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13. GRAVITY SURVEY OF PROPOSED DAM SITE, KINGSTON

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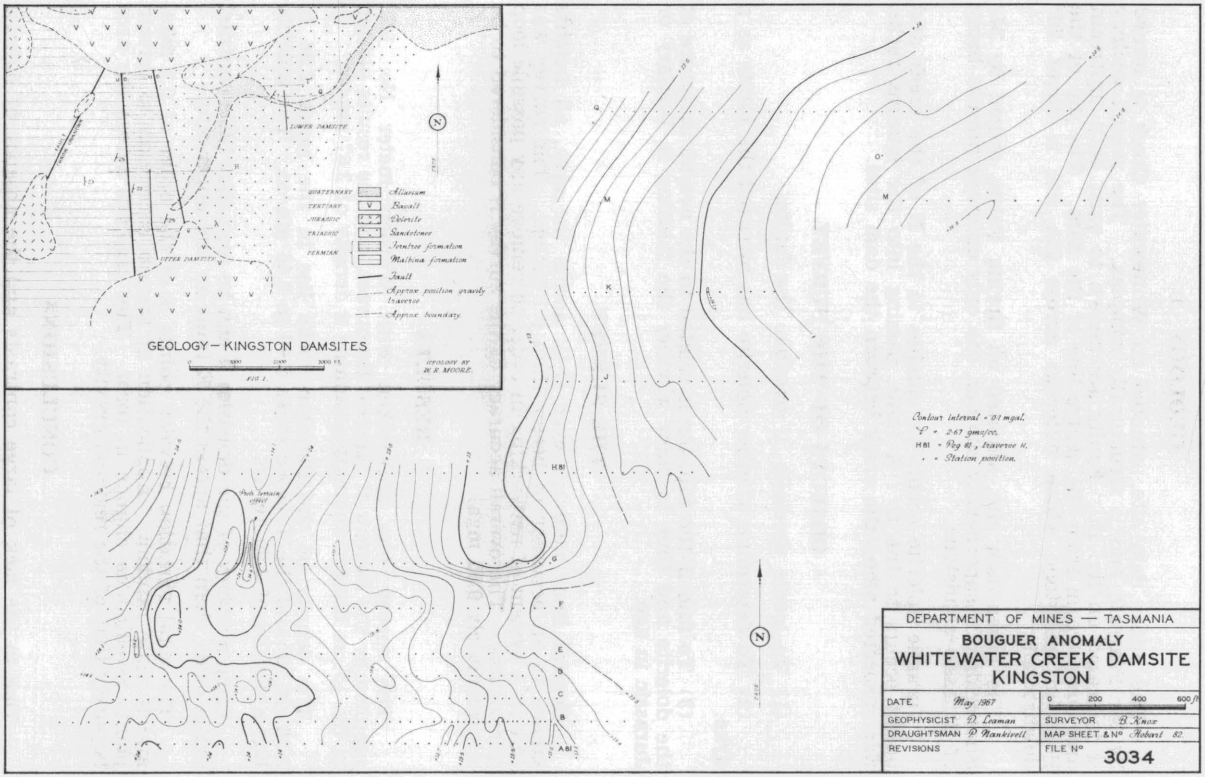
INTRODUCTION

As part of a detailed geophysical examination of two dam sites on Whitewater Creek, a gravity survey was undertaken with a view to determine regional and local aspects of structure.

The topography is of gentle to moderate relief, and is only severe in the immediate vicinity of the centre lines of the dams.



5 cm

FIGURE 15

GEOLOGY

The upper dam site, situated on Whitewater Creek is owned by Mr Pearsall, and is structurally complex. The sketch geology is indicated on fig. 15. Faults are known to exist both upstream and downstream from the centre line of the dam. The dip of the Permian mudstone which outcrops across the site is about 20° downstream.

The lower dam site, situated on Spring Farm, owned by Mr Shoobridge, is superficially simpler, the only outcrops present being of Triassic sandstone.

Jurassic dolerite occurs in patches to the N of the creek and basalt occurs to the S. A fault, passing into the igneous rocks, was suspected along the creek between the dam sites.

OBJECTS OF THE SURVEY

(1) To locate precisely, if possible, the faults.

(2) To determine whether dolerite has intruded the faults as a dyke.

(3) To find if the faulting is related to the overall structure of the dolerite and thus to show whether the faulting is Tertiary or Jurassic in age.

THE SURVEY

Several lines were surveyed E-W across the area, all heights known to an accuracy of better than 0.1 inches. The survey was run on a system of networking in order to remove any possible loop misclosures. The overall accuracy of the survey is considered to be approximately 0.05 mgal.

RESULTS

The survey was undertaken with Worden meter No. 169, supplied by the Bureau of Mineral Resources, and the results plotted in fig. 15, as Bouger anomaly assuming a density of 2.67 gm/cc.

The density of the Permian rocks lies in the range 2.54 to 2.58 gm/cc and the Triassic rocks 2.40 to 2.45 gm/cc. The dolerite has a density of 2.90 gm/cc.

From a review of the densities it can be seen that little contrast exists other than that across the E fault on the upper site.

The total variation between points is of the order of 0.2 mgal and is quite random. Application of terrain correction to certain points revealed no change in form. The gradient across the area is purely that of the regional gravity.

CONCLUSIONS

Due to the lack of large contrasts and the absence of dolerite dykes no faults were located. The lack of anomaly across dolerite and basalt outcrops(?) suggests that very little material is present.

Furtner the lack of anomalies across the known faults shows that the faults were not produced by selective intrusion of dolerite into given structural blocks, and thus if a dolerite sheet is present beneath the area it is of uniform thickness and not directly related to the faulting.

As the results for density 2.67 showed little, they were not re-plotted using a more realistic density.