

# Memorandum



**To:** Area Officer: Mount Maunganui/Papamoa  
**From:** Project Manager  
**Subject:** SLIP ON MAUAO  
**Date:** 26 October 2000

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**In Reply Please Quote:** 260-1-11

Following our visit to the landslip site at Mauao on 16 October 2000, please find below my comments on the slip and some photographs for your files.

## Description of Failure

The slip is a failure of the part of a large headscarp of a historic or relic landslide, refer Plate 1 attached. The scallop shaped landforms around the margins of Mauao shown on Plate 1 are indicative of past instability. The relic landslide backscarp is near vertical and about 5-6m in height at this location. The slip is about 15m<sup>2</sup> (≈5m wide by ≈3m deep) in plan area and probably involved about 30m<sup>3</sup> to 50m<sup>3</sup> of soil. The recent failure seems likely to have been triggered by heavy water flow through a large natural pipe within the colluvium, refer Plate 2. There is also a collapsed sinkhole about 1m in diameter and 1 meter deep which is about 2m back from the new slip and inspection of this hole revealed a natural pipe at the base of about 300mm in diameter leading back up slope and on the other side of the hole towards the headscarp of the new slip. This phenomenon is consistent to the natural pipe that probably triggered the slip above the camp site in 1998 and the suggestion of sinkholes referred to be Laurie Richards in his Mauao hazard report.

There is a large debris trail down slope of the slip that has run out some 50m+ and probably flowed down onto the base track another 20 or so meters below the bank shown on the photograph. A ≈1m diameter colluvium boulder was also likely to have dislodged during the slip and deposited immediately below the slip, refer Plate 3. The ground up slope of the slip is hummocky which is often a sign of creep, refer Plate 4. There is also evidence of numerous depressions suggesting there are or have been numerous natural pipes within the colluvium in this area.

Although the slip was only discovered recently by a shepherd, I suspect the slip occurred during the 9 April 2000 rainfall event. I noted during my report following an inspection soon after the 9<sup>th</sup> that along with the 20 or so other slips that had affected the track elsewhere that an extensive flow of debris material had flowed over an escarpment above the base track at about this location. This debris flowed through the base track itself and onto the shoreline below. I did not attempt to establish the cause of the debris flow at that time due to the other slip problems that required immediate attention. I believe the reason the debris moved so far is that it debris failed into a natural overland stormwater flowpath which was concentrated due to the size and natural concave shape of the historic landslide scarp. In these circumstances the soil and mud mix to form a very fluid slurry. From my experience overseas it is common for fluid debris to travel long distances at high velocities in these or similar circumstances. It interesting to note that the vegetation existing at the toe of the large landslide scarp did stop or trap some of the debris.

## Suggested Actions

In view of the numerous similar relic landslide features around Mauao it is not practical to implement measures to prevent similar slips occurring in the future. It would also be impossible to reliably predict where the natural pipes exist. In addition, experience has shown that slips typically occur during heavy rainfall when the track below is unlikely to be heavily occupied. With this in mind I recommend a "do minimum" risk management approach, namely:

- I recommend the slip scarp be hand trimmed to remove the steep sections of the headscarp and any overhanging portions.
- I also recommend the scarp is grassed to reduce the erosion of the bare soil.
- The ongoing effect of the natural pipe is difficult to gauge - it could provide the source for ongoing erosion and scouring. I therefore recommend you inspect this area after heavy rainfall events to establish if some erosion protection works are required. This is more a management issue.
- I recommend that the density of vegetation at the base of the historic scarp be increased so as to act as a barrier to further debris flows. This philosophy could be implemented gradually around the margins of Mauao in similar locations.
- I concur with your view that these areas should be retired from grazing.

s 7(2)(f)(ii)

**PROJECT MANAGER**

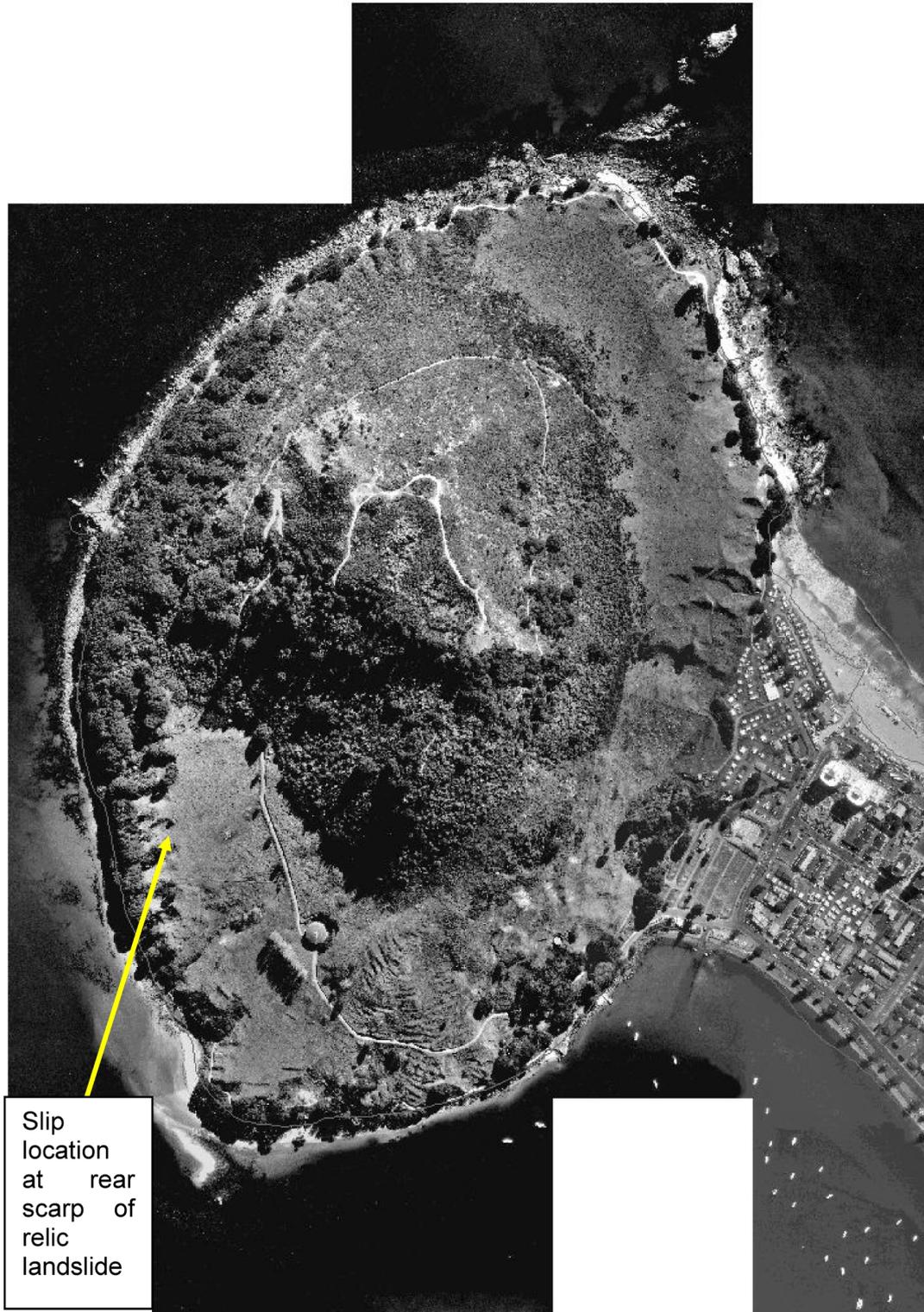


Plate 1 - Slip Location Plan



Plate 2 - View West showing slip scarp in foreground

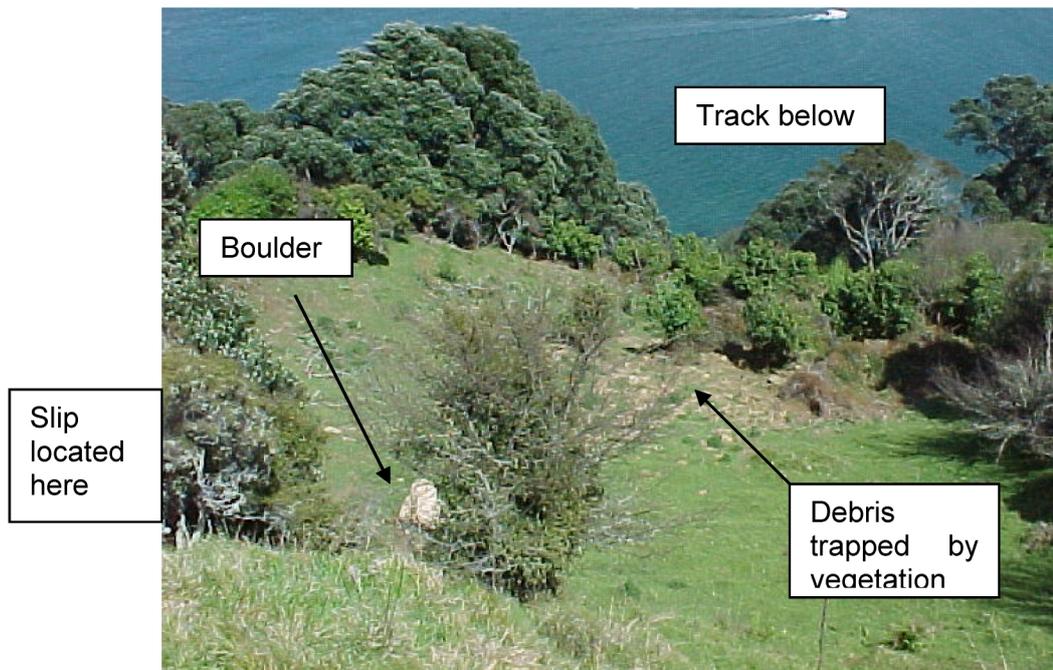


Plate 3 - Recent Slip occurred along part of a rear scarp of relic landslide



**Plate 4 - Hummocky ground above slip indicating creep and possibly sinkholes**



**Plate 5 - Slip debris partially trapped by vegetation near toe of relic slip**