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22 MAY 1984
DEPT. OF MINES
5074/84.

THE SHELL COMPANY OF AUSTRALIA LIMITED

METALS DIVISION

SUMMARY OF GEOPHYSICAL SURVEYS IN 1982
ON THE MOINA - HOUSETOP J.V. AREA
N.W. TASMANIA

MICROFILMED

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MQ00/1008	N.W. Tas St. Valentines Bouguer Gravity C.I. = 2·5 mgal (2 copies)

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HELL 100%

1	BORRADAILE PLAINS	E L	22/80
2	MOLE CREEK	E L A	

OINA J.V.

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MARIONOAK J.V.

9	MARIONOAK	E L	22/74

GRANITE TOR J.V. x

10	GRANITE TOR	E L	2/78

+	DEVONIAN	Granite
▨	PRECAMBRIAN	Sediments
☐	CAMBRIAN TO RECENT	Volcanics & sediments

● EXPLORATION BASE

E.L. BOUNDARY

SHELL COMPANY OF AUSTRALIA

METALS DIVISION

North - West Tasmania

Location Map

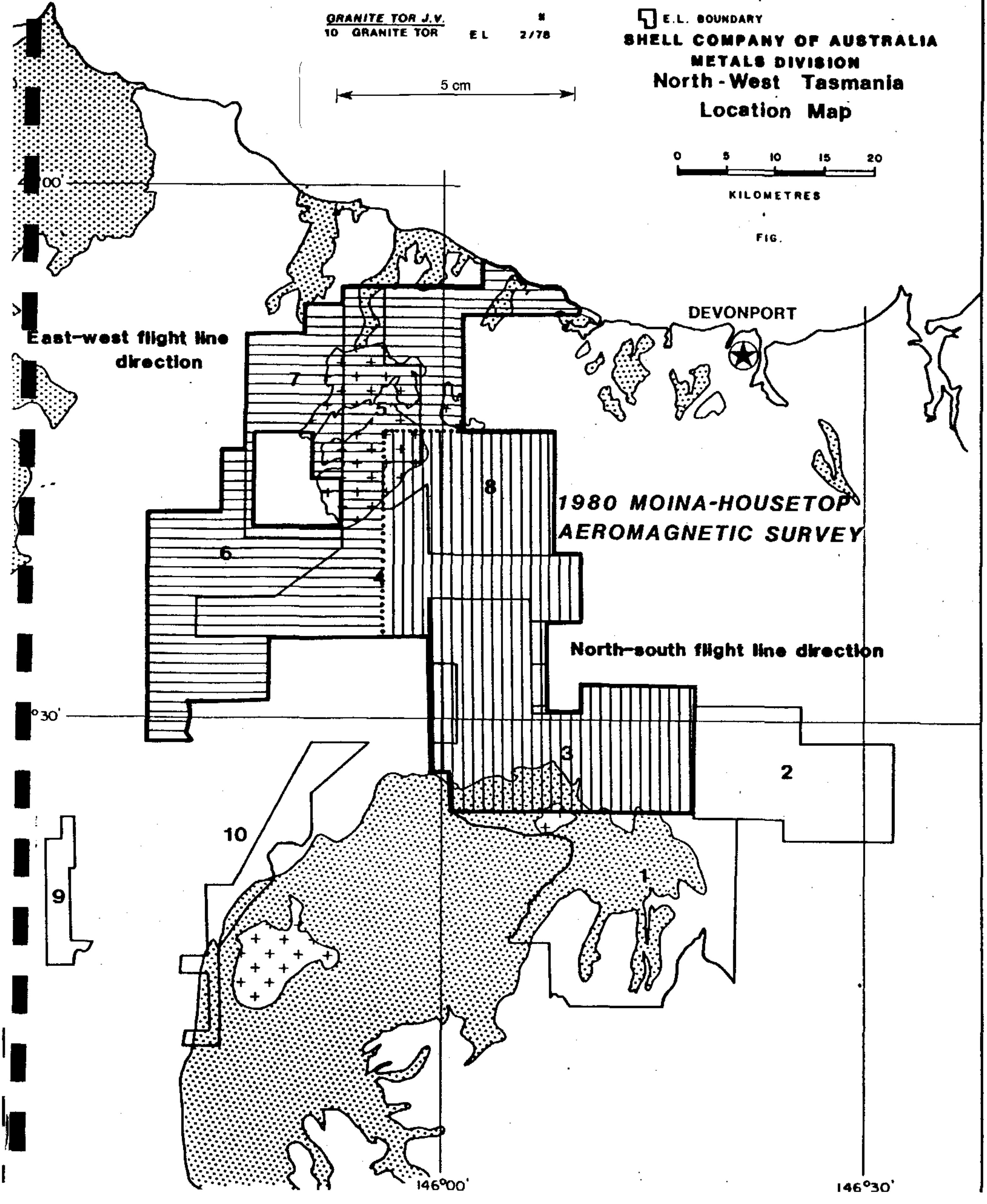

FIG.

1.0 Aeromagnetics

1.1 Rock Properties

The rock types seen by aeromagnetics tend to fall into four classes: basalt, magnetite skarn, Cambrian volcanics and non-magnetic (sediments and granite). A separate class for pyrrhotite skarn has not been included, as I suspect that the zones of magnetite at Natone control the character of its magnetic anomaly.

Tertiary basalt typically has a susceptibility in the range 200 - 800 x 10^{-6} cgs units. 31 samples, from 13 locations (including Marrawah), have been tested for remanence, and in all cases the remanent component of magnetization exceeded the induced component. The Koenigsberger ratio ranged from 1 to 71, with a mean value of 18. The remanent magnetization is either parallel or anti-parallel to the present magnetic field (i.e. normal or reversed polarity), to a good approximation, hence a pseudo-susceptibility may be used in modelling.

The susceptibility of magnetite skarn is of the order of 40,000 x 10^{-6} cgs, for bulk samples (e.g. from modelling at Kara). Susceptibilities of >100,000 x 10^{-6} have frequently been measured. Five samples from Moina and one from Kara all yielded significant remanent components (Koenigsberger ratios of 0.47 to 5.9). The remanent magnetization is not parallel to the present-day magnetic field, so remanence should be included in modelling. At Moina the remanent component is inclined roughly 30° (upwards pointing) to 270°. At Kara, it is inclined 45° (upwards pointing) to 060° (very rough orientation only, and not enough samples to give great confidence in this direction).

Cambrian volcanics typically have susceptibilities in the range 2000 - 4000 x 10^{-6} cgs units. Three samples from Loyetea gave a Koenigsberger ratio of 7, with the remanent component inclined 74° (downwards pointing) to 268°.

Granite and sediments are generally non-magnetic, for the purposes of interpreting the aeromagnetics. Garnet-diopside skarn, hornfels and other minor rock types are quite variable, but usually in the range 0 - 5000 x 10^{-6} cgs. It should be noted that the Housetop Granite generally gives susceptibilities of the order of 200 - 500 x 10^{-6} cgs (up to 1500 x 10^{-6} at Redwater), so it is not completely non-magnetic; suggesting that it is not prospective for tin mineralization. (Tin granites should tend to yield lower susceptibilities).

1.2 Follow-up as at 31/12/82

Table 1 summarizes the anomalies followed up as at 31/12/82, and lists the anomalies from Geoff Dickson's reports which remain to be considered. A total of 59 anomalies have been ground checked. A further 17 have been written off from geological or geophysical considerations, without ground follow-up. Of these anomalies, 41 are due to basalt topographic effects (either hills or basalt-filled valleys) 8 are due to magnetite skarn and 19 are due to Cambrian volcanics. Anomalies due to Precambrian sediments (Upper Stowport), magnetite in granite? (Laurel Creek North) and an ultramafic plug (Camena) have also been followed-up.

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TABLE 1

INPUT and Aeromagnetic Anomalies

(31/12/82)

MOINA E.L. 7/74 - Completed Aeromagnetic Anomalies

Anomaly	Name	Line Fiducial	Follow-up	Interpretation
4141/4		44.2695	Ground Check	Cambrian tuff
4141/5		547.2562	Ground Check	Cambrian tuff
4141/6		542.6621	Ground Check	Cambrian tuff
4239/3	Lorinna East	580.8082	Mag, gravity drilling	Basalt hill
4240/1	Gairdner Dam	553.1045	Mag, gravity drilling	Magnetite in volcanics
4240/2	Moina			Wrigglite skarn etc
4240/4	Bull Creek	571.7754	Mag.	Basalt
4240/5	Bull Creek	575.7925	Mag.	Cambrian volcanics
4240/6	Lorinna North	581.8124	Mag, drilling	Cambrian andesite
4240/7	Olivers Hill	583.8207	Mag.	Cambrian volcanics
4240/10	Lorinna West	574.7800	Mag.	?
4240/11	Wilmot Dam		Mag.	?
4240/12	Tin Spur		Mag, drilling	?
4241/10		63.894	Ground check	Basalt(?)
4339/1	Liena South	613.9687	-	Basalt(?)
4339/2	Liena	613.9695	Mag.	Basic pipe
4339/3		605.9280	Ground check	Basalt hill (stock?)
4339/5 4239/1	Lemontyme	591.8610 589.852	-	Basalt
4141/7	Alps Road	115.9959	-	Basalt
4141/9			Ground check	Basalt
4241/4		52.2219	Ground check	C volcanics/basalt

MOINA E.L. 7/74 - Uncompleted Anomalies [illegible]

4239/2
4240/3
4240/8
4240/9
4340/1
4340/2
4340/3

Ground check required

4339/4 - Modelling and max-min required

Totals:

22 anomalies finalized (incl. 4 drilled)
7 for ground check still
1 for modelling and max-min

30 anomalies considered

LOONGANA E.L. 36/79 - Completed Aeromagnetic Anomalies Shell

Anomaly	Name	Line Fiducial	Follow-up	Interpretation
4041/1		5.372	Ground check	Basalt hill
4041/2		333.2982	Ground check	Basalt
4041/3		347.	Ground check	Magnetite in tuff
4041/4		350.	Ground check	Magnetite in tuff
4041/5		345.4695	Ground check	Magnetite in tuff
4041/6		355.4579	Ground check	Basalt
4041/8			Ground check	Basalt
4041/10	Challenger I		IP, geochem.	Cambrian volcanics
4041/11	Challenger III		IP, mag. geochem	Cambrian volcanics
4042/4	Blythe River	316.1532	IP, mag. max-min	Magnetite skarn
4141/2		21.9284	Ground check	Basalt
4141/8	Tulip Creek	32.6977	Mag. geochem.	Cambrian tuff
4241/1	Nietta South	67.	Mag.	Basalt
4241/3		52.2228	-	Basalt
4241/6		58.1267	-	Basalt
4241/7		58.1262	-	Basalt
4241/8		60.1109	-	Basalt
4241/9		60.1102	-	Basalt
4241/10			-	Basalt
4241/12		72.3031	-	Basalt
4242/1		42.2420	-	Basalt

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LOONGANA E.L. 36/79 INPUT Block - Completed INPUT Anomalies SHELL

Anomaly	Name	Line Fiducial	Follow-up	Interpretation
4041/IL1		3332.66092	Max-min, mag, IP	Clay bands
4041/IL2		3191.62186	Ground check	Outside our E.L.
3941/IL3		3071.59016	Max-min, mag, IP	Clay bands
4041/IL6		3271.64227	Ground check	Clay bands
4041/IL7		3251.63774	Ground check	Clay bands
4041/IL9		3372.44556	Ground check	Clay bands
3941.IL10		3061.58705	Max-min, mag, IP	Clay bands
3941/IL11			Ground check	Clay bands

LOONGANA E.L. 36/79 - Uncompleted Anomalies

Aeromag.

4041/7 - ground check required
4041/9 - ground check required
4141/1 - Challenger II
4141/3 - ground check required
4241/2 - ground check required
4241/5 - ground check required
4241/11 - ground check required

INPUT

4141/IL4 - max-min required
4042/IL5 - additional magnetics required
4041/IL8 - max-min required

TOTALS

29 anomalies finalized (none drilled)

6 require ground check

3 INPUT anomalies require further work

1 anomaly (Challenger II) requires thought (has been drilled)

39 anomalies considered

HAYES PEAK E.L. 14/80 - Completed Aeromag. Anomalies

Anomaly	Name	Line Fiducial	Follow-up	Interpretation
4043/3	Ellis Ck. N.	243.5119	Ground check	Basalt
4044/2	Upper Stowport		Max-min, mag, drill	Magnetite in pЄ seds.

Uncompleted Anomalies

4043/2]
4044/4] ground check required

4044/3 - modelling (max-min?) required

Totals

2 anomalies finalized (1 drilled)
2 for ground check still
1 for modelling (and max-min?)
—
5 anomalies considered

014

GUILDFORD E.L. 1/76 - Completed Aeromag. Anomalies

Anomaly	Name	Line Fiducial	Follow-up	Interpretation
3840/1	Mt. Pearse E.		Magnetics	Basalt
3840/2	Mt. Pearse W.		Mag, gravity	Basalt
3841/1	Hellyer R.W.	360.	Mag, gravity max-min, drill	Basalt valley
3841/2	Hellyer R.E.	358.4390	Mag, gravity, max-min	Basalt
3842/1	Parawee	310.3410	Mag, gravity	Basalt
3842/2	Shooters Hill	319.3846	Mag, gravity	Basalt
3941/1	Talbots Lagoon	347.31865	Ground check	Basalt
3941/2	Bunkers Road	334.29095	Ground check	Basalt
3942/1	St. Valentines		Drill	Magnetite skarn
3942/2	Basils Road		Ground check	Basalt

Uncompleted Anomalies

3942/4 - Ground check required

Totals	10	anomalies finalized
	1	requires ground check
	11	anomalies considered

HIGHCLERE E.L. 4/77 - Completed Aeromag. Anomalies

Anomaly	Name	Line Fiducial	Follow-up	Interpretation
3943/1	Guide River		Mag, gravity, drill	Basalt valley
3943/2	Buckby		Mag, IP, max-min, drill	Diopside/pyrrhotit skarn
4043/1	Highclere		Mag, IP, Max-min, gravity, drill	Magnetite skarn

HIGHCLERE INPUT Block - Completed INPUT Anomalies

Anomaly	Name	Line Fiducial	Follow-up	Interpretation
3943/IH1		2271.54582	Ground check	Clay bands
3943/IH2		2271.54604	Ground check	Clay bands
3943/IH2A		2231.54040	Ground check	Clay bands
4043/IH3	Highclere	2271.54664	Mag, IP, gravity, drill	Magnetite skarn
3943/IH4		2221.53468	Mag, IP, Max-min	Clay bands
3943/IH5	Guide R. N.	2211.52986	Mag, IP, Max-min geochem.	pC shales
4043/IH7		2091.39280	Ground check	Clay bands
3943/IH10	St. Josephs R.	2061.38435	Mag, IP, max-min	Clay bands
4043/IH9	Falls Road	2061.38305	Mag, IP, max-min	Clay bands

HIGHCLERE E.L. - Uncompleted Anomalies

Aeromag.
3944/1]
3944/2]
3944/3] - ground check required
3944/4]
3944/5]

INPUT
3943/IH6]
3943/IH8] - max-min required (very low priority)

Totals		
	12	anomalies finalized
	5	require ground check
	2	INPUT anomalies require further work
	19	anomalies considered

RIANA E.L. 8/77 - Completed Aeromag. Anomalies Comalco.

Anomaly	Name	Line Fiducial	Follow-up	Interpretation
4042/1	Laurel Ck. W.	6.02896	Mag, drill	Skarn
4042/2	Laurel Ck. N.	8.01578	Ground check(?)	Magnetite-beari granite(?)
	Redwater	13.97995	Mag, IP, drill	Magnetite skarn
4142/2	Loyetea E.	21.9253	Mag, gravity	C volcanics
4142/3	Lowana Ck.		-	Basalt
4142/4		46.2615	-	Basalt
4142/5		44.2717	-	Cambrian
4142/6		41.6452	-	Cambrian
4142/7		36.6749	-	Cambrian
4142/8		34.6868	-	Cambrian
4142/11	Loyetea W.	19.938	Mag.	C volcanics
4143/3	Stotts Road	243.51275	Ground check	Basalt
4144/1	Cuprona	221.3069	Mag, gravity, drill	Basalt hill
4144/2	Camena		Ground check	Ultramafic plug

RIANA INPUT Block - Completed Anomalies

Anomaly	Name	Line Fiducial	Follow-up	Interpretation
4044/IR2		1081.57593	Mag, Max-min, gravity	pC shales
4044/IR3	Natone	1101.58443	Mag, max-min, gravity etc.	Pyrrhotite skar & pC shales
4044/IR4	Upper Stowport	1021.55965	Mag, max-min, IP gravity, drill	pC shales
4043/IR5		1042.35424	Ground check	Cultural
4044/IR6		1041.56578	Ground check	Clay band to pC shales

RIANA E.L. - Uncompleted Anomalies

Aeromag.

	4042/3	- Redwater trend anomalies (geological mapping and recce. mag. required).
	4142/1	
	4042/5	
	4042/6	
	4042/7	
	4042/8	
	4042/9	
	4042/10	
	4042/11	
	4042/12	
	4042/13	
	4042/14	
	4142/9	
	4142/12	
	4142/13	
	4142/14	
	4142/15	
	4142/16	
	4044/1	- Natone
	4044/5	- Natone East (IP survey if can get onto Mr. Shepherd's property).
	4142/10	- Ground check required (esp. 4142/10 - Gunns Plains).
	4143/1	
	4143/2	
	4143/4	
	4244/1	
	4244/2	
	4244/3	
	4144/3	- Grid & max-min (Midgley Falls)
INPUT	4144/IR1	- Grid & max-min.

Totals	18	Anomalies finalized (4 drilled)
	18	Anomalies in Redwater trend require thought
	2	Anomalies (Natone, Natone E.) require thought
	7	Anomalies require ground check
	2	Anomalies require grids and max-min
	47	Anomalies considered

1.3 Aeromag. Interpretation : Feb. 1983

The aeromag. from the Hampshire Gate area (i.e. western and south-western margin of the granite) and Natone - Redwater - Gunn's Plains area (eastern margin of the granite) was re-examined on the 1:20,000 contour plans, during February, 1983. This work was aimed to pick low-order anomalies in geologically interesting areas, and to give a rough interpretation of trends apparent in the aeromagnetics.

Results for the Hampshire Gate area are discussed in section 6.1. A total of 8 anomalies have been picked for follow-up in this area.

Interpretations for the eastern margin of the granite are contained on drawings (D/MT 24/040 - 047). All anomalies listed in Table 1 for this area are labelled, and a large number of new anomalies are indicated. Very few of these new anomalies are sufficiently outstanding to warrant follow-up, as most of them can be explained by the basalt cover. I suggest that anomalies close to the edge of the Housetop Granite or near gravity feature GL 11 be ground checked to confirm the existence of sufficient basalt topography, or a boundary between flows, to explain the anomaly. IP should be done over any anomaly not explained in this way, and all other anomalies can be forgotten.

The aeromag. interpretation lends weight to the interpretation of a separate, uranium enriched (and hence more prospective), granite phase from the radiometrics (see section 4). Radiometrically anomalous area B (centred on roughly 407500E, 5432500N) appears to be surrounded by a magnetic aereole, which is considered to be another indication of a tin granite (e.g. by Steve Webster of the NSW Geol. Survey and John Slade, consultant geophysicist). The magnetics over area C has not yet been considered in detail. Both areas C and B are certainly worthy of further follow-up, to check for the existence of another granite phase and examine its potential for tin mineralization. Detailed geological mapping and sampling, together with radiometric and mag. susceptibility measurements on the granite, would be the most appropriate follow-up at this stage.

Another area of interest arising from this aeromag. interpretation is the magnetic high trend extending south from anomaly 4042/7. This trend could well represent a separate skarn zone to that seen on the Redwater trend, with its lower amplitude representing pyrrhotite rather than magnetite skarn. The area should be ground checked and, if this does not explain the anomaly, gridded and covered with magnetics and max-min.

2.0 INPUT

2.1 Follow-up as at 31/12/82

Table 1 summarizes the anomalies followed up to date. All anomalies originally picked by Geoterrex or BXN/AHO have been ground checked (28 anomalies in all). Of tnese anomalies, 15 are due to clay bands related to basalt cover and a preserved paleoweathering surface; 3 are due to Precambrian black shales; 2 are due to skarns (Natone and Highclere); 1 anomaly is cultural and one anomaly is located outside Shell's E.L.'s.

Contour maps of the channel 3 amplitude have been prepared for all 3 INPUT blocks (Loongana, Highclere and Riana), but do not appear to be useful for anything much other than mapping basalt. The Riana block data may be useful for mapping black shales beneath the basalt, thus giving structural information and some idea of the location of Precambrian units. Plots of channel ratios or time constants may be useful for anomaly picking, at a later stage.

2.2 Re-evaluation; Feb. 1983 - Loongana Block

The INPUT data over areas of Cambrian volcanics was re-examined in Feb., 1983, with a view to testing their potential for Pb-Zn mineralization. Roughly half the area of volcanics within Loongana E.L. was covered by INPUT. Unfortunately, the volcanics generally correspond to areas of rugged topography, and the fixed-wing aircraft was unable to maintain adequate terrain clearance (clearance was rarely below 150m, and frequently much greater, compared with a specified mean terrain clearance of 120m), thus most of the data was quite useless. Any future surveys in the area should be flown with a helicopter system, if available.
Despite these problems, the following anomalies may be of interest:

<u>4041/IL2</u> : See Geoterrex report. This anomaly may well be in volcanics, but it is outside our E.L. therefore it has not been followed up completely (a grid was commenced, but there has not been time to complete it). Soil geochem. results are discouraging however.

<u>4041/IL12</u> : This is a 3 channel anomaly roughly 200m south of mapped volcanics. (Line.fiducial = 3421.45764). The small amplitude of the anomaly reflects the poor terrain clearance (over 200 metres).

The anomaly has a clear topographic association and is coincident with aeromagnetic anomaly 4041/7, so the cause may well be basalt topography, but a ground check is definitely worthwhile to confirm /deny this. If the ground check does not write the anomaly off,

Fig. 2·1

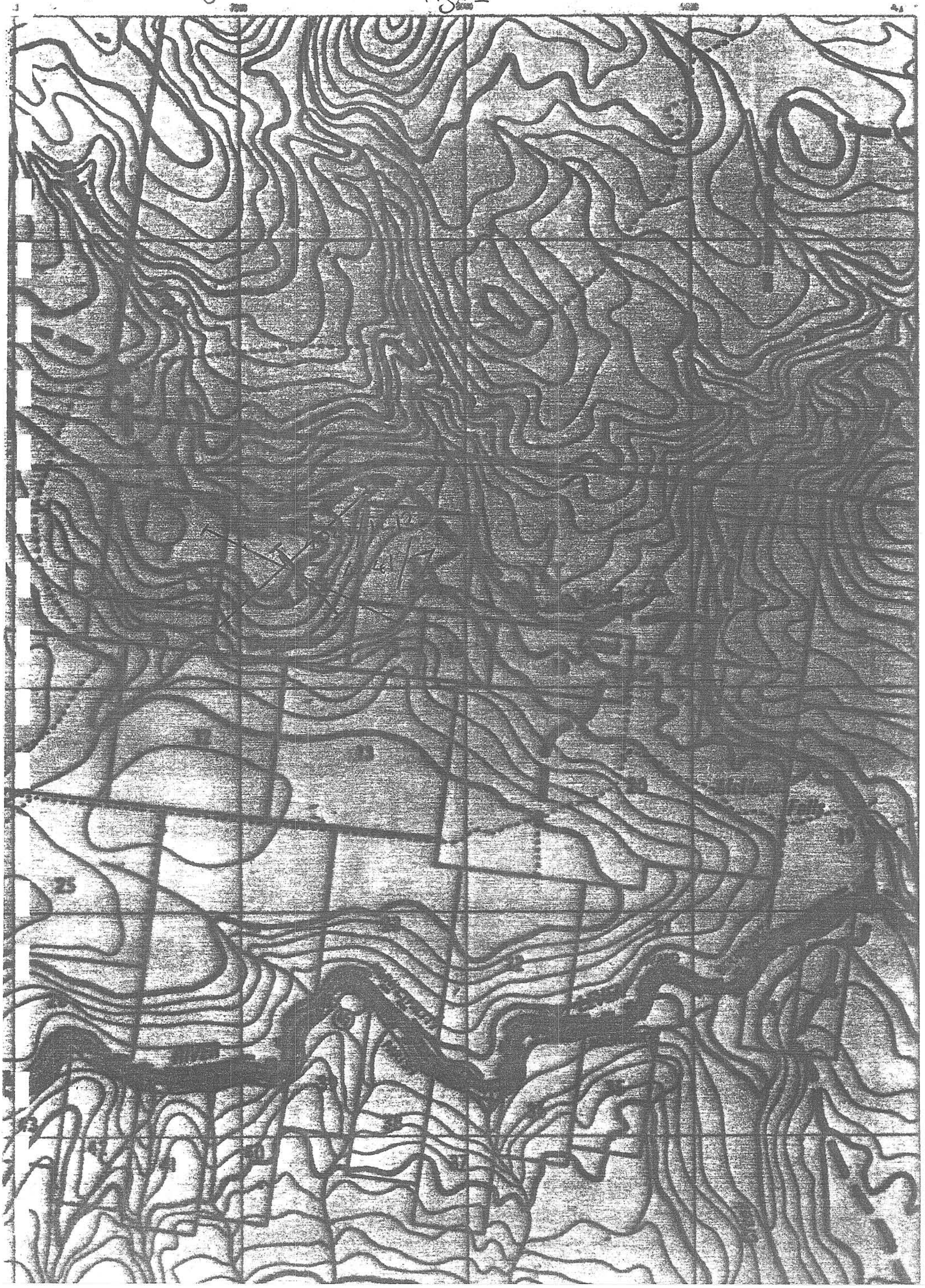
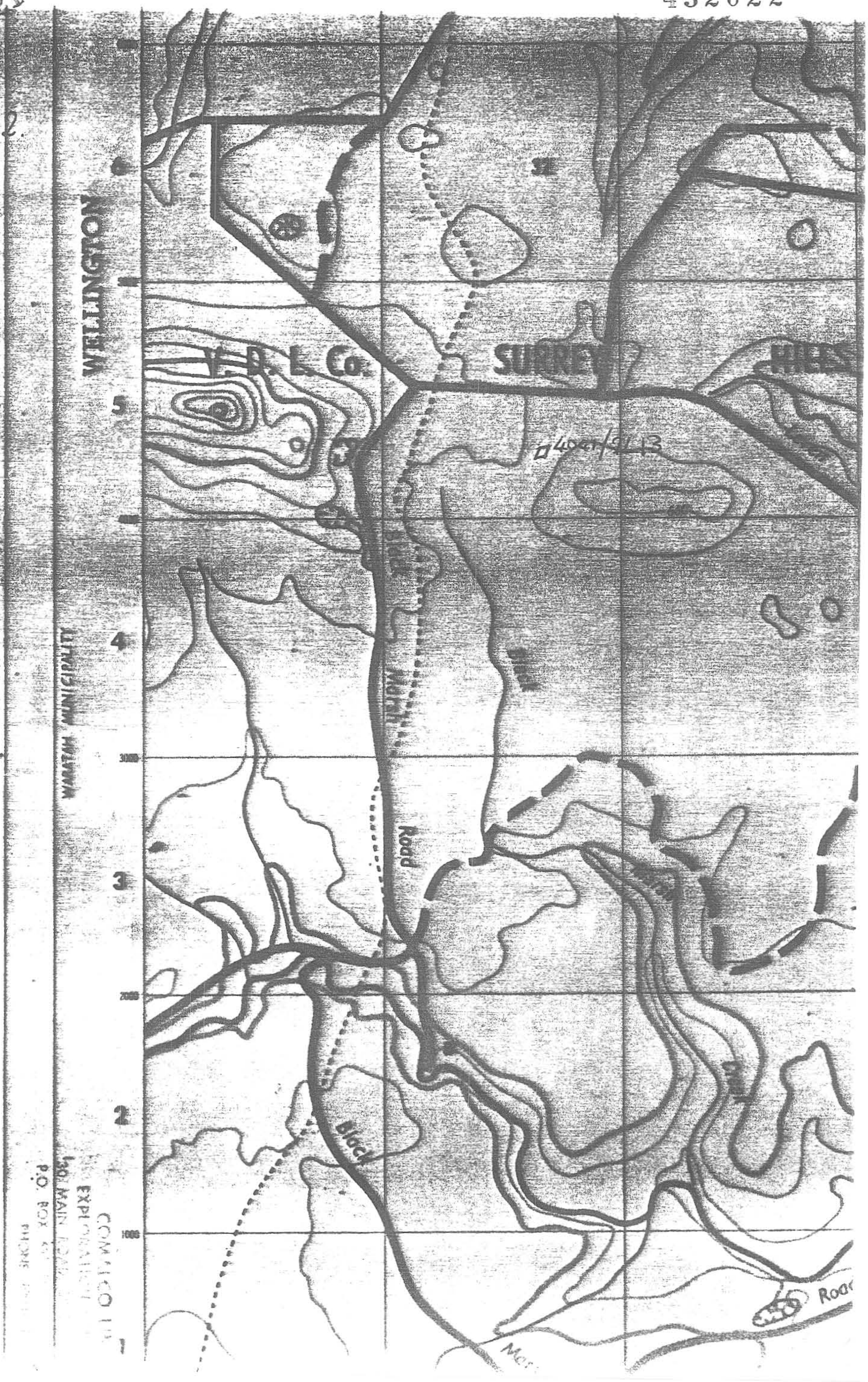


Fig 2.2.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EXPLORATION
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P.O. BOX

022

2 lines of max-min and magnetics, as shown in figure 2.1 are suggested.

4041/IL13 : (Line fid. = 3211.62967, see fig. 2.2). A 3-channel anomaly, 800m east of the northern quarry at 2 Hummocks (hence it could well be in the volcanics, and there is some interesting geochem. in the area). The terrain clearance was 150m.

To the best of my knowledge, the area is not basalt covered (or the basalt would only be very thin), but it may be a little swampy, which could explain the anomaly. A ground check is required; probably a couple of lines of max-min and soil sampling. The anomaly plots just to the east of Geopeko's old Challenger III grid, so this follow-up could probably be done by extending the northern lines of this grid. (Note that no INPUT anomaly was detected over the black shale unit at Challenger III, possibly because the flight lines were parallel to strike). IP should be done if the max-min is encouraging.

2.3 Re-evaluation; Feb. 1983 - Riana Block

The Riana block INPUT data was re-examined in Feb, 1983, to check for low-order anomalies in interesting geological locations, which may not have been picked by Geoterrex. Data from the Highclere and Loongana blocks was not considered as the greater basalt thickness over the prospective stratigraphy in these areas makes the INPUT's value dubious. Even in Riana, the large number of noisy powerlines, and the basalt cover, makes interpretation of the INPUT very difficult.

Nine further anomalies were picked in Riana E.L. (designated IR7 to IR15). Their locations are shown on Figures 3-6 From the INPUT data alone, none of the anomalies can be distinguished from a strong basalt response. Nonetheless, they should all be ground checked at least, to check for topographic/cultural associations etc., before being discarded. This follow-up would have moderate priority. Any anomaly not explained by a ground check should be covered with max-min and IP.

4044/IR7 : A low-order anomaly to the southeast of Natone. The INPUT has been severely corrupted by a Hz (powerline) response, so the exact location and significance of the anomaly is not clear. I suspect that the anomaly represents the max-min conductors seen in the southeastern corner of the Natone grid

These conductors would be tested by hole NT 4 proposed in the report, if they are considered significant.

4144/IR8 : A reasonable anomaly, with broad, low amplitude mag. association. the anomaly may have been affected by a Hz response. Its location on the side of a hill suggests that it has been caused by a clay band at a basalt flow interface or at the base of the basalt. A ground check is suggested, to test this hypothesis.

(Aline of VLF yielding a strong anomaly over a topographic inflection would confirm the hypothesis).

023

4144/IR9 : The anomaly follows a property boundary and road, so a cultural source is possible. A ground check should be made, to test this.

4143/IR10 : A fairly long anomaly (1500m strike length) with some mag. association. A ground check should be made, to test a basalt-related source.

4144/IR11 : The anomaly follows the top of a hill, so it could well be topographic or related to the basalt. A ground check is required to test this.

4144/IR12 : The anomaly contours around the side of a hill, so a check for a basalt-related source is required. Alternatively a cultural source is also possible, as the anomaly plots on a road and near a fence.

4144/IR13 : A strong 6-channel response, but apparently with a fairly long strike length (correlation between the northern and southern half of the anomaly is difficult, due to a strong Hz response). The anomaly appears to follow the edge of a basalt sheet (edge of a zone of 6-channel INPUT responses) so it could well have a basalt-related source. A ground check is required, to test this. the anomaly does not have any consistent topographic correlation (northern 2 lines plot at the top of a ridge, while the southern lines are at the side of a hill).

4144/IR14 : Ground check required.

4144/IR15 : A good 6-channel response at the edge of the surveyed area. The anomaly plots on a road, so a ground check for a cultural source is required.

024

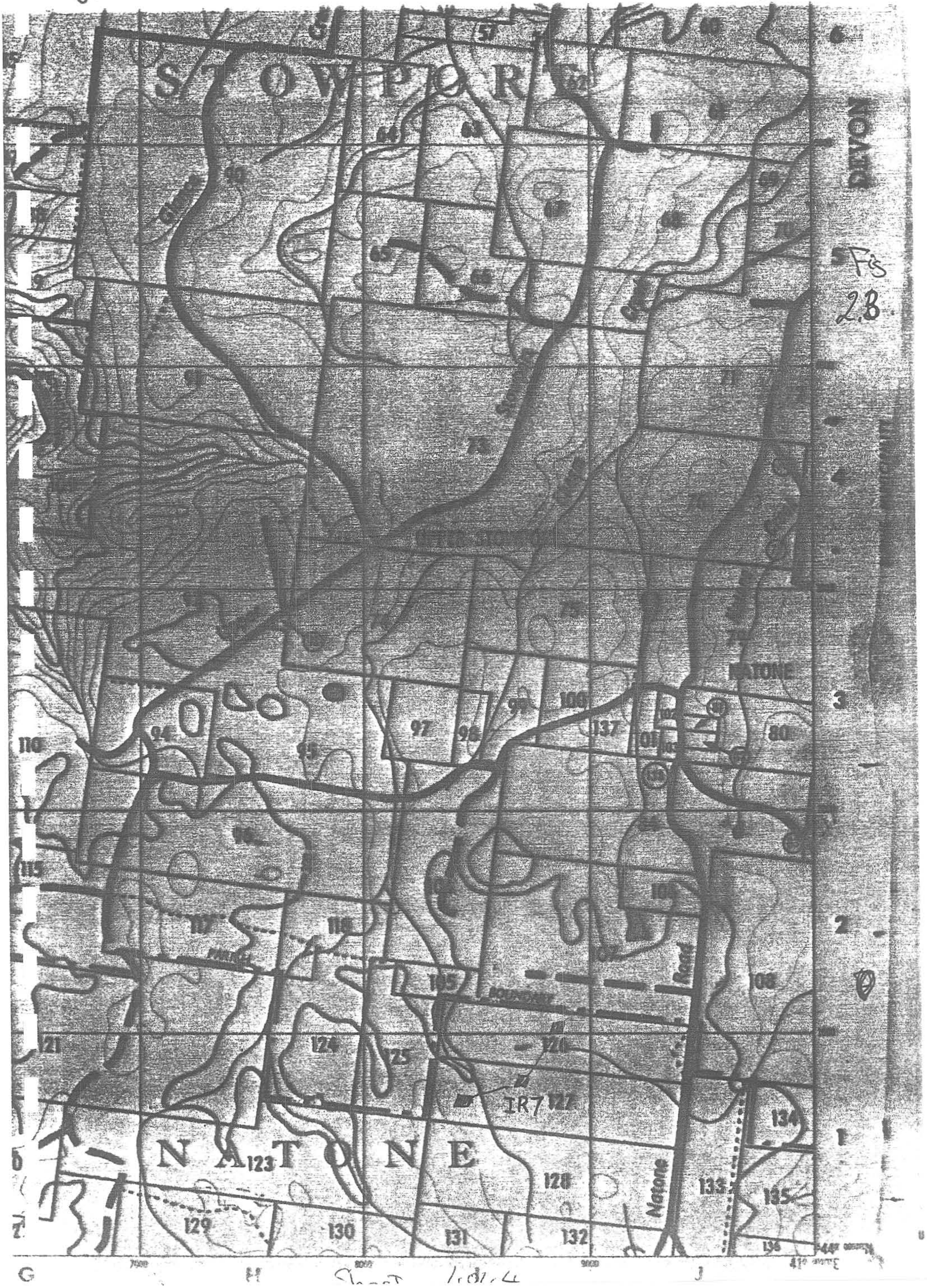

Fig 2.B

Sheet

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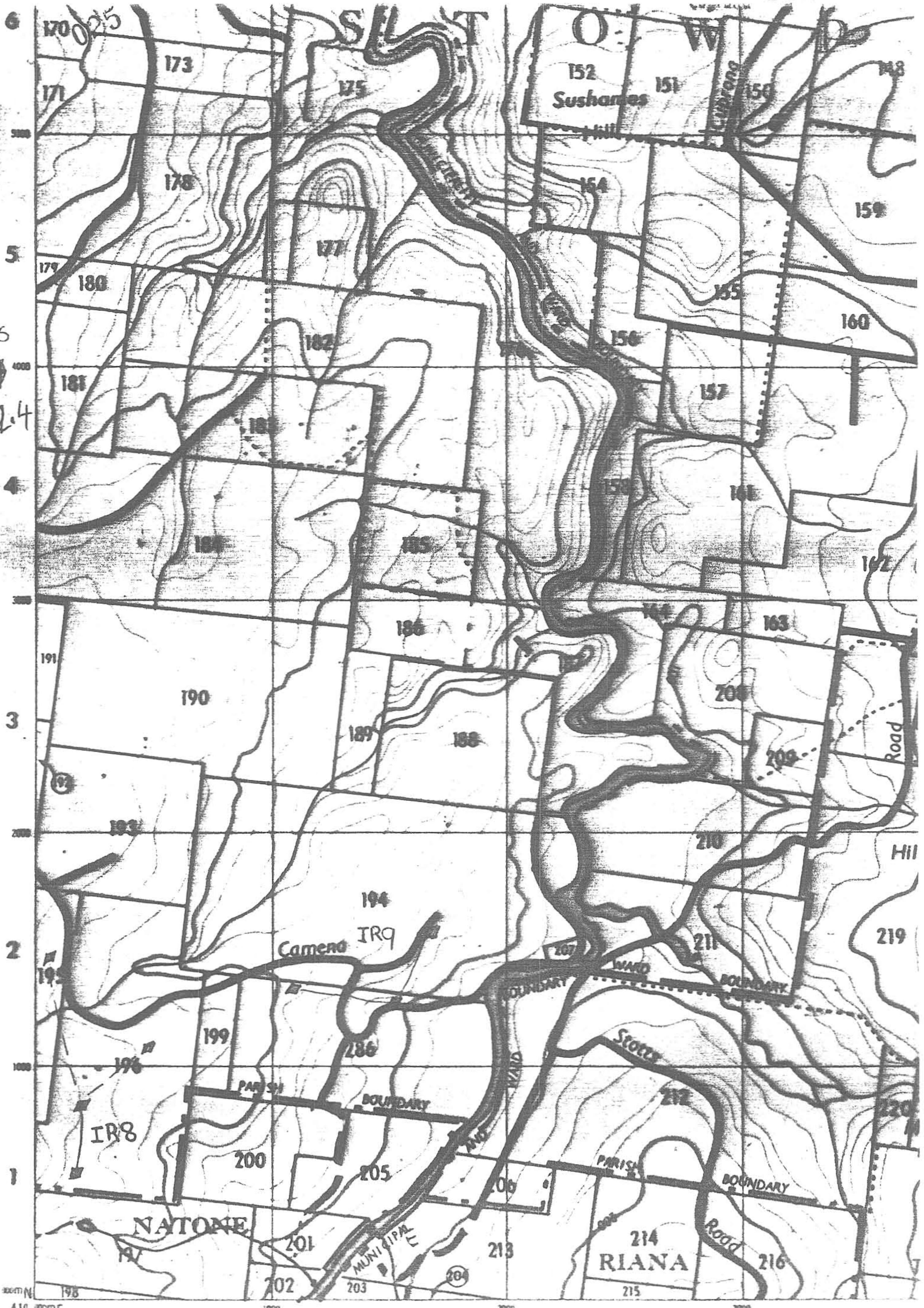

Sheet 4144

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Fig. 2.5.

Sheet 4143

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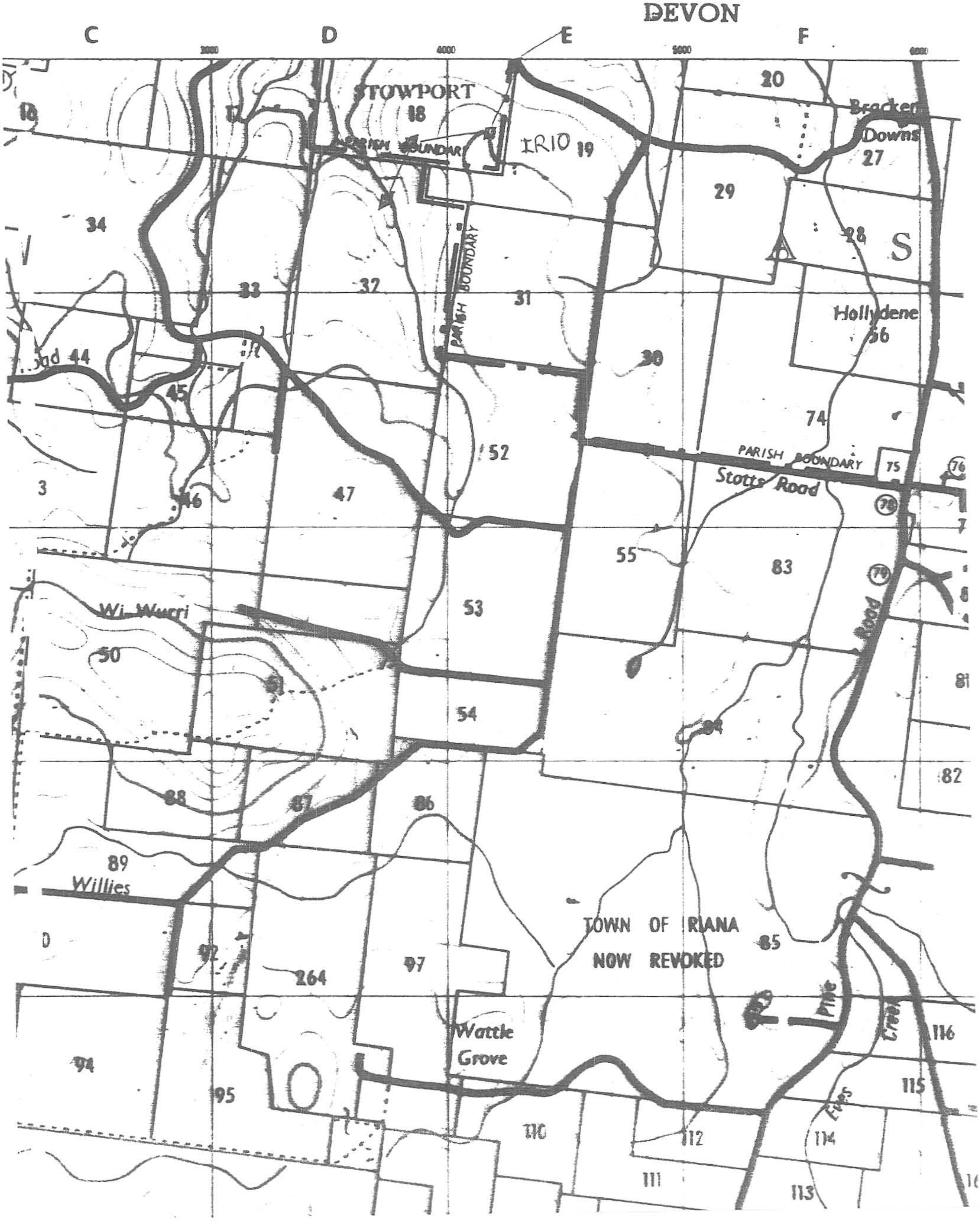
CADASTRAL - TOPOGRAPHIC SERIES

(Preliminary Edition)

RIANA WARD

PENGUIN MUNICIPALITY



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432028

Fig. 42.6

Sheet 4144

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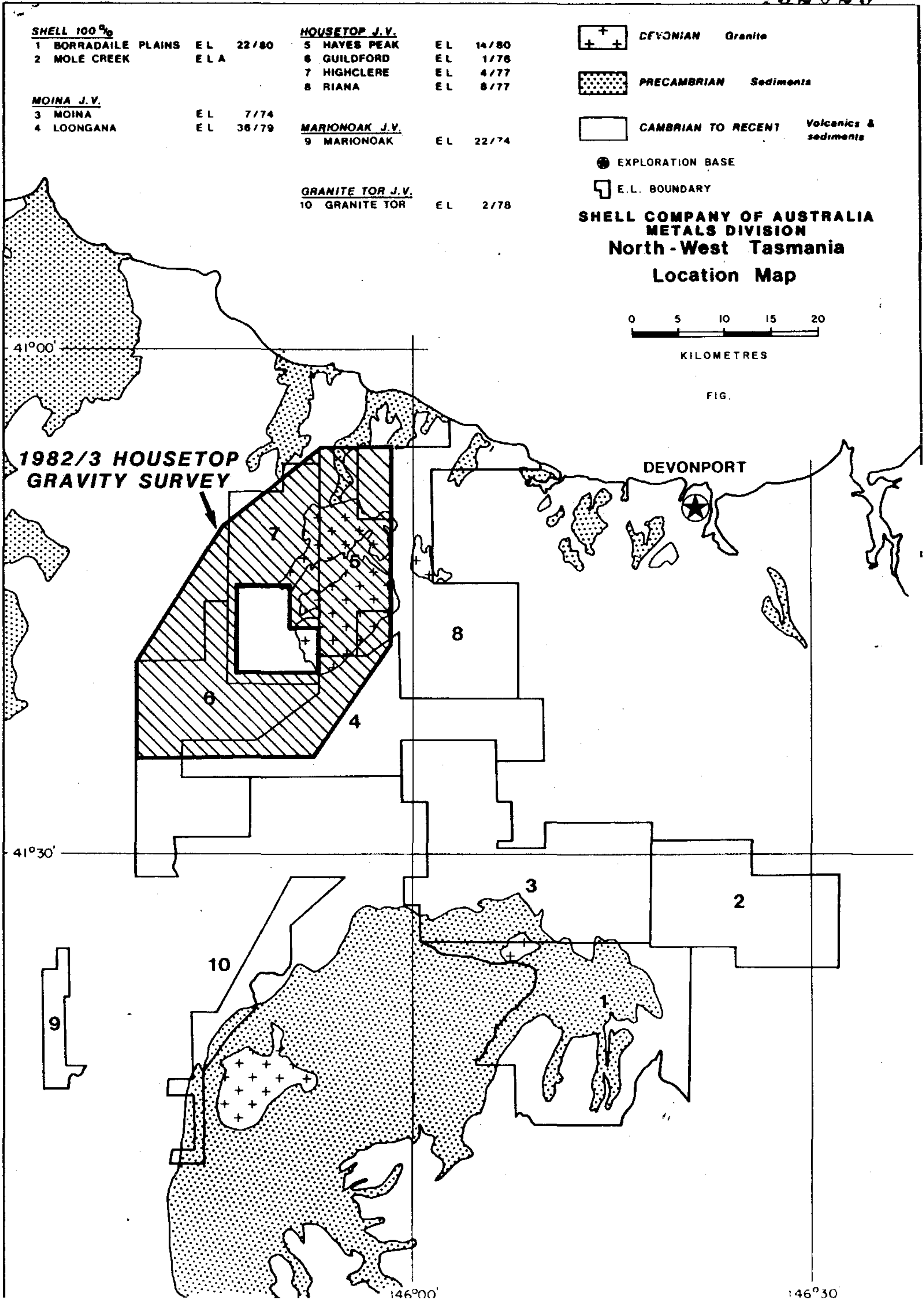
432029



SHELL 100%

1	BORRADAILE PLAINS	EL	22/80
2	MOLE CREEK	ELA	

MOINA J.V.

3	MOINA	EL	7/74
4	LOONGANA	EL	36/79

HOUSETOP J.V.

5	HAYES PEAK	EL	14/80
6	GUILDFORD	EL	1/76
7	HIGHCLERE	EL	4/77
8	RIANA	EL	8/77

MARIONOAK J.V.

9	MARIONOAK	EL	22/74

GRANITE TOR J.V.

10	GRANITE TOR	EL	2/78

+	*DEVONIAN*	*Granite*
▨	*PRECAMBRIAN*	*Sediments*
☐	*CAMBRIAN TO RECENT*	*Volcanics & sediments*
●	EXPLORATION BASE	
⌐	E.L. BOUNDARY	

SHELL COMPANY OF AUSTRALIA
METALS DIVISION
North - West Tasmania
Location Map

FIG.

3. HOUSETOP REGIONAL GRAVITY SURVEY

3.1 Rock Properties

The following densities are representative of the rocks in the area (source of the density is given in brackets):

Magnetite Skarn	4.25 (1 massive magnetite sample from Kara)
	3.2-3.4 (gravity modelling of Kara - probably represents a good bulk density)
	3.5 (2 wrigglite samples from Moina)
Pyrrhotite Skarn	3.5 (2 samples from Moina)
Gordon Limestone	2.7 (4 samples from Moina)
	2.7-2.72 (Leaman in Bull. ASEG, vol. 4)
Moina Sandstone	2.75 (1 sample from Moina)
	2.5-2.68 (Leaman)
	2.75 (7 samples from Lake Gairnder)
Granite	2.57 (1 sample from Moina)
	2.58 (Sheehan in Hons. Thesis, 1969)
Cambrian Volcanics	2.6-2.75 (Leaman)
	2.75 -3.26 (mean = 2.87:9 samples from Lake Gairdner)
	2.67-3.04 (mean = 2.78:12 samples from Challenger II)
Tertiary Basalt	2.77-3.04 (mean = 2.93:12 samples from Guide River)
	2.72-2.91 (mean = 2.82: Sheehan)

Use the following densities when modelling gravity (unless other information is available):-

granite = 2.6
limestone = 2.7
sandstone = 2.7
Є volcanics = 2.8
basalt = 2.9
skarn = 3.5

3.2 Survey Details

A total of 1186 gravity stations were read on the E.L.'s of the Moina and Housetop Joint Ventures during late 1981 and early 1982, using Shell's Sodin gravitymeter. Data was concentrated on the northern and western margins of the Housetop Granite, with some data on the eastern and southern margins, the main aim of the survey being to detect Kara-type apophyses from the main granite mass. A data density of 1-2 stations per square kilometer was achieved by traverses along roads and railway lines. Elevation was determined barometrically. Five base stations were used (see Table3.1) and were tied in to the BMR station at Mersey bluff Lighthouse, Devonport (although all stations of the survey have been corrected to an arbitrary datum only).

The data has been corrected for:

(1) drift and tides (using 2-2½ hour loops between base stations)

(2) Bouguer and free-air corrections

(3) latitude (a rough, linear correction only was applied)

(4) terrain (out to a distance of approx. 12 km, digitized topography from the Hellyer and Forth 1:100,000 topo. sheets).

Overall accuracy of the survey was 0.5-1 mgal.

3.3 Follow-up Program

A total of 16 gravity lows (designated GL1 - GL16 in drawings D/MQ00/008 & 009) were detailed on the margins of the large low representing the main granite mass. One of these (GL6) was well outside Shell's E.L.'s and hence was not worth following up. Preliminary follow-up of GL1, GL12 & GL14 has been completed as follows.

A further 230 gravity stations were read during December 1982 and January 1983. The instruments, processing and accuracy were as for the initial survey, with the aim of this follow-up being to confirm the results of the initial survey and to give additional data for modelling of interesting features (eg. to obtain estimates of depth to granite).

The following features were covered:

RIANA EL	-	GL7	(10 additional stations)
		GL8	(12 additional stations)
		GL9	(11 additional stations)
		GL10	(8 additional stations)
		GL11	(30 additional stations)
HIGHCLERE EL		GL2	(9 additional stations)

HAMPSHIRE GATE AREA 150 additional stations were read, from Dudfield Road south to Bunders Road. This work covered features GL4 and GL5; gave a couple of traverses across the major NW trending fault in the area; and gave detailed coverage (200 m station spacing) of the granite contact in the Dudfield - Basils Road area. A temporary base station at the eastern end of Basils Road was tied into the regional network for this work.

There was insufficient time to follow-up features GL3, GL13, GL15 and GL16. As all these features lie in the southern portion of Guildford EL, they now have very low priority for follow-up.

GL2 The follow-up has confirmed the existence of an 8-10 mgal anomaly. Figures 3.1. to 3.4 show some quick models for the gravity. They indicate that a fairly large density contrast is required to explain the anomaly (the models were constrained to give a contrast of less than 0.4 g/cm^3, this limit was always attained). The models also show that the source of the anomaly is shallow (probably less than 50 metres), and has reasonable dimensions for a small granite cusp. The anomaly is most unlikely to be due solely to a variation in the thickness of basalt cover, as this would not explain the amplitude, for any reasonable density contrast.

The existence of this feature upgrades any aeromag. anomalies in the area, as it represents a possible granite cupola.

GL7 The follow-up located a 2-3 mgal gravity low. The significance of this low is a little unclear, as it could possibly be explained by a variation in the thickness of the basalt. Alternately, it could represent a small granite cupola. The amplitude of the anomaly is too low to make modelling worthwhile (especially given the 1mgal overall accuracy of the survey).

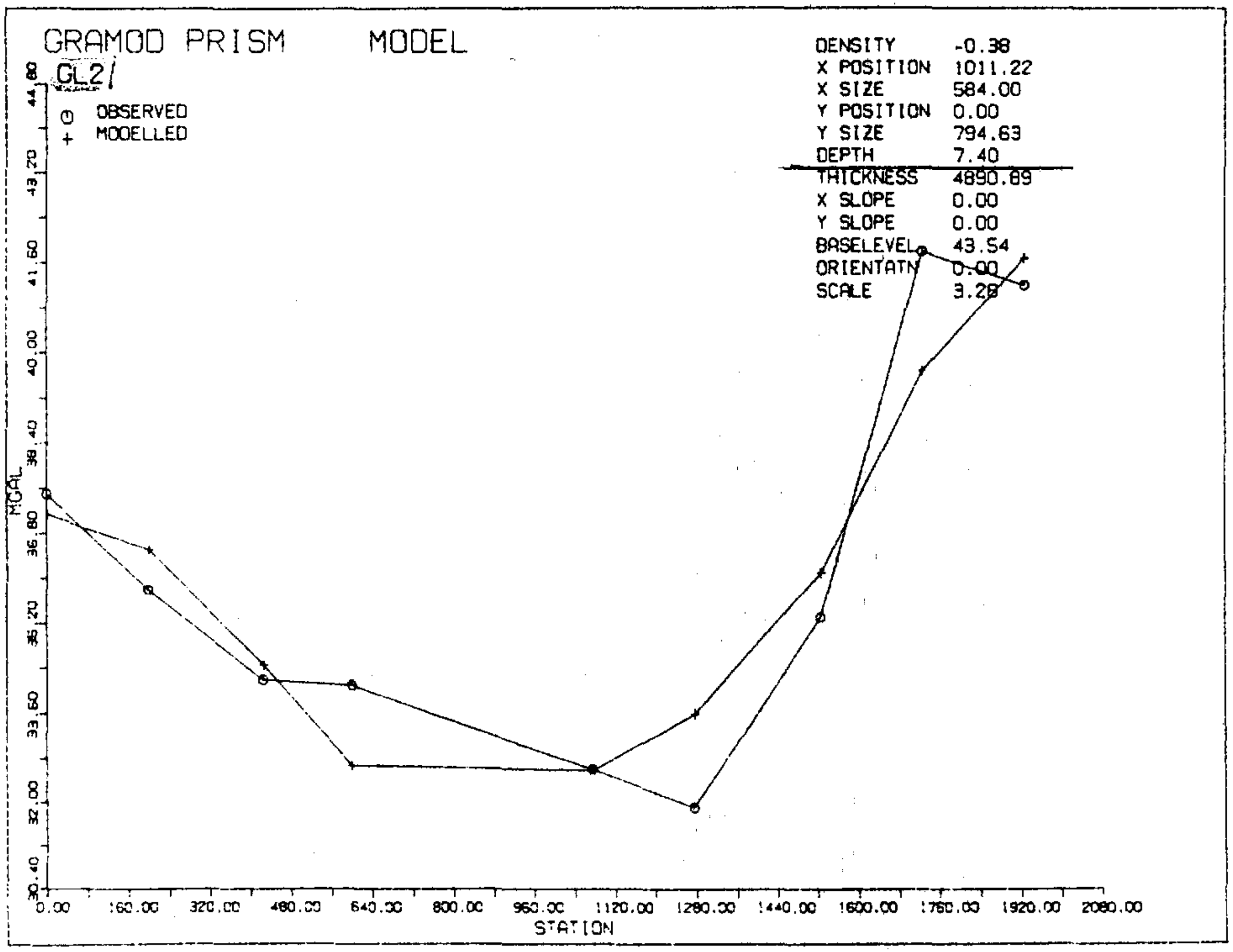
GL8 & GL9 The follow-up has confired the initial survey results, implying that both features are real. However, the anomalies only have amplitudes of 1-2 mgal and hence could be explained by a variety of sources, eg. variations in basalt thickness; topography on relatively shallow granite. Obviously the features are of considerable interest if they represent granite cusps,so a series of electrical soundings or a line of regional IP should be considered, to get another handle on the properties and depth of the source. If the source is granite, it has considerable potential for mineralisation as it is just to the north of Natone, and possibly intrudes the same carbonate sequence. The amplitude of th anomalies is too low to make modelling worthwhile.

GL10 The follow-up located a 3-5 mgal anomaly. Modelling results are given in figures 3.5-3.9. This modelling indicates a shallow source (probably less than 50 metres) and fairly large density contrast (0.4 g/cm^3, the maximum allowed in the modelling, was attained by all models). The source has a reasonable size for a small granite cusp, and the amplitude of the anomaly probably rules out basalt thickness variations as the source. Any aeromag. anomalies in the area are therefore upgraded by the existence of a possible granite cupola.

GL11 A 10 mgal low was located, confirming the existence of a sizeable granite body to the north east of the main Housetop Granite mass.

Unfortunately, one loop of the follow-up was rendered useless by a large barometric drift, so there is insufficient data to allow any modelling.

```
*** STOP
OK, C 3
OK, C GL2MOD1
OK, DO -TTY T$0000
[DO Version 1.0]
OK, ED C_GRA
```

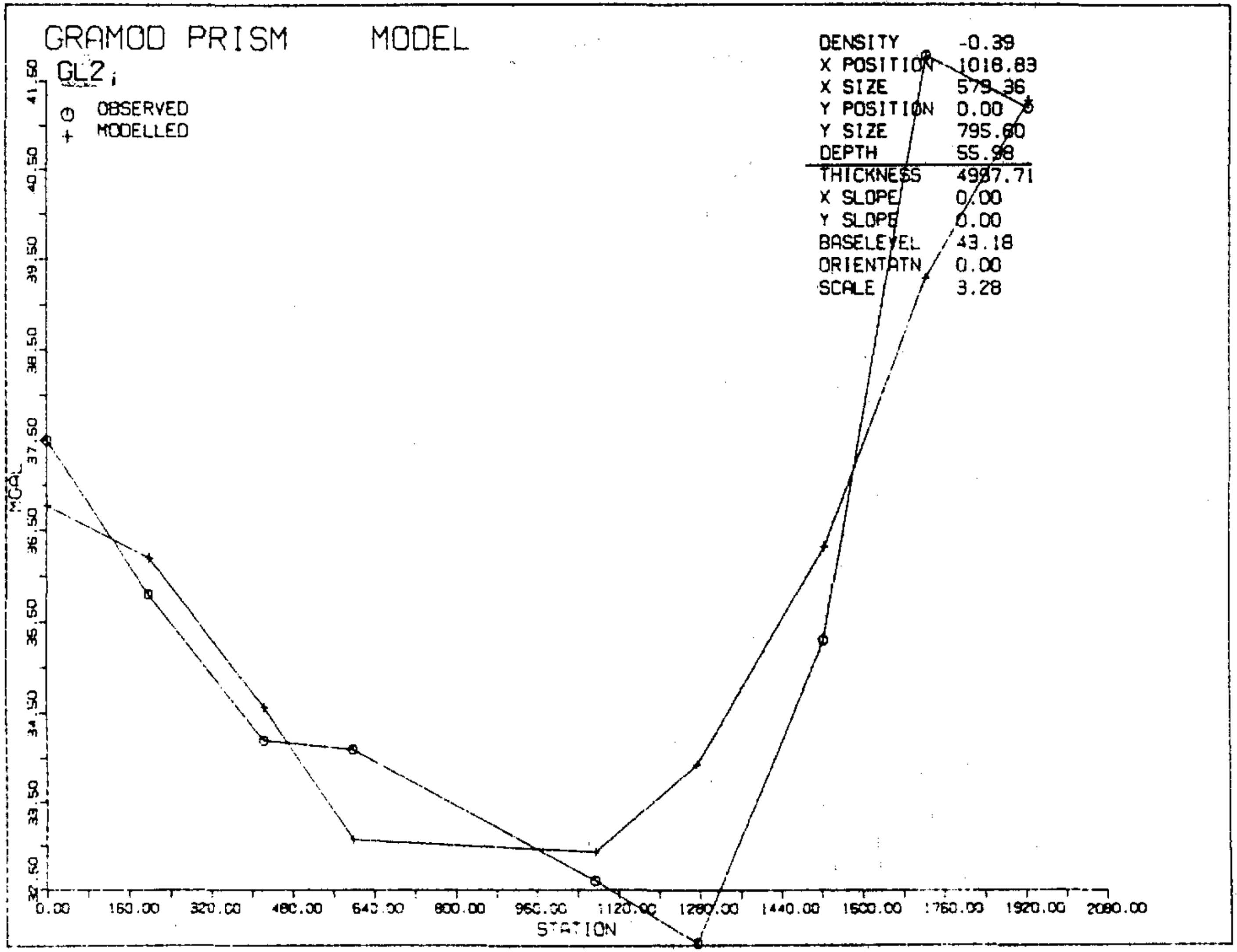


```
DENSITY       -0.38
X POSITION    1011.22
X SIZE        584.00
Y POSITION    0.00
Y SIZE        794.63
DEPTH         7.40
THICKNESS     4890.89
X SLOPE       0.00
Y SLOPE       0.00
BASELEVEL     43.54
ORIENTATN     0.00
SCALE         3.28
```

Fig. 3.1

5 cm

```
 *** STOP
OK, C 3
OK, C GL2MOD3
OK, DO -TTY T$0000
[DO Version 1.0]
OK,
```

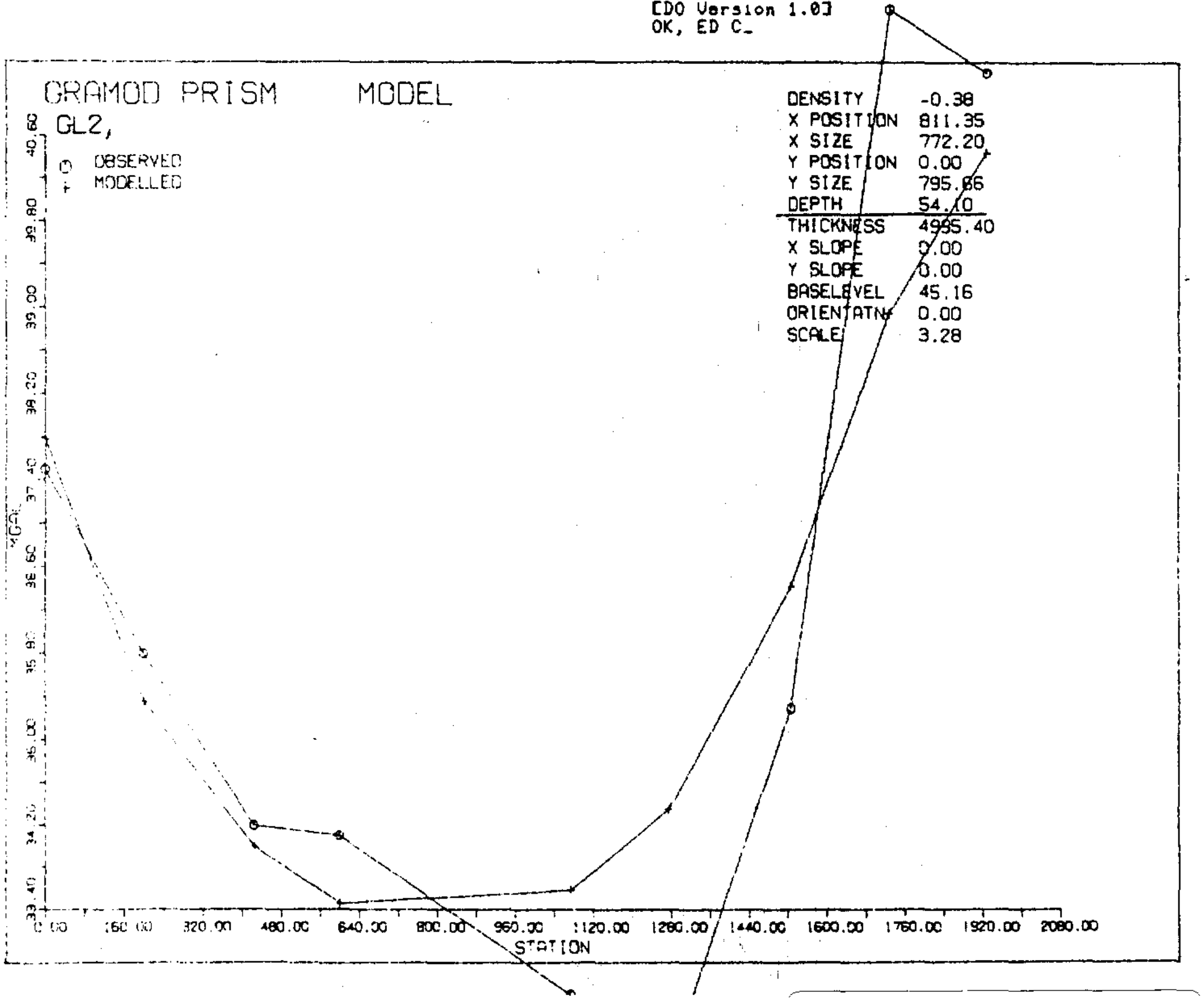


```
DENSITY       -0.39
X POSITION    1018.83
X SIZE        579.36
Y POSITION    0.00
Y SIZE        795.60
DEPTH         55.98
THICKNESS     4997.71
X SLOPE       0.00
Y SLOPE       0.00
BASELEVEL     43.18
ORIENTATN     0.00
SCALE         3.28
```

5 cm

Fig 3.2

```
:*** STOP
OK, C 3
OK, C GL2MOD4
OK, DO -TTY T$0000
[DO Version 1.0]
OK, ED C_
```



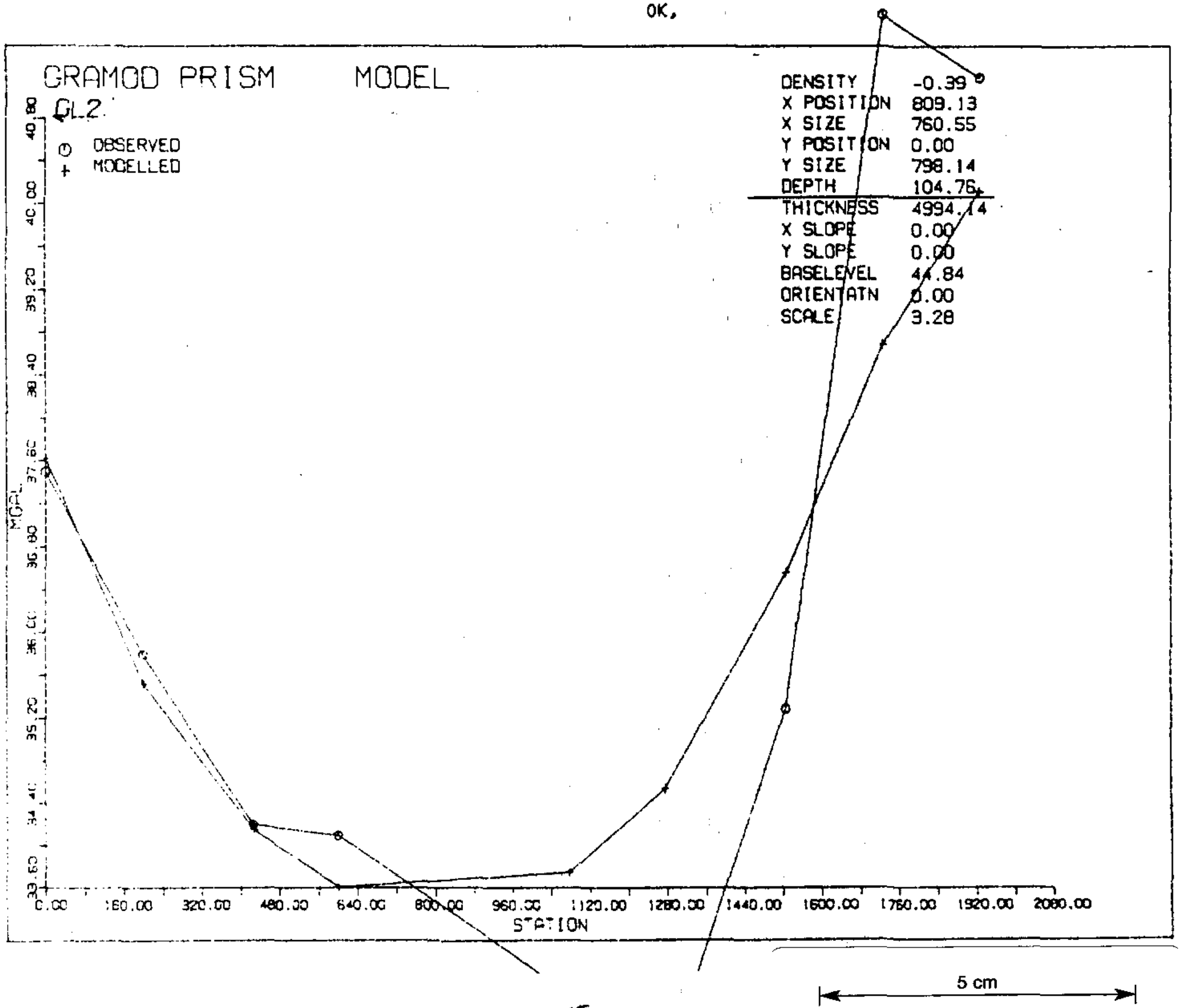
```
DENSITY       -0.38
X POSITION    811.35
X SIZE        772.20
Y POSITION    0.00
Y SIZE        795.86
DEPTH         54.10
THICKNESS     4985.40
X SLOPE       0.00
Y SLOPE       0.00
BASELEVEL     45.16
ORIENTATN     0.00
SCALE         3.28
```

?0

5 cm

Fig. 3.3

```
*** STOP
OK, C 3
OK, C GL2MODS
OK, DO -TTY T$0000
[DO Version 1.0]
OK,
```

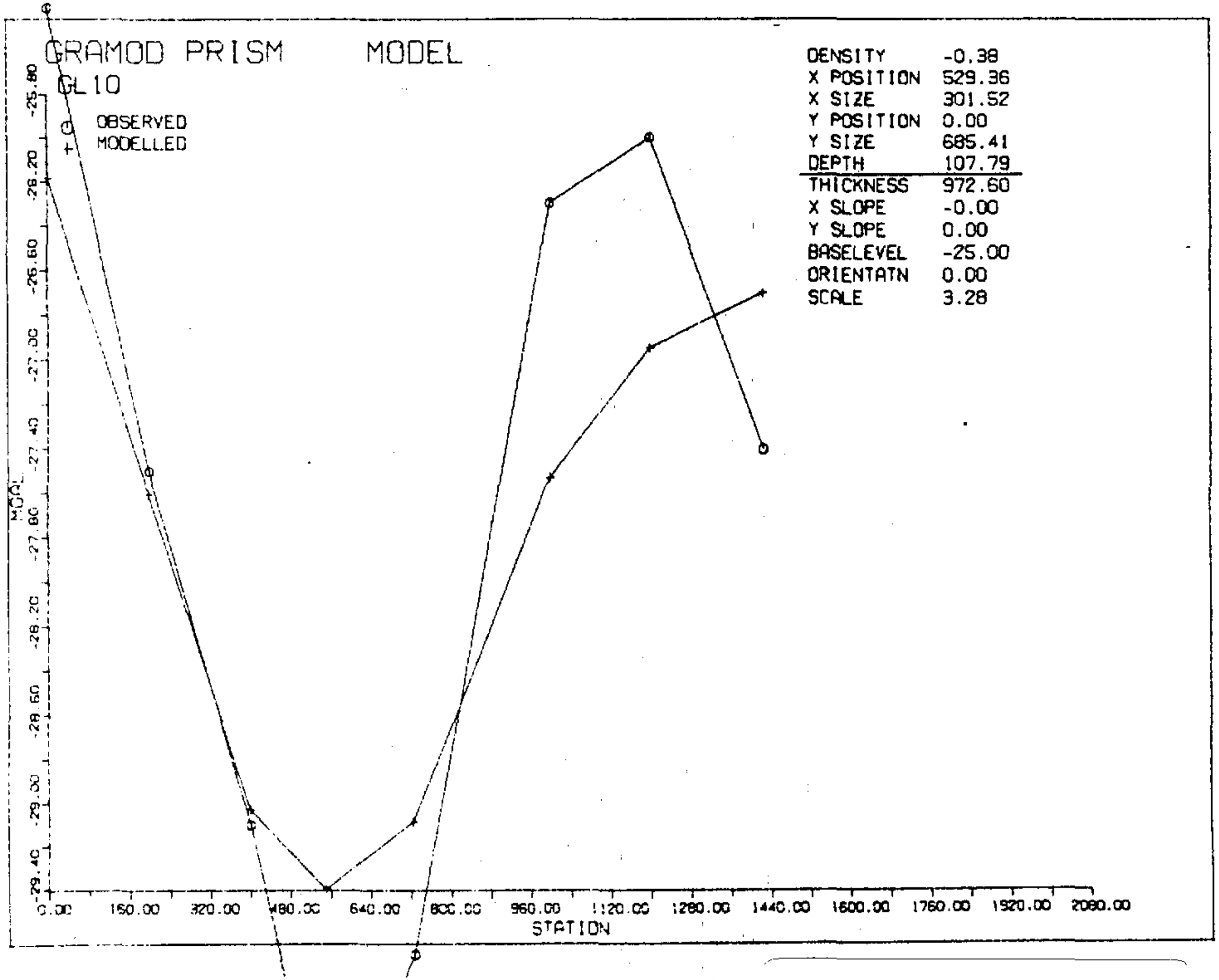


```
DENSITY      -0.39
X POSITION   809.13
X SIZE       760.55
Y POSITION   0.00
Y SIZE       798.14
DEPTH        104.76
THICKNESS    4994.14
X SLOPE      0.00
Y SLOPE      0.00
BASELEVEL    44.84
ORIENTATN    0.00
SCALE        3.28
```

Fig 3.4

036

```
*** STOP
OK, C 3
OK, C GL10MOD5
OK, DO -TTY T$0000
[DO Version 1.0]
OK,
```



70

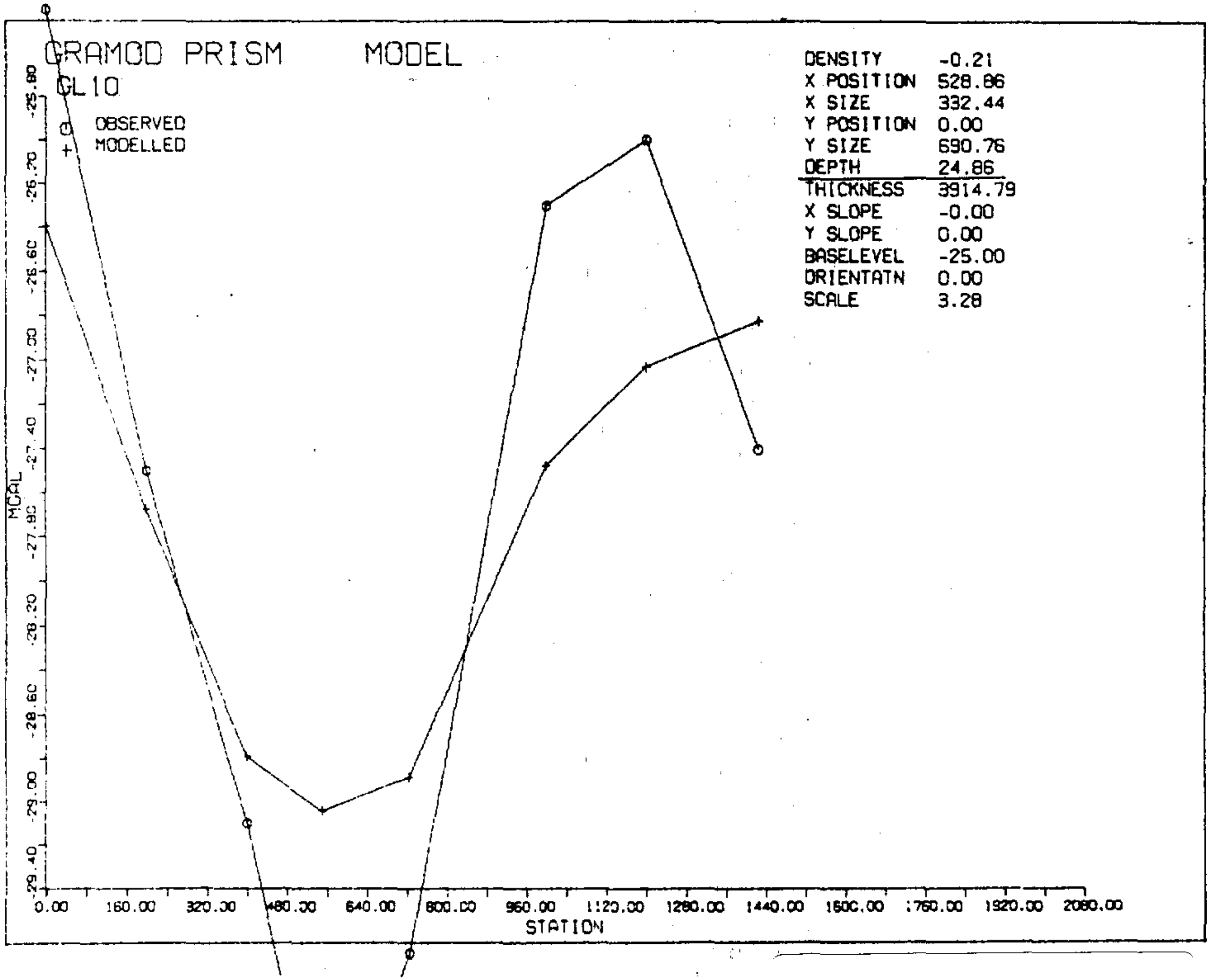
5 cm

Fig 3.5

432037

37A

```
*** STOP
OK, C 3
OK, C GL10MOD4
OK, DO -TTY T$0000
[DO Version 1.0]
OK, ED C_
```



```
DENSITY      -0.21
X POSITION   528.86
X SIZE       332.44
Y POSITION   0.00
Y SIZE       690.76
DEPTH        24.86
THICKNESS    3914.79
X SLOPE      -0.00
Y SLOPE      0.00
BASELEVEL    -25.00
ORIENTATN    0.00
SCALE        3.28
```

70

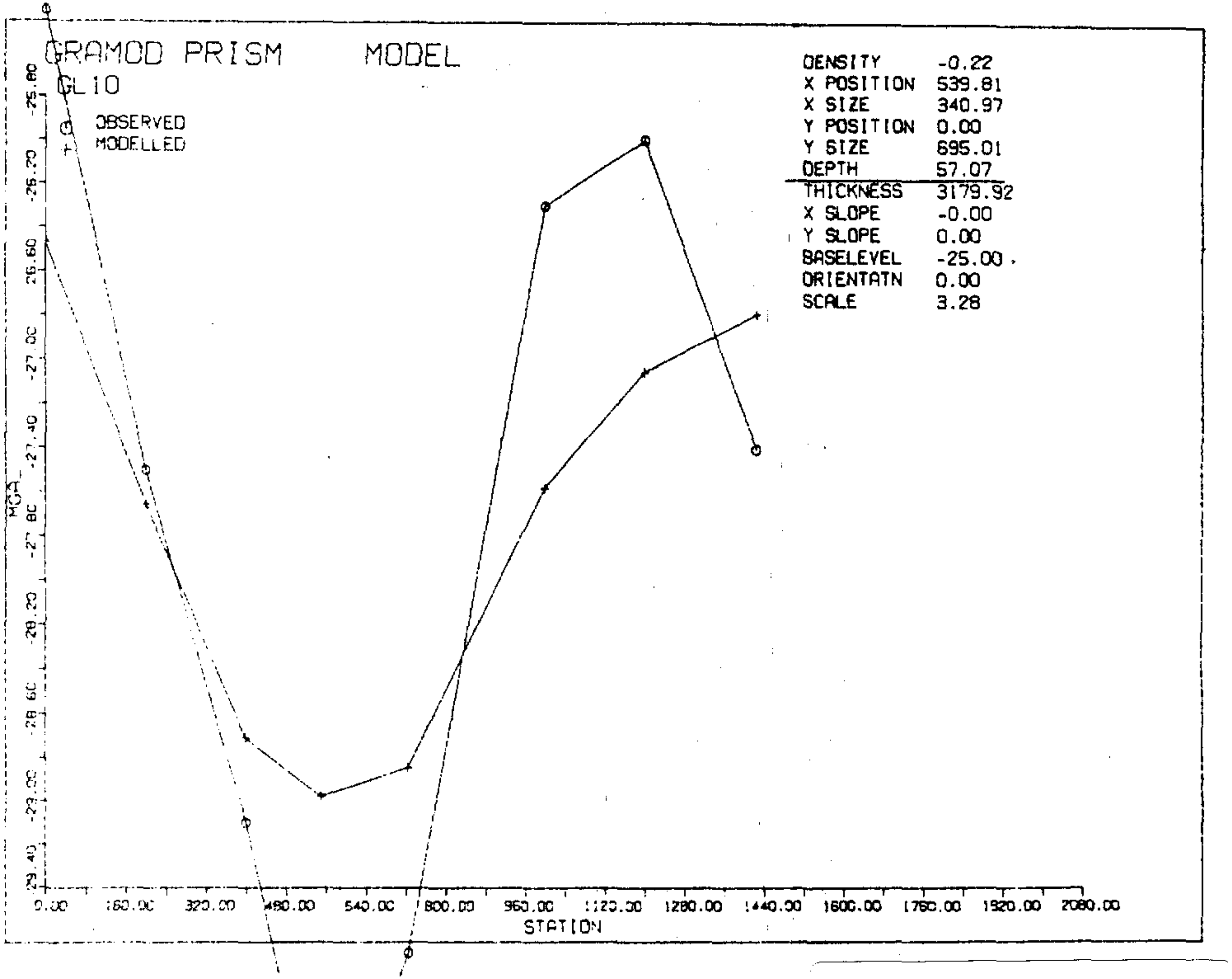
5 cm

fig 3.6

432038

037

```
:*** STOP
OK, C 3
OK, C GL10MOD3
OK, DO -TTY T$0000
[DO Version 1.0]
OK,
```



DENSITY	-0.22
X POSITION	539.81
X SIZE	340.97
Y POSITION	0.00
Y SIZE	695.01
DEPTH	57.07
THICKNESS	3179.92
X SLOPE	-0.00
Y SLOPE	0.00
BASELEVEL	-25.00
ORIENTATN	0.00
SCALE	3.28

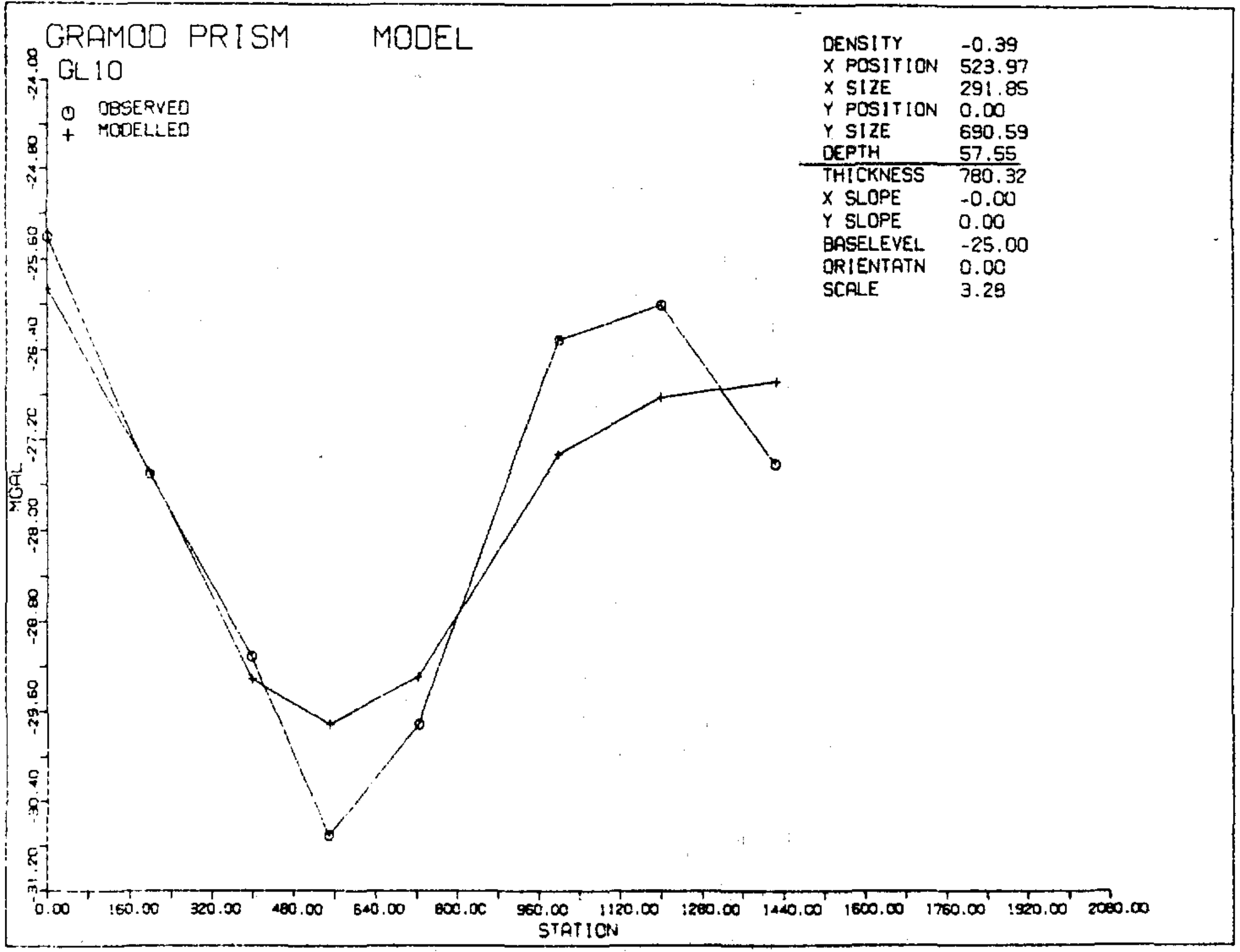
5 cm

Fig. 37

432039

038

```
*** STOP
OK, C 3
OK, C GL10MOD2
OK, DO -TTY T$0000
[DO Version 1.0]
OK,
```



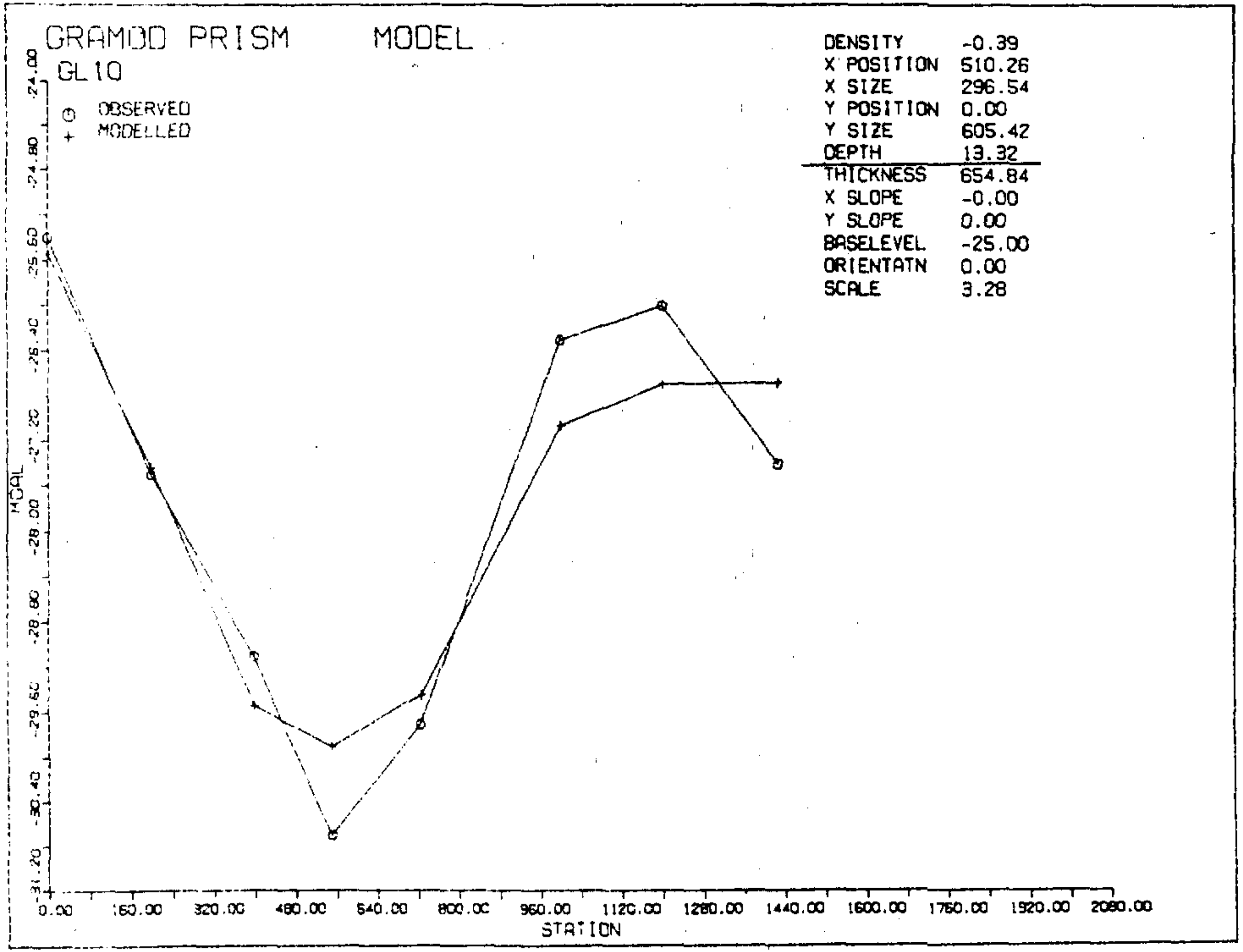
70

5 cm

Fig. 3.8

432040

```
*** STOP
OK, C 3
OK, C GL10MOD1
OK, DO -TTY T$0000
[DO Version 1.0]
OK,
```



```
DENSITY      -0.39
X POSITION   510.26
X SIZE       296.54
Y POSITION   0.00
Y SIZE       605.42
DEPTH        13.32
THICKNESS    654.84
X SLOPE      -0.00
Y SLOPE      0.00
BASELEVEL    -25.00
ORIENTATN    0.00
SCALE        3.28
```

?Q

5 cm

fig. 39

3.4 Comments on follow-up results

Agreement between data from the initial gravity survey and the follow-up of features GL1, GL12 and GL14 was patchy, indicating that data recording and punching errors have affected the initial survey, leading to spurious anomalies due to bad stations and loops. Thus it is clear that:

(1) detailed follow-up of regional features is essential, before any additional work is done,

(2) close supervision by an experienced geophysicist is essential for all major surveys.

3.5 Hampshire Gate Area (Including GL1)

44 additional gravity stations were read in the vicinity of the Hampshire Gate while following up feature GL1. This feature was found to be a spurious anomaly, probably due to an error in recording or punching the base station information for one loop of the original survey. These stations did, however, confirm the existence of a strong gravity gradient representing the edge of the main granite mass. This gradient indicates that the granite apophysis which is interpreted to be the source of the Kara tungsten mineralization,also underlies the Highclere and Guildford E.L.'s in this area. Thus this area is of considerable interest, as it could well be on a continuation of the Buckby carbonate stratigraphy. (Carbonates have been mapped in the area).

3.6 Gravity Modelling

Gravity modelling has been carried out in order to get some idea on the nature of the granite contact and depth to granite, beneath the basalt cover.

In general, shallow models (less than 100 metres) give a slightly better fit to the observed gravity, and they give a much more reasonable base level (for regional modelling, the base level can be reasonably well constrained). Thus a reasonably shallow depth to granite is preferred - but the fit for depths of over 200 m is still quite reasonable, so the depth to granite is not particularly well constrained by the gravity alone.

Modelling of profile 1 indicates that the granite contact dips steeply, although the direction of dip (east or west) is not well constrained. A dip to the east tends to give a slightly better fit (see diagrams in section 5). The thickness of the granite (of the order of 700 m) indicates that it could well have a laccolithic nature.

Profile 1 also shows that a gravity ridge possibly follows the contact. A similar ridge occurs in the Natone-Stowport area, and could well be due to contact metamporphism/metasomatism.

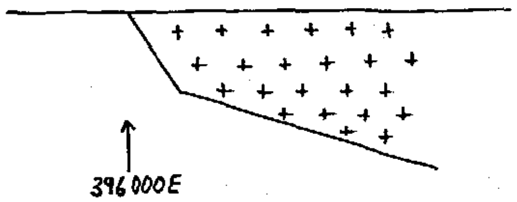
A maximum density contrast of 0.6 was specified when using GRAMOD. In all cases, this maximum was used in the final model (within tolerances). This contrast is probably too large : a contrast of 0.3 would be a more reasonably maximum. If this contrast was used, the depth to granite would probably need to be decreased.

3.7 Form of the Main Housetop Granite Mass

The general form of the regional gravity over the Housetop Granite confirms the conclusion by Sheehan, in his honours thesis, that the main granite is laccolithic in nature and that its cap has been eroded away. Quick interpretation of the profiles shown in drawings D/MQ00/010 to 016 yields the following rough ideas on the shape of the main granite mass.

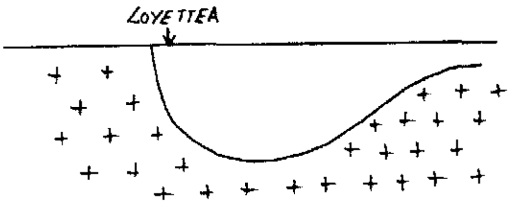
Profile A-A': There is a sharp, 8 mgal contact-type anomaly near Natone, indicating a steeply dipping granite contact.

Profile A1-A: The western granite contact probably has the form



(Profiles B'-B, C'-C, C1-C, D'-D, F2-F1, H'-H, G'-G, J'-J all agree with a gently sloping western contact, of a laccolithic nature). An alternate model to explain the gravity might be that the granite has 2 phases, with a denser phase to the west, but modelling is required to see if this would adequately explain the gravity.

Profile A-A2: there is an 8 mgal gravity ridge slightly to the east of Loyettea, with low gravity further east, in the Gunn's Plains area. A possible granite shape is:



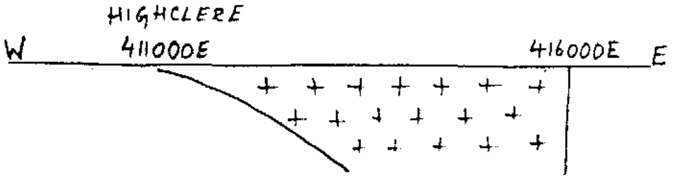
Profile B-B1: There is a 14 mgal sharp contact in the vicinity of 416000E, implying a steeply dipping granite contact.

Profile F1-F: The central core of the granite is in the vicinity of 5423000N, 405000E, on this profile.

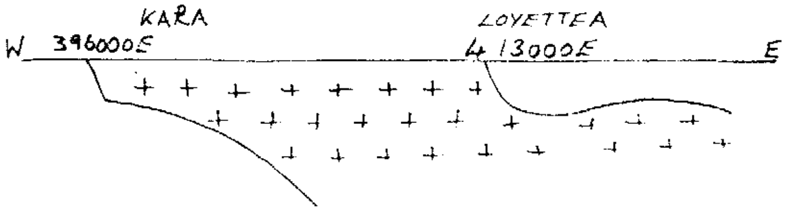
3.8 Conclusions

Hence the following possible sections across the Housetop Granite can be derived:

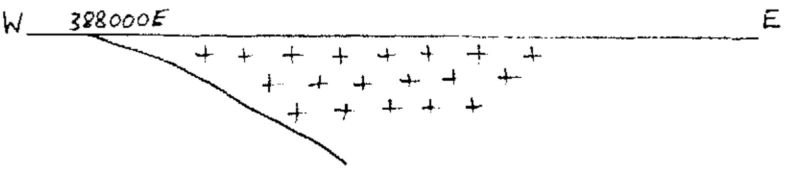
5 435000N



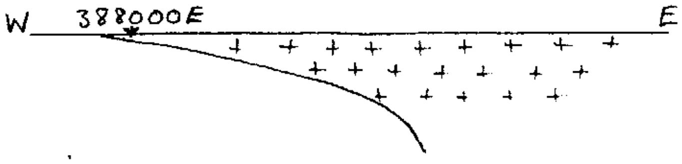
5 430000N



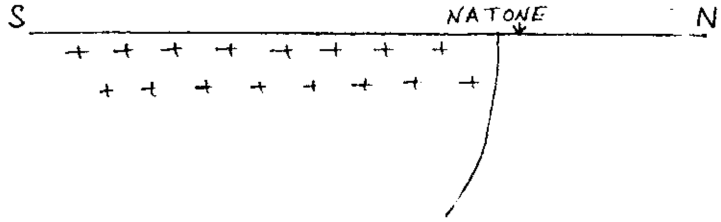
5 418000N



5 410000N



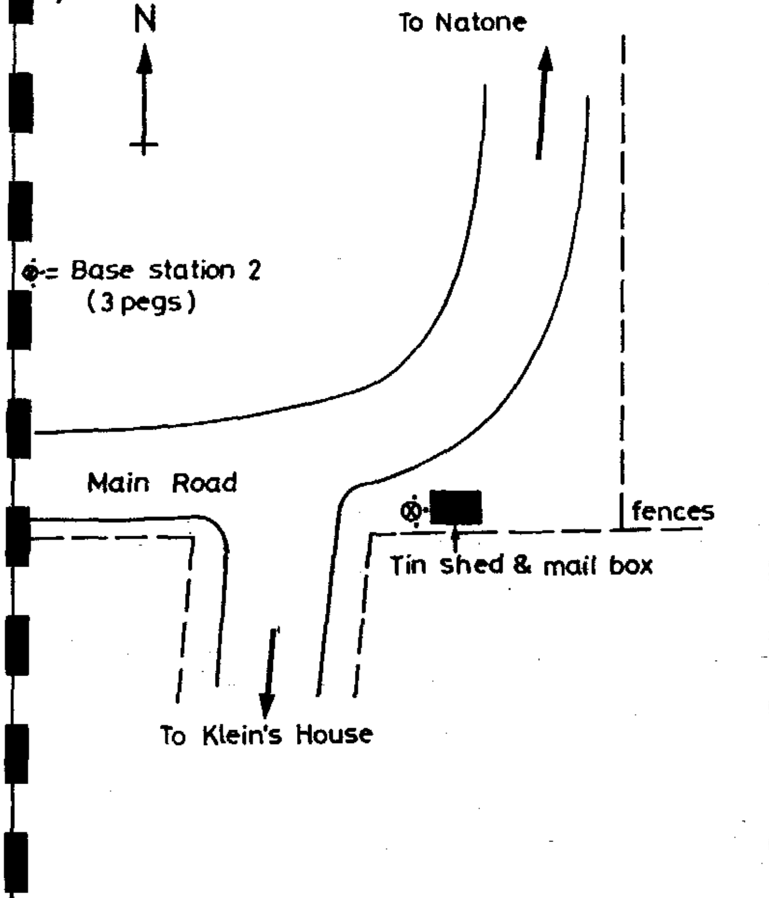
410000E



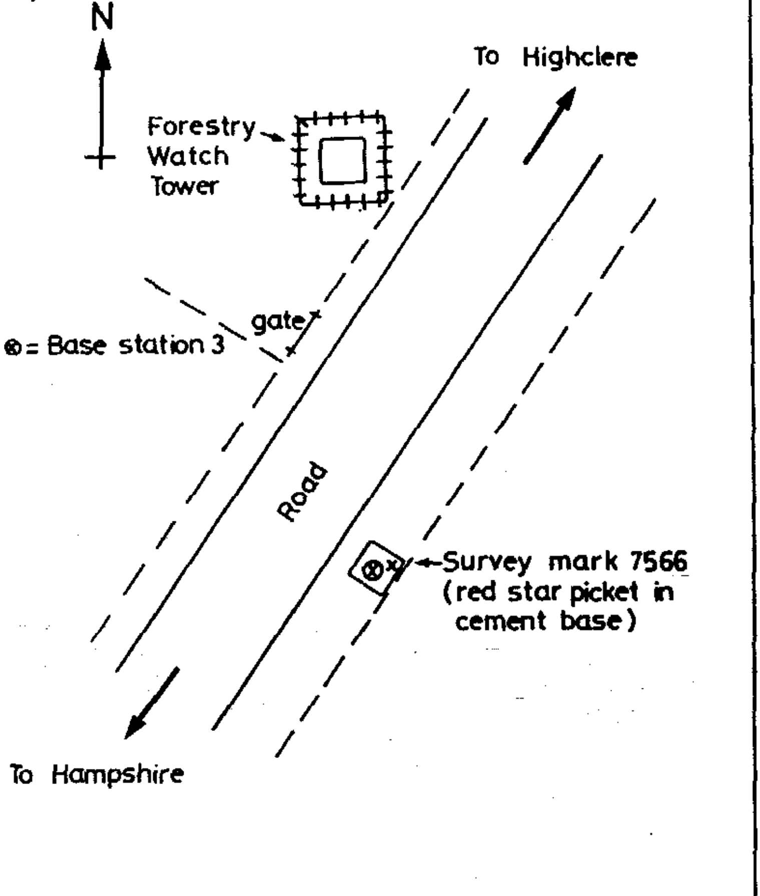
GRAVITY BASE STATIONS

(For values see Table 1)

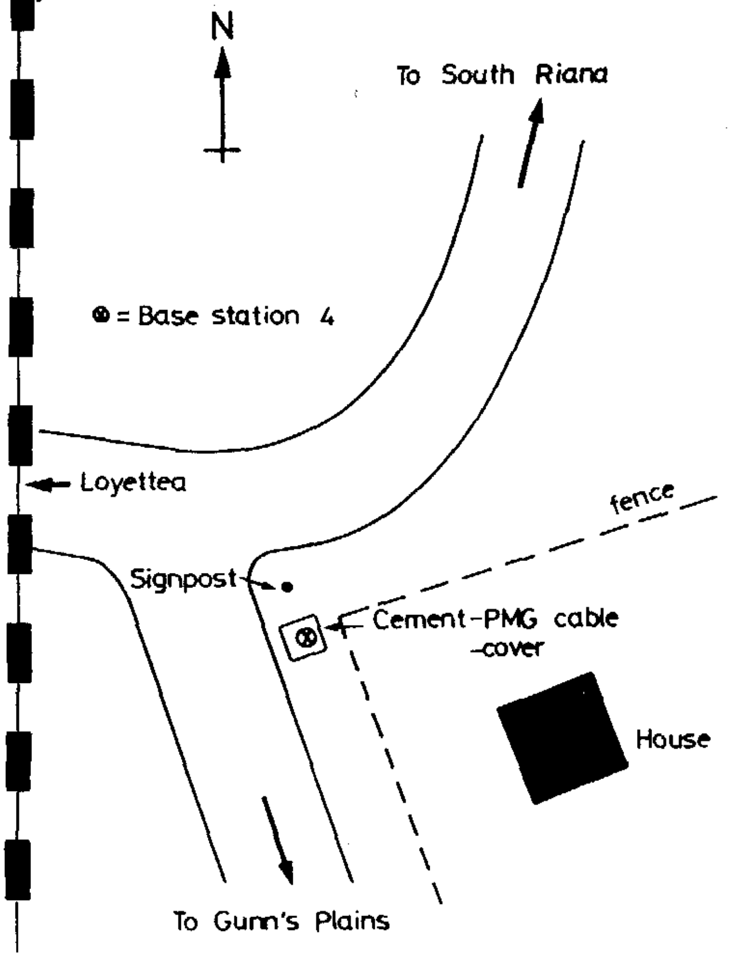
2/



3/



4/



5/

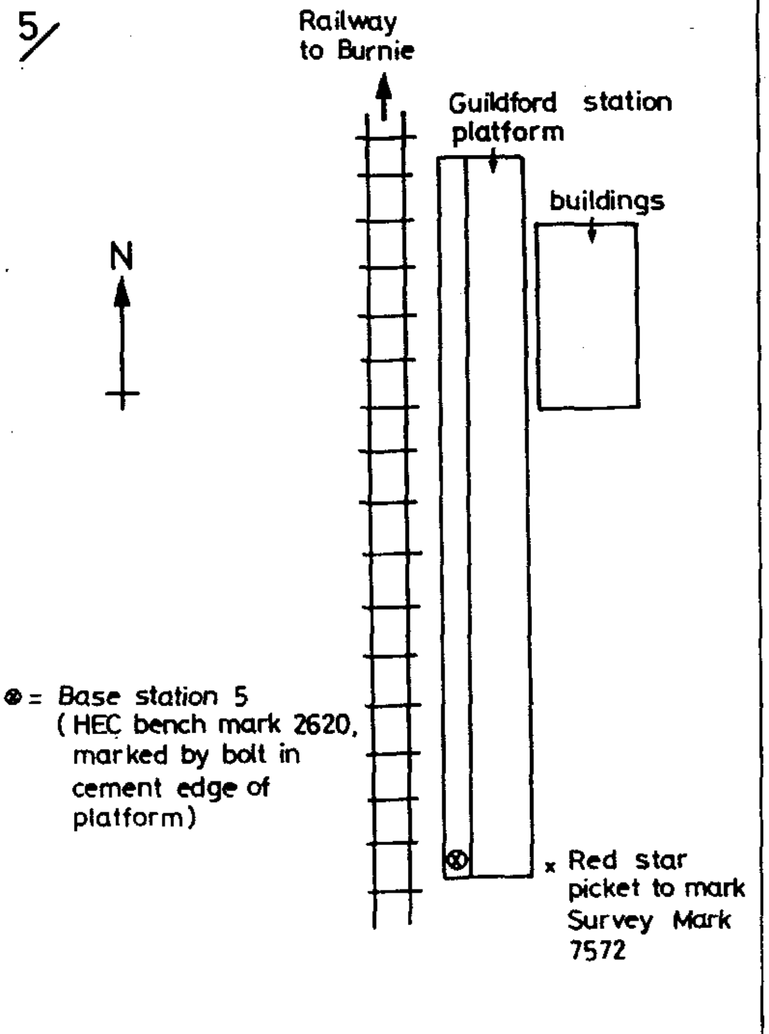


TABLE 3.1

TAS. REGIONAL GRAVITY BASES

	Location	Latitude	Elevation	Absolute Gravity	Description
1	Devonport		7.5± 1.9 m	980,282.09 mgal	Mersey Bluff Lighthouse - BMR station 6491.1141
2	Natone 408650E 5442200N (Burnie 1:50000 sheet)	41° 10' S	275.4±1.3 m	980,227.13 ±0.02 mgal	3 pegs to side of mail box at entrance to Klein's property.
3	Highclere 398550E 5434650N (Burnie 1:50000 sheet)	41° 14' S	490.585 m	980,190.18 ±0.04 mgal	Nolan's Hill.survey mark 7566
4	South Riana 413300E 5431950N (Loongana 1:50000 sheet)	41° 16' S	369.7±2.1 m	980,202.92 ±0.05 mgal	PMG cable cover at Gunn's Plains turnoff ~ 3 km south of South Riana
5	Guildford 390800E 5412650E (Waratah 1:50000 sheet)	41° 26' S	619.883 m	980,178.92 ±0.06	HEC bench mark 2620 on southern end of Guildford station (bolt on edge of platform)
6	NIETTA 422250E 5419750N		492.3±4.4 m	980,192.25 ±0.06 mgal	

4.0 RADIOMETRICS

4.1 Processing Method

Following work done by the BMR which showed that tin-bearing granite phases can be distinguished from non-prospective phases by their radiometric signatures (especially by the amount of uranium enrichment), it was decided to examine the airborne radiometrics, with a view to delineating separate phases, if any within the Housetop Granite. A discriminant analysis-style approach was to be used for this work. A secondary aim of the examination was to outline further areas of possible outcrop through the basalt, especially in Guildford E.L., where follow-up of total count anomalies had already yielded several areas of outcrop.

As Geometrics did not perform the standard corrections (altitude, spectral stripping, etc) on the data, it was first necessary to do these corrections. Due to the need to develop and test programs for this purpose, the corrections took some time and hence not as much time as was hoped could be devoted to developing programs to analyse the data. The lack of time also meant that no feedback between interpretation and processing was possible. Hence the final interpretation is only rough and is of little value for detailed geological mapping in the area, although it appears to have been successful in delineating possible granite phases.

Once the standard corrections had been performed, scatter diagrams of uranium vs. thorium, uranium vs. potassium and thorium vs. potassium for all data points were produced. This was done by scaling each count to a percentage of the maximum count for that channel and then contouring the density of data points for each 1% by 1% window. Figures 4.1 to 4.3 contain the resultant scatter diagrams.

047

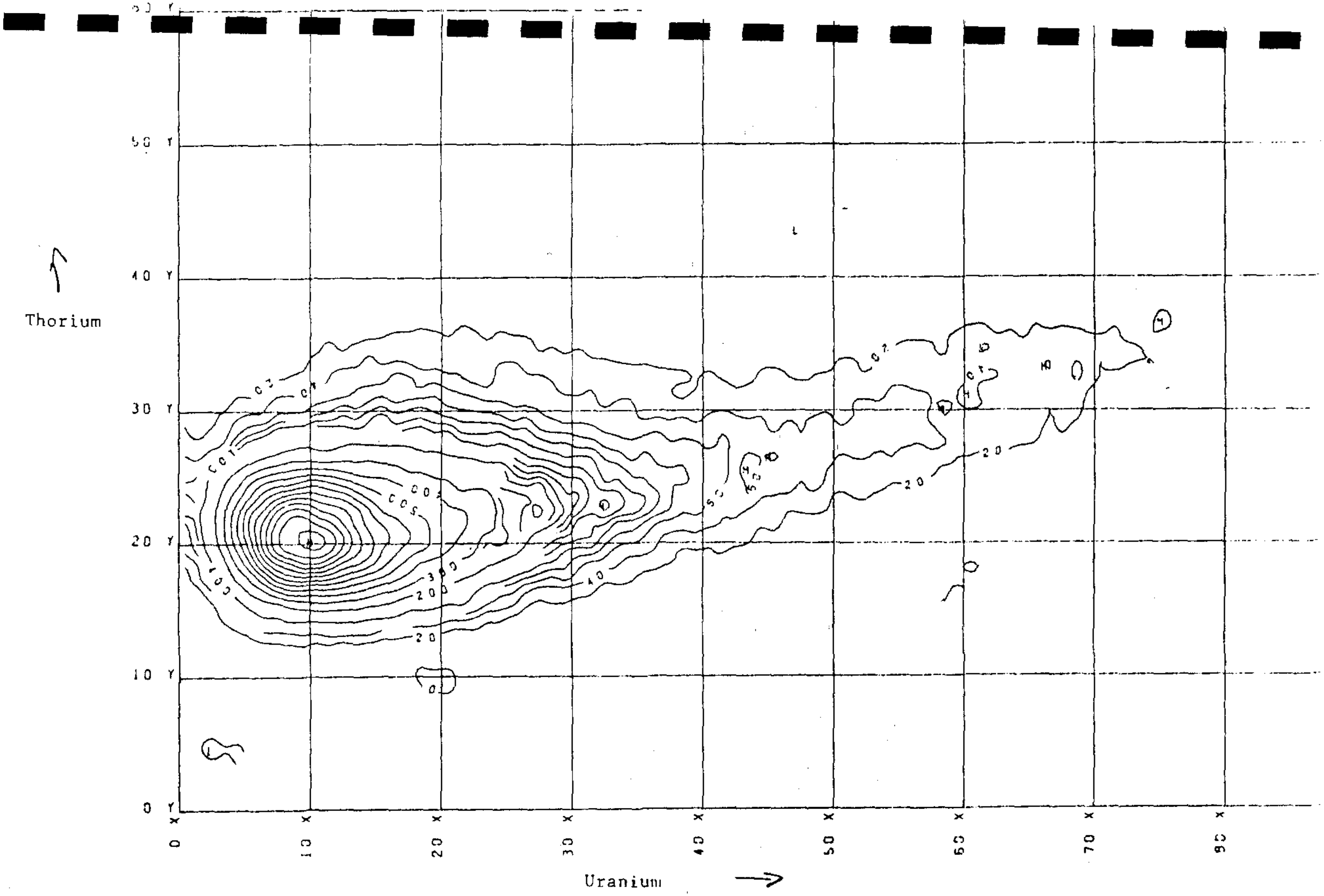


FIG. 4.1

432049

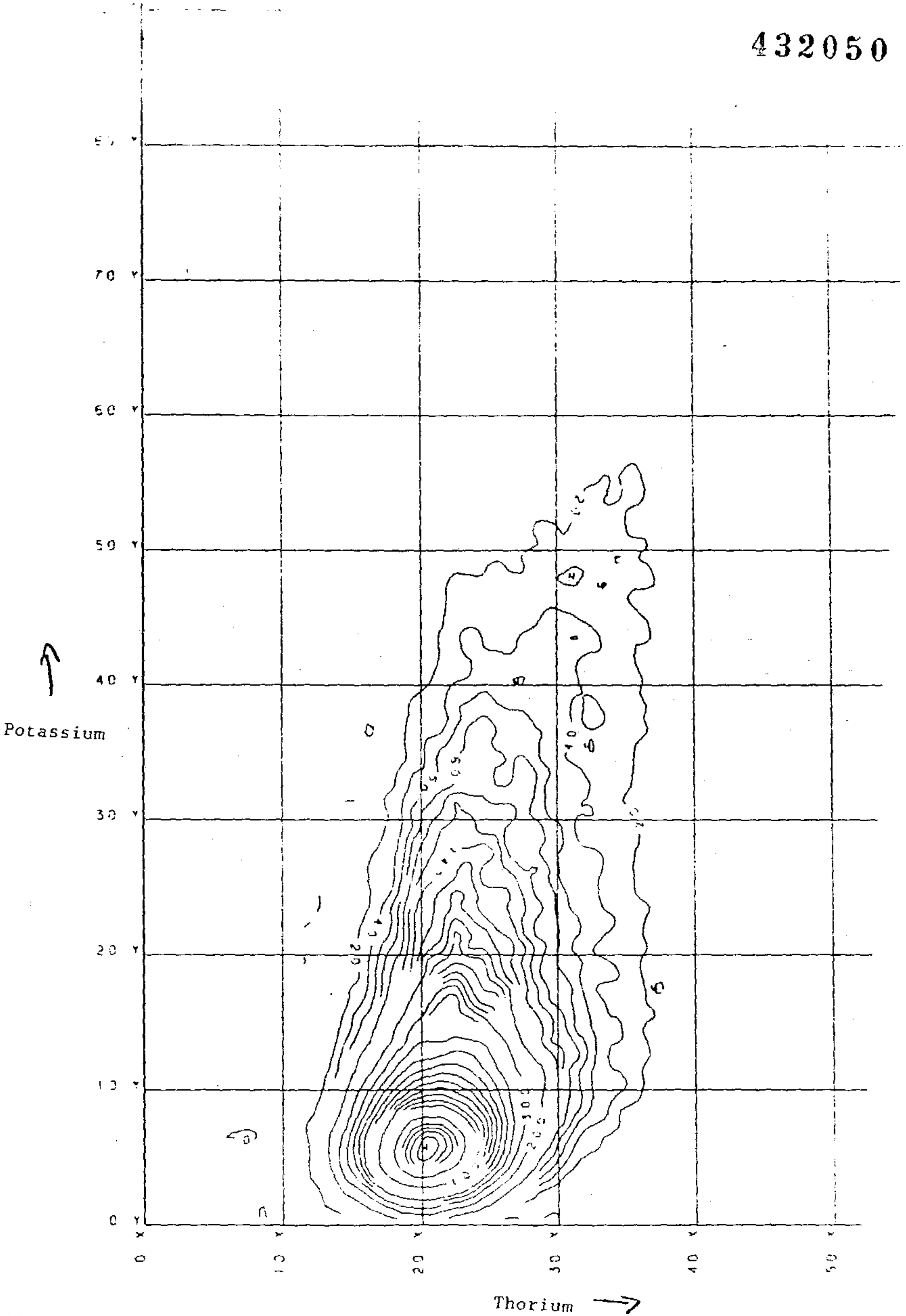

80
70
60
50
40
30
20
10
0
Potassium
0
10
20
30
40
50
Thorium
20
40
50
100
200
300

FIG. 4.2

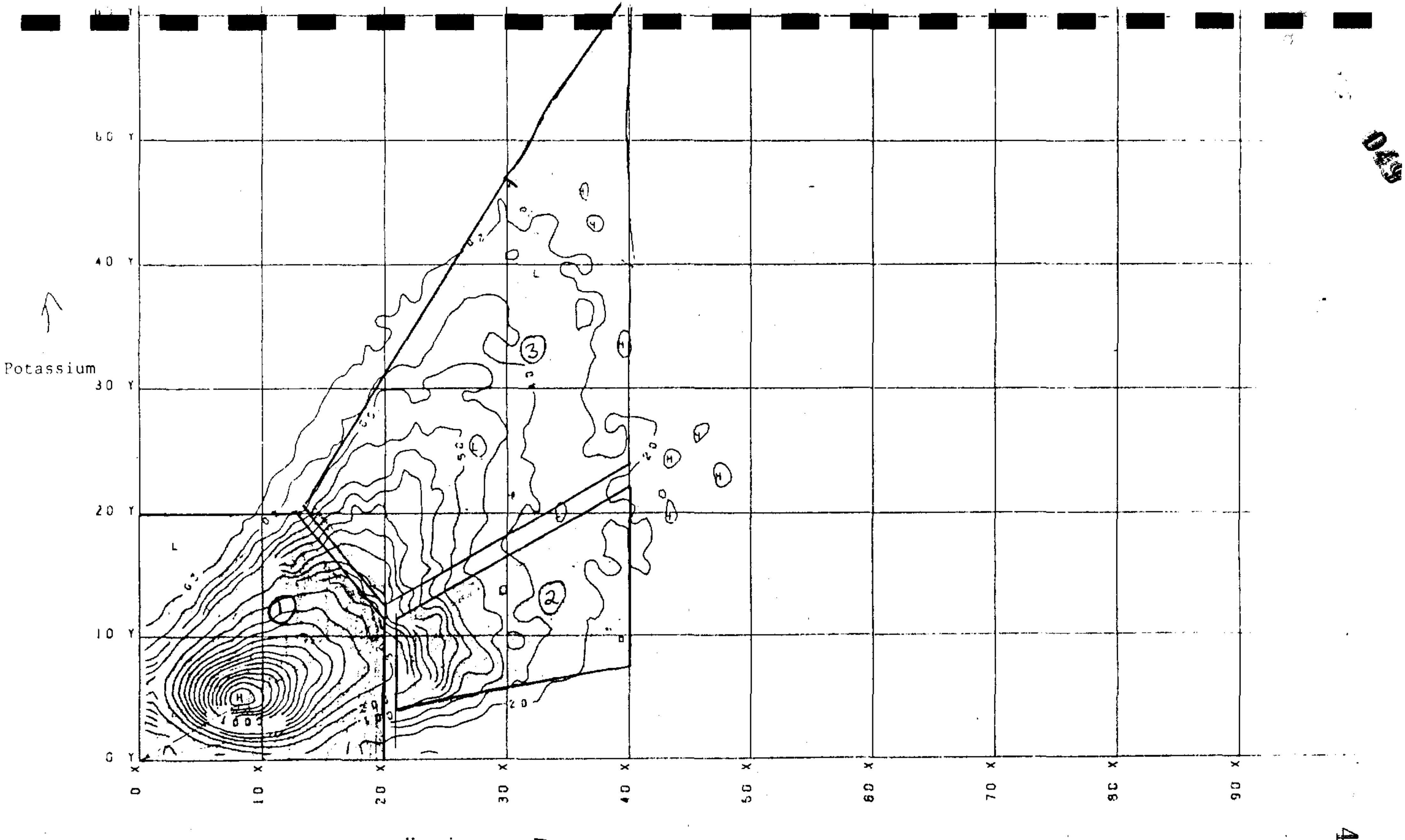

Potassium
Uranium
0
10
20
30
40
50
60
70
80
90
0
10
20
30
40
60
L
H
1000
20
50
3
2

FIG. 4.3

The scatter diagrams indicate that thorium is not a particularly valuable mapping parameter for this survey, as it has only a small spread of values. It is possible that the maximum count used for scaling thorium was too large (probably due to an outlying data point from an area of poor terrain clearance), and hence that the percent-maximum transformation used on the data has bunched it up too much to be of use. Unfortunately, there was not enough time to enlarge the plotting scale for throium and possibly overcome this problem, so thorium was not used in the discriminant analysis.

Fig. 4.3 also shows the 3 fields used for the discriminant analysis. These fields have been defined on the basis of potassium and uranium only. Field 3 represents samples enriched in uranium relative to potassium, and is therefore the field of interest when trying to define prospective granite phases. Discriminant analysis was performed by assigning data points to populations 1, 2, 3 or a remainder, depending on the field in which they fell. Although this is not a particularly rigorous procedure, in a statistical sense, it was the best that could be done without extensive program development, and appears to have been reasonably successful, given the modest aims of the processing.

4.2 Data Characteristics (After corrections)

Population	Size		Mean	Count	
		Total	K	U	Th
Entire Survey	196404	897	116	45	55
1	115821		28.1	16.9	
2	16060		48.1	42.5	
3	12252		105.1	42.8	
Remainder (R)	46361		107.2	54.7	

Notes:

1. 5910 data points from the entire survey were rejected prior to discriminant analysis (this explains why the population sizes do not add up; and why all groups have a potassium mean lower than that for the entire survey). The points were rejected on the basis of excessive terrain clearance, which causes the altitude correction to "blow up".

2. Population 1 represents the bulk of the survey, with low counts. Population 2 represents areas enriched in uranium relative to potassium. Tin granites should fall in this field, from the BMR's work. Population 3 and the remainder represent areas of high counts (usually granite), but with low uranium relative to potassium.

4.3 Interpretation

4.3.1 Areas of Interest

Drawings D/MT 24/36 to 39 give the distribution of discriminant groups on the survey area (four 1:50,000 sheets). Six areas for further follow-up are outlined:

A]
D] - These are total count anomalies on Guildford E.L.,
E] representing areas of possible outcrop. These should be ground checked with geological mapping and spectrometer traverses, if time permits.

B]
C] - These are possible uranium - enriched zones within
F] the Housetop Granite. Zone C is in the Lake Kara area, covering Crane's tin prospect and areas of anomalous stream sediment geochem. Zone B is to the east of zone C, and is surrounded by a possible magnetic aureole (see section 1.3). The existence of such a magnetic aureole is an upgrading feature (n.b. the aeromag. over zone C has not been examined in detail, therefore the possibility of an aureole has not been tested there). Zone F is on the north-eastern margin of the granite (south of Natone and Upper Stowport), and may also be associated with a magnetic aureole. All three zones should be followed up with geological mapping and sampling and radiometric/mag. susceptibility readings, to check for the existence of separate granite phases and determine their potential for tin mineralization.

4.3.2 Geological Correlation

Although the processing of the data has not been optimized to geological mapping, as noted in section 4.1, the following correlations between geological formations and radiometric discriminant groups are apparent:-

Granite - (a) Housetop Granite - groups 2, 3 and R (areas of group 2 reflect possible uranium enrichment; zones B, C and F of section 4.3.1).

(b) Dove Granite - groups 3 and R (no areas of group 2).

(c) Dalcoath Granite - not covered by radiometric data.

Basalt - groups 1 and 2. (Group 1 dominates, and I suspect that the areas of group 2 reflect "spillage" from the granite due to the window seen by any airborne spectrometer. Alternately, group 2 may reflect a specific basalt flow, but this seems less likely).

Gordon Limestone - groups 2, 3 and R (variable).

Moina Sandstone - group 1.

Roland Conglomerate - groups 1 and 3.

Cambrian Volcanics - groups 1, 2, 3 and R (very variable). Detailed examination (e.g. 1:10,000 or 1:20,000 scale) of the response over the volcanics may be useful at some stage, as an aid to mapping either individual units or alteration zones. Ideally, this would be done by a more detailed and rigorous discriminant or cluster analysis; but this would require considerable time for program development and feedback between processing and interpretation, unless an SPSS-style program is already available somewhere in AHO (such a program is not currently available on the Metals Division's PRIME). I suggest that a ratio parameter would be the best to use, if a complete analysis is not possible, as this would overcome many of the terrain clearance problems in the area; e.g. K/ U and Th) may be useful in mapping K-enriched zones.

Florence Sandstone - group 1.

Bell Shale - not enough coverage to assign a group with confidence.

Precambrian Volcanics - groups 3 and R.

Burnie Formation - group 1.

Rivers - groups 2, 3 and R - Due to altitude problems (specifically the problem with corrections in areas of excessive clearance) several rivers show up as linear strings of these groups. The problem of altitude corrections is even more apparent on some of the contour maps, where they have caused large spikes and gradients (the problem has also been accentuated to some degree by the recursive smoothing filter used).

5. ELECTRICAL SOUNDINGS

5.1 Rock Properties

Electrical surveys tend to distinguish 6 rock types in the area:-

Pyrrhotite Skarn - shows as an excellent conductor with high chargeability (e.g. Natone).

Magnetite Skarn - is a poor conductor, but very chargeable (e.g. Kara sample and surveys).

Precambrian Black Shales - are commonly excellent conductors and highly chargeable (e.g. Upper Stowport, INPUT anomaly IH5). Thus electrical surveys done cannot distinguish between pyrrhotite skarn and black shales with any confidence.

Granite - is very resistive and of very low chargeability (e.g. from IP along baseline, 1200E, at Natone; EM-37 sounding at Hampshire Gate).

Ordovician lst. and sst.; Cambrian volcs. - are quite variable (depending on content of clay, carbonaceous material, minor sulphides and magnetite). They may give low-order chargeability anomalies, but are rarely particularly conductive.

Basalt and associated Clay Bands/Palaeoweathering Zone - while fresh basalt appears to be quite resistive, it is almost invariably associated with clay bands; either at flow interfaces or in a palaeoweathering surface at the base of the basalt. These clay bands are quite conductive and hence give good EM or resistivity anomalies. They are not chargeable, however, and hence can be distinguished from sulphide conductors by IP surveys.

A typical geo-electrical section through basalt would seem to be (from 9 galvanic soundings and several down-hole IP/ resistivity surveys):-

1. thin resistive layer (300-2000 ohm.m)
   (possibly related to either thickness of uppermost flow or to depth to water-table)
2. conductive layer (10-40 ohm.m)
   (clay bands at flow interfaces?)
3. resistive layer (100-300 ohm.m)
   ("fresh" basalt?)
4. conductive layer (10-70 ohm.m)
   (palaeo-weathering surface?)
5. resistive basement (300-5000 ohm.m)

   (layers 2 and 3 may not be present, or could quite conceivably be repeated several times).

The thickness of each layer varies considerably from place to place. Depth to basement may be 200 metres or more, and rapid lateral changes (due to rugged pre-basalt topography) seem to be the rule. Layer 4 (the palaeoweathering surface) is the main barrier to penetration by electrical techniques, as it may be thick (e.g. 70 metres, from drilling results) and quite conductive (10-30 ohm.m, from modelling and borehole logging), giving a conductive overburden of the order of 1-6 mhos (e.g. 5-6 mhos for interpretation of Hampshire Gate EM-37). Apart from the problem of conductivity, its thickness alone represents a barrier to several techniques, with any fresh bedrock conductors being at depths of 100+ metres. The maximum penetration of max-min is of the order of 150 metres (200m coil separation), even in resistive condictions.

5.2 Galvanic Soundings (including Regional IP)

A total of 9 galvanic soundings (using Schlumberger array) have been done by Shell - 7 on Guildford/Loongana E.L.s (locations shown on drawing D/MQ 02/043), one at Highclere and one at Lorinna East. In addition, Comalco did several soundings, including 3 at Talunah Road, but I have not seen quantitative interpretations for these soundings (although qualitatively they appear similar to our soundings). Two lines of regional IP (dipole-dipole with 200 metre dipoles and n = 1 to 8) have been done in the Hampshire Gate area. The main aim of the IP work was to obtain high quality resistivity data, with chargeability as a by-product.

The aim of the soundings has been to determine the thickness of basalt cover and the basalt's electrical properties. Although the soundings have given useful information on basalt properties (with good correlation to downhole logs), their success in determining basalt thickness has been dubious at best. The conductive nature of the clay bands has meant that a large spread is required to see through them. In many cases the spread used has not been large enough, and where it has been large enough, interpretation is difficult due to the effect of lateral changes over distances of a kilometer or more. (See Final Report on Guildford E.L. for Schlumberger sounding plots).
The regional IP was done in an attempt to overcome the effect of lateral changes. Lateral effects can be seen on the pseudo-section and hence a 2-dimensional modelling programe can be used, rather than the 1-d interpretation approach used for most soundings. The two lines of dipole-dipole were quite effective, and gave relatively cheap cover of a reasonable area; but use of this technique is restricted to areas of reasonably straight roads and good access, as a large transmitter must be used.

Interpretation of the IP is given in section 6.2.3.

5.3 AMT/EM-37 Soundings (see also Final Report on Guildford EL)

EM soundings represent an alternative way to minimise the effects of lateral changes. As there is no need to expand the spread used, the lateral changes have less effect on the results than they do on galvanic soundings. This increase in data quality must, however, be paid for, with EM crews costing considerably more per day than IP/resistivity crews.

12 AMT and 1 EM-37 soundings have been done on Highclere, Guildford and Loongana EL's (locations shown on drawing D/MQ 0/1004). The EM-37 sounding was a test survey over drill hole HG 1, and its interpretation correlated reasonably well with the drilling results (see section 6.2.4).

The AMT inversion results are listed in the accompanying Table 5.1.

TABLE 5.1 Tasmania AMT Results : Shell Area : January 1983

SITE	EXHY	EYHX	JOINT with XY	JOINT with YX	DC	DRILLING	COMMENTS
1	87 — 119 26 — 245 570	85 — 114 16 — 164 1800	83 — 160 8 — 190 600			Basalt — 202 Seds,skarn — 255 Granite	N-S aeromag trend Dipole-dipole DC
2	50 — 420 980	40 — 360 1800					
3	65 — 26 39 — 260 980	35 — 58 26 — 235 390				>250 m of basalt	
4	20 — 34 140 — 105 30 — 330 570	20 — 50 60 — 60 40 — 320 170	(1000) — 1.5 14 — 6 40 — 430 770	(1000) — 1.2 23 — 90 60 — 440 290	104 — 1 55 — 130 10 — 150 (400)		N-S DC sounding (#6)
5	(4000) — (230) (3) — (250) 620	95 — 47 26 — 92 970					Noisy EXHY
6	76 — 213 9 — 250 2000	60 — 102 30 — 350 190		270 — 1 57 — 100 30 — 250 200	1000 — 4 130 — 180 10 — 230 (300)	Basalt >90 m	N-S DC sounding (#3)
7	NOT OCCUPIED						
8	50 — 230 5 — 270 440	60 — 200 19 — 330 260	53 — 245 3 — 255 430	53 — 245 7 — 300 280	700 — 5 60 — 220 (11) — 250 (300)		NW-SE DC sounding (#5)
9	54 — 240 10 — 290 230	63 — 170 16 — 270 390				Basalt >90 m	Noisy
10	40 — 160 2 — 180 600	40 — 56 34 — 310 530					
11	50 — 190 25 — 280 400	40 — 120 25 — 200 180					Noisy
12	25 — 13 70 — 210 1000	16 — 9 50 — 110 1100					

6.1 Guildford E.L.: Basalt Thickness

Drawing D/MQ 00/1004 indicates the results of various geophysical soundings and drill holes in the Guildford, Loongana and southern Highclere E.L.'s. It is apparent that over most of the basalt covered area, the basalt is at least 200 metres thick. (As far as electrical and electromagnetic soundings are concerned the 'basalt thickness' is in reality the thickness of both the basalt layer plus the underlying paleoweathered zones).

The implication of such a thick layer over fresh bedrock is that any mineralization will be extremely difficult to detect with any geophysical technique, since this zone is both variably conductive and variably magnetic (and dense).

6.2 Hampshire Gate Area

6.2.1 Aeromagnetics

Drawings D/MQ 02/039 and D/MQ 02/044 give a rough aeromag. interpretation for the Hampshire gate area, on northern Guildford and southern Highclere E.L.'s. Eight anomalies of interest have been picked in the area:-

i) Dudfield Road - magnetite skarn, probably beneath a basalt valley, intersected by hole HG1.

ii) Talunah Road - mag. anomaly of similar character and strike to Dudfield Road, but offset to the north. Comalco did some work on this anomaly, but have probably not tested the area adequately, given the results at Dudfield Road.

iii) Companion Road - mag. anomaly of similar character to Dudfield Road and along strike to the south of it.

iv) Reservoir West]
] - 2 small anomalies along strike and to the
v) Reservoir East] south of the Companion Road anomaly.

vi) 29 Mile Road - broad anomaly on the southern margin of the granite body.

vii) Peak Plain Road - small, broad anomaly near NW trending fault, to south of St. Valentines Peak.

viii) Old Park Mag. - small, broad anomaly near NW trending fault.

Drawing D/MQ 02/044 also shows trends in the aeromagnetics south of the major NW fault in the area. These trends represent an attempt to interpret basalt-filled valleys in the area. The significance of the trends is not clear however, due to the noisy nature of the basalt-covered areas and, I suspect, to the existence of reversely magnetised flows. Some magnetic low areas have also been shown, representing possible thin basalt or shallow granite. Again, their significance is unclear (eg. drill hole GF3 is in a mag. low area, but the basalt is not especially thin there - maybe granite is relatively shallow there).

6.2.2 Gravity Follow-up

150 additional regional gravity stations were read in the Hampshire Gate area during January 1983. These stations provide a check on the 40 or so stations read in the area during the initial survey, and give sufficient detail to allow a more refined interpretation of the gravity field in the area. The data density and quality is, however, still probably not good enough to allow a regional/residual separation or any detailed modelling. Such interpretation would aid considerably in mapping the topography of the top of the granite underlying the area, and should be done if time/resources allow the additional surveying and processing to be done at some stage in the future.

Drawing D/MQ 00/1008 shows the gravity field for the area, with an arbitrary datum added. This data has been derived from three surveys (initial survey in Jan. 1982; follow-up in Sept-Oct, 1982 and Jan, 1983). The three surveys overlap reasonably well and each station is probably accurate ∓ 1 mgal. The line A'A (Drawing No. D/MQ 00/010) represents the northern limit of the Jan, 1983 surveying, and interpolation across this line may be a little dubious (largely due to differences in the processing parameters used).

The steep gradients to the north and west of the area are also a little dubious, but they probably represent the western margin of the main granite mass, indicating that granite underlies the area at relatively shallow depth (probably of the order of 200-500 metres, from sounding and drilling results). The three gravity lows labelled on the drawing could well represent granite cusps on top of the main mass. It is interesting, that one of these lows lies between the Dudfield and Companion Road mag. anomalies, possibly explaining the lack of continuity of the mag. trend? I have not had time to interpret the gravity in detail but the existence of granite at relatively shallow depth throughout the area is obviously encouraging. Drawing No. D/MQ 00/008 indicates the regional gravity interpretation.

The NW fault in the south of the area is shown also - it appears to be associated with a kink in the gravity contours.

060

6.2.3 Regional IP and MMR: Basalt Thickness & Granite Contact Location

Two lines of regional IP (dipole-dipole with 200 metre dipoles and n = 1 to 8) were done along Basils and Dudfield Roads, to aid in the location of the granite contact (to assist gravity interpretation in particular) and give information on basalt thickness and the depth to granite. The good access and long, straight roads allowed a high-powered transmitter and IPR-11 receiver to be used, thus ensuring high quality data.

Dudfield Road IP (Fig. 6.2)

Figure 6.2 shows an IP2D model for the line along Dudfield Road. This model gives quite a good fit to the observed data, with the largest errors being at small n-spacings (where near-surface effects will be significant; and not worth trying to model. Lateral changes in the thickness and resistivity of the clay bands within and at the base of the basalt will control the resistivity at small n-spacings - it is impractical to try to model these changes. Similarly, the chargeabilities are dominated by the character of the basalt and the clay bands, so no attempt has been made to model chargeability).

The model in Figure 6.1 is geologically reasonable, and probably ties in reasonably well with the ground magnetics, although I have not had time to set up a detailed magnetic model for the area. The regional IP has given no control over the location of the granite contact, as the IP has not been able to discrimate between sediments and granite. The contact has arbitrarily been placed at the centre of the basalt-filled valley. However, the IP shows no evidence for Precambrian black shales (Burnie Formation - with low resistivities and high chargeabilities) to the west, so the basalt could well be underlain by limestone, even to the west of station OE. Alternatively, if the skarn intersected by HG1 is within the Gordon Limestone, the basalt at OE could be underlain by Moina Sandstone. As noted above, the geology under the basalt is not well constrained by the IP data; but the main point is that the IP does not deny the existence of a reasonable thickness of carbonates beneath the basalt, so further work in the area is definitely justified.

The IP has, however, been quite successful in determining the thickness of basalt - the line can be divided into 5 regions:-

i) West of 300E: basalt is probably of the order of 60m thick, with the weathered zone extending to 100m. Thus the area to the west of HG1 also has sufficient thin basalt to make further work worthwhile.

ii) 200E - 700E: basalt 100m thick, with the weathered zone extending down to 200m.

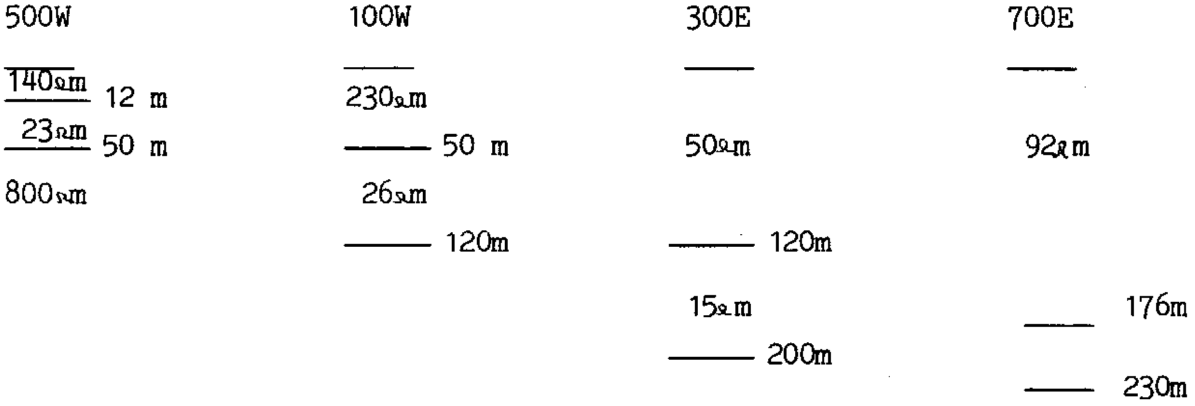
iii) 700E - 900E: 120m basalt, with weathered zone down to 300m.

iv) 900E - 1100E: 180m basalt, with weathering down to 300m. (The centre of the basalt valley).

v) East of 1100E: the basalt thins to the east, and is probably less than 60m thick by 2000E.

Basils Road (Fig. 6.7)

The IP on Basils Road shows similar character to that on Dudfield Road (with the basalt cover probably being thinner), so I have not prepared a detailed IP2D model. Using programme INVERT, I have prepared the following models:



The IP shows a contact at roughly 700W, so lateral changes probably override the INVERT Models (at least at 500W and 100W). Figure 6.8 shows an approximate model for the line. There appears to be a moderately chargeable (and slightly conductive?) zone to the west of 700W. As the line on Basils Road extends further west than on Dudfield Road, this zone could well be due to Precambrian shales (such as seen at Upper Stowport or IH5). If the skarn at Dudfield Road lies within Gordon Limestone, the unit to the west of 700W could be chargeable Moina Sandstone. The easterly dip of the units in Fig. 6.2 is included for geological reasons : it is not constrained by the IP (Gordon Limestone overlays Moina Sandstone, or Cambrian/ Precambrian Limestone overlays the Precambrian black shales).

MMR (Dudfield Road)

A test line of MMR was done on Dudfield Road, to see if this technique could successfully map the granite contact in the area. MMR would represent a fairly fast and cheap mapping tool, if it gives results, although it does not give as much information as dipole-dipole, and cannot be modelled with the programs currently available.

Figure 6.6 shows the MMR results. The basalt valley can be seen to extend from 0 to 1400E (which fits the IP2D model and the ground magnetics), although no firm information on basalt thickness is given. Contacts at 800E or 1400E could represent the edge of a granite cusp, with the contact at 800E fitting the drilling results at HG1.

062

DUDFIELD ROAD - IP MODEL

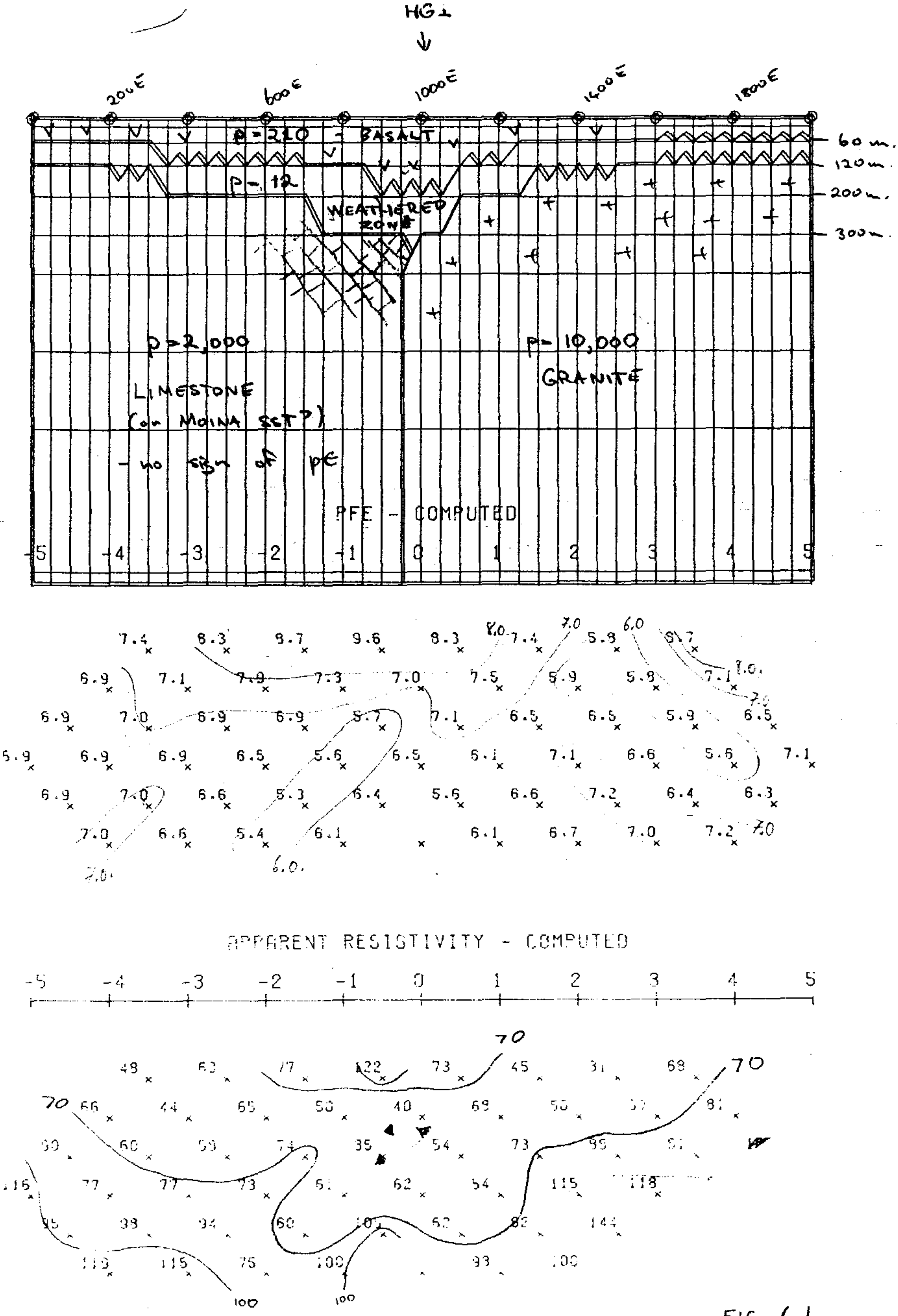
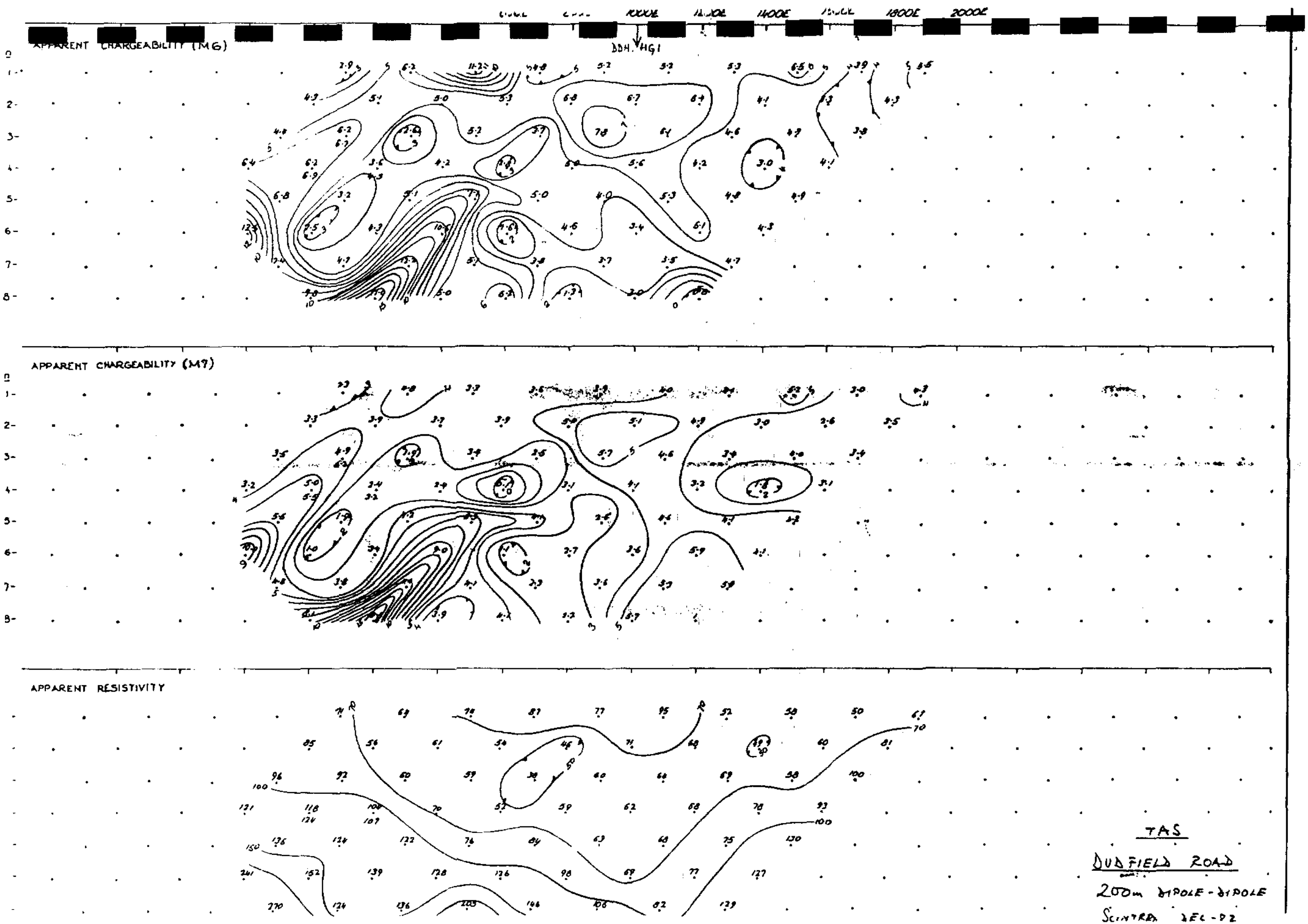


FIG 6.1.



TAS

DUDFIELD ROAD

200m DIPOLE-DIPOLE

SCINTREX IPC-7?

$T_{on.off}$ = 2 SECS

FIG 6.2

432066

064

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PAGE 1 OF 3 PAGES

DIAMOND DRILL HOLE Nº : HG-1

PROJECT : DUDFIELD RD
ANOMALY Nº : 3942/2
INCLINATION : 90°
DATE DRILLED :
CASING :

STATE : TAS
GRID COORDS (AMG) 5427600 m N 394300 m E (stn. 1000E on line)
AZIMUTH –
TOTAL DEPTH : 258.5 m

GROUND GEOPHYSICAL ANOMALIES : MAGNETIC

IP / RESISTIVITY LOGGING –
CONTRACTOR : SCINTREX (TAS-103)
DATE LOGGED : 10 JAN 83
ARRAY : 3 ARRAY
ELECTRODE SPACINGS : 10 m

SUSCEPTIBILITY LOGGING
BY :
DATE LOGGED :

MG

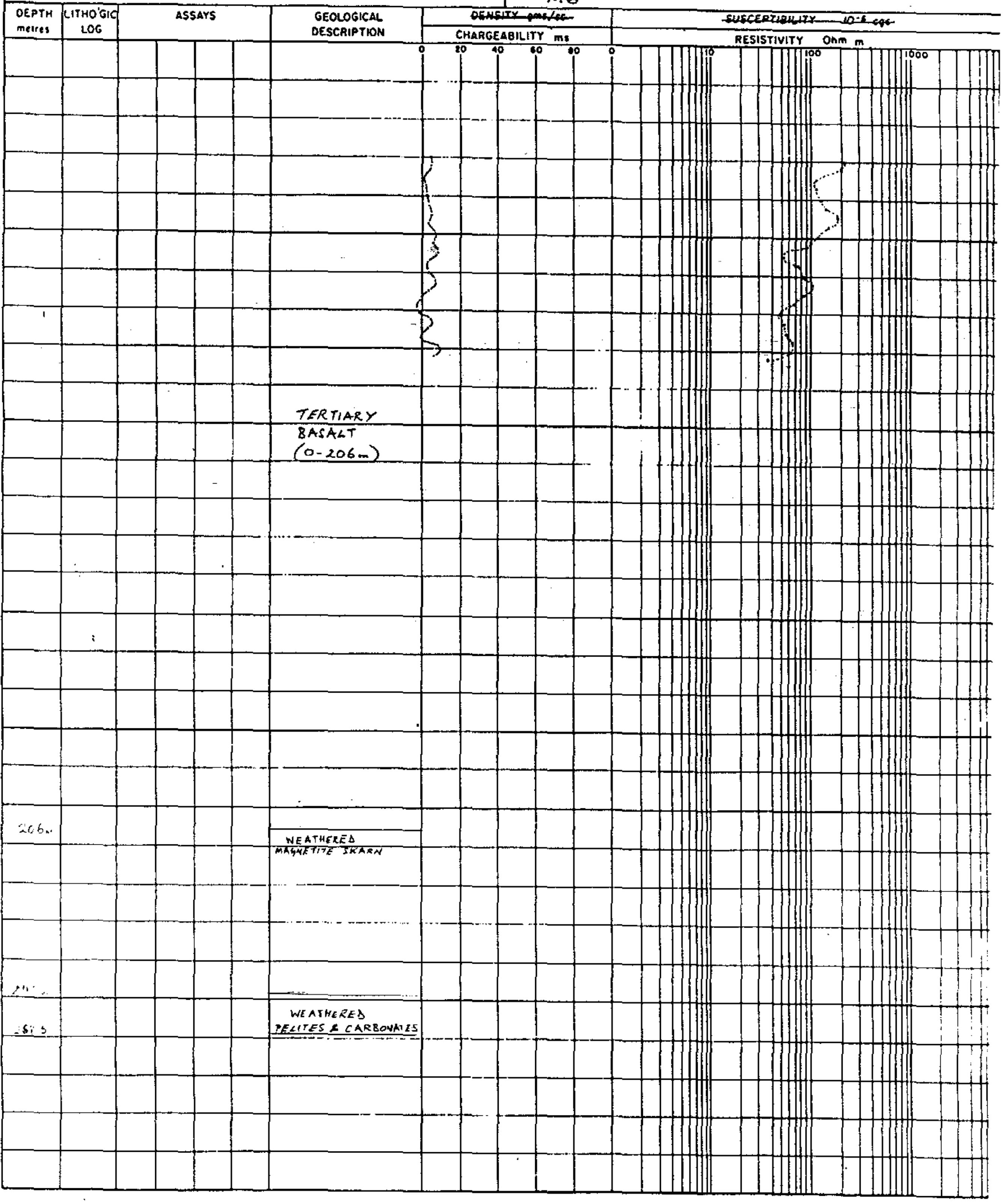

Fig 6.3

065

432067

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PAGE 2 OF 3 PAGES

DIAMOND DRILL HOLE Nº : HG-1

PROJECT : DUDFIELD RD
ANOMALY Nº
INCLINATION :
DATE DRILLED :
CASING :

STATE : TAS
GRID COORDS :
AZIMUTH :
TOTAL DEPTH :

GROUND GEOPHYSICAL ANOMALIES :

IP / RESISTIVITY LOGGING —

CONTRACTOR : SCINTREX (TAS-103)
DATE LOGGED : 10 JAN 83
ARRAY : D.H. ARRAY
ELECTRODE SPACINGS : 5m

SUSCEPTIBILITY LOGGING

BY :
DATE LOGGED :

M6

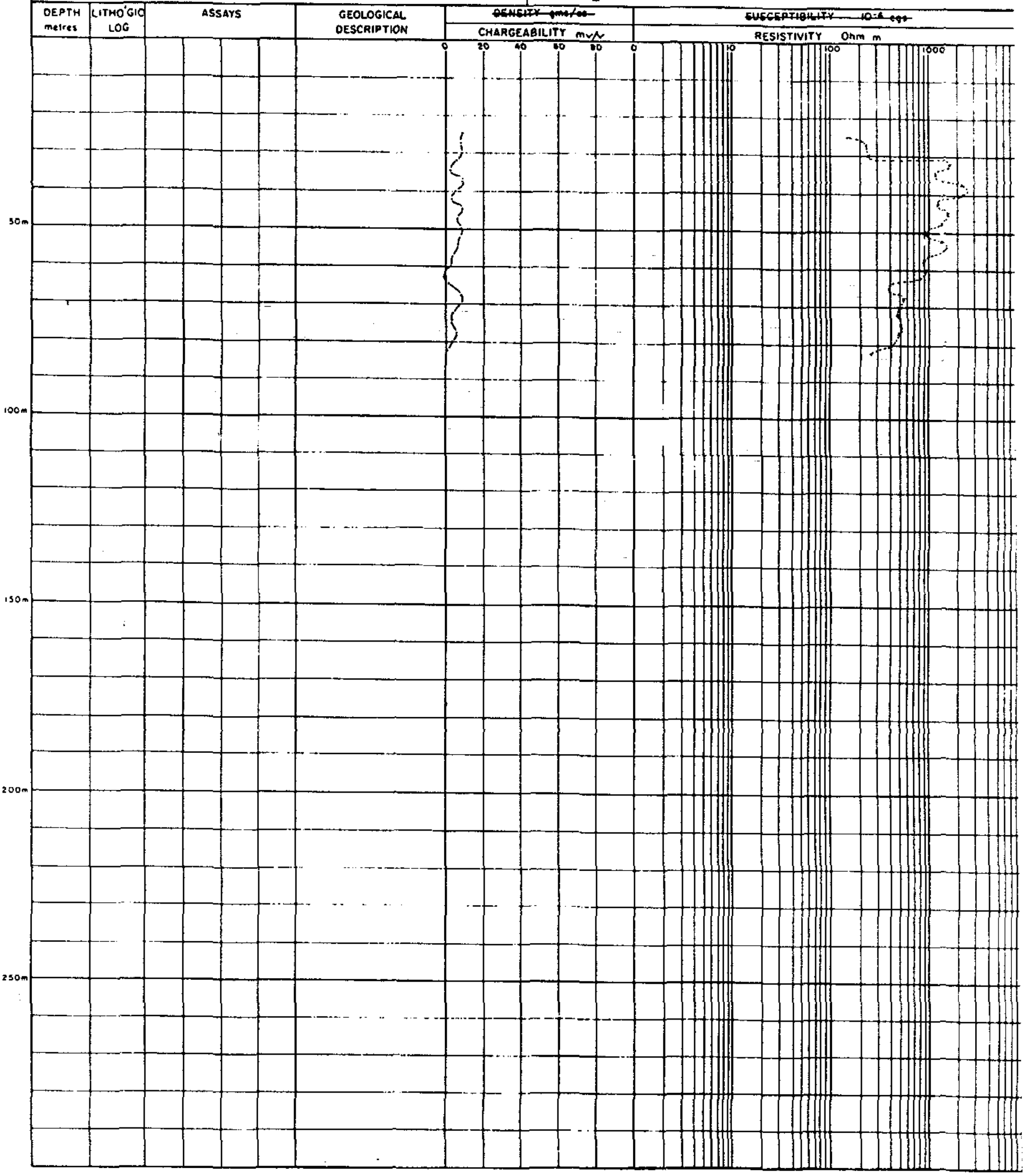

Fig 6.4

066

432068

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PAGE 3 OF 3 PAGES

DIAMOND DRILL HOLE N° : HG-1

PROJECT : OUDFIELD RD
ANOMALY N°
INCLINATION :
DATE DRILLED :
CASING :

STATE : TAS
GRID COORDS :
AZIMUTH :
TOTAL DEPTH :

GROUND GEOPHYSICAL ANOMALIES :

IP / RESISTIVITY LOGGING —

CONTRACTOR : SCINTREX (TAS-103)
DATE LOGGED : 10 JAN 83
ARRAY : P.H. ARRAY
ELECTRODE SPACINGS : 2.5 m

SUSCEPTIBILITY LOGGING

BY :
DATE LOGGED :

M6

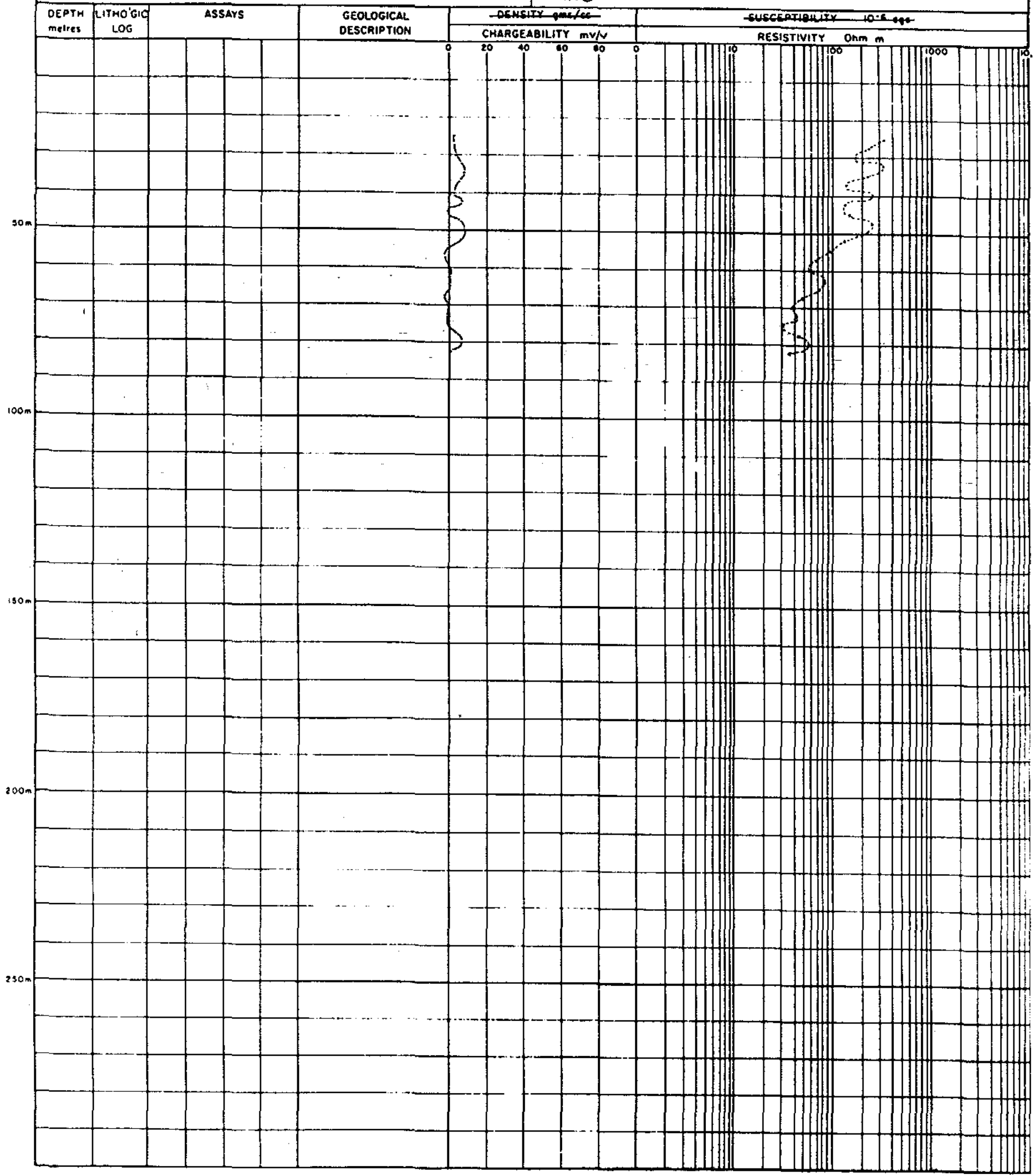


Fig 6.5

HIGHCLERE
Dudfield Rd
M.M.R.
TAS-103

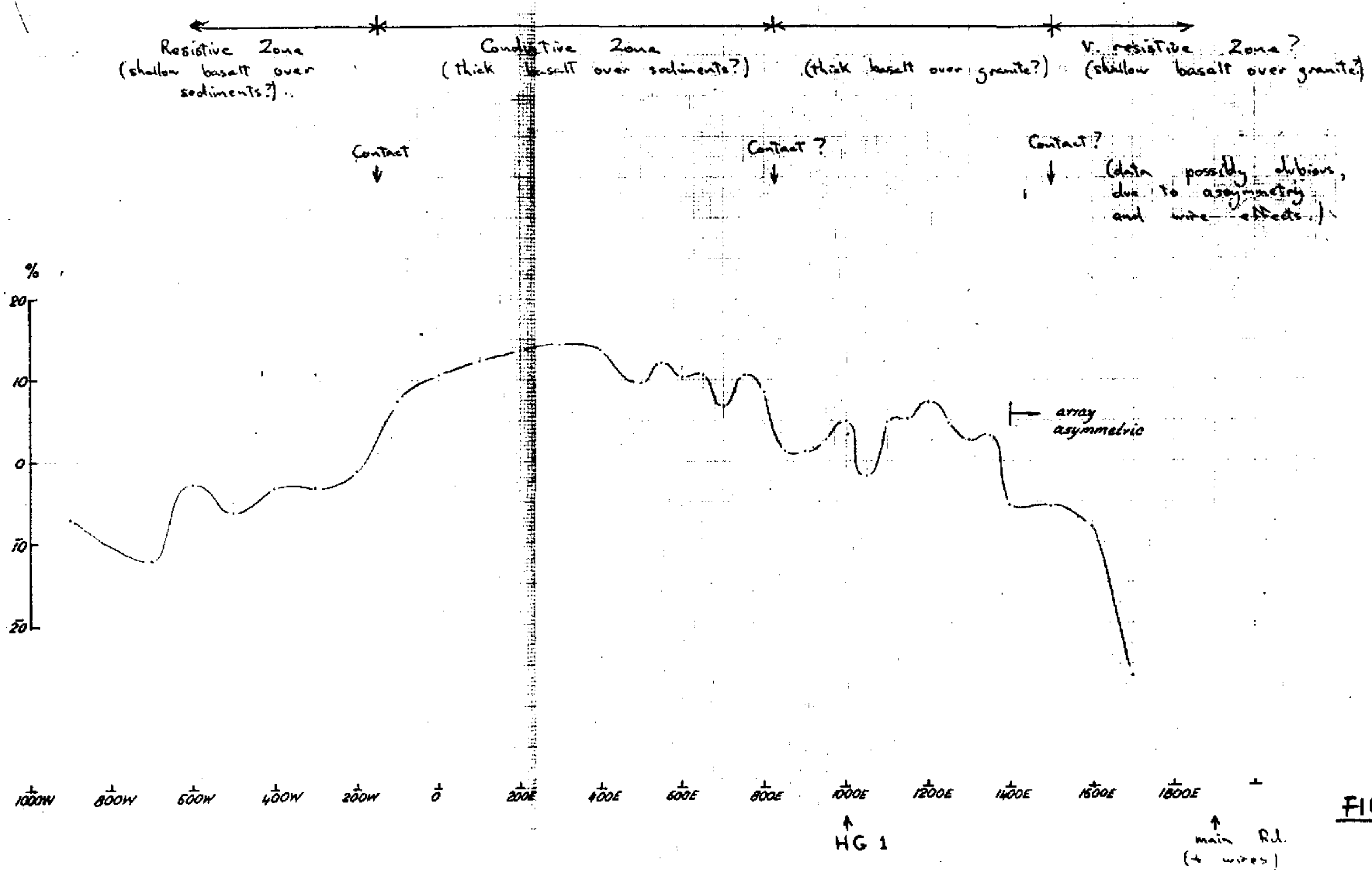
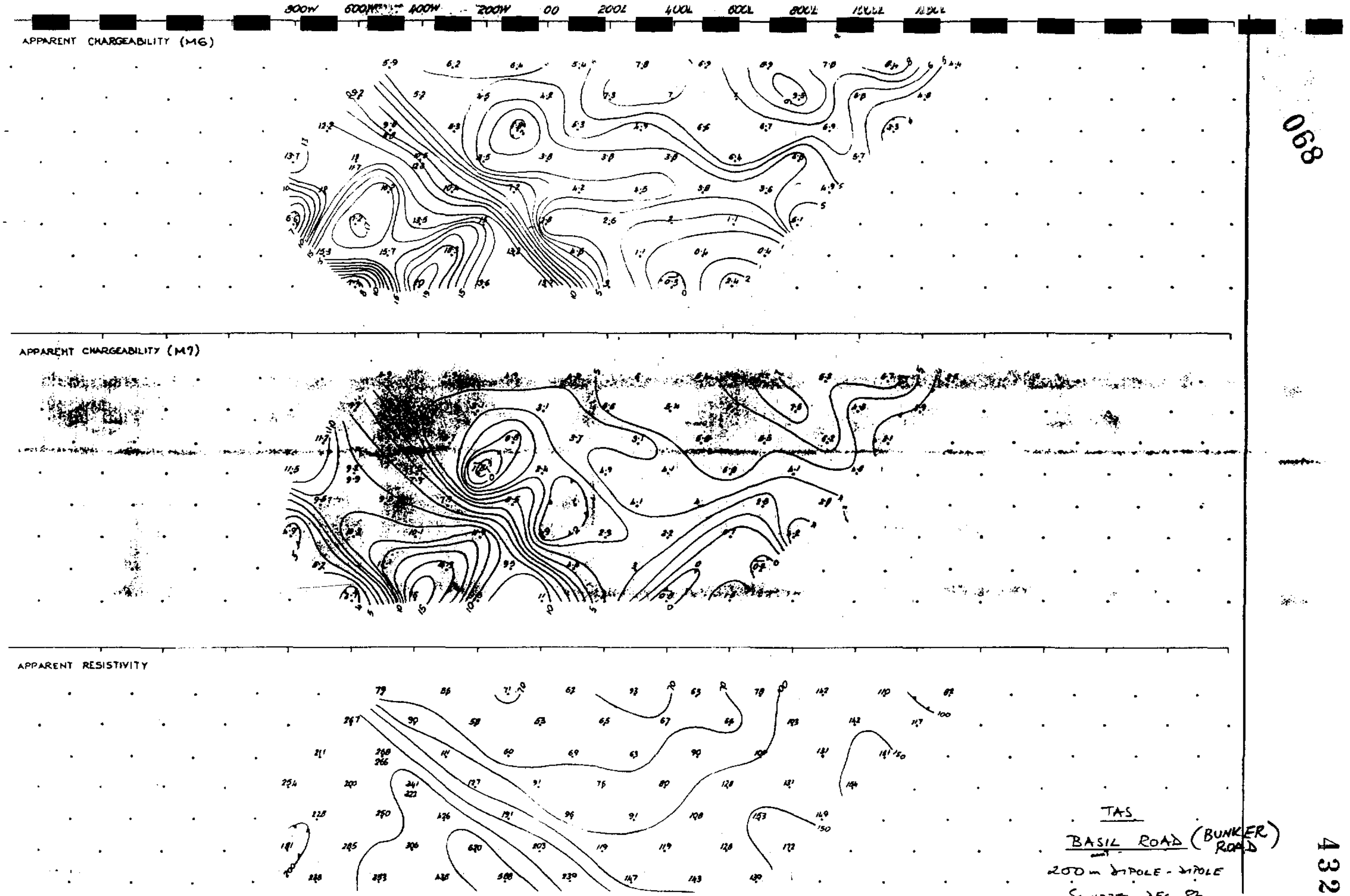


FIG 6.6



TAS

BASIL ROAD (BUNKER ROAD)

200 m DIPOLE - DIPOLE

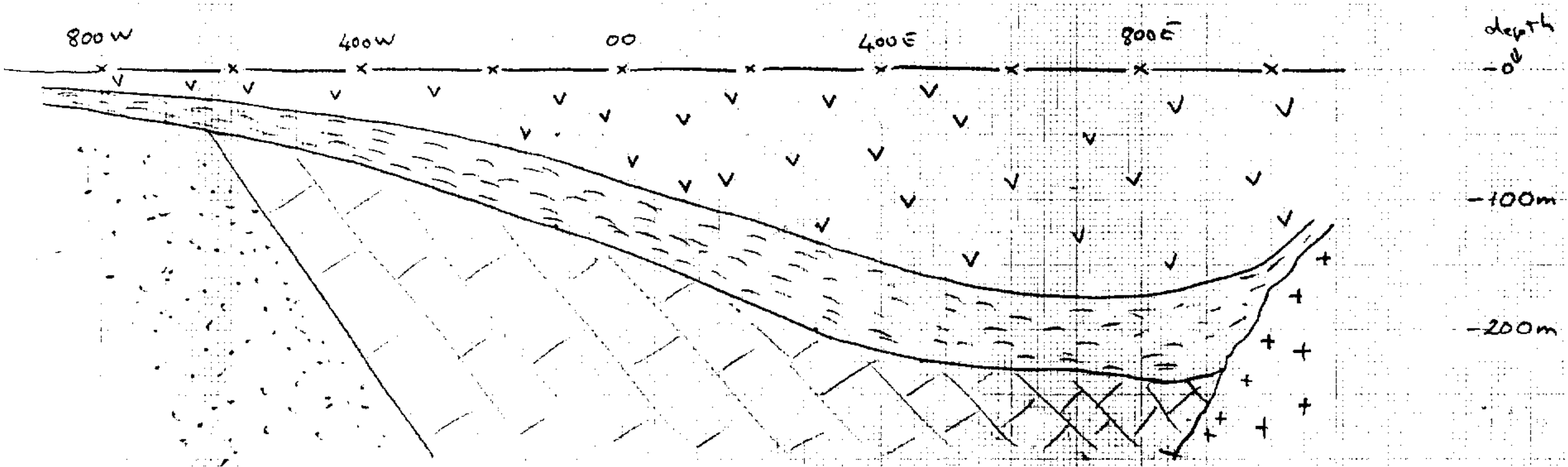
SCINTREX DEC 82

TON-OFF = 2 SECS

FIG 6.7

068

432070



v v v = BASALT

= = = = CLAY BANDS + SEDIMENTS

∴ ∴ = SHALES

⊥⊥⊥ = CARBONATES

+ + + = GRANITE

ROUGH IP INTERPRETATION - BASILS ROAD

FIG 6.8

SHELL COMPANY OF AUSTRALIA LTD.

Geophysical Log

PAGE 1 OF 3 PAGES

DIAMOND DRILL HOLE Nº : SH-1

PROJECT : (BASILS RD) BUNKER RD HIGHCLERE
ANOMALY Nº : 3941/2
INCLINATION : 90°
DATE DRILLED : 9-19/12/82
CASING :

STATE : TAS
GRID COORDS (AMG) 5420500 m N 391800 m E
AZIMUTH : –
TOTAL DEPTH : 202.5 m.

GROUND GEOPHYSICAL ANOMALIES : MAGNETIC

IP / RESISTIVITY LOGGING —
CONTRACTOR : SCINTREX (TAS-103)
DATE LOGGED : 10 JAN 83
ARRAY : D.H. 3 ARRAY
ELECTRODE SPACINGS : 10m

SUSCEPTIBILITY LOGGING
BY :
DATE LOGGED :

M6

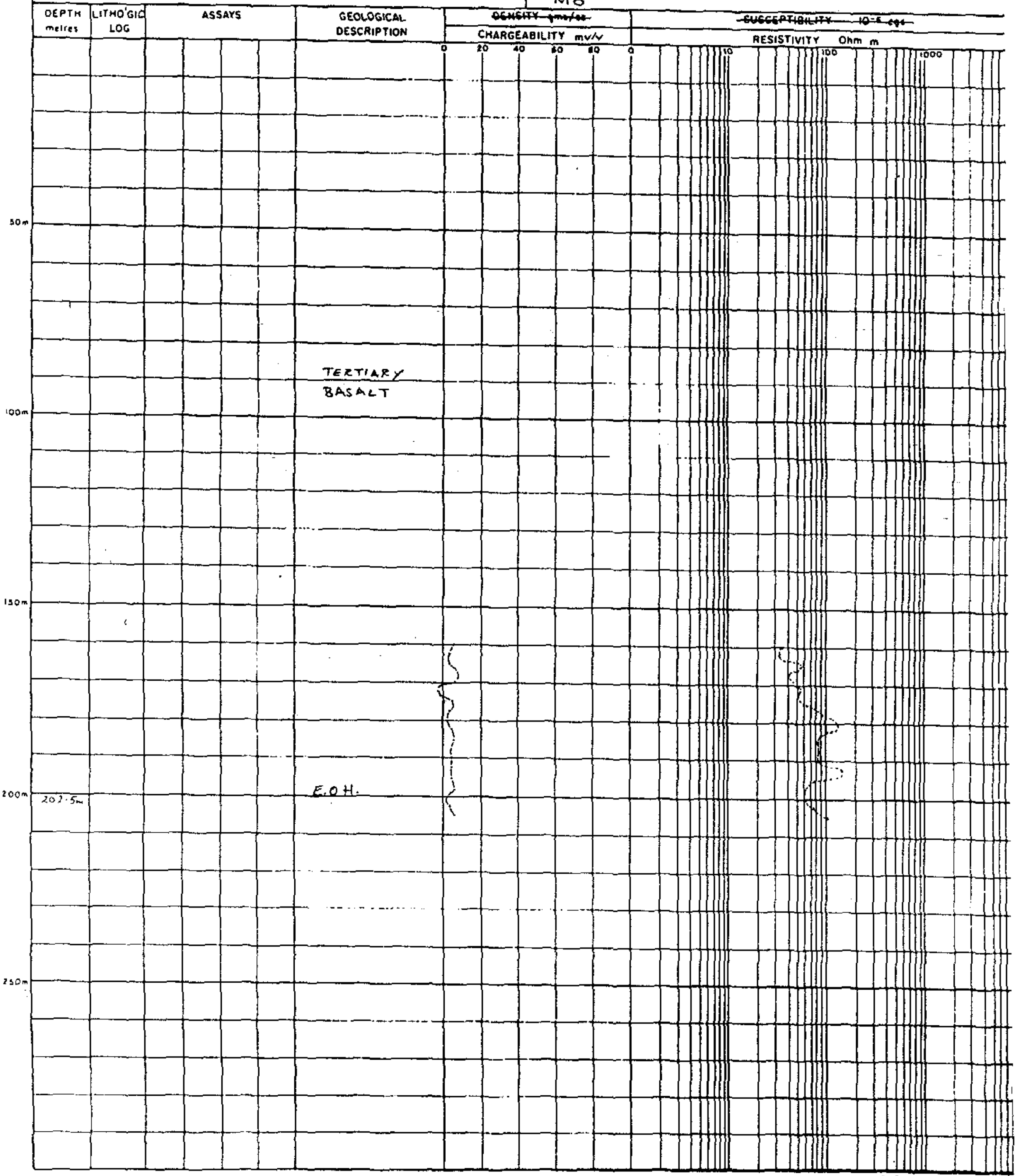


FIG 6.9

071

432073

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Geophysical Log

PAGE 2 OF 3 PAGES

DIAMOND DRILL HOLE N° : SH-1

PROJECT : GUNKER RD
ANOMALY N° :
INCLINATION :
DATE DRILLED :
CASING :

STATE : TAS
GRID COORDS :
AZIMUTH :
TOTAL DEPTH :

GROUND GEOPHYSICAL ANOMALIES :

IP / RESISTIVITY LOGGING –
CONTRACTOR : SCINTREX (TAS-103)
DATE LOGGED : 10-JAN 83
ARRAY : 3 ARRAY
ELECTRODE SPACINGS : 5m

SUSCEPTIBILITY LOGGING
BY :
DATE LOGGED :

M6

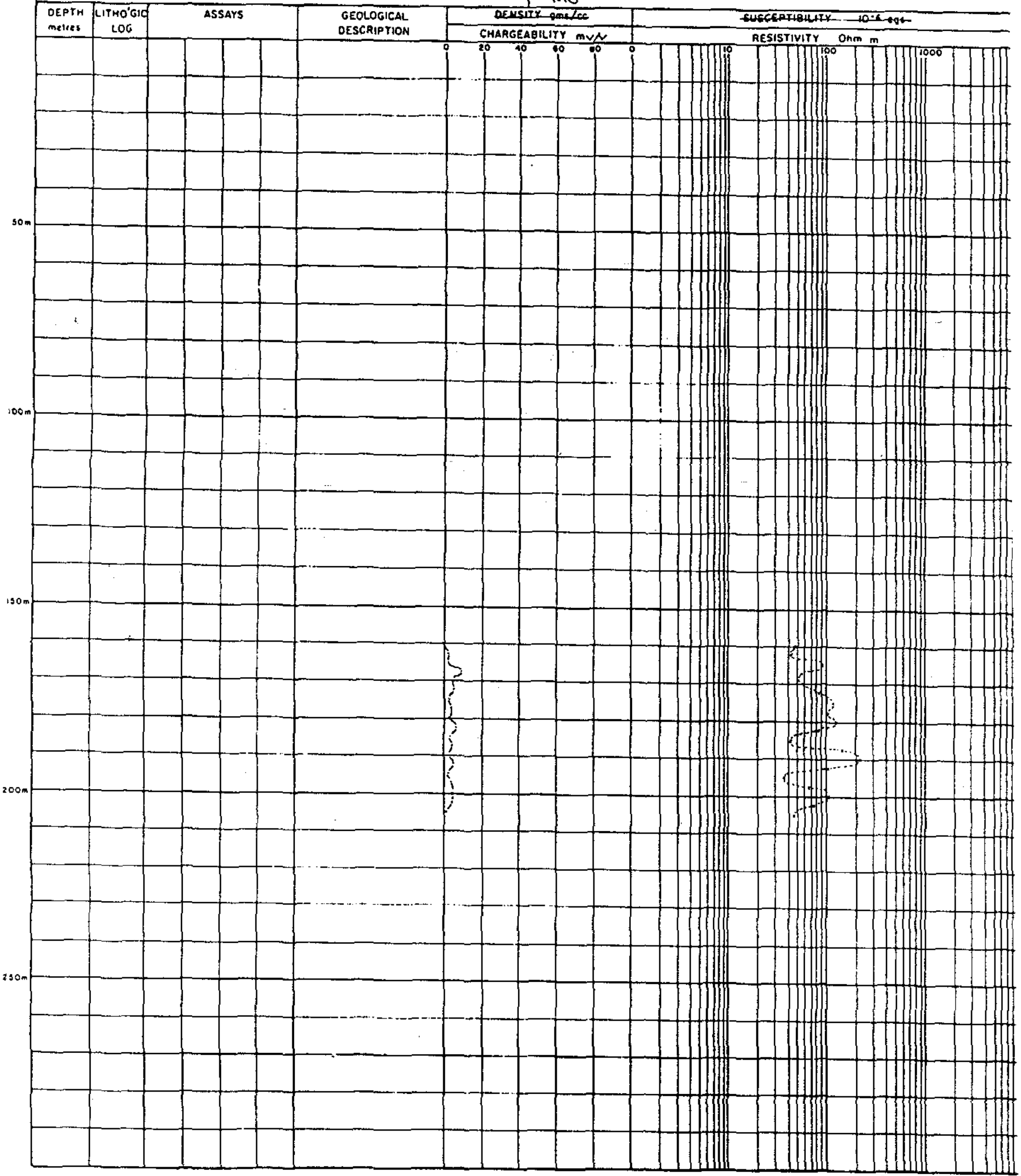

FIG 6.10

072

432074

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PAGE 3 OF 3 PAGES

DIAMOND DRILL HOLE N° : SH-1

PROJECT : BUNKER RD
STATE : TAS
ANOMALY N° :
GRID COORDS :
INCLINATION :
AZIMUTH :
DATE DRILLED :
TOTAL DEPTH :
CASING :

GROUND GEOPHYSICAL ANOMALIES :

IP / RESISTIVITY LOGGING —
CONTRACTOR : SCINTREX (TAS-103)
DATE LOGGED : 10 JAN 83
ARRAY :
ELECTRODE SPACINGS : 2.5m

SUSCEPTIBILITY LOGGING
BY :
DATE LOGGED :

M6

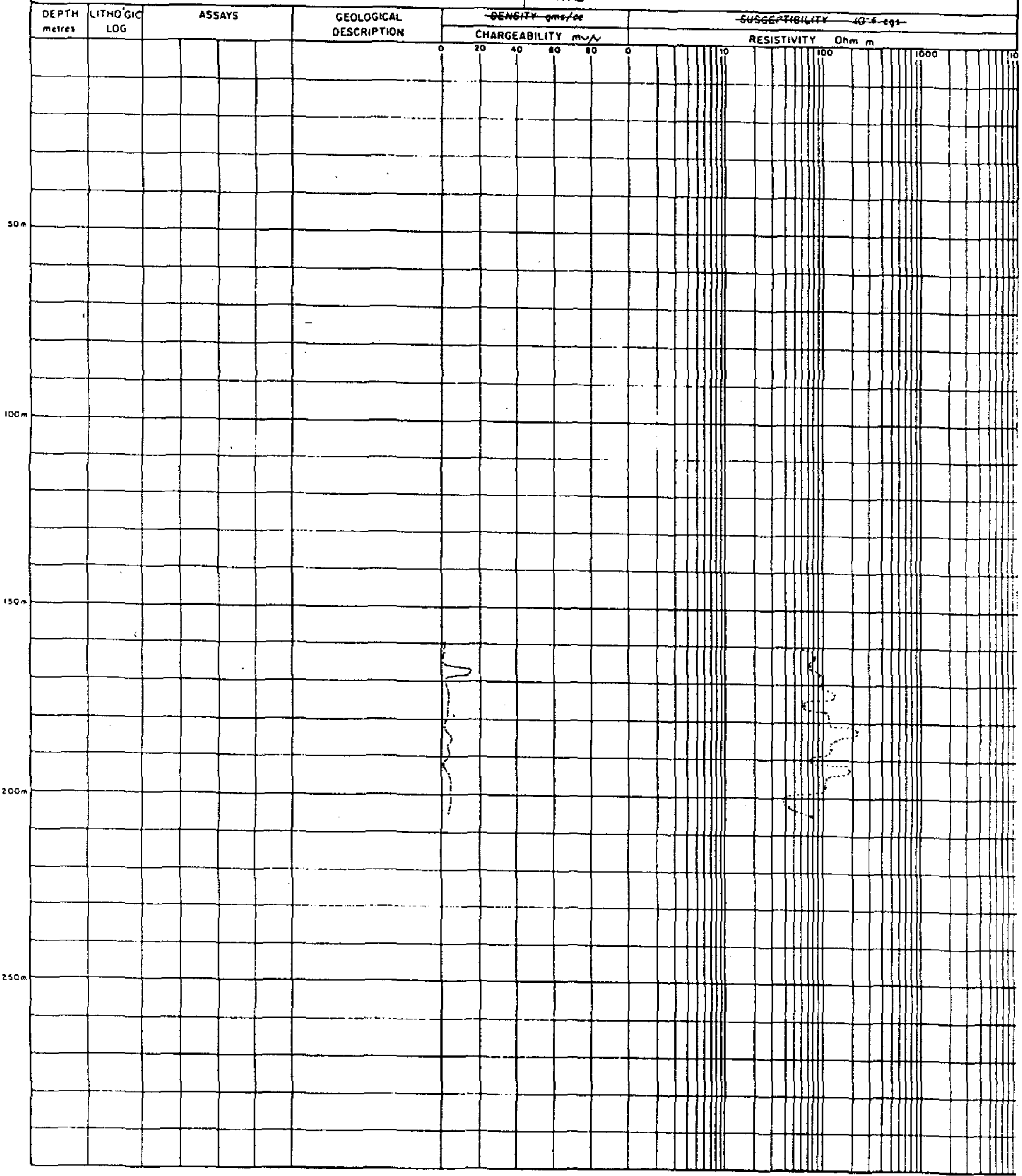
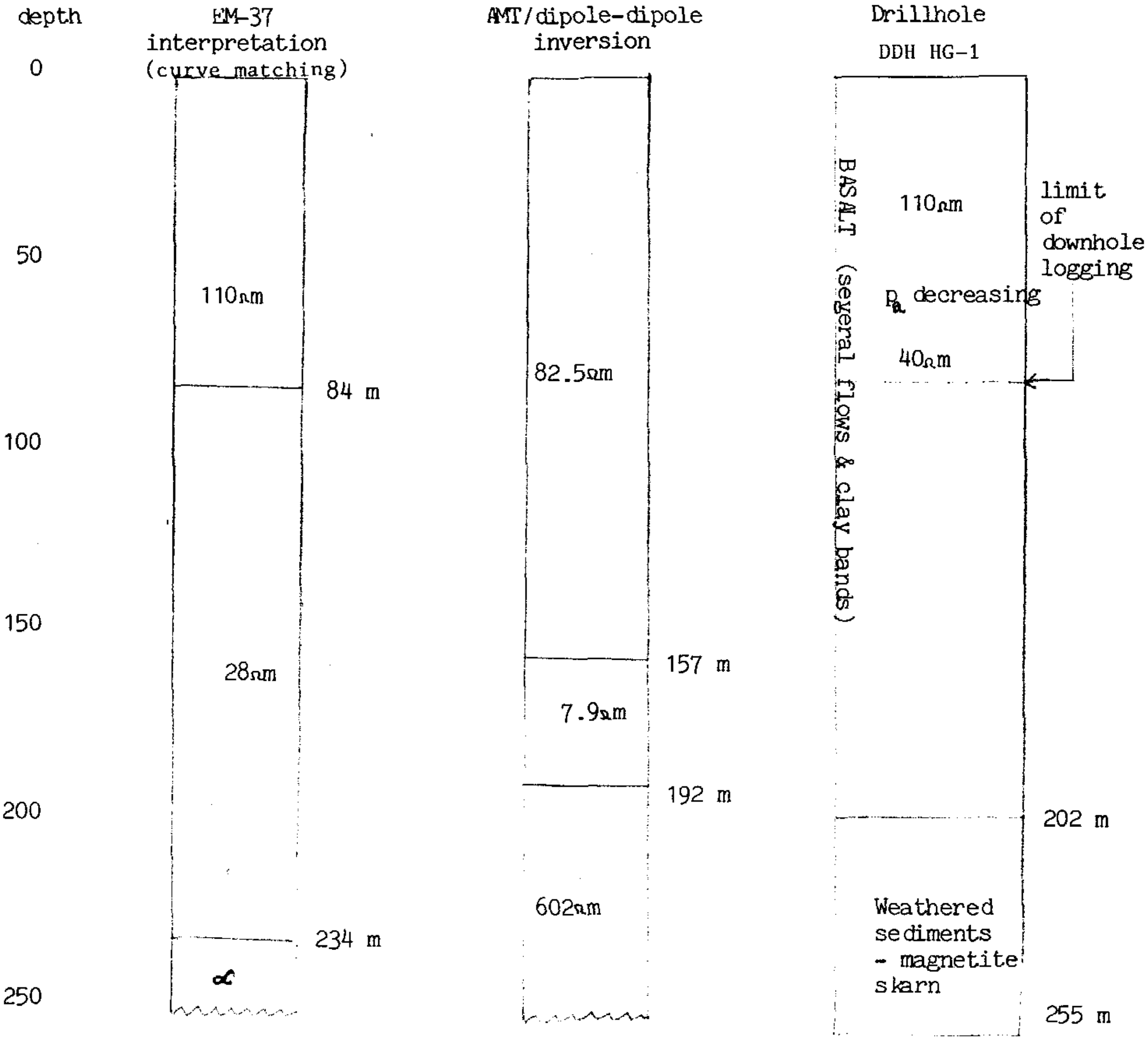


FIG 6.11

073

6.2.4 AMT/EM-37/Drill hole Correlation



Comparison of the EM-37 and AMT interpretations and the downhole logging of drillhole HG1 shows that the two soundings have both given a good idea of the rock properties (interpretted resistivities agree reasonably well with the limited amount of downhole logging). The depth to basement estimates are also reasonable for both soundings (10% low for the EM-37, 25% low for the AMT; which is as good as could be expected for either technique, given the 1-d interpretation technique for a 2-dimensional situation). As the soundings were located over the top of a basalt valley, any 1-d basement estimate would be expected to be somewhat less than the actual depth to basement.

The interpretation of thicknesses etc. of layers above the basement differs considerably for the two soundings. As there are more than 10 basalt flows and associated clay bands within the basalt pile, no three layer interpretation could be expected to give more than a rough approximation to the truth.

6.2.5 Ground Magnetic Modelling

Figure 6.12shows a model for a magnetic profile across the top of a flat-lying magnetite skarn of dimensions 500 m x 200 m x 30 m thick, at a depth of 200 metres. The susceptibility (40,000 x 10^{-6} cgs units) and size of the body are reasonable for the skarn at Dudfield Rd. The model indicates that a 500 nT mag. anomaly could be expected for such a body, thus giving a significant contribution to the ground magnetic anomaly on Dudfield Rd. (about 1000nT, see Drawing No. D/MQ 03/092).

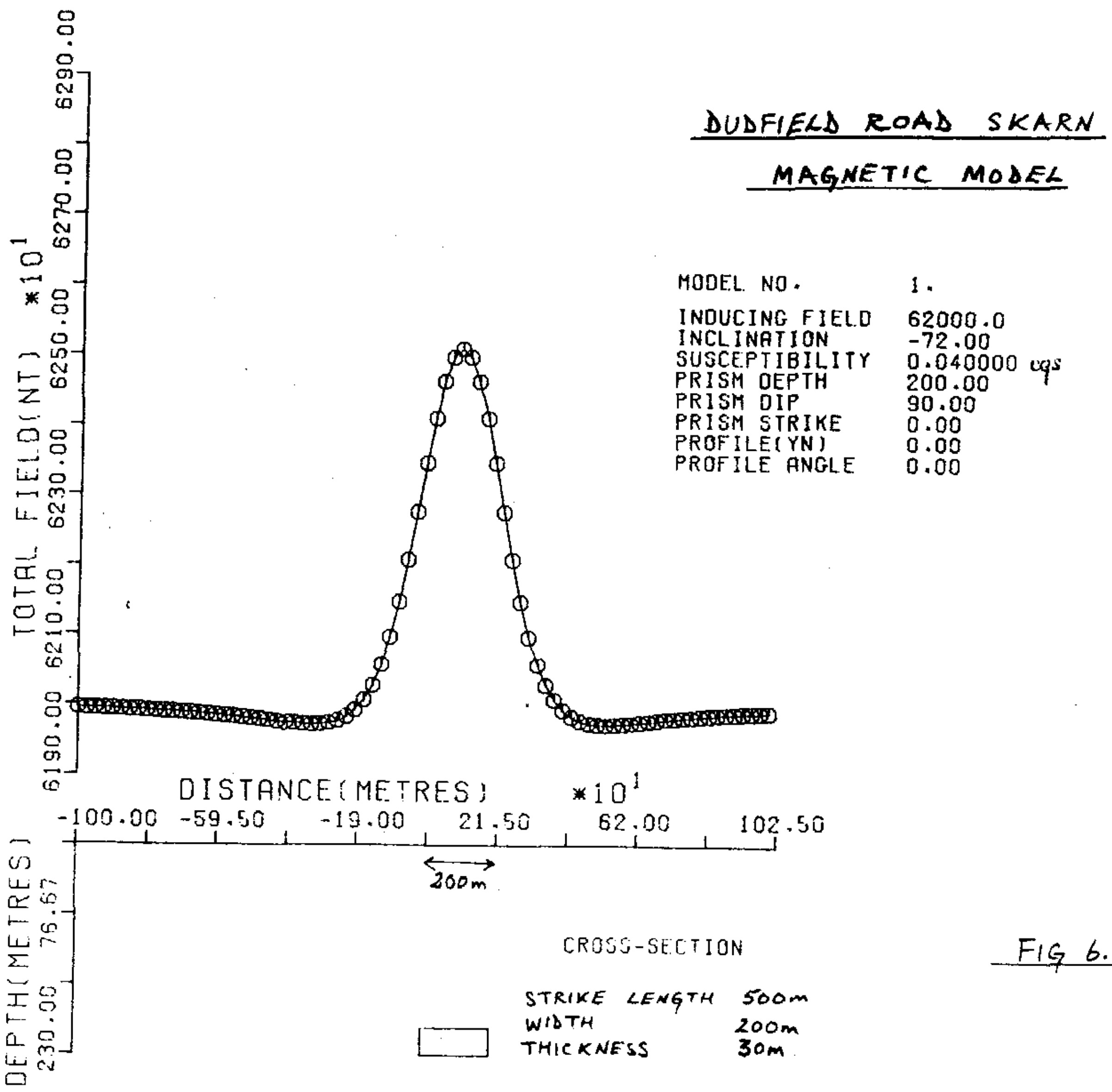
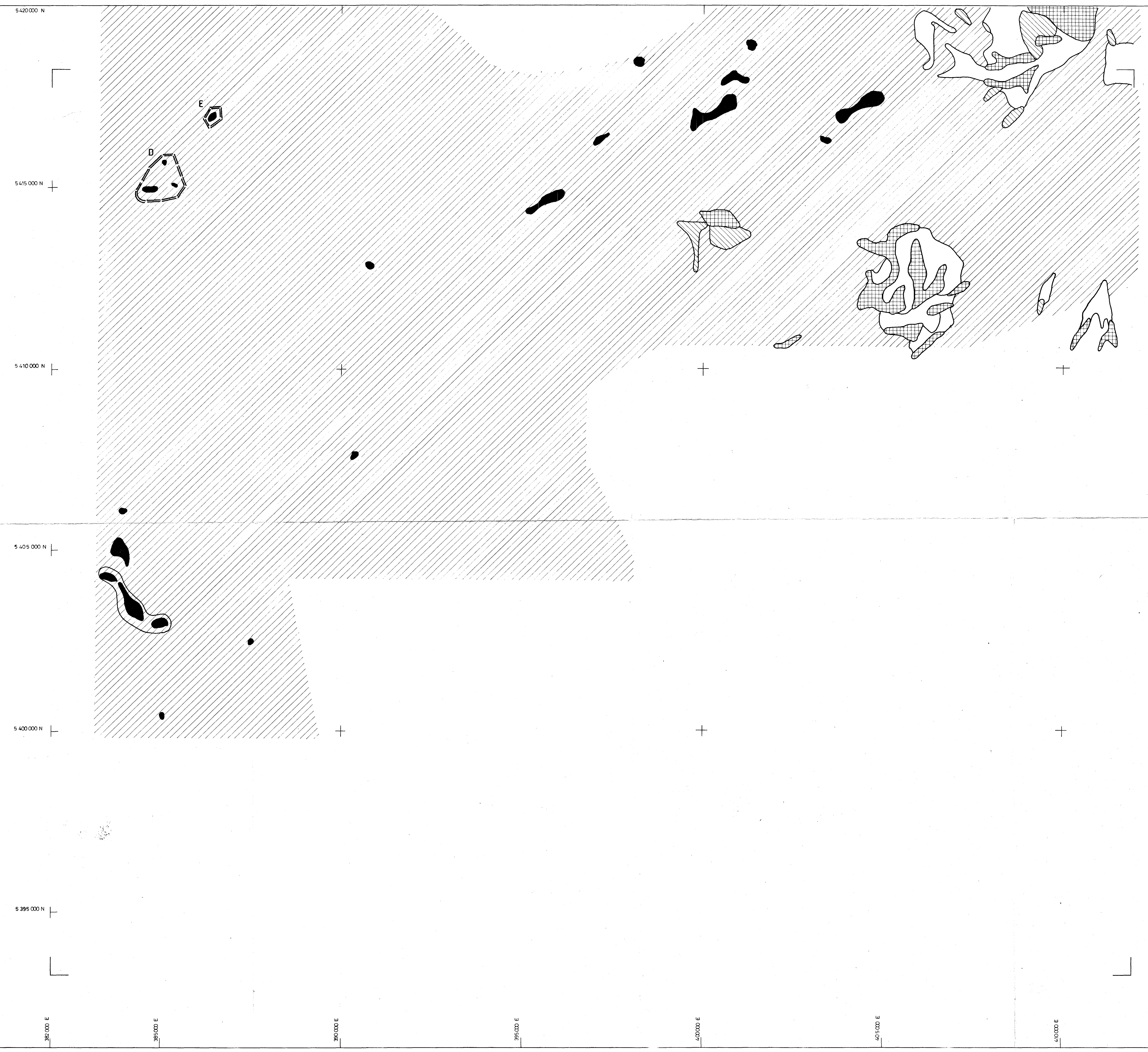


FIG 6.12

5 cm

075



LEGEND

▨	POPULATION 1 (Low U, K)
▧	POPULATION 2 ("High U", high U/K)
▦	POPULATION 3 ("High U"& K)
	REMAINDER = GENERALLY VERY HIGH U & K
●	TOTAL COUNT ANOMALY
D ▱	AREAS OF INTEREST D, E = POSSIBLE OUTCROP (Moina sst ?)

84-2123

432077

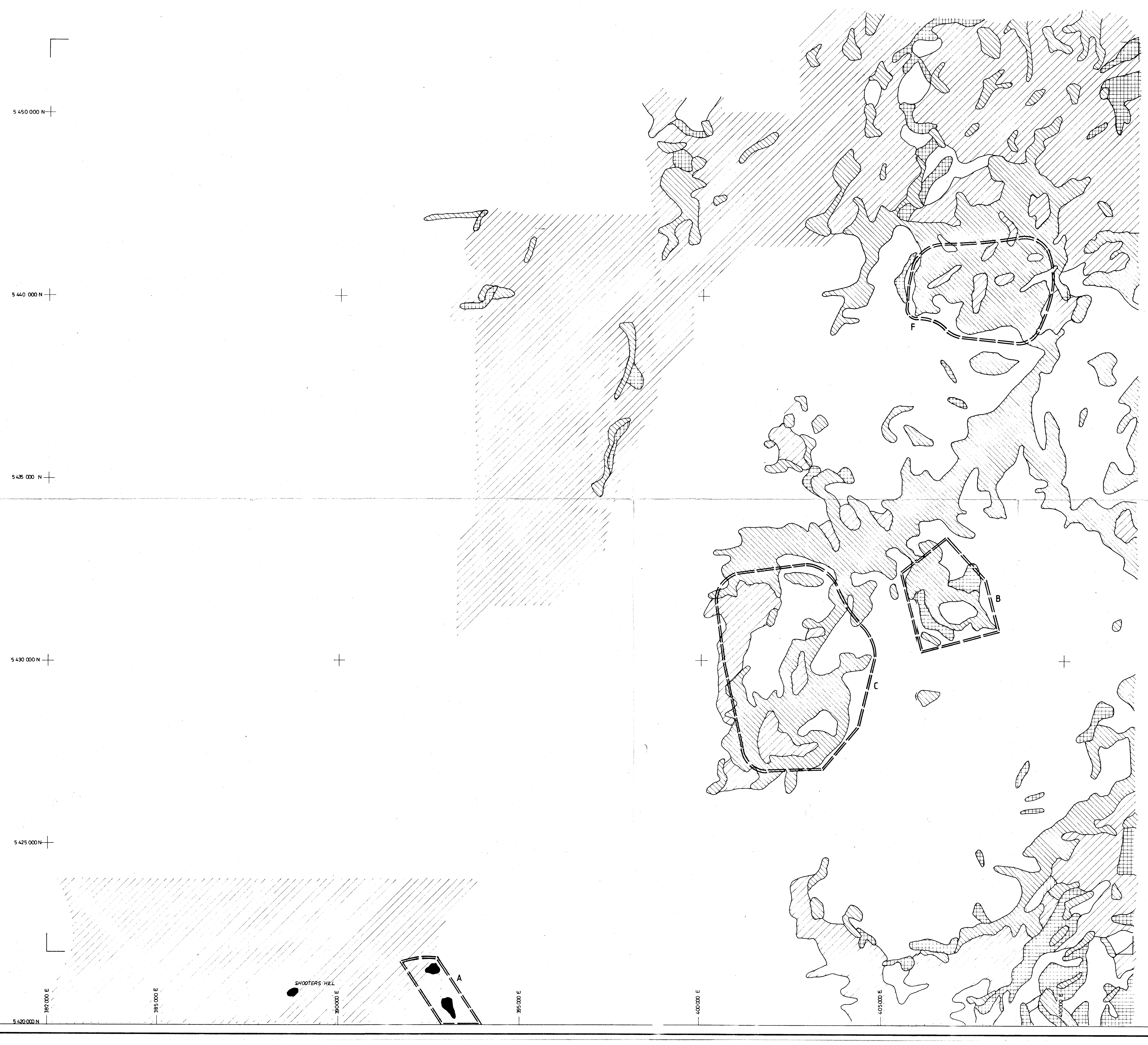
5 cm

The Shell Company of Australia Limited
METALS DIVISION

MOINA - HOUSETOP
RADIOMETRICS INTERPRETATION
S.W. SHEET

SCALE	1:50 000	DATE	25-2-83
AUTHOR	G.O.	DRAWN	J.L.L.
OFFICE	DEVONPORT	REP. No.	
ENCL. No		DRG No	D/MT 24/036

076



LEGEND

- ▨ POPULATION 1 (Low U, K)
- ▨ POPULATION 2 "(High U", high U/K)
- ▦ POPULATION 3 "(High U"& K)

REMAINDER = GENERALLY VERY HIGH U & K

● TOTAL COUNT ANOMALY

A ▭ AREAS OF INTEREST

A = POSSIBLE OUTCROP

B, C, F = GRANITE ENRICHED IN U RELATIVE TO K ??

84-2123

432078

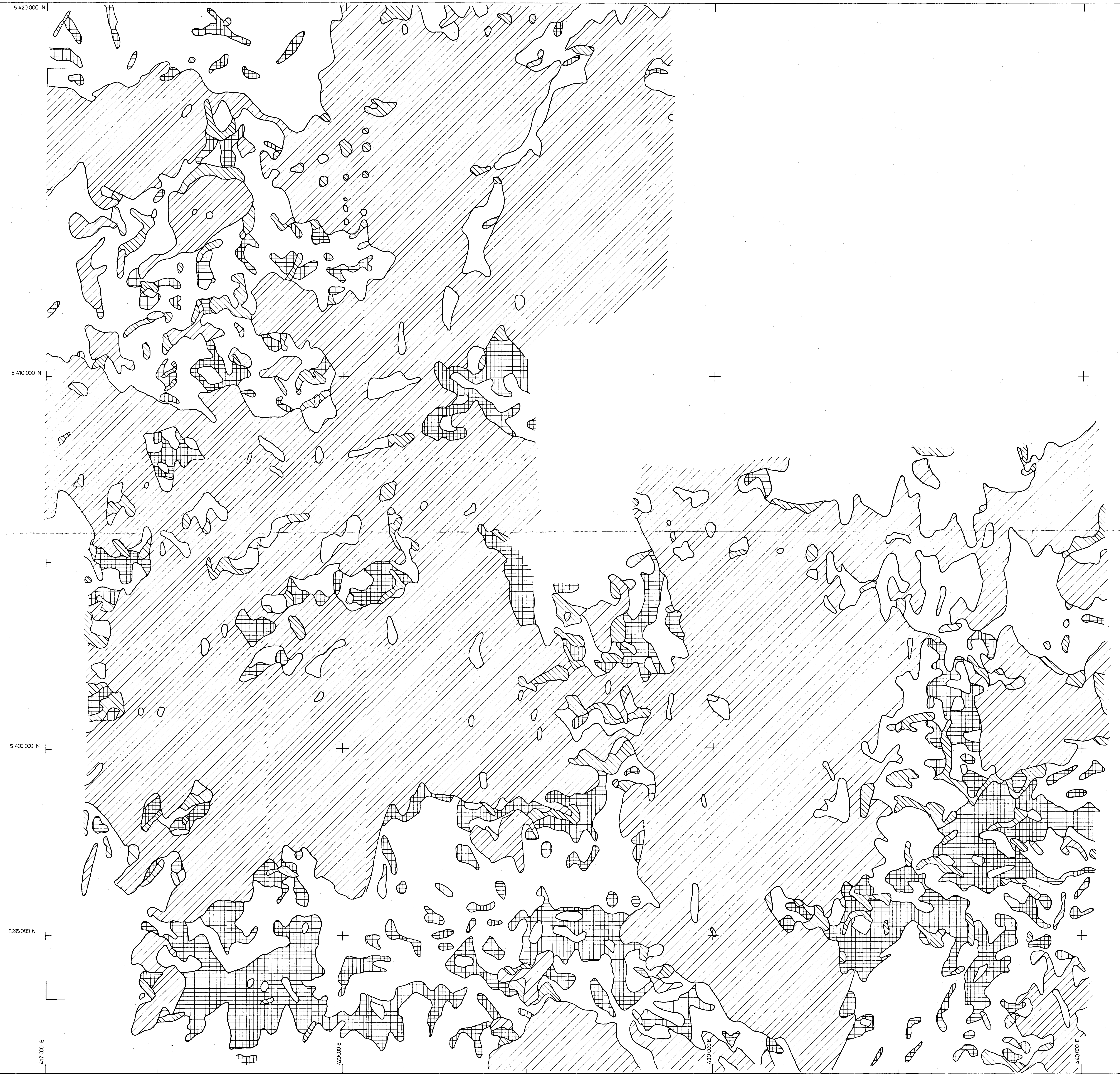
The Shell Company of Australia Limited
METALS DIVISION

MOINA - HOUSETOP
RADIOMETRICS INTERPRETATION
N.W. SHEET

5 cm

SCALE	1:50 000	DATE	17-12-82
AUTHOR	G. OAKES	DRAWN	J.L.L.
OFFICE		REP.No.	
ENCL No		DRG No	D/MT24/037

077



LEGEND

▨ POPULATION 1
(Low U, K)

▨ POPULATION 2
"(High U", high U/K)

▦ POPULATION 3
"(High U"& K)

REMAINDER GENERALLY VERY HIGH U & K

● TOTAL COUNT ANOMALY

AREAS OF INTEREST
A = POSSIBLE OUTCROP
B, C, F = GRANITE ENRICHED IN U RELATIVE TO K ??

84-2123

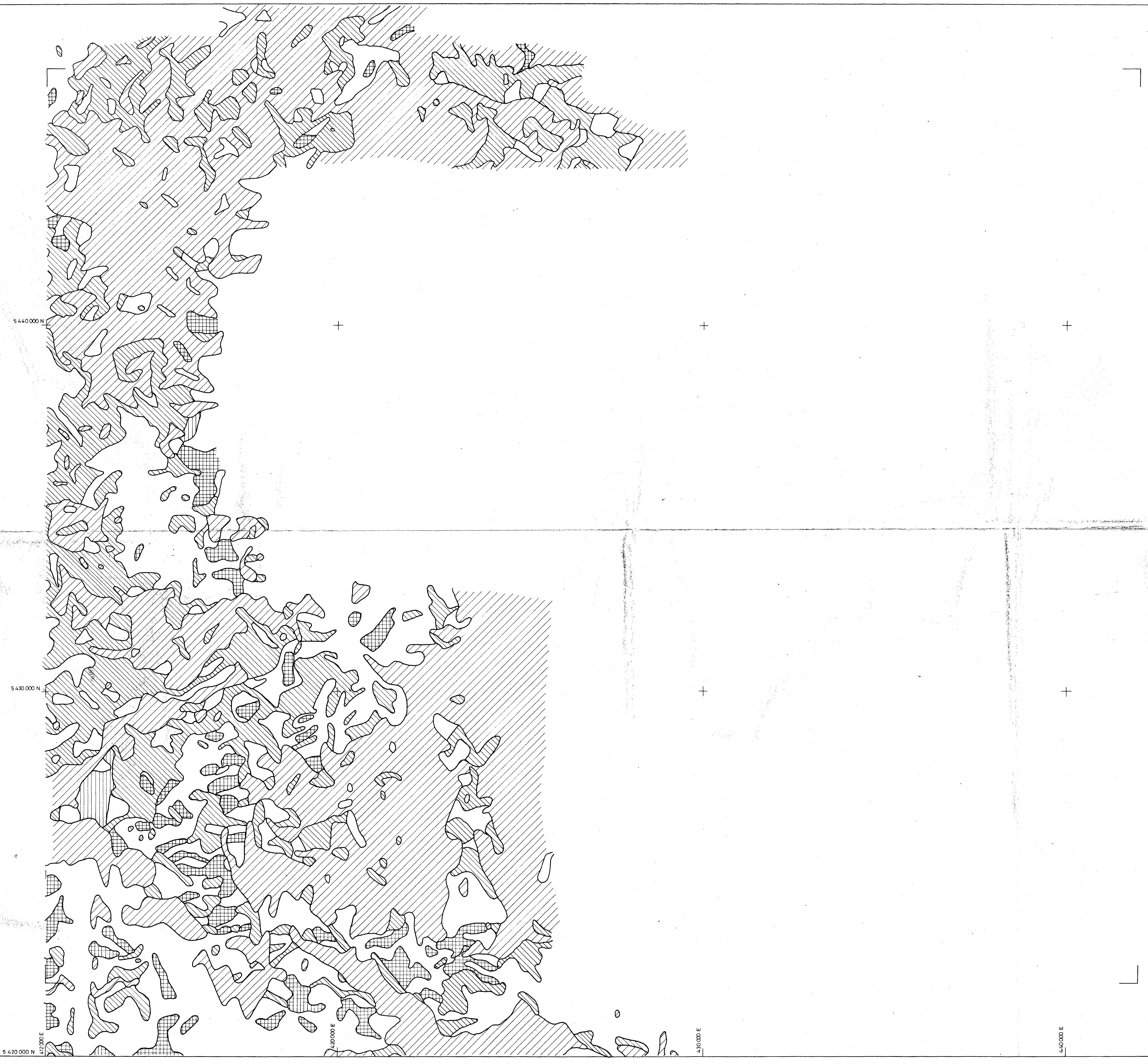
432079

The Shell Company of Australia Limited
METALS DIVISION

MOINA - HOUSETOP
RADIOMETRICS INTERPRETATION
S.E. SHEET

5 cm

SCALE	1:50 000	DATE	28-2-83
AUTHOR	G. OAKES	DRAWN	J.L.L.
OFFICE	DEVONPORT	REP. No.	
ENCL. No.		DRG No	D/MT24/038



LEGEND

▨ POPULATION 1
(Low U, K)

▨ POPULATION 2
(High U, high U/K)

▦ POPULATION 3
(High U & K)

REMAINDER = GENERALLY VERY
HIGH U & K

● TOTAL COUNT ANOMALY

A ▱ AREAS OF INTEREST
A = POSSIBLE OUTCROP
B, C, F = GRANITE ENRICHED IN U RELATIVE TO K ??

84-2123].

432080

0 1000 2000 3000 4000 m

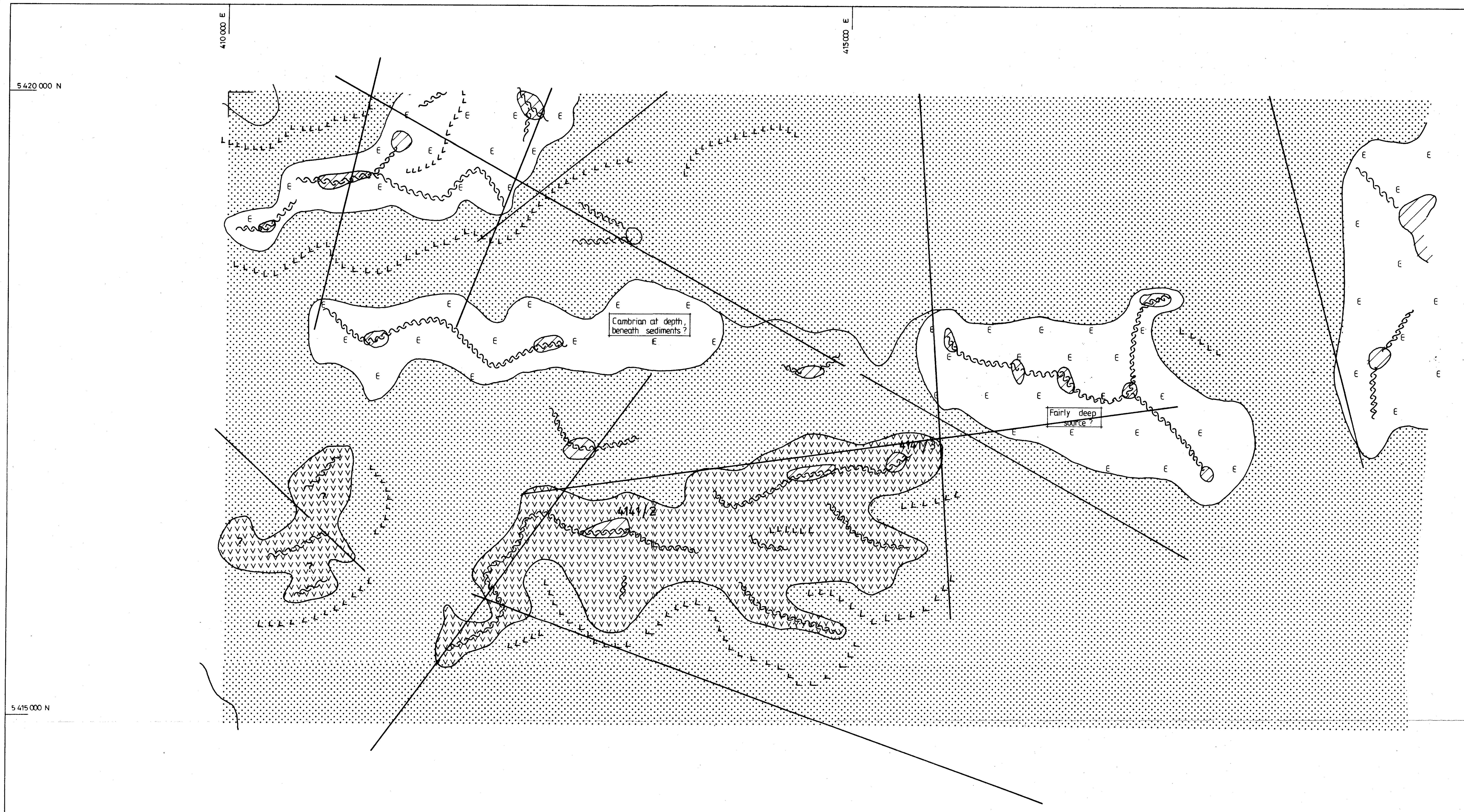
The Shell Company of Australia Limited
METALS DIVISION

MOINA - HOUSETOP
RADIOMETRICS INTERPRETATION
N.E. SHEET

5 cm

6641

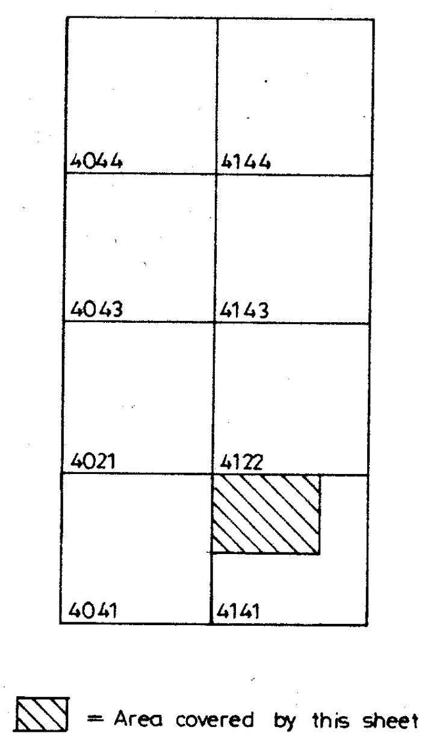
SCALE	1:50,000	DATE	14-3-83
AUTHOR	G.O.	DRAWN	J.L.L.
OFFICE	DEVONPORT	REP.No.	
ENCL.No.		DRG No.	D/MT 24/039



LEGEND

▨	Mag. Anomaly
+ +	Granite ? (mag. quiet area)
△ △	Skarn Zone
V V V V	Basalt covered (boundaries separate different flows)
〰	Mag. high trend
LLLLL	Mag. low trend
⁘	Mag. quiet area (Sediments.)
Є Є	Cambrian Volcanics? (mag. highs)

SHEET INDEX



▨ = Area covered by this sheet

432081

0 500 1000m

The Shell Company of Australia Limited
METALS DIVISION

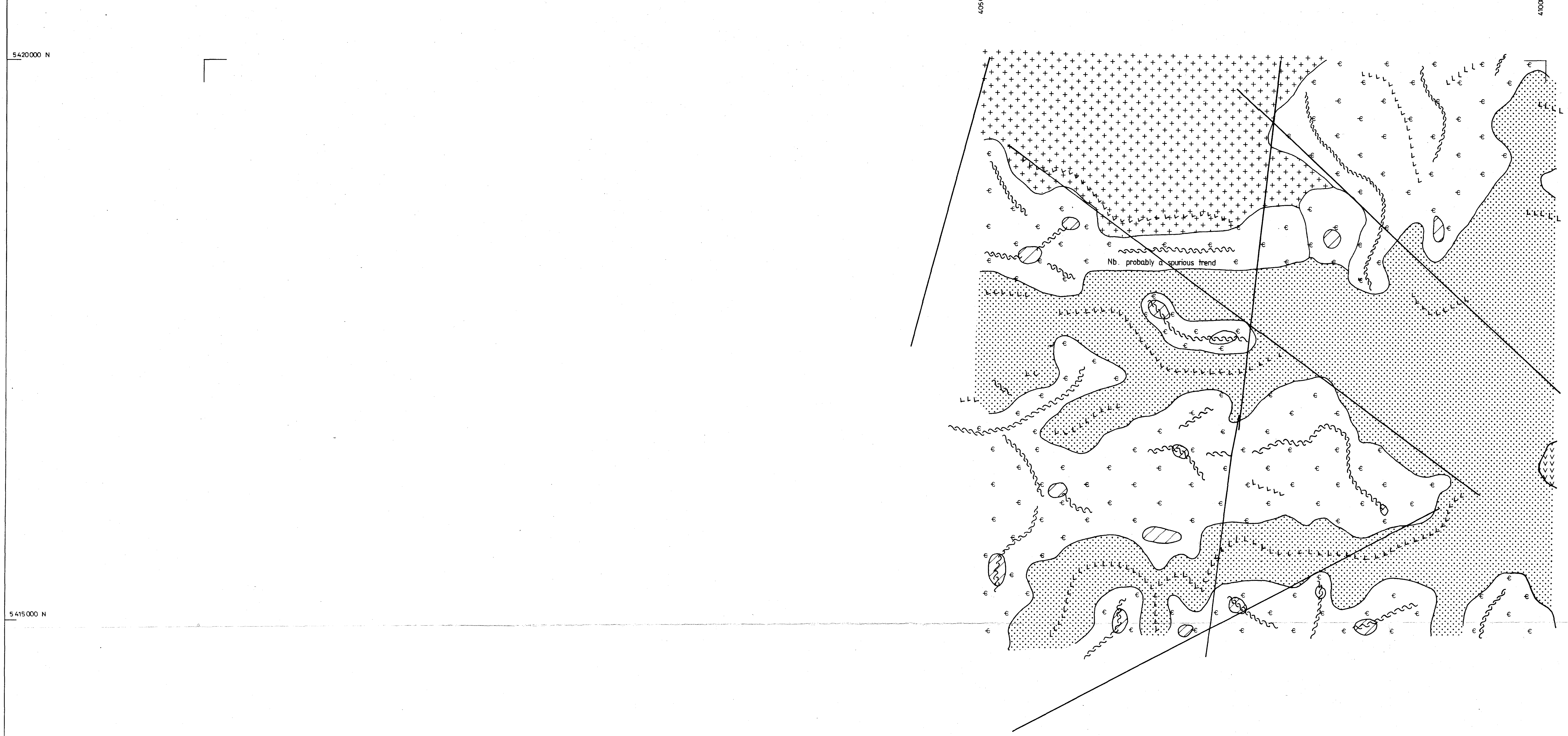
EAST HOUSETOP AREA
ROUGH AEROMAG INTERPRETATION

5 cm

6642

SCALE	1: 20 000	DATE	24 - 3 - 83
AUTHOR	G.O.	DRAWN	J.L.L.
OFFICE	DEVONPORT	REP. No.	
ENCL. No.		DRG No.	D/MT24/040

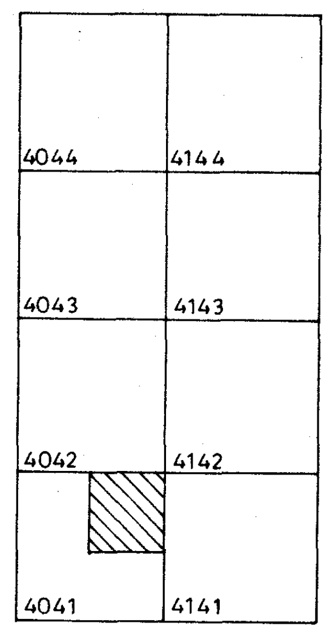
84 - 2123



LEGEND

- ▨ Mag. Anomaly
- + + Granite ? (mag. quiet area)
- ∴ Skarn Zone
- V V V V Basalt covered (boundaries separate different flows.)
- ∿∿∿ Mag. high trend.
- L L L L L Mag. low trend.
- ⁙ Mag. quiet area (Sediments.)
- € € Cambrian Volcanics.? (mag. highs)

SHEET INDEX



▧ = Area covered by this sheet

432082

0 500 1000 m

The Shell Company of Australia Limited
METALS DIVISION

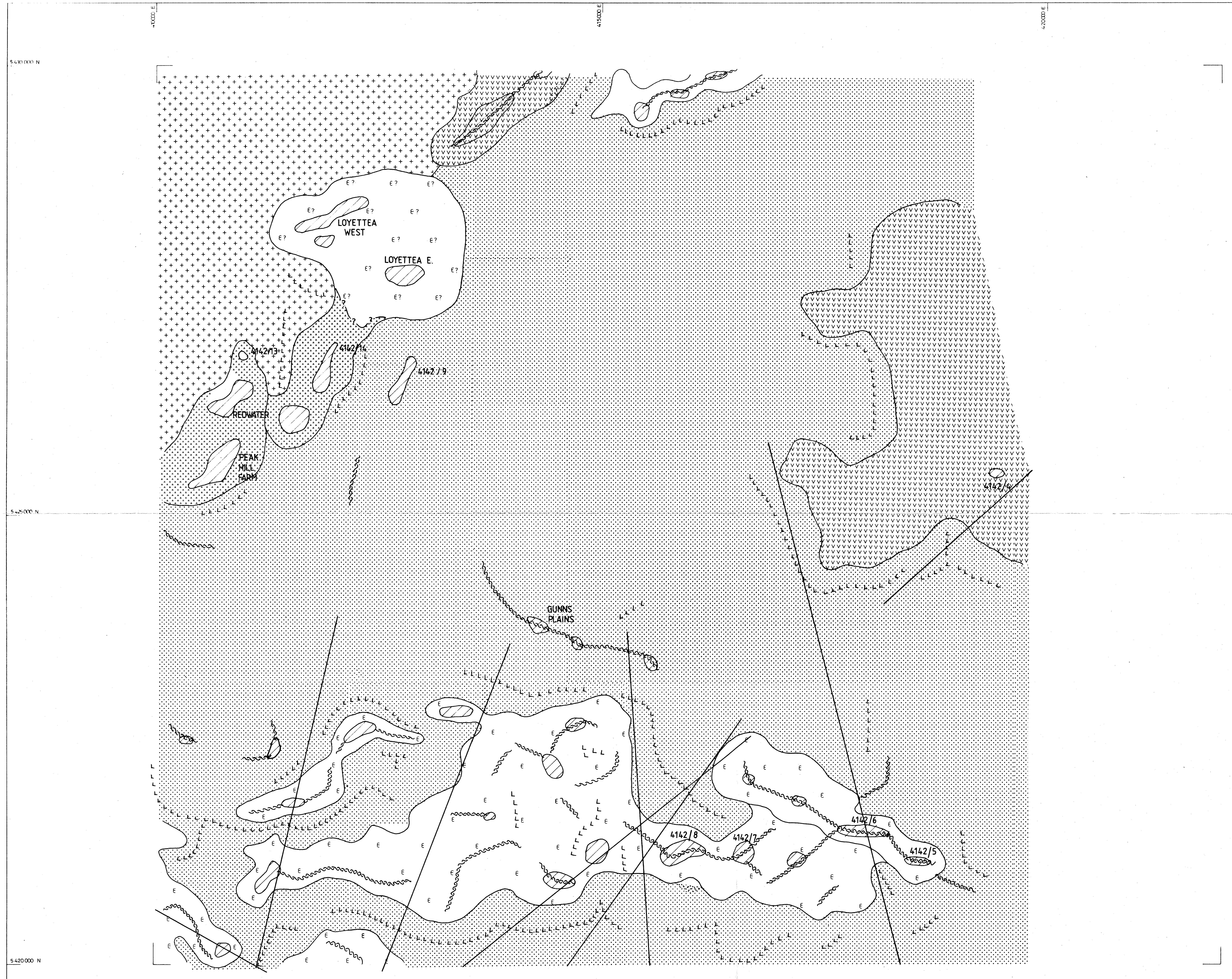
EAST HOUSETOP AREA
ROUGH AEROMAG INTERPRETATION

5 cm

6643

SCALE	1:20 000	DATE	8 - 4 - 83
AUTHOR	G.O.	DRAWN	J.L.L.
OFFICE	DEVONPORT	REP.No.	
ENCL.No.		DRG No	D/MT 24/041

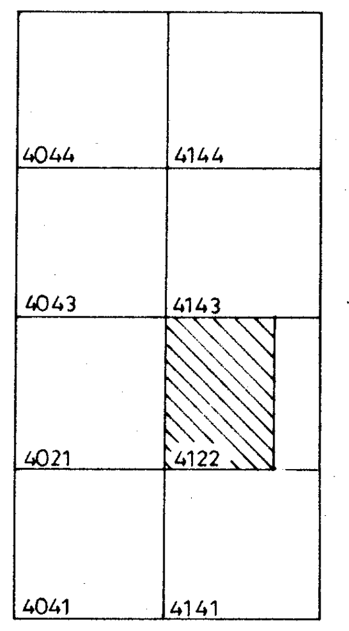
84-2123



LEGEND

▨	Mag. Anomaly
+ +	Granite ? (mag. quiet area)
△ △	Skarn Zone
V V V V	Basalt covered (boundaries separate different flows.)
∿∿∿	Mag. high trend
LLLLL	Mag. low trend
⋯	Mag. quiet area (Sediments)
€ €	Cambrian Volcanics ? (mag. highs)

SHEET INDEX



▧ = Area covered by this sheet

432083

0 500 1000 m

84 - 2123

The Shell Company of Australia Limited
METALS DIVISION

EAST HOUSETOP AREA
ROUGH AEROMAG INTERPRETATION

5 cm

6644

SCALE	1: 20 000	DATE	6 - 4 - 83
AUTHOR	G.O.	DRAWN	J.L.L.
OFFICE	DEVONPORT	REP.No.	
ENCL.No.		DRG No.	D/MT24/042

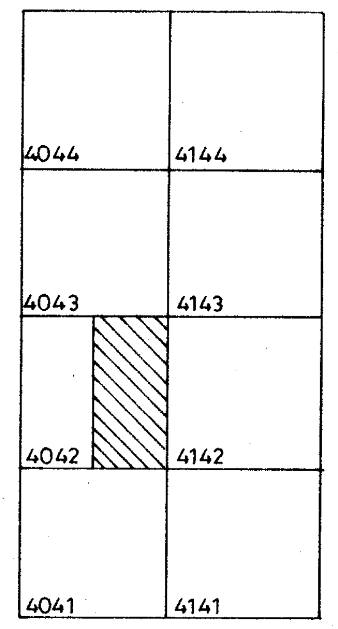
Possible skarn trend
- looks very interesting

Granite in this area appears
less magnetic than further north
- possibly another phase ?

LEGEND

▨	Mag. Anomaly
+ +	Granite ? (mag. quiet area.)
△ △	Skarn Zone
V V V V	Basalt covered (boundaries separate different flows)
〰	Mag. high trend
L L L L L	Mag. low trend
⁘	Mag. quiet area (Sediments.)
€ €	Cambrian Volcanics ? (mag highs)

SHEET INDEX



▨ = Area covered by this sheet

432084

0 500 1000 m

The Shell Company of Australia Limited
METALS DIVISION

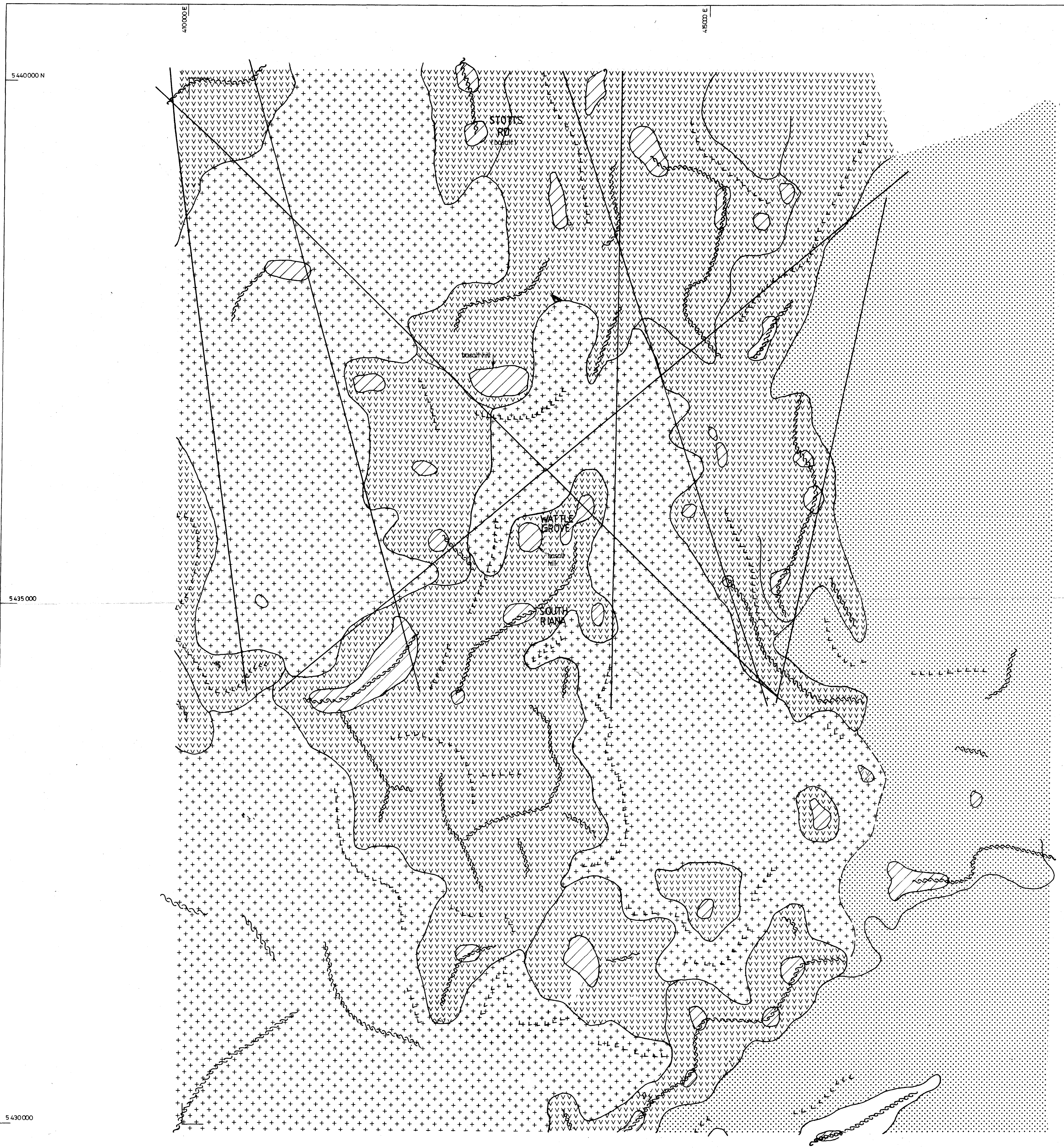
EAST HOUSETOP AREA
ROUGH AEROMAG INTERPRETATION

5 cm

6645

SCALE	1:20000	DATE	24- 3- 83
AUTHOR	G.O.	DRAWN	J.L.L.
OFFICE	DEVONPORT	REP.No.	
ENCL.No.		DRG No	D./MT24/043

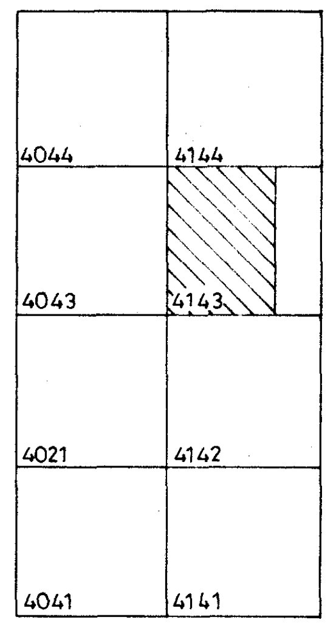
84-2123



LEGEND

▨	Mag. Anomaly
+ +	Granite ? (mag. quiet area)
△ △	Skarn Zone
V V V V	Basalt covered (boundaries separate different flows)
∿∿∿	Mag. high trend
L L L L L	Mag. low trend
⁘	Mag. quiet area (Sediments)
Є Є	Cambrian Volcanics ? (mag highs)

SHEET INDEX



▨ = Area covered by this sheet

432085

0 500 1000 m

The Shell Company of Australia Limited
METALS DIVISION

EAST HOUSETOP AREA
ROUGH AEROMAG INTERPRETATION

5 cm

84-2123

6646

SCALE	1: 20000	DATE	24-3-83
AUTHOR	G.O.	DRAWN	J.L.L.
OFFICE	DEVONPORT	REP. No.	
ENCL. No.		DRG. No.	D/MT24/044

LEGEND

▨ Mag. Anomaly

+ Granite ? (mag. quiet area)

∴ Skarn Zone

VVVV Basalt covered
(boundaries separate different flows)

〰 Mag. high trend

L L L L L Mag. low trend

⁙ Mag. quiet area (Sediments)

€ Cambrian Volcanics ? (mag. highs.)

SHEET INDEX

4044	4144
4043	4143
4042	4142
4041	4141

▧ = Area covered by this sheet

432086

0 500 1000 m

The Shell Company of Australia Limited
METALS DIVISION

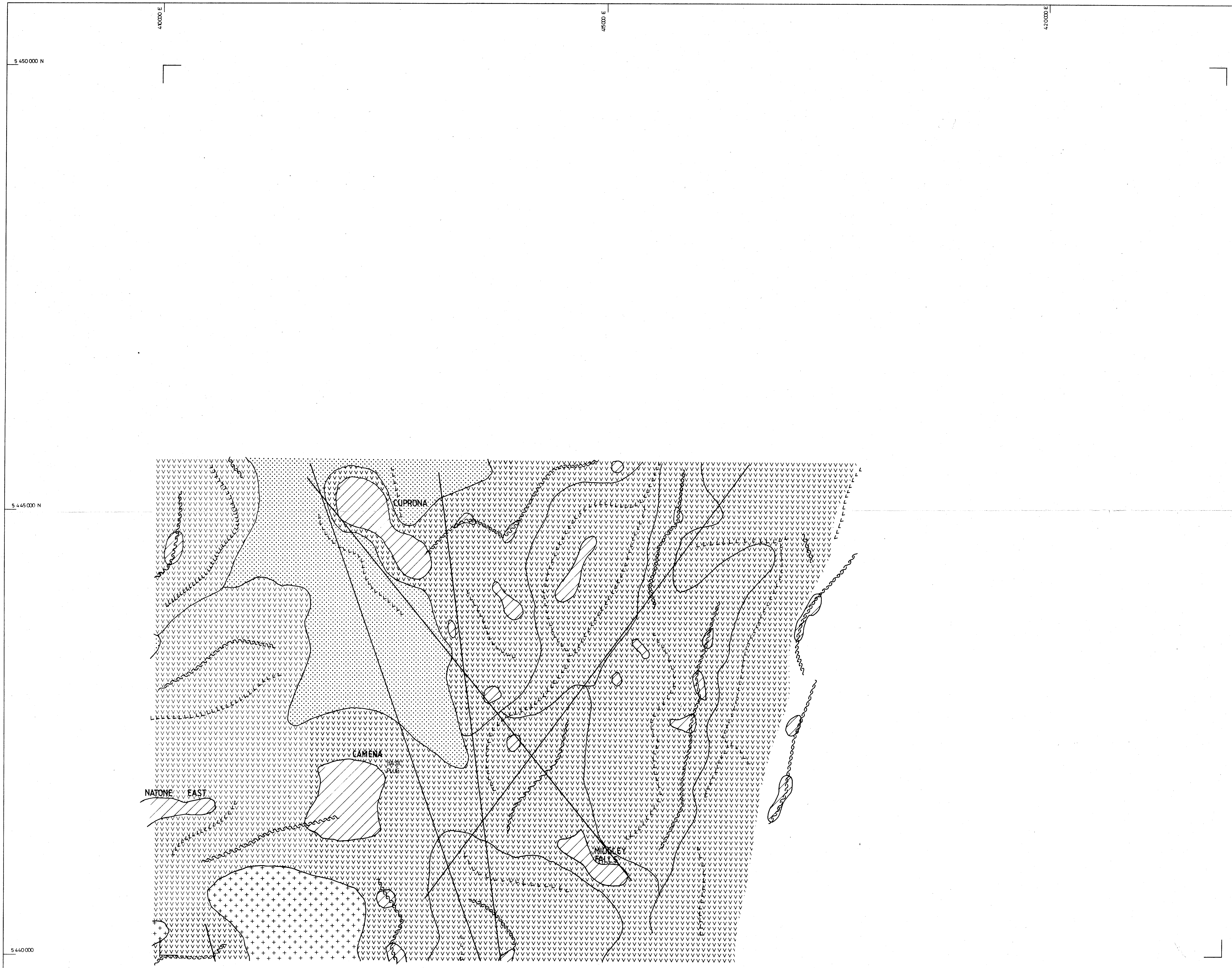
EAST HOUSETOP AREA
ROUGH AEROMAG INTERPRETATION

5 cm

6647

SCALE	1:20000	DATE	24 - 3 - 83
AUTHOR	G.O.	DRAWN	J.L.L.
OFFICE	DEVONPORT	REP.No.	
ENCL.No.		DRG No.	D/MT 24/045

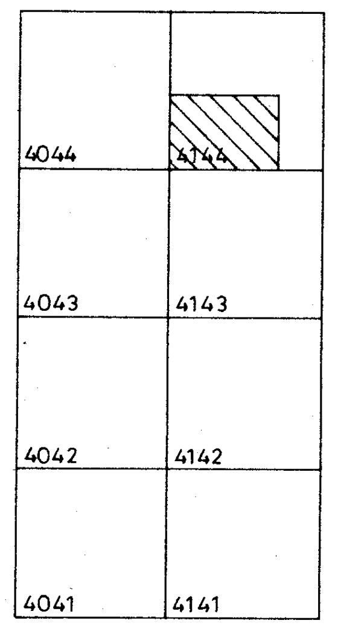
84-2123



LEGEND

▨	Mag. Anomaly
+ +	Granite ? (mag. quiet area.)
△ △	Skarn Zone
V V V V	Basalt covered (boundaries separate different flows.)
∼∼∼	Mag. high trend
L L L L L	Mag low trend
⋯	Mag. quiet area (Sediments .)
ϵ ϵ	Cambrian Volcanics ? (mag. highs.)

SHEET INDEX



▧ = Area covered by this sheet

432087

0 500 1000m

The Shell Company of Australia Limited
METALS DIVISION

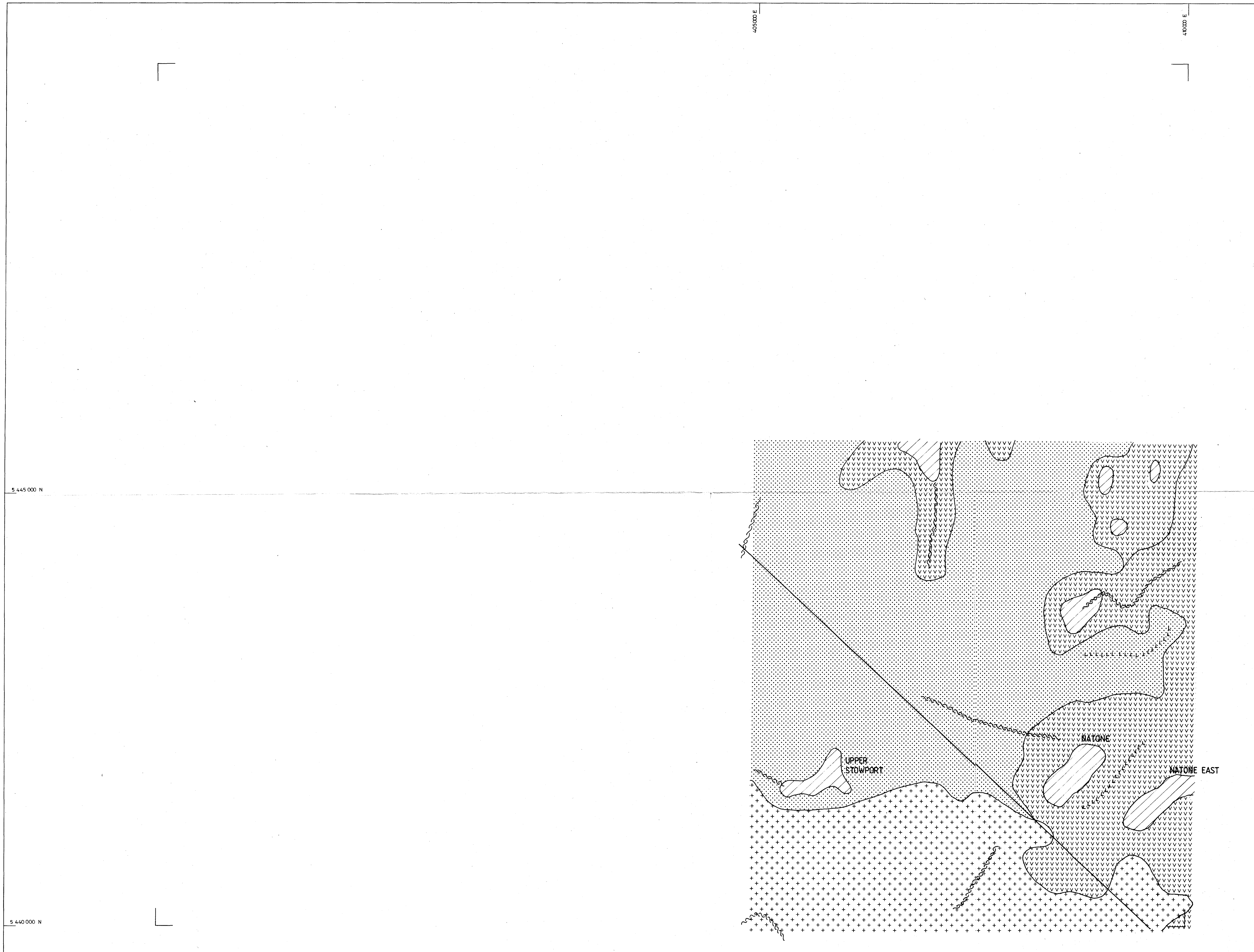
EAST HOUSETOP AREA
ROUGH AEROMAG INTERPRETATION

5 cm

6648

SCALE	1: 20000	DATE	24 - 3 - 83
AUTHOR	G.O.	DRAWN	J.L.L.
OFFICE	DEVONPORT	REP. No.	
ENCL. No.		DRG No	D/MT 24/046

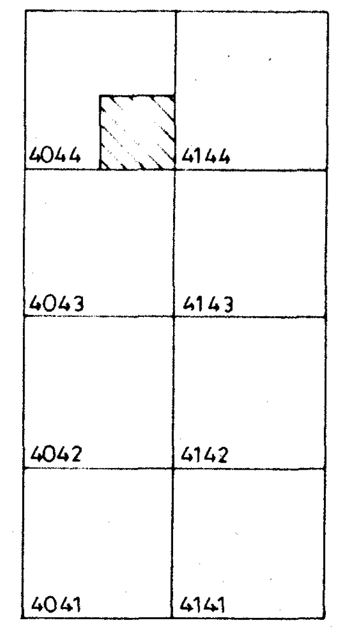
84-2123



LEGEND

▨	Mag. Anomaly
+ +	Granite ? (mag. quiet area)
△ △	Skarn Zone
V V V V	Basalt covered (boundaries separate different flows)
∿∿∿	Mag. high trend
L L L L L	Mag low trend
⋯	Mag. quiet area (Sediments)
Є Є	Cambrian Volcanics ? (mag. highs)

SHEET INDEX



▨ = Area covered by this sheet

432088

0 500 1000m

The Shell Company of Australia Limited
METALS DIVISION

EAST HOUSETOP AREA
ROUGH AEROMAG INTERPRETATION

5 cm

6649

SCALE	1:20 000	DATE	24 - 3 - 83
AUTHOR	G.O.	DRAWN	J.L.L.
OFFICE	DEVONPORT	REP.No.	
ENCL No		DRG No	D/MT24/047

84-2123

432089

84-2123

The Shell Company of Australia Limited
METALS DIVISION

HOUSETOP REGIONAL GRAVITY
Possible Granite Bodies
&
Proposed Follow-up

Northern Sheets

6650

SCALE	1: 50 000	DATE	14–9–82
AUTHOR	G. OAKES	DRAWN	H.L.S.
OFFICE	DEVONPORT	REP. No.	
ENCL. No.		DRG. No.	D/MQ00/008

432090

The Shell Company of Australia Limited
METALS DIVISION

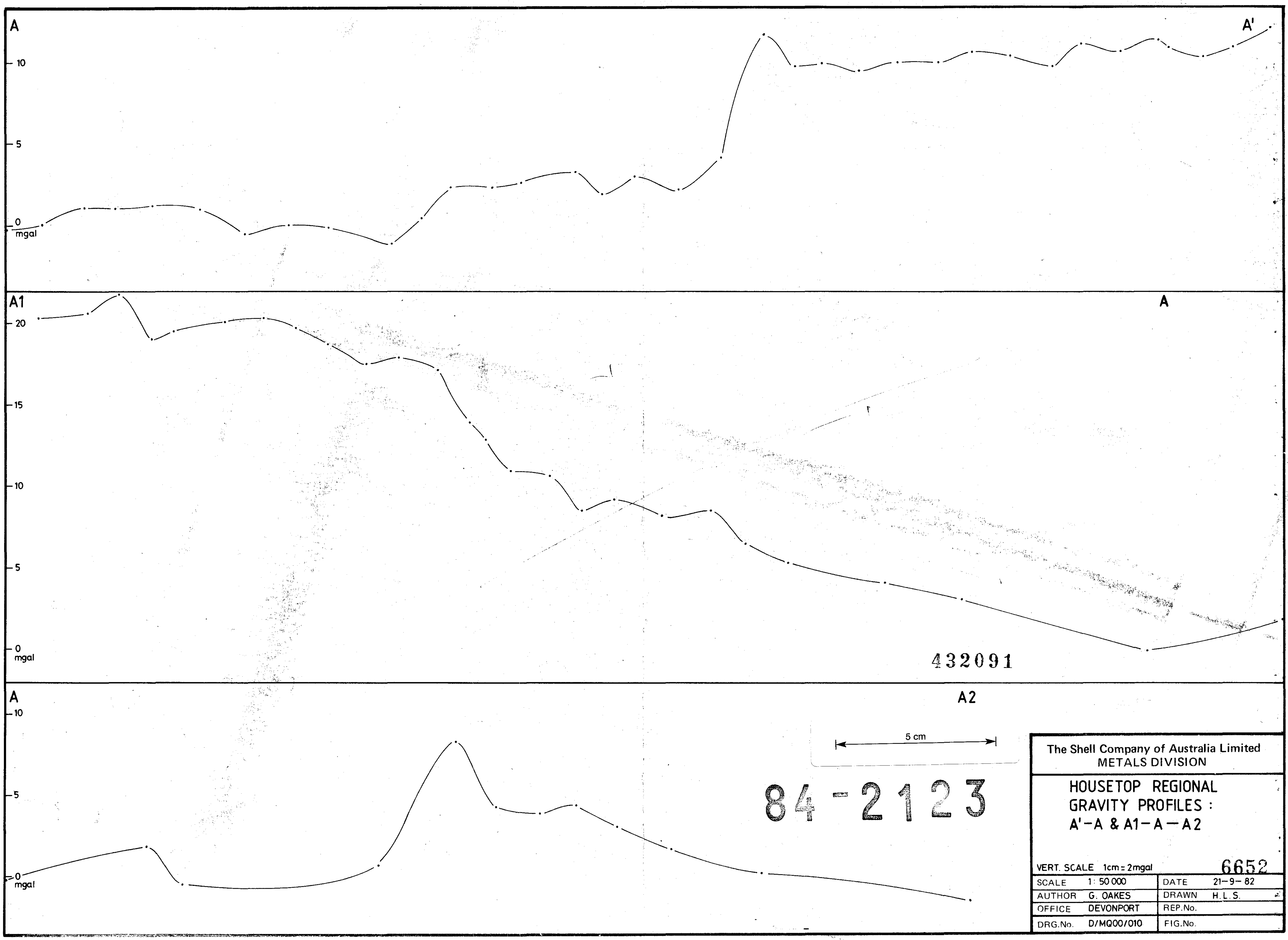
HOUSETOP REGIONAL GRAVITY
Possible Granite Bodies
&
Proposed Follow-up

Southern Sheet

6651

SCALE	1:50000	DATE	15-9-82
AUTHOR	G. OAKES	DRAWN	H.L.S.
OFFICE	DEVONPORT	REP. No.	
ENCL. No.		DRG No	D/MQ00/009

84-2123



432091

84-2123

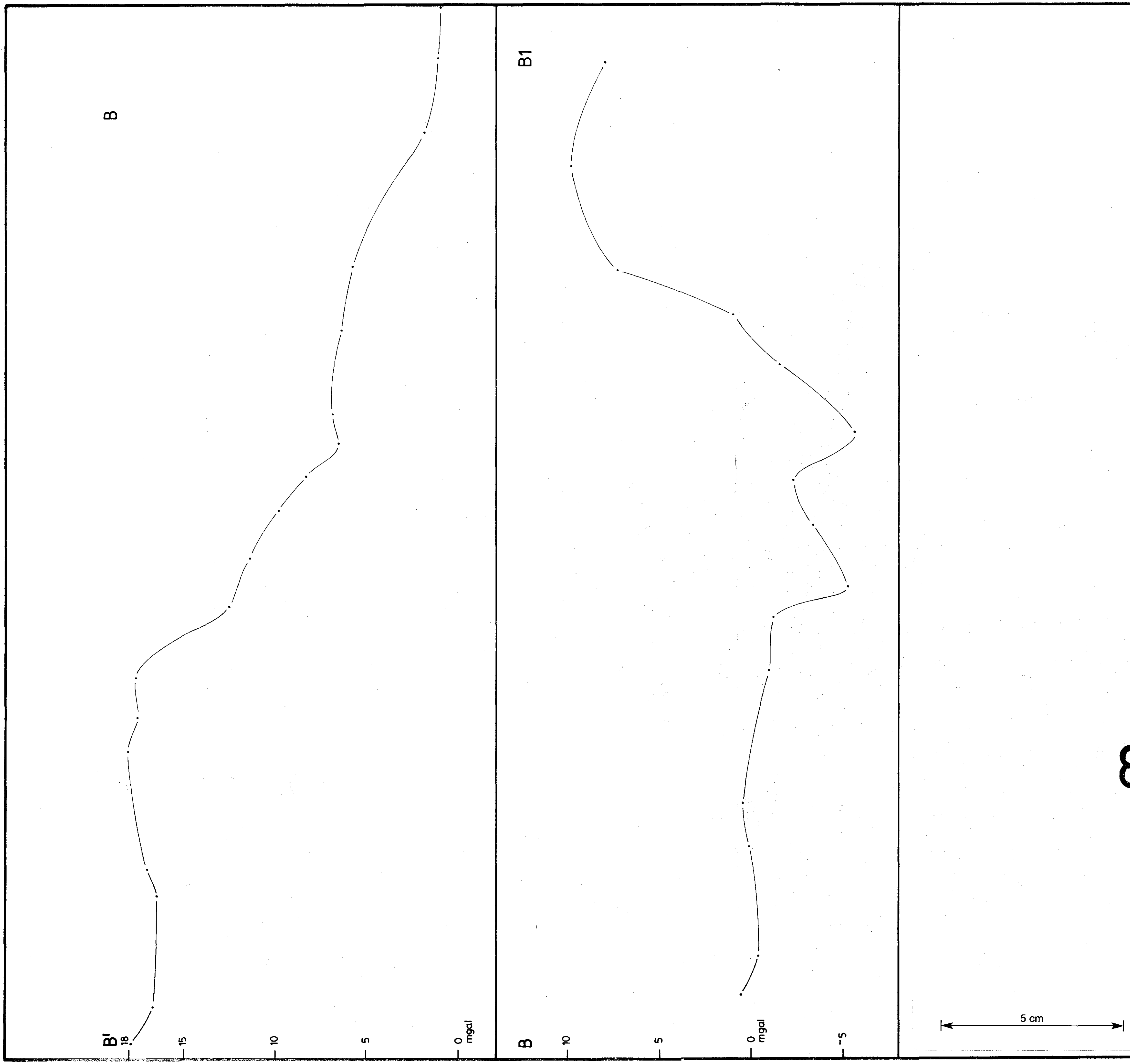
The Shell Company of Australia Limited
METALS DIVISION

HOUSETOP REGIONAL GRAVITY PROFILES : A'-A & A1-A-A2

VERT. SCALE 1cm = 2mgal

6652

SCALE	1: 50 000	DATE	21-9-82
AUTHOR	G. OAKES	DRAWN	H.L.S.
OFFICE	DEVONPORT	REP.No.	
DRG.No.	D/MQ00/010	FIG.No.	



432092

84-2123

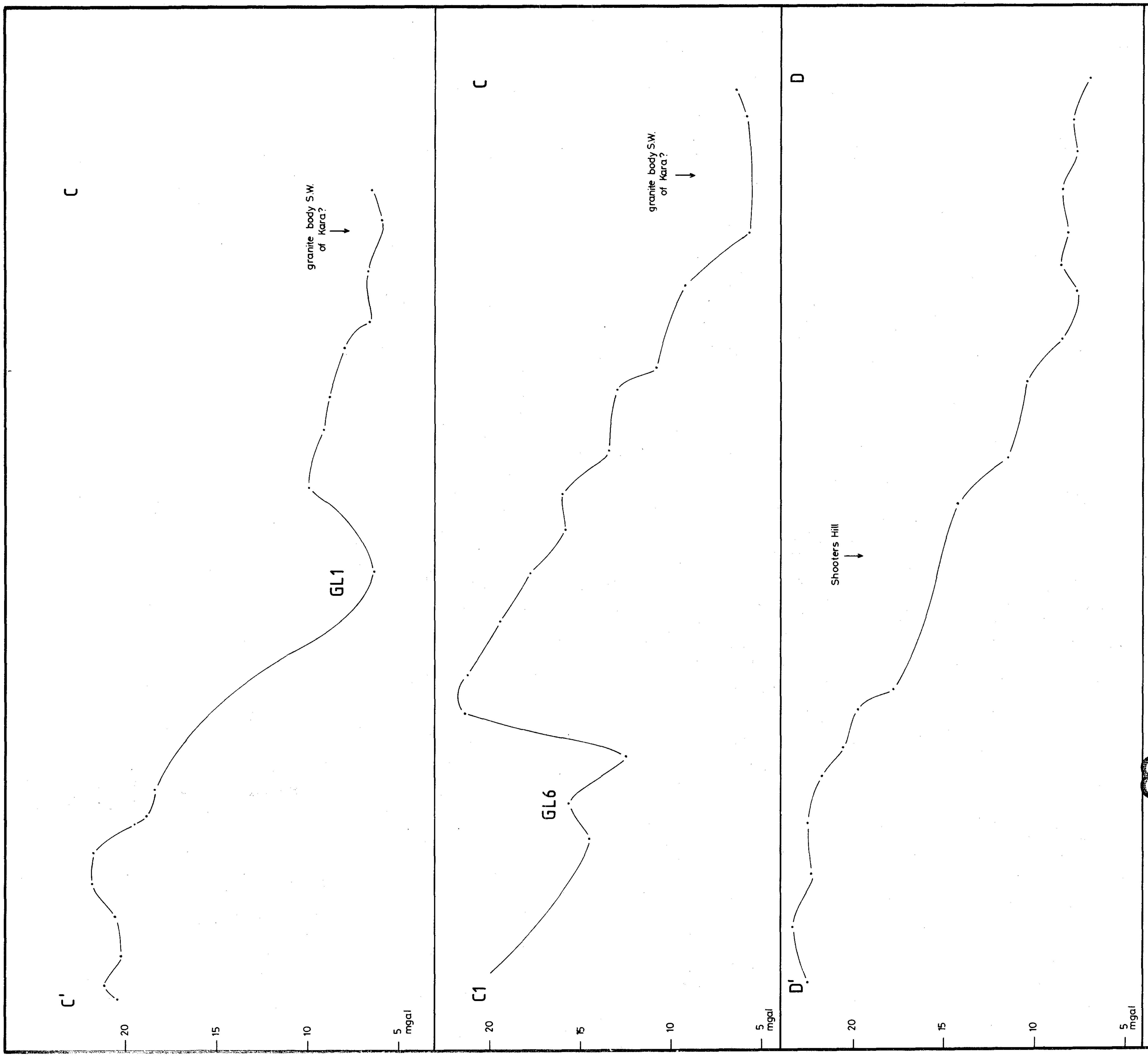
The Shell Company of Australia Limited
METALS DIVISION

HOUSETOP REGIONAL
GRAVITY PROFILE :
B' - B - B1

6653

VERT. SCALE 1cm= 2mgal

SCALE	1: 50 000	DATE	21-9-82
AUTHOR	G. OAKES	DRAWN	H.L.S.
OFFICE	DEVONPORT	REP.No.	
DRG.No.	D/MQ00/011	FIG.No.	



432099

5 cm

84-2123

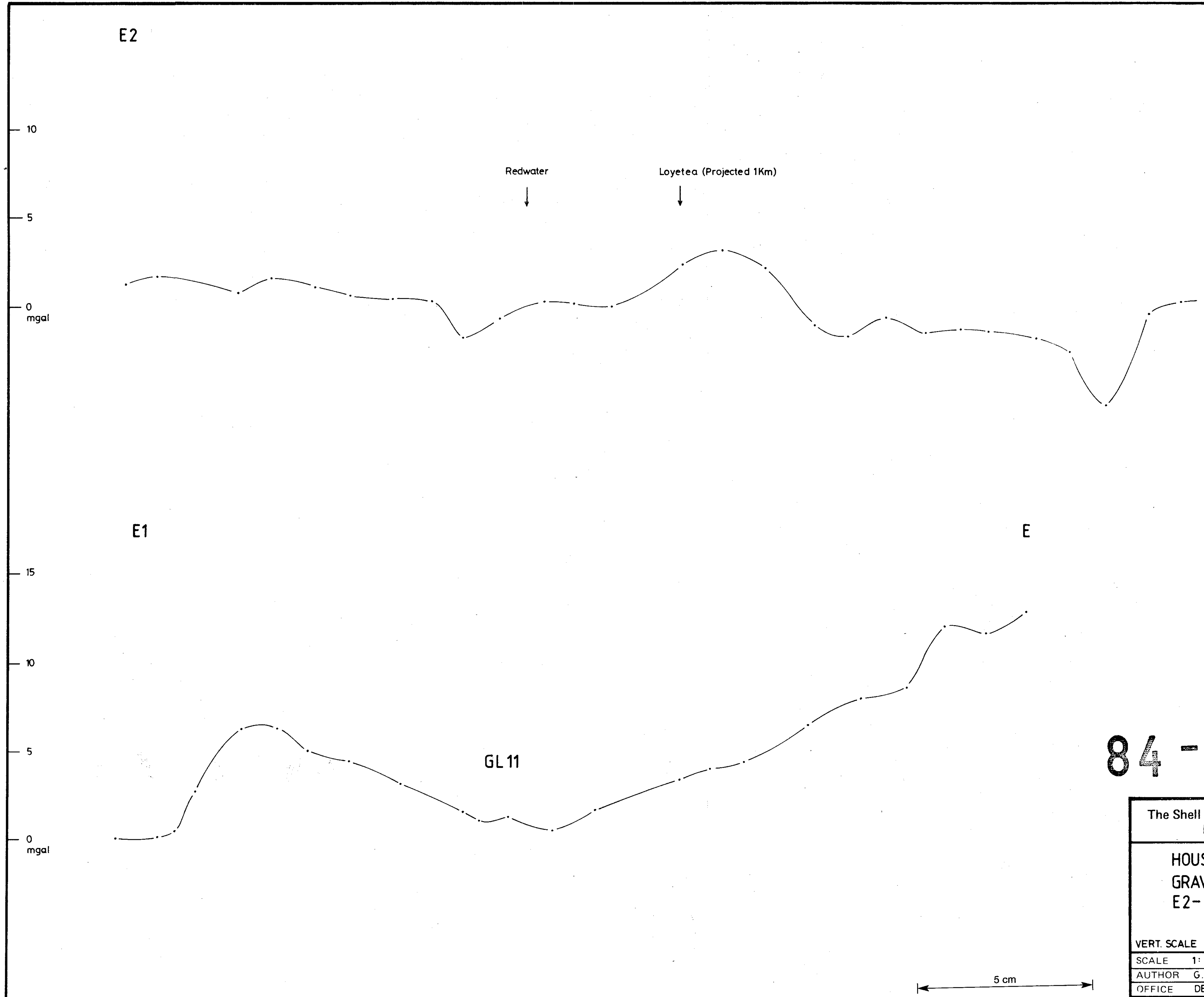
The Shell Company of Australia Limited
METALS DIVISION

HOUSETOP REGIONAL GRAVITY PROFILES : C'—C, C1—C & D'—D

VERT. SCALE 1cm = 2mgal

6654

SCALE	1: 50000	DATE	22—9—82
AUTHOR	G.OAKES	DRAWN	H.L.S.
OFFICE	DEVONPORT	REP.No.	
DRG.No.	D/MQ00/012	FIG.No.	



432094

84-2123

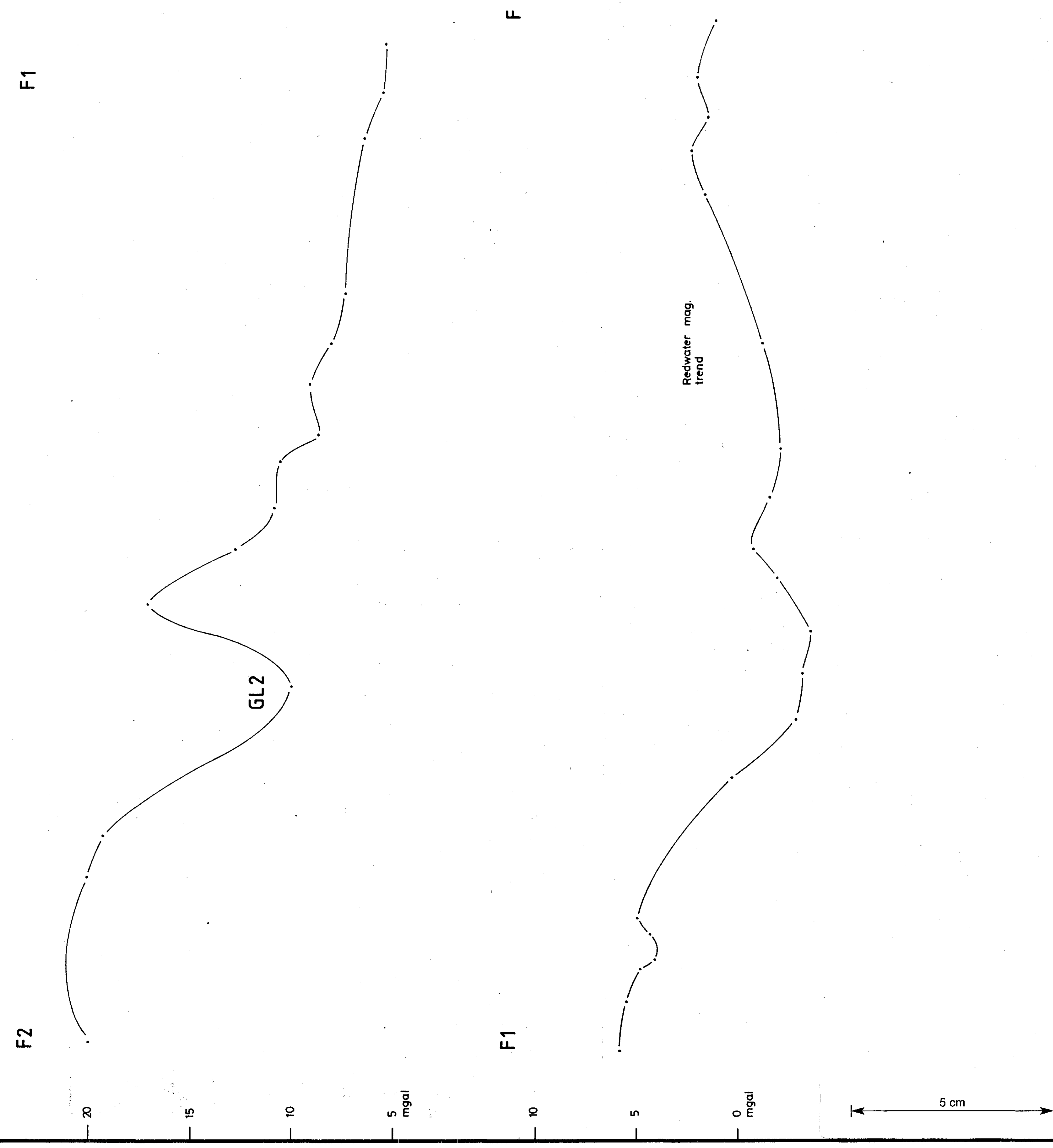
The Shell Company of Australia Limited
METALS DIVISION

HOUSETOP REGIONAL
GRAVITY PROFILE :
E2-E1-E

VERT. SCALE 1cm = 2mgal

6655

SCALE	1: 50 000	DATE	22-9-82
AUTHOR	G. OAKES	DRAWN	H.L.S.
OFFICE	DEVONPORT	REP.No.	
DRG.No.	D/MQ00/013	FIG.No.	



432095

84-2123

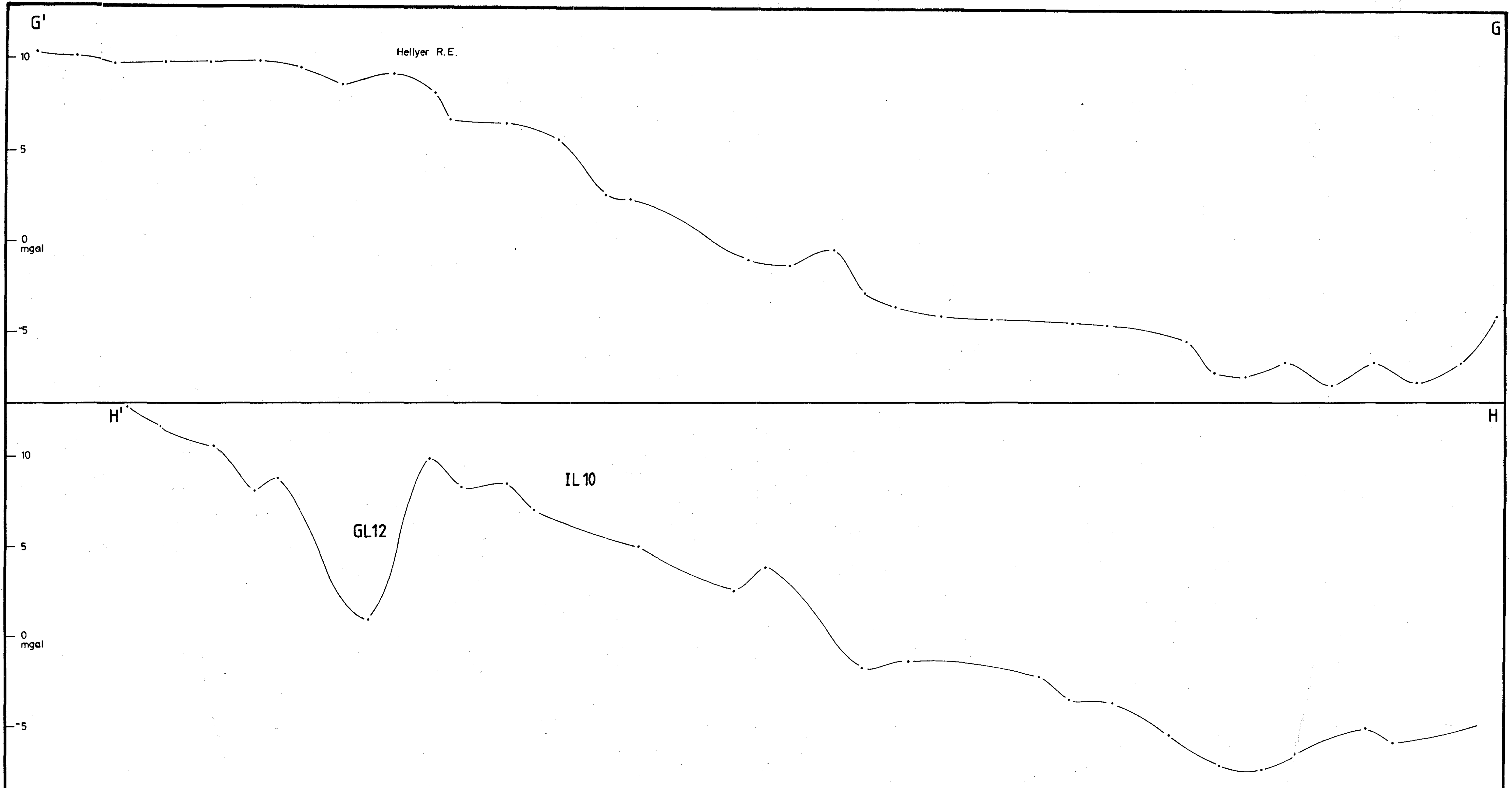
The Shell Company of Australia Limited
METALS DIVISION

HOUSETOP REGIONAL
GRAVITY PROFILE :
F2–F1–F

VERT. SCALE 1cm = 2mgal

6656

SCALE	1: 50 000	DATE	22–9–82
AUTHOR	G. OAKES	DRAWN	H. L. S.
OFFICE	DEVONPORT	REP.No.	
DRG.No.	D/MQ00/014	FIG.No.	



432096

5 cm

84-2123

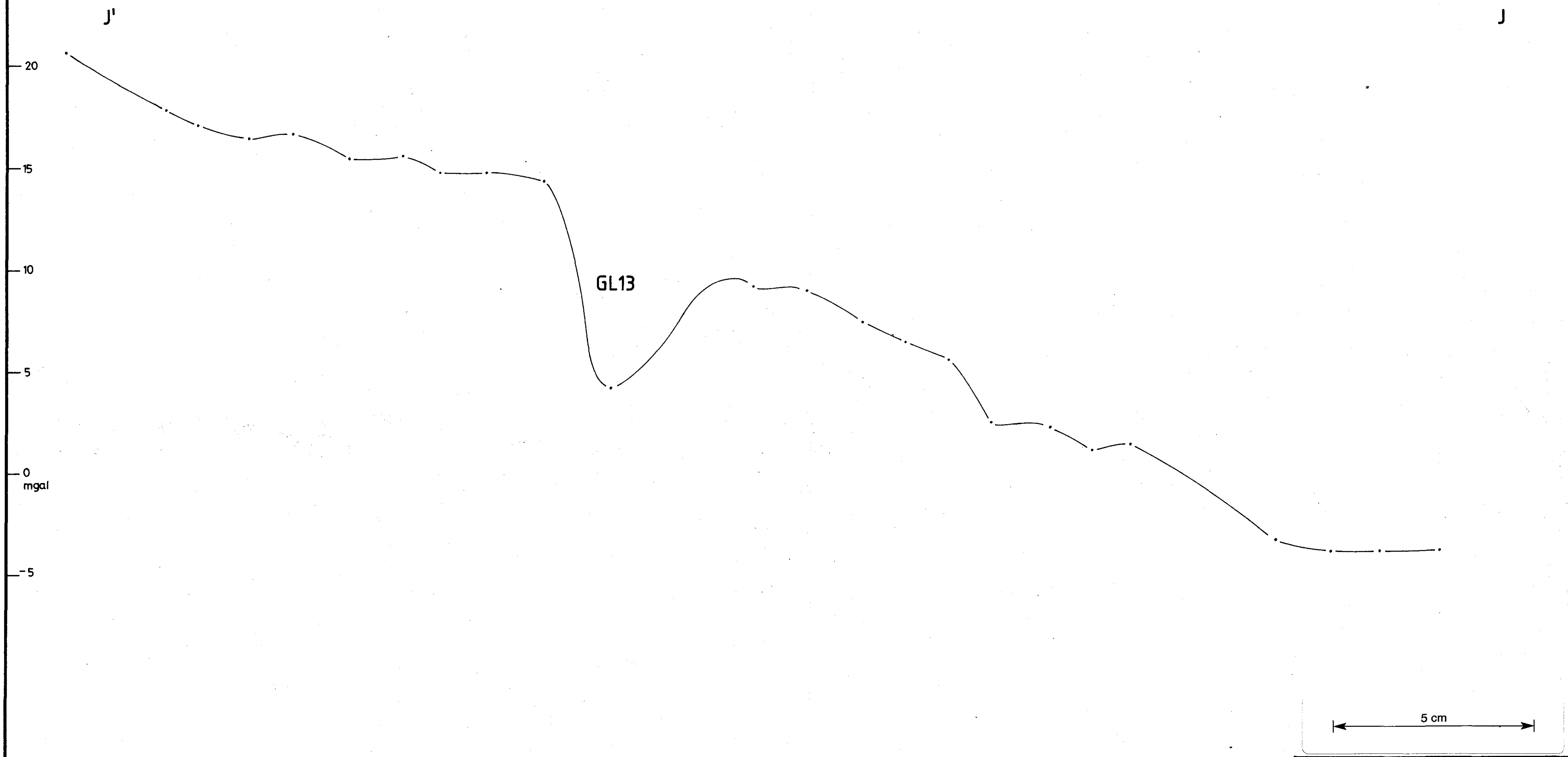
The Shell Company of Australia Limited
METALS DIVISION

HOUSETOP REGIONAL GRAVITY PROFILES: G'—G & H'—H

VERT. SCALE 1cm = 2mgal

6657

SCALE	1:50000	DATE	22-9-82
AUTHOR	G. OAKES	DRAWN	H.L.S.
OFFICE	DEVONPORT	REP.No.	
DRG.No.	D/MQ00/015	FIG.No.	



432097

84-2123

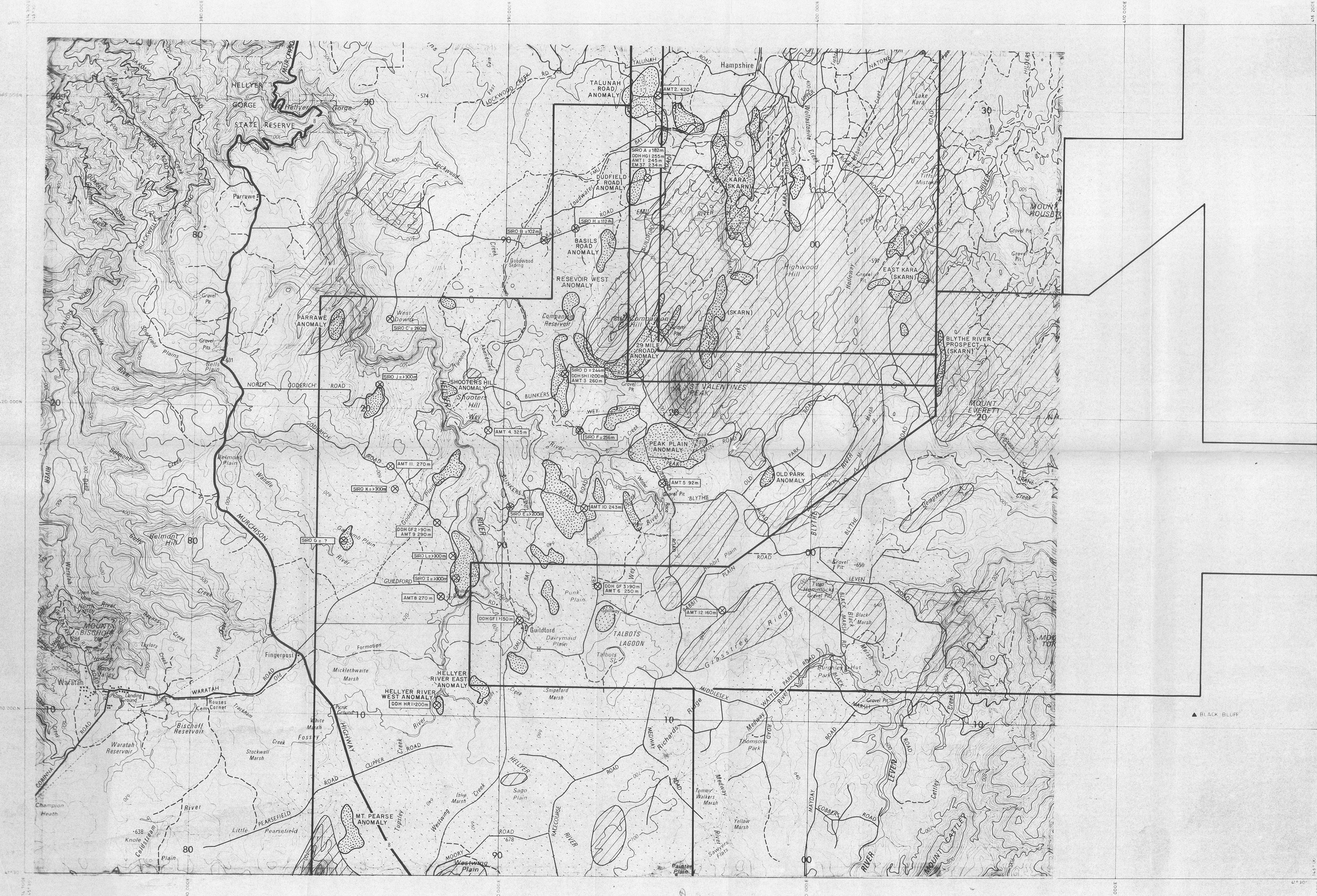
The Shell Company of Australia Limited
METALS DIVISION

HOUSETOP REGIONAL
GRAVITY PROFILE :
J'—J

VERT. SCALE 1cm= 2mgal

6658

SCALE	1: 50 000	DATE	23—9— 82
AUTHOR	G. OAKES	DRAWN	H. L. S.
OFFICE	DEVONPORT	REP.No.	
DRG.No.	D/MQ00/016	FIG.No.	



PRE - BASALT OUTCROP (Pre - Cambrian to Devonian)

MAJOR AEROMAG ANOMALIES / TRENDS

SIROTEM SDG.
DDH
AMT

Depths to (resistive) basement (metres) from DDH and AMT Site No i.e. Thickness of Tertiary Basalt plus thickness of paleo weathering

Basalt Thickness
> 200 m

432098

5 cm

84 - 2123

Shell

The Shell Company of Australia Limited
METALS DIVISION

N.W. TASMANIA
ST. VALENTINES
BASALT THICKNESS

SCALE	1 : 50,000	DATE	SEPT. 1983
AUTHOR	N H	DRAWN	
OFFICE	A H O	REP. No.	
DRG. No	MQ00/1004	FIG. No	

6659

84-2123

432099

The Shell Company of Australia Limited
METALS DIVISION

E.L. 1/76 GUILDFORD
HAMPSHIRE GATE AREA
ROUGH AEROMAG. INTERPRETATION
NORTHERN SHEET

6660

SCALE 1:20 000	DATE 28-2-83
AUTHOR G.O.	DRAWN J.L.L.
OFFICE	REP.No.
ENCL.No.	DRG No. D/MQ02/039

LEGEND

▨	Mag. Anomaly
+ +	Granite ? (mag. quite area)
△ △	Skarn Zone
V V V V	Basalt covered (boundaries separate different flows.)
∿∿∿	Mag. high trend
LLLLL	Mag. low trend
⁘	Mag. quiet area (Sediments)
Є Є	Cambrian Volcanics ? (mag. highs)

SHEET INDEX

3943
3842
3942
3841
3941

3842 = 1 : 20 000 sheet

▧ = Area covered by this sheet.

432100

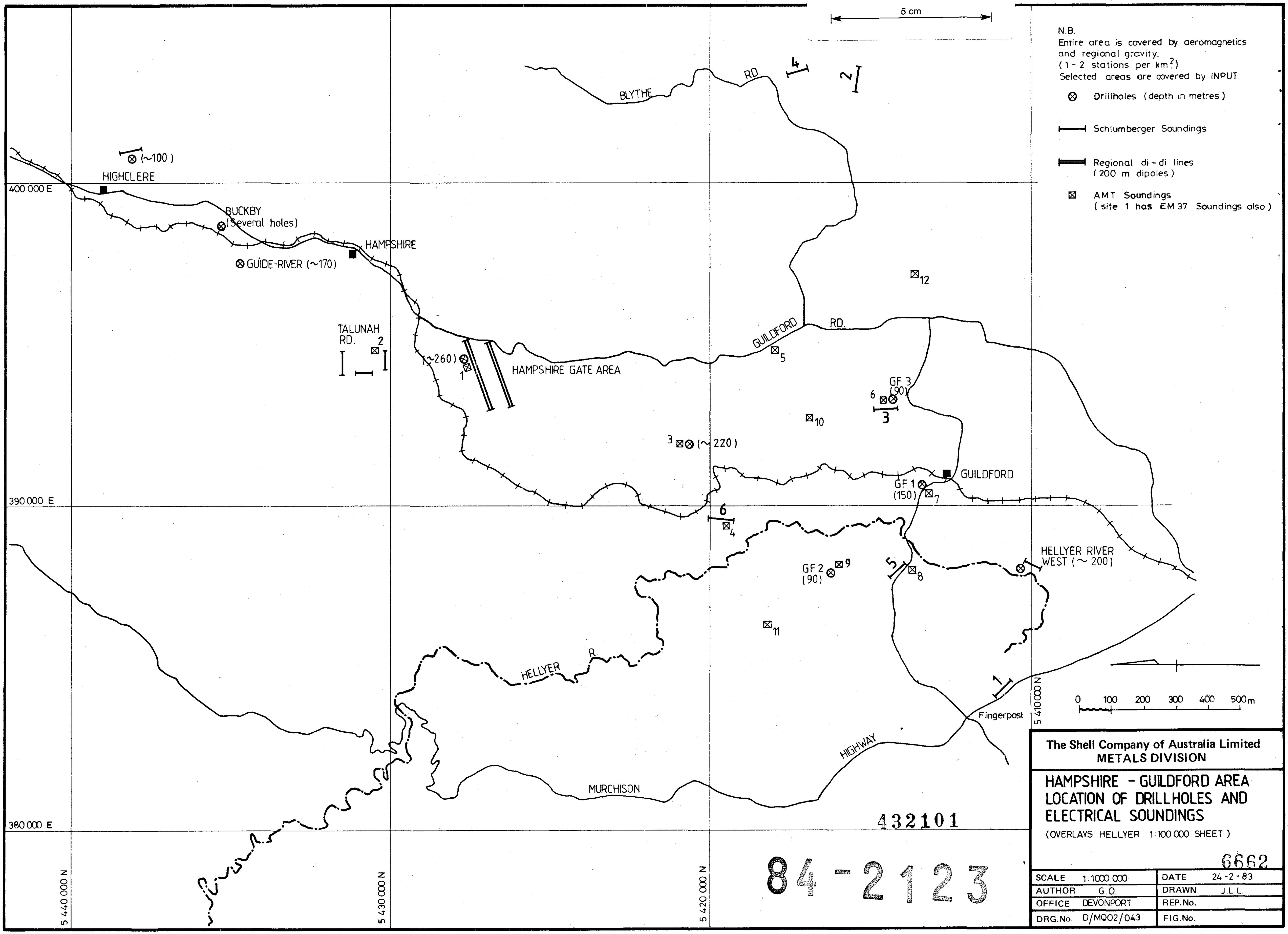
84-2123

The Shell Company of Australia Limited
METALS DIVISION

E.L. 1/76 GUILDFORD
HAMPSHIRE GATE AREA
ROUGH AEROMAG. INTERPRETATION
SOUTHERN SHEET

6661

SCALE	1 : 20,000	DATE	9 - 3 - 83
AUTHOR	G.O.	DRAWN	J.L.L.
OFFICE	DEVONPORT	REP.No.	
ENCL.No.		DRG No	D/MQ02/044



N.B.
Entire area is covered by aeromagnetics and regional gravity.
(1 - 2 stations per km^2.)
Selected areas are covered by INPUT.

⊗ Drillholes (depth in metres)

Schlumberger Soundings

Regional di - di lines
(200 m dipoles)

⊠ AMT Soundings
(site 1 has EM 37 Soundings also)

432101

84-2123

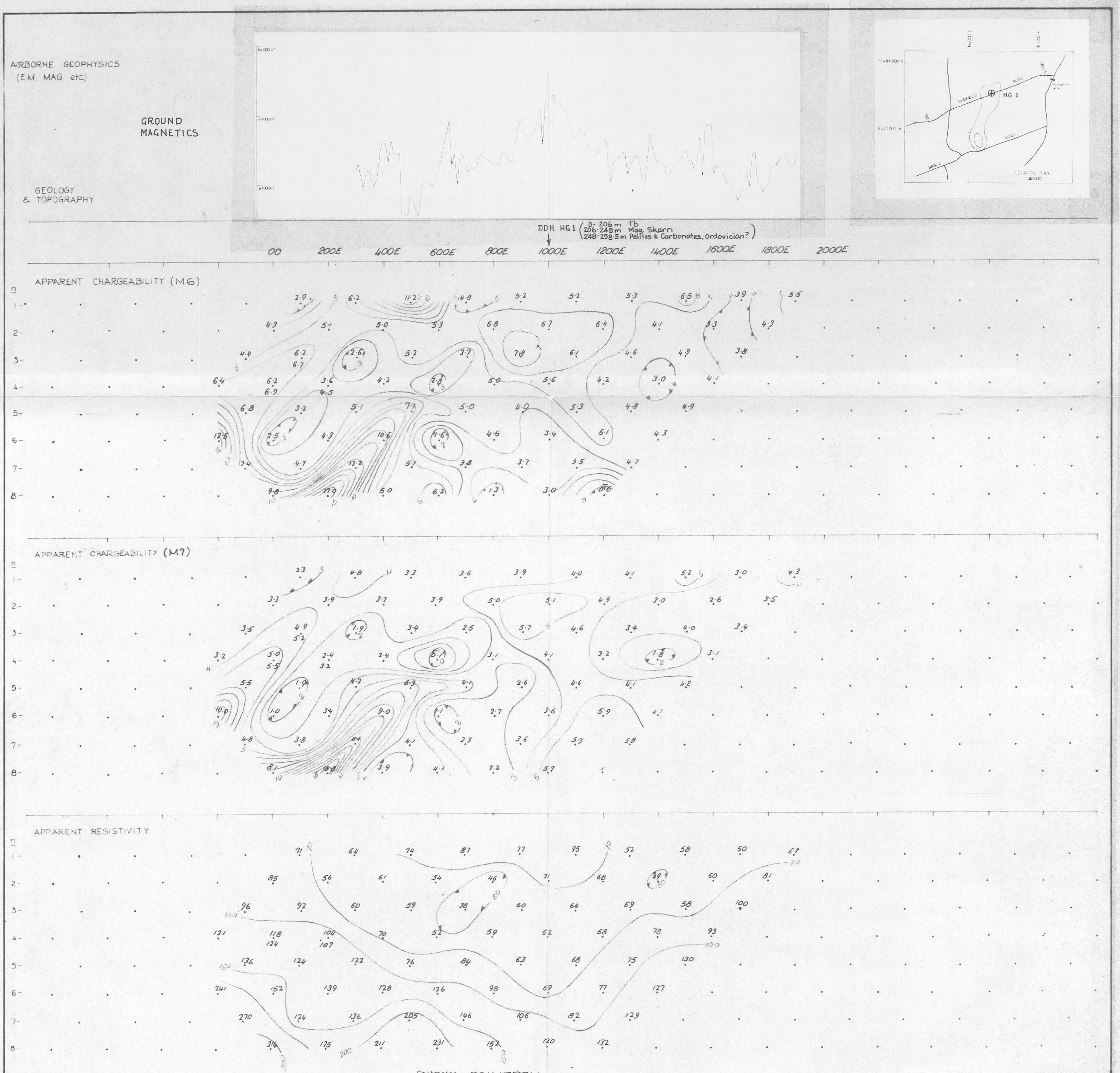
The Shell Company of Australia Limited
METALS DIVISION

HAMPSHIRE - GUILDFORD AREA LOCATION OF DRILLHOLES AND ELECTRICAL SOUNDINGS

(OVERLAYS HELLYER 1:100 000 SHEET)

6662

SCALE	1:1000 000	DATE	24-2-83
AUTHOR	G.O.	DRAWN	J.L.L.
OFFICE	DEVONPORT	REP.No.	
DRG.No.	D/MQ02/043	FIG.No.	



Contractor SCINTREX
Date 13-15 DEC 1982
Timing 2 sec
Transmitter
Receiver
Integration time
Array Dipole - dipole
Dipole length 200m

5 cm

432102

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The Shell Company of Australia Limited
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IP / RESISTIVITY SURVEY
E.L. 4/77 HIGHCLERE
DUDFIELD ROAD
I.P. AND MAGNETICS
Scale 1:10,000

FIG. No	REPORT No
ENCL. No	DRG. No D/MQ 03/092
DATE	AUTHOR
DRAWN	OFFICE

432103

N.B. 1. DATA COLLECTED PRIMARILY AT 0·5 TO 1·0 Km STATION SPACING ALONG ROADS.

2. DATA MUCH MORE LIMITED WITHIN TASMINEX EL (KARA)

3. TERRAIN CORRECTIONS HAVE BEEN APPLIED AFTER DIGITISING 1:100,000 TOPO. MAPS.

4. SODIN GRAVIMETER AND ANEROID BAROMETER USED.

5. EXPECTED ACCURACY ± 1mgal.

5 cm

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METALS DIVISION

N.W. TASMANIA
ST. VALENTINES
BOUGUER GRAVITY
C.I. = 2·5 mgal

84-2123

SCALE 1:50 000	DATE MARCH 1983
AUTHOR N.H.	DRAWN W.P.
OFFICE A.H.O.	REP No.
ENCL No.	DRG No. MQ00/1008

84-2123

[redacted]