4.8 S10 – SECONDARY HIGHWAY 762 MISCELLANEOUS SITES

The following subsections summarize the observations from the May 30, 2006 site inspections by AMEC and AIT personnel.

4.8.3 Site B

Background

Site B is located on Secondary Highway 762, approximately 19 km south of the junction with Highway 22X (as measured along the highway) and a short distance north of the Square Butte Community Hall. The highway is oriented north/south in this area.

Annual assessments were performed at this site by AIT and AMEC personnel from 2000 to 2004. There is limited background information regarding this site prior to 2000. The inspections up to 2004 focused on visual monitoring of minor settlement and cracking visible in the road surface.

In the summer of 2005, major instability occurred at this site during/following the significant rainfall on June 18 and June 19, 2005. Photos S10(B)-3 and S10(B)-5 show the damage to the road as it appeared at the time. AMEC attended a call-out request to this site by AIT on June 21, 2005 and the description of the instability is summarized as follows:

- The instability consisted of slumping of the west slope of the road embankment that extended through the southbound lane and into the northbound lane.
- As a result of the slumping, the road surface experienced settlements in excess of 1 m on several occasions. Maintenance contractor personnel reconstructed the road surface using granular material several times in order to buttress the northbound lane and maintain alternating one-lane traffic using the northbound lane only (i.e. the regraded southbound lane was only lightly compacted and not intended to carry traffic). Some perforated drainage pipes were placed perpendicular to the road centerline, with the inlet end across the northbound lane trenched into the otherwise intact northbound lane and the outlet ends across the southbound lane at the base of the fill used to reconstruct the southbound lane
- The slope face to the west of the road was deformed and bulged out in a pattern consistent with the slumping of the southbound lane of the road.
- Based on the geometry of the slumping visible at surface and the position of the headscarp and toe it appeared that the slumping extended down into the native soils underlying the road embankment.

AMEC conducted a geotechnical investigation in the summer of 2005 which concluded that the slumping of the road embankment was due to high groundwater levels (from the June 2005 rains) saturating the base of poor-quality road fill material and triggering slumping of the road

embankment down towards the west. The report recommended that the road and subgrade be excavated through the slumped segment of the road and for a specified extent to the north and south and replaced with compacted, higher quality fill material including a continuous drain layer at the base of the fill. AMEC understands that these recommendations were not implemented and that in the fall of 2005 the reconstructed southbound lane was compacted and repaved so that the road could be reopened to two lane traffic over the winter of 2005/2006.

Site Assessment

The site assessment was performed on May 30, 2006. The weather at the time of the site assessment was sunny and clear.

Observations

The following points summarize the observations made during the site assessment. Please also refer to Appendix S10 for annotated photographs.

- Some longitudinal cracking has developed along the center of the repaved southbound lane (Photo S10(B)-1). Otherwise, the repaved road surface was in good condition (Photos S10(B)-2 and S10(B)-3).

- Three of the drainage pipe outlets that were installed during repairs to the road in 2005 were visible at the south end of the previously slumped area. Two of these drainage pipes were discharging a trickle of water at the time of the inspection.

- The natural area downslope/west of the fenceline slopes down to the west at approximately 10°. There were boggy areas and possible groundwater springs visible in this area along with several trees tilted in various directions. These conditions were consistent with previous inspections and shows that groundwater discharge is a long-term condition in this area.

Please also refer to AMEC's June 30, 2005 report for further detailed description of the instability conditions at this site.

Post-inspection note – AMEC understands that in early July 2006 the road surface slumped again during/shortly after heavy rainfall. The pattern and extent of the instability was generally the same as in June 2005. AMEC understands that AIT plans to implement the repair measures that were recommended in AMEC's 2005 report.

Discussion

AMEC understands that AIT will implement the repairs recommended in AMEC's 2005 report for this site in order to repair the damage to the road from the July 2006 slumping.

Assessment and Risk Level

The Risk Level factors recommended below are the same as recommended when the road surface was slumped and in need of repair during June 2005 – which is understood to again be the case as of early July 2006. The factors listed below do not account for the planned repairs, and could be revised after the successful completion of the recommended repairs is confirmed.

- The Probability Factor should be set at 13 in order to reflect the active and high rate of landslide movement.

- The Consequence Factor should be set at 5 to reflect the partial closure of the road due to landslide movement, with the potential for full closure of the road and requirement for immediate temporary repairs if additional landslide movement occurs.

Therefore, the recommended Risk Level for this site is 65.

Recommendations

AMEC recommends the following future work for this site:

AIT to confirm that the repairs recommended in AMEC's 2005 report have been successfully completed.

Continue the annual inspections to monitor the road surface condition after repairs have been completed. If the repairs are judged to have been successful then the annual site inspections can likely be discontinued.

Photo S10(B)-1 (upper left) – May 2006 – facing south along the road. The area was repaved since the 2005 inspection. Minor longitudinal cracking visible in the repaved surface.

Photo S10(B)-2 (upper right) – May 2006 – facing south along the road. The area was repaved since the 2005 inspection. Compare with Photo S10(B)-3 (lower left) which shows the same area in June 2005.

Photo S10(B)-3 (lower left) – June 2005 – shows same area as Photo S10(B)-2, as it appeared in June 2005.

Photo S10 (B)-4 (lower right) – May 2006 – facing north along the road. The area was repaved since the 2005 inspection. Compare with Photo S10 (B)-5 (next page) which shows the same area in June 2005.

Photo S10(B)-5 (upper left) – June 2005 – shows the same area as Photo S10(B)-4, as it appeared in June 2005.