



December 2013

CG25399

Alberta Transportation  
2<sup>nd</sup> Floor, 803 Manning Road NE  
Calgary, AB T2E 7M8

**Attention: Mr. Ross Dickson**

Dear Ross:

**Re: Southern Region Geohazard Assessment  
2012 Annual Inspection Report  
Site S15: Highway 3:02, Crowsnest Lake Rock Fall Barrier**

This report documents the 2013 annual site inspection of Site S15 – Crowsnest Lake Rock Fall Barrier, along Highway 3:02 on the southeast shore of Crowsnest Lake, west of Coleman, AB and a short distance east of the border between Alberta and British Columbia. There is a rock fall hazard to the highway at this site that is being mitigated by a rock fall barrier net.

AMEC Environment and Infrastructure (AMEC), a division of AMEC Americas Limited, performed this inspection in partial fulfilment of the scope of work for the supply of geotechnical services for Alberta Transportation's (AT's) Southern Region (AT contract CON0013506).

The site inspection was performed on May 28, 2013 by Bryan Bale, P.Eng., Hugh Wang, P.Eng., and Tyler Clay, E.I.T., of AMEC; and Roger Skirrow, P.Eng., and Ross Dickson of AT during the 2013 Annual Tour.

## **1.0 SUMMARY**

The site condition is relatively unchanged from the 2012 inspection. The rock fall barrier was in good condition. Damage to the road surface was observed west of the barrier net site due to scaling work. The 2012 scaling work has reduced the potential for large rock falls but the amount of rock fall does not appear to have reduced based on the visible accumulations. The risk level has increased to 48 from 32 assigned in the 2012 assessment due to a reduction in the barrier capacity as a result of the accumulated debris. The site should be inspected next in 2014.

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## 2.0 BACKGROUND

A general description of the geohazard conditions at this site along with the site geological setting and chronology of previous events, investigations, monitoring and repair work were provided in the 2007 annual inspection report<sup>1</sup>.

The rock fall hazard at this site was first identified by AT in the late 1990's. Subsequent work by AT and their geotechnical consultants culminated in the installation of a rock fall barrier net in November 2005. The annual inspections of the site have been continued since the barrier net was installed in order to monitor the effectiveness of the barrier net and troubleshoot its required maintenance. A call-out site inspection to assess the rock fall hazard along the segment of the highway immediately west of the barrier net was also performed in June 2008<sup>2</sup>.

During the spring of 2012, the barrier net was replaced by two free-standing, offset barriers with clearance for equipment access. Refer to the 2012 annual report<sup>3</sup> for further details on the replacement barrier and the changes from the previous barrier.

## 3.0 SITE OBSERVATIONS

A summary of the observations from the May 2013 inspection is presented below:

- The rock fall barrier was in good condition with no sign of damage. The support posts were straight and showed only minor damage from rock fall impacts. None of the brake elements appeared to be activated. Refer to Photos S15-1 and S15-2.
- The chain link fence that was placed behind the cable mesh had numerous holes that could allow small rocks through. No holes were observed in the cable mesh. Refer to Photo S15-3.
- A large talus cone of fallen rock had accumulated behind the barrier net since the 2012 inspection. Refer to Photo S15-4.
- Impact marks were found on the road surface and guardrail to the west of the site, reportedly due to scaling work at the time of barrier replacement in Spring 2012. Refer to Photo S15-5.
- The head of the gully in the talus slope rock fall source area appeared steeper than was observed during the 2012 inspection and also appeared to have retrogressed slightly further

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<sup>1</sup> AMEC Earth & Environmental, 2007. *Southern Region Geohazard Assessment, Annual Assessment Report, 2007*, Project Number CG25263, submitted to AT November 6, 2007.

<sup>2</sup> AMEC Earth & Environmental, 2008. *Report On June 3, 2008 Site Inspection, Highway 3:02 Crowsnest Lake, Alberta*, Project Number CG25277.D, submitted to AT June 16, 2008.

<sup>3</sup> AMEC Environment & Infrastructure, 2012. *Southern Region Geohazard Assessment, Annual Assessment Report, 2012*, Project Number CG25399, submitted to AT November 20, 2012.

upslope. Refer to Photos S15-6 and S15-7 for a comparison of the upper gully from the 2012 inspection.

- A rock was found at the road edge that appeared to have outflanked the net on the west side. The largest rock found was 0.6 m x 0.4 m x 0.4 m. Refer to Photo S15-8.

#### **4.0 ASSESSMENT**

The general conditions of the site and barrier have not changed since the 2012 inspection. The following assessment remains valid:

- The ongoing headward retrogression of the gully in the talus slope and the bare bedrock surface within the gully will create a higher-energy rock fall path. Also, the gully appears to be retrogressing to the northwest into a higher talus slope. Rock fall is expected to continue for the foreseeable future, potentially with higher energy. This increases the risk at the site.
- Potential large rockfall sources may have been cleared by scaling in 2012. Continued rock fall accumulation behind the barrier and on the road shoulder indicates that the amount of rock fall has not been significantly reduced.
- As considered previously, the replacement barrier is thought to be slightly less effective than the properly assembled previous barrier but more effective than the previous barrier in its unmaintained state. Some rock fall has outflanked the new barrier, confirming this assessment.
- The talus cone that has accumulated behind the current barrier increases the risk of barrier capacity being exceeded.

#### **5.0 RISK LEVEL**

The recommended Risk Level to the highway at the barrier net location based on AT's rock fall risk matrix is as follows:

- The Probability Factor for this site should be set at 16 to reflect the active rock fall.
- The Consequence Factor for this site should be increased to 3 to reflect the observed rock fall on the road shoulder and accumulated debris that has reduced the barrier capacity.

Therefore, the current recommended Risk Level at the barrier net site is 48 (i.e. 16 x 3), which is increased from the level of 32 assigned in 2012, and reflects the result of the reduced barrier capacity as a result of rock fall accumulation and improved understanding of potential rock fall occurring outside the barrier's width of coverage.

## 6.0 RECOMMENDATIONS

### 6.1 Maintenance and Short Term Measures

The maintenance contractor should clean out the rock fall debris as required in order to keep the volume of accumulated debris behind the net to a practical minimum.

### 6.2 Long Term Measures

The barrier net should be regularly inspected and maintained as recommended in the manufacturer's guidelines. The annual site inspections by AT and geotechnical consultant personnel should be continued.

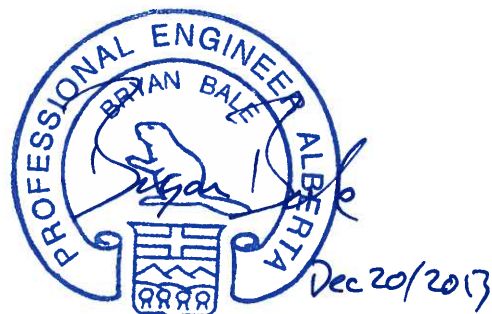
## 7.0 CLOSURE

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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 Environment & Infrastructure,  
a division of AMEC Americas Limited**



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