



BRIEF SITE SUMMARY
AND
RISK ASSESSMENT

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| 1. Site (GP#34) | Hwy 40:38 High Fill Culvert Slide
@ km 20.6 |
| 2. Reference Location along Highway | Hwy 40:38 (@Km 20.6) (2.9 km south of
Kakwa River bridge) |
| 3. Legal Description | Section 28, Twp 62, Rge 4, W6M |
| 4. UTM Coordinate | N 6,028,321 E 399,822 |
| 5. AT File | |
| 6. Alberta Transportation Plan and Profile | |
| 7. General Description of Instability | |

The sliding movement of a sidehill fill embankment has resulted in the pavement cracking of Hwy 40:38 as result of transgression of slide headslope onto the pavement footprint.

This slide site was located at about 2.9km distance south of Kakwa River Bridge. The slide is located at the lower elevation of valley slope with the sidehill alignment ascending towards south a 5.8% grade up the valley slope of the Kakwa River valley. The sidehill fill can be estimated at about 15m to 20m heights with a toe berm (of about 30m-40m in width and 5m-6m in height).

At the northern flank (i.e. downgrade side of highway towards the bridge) of the affected area, a centerline culvert of steep inclination (1200mm dia. 108m length at Sta. 57+580 installed at 28 degree skew) was placed beneath this sidehill fill embankment.

The site feature can be described as below:

- Headscarp crack along about 25m to 30m stretch can be located mostly along the south bound lane and has not transgressed beyond centerline. Pavement crack width was observed at about 3-5mm.
- Height of sidehill fill can be estimated at about 15-20m with a toe berm (30-40m in width) of 5-6m height. The sliding movement may be occurring above the toe berm since bulge of slope was noted at elevations above the toe berm.
- Along top of toe berm, toe of fill along edge of treeline, there are several vertical CSP manholes functioning possibly as clean out vents for subdrains which were installed during the grading construction (early 1980's).

- From information provided by construction staff (project manager in early 1980's grading of this highway), it is understood that adverse groundwater conditions of wet soils and seepage groundwater flow were encountered during construction. The dewatering measures of vertical sand drains were installed complete with pumping to alleviate the high pore pressure and to draw down the groundwater for staged construction of the fill. The subdrains were constructed to provide outfall of seepage groundwater within wet soils.

The site was observed over a 2 year duration (i.e. at 2007 & 2008 Slide Tour inspection). No obvious deterioration of site was apparent over 2 years.

8. Date of Initial Observation

2007 Slide Tour

9. Date of Recent Observation

2008 Slide Tour

No obvious deterioration of site was apparent.

10. Instrumentation Installed

None

11. Instrumentation Operational

None

12. Risk Assessment

$$PF(8) * CF(4) = 32$$

PF(8)

- Active with moderate rate of movement

CF(4)

- Road embankment movement will affect safety of use of roadway but not requiring closure of roadway

Note:

The risk assessment is provided based on a categorization of Hazard Probability Factor (PF) and Consequence Factor (CF) as provided by AIT's RFP 2000.

PF 1 to 20 scale

CF 1 to 10 scale

13. Geotechnical Conditions

From published information

The terrain at lower elevation of the Kakwa river valley can be described as rough, broken land with stream and gully valleys. The surficial soils can generally be colluvial deposits of mixed glacial and bedrock material and stability conditions of slopes can be variable. Depths of surficial deposit can be in vaneer on low to high relief slope and small floodplains. Generally, about 1m thickness of surficial deposits can be common but can be variable at slump locations.

The bedrock can be Scollard Formation of grey feldspathic sandstone; dark grey bentonite mudstone; presence of varying thickness of coal bed can be likely.

14. Chronology

2006 initial observation
2007 2nd observation
2008 recent observation to decide on inspecting this site at alternate years.

15. Comment and Action

2008 Slide Tour, it was assessed that:

- Deterioration of site not apparent.
- Frequency of inspection interval be downgraded to ALTERNATE year. The next inspection for this site will be in 2010.

END