

City of Lethbridge

# **Circulation Road Study Final Report**

**Prepared by:**

AECOM

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**Project Number:**

95975-03

**Date:**

July 2010

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This Statement of Qualifications and Limitations is attached to and forms part of the Report.

July 21, 2010

Darwin Juell, P.Eng.  
Transportation Manager, Infrastructure Services  
City of Lethbridge  
4th Floor, 910 – 4th Avenue South  
Lethbridge, Alberta T1J 0P6

Dear Mr. Juell:

**Project No: 95975-03**

**Regarding: City of Lethbridge Circulation Road Study – Final Report**

AECOM Canada Ltd. is pleased to provide the Circulation Road Study Final Report and Technical Reports for your records.

Sincerely,  
**AECOM Canada Ltd.**



Dan Bolger, P.Eng., MCIP  
Senior Project Manager  
dan.bolger@aecom.com

/svm  
Encl.

## Revision Log

Revision #	Revised By	Date	Issue / Revision Description
00	Dan Bolger	May 3, 2010	Circulation Road Study Final Report - DRAFT
01	Dan Bolger	July 21, 2010	Circulation Road Study – Final Report - FINAL

## AECOM Signatures

Report Prepared By:



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René Rosvold, P.Eng.  
Civil Engineer, Transportation

Report Reviewed By:



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Dan Bolger, P.Eng., MCIP  
Senior Project Manager

## Preface

# City Council Decisions on the River Crossing Review/Chinook Trail and the Circulation Road Study

Excerpt from the MINUTES of the **Regular Meeting** of the City Council held on Monday November 30, 2009.

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### 3.3 Darwin Juell, Transportation Manager, re River Crossing Review/Chinook Trail

650-A

#### *Mayor Tarleck assumed the Chair*

**Darwin Juell, Transportation Manager** advised that the purpose of the presentation is to provide City Council with the results of the River Crossing review.

Mr. Juell advised that in April 2008, City Council directed Administration to further evaluate the implications of the location of another river crossing. Since April 2008, the technical reports on nine evaluation criteria have been completed by the consultants, AECOM. A Community Advisory Committee held seven meetings to develop evaluation criteria and review the reports. A public house was held in May, 2009 to present the results of the reports and recommendations of the Consultant and the Community Advisory Committee. The following three options were reviewed:

- Chinook Trail Crossing
- Popson Park Crossing
- No additional Crossing

The Committee identified 44 criteria to be used in determining the preferred location of the future river crossing and then used an evaluation matrix to rank the importance of each criterion. He reported on the process used by the Community Advisory Committee to evaluate alternatives and outlined the conclusions arrived at by each of the four River Crossing Advisory Committee Discussion Groups. All the groups felt that a new planning model/change of driving behavior, if adopted, could delay if not prevent building a third river crossing.

Mr. Juell presented the evaluation of the Administration based on six different areas of criteria as a result of the findings of the Consultant and the Advisory Committee. He highlighted the advantages and disadvantages of all three of the options reviewed.

- He advised that the Administration has developed the following conclusions:
- A significant change in travel behaviour will be required to avoid construction of a new crossing
- If current travel patterns continue, major congestion issues will occur at University Drive, 6th Avenue S, and access points to Whoop-up Drive, unless a new crossing is constructed.
- Popson Park route does not help in relieving the congestion issues on 6th Avenue
- Popson Park route will require considerably higher investments than Chinook Trail
- The Popson Park route alignment is not compatible with the existing arterial road network in the southern part of West Lethbridge (connection with University Drive)
- Chinook Trail will attract more traffic than Popson Park route due to its convenient location, shorter trip times and trip distance
- Chinook Trail provides better opportunities for alternative transportation (i.e. pedestrians and cyclists)

The following resolution was presented:

**K.E. TRATCH:**

BE IT RESOLVED THAT the communication from Darwin Juell, Transportation Manager, recommending that Chinook Trail be reconfirmed as the future River Crossing location (protection of land) including a future Regional Trail Pathway Crossing, be received as information and filed

AND FURTHER BE IT RESOLVED THAT Chinook Trail continue to be reserved as the future crossing location, including a future pedestrian commuter corridor and dedicated pedestrian crossing

AND FURTHER BE IT RESOLVED THAT future planning investigate means to delay or eliminate the need for a future river crossing

AND FURTHER BE IT RESOLVED THAT Mr. Juell be thanked for his presentation and that the Community Advisory Committee be thanked for their input.

**PRESENTED IN TWO PARTS-----CARRIED**

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Excerpt from the MINUTES of the **Regular Meeting** of the City Council held on Monday January 11, 2010

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**3.2 Darwin Juell, Transportation Manager and Dan Bolger, AECOM, re Circulation Road Study**

**605-A  
650-A**

**Darwin Juell, Transportation Manager**, provided the background leading to the initiation of the Circulation Road Study. He advised that the objectives of the Circulation Road Study were to develop an Arterial Road Plan for the City with future population of 110,000 (estimated in 2030) and a long-term Arterial Road Plan, compatible with the provincial highway system including the Provincial North South Trade Corridor (NSTC) up to and beyond a future population of 150,000

Mr. Juell outlined the study process, data collection and existing traffic patterns. He provided information on City growth advising that the majority of the population growth is anticipated to be in West Lethbridge while the majority of employment growth is anticipated to be in South and North Lethbridge. He displayed maps identifying the potential long range urban growth areas and the resulting 110,000 population horizon travel patterns.

Mr. Juell advised that the proposed arterial road network serves the forecast travel demand. The recommended network improvements can be implemented in stages to serve growth and the two interchanges to the NSTC, one each at Scenic Drive and 43rd Street would provide the best long term options.

The following resolution was presented:

**B.A. LACEY:**

BE IT RESOLVED THAT the report from Darwin Juell, Transportation Manager, regarding the Circulation Road Study, be received as information and filed

AND FURTHER BE IT RESOLVED THAT the Circulation Road Study with a proposed access to the future Highway 3 at Scenic Drive North be approved

AND FURTHER BE IT RESOLVED THAT the Mayor's Office send a letter to the Province of Alberta (Alberta Transportation) requesting that this roadway connection be added to the proposed plan for the future Highway 3 designs

AND FURTHER BE IT RESOLVED THAT the protecting of the roadway corridors between the City and the future North-South Trade Corridor (Highway 3 and Highway 4) be referred to the Intermunicipal Development Plan Committee

AND FURTHER BE IT RESOLVED THAT Mr. Juell and Mr. Bolger be thanked for their presentation.

-----**CARRIED**

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# 1. Introduction

The City of Lethbridge, in partnership with Alberta Transportation (AT), retained AECOM Canada Ltd. to carry out the City of Lethbridge Circulation Road Study. The purpose of this study was to evaluate and establish the long term roadway needs of the City of Lethbridge for a potential new circulation road across the Oldman River, and also for connections from the city road network to the proposed provincial North-South Trade Corridor (NSTC). The goal of this study was to provide an enduring long range roadway plan for Lethbridge, which will guide the City in making future decisions on the provision of roadway infrastructure.

The study area and the routes for investigation are shown on **Figure 1**. The study assessed the roadway needs of the city for a future population horizon of 110,000.

## 1.1 Study Process

The Circulation Road Study was undertaken by AECOM under the direction of the City of Lethbridge. A technical review committee comprising representatives of the City of Lethbridge, Alberta Transportation, and County of Lethbridge provided technical guidance.

An enduring plan is based on sound technical work and effective consensus building. Consultation aimed at consensus building included both public consultation and Council presentation. Public consultation included meetings with a stakeholder group, public open houses, maintaining a study website, and numerous contacts with members of the public. Study findings were presented to City Council at various points of the study.



**Public Open House, May 2009**

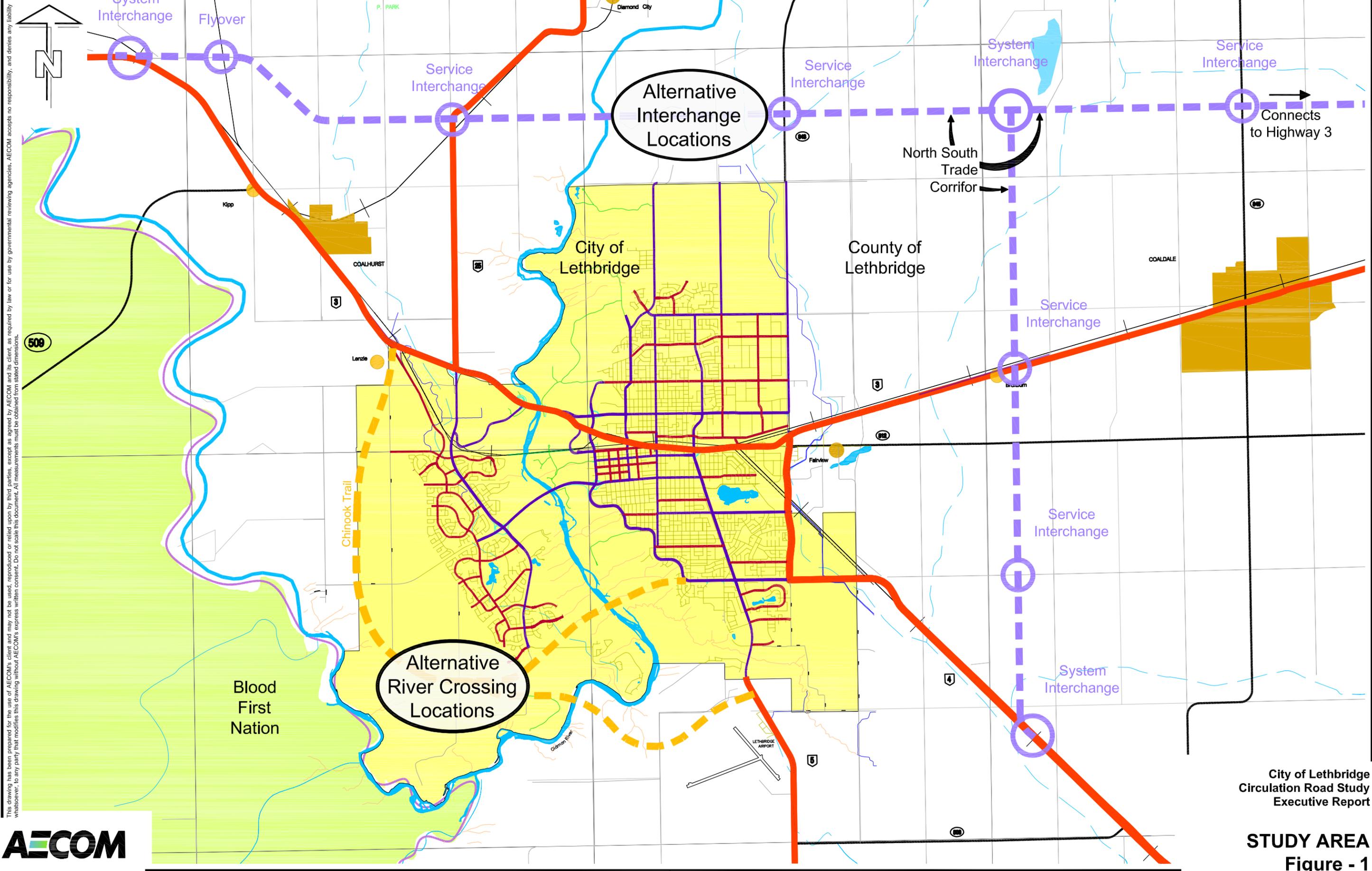
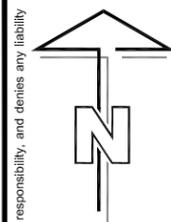
Development of the long range transportation plan requires an understanding of existing conditions and anticipated growth patterns. A comprehensive data collection program including traffic volumes, travel patterns, infrastructure, and intersection controls for the existing roadway network provided a strong base for determining existing travel and future patterns. Development of future travel patterns also took into consideration expected population and employment growth patterns. A key component of Circulation Road Study involved the development of a travel demand model to forecast morning and afternoon peak hour traffic demand. Model development included a base model to simulate existing conditions and future models to estimate travel demand at the 110,000 and 95,000 population horizons. The Transportation Model was used to develop and assess future roadway network alternatives including circulation road alternatives and interchange connection options on the NSTC.

Study recommendations incorporated technical findings and public consultation considerations.

The following sections of this final report summarize the work undertaken in the study and the study recommendations. More detailed information may be obtained in a number of technical reports prepared for the study and contained in a companion report – Circulation Road Study Technical Reports. The technical report titles are:

1. Public Consultation
  - March 18, 2008 Public Open House Summary
  - June 18, 2008 and June 19, 2008 Public Information Session Summary
  - May 27, 2009 Public Open House Summary
2. Data Collection Report
3. Model Software Selection Working Paper
4. Model Calibration Report
5. Traffic Impact Review
6. Noise Monitoring and Analysis
  - Scenic Drive South and 6th Avenue South Noise Monitoring Study
  - Scenic Dr South & 6th Ave South Noise Analysis Report
7. Community Assessment
8. Recreational Assessment of River Crossing Alternatives
9. An Environmental Overview of the Proposed Chinook Trail and Popson Park Crossings on the Oldman River
10. Historical Resources Overview
11. Geotechnical Overview of River Crossing Issues
12. Conceptual Bridge Planning Oldman River Crossing Corridors
13. Roadway Planning Overview and Construction Cost Estimates
14. Circulation Road Study – Chinook Trail Alignment Study

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**STUDY AREA**  
**Figure - 1**

## 2. Background

Lethbridge is located in southern Alberta at the crossroads of four major Alberta highways – Highway 3, Highway 4, Highway 5 and Highway 25 and is the last Alberta city before the United States border. Highway 3, Crowsnest Trail, is a major interprovincial route; and Highway 3 with Highway 4 form part of Alberta's north south trade corridor connecting to the USA and Mexico via the Canamex Trade Corridor. The Oldman River runs through the city separating West Lethbridge from North and South Lethbridge.

The 2006 City of Lethbridge population was 78,713. In 2006, approximately 30 percent of the population resided in North Lethbridge, 36 percent in South Lethbridge, and 34 percent in West Lethbridge. Employment in North, South, and West Lethbridge in 2006 was approximately 34 percent, 55 percent, and 8 percent, respectively.

### 2.1 Previously Approved Plans

In addition to the existing built form of the city, there are a variety of city-wide and local plans approved by City Council that provide guidance to this study.

Most relevant are:

#### City of Lethbridge, Transportation Master Plan for Roadways, June 2004

The Transportation Master Plan for roadways notes that “of particular importance to the city is the identification of the location and timing of a third river crossing and associated ring road: and recommends that a study be undertaken to identify the right-of-way for a third river crossing.

#### City of Lethbridge Transportation System Bylaw, No. 5281, July 26, 2004

The Transportation System Bylaw established a roadway system for the City of Lethbridge consisting of the map shown in **Figure 2**.

#### City of Lethbridge Municipal Development Plan, Bylaw 5320, May 16, 2005

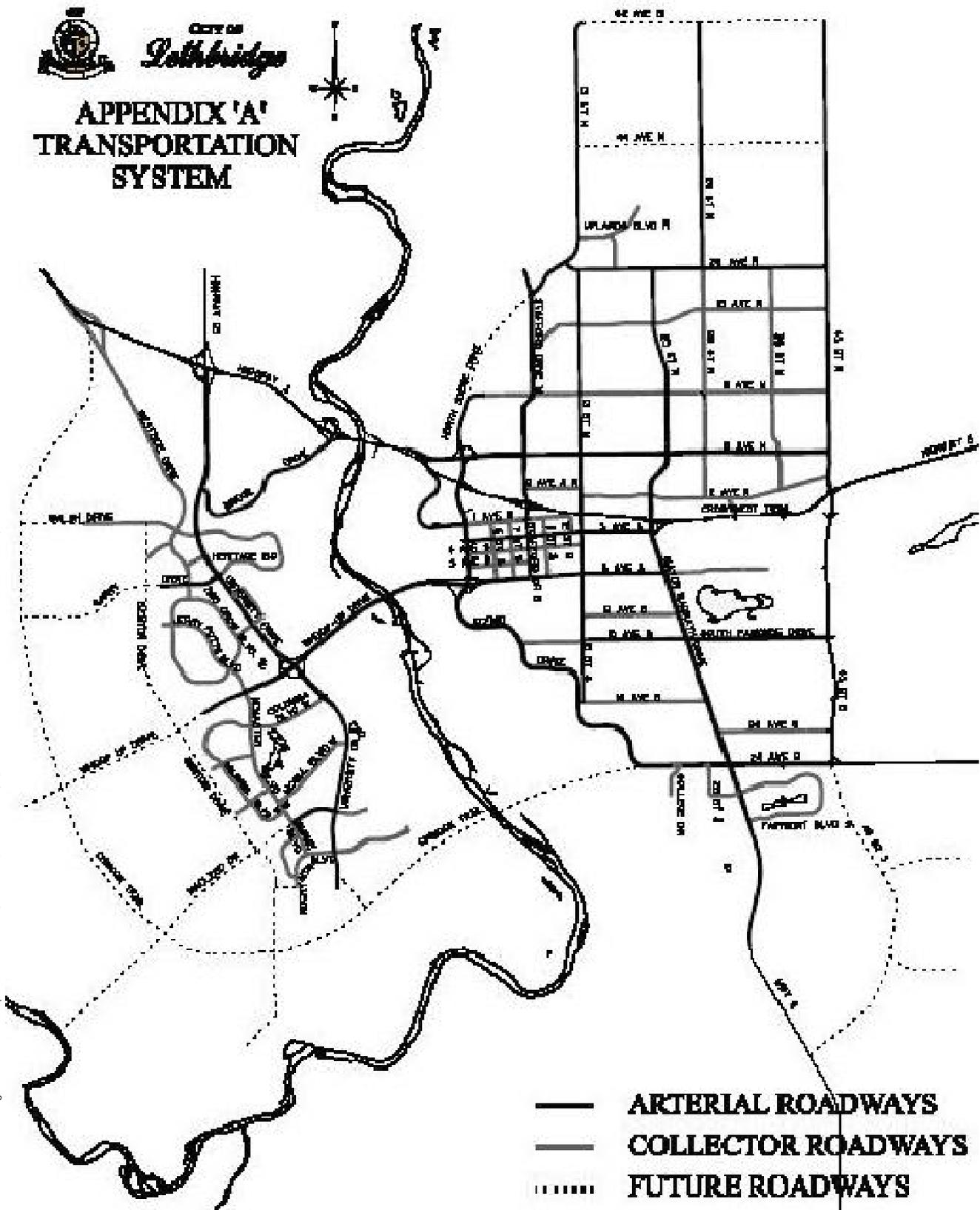
The Municipal Plan is a long-range land-use plan that is used to guide that City's future growth. The Municipal Development Plan anticipates that growth in west Lethbridge will require construction of a third bridge across the Oldman River as shown on **Figure 3**.

Also, the Province of Alberta has determined an alignment for the NSTC around Lethbridge. The alignment was established by the Highways 3 & 4, Lethbridge and Area NHS & NSTC, Functional Planning Study, Feb 2006, by Stantec Consulting Ltd., and is shown on **Figure 4**.

A number of area structure plans and urbanization plans have also been taken into consideration in this study. The documents reviewed include:

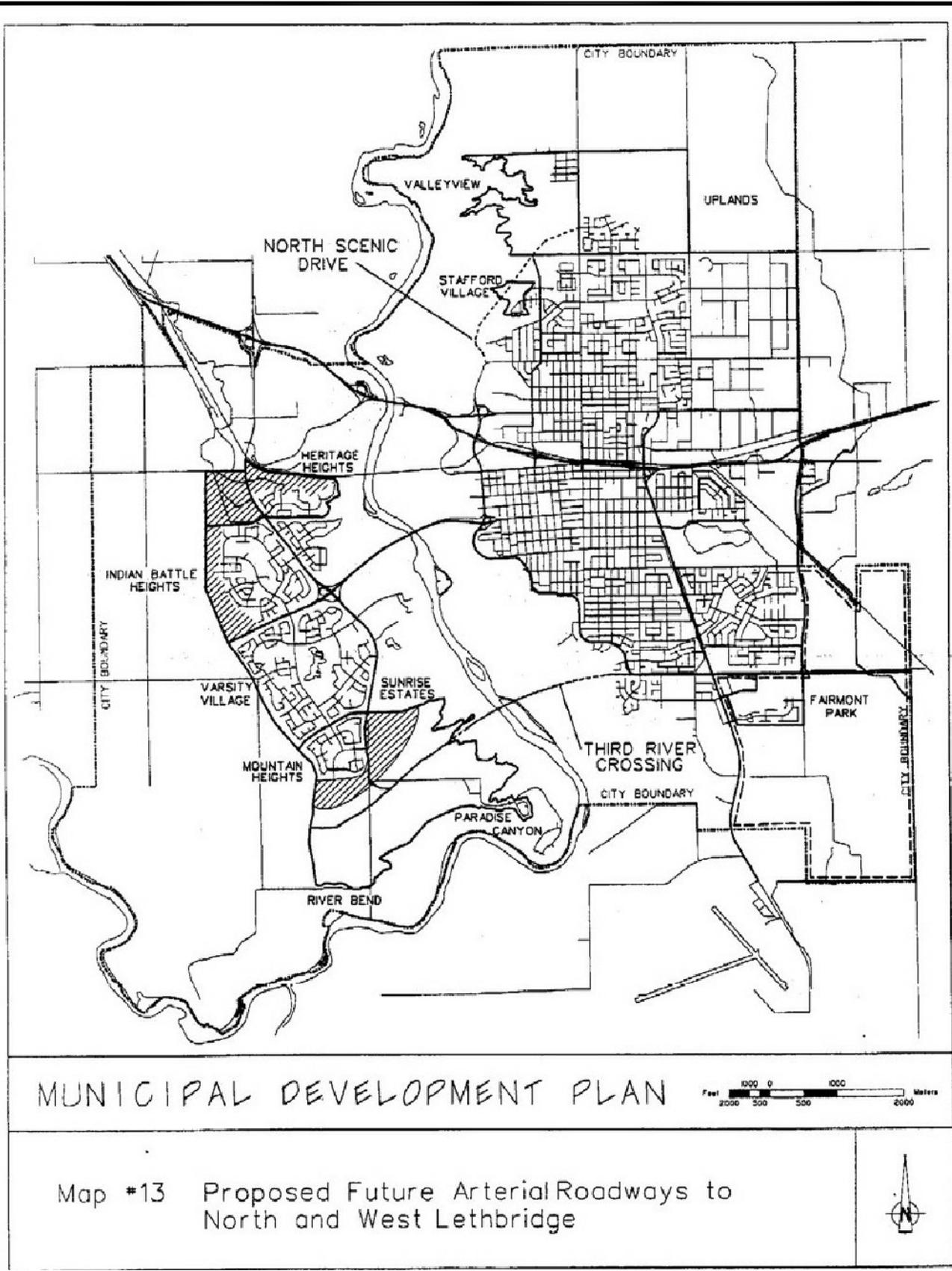
- Mountain Heights, Riverstone, Riverbend ASP, August 2009, amended in July 2003
- West Highlands ASP, October 2004
- West Lethbridge Phase II ASP, March 2005
- Inter Municipal Development Plan August 2004
- Municipal Development Plan 2007
- West Lethbridge and Southeast Lethbridge Urbanization Plans

**CITY OF Lethbridge**  
**APPENDIX 'A'**  
**TRANSPORTATION SYSTEM**



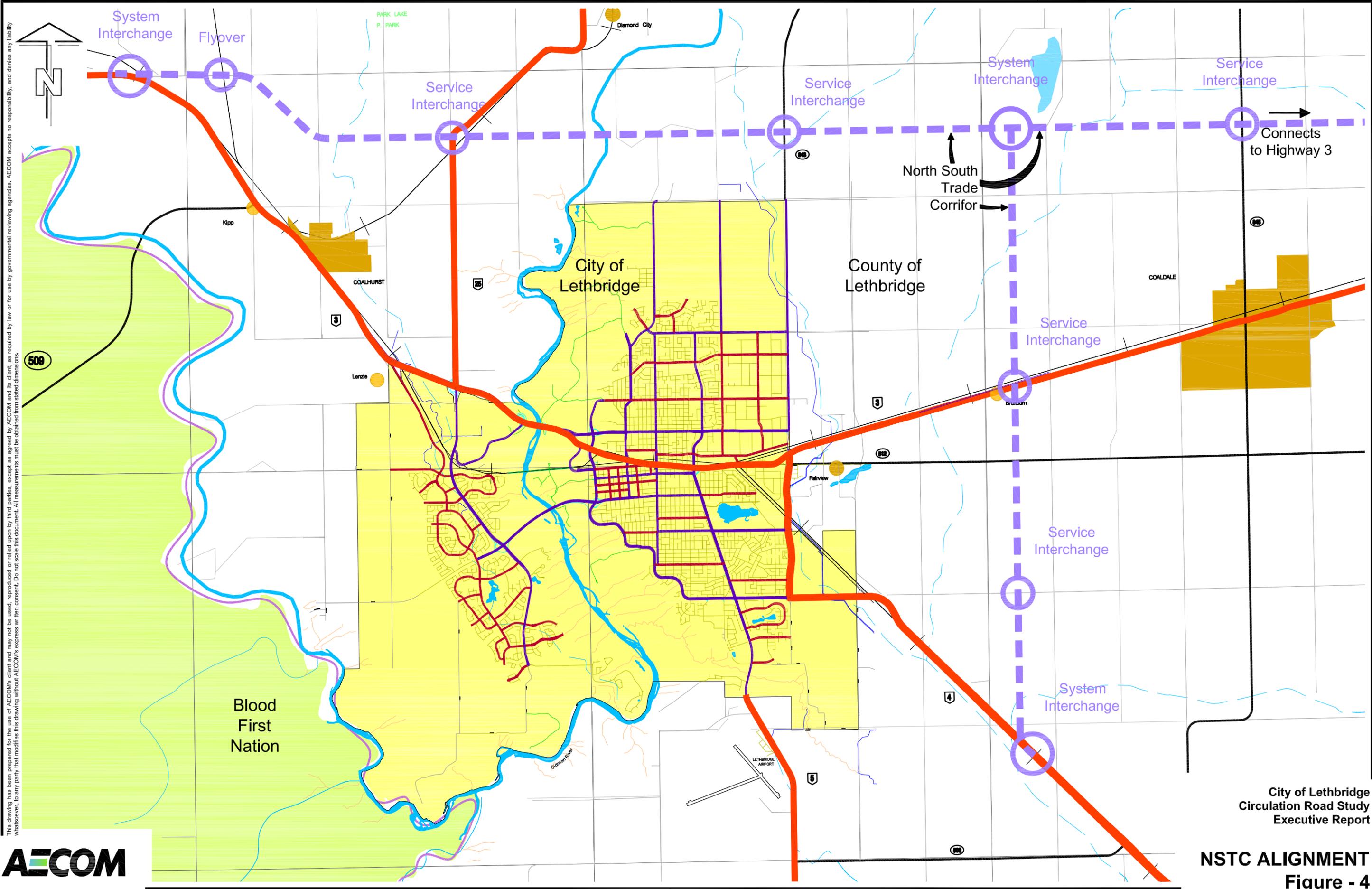
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**NSTC ALIGNMENT**  
Figure - 4

### 3. Travel Demand Model/Data Collection

The Travel Demand Model developed for the City of Lethbridge consists of trip generation and distribution sub-models. The software selected was emme2/emme3, which has all the model development, analysis, and graphic/text output features that the City will need for many years. The model included parts of the County of Lethbridge adjacent to the city.

The model was calibrated to traffic data collected in 2006, as well as land use data from census and planning sources. Complete details of the model development and calibration were provided to the City of Lethbridge.

#### 3.1 Traffic Data Collection

To ensure comprehensive data for the entire city, which also included the effects of University and College based trips, a large scale multifaceted traffic data collection program was developed. The traffic data collection program included methods to collect both traffic volume and travel pattern information. Traffic volume data was collected using a combination of manual turning movement and automatic counts placed at strategic locations in and surrounding the City of Lethbridge. Travel pattern information was collected through surveys. Three different surveys were completed, an external roadside survey, a household telephone survey, and a survey of students at the University of Lethbridge. All data was collected during the months of September, October, and November 2006 and was completed Monday through Thursday, and in a few cases included the morning peak on Fridays. The combination of traffic volume counts and individual surveys provided comprehensive information on travel patterns of Lethbridge residents, University students liming in Lethbridge part time or outside of Lethbridge, and non-Lethbridge residents travelling to and from the city. In summary, 130 traffic counts, 1800 roadside surveys, 1700 telephone interviews, and 1300 University of Lethbridge student interviews were completed; the data collection locations are shown in **Figure 5**.



**Data Collection September 2006**

#### 3.2 Road Network

The model road network includes all major roadways in the road system. The variables used to replicate a road system in the model include the number of lanes on the link, and volume delay functions.

Roadway links are used to represent the segments of the road system. A separate link is required for each direction of traffic flow on the link. Volume delay functions are mathematical equations used to represent traffic flow conditions as a function of speed and link capacity.

### 3.3 Land Use Information

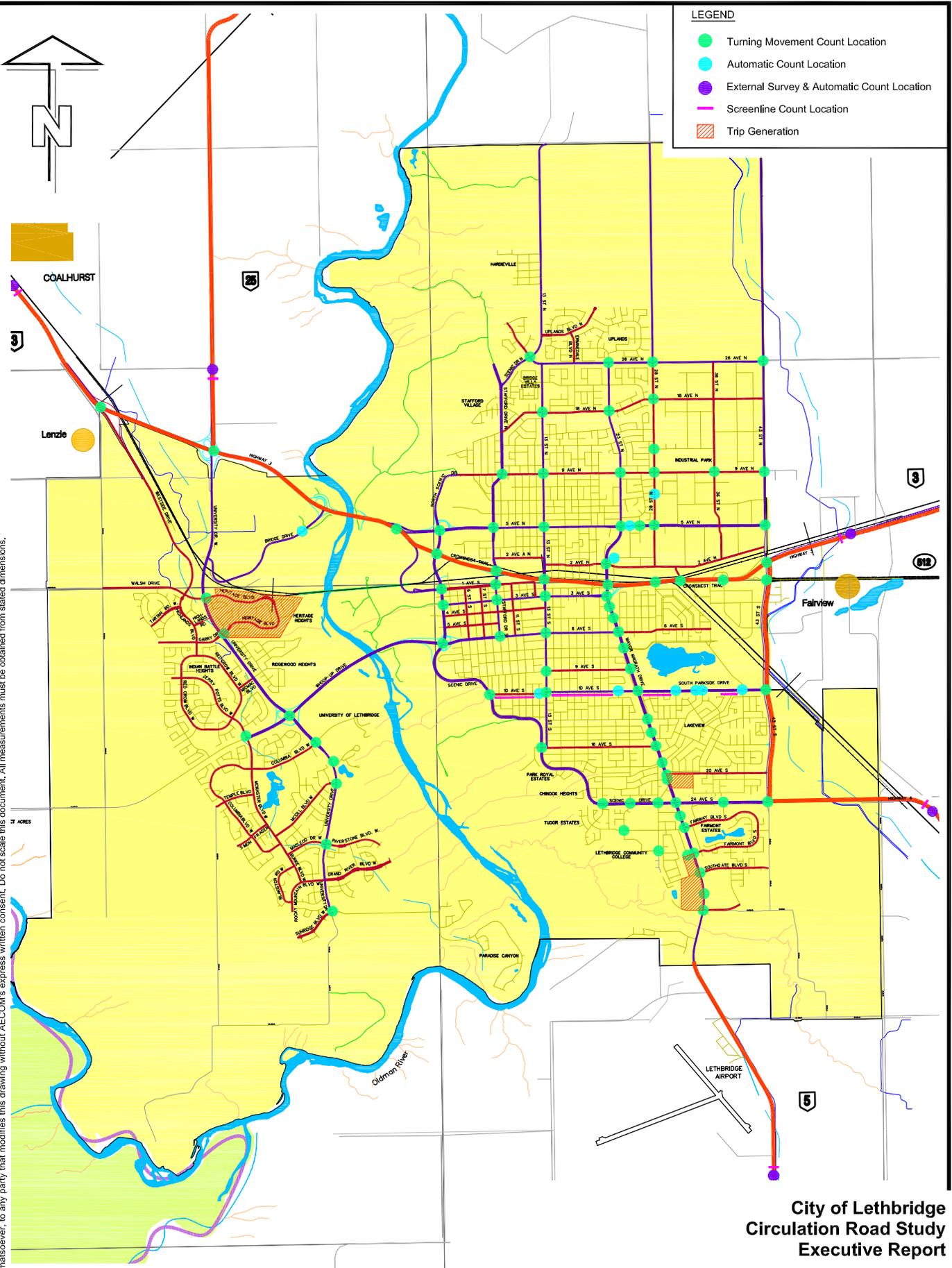
Land use information was gathered to develop estimates of population (dwelling) and employment locational distribution. The study area was divided into 220 zones (197 urban, 16 rural, and 7 external) and estimates of population dwelling and employment were developed from the 2006 Civic Census, 2001 Statistics Canada census information, as well as the roadside and telephone surveys, and planning/business data on zoning and employment, including school enrolment.

### 3.4 Traffic Flow

The model is designed to simulate average weekday personal vehicle traffic during the fall for the morning and afternoon peak hours.

**Figure 6** shows the existing generalized traffic flows as replicated in the model. The bandwidth of the traffic flow illustrates the relative volume of traffic on key city streets during the weekday peak periods.

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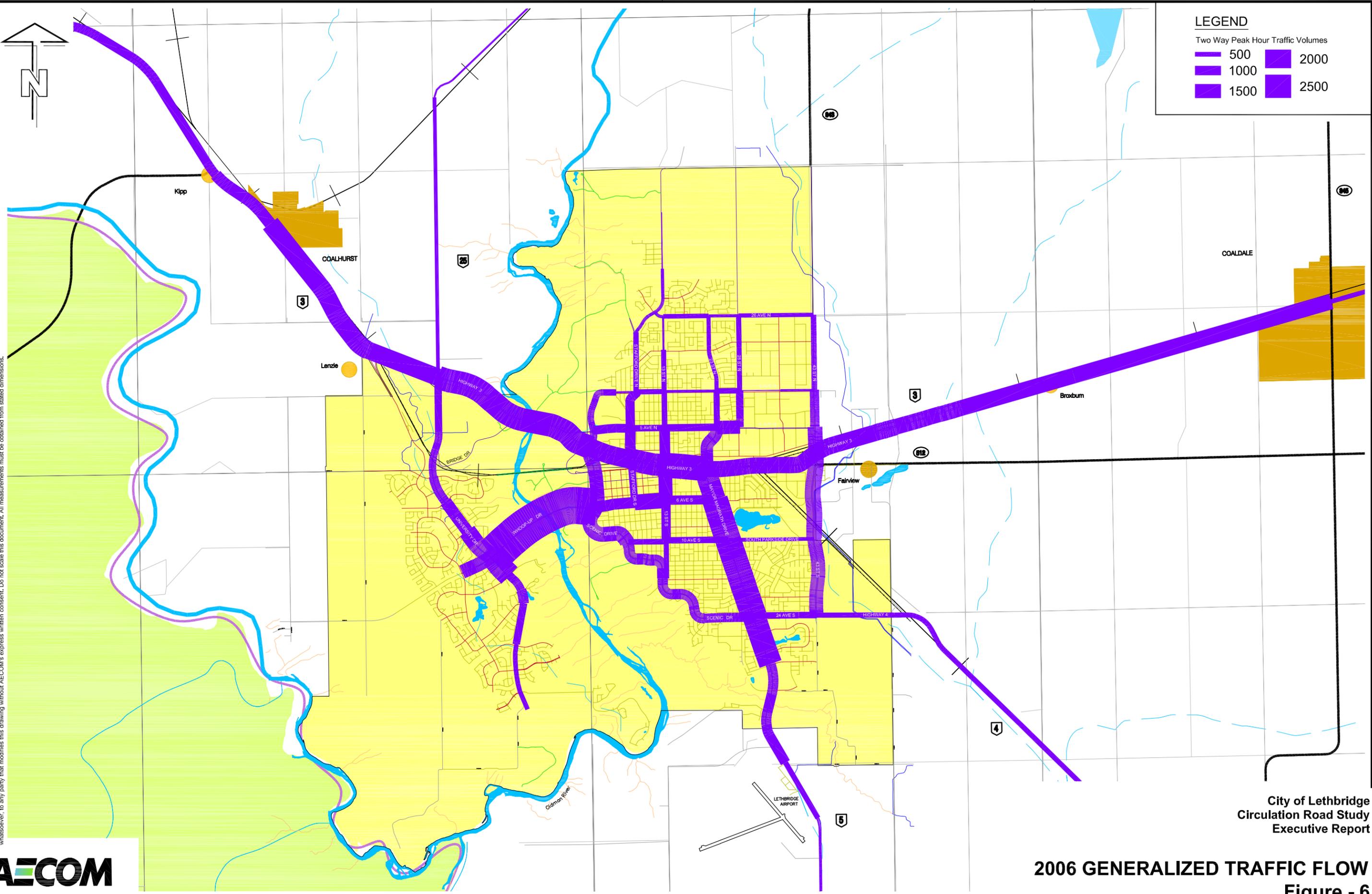


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**DATA COLLECTION LOCATIONS**  
**Figure - 5**



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2006 GENERALIZED TRAFFIC FLOW  
Figure - 6

## 4. City Growth

### 4.1 Study Planning Horizons

A population horizon of 110,000 was selected by the City of Lethbridge as the long term planning horizon for travel forecasting. This population horizon is expected to be reached in about 20 years (circa 2030). Consideration was also given to the longer range growth potential of the city and its roadway network implications. An interim population horizon of 95,000 (circa 2020) was also investigated.

### 4.2 Future Population/Employment Distribution

Based on approved land use plans and existing trends, the estimated distribution of population was provided by the City of Lethbridge.

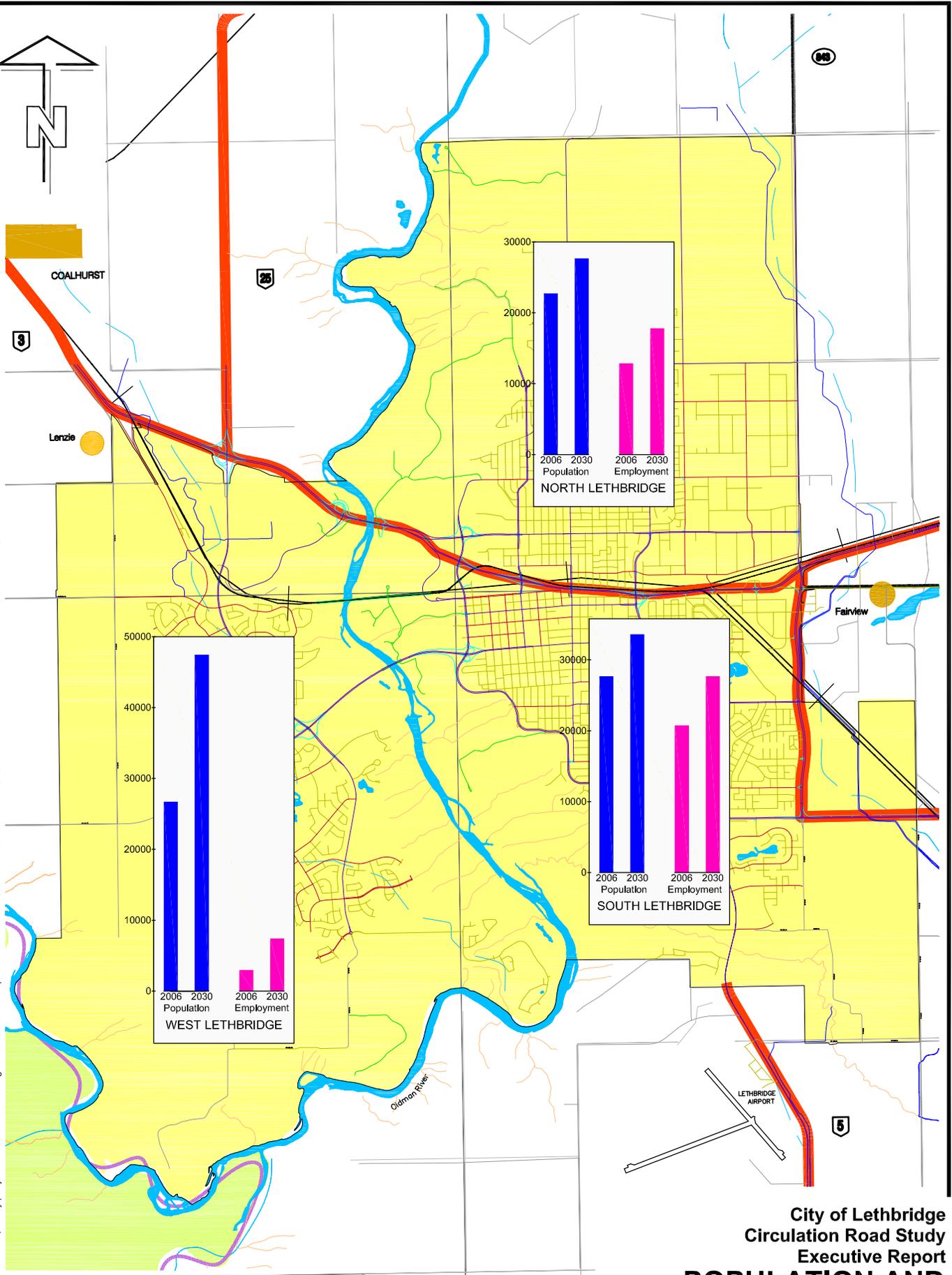
Employment distribution was based on land use plans, employment and enrolment projections provided by major employers and institutions and comparative data from other jurisdictions.

**Figure 7**, Population and Employment Growth, shows the existing and future distribution of population and employment for North, South and West Lethbridge. The data shows continuing strong population growth in west Lethbridge where the majority of the population increase will occur, and the remaining increase divided between North and South Lethbridge. The population growth is accompanied by an outward expansion of the City's urban footprint. In juxtaposition to the population growth, the employment growth will be mainly in the traditional employment areas in North and South Lethbridge on the east side of the Oldman River.

In spite of anticipated policy encouragement of employment in West Lethbridge at the Community Core and West Lethbridge Employment Area (centered on University Drive north of Walsh Drive), the ratio of jobs to employment west of the Oldman River remains low and raises the expectation for cross river traffic to increase.

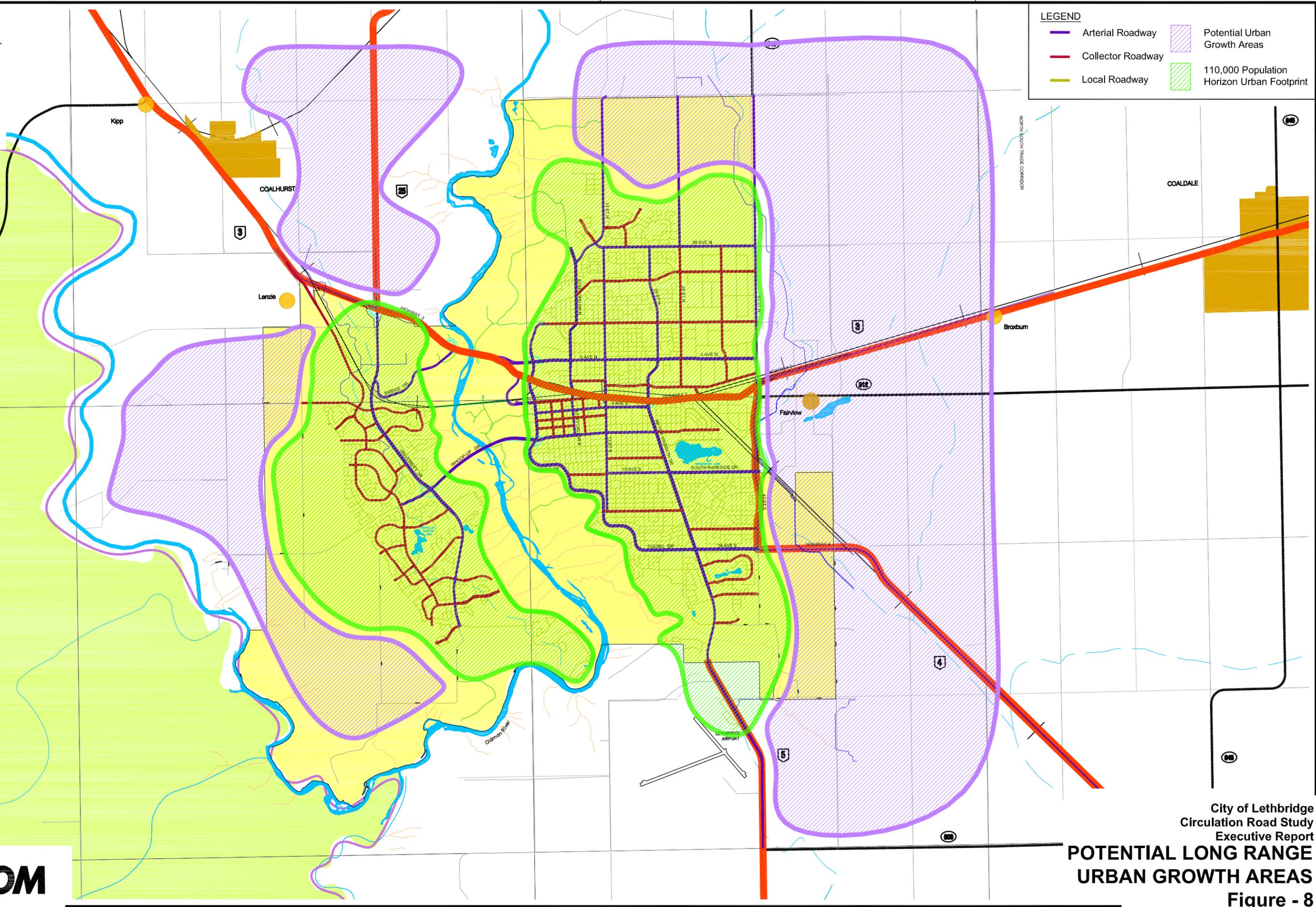
### 4.3 Longer Range Growth

It is the position of City of Lethbridge planning staff that, due to development utility servicing constraints, urban growth is unlikely to progress southward of current city limits in any substantial way. **Figure 8** shows potential (future urban) growth areas filling out lands to the city limits and beyond.



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**POPULATION AND  
 EMPLOYMENT GROWTH**  
 Figure - 7

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**LEGEND**

	Arterial Roadway		Potential Urban Growth Areas
	Collector Roadway		110,000 Population Horizon Urban Footprint
	Local Roadway		

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**POTENTIAL LONG RANGE  
 URBAN GROWTH AREAS**  
 Figure - 8

## 5. Future Roadway Network Alternatives

For all roadway networks tested for the 110,000 population horizon (circa 2030) it was assumed that the provincial NSTC would be in place. Also, roadways required to provide access to the expanded urban footprint were assumed to be in place, and roadway projects in the City's construction program were assumed to be completed.

Network alternatives that were tested focused on two independent issues:

- The need for connections between the NSTC and the North Lethbridge roadway network.
- The need for a 'third' river crossing of the Oldman River.

### 5.1 Connections to the NSTC

Two alternative connections to the NSTC were tested. The provincial study proposes one connection on 43 Street between the corridor and the North Lethbridge roadway network and this was tested as one alternative. The second alternative included two connections to the NSTC, one on 43 Street and one on the extension of 13 Street North (Scenic Drive N.), with a connection to 28 Street N. inside the city. These alternative network connections are shown on **Figure 9**.

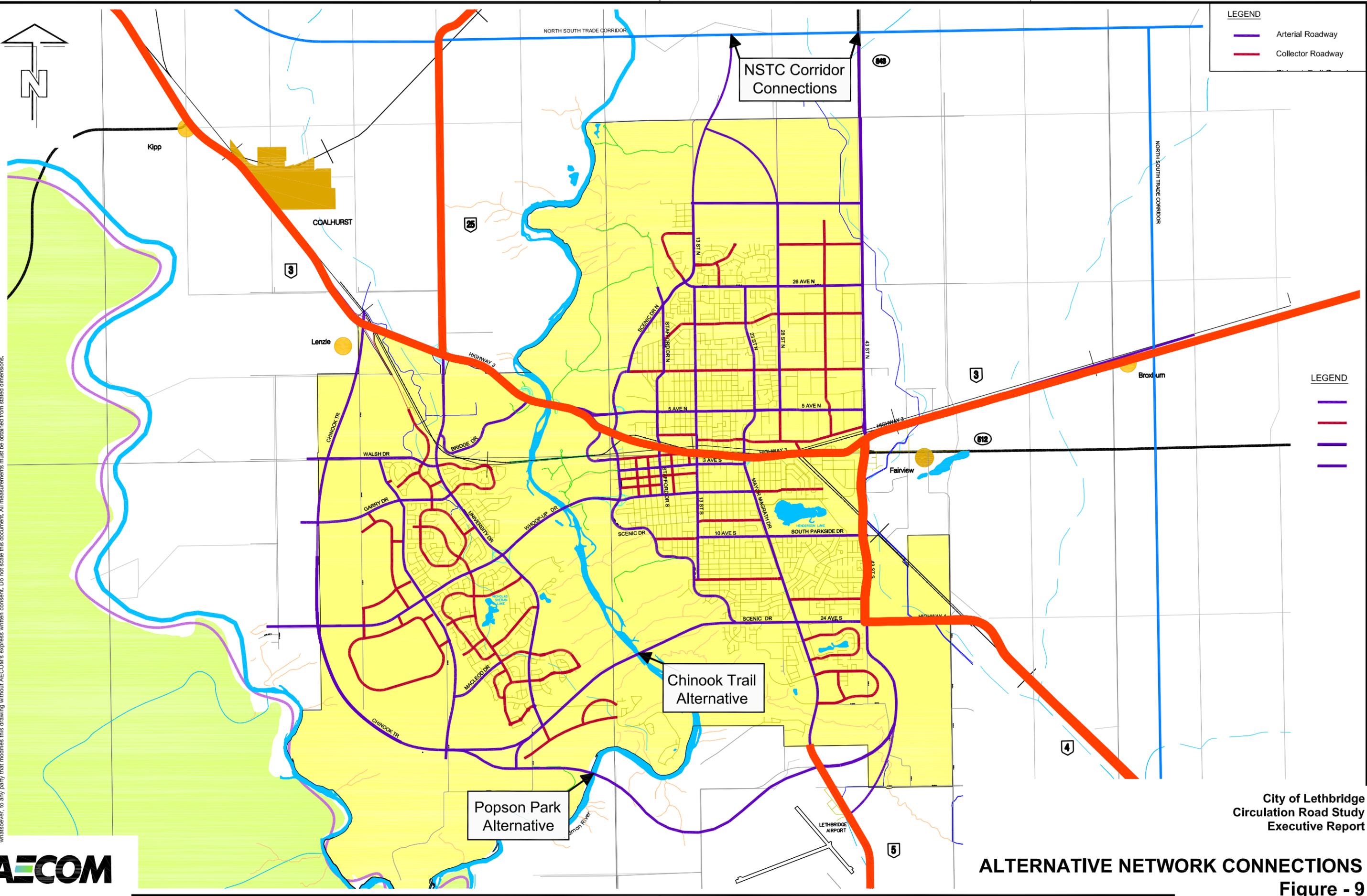
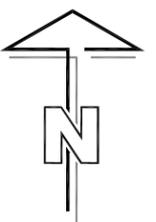
### 5.2 River Crossing Alternatives

Initially two river crossings were examined:

- Chinook Trail – a crossing location approved by City Council in various transportation and land use plans. The City of Lethbridge has acquired the majority of the right-of-way required for this crossing.
- Popson Park Crossing – a potential crossing through the Popson Park area and through the County of Lethbridge connecting to Highway 5.

Subsequent to an interim study presentation to City Council, Council directed that additional study and consultation be undertaken on these two alternatives and that a 'No New River Crossing' alternative is examined. The Chinook Trail and Popson Park alternative crossings are shown on Figure 9.

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**LEGEND**  
Arterial Roadway  
Collector Roadway

**LEGEND**  
[Three purple lines of varying thickness]

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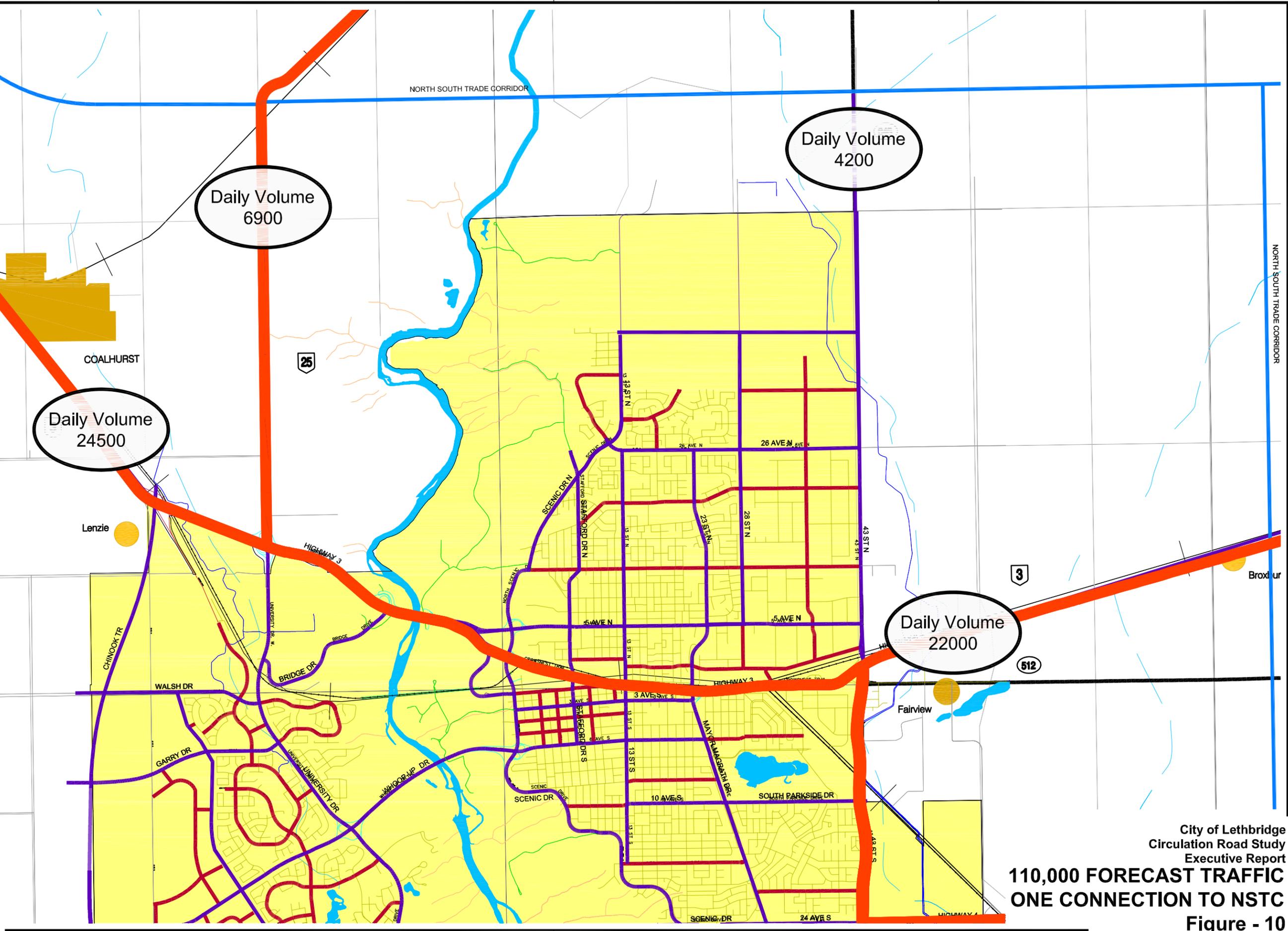
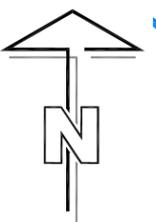
**ALTERNATIVE NETWORK CONNECTIONS**  
Figure - 9

## 6. North South Trade Corridor Connections Review

**Figures 10 and 11** show the forecast traffic for the NSTC Connection Alternatives (1 connection or 2 connections).

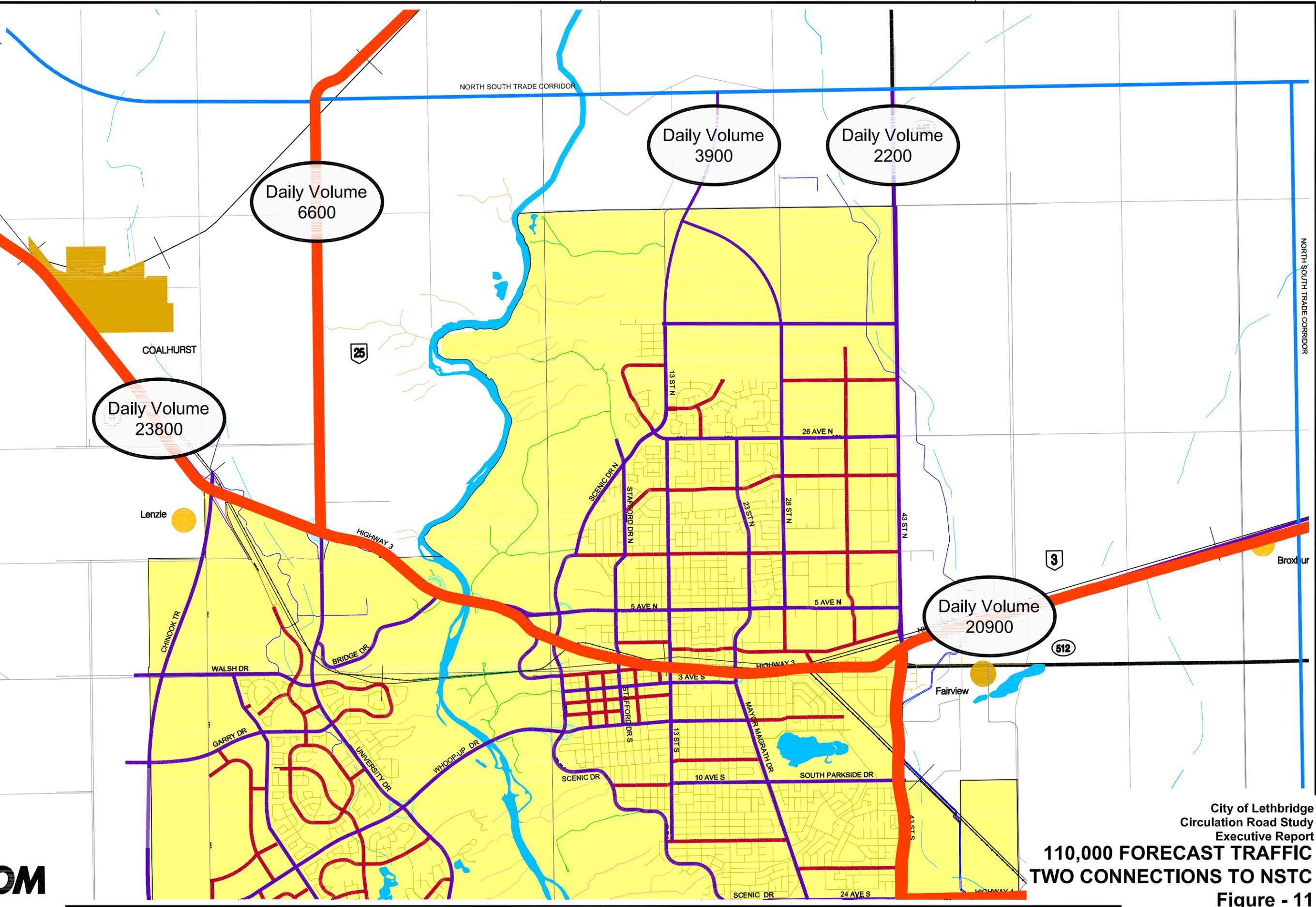
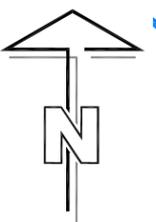
The traffic forecasts show that the westerly connection (Scenic Drive/28 Street connection) is the more attractive route for users, and provides a greater diversion of traffic volume from existing Crowsnest Trail, thereby allowing more local urban traffic to use this bridge.

The traffic volumes on the two connections will increase as the city grows beyond the 110,000 population horizon. The two connections will provide better access to North Lethbridge and the downtown core. Connecting 28 Street to Scenic Drive increases the beneficial effect of the connection to the NSTC, provides another connection to the N.E. Industrial areas, and improved connectivity across the CP Railway line to central and south parts of the city. Protection of two interchange locations on the NSTC at Scenic Drive and 43 Street is recommended.



City of Lethbridge  
Circulation Road Study  
Executive Report  
**110,000 FORECAST TRAFFIC  
ONE CONNECTION TO NSTC**  
Figure - 10

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City of Lethbridge  
 Circulation Road Study  
 Executive Report  
**110,000 FORECAST TRAFFIC  
 TWO CONNECTIONS TO NSTC**  
 Figure - 11

## 7. River Crossing Alternatives Review

Following an interim study presentation, City Council directed that further evaluation be undertaken on the Chinook Trail option, Popson Park option, and a 'No New River Crossing' option. The scope of this review included nine criteria for consideration:

- Traffic assessment
- Community assessment
- Environmental impacts
- Recreational assessment
- Historical impacts
- Noise assessment
- Geotechnical issues
- River engineering issues
- Cost estimates

Council also directed that further community consultation be undertaken.

The following sections of the report are a summary of the study undertaken. The City of Lethbridge staff undertook the community assessment and recreational assessment, and provided an estimate of land costs for roadway right-of-way. AECOM, with specialized sub-consultants undertook the remainder of the work.

The completed reports on each of the nine criteria were provided and presented to members of a river crossing advisory committee and to Council Community Issues Committee.

### 7.1 Traffic Assessment

Figures 12, 13 and 14 show the forecast generalized peak hour traffic flows (110,000 population horizon) for the 'no river crossing', Chinook Trail and Popson Park crossing, respectively.

Table 1 shows the predicted traffic volumes on each river crossing for the three river crossing alternatives at the 110,000 population level, as well as the modeled 2006 river crossing traffic volumes. The data shows that the Chinook Trail crossing would carry about twice as many trips as the Popson Park crossing. For traffic utilization the Chinook Trail crossing provides greater overall benefit for the 110,000 population and beyond.

**Table 1: Traffic Volumes by River Crossing**

	2006 (Model)			No River Crossing			Chinook Trail Crossing			Popson Park Crossing		
	AM	PM	24 Hr	AM	PM	24 Hr	AM	PM	24 Hr	AM	PM	24 Hr
<b>NSTC</b>				611	692	7689	513	647	7189	562	656	7289
<b>Highway 3</b>	2426	2679	29767	3325	3484	38711	3010	3388	37644	3122	3412	37911
<b>Whoop Up Drive</b>	4292	4167	46300	5907	5584	62044	5242	5087	56522	5652	5365	59611
<b>Chinook Trail</b>							1587	1498	16644			
<b>Popson Park</b>										764	779	8656
<b>TOTAL</b>	6718	6846	76067	9843	9760	108444	10352	10620	118000	10100	10212	113467

To provide a sense of the relative differences between the predicted traffic volumes a number of representative locations on the network have been selected for comparison and are shown on **Figure 15**. In the comparison figures for these locations the following information is provided:

- Current traffic flow as estimated in the model
- 110,000 population level predicted traffic flow for the:
  - No river crossing alternative,
  - Chinook Trail alternative,
  - Popson Park alternative.
- The % change between the predicted No River Crossing traffic and both the traffic for the Chinook Trail and Popson Park alternatives.

With these data one can see the predicted increase in travel as the city grows to 110,000 population; and how the alternative crossing locations would redistribute the traffic growth in both positive and negative manner depending on the location examined and the crossing alternative. For example, the Chinook Trail alternative has the biggest traffic increase on Scenic Drive (24 Avenue S) between the river crossing and Mayor Magrath Drive, however it has the least impact on Scenic Drive between Whoop-Up Drive and 24 Avenue S. The Popson Park crossing has the least traffic increase on Scenic Drive (24 Avenue S) between 20 Street S and Mayor Magrath Drive. The Popson Park crossing would also have negligible effect on 6 Avenue S west of 6 Street S. The No New Crossing alternative has the highest traffic increase on Whoop-Up Drive, 6 Avenue S, and Scenic Drive between Whoop-Up Drive and 24 Avenue S. On University Drive the effects of the No New Crossing, Chinook Trail or Popson Park crossing alternatives vary with the location considered.

The traffic flow diagrams (Figures 12, 13 and 14) show where the main traffic flows occur on the network and which roadway users chose for their travel needs. On the older east side of the Oldman River the grid type road pattern provides multiple route choices and users concentrate on higher speed/higher capacity routes. Constraints in the grid system, such as the CN Railway line, also concentrate traffic flows, as does location of major traffic generators such as the downtown, hospital, college, etc. On the west side of the river traffic flows are channelled onto a more modern hierarchal system of local streets, collector streets and arterials.

The concentration of traffic on the Oldman River crossing locations is evident, and the dependency of the network on the centrally located Whoop-Up Drive crossing is clear. In addition to being centrally located, adjacent to the downtown on the east sides, and University of Lethbridge on the west side of the river, Whoop-Up Drive is the most southerly crossing of the Oldman River and attracts all crossing trips to or from the south parts of Lethbridge. The capacity constraints to the Whoop-Up Drive crossing are its access connections on both sides of the river. As the city, and city traffic grows, an additional river crossing south of Whoop-Up Drive will be required.

## 7.2 Community Assessment

The Chinook Trail provides the greatest positive impact in terms of automobile mobility within the city. The Popson Park alternative provides an opportunity to avoid some negative impacts associated with Chinook Trail by creating an alignment through largely undeveloped lands south of the city. The impacts of a longer route are not expected to provide the mobility benefits associated with a third river crossing and the more extensive impacts resulting from developing a road through a city park are to be given much consideration. The 'No New Bridge' alternative provides an opportunity to avoid some of the economic impacts associated with the crossing alternatives by reducing transportation demand through creating congestion.

Many of the significant negative impacts such as the loss of recreational values and habitat fragmentation along with a diminished source of municipal water can also be avoided. Another alternative of No New Bridge with a paradigm

shift in travel behaviour was considered. While providing an opportunity to avoid economic impacts associated with the crossing alternatives, this alternative seeks to achieve the goal by reducing demand on the existing road network without creating significant levels of congestion which necessitate other costly improvements.

The City staff undertook this assessment and has made no recommendations relative to the community assessment. It was left to the Citizen's Advisory Committee for evaluation of the defined criteria in this category.

### 7.3 Environmental Impacts

Potential effects of crossing the Oldman River at Chinook Trail include loss of high quality riparian wildlife habitat, disruption of wildlife movements within the river valley, and loss of fish habitat and interruption of fish passage at a proposed culvert located on a side channel of the Oldman River. At the Popson Park crossing location, the primary concerns were related to loss of prairie rattlesnake habitat, potential destruction of critical hibernacula, and potential mortality of snakes during the operation of the road. Given the critical nature of the prairie rattlesnake habitat in the vicinity of the proposed Popson Park crossing, the Chinook Trail crossing location was identified as the preferred option.

Regardless of which option is selected, a detailed baseline inventory and assessment will need to be conducted to ensure that the effects of the proposed highway crossing on the aquatic and terrestrial environments are properly mitigated.



**Popson Park Crossing Location – Upstream View**



**Chinook Trail Crossing Location – Upstream View**

## 7.4 Recreational Assessment

From a nature based recreational perspective no additional river crossing seems to have the most neutral outcomes. The Chinook Trail option may open limited access to the valley and a crossing through Popson 'Park would significantly alter the atmosphere and experience currently enjoyed in the park. Nature based recreation is contingent on ecological impacts to the river valley. The most significant negative impact to the ecology is the Popson Park option because, in addition to the disturbance caused by construction there will be a significant disruption and damage to the Prairie Rattlesnake population. The pathway-based recreational opportunities are expanded by the Chinook Trail crossing by providing the most versatility and convenient routing options while using the pathway system. No river crossing maintains the limited choices to one pathway crossing and the Popson Park crossing location is too remote to add significant connectivity to the pathway system.

Considering the potential of utilizing the pathway system for alternative modes of transportation the most beneficial is the Chinook Trail crossing location. The Popson Park option connections are too far removed from the major employment centers in Lethbridge to be of significant value. Considering the recreational impacts with the associated ecological impacts and an alternate transportation perspective the option of an additional river crossing in the Chinook Trail location is, overall, the most beneficial and has fewer negative impacts in comparison to the other alternative.

## 7.5 Historical Impacts

The historical impacts assessment considered the historical and paleontological resource potential of the crossing locations. Both proposed crossing locations are considered to have high to moderate potential for recovery of historic resources. As bedrock occurs at both crossings, fossils within the bedrock may be affected.

A historical resources impact assessment for archaeology and palaeontology should be undertaken on the selected option at the design stage.

## 7.6 Noise Assessment

The study found that for the existing and predicted future noise levels for all alternatives assessed, no additional attenuation is required in order to meet the recommended design noise level of 60 dBA Leq (24) for backyard residential areas along Scenic Drive S or the area between Tudor Estates and Chinook Heights. One backyard location along 6 Avenue S between 5 Street S and 6 Street S is anticipated to require a 2.1 metre noise barrier to reduce the noise level to the target for the three alternatives considered.

## 7.7 Geotechnical Issues

A review of the general subsurface and groundwater conditions, site feature, slope stability, historical mining activity, and geological conditions was conducted.

It was determined that there is no sign of significant, recent slope instabilities for either crossing through the analysis of historical records of air photography. Visual observations of the slopes within and adjacent to the proposed project alignments indicate that the slopes are generally "meta-stable", although evidence of scour within the inverts of the coulee valleys was noted. The findings of the geotechnical overview for the Chinook Trail and Popson Park river crossing alternatives have been incorporated into the preliminary roadway plans for the respective crossings.

## 7.8 River Engineering Issues

At the Chinook Crossing location the river is flowing against a steeper bank on the west bank and the alignment crosses over Battleship Island and a small side channel on the east bank. The river channel appears to be quite stable and the wetted width during normal flows is about 100m. A theoretical bed-width of 150m (to be verified during future design) is required, and should be set tight against the steep west bank. Riprap bank protection may be required to guide the flows through the bridge opening. The side channel located to the east side of the 'island' does not carry significant flowing water during flood conditions, although it does get flooded with water. From a hydraulic perspective this channel could be closed off, however it likely provides environmental value and this may not be desirable from that perspective. If the side channel remains open it should be crossed with a separate bridge or culvert structure. The structure should be sized based on fisheries or recreational usage requirements and should consider cost-benefit issues.

At the Popson Park location the river is flowing against a steep bank on the east bank and has a wider plain area to the west side. The river channel appears to be quite stable and the wetted width during normal flows is about 100m. A theoretical bed-width of 150m (to be verified during future design) is required, and should be set tight against the steep right bank. Riprap bank protection may be required to guide the flows through the bridge opening.

Bridge heights should be greater than 7.2m above normal low water flow levels.

## 7.9 Comparative Construction and Land Costs

**Table 2** shows the comparative construction and land costs for the two alternative river crossings as well as the difference in the costs between the Chinook Trail and Popson Park alternatives. A negative difference (shown in red), shows where the cost of the Popson Park alternative exceeds the cost of the Chinook Trail alternative

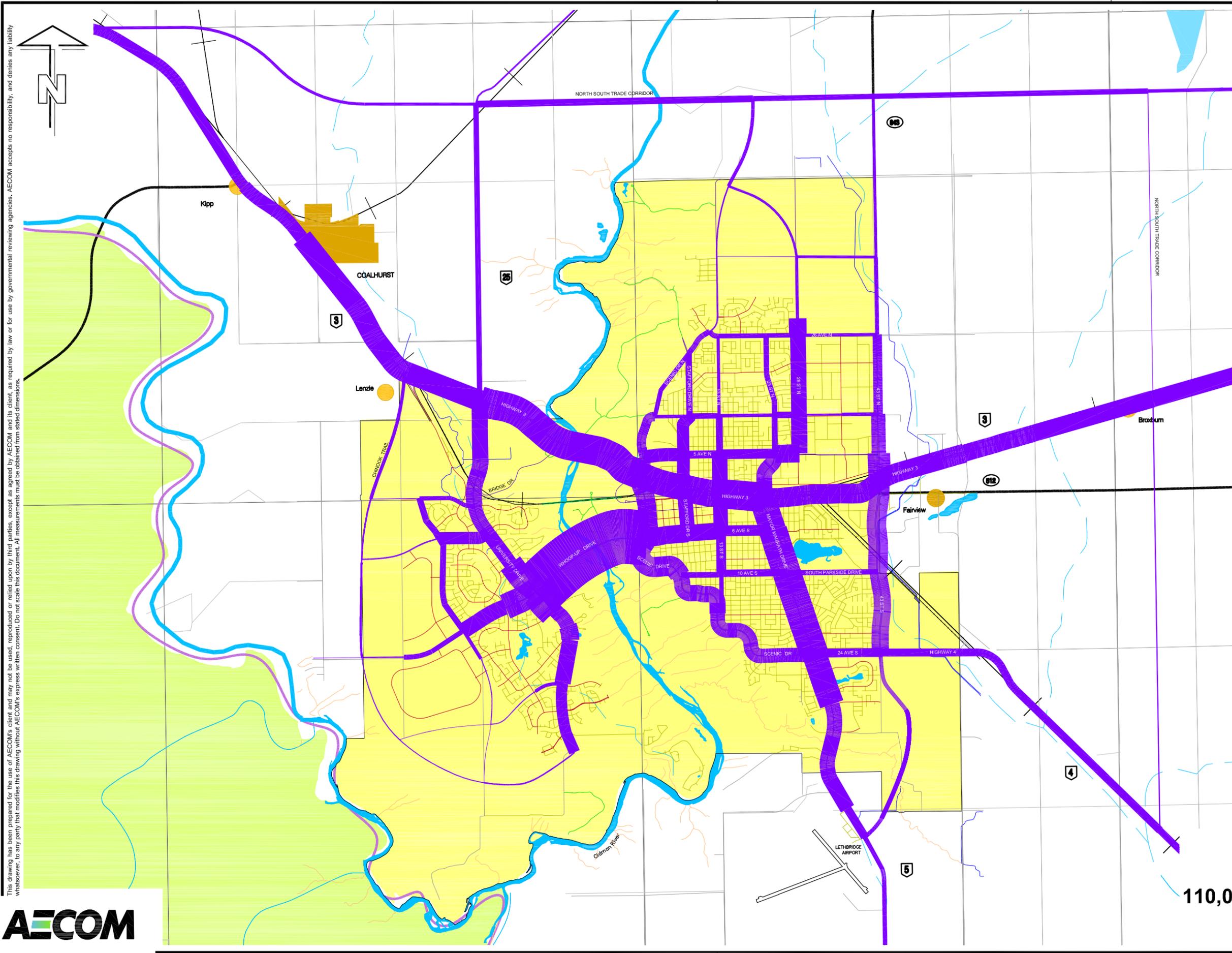
**Table 2: Comparative Construction and Land Costs**

Item	Chinook	Popson	Difference
Road	\$33,470,000	\$48,070,000	(\$14,600,000)
Bridge	\$68,010,000	\$65,710,000	\$2,300,000
Earthworks	\$15,280,000	\$55,900,000	(\$40,620,000)
Land	\$540,000	\$3,750,000	(\$3,210,000)
10% Engineering	\$11,730,000	\$17,350,000	(\$5,620,000)
10% Contingency	\$12,910,000	\$19,080,000	(\$6,170,000)
<b>TOTAL</b>	<b>\$141,940,000</b>	<b>\$209,860,000</b>	<b>(\$67,920,000)</b>

The price of the roadway is primarily dependent upon its length. Chinook Trail has a total length of 6.19 kilometres while Popson Park has a total length of 7.80 kilometres. The roadway alignments in the valley are 2.89 kilometres and 3.33 kilometres long for Chinook Trail and Popson Park respectively. The Popson Park alternative incurs an additional roadway length of 1.09 kilometres to accommodate the University Drive connection road. The Popson Park crossing alternative between Métis Trail and Highway 5 is therefore approximately 2.70 kilometres longer than the Chinook Trail alternative.

The majority of the cost difference between the two alignments is due to earthworks. Popson Park earthwork costs are approximately 40.6 million dollars more than the Chinook Trail alternative, largely because of its larger cuts. This cost difference can be attributed to the climb up the valley wall on the eastern bank. The Chinook Trail option follows a natural route up the valley wall and is roughly balanced on the eastern side of the river. The Popson Park option incurs larger cuts as it climbs the vertical profile through this section. The presence of these cuts in the Popson Park option is responsible for the large difference in the earth work costs.

The land values shown in Table 2 represent the 2008 value of land that has not been previously acquired. The estimated value of land for each of the river crossing alternatives was provided by the City of Lethbridge. The difference in land prices shown is primarily due to the fact that majority of the land required for the Chinook Trail crossing has been acquired previously. The 2008 land value for the Chinook Trail and Popson Park roadway right-of-way requirements are \$4,180,000 and \$4,420,000, respectively.



**LEGEND**

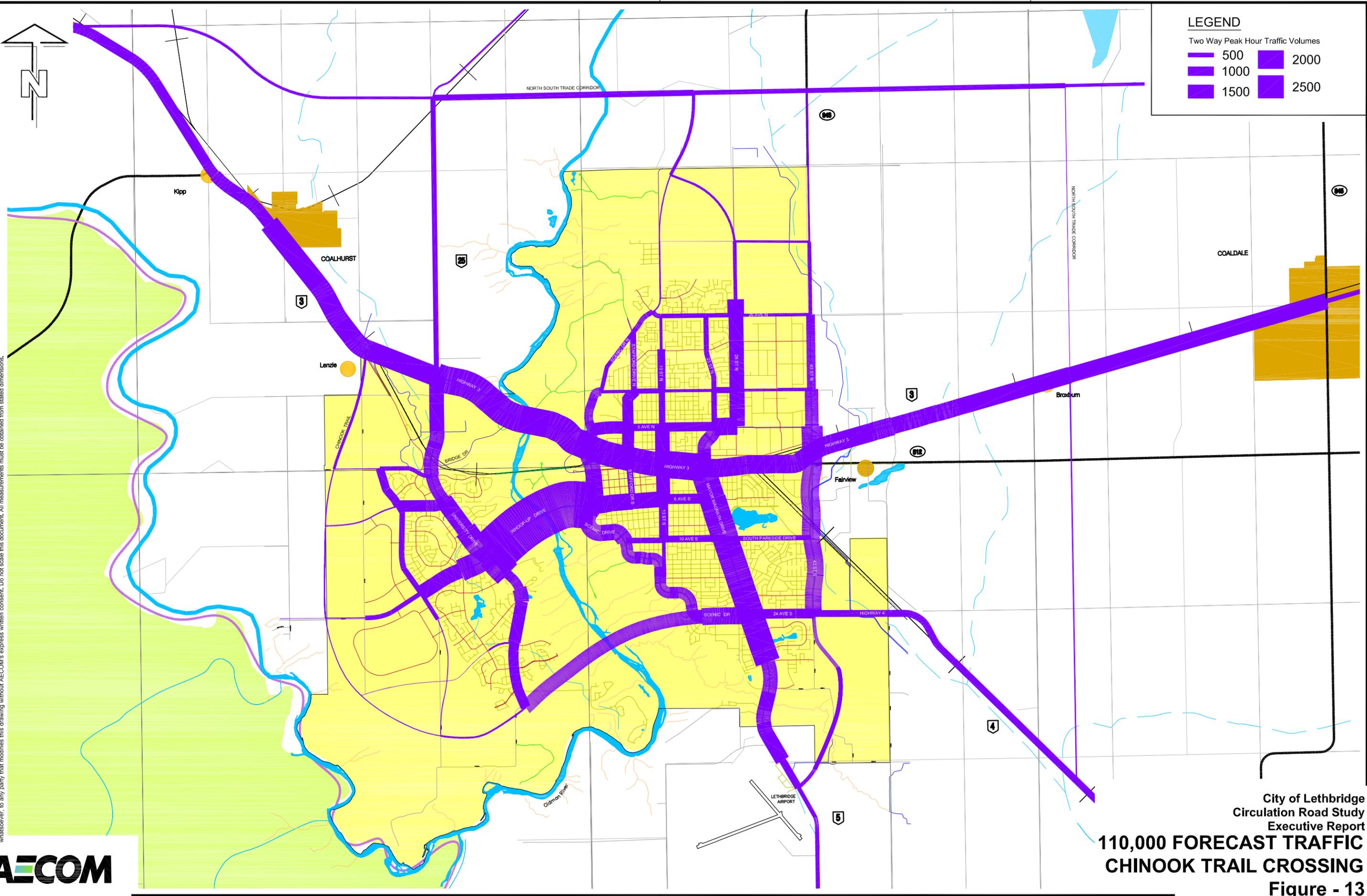
Two Way Peak Hour Traffic Volumes

	500		2000
	1000		2500
	1500		



City of Lethbridge  
 Circulation Road Study  
 Executive Report  
**110,000 FORECAST TRAFFIC**  
**NO NEW CROSSING**  
 Figure - 12

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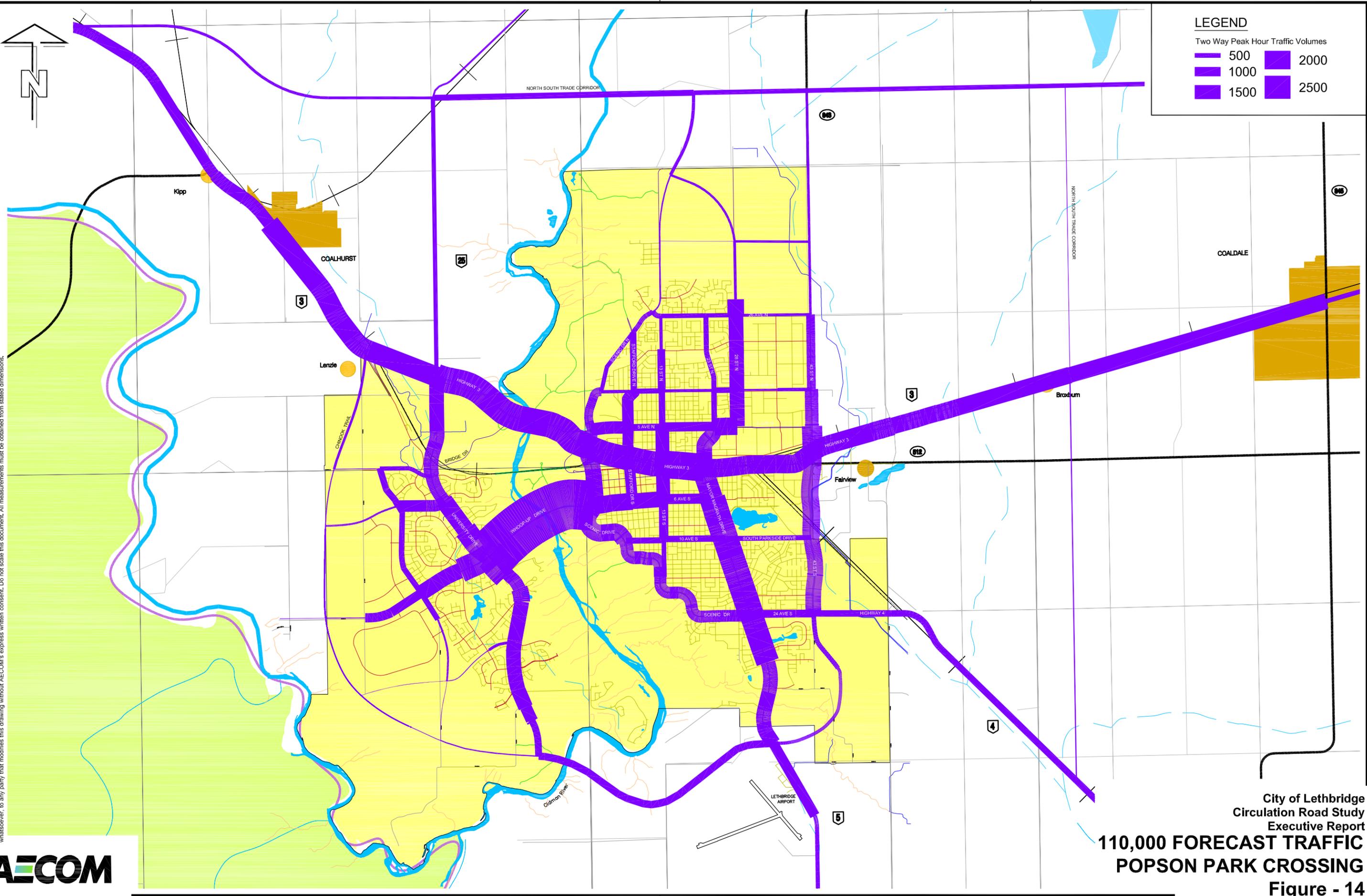
**LEGEND**

Two Way Peak Hour Traffic Volumes

Lightest Purple	500	Light Purple	2000
Medium Purple	1000	Dark Purple	2500
Darkest Purple	1500		

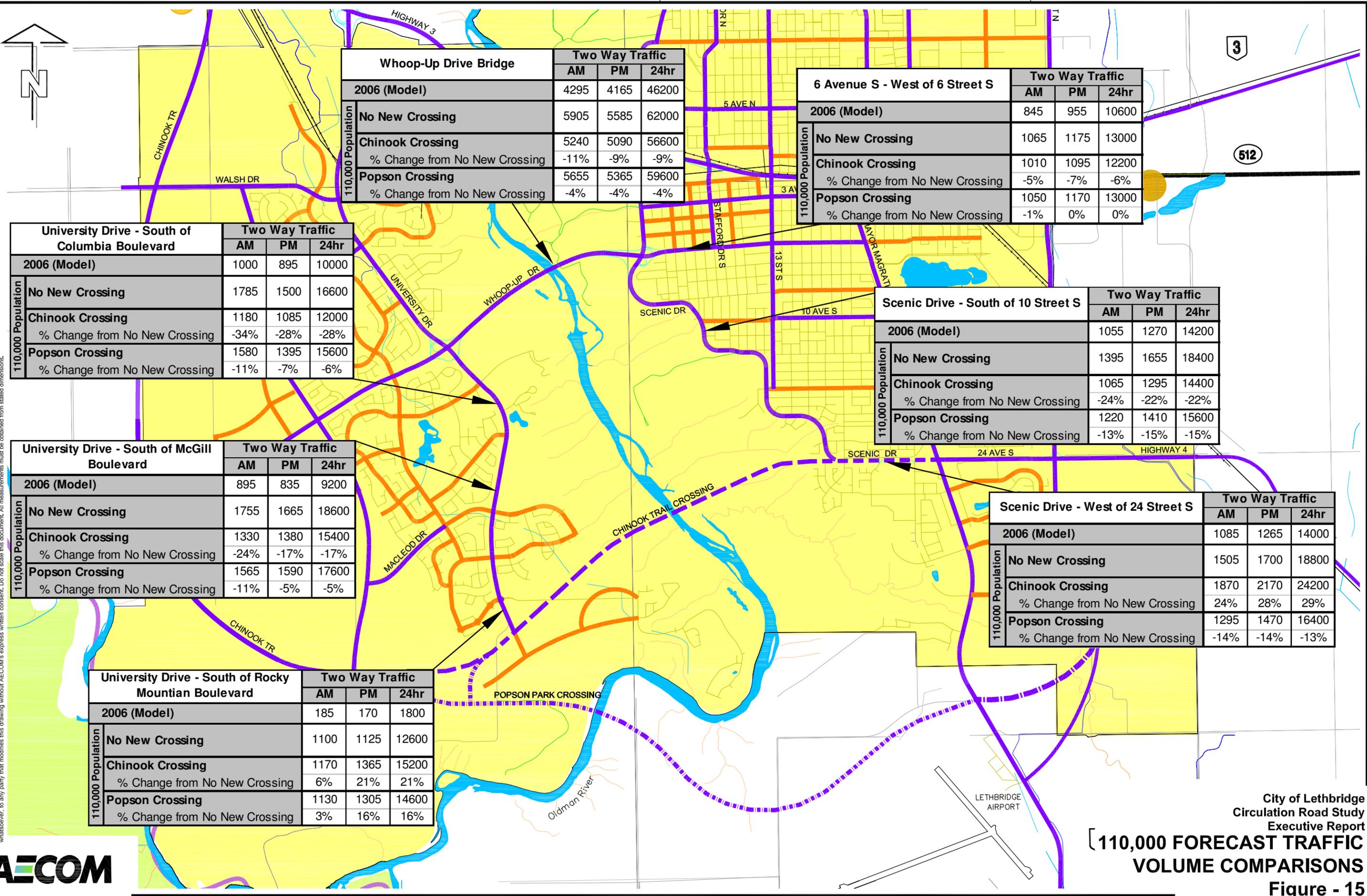
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 Circulation Road Study  
 Executive Report  
**110,000 FORECAST TRAFFIC  
 CHINOOK TRAIL CROSSING**  
 Figure - 13

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**110,000 FORECAST TRAFFIC  
POPSON PARK CROSSING**  
Figure - 14

ISS/REV: 01  
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Whoop-Up Drive Bridge		Two Way Traffic		
		AM	PM	24hr
2006 (Model)		4295	4165	46200
110,000 Population	No New Crossing	5905	5585	62000
	Chinook Crossing	5240	5090	56600
	% Change from No New Crossing	-11%	-9%	-9%
	Popson Crossing	5655	5365	59600
% Change from No New Crossing	-4%	-4%	-4%	

6 Avenue S - West of 6 Street S		Two Way Traffic		
		AM	PM	24hr
2006 (Model)		845	955	10600
110,000 Population	No New Crossing	1065	1175	13000
	Chinook Crossing	1010	1095	12200
	% Change from No New Crossing	-5%	-7%	-6%
	Popson Crossing	1050	1170	13000
% Change from No New Crossing	-1%	0%	0%	

University Drive - South of Columbia Boulevard		Two Way Traffic		
		AM	PM	24hr
2006 (Model)		1000	895	10000
110,000 Population	No New Crossing	1785	1500	16600
	Chinook Crossing	1180	1085	12000
	% Change from No New Crossing	-34%	-28%	-28%
	Popson Crossing	1580	1395	15600
% Change from No New Crossing	-11%	-7%	-6%	

Scenic Drive - South of 10 Street S		Two Way Traffic		
		AM	PM	24hr
2006 (Model)		1055	1270	14200
110,000 Population	No New Crossing	1395	1655	18400
	Chinook Crossing	1065	1295	14400
	% Change from No New Crossing	-24%	-22%	-22%
	Popson Crossing	1220	1410	15600
% Change from No New Crossing	-13%	-15%	-15%	

University Drive - South of McGill Boulevard		Two Way Traffic		
		AM	PM	24hr
2006 (Model)		895	835	9200
110,000 Population	No New Crossing	1755	1665	18600
	Chinook Crossing	1330	1380	15400
	% Change from No New Crossing	-24%	-17%	-17%
	Popson Crossing	1565	1590	17600
% Change from No New Crossing	-11%	-5%	-5%	

Scenic Drive - West of 24 Street S		Two Way Traffic		
		AM	PM	24hr
2006 (Model)		1085	1265	14000
110,000 Population	No New Crossing	1505	1700	18800
	Chinook Crossing	1870	2170	24200
	% Change from No New Crossing	24%	28%	29%
	Popson Crossing	1295	1470	16400
% Change from No New Crossing	-14%	-14%	-13%	

University Drive - South of Rocky Mountain Boulevard		Two Way Traffic		
		AM	PM	24hr
2006 (Model)		185	170	1800
110,000 Population	No New Crossing	1100	1125	12600
	Chinook Crossing	1170	1365	15200
	% Change from No New Crossing	6%	21%	21%
	Popson Crossing	1130	1305	14600
% Change from No New Crossing	3%	16%	16%	



City of Lethbridge  
 Circulation Road Study  
 Executive Report  
**110,000 FORECAST TRAFFIC VOLUME COMPARISONS**  
 Figure - 15

## 8. Long Term Skeletal Roadway Network

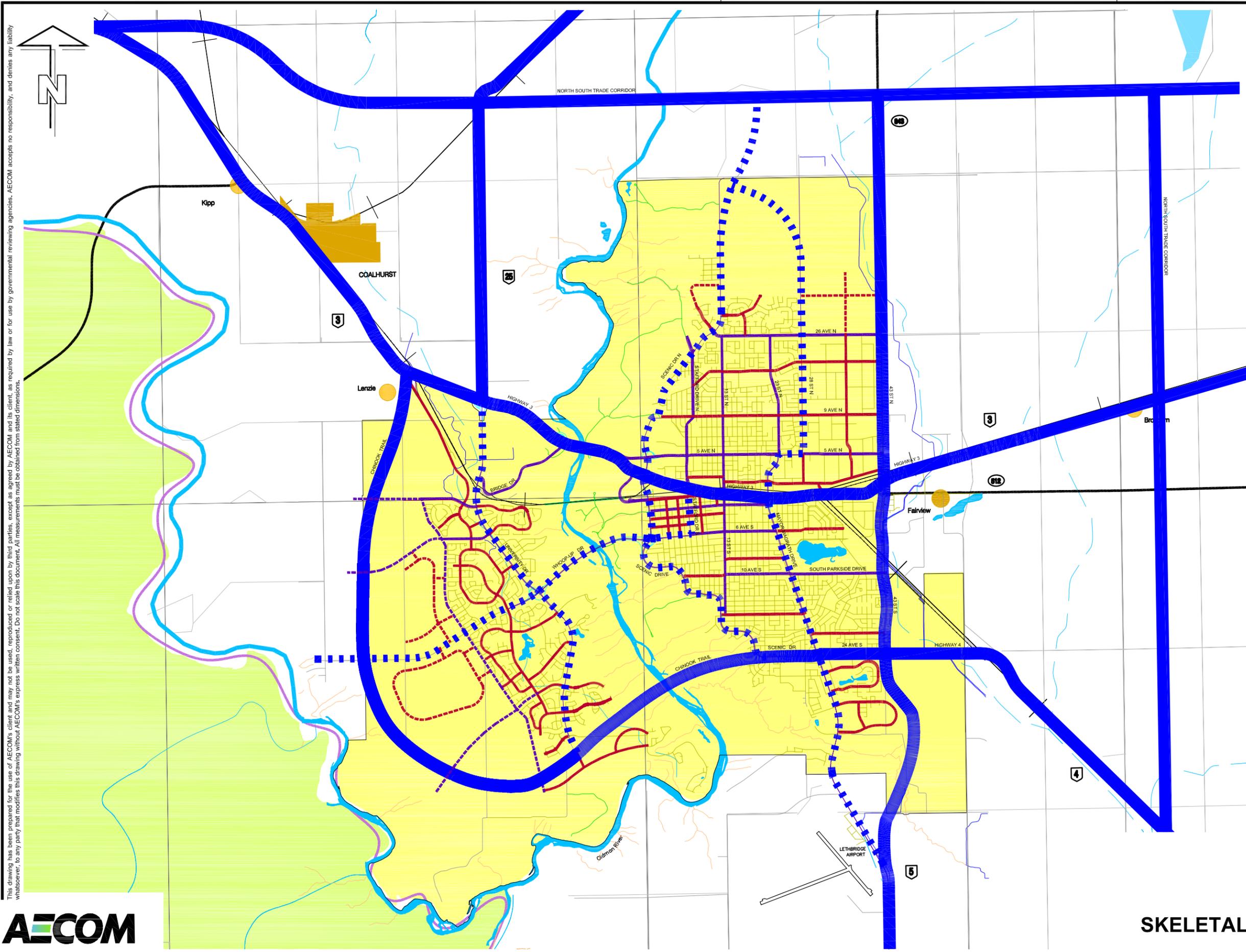
The circulation road crossing the Oldman River is an arterial roadway intended to efficiently convey large volumes of traffic throughout the City of Lethbridge. In previous studies the Province of Alberta has determined that the route of the NSTC will be external to the city. Consequently, the additional river crossing does not have the primary function of carrying traffic by-passing the City of Lethbridge. The decision by the Province of Alberta to route the NSTC to the east and north of Lethbridge has the effect of diverting by-pass traffic around Lethbridge in the future. Implementation of the NSTC will also affect the routes of some travel from outside the city into the city.

An additional roadway crossing of the Oldman River would perform a key function in the roadway network by improving connectivity across the barrier which the river creates between the east and west sections of the city. The importance of this connectivity will increase over time as Lethbridge grows on both sides of the Oldman River. Potential growth areas beyond the 110,000 population footprint are shown on Figure 8. The expected directions of growth are to the west, north and east. Southward growth is considered unlikely due to utility service considerations.

Within the context of future growth directions and the location of the NSTC, AECOM has developed a Skeletal Network Concept of high level roadways that would serve Lethbridge beyond the 110,000 population horizon. This Skeletal Network is shown on **Figure 16**. The network could incorporate either of or neither of the Chinook Trail and Popson Park river crossings, the recommended Chinook Trail crossing location is shown.

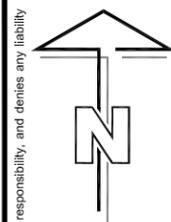
It can be expected that city traffic flow will increase proportionally to urban growth. The rate of traffic growth could be modified by behavioural change. However, to reduce the impact of increasing traffic on the existing roadway network, new routes will be needed. The Skeletal Network can be implemented as required and provides a robust response to future growth.

The traffic forecasts show that it would be prudent to protect for another river bridge to the south of Whoop-Up Drive. The greatest benefit to mobility would be gained from the Chinook Trail crossing.



**LEGEND**

- Arterial Roadway
- - - Future Arterial Roadway
- Collector Roadway
- - - Future Collector Roadway
- Local Roadway
- Skeletal Network
- - - Key Supporting Arterials



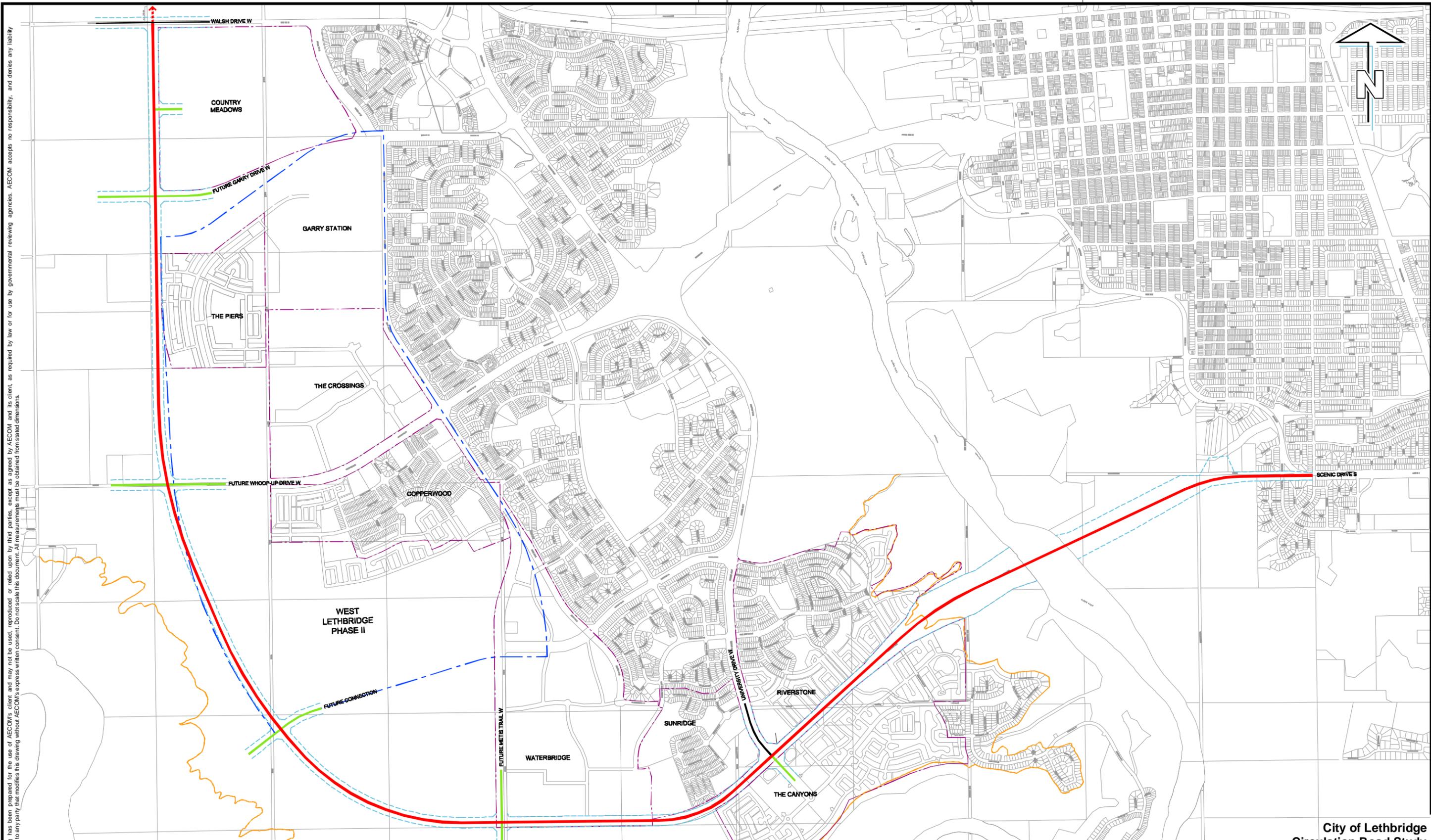
## 9. Chinook Trail Roadway Alignment

Figure 17 shows the proposed alignment plan for Chinook Trail between Walsh Drive and Scenic Drive. This plan includes the previously determined Oldman River crossing alignment between University Drive and Scenic Drive where the majority of the right-of-way has been acquired by the City of Lethbridge. West of University Drive the West Lethbridge Phase 11, Area Structure Plan (ASP) established an approximate boundary for the circulation road, coinciding approximately with the east city limits. Approved and emerging plans for the Canyons, Sunridge, the Piers, Waterbridge and Country Meadows were also considered with respect to boundary conditions and access points.

The proximity of the Oldman River escarpment was considered with respect to possible development and access to lands between the Chinook Trail and the potential edge of development respecting escarpment requirements.

Also, the roadway alignment was integrated in part with a Bonavista Petroleum Ltd. gas pipeline to reduce the combined right-of-way requirements. North of Walsh Drive to Highway 3 the alignment will be determined through planning studies being undertaken for that area.

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**PRELIMINARY**  
**FOR DISCUSSION ONLY**  
 Date: 2010/07/07

**LEGEND**

	PROPOSED CHINOOK TRAIL		PROPOSED RIGHT OF WAY
	PROPOSED CONNECTING ROADWAY		TOP OF ESCARPMENT
	EXISTING ROADWAY		OUTLINE PLAN BOUNDARY
			AREA STRUCTURE PLAN BOUNDARY

City of Lethbridge  
 Circulation Road Study

**Chinook Trail Alignment**  
**Walsh Drive W to Scenic Drive S**  
**Figure 17**

## 10. Public Consultation

Consultation with the public was ongoing throughout the study beginning with notification of the study commencement and initiation of the data collection program. A stakeholder committee comprising representatives of various organizations and institutions was convened. A website on the City's web page was established to maintain ongoing information on the study. A contact telephone number was provided.

A progress report on the findings of the Circulation Road Study was presented at a Public Open House on March 18, 2008. The Open House provided information on the roadway network alternatives considered including the future river crossing locations. The results of the open house were presented to the Lethbridge City Council on April 28, 2008; subsequently proposal for a study to further evaluate the future river crossing alternatives was requested. The scope of the study was approved by the Lethbridge City Council to evaluate two river crossing alternatives as well as the option of no river crossing. The roadway network alternatives considered are:

- Chinook Trail Crossing
- Popson Park Crossing
- No New River Crossing

Public open houses were held on June 18 and 19, 2008 advising the public of the river crossing review and soliciting volunteers to participate in a river crossing advisory committee.

Seven meetings/workshops of the river crossing committee were held to review the technical reports from the City and consultants. The committee deliberations were facilitated by City staff. The process concluded with the committee forming four discussion groups whose discussions were summarized as follows:

### *Discussion Group 1:*

- Protect Chinook Trail for a future bridge crossing.
- Endeavour to design the City in a manner that delays or avoids the need to build a bridge.
- Conduct a financial analysis to determine the best time to build the bridge.

### *Discussion Group 2:*

- No consensus was achieved for the preferred location for a future river crossing.
- Some in the group felt that the negative impact on Tudor Estates and Chinook Heights outweighed the benefits of Chinook Trail; some felt Chinook Trail was acceptable.
- A change in city planning and resident behaviour to reduce automobile trips is desirable; however it may take a catastrophic event to make an effective change.

### *Discussion Group 3:*

- Protect Chinook Trail for a future bridge crossing.
- Consider a paradigm shift to avoid building another bridge, but be cautious in assuming the magnitude or timing of the shift.
- Provide a pedestrian/cycling crossing at Chinook Trail, even in an auto crossing is not required.
- Try to eliminate the placement of fill on the island in the river (Battleship Island).
- At the detailed design stage, address any traffic conflict issues with Chinook Heights and Tudor Estates.

*Discussion Group 4:*

- Both Chinook Trail and Popson Park routes should be reserved for a crossing.
- It appeared from the discussion that IF a bridge was constructed, it should be at the Chinook Trail Crossing.
- Good mobility exists in Lethbridge and we should not be eager to construct another bridge.
- The final decision should be made at a future date when construction is imminent.
- More commercial and employment uses should be provided in West Lethbridge to reduce the need to cross the river.

A public Open House was held on May 27, 2009 at the City Hall to present the results of the Technical Reports and the Consultant recommendation. The recommendations of the river Crossing Advisory Committee review were also presented at this Open House. Approximately 300 people attended the open house and 177 comment sheets were received. Approximately 58% of respondents supported the Chinook Trail option, whereas 27% supported the Popson Park option and 11% supported a 'No New River Crossing' option; 4% of the responses were uncommitted or unclear.



**River Crossing Committee Discussions**

## 11. Findings and Recommendations

The City of Lethbridge can look forward to continued growth and urban expansion. With growth comes increased demand for mobility. The rate of traffic increase may be tempered by arranging land use relationships, where people live and work, to reduce need for travel; or, if resident's travel behaviour changes to reduce use of the single occupant automobile. However, expected residential growth areas, predominantly in West Lethbridge, point towards a need for another bridge crossing the Oldman River to the south of Whoop-Up Drive.

This study examined two potential river crossing locations and a 'No River Crossing' option, and reached the conclusion that the Chinook Trail crossing is the best option for the future. Right-of-way should continue to be protected for the Chinook Trail crossing. The Chinook Trail will act as a high-speed/high-capacity arterial roadway connecting East and West Lethbridge and providing an important component to a long range Strategic Roadway Network proposed to serve Lethbridge's future traffic needs and reduce negative consequences of increased traffic on the existing roadway system.

This study also examined two alternatives for connections from North Lethbridge to the future NSTC. Findings were that two connections to the trade corridor provide better access to North Lethbridge and the downtown core. The Strategic Roadway Network includes two connections from North Lethbridge to the future NSTC.

### 11.1 Recommendations

- i. That the Strategic Roadway Network shown on Figure 16 be adopted to guide development of the roadway network in Lethbridge.
- ii. That the Chinook Trail crossing continue to be the approved location for an additional roadway crossing of the Oldman River south of Whoop-Up Drive.
- iii. That there are two connections, Scenic Drive and 43 Street, between North Lethbridge and the NSTC.