UR1973_02

Underground water prospects at Richmond.

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R.D. Baker owns the property 'Logie' about 5 km north-east of Richmond which covers an area of about 600 ha. He requested advice as to whether underground water is likely to occur on the property.

GEOLOGY AND RELIEF

The property is underlain by Triassic sediments intruded by Jurassic dolerite. Dolerite occurs at several points on the property and it is difficult to determine the exact attitude of each body but most occurrences appear to be dyke-like rather than sills. Some of the dolerite is pegmatitic and weathers deeply but most of it is fine- to medium-grained. On the north-western part of the property mudstone beds appear to predominate in surface exposures of the Triassic sequence whereas on the rest of the property sandstone areas are most common although mudstone beds do occur. Possible Permian mudstone occurs near the old homestead and has been excavated in water holes.

The hilly nature of the property has been caused by the differential erosion of the dolerite and the sedimentary rocks.

HYDROLOGY

The most favourable rocks for obtaining underground water on the property are areas where thick Triassic sandstone beds and possible Permian rocks occur. Rates of flow of the order of 15-40 *l*/min are usually obtainable from these rocks. It is not expected that quantities sufficient for irrigation will be obtainable. The quality of the water could be poor. Three bores drilled in the early 1920s on the nearby property, 'Inverquharity', yielded water with total dissolved solids of 5271-13224 ppm. It is doubtful whether the higher salinity water would be useful for any normal purpose including stock water. The lower value would be suitable for stock.

The property has been divided into four areas for the purpose of the following discussion (fig. 1).

Area 1. This is probably the best area from several aspects. There is a well about 25 m deep near the house. Water quality is reasonable, a sample tested with a salinity meter, gave a reading of about 1100 ppm TDS. The advantages of this site are that water has already been found and if a hole was drilled a little deeper, a more permanent supply could be expected. Electric power is readily available at this point. The bore would need to be extended below the level of the valley to the north, as also has the well. In order to ensure the smallest drilling costs, the lowest point on the property in the vicinity of the house should be selected.

Areas 2 and 3. These areas are underlain by sandstone and are at least 200 m from any obvious surface exposures of dolerite. They are both situated in lower lying areas where water could probably be obtained. If the dolerite dips below these areas from the surface exposures water may not be obtained.

Area 4. This is a low-lying area between two dolerite ridges. Here again, if dolerite underlies the area at depth, then the chances of obtaining water are reduced. A resistivity probe was undertaken in the area but this cannot be regarded as completely reliable because of the dryness of the ground even though water was poured around the electrodes. The shape of the graph suggests that if water is obtainable from this area, it will be struck at 10-15 m from the surface.

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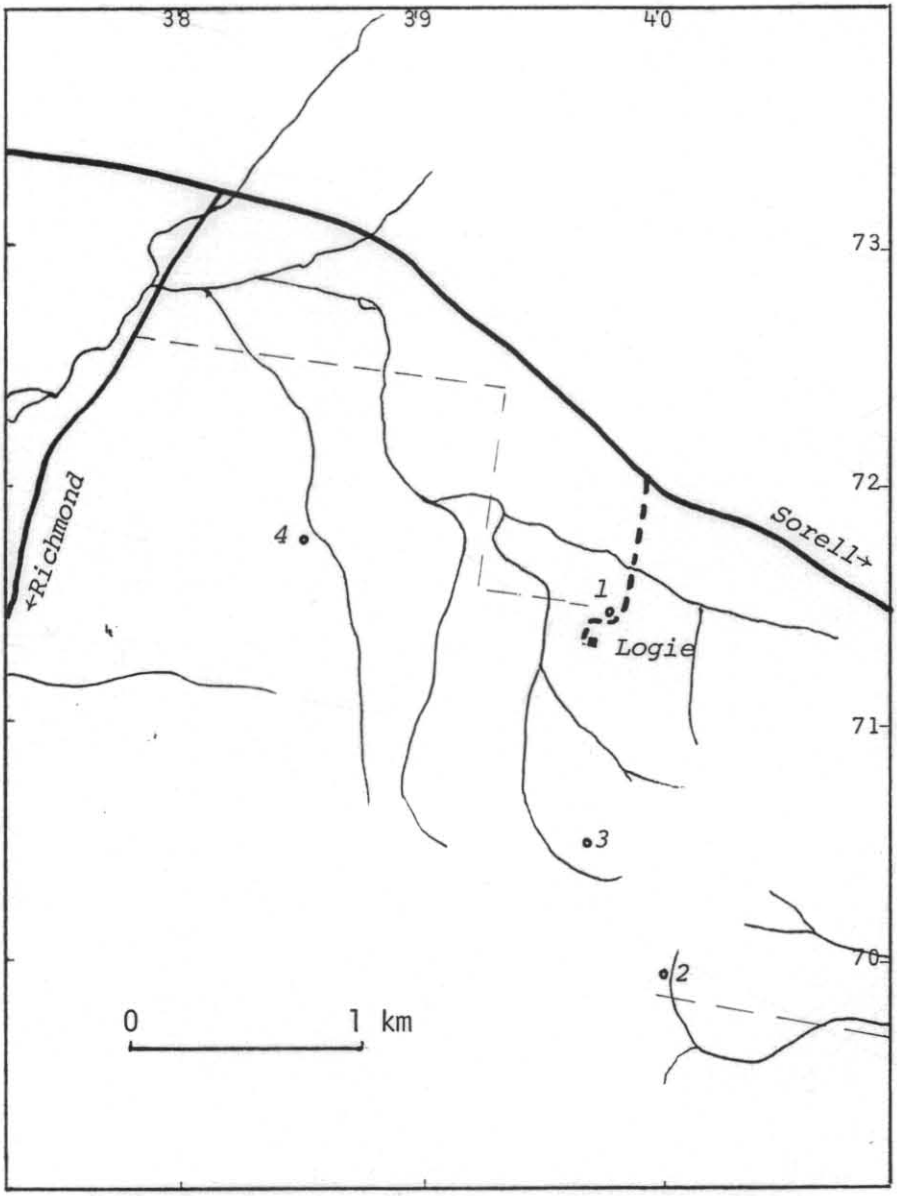

Figure 1. *Possible bore sites, 'Logie', near Richmond.*

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