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THE MOUNT LYELL MINING AND RAILWAY COMPANY LIMITED

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MT. TYNDALL

ANNUAL REPORT

1977/78

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1. INTRODUCTION

Work for the period July 1977 to June 1978 was mainly concentrated on four separate areas. Expenditure for the period was $187,848; total expenditure since 1966 totals $1,213,209.

A four hole diamond drilling program was carried out at Red Hills to test for the massive sulphide horizon intersected in RH 5, and to test the mineralised sequence south of RH 5. The drilling program showed that there is potential for significant base metal mineralisation in this southern area, but that the RH 5 mineralisation is most probably a small pod in a generally mineralised sequence.

North of the Red Hills and Henty Fault Zone grids, a new grid (Red Hills North) was cut, pegged and surveyed with gradient array E.I.P. geophysics and detailed ground magnetics. This completes the reconnaissance phase of exploration on the Tyndall lease west of the Tyndall Range.

Several secondary E.I.P. anomalies were located. A reconnaissance soil geochemistry survey was suspended due to higher work priorities in other areas.

Two separate programs were carried out on the White Spur Grid. On the western section of the grid intermediate lines were cut, and surveyed with gradient array E.I.P. geophysics. Follow-up ground magnetics and soil sampling surveys will start early in 1978/79.

On the north-east section of the grid intermediate lines were cut and surveyed with gradient array E.I.P. geophysics and ground magnetics, and were soil sampled and mapped. Two diamond drill targets have been selected.

The work program for the year 1978/79 will concentrate on the White Spur Grid. It is proposed to drill two diamond drill holes in the north-east part of the grid, and one in the western part.

Additional soil sampling and mapping will be done on the intermediate lines in the northern half of the western area, and a detailed ground magnetic survey will be conducted.

Intermediate lines in the southern half of the western area will be cut, and surveyed [illegible] gradient array E.I.P. geophysics and detailed ground magnetics, with follow-up soil sampling and geological mapping.

In the Red Hills area, the work program will initially involve an evaluation of the drilling program to date. Two diamond drill holes will probably be drilled to test the northern and southern strike extensions of the mineralised horizons intersected in RH 5 and RH 9 respectively.

The Henty Fault Zone still remains untested north of the costean on L 49N (2.4m of 40% sulphide). A program involving intermediate grid line track cutting with follow-up gradient array E.I.P. geophysics and detailed ground magnetics, plus a soil sampling survey, will be carried out. An equipotential survey will be done over the semi-massive sulphide body exposed in the L 49N costean in an effort to define its strike extension. One diamond drill hole to the north of L 49N is proposed to test this mineralised horizon.

On the Red Hills North Grid, a small soil geochemical sampling program (plus gradient array E.I.P. geophysics, if warranted) will be carried out to test the anomalies located in the 1977/78 reconnaissance survey.

The area east of the Tyndall Range (Lake Dora - Anthony Creek) has been incompletely explored. A complete re-appraisal of the available information will be carried out during the year, and a program worked out to completely cover the area.

The cost estimate for the year 1978/79 depends on (i) budget limitations, (ii) the amount of diamond drilling done, and (iii) the drill operators (contractor or Mt. Lyell). The full program set out above will cost $215,270 ($178,550 with Mt. Lyell drillers). It is more probable that a program of 3 diamond drill holes at White Spr and 1 diamond drill hole in the Henty Fault Zone will be carried out, costing $158,730 ($135,670 with Mt. Lyell drillers).

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2. EXPLORATION COMPLETED 1977/78

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2.1 RED HILLS GRID

2.1.1 Introduction

A four hole drilling program was carried out to further test the Pb-Zn mineralisation in RH 5 (3m of 0.29% Cu, 11.10% Pb, 31.33% Zn, 5.3 ppm Au, 167 ppm Ag). Associated work included E.I.P. downhole geophysics, equipotential geophysics over RH 5, and costeaning over the RH 5 stratigraphic sequence.

Soil sampling approximately 2,500' north along strike from RH5 was begun to test for any surface expression of the mineralised horizon.

A brief summary of the drilling results is presented in this report. A more detailed interpretation of all the diamond drilling to date will be the subject of a separate report.

2.1.2 Diamond Drilling

2.1.2.1 Introduction

Four diamond drill holes totalling 1623.7m were completed by Longyear Australia Pty. Ltd. at a cost of $54.97/m. Drilling was on a two shift/day basis and the operators worked from a caravan camp 15-20 minutes driving time from the rig. Penetration rate was 9.9m/shift for the complete program using a Longyear 38 drilling rig with NQ wireline equipment.

2.1.2.2 Results

RH 8: The purpose of the drill hole was to test for the RH 5 mineralised horizon at RL 1900' on L 32S. The hole was collared on 31.10.~~78~~ 77 and completed on 16.11.~~78~~ 77.

Hole bearing, 105° mag.; dip-60°; length 380.0m. Collar location 30' south of L 32S 1100E.

Lithology summary (Fig. 3):
0-175.0m: A sequence of variably altered fine-coarse grained felsic tuffs containing minor pyrite and calcite, with some sericite, and siliceous sediment units.
126.7-128.2m, 129.9-131.2m: Basic intrusive.
175.0-231.1m: Carbonaceous pyritic black shales. Minor Zn and Pb reported in the assays (maximum values 4.5m of 0.25% Zn, 1.5m of 0.17% Pb).
231.1-321.4m: Sequence of fine-coarse grained altered (siliceous and/or calcitic and/or sericitic) felsic tuffs with minor pyrite.
279.3-283.3m: Altered fine grained siliceous tuff including a band of semi-massive sphalerite-galena with adjacent disseminated sphalerite-galena (maximum values 281.9-282.5m of 1.70% Zn, 1.42% Pb, 9 ppm Ag, 0.2 ppm Au).
321.4-328.5m: Coarse grained lithic tuff with disseminated sphalerite in the groundmass, (maximum values 318.5-327.5m, 9.0m of 1.00% Zn). This unit may correspond with the RH 5 mineralised horizon.
322.95-323.55m: Basic intrusive (c.f. RH 5).
328.5-362.2m: Coarse grained altered (crystal) tuff-agglomerate. Minor chalcopyrite and sphalerite in the groundmass.
362.2-380.0m: Fractured and brecciated altered fine grained siliceous lava (Red Hills type). Minor pyrite and chalcopyrite (assay values 365.0-380.0m, 15m of 0.20% Cu).

Assay Summary:

281.0-282.5m:	150 ppm Cu	1.42% Pb	1.70% Zn	9 ppm Ag	0.2 ppm Au
320.0-327.5m:	273 " "	1.12% "	369 ppm Zn	2 ppm Ag	

The hole flattened more than anticipated (external stepped bits used) and the target zone was intersected at RL 2000'. The results from this hole suggest that the RH 5 mineralisation is a small pod, and that further testing of this zone close to RH 5 is not warranted.

Downhole E.I.P. log of RH8:

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The hole was logged to 180.0m on 10.12.77 (Scintrex Pty. Ltd. Report No. Tas 054 E). The lithologies from 0-110m were interpreted as alternations of two quite different rock types(geologically logged as a single unit as fine grained altered felsic tuffs). The alternations of the IP characteristics may correspond with pyrite content, or repeating colour variants or the degree of fracturing observed in the rocks. From 110-180m no significant changes were noted although apparent resistivity increases while chargeability slowly decreases downhole.

RH 9: The purpose of the hole was to test for the RH 5 mineralised horizon 1100' south of RH 5 at RL 1800', L 40S. RHP 95 was drilled in 1958 (E.Z. Co Ltd.) on this section, but stopped short of the projected RH 5 mineralization position. This was considered in site selection since it could provide additional information for stratigraphic and structural correlations. The hole was collared on 18.11.77 and completed on 1.12.77.

Hole bearing, 90^{o} mag.; dip-65^{o}; length 388.2m. Collar location 200' south of L 40S 1250E.

Lithology summary (Fig. 4):
0-130.3m: Variably altered fine-coarse grained lithic tuffs containing sericite, quartz or calcite, and minor pyrite.
125.55-126.1m, 127.9-128.2m, 129.8-130.2m: Altered basic intrusive.
130.3-131.15m: Carbonaceous and sericitic shale.
131.15-154.1m: Brecciated felsic lava.
154.1-193.7m: Fine-medium grained altered sericitic tuffs with minor pyrite and occasional very minor sphalerite (maximum value 1.5m of 0.165% Zn, 0.038% Pb)
193.7-210.6m: Pyritic carbonaceous shales (maximum values 0.090% Cu, 0.026% Pb, 0.085% Zn).
210.6-215.1m: Altered siliceous coarse grained tuffs with pyrite and minor sphalerite (maximum value 1.5m of 0.28% Zn).
215.1-310.75m: Fine-medium grained (crystal) tuffs, with calcite, sericite, chlorite common, and minor pyrite.
310.75-320.55m: Sequence of black shales, fine grained sediments and lithic tuffs; minor pyrite and disseminated sphalerite in fine grained units.
309.5-318.5m of 0.031% Cu, 0.32% Pb, 1.64% Zn, 10 ppm Ag.
320.55-360.1m: Altered fine-medium grained sericitic and siliceous tuffs and minor sediments. Pyrite minor throughout, minor disseminated sphalerite is common.
336.1-336.3m: Semi-massive sphalerite-galena-pyrite in quartz-haematite sedime
335.0-345.5m: 1.96% Zn, 0.40% Pb, 3 ppm Ag.
360.1-367.6m: Altered chloritic coarse grained tuff, minor pyrite and chalcopyrite (362.9-368.0m, 0.17% Cu).
367.6-388.2m: Altered siliceous chlorite feldspar fine grained felsic lava ("Red Hills" type). Minor pyrite and occasional chalcopyrite (371.0-383.0m, 0.13% Cu).

Assay Summary:

211.5-213.0m:	1.5m of	55 ppm Cu,	205 ppm Pb,	0.28% Zn,	1 ppm Ag
309.5-318.5m:	9m "	310 " "	0.32% Pb,	1.64% Zn,	10 "
335.0-345.5m:	10.5m "	336 " "	0.40% Pb,	1.96% Zn,	3 "
351.5-360.5m:	9m "	440 " "	166 ppm Pb,	0.988% Zn,	1 "

309.5-360.5m, 51m of 1.04% Zn
362.0-368.0m, 6m of 0.17% Cu
371.0-383.0m, 12m of 0.13% Cu

The semi-massive sulphide zone 336.1-336.3m occurs in a similar stratigraphic position to the RH 5 mineralisation.

The occurrence of significant amounts of sphalerite in the lower shale unit 310.75-320.55m is encouraging since it is known that the shale horizon thickens to the south thus providing a suitable environment for base metal deposition.

The downhole E.I.P. log of RH 9 was stopped at 85m by cave-in material blocking the hole.

RH 10: The purpose of the hole was to test the RH 5 mineralised horizon at RL 1600' on L 58S, 2200' south of RH 5; and to test the sphalerite-bearing

horizon intersected in RH 9. The hole was collared on 3.12.77 and completed on 15.1.78 (including a 3 week Christmas shut-down).
Hole bearing, 110° mag; dip-80°, length 474.5m. Collar location 200' south of L 48S 1200E.

Lithology summary (Fig. 5):

0-67.15m: Coarse grained lithic-crystal tuff.
67.15-109.95m: Fine-coarse grained lithic and crystal tuffs; occasional minor pyrite, and calcite.
109.95-122.9m: Fine-coarse grained carbonaceous and sericitic tuffs and shales, minor pyrite and calcite.
122.9-229.9m: Fine-coarse grained lithic (crystal) tuffs, minor pyrite.
229.9 253.9m: Sericitic carbonaceous fine grained tuffs and shales, minor pyrite and calcite common.
239.2-239.4m, 245.1-245.95m, 246.1-246.45m: Fine grained altered basic intrusive.
253.9-295.85m: Fine-coarse grained (vitric) lithic tuffs, variably pyritic (to 10%) and calcitic.
295.85-301.65m: Carbonaceous pyritic shales and carbonaceous sericitic pyritic tuffs.
301.65-381.0m: Altered fine-coarse grained sericitic and sericite-chlorite tuff, variable calcite and pyrite content.
379.0-379.3m: Fine grained siliceous sediment with chalcopyrite-pyrite-(chlorite) stringers, assay 0.3m of 0.94% Cu.
381.0-474.5m: Sequence of altered fine grained felsic lavas ("Red Hills" type).

Assay Summary:

379.0-379.3m: 0.94% Cu, 0.005% Pb, 0.018% Zn, < 1 ppm Ag.

The shale and altered tuff zone intersected in RH 9 (51m of 1.04% Zn) was intersected (295.85-301.65m), however no significant Zn or Pb values were obtained.

The mineralised sediment 379.0-379.3m (0.94% Cu) is probably a small stringer zone with no direct correlation with the RH 5 mineralised horizon.

The downhole E.I.P. log of RH 10 (35-240m) gave no additional information.

RH 11: The purpose of the hole was to test for the RH 5 mineralised horizon at RL 1600' on L 68S, 3600' south of RH 5; and to test the black shale horizons on this section. The hole was collared on 17.1.78 and completed on 4.2.78.

Moraine was encountered from 0-8.2m and heavy mud was used to help penetration.

Hole bearing, 95° mag; dip-70°; length 381.0m. Collar location L 68S, 2150E.

Lithology Summary (Fig. 6):

0-8.2 m: moraine - boulders and sand.
8.2-182.15 m: sequence of mixed and alternating black carbonaceous (pyritic) shales, sericitic-carbonaceous (calcitic) fine grained tuffs including intraformational slumped and brecciated sediments. Minor barite. Disseminated sphalerite-galena occurs spasmodically from about 115 m.
92.0-94.2 m, 95.7-97.9 m, 115.7-116.7 m: Medium grained altered basic intrusive.
126.5-129.5 m, 0.09% Cu, 0.052% Pb, 1.96% Zn, 11 ppm Ag.
140.0-144.5 m, 0.008% Cu, 0.169% Pb, 0.43% Zn, < 1 ppm Ag.
167.6-168.7 m: brecciated black shale with sphalerite galena (chalcopyrite) infilling.
165.5-171.5m, 0.025% Cu, 0.46% Pb, 1.49% Zn, 4 ppm Ag.
119.0-180.5m, 61.5m of 0.015% Cu, 0.177% Pb, 0.44% Zn.
182.15-219.4m: medium-coarse grained sericitic lithic tuff with minor pyrite and calcite, and occasional sphalerite.
219.4-222.85m: carbonaceous pyritic (calcitic) shale with assay 219.4-222.4m; 0.069% Pb, 0.179% Zn.
222.85-226.7m: medium-coarse grained lithic tuffs.
226.7-234.9m: carbonaceous (pyritic, calcitic) shales with assay 227.0-237.5m, 0.27% Zn.
234.9-245.25m: medium-coarse grained lithic tuff with pyrite and occasional disseminated sphalerite.

245.25-246.15m: Carbonaceous shale and fine grained tuff with assay 245.0-246.5m, 0.18% Zn.
246.15-253.0m: Altered medium-coarse grained lithic crystal tuff, calcitic (sericitic) with minor shales.
253.0-256.3m: Carbonaceous pyritic sericitic shales.
256.3-262.0m: Altered coarse grained lithic tuff.
262.0-276.0m: Altered fine grained quartz sericite tuff.
276.0-319.0m: Medium-coarse grained lithic tuffs.
319.0-358.1m: Altered coarse grained lithic tuffs.
358.1-381.0m: Fine grained altered brecciated and fractured siliceous (chloritic) felsic lava ("Red Hills" type).

Assay Summary:

119.0-180.5m, 61.5m of 0.015% Cu, 0.177% Pb, 0.44% Zn.
including 126.5-129.5m, 3m of 0.52% Pb, 1.96% Zn, 11 ppm Ag
140.0-144.5m, 4.5m of 0.43% Zn
165.5-171.5m, 6.0m of 0.46% Pb, 1.49% Zn, 4 ppm Ag
219.4-222.4m, 3m of 0.179% Zn
227.0-237.5m, 10.5m of 0.27% Zn

The RH 5 mineralised horizon was not recognized in the hole.

There is a significant increase in the number and size of faults in this hole; faulting may cause displacement of shale units making correlation difficult (n.b. surface outcrop is very limited). Faulting may cause significant concentrations of base metals.

The thickness and number of shale horizons appears to be increasing southwards. In RH 11 there appears to be three separate mineralised horizons with the shale-fine tuff unit.

The hole caved-in when the casing was pulled, and prevented a downhole E.I.P. survey.

2.1.2.3. Diamond Drilling Summary

The drilling to date has reasonably tested the area close to the RH 5 massive sulphide intersection (Figs. 7 & 8). This mineralised horizon was intersected in RH 6R, 7, 8 and 9, all with much reduced base metal content. This zone of mineralisation may have some potential north of RH 7, however more soil geochemical data is required before a decision to drill can be made.

There is some potential for a deep (700' below surface) mineralised zone that would be satisfactorily tested by a drill hole to intersect the down-dip extension of the RH 5 mineralised horizon at RL 1200', L 28S.

RH 10 and RH 11 did not intersect the RH 5 mineralised horizon. However, RH 9 and RH 11 intersected significant sphalerite-galena mineralisation in black shales (e.g. 1.1m of 5.80% Zn, 1.62% Pb in RH 11).

There are several black shale horizons in the Red Hills-Gooseneck area, although the mineralisation appears to be restricted to the more easterly horizons. The shale horizons continue southwards from RH 11, under moraine, and Owen Conglomerate (?) and should be further tested by diamond drilling.

2.1.3 Geochemistry Geology

(a) Costean over the RH 5 stratigraphic sequence (Figs. 9 & 10), 300' north of L 32S, 1700E.

The purpose of the costean was to test for any surface expression of the massive sulphide zone intersected in RH 5, and to provide assay and rock type correlation with RH 5.

Minor very fine grained pyrite-galena was observed in fine grained siliceous tuffs, but did not report in the assay results. Weathering and leaching of the rocks is common; iron and/or manganese oxide staining is common.

TABLE 1. Assay results from RH 5 costean.

ROCK TYPE		Costean Average ppm	Costean Maximum ppm	RH 5 Average ppm	RH 5 Maximum ppm	Downhole Depth
Shales	Cu	109	255	170	710	32-66m
	Pb	505	2000	320	620	
	Zn	56	118	530	1090	
Altered sericitic felsic vitric tuffs	Cu	100	145	210	1020	66-78m
	Pb	250	300	520	1290	
	Zn	126	220	980	4030	
Altered sericitic pyritic vitric crystal tuff	Cu	95	115	70	210	78-100m
	Pb	285	400	750	2520	
	Zu	93	94	1870	8200	
Medium-coarse grained chloritic lithic tuff	Cu	82	95	80	250	100-122m
	Pb	285	600	150	400	
	Zn	128	154	220	580	
Fine grained vitric siliceous tuff	Cu	111	325	100	480	122-146m
	Pb	98	130	350	1850	
	Zn	184	255	270	1120	
Fine-coarse grained lithic and crystal? vitric? tuff	Cu	93	165	710	6000	146-178m
	Pb	158	450	210	1690	
	Zu	136	225	360	1670	
Coarse grained siliceous lithic tuff	Cu	78	95	400	1300	178-196m
	Pb	24	30	270	900	
	Zn	110	155	760	2000	
Fine-coarse grained altered tuffs	Cu	87	105		0.35%	196-208.5m
	Pb	67	140		12.30%	
	Zn	78	103		35.5 %	

There is no apparent surface expression of the massive sulphide zone intersected in RH5.

(b) Soil geochemistry

Lines 8S and 00N were sampled across the assumed northern strike extension of the RH 5 mineralisation. L 16S, approximately 800' north of RH 7, showed anomalous Pb values, maximum 285 ppm, over black shales and tuffs east of the shales, in a similar position to Zn mineralisation in RH 7 (6m of 1.87% Zn) and to the RH 5 mineralisation. A moderate Pb anomaly was obtained on L 8S (maximum 187 ppm c.f. background 35 ppm) over 150'. No anomaly was observed on L 00N, although sample quality was low (poor soil development on leached sub-outcrop, and swampy terrain).

2.1.4 Geophysics

(a) Downhole E.I.P. drill hole logging.

Diamond drill holes RH 6R and RH 7 (drilled 1976/77) and RH 8, 9 and 10 were logged with "at hole" downhole E.I.P. and resistivity surveys (Scintrex Pty. Ltd., Job No. Tas 054E, Report July 1978). RH 5 was logged in 1976/77, but not reported. The abovementioned Report discusses all of these logs, and detail will not be presented here.

Significant features of individual logs are presented in Table 2.

TABLE 2. Significant features of E.I.P. downhole surveys of Red Hills diamond drill holes.

RH 5 (Fig. 11)	Downhole distance	Chargeability ms	Resistivity ohmm	Rock Type
	30-65m	130 ±	40-1000	Carbonaceous shales
	157m	90	600	minor Cu mineral-n
	185m	172	400	possible "near miss mineral-n.
	197m	224	45	massive sulphides
	222-232	10	10000	"Red Hills Lavas"

The mineralised zone (197m) stands out clearly, and both the shale unit and Red Hills lavas are well defined. Isolated chargeability peaks generally correspond with mineralisation, particularly chalcopyrite, often without an associated drop in resistivity.

RH 6R				
Logged 10-420m	10-30m	1	> 350,000	Silicified m.gr. felsic tuffs.
	157m	37	50,000	F.gr. silicified sed.
	292m	80	80,000	disseminated galena in f.gr felsic tuff.
	315m	100	15,000	qtz, epidote Py vein
	326-370m	80-150	3,000-10,000	Agglomerate, f.gr tuffs, with ch. peaks = cp (gal)
	370-420m	20-30	200,000	"Red Hills Lava".

Pb and Pb-Zn mineralisation generally show on the E.I.P. log, with any sphalerite having a variable masking effect. Sphalerite alone is generally indistinguishable from normal fluctuations.

RH 7				
Logged 5-247.5m	15-93m	5-10	60,000	M.gr felsic tuff
	97m	50	11,000	V.f.gr. tuffac. seds.
	105-125m	170-200	1,000-3,000	Carbonaceous shales
	147m	77	5,000	? sericite-py shear
	165-210m	2-5	4,000-8000	C.gr., f-m.gr felsic tuffs
	235		50% drop	Fault + Py gal sphalerite

The only significant mineralisation occurs from 248.5m. Faults and shear zones sometimes show an associated resistivity drop ± chargeability increase, depending on the presence of sulphides.

RH 8				
Logged 0-177m	0-110m	(i) 75-70	3,000-11,000	A repeating sequence of two rock types.
		(ii) 15-25	23,000-50,000	

Unit described as "altered fine grained felsic tuffs"; the difference in physical properties due to pyrite content, degree of fracturing, or overall rock composition.

RH 9				
Logged 35-85m	No distinctive features			
RH 10	105-115m	40+ background	600-1000	? Carbonacous shales
Logged 35-240m	125-145m	-10 ms	1500	Coarse gr tuff
	225-240m	-10 to -120	60	Carbonaceous shales

The negative chargeability values infer a low chargeability background.

RH 11	No survey	due to hole cave-in.		

Correlation of rock types between diamond drill holes using geophysical parameters is sometimes possible, although generally limited to units that are geologically distinct anyway!

Several different rock types have similar physical properties, which may be due to qualities such as the degree and type of alteration, grain size of the groundmass or the degree of silicification, rather than gross lithological differences being the main determinant of the geophysical parameters.

The resistivity of black carbonaceous shale units is variable, although the chargeabilities are always high.

"Within volcanic sequences it can be expected that the physical properties of chargeability and resistivity for pyrite-lead-zinc lodes, both lean and rich in copper, will overlap those for graphitic shales". (Scintrex Report July, 1978 p.26).

The downhole E.I.P. and resistivity surveys do provide useful information for little extra cost. It is important that the surveys be done as soon as possible after the completion of drilling (possibly even with some casing left in the hole with the rig still over the hole) to minimise the risk of hole cave-in.

(b) Applied Potential (E.I.P.) and Magnetometric Resistivity (M.I.P.) down hole surveys over RH 5 were carried out as a preliminary test of the method to ascertain whether or not the mineralised section of RH 5 could be detected and traced out on surface. Refer to Scintrex Pty. Ltd., Report August 1978, Job No. Tas - 054F.

Both methods succeeded in tracing the mineralisation to the north (40m) (Fig.12), and it is recommended that the survey be completed. The mineralisation is open north and south of RH 5, and the top of the mineralisation is estimated to be between 60 and 100m below surface.

(c) Gradient Array over RH 5.

One line of detailed gradient array E.I.P. was run over the RH 5 surface section to see if the $<$ 70% sulphide mineralisation could be detected on surface using this technique, with either 100' or 50' dipole spacing (Fig. 13).
The horizon was not detected.
The survey isolated a small occurrence of very finely disseminated pyrite-galena within fine grained siliceous tuffs (chargeability +10 ms above background, c.f. shales +28 ms; 60% reduction in resistivity).

2.2 WHITE SPUR GRID

2.2.1 Introduction

The discussion of the White Spur Grid is divided into two sections.

(a) North-east area: the area considered is the eastern 3,000' of the grid north of L 36N. This area contains several fine grained tuffaceous shale units in a sequence of crystal lithic, and altered sericitic, felsic tuffs, with several conformable basic intrusives.

(b) Western area: west of the White Spur-Mount Read track and north of L 28N. This area is characterised by numerous black shale horizons within a sequence of felsic crystal and welded tuffs.

2.2.2 North-East Area

2.2.2.1 Previous Work.

The grid over the area was cut at 600' spacing.

(a) Geophysics: the area was surveyed by gradient array E.I.P. and resistivity by Scintrex Pty. Ltd. in January 1976 (Scintrex Report Job No. Tas-035C). Anomalies E2 and E3 were defined. The maximum chargeability occurred on L 39N 5050E (29.5 ms c.f. background 10 ms) and corresponded with anomaly E3. Anomaly E2 has a strike length of 1800' crossing L 39N, 40N and 41N.

(b) Geochemistry: follow-up geochemical soil sampling was carried out over the geophysical anomalies on L 38N, 39N, 40N and 41N. Anomalous Pb Zn values corresponded with the broad chargeable zone around E2 and E3, with Zn $>$ 250 ppm on L 39N 5000-5100 E (anomaly E3).

2.2.2.2 Work Completed 1977/78.

2.2.2.2.1. Access

Intermediate lines were cut to reduce the line spacing to 300' for a detailed gradient array E.I.P. survey. Five lines were cut and pegged, each about 2000' long; total footage 9600'. Contractor was G. Mallinson and partners at a contract price of $76/1000' ($250/Km).

2.2.2.2.2 Geophysics

(a) Gradient array E.I.P. and resistivity survey (Scintrex Pty. Ltd., Report Job No. Tas-054B, June 1978). Lines 37.5N to 41.5N, including the previously surveyed lines, were surveyed. The results confirmed the anomalous zones and provided greater definition (Figs. 14 & 15).

A zone of chargeability > 25 ms (background about 10-12 ms) has a strike length of 1800' (L 37.5N 5500E to L 40N 4950E), maximum width of 600' (L 38.5N), and includes two sub-zones of chargeability > 30 ms (maximum 37.6 ms).

The zone is co-incident with a sequence of grey shales, tuffaceous shales and fine-medium grained lithic crystal tuffs. The sub-zones occur in tuffaceous shales and fine-medium grained crystal lithic tuffs (L 38.5N, 5500E and 5050E respectively). There is no apparent explanation in the surface rocks for the high chargeability values.

A zone of low resistivity (< 2000 ohm m) broadly corresponds with the anomalous chargeability zone. A zone of resistivity < 1000 ohm m occurs on L 38N - 37N slightly offset to the east of the eastern chargeability sub-zone. On L 41N, 39.5N and 39N the resistivity minima coincide with the chargeability sub-zones; on L 40.5N, 40N, 38.5N-37.5N the resistivity minima occur between the two chargeability sub-zones.

(b) Dipole-dipole array on L 39N, 4500-5700E.
The bulk of the source of the E.I.P. anomaly is considered to be below 150' (Fig. 16). The resistivity data indicates a westerly dip of about 70°.

The gradient array data on L 39N shows two distinct chargeability maxima with corresponding resistivity lows at 4850E and 5050E. The dipole-dipole survey shows a single resistivity low at 5200-5300E, and a strong chargeabl zone at 4950E, with a weak high at 5300E.

(c) Detailed ground magnetics.
A ground magnetic survey was done on the intermediate lines, and contoured together with the initial grid magnetic survey data (Fig. 17).

A magnetic anomaly occurs in the same area as the anomalous chargeability zone, but cuts across the general N.N.W. trend in detail striking approximately N-S. This magnetic trend cuts across rock type boundaries, and no rock unit appears to have a distinctive magnetic character (including rocks mapped as fine-medium grained basic intrusives).

2.2.2.2.3 Geochemistry

(a) Rock chip sampling.

Costean L 39N 4700-5200E.
The western end of the costean (4720-4980E) contains mainly fine grained tuffaceous shales and corresponds with the resistivity low and the lower chargeability peak (gradient array data).

Average assay values		Cu 66 ppm		
		Pb 56 ppm		
		Zn 109 ppm		
Maximum values	4890-4900E	170 ppm Cu,	60 ppm Pb,	290 ppm Zn
	4940-4950E	40 "	140 "	70 "

The eastern end of the costean (4980-5160E) contains lithic feldspar porphyritic medium-coarse grained crystal tuffs, partly welded, felsic to intermediate in composition.

Average assay values	Cu 52 ppm
	Pb 62 ppm
	Zn 274 ppm
Maximum values 5050-5060E	90 ppm Cu, 80 ppm Pb, 375 ppm Zn.

These assays are low, considering the depth of the E.I.P. anomaly is about 150'. The zinc values closely correlate with the different rock types.

Isolated rock chip samples in the area gave assay values similar to those from the costean.

(b) Soil Geochemistry

Geochemical soil sampling has been done on all grid lines. The C horizon was sampled where possible, however much of the steeper parts of the area are characterised by poorly developed soil profiles. Also, the area has been glaciated, producing a variably severe effect on soil horizon development.

Contour plans are shown in Figures 18, 19, 20; Cu-Ag, Pb, Zn respectively. The soil copper background is about 25 ppm, with a maximum of 165 ppm occurring over dolerite. Several other anomalous areas correspond with dolerite.

However geological mapping is sufficient to isolate these areas from the remaining Cu anomalies (Cu 50-130 ppm) which all correspond with fine grained laminated tuffs and tuffaceous shales.

The soil lead background is about 35 ppm, with a maximum value of 1850 ppm occurring over coarse grained crystal lithic tuff (37.5N, 5100E). Contouring of the lead values produces N.N.W. trends that generally correlate with the underlying geology.

The fine grained laminated tuff unit mapped in the L 39N costean shows above background soil lead content for most of its strike length, including three separate regions of very high lead values (to 1450 ppm, L 39.5N 4500 E).

The tuffaceous shale unit outcropping beyond the eastern end of the L 39N costean also shows above background lead values with a high zone (>190ppm) from L 39.5N - L 38.5N, strike length 1000'.

A lead-zinc soil high occurs over a fine grained tuffaceous shale unit at L 40N 4200 E.

The soil zinc background is about 55 ppm with a maximum value of 1460 ppm (L 42N 4000 E) occurring in fine grained altered sericitic felsic tuff.

Between L 37N and L 40N the contoured trends of the soil zinc values correspond with the geology. The highest values occur in the medium-coarse grained crystal lithic tuff units that outcrop immediately east of the lead-anomalous fine grained tuffaceous shales, including the tuff unit mapped in the L 39N costean: strike length 900' >200 ppm Zn).

Above background soil zinc values occur in some of the dolerite units.

Values of soil silver content were 2 ppm or less, with no obvious patterns or correlation with rock types. Most anomalous zones contain 1 or 2 ppm Ag, with Cu-Ag showing a strong correlation.

In summary, there are several small zones of co-incident base metal soil anomalies occurring in both the fine tuffaceous, and medium-coarse grained tuff units. Both of these horizons are considered prospective.

Table 3 lists the soil anomalies, and the corresponding chargeability values and rock type.

TABLE 3 Geochemical soil anomalies, North-east area, White Spur.

Line	Easting	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ch m.s.	Rock Type
L 37.5N	4400 E	40	34	580	1	9.4	) F - m.gr basic
	4450 E	165	41	450	1		) intrusive
	5100 E	35	1850	490	1	15.6	) M - c.gr crystal
	5150 E	11	400	200	1		) lithic tuff
	5200 E	9	400	70	0	16.0	) F.gr tuffaceous
	5250 E⊕	7	390	65	0		) shales
L 38N	4100 E	57	86	220	1	9.8	) M - c.gr crystal
	4150 E	60	86	190	1		) lithic tuff
	4750 E	48	69	360	1	17.1	)
L 38N	4700 E	114	34	132	2	17.6	F - m.gr basic intr.
	4950 E	130	74	186	2	23.9	) F - c.gr crystal
	5000 E⊕	27	120	240	1	33.5	) lithic tuff
	5350 E⊕	55	120	110	1	27.2	F.gr tuffaceous shale
L 39N	4100 E	55	22	187	NA	6.9	M - c.gr crystal lithic tuf
	4750 E⊕	61	70	198		23.1	) F.gr tuffacous
	4900 E⊕	88	68	138		24.7	) shale
	5000 E	39	42	305		26.8	) M-c.gr crystal
	5050 E*	24	33	360		29.1	) lithic tuff
	5100 E	29	100	255		27.0	)
	5300 E	44	322	120		24.0	F.gr tuffaceous shale
L 39.5N	3700 E	1	40	230	0	5	) M - c.gr crystal
	4300 E	16	57	240	1	10.4	) lithic tuff
	4350 E	13	75	290	1	13.4	)
	4500 E	0	1450	31	0	14.6	) F.gr tuffaceous
	4700 E	82	216	160	1	22.8	) shale
	4750 E	55	105	360	2	22.9	)
L 40N	4150 E	7	240	370	1	4.5	F - m.gr basic intr.
	4200 E	10	210	260	1	6.4	F.gr tuffaceous shale
	4350 E	13	210	230	0	8.6	M - c.gr crystal lithic tuff
	5200 E	22	172	120	NA	11.9	F.gr tuffaceous shale
L 40.5N	3900 E	18	25	450	0	9.8	F.gr tuffaceous shale
	4000 E	26	48	340	1	9.2	M - c.gr crystal lithic tuff
	4650 E*	50	420	180	0	23.9	F.gr tuffaceous shale
L 41N	3950 E	2	340	134	NA	9.5	F.gr sericitic felsic tuf[illegible]
	4050 E*	36	115	320		11.7	M - c.gr crystal lithic tuff
L 41.5N	Nil						
L 42N	4000 E	55	400	1460	1	6.6	F.gr sericitic felsic tuf[illegible]
	4050 E	16	400	500	0	5.9	" " " "
	4100 E	21	200	170	0	5.9	" " " "

* These sample locations are chargeability maxima on the N.N.W. trending E.I.P. chargeable zone.

⊕ These sample locations are within 200' of the main E.I.P. chargeable zone.

2.2.2.2.4 Geology

The area from L 37N to L 43N has been mapped in detail using rock chip data from soil auger samples and occasional outcrop data. (Fig. 21).

The general strike of the rocks is N.N.W. (with minor buckling), with a regional steeply west dipping to vertical attitude. There is equivocal evidence that the sequence is overturned: this anomalous zone is considered by geologists from E.Z. (A'asia) Co. Ltd. at Rosebery to be on the same horizon as the Rosebery orebody, which faces east. No facings in the rocks have been observed.

The anomalous E.I.P. zone appears to be associated with both fine grained laminated tuffaceous shales, and lithic feldspar porphyritic medium-coarse grained chloritic? welded? crystal tuffs. The anomalous zone has been considered as continuous, but it may be a series of separate, but closely related, subzones that occur in both the above rock types.

The rocks are moderately foliated, and have been slightly altered.

To the west and east of this main "central zone" are strongly altered fine grained sericitic felsic tuffs. They are well foliated with few distinguishing features; occasional feldspar phenocrysts and pyrite are still visible. The "central zone" rocks appear to lens out into this unit to the north.

Rocks of basaltic composition are common in the area. Grain size varies from fine to coarse, with some units possibly being flows. The intrusive rocks appear to be sill-like in attitude, being more or less conformable.

There is no positive evidence for major faulting in the area. Interpretation of the geophysics suggests a set of ENE striking faults (e.g. the resistivity data shows a distinct break between L39.5N and L40N).

2.2.3 Western Area

2.2.3.1 Exploration Objectives for 1977/78.

Past surveys have isolated several zones of coincident E.I.P. and soil geochemical anomalies. The principal objective of the past Year's work was to more closely define the character and position of these anomalous zones in the northern section of the Western area of the White Spur Grid, with the aim of selecting possible diamond drill hole targets.

2.2.3.2 Work Completed 1977/78.

2.2.3.2.1 Access:

Eleven intermediate lines, from L33N to L43N, were cut and pegged by contractor G. Mallinson and partners to reduce the line spacing to about 300 ft. Total footage was 23,000' at a contract rate of $76/1000 ft. ($250/km).

2.2.3.2.2 Geophysics:

(a) A gradient array E.I.P. and resistivity survey was done over the intermediate lines and the previously surveyed lines. Refer to Scintrex Pty. Ltd. reports: Job No. Tas-035C April 1977 (first survey), and Job No. Tas-054B June 1978.

The survey successfully defined the extent and location of the primary target anomalies (Fig. 22). Eight anomalies of major interest occur, and these are presented in Table 4. These zones require further geochemical soil sampling and geological mapping.

(b) The ground magnetic survey in 1977 revealed an elongate anomalously high zone south of L 37N, that broadly correlates with black shales (location discrepancies may be caused by the flat dips of the shale units). This anomaly may be explained by pyrrhotite occurring within the shale units. The large (+ 300 γ) anomaly on L 36N 1700E remains unexplained, despite costeaning.

TABLE 4 E.I.P. anomalies, Western area White Spur.

Zone (Fig.22)	Lines	Strike Length	Maximum Chargeability Line	Easting	ms	Minimum Resist. ohm.m
W 13	L33.5N-35N	1100' + (open to south)	L 33.5N	1150W	51	620
W 15	L 34.5N-	1500'	L 36N (costean)	1400W	48	300
W 18S	L 36.5N-38.5N	1600'	L 38N	3450W	54	600
W 18N	L 38N-39.5N	900'	L 39N	3850W	56	620
W 21	L 40.5N-41.5N	700'	L 41N	2650W	46	2600
W 23	L 41N-43N?	1400' (equivalent to) ?W 26	L 41.5N	3750W	51+	1100
W 25	L 42N-43N	500'	L 42N (first survey)	2350W	33	1000
W 26	L 42N	500'	L 42N	2900W	67	600

2.2.3.2.3 Geochemistry

(a) Rock chip sampling on L 36N costeans.
Rock chip sampling was carried out on two costeans on L 36N (i) 1440-1580W, (ii) 1630-1850W (Fig. 23).

The costeans were dug to try and determine the source of the E.I.P. anomalie: W 15 and W 16, and of the very high magnetic anomaly (+ 300 γ) centred on L 36N 1650W. In addition, soil geochemistry on L 35N 1350E (400' south) was 151 ppm Cu, 1950 ppm Pb, 287 ppm Zn, with copper and zinc being slightly anomalous on L 36N.

Section (i): The assay results were uniformly low, with higher values occurring at 1470-1480W (490 ppm Cu in black shale) and 1540-1550W (1270 ppm Cu in grey shales).

1440-1480W	Black shale	229 ppm Cu,	77 ppm Pb,	101 ppm Zn
1480-1510W	Grey shale	128 ",	35 ",	102 "
1510-1550W	Mixed tuff/shales	400 ppm Cu,	22 ppm Pb,	100 ppm Zn
1550-1580W	Fine tuff/shale	115 ",	22 ",	110 "

Section (ii): The assay results were very low; maximum values were 190ppm Cu (1800-1810W), 100 ppm Pb (1630-1640W) and 150 ppm Zn (1650-1660W, 1830-1840W).

1630-1680W	F-m.gr lithic tuffs minor shales	106 ppm Cu,	50 ppm Pb,	117 ppm Zn
1680-1700W	Tuffac. shales	120 "	25 "	110 "
1700-1760W	F-m.gr lithic tuffs	132 "	26 "	101 "
1760-1790W	M-c.gr felds crystal tuffs	123 "	17 "	115 "
1790-1860W	F-m.gr lithic tuffs	144 "	32 "	129 "

The major E.I.P. anomaly (W 15) could not be satisfactorily costeaned due to the proximity of very boggy ground, and a large creek. However, it appears that anomaly W 15 is caused by black shales, a d anomaly W 16 by fine grained tuffs-shales.

Further discussion of the costeaning is contained in Section 2.2.3.2.4. Geology.

(b) Soil Geochemistry

The geochemical soil sampling program over E.I.P. anomalous zones on the original grid was completed early in the year 1977/78. There is a variety of soil types in the area, depending on slope, drainage, vegetation and glaciation history as well as underlying rock type. Hence correlation from line to line is often difficult, and comparison of absolute values hindered by different background levels in different areas. Notwithstanding these comments, Copper, Lead and Zinc contour plans are shown in Figs. 18, 19 and 20 respectively.

Above background trends generally strike N.N.W. and closely parallel the E.I.P. chargeability and known geology trends.

The background soil Cu content is markedly less than Pb and Zn, being about 10 ppm south of L 36N and 20 ppm to the north. Pb and Zn background values are both about 20 ppm and 30 ppm, south and north of L 36N respectively.

The main band of anomalous soil geochemistry is about 1600' wide in the north and widens to about 3000' in the south of the area. The length and magnitude of the geochemically anomalous sub-zones with this band increase nprthwards.

Anomalous Cu, Pb and Zn values appear to be associated with three rock types:

(i) pyritic black and grey shales,
(ii) fine-coarse grained lithic (welded, crystal) tuffs,
(iii) ignimbritic crystal tuff sequence.

The shale units are the most consistently anomalous

The maximum Copper values occur within or adjacent to the ignimbritic crystal tuff unit striking N.N.W. through the western end of L 33.5N and L 40.5N. The surrounding rocks are fine-coarse grained lithic tuffs. Several small anomalous chargeability zones occur immediately west of this ignimbritic unit: a copper high (129 ppm Cu) occurs over the northernmost zone (L 40N, 35 m.s peak, southern end of zone W23); one zone is untested by geochemistry (L 38.5N), and the other zones have no anomalous copper expression.

Copper highs also occur on the southern end of E.I.P. anomalies W 15 (L 34N) and W 16 (L 35N), corresponding with pyritic black shales and fine-medium grained tuffs and tuffaceous siltstones respectively. (Anomalies W 15 and W 16 were unsuccessfully tested by the costeans on L 36N, 1400-1900W).

The soil Lead and Zinc geochemical anomalies are closely associated with the shale horizons, although the sub-zones W 23 (L 40N, ignimbritic crystal tuff) and W 16 (L 35N, fine-medium grained tuffs) discussed above also show strong Pb and Zn response, (Pb maxima 615 ppm and 1950 ppm, Zn maxima 178 ppm and 287 ppm, respectively).

In the north-west corner of the grid, a strong Pb-Zn anomaly corresponds with the continuous (?) E.I.P. zones W 22 and W 26, within a sequence of shales, with a strike length of 2500' (open to the north). The maximum Pb value is 343 ppm on the western edge of the E.I.P. anomaly; the maximum Zn value is 300 ppm on the southern end of the E.I.P. anomaly.

An 800'+ zone corresponding with black shales and E.I.P. zone W 14 has soil Pb values up to 395 ppm and Zn values to 290 ppm. The zone occurs from L 33N 700W to L 32N 1000W.

A very narrow zone of anomalous soil Pb values occurs on the western end of L 33N to L 37N (2500'). The maximum value is 850 ppm Pb at L 35N 2650W. A moderate Zn anomaly, 187 ppm Zn, occurs on the southern end of this zone. The anomaly occurs within fine-coarse grained lithic (welded, crystal) tuffs, and may correlate with a shale horizon mapped 1000' north along strike. This zone occurs on the edge of the geophysical survey area and contouring is difficult, however a 30+ ms anomaly corresponds with the southern part of the zone and possibly continues north.

A Zinc soil anomaly (maximum 235 ppm Zn), strike length 800', occurs over a thin shale horizon which may correspond with E.I.P. zone W 13. This zone may be a northern continuation of the E.I.P. W 14-Pb Zn anomalous zone discussed above.

An 800' long Zn anomaly (maximum 277 ppm) occurs between L 39N 2450W and L 40N 2550W in fine-coarse grained lithic (welded crystal) tuffs. Moderate Pb values are also associated with this zone. There is no obvious geophysical expression of this soil anomaly.

A narrow Pb-Zn soil geochemical anomaly occurs from L 43N 050E to L 41N 900E (strike length 1300'). Maximum values are 184 ppm Pb and 255 ppm Zn. The anomaly occurs within agglomerates in a similar stratigraphic position to an agglomerate unit containing several large pyrite boulders on L 38N, 00E, about 2500' south (see E.L. 9/66 Annual Report 1975/76 P.6).

A smaller, weaker anomalous Pb zone occurs 300' to the west.

A well defined chargeability anomaly, E.1, occurs 400' east of the major Pb-Zn anomaly (maximum chargeability 27 ms, local background 12 ms). The overlying shale unit dips shallowly east, and therefore the E.I.P. anomaly may occur in the underlying unit - i.e. the Pb-Zn anomalous agglomerate.

This zone requires detailed mapping and follow-up geochemical sampling.

Further geochemical soil sampling is required to more closely define the soil and geochemical anomalies. This would include follow-up sampling on the intermediate lines.

Several zones already appear to be of significant interest and these are shown in Table 5.

TABLE 5 Soil Geochemical Anomalies Western Area, White Spur Grid

Line	Easting	Geochem.	I.P.Zone	& Priority	Strike Length	Rock Type
L 42N* 43N	2850-3350W 2600W	Pb Zn	W 26	1	500' +	Black shale-tuffs
L 43N 42N 41N	00 500W 1000W	Pb Zn	E 1	1-2	1300'	Agglomerate
L 42N	2350W	Pb Zn	W 25	2	500'	Black shale-ignimbritic tuff
L 40N* L 41-43N?	3400W	Cu Zn	W 23 (equivalent to W 26?)	1	1400' ?	Ignimbritic tuff
L 40N	3200W	Zn	Nil			Shale-tuff
L 40N	2850W	Cu Pb Zn	W 22	2	500' +	Shale-ignimbritic tuff
L 41N	2650W	-	W 21	1-2	700'	Shale-tuff
L 39N	3850W	-	W 18N	1	900'	Tuff
L 38N	3450W	-	W 18S	1	1600'	Tuff-ignimbritic tuff
L 39N	2450W	Pb Zn	Nil		800'	Ignimbritic tuff
L 37N to34N	3800W 2550W	Pb Zn		3	2300'	Tuff
L 36N*	1400W	-	W 15	1	1500'	Shale
L 35N	1350W	Cu Pb Zn	W 16	3	400'	Tuff
L 33.5N*	1150W	Cu Pb Zn	W 13	1	1100' +	Shale-ignimbritic tuff
L 33N	2200W	Cu	Nil		400'	Tuff-ignimbritic tuff
L 33N	750W	Pb Zn		2	700'	Shale

* Signifies area of prime interest.

2.2.3.2.4 Geology (Refer to Fig. 21)

The rocks are generally N.N.W. trending with variable dips. No detailed structural interpretation has yet been attempted, however it appears that an anticlinal axis runs N.N.W. from L 36N OOE along the main ridge with a shallow dipping east limb (shales and agglomerates underlying a thick ignimbritic tuff sequence to the east) and a steeper western limb. The western sequence is a series of steeply west dipping (folded ?) shales, fine-coarse grained lithic (crystal) tuffs and ignimbritic tuffs. The units have gradational contacts and generally include minor horizons of other rock types.

A small E.N.E. trending fault (L 33.5N) slightly displaces the sequence.

South of this fault, the dips are very flat with a possible shallow syncline occurring to the west of the base-line.

The most prospective unit appears to be the western-most shale horizon. It has a strike length of over 7500' and varies in horizontal thickness up to 450'. The unit contains thin fine-coarse grained lithic tuff beds (sometimes containing shale fragments), and is variably carbonaceous and pyritic.

Geophysical and soil geochemical anomalies occur within this shale horizon, however no significant base metal mineralisation has been observed to date. E.I.P. and soil geochemical anomalies also occur close to the contact and within the units immediately east and west of the shale horizon.

The horizon was diamond drilled by R.T.A.E. in 1962 (D.D.H.WSP 103, length 791') on approximately L 34N, without intersecting any significant base metal sulphides.

Disseminated pyrite was a common minor component of the shales, and was thought to adequately explain the Turam anomaly.

A thinner shale horizon occurs about 200-300' east of the main shale unit. Parts of this unit are anomalous in Pb and Zn (soils) and show increased chargeability.

Immediately west of the main shale horizon is a long narrow band of mainly fine grained tuffs, with some medium-coarse grained tuffs (± welding, ± crystal content). This horizon contains several soil geochemical anomalies, and a very large magnetic anomaly (L 36N 1700W, costeaned; no apparent source of the anomaly was found).

A third shale horizon cuts the base line on L 42N and L 39N and is characterised by remarkable soft sediment deformation structures. The unit is thin and flat-dipping.

Underlying this shale is an agglomerate unit which contains boulders of massive pyrite. Parts of this agglomerate have anomalous Pb and Zn soil geochemistry values which may be due to either sulphide fragments, or to an increased base metal content in the groundmass. No Cu, Pb or Zu mineralisation has been observed in this unit.

Several ignimbritic tuff horizons occur in the area. These are generally medium-coarse grained and show welding and/or flattening of a significant proportion of fragments. Some soil geochemical anomalies occur within the unit, but any corresponding E.I.P.-resistivity response is poor unless it is near a contact with either shales or fine grained tuffs.

<u>Costean L 36N</u> 1440-1580W and 1630-1850W

The eastern costean (Fig.23) exposed a series of black and grey shale bands and minor tuffs. Pyrite was observed only at the eastern end of the costean in graphitic black shales. These rocks are considered to be the source of the major E.I.P. anomaly W 15, although the anomaly peak could not be costeaned since it occurred in the creek. The rock chip geochemistry was low.

The western costean (Fig. 23) exposed a series of fine-medium grained lithic tuffs with minor shale bands and crystal tuff units. There was no apparent source of the E.I.P. anomaly (W 16) or magnetic anomaly observed in the costean. The source of the E.I.P. anomaly may be disseminated sulphides within the fine grained tuff units.

2.3 RED HILLS NORTH GRID

2.3.1 Introduction

The grid area lies between the northern E.L.9/66 lease boundary and the Red Hills and Henty Fault Zone Grids in the north-west corner of the lease area (Fig.2). This grid completes the reconnaissance exploration coverage of the Mt. Read Volcanics on the western side of the Tyndall Range in the E.L.9/66 lease area.

2.3.2 Work Completed 1977/78

2.3.2.1 Access:

Ten lines, spaced at 600' intervals, were cut to cover the area bounded to the west and north by the E.L.9/66 lease boundary, to the east by outcropping Tyndall Group rocks on the southernmost part of Mt. Murchison, and to the south by the Red Hills and Henty Fault Zone Grids. An access track in the west of the grid was also cut (Fig. 24).

Total footage cut and pegged was 89,900', contracted to Peter Russel (Lake Margaret Road Gang) at $70/1000'.
No roadwork was required.

2.3.2.2 Geophysics:

A reconnaissance gradient array E.I.P.-resistivity survey and a detailed ground magnetics survey were carried out by Scintrex Pty. Ltd. (Scintrex Job No. Tas-054A, June, 1978).

Three minor anomalous E.I.P. zones were defined, and have been interpreted as disseminated sulphides within pyroclastics. Apart from follow-up geochemical soil sampling, no further work is planned over these zones.

The combination of chargeability, apparent resistivity and total magnetic field data enabled a useful geophysical properties map to be compiled which aided in the geological interpretation of the area.

2.3.2.3 Geochemistry:

Reconnaissance soil geochemical sampling was commenced on the western half of the grid (L 68N 5100-9200W, L 50N 4300-9500W) at 200' intervals. This program was not completed (discouraging geophysical E.I.P. survey results downgraded the area as a work priority).

Anomalous Pb and Zn values were obtained on the western end of L 50N, and will require follow-up work.
This zone may correspond with a broad anomalous E.I.P. zone 3000' south which also shows sporadic soil geochemistry anomalous values (Henty Fault Zone Grid). A marked drop in resistivity at the western ends of L 56N, 50N and 44N also make this zone interesting.

2.3.2.4 Geology:

The western half of the grid was systematically mapped (Fig. 24).
The Henty Fault zone was traced through the area as a chloritic fine grained rock. The zone varies in width from 250-700', and has a slightly greater than background soil geochemical response. No significant sulphide concentrations were observed, and the E.I.P. survey results do not indicate any significant chargeable source within these rocks.

At the western end of the grid a NW-SE trending creek marks a linear fault. The rocks west of the fault are fine-medium grained feldspar porphyritic felsic crystal tuffs. The anomalous Pb-Zn soil values discussed above (Section 2.3.2.3) occur within these rocks.

The rock unit between the above-mentioned fault and the Henty Fault is mainly a feldspar (chlorite) porphyritic medium-fine grained felsic lava (with minor andesites). The rock is relatively massive and uniform, with flat geochemical and geophysical character.

The area east of the power line was not mapped in detail. Some minor re-interpretation was done, but generally mapping is from the 1976/77 E.L.9/66 Annual Report.

2.4 EXPLORATION EXPENDITURE 1977/78

1.	Salary Wages	$ 26 685
	Burden charges	9 383
2.	Materials	11 957
3.	Access (including d.d.h site preparation)	23 007
4.	Geophysics	14 709
5.	Geochemistry/Petrography	5 278
6.	Diamond drilling	84 845
7.	Equipment and Facilities	6 757
8.	General costs	1 323
9.	Indirect charges (6½% of 1.2.5. and 7.)	3 904
	Total for the period July 1977 to June 1978	$187 848

Budget allowance for the period was $136,285. The major over-expenditures were items -
6. Diamond drilling (+$21,595)
3. Access (+$16,107) and
2. Materials (+$ 9,057)

Total expenditure on E.L. 9/66 since 1966 is $1,213,209.

3. PROPOSED EXPLORATION PROGRAM 1978/79

3.1 INTRODUCTION

The exploration program set out below includes some work that will probably extend over more than 1 year. Also, the actual work started will depend on:
(a) budget limitations, and
(b) manpower availability. The proposed program is therefore an optimistic ideal that is subject to the above constraints.

3.2 WHITE SPUR GRID

3.2.1 North-East Area

3.2.1.1 Diamond Drilling:

The E.I.P. anomalous zone referred to in Section 2.2.2.2.2 above corresponds in part with a laminated tuffaceous shale, and in part with medium-coarse grained crystal lithic tuffs (Fig. 21). Both rock types are considered potential hosts to significant base metal sulphide mineralisation. Anomalous soil geochemistry occurs over both rock types.

Diamond drilling of both rock types is therefore warranted to test co-incident E.I.P. and geochemical anomalies.

Two diamond drill holes are planned:

(i) to test the E.I.P. anomaly on L 38.5N, 5050E and co-incident Cu Pb Zn soil geochemical anomaly (Fig. 25). This target appears to lie within the medium-coarse grained crystal lithic tuff unit mapped in the eastern end of the L 39N costean. This drill hole would also test the fine grained laminated tuffaceous shales adjacent to the anomalous horizon.

(ii) to test the E.I.P. anomaly on L 39.5N, 4600-5100E and the associated scattered Cu Pb Zn soil geochemical anomalies (Fig. 26). This target appears to lie within the tuffaceous shales mapped in the western end of the L 39N costean. The target zone has a horizontal thickness of about 500', and therefore the hole should be longer and shallower than d.d.h (i).

	Collar	Bearing	Dip	Length
d.d.h (i)	L 38.5N, 50' south 4800E	75° Mag.	-60°	300m
d.d.h (ii)	L 39.5N, 120' south 4450E	75° Mag.	-50°	350m

Additional work in this area will depend on the results of the diamond drill holes and their interpretation. Downhole geophysics, and further surface geophysics and geochemistry may be carried out.

3.2.1.2 Exploration Costs:

Access and d.d.h site preparation:

		$
2 holes x 30 machine hours each		1 800
Geophysics:	E.I.P. logging of 2 d.d.h	200
Geochemistry:	Assay of drill core (100 x 1.5m samples/hole)	1 160
	Petrology/mineragraphy	500
Diamond Drilling:	2 d.d.h, total 650m	
	(a) outside drilling contractor	42 250
	(b) Mt. Lyell " "	(29 250)
	TOTAL	$45 910
		($32 910)

3.2.2 <u>Western Area</u>

3.2.2.1 Access:

Intermediate lines south of L 33N are required for follow-up geophysics and soil geochemistry surveys. Total footage for five lines is 22300'. Cost $2,400.

One diamond drill hole is planned for the year 1978/79. Access and site preparation will be about 30 machine hours; cost $900.

3.2.2.2 Geochemistry:

Follow-up soil sampling is required on all intermediate lines cut and surveyed during 1977/78 (L 33.5N to L 42.5N).

Total number of samples will be 440; cost $990.

Follow-up soil sampling will be required on the intermediate lines south of L 33N.

Total number of samples for assay will be 450; cost $1,010.

Assay of diamond drill core from one hole:

100 x 1.5m samples; cost $580. Associated petrology/mineragraphy of drill core samples, cost $200.

3.2.2.3 Geophysics:

A gradient array E.I.P.-resistivity survey will be required over the intermediate grid lines south of L 33N. Results of follow-up surveys done recently have been directly comparable to previous survey results, hence, apart from a single "orientation" overlap line, the old grid lines will not be surveyed.

Total footage 26,000'; cost $3,170.

A ground magnetic survey will be conducted over intermediate lines from L 28N to L 43N.

Total footage 42600'; cost $1,690.

E.I.P. downhole logging of one diamond drill hole, cost $100.

3.2.2.4 Diamond Drilling:

One 350m hole is proposed although work is not sufficiently advanced at present for target selection.

Cost	(a)	outside drilling contractor	$22,750
	(b)	Mt. Lyell " "	($15,750)

3.2.2.5 Exploration Costs:

Access		$ 3,300	
Geochemistry		2,780	
Geophysics		4,960	
Diamond drilling (a)		22,750	
(b)		(15,750)	
	TOTAL	$33,790	($26,790)
(Without 1 d.d.h,	TOTAL	$ 9,260)	

3.3 RED HILLS GRID

3.3.1 Introduction:

The exploration program for the year 1978/79 will largely depend on the conclusions of the Report on the total Red Hills drilling program to date. This report will be completed early in the 1978/79 year.

3.3.2 Access:

(a) Two diamond drill sites, total cost about $1,800.

(b) A proposed grid for an Applied Potential survey over RH 5, requires 4600m of grid cutting costing $1,610 (see Fig. 27).

3.3.3 Geochemistry:

Further soil sampling is required both north and south of the main Red Hills area.

In addition, to the north and west are two mineralised areas, both untested apart from old prospecting shafts (one Cu, the other Pb-Zn). South of RH 11, the soil geochemical data is incomplete. Total number of samples is 450, cost $1,010.

Assay of diamond drill core: 170 x 1.5m samples per hole; cost $1,980. Associated petrology-mineragraphy cost $400.

3.3.4 Geophysics:

A 17 line Applied Potential E.I.P. and M.I.P. survey is proposed to trace out the mineralised section of RH 5. Line spacing averages 50m, with lines extending 150m west and 250m east of the RH 5 collar position (Fig. 27).

Cost estimate for the survey is $1,500.

E.I.P. downhole logging of two diamond drill holes, cost $200.

The possibility of conducting a gravity survey over the area south of RH 10 is being investigated, but will not be costed.

3.3.5 Diamond Drilling:

Two diamond drill holes are proposed to further test the mineralised pyroclastic-shale sequence west of the Red Hills lava mass. Final site selection has not been completed.

Two d.d.h, 400m length each

(a) outside drilling contractor	$52,000
(b) Mt. Lyell " "	($36,000)

3.3.6 Exploration Costs:

Access		$ 3,410	
Geochemistry		3,390	
Geophysics		1,700	
Diamond Drilling (a)		52,000	
(b)		(36,000)	
	TOTAL	$60,500	($44,500)
(Without 2 d.d.h,	TOTAL	$ 4,120)	

3.4 HENTY FAULT ZONE

3.4.1 Introduction

A brief re-appraisal of the data covering the zone L 38N to L 61N suggests that the results to date are somewhat inconclusive, the geology is only poorly known and that further work is warranted.

The existing grid is on approximately 600-800' spacing and has been surveyed with gradient array E.I.P.-resistivity (Scintrex Pty. Ltd., 1973, Job No. Tas-016). This survey highlighted several anomalous zones, including a semi-massive sulphide lens (40% sulphides, 2.4m true width) on L 49N, and the Henty Fault. Follow-up geochemistry was patchy and concentrated on the L 49N zone.

The I.P anomalous zone east of the Henty Fault on L 38N - 44N has been tested by d.d.h. HFZ 3 (L 43N), HFZ 4 (L 42N), HFZ 7(L 40N) and HFZ 8 (L 38N). Two potentially E.I.P. anomalous rock units were intersected in these holes i.e. a shale sequence (variable purple-black, carbonaceous-tuffaceous: E.I.P. response in HFZ 3, 4 and 7), and a fine grained altered tuff unit (E.I.P response in HFZ 8, slight in HFZ 4 and 7). Base metal values were very low in both rock types. It is possible that the altered fine grained tuff unit in the drill holes is the same unit as the host rock to the semi-massive mineralisation on L 49N (Fig. 28). The sulphide lens itself has been tested by d.d.h HFZ 5 (Fig. 29). Further work is required to fully test this encouraging mineralisation.

Several other anomalous E.I.P. zones (L 45N 400E, L 48N 1600W, L 53N 2500E, L 55N 200W) need complete soil geochemical sampling, and geological mapping where possible, before further evaluation can be made. The grid spacing is broad, and should the geology and soil geochemistry be encouraging, then intermediate lines should be cut, and surveyed with E.I.P.-resistivity and detailed ground magnetics, and soil geochemical sampling carried out.

3.4.2 Geology:

Geological mapping of the area between the Henty Fault and The Gooseneck mountain (Owen Conglomerate) is hampered by lack of outcrop. Correlation of rock types in diamond drill holes HFZ 3, 4, 5, 6, 7 and 8 is good; however the stratigraphic setting assumed by N. P. Stevens-Hoare is questionable (Annual Reports E.L.9/66, 1974-75 and 1975-76).

Further grid cutting should provide further outcrop.

The separation of the rocks in the L 49N area, east of the Henty Fault, into Tyndall Group, Dundas Group and Queenstown Pyroclastic's appears unjustified due to the lack of outcrop and control. The Comstock Tuffs logged in some of the HFZ drill holes is probably a valid term in the regional sense.

The semi-massive sulphide costeaned on L 49N may be cut off to the south by the Henty Fault, but has ample space for significant northern extensions.

3.4.3 Proposed Exploration Program 1978/79.

The program set out below is a full exploration sequence. Manpower and budget limitations may mean that the work will not be completed in the year 1978/79.

3.4.3.1 Access: (Fig. 30)

Some intermediate line cutting has been done in the vicinity of L 49N 1600E for detailed geochemical sampling (1974), and will require re-cutting. Further cutting is required to complete a grid around the L 49N 1600E costean, for an applied potential E.I.P. survey.

L 48.3N	(formerly L 49N - 400')	650'	
L 48.6N	(" " - 200')	450'	
L 48.8N	(" " - 100')	350'	
L 49.1N	L 49.2N	350'	each
L 49.3N		500'	
L 49.5N		600'	
	TOTAL	3250'	

Track cutting is required for intermediate lines for follow-up E.I.P.-resistivity and soil sampling surveys north and south of L 49N, and to test the very strong E.I.P. anomaly on the eastern ends of L 51N-54N. Total footage, including two sub-base lines, is 12,100'.

Total trackcutting footage 15,350'; cost $1,650.

3.4.3.2 Geophysics:

(a) E.I.P. applied potential survey to trace out the semi-massive sulphide lens costeaned on L 49N. Approximately 5000' of survey (3 days work), cost $900.

(b) Gradient array E.I.P. survey north and south of L 49N. Approximately 16,000' of survey, cost $2,800.

(c) A ground magnetic survey may be carried out, but is not costed.

3.4.3.3 Geochemistry:

(a) Soil sampling to complete the coverage on existing lines:

L 44N	500-1200E	L 52N	800-2600E*	L 56N	1000-1500E
45N	300-1400E	53N	300-900E	57N	800W-1500E
46N	500-1800E		2000-3200E*	58N	800W-900E
47N	900W-2200E	54N	1000W-1000E		1500-2400E
	1500-2000W	55N	1000W-500E	59N	400W-400E
50N	500-2300E*		1200-1500E	60W	500W-800E
51N	500-2500E*	56N	0-400E	61N	400W-500E

* First priority.

(b) The proposed intermediate lines will also require follow-up soil geochemical sampling.

Total number of samples - 680, costing $1,530.

3.4.3.4 Diamond Drilling:

The semi-massive sulphide lens costeaned on L 49N may require testing to the north (strong I.P. response on L 50N). One 350m diamond drill hole is planned and included in the budget.

Target selection will be determined after the abovementioned geophysical and geochemical surveys have been completed.

Cost :	(a)	outside drilling contractor	$22,750
	(b)	Mt. Lyell " "	($15,750)

3.4.3.5 Exploration Costs:

Access (including d.d.h. site prep)	$ 2,850	
Geochemistry (including d.d.h work)	2,720	
Geophysics (" " ")	3,800	
Diamond Drilling	22,750	
	(15,750)	
TOTAL	$32,120	($25,120)

3.5 RED HILLS NORTH GRID

3.5.1 Access:

The zone of interest at the western ends of L 56N, 50N and 44N may require further track cutting to the west to the lease boundary. If the zone extends southwards, the northern lines of the Henty Fault Zone grid may require re-cutting.

Total footage 2,000' costing $210.

3.5.2 Geochemistry:

(a) Initial follow-up of the soil geochemical anomaly on L 50N requires sampling L 56N, 50N and 44N from 8700-9500W at 50' intervals.

Total number of samples is 50.

(b) Completion of the reconnaissance soil sampling program, eastern section of the grid, 200' sample spacing, every third line, total number of samples 100.

(c) Follow-up soil sampling of the E.I.P. anomalies as in Table 6.

TABLE 6 Red Hills North Follow-up Geochemical Soil Sampling

Line	Easting	Anomaly Name	No. of Samples
14N	00 - 2000E	Z3	41
32N	5000W - 3500W	-	31
38N	4000 - 2500W	Z2	31
44N	3500 - 2500W	Z1	21
50N	3500 - 2500W	Z1	21
56N	3500 - 2500W, 5000-4000W	Z1, un-named	52
62N	4000 - 2500W	Z1	31
		TOTAL	218 Samples

Total number of samples 368, costing $830.

3.5.3 Geophysics:

A follow-up gradient array E.I.P-resistivity survey may be justified on the western extensions of L 44N - 56N.

Total footage 3000', costing $800.

3.5.4 Geology:

Systematic mapping of the eastern section of the grid will be completed. Follow-up mapping of the western ends of L 56N, 50N and 44N will be done in association with the soil sampling.

3.5.5 Exploration Costs:

Access	$ 210
Geochemistry	830
Geophysics	800
TOTAL	$1,840

3.6 EAST OF THE TYNDALL RANGE

No work was done in this area during the year 1977/78.

The program for 1978/79 involves a detailed re-appraisal of all available information with a view to planning further field work during 1979/1980 if warranted.

Costs will be limited to salaries and materials, and are not considered here.

3.7 Cost summaries for proposed exploration programs 1978/79. See Table 7.

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TABLE 7

Unit Costs Used in 1978-79 Exploration Budget

EXPLORATION METHOD	UNIT COST	PRODUCTIVITY
1. TRACK CUTTING	Max $350/km Min $250/km	} 500 m/crew/day
2. GEOCHEMICAL ASSAYS		
(i) soils	1 fraction - $2.25 2 fractions - $4.50	} Cu, Pb, Zn, Ag, Mn
(ii) rock chips	Cu, Pb, Zn, Ag, Mn - $4.25	} less $2.00 if sample preparation by field assistants
(iii) drill core	Cu, Pb, Zn, Ag, S - $5.80	
3. GEOPHYSICS		
(i) gradient array I.P.	$400/km	1 km/crew/day
(ii) D.D.H. E.I.P. logging	Max $300/hole (Scintrex) Min $100/hole (Mt. Lyell)	} 1 hole/day
(iii) ground magnetics	$130/km	3 km/operator/day
4. DIAMOND DRILLING (all inclusive)	Outside contractor $65/m Mt. Lyell crew $45/m	} 10 m/shift
5. EARTHMOVING		
(i) drill site preparation	D7 - $30/hour	20 hours/drill site
(ii) road construction	$6,000/km - steep terrain $2,100/km - flat terrain	20 dozer days/km 7 dozer days/km
6. HELICOPTER	$340/hour Bell Jetranger 206B	1977-78 average usage 4 hours/day

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1973 I.P Survey Mt. Tyndall Area E.L. 9/66 (Henty Fault Zone). Job No. Tas-016 Feb. 1973.

1977 Gradient Array Reconnaissance E.I.P and Total Field Magnetics Survey over White Spur Grid E.L. 9/66 Job No. Tas-035C April 1977.

1978 (a) E.I.P Gradient Array and Total Field Magnetic Surveys over Red Hills North Grid E.L. 9/66. Job No. Tas-054A June 1978.

1978 (b) Report on Additional Geophysics Survey over the White Spur Grid E.L. 9/66. Job No. Tas-054B June 1978.

1978 (c) Comments on "At Hole" Down-hole E.I.P and Resistivity logging down various drill holes at Mt. Lyell (including Red Hills). Job No. Tas-054E July 1978.

1978 (d) Report on Applied Potential (E.I.P.) and Magnetometric Resistivity (M.I.P.) Down Hole Surveys, Red Hills Area E.L. 9/66. Job No. Tas-054F August 1978.

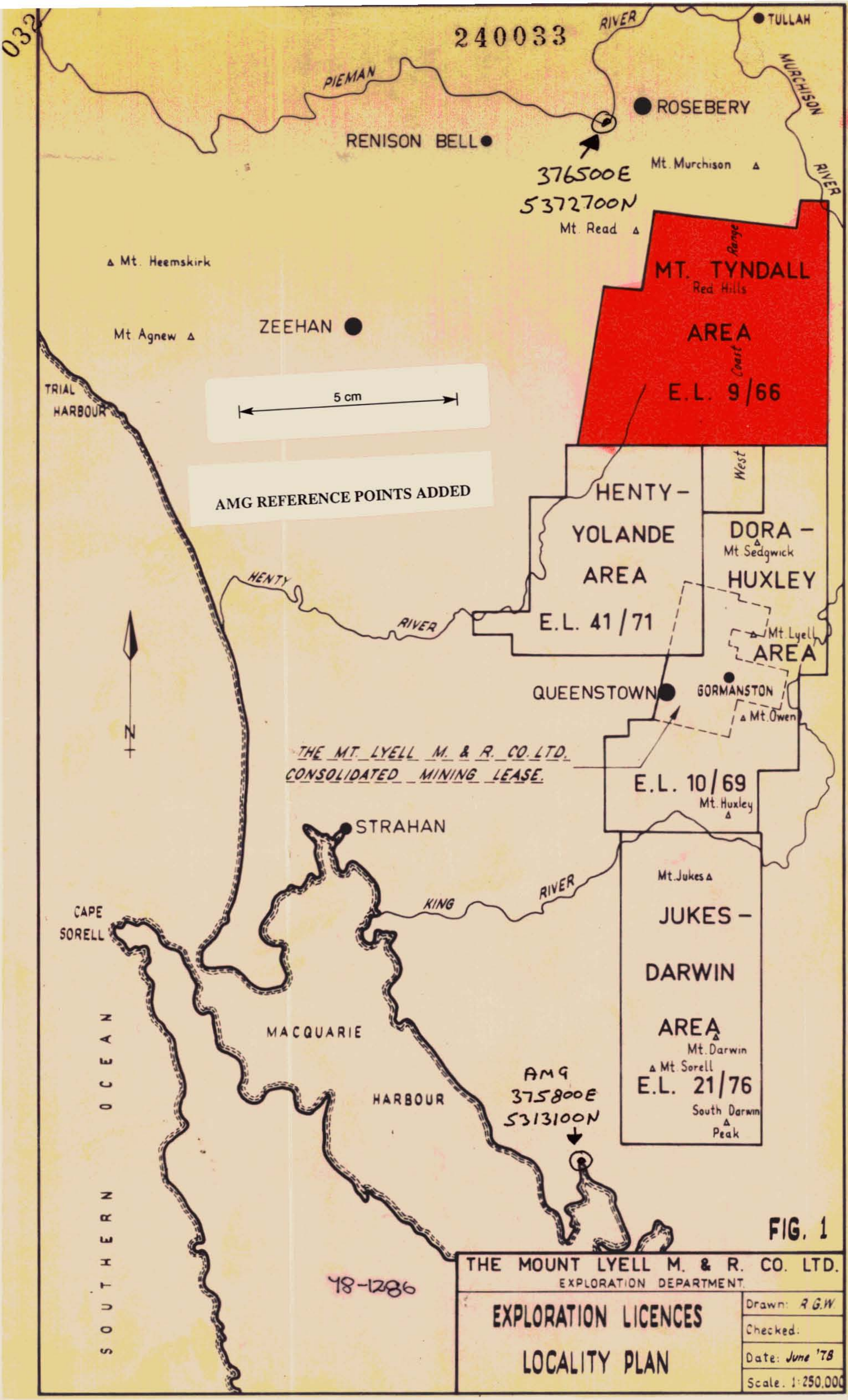
Stevens-Hoare, N.P.

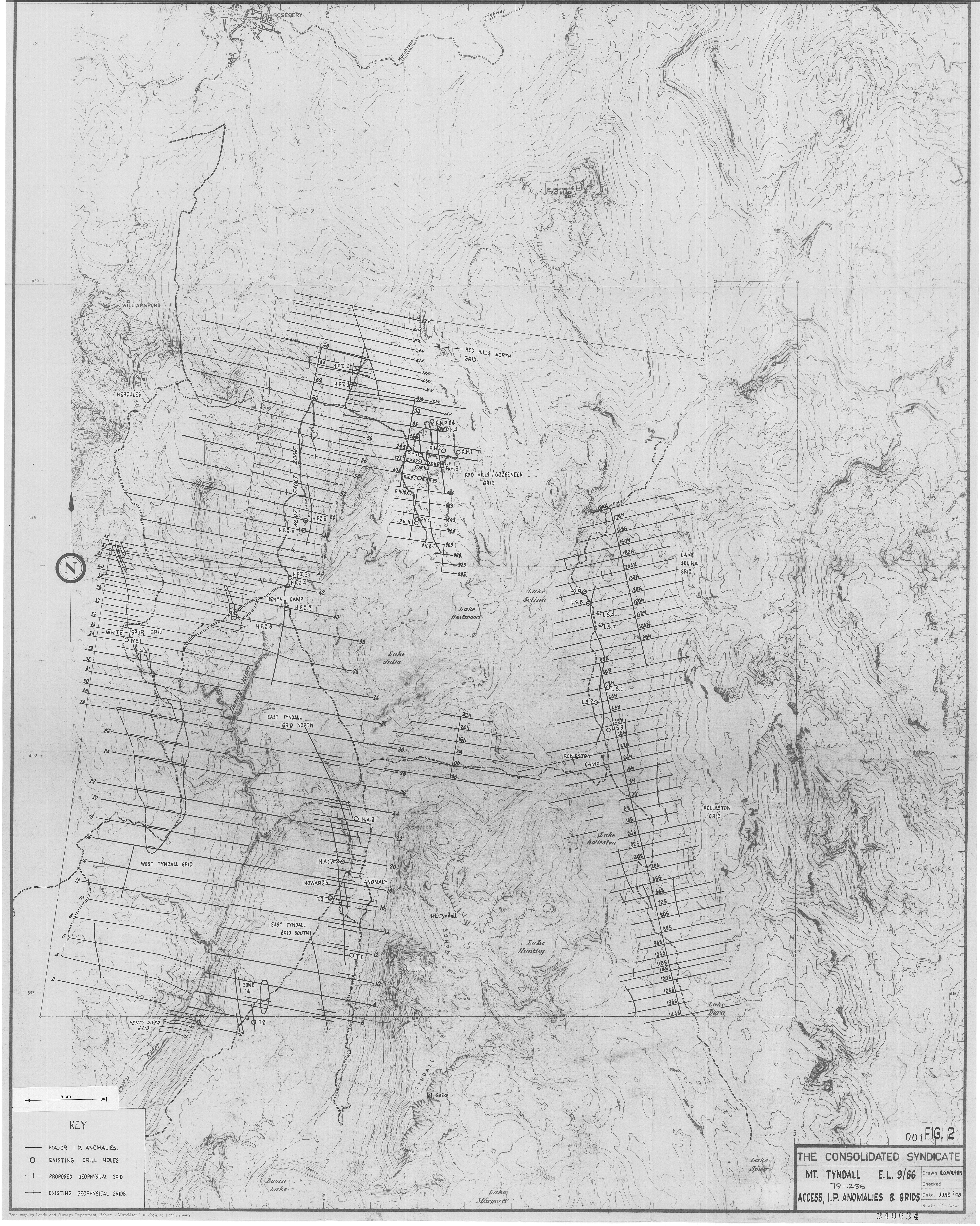
1975 Annual Report, Mt. Tyndall Area E.L. 9/66 1974/75.

1976 Annual Report, Mt. Tyndall Area E.L. 9/66 1975/76.

Walter, A. C.

1977 Annual Report E.L. 9/66 1976/77.


032
240033
PIEMAN
RIVER
TULLAH
MURCHISON
RIVER
ROSEBERY
RENISON BELL
376500E
5372700N
Mt. Murchison
Mt. Read
Mt. Heemskirk
MT. TYNDALL
Range
Red Hills
AREA
Coast
E.L. 9/66
ZEEHAN
Mt Agnew
TRIAL
HARBOUR
5 cm
AMG REFERENCE POINTS ADDED
West
HENTY-
YOLANDE
AREA
E.L. 41/71
DORA-
Mt Sedgwick
HUXLEY
Mt. Lyell
AREA
HENTY
RIVER
N
QUEENSTOWN
GORMANSTON
Mt. Owen
THE MT. LYELL M. & R. CO. LTD.
CONSOLIDATED MINING LEASE.
E.L. 10/69
Mt. Huxley
STRAHAN
Mt. Jukes
JUKES-
DARWIN
AREA
Mt. Darwin
Mt. Sorell
E.L. 21/76
South Darwin
Peak
KING
RIVER
CAPE
SORELL
MACQUARIE
HARBOUR
AMG
375800E
5313100N
SOUTHERN OCEAN
78-1286
FIG. 1
THE MOUNT LYELL M. & R. CO. LTD.
EXPLORATION DEPARTMENT
EXPLORATION LICENCES
LOCALITY PLAN
Drawn: R.G.W.
Checked:
Date: June '78
Scale. 1:250,000

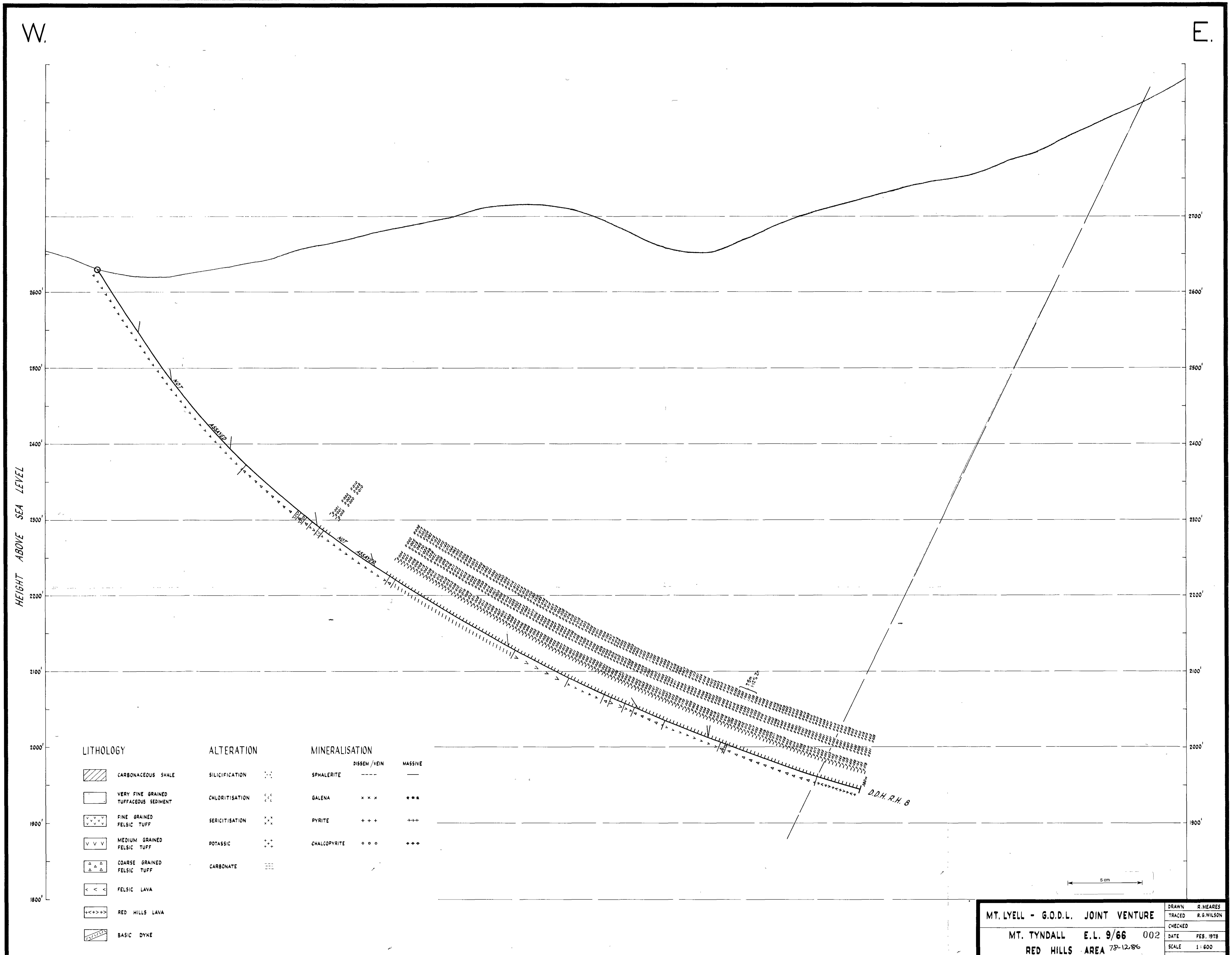


001 FIG. 2

THE CONSOLIDATED SYNDICATE	
MT. TYNDALL E.L. 9/66	Drawn: R.G.WILSON
78-1286	Checked
ACCESS, I.P. ANOMALIES & GRIDS	Date JUNE '78
	Scale

Base map by Lands and Surveys Department, Hobart. "Murchison" 40 chain to 1 inch sheets

240034



MT. LYELL - G.O.D.L. JOINT VENTURE

MT. TYNDALL E.L. 9/66 002

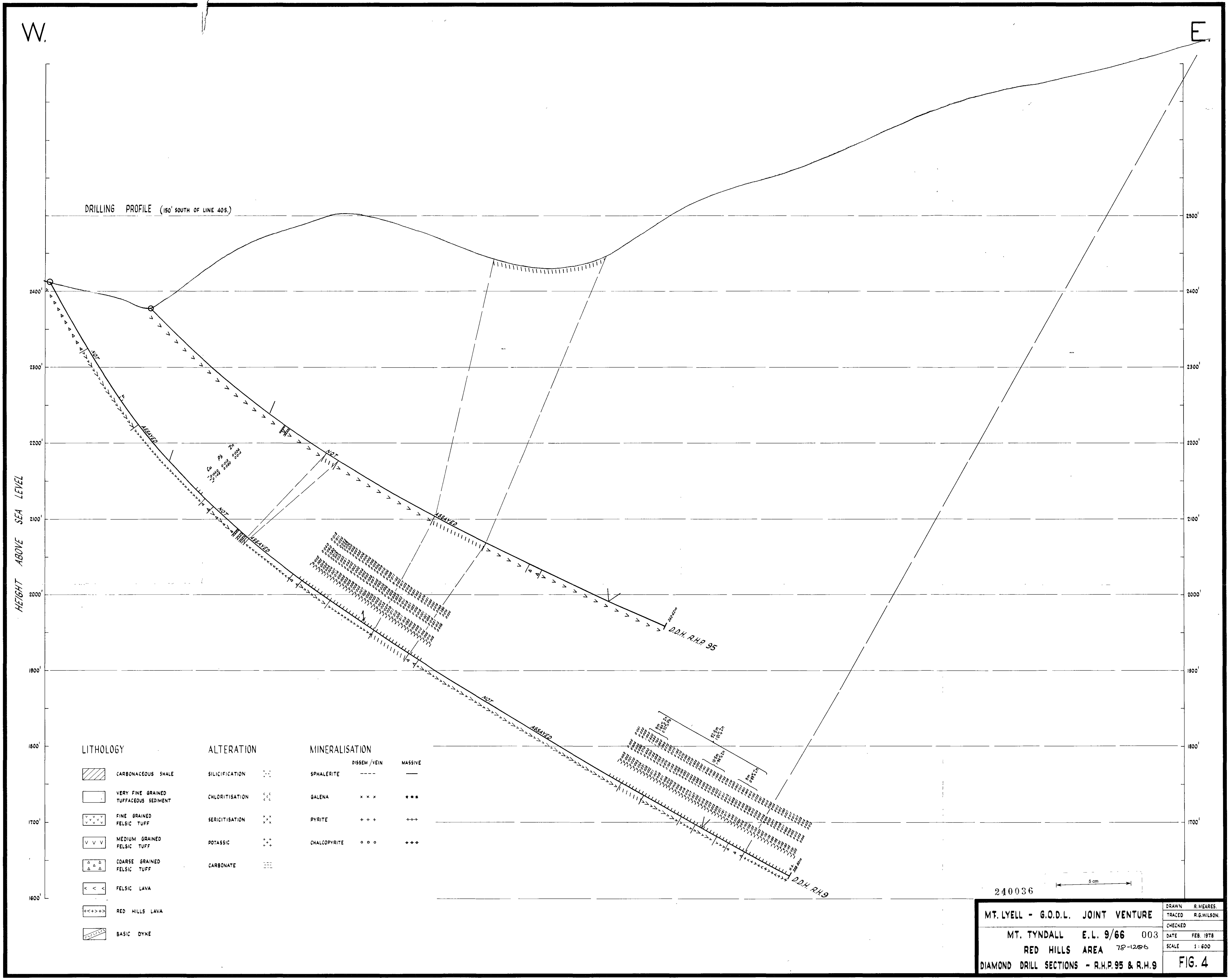
RED HILLS AREA 78-1286

DIAMOND DRILL SECTION - R.H. 8

DRAWN	R. MEARES
TRACED	R.G. WILSON
CHECKED	
DATE	FEB. 1978
SCALE	1 : 600

FIG. 3

240035



MT. LYELL - G.O.D.L. JOINT VENTURE

MT. TYNDALL E.L. 9/66 003

RED HILLS AREA 78-1286

DIAMOND DRILL SECTIONS - R.H.P. 95 & R.H. 9

DRAWN	R. MEARES.
TRACED	R.G. WILSON.
CHECKED	
DATE	FEB. 1978
SCALE	1 : 600

FIG. 4

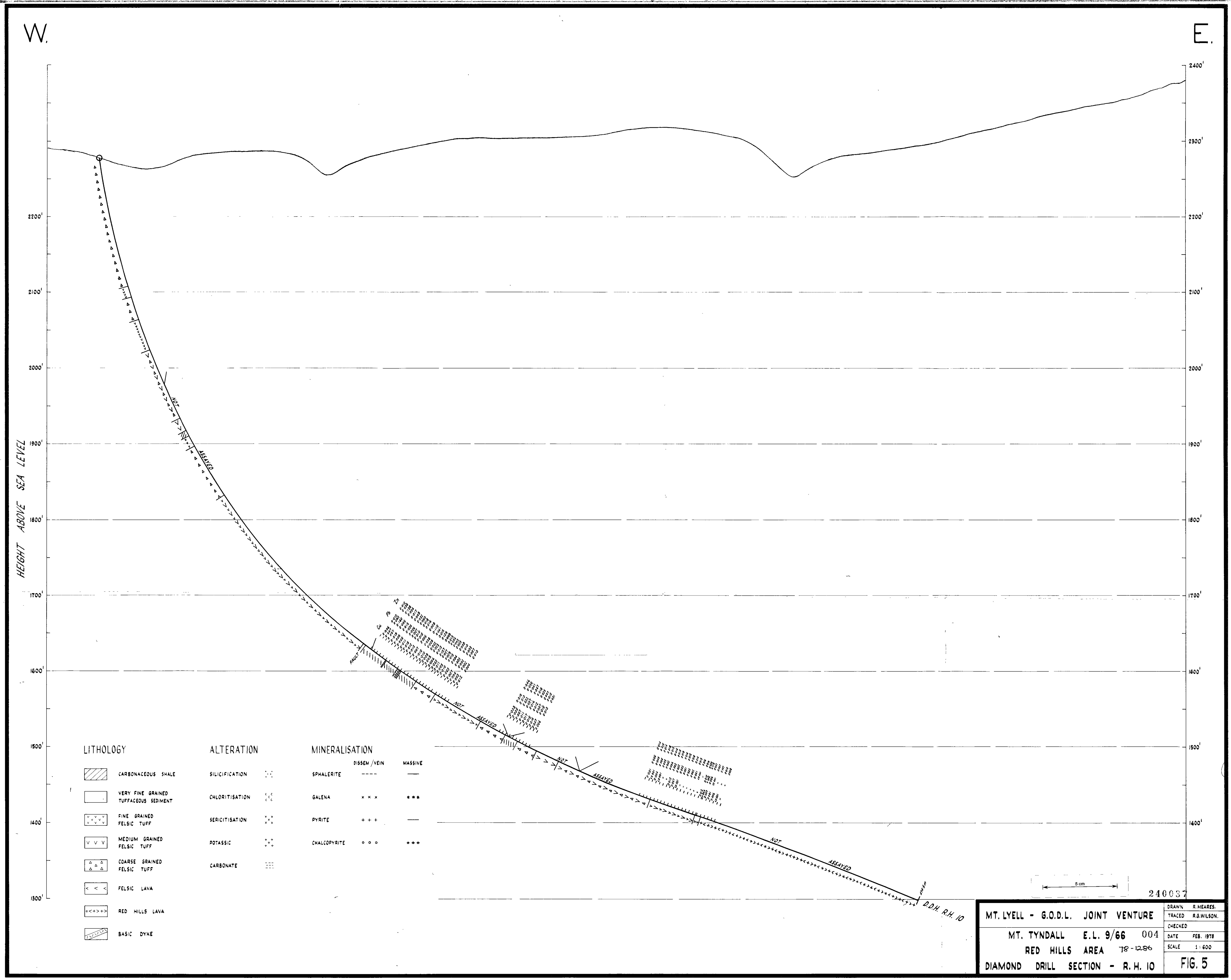
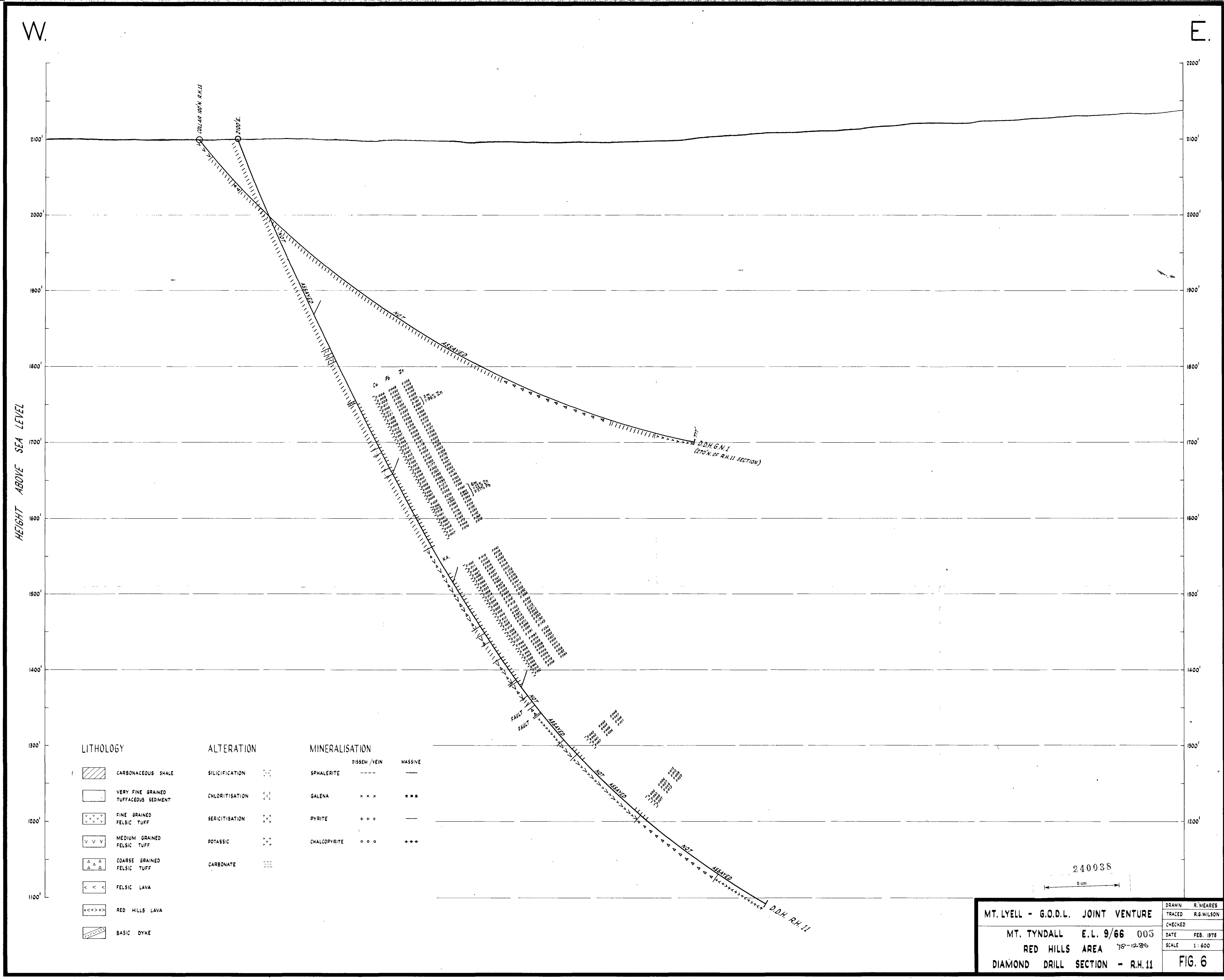
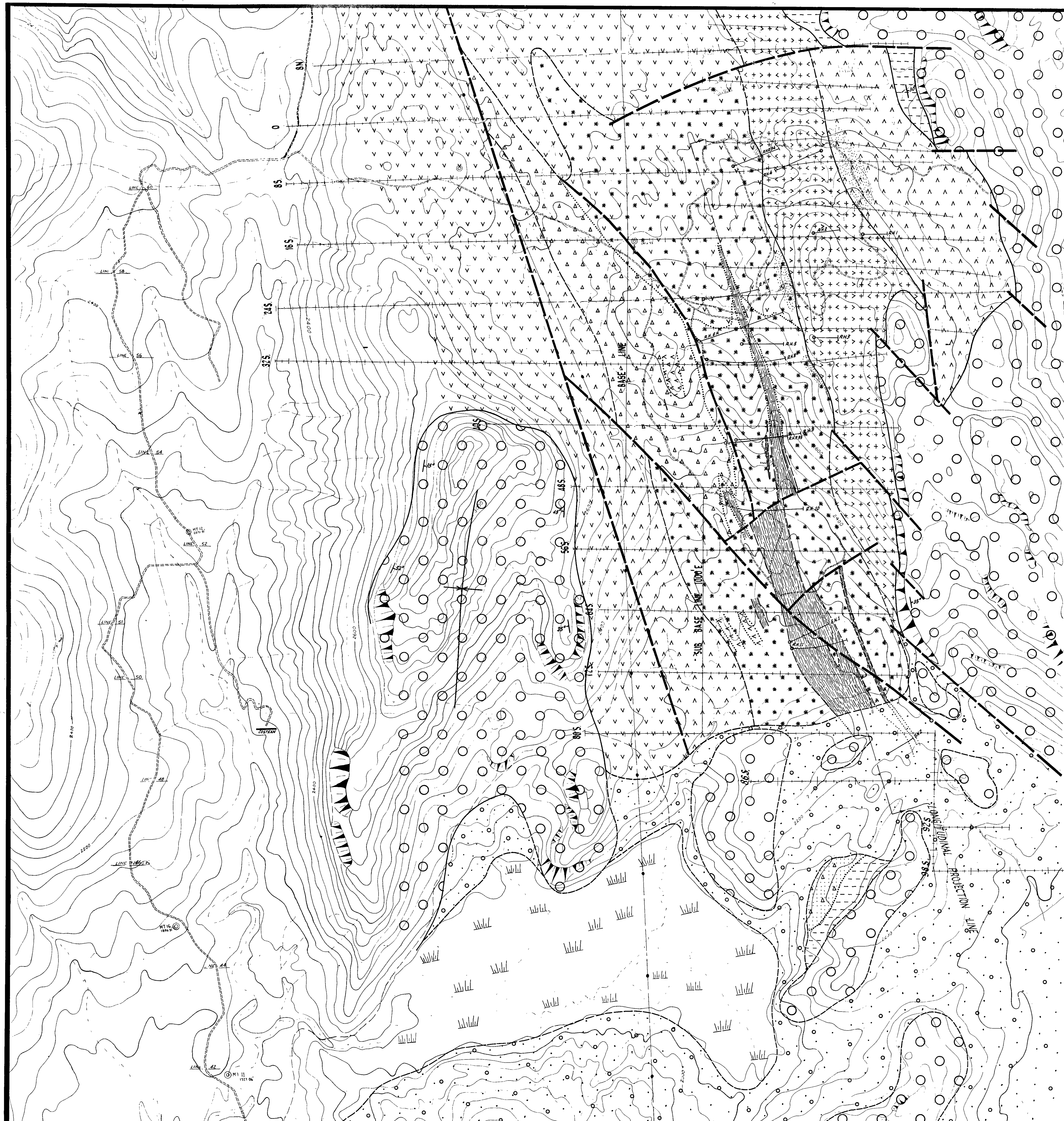

W.
E.
HEIGHT ABOVE SEA LEVEL
2400'
2300'
2200'
2100'
2000'
1900'
1800'
1700'
1600'
1500'
1400'
1300'
NOT ASSAYED
FAULT
Cu
Pb
Zn
NOT ASSAYED
NOT ASSAYED
NOT ASSAYED
D.D.H. R.H. 10
5 cm
LITHOLOGY
CARBONACEOUS SHALE
VERY FINE GRAINED TUFFACEOUS SEDIMENT
FINE GRAINED FELSIC TUFF
MEDIUM GRAINED FELSIC TUFF
COARSE GRAINED FELSIC TUFF
FELSIC LAVA
RED HILLS LAVA
BASIC DYKE
ALTERATION
SILICIFICATION
CHLORITISATION
SERICITISATION
POTASSIC
CARBONATE
MINERALISATION
DISSEM./VEIN
MASSIVE
SPHALERITE
GALENA
PYRITE
CHALCOPYRITE
240037
MT. LYELL - G.O.D.L. JOINT VENTURE
MT. TYNDALL E.L. 9/66 004
RED HILLS AREA 78-1286
DIAMOND DRILL SECTION - R. H. 10
DRAWN R. MEARES.
TRACED R.B.WILSON.
CHECKED
DATE FEB. 1978
SCALE 1:600

FIG. 5


W.
E.
HEIGHT ABOVE SEA LEVEL
2200'
2100'
2000'
1900'
1800'
1700'
1600'
1500'
1400'
1300'
1200'
1100'
COLLAR 100'N. R.H.11
2100'E.
NOT ASSAYED
Cu Pb Zn
N.A.
FAULT
FAULT
D.D.H.G.N.1
(270'N. OF R.H.11 SECTION)
D.D.H. R.H.11
LITHOLOGY
CARBONACEOUS SHALE
VERY FINE GRAINED TUFFACEOUS SEDIMENT
FINE GRAINED FELSIC TUFF
MEDIUM GRAINED FELSIC TUFF
COARSE GRAINED FELSIC TUFF
FELSIC LAVA
RED HILLS LAVA
BASIC DYKE
ALTERATION
SILICIFICATION
CHLORITISATION
SERICITISATION
POTASSIC
CARBONATE
MINERALISATION
DISSEM./VEIN
MASSIVE
SPHALERITE
GALENA
PYRITE
CHALCOPYRITE
240038
5 cm
MT. LYELL - G.O.D.L. JOINT VENTURE
MT. TYNDALL E.L. 9/66 005
RED HILLS AREA 78-1286
DIAMOND DRILL SECTION - R.H.11
DRAWN R. MEARES
TRACED R.G.WILSON
CHECKED
DATE FEB. 1978
SCALE 1:600
FIG. 6



LEGEND

RECENT

- ALLUVIUM.
- MORAINE AND CONGLOMERATE SCREE.

ORDOVICIAN

- OWEN CONGLOMERATE.

CAMBRIAN — MT. READ VOLCANICS — TYNDALL GROUP

- VOLCANOCLASTIC SEDIMENTS. (JUKES)
- CRYSTAL TUFFS AND AGGLOMERATES.
- QUARTZ PORPHYRITIC LAVAS.
- DOMINANT AGGLOMERATES + MINOR LITHIC TUFFS.
- PYROCLASTIC SEQUENCE INCLUDING MEDIUM - COARSE CRYSTAL LITHIC TUFFS + MINOR AGGLOMERATES. — << FINE GRAINED SILICIFIED FELSIC LAVAS.
- SHALES AND/OR TUFFACEOUS SILTSTONES.
- INTERBEDDED LAVAS AND PYROCLASTICS.
- FELDSPAR PORPHYRITIC LAVAS.
- FINE GRAINED PINK FELSIC LAVA, STRONGLY BRECCIATED AND ALTERED THROUGHOUT. } ≡ DARWIN TYPE RHYOLITE.
- CHLORITISATION + PYRITE - HAEMATITE / MAGNETITE - MINOR CHALCOPYRITE MARGINAL TO FINE GRAINED FELSIC LAVAS.

- BEDDING.
- SYNCLINE AXIS - MT. GOOSENECK.
- FAULT.
- DIAMOND DRILL HOLES:
  - R.H.P. - E.Z. CO. LTD. 1959 - 60.
  - G.N. - R.T.A.E. 1960.
  - R.H. - MT. LYELL 1971 & 1977.

- DEFINITE GEOLOGICAL BOUNDARY.
- APPROXIMATE GEOLOGICAL BOUNDARY.
- INFERRED GEOLOGICAL BOUNDARY.

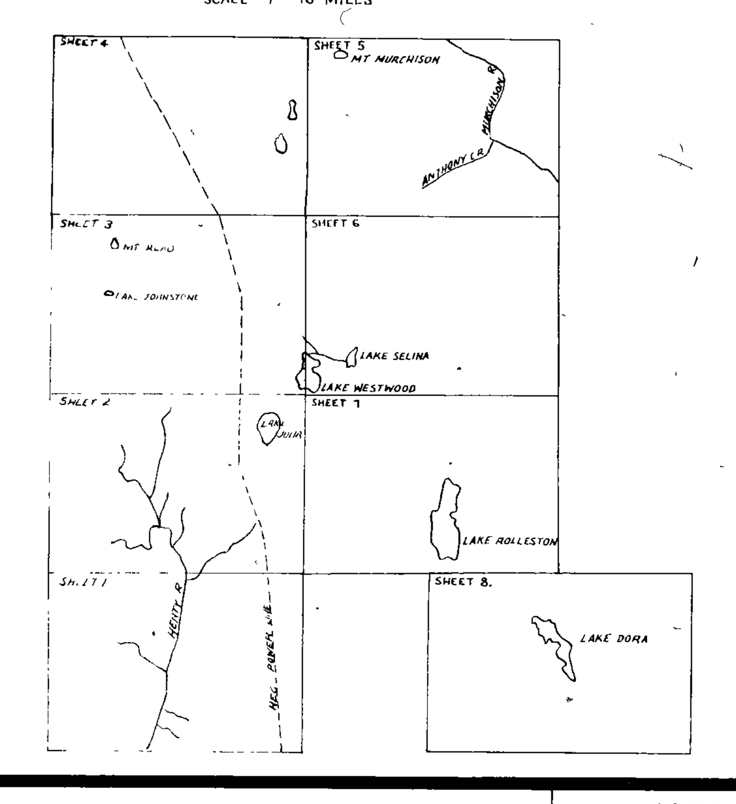
MAP COMPILATION - P. BROPHY 1977.

DATA FROM:
1. R POLTOCK 1970/71.
2. N. STEVENS - HOARE 1976.
3. P. BROPHY 1977.

N MN

5 cm

LOCATION DIAGRAM
SCALE 1" = 16 MILES



THE CONSOLIDATED SYNDICATE	DRAWN BY A.C. WALTER
RED HILLS GEOLOGY & DIAMOND DRILLING	TRACED BY R.G. WILSON
MT. TYNDALL AREA	CHECKED BY.
E.L. 9/66. 78-1286	DATE JUNE 1978
Sheet 3 006	SCALE 1": 6000
	FIG. 7

240039

RED HILLS LONGITUDINAL PROJECTION

BEARING: 341°

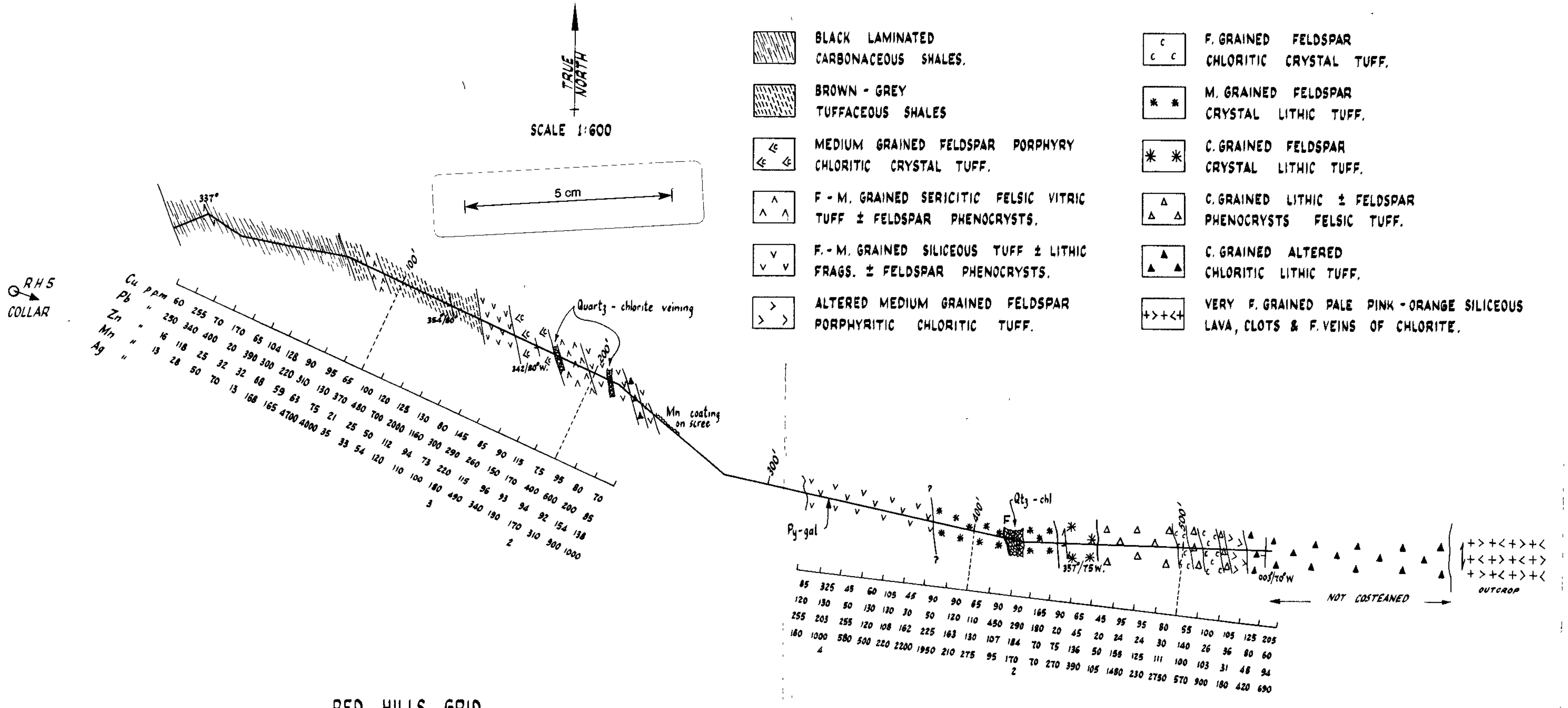
SCALE: 1" = 250'

240040

FIG. 8

78-1286

007



RED HILLS GRID

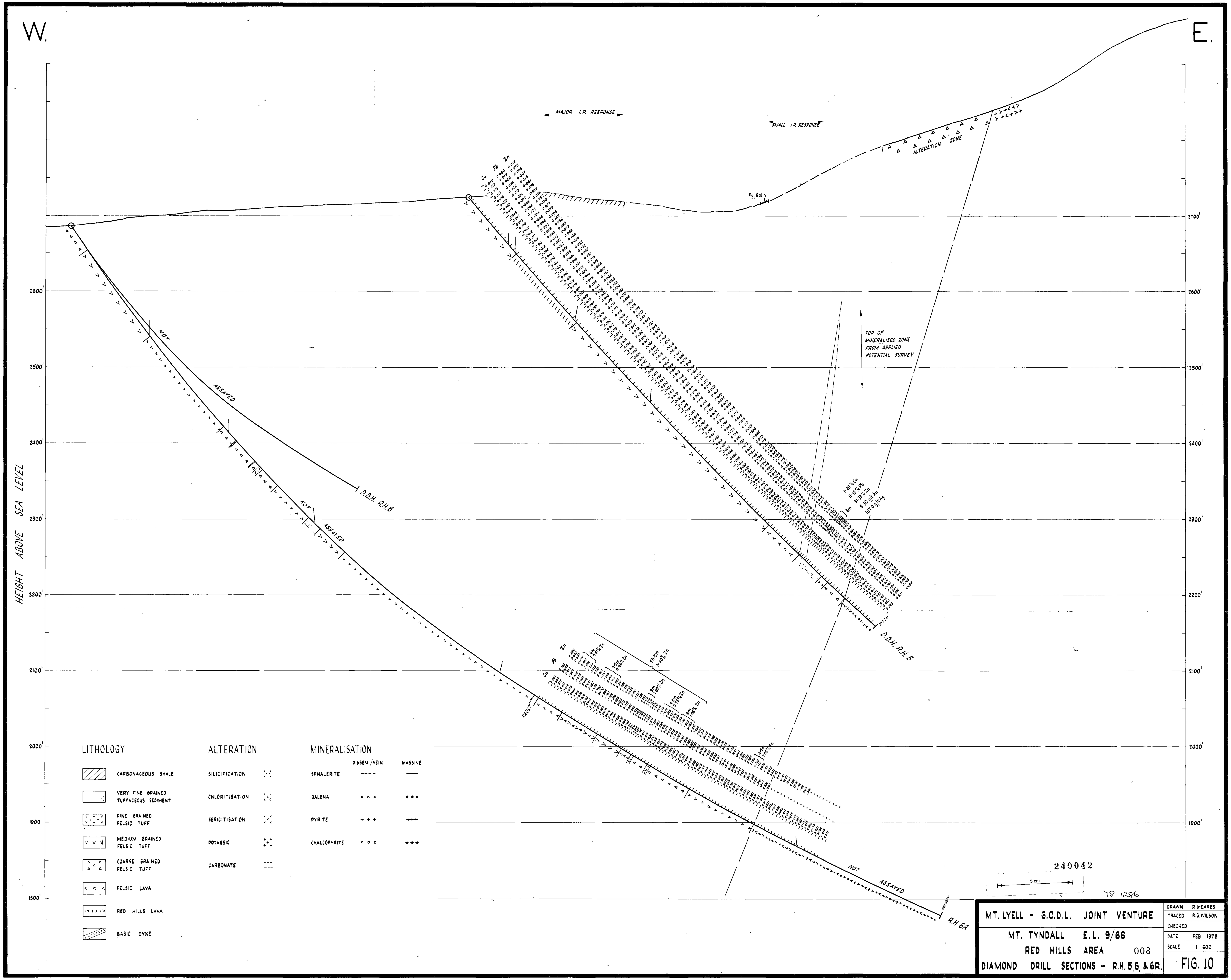
COSTEAN IMMEDIATLEY EAST OF D.D.H. RED HILLS Nº5 COLLAR

PURPOSE: TO TEST FOR ANY SURFACE EXPRESSION OF THE MASSIVE SULPHIDE ZONE INTERSECTED IN D.D.H. R.H.5 AND TO PROVIDE ROCK-TYPE CORRELATIONS WITH R.H.5.

240041

78-1286

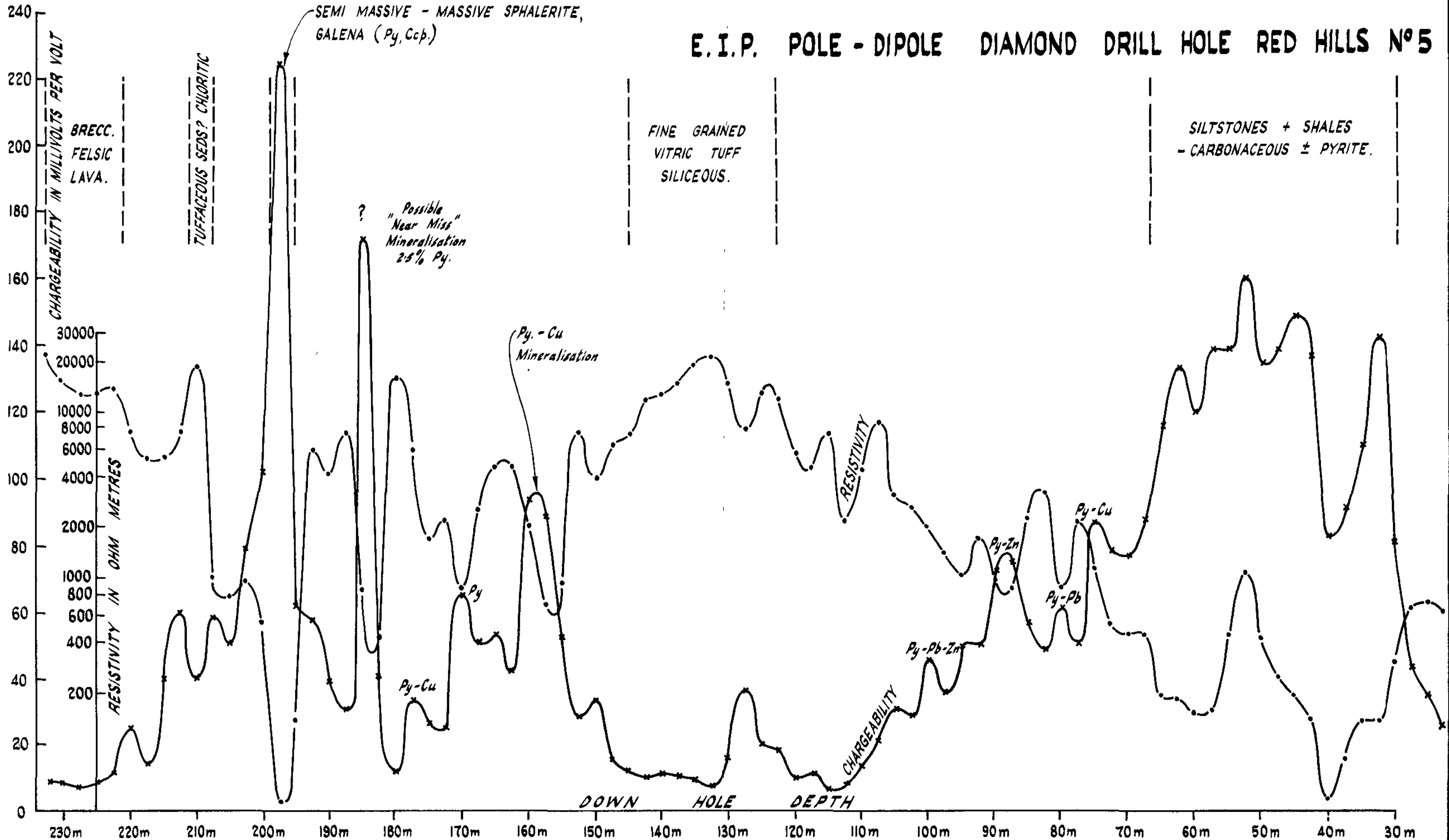
FIG. 9



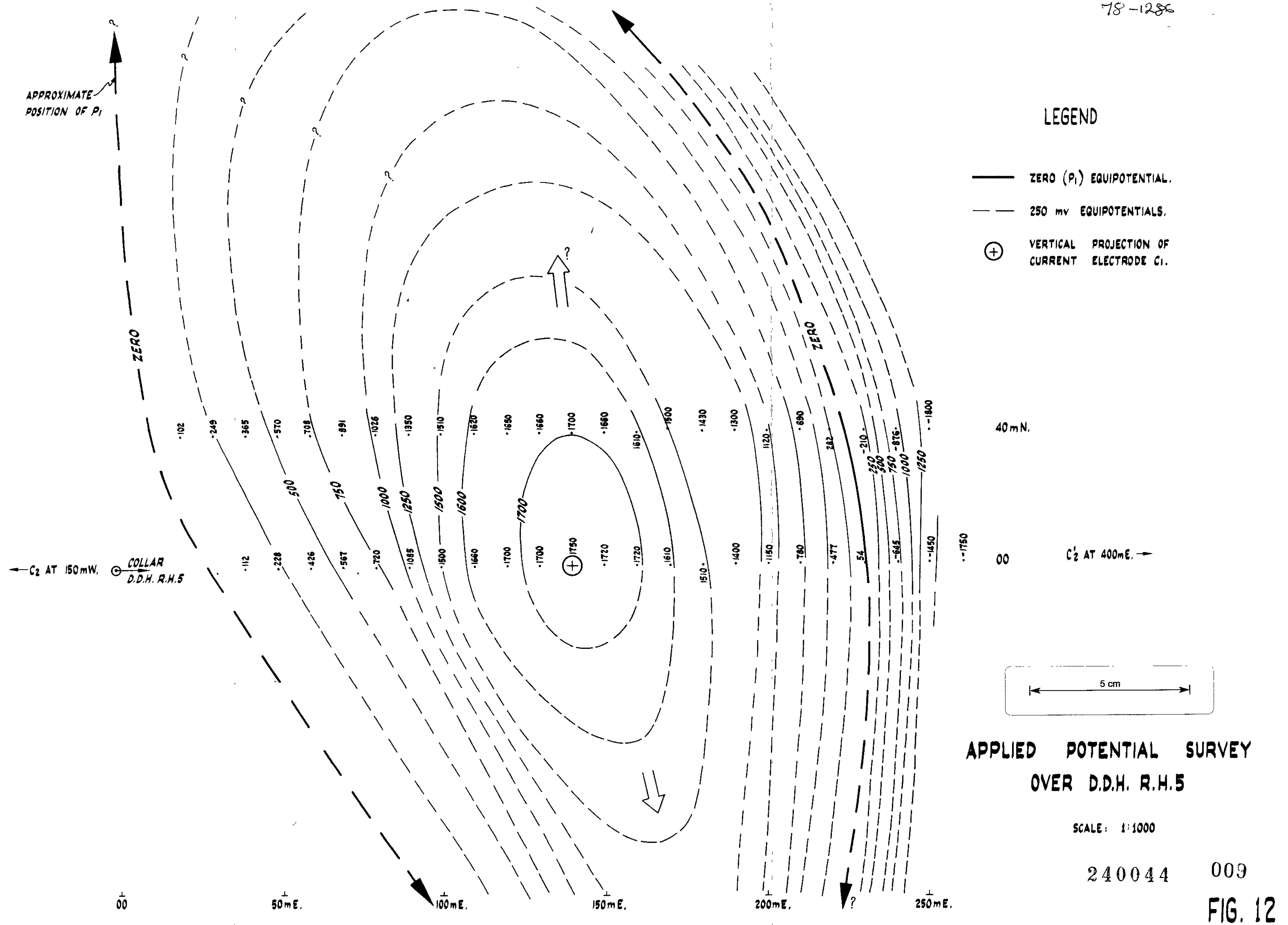
W.
E.
MAJOR I.P. RESPONSE
SMALL I.P. RESPONSE
ALTERATION ZONE
Py, Gal.
TOP OF MINERALISED ZONE FROM APPLIED POTENTIAL SURVEY
HEIGHT ABOVE SEA LEVEL
2700'
2600'
2500'
2400'
2300'
2200'
2100'
2000'
1900'
1800'
Cu Pb Zn
NOT ASSAYED
D.D.H. R.H.6
D.D.H. R.H.5
R.H.6R
FAULT
LITHOLOGY
CARBONACEOUS SHALE
VERY FINE GRAINED TUFFACEOUS SEDIMENT
FINE GRAINED FELSIC TUFF
MEDIUM GRAINED FELSIC TUFF
COARSE GRAINED FELSIC TUFF
FELSIC LAVA
RED HILLS LAVA
BASIC DYKE
ALTERATION
SILICIFICATION
CHLORITISATION
SERICITISATION
POTASSIC
CARBONATE
MINERALISATION
DISSEM./VEIN
MASSIVE
SPHALERITE
GALENA
PYRITE
CHALCOPYRITE
240042
5 cm
78-1286
MT. LYELL - G.O.D.L. JOINT VENTURE
MT. TYNDALL E.L. 9/66
RED HILLS AREA 008
DIAMOND DRILL SECTIONS - R.H. 5, 6, & 6R.
DRAWN R.MEARES
TRACED R.G.WILSON
CHECKED
DATE FEB. 1978
SCALE 1:600
FIG. 10

FIG. 11 78-1286 240043

E.I.P. POLE - DIPOLE DIAMOND DRILL HOLE RED HILLS Nº5



78-1286



APPLIED POTENTIAL SURVEY OVER D.D.H. R.H.5

SCALE: 1:1000

240044 009

FIG. 12

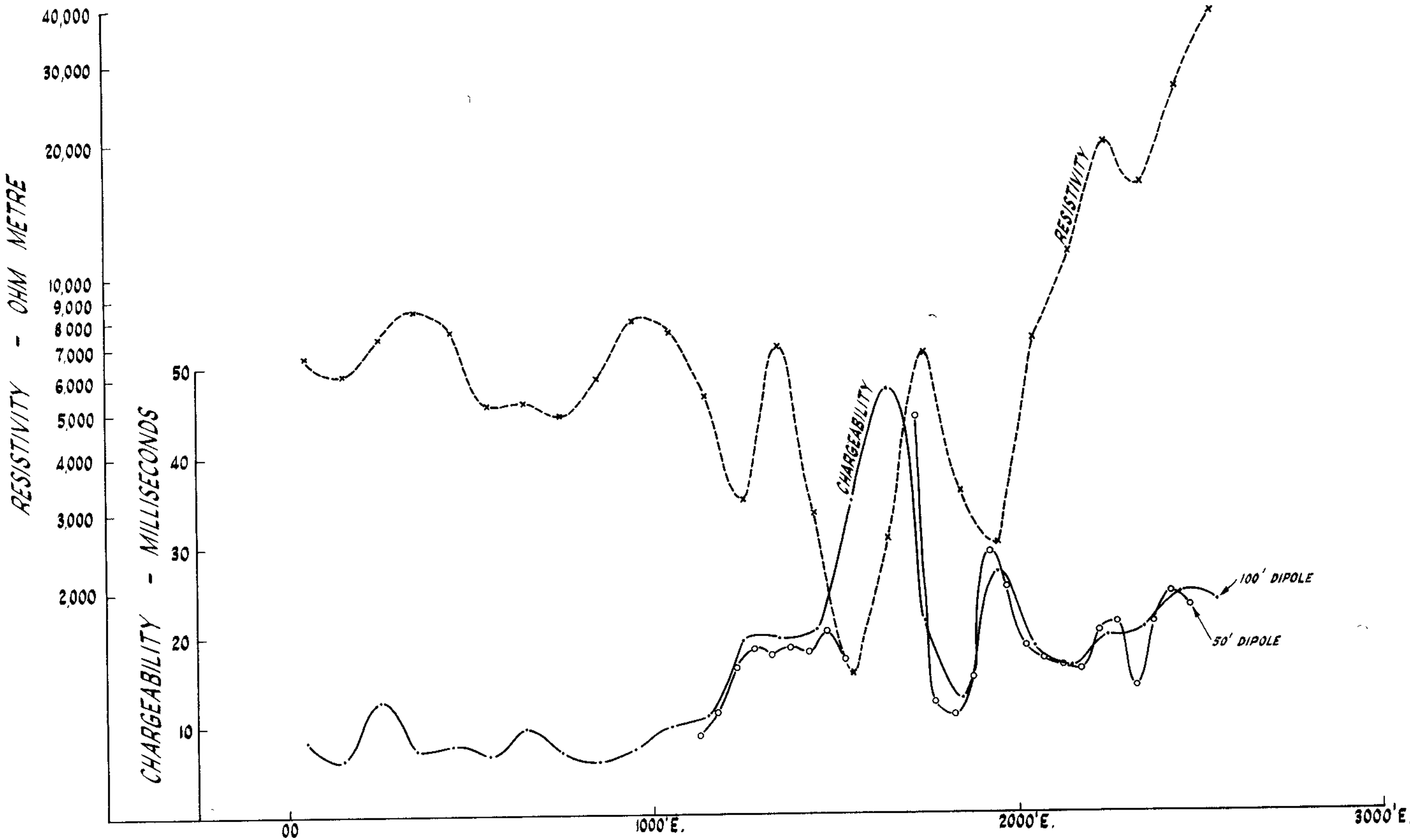
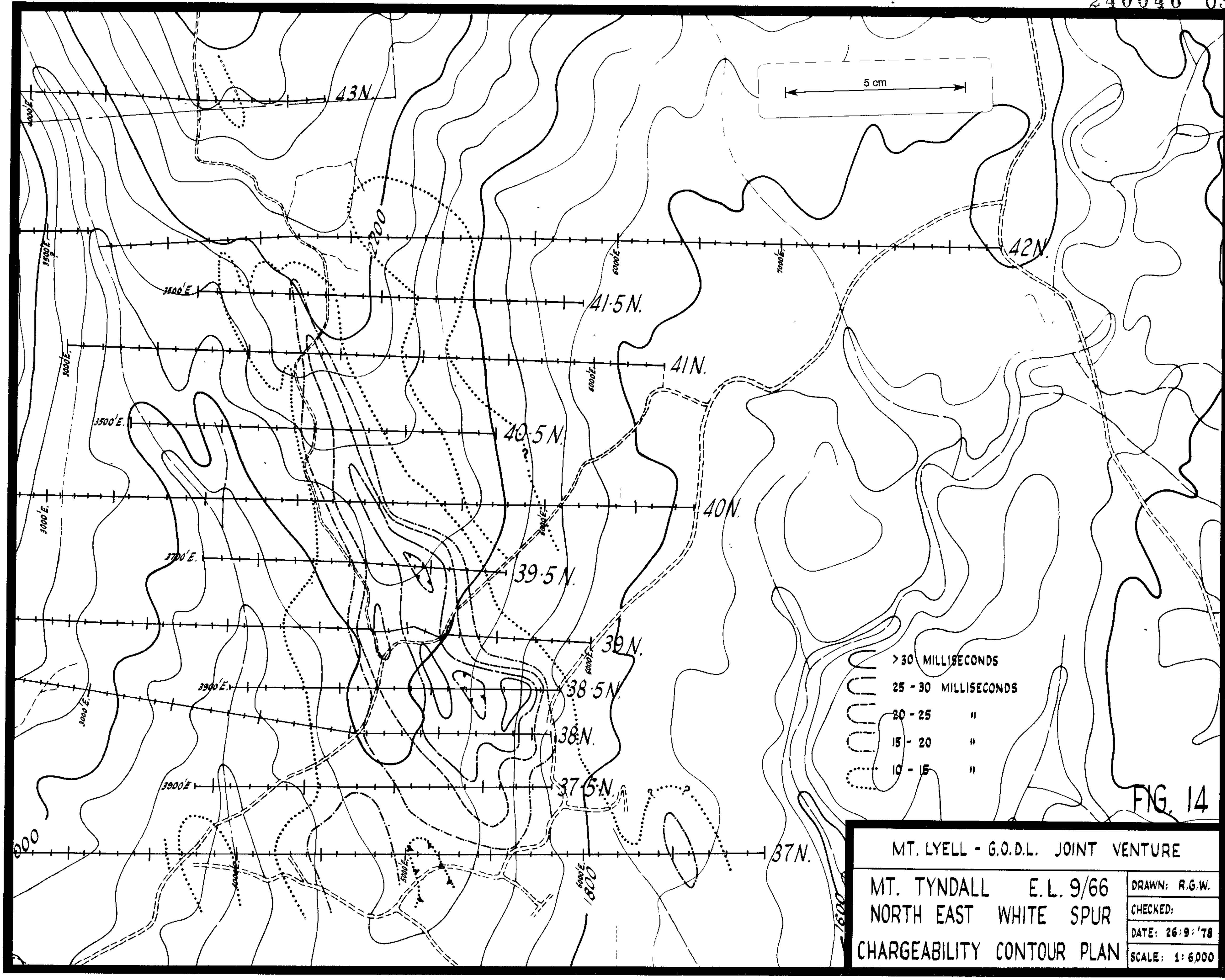
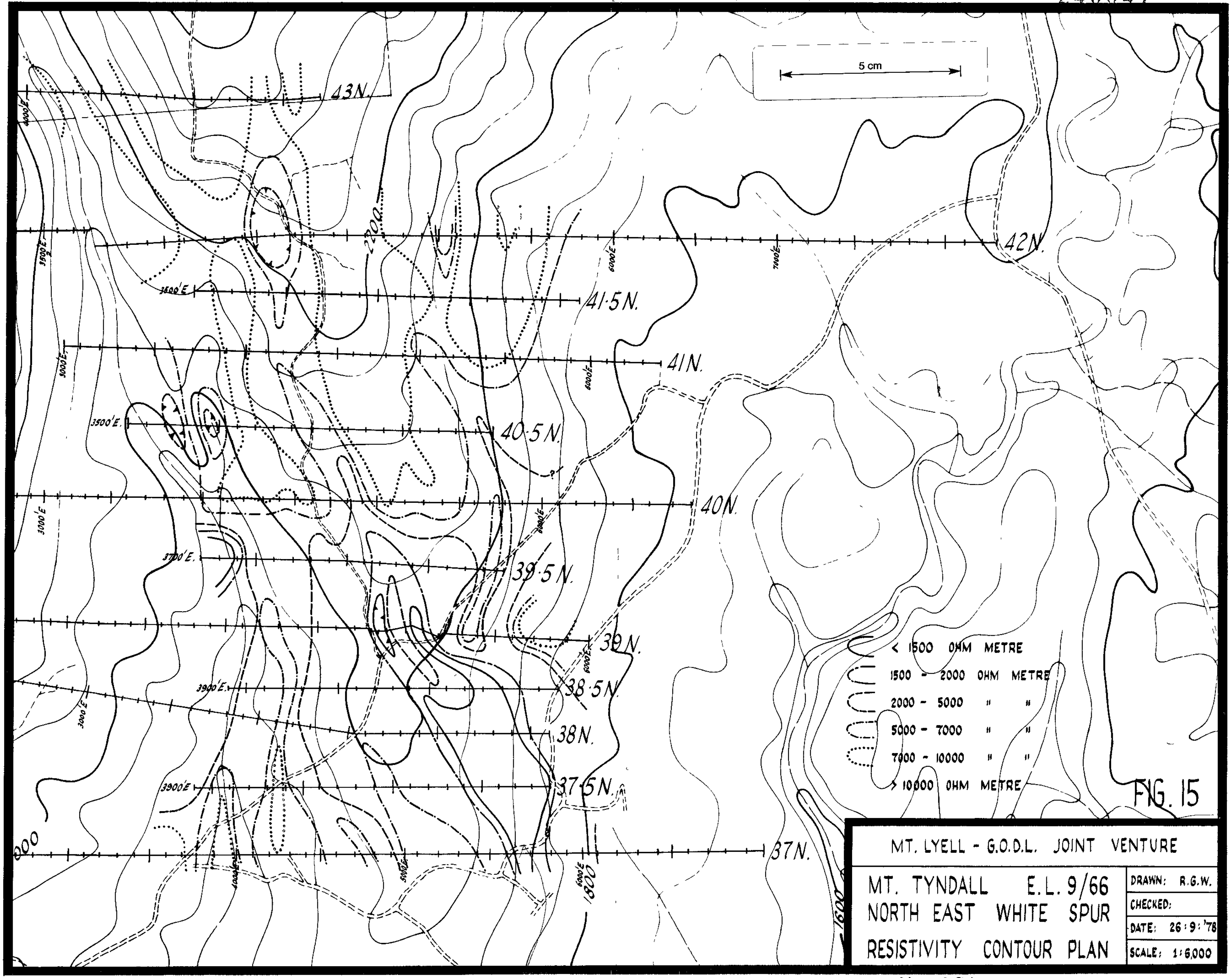


FIG. 13

ONE - LINE GRADIENT ARRAY E.I.P. OVER R.H. 5

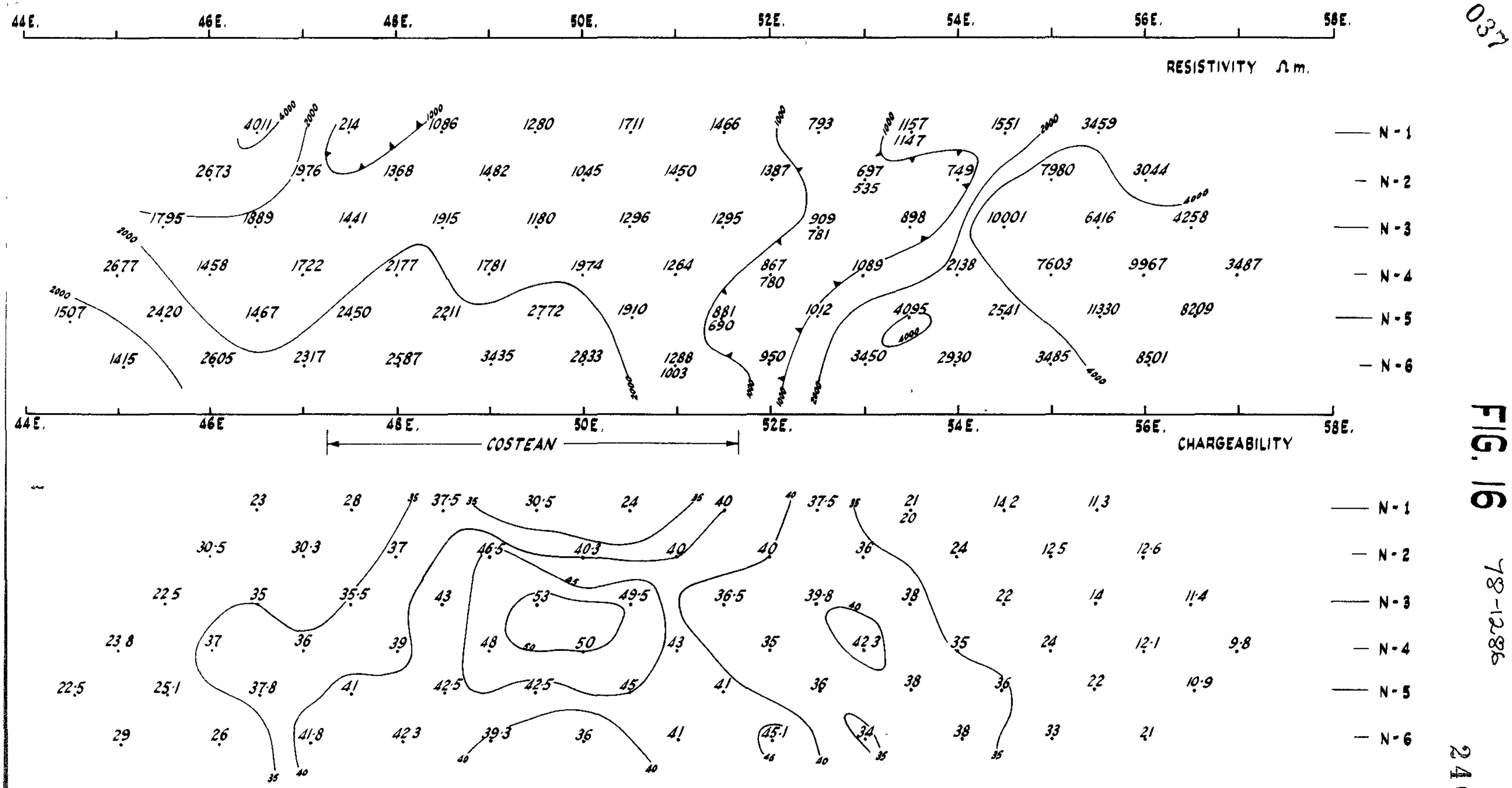

5 cm
43N.
42N.
41·5N.
41N.
40·5N.
40N.
39·5N.
39N.
38·5N.
38N.
37·5N.
37N.
3500'E.
3000'E.
3700'E.
3900'E.
4000'E.
5000'E.
6000'E.
7000'E.
2200
1800
1600
>30 MILLISECONDS
25 - 30 MILLISECONDS
20 - 25 "
15 - 20 "
10 - 15 "
FIG. 14
MT. LYELL - G.O.D.L. JOINT VENTURE
MT. TYNDALL E.L. 9/66
NORTH EAST WHITE SPUR
CHARGEABILITY CONTOUR PLAN
DRAWN: R.G.W.
CHECKED:
DATE: 26:9:'78
SCALE: 1:6,000

78-1286



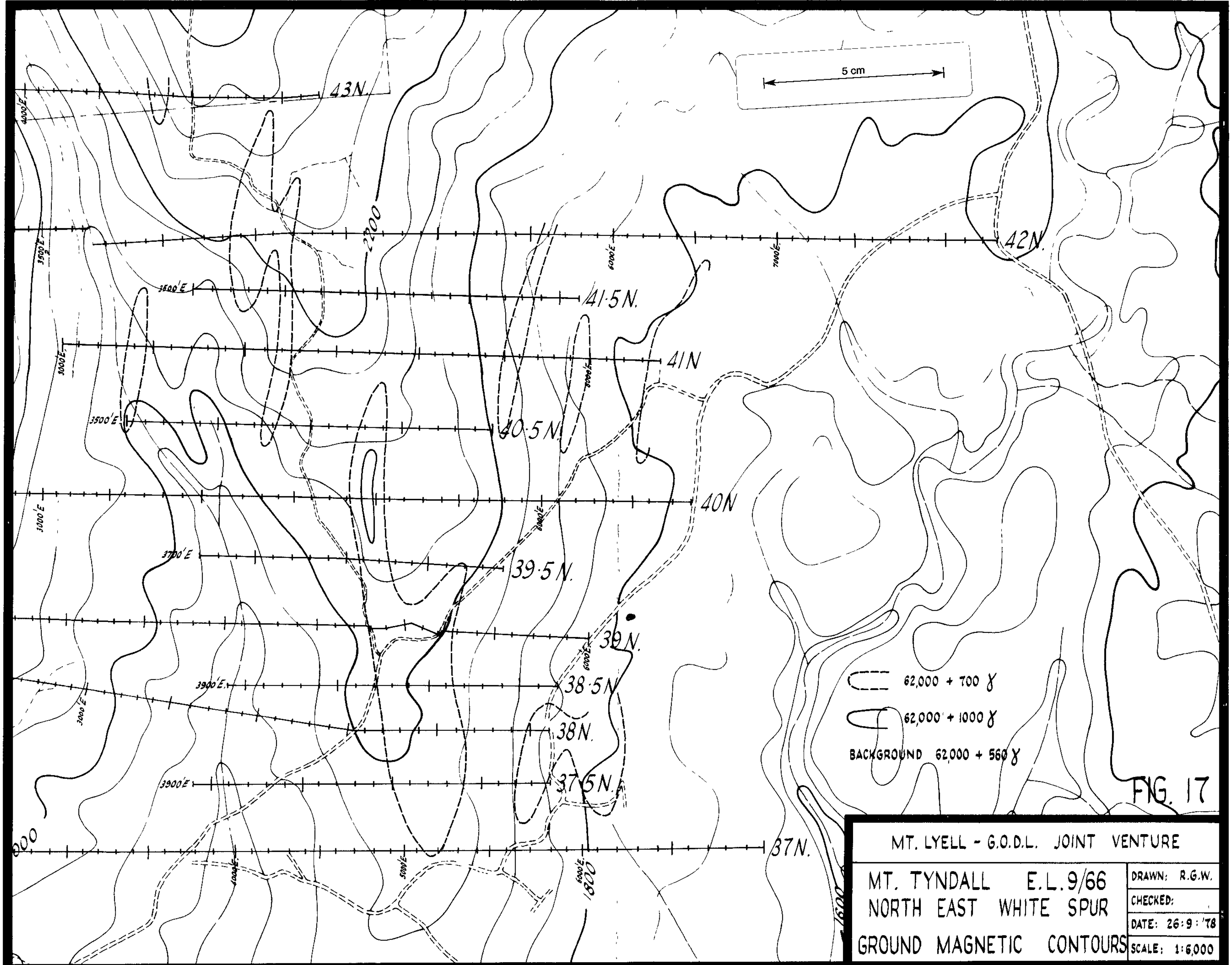
5 cm
43N.
42N.
41·5N.
41N.
40·5N.
40N.
39·5N.
39N.
38·5N.
38N.
37·5N.
37N.
3500'E
3000'E
3700'E.
3900'E.
4000'E
5000'E
6000'E
7000'E
2700
1800
1600
< 1500 OHM METRE
1500 - 2000 OHM METRE
2000 - 5000 " "
5000 - 7000 " "
7000 - 10000 " "
> 10000 OHM METRE
FIG. 15
MT. LYELL - G.O.D.L. JOINT VENTURE
MT. TYNDALL E.L. 9/66
NORTH EAST WHITE SPUR
RESISTIVITY CONTOUR PLAN
DRAWN: R.G.W.
CHECKED:
DATE: 26:9:'78
SCALE: 1:6,000

78-1286



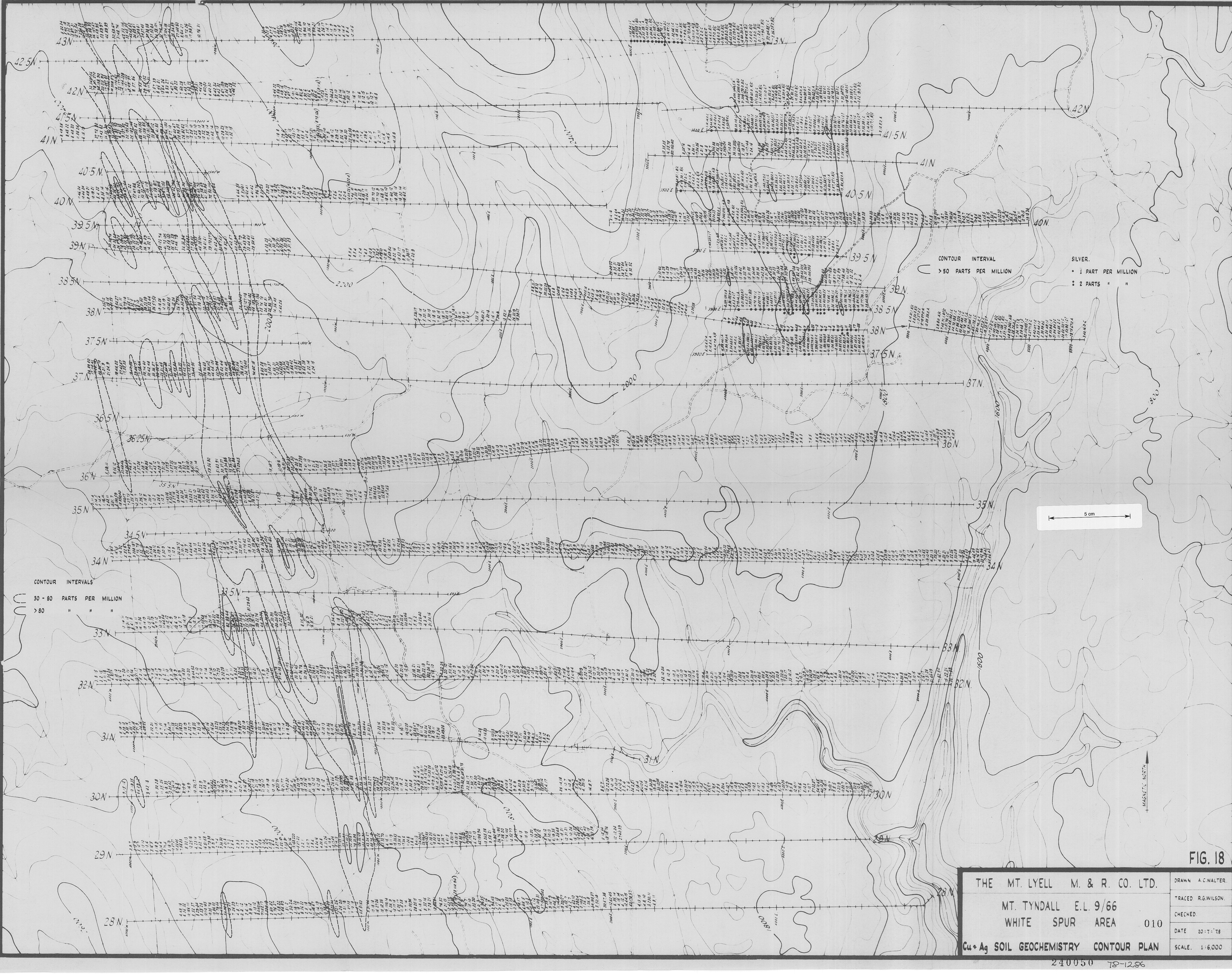
DIPOLE - DIPOLE SURVEY - LINE 39 NORTH

NORTH - EAST AREA - WHITE SPUR GRID



5 cm
43N.
42N.
41·5N.
41N
40·5N.
40N
39·5N.
39N.
38·5N
38N.
37·5N.
37N.
3500'E
3000'E
3700'E
3900'E
6000'E
7000'E
2200
1800
1600
62,000 + 700 γ
62,000 + 1000 γ
BACKGROUND 62,000 + 560 γ
FIG. 17
MT. LYELL - G.O.D.L. JOINT VENTURE
MT. TYNDALL E.L. 9/66
NORTH EAST WHITE SPUR
GROUND MAGNETIC CONTOURS
DRAWN: R.G.W.
CHECKED:
DATE: 26:9:'78
SCALE: 1:6,000

78-1286



240050 78-1286

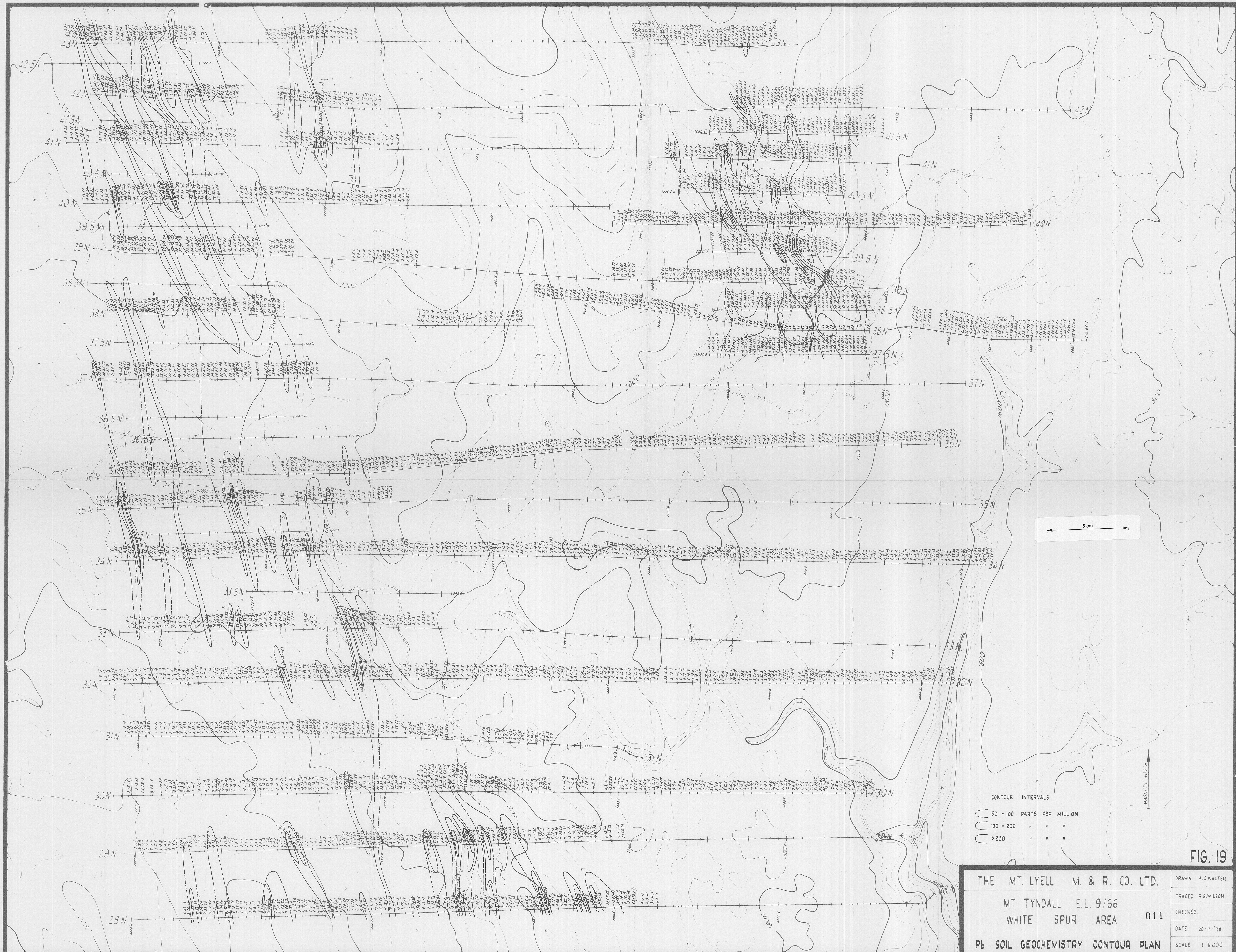


FIG. 19

THE MT. LYELL M. & R. CO. LTD.

MT. TYNDALL E.L. 9/66
WHITE SPUR AREA 011

Pb SOIL GEOCHEMISTRY CONTOUR PLAN

DRAWN	A.C.WALTER
TRACED	R.G.WILSON
CHECKED	
DATE	20.7.'78
SCALE	1:6000

78-1286 240051

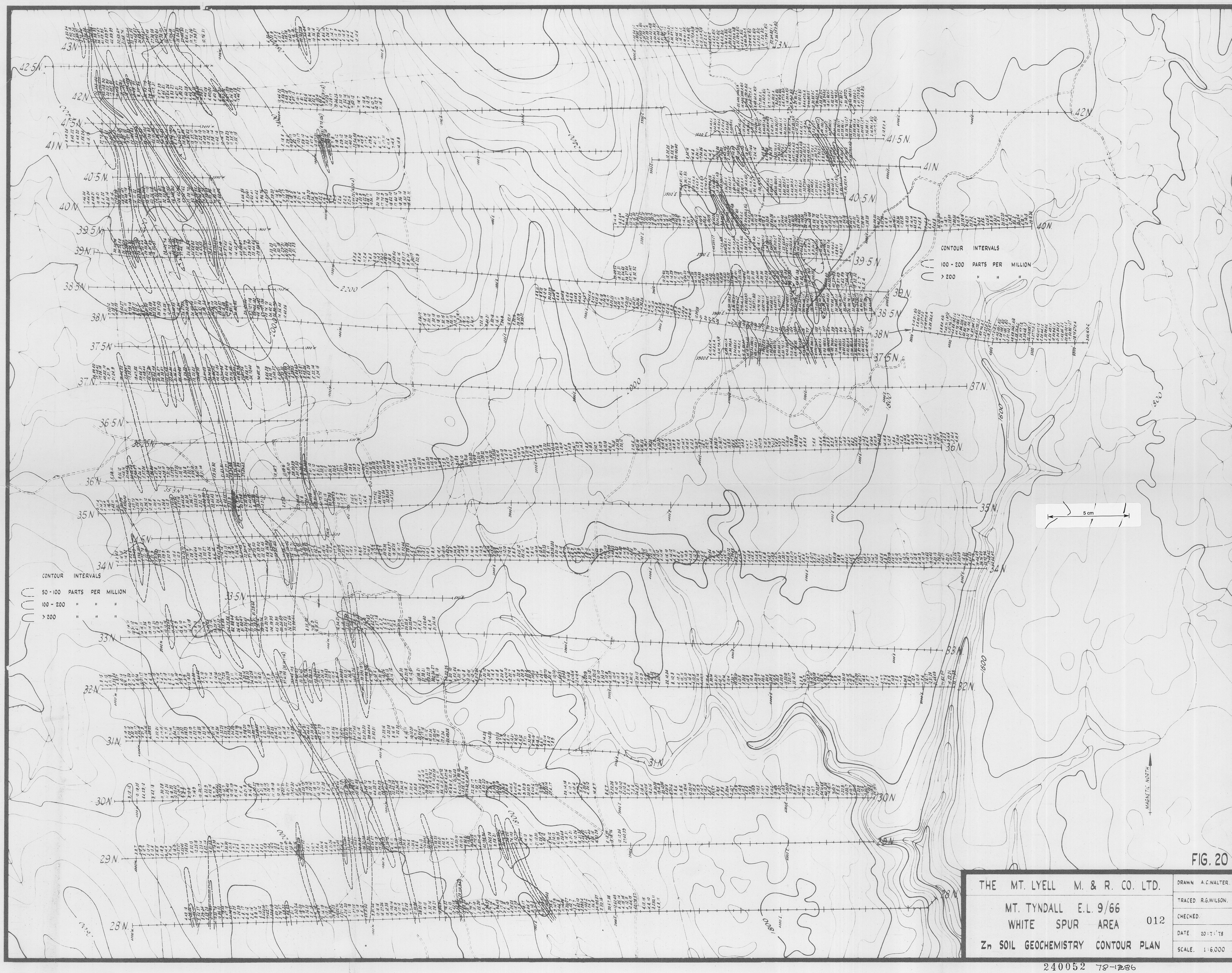


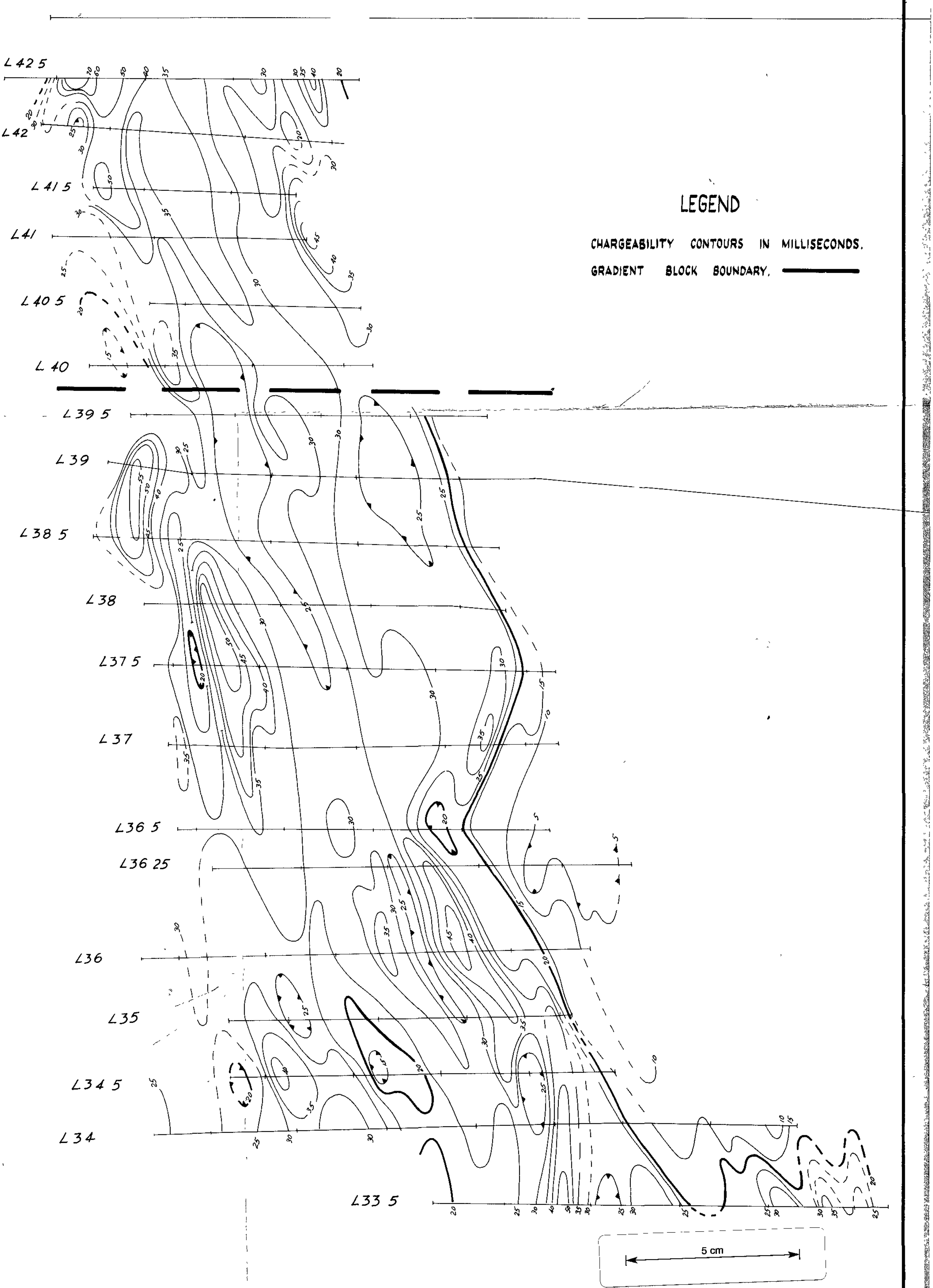
FIG. 20

THE MT. LYELL M. & R. CO. LTD.	DRAWN A.C.WALTER.
MT. TYNDALL E.L. 9/66	TRACED R.G.WILSON.
WHITE SPUR AREA 012	CHECKED.
	DATE 20.7.'78
Zn SOIL GEOCHEMISTRY CONTOUR PLAN	SCALE. 1:6,000

240052 78-1286

FIG. 21

240053

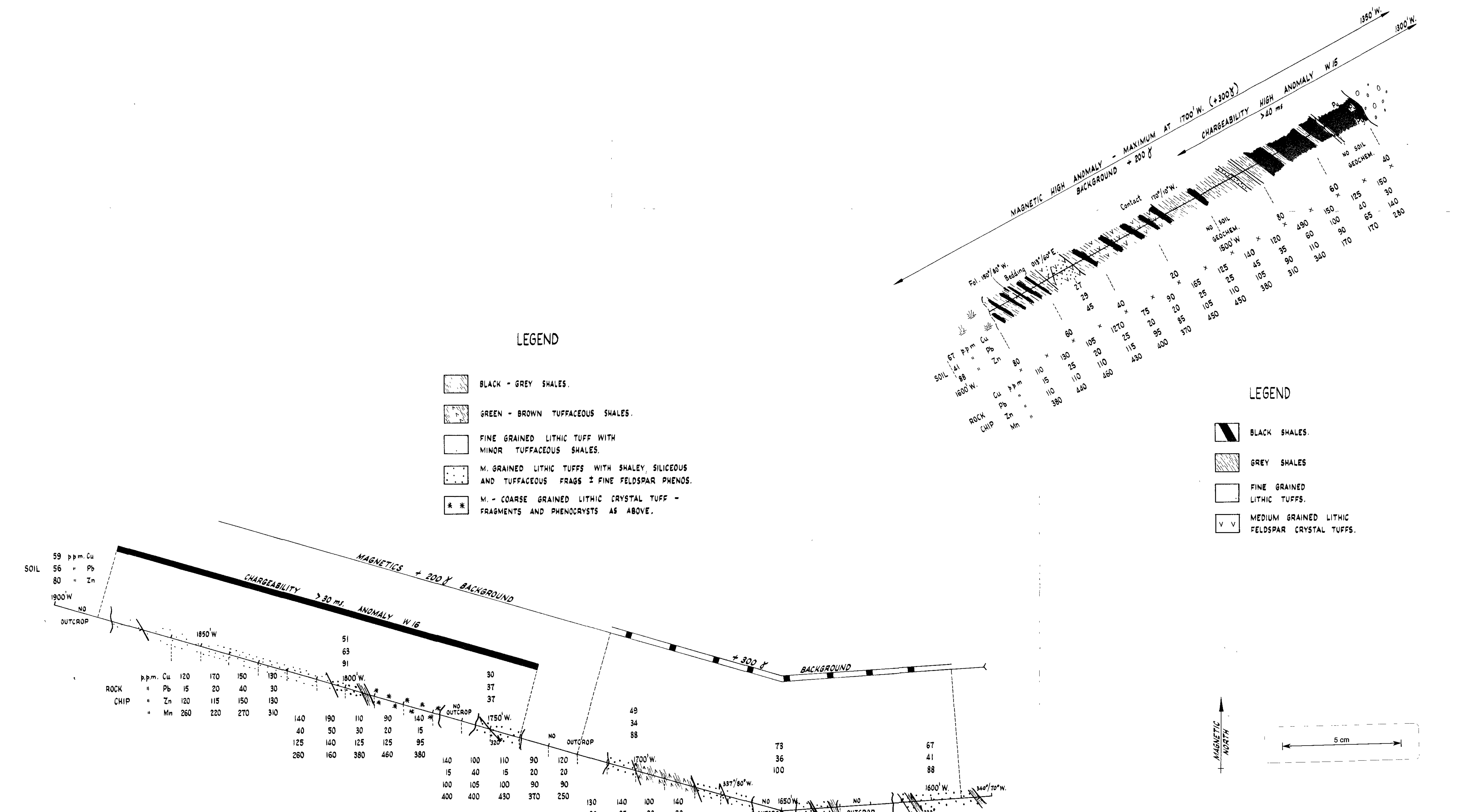


WESTERN AREA WHITE SPUR GRID
CHARGEABILITY CONTOUR PLAN

SCALE: 1:6000 78-1286

014 FIG. 22

240054



WHITE SPUR GRID

LINE 36N. 1440'W. - 1900'W.

ASSAY & GEOLOGY PLAN OF COSTEAN

SCALE: 1" = 20'   78-1286

015

FIG. 23

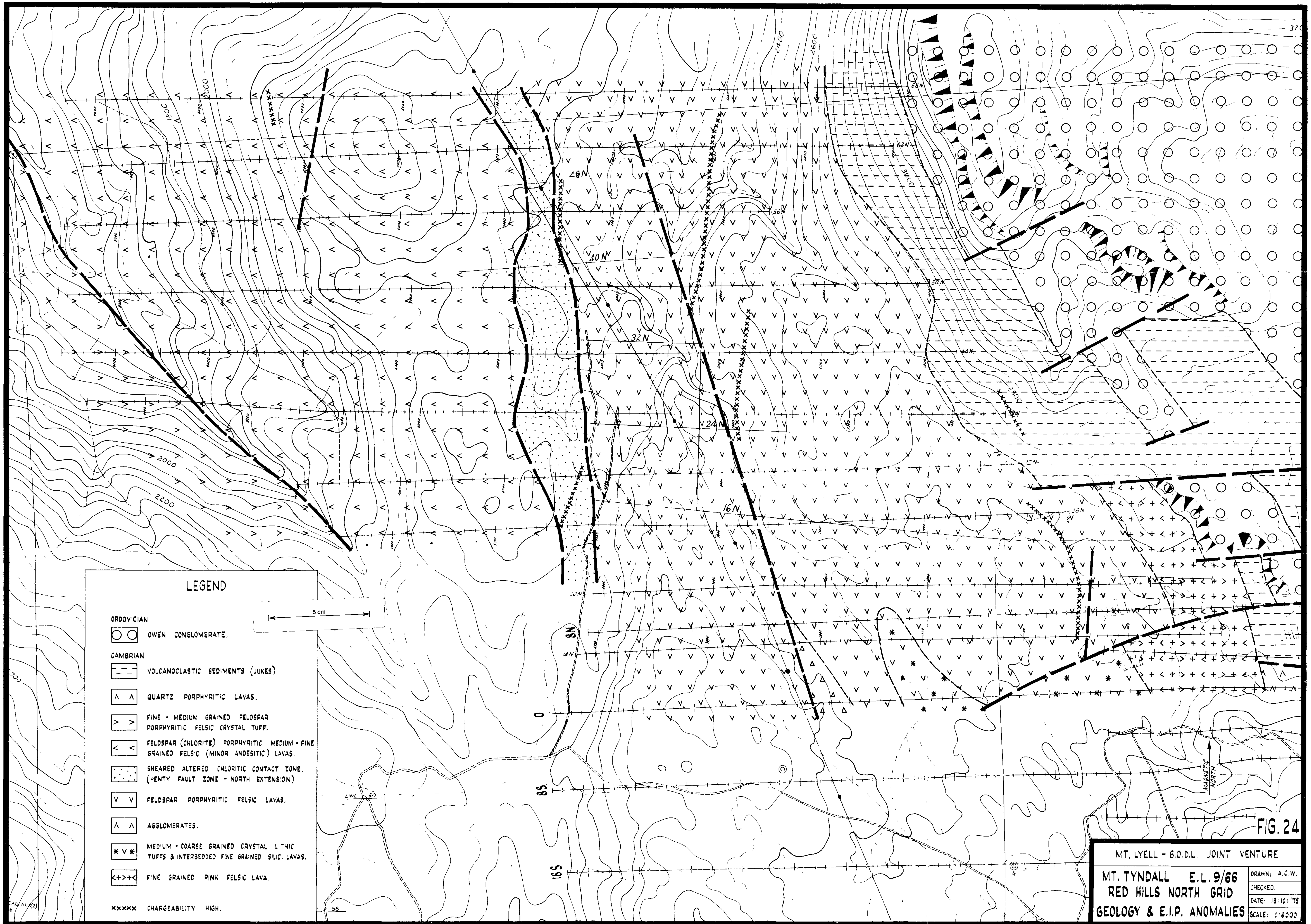
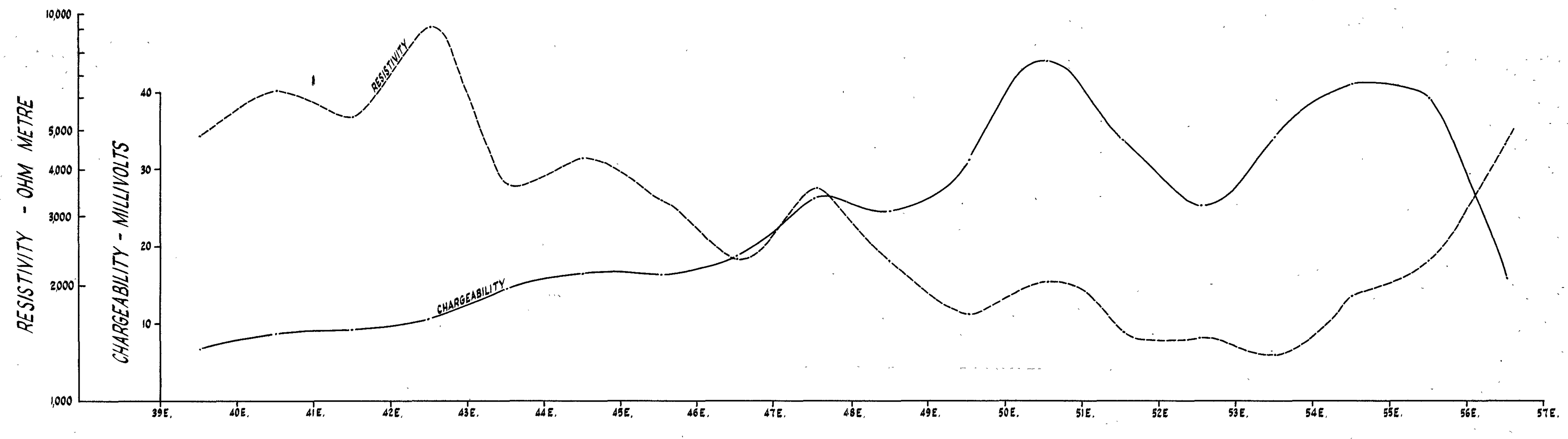


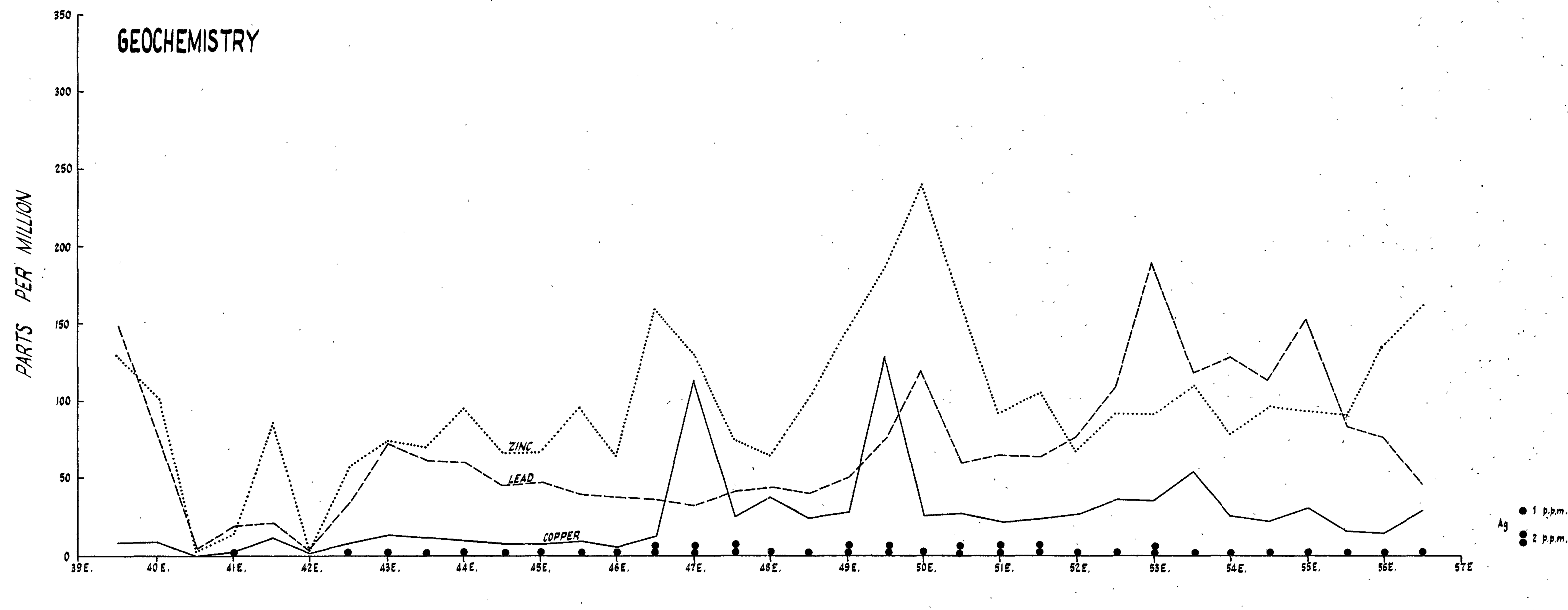
FIG. 24

240055 78-1286 016

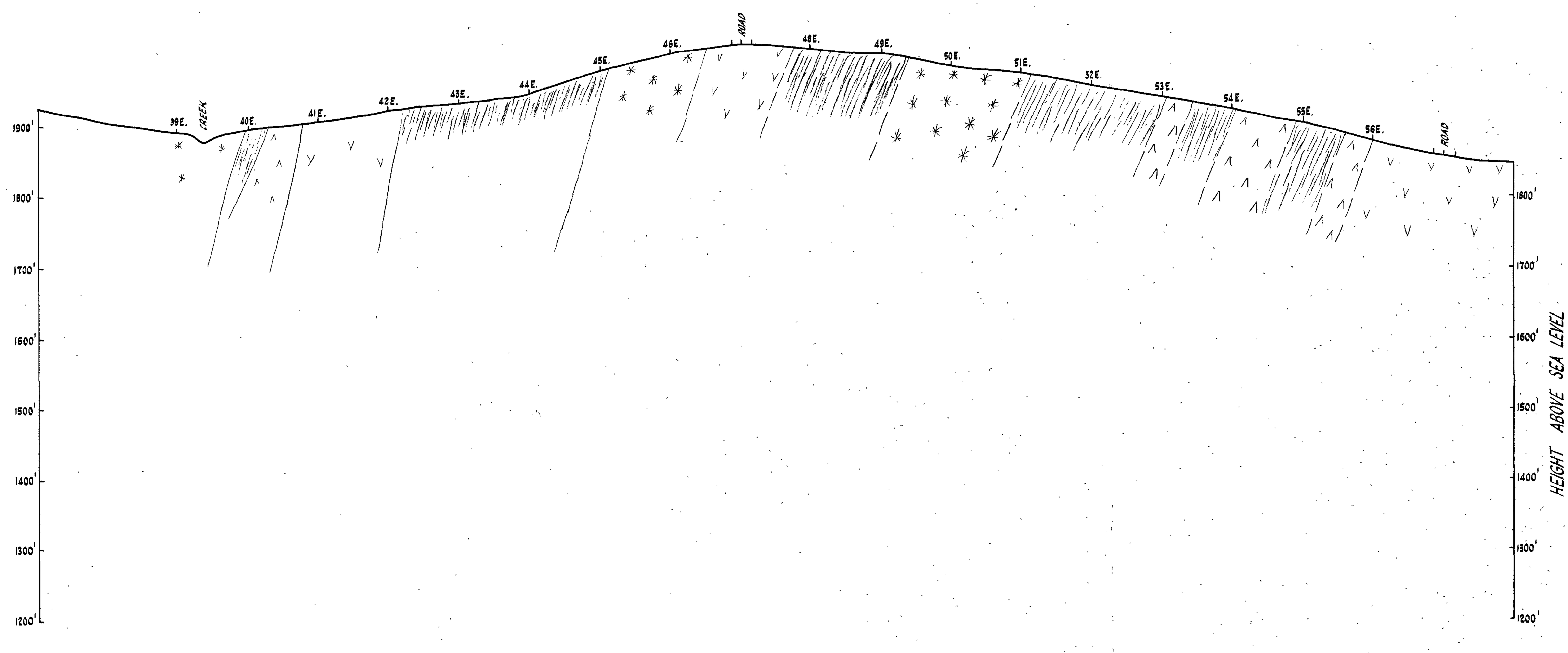
E.I.P. GRADIENT ARRAY



GEOCHEMISTRY



DRILLING PROFILE
LINE 38·5 N.



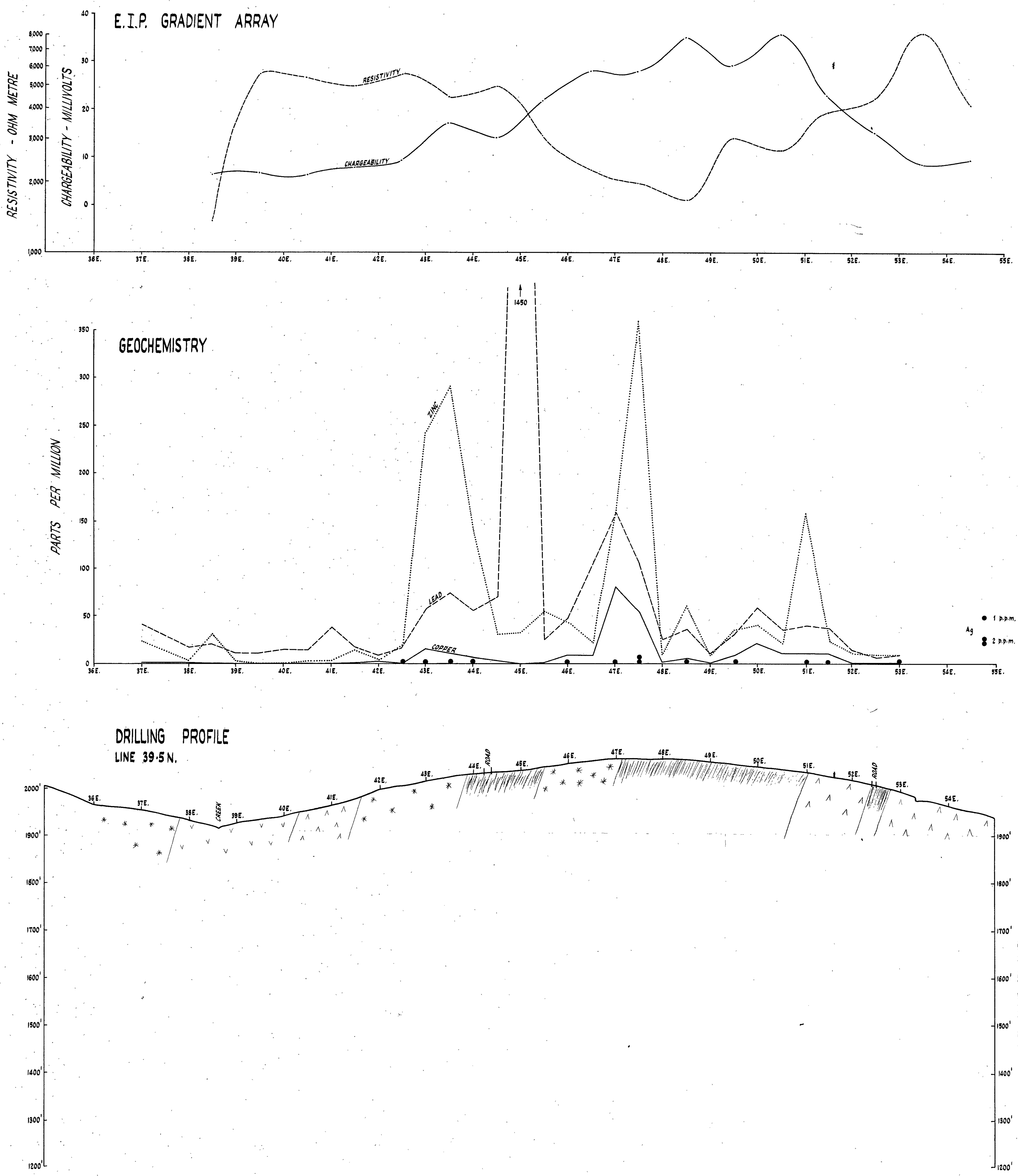
5 cm

24005C

MT. LYELL - G.O.D.L. JOINT VENTURE	DRAWN. A.C.W. TRACED. R.G.W. CHECKED.
MT. TYNDALL E.L. 9/66 WHITE SPUR AREA DRILLING PROFILE LINE 38·5 N.	DATE. 16·9·'78 SCALE. 1:1200 FIG. 25

017

78-1286

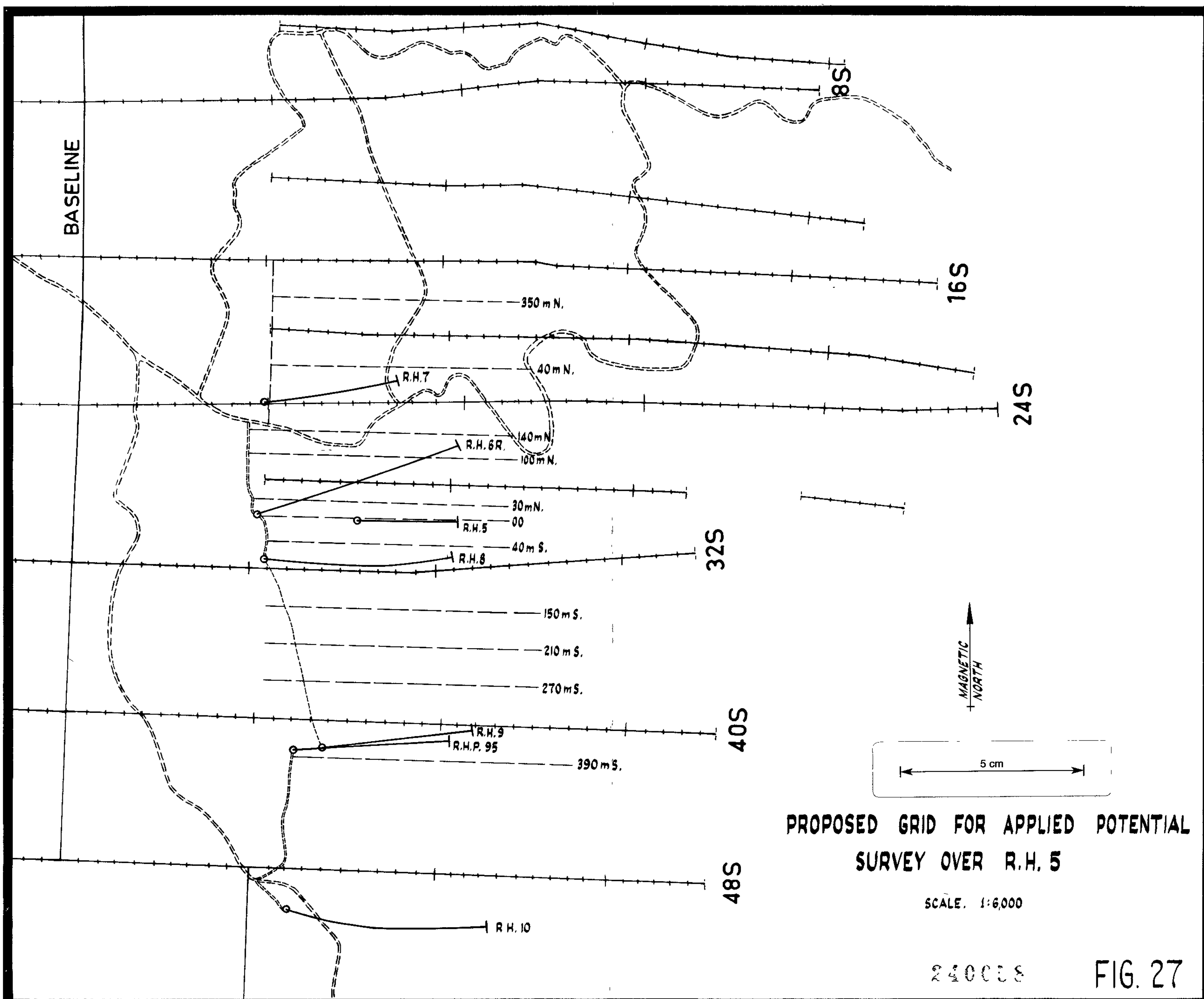


240057

5 cm

MT. LYELL - G.O.D.L. JOINT VENTURE	DRAWN. A.C.W.
	TRACED. R.G.W.
MT. TYNDALL E.L. 9/66	CHECKED.
WHITE SPUR AREA 018	DATE. 16·9·'78
DRILLING PROFILE LINE 39·5 N.	SCALE. 1:1200
	FIG. 26

78-1286



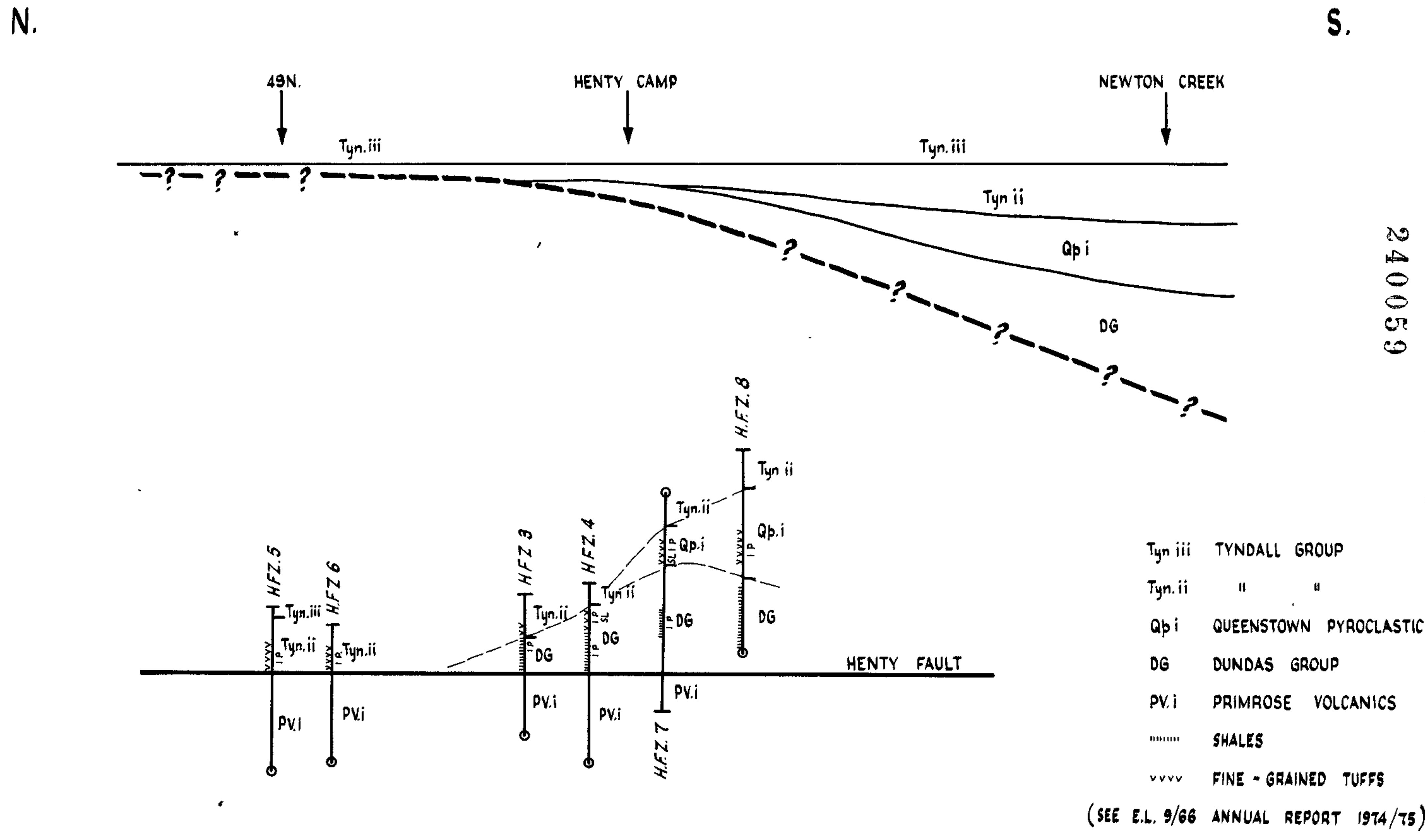
PROPOSED GRID FOR APPLIED POTENTIAL SURVEY OVER R.H. 5

SCALE. 1:6,000

240018

FIG. 27

78-1286

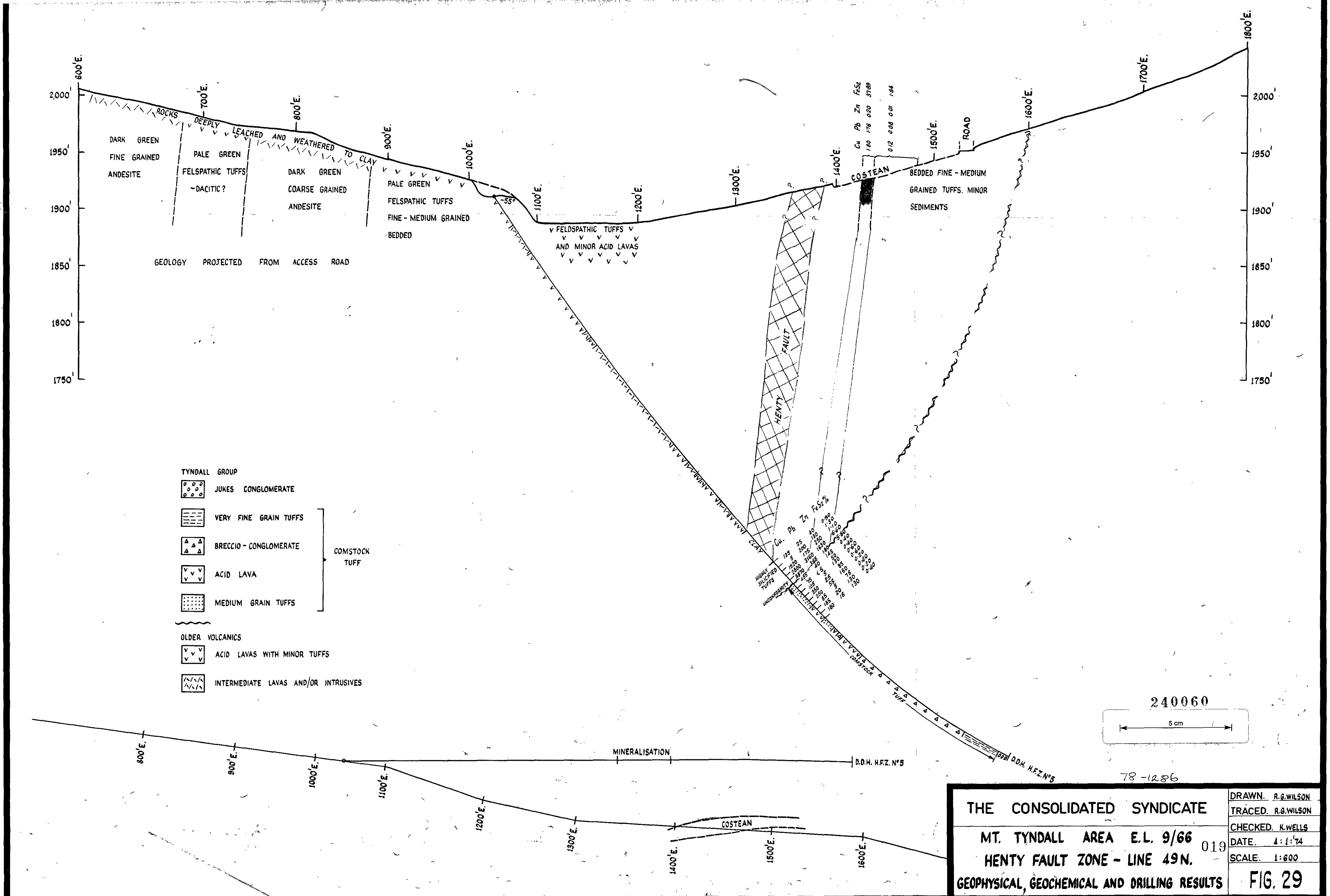


240059

78-286

FIG. 28

DIAGRAMMATIC N.-S. STRATIGRAPHIC SECTION OF THE HENTY FAULT ZONE.



THE CONSOLIDATED SYNDICATE

MT. TYNDALL AREA E.L. 9/66

HENTY FAULT ZONE - LINE 49 N.

GEOPHYSICAL, GEOCHEMICAL AND DRILLING RESULTS

019

DRAWN. R.G.WILSON
TRACED. R.G.WILSON
CHECKED. K.WELLS
DATE. 4:1:'74
SCALE. 1:600

FIG. 29


THE CONSOLIDATED SYNDICATE
MT. TYNDALL AREA
E.L. 9/66
HENTY FAULT ZONE
PROPOSED ACCESS / TRACK CUTTING
020
DRAWN: A.C.W.
TRACED: R.G.W.
CHECKED:
DATE. 6:10:'78
SCALE: 1:2400
FIG.30
78-12886
MAGNETIC NORTH
24061
5 cm
HENTY FAULT
57N.
56N.
55N.
54N.
53N.
52N.
51N.
50N.
49N.
48N.
47N.
46N.
45N.
44N.
43N.
42N.
24S.
32S.
53·5N.
52·6N.
52·3N.
51·5N.
50·5N.
49·5N.
49·3N.
49·2N.
49·1N.
48·8N.
48·6N.
48·3N.
47·5N.
46·5N.
45·5N.
44·5N.
45·3N.
H.F.Z.5
H.F.Z.6
H.F.Z.3
H.F.Z.4