TR14_108_111

23. Seismic survey, Bradys Creek lower dam site, Triabunna

P. C. STEVENSON

The survey described in this report was conducted at the request of Messrs R. M. Foster and Associates, Consulting Engineers for the Spring Bay Municipality. It follows a report on a geological examination of the site in November 1968 (Stevenson, P. C., 1969).

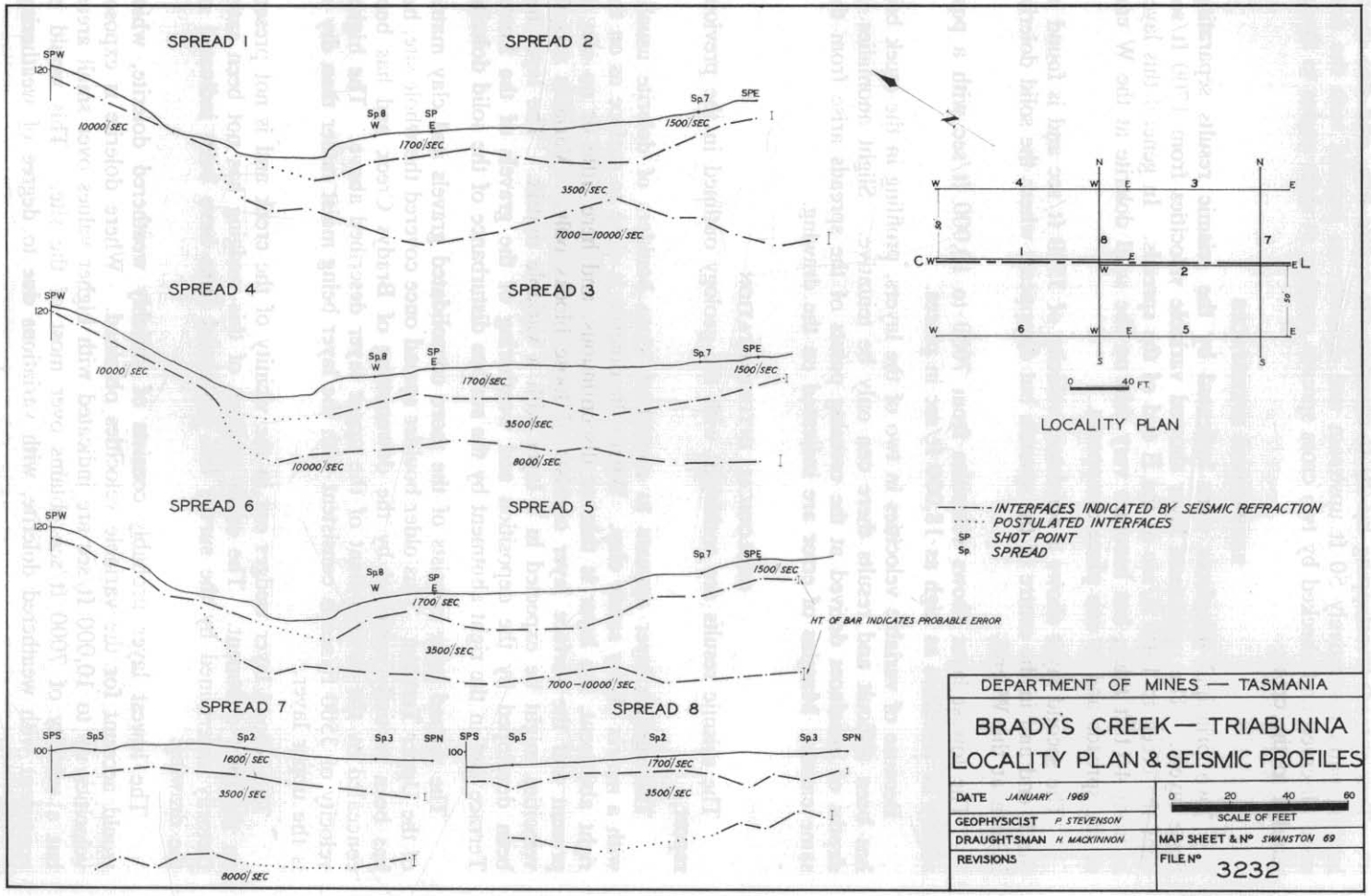
The purpose of the survey was to determine the position of the solid dolerite under the creek bed and under the left abutment.

LAYOUT

The survey was aligned along the dam centre line (Stevenson, P. C., 1969, fig. 22).

Spreads of 130 ft consisting of twelve geophones at 10 ft spacings with a shot point at either end were employed, and were laid out as indicated in Figure 33.

FIGURE 33


SPREAD 1
SPREAD 2
SPW
120
10000/SEC
Sp.8 W
SP E
Sp.7
SPE
1700/SEC
1500/SEC
3500/SEC
7000—10000/SEC
SPREAD 4
SPREAD 3
10000/SEC
8000/SEC
SPREAD 6
SPREAD 5
HT OF BAR INDICATES PROBABLE ERROR
SPREAD 7
SPREAD 8
SPS
Sp.5
Sp.2
Sp.3
SPN
100
1600/SEC
8000/SEC
LOCALITY PLAN
INTERFACES INDICATED BY SEISMIC REFRACTION
POSTULATED INTERFACES
SP SHOT POINT
Sp SPREAD
0 40 FT
DEPARTMENT OF MINES — TASMANIA
BRADY'S CREEK— TRIABUNNA
LOCALITY PLAN & SEISMIC PROFILES
DATE JANUARY 1969
GEOPHYSICIST P. STEVENSON
DRAUGHTSMAN H. MACKINNON
REVISIONS
0 20 40 60
SCALE OF FEET
MAP SHEET & N° SWANSTON 69
FILE N° 3232
5 cm

Two spreads overlapping by 20 ft covering the centre line, and two overlapping pairs respectively 50 ft upstream and downstream parallel with the first were observed and checked by two cross spreads running at right angles to these, parallel to the creek.

REFRACTING INTERFACES

Two principal interfaces were indicated by the seismic results separating three layers. The uppermost layer showed variable velocities from 1700 ft/sec near the creek to 1500 ft/sec at the E end of the spreads. In general this layer is from 4-11 ft thick, but becomes very thin on the solid dolerite at the W end of the spreads and in one place disappears.

The second layer shows a consistent velocity of 3500 ft/sec and is found at the E end and in the centre of the spreads but disappears where the solid dolerite is seen at the W end.

The lowest layer shows velocities from 7000 to 10,000 ft/sec with a possibility of velocities as high as 18,000 ft/sec in places.

Because of variable velocities in two of the layers, profiling in the creek bed has been difficult and results there can only be tentative. Slight anomalies in depths of interfaces derived at the crossing points of the spreads arise from the same cause. Margins of error are indicated on the drawing.

GEOLOGICAL INTERPRETATION

The seismic results are consistent with the geology outlined in the previous report.

The surface layer appears to consist of loose boulders of dolerite usually with a matrix of dry sandy clay. Where the dolerite is close to surface as on the right abutment, the layer is thin or discontinuous, and here little or no clay is present and the surface layer consists of loose blocks only. Variable seismic velocities might be expected in a layer with a variable matrix. The layer has been developed by the deposition and weathering of the gravels of the Lower Terrace and in the right abutment by the surface disturbance of the solid dolerite.

The second layer consists of the more consolidated gravels and clay matrix of the Upper Terrace. This older boulder spread once covered the whole site, but has been partially removed by the downcutting of Bradys Creek and has been concealed by the development of the upper layer described above. The higher velocity of 3500 ft/sec is consistent with the layer being moist rather than dry as is the upper layer.

The second layer wedges out in the vicinity of the creek and is not present on the right abutment. The exact position of this wedging has not been satisfactorily determined by the survey but postulated lines have been indicated on the drawing.

The lowest layer probably consists of variably weathered dolerite, which would account for the variable velocities obtained. Where dolerite is exposed velocities up to 10,000 ft/sec are indicated with higher values over small areas, but a velocity of 7000 ft/sec obtains over most of the site. This would be consistent with weathered dolerite, with variations due to degree of weathering.

REFERENCE

STEVENSON, P. C. 1969. Geological examination of the lower dam site on Bradys Creek, Triabunna. *Tech. Rep. Dep. Mines Tasm.* 13: 103-106.