

July 19, 2010
CG25332.300

Mr. Ross Dickson
Alberta Transportation
2nd Floor, 803 Manning Road NE
Calgary, AB T2E 7M8

Dear Ross:

**Re: Southern Region Geohazard Assessment
Spring 2010 Instrumentation Monitoring Results
Site S31: Highway 762:02, "Mystery Culvert" Site**

1.0 OBSERVATIONS

1.1 Field Program and Instrumentation Status

The slope inclinometer (SI) at this site was read on May 3, 2010 by Mr. Bryan Bale, P.Eng, of AMEC Earth and Environmental (AMEC), a division of AMEC Americas Limited.

The SI was read using a metric Slope Indicator probe and Digitilt Datamate readout manufactured by Durham Geo Slope Indicator (DGSI). Inclinometer reading depths were referenced to the top of the SI casing.

Please refer to Figure S28-1, attached, for a site plan showing the instrument location.

The SI was installed in the summer of 2009 in order to check the depth of movement below an area of ongoing settlement and cracking of the road surface, and to thereby provide a basis to select the most appropriate repair measure for this site. Please refer to the 2009 annual inspection report¹ for this site as well as the report on the June 2009 borehole drilling and SI installation² for further information on the site conditions. The site conditions at the time of the October 2009 instrument readings were largely unchanged from observations during 2008 and earlier in 2009.

¹ AMEC report "Southern Region Geohazard Assessment Program, Site S31 – "Mystery Culvert", 2009 Annual Inspection Report", submitted to AT on August 20, 2009, AMEC project number CG25309.B.

² AMEC report "Southern Region Geohazard Assessment Program, June/July 2009 Instrument Repairs and Installations", submitted to AT on September 4, 2009, AMEC project number CG25309.C.

2.0 INTERPRETATION AND RECOMMENDATIONS

2.1 General

Plots of the SI data are attached and the data is summarized in the following sections.

2.2 Zones of Movement

There has been continued movement in the previously-noted movement zone around 3.8 m depth in the SI. No new movement zones were identified in the May 2010 data.

2.3 Interpretation of Monitoring Results and Recommendations

2.3.1 Interpretation

SI 2009-1 (Figures S31-2 to 4)

- There has been approximately 25 mm of downslope movement at 3.8 m depth since the baseline reading on July 30, 2009. This movement is occurring at the contact between the soft to firm clay and silt road fill and the underlying stiff to very stiff, native clay till soil.
- As shown on the displacement vs. time plot on Figure S31-4, the rate of movement slowed after the September 10, 2009 reading but is ongoing.

2.3.2 Recommendations

The movement has continued at the previously noted depth of 3.8 m. AMEC recommends proceeding with a repair for the site. The repair could include:

- Excavating the road fill approximately 0.5 to 1 m below the depth of movement, with the lateral extents of the excavation extending a nominal distance on either side of the visible damage to the road surface. The excavation should be laid out on a surveyed site plan/cross-section of the road embankment in order to check the excavation base elevation relative to the elevation of the swampy area on the valley floor adjacent to the road embankment and determine provisions for groundwater control in the excavation as well as appropriate excavation sideslopes for short-term stability during construction.
- Reconstructing the road embankment with clean, free-draining backfill.

This recommended repair would entail a temporary closure of the highway, however it is judged to be the most practical and appropriate for the site conditions. AMEC would be pleased to provide specifications and drawings to guide the repair construction by AT's maintenance contractor, or alternatively could prepare a design and draft tender package for the repair work if AT would like.

3.0 INSTRUMENTATION REPAIRS AND MAINTENANCE REQUIRED

No repairs are required at this time. Note that SI 2009-1 is a 75 mm diameter casing, and will likely be inoperable in the near future due to excessive deformation.



TABLE S28-1
SPRING 2010 – “Mystery Culvert” Site
Slope Inclinator Instrumentation
Reading Summary

Date Monitored: May 3, 2010

INSTRUMENT NAME AND COORDINATES (LATITUDE AND LONGITUDE)	DATE INITIALIZED	TOTAL CUMULATIVE RESULTANT MOVEMENT AT DEPTH SINCE INITIAL READING	MAXIMUM RATE OF MOVEMENT	CURRENT STATUS	DATE OF PREVIOUS READING	SINCE PREVIOUS READING		
						INCREMENTAL MOVEMENT	RATE OF MOVEMENT	CHANGE IN RATE OF MOVEMENT
SI 09-1 (co-ords n/a)	July 30, 2009	24.8 mm at 3.8 m depth	127 mm/yr (Sept/Oct 2009)	Operational	October 20, 2009	7.5 mm	14 mm/yr	-11 mm/yr

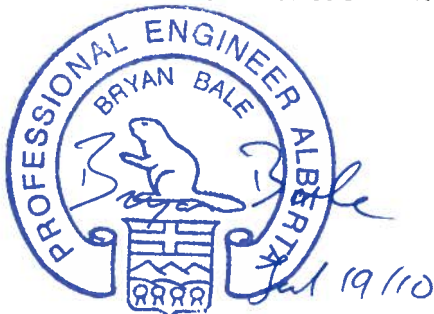
4.0 CLOSURE

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**



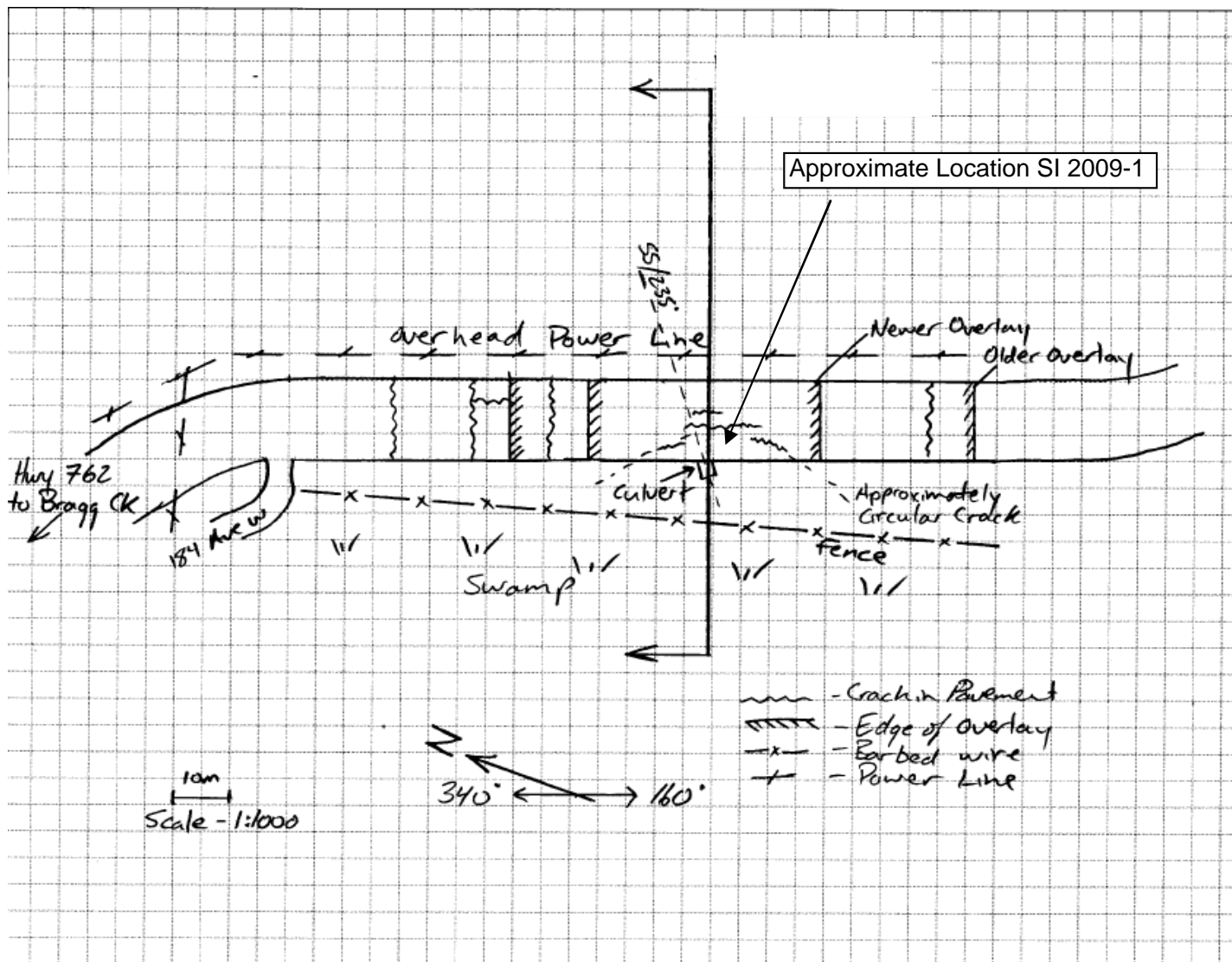
Bryan Bale, M.Sc., P.Eng.
Geotechnical Engineer

APEGGA Permit to Practice No. P-04546

Reviewed by:

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

Attachments: Figures S31-1 to S31-4



Note:

1. Schematic only, based on June 2008 site inspection. All dimensions approximate.

Client	Alberta Transportation		Figure S31-1	
Project	Southern Region Geohazard Assessment		Date:	Revision
	SITE S31 - "MYSTERY CULVERT"		Jun-10	
	HIGHWAY 762:02		Job No.	
	SCHEMATIC SITE PLAN		CG25332.300	
			File No.:	

