November 23, 2007 File: 15-85-70

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

Attention: Mr. Randy Shaul

NORTH CENTRAL REGION GEOHAZARD ASSESSMENT
HWY39:06 – SLIDE NEAR GREENWOOD LAKE ROAD (NC23)
2007 ANNUAL INSPECTION REPORT

Dear Sir:

This letter documents the 2007 annual site inspection of a portion of Highway 39:06 located at km 12.6 (refer to Figure NC23-1 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 CE142/2006 with Alberta Infrastructure and Transportation (INFTRA).

Mr. Renato Clementino, P.Eng of Thurber undertook the inspection on May 23, 2004 in the presence of Messrs. Rocky Wang. and Randy Shaul 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 included in the site binder.

After the 2005 assessment, construction activities were undertaken on this site for the installation of subhorizontal drains and replacement of a non-functioning culvert with a new smooth wall steel culvert (SWSC). In addition, grading of the surrounding area was also performed to provide positive drainage of surface water and avoid ponding of water on the slope. The remedial construction work was completed at the end of October 2005.

Detailed information regarding the design and construction are provided in two construction completion reports from Thurber Engineering Ltd. submitted to AIT titled "Drainage Improvement and Other Work Contract 6585/04" (August 18, 2005) and "Culvert Replacement, Grading and Other Work Contract 6979/05 (February 6, 2006).

At the time of this site reconnaissance Construction activities were ongoing for the addition of a climbing lane on the north side of the highway and the placement of an asphalt overlay.

2. SITE OBSERVATIONS

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

The new construction activities did not allow for a full inspection of the north side slope since the area had been stripped and grading was cut and was being carried out for the construction of the climbing lane. However it was noted that the new sideslope is steeper at the location of the existing centreline culvert outlet than the adjacent slope further from the culvert.

The instruments (PN03-3 and 4 and SI01-4) located in the path of the new climbing lane were being preserved by the Contractor so they could still be read after construction.

In comparison with last year, the pavement distress had not changed significantly. Some of the old cracks that have been patched over had re-opened and some new ones had appeared.

At the time of this site inspection, all the previous locations where water was pooling were dry. Site drainage had improved considerably after the grading work performed in 2005.

The west drainage collection point had two subhorizontal drains producing water. No flow was observed from the drains in the east drainage collection point. However, in a previous call-out (May 7, 2007) performed at this site by Mr. Clementino for the climbing lane construction, it was noted that at that time the east collection point had one subdrain producing water.

The gabion outfall is performing well, however there is small erosion forming at the west end at the gabion/soil interface. The vegetation is catching well in the gabion mat installed along the base of the gabion wall.

3. ASSESSMENT

All the SI readings show a significant drop in movement rates since the drainage remediation work was completed. The recorded rate of movement has been small for the last three sets of SI readings. Also no significant increase in groundwater elevation has been observed in the piezometers with the exception of the groundwater level in PN01-2A which has increased 3.4 m, and is now at 1.5 m below ground surface.

Base on the instrumentation results, it is expected that the pavement distress will reduce with time as the groundwater continues to drain. However, the addition of the climbing lane, which has added a new load to the sideslope, may increase somewhat the slope rate of movement. Further instrumentation monitoring data will allow for a better assessment of the slope performance in response to the climbing lane construction.

4. RISK LEVEL

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

PF(7) * CF(4) = 28

A Probability Factor of 7 is considered appropriate since the instrumentation shows that the slide is relatively inactive; however the addition of the climbing lane fill may increase the pore pressure causing a possible remobilization of the slide. A Consequence Factor of 4 is considered appropriate since the embankment is relatively long, with a high side slope and a partial closure of the road would be a direct result of an aggressive slide movement.

5. RECOMMENDATIONS

5.1 General

Continued monitoring of the slope and instrumentation is recommended as programmed to evaluate the performance after the construction of the climbing lane.

As observed during the site reconnaissance, the new sideslope for the climbing lane is oversteepened at the location of the existing centreline culvert compared to the adjacent slope. Therefore consideration should be given to extending the existing culvert to allow the sideslope to be flattened at this location. This recommendation was discussed with EBA Consultants Ltd. who were administering the highway rehabilitation contract.

5.2 Maintenance

The scour that is forming at the interface of the gabion wall and soil at the west end should be repaired and the ground above the gabion should be re-graded to direct the surface water flow to spill over the top of the gabion wall and not along the interface.

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
/dw

Attachments

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