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1977/4. Groundwater investigations near Pawleena.

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The Department of Mines was requested by Glenila Poultry Service to investigate the possibility of obtaining groundwater at a proposed poultry farm near Pawleena. The company has an option to buy land in the vicinity of Mountain Gully Creek, a small tributary of Sorell Rivulet and a proposed site has been selected at [EN492697], with access from Webbs Road.

The company will need a small (about 2500 *l*/day) but continuous supply of water for poultry feeding. Accordingly, it was tentatively proposed to either dam Mountain Gully Creek, or use groundwater.

The site was visited on 11 January 1977 with Mr D. Black (Rivers and Water Supply Commission), Mr S. Piercy (Glenila Poultry Service), and a representative of the Sorell Council.

GEOLOGY

The proposed site is wholly underlain by Lower Triassic quartz sandstone, which dips north at a low (<5°) angle. Mountain Gully Creek flows westward through the area, constricted on its northern side by low sandstone cliffs, and bounded to the south by subdued sandstone spurs. Massive quartz sandstone, in places finely laminated (*e.g.* at [EN493698]), crops out in the creek bed, which is littered with sub-angular to rounded boulders of Jurassic dolerite. The dolerite underlies Square Mountain and Burrows Sugarloaf, and is faulted against Triassic sediments about one kilometre upstream from the proposed site.

Mountain Gully Creek is actively eroding an unconsolidated dolerite boulder bed which forms an elongate irregular strip of creek sediment along its lower reaches. The bed is unstratified and poorly sorted, with dolerite boulders up to 60 cm across in a gritty and clayey matrix, and is variable in thickness. At the proposed site, the boulder bed has infilled a shallow depression (about one hectare in area) between sandstone spurs: the bed wedges out to the north and south against the rising basement, but attains a thickness of at least 3 m near the creek.

TRIAL PITS

Several back-hoed trial pits were excavated at the site as part of the concurrent investigations to dam Mountain Gully Creek. Some of the holes were located to the south of the creek, on higher ground underlain at shallow depth by Triassic sediments. The generalised log of these is:

Depth (m)	*Description*
0-0.3	Grey sandy loam
0.3-0.8	Stiff orange-brown clay.
0.8-	Triassic sandstone

Clay was absent in one hole, where one metre of sandy loam and clean quartz sand rested directly on unweathered sandstone. The remainder of the pits were excavated at or near creek level in boulder beds. The generalised log is:

Depth (m)	*Description*
0-0.2	Heavy brown clayey loam; some boulders.
0.2-*c.*2 or 3	Dolerite boulders in gritty and clayey matrix
*c.*2 or 3	Unweathered Triassic sandstone.

In two pits sited near the creek, at least 3 m of dolerite boulders were established. In both of these, water was struck at 2 m, flowing into the holes at rates estimated greater than 10 *l*/min.

RECOMMENDATIONS

The permeable nature of the boulder deposit precludes the construction of a dam across the creek, but the same deposit contains sufficient groundwater for the company's needs. (Groundwater is also probably present in the underlying Triassic sediments, but the drilling of a bore hole is economically unjustifiable and geologically unnecessary).

Groundwater may be extracted from the boulder deposit by either or both of the following methods.

(1) If the thickness of the summer saturated zone in the boulder beds exceeds about 2 or 3 m, a well is the cheapest and preferred method of extraction. The well should be dug as deep as possible (probably to Triassic sandstone basement) by a traxcavator or similar plant. Prior to installation of the well-lining, it is advisable to conduct a short term (about one day) pump test to determine whether it is capable of supplying a continuous and sufficient amount of groundwater. If so, the hole should then be cased with large (up to 2 m) diameter perforated concrete liners to ground level. The outer annulus should then be backfilled with clean permeable material, and the well capped with a concrete cover.

(2) If the initial pump test indicates that the well will not sustain the required pumping rate (*i.e.* it is pumped dry, or shows excessive drawdown), or that the saturated zone in the boulder bed is too thin, a second well may be dug, or the groundwater may be extracted from a collection trench (equivalent to a horizontal well). Construction involves the excavation of a trench to about a metre below the summer water table, and in which is laid a perforated pipe. The base of the trench must slope gently to one end, at which is constructed a sump or collection area, and from which the groundwater is pumped. The trench should then be backfilled to ground level with clean permeable material. (Depending on the permeability of the fill, it may not be necessary to install piping at the base of the trench). The yield of the system can be increased at any time by extending the trench in either direction.

Maximum efficiency is maintained if either system is pumped at a low continuous level.

The quality of the groundwater (which is derived mainly by leakage from Mountain Gully Creek) will be suitable for the required needs. However, care should be taken to avoid pollution of the well or trench from the farming operations.

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