

Highway 742 – Unnamed Creek At Mount Buller (Km 29.7)

This site is located approximately 30 km southbound from the junction between Highway 742 and Three Sisters Parkway in Canmore, AB and roughly 4 km southbound from the Spray Lakes Day Use Area on the east shore of the Spray Lakes Reservoir. The site location is shown on Figures A1 and A3 in Appendix A. The site coordinates are listed in Table A1 in Appendix A.

The site inspection was performed on October 18, 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 physical setting and conditions around this site is presented in Section 4.2 of this report.

Site Observations

- The highway crosses a seasonal, unnamed creek channel at this site, as shown on Photo 742-46. The creek drains a basin on the west side of Mount Buller. The creek channel is conveyed below the highway via a 1400 mm diameter culvert.
- There was no flow in the creek at the time of the October 2008 site inspection. As shown in Photo 742-46, the creek channel is incised slightly into a broader colluvial/fluvial fan upslope of the highway. The active channel is lined with up to boulder-sized rocks. It appears that in recent years, seasonal flow in the creek has deposited up to boulder-sized material into the upslope road ditch (see Photo 742-47), filling the ditch around the culvert inlet and with debris filling the ditch for approximately 10 to 15 m northbound from the culvert. The culvert inlet itself was clear of debris at the time of the inspection, as shown in Photo 742-48.
- The overall appearance and incision depth of the channel does not suggest that it is prone to lateral shifting within the fan above the highway.

Assessment

The debris in the upslope ditch northbound of the culvert inlet may have been deposited if the culvert was partially blocked at one point, with creek flow being diverted northwards along the ditch. However, it did not appear that creek flow has overtopped the road surface due to culvert blockage. It is also possible that creek flows had blocked

the culvert inlet with debris, and that the debris around the culvert inlet was excavated and simply placed in the ditch to the north of the culvert inlet.

Risk Level

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

- Probability Factor of 6 to reflect an apparent flow event or events in recent years that deposited the debris in the road ditch but also considering the possibility that the debris in the ditch was actually material excavated from around the culvert inlet only.
- Consequence Factor of 2 to allow for the possibility of debris spilling onto the road but likely without requiring road closure.

Therefore, the recommended Risk Level for this site is 12.

This is considered to be a conservative rating because it appears that the culvert can accommodate the creek and debris washing down along the channel without becoming blocked and overtopping the road. However, there appears to be a possibility that the culvert has previously been at least partially blocked, which could temporarily affect the use of the roadway but without requiring complete closure. It may be possible to reduce the Consequence Factor to 1, and the corresponding Risk Level to 6, if the site inspection after spring runoff in 2009 provides some assurance that the culvert remains clear of debris in most years.

Recommendations

Maintenance and Short Term Measures

The debris in the upslope road ditch should be excavated in order to restore the ditch to full capacity.

Medium to Long Term Measures

This site should be included in the summer 2009 annual Southern Region inspection tour in order to review the site conditions after the spring 2009 runoff and check the amount of debris accumulation in the upslope road ditch and around the culvert inlet. The recommended Risk Level for this site can be re-evaluated at that time.

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Photo 742-46 (top) – Facing upstream along the creek channel from the highway. Note how the seasonally-active channel is incised into a broader fan.



Photo 742-47 (bottom) – Facing northbound along the upslope road ditch. Note the up to boulder-sized material deposited in the upslope road ditch, northbound of the culvert inlet.

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Photo 742-48 (top) – Facing downslope along the creek channel towards the culvert inlet. Note the debris extending northbound (to the right) along the ditch.