Slope stability at Windermere.

S. Elmer

Mr R.M. Longden of Windermere, has requested an examination of the stability of his property which is situated approximately 700 ft upstream from the Windermere Church. The property is located on a peninsula of land along the Tamar River and was examined on 7 December.

Most of the peninsula is covered with Tertiary sediments and scree material, and basalt crops out on the top of a hill. A large proportion of the scree material which has slipped downhill is weathered to a basalt clay. A grey plastic Tertiary clay underlies the scree and basalt clay and was observed on the shore. The ground has a slope of 12° from the road down to a small gentle sloping area near the shore. Seepage water was evident at the river side of the house.

No apparent slip scar was present in the ground, but the ground was obviously in tension and had moved at least 2 ins and probably much more. This was inferred from cracks in the concrete drive-way which runs from the road down to the shore and from a 2 ins crack in a small concrete wall running parallel with the drive-way. It is also indicated by a fence post which has been pulled apart. The top part of a concrete wall on the shore had cracked and been pushed out approximately 3 ins. The house displayed obvious signs of being in tension. Mr Gale, a resident of the house, reported that H.E.C. personnel had slackened the powerline to prevent a possible disconnection caused by the downslope movement of the house.

The house is located in a 6 ft deep cutting and is badly damaged, with cracking occurring on every wall. The house appeared to be breaking up under tension. Several cracks 2 ins in width were in the house, and according to Mr Gale, clay has been welling up on the shore and as a consequence the boat-ramp was lifted and broken. Most of the same clay has been removed by wave action, but there is still some evidence of the upwelling on the shore. Mr Gale had previously drilled two auger holes at the corners of the house on the river side and water from one had flowed out over ground level. The weight of the house and the pressure from the sliding may be forcing the clay under the house and out on the shore, without much disturbance to the ground surface in between. This subsidence and loss of support under the house is adding seriously to the cracking of it and may also explain the much more severe cracking to the house than what could be expected from the at present, limited horizontal movement. Mr Gale has also constructed a drain from the road-side of the house down to the shore. The drain has not carried any appreciable amount of water which indicates that the soil is fairly impermeable.

CONCLUSION

The house is probably subject to what may be termed a 'compound landslide', with two major factors effecting it:

(a) downslope movement of the ground;
(b) subsidence through the removal of clay by a liquid or plastic flow of clay under the house.

From an examination of the geological situation at the site and from prior knowledge of similar cases in the Tamar Valley, the slide may be expected to continue to move every winter or at least every wet winter, for several years. Remedial measures are likely to be very complicated and expensive, and their effectiveness is probably questionable.

Mr Longden requested a further examination of the next block downstream in order to establish a possible site for the reconstruction of the house. The geological conditions are similar to those of the present site and building thus cannot be recommended.

REFERENCE

LONGMAN, M.J.; MATTHEWS, W.L.; ROWE, S.M. 1964. Geological atlas 1 mile series. Zone 7 Sheet 39 (8315S). Launceston. *Department of Mines, Tasmania*.

[13 December 1971]