

TRIA-75-77

16. Geology around a proposed dam site, north-west of Bracknell

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The Rivers and Water Supply Commission is investigating several possible dam sites between Bracknell and Deloraine and one of these is about 2 miles NW of Bracknell on Whitemore Creek. A geological survey has been made of the dam site and the surrounding country as a preliminary part of these investigations. The maximum height of the dam is limited by the topography to 30-40 ft.

Access to the dam site by vehicle can only be gained by means of a farm track from the N. Most of the land around the dam site is largely undeveloped or in the process of development as farmlands. The dam site is situated in a low NW-SE trending range of hills which form a northern extension of McRaes

Hills. A flat occurs between these hills and the Western Tiers and Whitmore Creek runs from this flat, through the low hills and crosses into the flats of the Longford Tertiary Basin.

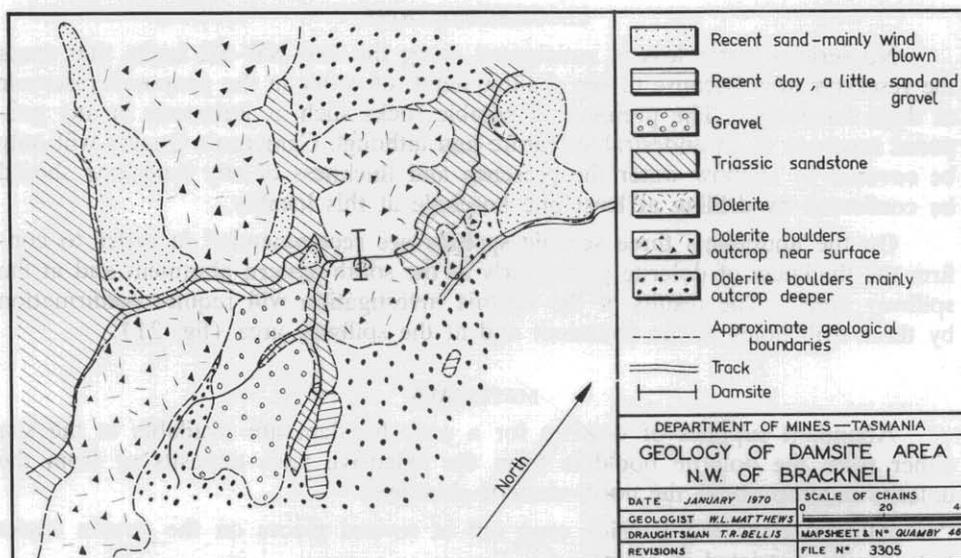


FIGURE 22

GEOLOGY

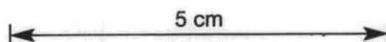
Most of the area around the dam site is underlain by dolerite boulders which probably overlie *in situ* dolerite. Only one small area of outcropping dolerite has been mapped and this is at the dam site itself. Areas have been marked on the plan where dolerite boulders are so common that *in situ* dolerite could be expected at shallow depth. Areas of sparse dolerite boulders with clay are also likely to overlie *in situ* dolerite; sand, quartz- and ironstone-gravel are associated with some of these areas but are of limited extent and thickness and have not been mapped separately.

Areas of baked sandstone of probable Triassic age are shown on the map (fig. 22). In a few places the sandstone may be *in situ*; elsewhere only sandstone boulders occur. Dolerite probably underlies these deposits.

An area of large sub-rounded boulders, composed mainly of quartzite, conglomerate, vein quartz and mudstone has been mapped to the S of the dam site, angular dolerite boulders can be found in a few places within this area, which is probably underlain by dolerite. The gravel deposit is probably of Tertiary age since in regional geological surveys similar gravels have been seen to underlie areas of basalt to the N and E of the dam site.

Several areas of Recent sand have been mapped. The sand is mainly wind-blown or locally derived and is not expected to be very thick.

Along the stream and on the flat W of the range of low hills, there are Recent deposits consisting mainly of clay with some sand and gravel. Much of the clay is dark grey-brown and is probably derived mainly from the weathering of dolerite.



Because of the lack of outcrop, little can be said concerning the geological structure of the area but from regional studies, it is likely that the northern extension of the Tiers Fault passes through this area. Most or all of the movement on this fault took place before the emplacement of dolerite; S of the dam site area, dolerite was intruded up the fault.

MATERIALS OF CONSTRUCTION

If a rock fill dam with a clay core is to be constructed the development of a quarry for rock fill in the immediate vicinity of the dam site may prove difficult, since a considerable thickness of overburden may need to be removed. Clay suitable for a clay core could probably be obtained from the floor of the valley, SW of the dam site. Much of clay in this area is probably derived from the weathering of dolerite but its suitability would need to be established.

CONCLUSIONS

The lack of outcrop does not allow any real assessment of the suitability of the dam site to be made. Much of the area appears to be underlain by dolerite at least at depth. The weathered sections could be expected to consist of dolerite boulders and clay. Subsurface investigations would be required to determine the detailed geology of the area. As a first stage, a seismic survey should be carried out to help determine whether solid dolerite occurs below the dam site, and at what depth unweathered rock occurs. Diamond drilling would be needed to confirm the results of this seismic survey. A preliminary programme of five drill holes 50-100 ft in depth, along the centre line of the dam should indicate whether further investigations of the dam site would be warranted. Water pressure testing should be carried out to determine whether leakage would be a serious problem and whether grouting would be necessary. If leakage is not found to be a problem in the dam site area, it is unlikely to be a problem in the storage area because of the general similarity of the underlying rocks in the two areas. There may be some smaller faults parallel to the Tiers Fault but cover by Recent clay in the valley floors would probably act as a seal where the faults cross the storage area.

Seismic surveys should be used in selected places to determine areas of minimum overburden for the development of a quarry for the rock fill.