

2011 Manawatu Gorge Landslide

The landslide which is currently blocking SH 3 in the Manawatu Gorge about 4 km from Ashhurst initially occurred on 18 August 2011. Several enlargements of the slip occurred during September to early October 2011, extending the headscarp to about 70 m above road level. Heavy rain on the night of 17 October triggered a much larger (~60,000 m³) failure at the site, involving vegetation, soil, and rock debris with boulders up to 2 m across (~20 tonnes), which again blocked SH 3 and spilled debris into the Manawatu River. The new failure caused the top of the slip to regress 70 m upslope, and its western margin extended 50 m east towards Woodville (Figure 1). In the technical sense the landslide is a 'rock and debris slide'. Investigations to date have shown that the landslide has occurred on the steep 40-60° slope above SH 3, apparently on the toe of a larger prehistoric landslide, which is thought to have formed thousands of years ago during the formation of the gorge.

The new failure has left the oversteepened (65-75°) headscarp in a highly unstable state, in which weak soils, colluvium (angular clayey gravel and boulders), and closely fractured and disrupted sandstone and argillite are exposed. Based on the nature of the present slip face and the development of the landslide to date, further failures are expected to occur from the top of the slip area, especially during heavy rainfall or strong earthquake shaking. Future failures could extend the slip scar another 50 m upslope to where the scarp of the prehistoric landslide has been identified, and possibly ~50–100 m to the west into a large colluvium-filled basin in the centre of the old landslide (see Figure 1). The area of potentially unstable material that could fail at this site is currently estimated to be about 20,000 m². Assuming an average slide mass thickness of 5 m, the volume of potentially unstable material that could fail may therefore be as much as ~100,000 m³ or possibly more.

There are still many unknowns about the nature of the landslide, the state of the slope above the scar, and how it might evolve. Investigations in the next week or two will focus on obtaining more data on the failure. Further laser scanning is planned to obtain more accurate location, size and volume data, along with geological mapping of the potential failure areas above the landslide scarp. Because of the steep bush-covered slopes in the slip area, these tasks are faced with physical and logistic challenges that must be overcome. However, the information and understanding that they will provide is essential before engineering decisions can be made on how to stabilise the slope and minimise the risk of future landslide problems at the site.

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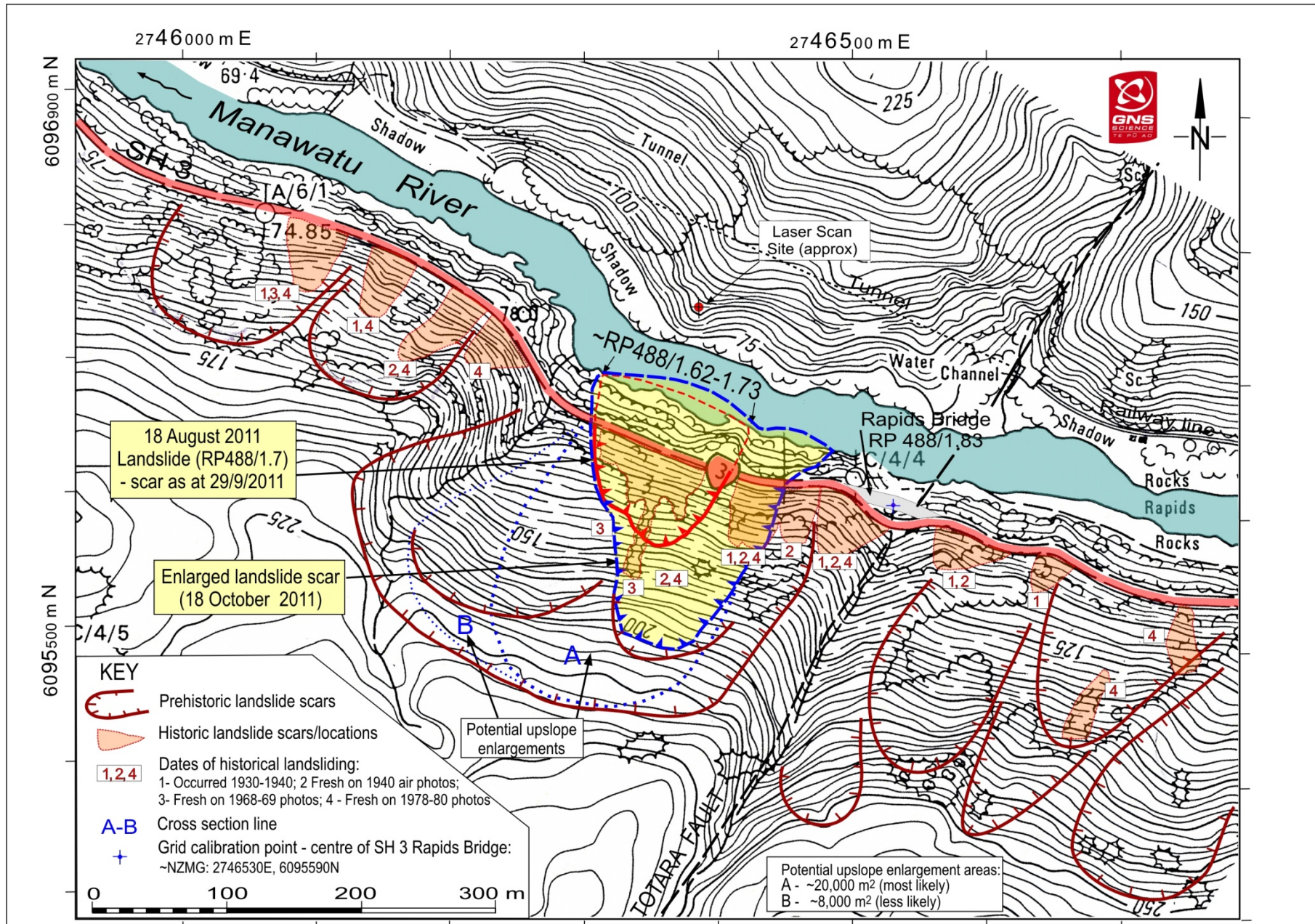


Figure 1. Geomorphic map of the 2011 landslide site in the Manawatu Gorge.