November 22, 2007 File: 15-85-66

Alberta Infrastructure and Transportation
Unit 2, Jewell Building
3603 – 53 Street
Athabasca, Alberta
T9S 1A9

Attention: Mr. Arthur Kavulok

NORTH CENTRAL REGION GEOHAZARD ASSESSMENT
HWY 661:02 NEAR THE NORTHEAST BOUNDARY OF
THE TOWN OF FORT ASSINIBOINE (NC14)
2007 ANNUAL INSPECTION REPORT

Dear Sir:

This letter documents the 2007 annual site inspection of an area of slope instability located along Hwy 661:02 on the northeast boundary of the Town of Fort Assiniboine, Alberta (refer to Figure NC14-1 attached for inclusion in Section F of the binder).

Thurber Engineering Ltd. (Thurber) undertook this inspection in partial fulfillment of our Geotechnical Services for Geohazard Assessment, Instrumentation Monitoring and Related Work contract (CE141/06) with Alberta Infrastructure and Transportation (INFTRA).

Mr. Renato Clementino, P.Eng of Thurber undertook the inspection on May 23, 2007 in the presence of Mr. Rocky Wang of INFTRA.

1. BACKGROUND

Thurber last visited the site in May 2006 and the site condition at that time is described in our Part B assessment letter in the site binder. Additional site information is provided in the Geotechnical File Review in Section A and Section G of the binder.

Thurber installed five slope inclinometers (SI) and 12 standpipe piezometers (SP) at this site in March 2006 under a different assignment for INFTRA, as described in the Thurber report dated May 31, 2006 - File 15-85-28, which is included in Section G.

2. SITE OBSERVATIONS

The changes in condition since last year are shown on the attached site sketch plans; Figure NC14-1 (overview) and Figure NC14-2 (detail of the mid-hill slide area). A cross-section prepared by AGRA Earth & Environmental passing through the main portion of the slide was presented in Thurber's (2000) report as Figure NC14-3 and is included in Section F of the binder for reference. Selected photographs taken during the 2007 visit are also attached.

Visually there was not much difference in site features than what was observed in 2006. A few new pavement cracks were observed and the previous cracks appeared to be slightly more open with an average width of about 10 mm. No to small differential drop was observed across the cracks.

The mid-hill crack was about 20 mm wide with a small differential drop across the crack.

Other slide features, i.e., scarps and graben, existing on the sideslope were inspected and no noticeable changes were observed from that observed last year.

The collection well (CSP) located at the toe of the mid-hill slope was inspected and the existing pipes were trickling with a steady drip of water at the time of the inspection. A small slump had occurred near the collection well (northeast side) and part of the slumped material had spilled over the collection well lid.

The CSP manhole located in the back slope near the bottom of the hill was also inspected, but the lid could not be removed. The CSP is perforated just above the ground level to collect surface water. As happens every year, these holes were mainly clogged and water was ponding at surface to the east of the manhole. The source of the water appears to be from a natural surface drainage course that comes from the north side of the manhole. The holes were cleaned with a stick and water started to flow into the manhole.

3. ASSESSMENT

The observed pavement distress is a clear indication that some slide activity is occurring on this site. However, the recent SI readings taken on May 22, 2007 do not show any noticeable slope movement.

It is believed that the slope movement on this site is related to the groundwater elevation. The last three sets of groundwater level readings show no increase in groundwater elevation, in fact the last readings (May 22, 2007) show a decrease in groundwater elevation. This may explain the lack of recent movement in the SIs.

There is likely an on going creep movement that causes the pavement distress but is too slow to be capture by the SIs in just one year of monitoring. It is expected that if there is a future rise in the groundwater elevation the slope movement rate will increase and will be captured by the SI readings. Further instrumentation monitoring should confirm this.

SP06-4 and 06-5 were installed adjacent to each other at 15 m and 25 m depths, respectively. The water levels measured in SP06-4 and SP06-5 were 9.3 m and 15.8 m below ground surface, respectively. This may be an indication of perched water, which could be a contributing factor to the slope instability.

4. RISK LEVEL

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

PF(8) * CF(4) = 32

A Probability Factor of 8 is considered appropriate since the slide is active with a slow of ongoing 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.

5. RECOMMENDATIONS

5.1 Short Term

In the short term the site should be regularly inspected by the MCI especially after heavy and long precipitation events. Cracks in the surface of the road that open up should be sealed to reduce the inflow of water into the slide mass.

5.2 Long Term

High groundwater levels appear to be the major cause of the instability at this site. The installed instrumentation will provide, with time, valuable information for understanding the failure mechanism and will allow for a better assessment of the potential remediation options for this site. Further monitoring is required to build up the data bank for this site and allow for a better understanding of the groundwater flow regime.

5.3 Maintenance

As a maintenance item for short term improvement of the slope stability it is recommended to inspect and clean the existing collection points to improve

groundwater discharge that seems to be decreasing over the years possibly due to siltation in the collection points.

Consideration should be given to installing a surface drainage treatment around the collection point located at the south end of the backslope to reduce the potential of having the existing holes clogged. This treatment may consist of excavating around the perimeter of the manhole to expose the holes, cover the exposed perimeter, holes and bottom of the excavation with non-woven geotextile and backfill with washed rock. This should allow the surface water to enter the manhole while reducing the potential for clogging of the holes.

6. CLOSURE

We trust this assessment and recommendations meet your present requirements. 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, Ph.D., P.Eng.
Project Engineer
/dw

Attachments

cc: Mr. Roger Skirrow, P.Eng. (Geotechnical Director, INFTRA)