

## Site 26 – Pocaterra Creek Slope

This site consists of a steep slope below (west of) the highway and approximately 2 km southbound of the parking area at the Elbow Pass trailhead. The highway is oriented roughly north/south along the lower slopes of Mount Rae and on the east side of the Pocaterra Creek valley. Figure E7 shows the 1999 airphoto of the site. The toe of the slope below the highway is at the Pocaterra Creek channel. The slope between the highway and Pocaterra Creek is inclined at approximately  $41^\circ$  and has an estimated vertical height of 25 m. The crest of the slope is offset approximately 6 m west of the guardrail. Photos 1 and 2 show the slope at this site and the offset of the highway from the crest of the slope.

The airphoto on Figure E7 shows that debris from an avalanche track/tributary creek channel on the west side of the valley has deflected the channel of Pocaterra Creek to the east (i.e. towards the highway). It appears that the creek channel is eroding the toe of the steep slope below the highway at this location. The creek channel was confirmed to be flowing along the toe of the slope during the field inspection, however the bank erosion did not appear to be significantly destabilizing the slope below the highway. The slope did show signs of shallow soil creep (e.g. curved tree trunks) that appeared to be unrelated to toe erosion at the creek bank. There were no significant slump block scarps or signs of retrogressive instability that could threaten the highway.

The slope inclination (approximately  $41^\circ$ ) is relatively high, however as noted above there were no signs of significant instability that would threaten the highway. There is a possibility that the slope angle is controlled by underlying, shallow bedrock or even permafrost given the elevation of the site (approximately 2040 m). Gardner et al. (1983) document alpine permafrost at an elevation of 2430 m at a nearby site. However, it is judged that there is no permafrost at this site.

AMEC recommends the following Risk Level factors for this site using AIT's general geohazard fall frequency-severity matrix:

- Probability Factor of 5 based on appearance of active, shallow soil creep on the slope below the road.
- Consequence Factor of 2 based on the interpretation that if a landslide developed on the slope below the road and retrogressed back to the guardrail, a portion of the road would be affected but closure of the road would not be required.

Therefore, the recommended Risk Level for this site is 10.

It is possible that the Probability Factor for this site could increase in the future if the amount of debris deposited at the base of the avalanche track/tributary creek channel on the opposite side of the valley increases rapidly or significantly and causes the

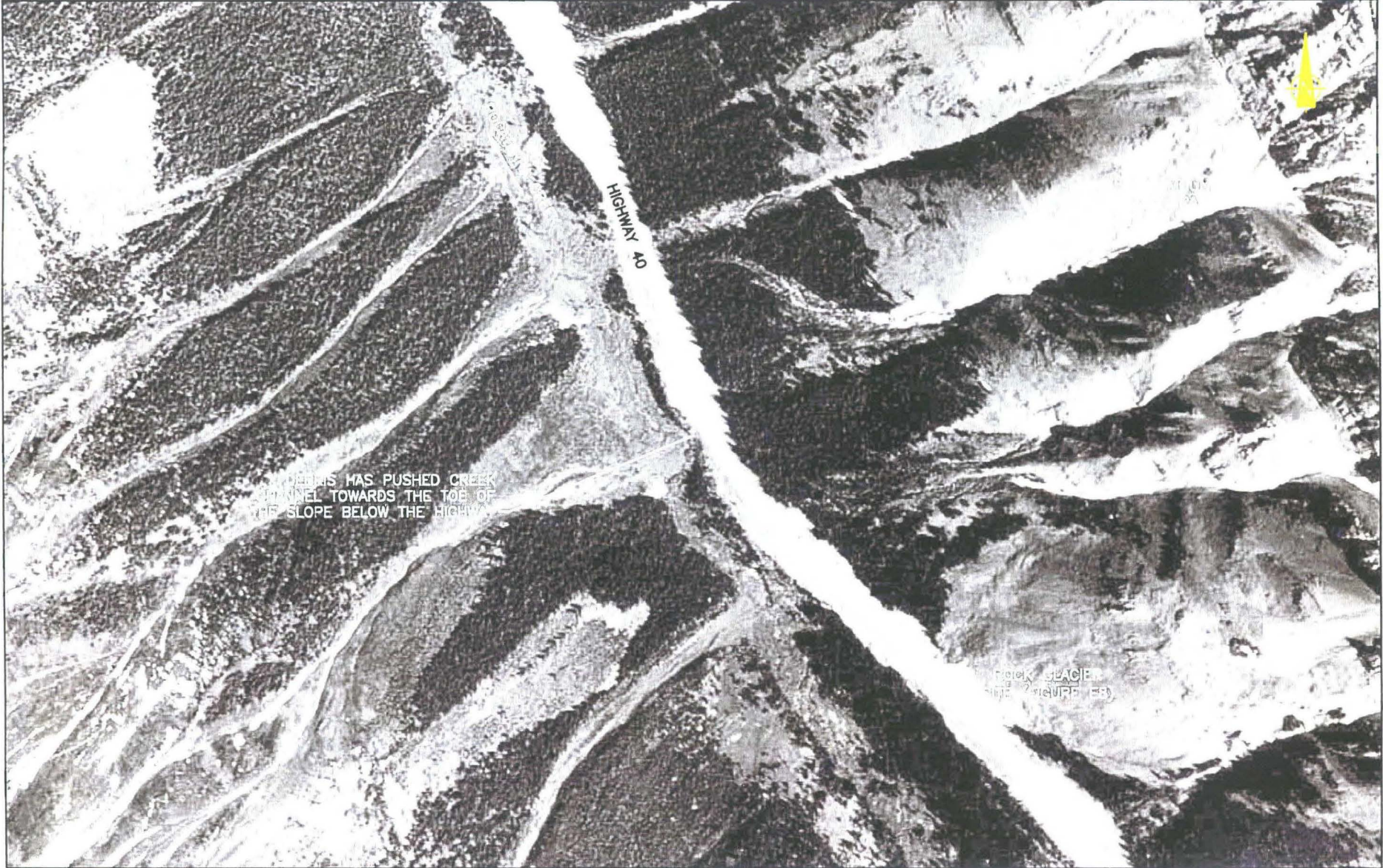
Pocaterra Creek channel to shift further and erode more aggressively into the toe of the slope. However, based on the visual appearance of the site it is judged that there is a low probability of this occurring. Furthermore, if aggressive erosion at the toe of the slope initiated retrogressive slope instability that could affect the road, it is judged that there would be sufficient time to mitigate the situation before the road was actually damaged.

AMEC recommends that visual inspections of this slope be performed annually in order to:

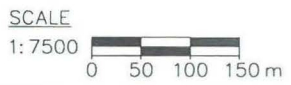
- Monitor the offset of the crest of the slope from the guardrail,
- Check the condition of the slope face,
- Check the creek erosion conditions at the toe of the slope.

These inspections should be performed by a geotechnical engineer and could be done in conjunction with other recommended site inspections along the highway corridor in order to economize on field time.





AIRPHOTO REFERENCE: PROVINCE OF ALBERTA, 99-091, AP 82J, LN-18, AS5084 No.96, 1:20, 000, 99-07-12



**amec** Earth & Environmental

CLIENT: **Alberta**  
INFRASTRUCTURE AND TRANSPORTATION

|   |                  |                        |                       |        |
|---|------------------|------------------------|-----------------------|--------|
| PROJECT: HWY 40/HWY 541 GEOHAZARDS REVIEW |                  |                        |                       |        |
| TITLE: POCATERRA CREEK SLOPE              |                  |                        |                       |        |
| DATE: DECEMBER 2005                       | JOB No.: CG25211 | CAD FILE: 25211N01.dwg | FIGURE No.: FIGURE E7 | REV. A |





**Photo 1** (top) – Facing north across the slope below the highway. The guardrail along the west side of the highway is visible in the upper right portion of the photo. The slope angle is approximately  $41^{\circ}$  and the crest of the slope is offset approximately 6 m from the guardrail. The vertical height of the slope is approximately 25 m. The toe of the slope is along the east bank of the Pocaterrea Creek channel.

There are signs of shallow soil creep on the slope face but no indications of significant slumping or retrogressive instability that could directly affect the highway.



**Photo 2** (bottom) – Facing south across the slope with the relative position of the highway, the slope and the Pocaterrea Creek channel visible.