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Land stability at Humes Quarry and Prospect Vale.

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The Department of the Environment requested advice on the effects of operations in the quarry [EQ110075] on the stability of the surrounding land.

TOPOGRAPHY AND GEOLOGY

The pit has been developed just to the south of Hutton's brick pit. The eastern half of it has been worked out and sporadic working of the western part is taking place. The landsurface slopes to the north towards a small creek, which runs between Hutton's and Hume's pits, and is part of the headwaters of Kings Meadows Rivulet. The original shape of land is unknown because of the excavations which extend almost to the crest of the hill to the south.

Around the southern margin of the pit towards the crest of the hill, sand with a little ilmenite, limonite cemented grit and gravel and concretionary iron occurs at the surface. This is underlain by about 1.5 m of brown fragmented weathered clay which in turn is underlain by light grey clay and silty clay with a faint iron oxide staining. Some parts of the clay beds are heavily stained with iron oxide giving a purplish colour. Occasional iron oxide concretions occur in this horizon. Lower in the sequence beds of sand and sandy clay appear to predominate.

DISCUSSION OF STABILITY

The sediments in the quarry are the kind of sediments in which nearly all the landslips in the Launceston area occur. On steep slopes or areas where slopes have been steepened by excavations, landslips are sometimes common.

There are probably limits to the depth that can be excavated because of unsuitable material occurring at depth. However if the western portion of the pit is excavated to a similar depth as the eastern portion then unstable conditions could develop if the excavation slopes are steep.

On some of the cuts around the pit when examined some small scale slumping has taken place and the final angle on these slipped areas ranged from 22-33°. Cuts excavated at slightly greater angles would probably be stable.

The excavations will be deeper on the southern side than the western part and it is in the south where there is most danger of unstable conditions affecting the adjoining land. If the average slope from the property boundary to the bottom of the pit is about 25° then there should be little danger of unstable conditions affecting adjoining land provided the pit does not extend deeper than 10 m below original ground level. Cuts up to 3 m high could be cut with slopes up to 40° but benches or berms would need to be established between them. If strips of land are left untouched along the southern boundary as along western boundary (where a 14 m strip has been left) and the vegetation, particularly the large trees, is left to stand, then this will decrease the risk of neighbouring land being affected by slips.

CONCLUSIONS

Excavations in the clay pit could affect the stability of neighbouring land. However if the cuts near the boundary are trimmed to low angles then

this danger will be appreciably reduced. If a strip of land with vegetation is left around the boundary of the pit, then risk of landslips affecting nearby land will be further reduced.

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