

TR16-136-137

25. Geological survey of the proposed Blythe River dam site.

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A preliminary geological and refraction seismic investigation of a proposed dam site on the Blythe River was undertaken at the request of the consulting engineers to the Rivers and Water Supply Commission, Messrs Gutteridge, Haskins and Davey.

The site is located about 2.5 km from Blythe Heads. The Department of Mines explosives magazine is situated uphill from the east abutment. The dam is expected to be about 25 m in height.

The river lies in a steep sided, winding gorge, between hills of up to 120 m in elevation. The inner banks are very steep and narrow. The area is covered with a thick bush which makes detailed geological mapping very difficult without a considerable amount of clearing.

GEOLOGY

No attempt has been made to draw a geological map of the area since only eight outcrops were found; the rock types were quartzite and phyllite. The Burnie one-mile geological map shows the whole area to be in the Burnie Quartzite and Slate which is of Precambrian age. The quartzite is very well jointed with closed joints (generally 3-6 per metre) and with a consistent direction (generally 50-60°). The joints are steep (60-70°). The jointing is expected to persist throughout most of the area, it may therefore be difficult to find a quarry site close to the abutments where large blocks suitable for rock fill could be obtained. Fortunately the major joint directions lie across the river so that leakage across the joints would be at a minimum. Some opening of the joints due to load relaxation would be expected in this situation. Where phyllite was observed it occurred as lenses, 150 mm across, in the quartzite, so that isolated lenses run through a matrix of quartzite. The weathering in the area is very superficial, as the quartzite is very resistant, and the cutting of the Blythe River gorge at this point is a relatively recent geological event. Soils are thin and poorly developed because of the steep slopes.

SEISMIC REFRACTION INVESTIGATION

Abutment Area

Five spreads were fired in the abutment area; one of these was a cross spread (fig. 42).

A surface layer with a seismic velocity of approximately 425 m/s was recorded in the eastern abutment and was distinguished from a second 2,130-3,350 m/s layer. In the western abutment corresponding velocities were 240-335 m/s for the first layer and 1,670-2,900 m/s for the second layer. The spread aligned across the principal joint directions gave similar values indicating tight joints.

The surface layer is thought to be decomposed vegetation, scree and soil; the second layer well jointed unweathered quartzite.

The thickness of the surface layer ranges up to about 2.5 m but is generally about 1.2-1.5 m.

Reservoir Area

No spreads were fired in the reservoir area since the quartzite is expected to be consistent throughout the whole area and there are no narrow ridges where water is likely to leak, into another drainage system.

CONCLUSIONS

Most of the Blythe River catchment area is covered by a thin regolith which is derived from the quartzite and the vegetation. The whole area is underlain by well jointed but only superficially weathered quartzite. Consequently the dam and the spillway will be constructed in quartzite.

Slight changes in the position will not affect the geological limitations of the site. From the present investigation, leakage is not expected to present unusual difficulties. It will be difficult to obtain clay for a clay core, and only quartzite blocks 150-300 mm thick are available for rock fill.

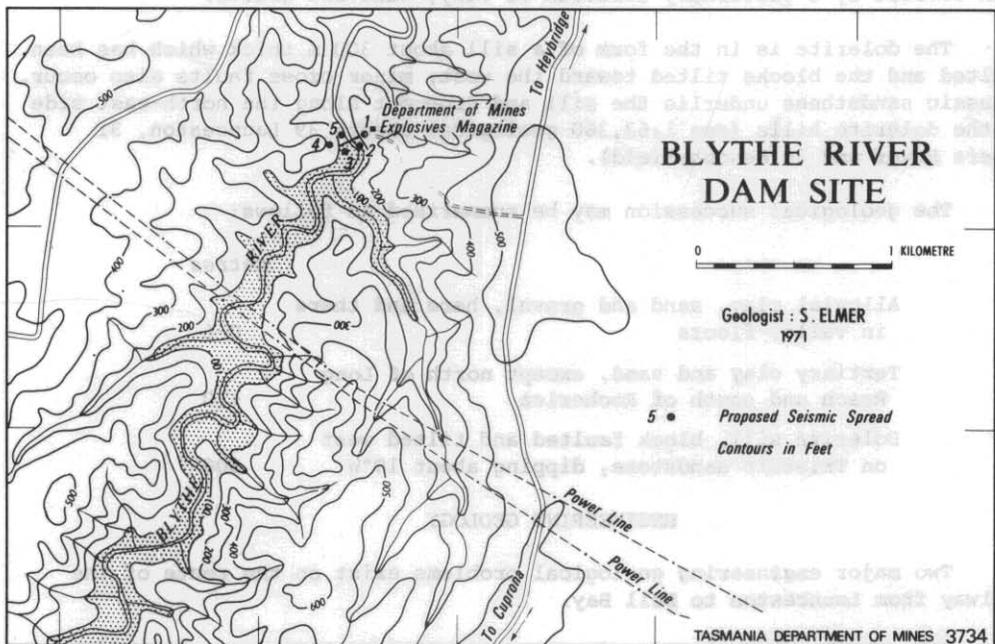


Figure 42.

5 cm