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42. Underground water prospects from unconsolidated aquifers in the George Town area.

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Due to increasing water use a new supply source or an additional pipeline is needed to supplement the George Town water supply.

Regional mapping north and north-east of George Town indicates the presence of large tracts of wind-blown sands (Gee and Legge, 1971). A simplified version of their map is shown in Figure 63 in which all rocks older than Tertiary are shown as basement and silt outcrops are indicated. The unhatched area represents wind-blown sand overlying Tertiary sand, silt and clay commonly with interbedded basalt flows. Such wind-blown sand usually has excellent hydrologic characteristics and yields good quality water.

For the purposes of a feasibility study the region was divided into three areas each of which would have its own intake system. Assuming a saturated sand thickness of 15 m and an average annual recharge of 450 mm the following yield figures would be anticipated with a transmissibility of 0.3 Ml/day/m and a storage coefficient of 0.2. The yield estimates are minima.

	Area 1	*Area 2*	*Area 3*	*Total*
Water storage (Ml)	12,000	19,000	7,700	38,700
Recharge (Ml)	1,800	2,900	1,200	5,900
Safe yield (Ml)	1,800	2,900	1,200	5,900
Daily safe yield (Ml)	5	8.1	3.1	16.2
Area considered (km^2)	3.9	6.5	2.6	13

THICKNESS OF THE SAND

The above feasibility figures depend heavily on the presence of an average, saturated sand thickness of about 15 m.

Seismic work was undertaken in selected zones of each area, where the sand cover was inferred to be thickest. In Areas 1 and 2 it was found that the sand cover was normally no thicker than 3 m and commonly less than 1 m, Tertiary clay or Tertiary basalt being the underlying materials. In Area 3 only one locality, in the dunes west of Beechford, was examined. At this stage, having found that the scheme was not feasible, it was considered worthwhile to examine the coastal sand at Beechford with a view to the determination of its hydrologic properties for future reference and information. The thickest sand (8 m) in the whole region was found at Beechford. The general thickness was a little over 6 m.

A drill hole was sited at Beechford at a point where the seismic survey indicated a thickness of about 7 m. The seismic velocity in the sand was found to be about 350 m/sec and that in the underlying rocks about 2,500-3,000 m/sec. It was anticipated that the higher seismic velocity layer represented fractured basalt with an unweathered upper surface.

Basalt was struck at 7 m, the water table being at a depth of 5.1 m. A screen, with apertures of 5 μm and 1.5 m in length, was set on the basalt and the remainder of the hole cased. The screen diameter was 150 mm.

A sample of the sand, which was composed principally of quartz, was taken for analysis. The table below gives the details of sizing.

Size (µm)	%	*Size (µm)*	%
63	1	250	75
125	22	500	2

PUMPING TESTS

Limited pumping tests of up to 8 hour duration were undertaken. It was found that the bore could yield 1,590 l/h at a drawdown of 1.8 m. The sand was found to have a transmissibility of >60,000 l/d/m and an estimated storage coefficient of about 0.25. Water quality: 800 ppm TDS.

REFERENCE

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

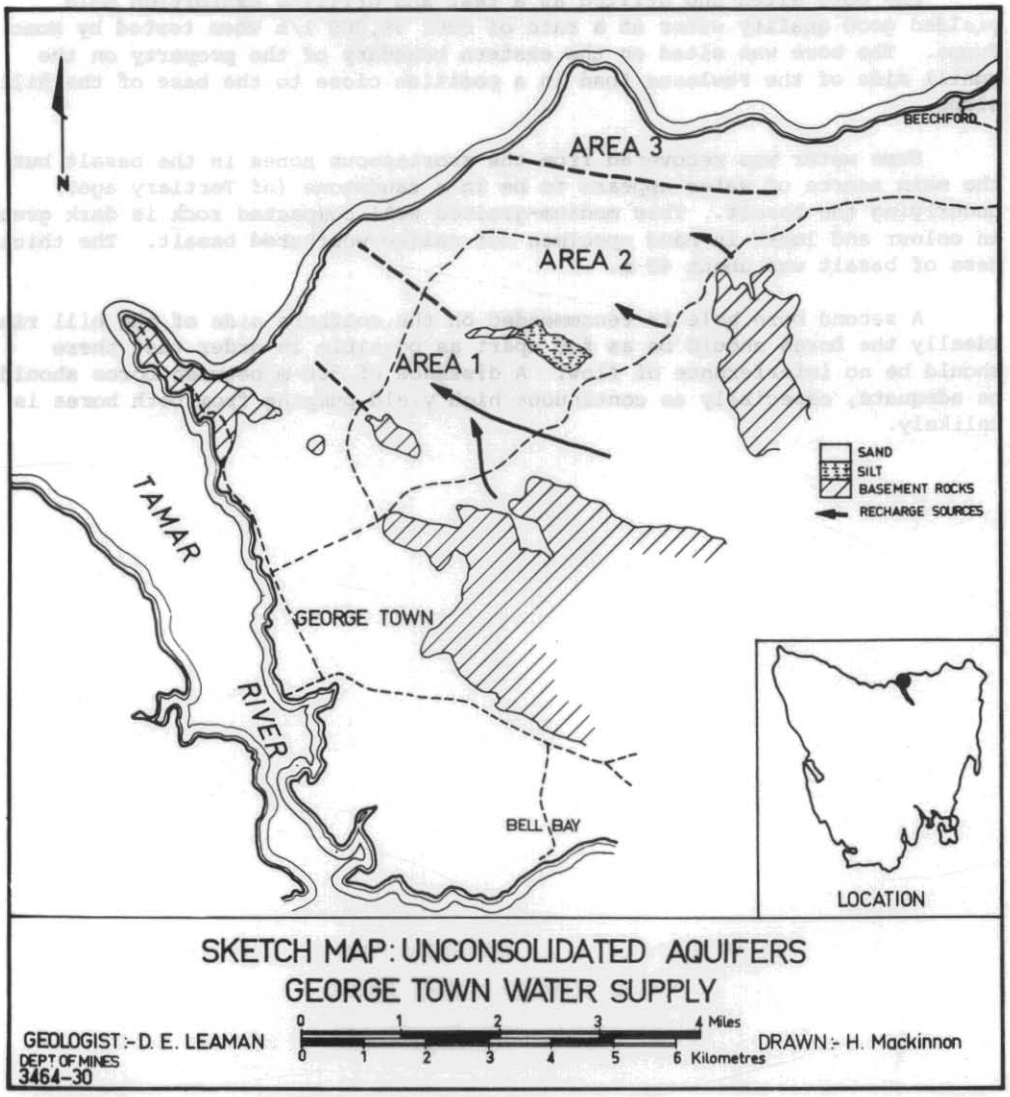

Figure 63.

5 cm