



## Inspection of properties at 52 and 54 William Street, Ulverstone

*B. D. Weldon*

Two properties in William Street, Ulverstone, were inspected at the request of the Department of Construction.

A landslide occurred behind 50 and 52 William Street in 1963. The homes on these properties are located on a gentle slope, with the rear of the houses being located about 15 m from a change in slope to the much steeper slope of Heazlewoods Hill. It is on this steeper slope that the landslide originated.

The toe of the 1963 landslide is located about ten metres from the rear of the houses. A report on the landslide was prepared by the Department of Mines in 1963 (Jennings, 1964). During the recent inspection it became apparent that the majority of the remedial drainage measures recommended in the 1963 report had been implemented but, in recent times, little or no maintenance had been performed on the drainage system which now appears to be ineffective. No evidence of subsequent re-activation of the landslide was observed during the inspection.

There is evidence of high earth pressures bearing against the recently constructed retaining wall inside the rear fence of 54 William Street. The retaining wall was reported to be constructed from uprights of 75 mm diameter steel pipe driven about 1200 mm into the ground below the bottom of a 1000 mm deep hole augered by a post hole digger. It was reported that the holes were backfilled with concrete. Railway sleepers were placed behind the steel uprights. There is no drainage material behind the railway sleepers, but a spoon drain outside the fence intersects surface run-off. Rotation outwards at the top of the retaining wall is now apparent. This property was unaffected by the 1963 landslide.

The occupants of 52 and 54 William St reported that their back yards become very wet and boggy during winter. Gravel spread over the yards was reported to 'sink' into the ground under traffic, the areas becoming unusable in winter. At 54 William Street it was reported that ponding occurred in the back yard during winter. A green, slimy, smelly growth was reported to occur within the pond.

A well developed polygonal system of cracks up to 10 mm wide at the surface and at least 100 mm deep was observed close to the rear of the residence at 52 William Street. The occupant reported that the cracks close up during winter. The occupants at 54 William Street reported that during excavation of the back yard by back-hoe in the dry season, the cracks could still be seen at the finished level (maximum depth of about 1000 mm). This property was not affected by the 1963 landslide. The cracks are considered to indicate reactive clays.

An examination of the houses at 52 and 54 William Street reveals significant cracks in the foundation brickwork, parts of which have been reconstructed. Cupboards and doors no longer close properly, floors are uneven and the chimney of 52 William Street is bowed. Differences in the thickness of the mortar layers were noted in the chimney, suggesting possible poor workmanship. A sickly musky smell was reported to come from the under floor area of 54 William Street.

It is assessed that distortion of these houses is due primarily to reactive clays expanding and contracting with changing ground moisture content. Underground seepages during winter from the toe of the old landslide mass could be a contributing source of ground moisture. A secondary factor may be long term soil creep or heave of (saturated) ground in front of the toe of the landslide due to the load imposed by the toe on saturated ground. Soil creep is considered unlikely because of the gentle slopes on which the houses are constructed. It would be difficult to demonstrate a heave effect without monitoring survey points over a period of time. The residences are unaffected directly by earth movement caused by a landslide, but an indirect (heave) effect cannot be discounted.

It is recommended that the two sites be classified for reactive clays according to Australian Standard AS2870 and the appropriate foundation system adopted for any redevelopment of the sites. Redevelopment should occur as close to the street frontage as permitted by Council regulations. It is also

recommended that drainage improvements be undertaken in the back yards. Deep subsurface drains are indicated, but the depth of a connection to council stormwater services may limit the depth which can be effectively achieved.

Attention should also be given to ensuring that recommendations 4 to 6 of the 1963 report in the section titled 'Remedial Measures' are adhered to, that is, the steep slope behind the homes should be planted with deep rooted vegetation, that gardening on the slope be forbidden and that watering on the slope

should also be forbidden. Geological Survey Bulletin 63 (Telfer, 1988) provides details on suitable vegetation species.

## References

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- JENNINGS, I. B. 1964. Landslip at William Street, Ulverstone. *Technical Report Department of Mines Tasmania* 8:113-115.
- TELFER, A. L. 1988. Landslides and land use planning. *Bulletin Geological Survey Tasmania* 63.

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