1977/6. Groundwater investigations at Badger Head

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The executive officer of the Y.M.C.A. of Launceston, Mr N.D. Braidwood, requested that the Department of Mines investigate the possibility of obtaining groundwater at Badger Head. The Y.M.C.A. owns land (Camp Badger, [DQ 726496]) fronting onto Badger Head Road, at the western end of Badger Beach. The camp is presently being extended: excavations have been completed for a new hall, and the existing hall will be converted to a toilet and shower block. Adjacent shackowners presently obtain water from roof runoff, but such a supply is inadequate when the camp is occupied. Groundwater is needed to supplement tank supplies for toilet, shower and general domestic purposes.

Topographically, the property consists of three sections: a lowermost almost flat marshy area near Badger Head Road; a middle gently-steeply sloping section on which the existing amenities blocks are built; and along the south-western boundary of the property, an intermittent line of cliffs.

GEOLOGY

Each of the three topographic divisions is underlain by different rock types. Precambrian sandstone, quartzite, slate and phyllite of the Badger Head Group (Gee and Legge, 1971) form the Asbestos Range and crop out in massive cliffs immediately south-west of the camp. Badger Camp is built on a scree deposit of boulders and stiff white-brown clay which mantles the cliffs. This deposit extends north-east from the camp, and is overlain by unconsolidated sediments near the Badger Head Road. A proline auger hole drilled near the road [DQ727497] passed through the following:

Depth (m)	*Description*
0.0 - 0.25	Dark grey organically enriched A_1 soil horizon.
0.25 - 1.7	Medium-fine grained shelly slightly clayey grey sand.
1.7 - 4.2	Yellow-brown gravelly clay, with rounded-angular quartzite pebbles up to 2 cm; minor clayey sand containing charcoal fragments.
4.2 - 4.8	Mottled pale grey and bright yellow-brown slightly sandy clay, with rare quartzite fragments.

The water table (January 1977) was at 2 m.

The uppermost 2 m of sediments are considered to be Quaternary marine deposits. The underlying clayey and sandy gravel, probably also Quaternary, may represent marine-reworked scree material. Sediments below about 4 m are either weathered *in situ* scree, or basement rocks. Nearby, the Quaternary sediments are overlain by Holocene aeolian sand dunes, which are absent on the property.

DISCUSSION

The unconsolidated Quaternary deposits are the only potential source of groundwater on the property. The flat low-lying area is apparently water logged after winter rains, and despite the fact that the lateral continuity of the deposits has not been established, they no doubt contain sufficient water for the camp's needs. However, the quality of the water restricts its

general use. An on-site salinity test by conductivity meter indicated a salinity of about 3500 mg/*l* of total dissolved solids. The contamination is related to the proximity of the beach (infiltration of salt spray) but probably is mainly controlled by a nearby tidal creek. Such water is salty to the taste, and is unsuitable for human consumption. It is also unsuitable for hot water supplies, as the dissolved species corrode fittings and cylinders. However, it is suitable for cold water supplies to showers, and for toilets and septic tanks.

RECOMMENDATIONS

Despite the restrictions on its use, it may still be economical to utilise groundwater as a supplementary supply for showers (cold water only) and toilets.

It is recommended that a well be constructed at the proline hole site near the Badger Head Road. The well should be excavated by backhoe or larger plant during the summer months, to a depth of about 4 m. The hole should be cased with large diameter (1-2 m) concrete liners to surface level (or higher if the area is inundated after rain) and covered with a concrete cap. A well is preferable to a small diameter spear bore as it allows a lower entrance velocity of groundwater to the well, thus reducing the amount of fine clayey material carried in suspension. However, the well acts both as a storage reservoir (a 2 m diameter well containing 2 m of water stores 6 m^3 water, or 1200 gallons) and a settling tank. The relatively impermeable clay at 4 m will also act as a convenient base for the construction. The annulus between liners and excavation should be back-filled with fine gravel or coarse sand.

When the camp is occupied, the well will operate with greater efficiency if it is pumped continuously at the lowest possible rate. The groundwater should preferably be stored in surface tanks (where it can be diluted with surface water if desired) prior to reticulation to allow more complete settling of any suspended matter it may contain.

Although contamination from the camp's septic tank system is unlikely to occur, it would be judicious to periodically analyse the water for bacteriological contamination before and when the camp is operating.

REFERENCE

GEE, R.D.; LEGGE, P.J. 1971. Geological atlas 1 mile series. Zone 7 Sheet 30 (8215N). Beaconsfield. *Department of Mines, Tasmania.*

[3 February 1977]