ANNUAL REPORT

E.L.110/87 - DUNNS CREEK

for

C.S.R. - READYMIX

by Vic Threader

May 1990

Vic Threader and Associates Pty. Ltd.
Kingston Beach

AMG REFERENCE POINTS ADDED

CONTENTS

Introduction

The licence area has been investigated for the establishment of a hard rock quarry to serve both the Hobart and Channel districts and provide continuity of supply to the C.S.R.-Readymix operations when the company's Mornington quarry ceases operation.

The area is situated 7km south of Hobart and 3km north of Kingston within the land tenement designated U.P.I.1398 on the 1 : 25 000 Taroona topographic map (5224). It has access on to the Southern Outlet around 1km west of the proposed quarry site.

History

C.S.R.-Readymix applied for an exploration licence of 6km^2 in the Dunns Creek area on 22nd February 1988. To allay the concerns of some residents in the Summerleas Road area this was reduced to 4km^2 by the company on 30th May 1988. The licence was issued on 30th November 1988 for three months. It was renewed for a further twelve months on 1st March 1989 and reduced to 1km^2. On 1st February 1990 C.S.R.-Readymix applied for a mining lease over the same area as covered by the 1km exploration licence.

The original licence area of 6km^2 complied with the Division of Mines' requirement that applications conform to the 1km map grid but as the area of interest at the outset of exploration was confined to the present quarry proposal, the reductions have not placed any constraints on the investigation.

Geology

The licence area is entirely covered by dolerite. Dolerite is exposed in the road cuttings of the Southern Outlet, Proctors Road and the access road along the eastern boundary and also in the valley

of Dunns Creek to the west at the same level. Dolerite also crops out on the knolls at around 300m either side of the proposed quarry. There is therefore no reason to doubt that the ridge is composed of dolerite to whatever depth it is practicable to mine. This is further borne out by aeromagnetic and gravimetric surveys which indicate that the dolerite intrusive centre lies 1-2km north of the proposed quarry (D.Leaman - Pers. Comm.).

Seismic surveys and hammer drilling indicate that the dolerite is of granophyric composition - which is further evidence of proximity to the intrusive centre of the dolerite.

Exploration

Seismic surveys were conducted along the ridge crest using both 7.5 and 15m geophone spacing in order to determine the depth to hard rock. Three seismic velocity zones were identified:

Velocity m/sec	Rock Type
400 - 1000 m/sec	Soil and loose rock
1000 - 2260	Weathered dolerite
> 2260	Fresh dolerite (dolerite with a seismic velocity <3000m/sec would contain some unweathered material)

The full reports are appended and are summarised in the following tables.

Summary Table of Seismic Data E.L.110/87

Spread	Layer	Velocity (m/sec)	Thickness (m)	Depth	Remarks
1	1 2 3	500 1600 4200	0.5-3 5-17 -		Sedimentary material in this spread
2	1 2 3	750 1350 2475	2-3 3-55 -		Dolerite/Sedimentary boundary is possible in this spread
3	1 2 3	450 1250 3040	2-3 8-15 -	11-18	
4	1 2 3	400 1610 2380	5-8 2-23 -	10-25	
5	1 2 3	450 1500 2300	2-3 2-8 -	5-10	
6	1 2 3	650 2260 4800	2-6 10-30 -	12-36	
7	1 2 3	850 1950 3000	0.8-4 13-19 -	15-20	
8	1 2 3	950 1650 3900	0.5-6 11-26 -	15-30	
9	1 2 3	1000 1700 6000	1-3.5 19-29	20-30	
10	1 2 3	750 2000 -	1-3 20+ -	-	Depth to high velocity cannot be determined on end of traverse
11	1 2 3	500 1900 3775	2-3 19-29 -	-	-do-

Summary Table of Supplementary Seismic Data

Spread	Layer	Velocity m/sec	Depth (m)
1	1	1050-1525	5-8
	2	2540-2625	20-30
	3	5300-5570	30
2	1	1100	3-6
	2	1570-1970	13-22
	3	4150-4240	>22
3	1	825	4-6
	2	1400-2200	20-30
	3	4840	>30

The supplementary seismic survey (using the longer geophone cable) gives a more reliable depth measurement to hard (fresh) dolerite i.e. zone 3. The previous survey gives more reliable depth estimates of the surface layers (weathered zones).

Ten hammer drill holes were put down on and near the ridge line to obtain samples of rock for microscopic examination and to provide control for seismic interpretation.

It was found that in the upper 10-15m the fresh rock content was in general <50%

Judging from variations in speed of penetration of the hammer drill, it was apparent that the upper levels contain boulders of unweathered dolerite (which are the kernels of joint blocks) in a matrix of dolerite granules, a weathering pattern typical of granophyre. Seismic velocities would be difficult to interpret in such a nonhomogenous medium.

Eight samples of rock chips were mineralogically examined. Five of these were examined by XRD analysis and three were further examined in thin section. All contained secondary calcite which commonly forms on joint planes in dolerite due to weathering effects.
All samples were identified as granophyric dolerite and showed evidence of deuteric alteration (late stage magmatic alteration as distinct from weathering).

It is estimated that in a 250m x 250m area the weathered zone would contain around two million tonnes of doleritic gravel.

Reserves

A. Premium Grade Crushed Dolerite

It is estimated that a 250m square would contain a 21 million tonne in situ reserve in 10 x 15m benches. The corresponding figure for a 200m square is 13 and for a 100m square is 3 million tonnes.

Area of Quarry	Reserves in 10 (15m) Benches+ In situ	Premium Grade*	Years Reserve at 250 x 10^6 t.p.a.
250 x 250	21	17	68
200 x 200	13	10	45
100 x 100	3	2.5	10

Years reserve at 250×10^3 t.p.a.

+Rock density = 2.9

*80% assumed recovery of premium grade crushed rock.

B. Gravel

Material above the 235m contour (around 15m) was not included in the reserve calculation.

Overburden data from the six drill holes relevant to the actual quarry area are:

No.	Thickness (m) a	% Fresh Rock b	ab
5	11	30	330
6	12	8	96
7	12	30	360
8	13	8	104
9	19	6	114
10	16	10	160
	Σ 83		Σ 1164

$\frac{\Sigma a}{n}$ = 14m mean thickness $\frac{\Sigma ab}{\Sigma a}$ = 14% weighted mean content of fresh rock in top 14m (86% gravel)

Reserves of overburden (saleable as red gravel and/or usable for earth works on site) are (250 x 250 x 14)m x .86 x 2.6 (assumed density) = 2 million tonnes.

Alternative Quarry Sites

Dolerite is so widespread in Tasmania, especially in the south of the state, that it is generally believed quarry sites can be sited at will. The opposite is in fact the case. Urban, residential and recreational zones occupy most of the Greater Hobart area. When the remaining area is superimposed on a geological map it becomes apparent that the number of quarry sites is few indeed. When these potential quarry sites are examined in the context of:

Land owner's consent

rock quality

depth of overburden

economics of location with regard to access and distance from market

environmental constraints

the final number may be nil.

Community Interests

Transport is the most costly item in the production and supply of quarry products. For this reason the extractive industries are situated in the periphery of population centres since it is only there that they can operate economically and therefore effectively.

The proliferation of Rural Residential subdivisions in these areas is sterilising resources of extractive materials and forcing the industry further from the market. This results in higher costs of materials and increased damage to roads.

Ultimately Government Agencies must decide whether the greater good of the community is best served by moving extractive industries further from the areas they serve or allowing them, with environmental safeguards, to co-exist with those members of the community who have chosen to live in these areas.

Conclusion

This report has:

1 detailed the investigation of a dolerite resource (Chapters 1 - 5)

2 provided evidence that crushed rock resources are inadequate to provide for future development in Greater Hobart (Appendix 3)

3 outlined the difficulties created by planning decisions which lead to sterilisation of resources (Chapter 6) and

4. suggested that with proper safeguards, quarries and communities can co-exist in this area. (Chapter 7)

It is anticipated that the Management Plan, which will be prepared when the guidelines have been provided, will give confidence to the community that this can be achieved.

REFERENCES

Leaman D.E. (1975) Evaluation of dolerite quarry sites, Hobart area. Tech.Rep.Dep. Mines Tasm 19 37-42

Summons T.G. (1981) Production of Crushed Basalt, Dolerite and Limestone in the Hobart and Launceston areas 1960-1980. Unpub.Rpt. 1981/13 Dept. of Mines Tas.

Threader V.M. (1976) Economic Geology section in Leaman D.E. 1976 Geological atlas 1 : 50 000 series sheet 82 (8312S) Hobart. Explan.Rep. Dept. Mines Tasm.

Statistical Tables in Annual Reports of the Director of Mines (1961-1989)

Tasmanian Year Book (1988) Australian Bureau of Statistics

APPENDIX 1

SEISMIC SURVEY

by W.L. Matthews

Tasmania Department of Mines—Report 1989/25

A seismic survey in the Proctors Road area

by W. L. Matthews

Abstract

A refraction seismic survey in the Proctors Road area has shown that the dolerite is variably weathered and/or strongly jointed to depths of up to 30 metres. There is a strong likelihood that appreciable thicknesses of overburden overlies competent rock in parts of the area.

INTRODUCTION

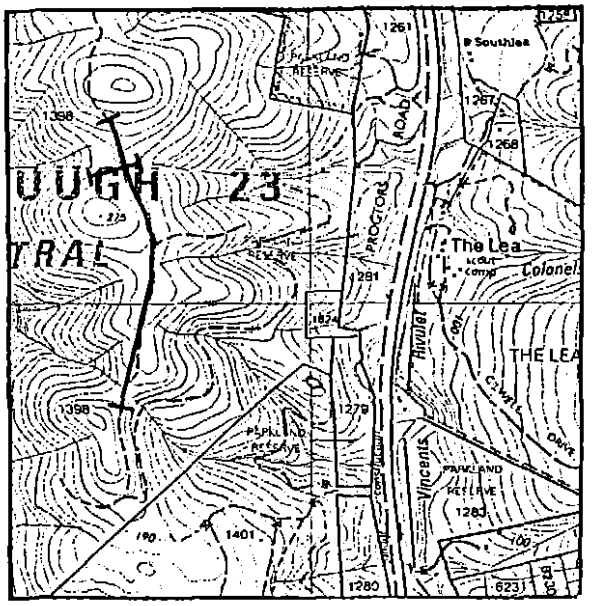
A refraction seismic survey in the area south of Badger Hill and to the west of Proctors Road was undertaken at the request of V. M. Threader, Consulting Geologist. The area is being examined to assess whether it is likely to be suitable for the development of a quarry to produce crushed blue metal. The area has been mapped as being underlain by Jurassic dolerite.

The survey consisted of eleven spreads with a geophone spacing of 7.5 metres. The spreads were fired at each end. Ten of the spreads were laid out along a track, making the traverse length almost one kilometre, while the other spread was fired across the traverse line towards the northern end.

INTERPRETATION OF SEISMIC RESULTS

Interpretations show that the dolerite is weathered and/or strongly jointed to considerable depths under the whole length of the traverse and under the one cross spread. Dolerite with no weathering and little open jointing is indicated under only three or four spreads, i.e. where indicated velocities were about 4000 m/sec or greater, and in each case at fairly deep levels. One spread (10) has no high velocity material indicated, and it is unlikely that material with a velocity of 3500 m/sec or greater is any closer to the surface than 20 m or more (on the ends of the spread).

The results are presented in Table 1.



Material with velocities of 400 to 1000 m/sec is likely to represent mainly soil, loose rock and talus, with perhaps some very weathered rock. The second layer material has velocities ranging from 1250–2260 m/sec. The lower part of this velocity range is possibly also due to compacted clay and talus on deeply weathered dolerite. Where the velocity is greater than 1600 m/sec, it probably represents *in situ* weathered dolerite. Material with seismic velocities in the range of 2000–3000 m/sec is probably less weathered dolerite or very jointed dolerite.

The lower refractor has a variable velocity, and any velocity up to 3000 m/sec is probably indicative of some weathering, although strong open jointing could produce the same result. Velocities of about 4000 m/sec and above are expected to represent relatively fresh rock.

Table 1. *Results of seismic refraction survey*

Spread No.	V_0 (m/sec)	Thickness (m)	V_1 (m/sec)	Thickness (m)	V_2 (m/sec)
1	500	0.5–3 m	1600	5–17 m	4200
2	750	2–3 m	1350	3–55 m	2475
3	450	2–3 m	1250	8–15 m	3040
4	400	5–8 m	1610	2–23 m	2380
5	450	2–3 m	1500	2–8 m	2300
6	650	2–6 m	2260	10–30 m	4800
7	850	0.8–4 m	1950	13–19 m	3000
8	950	0.5–6	1650	11–26 m	3900
9	1000	1–3.5 m	1700	19–29 m	6000
10	750	1–3 m	2000	20+?	–
11	500	2–3 m	1900	19–29 m	3775

CONCLUSIONS

The seismic survey indicates that the dolerite has low to moderate seismic velocities to relatively deep levels, and this is likely to be due to deep weathering, fracturing, or both. Material with velocities of less than 4000 m/sec is likely to extend to depths of at least 20–35 m in many locations in the area.

[23 June 1989]

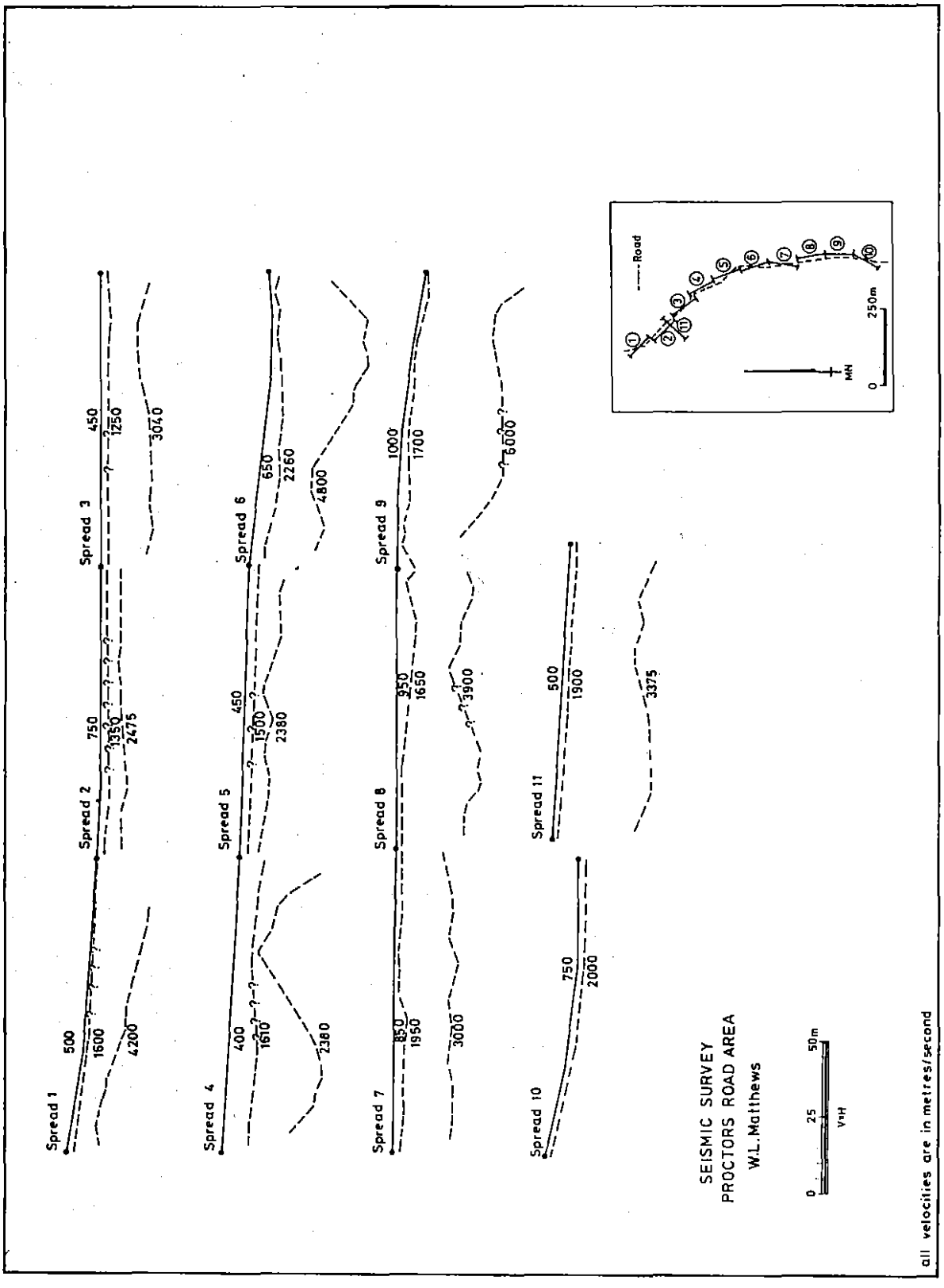


Figure 1.

APPENDIX 1

Time/distance data

Spread 1

Geophone	Time (m/sec)	Distance (m)
West shot		
0	-	0
1	15	7.5
2	20	15
3	24	22.5
4	28	30
5	31	37.5
6	33	45
7	35	52.5
8	40	60
9	41	67.5
10	40	75
11	42	82.5
12	?	90
East shot		
0	-	0
1	-	7.5
2	9	15
3	13	22.5
4	19.5	30
5	24.5	37.5
6	25	45
7	29.5	52.5
8	33	60
9	34	69.5
10	35	75
11	37	82.5
12	38	90

Spread 2

West shot		
0		0
1	10	7.5
2	18	15
3	21.5	22.5
4	24.5	30
5	27	37.5
6	30	45
7	32	52.5
8	35	60
9	37	67.5
10	41	75
11	43	82.5
12	46.5	90
East shot		
0		0
1	10	7.5
2	15.5	15
3	19	22.5
4	22	30
5	25	37.5
6	28	45
7	32	52.5
8	35	60
9	39	67.5
10	43	75
11	46.5	82.5
12	47	90

Spread 3

West shot		
0		0
1	14	7.5
2	21	15
3	26.6	22.5
4	31	30
5	34.5	37.5
6	39	45
7	43	52.5
8	46	60
9	49	67.5
10	50	75
11	53.5	82.5
12	51 or 58	90
East shot		
0		0
1	17	7.5
2	24	15
3	30	22.5
4	35	30
5	40	37.5
6	45	45
7	48	52.5
8	50	60
9	53	67.5
10	55	75
11	56	82.5
12	59	90

Spread 4

West shot		
0		0
1	20	7.5
2	25.5	15
3	30.5	22.5
4	36	30
5	38	37.5
6	42	45
7	47	52.5
8	49	60
9	52	67.5
10	55	75
11	56.5	82.5
12	60	90
East shot		
0		0
1	18	7.5
2	21	15
3	26	22.5
4	28.5	30
5	34	37.5
6	37	45
7	42	52.5
8	44	60
9	50	67.5
10	51	75
11	54	82.5
12	58	90

Spread 5

Geophone	Time (m/sec)	Distance (m)
West shot		
0		0
1	15	7.5
2	20	15
3	25	22.5
4	27	30
5	30	37.5
6	36	45
7	37	52.5
8	41	60
9	48	67.5
10	52	75
11	55	82.5
12	56.5	90
East shot		
0		0
1	16.5	7.5
2	21	15
3	26.5	22.5
4	33	30
5	35	37.5
6	39	45
7	41	52.5
8	43	60
9	46	67.5
10	49	75
11	53	82.5
12	54	90

Spread 6

West shot		
0		0
1	16	7.5
2	22	15
3	27	22.5
4	31	30
5	33	37.5
6	37	45
7	38.5	52.5
8	41.5	60
9	43	67.5
10	44.5	75
11	45	82.5
12	45	90
East shot		
0		0
1	7.5	7.5
2	12.5	15
3	15.5	22.5
4	23	30
5	27	37.5
6	30	45
7	34	52.5
8	37	60
9	40	67.5
10	42	75
11	44	82.5
12	46	90

Spread 7

Geophone	Time (m/sec)	Distance (m)
West shot		
0		0
1	10	7.5
2	14	15
3	18	22.5
4	23.5	30
5	26	37.5
6	31.5	45
7	32	52.5
8	35	60
9	38	67.5
10	38	75
11	42	82.5
12	44	90
East shot		
0		0
1	7.5	7.5
2	11	15
3	15	22.5
4	17	30
5	22.5	37.5
6	25	45
7	27	52.5
8	33	60
9	37	67.5
10	39	75
11	42.5	82.5
12	45	90

Spread 8

West shot		
0		0
1	7	7.5
2	10	15
3	15	22.5
4	20	30
5	24	37.5
6	29	45
7	34	52.5
8	39	60
9	42.5	67.5
10	46	75
11	47.5	82.5
12	50	90
East shot		
0		0
1	9	7.5
2	17.5	15
3	23.5	22.5
4	29	30
5	32	37.5
6	38	45
7	40	52.5
8	44	60
9	47	67.5
10	47.5	75
11	51	82.5
12	50	90

Spread 9

Geophone	Time (m/sec)	Distance (m)
West shot		
0		0
1	6	7.5
2	13	15
3	20	22.5
4	23	30
5	24	37.5
6	28	45
7	33.5	52.5
8	38.5	60
9	41.5	67.5
10	42.5	75
11	43	82.5
12	44.5	90
East shot		
0		0
1	12	7.5
2	12	15
3	15	22.5
4	20	30
5	26	37.5
6	32	45
7	36.5	52.5
8	40	60
9	45	67.5
10	48	75
11	51.5	82.5
12	50	90

Spread 10

West shot		
0		0
1	10	7.5
2	12	15
3	15	22.5
4	18	30
5	22	37.5
6	27	45
7	29	52.5
8	34	60
9	37.5	67.5
10	42	75
11	45	82.5
12	49	90
East shot		
0		0
1	10	7.5
2	12.5	15
3	17	22.5
4	20	30
5	24	37.5
6	29	45
7	30	52.5
8	38	60
9	40	67.5
10	41	75
11	44	82.5
12	47	90

Spread 11

Geophone	Time (m/sec)	Distance (m)
North shot		
0		0
1	11	7.5
2	15	15
3	19.5	22.5
4	23.5	30
5	28	37.5
6	31.5	45
7	35	52.5
8	36	60
9	39	67.5
10	43	75
11	42	82.5
12	46	90
South shot		
0		0
1	13	7.5
2	16.5	15
3	20	22.5
4	24	30
5	28	37.5
6	31	45
7	37.5	52.5
8	44	60
9	45	67.5
10	47	75
11	50.5	82.5
12	52	90

Tasmania Department of Mines—Report 1989/30

Supplementary seismic survey—Proctors Road area

by W. L. Matthews

Abstract

A further three seismic spreads were fired in the Proctors Road area, with extension shots and wider geophone spacings. The seismic spreads indicated considerable depths of low and intermediate velocity material.

INTRODUCTION

A further three seismic spreads have been fired in the Proctors Road area (fig. 1) at the request of V. M. Threader, Consulting Geologist. A wider geophone spacing (15 m) was used so that more refractions from deeper levels (and higher velocities) were indicated on more geophones. Extension shots were also fired on the end of each spread (except on the east end of spread 3), which further increased the number of geophones indicating higher velocity. The three spreads were located near the northern part of the area previously examined.

SEISMIC RESULTS

The approximate locations of the spreads are shown on the Figure 2.

The interpreted profiles resulting from firing at each end of the spreads (15 m from the first geophone) and from the extended shots (45 m from the first geophone) are shown separately. Slightly different velocities result from these extension shots.

The depth to fairly definite, competent, close-jointed dolerite in all three spreads varies from about 15 to 30 m, with the extended shot profiles suggesting a slightly lesser thickness of overlying material. As indicated previously (Matthews, 1989), the intermediate velocities (approximately 2200–3500 m/sec) may indicate relatively fresh, open-jointed dolerite or variably weathered rock.

CONCLUSIONS

The wider-spaced seismic spreads suggest that considerable depths of low and intermediate velocity material overlies relatively competent unweathered dolerite. This is consistent with the results of the previous survey.

REFERENCE

MATTHEWS, W. L. 1989. Seismic survey in the Proctors Road area. *Unpubl. Rep. Dep. Mines Tasm.* 1989/25

[24 July 1989]

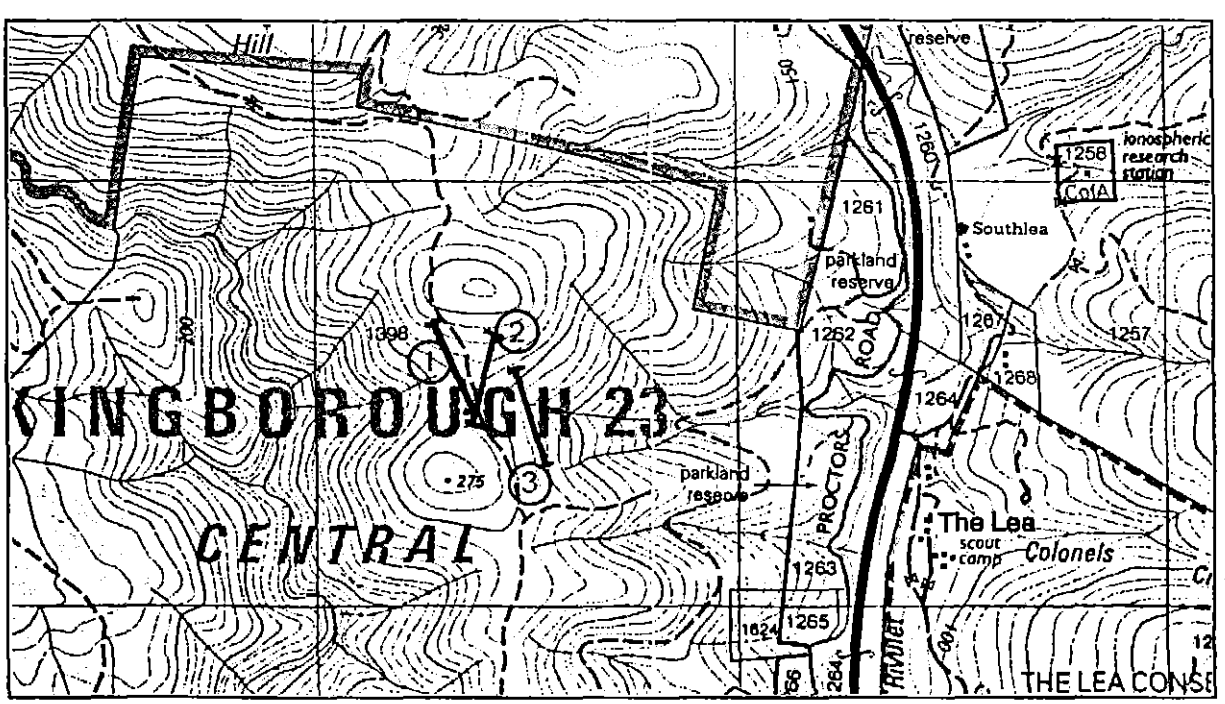


Figure 1. *Location of study area.*

a/b 1:18000

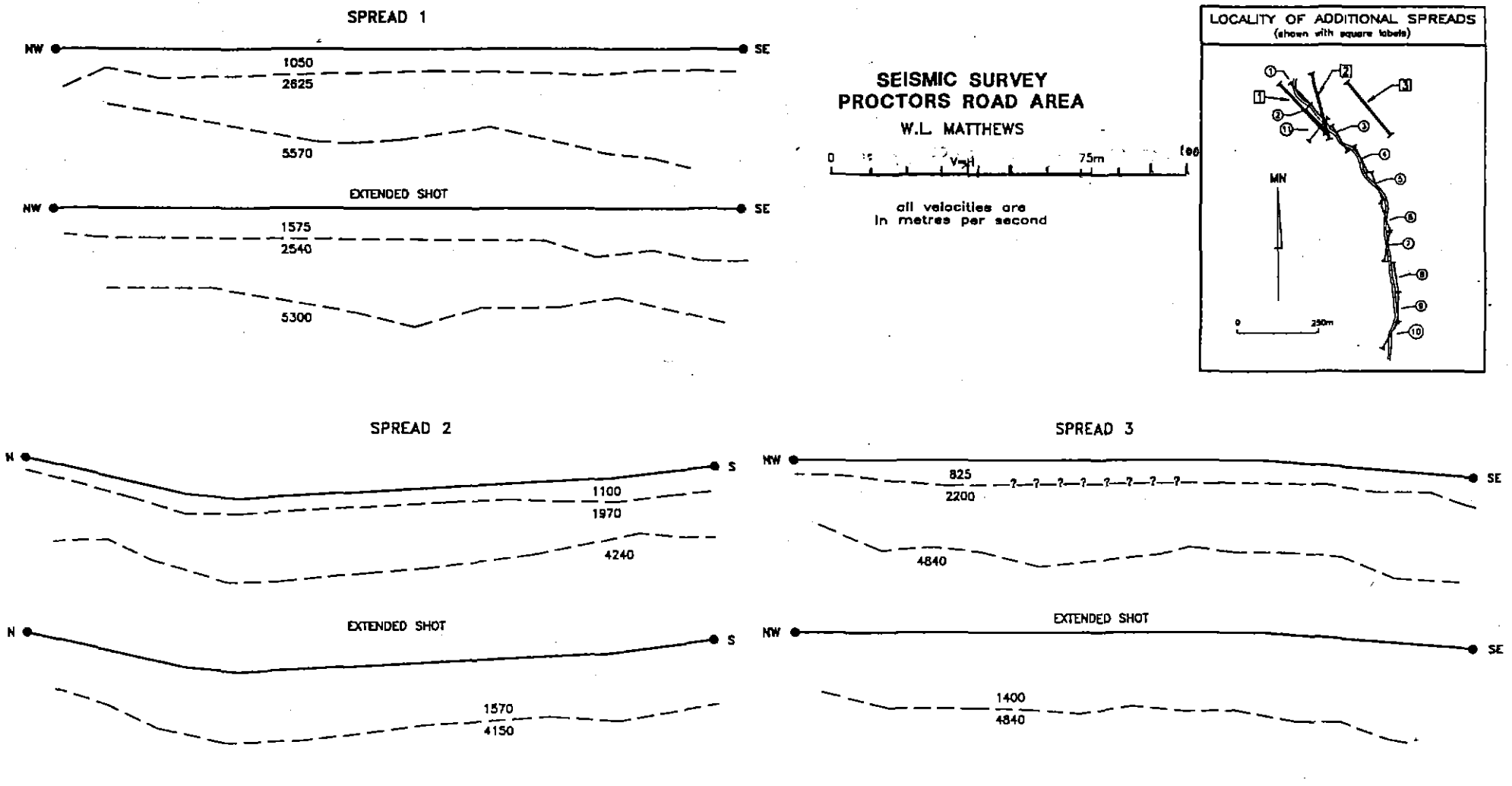


Figure 2.

APPENDIX 1

Time/distance data

Spread 1

Geophone	Time (m/sec)	Distance (m)
North-west end		
0	-	0
1	14	15
2	26	30
3	28	45
4	32	60
5	34	75
6	41	90
7	42	105
8	44	120
9	47	135
10	54	150
11	56	165
12	59	180
South-east end		
0	-	0
1	16	15
2	22	30
3	29.5	45
4	34.5	60
5	40.5	75
6	45	90
7	51	105
8	51	120
9	53.5	135
10	56.5	150
11	60	165
12	61	180

Extension shot

North-west end		
0	-	0
1	26	45
2	32	60
3	35	75
4	38	90
5	40	105
6	45	120
7	49	135
8	50	150
9	53	165
10	55	180
11	59	195
12	64	210
South-east end		
0	-	0
1	32	45
2	36	60
3	43	75
4	45	90
5	50	105
6	52.5	120
7	59	135
8	57	150
9	60	165
10	65	180
11	66	195
12	66	210

Spread 2

Geophone	Time (m/sec)	Distance (m)
South end		
0	-	0
1	17	15
2	25	30
3	31	45
4	37	60
5	42	75
6	48	90
7	50	105
8	55	120
9	61	135
10	61	150
11	61	165
12	63	180
North end		
0	-	0
1	14	15
2	21	30
3	31	45
4	37	60
5	41	75
6	44	90
7	45	105
8	49	120
9	52	135
10	57.5	150
11	58	165
12	62	180

Extension shot

South end		
0	-	0
1	35	45
2	40	60
3	45	75
4	45	90
5	50	105
6	55	120
7	60	135
8	62.5	150
9	69	165
10	69	180
11	69	195
12	69	210
North end		
0	-	0
1	26	45
2	31	60
3	38.5	75
4	43	90
5	45	105
6	48	120
7	50	135
8	52.5	150
9	55	165
10	59	180
11	64	195
12	67.5	210

Spread 3

Geophone	Time (m/sec)	Distance (m)
East end		
0	-	0
1	19	15
2	30	30
3	34	45
4	42.5	60
5	48	75
6	52	90
7	52	105
8	58	120
9	59	135
10	63	150
11	64	165
12	65	180
West End		
0	-	0
1	17	15
2	28	30
3	36	45
4	40	60
5	46	75
6	48	90
7	50	105
8	53	120
9	60	135
10	61	150
11	66	165
12	70	180

Extension shot

West End		
0	-	0
1	32	45
2	42?	60
3	44?, 56?	75
4	47	90
5	52	105
6	56	120
7	56	135
8	62	150
9	64	165
10	70	180
11	70	195
12	80	210

APPENDIX 2

DRILLING RECORD

A.M.G. Co-ordinates of Holes

and

Mineralogy of Samples (R. Bottrill)

Percussion Drilling Record E.L.110/87

B.H.No.	Depth (m)	Penetration Time (Min)	Sample No.	Remarks	Estimated Fresh Rock %
1	0-3	3	1		0
	3-6	3	2		0
	6-9	3	3		0
	9-12	3	4		0
	12-18	5	5		10
	15-18	6	6		50
	18-21	8	7		75
	21-24	5	8	Rods slightly wet at end of	95-100
	24-27	7	9	drilling. (Thin section)	"
	27-30	-	10		"
2	0-3	2	1	Weathered rock fragments	5
	3-6	4½	2		10
	6-9	5	3	Blue grey hornfels (?)	20
	9-12	6½	4	(thin section) with some weathered fines becoming less towards bottom of hole.	50
	12-13½	-	5	Bitjammed. Lost bit and rods. Hole abandoned	50
3	0-3	2½	2	Log same as B.H.No.2	0
	3-6	3½	2		0
	6-9	3½	3		0
	9-12	4	4	Bit jamming throughout run	10
	12-15	7	5	Bit jamming at 15. Hole (Thin section) abandoned at 15m with no loss of equipment	10
BHs 1-3 were acid reactive, i.e. contained calcite - the hornfels less so. Thin sections for mineralogical examination.					
4	0-3	4	1		0
	3-6	5	2		10
	6-9	5½	3		30
	9-12	6	4	Some fragments containing slightly pink feldspar (iron stained) due to weathering effects presumably on joint surfaces.	75
	12-15	11	5		95-100
	15-18	10	6		"
	18-21	9½	7		"
	21-24	15½	8		"
	24-27	12	9		"
	27-30	13½	10		"
5	0-3	10½	1		20
	3-6	7	2		25
	6-9	5	3		30
	9-12	13½	4	Fresh dolerite below 11m	40
	12-15	14	5		80

	15-18	16½	6		90
	18-21	16	7		80-90
	21-24	17	8		90
	24-27	16½	9		95
	27-30	15	10		100
6	0-3	4	1		0
	3-6	4	2		10
	6-9	5	3		10
	9-12	3½	4		10
	12-15	8½	5		80
	15-18	10	6		95-100
	18-21	11	7		"
	21-24	11	8		"
	24-27	17	9		"
	27-30	13	10		"
7	0-3	5	1		10
	3-6	4	2		10
	6-9	7½	3		30
	9-12	12	4		80
	12-15	16½	5		95-100
	15-18	14	6		"
	18-21	17	7		"
	21-24	13	8		"
	24-27	19½	9		"
	27-30	24	10		"
8	0-3	3	1		0
	3-6	4½	2		0
	6-9	5	3		0
	9-12	6	4		30
	12-15	13	5	Change to fresh dol. at 13m	80
	15-18	14½	6		100
9	0-3	2½	1		0
	3-6	4½	2		10
	6-9	5	3		10
	9-12	4½	4		5
	12-15	6	5		0
	15-18	5½	6		5-10
	18-21	9½	7	Change to 100% fresh rock at 19m	100
	21-23	6½	8	Rods jamming at 23m.	100
10	0-3	3½	1		0
	3-6	9	2		0
	6-9	5½	3		10
	9-12	4½	4		5
	12-15	4½	5		5-10
	15-18	9	6	Change to 100% fresh rock at 16m	85
	18-21	16½	7	Slight weathering 19-20m.	100

A.M.G. Co-ordinates of Percussion Drill Holes

	m East	m North
1.	524340	5244720
2.	524480	5244860
3.	524490	5245040
4.	524490	5245150
5.	524620	5245230
6.	524380	5245510
7.	524350	5245590
8.	524510	5245600
9.	524500	5245480
10.	524570	5245340

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DEPARTMENT OF MINES

TASMANIA

Head Office:
Gordons Hill Road,
P.O. Box 56,
ROSNY PARK 7018

Enquiries: R. Bottrill
Phone: 30 8359
Your ref.:
Our file: RB1(6):AT

23 MAY 1989

Mr V. Threader
43 Kingston Heights
KINGSTON BEACH TAS 7050

Dear Sir,

MINERALOGY OF PERCUSSION SAMPLES
SOUTHERN OUTLET

Eight samples from percussion drilling on the Southern Outlet dolerite prospect were submitted for identification of rock type and carbonate content. Samples 1/7, 2/4 and 3/5 consisted of about 5-15 mm sized rock particles, and samples 6/8, 6/10, 7/5, 7/6 and 7/7 consisted of -5 mm rock dust. All samples showed some reaction to 2M HCl, indicating a significant calcite content.

Samples 6/8, 6/10, 7/5, 7/6 and 7/7 were examined by X-ray diffraction and all found to contain feldspar, quartz and pyroxene. This would more likely indicate a silicic granophyre than a hornfelsed sediment. No carbonates could be identified.

Samples 1/7, 2/4 and 3/5 were prepared as thin sections G400392 to G400394, and all contain sections of between five and nine rock chips. These rock chips invariably contain a number of alteration minerals, including calcite, limonite, chlorite, and unidentified phyllosilicates and clays, between two and 10% of the rock. Most of the rocks are medium grained granophyric dolerites, and textures indicate that much of the alteration may be deuteric, related to late stage crystallisation of volatile-rich magma in the upper part of the chamber, possibly reacting with, and incorporating some of the wallrocks. In some rocks, for instance, some of the pyroxenes have altered to fine to medium grained magnetite and phyllosilicates, while plagioclase exhibits ubiquitous but minor alteration to medium-grained calcite.

In conclusion, all the samples are probably representative of deuterically altered granophyric dolerite.

Please find enclosed Invoice No. 17691 for $270.00 for five XRD analyses and three thin sections and brief petrological descriptions.

Yours faithfully

R. Bottrill
MINERALOGIST/PETROLOGIST

Encl.

APPENDIX 3

1. Production of Crushed Dolerite and Basalt in the Hobart Area 1961-90

2. Growth trends in Production

Crushed Dolerite and Basalt Production in the Hobart Area

Year	t.p.a.
1961	221880
1962	240210
1963	376162
1964	338934
1965	398354
1966	682200
1967	579670
1968	601784
1969	659220
1970	811050
1971	1082160
1972	922398
1973	950914
1974	765636
1975	892294
1976	933770
1977	950722
1978	1035180
1979	880466
1980 (Jan–June)	672795

Year	t.p.a
1980–1	899322
1981–2	973701
1982–3	1171276
1983–4	890063
1984–5	985389
1985–6	1095898
1986–7	1071224
1987–8	856979
1988–9	1323671
*1989–90	1367218

* 6 month data x2 to give total production to June 1990

Mean Annual Growth Rates:

1961–1990	+7%
1961–1971	+12%
1971–1974	-9%
1974–1990	+4%

Trends in Production of Crushed Dolerite and Basalt

Production data of crushed rock production in the Hobart area (Appendix 3) indicate a growth rate of 14% during the 60s and early 70s followed by a three year period of negative growth and finally an average growth of 4% over the last 16 years.

If the last growth rate is calculated to include the period of negative growth, i.e. 1971-1990 the growth is 2%.

The following estimates of production over periods of 25 and 100 years are based on a 2% to 5% growth rate using the compound interest formula: $Pn = P(1 + r)^n$, where P = production in the base year, Pn = production in the year n, r = growth rate and n = number of years.

	1990	2015				2090			
		2	3	4	5	2	3	4	5
Production of crushed Basalt and Dolerite in Hobart area 10^6t	1.37	2	3	4	5	10	26	69	180
Total production 10^6t	1.37	44	50	57	65	428	832	1356	3576

This table indicates the predicted annual production in

1) 25 years from now (year 2015)

2) 100 years from now (year 2090)

for growth rates of 2% to 5% and

3) the total production during those two periods at those growth rates.

Summons (1981) estimated that the reserves of the major producers would be exhausted by 2025 if the growth rate of 5% (measured between 1974 and 1980) continued. The growth rate from 1980 (the latest data available to Summons) to 1990 is 4%, which would suggest that

Summons' predictions may be close to reality.

Summons' projections were calculated from a total reserve (of the major producers) of 47 x $10^6 m^3$ in 1980, assuming a 90% recovery of premium grade crushed rock and a density factor of 2.9, this converts to 122 x 10^6 tonnes in 1980 which has reduced by 11 x 10^6 to 111 x 10^6t in 1990.

The reserve in the E.L. area has been estimated to be 17 x 10^6t of premium grade crushed rock, which is equivalent to 10 years production thereby nearly compensating for the last 11 years production and leaving reserves to be exhausted in 30 years' time as before.

The population of Hobart (and other Tasmanian population centres) has remained relatively static over the study period* and the growth rate in production of quarry products is probably due mainly to an increase in per capita consumption. If the per capita consumption declines then a 4% growth rate in production can only occur if there is a significant rise in population - or an increase in capital works.

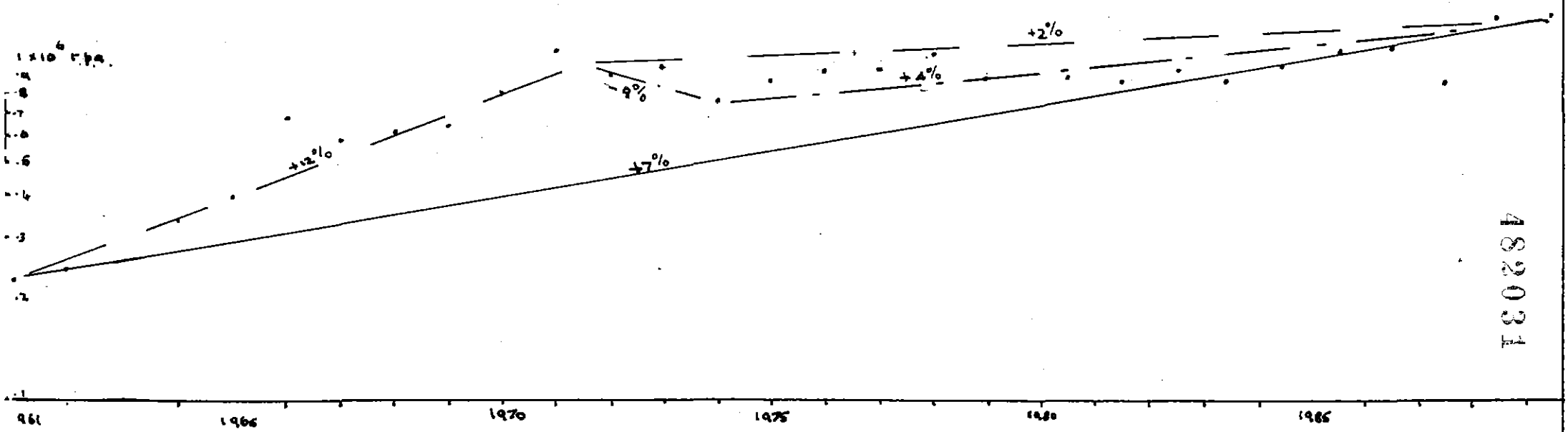
A 4% growth cannot therefore be assumed with any certainty, but the possibility of even a 4% growth cannot be ignored nor can the planners afford to be satisfied with less than 100 years' reserves, and that means thousands not tens of millions of tonnes supply.

This is a matter which has been examined before: Leaman (1975), Threader (1976) and Summons (1981), all with similar predictions, but there is still no long-range planning for extractive industries in any of the population centres.

* (According to the most recent census data there has been a 1.03 growth rate in the population of Greater Hobart during the six-year period 1981-1987)

PRODUCTION OF CRUSHED DOLERITE & BASALT

IN THE HOBART DISTRICT (1961 - 1990)



MAY 1990

031

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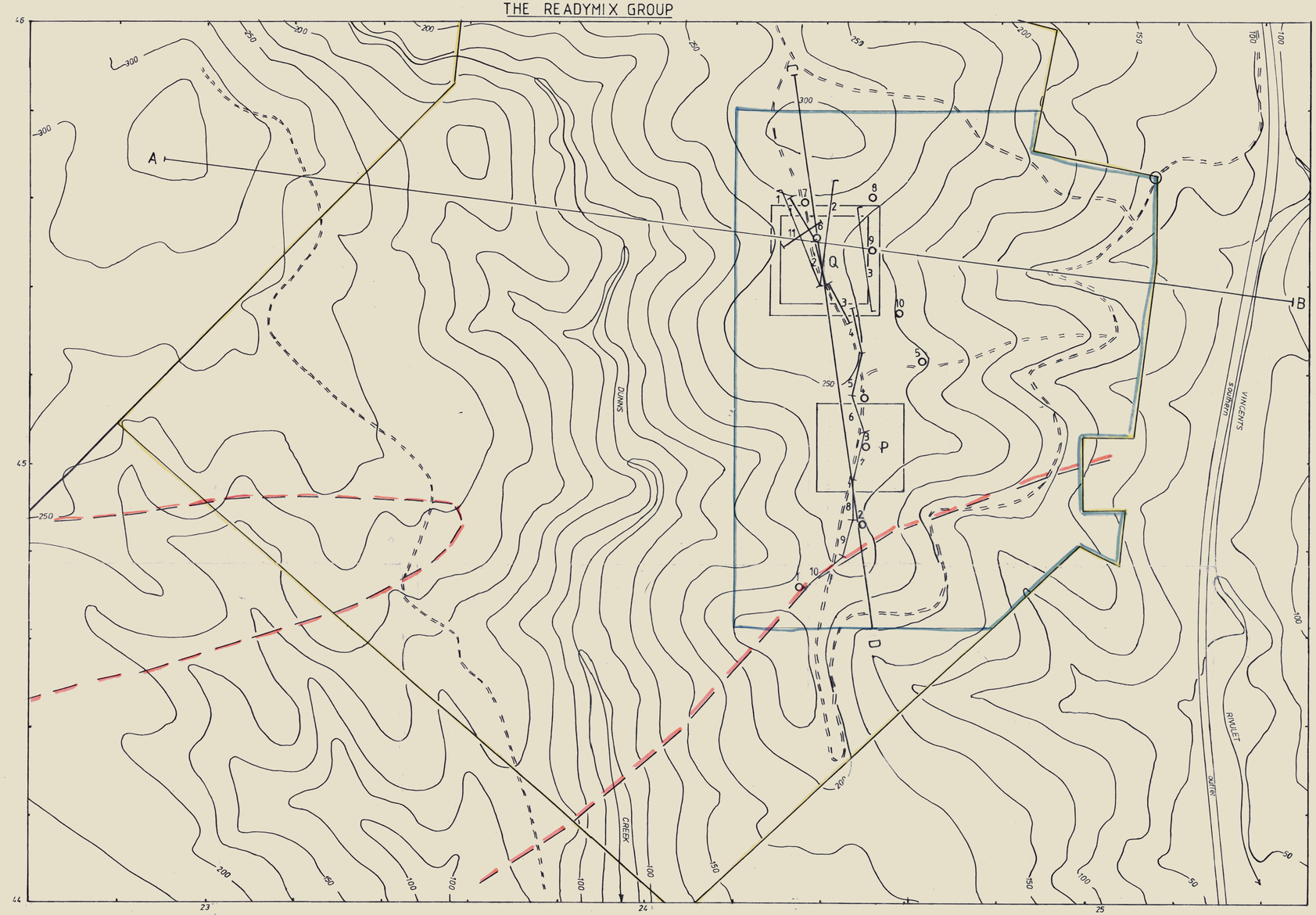
FIGURE 1

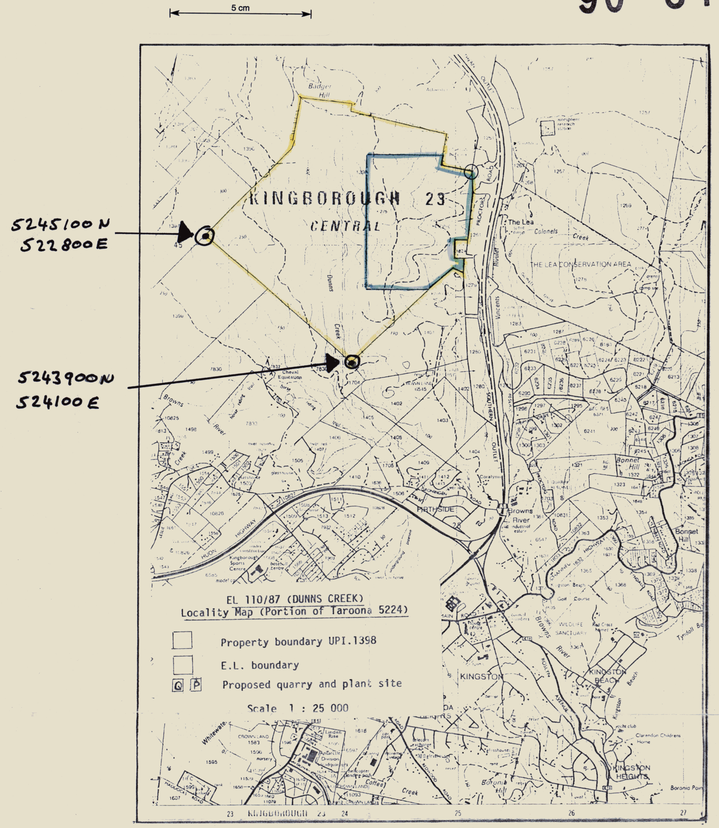
90-3134.

EXPLORATION LICENCE 110/87 DUNNS CREEK

THE READYMIX GROUP

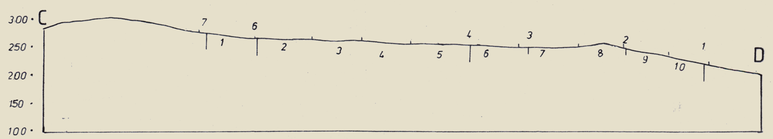
AMG REFERENCE POINTS ADDED





0 500m 1km

Scale V&H



LEGEND

- EL/MLA boundary
- Vehicular track
- Property boundary
- 300 Contour
- Watercourse
- A—B Section Line
- Percussion Drill Hole
- Proposed quarry Q and plant P site
- Dolerite/Sedimentary boundary
- 200m AMG co-ordinates
- 2 Seismic line (7.5 geophone spacing)
- 1 - - - (15m - - -)
- Marking out Notice MLA 1414P/M

MAY 1989/90

VIC THREADER AND ASSOCIATES PTY. LTD.