

## **S2 – PRIDDIS**

### **Background**

The Priddis site is located on Highway 22:14, approximately 11 km west of the Priddis turn-off and approximately 10 km southeast of Bragg Creek (as measured along Highway 22). At this site the highway is oriented east-west as it ascends out of the Priddis Creek valley. The highway is located on a sidehill, with the south side upslope and the north side downslope.

The slope instability at this site consists of a moderately deep-seated (in the order of up to 10 m below road surface elevation) rotational failure (possibly with a translational component) encompassing the north shoulder of the road and extending nearly to the toe of the slope face to the north of the road. This is combined with a translational/spreading movement extending approximately 150 m downslope (north) from the toe of the highway embankment. The translational/spreading slide appears to be seated in relatively shallow, soft, wet soils, but is likely causing a loss of foundation support below the road embankment fill.

No details of the first occurrence of the slide were included in the site file previously reviewed by AMEC, however it would have pre-dated November 1992 because the second batch of SI's (#5 to 10) were installed at that time. It is not known if the original slide encompassed the road, although it appears likely based upon the oversteepened slope face immediately adjacent to the north shoulder of the road and the fact that a pile wall is understood to have been installed along the north shoulder of the highway above the slide area, presumably to arrest movement extending beneath the road surface. No design or as-built information on the existing pile wall along the north shoulder has been available during the previous information review for this site.

Site assessments, installation and monitoring of slope inclinometers has been conducted at this site since at least the early 1990's. Please refer to Section A of the site binder for a more detailed discussion of the site background.

### **Site Assessment**

The site assessment was performed on June 27, 2005. The weather at the time of the site assessment was overcast with a steady rain.

Please refer to Appendix S2 for a site plan illustrating the layout of the site. The highway surface and the slope face below the road were inspected down to the toe thrust of the translational movement north of the fenceline. The ground traverse extended to just north of the small creek flowing along the toe of the overall slope, approximately 20 to 30 m north of the fenceline below the road.

### **Observations**

The following points summarize the observations made during the site assessment. Please also refer to Appendix S2 for a site plan and annotated photographs illustrating key observations.

- Recent cracking and settlement along the downslope edge of the road surface that appears to outline the existing pile wall and shows that the guardrail is pulling away from the road (Photos S2-1 to S2-4). This cracking occurred after the instruments were read on May 17, 2005.
- Portions of the landslide toe thrust to the north of the fenceline north of the road appeared to have increased in size in several locations since the 2004 inspection.
- The slope face in the slide area below the road appeared to be relatively unchanged since the 2004 inspection, however the thick grass and vegetation cover would have obscured any recent subtle cracking or deformation. Photos S2-5 and S2-6 show typical views of this area.

Based on discussions on site during the assessment, AMEC understands that:

- AIT owns the forested area to the north of the fenceline and therefore has access to this area if required for the construction of stabilization measures. During the geotechnical investigation at this site in 2001 it was assumed that AIT only had rights up to the fenceline to the north of the highway.
- It is possible that this highway may be twinned in the future.

### **Assessment and Risk Level**

The slope stability conditions at this site do not appear to have worsened significantly since the previous assessment, however the apparent continued slope movements at the overall toe of the slope north of the fenceline are of concern. There is a possibility that additional slope movement will occur in response to the significant rainfall during June 2005. The continuation of slope movements will eventually directly destabilize the road embankment. The existing pile wall along the downslope edge of the road may be effective in protecting against such destabilization, however without any design or as-built information (e.g. pile depths, size, spacing) on this pile wall it is not possible to confirm its effectiveness beyond ongoing visual observation of surface conditions.

The northern (downslope) shoulder of the road has continued to require patching and overlays in recent years and will require further repairs due to the cracking and settlement that occurred during June 2005.

Therefore, AMEC recommends the following Risk Level factors for this site:

- Probability Factor of 9 in order to reflect the ongoing slope movements measured in the instruments since the Spring 2000 readings (notwithstanding the negligible movements measured between Fall 2004 and Spring 2005), along with the continued settlement and cracking of the road surface.
- Consequence Factor of 5 given that larger movements are possible and the degree of effectiveness of the pile wall is uncertain without additional information. It is possible that larger movements could occur and affect a significant portion of the highway surface.

Therefore, the current recommended Risk Level for this site is equal to 45. The recommended Risk Level is unchanged since the 2002 assessment.

### **Recommendations**

AMEC recommends the following future work for this site:

**The monitoring programs currently in place should be continued.** The maintenance contractor should be instructed to avoid paving over the existing instruments on the north shoulder of the road.

**Annual assessments at this site should be continued.**

**The surface conditions of the road at this location, as well as the guardrail alignment, should be carefully monitored by maintenance personnel.** This would be in conjunction with the recommended instrumentation monitoring to provide as early detection of potential problems below the road as possible.

**Additional geotechnical investigation and design work should be performed for this site.** The objectives of this additional work would be to install supplementary instrumentation to further characterize the slope movement and gather survey information for the area to the north of the fenceline. This information can be used to develop a conceptual design for earthworks to stabilize the highway. AMEC will submit a proposal and cost estimate for this work under separate cover.

**AIT's files should be checked again for information on the existing pile wall.** This information was not recovered during the 2000 file review at the start of the GRMP, but would be worth checking for again so that it can be properly accounted for during future design work of repair measures.

**Borehole logs from AIT's database for this site should be reviewed.** AIT has provided electronic copies of borehole logs from the general area of the S2-Priddis site and these logs should be checked to see if any of the instrumentation boreholes at this site from prior to 2000 are included.