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77-1225

THE MOUNT LYELL MINING & RAILWAY COMPANY LTD. 300001

A N N U A L R E P O R T

E.L. 10/69

1976/77

By: A. C. Walter

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Copies to: General Office
Mine Office (2)
Tas. Mines Dept.
C.G.F.A.
G.O.D.L.

August 1977

CONTENTS

M A P S

F I G U R E S

1. INTRODUCTION

In January 1976 the Mount Lyell Mining & Railway Company Ltd. decided to joint venture its three Exploration Licence areas due to a shortage of funds available to spend on exploration. This situation was brought about by the prevailing depressed world copper price.

On 20th May 1976 the joint venture agreement between The Mount Lyell Mining & Railway Company Ltd. and Getty Oil Development Co. Ltd. (G.O.D.L.) covering three Exploration Licences (E.L.'s 9/66, 10/69 and 41/71) in the vicinity of Queenstown, became effective.

This report includes data from period 13, 1975/76 and period 1-13, 1976/77.

Expenditure on E.L. 10/69 during 1976/77 was $57,054, bringing the total amount spent since 1969 to $157,485.

1.1 SUMMARY

The licence area was increased by 16 sq. km to include the area of Mount Read Volcanics from Miners Slate Ridge to the Queen River (see Appendix I, Map 3 for details of the Lease addition).

The exploration effort centred on the Beatrice grid on the southern flanks of Mt. Sedgwick (approximately 5 km north-east of the Cape Horn Copper Mine).

Track cutting of the grid was completed in early December 1976 and totalled 43.5 km. Geological mapping of the grid commenced, and was completed in April 1977.

A gradient array IP geophysical survey was conducted over 38 line-km. Six anomalous areas were located; plus eight small anomalous zones were identified. The results of the survey are somewhat confusing. A total field magnetometer survey was undertaken, and this data provided some interpretive assistance to both geophysical and geological mapping.

Geological mapping located five areas that are regarded as prospective. However, little surface base-metal mineralisation is apparent.

The proposed exploration program for 1977/78 will concentrate on gaining a complete geochemical soil sampling coverage of the grid with a view to locating diamond drilling targets or areas that require follow-up geophysical/geochemical surveys.

The proposed budget for 1977/78 is $45,000.

2. WORK COMPLETED 1976/77

2.1 PREVIOUS WORK AND 1976/77 EXPLORATION OBJECTIVES

Previous work over the whole Licence area is summarised in Annual Report E.L. 10/69, 1974/75 and 1975/76.

The 1976/77 exploration program was entirely focussed on the Beatrice grid on the southern slopes of Mt. Sedgwick.

The area was mapped in 1975/76 by P. Brophy (Annual Report E.L. 10/69, 1975/76), and the Beatrice grid was established using this reconnaissance data.

The objectives for 1976/77 were the cutting of the Beatrice grid, and the subsequent reconnaissance gradient array E.I.P. survey, and detailed magnetometer survey, followed by a detailed mapping and follow-up geochemical sampling program over areas of interest.

2.2 BEATRICE GRID

2.2.1 Access (Map 3)

(a) Road Construction was planned to provide access to the central portion of the grid. However, swampy ground prevented a crossing of the Comstock Creek approximately opposite the grid base line and forced the access track to be constructed on old logging tracks in the west of the grid. 1¾ Km of old track was cleared and ¾ Km of new track was built before boggy clay ground and steepening terrain prevented further work.

This road will need some maintenance and perhaps extending during the 1977/78 field season.

(b) Trackcutting of the Beatrice grid was done by the Furdon Bros. who contracted the work at $300/Km. Due to the failure of the road access to reach the proposed position, the track cutters did not peg the grid. Work commenced in early August 1976 and was satisfactorily completed in early December 1976. Total grid length is 43.5 Km.

Line spacing is 200 m; traverse lines are pegged every 30 m (L00 to 1200 m N inclusive is pegged, L1400 m N to 2000 m N is bush-pegged); base line is pegged every 25 m. Traverse line bearing is nominally 112° (true).

2.2.2 Geophysics (Maps 4-7)

(a) Reconnaissance gradient array E.I.P. survey was done by Scintrex Pty. Ltd. (Report April 1977, Tas-035D). Approximately 38 line-Km were surveyed at 30 m stations in 12 days between 10th January and 3rd February 1977. Up to three reading crews were employed.

A 10/15 Kw generator was employed to energise current dipoles of from 1600-4000 m. The generator was up to 5 Km from the electrode positions. This large transmitter proved cost effective in the remoter sections of the grid area.

The results of the survey are confusing. This may be due (1) inexact knowledge of the geology of the area

and/or (2) inexact knowledge of the geophysical characteristics of the rocks in the area, compared with other rock types in the Mount Read Volcanics

and/or (3) shortcomings in the geophysical survey method and/or interpretation associated with using such a large generator and large current dipole.

and/or (4) the variable strike directions of the rocks meant that in some parts of the grid the traverse lines were tending to sub-parallel the rock foliation/bedding trends, thus making interpretation difficult.

Six anomalous areas were located, within which are ten IP anomalies. 16 isolated anomalies occur in other parts of the grid (Map 5).

Both the chargeability and resistivity data produce a strike trend similar to the lithology boundaries on the grid, but do not reflect strike changes within a unit. Chargeability background is about 12½ ± 2½ milliseconds with anomalous areas x2 to x3 background. Background resistivity is about 2000-3000 ohm-meter, with a range of <30- > 20,000 ohm-meter.

The north-west corner of the grid (+800 m N, +1500 m W) is characterised by very high chargeabilities and very low resistivities, and is geophysically distinct from the rest of the grid. The rock types are felsic quartz feldspar porphyritic lavas with interbedded shales grading northwards to include fine grained siliceous pyritic sediments.

Several shale bands, including a narrow unit 1800 m long perpendicular to the traverse lines, are isolated by chargeability highs. However, two zones on L 1800 m N (300 m W and 750 W) consisting of altered pyritic fine tuffs show chargeability lows compared with expected higher than background values.

(b) <u>A total field magnetometer survey</u> was undertaken, with continuous base station readings taken to provide a detailed contour plan. Four zones were defined and contain the majority of significant magnetic events.

The fine grained siliceous haematitic magnetitic felsic lava ("Darwin-type rhyolite") was characterised by a total magnetic field generally >4500γ above the background of about 62600 ± 50γ, and the fine grained altered lavas to the east have values generally >200γ above background.

2.2.3 Geological Mapping

The grid area was mapped in detail during the summer field season with the aim of locating prospective lithologies and environments, and providing geological knowledge to assist in interpreting the reconnaissance E.I.P. gradient array survey (see Map 4, Fig. 1).

2.2.3.1 Mineralisation

Five areas of possible significant mineralisation were recognized:-

(1) L 1800 m N, 1970 m E: a thin shale band within a sequence of chloritic pyritic crystal lithic tuffs contained visible galena and sphalerite (Annual Report E.L. 10/69, 1975/76). Approximately 60 m north, a coarse grained lithic tuff contained fragments of semi-massive sphalerite, and minor galena. The gradient array survey shows several small chargeability highs in this area, and therefore the area requires further geochemical and geological assessment.

(2) L 400 m N, 650 m W to + L 1800 m N 1020 m W: a narrow long outcrop of pyritic black shales occurs within a thin sequence of fine-coarse tuffs. Occasionally, fine grained sphalerite is visible in hand specimen. The whole unit is more or less anomalously chargeable, and requires complete geochemical coverage.

(3) 1800 m N, 810 m W: minor chalcopyrite occurs in a very altered (silica sericite pyrite) fine grained tuff, within a sequence of pyritic (haematitic to south) fine-medium grained altered felsic tuffs which appears to have a strike length of 300 m. The IP geophysical response over this area is unremarkable, which may be due to the high silica content of the rock.

(4) An altered sequence of tuffs occurs from about 1450 m N, 150 m W to 1950 m N 400 m W. Sericitic pyritic fine grained tuffs are common. No base metal sulphides were observed. The IP geophysics over the area is unremarkable (as above).

(5) To the north-west of the grid is a sequence of lavas, and pyritic fine grained siliceous sediments, and agglomerates. The rocks appear to be high in the rock sequence in the area, and should be covered by a small geophysical IP survey.

2.2.3.2 Lithologies (Map 3)

A representative set of 32 rocks from the grid area has been described by Amdel (Report MP 3223/77):-

Pyroclastics:

(a) The eastern section of the grid consists of a sequence of altered (chloritic and/or siliceous) feldspar and/or quartz porphyritic fine-coarse grained felsic crystal lithic tuffs. Thin shale horizons and siliceous sediments occur occasionally, but appear to be of limited extent. Similarly occasional agglomeratic units have only a short strike length. Mineralisation associated with these shales and agglomerates is discussed above (see Section 2.2.3.1 Mineralisation (1)). Minor lava horizons occur within the sequence.

The tuffs in this sequence are generally fine grained and usually chloritic. Fine grained pyrite is common, but usually < 2% by volume. Haematite and/or magnetite are locally quite abundant. Many rocks show only relict phenocrysts or none at all; this is often due to alteration having destroyed the feldspar or quartz phenocrysts. In Amdel Report MP 3223/77, several rocks from this unit are described as crystal vitric or vitric tuffs.

(b) A similar tuff sequence occurs immediately south-west of (a), but the rocks are mainly coarse grained with a higher lithic content.

(c) A sequence of tuffs occurs between the western group of lavas and intrusives and the central lava group. Its western margin is marked by a thin long NNE trending shale horizon (see Section 2.2.3.1 Mineralisation (2)). Conformably overlying the shale is a sequence of feldspar and/or quartz porphyritic crystal tuffs and fine-coarse grained lithic tuffs, with minor black shale horizons. Alteration is variable, with regions of chlorite, and silica-sericite, with no apparent areal pattern. Pyrite occasionally occurs as fine grains in the matrix of some altered rocks.

(d) Within unit (c) above are two highly altered tuff horizons. The rocks are generally pale and sericitic, with varying quartz content, generally fine grained and often with pyrite to 4% by volume. They are discussed above (see Section 2.2.3.1 Mineralisation (3), (4)). Banding occurs often highlighted by small-scale pyritic bands and lenses. The units appear to be conformable with the surrounding rocks (Unit C above).

(e) BL, 1200-1800 m N: a sequence of chloritic tuffs outcrops to the West of the central lavas. Alteration is extensive and the foliation is well developed. Grain size varies from coarse grained lithic to fine grained (may be due to alteration). Minor crystal tuffs occur within the sequence. Minor pyrite, and silicification are relatively common.

Lavas:

(a) The rocks at the western end of the grid are predominantly quartz/feldspar porphyritic lavas with minor shale horizons and lithic tuffs occurring within them. The groundmass varies from pink-grey (felsic, predominantly quartz) to dark grey occasionally greenish (chloritic). The ratio of quartz: feldspar phenocrysts is extremely variable over short distances. The rocks are often massive in outcrop and relatively un-weathered; flow banding occurs occasionally. Pyrite is a rare component of the groundmass.

The occurrence of small chargeability highs in the geophysical coverage is probably due to narrow black or laminated shale horizons.

(b) Immediately south-east of unit (a) is a chloritic unit, very similar to (a). The chlorite alteration is pervasive and occasionally obscures the original features of the rock.

(c) "Darwin-type rhyolite" occurs between L 1400 m, N 300 m E and L 2000 m N 300 m E. This outcrop is regarded as amalogous to similar outcrops at Mt.Darwin, Whip Spur and Red Hills. The rock is a fine grained siliceous haematite-magnetite veined altered brecciated felsic lava (see Annual Report E.L. 10/69, 1975/76 for chemical analyses).

Alteration of surrounding lavas is pronounced and decreases away from the outcrop. This alteration zone is considered prospective, but the massive outcrop itself appears to be unmineralised with respect to economic minerals.

(d) Surrounding the "Darwin-type rhyolite" is a variably altered generally fine grained felsic lava. Haematite, chlorite and silica alteration are common with occasional minor pyrite being found in the groundmass. This unit may grade into the altered crystal lithic tuff sequence to the east; its western limit may be partly fault contact partly conformable. The unit is generally well foliated, and shows occasional flow brecciation structures.

Intrusives:

(a) Due south of Mt. Sedgwick summit: quartz feldspar porphyry of rather undiagnostic features; may be a lava or an intrusive. The groundmass is generally siliceous with varying amounts of feldspar and/or chlorite. Feldspar (pink, often euhedral, and clustered) and quartz (often embayed, fractured, clear) phenocrysts are variable in size and relative proportions.

The unit appears to be a high-level intrusion possibly late in the volcanic history of the area.

(b) At the eastern end of Lines 1200 m N and 1400 m N a well foliated medium-coarse grained quartz porphyritic rock outcrops. It is fault bounded to the west, and probably unconformably overlain by Jukes Conglomerate in the east.

2.2.3.3 Structure

There appears to be no unifying structural pattern through the area, however the general foliation trend is approximately 310-340°/70-85° W, with the exception of

(a) A small syncline (Fig. 1) in the centre-west of the grid area,

(b) The stock of "Darwin-type rhyolite" which shows no consistent foliation or strike trend.

The well developed foliation and alteration suggests a similar tectonic history to elsewhere within the Mount Read Volcanics. However, the variable dips and strikes that are seen in some units also suggests that relatively complex folding has taken place.

The open folding in the Owen Conglomerate to the north of the grid area has no apparent equivalent structures within the volcanic rocks of the grid area.

Several large faults occur generally striking NNE to NE and including a major NE trending structure in the south-eastern part of the grid that has brought the Jukes Conglomerate in contact with the volcanics (Annual Report E.L. 10/69, 1975/76).

A NW trending fault in the eastern part of the grid appears to have considerable displacement along it.

2.2.4 Geochemistry

Very little rock chip geochemistry was done during the year. Further work is required to establish background base metal values and relationships with soil geochemical values.

Rock chip and stream sediment analyses for 1974-1977 are given in Appendix II and III, and Map 8.

The small stream sediment sampling program has isolated three areas of potential mineralisation:

(1) the NNE trending shale sequence in the centre-west of the grid. Minor fine grained sphalerite has been observed in the shales, and the two stream sediment samples from this area are SS 43 - 145 ppm Cu, 1110 ppm Pb, 1130 ppm Zn, and SS 44 - 185 ppm Cu, 906 ppm Pb, 780 ppm Zn.

(2) high Pb values occur in 3 samples that drain

(i) an altered sericitic fine-medium grained tuff sequence containing some abundant pyrite (see Section 2.2.3.1 mineralisation (4)).

(ii) the outcrop of "Darwin-type rhyolite" in the centre-north of the grid. The values are SS 25 - 83 ppm Cu, 390 ppm Pb, 122 ppm Zn; SS 26 - 55 ppm Cu, 414 ppm Pb, 52 ppm Zn; SS 27 - 42 ppm Cu, 275 ppm Pb and 60 ppm Zn.

(3) the eastern sequence of altered fine-coarse grained crystal lithic tuffs and minor shales has known mineralisation (see Section 2.2.3.1 mineralisation (1)). Two anomalous locations occur.

(i) near the western limit of this rock type; no known mineralisation in the area SS 31 - 72 ppm Cu, 260 ppm Pb, 129 ppm Zn.

(ii) below the known galena and sphalerite occurrences mentioned above: SS 30 - 48 ppm Cu, 88 ppm Pb, 39 ppm Zn; SS 38 - 60 ppm Cu, 230 ppm Pb, 53 ppm Zn; SS 47 - 43 ppm Cu, 340 ppm Pb, 40 ppm Zn.

2.3 GREAT LYELL AREA

In previous years work on the Great Lyell area has been carried out as part of the E.L. 10/69 Lease exploration program. However, the area falls on the Consolidate Mining Lease, and hence no work will be carried out over this area while the G.O.D.L. joint venture agreement is in operation.

P. Brophy completed a report on the Great Lyell area entitled "Geology and Mineralisation of the Great Lyell Area, Tasmania, and Problems in the Application of Various Exploration Techniques", a dissertation for M.Sc., James Cook University of North Queensland, January 1977.

2.4 EXPLORATION COSTS E.L. 10/69, 1976/77

P13	3.6.76 - 30.6.76	$
	Salaries *	1,315
	Materials *	49
	Equipment and Facilities *	187
	General Costs	555
	Burden A *	273
	Burden B *	214
		2,593
	TOTAL (+6½% Indirect Costs *)	$ 2,725
P1-13	1.7.76 - 29.6.77	
	Salaries *	15,080
	Materials *	434
	Access *	14,442
	Geophysics *	12,414
	Geochemical/Petrography *	14
	General Costs	917
	Equipment and Facilities *	276
	Burden A - direct labour o'head *	156
	Burden B - employee benefits *	114
		51,538
	TOTAL (+6½% Indirect Costs *)	$ 54,329
TOTAL	for P13, 3.6.76 to P13, 29.6.77	$ 57,054

3.1 PROPOSED EXPLORATION PROGRAM 1977/78

Work during 1977/78 will be concentrated on the Beatrice grid. Track cutting will be done (a) to extend the grid to the north-west to cover the main shale horizon (L 2000 m N), and a sediment-lava sequence in the north-west; (b) for follow-up detailed geophysical surveys over anomalous geophysical (1976/77 survey) and geochemical (1977/78 program) zones. A comprehensive geochemical soil sampling program will be undertaken over areas of geophysical and geological interest. Additional mapping will be done as required. No diamond drilling is proposed for 1977/78.

3.1.1 Access

(a) Road maintenance - initial maintenance at the start of the season, plus intermittent maintenance through the season will be required.

(b) Track cutting to extend the grid to the north-west (Map 6):

4 lines	L 1400 m N,	600 m to 2340 m W	
	L 1600 m N,	1000 m to 2320 m W	
	L 1800 m N,	1000 m to 2050 m W	
	L 2000 m N,	1000 m to 1750 m W	
		3600 m	

(c) Track cutting to allow follow-up detailed geophysical surveys over major anomalous geochemical/geophysical responses located by reconnaissance work. Estimated 3000 m.

Costs	(a)	3 days, 24 hours, $30/hr.	$ 720
	(b)	Mt. Lyell employees	$ -
	(c)	Contractors $350/Km, 3Km	$1150
		Total	$1870

3.1.2 Geochemistry

Soil sampling of IP geophysical anomalous zones will be carried out. Approximately 22500 m of sampling, with about 1500 samples, has been estimated as necessary to adequately test the area.

Rock chip sampling will be carried out as required.

Cost 1500 samples @ $1.35/sample $2000

3.1.3 Geophysics

(a) IP gradient array survey over north-west extension of the grid. Approximately 4000 m.

(b) Detailed follow-up geophysical surveys over coincident reconnaissance geophysical and geochemical zones of interest. Approximately 3000 m.

Costs	(a)	4000 m, 5 days @ $400/day	$2000
	(b)	3000 m, 5 days @ $400/day	$2000
		Total	$4000

3.2 PROPOSED EXPLORATION PROGRAM COSTS 1977/78

Salaries and Wages	$ 18797
Burden A	4059
Burden B	3030
Access	1870
Geophysics	3200
Geochemistry	2000
Diamond Drilling	-
Materials	950
Equipment and Facilities	2180
General Costs	950
Capital Items	4500
Indirect Charges	1885
TOTAL	$ 43421

REFERENCES

Amdel	1977	Description of Metavolcanic Rocks and Some Associated Sulphides. Report Number MP 3223/77.
Brophy, P.	1975	Annual Report E.L. 10/69, 1974/75.
Brophy, P.	1976	Annual Report E.L. 10/69, 1975/76.
Howland-Rose, A. W.	1977	A Report on Gradient Array Reconnaissance E.I.P. and Total Field Magnetometer Surveys over the Beatrice Grid E.L. 10/69. Scintrex Pty. Ltd. Report No. April 1977 Tas-035D.

APPENDIX I

SCHEDULE OF LEASE BOUNDARY

E.L. 10/69

ADDITION TO AREA

In accordance with the provisions of Section 190 (7) of the Mining Act, 1929 this licence will now apply to a total area of 132 square kilometres (more or less) as described hereunder.

SCHEDULE

Commencing at a northern angle of the area whose grid coordinates are 379260 metres E. 5338900 metres N. and being the south-west corner of Consolidated Mineral Lease 15M/75 4912 hectares held by the Mt. Lyell Mining and Railway Co. Ltd. thence easterly, northerly, again easterly again northerly, westerly again northerly again westerly again northerly again easterly again northerly again westerly again northerly and again westerly by a southern an eastern again a southern again an eastern a northern again an eastern again an northern again an eastern again a southern again an eastern again a northern again an eastern and again a northern boundary of Mineral Lease 15M/75 aforesaid to the eastern boundary of E.L. 41/71 thence again northerly by part of that eastern boundary to its intersection with grid 5350405 metres N. grid east to 385980 metres E. grid north to the southern boundary of E.L. 9/66 thence again easterly partly by the southern boundary of E.L. 9/66 aforesaid to its intersection with grid 389790 metres E. grid south to 5341285 metres N. grid west to 388025 metres E. again grid south to 5335770 metres N. again grid west to 385785 metres E. again grid south to 5332050 metres N. again grid west to 377100 metres E. grid north to 5337500 metres N. again grid east to 378685 metres E. again grid north to 5338900 metres N. aforesaid thence again grid east to the point of commencement.

EXCLUSIONS

The area embraced by this licence shall be exclusive of:-

(a) All municipal and public reserves and roadways.

(b) All forms of mining tenements and water licences including leases, water licences, easement licences, special and exploration licences, prospectors licences, miners rights, permits to enter, owners consents and owners rights which were in lawful possession or marked out prior to the date of marking out of this licence.

(c) Land exempt from the provisions of the Mining Act, 1929.

(d) Land under the National Parks and Wildlife Act, 1970 not subject to the Mining Act, 1929.

(e) Any Crown Reservations or other land set apart or dedicated for any public purposes.

MINISTER FOR RESOURCES AND DEVELOPMENT

29th July, 1976

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E.L. 10/69

EXTENSION AND ALTERATION OF CONDITIONS

This licence is extended under the provisions of Section 150 (6) of the Mining Act, 1929, until 5th June, 1977. The current Schedule 'A' is rescinded and replaced by Schedule 'A' (Revised) which is attached.

MINISTER FOR RESOURCES
AND DEVELOPMENT

8 December, 1976

EXTENSION

This licence is extended under the provisions of Section 150 (6) of the Mining Act, 1929, until 5th December, 1977.

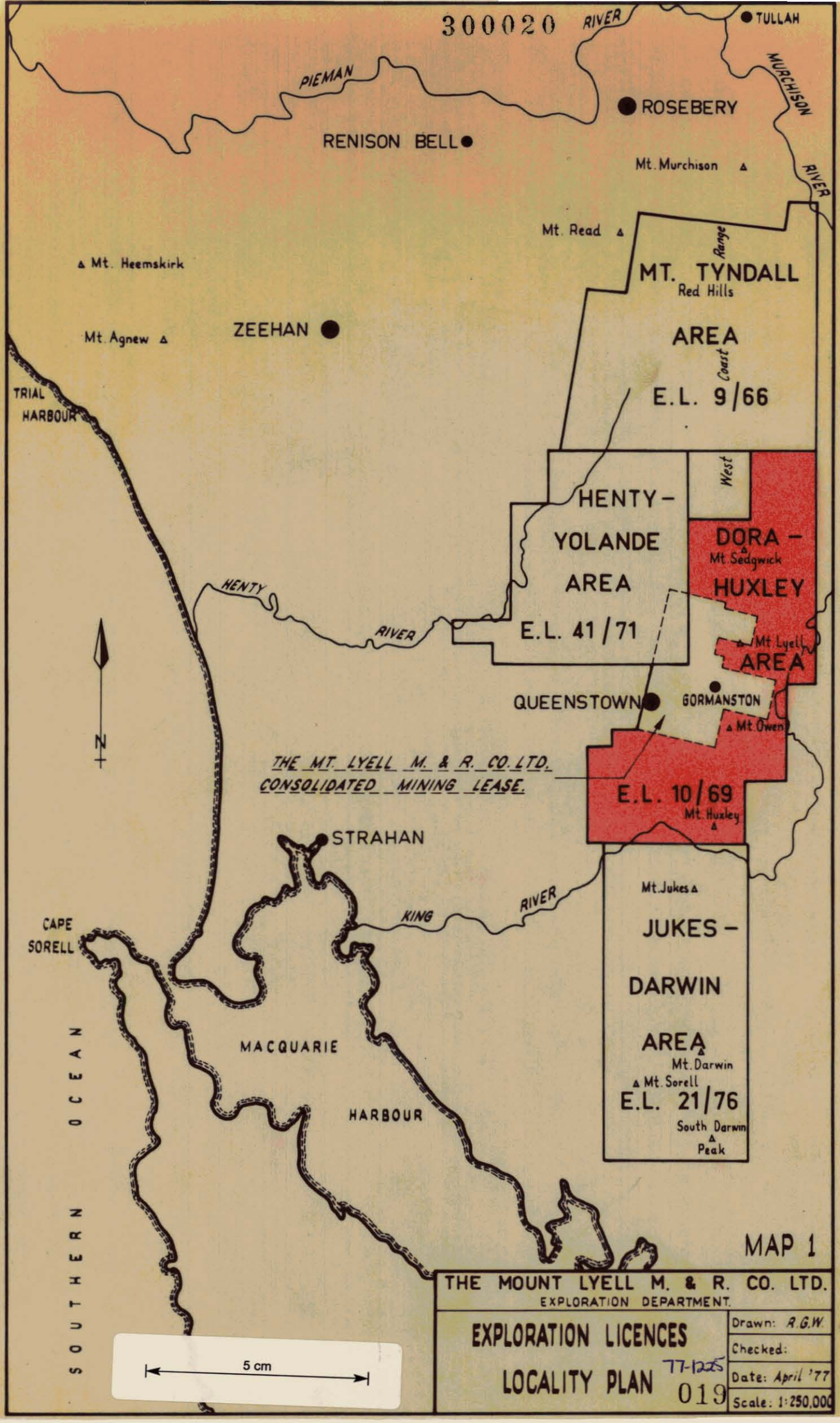
Per

APPENDIX II

Sample No.	Cu ppm	Pb ppm	Zn ppm	Ag ppm		Location N	Co-ord. E	Field No.	Rock Type
DH 14	260	1300	220			825860	364700	MS 4	Weathered, brecciated, chloritic volcanic
DH 15	520	900	170			825720	364440	MS 5	Acid porphyry lava + strong leaching
DH 16	200	60	380			825970	364410	MS 25	Quartz feldspar porphyry lava
DH 17	280	105	380			825770	367840	MS 32	Silicified acid lava/tuff + chlorite + pyrite
DH 18	375	1300	3000			825740	367830	MS 33	Fine grained sediment + haematite + galena
DH 19	650	120	315			825640	367130	MS 38	Altered chloritic acid lava
DH 20	270	2200	145			826550	365210	MS 44	Brecciated, altered acid lava + haematite
DH 21	140	510	720			827000	365490	MS 48	Altered acid lava + haematite
DH 22	160	100	510			827160	365560	MS 49	Flow banded acid lava + pyrite
DH 23	220	170	105			827200	365590	MS 50	Tuffaceous shale
DH 24	230	145	290	5		825710	366870	MS 55	Brecciated limonitic material in altered tuff
DH 25	465	60	235	5		825800	366830	MS 58	Gossan material in weathered lapilli tuff
DH 26	1225	190	170	5		826130	365340	MS 68	Minor sulphides in brecciated altered tuff
DH 27	57	38	118			825340	367750	BW 31	Sheared crystal lithic tuff - near fault
DH 28	100	30	100			825590	366880	BW 88	Coarse grained lithic tuff
DH 29	93	64	78			825770	367340	BW 95	Haematite-magnetite vein material
DH 30	212	170	190			827150	365200	BW 134	Black pyritic shale
DH 31	96	260	142			826490	365010	BW 143	Black shale
DH 32	194	63	40			825990	367700	BW 146	Fault breccia
DH 33	182	60	190			826160	364850	BW 173	Black shale
DH 34	143	66	200			826830	365870	BW 180	Altered fine-medium grained sericite silica felsic crystal lithic tuff
DH 35	139	29	52	Ag ND	Mn 51	825730	364520	MS 3	Altered quartz feldspar porphyritic chloritic lava
DH 36	84	565	1200	ND	22	827760	364090	BW 115	Altered fine grained sediment, siliceous + pyritic
DH 37	85	207	570	ND	52	827850	364130	BW 116	As for BW 115
DH 38	48	25	140	ND	240	825140	367190	BW 154	Sericitic altered coarse grained crystal lithic tuff
DH 39	69	39	150	ND	650	825830	367710	BW 166	Fine grained chloritic felsic crystal lithic tuff
DH 40	49	11	39	ND	53	825430	367770	BW 167	As for BW 166, + magnetite
DH 41	59	10	40	ND	133	826180	365780	BW 176	Fragmental siliceous lava
DH 42	84	25	64	ND	353	826740	365930	BW 178	Feldspar porphyritic felsic crystal tuff?
DH 43	81	90	160	ND	364	826860	366110	BW 189	Fragmental siliceous fine grained lava

APPENDIX III

Sample No.	Cu ppm	Pb ppm	Zn ppm	Co-ordinates N	E
SS 25	83	390	122	825840	365900
26	55	414	52	825660	365870
27	42	275	60	825280	366010
29	35	47	48	824710	367290
30	48	88	39	825840	367850
31	72	260	129	825520	366910
32	26	47	45	825400	367000
33	42	40	43	825090	367090
34	44	38	62	825800	366570
35	41	54	37	825770	366360
36	25	42	22	825420	366340
37	17	20	14	824720	366750
38	60	230	53	824970	367560
39	16	53	21	825650	368350
41	55	52	38	825010	365510
42	42	197	44	826150	365410
43	145	1110	1130	826730	365100
44	185	906	780	825740	364390
46	28	56	22	825995	367820
47	43	340	40	825440	367880
48	38	70	74	826460	366110

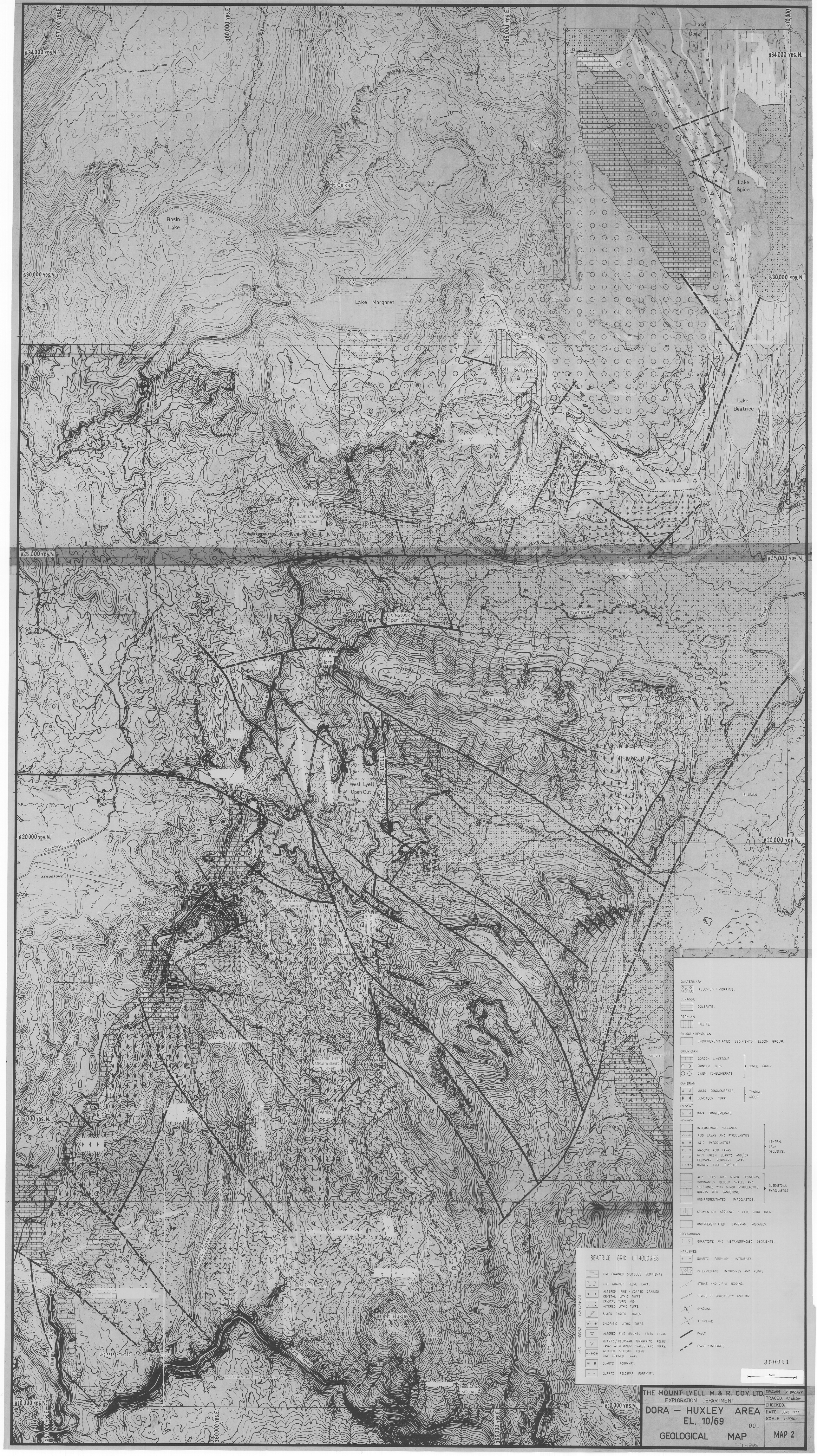


THE MOUNT LYELL M. & R. CO. LTD.
EXPLORATION DEPARTMENT.

EXPLORATION LICENCES
LOCALITY PLAN

77-1225
019

Drawn: R.G.W.
Checked:
Date: April '77
Scale: 1:250,000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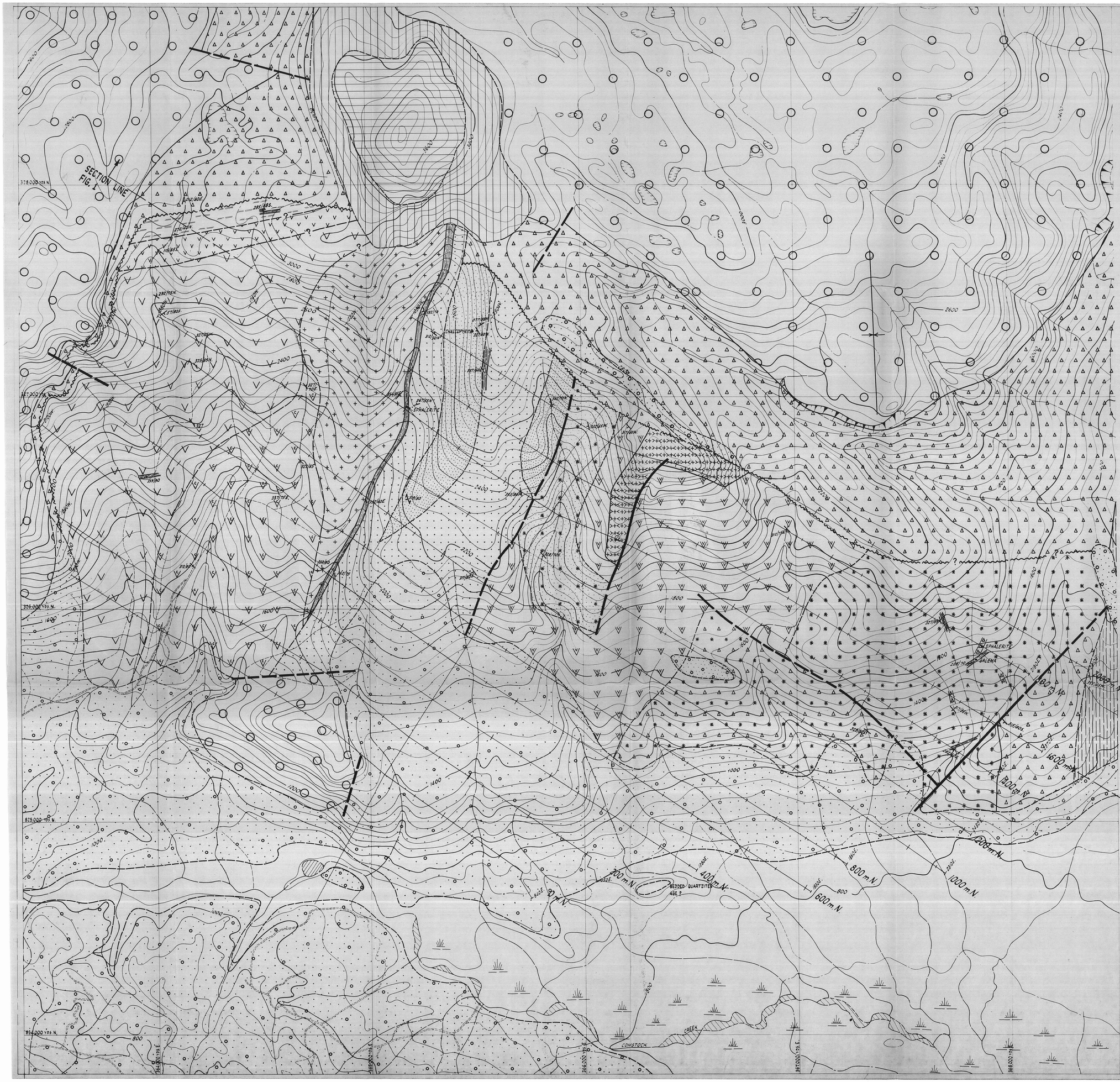
Basin Lake
Lake Margaret
Mt. Sedgwick
Lake Dora
Lake Spicer
Lake Beatrice
Comstock Open Cut
Cape Horn
Mt Lyell
West Lyell Open Cut
GREAT LYELL FAULT
NORTH LYELL FAULT
Lyell Highway
GORMANSTON
Comstock Creek
SILURIAN
Zeehan Highway
Strahan Highway
AERODROME
QUEENSTOWN
Great Lyell
OWEN FAULT
SOUTH OWEN FAULT
Mt Owen
Whip Spur
Mt. Huxley
King River
Queen River
Toft River
Miners Slate Ridge
UNDIFFERENTIATED POST CAMBRIAN LOWER PALAEOZOIC SEDIMENTS
UNDIFFERENTIATED CAMBRIAN VOLCANICS
PYROCLASTIC SEQUENCE
GRADED UNIT COARSE BRECCIAS TO FINE GRAINED SEDIMENTS
UNDIFFERENTIATED VOLCANICS
WHIPSPUR TUFFS REPEATED GRADED UNITS (10'-15')
TUFFS AND SEDIMENTS
GREYWACKES
QUATERNARY
ALLUVIUM / MORAINE.
JURASSIC
DOLERITE.
PERMIAN
TILLITE.
SILURO - DEVONIAN
UNDIFFERENTIATED SEDIMENTS - ELDON GROUP.
ORDOVICIAN
GORDON LIMESTONE.
PIONEER BEDS.
OWEN CONGLOMERATE.
JUNEE GROUP.
CAMBRIAN
JUKES CONGLOMERATE.
COMSTOCK TUFF.
TYNDALL GROUP.
DORA CONGLOMERATE.
INTERMEDIATE VOLCANICS.
ACID LAVAS AND PYROCLASTICS.
ACID PYROCLASTICS.
MASSIVE ACID LAVAS.
GREY GREEN QUARTZ AND/OR FELDSPAR PORPHYRY LAVAS.
DARWIN TYPE RHYOLITE.
CENTRAL LAVA SEQUENCE.
ACID TUFFS WITH MINOR SEDIMENTS.
DOMINANTLY BEDDED SHALES AND SILTSTONES WITH MINOR PYROCLASTICS.
QUARTS RICH SANDSTONE.
UNDIFFERENTIATED PYROCLASTICS.
QUEENSTOWN PYROCLASTICS.
SEDIMENTARY SEQUENCE - LAKE DORA AREA.
UNDIFFERENTIATED CAMBRIAN VOLCANICS.
PRECAMBRIAN
QUARTZITE AND METAMORPHOSED SEDIMENTS.
INTRUSINES
QUARTZ PORPHYRY INTRUSIVES.
INTERMEDIATE INTRUSIVES AND FLOWS.
STRIKE AND DIP OF BEDDING.
STRIKE OF SCHISTOSITY AND DIP.
SYNCLINE
ANTICLINE
FAULT
FAULT - INFERRED
BEATRICE GRID LITHOLOGIES
FINE GRAINED SILICEOUS SEDIMENTS
FINE GRAINED FELSIC LAVA.
ALTERED FINE - COARSE GRAINED CRYSTAL LITHIC TUFFS.
CRYSTAL TUFFS AND ALTERED LITHIC TUFFS.
BLACK PYRITIC SHALES.
CHLORITIC LITHIC TUFFS.
ALTERED FINE GRAINED FELSIC LAVAS.
QUARTZ / FELDSPAR PORPHYRITIC FELSIC LAVAS WITH MINOR SHALES AND TUFFS.
ALTERED SILICEOUS FELSIC FINE GRAINED LAVAS.
QUARTZ PORPHYRY.
QUARTZ FELDSPAR PORPHYRY.
MT. READ VOLCANICS
300021
5 cm
THE MOUNT LYELL M. & R. COY. LTD.
EXPLORATION DEPARTMENT
DORA – HUXLEY AREA
E.L. 10/69
001
GEOLOGICAL MAP
77-1225
DRAWN: P. BROPHY
TRACED: R.G. WILSON
CHECKED.
DATE: JUNE 1977
SCALE: 1:15840
MAP 2



LEGEND

QUATERNARY

- ALLUVIUM.
- GLACIAL MORAINE AND SCREE.

JURASSIC

- DOLERITE.

PERMIAN

- TILLITE.

ORDOVICIAN

- HAEMATITIC CONGLOMERATES/SANDSTONES. (OWEN SERIES)

CAMBRIAN

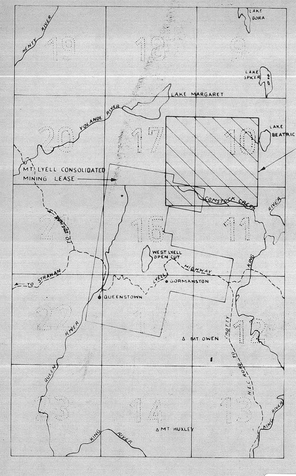
- HAEMATITIC CONGLOMERATE, WITH VOLCANOCLASTIC AND QUARTZITIC FRAGMENTS - JUKES CONGLOMERATE.
- UNCONFORMITY.
- FINE GRAINED SILICEOUS SEDIMENTS.
- ALTERED (CHLORITE, SILICA) FELDSPAR AND/OR QUARTZ PORPHYRITIC FINE - COARSE GRAINED CRYSTAL LITHIC TUFFS, WITH MINOR FINE GRAINED FELSIC LAVAS AND SHALE HORIZONS. — PREDOMINANTLY COARSE GRAINED TUFFS.
- FELDSPAR AND/OR QUARTZ PORPHYRITIC CRYSTAL TUFFS AND ALTERED FINE - COARSE GRAINED LITHIC TUFFS, WITH OCCASIONAL SHALES.
- PALE ALTERED (SERICITIC, SILICA) FINE - MEDIUM GRAINED LITHIC TUFFS, PARTLY PYRITIC, MINOR QUARTZ AND/OR FELDSPAR CRYSTAL TUFFS.
- CHLORITIC FINE - COARSE GRAINED ALTERED LITHIC TUFFS, MINOR CRYSTAL TUFFS.
- BLACK (PYRITIC) SHALES.
- MICACEOUS QUARTZITES AND SHALES.
- QUARTZ PORPHYRITIC FINE GRAINED FELSIC LAVA.
- QUARTZ AND/OR FELDSPAR PORPHYRITIC FELSIC LAVAS WITH INTERCALATED BLACK AND LAMINATED SHALES AND MINOR LITHIC TUFFS. — STRONGLY CHLORITISED FELSIC LAVAS.
- ALTERED FINE GRAINED FELSIC LAVAS (HAEMATITIC, SILICEOUS OR CHLORITIC)
- BRECCIATED AND ALTERED FINE GRAINED FELSIC LAVAS, DEVELOPMENT OF HAEMATITE WITH MINOR MAGNETITE AND QUARTZ VEINS.
- MEDIUM - COARSE GRAINED QUARTZ PORPHYRY.
- QUARTZ FELDSPAR PORPHYRY.
- LITHOLOGY BOUNDARY.
- INFERRED BOUNDARY.
- FAULT.
- INFERRED FAULT.
- UNCONFORMABLE LITHOLOGY BOUNDARY.
- SYNCLINE.
- STRIKE AND DIP OF FOLIATION.
- STRIKE AND DIP.

MAP DATA: GRID AREA - A.WALTER. 1976/77. OUTSIDE GRID AREA - P.BROPHY. 1975/76.

T M

N

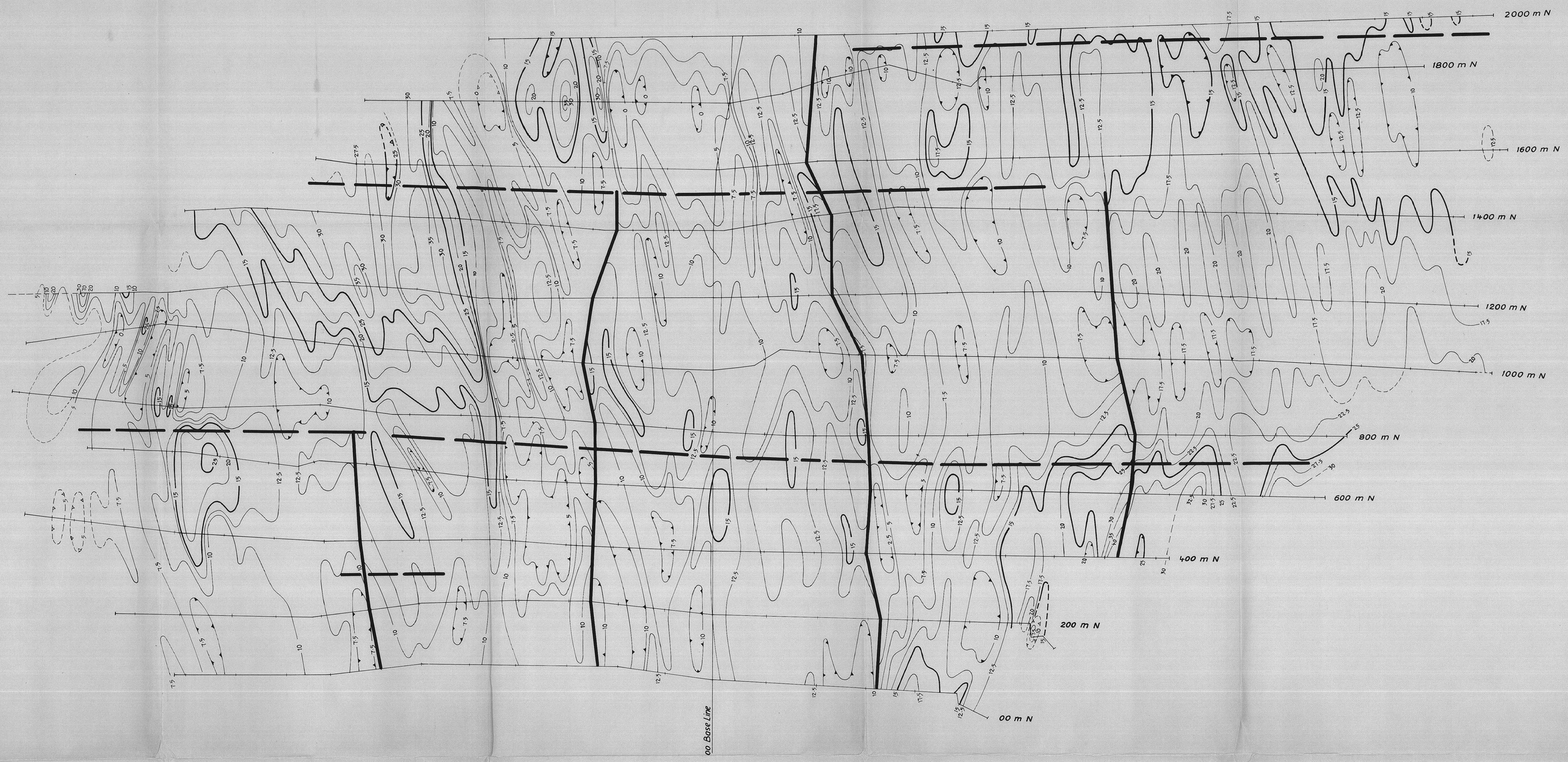
LOCATION



300022

5 cm

THE MOUNT LYELL M. & R. COY. LTD. GEOLOGICAL DEPARTMENT	DRAWN. A.WALTER.
	TRACED. R.G.WILSON.
DORA - HUXLEY AREA E.L. 10/69	CHECKED.
BEATRICE GRID 002	DATE. 5·8·77
GEOLOGY MAP 77-1225	SCALE 1:6000
	MAP 3



MOUNT LYELL MINING & RAILWAY COMPANY LTD.

BEATRICE GRID

(NR.) QUEENSTOWN-WEST COAST TASMANIA

ELECTRICAL INDUCED POLARIZATION SURVEY
GRADIENT ARRAY
CHARGEABILITY CONTOUR PLAN

5 cm

SURVEYED & COMPILED BY
SCINTREX PTY., LTD,

FEBRUARY 1977

LEGEND

Chargeability contours in milliseconds

Gradient block boundary

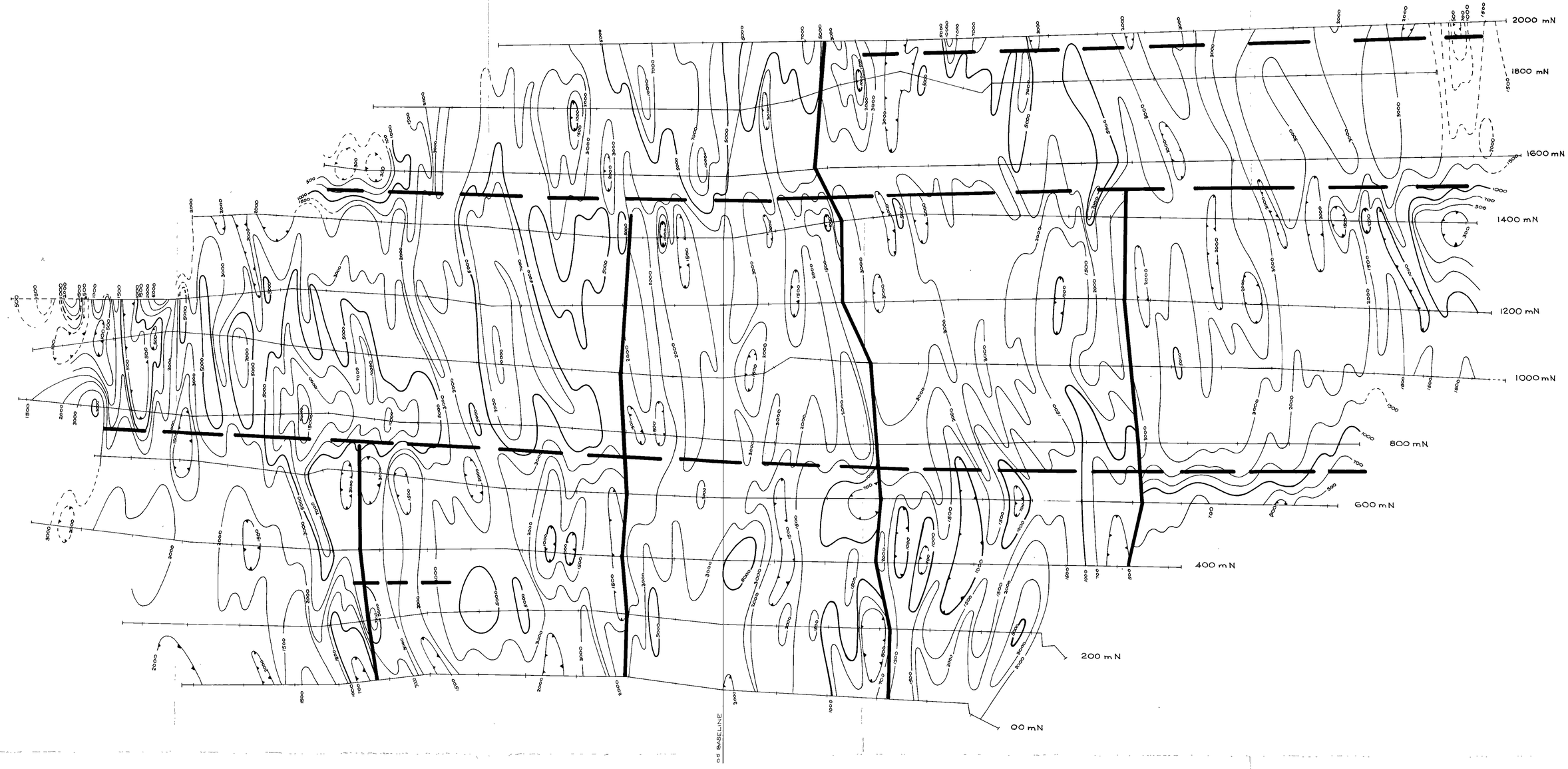
240 180 120 90 60 30 00 120 240 (metres)

300023

003

77-1225

MAP 4



LEGEND :

Resistivity contours in ohm-metres

Gradient block boundary

MOUNT LYELL MINING & RAILWAY COMPANY LTD.

BEATRICE GRID

(NR.) QUEENSTOWN - WEST COAST TASMANIA

ELECTRICAL INDUCED POLARIZATION SURVEY

GRADIENT ARRAY

RESISTIVITY CONTOUR PLAN

5 cm

SURVEYED & COMPILED BY

SCINTREX PTY. LTD

FEBRUARY 1977

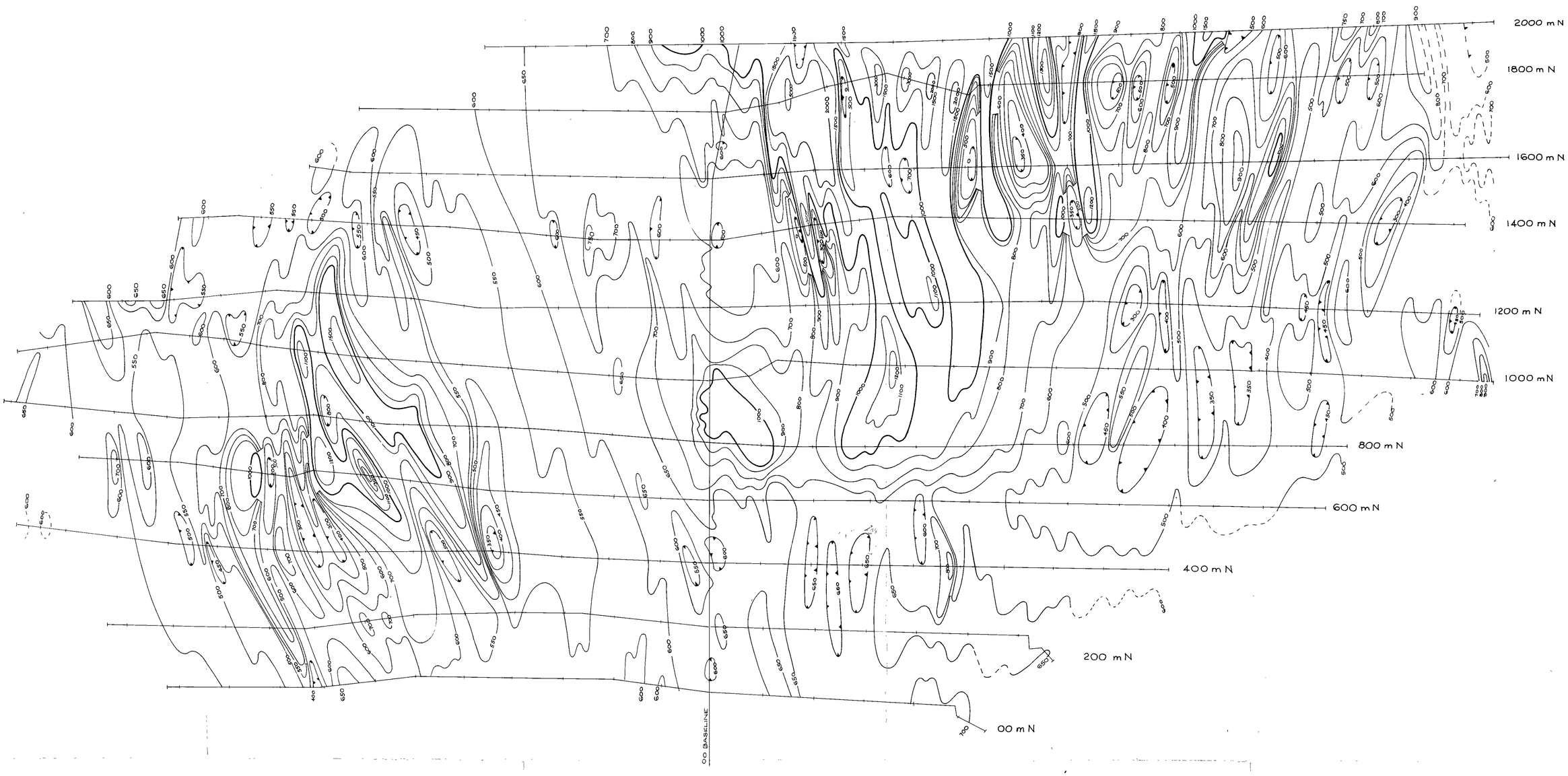
300024

240 180 120 60 30 00 120 240 (metres)

004

77-1225

MAP 5



NOTE For correct total magnetic field, add 62000 gammas to all values

MOUNT LYELL MINING & RAILWAY COMPANY LTD.

BEATRICE GRID

(NR.) QUEENSTOWN - WEST COAST TASMANIA

TOTAL FIELD MAGNETOMETER SURVEY

CONTOUR PLAN

5 cm

SURVEYED & COMPILED BY

SCINTREX PTY LTD.

FEBRUARY 1977

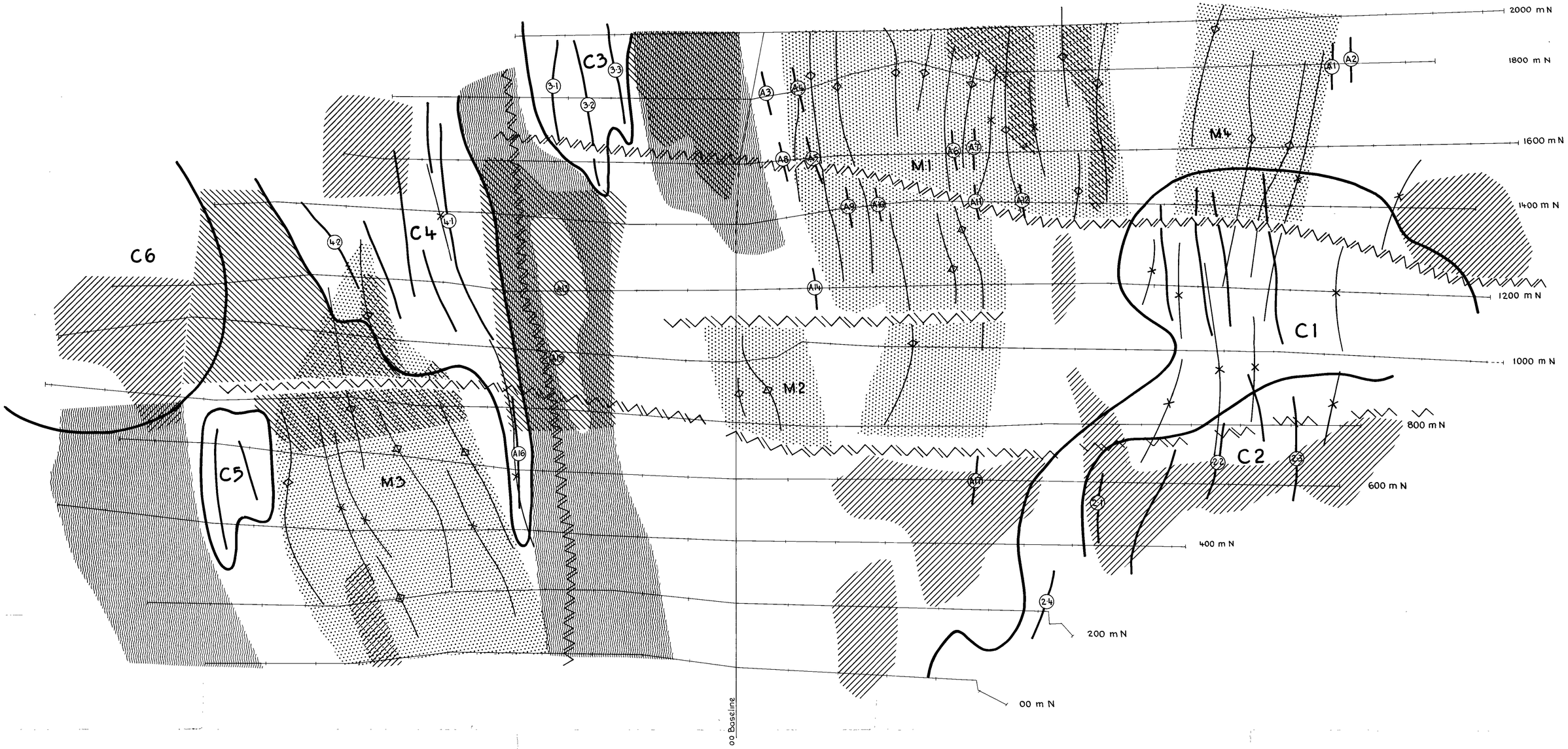
300025

240 180 120 90 60 30 00 120 240 (metres)

005

77-1325

MAP 6



LEGEND

- Areas of low resistivity
- Areas of high resistivity
- C — Areas of high chargeability background
- Areas of abnormaly low chargeability
- M — Areas of high magnetic background
- Induced polarization responses
- Magnetic lows
- Magnetic highs
- Possible faults

MOUNT LYELL MINING & RAILWAY COMPANY LTD.

BEATRICE GRID

(NR.) QUEENSTOWN - WEST COAST TASMANIA

ELECTRICAL INDUCED POLARIZATION SURVEY

INTERPRETATION PLAN

5 cm

SURVEYED & COMPILED BY
SCINTREX PTY., LTD.
FEBRUARY 1977

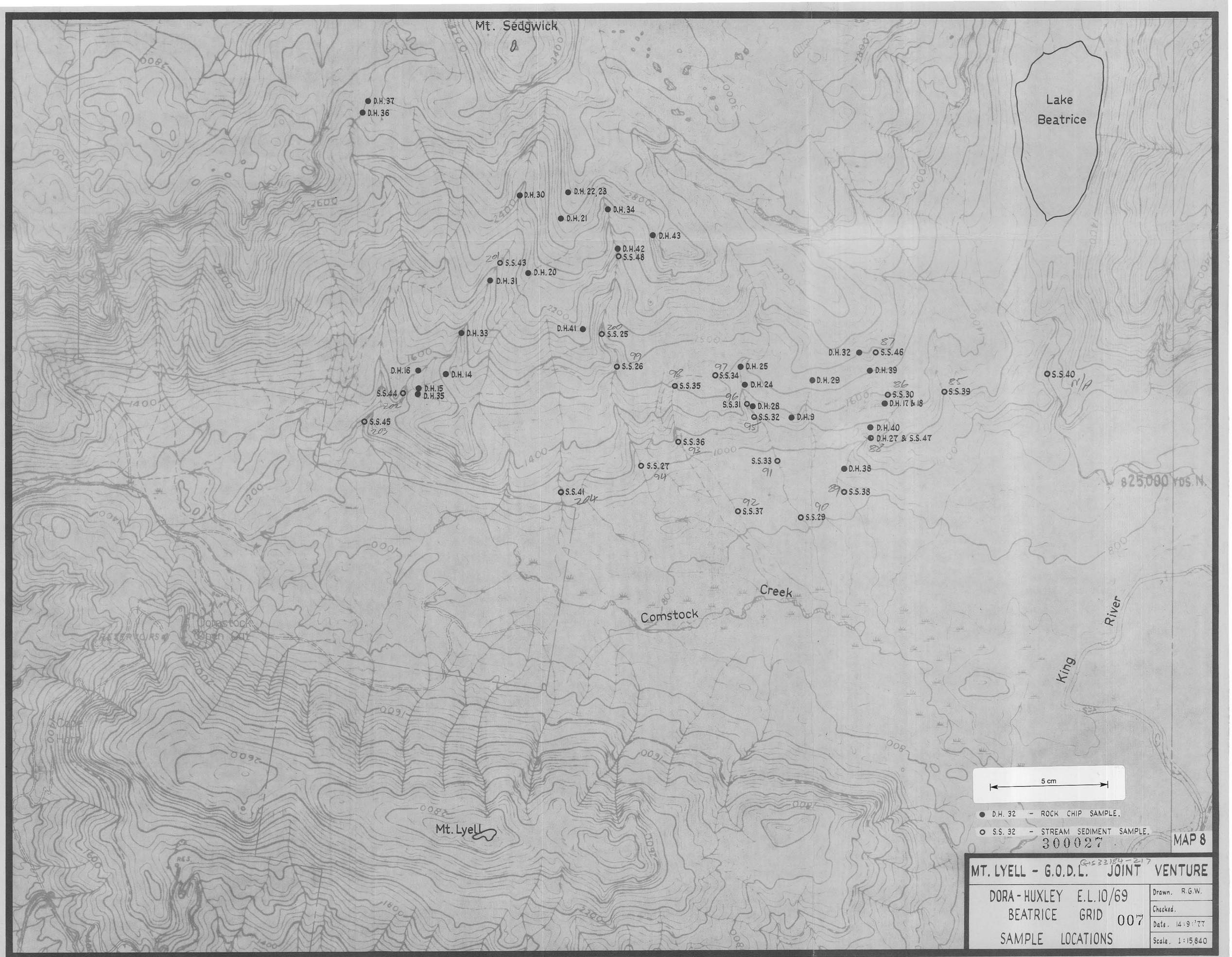
300026

240 180 120 90 60 30 00 120 240 (metres)

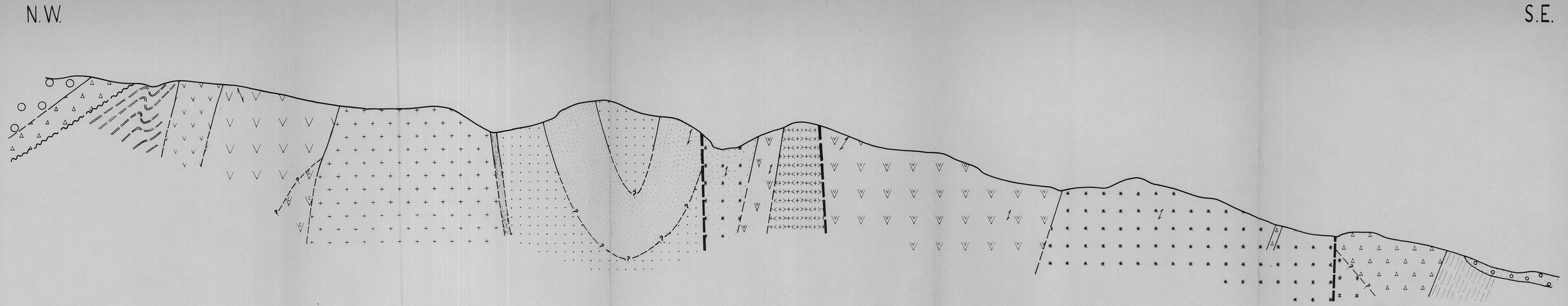
003

77-1225

MAP 7


Mt. Sedgwick
Lake Beatrice
D.H. 37
D.H. 36
D.H. 30
D.H. 22, 23
D.H. 34
D.H. 21
D.H. 43
D.H. 42
S.S. 48
S.S. 43
D.H. 20
D.H. 31
D.H. 33
D.H. 41
S.S. 25
S.S. 26
D.H. 16
D.H. 14
D.H. 15
D.H. 35
S.S. 44
S.S. 45
S.S. 35
S.S. 34
D.H. 25
D.H. 24
D.H. 29
D.H. 32
S.S. 46
D.H. 39
S.S. 40
S.S. 30
D.H. 17 & 18
S.S. 39
S.S. 31
D.H. 28
S.S. 32
D.H. 9
D.H. 40
D.H. 27 & S.S. 47
S.S. 36
S.S. 27
S.S. 33
D.H. 38
S.S. 41
S.S. 38
S.S. 37
S.S. 29
825,000 YDS. N.
Comstock Creek
King River
Comstock Open Cut
Mt. Lyell
5 cm
D.H. 32 - ROCK CHIP SAMPLE.
S.S. 32 - STREAM SEDIMENT SAMPLE.
300027
MAP 8
MT. LYELL - G.O.D.L. JOINT VENTURE
DORA-HUXLEY E.L. 10/69
BEATRICE GRID 007
SAMPLE LOCATIONS
Drawn. R.G.W.
Checked.
Date. 14:9:'77
Scale. 1:15,840
77-1225


Henty River
Lake Dora
Lake Spicer
Eldon Peak
Eldon River
North
Mt Geikie
Basin Lake
Lake Margaret
Mt Sedgwick
Lake Beatrice
South Eldon River
BEATRICE GRID
2000m.N.
1800m.N.
1600m.N.
1400m.N.
1200m.N.
1000m.N.
800m.N.
600m.N.
400m.N.
200m.N.
00
Comstock Creek
King River
Mt. Lyell
TO ZEHAN
MURCHISON HIGHWAY
TO STRAHAN
AERODROME
QUEENSTOWN
GORMANSTON
LITTLE OWEN GRID
12200'N.
11500'N.
11000'N.
10400'N.
9800'N.
9200'N.
8600'N.
8000'N.
7400'N.
6800'N.
6200'N.
5600'N.
5000'N.
4400'N.
3800'N.
3200'N.
2600'N.
2000'N.
1400'N.
800'N.
00
1600'S.
3200'S.
4800'S.
6400'S.
8000'S.
9600'S.
11200'S.
Mt. Owen
Mt Huxley
LICENCE EXTENSION BOUNDARY.
HUXLEY GRID
LYELL HIGHWAY
TO HOBART
5 cm
KEY
PROPOSED GRID EXTENSION.
PROPOSED ROAD EXTENSION.
EXISTING GRIDS.
EXISTING ROADS.
300028
TRUE NORTH
MAGNETIC NORTH
77-1225
MAP 9
008
THE MOUNT LYELL M. & R. CO. LTD.
EXPLORATION DEPARTMENT
DORA-HUXLEY E.L. 10/69
PROPOSED GRID EXTENSION AND ROAD EXTENSION
Drawn: R.G.W.
Checked:
Date: JULY '77
Scale: 2" = 1 mile
Base map by Lands and Surveys Department, Hobart. 40 chains to 1 inch sheets.
Co-ordinates on State Grid.



300029

FIG. 1

5 cm

SECTION ALONG LINE 1600 m N. (Brg: 122°) BEATRICE GRID

SCALE 1 : 6000 HORIZONTAL & VERTICAL

LEGEND: REFER TO MAP 4

009

77-1225