TR14_88_90

21. Seismic survey, proposed Army Training Depot, Youngtown, Launceston

B. KNOX

At the request of the Commonwealth Department of Works, a seismic investigation of the site was undertaken by M. J. Longman, Geophysicist, assisted by the writer. The seismic field work was carried out by M. J. Longman and field survey work and the following interpretation by the writer.

EQUIPMENT

The seismic equipment used was a portable 12-channel refractor seismograph type G.T.2 manufactured by Geospace Corporation, Houston, Texas; and Hall Sears X2 model K geophones with a natural frequency of 14 c/s.

METHOD

Twenty-three geophone spreads were located as shown on Figure 26. These spreads were laid out in relation to existing cadastral boundaries using a Watts Microptic Theodolite and steel measuring band. Ground levels were determined at each shot point using a Fuji Automatic Level and these were related to State Datum.

Each geophone spread was recorded twice (i.e., fired at both ends):

Geophone spreads 1-5, 6 and 8 were 65 ft in length, with a geophone spacing of 5 ft.

Geophone spreads 7, 9-23 were 130 ft in length with a geophone spacing of 10 ft.

GEOLOGY

Regional mapping indicates that Tertiary sediments overly Jurassic dolerite in this area.

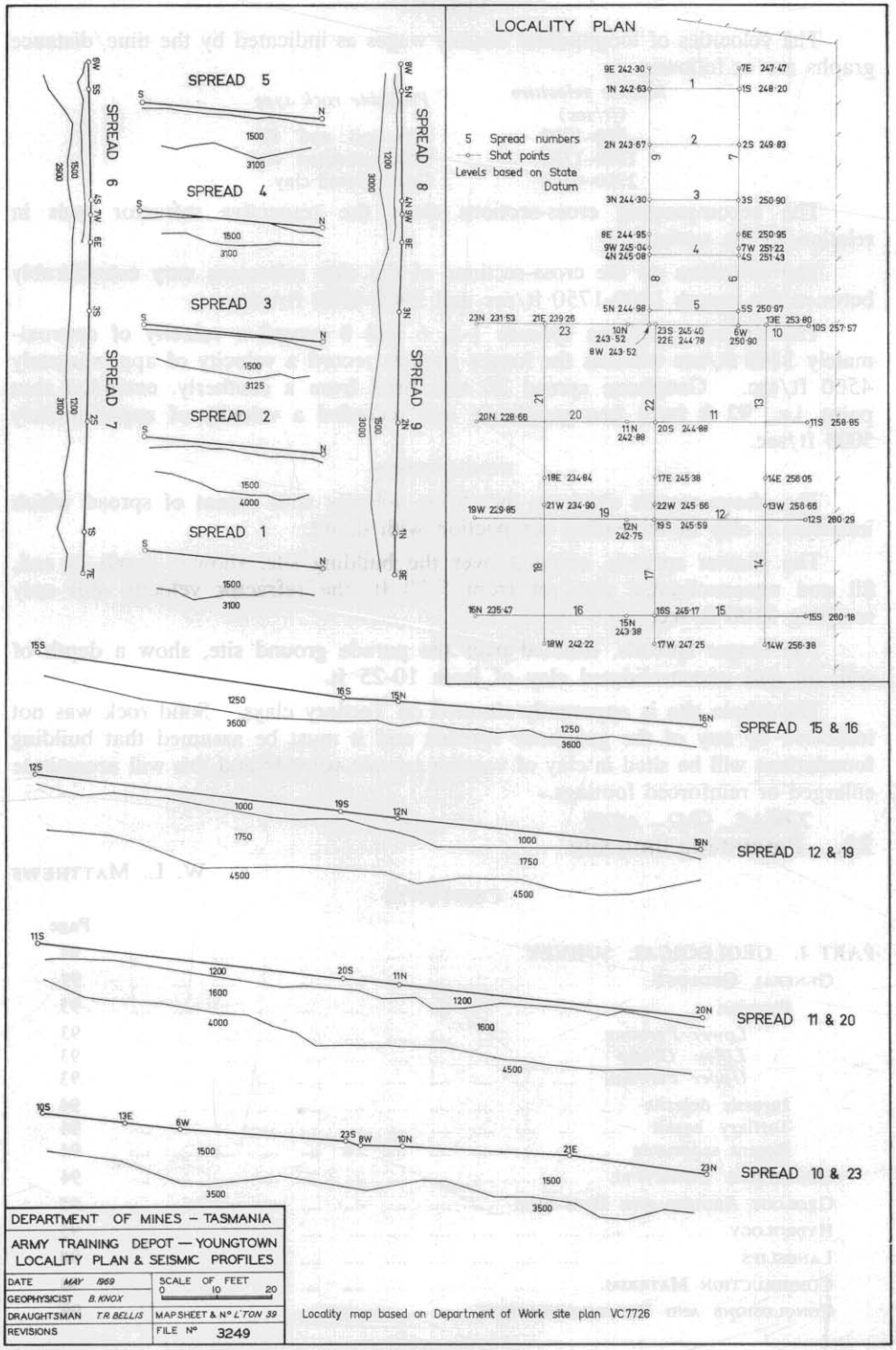

FIGURE 26

5 cm

RESULTS

The velocities of longitudinal seismic wages as indicated by the time/distance graphs are as follows:

Seismic velocities (ft/sec)	*Probable rock type*
800–1000	Top soil and fill
1200–1750	Unconsolidated clay
2900–4500	Consolidated clay.

The accompanying cross-sections show the respective refractor beds in relation to the surface.

The velocities on the cross-sections of the clay refractors vary considerably between the ranges 1200-1750 ft/sec and 2900-4500 ft/sec.

The shorter geophone spreads 1-5, 6 and 8 record a velocity of approximately 3100 ft/sec whereas the longer spreads record a velocity of approximately 4500 ft/sec. Geophone spread 20 was fired from a southerly, extended shot point, i.e., 92 ft from first geophone, and recorded a velocity of approximately 5000 ft/sec.

CONCLUSIONS

The above results show an increasing velocity with extent of spread which indicates a clay of increasing compaction with depth.

The shorter spreads, situated over the building site, show a depth of soil, fill and unconsolidated clay, of from 5-20 ft; the refractor velocity still only reaching 3100 ft/sec.

The longer spreads, situated over the parade ground site, show a depth of soil, fill and unconsolidated clay of from 10-25 ft.

The whole site is apparently situated on Tertiary clays. Solid rock was not indicated by any of the geophone spreads and it must be assumed that building foundations will be sited in clay of varying seismic velocity and this will necessitate enlarged or reinforced footings.