

TR9-109-111

17 FOUNDATION CONDITIONS AT PERTH RAILWAY STATION

by I. B. Jennings

ABSTRACT

Seven 5 inch percussion bores were put down to determine the foundation conditions for proposed grain silos at Perth. The bores intersected a sequence of clay and gravel of probable Tertiary age. The foundation conditions appear to be generally satisfactory but further soil tests are recommended.

It is proposed to erect a number of grain silos at the Perth railway station and seven bore holes have been put in in order to determine the foundation conditions. The boring was carried out with a G33 percussion plant using an earth socket as far as possible. The samples obtained are therefore disturbed and in most cases determination of the material present had to be made from sludges. The thicknesses of the formations present have been determined from a study of the samples and the driller's reports and rely somewhat on the driller's observations. They are probably correct within a foot or so.

The township of Perth is situated in the Launceston Tertiary Basin. Blake (1959) indicated a thin veneer of Quaternary gravel overlying the Tertiary beds at Perth but it has not been encountered in the present drilling. A hill of Jurassic dolerite occurs north of the railway station and it is expected that this mass slopes gently to the south under the area investigated. Thus, although dolerite in situ was not encountered in the bores, it is expected to form the basement at depth. Tertiary basalt overlying the Launceston Beds occurs in the vicinity of Western Junction and near the Forestry Commission Nursery east of Perth. The Launceston Beds consist of a thick sequence of clay, sand and gravel which accumulated in a structural basin under lacustrine conditions.

Results of Boring

Hole No. 1—

feet.

- 0-20 Firm plastic brown clay.
- 20-27 Light brown sandy clay.
- 27-36 Fine gravel composed mostly of rounded fragments of dolerite with some basalt, quartz and chert.
- 36-45 As above but much finer, mostly sand grade, containing fragments of basalt up to 1 inch.

Hole No. 2—

feet.

- 0-12 Firm plastic brown clay.
- 12-24 Brown sandy clay resembling weathered dolerite in texture.
- 24-36 Gravel composed of rounded "pellets" of basalt in a clay matrix.

Hole No. 3—

feet.	
0-3	Brown and black silty clay with quartz and ironstone pebbles.
3-14	Stiff brown clay.
14-30	Light brown and white silty clay with occasional weathered dolerite fragments.
30-50	Sand and gravel, mostly basalt fragments but very occasional chert fragments. Note , the driller reported this as solid basalt but the sludges suggest that this is incorrect.

Hole No. 4—

feet.	
0-2	Soil and filling.
2-10	Stiff clay.
10-20	Light brown clay with pebbles.
20-28	Clay and gravel.
28-36	Gravel containing basalt, dolerite, quartz and ironstone.
36-45	Coarser gravel, mostly basalt and dolerite boulders.

Hole No. 5—

feet.	
0-6	Surface soil and clay with limonite pebbles.
6-17	Brown clay with pebbles of dolerite and basalt.
17-23	Sandy gravel with some larger cobbles of dolerite and basalt.

Hole No. 6—

feet.	
0-2	Soft clay with limonite pebbles.
2-6	Plastic brown clay with occasional ironstone pebbles.
6-14	Brown clay and pebbles, mostly dolerite.
14-20	As above, larger pebbles.
20-25	Gravel and cobbles, mostly dolerite and basalt.

Hole No. 7—

feet.	
0-2	Soil and gravel.
2-6	Firm brown clay.
6-16	Clay with basalt and dolerite boulders.
16-17	Gravel, dolerite and basalt pebbles.

The general sequence over the area bored appears to be:—

	Thickness (feet)
(1) Surface soil and stiff brown clay	6 to 20
(2) Variable, light coloured clay with pebbles in some localities	7 to 18
(3) Gravel, sandy gravel and sand	20+

The stiff clay decreases in thickness from about 20 feet in bore No. 1 to about 6 feet in bores Nos. 5, 6 and 7. The underlying light brown clay is variable in thickness and in the pebble content but the boundaries are difficult to place exactly from percussion drill samples.

The driller reported that the standing water level in most holes was close to the top of the gravel. The lighter clay overlying the gravel was reported to be quite dry in most holes. In hole No. 1 a small quantity of water was encountered in the top clay but this appears to have been "perched" water. The water level in this hole at first stood at about 27 feet but at the completion of the boring it was noted that this had risen to about 3 feet from the surface. It is thought that this is due to the influx of surface water into the hole.

Foundation conditions

The upper stiff clay would form an admirable foundation if it were thick enough or persistent over the whole area. Final details of the design are not available but it appears likely that much of the load will be carried by the light sandy clay between the firm clay and the gravel. The bores do not give an adequate sample of this material.

The presence of limonite fragments and basalt pebbles in the sequence indicates the possibility that this sequence may not be correlated with the Launceston Beds but may lie above them. This is important as the Launceston Beds would have undergone precompression by at least 100 feet of overlying sediment at an earlier period. In view of this it is recommended that if the loading is to exceed 1.5 tons per square foot, shear tests should be made on undisturbed samples of this material.

Samples for this purpose could be obtained fairly conveniently from shallow test pits, 8 to 10 feet deep near bore sites Nos. 5 to 7. A back hoe could excavate 2 or 3 such pits in a few hours.

Reference

BLAKE, F., 1959.—Longford Map Sheet. *Geol. Surv. Tas.* 1-mile Geol. Map Ser. No. 47.