

**BRIEF FILE REVIEW
(LANDSLIDE RISK ASSESSMENT)**

1)	Site (GP15)	Location A: SH 727:02 Rat (Howard) Creek 5 slide areas along the Rat (Howard) Creek valley slope									
		Location B: SH 727:02 Ksituan River 1 slide (settlement area) north of Ksituan River									
2)	Reference Location along Highway:	SH 722:02 Rat (Howard) Creek and Ksituan River									
3)	Legal Description:	Location A: NE Section 1, Twp 79, Rge 7, W6M Location B: SW Section 14, Twp 79, Rge 7, W6M									
4)	UTM Coordinate:	<table border="0"> <tr> <td></td> <td align="center">Northing</td> <td align="center">Easting</td> </tr> <tr> <td>Location A:</td> <td align="center">6196597.542</td> <td align="center">249133.375</td> </tr> <tr> <td>Location B:</td> <td align="center">6190701.906</td> <td align="center">-247366.955</td> </tr> </table>		Northing	Easting	Location A:	6196597.542	249133.375	Location B:	6190701.906	-247366.955
	Northing	Easting									
Location A:	6196597.542	249133.375									
Location B:	6190701.906	-247366.955									
5)	AI File:	Location A: SH 722:02 (Rat (Howard) Creek) Location B: No record									

6) **Alberta Infrastructure Plan and Profile**

Site A) SH 722:02 Rat (Howard) Creek

- Plan of slide areas (attached). Profiles (refer to AI files)
- Shear movement slope indicator (SI) records (in AI files - not attached)

Site B) SH 722:02 Ksituan River

- No record

7) **General Description of Instability****A. Rat (Howard) Creek****5 slide areas along the Rat (Howard) Creek Valley slope**

The slide area is located along a sidehill alignment of a tributary creek valley joining the Rat (Howard) Creek Valley. Five slides were located within the slide area along the sidehill slope of this creek valley. The widths of the two largest slides were estimated at 300 m and 150 m; these two slides were located close to the top of the creek valley. The widths of the other three minor slides were estimated at 30 m to 50 m; these three slides were located close to the bottom of the creek valley.

Past slope indicator information from 1987 indicated that movements were monitored at 6 to 17 m depths along this creek valley slope and that groundwater influence could be a factor. At one major slide, horizontal drains (10 pieces @ 150 m to 180 m length) were installed in Nov 1987 from the creek elevation to facilitate drainage. It is unknown whether these horizontal drains are still functioning.

The roadway was recently shifted (1999) towards the backslope with a steep (1H:1V) cut of the backslope. This effectively shifted the road away the slide. As observed in the June 2000 site inspection, the headscarp cracking of the major slide has transgressed to the top of sideslope with a 3 to 4 m setback from the sideslope shoulder line. At the same major slide area, the toe area of the slope deteriorated into slumping blocks compared with more or less intact (but slumped) slope as observed in 1990 to 1991. It appeared that all the previous slope indicators were destroyed. Most of the slope indicators were recorded as "sheared-off" in 1989.

The conditions and functionality of the previous horizontal drains remains to be checked.

B. Ksituan River**1 slide (settlement area) north of Ksituan River**

Past information from AI's maintenance contract inspector (MCI) and recent widening construction (1999) indicated that a 30 m stretch of roadway experienced settlement just north of the Ksituan River (information from June 2000 slide tour). A brief walk inside the bushline (approximately 30 m setback distance between the roadway and the riverbank) indicated the presence of wide cracks and a step slump terrace in the setback space between the roadway and the river bank. It appeared that erosion of Ksituan River has formed an unstable, steep bank incurring instability and that slippage of the roadway towards the river is likely with time.

Further site inspection and instrumentation of this area is advised.

8) **Date of Initial Observation**

Site A) 1987 (AI records)

Site B) June 2000 (slide tour)

9) **Date of Last Inspection**

- June 2000 (2000 Slide Tour)

10) **Instrument Installed**

Site A

- 8 slope indicators (1987)

Site B

- N/A

11) **Instrument Operational**

Site A

- None (2000)

Site B

- N/A

12) **Risk Assessment****A. Rat (Howard) Creek****5 slide areas along the Rat (Howard) Creek Valley slope**

$$PF (11) * CF (5) = 55$$

$$PF = 11$$

- 5 adjacent slide areas identified along a 1 km stretch of the creek valley.
- Active sliding with steady rate of ongoing movement.
- Shear zones along sideslope vary in shear depths from 6 to 17 m.
- Historic slide area since mid-1980's

$$CF = 5$$

- Partial closure of road will result in case of slide occurrence
- Road already shifted (1999) towards backslope with a steep backslope 1H:1V cut.
- Backslope instability will probably occur with time due to steep cut slope in addition to existing sideslope instability.
- Road serves mainly local farm traffic.

B. Ksituan River
1 slide (settlement area) north of Ksituan River

$$PF (8) * CF (5) = 40$$

$$PF = 8$$

- Potential slide area identified along a steep river bank adjacent to roadway
- Active sliding anticipated because cracking and slump terraces already observed at top of bank with approximately 30 m setback space.
- Further investigation of this area is required.

$$CF = 5$$

- Partial closure of road will result in the case of slide occurrence
- Road serves mainly local farm traffic

Note:

This Risk Assessment rating is based on the Scheme proposed by AI in the Request for Proposal (2000).

Probability Factor (PF) : 1 to 20 scale

Consequence Factor (CF) : 1 to 10 scale

13) **Geotechnical Conditions**

- This site is located within the general Peace River area with Howard Creek and the Ksituan River as tributaries to the Peace River. The upland topography above the Ksituan River Valley and Howard Creek is gentle rolling terrain. Surficial deposits are generally glacial till and lacustrine clay deposits from past glaciation erosion and deposition as well as glacial lake deposition environments. The thickness of surficial deposits can vary from a few metres to the 100 metre range with generally increasing thickness at river valley areas.
- Bedrock comprises Cretaceous sandstone and shale. Sequences of bedrock formation (top down) can generally be: 1) Wapiti Formation, 2) Smoky River Formation, 3) Bad Heart Formation, 4) Dunvegan Formation, 5) St. Johns Formation, and 6) Peace River Formation.

14) **Chronology**

A. Rat (Howard) Creek
5 slide areas along the Rat (Howard) Creek Valley slope

Historical setting:

- In 1987, 8 slope indicators were installed; In 2000, all instrumentation non-operational.
- In 1987, horizontal drains (10 pieces @ 150 to 180 m lengths) installed from the creek at bottom of slope.
- In 1990 to 1991, realignment options considered by AI.
- In 1999, the shifting of the roadway utilizing a steep backslope was constructed to effect a shifting of the alignment away from the slide.

B. Ksituan River
1 slide (settlement area) north of Ksituan River

- Historical information not available for this site.
- Action: investigation required for this new site.

15)

Action

- A detailed investigation for this site is recommended. The investigation will include instrumentation of the critical distress areas and detailed site reconnaissance. A proposal of such work will be submitted on request.

END