



THURBER ENGINEERING LTD.

ALBERTA TRANSPORTATION LANDSLIDE RISK ASSESSMENT

SECTION A: GEOTECHNICAL FILE REVIEW

NORTH CENTRAL REGION - ATHABASCA

SITE NC53: HWY 754:04 NORTH OF SLAVE LAKE (km 18.6)

Highway Control Section:	HWY 754:04
Nearest Landmark	38 KM EAST OF JCT HWY 88 AND 754 73 KM NORTH OF SLAVE LAKE
Legal Location:	SE-29-77-03-W5M
Date of Initial Observation:	2006
Date of Last Inspection:	June 2012
Last Inspected By:	Thurber Engineering Ltd. (Thurber)
Instruments Installed:	None
Instruments Operational:	N/A
Risk Assessment:	PF(7) x CF(2) = 14
Last Updated:	2008 – Thurber Engineering Ltd.
Previous Update:	N/A



1. LOCATION

The site is located on Highway 754:04 at km 18.6, and is about 73 km northeast of the town of Slave Lake in Alberta and about 38 km east of the junction of Highways 88 and 754.

2. GENERAL DESCRIPTION OF SLOPE INSTABILITY

The slide occurred within the east side slope of the highway, at about 40 m from the left margin of Willow River. It is estimated that the overall height of the valley is approximately less than 10 m in this location, based on published topographical mapping.

The head scarp of the slide is located at about 9.2 m from the edge of pavement (within the highway clear zone) and has dropped by about 0.7 m to 1.0 m. The original scarp was located at 10.5 m from the edge of pavement. Details of the slide main features are shown in sketch on Figure NC53-1.

Hairline longitudinal cracks have been noticed occasionally on the pavement surface during previous inspection visits. Highway ditch flow is directed towards the south side of the slide area.

Observations made during previous site inspection visits indicated that the landslide is toeing out into the small old oxbow lake, located at the bottom of the slope. The slope has been creeping at a slow rate and no further retrogression of the slide head scarp has been noted since 2007.

3. GEOLOGICAL/GEOTECHNICAL CONDITIONS

Physiographic Region: Located in the Utikuma Upland (Atkinson, N. and Lyster, S., 2010).

Bedrock Geology: The bedrock at the site is of the Labiche Formation, dark grey shale and silty shale; ironstone partings and concretions; silty fish-scale bearing beds in lower part; marine. (Geological Map of Alberta, AGS, AEUB, 1999).

Surficial Geology: Large-scale surficial deposits map (Surficial Geology of the Willow River Area, Alberta, AGS, 2004) indicates that the site is located in an area of plain moraines (till) deposits, greater than 2 m thick; deposited directly by glacial ice. Locally may contain organic deposits.

Hydrogeology: The Labiche Formation bedrock would be limited to less than 0.1 L/s groundwater flow with similar or slightly higher flows expected from the clay tills (0.1 to 0.4 L/s). However, much higher flows (2 to 8 L/s and up to 38 L/s) would be expected in the glacial or preglacial sand and gravel lenses overlying the bedrock shale. Groundwater flow is expected to be southeast toward the Willow River. An area of local recharge (lakes and slightly higher ground) was located less than 1 km to the northwest of the site (Hydrogeological Map Lesser Slave Lake Alberta, ARC, 1977).

Stratigraphy: No stratigraphy is currently available at the site.



4. CHRONOLOGY

2006

A Call-Out inspection visit was undertaken by Thurber in May 2006. A toe bulge was observed on the flood plain. Fallen trees were also observed at the bottom of the slope and near the river bank. The slide's head scarp appeared to have retrogressed by about 0.3 m. Pavement distress was not observed on the highway surface.

2007

The site was added to the North Central Annual GeoHazard Assessment program and a site reconnaissance was carried out by Thurber in May 2007. Site conditions have not changed since 2006. A 1.8 m long hairline crack was observed on the road surface.

2008 to 2009

No significant change in site conditions.

2010 to 2011

Thurber discontinued site visits as directed by TRANS.

2012

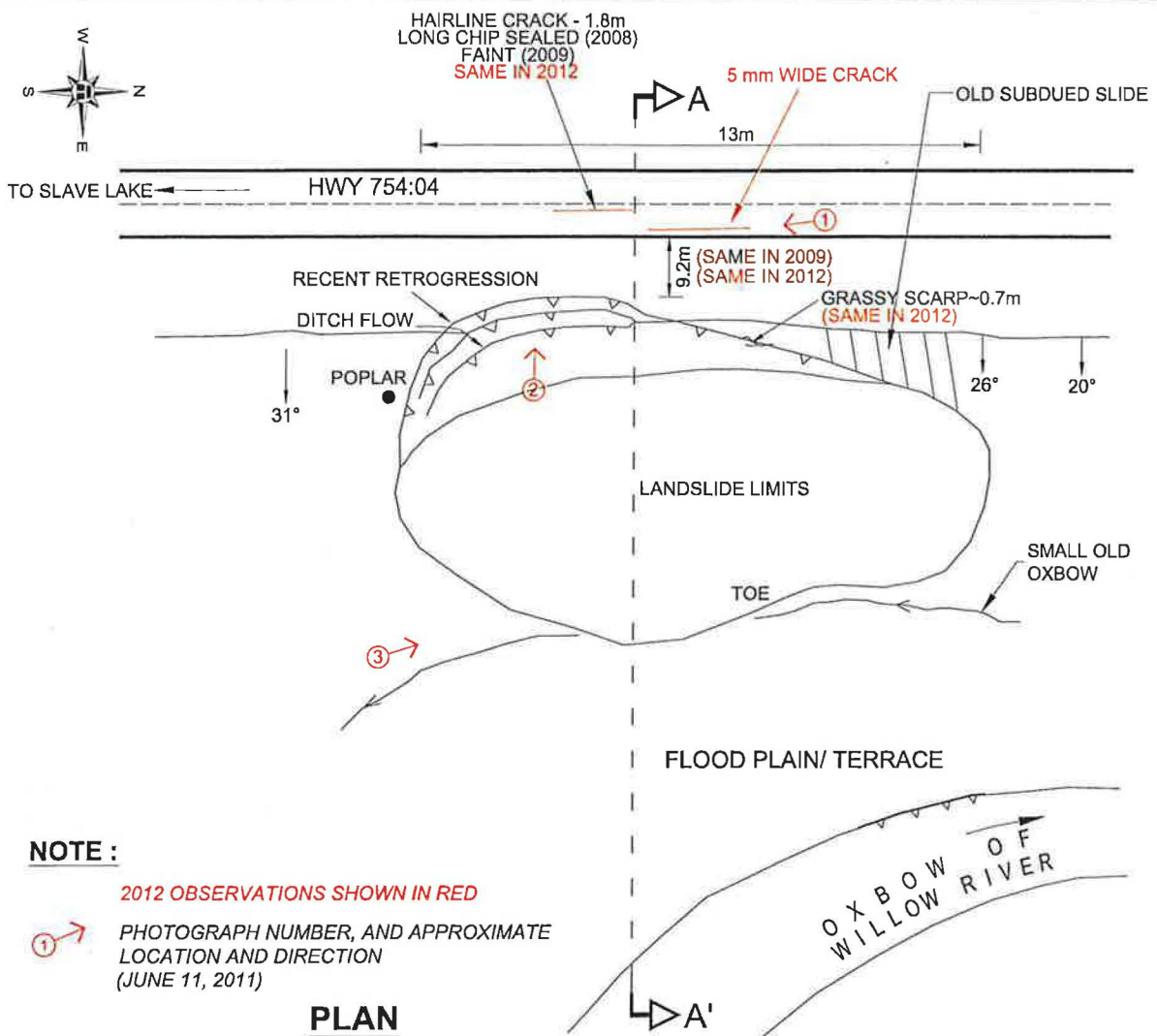
A 5 mm wide longitudinal crack was observed in the highway surface. The location of the slide's head scarp remains unchanged.



REFERENCES

1. Atkinson, N. and Lyster, S., 2010. "Bedrock Topography of Alberta, Canada," ERCB/AGS Map 50, scale 1:1,500,000.
2. Alberta Geological Survey, Alberta Energy and Utilities Board, 1999. "Geological Map of Alberta." Map No. 236, scale 1:1,000,000, compiled by Hamilton, W.N., Price, M.C. and Langenberg, C.W..
3. R.C. Paulen, M.M. Fenton and J.G. Pawlowicz, 2004. "Surficial Geology of the Willow River Area, Alberta." Map 313, scale 1:100,000, Alberta Geological Survey, Alberta Energy and Utilities Board.
4. Alberta Research Council, 1977. "Hydrogeological Map Lesser Slave Lake Alberta."

Z:\15\15-16-275\15-16-275_NC53-1.dwg - NC53-1 - Nov. 21, 2012



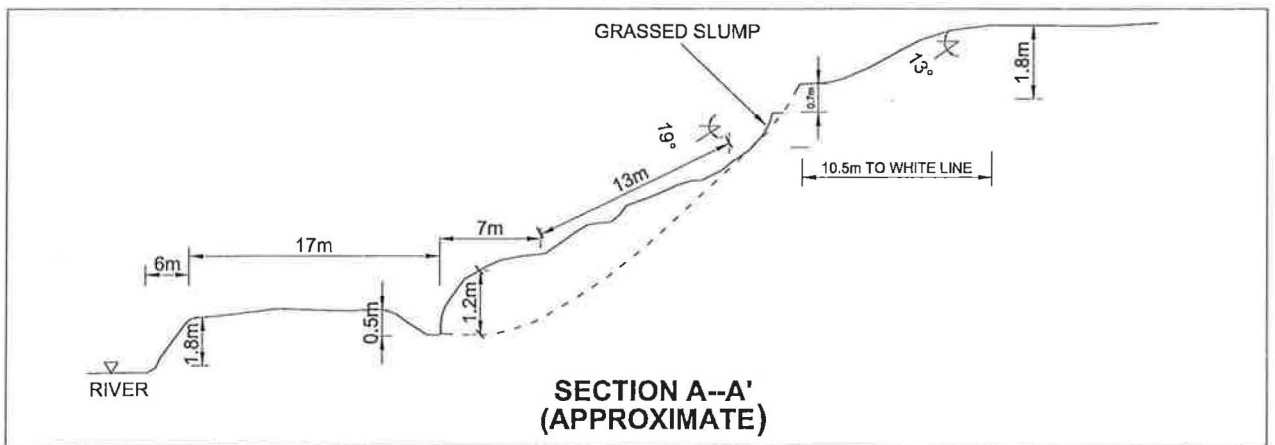
NOTE :

2012 OBSERVATIONS SHOWN IN RED



PHOTOGRAPH NUMBER, AND APPROXIMATE LOCATION AND DIRECTION (JUNE 11, 2011)

PLAN



NORTH CENTRAL REGION (ATHABASCA AREA)
 - 2012 GEOHAZARD ASSESSMENT
 NC 53: HWY 754:04 NORTH OF SLAVE LAKE (km18.6)
 SITE PLAN AND CROSS - SECTION

FIGURE NC53-1



DRAWN BY	ML
DESIGNED BY	TSA
APPROVED BY	DWP
SCALE	N. T. S.
DATE	OCTOBER 2012
FILE No.	15-16-275



THURBER ENGINEERING LTD.