

Section 2: Engineering Geology

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THE STONY RISE RESERVOIR SITE

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Introduction

The search for a suitable reservoir site near Devonport was made during last year and the results were outlined in the Report "Reservoir Sites on Kelcies Tier" published in Technical Report No. 1, 1956. Further investigation has led to acceptance of a site near the Stony Rise which is the site No. 3 of that report.

Although solid dolerite outcrops on each side of the site, a fault passing through the site was predicted, and the possibility of Permian siltstones underlying the reservoir site was indicated.

Nature of the Bedrock

Excavations in trenches show that the dolerite is overlain by clays which preserve the dolerite structure, with white spots due to decomposition of feldspars in a red matrix derived from pyroxenes. Platy jointing is also retained.

Overlying the weathered dolerite is structureless clay, blue, white and brown, with incipient parting and containing rounded quartz pebbles. This results probably from weathered Permian rocks transported to their present position during Tertiary time.

The surface is a bed, up to four feet thick, of nodular rock, consisting of pebbles of basalt and haematite (?) in a cement of white clay. The clay was instantly recognised by J. Evans (H.E.C. Soil Division) as derived from basalt.

Structure

The rock distribution indicates a basin plunging east. The circumference is solid dolerite, the next circumferential ring is weathered dolerite, and the centre is occupied by pebbly clay. The basin possibly deepens on the southern side. A bore has shown that the weathered dolerite becomes a typical yellow doleritic clay in depth.

The nodular rock is a blanket in the centre of the basin.

Dam Construction

Doubts about the permeability of the weathered dolerite have been removed by the discovery that it becomes the typical yellow clay in depth.

The pebbly clays appear impermeable, as trenches hold water. However, field tests are advised to make certain. The bore-hole encountered no sand-lenses, and none were found in trenches, so that even if this rock is Tertiary, it does not seem to contain the permeable sands that occur elsewhere, as on the Tugrah Road.

The nodular rock is also impermeable, but appears unsuitable for dam construction, as basalt clays can be very unstable. Tests in the Public Works Department laboratory would resolve this point.

Conclusion

Provided the possibility of leakage beneath the dam is properly evaluated, there is nothing to prevent using usual construction methods. If the permeability of the pebbly clays is too high, a cut off trench to the dolerite clay, which would need to be somewhere about 30 feet deep, would be sufficient to prevent leakage.