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Slope stability of a block at Swan Bay

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A block of land at Swan Drive, Swan Bay, was examined on 3 October. The block has a long uniform slope of 9° to the north. The surface soil is a grey sand 0.3–0.5 metres thick overlying yellow clay. Although not exposed on the block the clay is visible in the nearby road drains and is also exposed in the extensive recently dug system of boundary drainage ditches and septic tank overflow evaporation drains on a neighbouring block.

From these exposures the clay appears to belong to the Launceston Beds of Tertiary age. It is this clay which is generally the problem sediment of the Tamar Valley region; it fails on slopes forming landslides as well as being frequently highly expansive. Shrinkage in this clay, especially during the recent drought of 1982–1983, has caused a considerable amount of house cracking in the Launceston area. From the field examination, the clay was plastic with a probable low shear strength, and is possibly expansive.

Slope failures are known to have occurred in the Tamar Valley on slopes lower than 9° but such failures are exceptional. Most of this block has been classified as a Zone III area on the Department of Mines Tamar Valley Landslide Zone Map. Zone III is defined as a potential landslide area in which building should be according to special code of the building regulations. Much of the Zone III area of the Tamar Valley has already been built on. Given the large area of this block and that certain precautions are taken, the risk of slope failure can be reduced until it becomes acceptable.

The most important precaution is to ensure that the block is adequately drained, that no broken pipes occur, and that swimming pools do not become cracked and leak. Above-ground swimming pools are preferable in landslide risk areas and in some areas are mandatory. The positioning of the septic tank overflow evaporation drains is also important. Excessive garden and lawn watering should be avoided.

Cutting into the slope should be restricted as much as possible and the height of any bank should be kept to 1–1.5 metres and preferably with a well-drained retaining wall as a support.

The expansive properties of the clay were not tested but it is recommended that this should be done before the house foundations are designed. This will require auger drilling a hole near the proposed location of the house. If the clay is thick, the hole should be drilled to at least two metres depth and samples collected every 500 millimetres. The samples should then be tested for linear shrinkage, moisture content and atterberg limits in a licensed soil testing laboratory or by the Department of Mines. If the clay is found to be expansive the foundations should be designed to withstand the potential movements in the underlying clay. A strengthened slab, designed by a competent foundation engineer, is generally recommended.

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