

1984/11. Spear bores in the Strahan area

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Abstract

Two spear bores in the Strahan area have encountered water of good quality. Extensive sand deposits occur in the area and large quantities of water are likely to be stored in them. The composition of the sand and whether shell fragments are present is likely to have a strong influence on the water quality, particularly the pH, bicarbonate, and calcium content.

INTRODUCTION

The Strahan Municipal Council requested that the Department of Mines investigate the possibility of installing spear bores at Macquarie Heads [CP540240], some 12 km by road south of Strahan. In addition to this, water is required for drilling operations being undertaken by the Department of Mines north of Strahan, and as sand dunes occur in the area, a spear bore was regarded as a possible source.

GEOLOGY

Extensive deposits of sand, including dune sand, occur along the coast in the Strahan area. These deposits extend from Braddon Point to north of the Henty River, a distance of more than 25 km, and have a width of up to 5 km (Baillie et al., 1977).

Macquarie Heads

The Macquarie Heads campsite is the same area where three spear bores had been installed at the request of the Forestry Commission about four years ago. The spears had not been established as operating bores and only one could be found. It was located in one of the areas where water was required by the council (about 100 m west of the caretaker's hut near a barbeque).

From the installation report (letter to District Forester, Queenstown 3.3.1981) the bore was 3.5 m deep, with a 600 mm long, 40 mm diameter screen at the bottom, the screen opening being 0.25 mm. The safe yield was given as about 15 litres per minute and the salinity, measured with a conductivity meter was about 450 mg/l total dissolved solids.

The bore was pumped during the recent visit at about 15 l/min for about 45 minutes without any reduction in output. The standing water level was about one metre below the surface and the salinity, again measured with a conductivity meter, was about 450 mg/l.

A hole was drilled near the westernmost campsite at Macquarie Heads, some 400 m west of the above area (fig. 1). The sand was fine-grained, light grey-brown in colour to 4.3 m, where it changed to dark grey to the final depth of 4.6 m. Examination of the sand under magnification shows that much of it consists of angular clear quartz fragments, while shell fragments and sponge spicules are fairly common. There are small amounts of ilmenite and magnetite.

A 50 mm diameter spear with a 600 mm long stainless steel screen (opening 0.38 mm) was installed in the hole to a depth of four metres. The bore was pumped at about 23 l/min for about 45 minutes and a very small

amount of sand was pumped with the water at this rate. The standing water level was at 1.2 m below the surface and measurement with a conductivity meter suggested a salinity of about 380 mg/l total dissolved solids.

Lake Ashwood area

Water is required for diamond drilling a hole about 1.5 km west of the Strahan-Zeehan road in the Lake Ashwood area (fig. 1). A low-lying area in the sand dunes some 200 m north-east of the drill site was selected for examination.

A hole was drilled to 6.0 m in fine-grained grey quartz sand with a narrow hard band at about 4.3 m. Examination of the sand under magnification indicates that most is composed of clear angular quartz fragments with a few milky quartz fragments. Occasional fragments of ilmenite and magnetite are present, together with very occasional fragments of sponge spicules. No obvious fragments of shell were noted.

A 50 mm diameter spear was installed to 3.9 m with a 1.5 m long stainless steel screen (opening 0.25 mm) at the bottom. The standing water level was about one metre below the surface and the hole was pumped at about 30 l/min for about 30 minutes. The water had a slight yellow colour and a smell of H₂S gas. A conductivity meter measurement suggested a salinity of about 140 mg/l dissolved solids content in the water.

Size of sand

The approximate size range of the sand in the aquifers at the two sites where drilling was undertaken is shown in Figure 2. These size ranges represent an average sample over the whole drill hole length rather than from one particular level. The sand from near Lake Ashwood is coarser than that at Macquarie Heads. Uniformity coefficients are low for each sample (1.2 for Macquarie Heads sand and 1.4 for the Lake Ashwood sand).

CHEMICAL ANALYSES OF WATER

Chemical analyses undertaken by the Department of Mines laboratory in Launceston are given below:

	<i>Macquarie Heads</i>	<i>Lake Ashwood area</i>
pH	7.4	5.4
Conductivity (µS/cm)	580	220
<i>Item</i>	<i>mg/l</i>	<i>mg/l</i>
CO ₃	nil	nil
HCO ₃	300	6.7
Cl	42	51
SO ₄	8.9	11.0
SiO ₂	<5	10.0
Ca	77	2.3
Mg	7.5	4.1
Fe	<0.1	3.4
Al	<0.2	0.6
K	1.2	1.0
Na	24	31
TDS	350	180

	Macquarie Heads	Lake Ashwood area
Permanent hardness	nil	27.0
Temporary hardness	220	5.5
Alkalinity	240	5.5

Apart from a difference in total dissolved solids content, there are some significant differences in the factors determined. For water from the Macquarie Heads bore the pH is higher, the bicarbonate content is much higher, both numerically and with respect to chloride content, and the calcium content is also higher. In each case these higher values are almost certainly due to the component of shell fragments in the sand at Macquarie Heads.

CONCLUSIONS

Extensive sand deposits occur in the Strahan area and these are likely to contain enormous quantities of water. The results of spear bores at two points suggest that the water is potable and that the quality will depend to some extent on whether shell fragments are present in the sand.

REFERENCE

BAILLIE, P.W.; CORBETT, K.D.; COX, S.F. et al. 1977. Geological atlas 1:50 000 series. Sheet 57 [7913N]. Strahan. *Department of Mines, Tasmania.*

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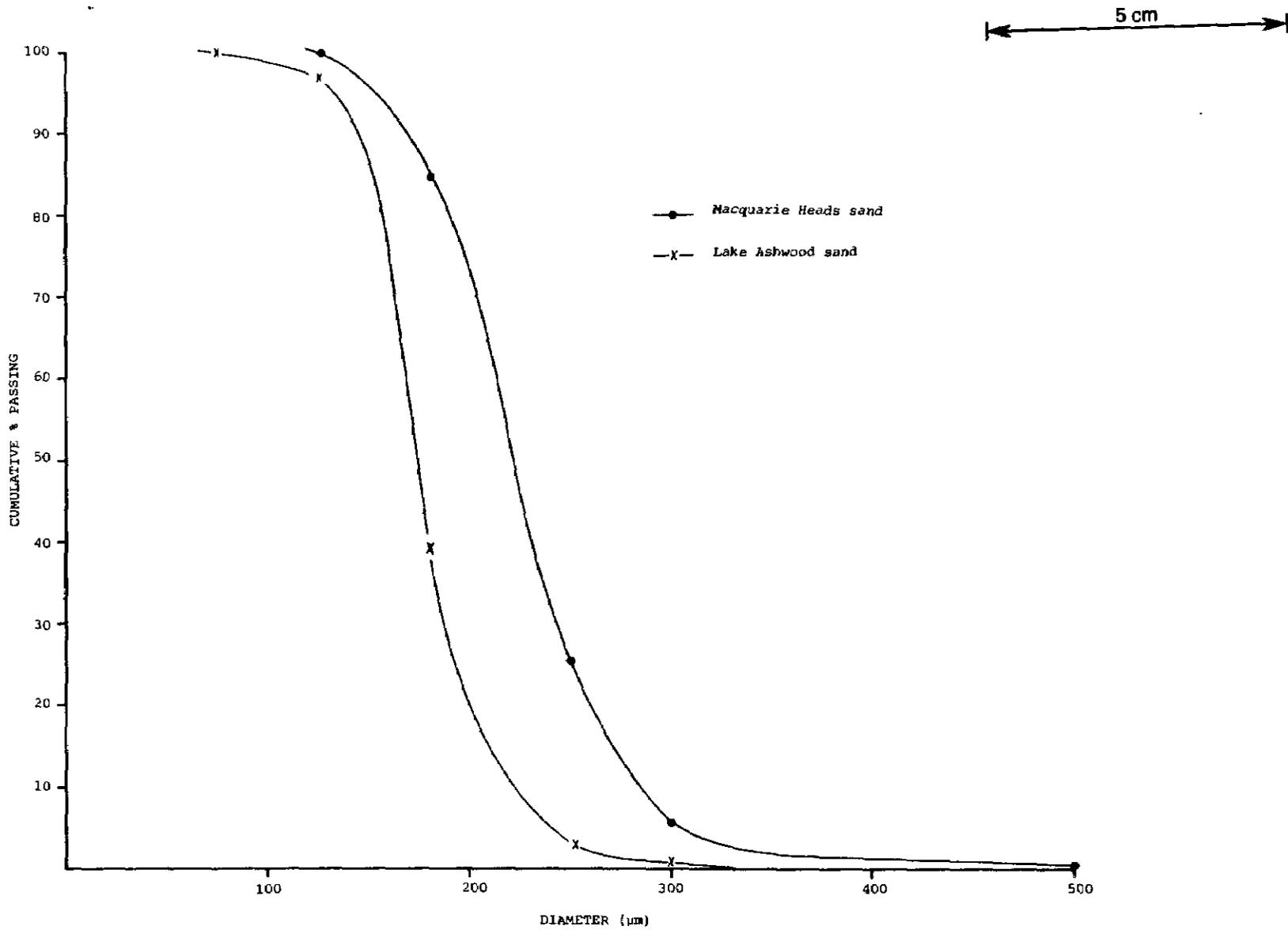


Figure 2. Approximate average size range, sand aquifers, Strahan

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