

August 28, 2009

CG25309.B

Alberta Transportation
2nd Floor, 803 Manning Road NE
Calgary, AB T2E 7M8

Attn: Mr. Ross Dickson

**Re: Southern Region Geohazard Assessment Program
Highway 40, Limestone Mountain Cut Slope
June 2009 Inspection Report**

This letter documents the June 2009 site inspection of the Limestone Mountain cut slope along Highway 40, approximately 600 m south of the Galatea Creek Provincial Recreation Area parking area.

AMEC Earth & Environmental (AMEC), a division of AMEC Americas Limited, performed this inspection in partial fulfillment of the scope of work for the supply of geotechnical services for Alberta Transportation's (AT's) Southern Region (AT contract CE061/08).

The site inspection was performed on June 10, 2009 by Mr. Andrew Bidwell, P.Eng. of AMEC.

BACKGROUND

The only previous assessment of this site under AT's Geohazard Risk Management Program (GRMP) was during 2005 as part of the Highway 40/Highway 541 corridor review. Please refer to the report on the corridor review¹ for further details. In summary:

- There is a rockfall hazard at this slope due to:
 - Cobble to boulder-size rocks detaching and sliding down exposed bedrock dip planes.
 - Cobble to boulder-size rocks eroding out of the exposed soil in the upper cut slope and falling/rolling downslope.
- The ditch roughly meets the sizing criteria of the "Ritchie ditch" chart.

¹ AMEC report "Geohazards Review, Highway 40/Highway 541 Corridor, Southwestern Alberta", submitted to AT on April 10, 2006, AT contract number CE044/2004, AMEC project number CG25211.

The June 2009 inspection was recommended to AT as a follow-up to the 2005 inspection, due to the recommended Risk Level of 24 being relatively high amongst the other Southern Region sites within AT's GRMP.

SITE OBSERVATIONS

Key observations from the June 2009 inspection were as follows:

- There was an accumulation of gravel to cobble-sized rockfall debris along the toe of the cut slope and extending into the central portion of the ditch, as shown in Photo 1.
- The boulder-sized debris noted along the ditch during the 2005 inspection (see Photo 2) had been cleaned out at some point since 2005, and no additional boulder-sized rocks have subsequently fallen into the ditch.
- There was no rockfall debris along the edge of the paved road surface at the time of the June 2009 inspection.

ASSESSMENT

The rockfall hazard at this site is essentially unchanged from the 2005 assessment, however the associated risk to the highway has been reduced because the accumulation of rockfall debris, including up to boulder-sized rocks, noted in 2005 has been cleaned out from the ditch and relatively little additional debris has accumulated to date.

As noted in the previous inspection, the ditch at this site roughly meets the "Ritchie Ditch" sizing criteria.

RISK LEVEL

AMEC recommends the following Risk Level for this site based on AT's rockfall risk matrix:

- Probability Factor of 13 based on the evidence of several rockfalls each year at the cut slope along the highway. This is slight increase from the value of 12 recommended after the 2005 inspection due to refinements to AT's rockfall risk matrix that result in a value of 13 rather than 12 for the conditions at this site.
- Consequence Factor of 1, based on the existing ditch being able to contain rockfalls if cleaned as required to maintain the ditch capacity.

Therefore, the recommended Risk Level is 13. This is a reduction from the value of 24 recommended after the 2005 inspection,.

RECOMMENDATIONS

No further work is recommended for this site aside from cleaning of accumulated rockfall debris from the ditch as required to keep the ditch reasonably close to maximum capacity.

The occasional site inspections by AT and AMEC personnel as part of AT's GRMP should be discontinued unless AT or maintenance contractor personnel report increased volumes of rockfall debris in the ditch which may indicate a change in the rockfall conditions at this site.



CLOSURE

This report has been prepared for the exclusive use of Alberta Transportation for the specific project described herein. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it are the responsibility of such third parties. AMEC Earth & Environmental, a division of AMEC Americas Limited, cannot accept responsibility for such damages, if any, suffered by any third party as a result of decisions made or actions based on this report. This report has been prepared in accordance with accepted geotechnical engineering practices. No other warranty, expressed or implied, is made.

We trust that this meets your needs at this time. Please contact the undersigned if you have any questions or require any further information.

Respectfully Submitted,

**AMEC Earth & Environmental,
a division of AMEC Americas Limited**

Andrew Bidwell, M.Eng., P.Eng.
Associate Geological Engineer

APEGGA Permit to Practice No. P-04546

Reviewed by:

Pete Barlow, M.Sc., P.Eng.
Principal Geotechnical Engineer

Attachments: Photos 1 and 2



Photo 1 (top) – June 2009

Facing south along the east highway ditch adjacent to the cut slope. The rockfall debris from this cut slope is contained within the existing ditch.



Photo 2 (bottom) – 2005

Facing north along the east highway ditch, across the same area shown in Photo 1. At the time of the 2005 inspection there was a significant accumulation of up to boulder-sized rockfall debris along the ditch.