

Highway 940 – Upper Wilkinson Creek Valley, Km 81.4 Cut Slope

This site is located approximately 81 km northbound from the junction between Highway 3 and Highway 940 at Coleman, AB, and approximately 8 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 8 m high cut slope along the south side of the highway that exposes glacial till/rocky soil with up to boulder-sized rocks visible. The cut slope angle is approximately 30 to 33°. Photo 940-39 shows the cut slope.
- The road surface is approximately 9 m wide and there is no effective ditch along the toe of the cut slope.
- There was an accumulation of gravel to cobble-sized rocks along the south edge of the road, as shown in Photos 940-40 and 940-41. This material had eroded out from the cut slope and rolled/slid downslope to the edge of the road.
- Surface runoff along the road was visible flowing through the debris along the toe of the cut slope, as shown in Photo 940-41.

Assessment

The accumulation of rocks along the south edge of the road is a hazard to vehicles and without a ditch may force surface flow along the road into the traffic lanes. However,

given the angle of the cut slope, it is not expected that rocks eroding out from the cut slope will roll into the traffic lanes of the road.

It appears that the accumulation of rocks along the south edge of the road is dealt with during routine grading of the unpaved road. It is not known if the volume of rock accumulated along the edge of the road at the time of the site inspection is a typical amount that accumulates before regrading. The consequence of the debris along the edge of the road appears to be relatively minor, particularly for this secondary highway in an area that is closed to traffic for five months of each year.

Risk Level

The recommended Risk Level for this site, based on AT's general geohazard risk matrix, is as follows:

- Probability Factor of 7 due to the active erosion of the cut slope that is causing rock debris to accumulate along the toe of the cut slope.
- Consequence Factor of 2 because the accumulation of rocks along the south edge of the relatively narrow highway could damage a vehicle if the vehicle drives through the debris.

Therefore, the current recommended Risk Level for this site is 14.

Recommendations

Maintenance and Short Term Actions

The accumulation of rocks along the south edge of the road should continue to be cleared out during the routine grading of the road. It appears that the maintenance contractor is already doing this as part of their operations.

Medium to Long Term Actions

The risk to traffic from the accumulation of rocks along the south edge of the road could be reduced by establishing a ditch that would contain the rocks that erode out from the cut slope and also ensure that surface runoff flowing along the road is not diverted into the traffic lanes by accumulations of debris along the toe of the cut slope. However, the existing road is too narrow to accommodate a new ditch without excavating into the existing cut slope, and the effort and site disturbance to excavate and "push back" the existing cut slope to gain road width for a ditch is judged to outweigh the benefit of reducing the currently low risk level at this site. Other options, such as steepening the cut slope to gain road width for a ditch and/or applying erosion protection measures to the slope face to reduce the amount of rock debris accumulating along the toe of the

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slope are judged less likely to be effective and/or the corresponding increase in future maintenance work at this site would outweigh the benefit of reducing the already relatively low Risk Level.

Therefore, no repair work is recommended for this site.



Photo 940-39 (top) – Facing southbound along the highway with the approximately 8 m high cut slope along the south side visible on the right. Note the lack of a ditch along the toe of the slope. The cut slope is marginally stable at 30 to 33° inclination, with eroded material from the exposed rocky soil rolling and sliding downslope to the road and accumulating along the toe of the slope.



Photo 940-40 (bottom) – Closer view facing southbound along the toe of the slope. Note the accumulation of eroded material, including cobble-sized rocks, along the toe of the slope.

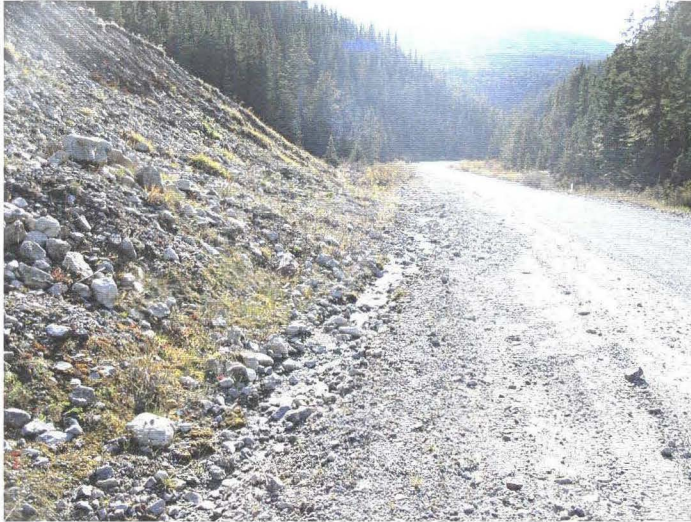


Photo 940-41 (top) – Facing northbound along the toe of the slope. Note the lack of ditch to contain the eroded material. Note also the surface runoff flowing through the debris along the toe of the slope.