

1.0 Site Visit

The Annual Inspection site visit was conducted on 29 May 2002. At the time of the visit, the weather was partly cloudy and calm.

2.0 Significant Observations

The following observations, considered to be relevant to the stability of the slope were made:

- Loss of ground around the pile wall along the downslope edge of the road continues to be evident in the cracked and distressed pavement surface in the slide area.
- The guardrail through the slide area continues to show deformation due to the slope movement (Photo 1).
- No open tension cracks or groundwater seepage were noted in the slope below the road at the time of the inspection.
- Artesian groundwater flow was noted at the standpipe installed in AMEC BH-6, near the fenceline at the toe of the slope north of the road.
- The toe lobe of the landslide near the small creek north of the fenceline does not appear to have advanced significantly since the last inspection (Photos 2 to 4).

3.0 Changes from Previous Visits

The slope movement at this site appears to be ongoing at a relatively slow rate, as evidenced by the continued cracking and subsidence of the road surface (especially downslope of the pile wall). However, there have been relatively few changes since the previous assessment in 2001, and most of the observations reported at that time remain valid.

The slope inclinometer readings taken in May, 2002 indicate that no significant movement has occurred since the Spring 2000 readings except for SI #7, which was noted in the fall of 2000 to be sheared off at a depth of 6.4 m – as opposed to 7.6 m previously. The newer instruments installed by AMEC in February, 2001 also show no significant movement.

4.0 Discussion

Significant movement does not appear to have occurred at this site since the 2001 assessment. However, the slope stability conditions at this site have not improved during that time and the previously installed remedial measures (namely the pile wall along the downslope edge of the road) continue to only be partially effective in mitigating the slide.

As noted in last year's assessment report, the slide at this site extends approximately 150 m north of the highway and "toes out" in the small stream. The scope of the slide appears to be such that the toe of the road fill is losing support and it is considered likely that such movements will continue over time. Periodic reconstruction of the road shoulder and regular surface patching will be effective in handling the movement in the short term, but at some point it is likely that significant repairs will be required.

In order to adequately mitigate this slide with respect to the road it would be required to improve the support below the toe area of the road fill. AMEC performed a site investigation and preliminary analysis of remedial options in 2001 and recommended a tied-back pile wall to support the road. Please refer to the recommendations section for further discussion.

5.0 Assessment

The area extending at least 150 m downslope of the highway fill embankment is an active translational/spreading slide area. It is likely that this landslide extends below the road fill and is responsible for a loss of support below the fill, which is, in turn, causing rotational failures in the fill. The existing pile wall along the downslope edge of the road appears to be partially effective in reducing the ongoing settlement and damage to the road surface. However, the fill material downslope of the pile wall is not supported. The geotechnical site investigation and preliminary analysis indicated that a tied-back pile wall located on the slope below the road would be the most effective option for supporting the fill material downslope of the pile wall. During the site visit, the installation of a row of pumping wells on the slope face below the road in order to lower the artesian groundwater levels in this area was also discussed.

The Probability Factor with respect to this slide should be reduced from 11 to 9 in order to reflect the relatively minor slope movements measured in the instruments since the Spring 2000 readings, albeit with some continued settlement and cracking of the road surface and deformation of the guardrail since that time.

It is likely that in the short term continuing movements will result in repairs and patching being required to the north shoulder and a portion of the westbound lane. However, larger movements are possible and likely in the longer term, which would effect a significant portion of the highway. On this basis a Consequence Factor of 5 is assigned to this slide.

Based on the above, the Risk Level at this site is calculated as 45, which is an decrease from the value of 55 calculated after the 2001 inspection.

6.0 Recommendations

The monitoring programs currently in place should be continued.

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 slope indicator and piezometer monitoring to provide as early detection of potential problems below the road as possible.



Significant additional mitigative works be considered for this site. AMEC has performed a geotechnical site investigation and considered a number of options for remedial measures at this site. A tied-back pile wall located downslope of the road was recommended as the most effective option. Detailed design of remedial measures have been deferred at this time because there does not appear to be an immediate risk to large portions of the highway. Other options, such as a row of pumping wells on the slope face below the road to lower the artesian groundwater levels noted during the inspection, could also be considered.