

**ALBERTA TRANSPORTATION
LANDSLIDE RISK ASSESSMENT**

SECTION A: GEOTECHNICAL FILE REVIEW

NORTH CENTRAL REGION – EDSON AREA

SITE NC74: SOUTH OF ENTWISTLE SLIDE

LEGAL LOCATION:	SE17- and SW16-52-07-W5M
NEAREST LANDMARK:	11 km South of Entwistle
HIGHWAY CONTROL SECTION:	HWY 22:30 km 44.15
DATE OF INITIAL OBSERVATION:	2011
DATE OF LAST INSPECTION:	N/A
LAST INSPECTED BY:	N/A
INSTRUMENTS INSTALLED:	None
INSTRUMENTS OPERATIONAL:	N/A
RISK ASSESSMENT:	PF(9) x CF(2) = 18
LAST UPDATED:	August 2012



1.0 LOCATION

The site is located at km 44.15 on Hwy 22:30, approximately 11 km south of Entwistle. The Pembina River parallels that highway to the west at this location. The site is bordered by agricultural land to the east and a treed ravine leading to the Pembina River to the west.

2.0 GENERAL DESCRIPTION OF DISTRESS

The distress observed by Thurber in a call out site visit performed on October 5, 2011 is located in a relatively flat section of the highway in the southbound lanes. Just south of the distressed area, the highway begins to rise gently. The embankment is approximately 6 m high and slopes down to a drainage channel at roughly 8H:1V on the west side of the highway. On the east, the embankment is approximately 2 m high. LiDAR images show that drainage patterns carry surface water from east to west across the highway through a culvert at the south end of the site. A second culvert is located approximately 120 m to the north of the distressed area. The drainage channel at the toe of the west slope flows into the Pembina River.

Several patches have been undertaken starting prior to 2007, with three done in 2011, the last one being completed in August of 2011. Cracking along the centreline of the highway at the north end of the site was observed to be propagating through the patches. These cracks were found to be about 5 mm wide with up to 5 mm in height differential. Hairline cracking was noted extending approximately 6 m south beyond the main crack. A smaller hairline crack was observed near the culvert at the south end of the site, and extended approximately 3 m close to the centreline of the highway. This may represent the south extent of slope instability.

Cracking along the shoulder was observed at the north end of the site, beginning approximately 9 m south of the north extent of the patch. These were found to be more severe than centerline cracks, ranging in width from 10 to 30 mm, with up to 70 mm in height differential. There was a 3 m long crack approximately 60 mm wide joining the centreline and shoulder cracks.

Observations of the slope to the west of the highway did not reveal any obvious toe bulges. However, the stream has either been undercutting the toe of the slope or the toe has been sliding into the stream. The fence between the stream and highway was noted as leaning at an angle of 6° downslope. No other signs of instability were noted.

3.0 GEOLOGICAL/GEOTECHNICAL CONDITIONS

PHYSIOGRAPHIC REGION

Western Alberta Plains (Natural Regions Committee 2006. Natural Regions and Subregions of Alberta. Compiled by D.J. Downing and W.W. Pettapiece. Government of Alberta. Pub. No. T/852.)



BEDROCK GEOLOGY

The bedrock at the site is thick bedded, calcareous, cherty sandstone; siltstone and mudstone; minor conglomerate, thin limestone, coal and tuff beds of the Paskapoo formation.

SURFICIAL GEOLOGY

Surficial geology consists of fine textured glaciolacustrine clay and silty clay. This clay is generally high plastic in the area of the site.

HYDROGEOLOGY

The sandstone in this area may be able to provide groundwater flow up to 7 L/s. Groundwater flow is generally downwards, with some flow likely directed towards the Pembina River. Water well records in the area show a static water level of approximately 10 m below ground surface.

STATRIGRAPHY

No information available.

4.0 CHRONOLOGY

1979

Final paving completed.

2007

Intermittent patching had been done from 2007 to present, with three patches completed in 2011. Patching had started prior to 2007, however no photos or records are available from this time.

2011

Call-out undertaken by Thurber on October 5.

2012

First site inspection under the annual Geohazard Assessment program by Golder Associates Ltd. Cracking observed in the existing patch was noticed to be more extensive, with increased widths and differential heights.



5.0 REFERENCES

1. Natural Regions Committee 2006. Natural Regions and Subregions of Alberta. Compiled by D.J. Downing and W.W. Pettapiece. Government of Alberta. Pub. No. T/852.
2. Andriashek, L.D., Fenton, M.M., and Root, J.D., 1979. "Surficial Geology Wabamun Lake." Alberta Geological Survey, Map No. 149.
3. Hamilton, W.N., Langenberg, C.W., Price, M.C., and Chao, D.K. 1999. "Geological Map of Alberta." Alberta Geological Survey, Map No. 236.
4. Ozoray, G.F. 1970. "Hydrogeological Map of the Wabamun Lake Area, Alberta, NTS 83G." Alberta Geological Survey, Map No. 103.
5. Alberta Transportation, Geotechnical Files.
6. Thurber Engineering Ltd., November 1, 2011 Call-out report: North Central Region – Edson Area Geohazard Assessment (CE103/08) Call-out on Hwy 47:06 km 0.4 Frost Heave near Robb, AB.

