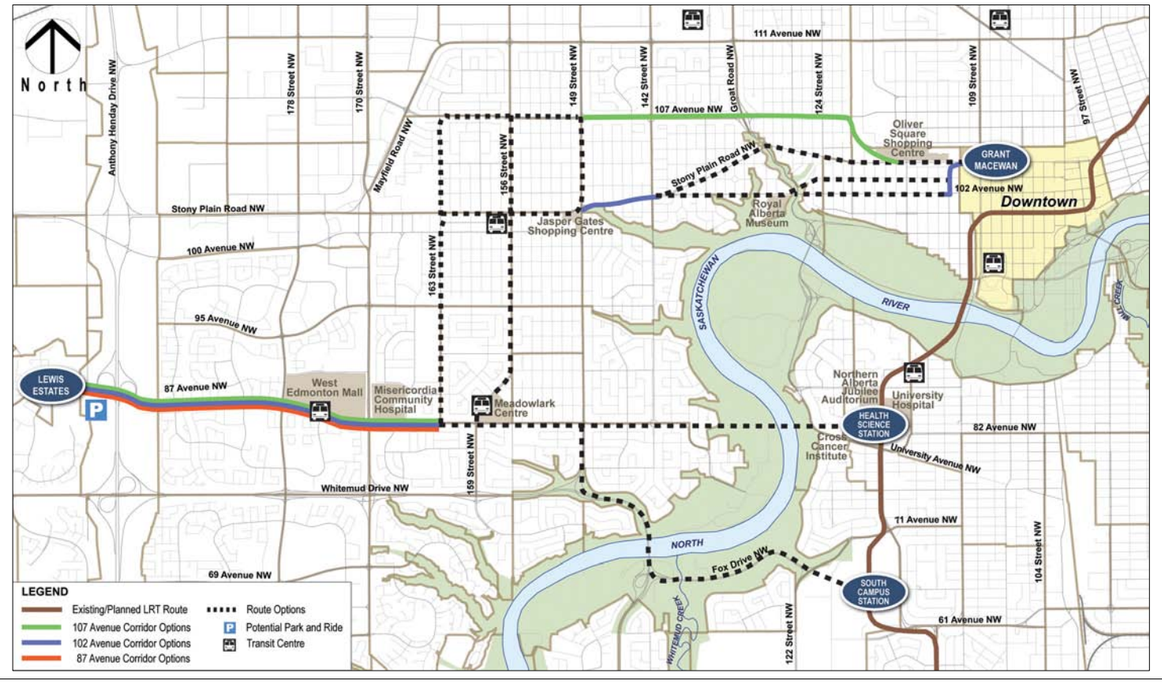
Level 1 analysis resulted in three major groupings of corridors being advanced to Level 2 analysis. Exhibit 3-1 graphically displays these corridor groupings and their various options. These corridors are also described below. All Level 2 alternatives would use 87 Avenue between Lewis Estates and 163 Street. At 163 Street, the three overall route options separate into distinct alternatives, each with sub-options.

The 107 Avenue and 102 Avenue corridors are collectively referred to as the "Northern Corridors"; they access downtown directly from the west. The 87 Avenue corridors are also refered to as the "Southern Corridors"; they access downtown from the existing South LRT line, south of the river.

107 Avenue Corridor

The corridor would follow 87 Avenue, turning north on 163 Street or 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.

EXHIBIT 3-1
Corridor Groupings



102 Avenue Corridor

There were 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.
- The corridor would follow 87 Avenue to either 163 Street or 156 Street, to Stony Plain Road, to 102 Avenue/103 Avenue couplet (eastbound trains on 102 Avenue/westbound trains on 103 Avenue).
- The corridor would follow 87 Avenue to either 163 Street or 156 Street, to Stony Plain Road, to 104 Avenue. (This alternative later became known as the Stony Plain Road alternative.)

87 Avenue Corridor

There were two possibilities for this corridor:

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

4 Preliminary Station Identification

Upon completion of the Level 1 screening, the project team identified potential station locations for each corridor. Station locations were developed and vetted through various City departments, as well as other stakeholders through the public consultation process. The station identification process involved examining existing and future activity centres, appropriate station spacing for urban LRT operations, land use/zoning, population densities, transit centres, and active or potential redevelopment areas. The team considered various types of stations including mixed use stations, residential neighbourhood stations, employment centres, park-n-rides, etc. The station types follow the recommendations outlined the City of Edmonton's draft Transit Oriented Development Guideline document. While LRT provides opportunities for densification and redevelopment in appropriate areas, not all LRT stations are anticipated to be TOD opportunities. Residential neighbourhood stations are proposed to serve established neighbourhoods that are not likely to experience significant land use changes.

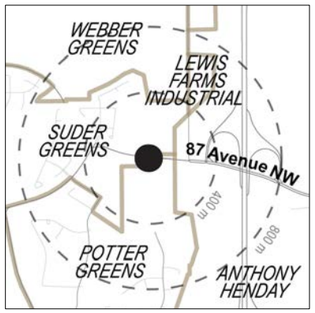
The station infrastructure itself is intended to be simple. As a low floor LRT system operating within an urban environment, stations would include a slightly raised platform with weather protection. Riders would board the LRT level with the platform, allowing efficient and fast boarding for all patrons.

The photos presented here demonstrate the low floor style of platform envisioned for this corridor. This basic station infrastructure allows stations to integrate into neighbourhoods and developed areas.

Table 4-1, on the following three pages, identifies each of the stations advanced for each corridor. The table depicts the station locations and provides text that describes many of the opportunities and challenges of each. The station locations presented represent the general location and not the exact site for station platforms. As the project progressed and more details were developed for the corridors, station locations evolved. Final station locations for the recommended corridor will be determined during the future planning phases of the project.

As an example, the Lewis Estates location, common to all West alternatives, is shown here:

Lewis Estates



+ Terminal station with planned park and ride
+ Access to Anthony Henday Drive and the regional highway network
+ Integration with future transit infrastructure
- Dominant low density nature of development
- Large proportion of nearby Provincial Transportation Utilities Corridor (TUC) Lands

- Cross streets for the station location are provided in bold text
- Names of adjacent neighbourhoods are provided in italics and all capitals
- Activity centres are shaded a greyish-brown, with the name in brown text
- A "+" sign indicates an opportunity
- A "-" sign indicates a challenge

TABLE 4-1
Station Location, Opportunities and Challenges

87 Ave / 182 St Station

+ Proximity to clustered higher density land uses
+ Service to potential high density redevelopment
+ Mixed land uses
- Dominant nearby low density land use

Meadowlark Station

+ Service to Meadowlark Centre
+ Integration with existing transit infrastructure
+ Mixed land uses
+ Service to potential high density redevelopment
- Dominant nearby low density land use

Fort Edmonton Park Station

+ Service to Fort Edmonton Park
- Physical severance from neighbourhood
- High proportion of nearby parklands

West Edmonton Mall Station

+ Service to West Edmonton Mall
+ Proximity to clustered higher density land uses
+ High Existing and Future Population and Employment Catchment
+ Mixed land uses
+ Existing transit infrastructure
- Dominant nearby low density land use

87 Ave / 149 St Station

+ Proximity to clustered higher density land uses
- Dominant nearby low density land use
- Duplication of service with Meadowlark Station

95 Ave / 163 St Station

+ Proximity to clustered higher density land uses
- Dominant nearby low density land use

Misericordia Station

+ Service to Misericordia Hospital
+ Service to potential high density redevelopment
+ Mixed land uses
- Duplication of service with West Edmonton Mall and Meadowlark Stations

87 Ave / 142 St Station

+ Service to traversed neighbourhood
+ Possible connection for service to Edmonton Valley Zoo
- Dominant nearby low density land use

95 Ave / 156 St Station

+ Proximity to clustered higher density land uses
- Dominant nearby low density land use

Stony Plain Rd / 163 St Station

+ Mixed land uses
+ Proximity to high density land uses
- Adjacent to Cemetery lands

Stony Plain Rd / 142 St Station

+ Proximity to clustered higher density land uses
+ Service to planned high density redevelopment
- Dominant nearby low density land use
- High proportion of nearby parklands

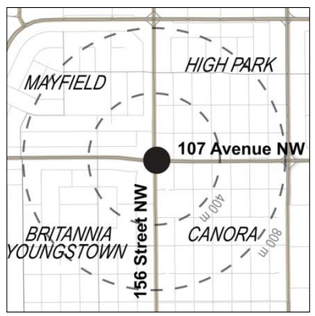
107 Ave / 124 St Station

+ Service to high density redevelopment
+ Proximity to high density land uses
+ Mixed land uses
- Cemetery lands nearby

Stony Plain Rd / 156 St Station

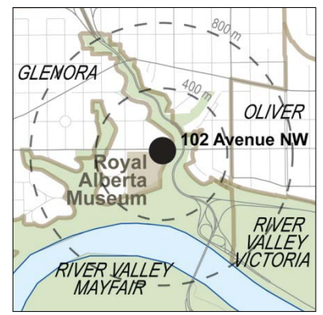
+ Integration with existing Transit Infrastructure
+ Mixed land uses
+ Proximity to high density land uses
+ Service to planned high density redevelopment
+ Service to post secondary campus
- Land acquisition required for station footprint

107 Ave / 156 St Station



+ Proximity to clustered higher density land uses
- Dominant nearby low density land use

Royal Alberta Museum Station



+ Service to Royal Alberta Museum
- High proportion of nearby parklands
- Dominant nearby low density land use

Stony Plain Rd / 149 St Station

+ Proximity to high density land uses
+ Mixed land uses
+ Service to potential high density redevelopment
- Dominant nearby low density land use

107 Ave / 142 St Station

+ Proximity to clustered higher density land uses
- Dominant nearby low density land use

102 Ave / 124 St Station

+ Service to Royal Alberta Museum
+ High density residential within catchment
+ Proximity to high density land uses
+ Mixed land uses
- High proportion of nearby parklands

102 Ave / 116 St Station

+ Service to high density redevelopment
+ Above average existing and future population and employment density
+ Proximity to high density land uses
+ Mixed land uses
- Constrained right of way for station allowance

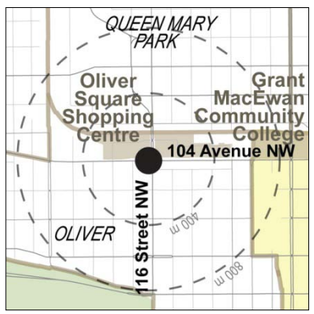
102 Ave / 112 St Station

+ Service to high density redevelopment
+ Above average existing and future population and employment density
+ Proximity to high density land uses
+ Mixed land uses
- Constrained right of way for station allowance

104 Ave / 112 St Station

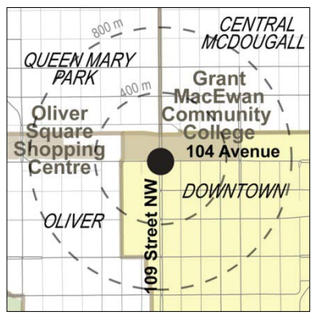
+ Above average existing and future population and employment density
+ Proximity to high density land uses
+ Mixed land uses

104 Ave / 116 St Station



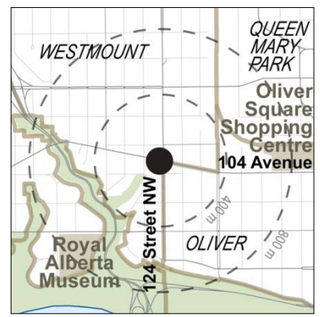
+ Service to high density redevelopment
+ Above average existing and future population and employment density
+ Proximity to high density land uses
+ Mixed land uses
- Cemetery lands nearby

Grant MacEwan Station



+ Service to major post secondary campus
+ Service to high density redevelopment
+ Above average existing and future population and employment density
+ Proximity to high density land uses
+ Mixed land uses

104 Ave / 124 St Station



+ High density residential within catchment
+Proximity to high density land uses
+ Mixed land uses
- High proportion of nearby park lands

5 Level 2 – Corridor Screening

5.1 Screening Criteria (Level 2)

Level 2 criteria were applied at the second stage of the screening process. While Level 1 aimed to remove corridors from consideration by primarily identifying fatal flaws though qualitative analysis, Level 2 criteria were applied to specifically differentiate between corridors and provide more quantitative information.

The project team developed the initial Level 2 criteria weightings for review and consideration by City Council. The process and criteria were presented to City Council for review and approval in December 2008. These criteria apply not only to 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. While City Council approved weightings for each category of criteria, they also recognized that all of the criteria are critically important. There was no single criterion that drove the final outcome. The recommended corridor was selected based on its performance related to a mix of all criteria. The criteria weightings reflect the strategic direction inherent in the City's policies. City policy direction is based on the direction City Council has been given by their constituents, the citizens of Edmonton.

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 people and goods; technical feasibility and cost; impacts to parks and the river valley; and impacts to the social and natural environment. These issue areas are reflected in the Purpose Statement's guiding principles and the City Council approved criteria used to evaluate each corridor option.

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

Land-use and promoting compact urban form was the highest-weighted criteria. This represents the critical influence of land use and transportation on the ultimate sustainability of the City. More efficient transit, in closer proximity to homes, businesses, and activity centres is necessary and demand will increase as the city continues to grow. These growth patterns minimize cost and improve efficiency in the provision of urban services, including transit. Additionally, more compact land use provides easier access (transit, walking, etc.) for citizens living in these neighbourhoods. Limiting urban sprawl by creating desirable urban neighbourhoods as an alternative creates environmental benefits through less consumptive land use patterns.

TABLE 5-1
Land Use Evaluation

OBJECTIVE	CRITERIA (METHOD OF MEASUREMENT)
Maintain important transit connections.	How many existing transit centers or park-n-ride locations are within 800 m of proposed stations?
Provide convenient transit service for riders.	What is the existing/future population density (population per ha) within 800 m of the station locations?
	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 corridor?
	Number of existing and future activity centers connected by the corridor?
	Is the corridor consistent with the TMP, MDP, and the City's strategic direction?
Identify areas ripe for redevelopment.	How many ha of vacant and/or underutilized properties are located within 800 m of stations?
Clarify if redevelopment opportunities are real opportunities or more speculative.	Do the City land use plans and bylaws support development or redevelopment of the activity centers along the corridor?
	Would proposed activity center development/redevelopment occur within a reasonable time frame (within 5 years)?

Movement of People and Goods (Weighting = 3)

These criteria represent the need to develop an LRT corridor that is frequent, efficient, and delivers riders to the locations where they live, work, and recreate. It also respects the need to accommodate goods movement adjacent to the LRT corridor.

TABLE 5-2
People and Goods Movement Evaluation

OBJECTIVE	CRITERIA (METHOD OF MEASUREMENT)
Enhance the efficiency and speed of transit.	What percentage of the corridor within existing public and railroad ROW?
Maximize the potential success of the corridor to serve the most transit riders.	What are the projected opening day boardings?
	What are the projected 2041 boardings?
	What is the projected travel time for the corridor (downtown to/from Lewis Estates)?
Identify significant traffic impacts.	What are the impacts to traffic?
Maximize connectivity and accessibility.	How does the corridor maximize transit integration?
	Does the corridor include existing and future bicycle and pedestrian facilities?
	Does the corridor allow for park-n-ride locations?

Feasibility and Constructability (Weighting = 2)

These criteria consider the overall complexity of designing and constructing an LRT corridor within the unique geography and neighbourhoods of west Edmonton. Cost is directly correlated to the complexity of construction and was a major consideration for all corridors reviewed.

TABLE 5-3
Feasibility and Constructability Evaluation

Objective	Criteria (Method of Measurement)
Minimize cost.	What is the estimated capital costs per kilometre (km) for the corridor?
	What is the estimated annual operating costs per kilometre (km) for the corridor?
	What is the estimated cost per rider for the corridor?
Minimize cost and improve transit efficiency.	To what extent is the corridor likely to impact the cost of supporting bus operations?
Minimize cost, complexity of construction, and private property acquisition.	Does the corridor require new grade separations?
	How many km does the corridor require of track at grade, on structure, on retained fill, and in tunnel?
	How many km of the corridor are inside tunnel and protected from weather or other interference?
Consider long term LRT needs. Minimize cost, complexity of construction, and private property acquisition.	How complex would it be to expand the system in the future?
Consider maintenance. Minimize cost, complexity of construction, and private property acquisition.	What is the distance to the existing or proposed Maintenance Facility?
	How many at grade crossings are located along the corridor?

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

These criteria reflect the importance of the various parks, river valley and ravine systems to the citizens of Edmonton. The river valley is a defining feature of Edmonton and was carefully considered through these criteria. The criteria not only examined impacts, but also identified the potential for increased access to active park spaces and the river valley.

TABLE 5-4
Parks, River Valley and Ravine Evaluation

Objective	Criteria (Method of Measurement)
Consider long term planning for parks and river valley.	Is the corridor consistent with City plans, bylaws, provincial and federal regulations addressing the river valley?
Maximize connectivity and accessibility to parks and river valley resources (where appropriate).	What are the benefits to parks, open space, and river valley accessibility (pedestrian, bike, vehicle, etc.)
	To what extent would impact be likely to undisturbed vs. programmed/disturbed river valley areas?
Minimize acquisition of parks and river valley property.	How many ha of public park lands would be acquired for the corridor?

Natural Environment (Weighting = 2)

The criteria related to the natural environment are correlated closely with the parks, river valley, and ravine system. However, these criteria examined the natural and biological aspects and potential impacts.

TABLE 5-5
Natural Environment Evaluation

Objective	Criteria (Method of Measurement)
Minimize disturbance of riparian habitat.	How many ha of valuable riparian habitat would be acquired for the corridor?
Minimize water quality issues, disturbance of water resources, and aquatic habitat.	What are the number of stream/river crossings are along the corridor?
Consider long term planning for natural areas.	Is the corridor consistent with City plans, bylaws, provincial and federal regulations addressing natural areas?
Minimize disturbance of natural areas.	What are the total ha of area disturbed during construction?

Social Environment (Weighting = 2)

The criteria related to social environment attempted to balance the potential benefits and impacts to neighbourhoods and residents.

TABLE 5-6
Social Environment Evaluation

Objective	Criteria (Method of Measurement)
Minimize the acquisition of private property.	How many hectares (ha) of private property (residential - single family/multifamily, commercial, and industrial) would be acquired for the corridor?
Provide benefits to neighbourhoods by maximizing connectivity and accessibility.	How many residences are located within 800 m of station sites that may benefit from increased property values?
Maximize potential employment benefits.	What are the potential temporary employment opportunities related to construction?
Minimize impacts to neighbourhoods.	Could neighbourhood impacts be avoided, minimized, or mitigated; or are they irresolvable?
Minimize noise and vibration impacts.	How many sensitive receptors are within 150 m of the corridor that may be impacted by noise or vibration impacts?
Minimize impacts to heritage sites.	How many known cultural resource/heritage sites are adjacent to the corridor?
Maximize connectivity and accessibility.	Does the corridor create physical barriers for neighbourhood residents?
	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?

5.2 Corridor Screening (Level 2)

Level 2 screening was conducted to provide a comparative analysis of the remaining four corridors and their design options. The goal for this activity was to identify the corridor that performed best under the more detailed Level 2 screening criteria.

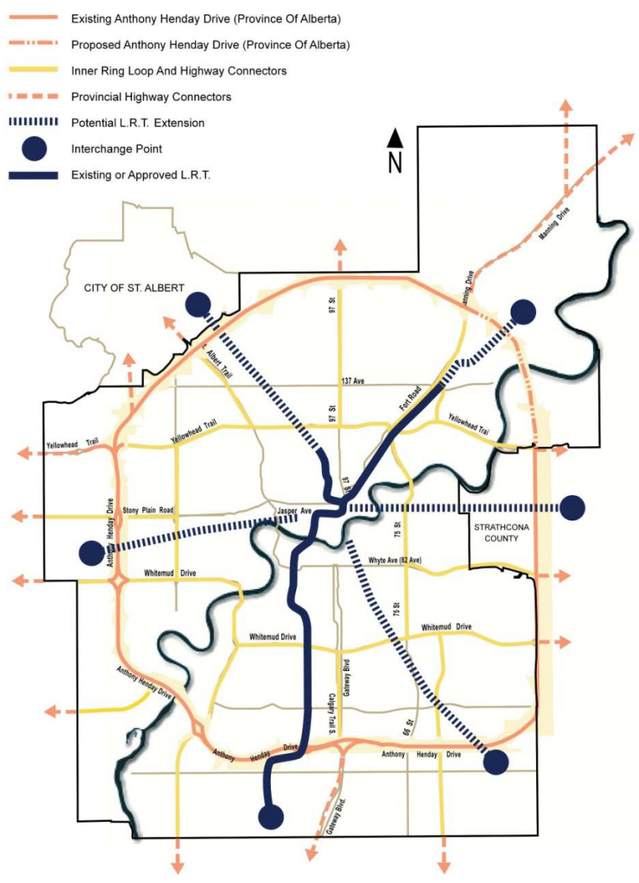
In preparation for Level 2 screening, the project team completed basic design layouts to better understand the potential impacts, benefits, and constraints for each corridor. The design included preliminary layouts of track locations, roadway reconstruction, bridge structures, earthwork required, and station platform layouts. The preliminary layouts identified the overall area of potential impact, referred to as the impact "footprint". While the design was completed at a basic level, the impact footprints provided the appropriate level of detail to compare the corridors against one another. The impact footprints were used in the analysis of several quantitative Level 2 criteria, such as property acquisition and parkland acquisition.

As described previously, the Level 2 screening was completed by the internal City project team as one piece of the technical analysis and overall decision making process. The screening informed the decision making process, based on criteria related to key technical and stakeholder issues. This screening alone was not the only influence on the selection of the recommended corridor. The recommended corridor was balanced 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 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 directly informed the West LRT study and ultimately the selection of the recommended corridor.

5.2.1 Influence of Final LRT Network Plan on West LRT Screening

Prior to completing the Level 2 screening, the City finalized the LRT Network Plan. The LRT Network Plan identifies LRT transit needs within the City and region when population approaches 3.2 million over the next century.

EXHIBIT 5-1
LRT Network Plan



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 in to the existing system should be developed with low-floor LRT vehicles.
- Central Area Circulation – An East-West LRT connection should be developed through the Strathcona area to provide greater overall operational flexibility and increase the carrying capacity of the network.

Implementing the recommended urban-style LRT system for the West LRT corridor would result in shorter stop spacing, enhancing opportunities to serve multiple activity centres and mature communities. The LRT Network Plan also recommended the West LRT corridor connect with the proposed Southeast LRT corridor.

Additional direction was proposed for both West and Southeast corridors to utilize low-floor LRT technology and not interline with the existing LRT system. The combination of the low-floor technology and the urban style offers the ability to reduce the scale of infrastructure and create a more condensed LRT footprint.

The LRT Network Plan identified the central area, including the downtown and University, as the most transit-supportive area of the City. This area is a high density activity zone for both population and employment. All of the LRT corridors serve the central area and interconnect there to provide multiple transfer and destination opportunities. The LRT Network Plan identified that new corridors not interlining with the existing system will operate in the downtown at the surface (street level), with convenient walking connections to the exiting underground LRT stations. Additionally, an East-West LRT connection through the Strathcona area will provide an improvement in overall operational flexibility and can also increase the carrying capacity of the network.

While the LRT Network Plan recommended low floor technology for the West LRT, the 87 Avenue high floor option linking to the existing system continued to advance. The project team believed there was merit in continuing to advance the corridor recommended by the 2006 West LRT study through Level 2 screening.

5.3 Screening Results (Level 2)

As the Level 2 corridors were developed to a basic engineering level, their designs were further refined to reflect engineering constraints and public comments received through the consultation process. The final corridors that were advanced to Level 2 screening were the 107 Avenue corridor, 102 Avenue/Stony Plain Road corridor, and the 87 Avenue corridor. They include new design options and refinements to enhance the performance of each corridor.

Level 2 screening, as described in Section 5.2, included quantitative and qualitative criteria to compare the corridors against one another. By advancing through Level 1 screening, LRT Network Plan considerations, and scrutiny by the internal and public city stakeholders, these corridors represented three viable options for the West LRT. The goal of Level 2 analysis was to draw out the subtle differences between the corridors. Level 2 screening assisted the internal city team in making an informed recommendation regarding the preferred corridor to City Council. City Council was the ultimate decision maker, taking into account the strategic direction and planning of the City, the technical analysis and public input.

The 107 Avenue corridor, 102 Avenue/ Stony Plain Road corridor, and the 87 Avenue corridor all included multiple design options (optional corridor choices). Each of these design options were considered on their own merits. Design options utilizing a north-south connection on 163 Street miss the opportunity to serve Meadowlark Mall, as well as the multi-family residential along portions of 156 Street. Therefore, all 163 Street design options were dropped from further consideration. The remaining design options were advanced through the Level 2 Screening process.

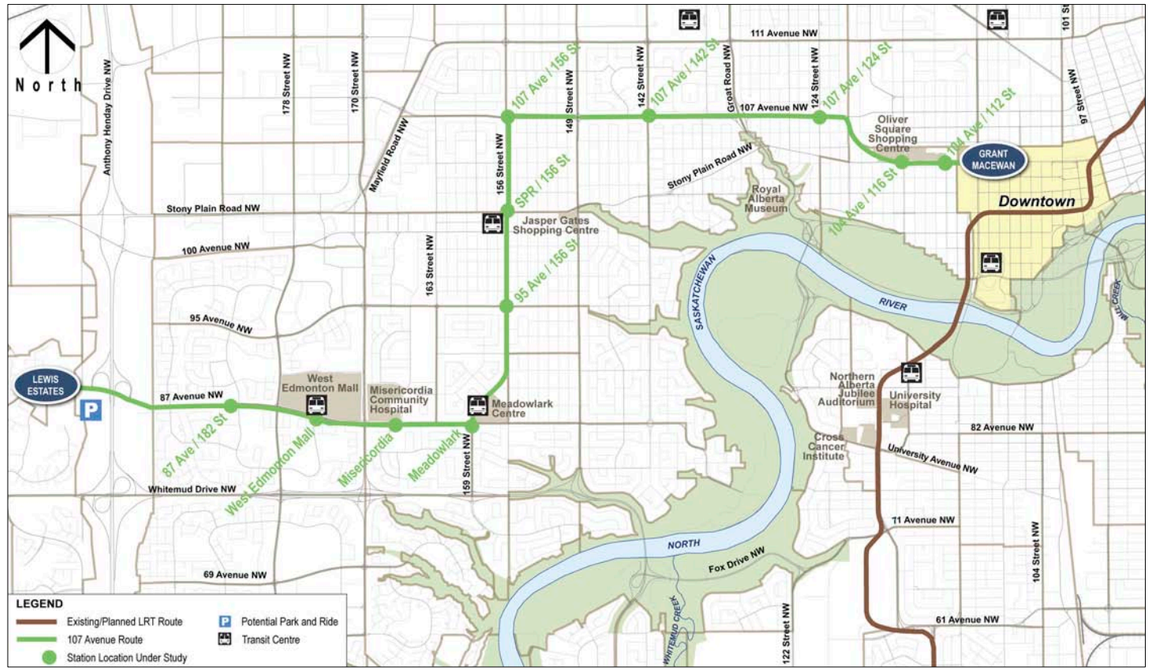
The following text describes the Level 2 corridors with design options. The corridors are described from west to east (Lewis Estates to downtown). Exhibits 5-2, 5-3 and 5-4 are graphic representations of each corridor and design option analyzed.

5.3.1 Level 2 Corridors

107 Avenue Corridor

This corridor begins at the Lewis Estates Transit Centre and travels east on 87 Avenue. Turning north on Meadowlark Road, the corridor passes behind Meadowlark Mall, then onto 156 Street. The corridor continues north on 156 Street and turns east on 107 Avenue. The corridor follows 107 Avenue, then turns south onto the multi-use trail (former railroad ROW/approximately 121 Street), passing through the Molson Brewery site. At 104 Avenue the corridor turns east until its terminus in front of Grant MacEwan University. The downtown connection is under analysis by a separate City study.

EXHIBIT 5-2
107 Avenue Corridor



102 Avenue / Stony Plain Road Corridor

Stony Plain Road Corridor (SPR) – This corridor begins at the Lewis Estates Transit Centre and travels east on 87 Avenue. Turning north on Meadowlark Road/156 Street, the corridor continues and turns east on Stony Plain Road. The corridor continues east on Stony Plain Road to 104 Avenue, linking to the downtown connection in front of Grant MacEwan University.

102 Avenue Corridor (102) – This corridor is similar to the SPR corridor except that it uses 102 Avenue to connect to downtown, rather than SPR/104 Avenue. Two options existed for this corridor:

- East of 142 Street, the corridor follows 102 Avenue. The corridor would turn north on 111 Street to access Grant MacEwan University, where it would link to the downtown connection.
- East of Groat Road, the corridor follows a couplet along 102/103 Avenues to Grant MacEwan. The couplet would operate with eastbound trains located on 102 Avenue and westbound trains would follow 103 Avenue.

87 Avenue Corridor

87 Avenue Corridor (87A) – This corridor begins at the Lewis Estates Transit Centre and travels east on 87 Avenue. The corridor would follow 87 Avenue straight east across the river valley to the University Health Sciences connection to the existing South LRT line at the Heath Sciences Station. This corridor requires a new river crossing. This corridor would connect directly with the existing LRT system into downtown Edmonton.

87 Avenue Corridor (87B) – This corridor begins at the Lewis Estates Transit Centre and travels east on 87 Avenue. The corridor would turn south on 149 Street to Whitemud Drive. The corridor would follow Whitemud Drive on a new bridge adjacent to Whitemud over the river. Once the corridor reaches the south side of the river it would follow Fox Drive to Belgravia Road to the existing South Campus LRT station. This corridor would connect directly with the existing LRT system into downtown Edmonton.

EXHIBIT 5-3
102 Avenue and Stony Plain Road Corridors

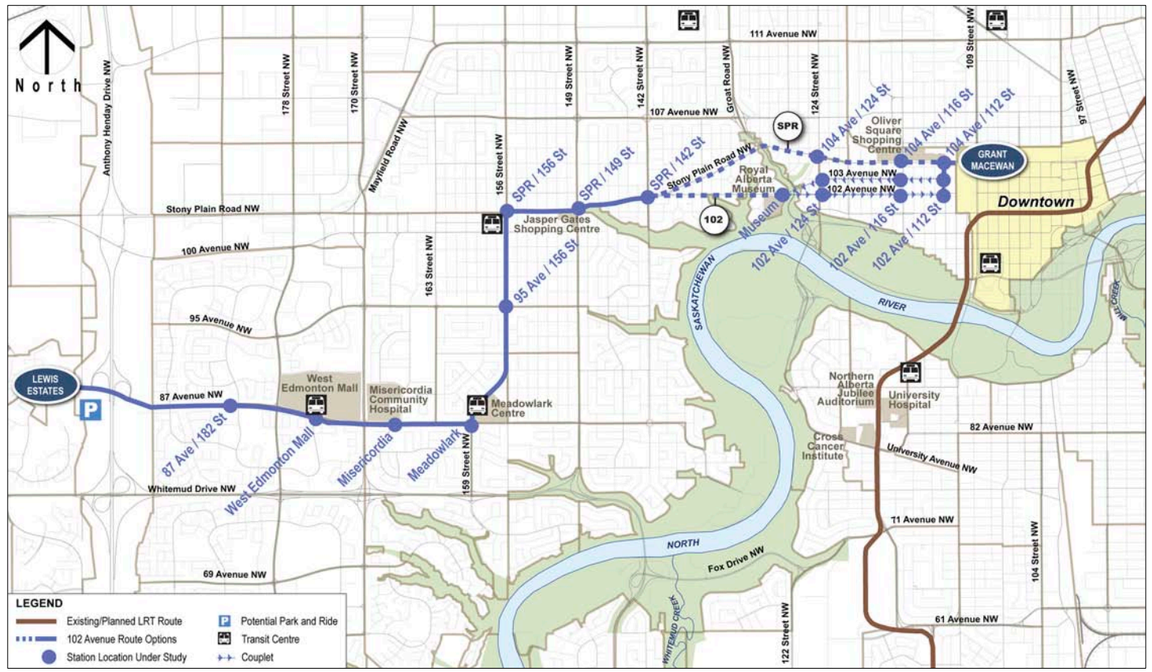
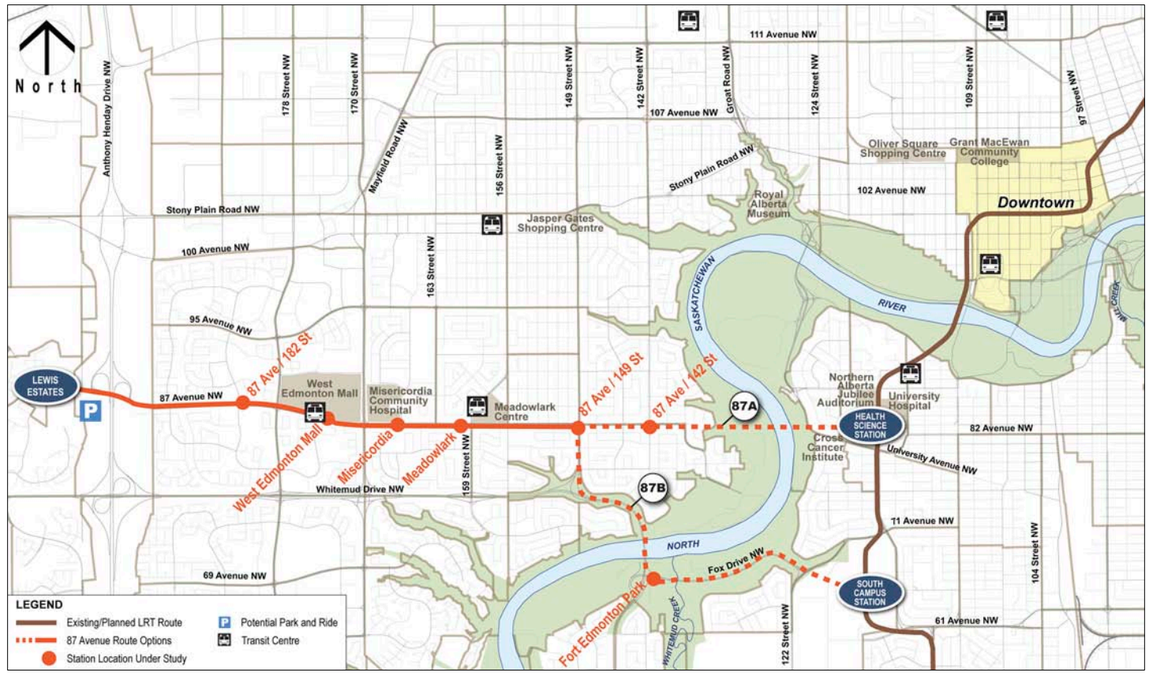


EXHIBIT 5-4
87 Avenue Corridors



Several discriminators between the corridors are bulleted below.

107 Avenue Corridor

- Does not directly serve neighbourhoods, but is located on the boundary between the residential areas north of 107 Avenue and those south of 107 Avenue
- Serves predominantly single-family residential areas along 107 Avenue
- Future opportunity for developing compact urban form but no supportive plans

Stony Plain Road Corridor

- Best aligns with goal of promoting compact urban form
- Reinforces current major transit patterns
- Presents an advantage over other corridors in serving redevelopment areas

102 Avenue Corridor

- Provides access to the Royal Alberta Museum and the River Valley in the vicinity of Groat Ravine
- Directly penetrates the high density residential neighbourhood of Oliver, immediately west of downtown

87 Avenue Corridors

- Links directly with the existing LRT system
- Provides significantly less opportunity to promote more compact urban form through redevelopment
- Has the fastest travel time

All Corridors

The corridors were generally equal in:

- Capital cost
- Potential ridership
- Potential property acquisitions
- Proximity to noise sensitive areas

5.3.2 Evaluation

Level 2 evaluation involved corridor data collection and analysis for the various criteria. Tables A-1 through A-6, in Appendix A display the raw data collected through the Level 2 screening process by each criteria category. For each criteria, a numerical score was assigned from 1 (least responsive) to 5 (most responsive) to represent the relative merits of each corridor with respect to the goals of the specific criteria. The criteria scores were then grouped such that the council endorsed weightings could be applied. Sections 5.3.3 through 5.3.8 provide a more detailed narrative regarding the findings for each criteria category.

Table 5-7 provides the Level 2 Screening scores for each corridor, by "Criteria Grouping". It also indicates the maximum score possible ("Max Score") for each Criteria Grouping. This Max Score is calculated by multiplying the best possible score, which is always 5, by the weighting for the Criteria Grouping. As an example, the maximum available score for Land Use is 5 x 26.7% = 1.3, as shown in Table 5 7. The sum of these scores from each Criteria Grouping represents the overall score for a specific corridor option.

TABLE 5-7
Final Level 2 Screening Scores

Criteria Grouping	Weight	Max Score	Corridors Evaluated				
			107	SPR	102	87A	87B
Land Use/Promoting Compact Urban Form	26.7%	1.3	1.2	1.2	1.1	0.6	0.4
Movement of People/Goods	20.0%	1.0	0.7	0.7	0.6	0.7	0.7
Feasibility/ Constructability	13.3%	0.7	0.4	0.3	0.4	0.4	0.4
Natural Environment	13.3%	0.7	0.5	0.5	0.4	0.5	0.3
Parks, River Valley, and Ravine System	13.3%	0.7	0.5	0.6	0.5	0.3	0.4
Social Environment	13.3%	0.7	0.5	0.5	0.5	0.5	0.4
Total Weighted Score	**100%**	**5.0**	**3.8**	**3.8**	**3.5**	**3.0**	**2.6**

The results of the Level 2 Screening demonstrate a clear advantage for the Northern Route options (107 Avenue, Stony Plain Road and 102 Avenue) over the Southern Route options (87 Avenue A and B). The incremental difference between the Northern Route options was much less definitive.

The Level 2 Screening results reflect the benefits and challenges associated with the two travel markets within the study area. The northern corridors generally travel along 107 Avenue and 102 Avenue/Stony Plain Road; while the southern corridor follows 87 Avenue. While the total ridership for the corridors is similar, the analysis of Level 2 screening demonstrated the northern corridors serve more diverse destinations with stronger off-peak ridership potential than the 87 Avenue corridor. The northern corridors were proposed as low floor, urban style LRT. The southern corridor was high floor technology, to retain the advantage of through-routing ("interlining") trains with the South corridor LRT service.

Consistency with the City's policy direction on land use became a discriminating feature in comparing the corridors. The northern corridors demonstrated stronger potential for consistency with the City's Strategic Vision: The Way Ahead, MDP and TMP. These opportunities were evident through the redevelopment potential north of 104 Ave and support of the West Jasper Place Revitalization Plan. The 87 Avenue corridor would result in little opportunity for densification and shaping of urban form.

The northern corridors performed effectively by providing direct service to Grant MacEwan University and downtown Edmonton. In contrast, while the 87 Avenue corridor to the south did serve fewer destinations, it provided more peak period ridership. The corridor did benefit by serving the university area as a key destination in the Edmonton region.

Finally, the 87 Avenue corridor imposes significant impacts as a result of the new river valley crossing. After fully debating these considerations the project team identified the northern corridors (107 Avenue and 102 Avenue/Stony Plain Road corridors) as the strongest performers and focused the Level 2 screening on these options.

5.3.3 Land Use/Promoting Compact Urban Form

The criteria associated with land use and promoting a more compact urban form shaped the outcome of the Level 2 screening for the West LRT. The Northern Routes all scored significantly higher than the 87 Avenue routes in this category. The Stony Plain Road corridor scored best under this category due to the significant potential for redevelopment and densification along the LRT corridor.

The project team's analysis of the land use criteria examined land use plans, aerial photography, growth and employment patterns, and future opportunities for TOD. This analysis concluded there are greater opportunities along Stony Plain Road and 104 Avenue that may benefit from LRT transit and the associated land use benefits. Directly serving neighbourhoods surrounding the stations is critical to the success of LRT.

87 Avenue Corridors

East of 156 Street, the 87 Avenue corridors provided few strong opportunities to significantly affect land use and the urban form in a positive manner. Smaller commercial centres exist along the corridor, but it is primarily larger arterial and freeway corridors and River Valley parkland. The proposed South Campus development provides some opportunity. The area is already served by the existing South Campus station, reducing the leverage on land use development offered by a new LRT investment.

107 Avenue Corridor

Under this criteria, 107 Avenue performs well as the majority of its corridor mirrors that of 102 Avenue. Where it does differ, it primarily provides LRT at the edges of fully developed predominantly single family neighbourhoods, which border both north and south sides of 107 Avenue. This provides adjacent rather than direct access to neighbourhoods, but does not have the benefit of directly encouraging densification of redevelopment.

The 107 Avenue corridor provides limited station access where it crosses the Stony Plain Road business district on 156 Street, but does not take full advantage of the benefits of LRT investment in the area. The visibility of LRT and the potential for multiple points of access to the LRT system are critical to maximizing ridership, as well as realizing the land use benefits associated with LRT. Given these impacts, the full land use benefits of LRT would likely not be realized along the 107 Avenue corridor.

Stony Plain Road and 102 Avenue Corridors

<u>Stony Plain Road Business District</u>

All of the Northern Corridors provide access to Stony Plain Road revitalization opportunities. However, they do so in different ways. The 102 Avenue and Stony Plan Road corridors directly serve the historic business district along Stony Plain Road. Residents and business owners in this area have been working towards revitalization and strengthening the existing businesses in the area. The area is adjacent to medium density residential uses. Like many of Edmonton's smaller historic commercial areas, the commercial market for Stony Plain Road businesses has been limited by the commercial footprint of West Edmonton Mall, Whyte Avenue, downtown, and various power centres throughout Edmonton. Stony Plain Road has developed smaller businesses, focused on specialty markets. This continued focus on specialty markets would likely bring the most commercial success to Stony Plain Road.

Customer access is a significant contributor to the success of any business area. Adding LRT would provide a significant level of access and visibility for businesses along the Stony Plain Road corridor. Rail transit provides the ability for significantly more people to travel the Stony Plain Road corridor than is possible today with automobiles and buses traveling in the same lanes. LRT opens area businesses to a much wider market of potential customers than would otherwise occur.

Throughout the Level 2 screening and the public consultation process, discussion developed regarding avoiding the primary business portion of Stony Plain Road and traveling along 100 Avenue (south of Stony Plain Road between 156 Street and 163 Street). The project team reviewed this option at length. From a land use and redevelopment perspective, the team felt the 100 Avenue option would significantly dilute the small commercial market and ancillary land use benefits of the LRT investment in this area. Given the limited market in Edmonton for commercial land uses (outside of West Edmonton Mall and a few other commercial districts), placing LRT on 100 Avenue was judged to have a high potential to drive commercial uses away from Stony Plain Road, refocusing them along 100 Avenue, which is primarily residential on in this area. The 100 Avenue option had significant potential to reverse the recent revitalization gains made by the Stony Plain Road businesses. The project team believed the best opportunity for success for the LRT and Stony Plain Road business district is to focus on enhancing the area's best commercial asset, the historic business district. Sustained focus on this area was judged as more likely to bring success over time. While not envisioned as an immediate transformation, a focus on the existing small, unique businesses that serve a niche market have the potential to develop and multiply over time. The West LRT was judged to offer a major catalyst for re- investment in this corridor.

<u>Access to Downtown</u>

While the 102 Avenue corridor directly serves the existing high density residential neighbourhood of Oliver, the neighbourhood is also quite mature and already highly transit supportive. Therefore, it has less potential to promote new compact urban development, as is the case along 104 Avenue and in the north edge of downtown. The higher density Oliver neighbourhood is still in close proximity to the Stony Plain Road corridor and very accessible.

Consequently, the Stony Plain Road/104 Avenue corridor is favoured over 102 Avenue corridor in this regard.

5.3.4 Movement of People/Goods

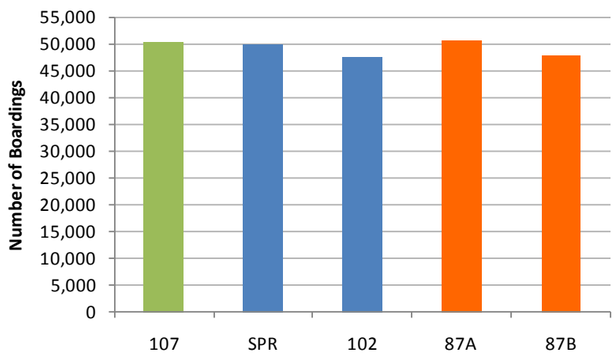
Movement of people and goods examined key criteria including potential ridership, travel time, and traffic impacts.

Ridership

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 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. Exhibit 5-5 presents forecast boardings in 2041 for each corridor option.

EXHIBIT 5-5
Graph of Potential 2041 Boardings



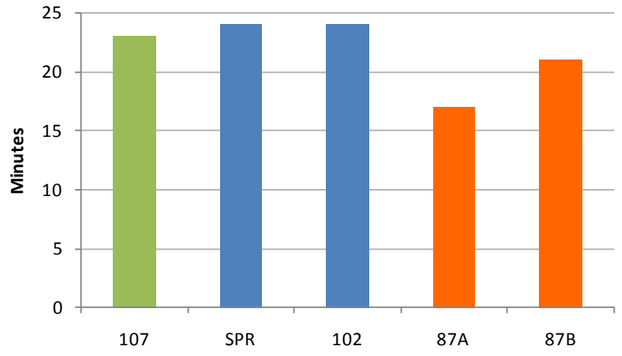
In general, ridership was not a discriminator among the corridors - all corridors scored positively. Ridership ranged from an estimate of 48,000 to 52,000 potential boardings each day, demonstrating the strong transit market in west Edmonton and confirming the need for this project.

Knowing that transit demand exists for connections from west Edmonton to both downtown and the university area, the City committed to providing premium transit service connections to the university area. This service will likely be "premium" transit including frequent bus service, separated (where possible) from other traffic. The City will continue to develop the premium transit concept as the most efficient and cost effective way to bridge the transit connection between west Edmonton and the university area.

Travel Time

Travel time was another criterion examined to compare the Level 2 corridors. The 87 Avenue corridors scored higher in this category due to their suburban and separated nature, with 87A having the fastest travel time. These corridors can reach higher travel speeds, compared to roadway speeds along the more urban 107 Avenue, Stony Plain Road and 102 Avenue corridors. The estimated travel time from Lewis Estates to downtown for each corridor is shown in Exhibit 5-6.

EXHIBIT 5-6
Graph of Travel Time



Traffic Impact

Traffic surfaced as a concern on all West LRT corridors. The project team completed an evaluation of potential impacts to traffic for each proposed corridor. With the basic level of engineering available on each corridor, the traffic analysis represented a high level examination of potential impacts. The project team utilized the City's available existing and projected future traffic volumes for major corridors.

All corridors would result in impacts to traffic, access changes, and adjustments to intersections. While traffic impacts would be significant, the majority of impacts can be minimized or mitigated through design. However, the proposed couplet for 102 Avenue and 103 Avenue would require adjusting these streets to one way traffic, in a single lane. On the Stony Plain Road and 102 Avenue corridor options, one lane of traffic in each direction would be removed from both Stony Plain Road and 156 Street. This would result in significant traffic constraints. However, traffic volumes through this area are anticipated to increase significantly without the LRT. Managing the corridor to maximize the number of people that can be moved through the corridor in a more efficient manner is essential to its long term viability. Of available transit options, LRT maximizes people movement through a constrained corridor, such as Stony Plain Road.

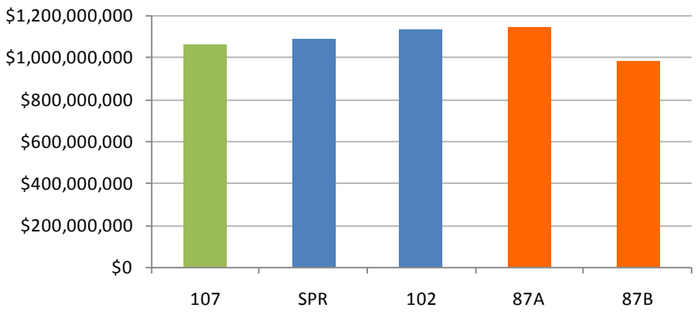
The street network in west Edmonton includes a robust grid of arterial and collector roadways. Due to this, the network can accommodate vehicular reduction on Stony Plain Road by accommodating this traffic on other routes, specifically, 107 Avenue, 111 Avenue, and 118 Avenue. Additionally, available capacity along 163 Street and 149 Street could accommodate traffic diverted from placing LRT on 156 Street. Access along roadways with LRT would be adjusted to limit full movements to only signalized intersections. New signal locations would be identified through later design stages to ensure that critical movements for residents and businesses are maintained.

5.3.5 Feasibility/Constructability

Feasibility and constructability included various criteria to compare the corridors on the basis of cost, complexity of construction, future expansion capabilities, and potential integrate with the existing transit network. Exhibit 5-7 indicates the capital cost of each corridor option.

The cost evaluation included civil construction for track, station platforms, electrification, drainage, improvements, tunnels, new bridge structures/grade separations, and all related roadway reconstruction. Costs were verified through comparisons with other similar systems in North America and the current LRT expansion to NAIT. The estimates reflect 2009 costs for comparison.

EXHIBIT 5-7
Graph of Capital Costs



All corridors have complex segments of construction. The 87 Avenue corridor requires a new bridge over the North Saskatchewan River requiring complex earthwork to tie into the existing LRT system. All corridors require reconstruction of city streets to accommodate the proposed LRT. Exhibit 5-7 shows that costs range from $981 million to $1.147 billion dollars. At this level cost is a critical consideration; however, these costs were sufficiently similar that cost did not surface as a key differentiator among corridors. In general, the 87B Avenue corridor has a slightly lower capital cost than the others.

5.3.6 Natural Environment

Construction of the 107 Avenue, Stony Plain Road and 102 Avenue corridors results in little disturbance to natural areas. These corridors are highly urbanized. By comparison, the 87 Avenue corridor would result in significant impacts to natural areas; it requires a new river crossing and tunnel approaches, causing impacts to riparian and natural areas.

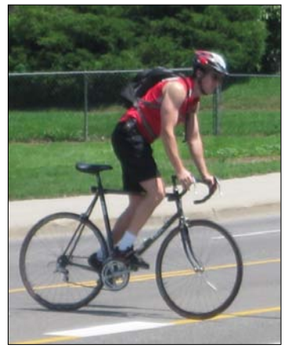
The river valley provides natural wildlife habitat and serves as a habitat corridor through the urbanized area of Edmonton. This is an important function; however the previous human disturbance to the area does lessen the quality of the habitat. Wildlife is highly adaptable and can be sustained in urban refuges, like the river valley area. It is likely that a crossing for either 87 Avenue corridor would not adversely impact wildlife in the river valley. Any new river crossings would be developed to span the highest value habitat at the river's edge and to maintain both human and wildlife passage through the river valley. By comparison, the 87 Avenue corridor ranks low under this criterion, as it would result in more disturbances of the riparian habitat.

5.3.7 Parks River Valley and Ravine System

The river valley is a defining feature and important amenity of the City of Edmonton. Through the project's technical analysis and throughout the public consultation process, the importance of the river valley to Edmonton residents was continuously expressed.

The river valley serves as a visual resource, a retreat from the urban environment of the surrounding neighbourhoods, as well as an active recreational amenity. Direct impacts by the corridors to river valley and ravine system property were analyzed for comparison. Additionally, impacts to actively programmed parks were also quantified. Impacts to parks actively used by citizens may be perceived by residents as a greater overall impact. The City of Edmonton Parks Branch was actively involved in the analysis comparing the final corridors.

Similar to the natural environment criteria, the Level 2 analysis also demonstrated an advantage for the 107 Avenue, Stony Plain Road and 102 Avenue corridors, as compared to the 87 Avenue corridors. The new structure proposed with the 87 Avenue options would attempt to span large areas of the river valley parkland. However, the impacts of a new bridge structure would be realized. The 87 Avenue option (87B) following Fox Drive would impact significant portions of the river valley land adjacent to Fox Drive.



5.3.8 Social Environment

The analysis of social environment included criteria focused on impacts to neighbourhoods (noise, neighbourhood barriers, heritage sites, etc) as well as the potential benefits provided due to better transit access.

All corridors would pass through established neighbourhoods. However, the Stony plain Road and 102 Avenue corridors directly serves more established neighbourhoods with new LRT service. The Stony Plain Road option does the best job of serving more densely developed areas, areas of TOD opportunity, and areas of potential redevelopment. The trade-off to providing better transit access in established communities is the potential of having additional impacts.

Developing LRT through mature urbanized areas typically results in greater impacts during construction than in less developed suburban areas. The low floor technology proposed would not create physical separation of neighbourhoods and is intended to fit into the local community. In more developed neighbourhoods, physical delineation of the LRT tracks from the roadway would primarily be through the use of raised curbs, with the track embedded directly into concrete or other materials. Low-floor trains, with urban style operations, travelling at lower speeds, with minimal barriers, provide the opportunity for a less intrusive LRT system.

The high-floor technology proposed for the 87 Avenue corridor options to tie into the existing LRT system is more intrusive to the community; however, this is mitigated by the wider ROW generally available in suburban areas and can be further mitigated through the use of urban style station design. One of the greatest social impacts from the 87 Avenue (A) corridor would be the portal just east of 87 Avenue and 142 Street.

In terms of ROW and potential property acquisition required to accommodate the LRT, both the 102 Avenue and 87 Avenue corridors scored similarly, however, the 107 Avenue corridor east of Groat Road is significantly constrained and would require multiple private property acquisitions to implement LRT.

5.3.9 Conclusion

Conceptually, a step-wise process, utilizing the technical results of the Level 2 Screening process, along with input from the public and the LRT Network Plan, led to the corridor recommendation. The 87 Avenue (or Southern) corridors scored considerably lower than the Northern routes during the Level 2 Screening process and were therefore dropped from consideration. This left three viable corridor options to further evaluate (107 Avenue, Stony Plain Road and 102 Avenue).

These three corridors share many common elements, including the portion of the alignment along 87 Avenue to Meadowlark Mall, and the portion along 156 Street to Stony Plain Road. As well, all three options provide a direct connection to downtown from West Edmonton. The 107 Avenue option, by intersecting with Stony Plain Road on its way to 107 Avenue rather than traversing Stony Plain Road, doesn't offer the same potential opportunities for influencing urban form and promoting transit oriented developments. For these reasons, and those described in Section 5.3.3 to 5.3.8, the 107 Avenue corridor was not recommended.

The Stony Plain Road and 102 Avenue options vary only in their respective approach to downtown, with the Stony Plain Road option remaining on Stony Plain Road/104 Avenue all the way to downtown, while the 102 Avenue option diverges from Stony Plain Road at 142 Street to follow 102 Avenue into downtown. As described in Section 5.3.3, the 104 Avenue approach to downtown offers more significant opportunities for influencing the urban form than the 102 Avenue approach. For this, and the other reasons identified in Section 5, the Stony Plain Road corridor was recommended by the study team as the preferred West LRT Corridor.

6 Public Involvement

Informed by the technical work completed in 2008 and 2009, and the information collected through the 2006 West LRT study, the City of Edmonton conducted a comprehensive public involvement process on this re-evaluation of the West LRT. Consistent with the City's commitment to an open consultation process, public input assisted in shaping the outcome of the project. The public involvement objectives included:

- Identify community/institution/business-specific issues that should be reflected in the evaluation of corridor options.
- Identify issues with respect to traffic and pedestrian impacts – within communities and with respect to the overall transportation network.
- Identify community, institutional, and/or business impacts that will affect the preliminary and detailed design.

The public involvement process included individual stakeholder meetings, on-line comment opportunities, workshops and information sessions. The first public workshops were held on June 3 and 4, 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. City Council then considered the corridor recommendation in a series of public hearings on November 9 and 13, 2009 and December 15, 2009. At the latter public hearing, City Council formally approved the recommended corridor and adopted it into the City of Edmonton Transportation Bylaw, facilitating advanced planning and design. Table 6-1 provides a basic timeline for the public involvement activities.

TABLE 6-1
Timeline of Public Consultation Activities

DATE	ACTIVITY
March/April 2009	Questionnaires and interviews
June 2009	Impacts workshop
May/June 2009	Online consultation
September 2009	Information mailing
September 2009	Open house
November/December 2009	Public hearings

Input provided by the public was a key consideration by the project team when developing their recommendation and by City Council in their ultimate decision on the recommended corridor. Over the course of the project, 27 public consultation events were conducted with approximately 1,177 participants. The key themes of input were captured at each meeting and were incorporated, to the extent possible. The key themes are described in Table 6-2.

TABLE 6-2
Key Themes of Public Input

KEY PUBLIC INVOLVEMENT THEME	PROJECT CONSIDERATION
Support for LRT as a means to encourage higher residential density and business revitalization	Provide development and redevelopment opportunities at areas surrounding stations. Work with local businesses and residents to develop mitigations and address construction impacts. Encourage various densities and strong pedestrian environments around stations locations. Implement city planning documents encouraging denser, more sustainable communities with direct transit access.
Recognize neighbourhood and business impacts (such as, property acquisition, noise, safety/security, parking)	Minimize private property acquisition through the use of city owned right-of-way (ROW) on existing transportation corridors. Address noise impacts through appropriate operations and maintenance of the LRT. Maximize system safety through environmental design principles and safety audit procedures. Provide appropriate access for all modes of transportation (bus, pedestrian, cyclists, autos).
Consider impact on overall traffic network (cars aren't going away)	Certain corridors will focus on transit as a primary connection, while others will focus on moving auto traffic most efficiently. Transit has the opportunity to move more people in a more efficient manner than autos and will be a priority. Traffic will be managed along the LRT corridor and at stations to minimize impact and flow of traffic.
Plan for cyclist, pedestrian integration	Encourage various densities and strong pedestrian environments around stations. Provide appropriate access for all modes of transportation (bus, pedestrian, cyclists, autos).
Property acquisition, business and property value impacts	Minimize property acquisition through the use of City ROW, as much as possible. Minimize the width of the LRT to avoid property acquisition. Mitigate business impacts related to construction and access.
Neighbourhood barriers	Limit physical barriers along the LRT to only those locations where they are necessary for safety purposes. Educate the public on the urban style of LRT. Provide strong transit access for neighbourhoods.
Traffic Impacts	Minimize traffic impacts (to the extent possible) by keeping LRT in its own ROW. Allow appropriate traffic turning movements that avoid conflicts with LRT.
Safety	Create station environments with strong neighbourhood environments, considering pedestrians, cyclists, LRT trains, and vehicles.
Costs	Fit LRT into existing City ROW to avoid cost of property acquisition. Minimize costly structures and keep LRT on the surface (where feasible). Minimize cost by selecting a direct corridor connecting the downtown and Lewis Estates.

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7 Identification of Recommended Corridor

Technical studies, the public input, and the LRT Network Plan all influenced City Council's decision to approve the Stony Plain Road corridor as the preferred West LRT corridor. This 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 Corridor

Exhibit 7-1 shows the West LRT recommended corridor with station locations approved by City Council. The recommended corridor follows 87 Avenue from the new Lewis Estates transit center, just west of Anthony Henday Drive, to Meadowlark Road. The existing ROW, 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, 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.

EXHIBIT 7-1
Recommended Corridor

At the intersection of 156 Street and Stony Plain Road, the recommended corridor 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 LRT corridor using surface downtown streets. The downtown connection is under separate study by the City.

Maps 1 to 6 in Appendix B provide the conceptual engineering layouts for the recommended corridor. As design of the recommended corridor is advanced, additional analysis and public consultation will be conducted to finalize the stations and design details.

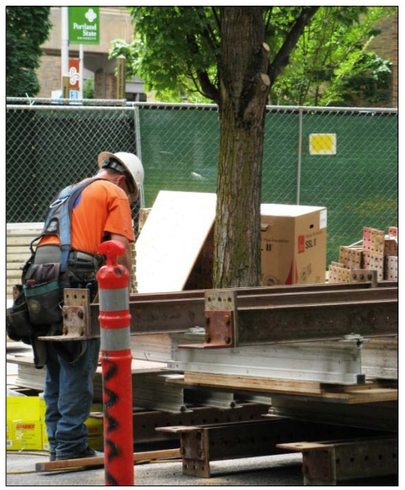
Throughout the process concern was expressed regarding the potential impacts of developing LRT along this densely developed corridor. Comments regarding parking, property acquisition, and business impacts related to construction impacts were commonly raised. Additional examination of issues and mitigations is ongoing through the design of the corridor. However, to ensure the project was viable, the project team completed additional examination of several key issues to inform City Council's deliberations on the corridor.

Property Acquisitions & Parking

Concern was expressed regarding the potential removal of parking along Stony Plain Road from 149 Street to 156 Street. In order to minimize potential private property acquisitions, the City elected to utilize the public road ROW. Through this segment of the recommended corridor, the project proposes removing the on street parking, as well as one lane of traffic in each direction on Stony Plain Road (between 149 St and 156 St). The project team examined multiple potential mitigations to address this loss of parking. One concept would involve adding pockets of parking on Stony Plain Road, where the ROW is sufficiently wide to fit the LRT and parking. Additionally, several areas of underutilized parking exist within the business district. These areas may be improved to more efficiently provide parking for all businesses in the area. Side street parking may be provided, with a change to angle parking to better utilize space and add more parking stalls. Back alleyways may be improved to provide better traffic circulation and rear parking, while also linking joint parking lots along the corridor. The City is committed to working with the businesses and residents in this area to develop the best solution possible.

Business Impacts During Construction

As design advances, more construction details will allow for the development of a construction mitigation plan. Working cooperatively with local businesses and residents, this plan will set expectations for methods to address impacts such as construction noise, working hours, access issues, signage, temporary parking, and business visibility. The LRT is intended to serve as a catalyst for areas like the Stony Plain Road business district. Maintaining existing businesses through construction is a priority to the long-term viability of business areas.



Summary

As with the other shortlisted corridors, the recommended corridor has both advantages and disadvantages. All final short-listed corridors accomplish the City's goals, but each 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 ROW rather than expanding outside public ROW, providing opportunity to carry 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 alternatives. In comparing the 107 Avenue and Stony Plain Road alternatives, some very pragmatic differences became clear.

When infrastructure conditions are addressed in 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 LRT and ancillary infrastructure improvements would greatly improve the likelihood 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 ROW and thus fewer traffic and access impacts. However, the neighbourhoods 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 accomplish 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 neighbourhoods
  - Neighbourhood-scale commercial nodes
- It provides direct connections to downtown (the West area's primary transit market), direct connections to Grant MacEwan campus downtown, and via downtown connections to the existing South LRT line connecting to the University of Alberta.
- It upgrades transit access to mid-corridor destinations and for 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.

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.

Appendix A - Raw Data by Category from Level 2 Screening Process

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Legend

- + positive performance against evaluation measure
- – negative performance against evaluation measure
- ~ not a discriminator

NOTE: This legend applies to all tables in this appendix.

TABLE A-1
Land Use/Promoting Compact Urban Form

		Northern Corridors			Southern Corridors	
Criteria	Notes	107 Avenue	Stony Plain Road	102 Avenue	87 Avenue (A)	87 Avenue (B)
How many existing transit centers or park-n-ride locations are within 800 m of proposed stations?	Total within 800 m	~ 3 existing Transit Centers. No existing park-n-ride.	~ 3 existing Transit Centers. No existing park-n-ride.	~ 3 existing Transit Centers. No existing park-n-ride.	~ 3 existing Transit Centers. No existing park-n-ride.	– 2 existing Transit Centers. No existing park-n-ride.
What is the existing/future population density (population per ha) within 800 m of the station locations?	Existing population per ha (800 m all stations)	+ 36 population/ha	+ 33 population/ha	+ 33 population/ha	~ 24 population/ha	– 18 population/ha
	2041 population per ha (800 m all stations)	+ 46 population/ha	+ 44 population/ha	+ 43 population/ha	~ 38 population/ha	~ 38 population/ha
What is the existing/future employment density (jobs per ha) within 800 m of the station locations?	Existing employment per ha (800 m all stations)	~ 29 jobs/ha	~ 29 jobs/ha	~ 28 jobs/ha	~ 23 jobs/ha	– 11 jobs/ha
	2041 employment per ha (800 m all stations)	~ 36 jobs/ha	~ 34 jobs/ha	~ 34 jobs/ha	~ 33 jobs/ha	– 18 jobs/ha
What is the housing density (housing units per ha) within 800 m of the station locations?	Existing housing units per ha (800 m all stations)	~ 13 units/ha	~ 12 units/ha	~ 12 units/ha	~ 9 units/ha	– 7 units/ha
What is the existing mix of zoning types within 800 m of stations?	Qualitative assessment	~ Mix of low to medium density residential with some commercially zoned areas.	+ Mix of low to medium density residential and mixed use, and institutionally zoned properties.	+ Mix of low to medium density residential and mixed use, and institutionally zoned properties.	~ Mix of low to medium density residential with some commercially zoned areas.	~ Mix of low to medium density residential with some commercially zoned areas.

Criteria	Notes	Northern Corridors			Southern Corridors	
		107 Avenue	Stony Plain Road	102 Avenue	87 Avenue (A)	87 Avenue (B)
What is the future mix of land use types within 800 m of stations?	Qualitative assessment	~ Land use trends anticipate further redevelopment along 104 Avenue and in the north edge of downtown. Mature neighbourhoods along 107 Avenue and 156 Street include a mix of low to medium density and are fully developed. Potential redevelopment sites exist at the corner of Stony Plain Road and 156 Street as well as between Meadowlark and Lewis Estates.	+ Corridor best serves potential denser development within neighbourhoods. Land use trends anticipate further downtown redevelopment along 104 Avenue and in the north edge of downtown. Mature neighbourhoods along 156 Street include a mix of low to medium density and are fully developed. Potential redevelopment sites exist along Stony Plain Road from 156 Street to 142 Street, as well as between Meadowlark and Lewis Estates.	~ Mature neighbourhoods along 156 Street and 102/103 Avenue include a mix of low to medium density and are fully developed. Potential redevelopment sites exist along Stony Plain Road from 156 Street to 142 Street, as well as between Meadowlark and Lewis Estates.	– Mature neighbourhoods along 87 Avenue include a mix of low to medium density and are fully developed. Potential redevelopment sites exist between Meadowlark and Lewis Estates.	– Mature neighbourhoods along 87 Avenue include a mix of low to medium density and are fully developed. Potential redevelopment sites exist at South Campus, as well as between Meadowlark and Lewis Estates.
How many large development proposals are formally submitted for approval or under construction along the corridor?	Number of proposals	+ 37 proposals	~ 25 proposals	~ 27 proposals	– N/A	– N/A
How many ha of vacant and/or underutilized properties are located within 800 m of stations.	Hectares	~ 179.7 ha (6.7% of area)	~ 151.1 ha (5.8% of area)	~ 158.6 ha (6.1% of area)	– 69.0 ha (4.9% of area)	– 68.4 ha (4.9% of area)
Total existing and future activity centers	Total activity centres	~ 63 centres	~ 62 centres	+ 70 centres	– 15 centres	– 18 centres
Do the City land use plans and bylaws support development or redevelopment of the activity centers along the corridor?	Qualitative assessment	~ The existing land use plans are out of date and do not consider LRT. They will require amendment or replacement to promote TOD at station locations.	~ The existing land use plans are out of date and do not consider LRT. They will require amendment or replacement to promote TOD at station locations.	~ The existing land use plans are out of date and do not consider LRT. They will require amendment or replacement to promote TOD at station locations.	~ The existing land use plans are out of date and do not consider LRT. They will require amendment or replacement to promote TOD at station locations.	~ The existing land use plans are out of date and do not consider LRT. They will require amendment or replacement to promote TOD at station locations.
Would proposed activity centers development/redevelopment occur within a reasonable time frame (within 5 years)?	Qualitative assessment	~ 26 likely w/in 5 years	~ 19 likely w/in 5 years	~ 21 likely w/in 5 years	– 0 likely w/in 5 years	– 0 likely w/in 5 years
Is the corridor consistent with the TMP, MDP, and the City's strategic direction?	Qualitative assessment	~ Generally consistent	+ Best meets the direction of City plans and strategic direction	+ Best meets the direction of City plans and strategic direction	– Not consistent	– Not consistent

TABLE A-2
Movement of People and Goods

		Northern Corridors			Southern Corridors	
Criteria	Notes	107 Avenue	Stony Plain Road	102 Avenue	87 Avenue (A)	87 Avenue (B)
What percentage of the corridor within existing public ROW?	Public ROW	~ 85% public ROW	+ 95% public ROW	+ 95% public ROW	~ 80% public ROW	− 70% public ROW
What are the projected opening day boardings?	2006 potential boardings	~ 36,300 boardings	~ 34,900 boardings	~ 34,300 boardings	~ 34,700 boardings	− 31,900 boardings
What are the projected 2041 boardings?	2041 potential boardings	~ 50,400 boardings	~ 49,900 boardings	~ 47,600 boardings	~ 50,700 boardings	~ 47,800 boardings
What is the projected travel time for the corridor (downtown to/from Mill Woods)?	Minutes	~ 23 minutes	~ 24 minutes	~ 24 minutes	+ 17 minutes	+ 21 minutes
What are the impacts to traffic?	Traffic assessment	~ Moderate Some driveways/ roads/ alleys accessing directly onto 156 St; minor character change; 107 Ave close to capacity in sections	− Significant Some driveways/ roads/ alleys accessing directly onto 156 St; minor character change; significant capacity impacts on 102/103 Ave or SPR with removal of lanes; potential major traffic infiltration into residential area	− Significant Some driveways/ roads/ alleys accessing directly onto 156 St; minor character change; significant capacity impacts on 102/103 Ave or SPR with removal of lanes; potential major traffic infiltration into residential area	+ Minor to moderate Several driveways/ roads/ alleys directly accessing 87 Ave; major character change for small portion; moderate impact to capacity in residential areas	+ Minor Small section character change on 87 Ave; relatively low impact to capacity in residential areas
How does the corridor maximize transit integration?	Qualitative assessment	~ Corridor includes multiple transit corridors, but requires some out of direction travel for West Edmonton to downtown.	+ Follows existing major transit corridor from Jasper Place to downtown.	+ Follows existing major transit corridor from Jasper Place to downtown.	+ Follows existing major transit corridor from Jasper Place to downtown.	+ Follows existing major transit corridor from Jasper Place to downtown.
Does the corridor include existing and future bicycle and pedestrian facilities?	Qualitative assessment	~ Corridor includes opportunities to connect to existing bikes and pedestrian trails along the route at future stations locations	~ Corridor includes opportunities to connect to existing bikes and pedestrian trails along the route at future stations locations	~ Corridor includes opportunities to connect to existing bikes and pedestrian trails along the route at future stations locations	~ Corridor includes opportunities to connect to existing bikes and pedestrian trails along the route at future stations locations	~ Corridor includes opportunities to connect to existing bikes and pedestrian trails along the route at future stations locations
Does the corridor allow for park-n-ride locations?	Qualitative assessment	~ Yes, at Lewis Estates.	~ Yes, at Lewis Estates.	~ Yes, at Lewis Estates.	~ Yes, at Lewis Estates.	~ Yes, at Lewis Estates.

TABLE A-3
Feasibility/Constructability

Criteria	Notes	Northern Corridors			Southern Corridors	
		107 Avenue	Stony Plain Road	102 Avenue	87 Avenue (A)	87 Avenue (B)
What is the estimated capital costs per kilometre (km) for the corridor?	Total estimated capital cost	+ $1,058,000,000	~ $1,088,000,000	~ $1,131,000,000	− $1,147,000,000	+ $981,500,000
	Estimated capital cost per km	+ $78,700,000	~ $85,600,000	~ $91,300,000	~ $119,400,000	~ $98,400,000
What is the estimated annual operating costs per kilometre (km) for the corridor?	Estimated annual O/M cost	~ $8,520,000	~ $7,440,000	~ $7,560,000	~ $5,760,000	~ $6,180,000
Does the corridor require new grade separations?	Number of new grade separations	~ 3 grade separations	~ 3 grade separations	~ 4 grade separations	~ 5 grade separations	~ 6 grade separations
To what extent is the corridor likely to impact the cost of supporting bus operations?	Number of bus routes potentially fully removed or partially removed due to LRT service	~ 3 routes	+ 7 routes	+ 7 routes	~ 3 routes	~ 3 routes
What is the estimated cost per rider for the corridor?	Estimated cost per rider	~ $5	~ $5	~ $6	~ $5	~ $4
What is the length of the corridor?	Total length (km)	− 14.2 km	~ 12.7 km	~ 12.6 km	+ 9.6 km	+ 10.3 km
How complex would it be to expand the system south and east in the future?	Extension west	~ High - End of line station located with easy extension further west.	~ High - End of line station located with easy extension further west.	~ High - End of line station located with easy extension further west.	~ High - End of line station located with easy extension further west.	~ High - End of line station located with easy extension further west.
	Extension northwest	~ Medium - Reasonable connection to the northwest along 170 Street or Groat Road.	~ Medium - Reasonable connection to the northwest along 170 Street or Groat Road.	~ Medium - Reasonable connection to the northwest along 170 Street or Groat Road.	− Low - Too far south to reasonably connect to the northwest.	− Low - Too far south to reasonably connect to the northwest.
If the corridor directly connects with the existing or future maintenance facility?	Qualitative assessment	~ New facility required.	~ New facility required.	~ New facility required.	~ New facility required.	~ New facility required.
How many at grade crossings are located along the corridor?	Total number of track at-grade crossings	~ 53 crossings	~ 65 crossings	~ 67 crossings	+ 27 crossings	+ 28 crossings

TABLE A-4
Natural Environment

		Northern Corridors			Southern Corridors	
Criteria	Notes	107 Avenue	Stony Plain Road	102 Avenue	87 Avenue (A)	87 Avenue (B)
How many ha of valuable riparian habitat would be acquired for the corridor?	Riparian habitat (ha)	~ <1 ha	~ <1 ha	~ <1 ha	– 1.3 ha	– 4.2 ha
What are the number of stream/river crossings along the corridor?	Crossings	~ 0 crossing	~ 1 stream crossing	~ 1 stream crossing	~ 1 river crossing	– 2 stream/river crossings
Is the corridor consistent with City plans, bylaws, provincial and federal regulations addressing natural areas?	Qualitative assessment	~ Yes, minimal natural areas impact	~ Yes, minimal natural areas impact	~ Yes, minimal natural areas impact	– No, potential for natural areas impact	– No, potential for natural areas impact
What are the total ha of area disturbed during construction?	Hectares (ha)	– 52 ha	~ 47 ha	~ 42 ha	~ 33 ha	+ 28 ha

TABLE A-5
Parks, River Valley, and Ravine System

		Northern Corridors			Southern Corridors	
Criteria	Notes	107 Avenue	Stony Plain Road	102 Avenue	87 Avenue (A)	87 Avenue (B)
Is the corridor consistent with City plans, bylaws, provincial and federal regulations addressing the river valley?	Qualitative assessment	~ Yes, no proximity to river valley.	~ Yes, given proper permitting, assessments and approvals are obtained.	~ Yes, given proper permitting, assessments and approvals are obtained.	~ Yes, given proper permitting, assessments and approvals are obtained.	– Highest impact – however option viable given proper permitting, assessments and approvals are obtained.
What are the benefits to parks, open space, and river valley accessibility (pedestrian, bike, vehicle, etc.)	Qualitative assessment	~ Benefit of increased access to Edmonton Grads Park	+ Benefit of increased access to McKinnon Ravine and parklands in Oliver; Potential impacts along Stony along 102 Avenue park space	+ Benefit of increased access to McKinnon Ravine and parklands in Oliver; Potential impacts along Stony along 102 Avenue park space	– Potential significant impact to Laurier Park and river valley lands due to new bridge, no station to provide access to river valley.	– Generally neutral, potential access to Fort Edmonton Park and Whitemud Equine Center balanced with impact to parkland adjacent to Fox Drive.
How many ha of public park lands would be acquired for the corridor?	Public park lands (ha)	~ 2.0 ha	~ 2.6 ha	~ 3.3 ha	~ 2.7 ha	– 4.2 ha
To what extent would impact be likely to undisturbed vs. programmed/disturbed river valley areas?	Qualitative assessment	~ No new river crossing.	~ No new river crossing.	~ No new river crossing.	– New river crossing: traverses conservation and preservation parklands.	– New river crossing: traverses possible extensive use parklands.

TABLE A-6
Social Environment

		Northern Corridors			Southern Corridors	
Criteria	Notes	107 Avenue	Stony Plain Road	102 Avenue	87 Avenue (A)	87 Avenue (B)
How many hectares (ha) of private property would be acquired for the corridor?	Total (ha)	− 3 ha	~ 2 ha	~ 1 ha	~ 1 ha	+ 0 ha
What are the potential temporary employment opportunities related to construction?	Temporary construction employment	~ 4,800	~ 5,800	~ 5,700	~ 5,900	~ 4,900
Could neighbourhood impacts be avoided, minimized, or mitigated; or are they irresolvable?	Qualitative assessment	+ Mitigated based on alignment choice	+ Mitigated based on alignment choice	− Impacts are reduced, but not resolved	~ Minimized	~ Minimized
Does the corridor create physical barriers for neighbourhood residents?	Qualitative assessment	+ Barriers will be reduced through station design options and Low Floor technology	+ Barriers will be reduced through station design options and Low Floor technology	+ Barriers will be reduced through station design options and Low Floor technology	− Barriers will be reduced through High Floor technology station design options. Tunnel portals may create barriers in neighbourhoods	~ Barriers will be reduced through High Floor technology station design options.
How many sensitive receptors are within 150 m of the corridor alignment that may be impacted by noise or vibration impacts?	Total	~ 1,400	~ 1,100	~ 1,100	~ 900	~ 700
How many known cultural resource/heritage sites are adjacent to the corridor?	Number of known heritage sites adjacent	~ 2	− 16	− 16	~ 1	~ 1
What is the post secondary student population within 800 m of proposed station sites?	Post secondary student population within 800 m	~ 4,300	~ 4,100	~ 4,100	~ 3,600	− 1,100
What is the high school student population within 800 m of proposed station sites?	High school student population within 800 m	~ 1,500	~ 1,400	~ 1,400	~ 1,100	− 790
What is the number of low income, no car, and senior households within 800 m of proposed station sites?	Seniors within 800 m	~ 23,400	~ 21,800	~ 22,100	− 8,700	− 6,500