



THURBER ENGINEERING LTD.
GEOTECHNICAL • ENVIRONMENTAL • MATERIALS

December 4, 2006

File: 15-85-32

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 754:02 km 10.2, km 10.45, AND km 10.8 (NC 41)
NORTH OF SLAVE LAKE
2006 ANNUAL INSPECTION REPORT**

Dear Sir:

This letter documents the 2006 annual site inspection of slope instability of the above noted areas located along Hwy 754:02 north of Slave Lake, Alberta (refer to Figure NC41-1, 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 (CE143/2006) with Alberta Infrastructure and Transportation (AIT).

Mr. Don Proudfoot, P.Eng. and Mr. Masud Karim, EIT of Thurber undertook the inspection on May 2, 2006 in the presence of Mr. Roger Skirrow, P. Eng., Mr. Arthur Kavulok and Mr. Fred Bickell of AIT.

1. BACKGROUND

Thurber last visited the site in June 2005 and the site condition at that time is described in our Part B assessment letter in the site binder. Additional information for the site is provided in our call-out report (erosion assessment) dated July 11, 2001, included in Section E of the binder.



2. SITE OBSERVATIONS

2.1 General

Four erosion gullies were viewed at locations km 10.0, 10.2, 10.45 and km 10.8 along this section of the highway, which is flanked on the southeast by Cabin Creek. No significant cracking was noted in highway pavement. No signs of instability of highway side slope were evident, other than shallow slumping of the gully side slopes.

The changes in conditions noted at each of the sites since last year are shown on the site sketch plan, Figure NC41-1, attached for inclusion in Appendix F of the binder. Selected photographs taken during the visit are also attached.

The site features have already been described in our 2005 report. The changes in the site features compared to the last year are described for each location separately in the following sections.

2.2 Location km 10.0

The gully had been created by erosion and is currently covered by grass, shrubs and debris left from clearing bushes. The erosion gully was dry, with no signs of seepage or active erosion noted at the time of the site reconnaissance. The width of the gully is approximately 35 m.

2.3 Location km 10.2

Minor sign of retrogression of the gully scarp toward the road surface was observed during this site visit. The gully is about 12 m wide.

2.4 Location km 10.45

The gully is a direct result of the outflow from a steel culvert resulted in a 1.6 m deep down cut. A slight ditch erosion was noted at the crest of the gully. A narrow channel with eroded slope was noted beyond the gully down the creek valley.

2.5 Location km 10.8

No changes in site features were observed compared to the 2005 inspection.



3. ASSESSMENT

The close proximity of the gullies to the highway ditch indicates that these erosion features have been developed or have been accelerated by the surface runoff and/or culvert flow.

Similar to the 2005 observation there is no evidence of slope instability during the site visit. However, slight retrogression in the upper portions of the erosion gullies was observed at km 10.2 and 10.45. Also it appeared that a narrow channel with eroded slopes has developed down from the bottom of the gully at km 10.45.

There were no signs of cracks on the highway pavement, indicating the erosion gullies are not impacting the highway at the present time. However, as was mentioned in our last report, if left untreated, the gullies may migrate laterally to impact the highway in the future, especially gully at km 10.2, which has the highest potential of all of the sites to impact the highway in future.

4. RISK LEVEL

The risk level for the location km 10.2 has been assessed as follows:

$$PF (9) * CF (2) = 18$$

A risk level of 18 is considered applicable to this site, based on a Probability Factor of 9 (active, moderate steady rate of erosion) and a Consequence Factor of 2 (small volume slide affecting roadway may be triggered by ongoing erosion).

The other locations have a lower risk level.

5. RECOMMENDATIONS

5.1 Short Term

In the short term the site should be regularly inspected by the MCI to determine the progression of the erosion gullies.

For public safety, it is recommended to install a guard rail at km 10.0 and 10.2 locations close to the crest of the gullies. At km 10.2, before installing the guard rails, a gravel wedge may be constructed in the upper slope to reduce the retrogression of the crest and side slopes of the gully.



5.2 Long Term

As recommended in the 2005 report, it is important to undertake the remedial measures at this site to control the erosion and progression of the gullies at the different locations. The remedial measures have been presented in the 2005 report. Following are some additional recommendations.

At km 10.0, the berm to divert ditch flow into the gully could be about 0.3 m high and 2 m wide at the top with 3:1 side slopes.

At km 10.2, the erosion gully should be backfilled by pit run gravel to stop the headscarp erosion retrogression. As discussed with AIT during the site visit, a possible source of the pit run gravel is 6 to 8 km from Marten Creek Pit. The erosion of the gully is highest at this location and a swale should be built to divert the flow from km 10.2 to km 10.45 by re-sloping the side slope.

At km 10.45, remedial measures need to be undertaken to restore the gully itself and the down slope area below the gully bottom. Fallen trees need to be removed before any stabilization measure is undertaken. The base (0.3 m wide by 0.3 m deep) of the gully is recommended to be filled with cobbles. The narrow channel with little eroded slope below this point should be filled with pit run gravel. At km 10.8, similar to the gully at Km 10.0, a shallow berm needs to be constructed across the gully to divert ditch water to Km 10.45.

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 Law, P.Eng.
Review Principal

Masud Karim, M.Sc.
Project Coordinator
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Attachments

cc Mr. Roger Skirrow, P.Eng.
Director, Geotechnical Services (AIT)

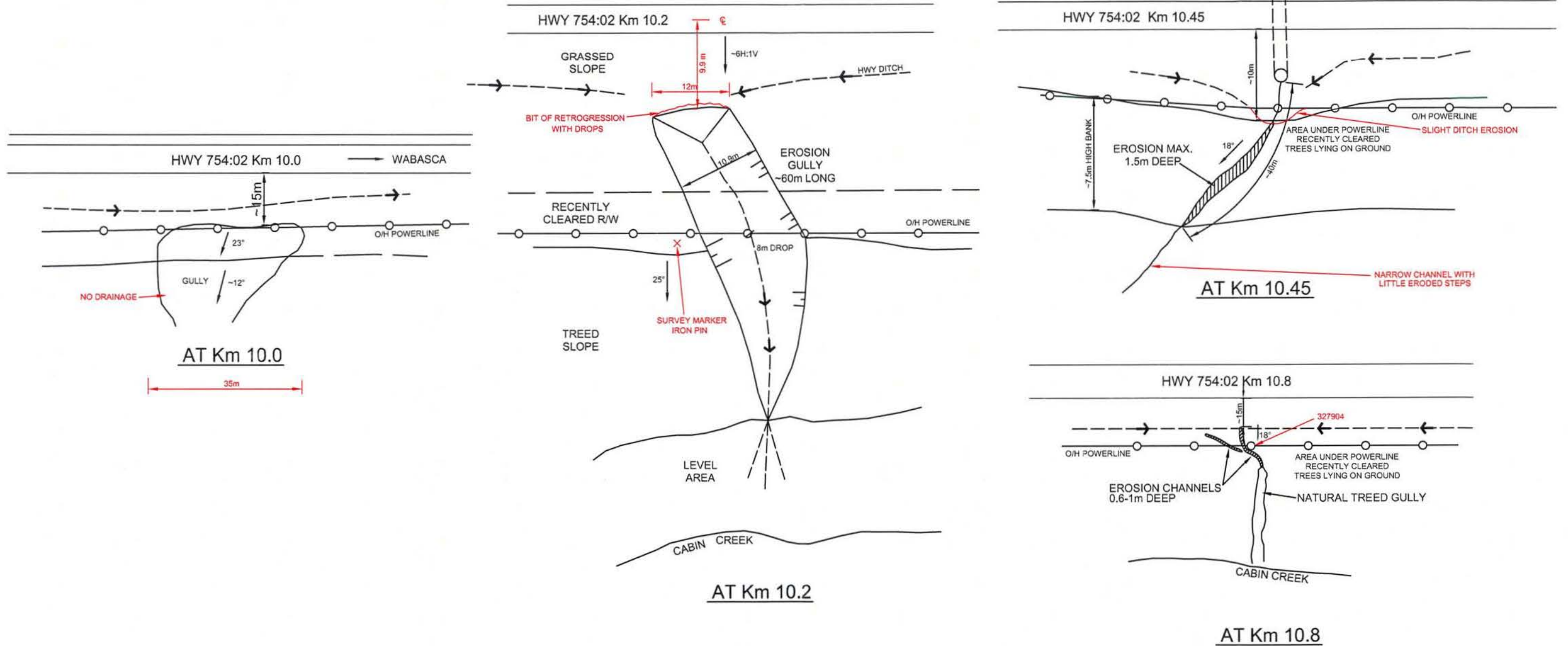
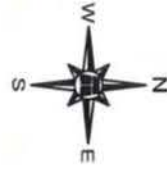


FIGURE NC41-1 SKETCH SITE PLANS
NC41- HWY 754:02 - Km10.0, 10.3, 10.45, AND 10.8

N.T.S.
JUNE 7, 2004
THURBER PROJECT #15-85-32



Photo 1 & 2 Looking at the Gully at km 10.0, May 2, 2006.



Photo 3 & 4 Looking at the Gully at km 10.2, May 2, 2006.



Photo 5 & 6 Looking at the Gully at km 10.45, May 2, 2006.



Photo 7 Looking at the Gully at km 10.45, May 2, 2006.



Photo 8 Looking at the Gully at km 10.8, May 2, 2006.