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THURBER

ALBERTA TRANSPORTATION
LANDSLIDE RISK ASSESSMENT

SECTION A: GEOTECHNICAL FILE REVIEW

NORTH CENTRAL REGION

SITE NC10: 25 KM NORTH OF GUNN

LEGAL LOCATION:	**SE28-57-3-W5M**
NEAREST LANDMARK:	**25 km NORTH OF GUNN**
Highway Control Section:	**HWY 33:04 km 25**
Date of Initial Observation:	**1997**
Date of Last Inspection:	**2003**
Last Inspected By:	**Thurber Engineering Ltd. (Thurber)**
Instruments Installed:	**3 Slope Inclinometers (1997)**
Instruments Operational:	**3 Slope Inclinometers (2004)**
Risk Assessment:	PF(9) · CF(4) = **36**
Last Updated:	July 2004 – Thurber Engineering Ltd.

1. LOCATION

The site is located along Hwy 33:04 about 25 km north of Gunn and 15 km south of Barrhead as shown on Figure NC10-1, Section F.

2. GENERAL DESCRIPTION OF SLOPE INSTABILITY

The only distress observed at this site to date is a faint arc-shaped crack on the pavement surface that is developing slowly. No evidence of past repairs is visible at the site. Also of note is a beaver pond that has been created at the toe of the slope though it has not yet impacted the slope.

Three slope inclinometers were installed at the site in 1997 to monitor ground movements. The locations of the instruments are shown on Figure NC10-1, Section F, and the corresponding test hole logs are included in Section G. The three SI's are all functional (as of 2004) and the latest readings are provided in Sections C and D of the binder.

Based on the slope inclinometer readings, the slide appears to have a relatively shallow failure plane (between 6 to 8 m deep) as observed in the data from the SIs located on the west side of the highway. The recent movements observed appear to be related to seasonal elevated precipitation conditions. The total cumulative movement has been about 65 mm in each of the instruments on the west side of the highway since the initial reading in 1998. No movement has been observed in the SI on the east side of the highway. No piezometers have been installed at this site.

3. GEOLOGICAL/GEOTECHNICAL CONDITIONS

Physiographic Region: East Alberta Plains (1969, Atlas of Alberta, University and Government of Alberta).

Bedrock Geology: The bedrock at the site is grey sandstone, mudstone, bentonite, and scattered coal beds of the Cretaceous Wapiti Formation. Bedrock is expected to be greater than 30 m below ground surface.

Surficial Geology: The site is located at the border between a ice-thrust moraine to the north and ice-thrust and stagnation moraine to the south. Surficial soils are expected to consisted of tills with rafted bedrock over contorted and intact bedrock. The topography is thick rolling and hummocky. The site is adjacent to a fine sediment ice-contact lacustrine deposit consisting of sand, silty, clay, and some till.

Hydrogeology: The sandstone bedrock at the site may be able to provide up to 2 L/s of groundwater flow. A nearby water well in SW22-57-03-W5M drilled to 33 m reported groundwater at approximately 6 m below ground surface. Groundwater is at approximate elevation 670 m and flow directions are downward in this area with interpolated near-surface horizontal flow locally toward Lac la Nonne less than 1 km to the east. The Pembina River is located about 6 km to the north.

Stratigraphy:

The test hole logs indicate that the stratigraphy consists of about 3 to 6 m of medium to high plastic clay till over claystone and siltstone bedrock. Fill depths ranged from 2.5 to 4 m west side of the highway with no fill encountered on the east side.

4. CHRONOLOGY

There is no indication in the files reviewed when distress was first noted or what repair measures (if any) have been undertaken.

1997

Thurber installed three slope inclinometers in November.

REFERENCES

1. Thurber Engineering Ltd., January 13, 1998. "Hwy 33:04, 25 km North of Gunn – Inclinometer Installations." File 15-16-99.

2. Research Council of Alberta, 1970. "Bedrock Topography of the Wabamun Lake Map-Area, NTS 83G, Alberta."

3. Alberta Research Council, 1972. "Hydrogeology of the Wabamun Lake Area, Alberta." Report 72-8.

4. Alberta Research Council, 1990. "Quaternary Geology, Central Alberta."

5. University and Government of Alberta, 1969. "Atlas of Alberta."