

RETENTION LICENCE APPLICATION
EL24/88-CHAMPION ROAD
MINERAL HOLDINGS AUSTRALIA PTY LTD

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Completed Application Form R1

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INTRODUCTION. EL24/88 has been prospected for fine silica sand from 1988 to 1996.

The main features of this exploration were the sampling of excavator pits on Champion Road (Areas 1 & 2) and the sampling of excavator pits 300m to the SW .(Areas 3 & 4 which are actually one deposit cut by a small gully)

<i>IN SITU</i> RESERVES: (Estimate by polygonal method)				
PIT No	AREA SM	THICKNESS.	VOLUME	Fe ₂ O ₃
<u>AREAS 1 & 2</u>		SM	CM	ppm
1	300	5.7	1710	292
2	600	5.9	3440	93
3	1800	5.8	10440	107
4	1800	3.4*	6120	57
5	700	1.7*	1190	143
6	800	2.9*	2320	50
7	600	2.0	1200	64
8	600	3.9	2340	128
9	300	8.7*	2610	186
10	300	2.0	600	
11	300	5.0*	1500	
13	500	3.3*	1650	42
14	1100	2.5	<u>2750</u>	

Total: 37,800

The *in situ* reserve would be approximately doubled if all of the material under and south of Champion Road was included in the estimate .

AREAS 3 & 4

1	400	6.3*	2500	235
2	500	6.0*	3000	95
4	570	5.0*	2850	245
6	714	5.9*	4213	15
10	480	5.8*	2784	20
12	600?	5.0*	<u>3000</u>	20

Total: 18347

Pit No.12 is in Area 4.

* Pit still in silica sand at limit of machine. The full *in situ* reserves are therefore unknown but larger than the above estimate.

The combined (Areas 1-4)reserve is 56147 CM or 90,000t (using a tonnage factor of 1.6 *in lieu* of a known bulk density factor which has yet to be determined)

The *in situ* reserve estimate of 56,147 CM has been calculated by applying polygons of influence to each measured sand thickness given in the logs in Tables 1 & 2 ; the estimate qualifies as a measured reserve in accordance with established procedures (AIMM 1992). As the density factor has not been determined the above tonnage does not so qualify in the strictest sense but 1.6 is a generally used factor in the industry and the actual figure is not expected to deviate significantly from that.

MINING AND TREATMENT METHODS: The material will be won by open pit and mining recovery is estimated at 90%; a higher recovery rate may be achievable but could lead to excessive contamination.

The operation would require stripping of vegetation and soil over a sufficient area to expose the sand deposit and to allow space for stockpiling .

Treatment would consist of coarse screening on site and washing , screening and drying at the Index Minerals plant, Heybridge. This plant was set up to process fine silica sand (silica flour) from Corinna. The size range of the product is -250 to +30um (maximum content of -30 um <16.5%). This results in a further reduction of 40%. The total recovery is therefore estimated to be 50%.

Mining and processing of a 100t. sample would allow a truer estimate to be made of both mining and treatment recovery.

RECOVERABLE RESERVES: A 50% recovery reduces the estimated 90,000 to 45,000t.

.PRODUCT SPECIFICATION: The products at the top end of the silica sand market are given in the specifications designated 75/75 and 75/150 on the following two pages. Only a small proportion of the Champion road deposit would meet these limits but there is a range of products with less stringent requirements for which these deposits could be suitable, if sufficient high grade sand can be produced to carry the extraction of the lower grade material.

INFRASTRUCTURE REQUIREMENTS: Areas 3 & 4 are situated in natural forest and would require 900m of access road to be constructed. The construction cost for this road is \$30,000 based on road costs in similar conditions elsewhere in northwest Tasmania. Areas 1 & 2 are situated on Champion Road which is a disused all- weather, metalled , logging road and as such has no special access requirements.

ENVIRONMENTAL FACTORS: The deposits occur within State Forest and the vegetation is composed of mixed eucalypt and rain forest species . The 1 & 2 areas have been recently logged and are quite severely degraded. The operation would therefore not be environmentally damaging.

Area 3 has been partially burnt and is also substantially degraded .

Area 4 is undamaged native forest.

The principal environmental concerns would be the road construction necessary to gain access to 3 & 4 and rehabilitation of worked out areas. If the access route and its

construction is approved by Forestry Tasmania, maintained in accordance with the Forest Practices Code and rehabilitated when the operation has been completed, no lasting damage will ensue.

ESTIMATES OF WORKING COSTS: A budget estimate of \$24/t (following page) has been made by Index Minerals which embraces the operating costs at the mine, transport to plant and royalties. Road construction and rehabilitation would be additional costs and the deposit at Areas 3 & 4 needs to be of sufficient size and quality to warrant this expenditure.

MARKET ASSESSMENT: The statement from Index Minerals indicates that there is a market for silica sand meeting these specifications, and correspondence with Norton Abrasives confirms that markets exist for other grades of products as well. Index have given the opinion that the sand from Areas 1 & 2 would be mined to supply these other markets if sufficient reserves of the higher grade sand at Areas 3 & 4 were proven.

PRICE AND DEMAND FORECASTS: The current price for specification sand fob at Burnie is \$160/t. and demand is steady.

CONCLUSION: Further investigation is required to 1) establish whether a viable resource exists in these areas, 2) establish markets for the range of silica sand grades that are present in these deposits 3) bulk sample for mining and treatment feasibility. These matters will be addressed if the Retention Licence is granted.

Figure 1

Locality Map E.L.24/88 Champion Road

Mineral Holdings Australia Pty.Ltd

Scale 1:250 000

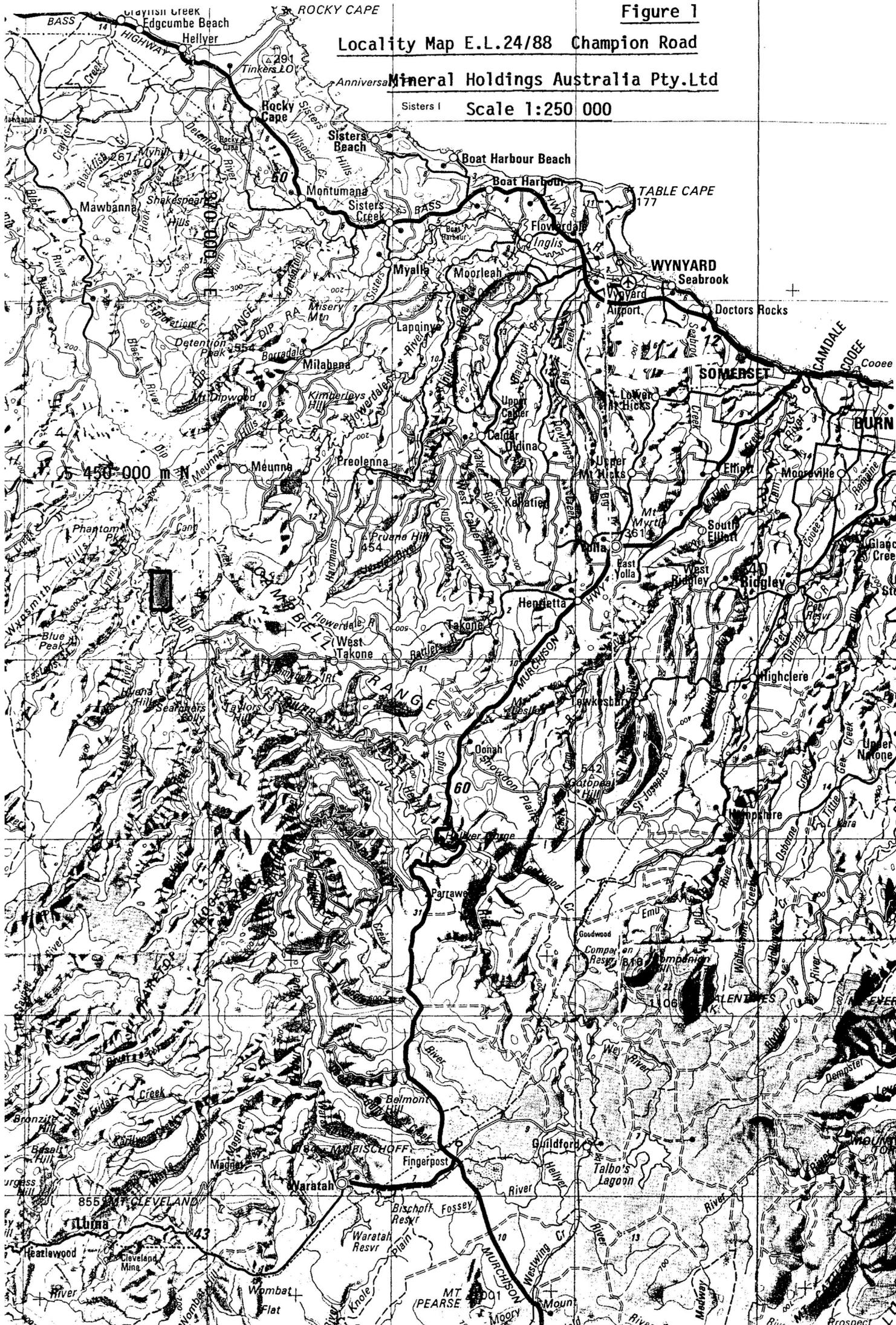
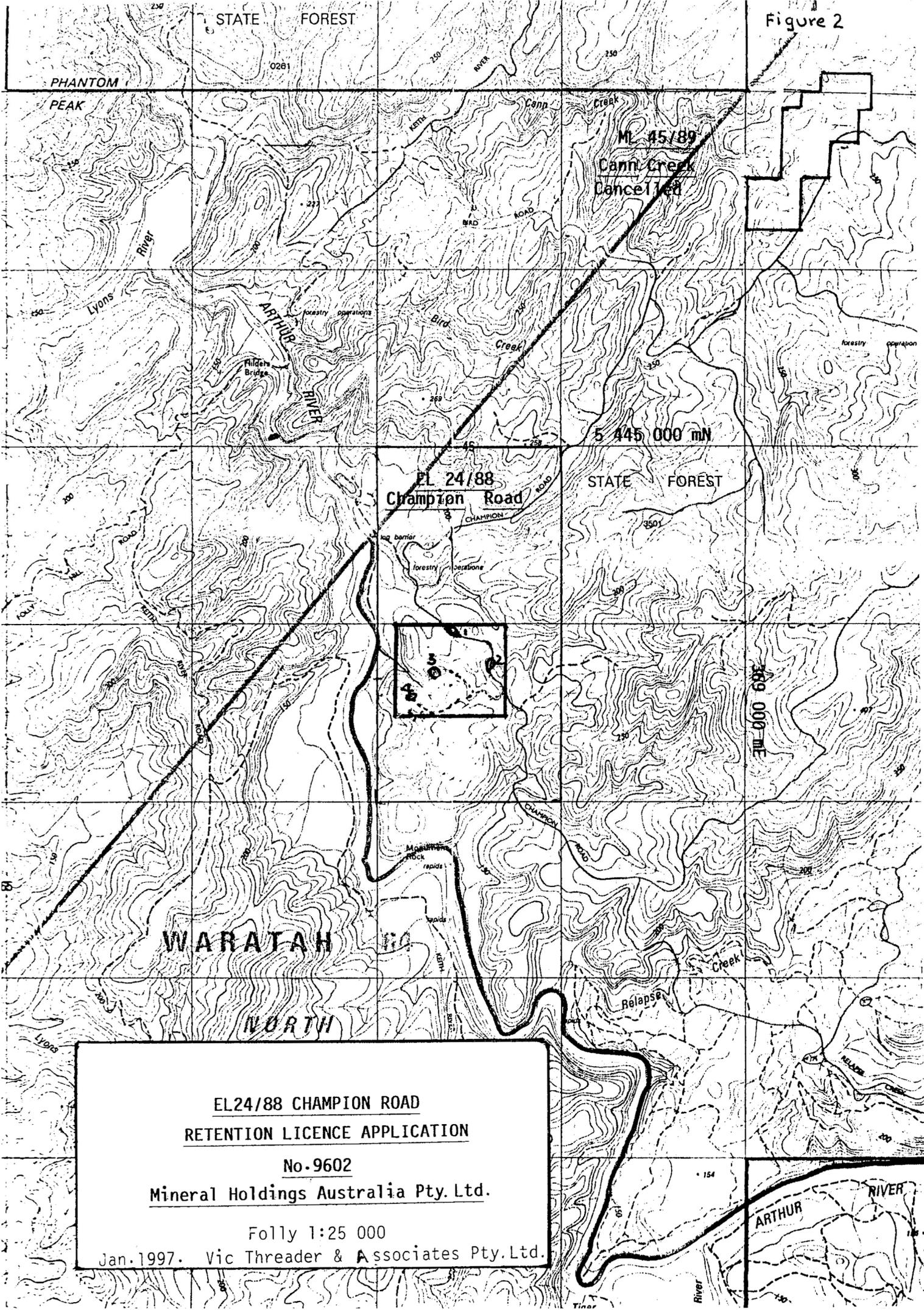
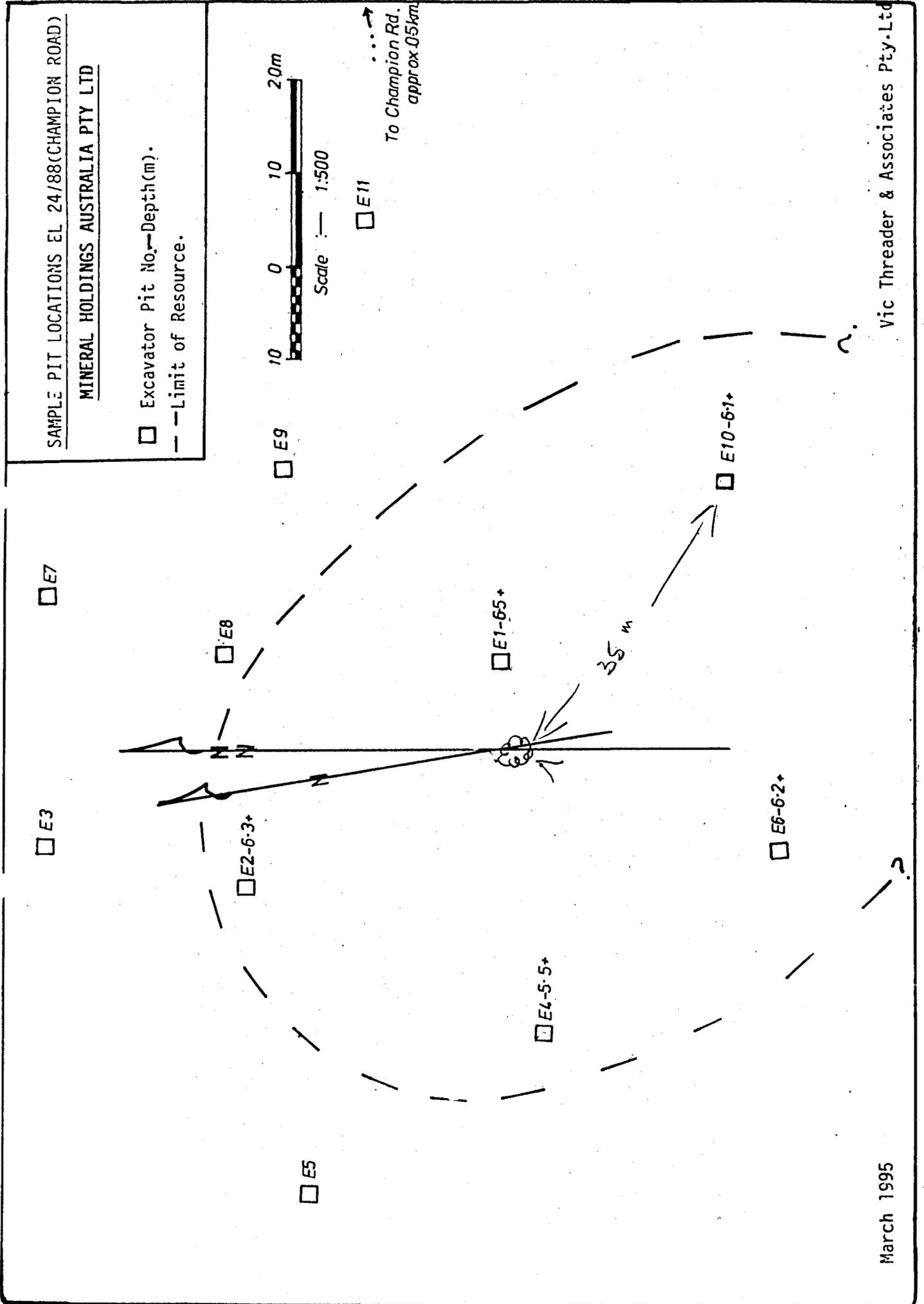


Figure 2



EL24/88 CHAMPION ROAD
RETENTION LICENCE APPLICATION
No. 9602
Mineral Holdings Australia Pty. Ltd.
 Folly 1:25 000
 Jan. 1997. Vic Threder & Associates Pty. Ltd.

Figure 4



CHAMPION ROAD SILICA FLOUR DEPOSIT

Excavator Pit Logs and Sampling Record

<u>Pit No.</u>	<u>Depth</u> (mm)	<u>Thickness</u> (mm)	<u>Log</u>	<u>Sample</u> <u>No.</u>	<u>Remarks</u>	Fe_2O_3
1	0-300 300-500	300 200	Soil Yellow clay			-
2	0-300 300-800	300 500	Soil Sand			-
3	0-300 300-6000 6000-7000	300 5700 1000	Soil Silica flour " " (discoloured)	1		2.92
4	0-400 400-6300 6300-7300	400 5900 1000	Soil Silica flour " " (discoloured)	2(1) 2(2)	Stopped in SiF at limit of machine	93
5	0-300 300-6100	300 5800	Soil Silica flour	3	- do -	107
6	0-300 300-3700	300 3400	Soil Silica flour	4	Slight pink colouration. Stopped in SiF due to hardness of ground	57
7	0-300 300-2000 2000-2500	300 1700 500	Soil Silica flour Black clay	5	Contains quartz pebbles near top	143
8	0-300 300-3200	300 2900	Soil Silica flour	6	Stopped in SiF, too hard to dig	50
9	0-300 300-800 800-2300	300 500 1500	Soil Silica flour " "	7	In road cutting Dug in drain i.e. below road level. (Still in SiF too hard to continue)	64

The 2 areas of Champion Road are estimated to contain around 90000m³, based on the following data:

	<u>Area</u>	<u>Mean thickness</u>	<u>Volume (m³)</u>
Northern deposit	12000m ²	3.5m	42000
Southern deposit	8000m ²	6.5m	52000
			94000

Re-Sampling of Silica Flour at Champion Rd (7 Feb. 1991)

Seven pits were excavated and sampled and an additional six pits were excavated on the margins of the silica flour deposits but were not considered to be within the economic limits of the deposit and were not sampled. All these pits are shown on the attached map. Samples CR 8, 9, 10, 11 and 12 were sent to M.K. Silica for analysis. Samples CR 8, 11 and 14 were sent to Analabs for check analysis and cemented or silicified material from samples CR 8, 9, 10, 11, 12, 13 and 14 were sent to Temco for evaluation.

Sample No.	Depth (m.)		Thickness (m)	Log	Cementation	* Fe ₂ O ₃
	From	To				
CR 8	0	0.3	0.3	Soil		
	0.3	4.2	3.9	Silica flour	10%	128
	4.2	4.5	0.3	Brown clay		186
CR 9	0	0.3	0.3	Soil		186
	0.3	9.0	8.7	Silica flour (not bottomed)	nil	172
CR 10	0	1.0	1.0	Soil & silica flour (previously stripped)		
	1.0	3.0	2.0	Silica flour (variably ironstained 1000-3000mm)	20% hard	
CR 11	0	0.5	0.5	Soil & silica flour (previously stripped)		
	0.5	5.5	5.0	Silica flour (abandoned due to caving)	35% "	
CR 12	0	0.3	0.3	Soil		
	0.3	2.0	1.7	Sand & silica flour	20% hard	
	2.0	2.2	0.2	Clay		
CR 13	0	0.3	0.3	Soil		42
	0.3	3.3	3.0	Silica flour (needed ripping)	20% soft	143
CR 14	0	1.0	1.0	Heaped soil (roadside)		
	1.0	3.5	2.5	Silica flour	20% soft	
	3.5	3.7	0.2	Brown clayey sand		

* upper Sieve : - 75 μ m
 lower Sieve : - 250 μ m + 75 μ m

APPENDIX 2

EXCAVATOR PIT LOGS EL24/88(CHAMPION ROAD) MARCH 1995				GRAIN SIZE ANALYSES:CUMULATIVE PERCENTAGES AT THE FOLLOWING SCREEN SIZES (µm.)									
PIT No.	DEPTH (m)		THICKNESS (m)	LOG	Fe ₂ O ₃ (ppm)	425	300	250	212	150	106	75	-75
	FROM	TO											
E1	0	0.20	0.20	Red soil									
	0.20	6.50	6.30	White silica flour 235 containing angular quartz fragments(50mm.)	24.6	27.6	29.4	31.3	34.0	37.2	41.4	58.8	
E2	0	0.30	0.30	Black soil									
	0.30	6.30	6.00	White silica flour 95	32.4	34.4	35.6	37.0	39.7	43.0	47.3	52.8	
E3	0	0.30	0.30	Soil									
	0.30	1.30	1.00	Gravel									
	1.30	3.50	2.20	White to dirty white silica flour containing 1m.diam.clay pod.									
E4	0	0.50	0.50	Soil	22.6	25.0	26.4	28.1	30.6	33.7	35.4	64.6	
	0.50	5.50	5.0	White silica flour 245									
E5	0	0.50	0.50	Soil									
	0.50	2.80	2.30	Grey quartz gravel, in part iron stained and containing pods of brown clay.									
E6	0	0.30	0.30	Soil	42.8	47.5	50.1	52.7	56.2	60.2	60.5	39.5	
	0.30	6.20	5.90	Hard white silica flour becoming harder at bottom of pit.	15								
E7	0	0.40	0.40	Red soil									
	0.40	4.00	3.60	Iron stained quartz gravel containing clay pods									
	4.00	4.50	0.50	White clay									
E8	0	0.20	0.20	Red soil									
	0.20	1.00	0.80	Coarse grained, iron stained gravel (up to 200mm.)									
E9	0	0.30	0.30	Soil									
	0.30	3.50	3.20	Iron stained silica flour containing brown clay pods.									
E10	0	0.30	0.30	Red soil									
	0.30	6.10	5.80	Soft white silica flour 20	30.9	34.4	36.23	38.1	40.8	44.0	47.9	52.1	
E11	0	1.00	1.00	Coarse gravel sandstone									
	1.00	1.50	0.50	Yellow clay									

Re Sampled Core by Martin Meneke October 1986.

3.
PARTICLE SIZE DISTRIBUTION

Diam.	1		2		3		4		5	
	%Ret	Cum%	%Ret	Cum%	%Ret	Cum%	%Ret	Cum%	%Ret	Cum%
+425	33.3	33.3			26.4	26.4				
+300	3.0	36.3			3.7	30.1				
+250	1.2	37.8	5.7	5.7	2.0	32.1				
+212	1.4	39.2			1.0	33.3	0.8	0.8		
+150	3.0	42.2	5.8	11.5	3.1	36.4	4.2	5.0		
+106	5.1	47.3			3.5	39.9	12.5	17.5	0.2	0.2
+ 75	5.2	52.3	29.8	52.6	4.8	44.7	17.3	34.8	2.1	2.3
+ 60									7.7	10.0
+45	17.0	69.5	8.4	<u>61.0</u>	21.11	<u>65.8</u>	42.2	<u>77.0</u>	31.5	41.5
-45			39.0	<u>100.0</u>	34.2	<u>100.0</u>	23.0	<u>100.0</u>		
+ 38	17.0	<u>69.5</u>								
-38	30.5	<u>100.0</u>								
+ 30									42.0	<u>83.5</u>
- 30									16.5	<u>100.0</u>
<u>Summary</u>										
+250		37.8		5.7		32.1				
-250+75		14.7		46.9		12.6		34.8		2.3
-75		47.5		47.4		55.3		65.2		97.7
Total		<u>100.0</u>		<u>100.0</u>		<u>100.0</u>		<u>100.0</u>		<u>100.0</u>

Key to sample numbers:

1. Mean grain size distribution from 20 sample pits (TCR 89-3030 & 92-3324)
2. Screen analysis of grab sample reported by Gwalia Group (1991)
3. Average screen analysis of composite test pit samples No. 8 to 14 by M.K. Silica.
4. Specification 75/150. (95% passing 100 mesh ie. 150µm.)
5. Specification 75/75. (95% passing 200 mesh ie. 75µm.)

Figure 5

Figure 5

Figure 3

