

89-2976

622001

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E.L.109/87 - MT. FAULKNER

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ANNUAL REPORT

THE READYMIX GROUP

89-2976

June 1989

Vic Threader and Associates Pty. Ltd.
Kingston Beach.

C O N T E N T S

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Seismic Survey by W.L. Mathews

Introduction

A property in the district of Claremont, City of Glenorchy (Fig.1) is currently being investigated by The Readymix Group for the purposes of establishing a stone quarry.

This property consists of three separate titles, with a total area of 167.5 ha., which is jointly owned by Messrs. G.W. and E.J. Deakes, and is the subject of a current option to purchase by The Readymix Group.

Location and Access

The area is situated in North Chigwell between Faulkner Rivulet and the Mt. Faulkner Water Reserve and is bounded on all sides by freehold land. Legal access consists of 1) a branch road off Abbotsfield Road from the north, which is unsuitable for heavy traffic due to steep gradients (1 : 4 over 600m from the property boundary) and also to residential development of surroundings and 2) Coopers Road, which is a tortuous mountain road connecting with Glen Lusk Road in the south; this access is also unsuitable due to its length and steepness.

Access has been obtained through property owned by G. Strickland which would provide a low level route eastwards to the Brooker Highway. This is the preferred option but gives access only to the lower slopes of the deposit.

Topography

The proposed quarry site occupies a ridge 300-400m wide trending ENE-WSW and rising in the westerly direction from 125m to 450m (A.S.L.). The ridge reaches a height of 700m on the western boundary of the property but quarrying above the 450m level is not being considered.

Gradients of as much as 1 : 2 on the slopes of the ridge render it difficult to establish a haul road on this site with a maximum gradient of 1 : 10 to allow quarrying from the upper levels.

Geology

The quarry rock is Jurassic dolerite which occurs as a broad body terminated to the east of the area on a fault (Fig.2 - inset) and extending into the proposed quarry site as a tongue narrowing

from 600m to 250m in width at the western end of the property.

The sinuous nature of the dolerite boundary is indicative of low dipping contacts with the host sediments. The dip angle and direction of dip of these contacts is crucial to the project as they determine the continuity of dolerite at depth.

Choice of Site

Of the factors relating to the choice of quarry site:

1. distance from market
2. accessibility
3. land value
4. distance from residential development
5. location of services
6. plant site
7. thickness of overburden
8. stone quality
9. reserves

nos.1 to 5 are favourable, no.6 can be negotiated on level ground close to the proposed quarry and nos. 7-9 are still under investigation.

Preliminary Reserve Estimate of Quarry Rock

The area of the proposed quarry (Fig.2) is 33 ha. This is estimated to contain 150×10^6 tonnes (in situ) of fresh dolerite between the 450m and 00m contours.

This area is bounded by the dolerite contacts, the 450m level in the west, a property boundary in the southeast and a 1 km buffer zone in the east.

For the sake of simplicity 1) the quarry walls are drawn as straight lines dipping at 57° (which approximates to 15m faces dipping at 70° with 5m benches) (Fig.3) and 2) the total volume has been estimated using 75m intervals instead of 15m thus:

| <u>Bench level (m)</u> | <u>Area (m²)</u> | <u>Mean Area</u> | <u>Interval (m)</u> |
|------------------------|-----------------------------|------------------|---------------------|
| 450 | 33750 | 87500 | 75 |
| 375 | 133850 | 155000 | 75 |
| 300 | 174375 | 185000 | 75 |

| <u>Bench level (m)</u> | <u>Area (m²)</u> | <u>Mean Area</u> | <u>Interval</u> |
|------------------------|-----------------------------|------------------|-----------------|
| 225 | 197500 | | |
| | | 165000 | 75 |
| 150 | 135000 | | |
| | | 115000 | 75 |
| 75 | 92500 | | |
| | | 62500 | 75 |
| 0 | 32500 | | |
| | | <u>770000</u> | |

Total volume = $770\,000\text{m}^2 \times 75 = 57\,750\,000\text{m}^3$ or 167 475 000t (SG = 2.9)

The approximations in the calculation are considered justified at this stage as the objective in making the estimation is to ascertain whether the site contains a sufficient reserve to warrant further expenditure.

A more precise estimation will be made after the ground magnetometer survey has established the nature of the dolerite boundary.

Exploration during Current Year

Site investigations: access routes and mapping of contacts

Preliminary resource estimates

Seismic survey

The mapped dolerite boundaries were found to co-incide with the mapped boundaries of the 1 : 50 000 geological map of Hobart but no conclusion regarding the nature of the contacts was reached and a ground magnetometer survey of the boundaries is being undertaken to clarify this issue.

A seismic survey was undertaken to determine the depth to fresh rock on the slopes of the ridge and the results are summarised in Table 1. The complete report is appended. The seismic survey was conducted with a 7.5m geophone spacing and did not determine the depth to the high velocity refractor in all cases, particularly below the 250m contour.

Programme of Work for Coming Year

- 1) Magnetometer survey to determine the nature of the dolerite boundary.
- 2) Further seismic surveys on an increased geophone spacing to obtain more precise data on depth to fresh rock.

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- 3) Drilling (confirmatory).
- 4) Bulk sampling.
- 5) Feasibility study.

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TABLE 1

Summary Table of Seismic Data E.L.109/87 - Mt. Faulkner

| Spread | Layer | Velocity (m/sec) | Thickness (m) | Depth |
|--------|-------|------------------|---------------|----------|
| 1 2 | 1 | 450 | 2.4-4 | 15-23 |
| | 2 | 1750 | 11-19 | |
| | 3 | 4360 | | |
| 2 | 1 | 825 | 2-5 | 20-30 |
| | 2 | 1780 | 16-28 | |
| | 3 | 4520 | | |
| 3 | 1 | 950 | 1.5-4 | 20-25 |
| | 2 | 2315 | 16-20 | |
| | 3 | >3000 | | |
| 4 | 1 | 1110 | 5-7.5 | 10 |
| | 2 | - | | |
| | 3 | 4975 | | |
| 5 | 1 | 1300 | 1.5-4 | 2.5-17.5 |
| | 2 | 2000 | 0-16 | |
| | 3 | 5000-5470 | | |
| 6 | 1 | 550 | 5 | 5-17 |
| | 2 | - | | |
| | 3 | 5140 | | |
| 7 | 1 | 1000 | 2-2.5 | 7.5-12.5 |
| | 2 | 1850 | 5-11 | |
| | 3 | 3950 | | |
| 8 | 1 | 775 | 2-4 | >20 |
| | 2 | 2120 | 16-20 | |
| | 3 | >3500 | | |

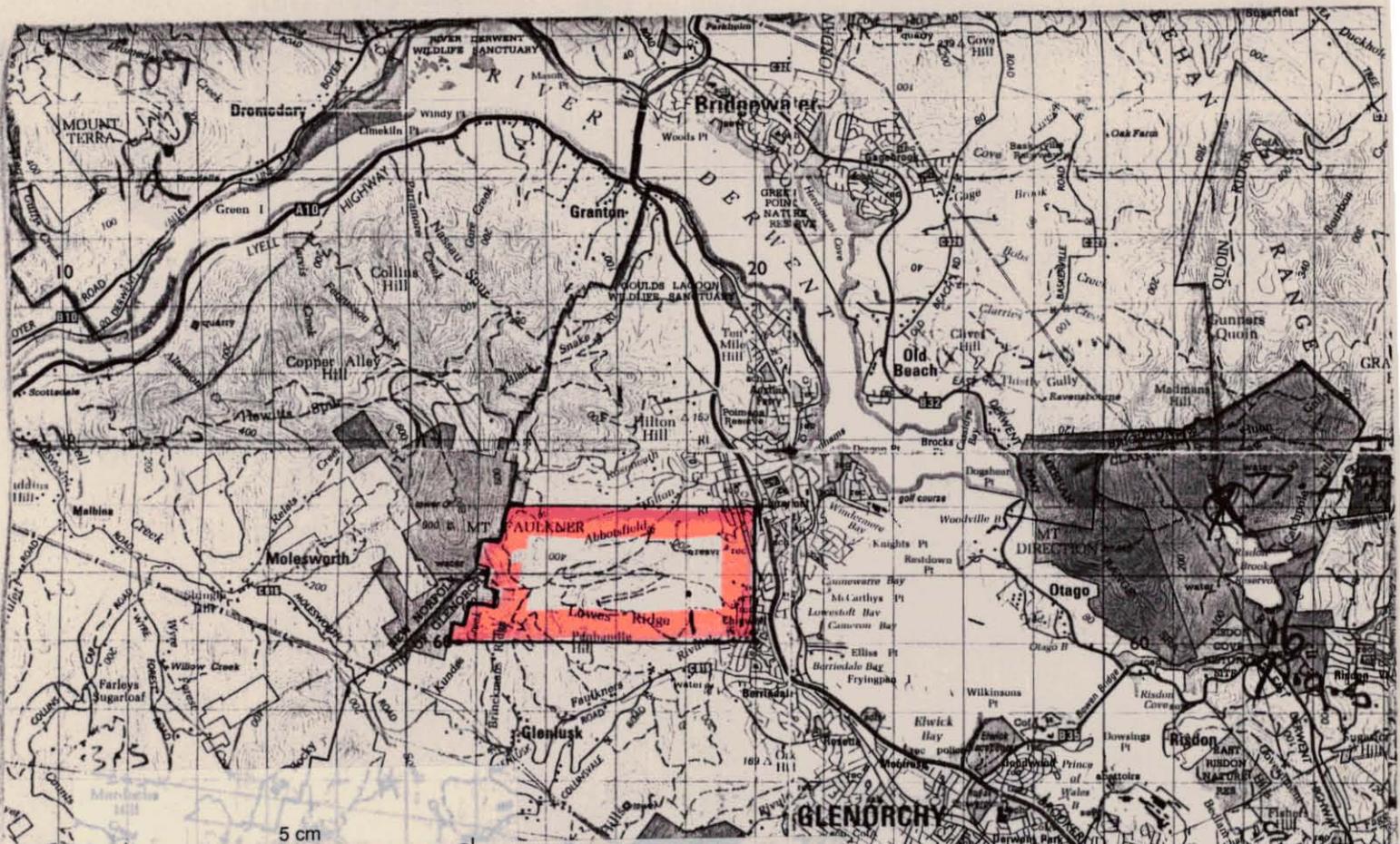


FIGURE 1

E.L. 109/87 (8 km²)

MT. FAULKNER

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READYMIX GROUP

Scale 1:100 000

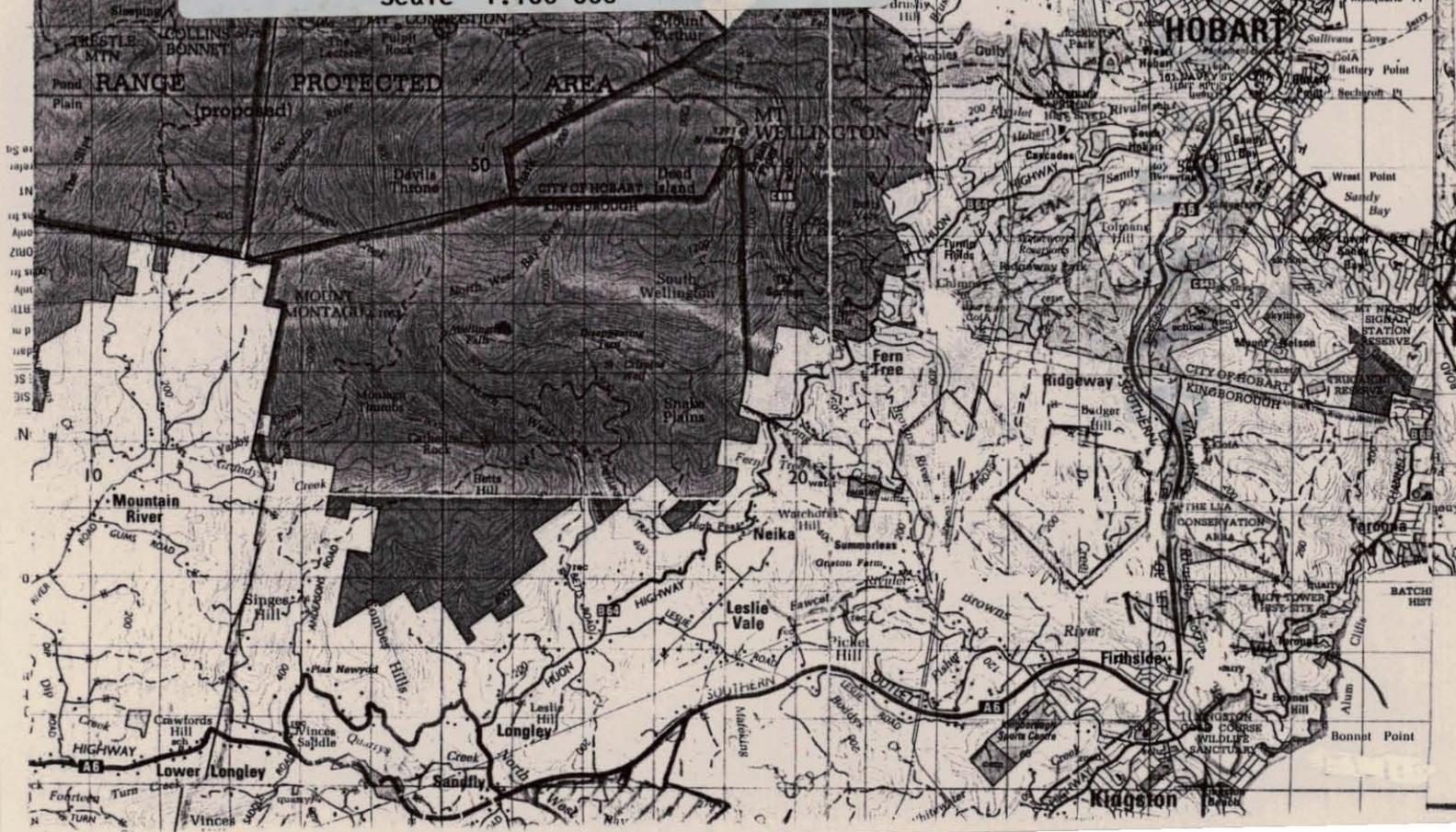
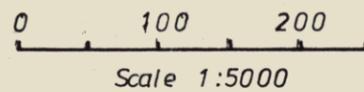


Figure 3

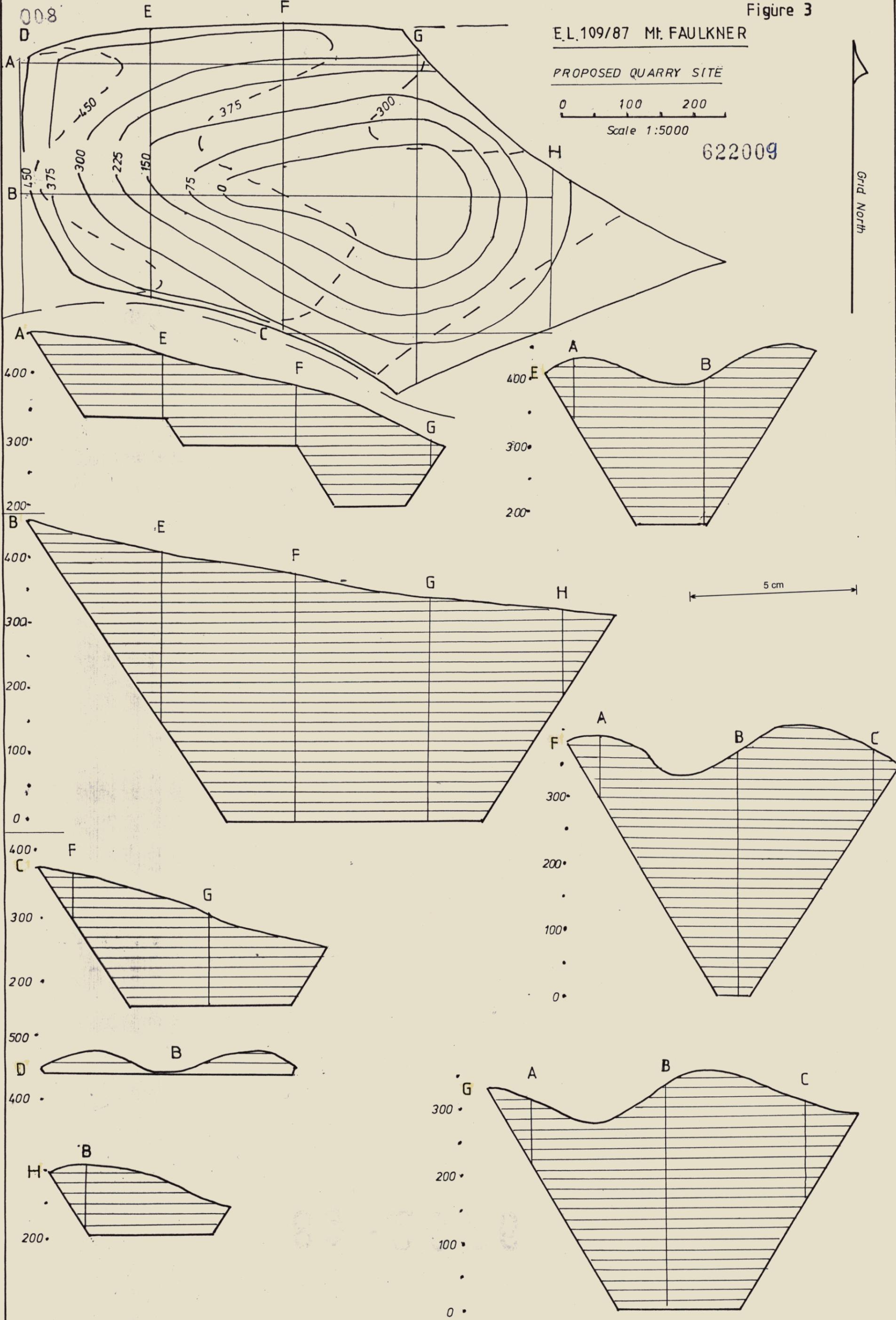
E.L.109/87 Mt. FAULKNER

PROPOSED QUARRY SITE



622009

Grid North



A P P E N D I X

Seismic Survey by W.L. Mathews



Seismic survey in the Chigwell area

by W. L. Matthews

Abstract

Seismic spreads have been fired along the margin of a track, extending up a steep ridge at Chigwell, to determine the depth to unweathered dolerite. On the lower parts of the slope unweathered rock appears to be 15–30 m or more below the surface, while at some locations on the upper part of the slope it may be as close as 2.5 m below the surface.

INTRODUCTION

At the request of V. M. Threder, Consulting Geologist, a refraction seismic survey has been undertaken in the Chigwell area. The survey is part of an assessment of the area to determine its suitability for the development of a quarry to produce crushed blue metal. The location of the seismic traverses are shown on Figure 1. Dolerite has been mapped on much of the hill, with Permian rocks occurring on the lower, north-west facing slopes.

SEISMIC TRAVERSE

The survey consisted of eight seismic spreads of 12 geophones with a spacing of 7.5 metres. Shots were fired at each end. Six spreads were fired along a track extending up a ridge, while the other two were laid out around the contour on the lower part of the slope. The track up the ridge is quite steep, ranging up to 22.5° in slope angle, with an angle of 15° or greater being the average. The slope flattens on the western end of spread 6.

The results are summarised below, with seismic velocities and interpreted thicknesses being indicated. The interpreted profile under each spread is shown Figure 2.

Material with a velocity of 450 m/s to 2000 m/s is likely to be soil and clay (perhaps with boulders) or very weathered rock. Velocities of between 2000 and 3500 m/s are likely to represent variably weathered and/or jointed rock, while velocities in excess of this range are likely to consist of largely unweathered rock.

Spreads around the lower slopes (1, 2, 3 and 8) suggest that there are considerable depths of low velocity material below the surface, while under spreads 4, 5, 6 and 7 (or parts of them) higher velocity material appears to be closer to the surface.

Spread 8 appears to have extended over Permian rocks on the western end but there is no obvious contact indicated from the seismic results. No outcrops (either Permian or dolerite) are obvious on the slopes in the vicinity of the seismic spreads, so that the extent of Permian rocks is really unknown. However velocities of greater than about 3500–4000 m/s are likely to indicate dolerite.

CONCLUSION

The seismic survey has indicated that considerable depths of weathered or very jointed rock overlies relatively unweathered rock. The more competent rock is likely to be closer to the surface higher up the hill than towards the base.

[22 June 1989]

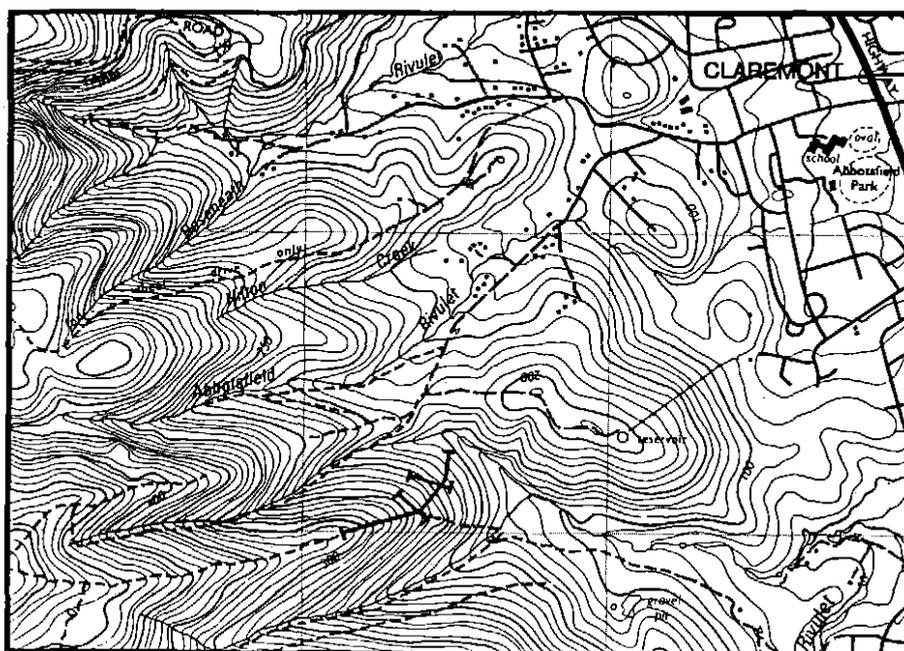


Figure 1. Location of seismic spreads.

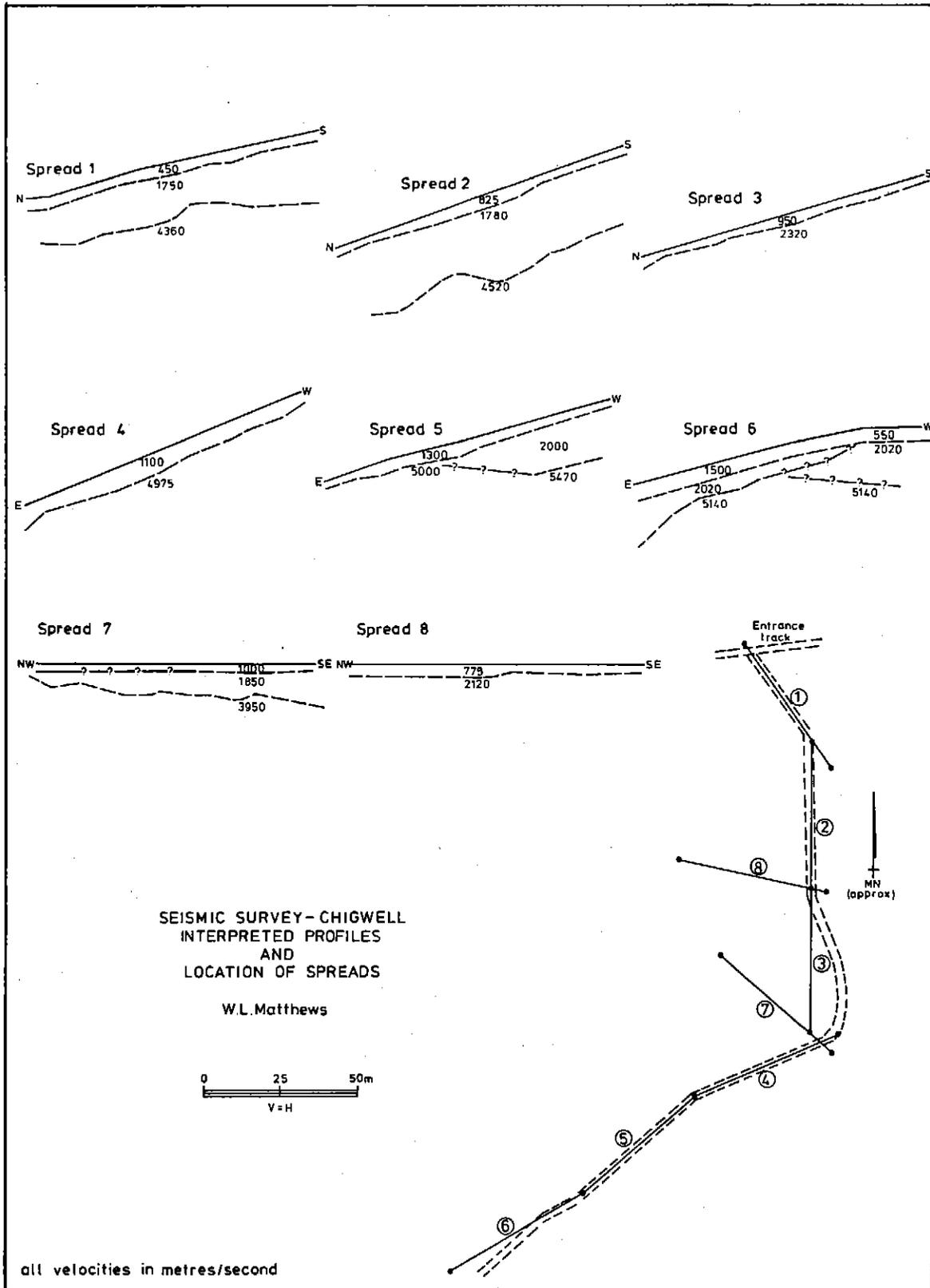
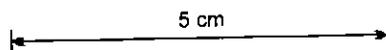


Figure 2.



APPENDIX 1

Interpretation of seismic spreads

Spread 1

| | | |
|--------------------|----------|------------------------|
| Surface layer | 450 m/s | 2.4-4 m thick |
| Intermediate layer | 1750 m/s | 11-19 m thick |
| Lower refractor | 4360 m/s | 15-23 m below surface. |

Spread 2

| | | |
|--------------------|----------|---------------------|
| Surface layer | 825 m/s | 2-5 m thick |
| Intermediate layer | 1780 m/s | 16-28 thick |
| Lower refractor | 4520 m/s | 20-30 below surface |

Spread 3

| | | |
|-----------------|----------|---------------|
| Surface layer | 950 m/s | 1.5-4 m thick |
| Lower refractor | 2315 m/s | |

Material with a velocity of 3000 m/s or greater would be at depths of 20-25 m or greater (on each end of the spread).

Spread 4

| | | |
|-----------------|----------|---------------|
| Surface layer | 1110 m/s | 5-7.5 m thick |
| Lower refractor | 4975 m/s | |

There appears to be a pinnacle of unweathered (or less jointed) rock under the eastern end of this spread and just off the end of Spread 3.

Spread 5

| | | |
|--------------------|-----------|---|
| Surface layer | 1300 m/s | 1.5-4 m thick |
| Intermediate layer | 2000 m/s | 0-16 m thick (this layer appears to wedge out on each end of spread). |
| Lower refractor | 5000-5470 | 2.5-17.5 m below surface |

Spread 6

| | | |
|--------------------|----------|----------------------|
| Surface layer | 500 m/s | W end |
| | 1500 m/s | E end |
| | | 3.5-5 m thick |
| Intermediate layer | 2020 m/s | 3-19.5 m thick |
| Lower refractor | 5140 m/s | 8-25 m below surface |

Spread 7

| | | |
|--------------------|----------|--------------------------|
| Surface layer | 1000 m/s | 2-2.5 m thick |
| Intermediate layer | 1850 m/s | 5-11 m thick |
| Lower refractor | 3950 m/s | 7.5-12.5 m below surface |

Spread 8

| | | |
|-----------------|----------|-------------|
| Surface layer | 775 m/s | 2-4 m thick |
| Lower refractor | 2120 m/s | |

North-west end of spread is on Permian rocks (boulders occur on surface). Material with a velocity of 3000-3500 m/s is likely to be more than 2025 m below the surface (on the ends).

APPENDIX 2

Time/Distance data

Spread 1

| Geophone | Time | Distance |
|--------------|------|----------|
| <i>North</i> | | |
| 0 | 14 | 0 |
| 1 | 18.5 | 7.5 |
| 2 | 22 | 15 |
| 3 | 29.5 | 22.5 |
| 4 | 30.5 | 30 |
| 5 | 30.5 | 37.5 |
| 6 | 36 | 45 |
| 7 | 35 | 52.5 |
| 8 | 37.5 | 60 |
| 9 | 41 | 67.5 |
| 10 | 43 | 75 |
| 11 | 50?? | 82.5 |
| 12 | 77 | 90 |
| <i>South</i> | | |
| 0 | 12 | 0 |
| 1 | 14 | 7.5 |
| 2 | 19.5 | 15 |
| 3 | 24 | 22.5 |
| 4 | 29.5 | 30 |
| 5 | 33 | 37.5 |
| 6 | 37 | 45 |
| 7 | 40 | 52.5 |
| 8 | 43.5 | 60 |
| 9 | 45 | 67.5 |
| 10 | 45.5 | 75 |
| 11 | 47 | 82.5 |
| 12 | 50 | 90 |

Spread 2

| Geophone | Time | Distance |
|--------------|------|----------|
| <i>North</i> | | |
| 0 | 5 | 0 |
| 1 | 9.5 | 7.5 |
| 2 | 15 | 15 |
| 3 | 21 | 22.5 |
| 4 | 25 | 30 |
| 5 | 30 | 37.5 |
| 6 | 35 | 45 |
| 7 | 41 | 52.5 |
| 8 | 43.5 | 60 |
| 9 | 45 | 67.5 |
| 10 | 46 | 75 |
| 11 | 49.5 | 82.5 |
| 12 | 50 | 90 |
| <i>South</i> | | |
| 0 | 5 | 0 |
| 1 | 8 | 7.5 |
| 2 | 10 | 15 |
| 3 | 15 | 22.5 |
| 4 | 17.5 | 30 |
| 5 | 20 | 37.5 |
| 6 | 26.5 | 45 |
| 7 | 29 | 52.5 |
| 8 | 40.5 | 60 |
| 9 | 41 | 67.5 |
| 10 | 47.5 | 75 |
| 11 | 50 | 82.5 |
| 12 | 49.5 | 90 |

Spread 3

| Geophone | Time | Distance |
|--------------|------|----------|
| <i>North</i> | | |
| 0 | 7 | 0 |
| 1 | 7.5 | 7.5 |
| 2 | 11 | 15 |
| 3 | 16 | 22.5 |
| 4 | 17 | 30 |
| 5 | 21 | 37.5 |
| 6 | 26 | 45 |
| 7 | 28 | 52.5 |
| 8 | 29.5 | 60 |
| 9 | 31.5 | 67.5 |
| 10 | 32.5 | 75 |
| 11 | 36 | 82.5 |
| 12 | 39 | 90 |
| <i>South</i> | | |
| 0 | 7 | 0 |
| 1 | 9 | 7.5 |
| 2 | 13 | 15 |
| 3 | 18.5 | 22.5 |
| 4 | 19 | 30 |
| 5 | 22 | 37.5 |
| 6 | 26 | 45 |
| 7 | 28 | 52.5 |
| 8 | 30.5 | 60 |
| 9 | 34 | 67.5 |
| 10 | 36.5 | 75 |
| 11 | 37 | 82.5 |
| 12 | 42 | 90 |

Spread 4

| Geophone | Time | Distance |
|-------------|------|----------|
| <i>West</i> | | |
| 0 | 6 | 0 |
| 1 | 6 | 7.5 |
| 2 | 8.5 | 15 |
| 3 | 10 | 22.5 |
| 4 | 13 | 30 |
| 5 | 14.5 | 37.5 |
| 6 | 15 | 45 |
| 7 | 18 | 52.5 |
| 8 | 22.5 | 60 |
| 9 | 22.5 | 67.5 |
| 10 | 23 | 75 |
| 11 | 24.5 | 82.5 |
| 12 | 26 | 90 |
| <i>East</i> | | |
| 0 | 14 | 0 |
| 1 | 7.5 | 7.5 |
| 2 | 15 | 15 |
| 3 | 19 | 22.5 |
| 4 | 21.5 | 30 |
| 5 | 21 | 37.5 |
| 6 | 22 | 45 |
| 7 | 24 | 52.5 |
| 8 | 25 | 60 |
| 9 | 26.5 | 67.5 |
| 10 | 27.5 | 75 |
| 11 | 29 | 82.5 |
| 12 | 30.5 | 90 |

Spread 5

| Geophone | Time | Distance |
|-------------|------|----------|
| <i>West</i> | | |
| 0 | 2.5 | 0 |
| 1 | 5.5 | 7.5 |
| 2 | 8 | 15 |
| 3 | 13 | 22.5 |
| 4 | 16 | 30 |
| 5 | 20 | 37.5 |
| 6 | 23 | 45 |
| 7 | 28 | 52.5 |
| 8 | 28 | 60 |
| 9 | 30 | 67.5 |
| 10 | 30 | 75 |
| 11 | 32.5 | 82.5 |
| 12 | 32.5 | 90 |

| | | |
|-------------|------|------|
| <i>East</i> | | |
| 0 | 4 | 0 |
| 1 | 5 | 7.5 |
| 2 | 9 | 15 |
| 3 | 10 | 22.5 |
| 4 | 12 | 30 |
| 5 | 13.5 | 37.5 |
| 6 | 19 | 45 |
| 7 | 22 | 52.5 |
| 8 | 24 | 60 |
| 9 | 26 | 67.5 |
| 10 | 30 | 75 |
| 11 | 30 | 82.5 |
| 12 | 36? | 90 |

Spread 6

| | | |
|-------------|--------|------|
| <i>West</i> | | |
| 0 | 14 | 0 |
| 1 | 14 | 7.5 |
| 2 | 18 | 15 |
| 3 | 20 | 22.5 |
| 4 | 20.5 | 30 |
| 5 | 23.5 | 37.5 |
| 6 | 25 | 45 |
| 7 | 32 | 52.5 |
| 8 | 26 | 60 |
| 9 | 30 | 67.5 |
| 10 | 33 | 75 |
| 11 | 34.5 | 82.5 |
| 12 | 41,49? | 90 |

| | | |
|-------------|------|------|
| <i>East</i> | | |
| 0 | 6 | 0 |
| 1 | 6 | 7.5 |
| 2 | 11 | 15 |
| 3 | 15 | 22.5 |
| 4 | 18 | 30 |
| 5 | 19 | 37.5 |
| 6 | 21.5 | 45 |
| 7 | 26 | 52.5 |
| 8 | 29.5 | 60 |
| 9 | 31 | 67.5 |
| 10 | 31.5 | 75 |
| 11 | 33.5 | 82.5 |
| 12 | 37.5 | 90 |

Spread 7

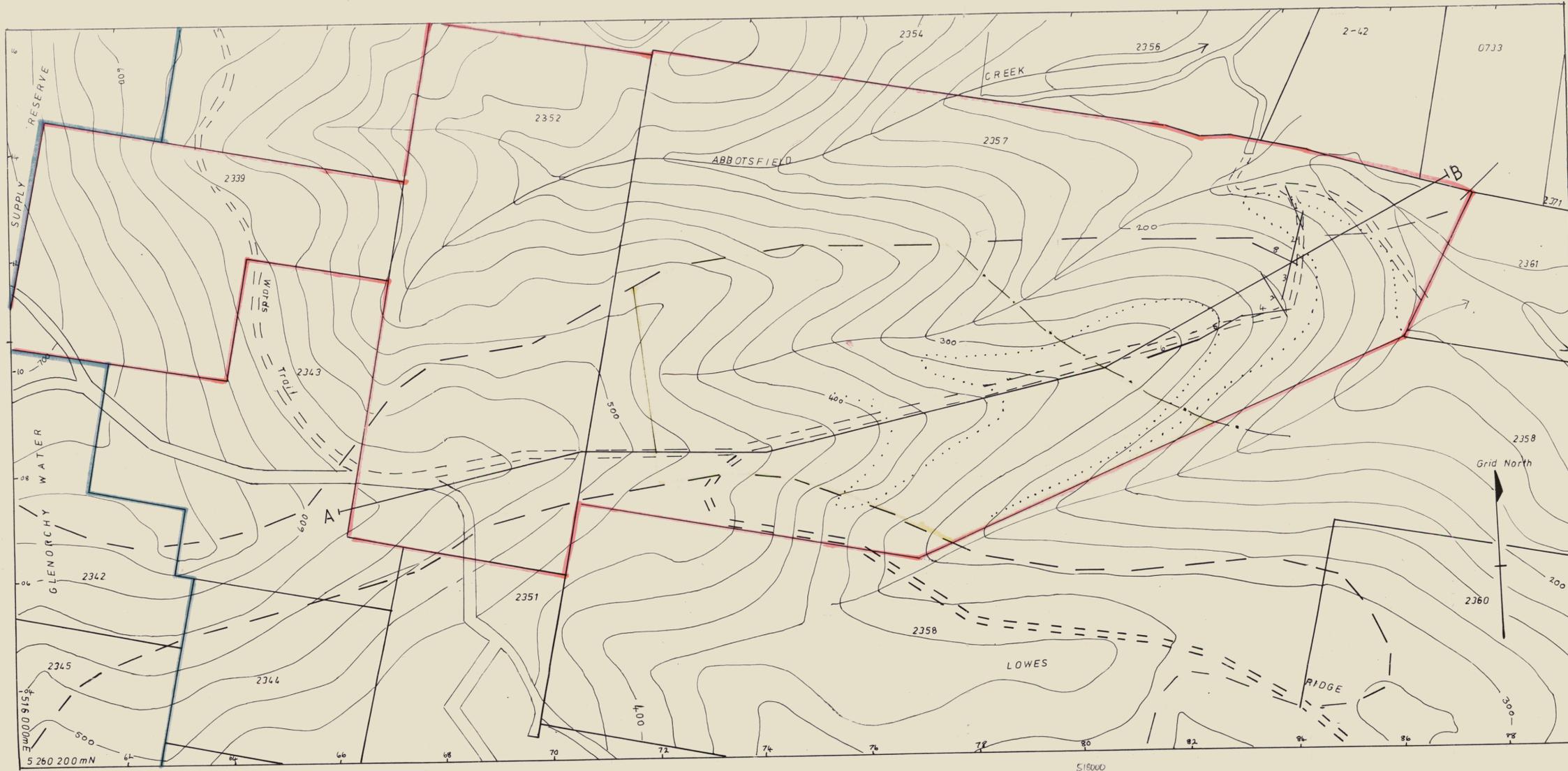
| Geophone | Time | Distance |
|-------------------|-------|----------|
| <i>North-west</i> | | |
| 0 | 5 | 0 |
| 1 | 8 | 7.5 |
| 2 | 9 | 15 |
| 3 | 13 | 22.5 |
| 4 | 16 | 30 |
| 5 | 19 | 37.5 |
| 6 | 20.5 | 45 |
| 7 | 23 | 52.5 |
| 8 | 24.5 | 60 |
| 9 | 32 | 67.5 |
| 10 | 29 | 75 |
| 11 | 32.5 | 82.5 |
| 12 | 43.5? | 90 |

| | | |
|-------------------|-----|------|
| <i>South-east</i> | | |
| 0 | 3 | 0 |
| 1 | 7 | 7.5 |
| 2 | 11 | 15 |
| 3 | 16 | 22.5 |
| 4 | 21 | 30 |
| 5 | 23 | 37.5 |
| 6 | 23 | 45 |
| 7 | 24 | 52.5 |
| 8 | 26 | 60 |
| 9 | 28 | 67.5 |
| 10 | 28 | 75 |
| 11 | 29 | 82.5 |
| 12 | 32? | 90 |

Spread 8

| | | |
|-------------------|------|------|
| <i>North-west</i> | | |
| 0 | 9 | 0 |
| 1 | 11 | 7.5 |
| 2 | 15 | 15 |
| 3 | 20 | 22.5 |
| 4 | 24 | 30 |
| 5 | 28.5 | 37.5 |
| 6 | 30.5 | 45 |
| 7 | 32.5 | 52.5 |
| 8 | 33.5 | 60 |
| 9 | 40 | 67.5 |
| 10 | 43 | 75 |
| 11 | 46.5 | 82.5 |
| 12 | 50 | 90 |

| | | |
|-------------------|------|------|
| <i>South-east</i> | | |
| 0 | 6 | 0 |
| 1 | 11.5 | 7.5 |
| 2 | 14 | 15 |
| 3 | 16.5 | 22.5 |
| 4 | 20 | 30 |
| 5 | 23 | 37.5 |
| 6 | 28 | 45 |
| 7 | 35 | 52.5 |
| 8 | 37 | 60 |
| 9 | 40 | 67.5 |
| 10 | 43 | 75 |
| 11 | 48 | 82.5 |
| 12 | 52 | 90 |



LEGEND

- 2352 Land Tenement (UPI No.)
- Western boundary of E.L.
- 500 Surface Contour (25m interval)
- ==== Public road
- ==== 4WD track
- Watercourse
- Limits of dolerite outcrop
- 1 : 10 gradient
- 1km radius from nearest dwelling
- Limits of quarry (48ha - see text)
- 200m Grid (AMG)
- 4 Seismic survey line

LOCALITY MAP

- EL Boundary
- Property of E. & G. Deakes
- Residential areas

5 cm

