

January 12, 2006

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Alberta Infrastructure and Transportation Room 301, Provincial Building 9621 - 96 Avenue Peace River, AB T8S 1T4

Attention: Mr. Ed Szmata

### PEACE REGION (PEACE RIVER / HIGH LEVEL) GEOHAZARD ASSESSMENT HWY 35:08, SITE PH11, WHITEMUD RIVER STATION 42+600 AND 43+200 SHALE SLOPE SITE 2005 ANNUAL INSPECTION REPORT

Dear Sir;

This report documents the 2005 annual site inspection of areas of slope instability at Stations 42+600 and 43+200 (Shale Slope Site) along Hwy 743:02 at the Whitemud River Valley crossing. Thurber Engineering Ltd. (Thurber) undertook the inspection in partial fulfillment of our Geotechnical Services for Geohazard Assessment, Instrumentation Monitoring and Related Work contract (CE049/2004) with Alberta Infrastructure and Transportation (AIT). The inspection was undertaken on June 21, 2005 by Mr. Don Proudfoot P. Eng and Mr. Vedran Bijeljanin, E.I.T., of Thurber along with Mr. Ed Szmata, Ms. Amanda Russell, and Mr. Roger Skirrow, P.Eng of AIT.

### 1. GENERAL

Hwy 743:02 crosses the approximately 140 m deep Whitemud River valley in a southeast to northwest direction following tributary valleys of the river. Through much of the river crossing the alignment is in a sidehill cut/fill arrangement.

The approximate locations of the above sites are shown on the attached site location map. The available background information for the two sites is also described in the Geotechnical File Review in Section A of the site binder. More site specific and recent information is summarized in Thurber's 2004 inspection report included in Section B.



## 1. STATION 42+600

### 1.1 Background

The site consists of a 20 m high embankment fill east of the highway, located at a Whitemud River tributary creek crossing. At this location the creek is channeled into a 1.57 m diameter CMP that crosses under the highway at a skew. There is also a 1.12 m diameter CMP overflow pipe located 4m higher up the embankment.

The east slope of the embankment failed some time prior to 1987. Slope reconstruction was implemented in 2002 that consisted of excavating the slide mass in a benched cut, placing gravel along the backslope and base of the cut, and rebuilding the slope with clay backfill containing geogrid and drainage gravel layers. A 610 mm diameter HDPE drop pipe c/w concrete headwall was also installed down the repaired slope to drain water from the southeast highway ditch down to the creek. Erosion protection measures were also implemented consisting of armouring the creek bed with gabions and riprap. Copies of the design drawings are attached for inclusion in Section G of the site binder.

### 1.2 Site Observations

A sketch plan and selected photographs which describe the conditions of the site were taken on June 21, 2005 are attached.

At the time of the site visit the repaired slope appeared stable and there were no signs of instability.

At the culvert outlet water seepage was observed behind the gabion blocks causing surface erosion.

#### 1.3 Assessment

The repaired slope appears stable and drainage is good based on the performance of the existing culverts. However, the surface erosion at the culvert outlet behind the gabion blocks could cause future local slope instabilities.

#### 1.4 Risk Level

A risk level has not been assessed for this site since the recent remedial measures appear to be performing well.



## 1.5 Recommendations

In order to provide a better containment for the water flow from the culvert outlet, the gabion blocks (walls) located on each side of the outlet should be extended upwards. In addition, the erosion channel north of the gabion blocks should be reinforced with rip rap underlain by geotextile to prevent further soil erosion.

The ballpark cost of these maintenance measures is \$10,000. Timely maintenance repairs may avoid much higher future reconstruction measure at the culvert outlet.

## 2. STATION 43+200 (SHALE SLOPE SITE)

### 2.1 Background

It is understood that the roadway has been realigned into a cut slope, which consists of clay shale. The slope is too steep to support vegetation growth and as the surface of the shale weathers, surface layers become unstable and slide down the slope into the road ditch. The accumulation of the shale debris is removed from the roadway ditch as required and placed in a designated spoil area.

### 2.2 Site Observations

A sketch plan and selected photographs of the site are attached+. The weathered shale backslope was quite steep and there was shale debris in the ditch at the time of the site visit. It appeared that the ditch had not been cleaned recently. It is understood that shale debris collected by the maintenance contractor has typically been placed in a berm located northwest of the shale slope. The west roadway side slope is showing good vegetative growth. An approximately 0.3 m high subdued scarp, located about 3 m downslope of the guardrail was noted as well. At the time of the site visit there were no noticeable signs of movement in the roadway.

#### 2.3 Assessment

The shale slope appears to have sufficient global stability and the spalling is considered to be more of a maintenance issue. There are no signs of movement in the roadway. The subdued scarp with a good vegetative cover indicates that the sideslope is currently stable.



# 2.4 Risk Level

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

PF(5) \* CF(2) = 10

A Probability Factor of 5 is considered appropriate since the slide is inactive, with a moderate probability of remobilization. A Consequence Factor of 2 is considered appropriate since the site is an area with a potential rock fall hazard.

## 2.5 Recommendations

No immediate action is required at this site. It is recommended to continue to monitor the slope and clean the ditches of shale debris as required.

# 3. 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 conditions worsen.

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

Don Proudy

Vedran Bijeljanin, E.I.T. Project Engineer /mes

Attachment