

## Executive Summary

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### BACKGROUND

Alberta Infrastructure and Transportation retained Stantec Consulting Ltd. (Stantec) to conduct a functional planning study for the improvement of two of the most important highway facilities in the southern region of the Province. The North/South Trade Corridor (NSTC), also known as the CANAMEX highway, links Canada with the United States (including Alaska) and Mexico by a north/south orientated transportation corridor along the western portion of North America. Within the study area, Highway 4 (between Lethbridge and the U.S. border crossing at Coutts) and Highway 3 (through and west of Lethbridge) comprise this international corridor.

The National Highway System (NHS) is comprised of more than 25,000 km of Canadian highway routes that provide both interprovincial and international trade and travel connecting as directly as possible the major provincial population centres. A recent joint federal / provincial announcement has been agreed upon for the renewed improvement to the national highway system in Canada (source: Edmonton Sun – September 23, 2005). Future funding agreements have yet to be finalized but it is believed to involve a 50 / 50 cost sharing. This will undoubtedly impact infrastructure improvements in the province, and due to the importance of this region with the province, the NSTC and NHS may be a candidate for improvement.

### STUDY OBJECTIVE

The objective of this functional planning study is to provide planning level information regarding the locations and requirements of a future highway corridor in the Lethbridge area. This corridor would be in the long-term best interests of the province, the City of Lethbridge, the County of Lethbridge, Town of Coaldale and the Town of Coalhurst, the general public and the transport industry. The future roadway is intended to be a high capacity, limited access, multi-laned facility thereby improving the operational characteristics of both Highway 3 and 4 in southern Alberta.

### STUDY AREA CHARACTERISTICS

This portion of the province is comprised of both rural and urban environments. Population throughout the region consisted of Lethbridge – 77,200 (2005 municipal census), County of Lethbridge - 10,000 (2001), Coaldale – 6,000 (2001) and Coalhurst – 1,500 (2001). The rural environment is comprised mainly of irrigated agricultural lands and numerous cattle feed lots serving the cattle export business. Within the study area, in addition to Highway 3 and 4 are several other provincial highways including:

- Highway 25 – west of Lethbridge north of Highway 3 and orientated north/south;
- Highway 508 – (orientated east/west) a short highway connecting Highway 4 to Highway 5 external to the City of Lethbridge in the southeast quadrant;

- Highway 509 – south of Highway 3 at the Kipp CPR Yards and orientated north/south;
- Highway 512 – (orientated east/west) a short highway beginning in the vicinity of the intersection of Highway 3 and 43<sup>rd</sup> Street in Lethbridge and terminating east of Coaldale on Highway 3; and
- Highway 845 – a 110 km long regional north/south roadway in southern Alberta that bisects the Town of Coaldale.

In addition, the main east/west rail line for southern Alberta is located directly north of Highway 3, from west of Coalhurst to east of Coaldale. In the early 1980s, the main rail yard in Lethbridge was relocated to the Kipp area. Also, from this area, the main rail connection to Calgary initiates. Another rail route is aligned east of Highway 4 for traffic destined to the United States. These main transportation corridors are illustrated on Figure E.1.

## TECHNICAL REQUIREMENTS

The technical requirements for this study include guidelines that are required to meet long-term needs and contribute to the safe and efficient operation of the facility. These are listed below:

- Speed requirements – in this case a design speed of 130 km/hr and a posted speed of 110 km/hr for both highway networks (NHS and NSTC). Due to the system requirements, the speed requirement is independent of whether the alignment is through an agricultural rural setting or a developed urban area;
- Divided roadway cross-section with 38 metres between centrelines for opposing travel directions in the initial stage which will accommodate future capacity improvements with expansion to either a six or eight lane facility; and
- Ultimate stage access management plan that restricts access to/from or across the freeway facility at interchange locations only. In some cases, the initial stage, at-grade intersections may be allowed as long as operational or safety concerns can be mitigated.

The focus of the study is to specifically define the design, construction and operational characteristics of the facility to meet generally accepted principles of road safety that is consistent with sound and accepted engineering standards or practices.

## URBAN IMPROVEMENT OPTION

The North/South Trade Highway enters the southeast corner of the City of Lethbridge. Highway 4 is coincident with 24th Ave South (east/west) and 43rd Street (north/south) from the City Limits to Highway 3 (Crowsnest Trail). The continuation of the international route then has an east/west orientation through the central portion of the City of Lethbridge until the west corporate limits of the urban area. It is noted that the existing geometric standards of this corridor are significantly different than what is required for the facility required by this study. A preliminary concept of the impact of improvement of internal route along 43<sup>rd</sup> Street and the Crowsnest Trail the following major required improvements (in no particular order) required to meet the geometric and operational characteristics for the future free-flow route:


- Realignment and access management of Highway 3 around Coaldale;

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**FIGURE E.1**  
**HIGHWAY 3 & 4**  
**LETHBRIDGE AND AREA NHS & NSTC**  
**FUNCTIONAL PLANNING STUDY**  
**STUDY AREA**

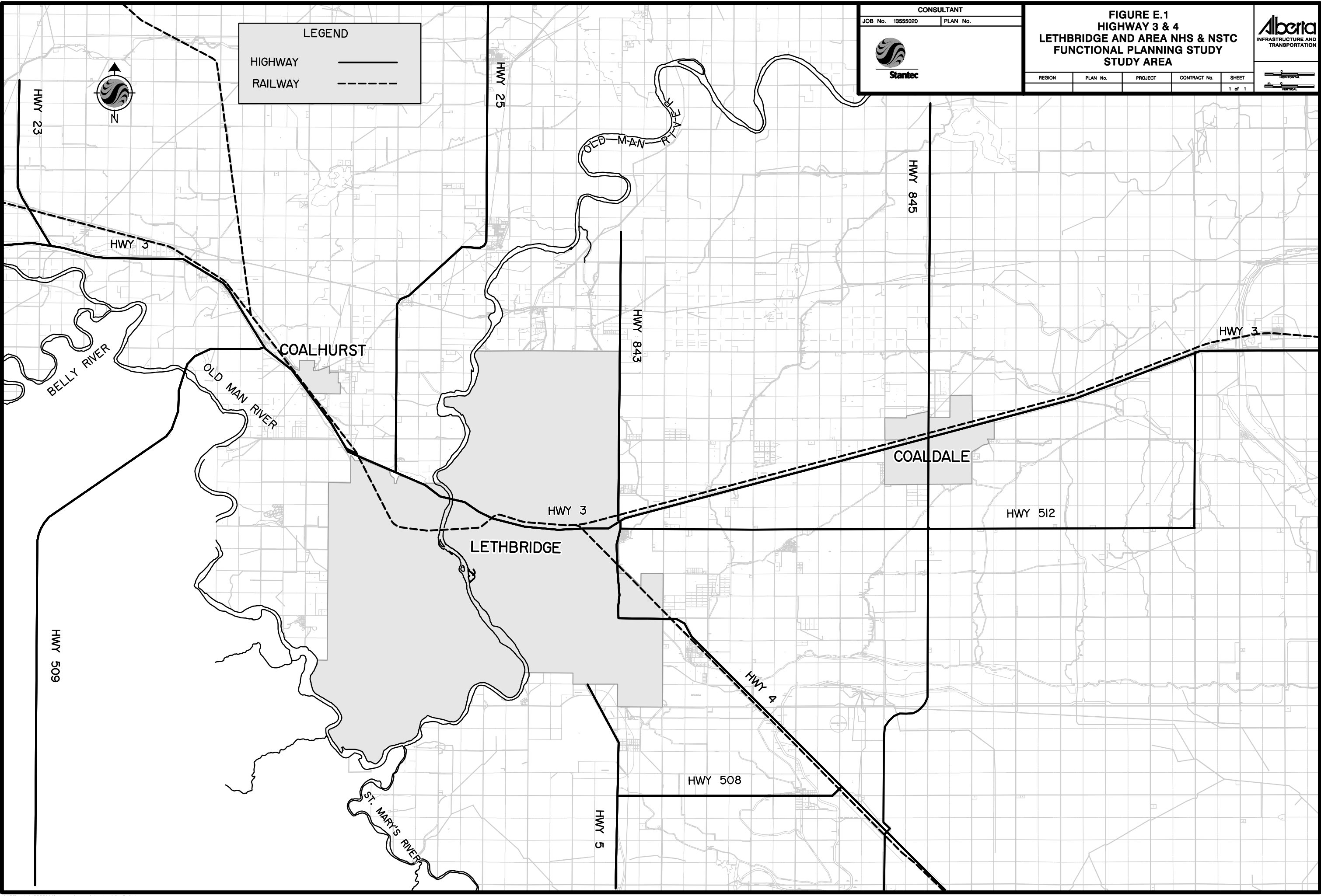
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**LEGEND**

HIGHWAY ———

RAILWAY - - - - -



- Widening and access management of Highway 3 between Coaldale and Lethbridge;
- Upgrading 15 km of roadway in Lethbridge (10 km urban and 5 km rural environment) to accommodate an eight-lane freeway;
- Construction of a grade separation CPR crossing on 24<sup>th</sup> Ave S (Figure 4.1);
- Realignment of 24<sup>th</sup> Ave and construction of a 43<sup>rd</sup> Street interchange (Figure 4.1);
- Realignment of NSTC between 24<sup>th</sup> Ave and Highway 3 (Figures 4.1 and 4.2);
- Construction of a CPR grade separation (north of S. Parkside Drive- Figure 4.2);
- Significant impact to business and residential properties adjacent to the corridor to accommodate realignment;
- Development of an directional interchange at the junction of Highway 3 and 43<sup>rd</sup> Street and a grade separation of the railway due to the close proximity (NOTE: due to level of urban development it is unlikely to meet project geometric standards);
- Widening of the Crowsnest Trail to the south of the existing facility to avoid the cost of acquiring or relocating the CPR line and associated buildings;
- Closure of W.T. Hill Boulevard S and 34<sup>th</sup> Street junctions with Highway 3;
- Development of a new grade separation of the CP tracks at 36th Street to provide access to the lands between the CP Tracks and the Crowsnest Trail;
- Closure of the at-grade crossing at 30<sup>th</sup> and 28<sup>th</sup> Street;
- Elimination of the industrial/commercial properties between 28 Street and 28B Street;
- Elimination of the back lane behind the residents on Glacier Avenue South between 25th and 28th Streets (Note: this may result in the acquisition of these properties);
- Conversion of the Mayor Magrath Interchange to a flyover allowing north-south movement only across and removing access to the Crowsnest Trail;
- Removal of the right-in/right-out access from 19th Street South;
- Potential purchase of all properties south of and abutting Crowsnest Trail between Mayor Magrath and Stafford Drive;
- Complete reconstruction of the existing structure at 13th Street;
- Complete reconstruction of the Stafford Drive interchange;
- Replacement of the CP railway and Scenic Drive grade separations;
- Complete realignment of Crowsnest Trail (east and westbound lanes) between Scenic Drive and the Oldman River (due to terrain characteristics);
- Reconstruction of the structure carrying eastbound Crowsnest Trail to 5th Avenue N;
- Twinning of the existing bridge across Oldman River;
- Reconstruction of the Bridge Drive and Highway 25 interchanges;
- Widening of the existing highway west of the Oldman River;
- Closure of the Coalhurst access to Highway 3; and
- Construction of the Highway 509 interchange.

It is expected that due to the magnitude of reconstruction of Crowsnest Trail, other improvements are also required to other portions of the City of Lethbridge roadway network to accommodate the changes in traffic patterns. In addition, there would be extensive development impacts during the reconstruction phase. Preliminary discussions with the City of Lethbridge administration staff indicated that a route through the urbanized area would not be supported due to the potential magnitude of impact and therefore this corridor was not considered as a viable alternative for development of the future free flow facility.

#### RURAL IMPROVEMENT OPTION

It is recognized that any highway alignment across the rural countryside will affect existing agricultural activities. Selection of possible highway alignments to connect the existing highway is affected by several factors. These include connection characteristics to the existing provincial roadway network, local grid road system and the overall corridor philosophy through irrigated agricultural land. Locating a new highway along quarter section or blind section lines is anticipated to reduce the impact to the local roads. It is also recognized that a majority of residential and commercial development will likely be in close proximity to the local roads, and therefore any future highway that is not aligned with the local roads will have a reduced development impact.

For this study there were 15 possible river crossings and 32 potential roadway corridors initially identified. From these a preliminary detailed analysis of 10 potential corridors and 3 river crossings (Figure E.2) was undertaken using identified planning principals for the study. These principals are summarized below:

- Impact Mitigation (environmental/cultural);
- Fiscal Responsibility;
- Community Viability and Stability;
- Growth Accommodation; and
- Public Participation.

#### TECHNICALLY PREFERRED IMPROVEMENT STRATEGY

The study analysis phase adopted the strategy to determine the best north corridor and evaluate it against the south alignment to determine the technically preferred route for the project. This summary of this analysis is shown in Table E.1 and indicates that a northerly realignment corridor is preferred.

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**FIGURE E.2**  
**HIGHWAY 3 & 4**  
**LETHBRIDGE AND AREA NHS & NSTC**  
**FUNCTIONAL PLANNING STUDY**  
**DETAILED CORRIDOR ANALYSIS**

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0 HORIZONTAL  
 0 VERTICAL

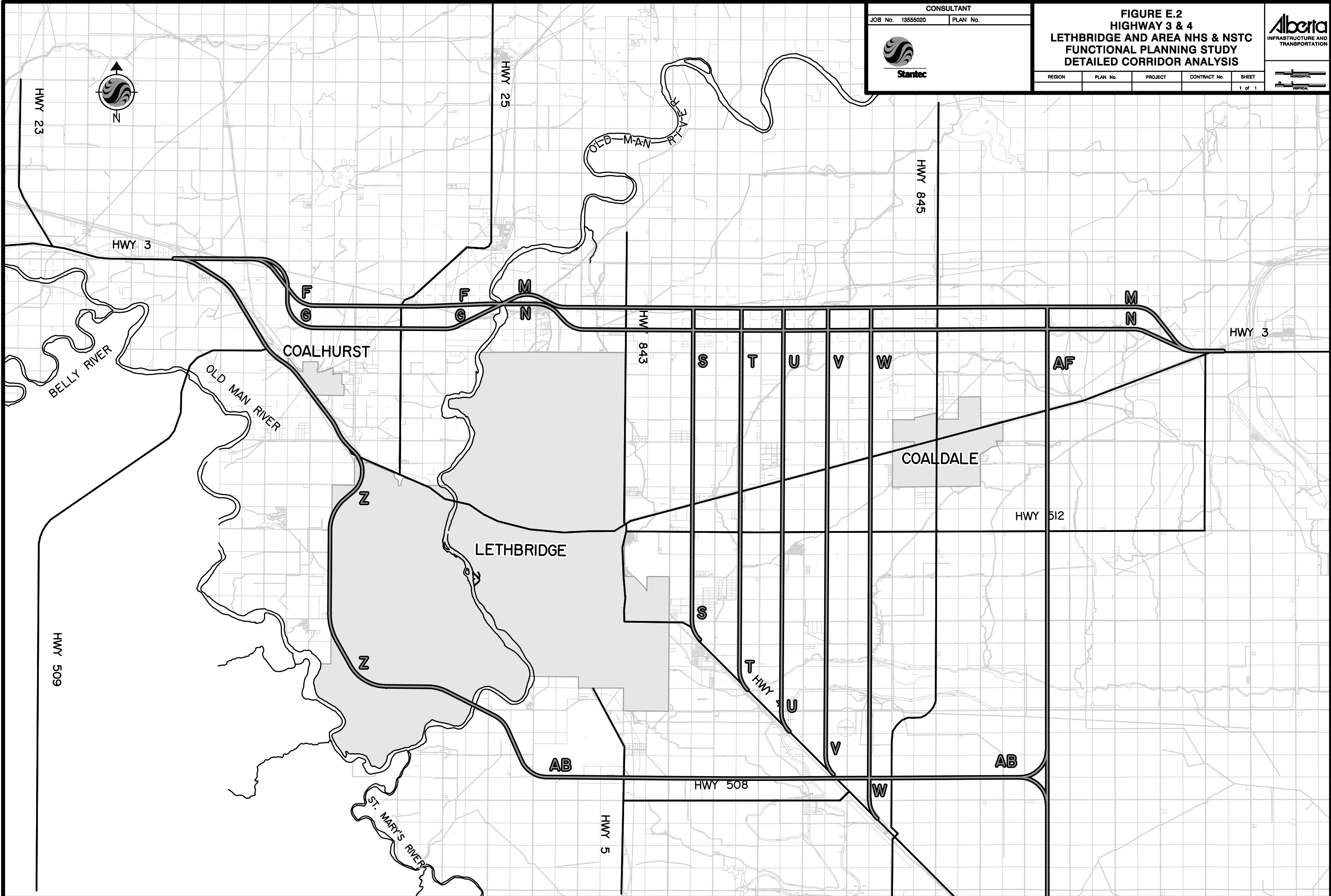




Table E.1  
Summary of Analysis of Best North and South Corridor  
Highway 3 and 4 - Lethbridge and Area

Criteria/Route	SOUTH Z-S3-AB-AF	NORTH F-N4D-M-U
<b>Fiscal Responsibility</b>		
<b>Rating</b>		
Alignment Cost	●	●
Route Usage	○	●
Highway 4 to Highway 3	●	●
Highway 3 to Highway 3	○	●
<b>Environmental/Cultural</b>		
<b>Rating</b>		
Environmental	○	●
Archaeological	○	●
Geotechnical	●	○
<b>Community Viability Impacts</b>		
<b>Rating</b>		
Public Parks	○	●
Dangerous Goods Route (proximity)	●	●
Growth potential	●	●
Development - Direct Property	●	○
Development - Proximity Property (50 m)	●	○
Development – Pivot Irrigated Properties	●	○
Development - Major Landowners	○	●
Development - Diagonal Farm Severance # of quarter sections severed (triangulation)	○	●
Development - Major Farm Landowners # of quarter sections separated	○	●
<b>TOTAL</b>	<b>7</b>	<b>10</b>
<b>Technically Recommended Alignment</b>		<b>*</b>

**Rating Legend**

●  
Good

○  
Moderate

○  
Poor

**ENVIRONMENTAL REVIEW**

The main focus of the environmental review occurred at the river crossing of the Oldman River. N4 would be considered to be a slightly better location for the highway than S3 from an environmental perspective based on the following points:

- S3, which is located in the immediate vicinity of Popson Park, will likely affect a prairie rattlesnake hibernacula. In comparison, based on a review of existing information, the N4 site does not contain a hibernaculum although this would have to be confirmed during the field site inspections.

- Based on a review of existing information and air photo interpretation, it also appears that the S3 site has higher fish habitat values than the N4 site. This is likely a function of the proximity of the S3 site to an important fish spawning and movement corridor (i.e., confluence of the St. Mary River and the Oldman River) and the more braided character of the Oldman River at this site (which increases habitat diversity) than at the N4 site.
- Construction activities associated with the bridge crossing will likely impact a larger area of the Oldman River valley at the S3 site than at the N4 site. The Oldman River is considered to be an environmentally significant site and efforts to reduce the impacts associated with habitat loss, loss of cottonwoods, etc. should be made.
- Since impacts associated with the S3 site are expected to be greater than the N4 site, mitigation and compensation requirements will also likely be greater.

From an environmental perspective, therefore, it would appear that the N4 site would be a better location for the Lethbridge Trade Highway than the S3 site and therefore the northern route is recommended.

## HISTORICAL REVIEW

Overall for the preferred north route there are potential historical resources conflicts with a mixed moderate to high historic resource potential crossing of the Oldman River that will traverse within 200 m of between 2 to 4 previously recorded historic sites. This proposed corridor will require a Historical Resources Impact Assessment for approximately 4 km to 5 km of the corridor and will require a deep testing program to be determined following the standard HRIA study. It is recommended that a historical resources impact assessment (HRIA) be completed for the moderate to high potential segments of the proposed development. This essentially includes the Oldman River valley margins and crossing area. A standard HRIA including a shovel assessment program is recommended for these locales and a deep testing program should also be considered for many locations along the Oldman River valley margins, base, walls, terraces, and in proximity to known sites within the proposed ROW. A palaeontological assessment is also recommended for this crossing of the Oldman River.

## GEOTECHNICAL REVIEW

Of the two possible river crossing locations, the site south of Lethbridge was considered to be more favourable for construction of a bridge as it has improved hydrotechnical attributes (i.e. river channel constancy based on a narrow valley cross-section). In addition, coalmines do not exist in the area and it has better geotechnical characteristics (i.e. closer to bedrock which directly relates to stability). The northerly crossing location was chosen by a compromise between the geotechnical, hydrotechnical and geometric constraints. The presence of two mine shafts and related coalmine workings on the east valley slopes factored in on the highway alignment. It is believed that these coalmines are not directly beneath this crossing. Preloading of the earthwork fill embankments prior to the actual construction of the bridge, with instrumentation to measure settlement and slope movements, are anticipated to be required for this crossing location. Another issue with this crossing is the gravel extraction area on the east river terrace. It is understood from discussions with Lafarge that this area will be further excavated in the future. From a geotechnical perspective, the existing gravel seam provides a



stable base for the future embankment and that further excavation is not preferred. Dewatering of the current water-filled excavation is required. Additional discussion with Lafarge would be required if this crossing is located to determine a course of action suitable to both future highway as well as the landowner.

## PUBLIC AND LANDOWNER CONSULTATION

Throughout the study there were three public open houses held. Prior to the second open house where the technically preferred alignment was presented to public, landowners adjacent to the route (both sides) were contacted. In total 118 invitations were made and a total of 62 landowner meetings were held over a four day period. Some of these meetings were with individuals and in some cases multiple landowners at one time. In addition, stakeholder meetings with the County of Lethbridge, Alberta Environment, Lafarge Canada and the City of Lethbridge were also conducted. The following summarizes the main issues that arose during the meetings:

- Future access to and across the highway (in general);
- Land acquisition procedures (general questions regarding the process);
- Property value (now and in the future);
- Impact to irrigation pivots;
- Loss of land/homes;
- Timing for construction – there are many landowners experiencing difficulty now and would like to see this occur sooner, others who would like to see this occur later; and
- Timing for planning study – why conduct the study so far in advance.

From the discussions held, there were not any significant issues brought to the forefront by the landowners and therefore it was interpreted as confirming the route choice of the TRC for the future NSTC and NHS facilities. Four separate public meetings comprised the second round of open houses. These events (between November 25 and 27, 2003) had 536 members of the public at four different locations. Plans shown at this stage of the study included all the potential river crossings and roadway corridors, routes considered for the detailed analysis and the technically preferred route alignment. From the 235 replies obtained from the questionnaire, the following summarizes the comments from the public:

- 68 replies (29%) indicated that they would be impacted by the preferred route, with 44 of those responses met with the planning team before of the open house;
- 78 replies responded that they had an opportunity to meet and discuss issues; and
- 139 replies (59%) agreed with the preferred alignment concept, and 39 replies (17%) did not agree. 8 questionnaires were blank, while 49 replies were identified as neutral.

As a majority of the work effort involved alignments through the rural environment, there were more presentations to Lethbridge County Council than the other elected bodies. In total 2 presentations were made to the County, and one to the City of Lethbridge and the Towns of Coaldale and Coalhurst. Following the presentation of the technically preferred alignment choice and the recommended route to the public, each local council was requested for an

endorsement of the corridor endorsed by the TRC. There was support/agreement from each of the four councils for adoption of the north alignment between Highway 3 west and Highway 3 east and the east corridor between Lethbridge and Coaldale. Two of the municipalities indicated several outstanding issues along with their support, and these are summarized below.

#### City of Lethbridge

- Request for a supplementary cost-sharing grant for the completion of the Ring Road Functional Planning Study;
- Request a review of the recommended NSTC route for compatibility with the Ring Road Functional Planning Study; and
- Request that all access roads between the City and the NSTC be under the jurisdiction of the Province.

#### County of Lethbridge

- Affected landowners are dealt with fairly and in a timely matter;
- Affected landowners who wish to sell now be given the opportunity; and
- Purchase offers to affected landowners to reflect the forced sale requirement.

### RECOMMENDED IMPROVEMENT STRATEGY

Based on the resolutions of the councils, input from the general public / landowners and analysis by the TRC, the route identified initially as the technically preferred corridor (sections F-N4D-M and U) is also recommended as the future NSTC and NHS alignment for Highways 3 and 4 in the vicinity of Lethbridge (Figure E.3). The following table summarizes an opinion of probable cost for the recommended improvements on the provincial highway network for the entire project (2005). It is noted that highway construction prices have risen dramatically within the last year and the unit rates used to prepare this estimate have been adjusted to account for this increase.

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**FIGURE E.3**  
**HIGHWAY 3 & 4**  
**LETHBRIDGE AND AREA NHS & NSTC**  
**FUNCTIONAL PLANNING STUDY**  
**TECHNICALLY RECOMMENDED ROUTE**

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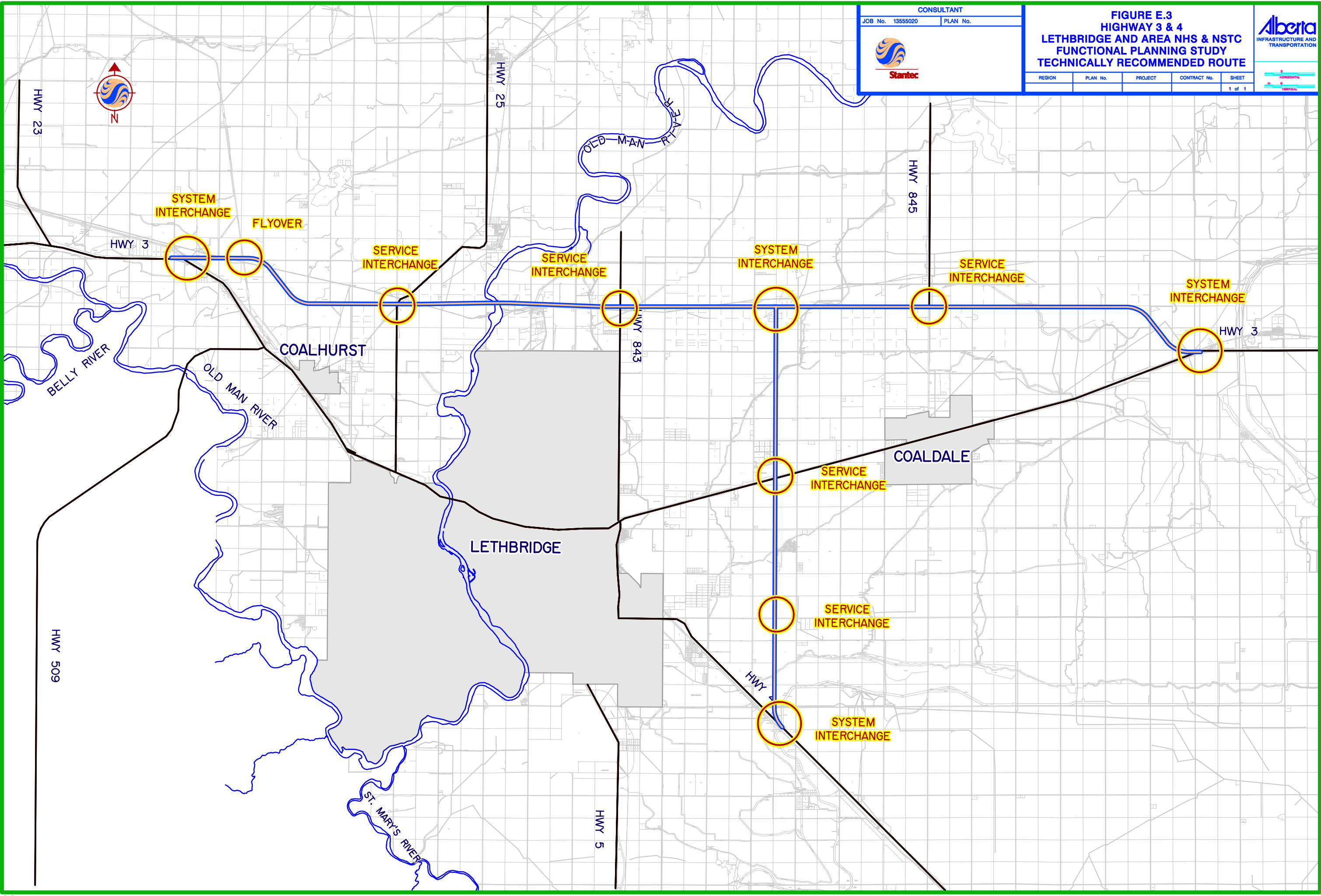


Table E.2  
 Lethbridge and Area NHS and NSTC  
 Opinion of Probable Cost (2005)

**ROAD CONSTRUCTION**

- Highway Construction*	173.5
- Hwy 3 Reconstruction	4.0
- River Crossings	35.8
<b>SUBTOTAL (\$M)</b>	<b>213.3</b>

**INTERCHANGE CONSTRUCTION**

- West Systems Interchange	15.2
- Centre Systems Interchange	19.5
- East Systems Interchange	16.6
- South Systems Interchange	7.5
- Service Interchanges (4)	80.0
- Highway 3 Service Interchange	25.0
- Railway Flyovers (1)	9.0
- Local Road Re-construction	2.4
<b>SUBTOTAL (\$M)</b>	<b>175.2</b>

**MISCELLANEOUS**

- Right-of-Way Impacts	31.8
- Irrigation Impact	14.3
- Major Utility Impact	2.8
- Railway Realignment	5.2
- Canal Crossings	8.9
<b>SUBTOTAL (\$M)</b>	<b>62.9</b>

<b>SUBTOTAL (\$ M)</b>	<b>\$451.5</b>
(10%) Contingency	44.1
(10%) Engineering	49.7
<b>TOTAL (\$M)</b>	<b>\$546.3</b>

\*Note: Parallel service costs not included