



December 14, 2005

File: 15-85-11

Alberta Infrastructure and Transportation
Room 223, Provincial Building
4709-44 Avenue
Stony Plain, Alberta
T7Z 1N4

Attention: Mr. Michael Baik

**NORTH CENTRAL REGION GEOHAZARD ASSESSMENT
HWY39:06 – SLIDE NEAR GREENWOOD LAKE ROAD (NC23)
2005 ANNUAL INSPECTION REPORT**

Dear Sir;

This letter documents the 2004 annual site inspection of a portion of Highway 39:06 located at km 12.6 (refer to Figure NC23-1, Section F). Thurber Engineering Ltd. (Thurber) undertook this inspection in partial fulfillment of our Geotechnical Services for Geohazard Assessment, Instrumentation Monitoring and Related Work contract (CE046/2004) with Alberta Infrastructure and Transportation (AIT).

Mr. Renato Clementino, P.Eng of Thurber undertook the inspection on May 19, 2005 in the presence of Mr. Roger Skirrow, P. Eng., Mr. Michael Baik, and Mr. Wilfred Cousineau of AIT.

1. BACKGROUND

Thurber last visited the site in May 2004 and the site condition at that time is described in our Part B assessment letter in the site binder.

2. SITE OBSERVATIONS

The changes in condition since last year are shown on the attached site sketch plan in Figure NC23-1; a site cross section is provided in Figure NC23-2 in Section F. Selected photographs taken during the visit are also attached.

In comparison with last year, the pavement distress has somewhat worsen. Some cracks have increased in length and some new ones have appeared.

The three sinkholes (one on the south side and two on the north side) along the blocked culver have increased in diameter. The one in the south side was also full of water at the time of the site visit.

The ponds along the south ditch appears unchanged, however the ditch bottom further east close to the east culvert inlet was wet and lush vegetation was found growing in the area.

No significant change was observed on the scour at the west culvert outlet location.

The site was not patched last year, and the appearance of new cracking on the pavement correlates with the relatively high movement rates recorded in the spring 2005 slope inclinometers readings, which varied from 4.2 to 20.2 mm/y, with a few SIs showing an increase from in rates from 2004.

During the site visit, subhorizontal drains were being installed as part of the slope stabilization program. The drain installation work was completed on June 14, 2005. By that time the subhorizontal drains discharge rate was approximately 20 L/min. The second and last phase of the slope stabilization work will consist of the replacement of the existing blocked culvert, which transverse the highway, dewatering the adjacent ponds and regrade the south ditch and the new culvert outlet area. This work is planned to start in mid September of 2005.

3. ASSESSMENT

Based on the site observations and slope inclinometers readings the slide is still active with a steady to increasing rates of movement. However, the remediation work (dewatering of the slope) that is currently being carried out should likely reduce the rate of movement and bring the slope to a more stable condition.

4. RISK LEVEL

The risk level for this site has been assessed as follows:

$$PF(10) * CF(4) = 40$$

A Probability Factor of 10 is considered appropriate since the slide is active with a perceived moderate steady to increasing rate of movement. A Consequence Factor of 4 is considered appropriate since the embankment fill is fairly high and a partial closure of the road would be a direct result of an aggressive slide movement. This risk level is the same as presented in 2004 because it was not

possible yet to evaluate the slope dewatering influence on the slope stability. It is expected that the dewatering will reduce the rates of movement and consequently the risk level. This will be assessed in the next set of instrumentation reading this fall.

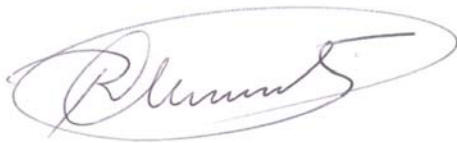
5. RECOMMENDATIONS

Since the remediation work for this site is currently on progress, with estimated completion date for the end of October 2005, no further recommendation is applicable for this site until the work is completed and the remediation performance can be assessed in the following year.

6. CLOSURE

We trust this assessment and recommendations meet with your needs at this time. Please contact the undersigned should questions arise or if the slide condition worsens.

Yours very truly,
Thurber Engineering Ltd.
Don Proudfoot, P.Eng.
Review Principal



Renato Clementino, P.Eng.
Project Engineer

Attachments