Section 3 — Underground Water

NOTE: Numbers immediately before titles refer to localities on the Locality Map, fig. 1.

TR11-109-113

5. PROSPECTS OF GROUNDWATER SUPPLY, COLES BAY

by D. E. Leaman

In view of the low standard of a proposed dam site three quarters of a mile N of the town and the expense of a piped supply from the Apsley River 17 miles N of Coles Bay, the Glamorgan Council is also considering the possibility of a groundwater supply.

GEOLOGY

Granite of Devonian age outcrops over much of the area under consideration. Elsewhere, particularly in the low lying zones and those adjacent to streams, a superficial cover of sand, gravel and weathered granite occurs. It varies in thickness up to 100 feet. In most instances, however, it is less than 20 feet. Estimates of the thickness have been made using the resistivity method (see sample curves, fig. 38). Jurassic dolerite also outcrops in the region of Hepburns Point.

HYDROLOGY

The crystalline rocks, dolerite and granite, cannot be considered as a source of supply due to likely drilling difficulties and uncertainty of success due to lack of information on joints. In addition the yield per bore from these rocks is likely to be inadequate for a town supply.

A close examination was therefore made of the unconsolidated superficial material within which several springs and soaks occur. These are generally small, but the water is of good quality, i.e., suitable for domestic usage.

In order to ensure the presence of adequate supplies of groundwater it is necessary to locate zones of maximum thickness. The greater the thickness, the greater the storage capacity and the greater the yield due to less edge and limiting effects during pumping.

However, this material is less than 20 feet thick over most of its area of outcrop and consequently such areas cannot supply sufficient water. It should be noted that many springs and soaks occur in this zone (see fig. 38) but since these are small and solid rock is at shallow depth there is little possibility of enlargement.

In other areas, such as those adjacent to the coast, where the elevation of the land surface is less than 20 feet, any water present may be contaminated with sea water. Certainly heavy pumping would cause admixture with a resultant loss in quality. Thus although this material may be quite thick, e.g., at A (see inset, fig. 38) thickness is 70 feet, it must be discounted as a groundwater supplier on the quality aspect where the water is required for a town supply.

Only in one area does the thickness of material considerably exceed 25 feet. This is shown in the inset to fig. 38. Some probes in this region indicated thicknesses of 70-100 feet. However, it cannot be assumed that this is one large basin of great depth as it may be a series of smaller basins interconnected with small ridges of rock which do not reach the surface. This area is also of sufficient elevation to ensure no saline contamination. Such a ridge occurs S of B (see inset), where many seepages occur. The thickness of unconsolidated material in probe i is at least 100 feet, whereas it is only 20 feet in probe ii. Further, since probe ii was placed at a point 10-15 feet higher than the water table in the immediate locality it may readily be seen that the springs are simply an expression of overflow from the basin at a point where the surface intersects the water table. The quality of water from these springs is 150-200 p.p.m.

The water table in this region, which is relatively low lying but in which the surface rises to the N and W, is probably shallow throughout, uniform and of a shape comparable to the surface.

The infiltration area for recharge has a minimum of 2.5×10^6 square feet. If then an average thickness of 60 feet is assumed across the region, the volume is 1.5×10^8 cubic feet. If the unconsolidated material has a porosity of 20 per cent, which would be a minimum figure, the effective volume is 3×10^7 cubic feet, which means that the storage capacity possible is 18.75×10^7 gallons, approximately 200 million gallons. Even assuming half could be removed, 100 million gallons is more than sufficient available water.

Should half the average rainfall of 25 inches fall on the direct infiltration area, allowing for evaporation and vegetation the volume of water available for recharge is 15 million gallons per annum. However, additional water would be carried into the region by streams after rainfall with the result that recharge may be 50 million gallons since this region lies at the centre of the catchment area of the streams here. Absorption will be rapid due to the open texture of the light, poorly vegetated, sandy soil. These are all minimum figures.

CONCLUSIONS

Only the unconsolidated surficial material can be considered a suitable aquifer and of the area covered by it only one small region is free of contaminatory effects where the thickness of material is sufficient. This region is likely to have storage and recharge possibilities and thus may be considered as suitable for boring.

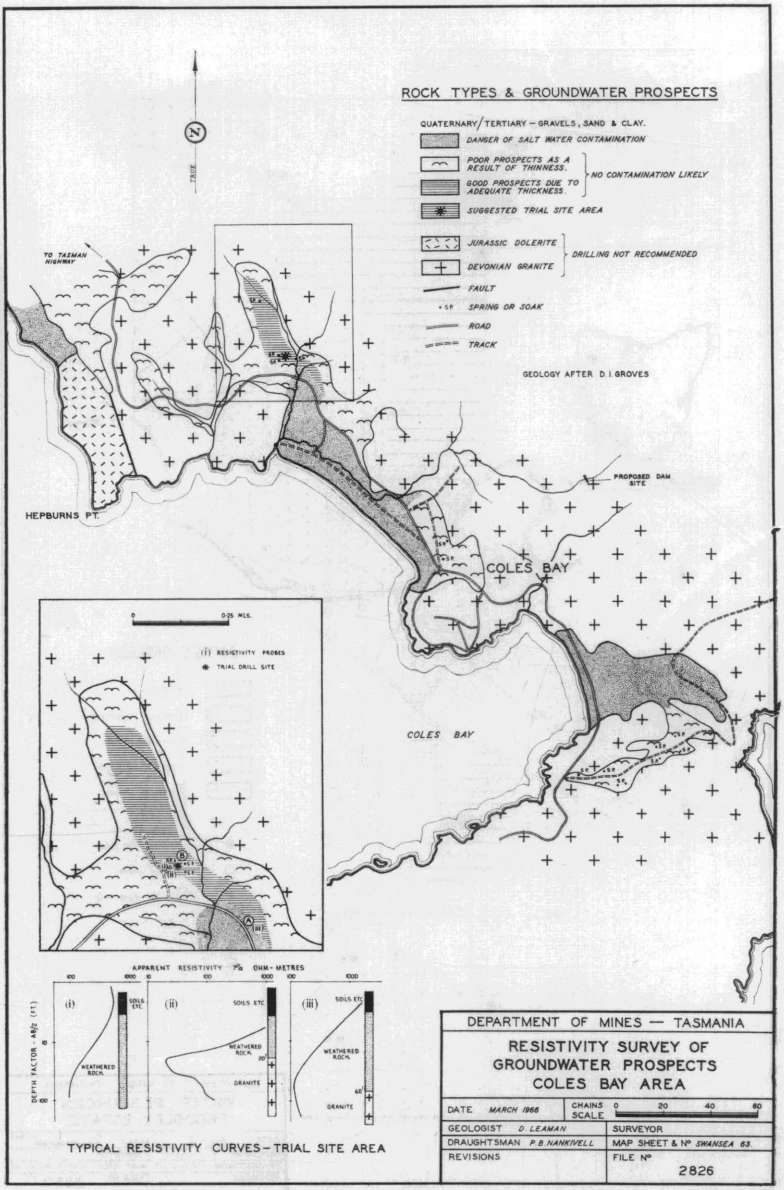

FIGURE 38

5 cm

RECOMMENDATIONS

Before detailed investigations are made on this region with regard to the siting of several bores (one is hardly likely to be adequate) a trial bore should be drilled at the point indicated on fig. 38. This site is a few yards N of the major spring in this locality. Such a trial bore is necessary to determine whether the quality is really suitable and that the yield, permeability and transmissibility are adequate for the purpose. Any bores sunk in this locality will require screening and developing.

If, after such preliminary tests, it is found that the yield characteristics of this unconsolidated material are such that a small number of bores could supply all the needs of Coles Bay, then further resistivity work should be considered across the whole zone in order to locate the best possible supplementary sites.