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Groundwater investigation, Chapman's farm, Lilydale.

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A geophysical investigation was undertaken at the request of Mono Pumps Ltd in an attempt to evaluate the groundwater potential at Chapman's farm, Lilydale. The farm [EQ 162319] is situated one kilometre south-west of Lilydale township above the Lalla road and railway line, on the north-eastern flanks of Browns Hill.

GEOLOGY

Browns Hill is an isolated hill capped by dolerite which is reported to be underlain by sediments of Triassic and Permian age. The contact between the dolerite and the sedimentary rocks appears to be approximately parallel to the south-western boundary of the property. Triassic sediments were not found exposed on the property. Conglomeratic sandstone and siltstone, of Permian age, are exposed along the Lalla road, and along the railway line which forms the north-eastern boundary of the farm. These Permian rocks were mapped by Longman (1966) as belonging to the basal section of the Liffey Group. The Permian sediments may be thin at this locality and the depth to the underlying Mathinna sediments not great.

GEOPHYSICAL WORK

A resistivity probe and a seismic spread were undertaken, followed by the drilling of an auger hole to a depth of 4 m at the break of slope on the southern edge of the proposed orchard area.

The resistivity values were very low, indicating a thick surface layer of clay. The auger hole confirmed the presence of clay to a depth of 4 m before the auger became jammed.

The seismic velocities were 1500 m/s for the upper ( $V_0$ ) layer, and 2100-2450 m/s for the lower ( $V_1$ ) layer. The depth to the  $V_0/V_1$  interface is calculated to be 18-23 m with a slope down to the south. A thin surface layer with a minimum thickness of 3 m and a seismic velocity of 450-610 m/s was detected from a weathering spread.

The surface layer as found in the weathering spread is considered to be a dry clay layer which is known, from the drill hole information, to extend to 4 m in depth. The  $V_0$  layer is considered to represent Permian weathered interbedded conglomerate and siltstone similar to those exposed on the Lalla road and railway line. The  $V_1$  layer represents either Lower Permian sediments and, or Mathinna sediments. The seismic velocity curve shows the stepped velocity increases characteristic of Mathinna sediments. Mathinna sediments within the seismic velocity range 1500-2450 m/s have been found to yield groundwater.

HYDROGEOLOGY

Mathinna sediments in the Bridport-Gladstone area are a reliable rock fracture aquifer giving low yields of groundwater. Although the properties of the Lower Permian sediments in the Lilydale region are less well known they are likely to be similar to those of the Mathinna sediments. The anticipated yields should be in the order of 75-150 l/m. Yields in other areas have ranged from 45-260 l/m. The quality of the water is variable, but is generally good.

The bore should penetrate to the base of the V<sub>1</sub> layer, consequently a bore to a depth of 45-60 m is likely to be required. Solid casing would be required in the clay surface layer and slotted casing in the V<sub>0</sub> layer. In the V<sub>1</sub> layer the hole should remain open without any casing.

#### RECOMMENDATIONS

This type of hole can be drilled by a percussion type of drill rig although a rotary or down-the-hole-hammer type of drilling plant is more efficient but more costly. The hole must be adequately flushed and surged for its entire length to remove any mud caking and clogging the rock fractures caused during drilling.

Such low yield bores elsewhere in north-eastern Tasmania have been found to be suitable for continuous low rate pumping either by small electric pumps or windmills into collecting dams. If such a scheme is contemplated the siting of the bore will be controlled by the position of the collecting dam.

#### REFERENCE

LONGMAN, M.J. 1966. One mile geological map series. K/55-7-39. Launceston.  
*Explan.Rep.geol.Surv.Tasm.*

[23 January 1974]