

Groundwater investigation, Seawood Ranch, Little Pipers River area.

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The groundwater prospects of an area of about 23 km² north and south of the Bridport-George Town highway were investigated at the request of the manager of the Seawood Ranch, Bridport.

The area extends west from Mickca Rivulet to Little Pipers river and north to the old Bridport-George Town road and is at present being cleared and prepared for pasture.

Three seismic spreads and one resistivity probe were undertaken.

GEOLOGY

The area consists of low undulating country: wide marshy flats and valleys separated by low flat ridges. The ridges are frequently covered with quartz gravel which has been extensively quarried for the construction of the new George Town-Bridport highway. Excellent exposures of folded mudstone and sandstone (Mathinna Beds) crop out in the highway cuttings in the area investigated. Elsewhere in the area the bedrock is covered by grey sand.

GEOPHYSICAL WORK

Incremental increases in seismic velocities between 900-4600 m/s were recorded in all three seismic spreads indicating the presence of Mathinna sediments. In the Mathinna sediments the groundwater appears to be concentrated in an intermediate zone of hard rock in which the fissures are open. This intermediate zone lies between the surface weathered zone and the hard rock zone in which the fissures are not open. This intermediate zone appears to coincide approximately with the layer which exhibits seismic velocities of between 1500 and 3000 m/s. The greater the thickness of this intermediate layer the higher the potential yield. Using this criterion all three areas where the spreads were fired are likely to give supplies of groundwater.

The three spreads were fired in three differing topographic locations characteristic of this type of country. Spread 1 was fired in a headwater valley immediately below the ridge, Spread 2 down a major wide tributary valley plain, Spread 3 along the top of gravel ridge. The greatest thickness of fractured Mathinna sediments was recorded from the valley location (Spread 2). No seismic velocity greater than 2750 m/s was recorded, even though the shot point was extended out 180 m. In this spread the thickness of the zone with open fractures was at least 40 m.

Spread No.	V_0 m/s	V_1 m/s	V_2 m/s	Depth to 'fast' (>2000 m/s) layer (m)	Slope Direction
1	1500-1800	3000-4000		24-35	Deeper to the N
2	1500	2450-2750		26-31	Deeper to the N
3	900	1500-1800	4000	34-37	No slope

The resistivity probe, undertaken in a valley, indicated a dry surface layer of silt and clay with water occurring within 2-3 m of the surface.

CONCLUSIONS

Geophysically and geologically the area investigated appears similar to the Bridport-Waterhouse-Gladstone region. In this region Mathinna sedi-

ments have been previously investigated and about 15 holes have now been drilled by the Department of Mines and private contractors; no dry holes have been reported. The Mathinna beds are therefore classified as a reliable low yield fractured rock aquifer which is a source of water of variable, but generally good, quality. One hole has produced water that is only suitable for stock use. The average yields from these bores are in the range 115-150 l/m (lowest recorded yield: 45 l/m; highest: 260 l/m).

RECOMMENDATIONS

This survey should be considered as a preliminary regional investigation and the siting of any bore should be influenced by the proposed use of the water.

When the most convenient sites for the bores have been chosen, their suitability should be confirmed by a further seismic spread and resistivity probe.

Drilling to depths of 45-60 m is likely to be required. Casing is normally only required in these sediments for the top 6-9 m.

Drilling can be carried out by either percussion, rotary or down-the-hole-hammer rigs, although rotary drilling has been found the most satisfactory method in Mathinna sediments. After drilling has been completed the hole must be adequately surged or aerated for its entire length below the water table to remove any mudcake left by the drilling. Low rate constant pumping is essential because yields will decline rapidly if bores in the Mathinna Beds are continuously over-pumped. Adequate pump testing should therefore be required of the drilling contractor.

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