

**FUNCTIONAL PLANNING STUDY: HIGHWAY 2 - 6/8 LANE UPGRADE  
HIGHWAY 42 to HIGHWAY 597**

The Highway 2 Planning Study, from Highway 42 to Highway 597 has identified the recommended improvements required for Highway 2 to be widened to six and ultimately eight lanes within the study limits.

The recommendations include a realignment of Highway 2 at the Red Deer River crossing. The existing horizontal and vertical geometry of Highway 2 in the vicinity of the Red Deer River does not meet current standards for a freeway design speed. In addition the existing bridge structures were constructed in 1962 so have a limited design life. However, the recommended realignment requires right of way from the adjacent Maskapatoon Park.

A Value Engineering workshop was conducted in January 2012 to review the Highway 2 alignment options in the vicinity of the Red Deer River crossing. Alternative alignment options were identified which would either eliminate or reduce the encroachment on Maskapatoon park. To confirm the feasibility and cost benefit of each of the alternative options, preliminary engineering will be conducted for each option. A recommendation for the Highway 2 alignment will be confirmed once the preliminary engineering has been completed.



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## Executive Summary

### Functional Planning Study – Highway 2 – from Highway 42 to Highway 597

Al-Terra Engineering was retained by Alberta Transportation to complete a Functional Planning Study to investigate the widening of the Queen Elizabeth II Highway (Highway 2) to a six lane divided freeway standard, with provision for an ultimate eight lane widening upgrade.

To maintain a minimum Level of Service (LOS) of “B” on Highway 2, thresholds of 31,000 and 51,000 Annual Average Daily Traffic (AADT) are used to establish the six and eight lane requirements, respectively. Using these values, in the next ten years, six lanes will be required throughout the study area and eight lanes needed between Taylor Drive and Highway 11. The twenty year horizon analysis suggests eight lanes will be warranted through the study area, except between Gaetz Avenue and Taylor Drive / Highway 2A (< 1 km). Traffic volumes for the next five years have been calculated based on the last ten years of data, traffic growth beyond five years has been estimated at 3.5% in the Red Deer area.

The desired standard cross-section for six lane freeway with design speed 130 km/h has 40 m centerline spacing, which provides median accommodating clear zone and a pier in the median. However, to preserve the existing infrastructure, to avoid sliver construction, and to reduce the right-of-way requirements, three other spacings have been proposed within the project area. It is recommended that 23.0m spacing for six lanes and 31.4m for eight lanes be used south of McKenzie Road; 30.48m spacing for six and eight lanes be used between the Highway 2A and the Highway 11A interchanges; and 32.5m spacing for six lanes and 40.9m spacing for eight lanes be used north of Highway 11A. Transitions are required to retain existing centerline spacing at some structures to accommodate the additional lanes without major structural modifications.

Minimum right-of-way requirements for the six and eight lane stages were determined to be 100 m south of Red Deer, 110 m in the Red Deer area, and 115 m north of Red Deer.

The existing alignment of Highway 2 at the Red Deer River crossing is bounded by Canadian Pacific railway (CPR) right-of-way and Maskatoon Park. There are safety issues with the existing geometry related to the horizontal curves and superelevations. Part of this study was to provide recommendations for improvements through the Red Deer River area. The recommended realignment includes improvements to the vertical (K140; max 3%) and horizontal (R950) geometry, along with two new bridges with shorter-than-existing spans. Construction of the new structures can be staged to minimize disruption to traffic on Highway 2 during construction.

A detailed review of collision data indicated that Highway 2, from McKenzie Road to Taylor Drive and from the Red Deer River crossing to Highway 597 interchange, have higher than average collision rates (over 100 collisions per 100 million vehicle kilometers per year) for the four lane divided expressway. By way of reference, the provincial average is 59 collisions per 100 million vehicle kilometers per year.

Potential habitats for rare species were identified near the river bank area in Maskatoon Park. Further environmental assessment will be required as part of the

detailed design. Most wetlands affected in the area are anthropogenic and do not require compensation. However, for areas that do require compensation within the Maskapatoon Park area, this should occur within the park. Restricted activity periods should be considered to minimize any disturbance to habitats.

The structures within the project area were reviewed for the improvements required to provide six travel lanes. Retaining walls and barriers will be needed at the Highway 42, 32 Street, and Highway 11 eastbound structures. Widening improvements are recommended to the Canadian National railway (CNR) in two locations (south of Highway 11 and north of Highway 11A) and Blindman River structures. The Red Deer River crossing structures are recommended for replacement along with the highway realignment improvements. New structures are needed at Highway 11 westbound, Gaetz Avenue, and Taylor Drive / Highway 2A. The McKenzie Road and Highway 597 structures can remain as existing.

The following chart is presented to summarize projected traffic volumes and the timeframe for when improvements are recommended. Our recommendations are to carry out basic six lane improvements between 32 Street and Highway 11 first, then complete the improvements from McKenzie Road to 32 Street, currently being designed by AECOM. Areas south of McKenzie Road and north of Highway 11A should be completed last. It should be noted that it may be warranted to carry out the full eight laning between 32 Street to Highway 11 (including the Red Deer River crossing) during the initial contract since the warrant for eight laning would be reached within next few years.

### Highway 2 Condition and Improvement Summary

	Highway 42 to McKenzie Road	McKenzie Road to Gaetz Avenue	Gaetz Avenue to Taylor Drive / Highway 2A	Highway 2A / Taylor to 32 Street	32 Street to Highway 11	Highway 11 to Highway 11A	Highway 11A to Highway 597
Length	6.7 km	3.0 km	0.7 km	2.3 km	4.8 km	3.4 km	7.0 km
Current AADT (2010)	33,000	34,000	24,000	35,000	44,000	35,000	35,000
Year Six Laning Required	2006 (Passed)	Existing 6-lane section	2020	2006 (Passed)	2004 (Passed)	2006 (Passed)	2007 (Passed)
Year Eight Laning Required	2032	2028	2043	2020	2014	2025	2024
Estimated Cost (\$ X 10 <sup>6</sup> )	32.1	47.9 <sup>(1)</sup>			77.1 <sup>(2)</sup>	4.0 <sup>(3)</sup>	34.1
Priority Ranking	3	2	2 <sup>(4)</sup>	2	1	2	3

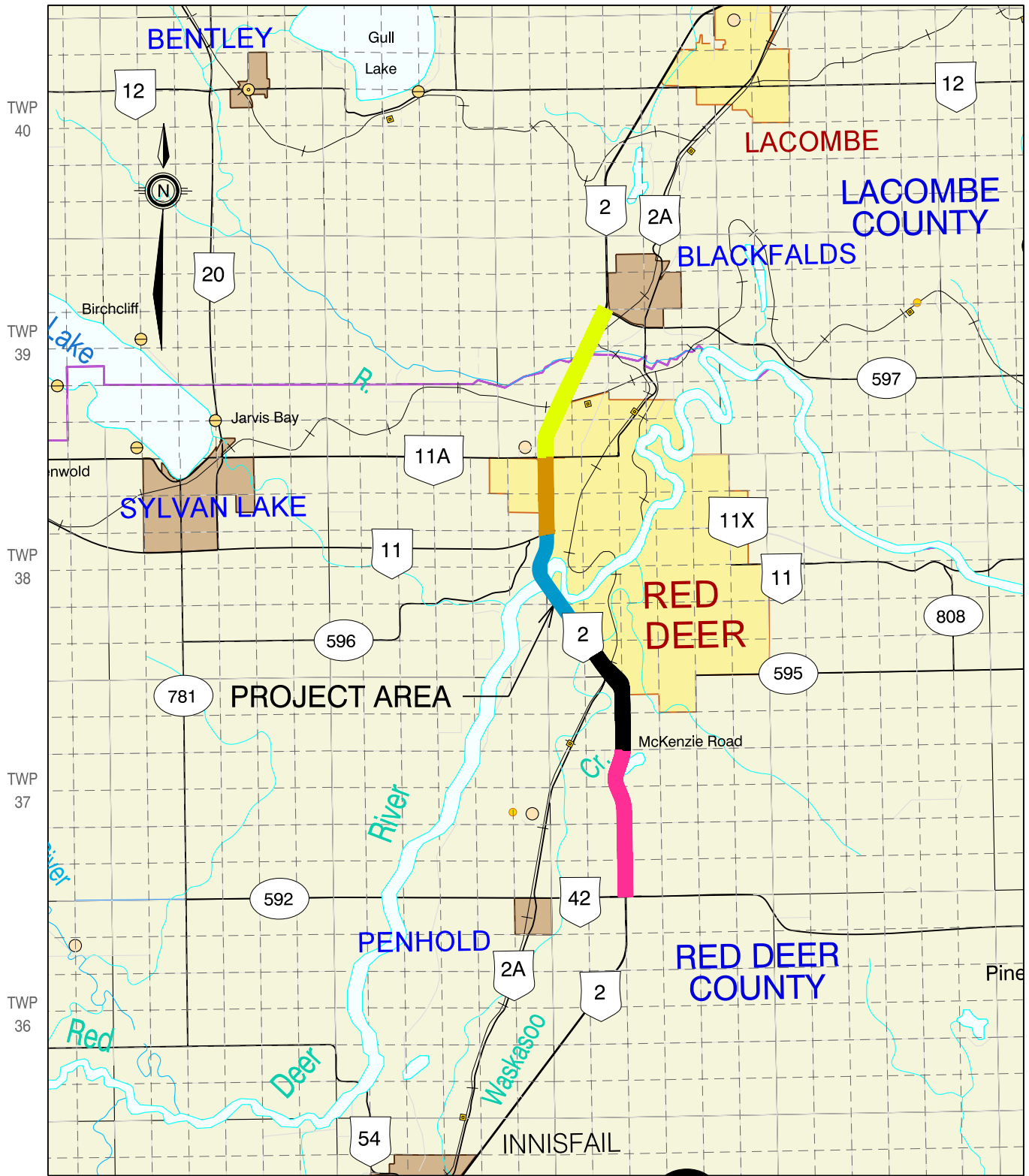
<sup>(1)</sup> Cost estimate provided by AECOM.

<sup>(2)</sup> There are two options available for the section between 32 Street and Highway 11: to reuse the existing structures or build new bridges and carry out full highway realignment. The recommended option replaces the bridges and carries out full realignment. To reuse the existing structures would reduce this section's costs to \$69.3 million.

<sup>(3)</sup> Estimated cost between Highway 11 and Highway 11A does not include the work that is already tendered. The grading work will be completed by the Highway 11A reconfiguration that was to be complete by the end of 2011.

<sup>(4)</sup> The section from Gaetz Avenue to Taylor Drive / Highway 2A has not reached six laning level; however, it should be six laned consecutively with the adjacent sections to maintain consistency. This section is only 1 km.

The total estimated project cost to upgrade to six basic lanes is \$195.1M excluding right-of-way acquisition and utility costs.



- Hwy 42 to McKenzie Road - Priority 3 - \$32.1M
- McKenzie Road to 32nd Street - Priority 2 - \$47.9 M
- 32nd Street to Hwy 11 - Priority 1 - \$76.7M
- Hwy 11 to Hwy 11A - Priority 2 - \$4.0 M
- Hwy 11A to N. of Hwy 597 - Priority 3 - \$34.1 M

*Note: Priorities are based on maintaining a high Level of Service.*

**HIGHWAY 2 PLANNING STUDY  
SIX LANE CAPACITY UPGRADE  
Highway 42 to Highway 597**

**EXECUTIVE SUMMARY - KEY MAP**