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1976/23. Investigation of a proposed building site at Lebrina.

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At the request of the Municipality of Lilydale a proposed building site for R.D. Shipton was examined on 21 April 1976. The Department of Health and the Lilydale Municipality inspectors were concerned that water from the septic tank etc., would reactivate an old landslip which is situated a short distance below the proposed building site.

TOPOGRAPHY

Shipton's block [EQ184424] is situated immediately below the crown of Red Hill, overlooking the Lebrina Valley. The block forms the headwater of a small streamlet that drains to the WSW. There are steep slopes on the northern and western sides of the block but towards the Scottsdale-Lilydale road the slope flattens as the valley becomes shallower. Near the eastern boundary of the block the stream has been impounded by a small, recently constructed, earth dam. The northern boundary of the block adjoins the access track to the forestry tower on the top of Red Hill. The southern boundary of the Shipton's block was not located with certainty but probably lies within the area occupied by the old landslip which forms most of the ESE side of the valley.

The site of the proposed dwelling was shown by the excavation for the concrete foundation slab and is situated on flat ground with an even surface. To the south the old slide is indicated by the very irregular land surface.

GEOLOGY

The foundations have been dug in red clayey soil, which is of the type normally derived from the weathering of basalt rock. Some small white clay fragments were found which have been derived from the weathering of cleaved mudstone and phyllitic mudstone (Mathinna Beds). At the building site it was not possible to determine whether the underlying rock was basalt or Mathinna Beds sediments.

At the dam, which is at a higher level than the building site, cleaved mudstone were exposed (Mathinna Beds) which had weathered near the surface to a white and grey clay; the depth of weathering was about 1-2 m. Cleaved mudstones are also exposed on the eastern side of the Lilydale-Scottsdale road north of the forestry access track to the lookout tower, where the road descends towards the Wyena valley. Fragments of Mathinna mudstone were found around the posts of the new fence around, and about 10 m above, the dam. Similar fragments were traced up the access track to Red Hill to an altitude of about 215 m so that it would appear that contact between the Mathinna mudstone and the basalt lies above this level. Above this level boulders and outcrops of basalt occur on the access track and around the top of Red Hill. From the outcrops on Red Hill it would appear that the Mathinna Beds are close to the surface for most of the area covered by Shipton's block.

There is an extensive flat area of red soil and basalt boulders on the west side of the Scottsdale-Lilydale road. The top of this presumed flow is at the same level as the entrance to the access track to the lookout tower. This basalt is at a lower altitude than the basalt capping Red Hill, and extends to a lower level towards the Lebrina Valley. Basalt boulders are seen on the first corner as the Lilydale-Scottsdale road climbs Red Hill from Lebrina, which also forms the toe of the old landslip.

These basalt boulders could mark the edge of the western flow as shown

on the Pipers River geological map (Marshall *et al.*, 1965) or alternatively could have been derived from the Red Hill basalt as the result of the old landslip.

ENGINEERING GEOLOGY

Whichever hypothesis for the origin of the basalt boulders occurring on the corner below the proposed site is correct there is ample evidence of recent movement at this locality as shown by the irregular road surface and extensive patching to the bitumen at the corner.

Surface irregularities of the old landslip continue parallel to the stream towards the break in slope near the dam at Red Hill. It would appear that the movement occurred in the clay which was derived from the weathering of the Mathinna mudstone as exposed in the dam. No evidence was found for the occurrence of Tertiary clay or sand between the Mathinna sediments and the overlying basalt at this locality as shown by Marshall *et al.* (1965).

The headwaters of the small stream are close to where the contact between the Mathinna Beds and the basalt is thought to occur. No actual spring was found but the water-loving plants indicate that groundwater percolates down through the basalt and reaches the surface on the clay at the contact between the Mathinna Beds and the basalt thus activating the original slip.

Clearly any further drainage from the proposed homestead will drain downslope directly into the old slide and possibly reactivate it. Such a reactivation would possibly extend the area of the slip upslope to include the proposed dwelling.

As construction of the dam has not yet reactivated the slip it seems that the dam was cleared down to bedrock and that groundwater is percolating into the bedrock and not the clay. If the drains, etc., at the proposed house can be excavated down to the cleaved mudstone below the clay the water will not travel into the old slip.

RECOMMENDATION

A back-hoe hole should be dug to determine the depth and nature of the bedrock. This hole should be dug at the proposed site of the septic tank to avoid additional expense. When this is done the excavation should be examined by a geologist.

REFERENCE

MARSHALL, B. *et al.* 1965. Geological atlas 1 mile series. Zone 7 sheet 31 (8315N). Pipers River. *Department of Mines, Tasmania.*

[4 May 1976]

APPENDIX 1

Following the recommendations above, a test pit was dug and examined by the writer and by Mr Griffan of the Lilydale Municipality staff on 7 May.

The pit was approximately 2.5 m deep but no basement rock was exposed. A layer of white plastic clay, similar to that overlying the cleaved mudstone of the Mathinna Beds in the nearby dam, occurred in the bottom of the pit. Above this was a transitional layer of grey-red silty clay approximately 1.5 m thick underlying a thick red soil.

There was a marked increase in the moisture content of the transitional layer towards its base, with a wet zone lying immediately above the white clay. It is along this interface that the groundwater collects and water movement down slope along this interface can be anticipated.

With a low ground surface slope of 5° no ground movement appears likely in the basalt soil and the underlying silty clay. The danger, as stressed in the preceding report, is that the sewage and sullage water will supplement the existing supply of groundwater above the white clay and travel down slope to reactivate the old slip. With the rock surface being at a depth of greater than 2.5 m, this danger is greater than if the white clay and the rock were closer to the ground surface. Recent tension cracks show that some movement has occurred on the old landslip and shows the edge of the slide to be approximately 15-17 m from the house site. These cracks indicate that the slip is widening in an upslope direction towards the house site.

RECOMMENDATIONS

It is recommended that the house site be moved from its existing location to a higher level. Every metre of ground gained between the edge of the old landslip and the proposed homestead appears to be warranted.

If relocation is not economically possible, it is suggested that all the sullage and sewage be directed into a dual purpose septic tank with the overflow from this tank going into a sullage pit dug down to the cleaved mudstones below the plastic clay layer.

This pit should be inspected by a geologist to examine the degree of weathering in the exposed mudstones before it is back filled with gravel and coarse sand. A leading drain from the pit should be dug parallel to the landslip towards the road. This drain should also be filled with coarse material.

The theory for this elaborate drainage system is that the cleaved mudstones of the Mathinna Beds are reliable low yield rock aquifer and will absorb the groundwater below the impervious clay layer at this site.

[19 May 1976]