

TR 12-80-82

20. GEOLOGICAL SURVEY — BROADMARSH DAM SITE

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INTRODUCTION

It is proposed to build a rock fill dam, 50 feet high, on the Jordan River at Broadmarsh, about five miles N of Brighton, Tasmania. The Jordan River at this point has no permanent flow for most of the year, but is subject to short periods of high flow in late winter or early spring. It is hoped to store some of this flash run-off for use during the summer months.

The dam site is situated in a deep, narrow gorge on the E side of Strathallie Hill. The impounded water will flood back over low-lying ground and alluvial flats at Broadmarsh.

The topography of the area is determined primarily by rock type, the distribution of which is largely determined by rock structure.

GENERAL GEOLOGY

The geology of the Broadmarsh area is shown in fig. 21. The sedimentary rocks present are Upper Permian and Lower Triassic in age. Both groups are faulted and intruded by Jurassic dolerite. The faults in the area appear to be pre-dolerite in age; certainly there is no evidence of post-dolerite movement. The dolerite has utilised many of these zones of weakness and intruded along them.

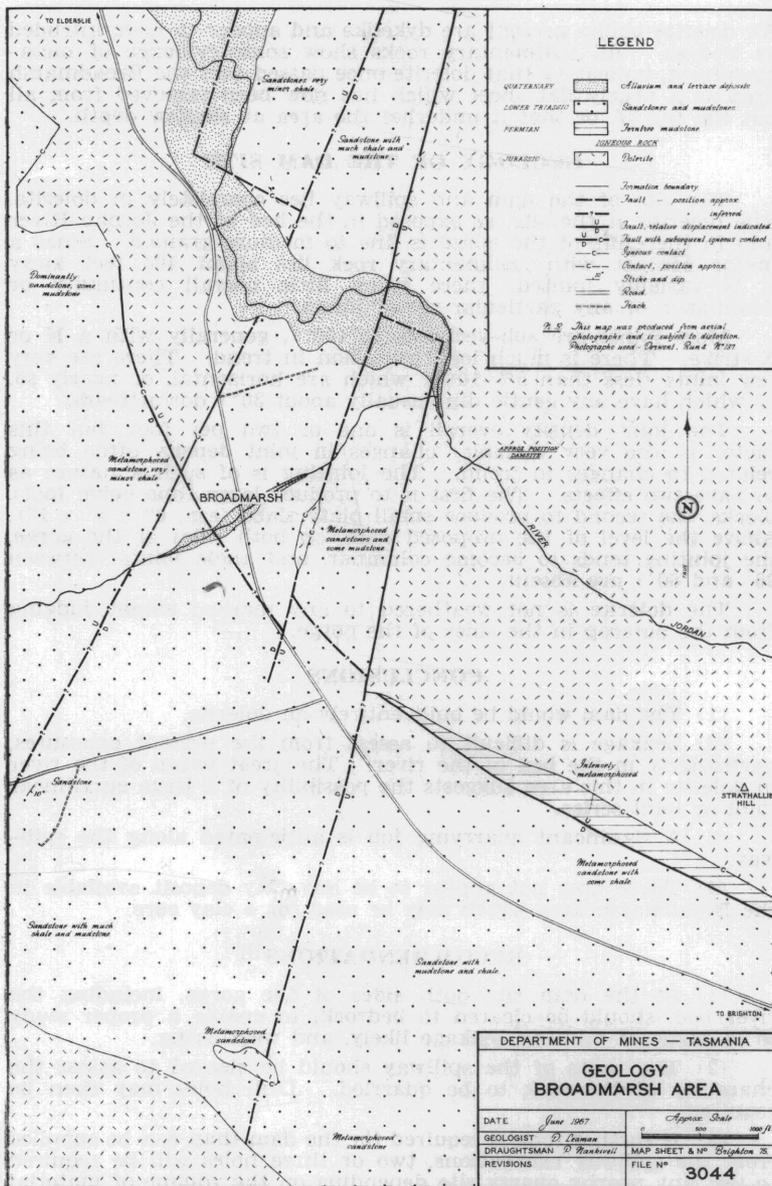
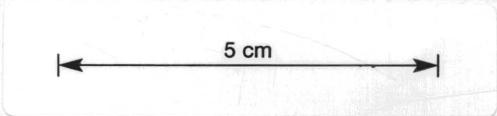


FIGURE 21



All dolerite bodies present are dykelike and appear to have intruded as wedges. All sedimentary rocks show some evidence of metamorphism, indicating that dolerite once passed over the Broadmarsh area as a nearly flat sheet which has now been removed from all but the far W, or that it underlies the area at shallow depth.

GEOLOGY OF THE DAM SITE

The site of the dam and spillway lies completely in dolerite. The dolerite at the site, as exposed in the bed of the Jordan River and in the cliffs of the gorge is fine to medium grained. Since a major contact with sedimentary rock lies about 400 feet away it is variably jointed; there being little overall continuity or dominance of any particular set of joints.

Most joints are sub-vertical (80° - 90°), generally with a N or E strike. There is much local variation in trend. There are very few joints (less than 5%-10%) which are horizontal, or nearly so, or which have any gentle dip (usually about 30°) downstream.

The joint density overall is one or two per foot, but this factor is also very variable; changes in joint density often being related to changes in trend. The jointing is of such a nature as to have two effects. The first is to produce large (one cubic foot) blocks, the second to produce small platy slabs (e.g., $6'' \times 5'' \times 1''$). Above the level of the proposed dam, on both sides of the gorge, the jointing tends to become columnar, and angle joints (between 20° and 60°) are absent.

The dolerite is not weathered to any marked extent judging from the outcrop in the sides of the gorge.

CONCLUSIONS

- (1) The dam would be built entirely on dolerite.
- (2) Leakage is difficult to assess from the present exposures, particularly in the bed of the river. The great sweep of the river in dolerite in this area suggests the possibility of a large curvilinear joint or joint series.
- (3) A significant quarrying job is anticipated along the spillway.
- (4) There does not appear to be any clay deposit available in the Broadmarsh area which may be used for a clay core.

RECOMMENDATIONS

- (1) At the dam site both sides of the gorge, including the river bed, should be cleared to bedrock, to enable a proper study to be made of jointing, leakage likely, and weathering.
- (2) The route of the spillway should be cleared to assess the character of the rock to be quarried. Drill holes may then be required.
- (3) If further rock is required for the dam than can be supplied from the spillway excavations, two or three holes will be required to test any nearby quarry site depending on the volume of material required. The present quarry at Broadmarsh is in a small dyke of fine grained, finely jointed and somewhat weathered dolerite and would probably be unsuitable for use in the dam.