Highway 940 – Upper Wilkinson Creek Valley, Km 82.2 Cut Slope

This site is located approximately 82 km northbound from the junction between Highway 3 and Highway 940 at Coleman, AB, and approximately 9 km northbound from the junction between Highway 940 and Highway 532. The site is within the upper portion of the Wilkinson Creek valley, a short distance northbound of the low pass between the Wilkinson Creek valley and the Dry Creek valley to the south.

The site location is shown on Figures B1 and B6 in Appendix B. The site coordinates are listed in Table B1 in Appendix B.

This segment of Highway 940 is closed between December 1 and April 30 each year.

The site inspection was performed on September 27, 2008 by Mr. Andrew Bidwell, P.Eng. of AMEC.

Background

AMEC is not aware of any previously reported problems at this site.

A general description of the geological and climatic conditions in this area is presented in Section 5.2 of this report.

Site Observations

- There is an approximately 5 to 6 m high rock cut slope along the northeast side of the highway. The cut slope angle varies and the overall cut slope angle is approximately 45°. Photo 940-42 shows the cut slope.

- The ditch along the toe of the cut slope is roughly 1 to 1.5 m wide with a depth varying from 0 to 0.5 m. There were cobble-sized rocks from the cut slope filling the ditch in places, as shown on Photos 940-43 and 940-44.

- The downslope edge of the highway is at risk of becoming undermined by erosion along the right bank of Wilkinson Creek, which is a few metres downslope of the highway. Any such erosion would be similar to that described for the Km 82.4 Creek Erosion site.

Assessment

There is a hazard of rockfall debris from the cut slope spilling out from the ditch and onto the road surface. The ability of the existing ditch to contain rockfall debris from the cut slope appears to be marginal. For reference, the rockfall catch ditch design chart attached as Figure C1 in Appendix C suggests a ditch approximately 3.7 m wide and

from 1 to 1.3 m deep for a cut slope in rock of this height and inclination. The existing ditch is smaller than this.

There is also a risk of erosion along the right bank of Wilkinson Creek destabilizing the slope between the creek bank and the downslope edge of the road and in turn destabilizing the road itself. This did not appear to be occurring at the time of the September 2008 site inspection, but bears watching in case a situation similar to the Km 82.4 Creek Erosion site begins to develop.

Risk Level

Creek Erosion

The recommended Risk Level for this site, relative to the potential for future creek erosion undermining the downslope edge of the road, based on AT's general geohazard risk matrix, is as follows:

- Probability Factor of 5 because it does not appear that the road is currently being undermined however with uncertainty as to whether or not it will start to become undermined in the future.

- Consequence Factor of 2 because if the downslope edge of the road starts to become undermined in the future, it may be necessary to post warning signs and temporarily reduce the road width for traffic prior to repair.

Therefore, the recommended Risk Level for this site with respect to the creek erosion hazard is 10.

Rockfall

The recommended Risk Level for this site, relative to the rockfall hazard along the cut slope, based on AT's rockfall risk matrix, is as follows:

- Probability Factor of 13 to reflect the active rockfall conditions with several falls occurring each year.

- Consequence Factor of 1 to reflect the apparent ability of the existing ditch to contain the rockfall debris *if the ditch is cleaned as required to maintain capacity.*

Therefore, the recommended Risk Level for this site with respect to the rockfall hazard is 13. This Risk Level value is contingent upon the ditch being kept clean and as close as practical to maximum capacity. Otherwise, the Consequence Factor should be raised to 2 and the Risk Level would increase from 13 to 26.

Recommendations

Maintenance and Short Term Actions

The ditch should be cleaned as necessary to keep it as close as practical to maximum capacity.

Medium to Long Term Actions

It is recommended that this site be visually inspected during the 2009 Southern Region inspection tour in order to check the erosion conditions along the right bank of the creek.

Hwy 940 – Upper Wilkinson Creek Valley
Km 82.2 Cut Slope

Photo 940-42 (top) – General view of the cut slope, facing northbound.

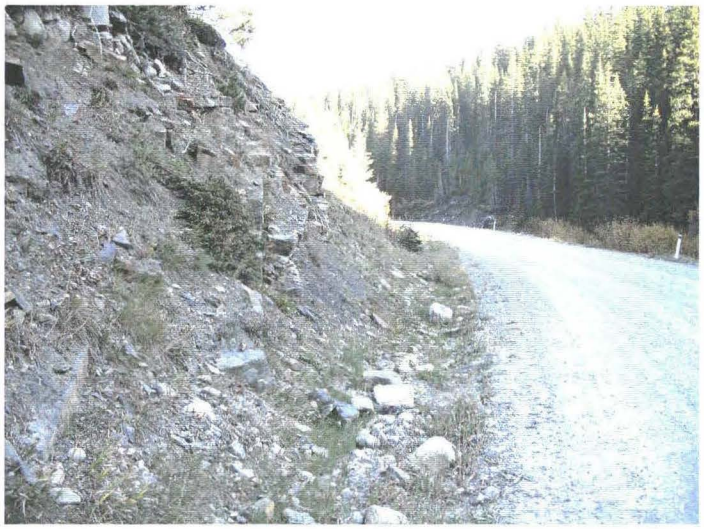

Photo 940-43 (middle) – Facing southbound along the toe of the cut slope. Note the very small ditch, and the cobble-sized rocks that have fallen from the cut slope.

Hwy 940 – Upper Wilkinson Creek Valley
Km 82.2 Cut Slope

Photo 940-44 (bottom) – Facing northbound along the toe of the cut slope. Note the very small ditch, and the cobble-sized rocks that have fallen from the cut slope.