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15. GEOLOGICAL EXAMINATION OF THE LOWER DAM SITE ON BRADY'S CREEK, TRIABUNNA

by P. C. Stevenson

The site was examined for the Spring Bay Municipality at the request of R. M. Foster and Associates, Consulting Engineers. The attached plan (scale 1:1200) (fig. 22) was produced by plane table survey.

GEOLOGY

The area lies entirely on dolerite but boulders and gravel derived from the dolerite hills inland lie banked against and partially covering the solid rock. Brady's Creek has formed two terraces. The older, upper terrace is composed of scree and the lower terrace, on either side of the creek and only six feet above it, is composed of younger, fresher material than the upper terrace.

On the right bank at the S end of the site the scree of the upper terrace is less than 4 or 5 feet deep and hence solid dolerite may be seen here and there where erosion by the creek has taken place. On the left bank, however, the stream has cut through the upper terrace to produce a smooth slope of boulders with no sign of solid dolerite.

Further upstream, where the creek turns from N to W, solid dolerite (mostly covered by blocks) continues on the right bank, but the upper terrace on the left bank consists entirely of dolerite gravel and boulders. Only at a point (A) about 600 feet N of the bend is solid dolerite seen on the left bank, and here it is extensively weathered. On the hillside above this point the rocky slope indicates solid dolerite near the surface.

From this point upstream, more continuous outcrops of solid dolerite are seen in cliffs which are from 5 to 18 feet high. At the N end of the area solid dolerite occurs in the stream bed.

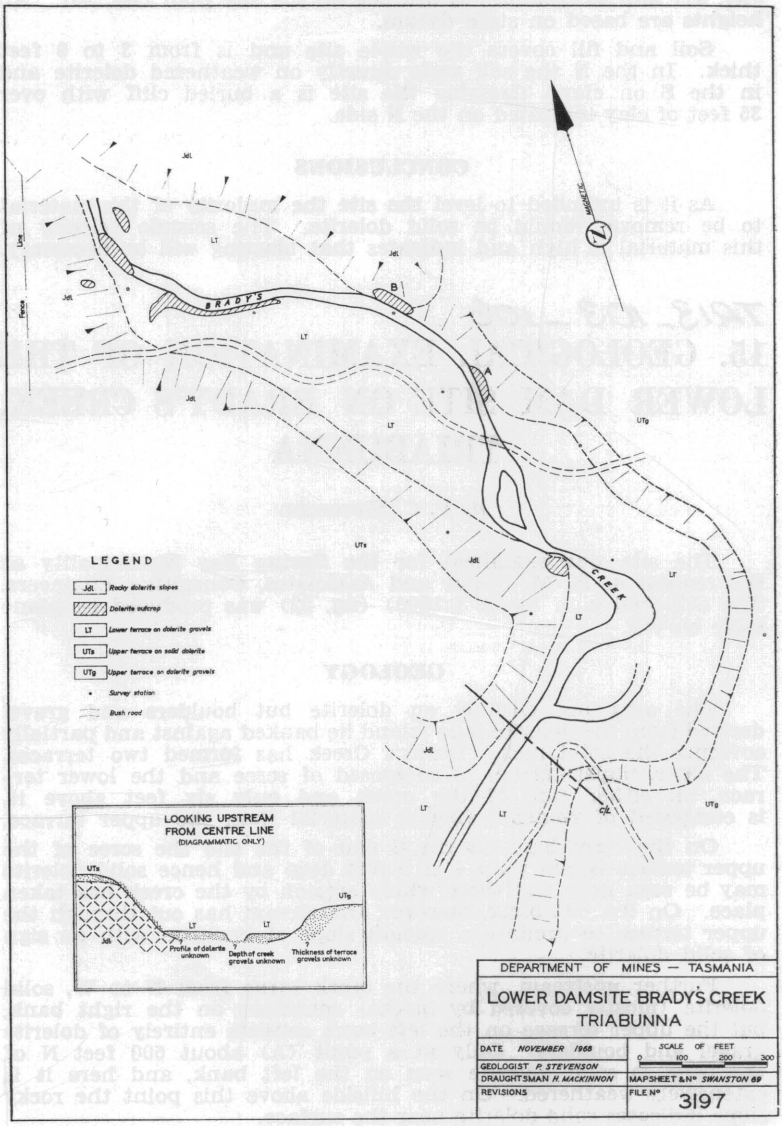
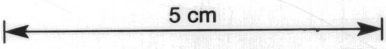

MAGNETIC
BRADY'S
CREEK
Jdt
LT
UTs
UTg
B
LEGEND
Jdt Rocky dolerite slopes
Dolerite outcrop
LT Lower terrace on dolerite gravels
UTs Upper terrace on solid dolerite
UTg Upper terrace on dolerite gravels
Survey station
Bush road
LOOKING UPSTREAM
FROM CENTRE LINE
(DIAGRAMMATIC ONLY)
Profile of dolerite unknown
Depth of creek gravels unknown
Thickness of terrace gravels unknown
DEPARTMENT OF MINES — TASMANIA
LOWER DAMSITE BRADY'S CREEK
TRIABUNNA
DATE NOVEMBER 1968
SCALE OF FEET
0 100 200 300
GEOLOGIST P. STEVENSON
DRAUGHTSMAN K. MACKINNON
MAPSHEET & N° SWANSTON 69
REVISIONS
FILE N° 3197

FIGURE 22.


5 cm

The gravels of the lower terrace are unconsolidated and have been deposited in modern times by floods. The stream position is inconstant and evidence for lateral movement and diversion of the stream is seen in several places. As the stream changes its bed the gravels of the lower terrace are re-worked and may be redeposited. The thickness of gravels below the present creek bed is unknown.

A diagrammatic section in the vicinity of the dam site is provided (fig. 22). This shows that whereas solid rock exists on the right abutment, the position of solid rock under the dam centre line or on the left abutment is unknown.

PERMEABILITY AND STABILITY CONSIDERATIONS

The dolerite gravels of the lower and upper terraces are expected to have high permabilities. Weathering has not affected either greatly, and therefore the amount of clay present is probably not enough to seal the voids. The upper terrace gravels are not well exposed and some trenching along the centre line would enable a better appreciation of their thickness and nature. It would be desirable to form some estimate of the permeability of the gravels by *in situ* permaneability tests.

In addition the position of the solid dolerite, under the dam and left abutment must be determined, and a seismic survey combined with the trenching is probably the most economical answer to this problem.

There is no shortage of fresh or partially weathered dolerite for construction of the dam, but although deeply weathered *in situ* dolerite is seen at A, a large quantity of clay suitable for a core wall has not been proved. The trenching of the left abutment may reveal deeply weathered material in the terrace but if not additional trench or augered holes will be required in order to find adequate clay deposits.

Provided that (i) the position of the *in situ* dolerite can be determined and (ii) the permeability of terrace gravels is found to be acceptably low then no problems of stability are anticipated.

RECOMMENDATIONS

In order to determine whether the site is suitable for a dam it is recommended that:—

(1) A seismic survey be conducted in an area along the centre line and at least 100 feet up and down stream to determine the position of the solid dolerite under the stream bed and under the left abutment.

(2) Trenching by backhoe or similar machine be done to examine the nature and depth of the gravels of the lower and upper terraces along the centre line.

(3) At least four *in situ* permeability tests be conducted in the gravels of the upper terrace near the left abutment to determine the magnitude of possible leakage. These tests would consists of measurements of the quantity of water lost in unit time from a vertical 4" polythene stand pipe cemented into the bottom of an augered hole at least four feet deep.

(4) Note be taken of the possible sources of clay revealed by the trenching and augering recommended above, and if little is available from this source then further exploration of exposures such as that at A be made with auger and backhoe.