

PART A
LANDSLIDE RISK ASSESSMENT
PEACE REGION (PEACE RIVER VALLEY/HIGH LEVEL)

SITE PH1: DUNVEGAN HILL, NORTH

LEGAL LOCATION: 80-4-W6M

Location along Highway: Station 0+750 (north of Dunvegan Bridge)

AI FILE: H2:68

Date of Initial Observation: 1996

Date of Last Inspection: June 1999

Instruments Installed: none

Instruments Operational: none

Risk Assessment: PF(11) * CF(2) = 22

Last Updated: AMEC Earth & Environmental Limited
June 29, 2000

INTRODUCTION

This section is a review of files made available by Alberta Infrastructure for the site. The file review was prepared prior to the site visit. The description of the sites is based on the information that was present in the file, topographical and geological information was added if it was not present in the file and if the site was familiar, previous observations were also included. A risk assessment, solely based on the file review is provided. The risk assessment may change once the observations made during the site visit are incorporated.

At the Dunvegan Hill, North, Highway 2 descends 200 m from prairie level to the Dunvegan Bridge across the Peace River. The road was constructed in a cut and fill operation. Pavement cracking has occurred at approximately Station 0+750 in the north bound (downhill side) lane. At this location, the road is approximately halfway up the valley slope. The slope below the road is inclined at approximately 4H:1V, the slope above the road, which is in bedrock, is inclined at approximately 1.5H:1V.

GEOTECHNICAL CONDITIONS

At Station 0+750 (north of the Dunvegan Bridge) the soil conditions consist of fill overlying shale and sandstone. Under the road surface, the soil conditions consist of 1 m to more than 9 m (bedrock was not encountered) of thick fill overlying shale and sandstone bedrock of the Dunvegan formation. On the slope downhill of the road, the soil consists of till (probably fill) with a thickness of more than 6 m (bedrock was not encountered), it is a mixture of clay, sand and silt, its consistency is firm, with a moisture content wet of optimum. No wet zones were encountered.

CHRONOLOGY

Table A1 provides the chronological background of the slide.

DESCRIPTION OF INSTABILITY

The signs of instability are settlement and cracks along the southern edge of the road, over a distance of approximately 70 m. It appears that the failure is occurring in the fill slope. The slope downhill of the failure is inclined at approximately 4H:1V. The fill in the slope is relatively wet, but seepage zones were not encountered.

PAST INVESTIGATIONS

In April 1998, six boreholes were drilled and six test pits were excavated at the site. A site plan and borehole and test pit logs are in the file.

In June 1999, a site visit was conducted by GAEA. Pavement cracks were reported. Photographs showing the cracks are in the file.

REMEDIAL MEASURES

GAEA had proposed remedial measures, but the report presenting them was not in the file. No remedial measures appear to have been implemented.

MONITORING RESULTS

No monitoring has been undertaken.

ASSESSMENT

This appears to be a failure of the fill slope. It is expected that high pore water pressures are a contributing factor.

Risk Assessment

The probability factor is 11, settlement of the road has occurred, and it appears that the rate of movement is increasing. The consequence factor is 2, this appears to be a relatively small failure that affects only a small part of the road. Thus, the risk level is estimated at 22.

TABLE 1: CHRONOLOGY

1958-1960	Construction of the road.
1998, 04	GAEA, Geotechnical Investigation Report. A geotechnical investigation was conducted at Station 0+750. Cracking in the road extends for 70 m and is mostly affecting the north-bound lane. The road has been periodically patched. Cracks have occurred at the locations of two culverts crossing the road. Six test holes were drilled in the road surface, five at the location of the road cracking, one at the location of a dip in the road just south of the southern limit of the cracks. The test holes indicated sandy and gravelly clay fill with a thickness ranging from 1 m to greater than 9 m (bedrock not encountered) overlying sandstone and shale of the Dunvegan formation. Test pits were excavated on the slope, indicating gravelly till (or fill).
1999, 06	GAEA, Annual Landslides Inspection. It is mentioned that GAEA has submitted a report suggesting drainage measures. (This report is not in the file. It is not known whether these drainage measures were implemented.) There is a dip in the road (near the curve sign). It is suspected that the dip is occurring where a culvert crosses the road. It is recommended that the culvert interior be checked for deformations.