

SITE C24: H564:10 Slide

LEGAL LOCATION: SW21-27-18-W4

REFERENCE LOCATION
ALONG HIGHWAY: km 32

UTM COORDINATES (NAD 83): **N 5,686,020 E 396,380**

AT FILE: H564:10

AT PLAN & PROFILE:

Date of Initial Observation: 1979

Date of Previous Inspection: May 21, 2003 (KCCL)
(Inspected by) May 18, 2004 (KCCL)

Instruments Installed: 4 slope inclinometers
3 standpipe piezometers

Instruments Operational: 3 standpipe piezometers

Reading Dates: August 1985 (AT)
(Read by) May 18, 2004 (KCCL)

Risk Assessment: $PF(9) * CF(2) = 18$

Last Updated by: Klohn Crippen Consultants Ltd. (KCCL)
Date: May 2004

Location

About 20 km southeast of Drumheller and south of the Red Deer River, Highway 564:10 (previously known as Duck Lake Road) descends into a coulee (known as East Coulee) to join with Highway 569. On the east side of the coulee, a large slide has developed and has resulted in an apparent dip in the highway grade. The slide area is about 300 m wide with a steep scarp relatively close to edge of highway.

General Description of Site Conditions

On the east side of the coulee, a large slide has developed and has resulted in an apparent dip in the highway grade. The slide area is about 300 m wide with a steep scarp relatively close to edge of highway.

Geotechnical Conditions

In July 1985, a site investigation was undertaken at the slide location. Four locations were drilled and indicated that the subsurface conditions comprised medium to high plasticity sandy clay over high plasticity clayshale and sandstone. Four slope inclinometers and three standpipe piezometers were installed. The instruments indicated that the water level and the shear movement generally corresponded with the clay-clayshale interface.

Liquid limits in the overburden soils ranged from 35% to 80% with an average moisture content of about 15%. SPT blow count values typically ranged from 12 to 23 blows per 300 mm, but were reduced to about 3 to 4 blows per 300 mm in soft wet zones. A direct shear test was performed on an overburden sample from test hole SI #1 at a depth of 9.1 m. The test indicated a friction angle of 33°, however, the material at this depth is about 7 m above the observed shear plane.

The clayshale liquid limits ranged from about 55% to 190%, indicating the presence of highly bentonitic, low strength layers. Natural moisture contents were typically about 25%.

Chronology (Refer to Section G for Further Information)

June - November 1979

In 1979 it was proposed to widen the existing road in this location by cutting the slope above and filling below, adopting 3H:1V slopes. The installation of horizontal drains at observed spring sources was also recommended. Test holes drilled in the area identified highly variable soil strengths and bentonitic layers in the soil.

It is assumed that the work was done as planned in the summer of 1979. In November 1979, a crack was observed in the road surface that was 30 mm wide and had settled about 70 mm. Cracks on the downhill slope had opened up to 50 mm wide and were over 1 m deep.

July 1985

A site investigation was undertaken at the slide location.

1986 - 1991

Over the period 1986 to 1990, numerous complaints from various landowners were received and resulted in an Alberta Transportation memorandum dated January 1990 describing the section of highway as "winding, traversing rugged terrain and there is evidence of road settlement and landslides on the hillside". It was believed at the time that the road was constructed over some old underground mine shafts, however a review of an EUB plan indicates that the highway is to the east of the western limit of the mine activity. It was not recommended in 1990 that this section of road be paved.

A study of two alternative road alignments was carried out at this time and was summarized in a memorandum dated June 1991. The outcome was that in view of the very high cost of the alternatives, it was recommended that the alignment follow the existing road. It was recommended that any effects of the slide investigated in 1985 be repaired with periodical maintenance as the most economical procedure.

Reports and Documents

May 2003 Inspection Form (KCCL)

May 2004 Inspection Form (KCCL)

Geotechnical Summary (KCCL), March 22, 2004 (includes historic data and reports)

Air photos (1978, 1992, 2001)