

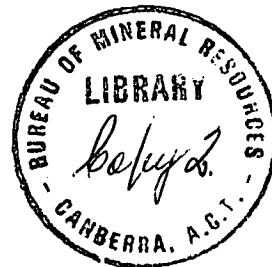
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DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

RECORD No. 1965/151



COMSTOCK AREA (QUEENSTOWN) GEOPHYSICAL SURVEY, TASMANIA 1965

by

J.P. Williams

RESTRICTED

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SUMMARY

Geophysical work carried out in the Comstock Valley in early 1965 for the Mount Lyell Mining and Railway Company completed the survey initiated in 1964. Electrical and electromagnetic methods were employed in the search for sulphide orebodies.

Anomalies were recorded with both electromagnetic (Turam) and Induced Polarisation methods. The Induced Polarisation anomalies coincide with the main Turam anomalies. Comparison with geophysical results over known orebodies in the Mount Lyell field indicates that the Turam and associated Induced Polarisation anomalies are probably due to mineralisation. Four drill holes are recommended as a preliminary test of the geophysical results.

1. INTRODUCTION

At the request of the Mount Lyell Mining and Railway Company, supported by the Tasmanian Mines Department, a geophysical survey was commenced in the Comstock area by the Bureau in 1964. The survey, which was to assist the search for sulphide orebodies, was completed in the 1965 season. The methods used were electromagnetic (Turam), induced polarisation self-potential and magnetic. These have been described in an earlier report (Williams, 1964).

The 1965 survey extended from January to April. Personnel were geophysicists, J.P. Williams (party leader), R.H. Andrews, A. Howland-Rose (for part of survey), and four field hands.

The surveyed area is east of the 1957 B.M.R. Comstock survey (Rowston, 1957) and is a glacial valley bordered by conglomerate hills to the north and south. The terrain is rugged due largely to the Recent weathering of glacial deposits. Plate 1 shows the locality and regional geology of the area.

Sulphide bodies at Mt. Lyell are typically associated with large structural faults near the schist-conglomerate contacts and it was thought this may be the case at Comstock. In the area surveyed, this contact is covered by glacial material, but its approximate position is indicated in Plate 1.

A more detailed outline of geology and methods will be given in the final report.

2. DISCUSSION OF RESULTS

The results of the self-potential and magnetic methods do not appear significant and are not treated in this report. The Turam and induced polarisation (I.P.) results are interesting and a representative selection is presented in Plates 2, 3A and 3B.

Plates 3A and 3B show contours of Turam phase differences measured at 660 c/s. Inclusion of the ratio results is not considered necessary in this preliminary report as they do not give additional information

about the location of the anomalies. The Turam results measured with primary cables at 800S (Plate 3A) and 1800N (Plate 3B) overlap between 00 and 800N. The different anomaly values can be explained by the different positions of the grounded cables. Also the primary field transmitted from 800S could suffer distortion north of the anomaly area along 300S. However relative high and low values on each map correspond. In both plates the phase contours show a general east-west trend which may be related to structure.

The main feature of the Turam results is the anomaly extending from 300S on 6400E to 800N on 800E (Plate 3A). The strongest part of the anomaly lies between 4400E and 6400E. From 3600E to 1600E the anomaly is accompanied on the northern side by large positive phase values with corresponding low ratio values.

Another Turam anomaly was observed on traverses 00 to 1200E, between 800N and 200S. It also is accompanied on the northern side by positive phase differences. Reference to the Turam profiles on Plate 2 shows however, that it is of a different type from the eastern anomaly. The profile on 800E is characteristic of a shallow dipping body while the profiles of the eastern anomaly are more consistent with a steeply dipping source. The Turam results on Plate 3B show no well-defined anomalies south of 1800N. There is a small Turam anomaly at 6400E/2600N. It indicates a steeply dipping conductor. The remainder of the area appears uninteresting.

I.P. anomalies were also recorded and their position is shown in Plate 3A. The method of presentation does not necessarily indicate extent of anomaly source. A fairly strong anomaly was recorded between 4800E and 6400E with a maximum at 5600E. An anomaly on 3200E shows weaker values, and the anomaly between 2400E and 00 becomes progressively weaker towards 00 where it is almost indiscernable. The I.P. anomalies recorded may be continuous, but, as some traverses were not surveyed by this method, this cannot be stated definitely. No I.P. effects were recorded at 6400E/2600N.

Turam anomalies are generally due to mineralisation or shear zones containing mineralised water. I.P. anomalies are generally due to mineralisation, or, in special circumstances, clay deposits. In the Mount

Lyell area mounting evidence suggests that areas with co-inciding Turam and I.P. anomalies are very promising prospects.

In the Corridor area (Boniwell and McKenzie, 1961), Turam and I.P. results outlined the orebody satisfactorily. The geophysical results from the present survey compare favourably with those recorded in the Corridor area, although the Turam results indicate lower conductivities at Comstock. This is borne out by the slightly higher resistivities measured with the I.P. method.

In the Comstock area traverse 1200W was surveyed by the I.P. method in 1965. The traverse crosses known mineralisation in the area of the Tasman shaft. Turam work was done in this area in 1957 (Rowston, 1959). These I.P. and Turam results and a geological section are presented in Plate 2. The Turam results along 1200W show that the northern lode (mainly pyritic) is a better conductor than the Tasman (galena) lode. This is evidenced by the relative ratio values over the two lodes. The two lodes could be distinguished from the Turam results, but this separation is not apparent in the I.P. results. Probably, use of smaller dipole lengths would have increased the resolving power.

The 1965 Turam results between 4800E and 6400E suggest a steeply dipping body with a conductivity slightly less than the northern body on 1200W. The conductivity may increase towards 2000E, but the anomaly dies out about 800E. The I.P. results between 4800E and 6400E compare very favourably with those on 1200W, exhibiting stronger frequency effects and metal factors. The I.P. results also weaken towards 1600E.

Both I.P. and Turam results suggest an apparent plunge to the west, but this is mainly a function of rising surface topography.

The Turam anomaly on 800E is accompanied by a weak and broad I.P. anomaly. The Turam results are consistent with a shallow dipping source.

The displacement to the north of the I.P. anomaly on 800E is due mainly to the low resistivities which give higher metal factors at 400N than at 00. Compared to the eastern results, frequency effects are lower. This would be consistent with weaker mineralisation.

CONCLUSIONS & RECOMMENDATIONS

The 1965 geophysical results compare favourably with results over known mineralisation in the Mt. Lyell area. Differences in conductivity suggest more disseminated mineralisation at Comstock, but this lower conductivity could be related to different mineral composition and not degree of mineralisation.

In general it would appear that the anomalies at Comstock could be due to mineralisation similar to that found in other areas of Mt. Lyell. This is also borne out by the position of the anomalies which have a trend similar to the major structural features of the area.

The anomaly between 4400E and 6400E is considered the most promising and two drill holes are recommended to test this area. Details of drilling are listed below, and the sites shown diagrammatically in Plate 2. Drill No. 1 is chosen to test the most favourable part of the anomaly as the I.P. results on traverse 5600E are the strongest in the area. Drillhole No. 2 should test the western part of the anomaly. Drillhole No. 3 is intended to test the Turam and I.P. anomalies on 3200E. If mineralisation is intersected, it is reasonable to expect it to be continuous with mineralisation further east. This is suggested by the Turam results. Drillhole No. 3 should also indicate whether the I.P. results are due to increased thickness of cover material or weaker mineralisation.

Drillhole No. 4 is chosen to determine the source of the anomaly between 00 and 800E.

LIST OF RECOMMENDED DRILL SITES

Drill Hole Number	Location of Drill Site EMR. Grid Co-Ords.	Angle of Depression	Bearing	Approx. Length of Hole	Position of Geophysical Target.
D.D.H. 1	5600E/190S	60°	South along traverse	350 ft.	5600E/275S depth 180 ft.
D.D.H. 2	4800E/100S	60°	"	350 ft	4800E/240S depth 265 ft.
D.D.H. 3	3200E/360N	45°	"	450 ft	3200E/100N depth 340 ft.
D.D.H. 4	800E/50N	90°	"	250 ft	800E/050N depth 210 ft.

The targets for these drill holes are based largely on location of current concentrations calculated from real and imaginary components of the electromagnetic field. The targets as shown on Plate 2 are intended to indicate the most favourable zone for intersection of mineralisations and are not related to shape or concentration of mineralisation.

4. REFERENCES

- | | | |
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| ROWSTON, D.L. | 1959 | Geophysical Surveys of the Great
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6.

WILLIAMS, J.P.

1964

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Bur. Min. Resour. Aust. Prog. Rep. 1964/12.

LEGEND

SEDIMENTARY ROCKS

- QUATERNARY
Q Talus, alluvium etc
Qp Moraine with varved clays
Pt Tillite of Mt Sedgwick

- SILURIAN
Sc Crotty Quartzite - grey, medium to coarse grained, locally split by shales

- ORDOVICIAN
Og Gordon Limestone, dark blue-gray, argillaceous.
Oou Upper Owen Conglomerate
Oom Middle Owen Conglomerate
Ool Lower Owen Conglomerate.

- CAMBRIAN
Ec Greywacke conglomerate
Cs Miners Slate - finely banded siltstones

METAMORPHIC ROCKS

(ex Dundas Group)

- qp Quartz felspar porphyry

GEOLOGICAL BOUNDARIES.

- OBSERVED
- - - APPROXIMATE
- ? - DOUBTFUL

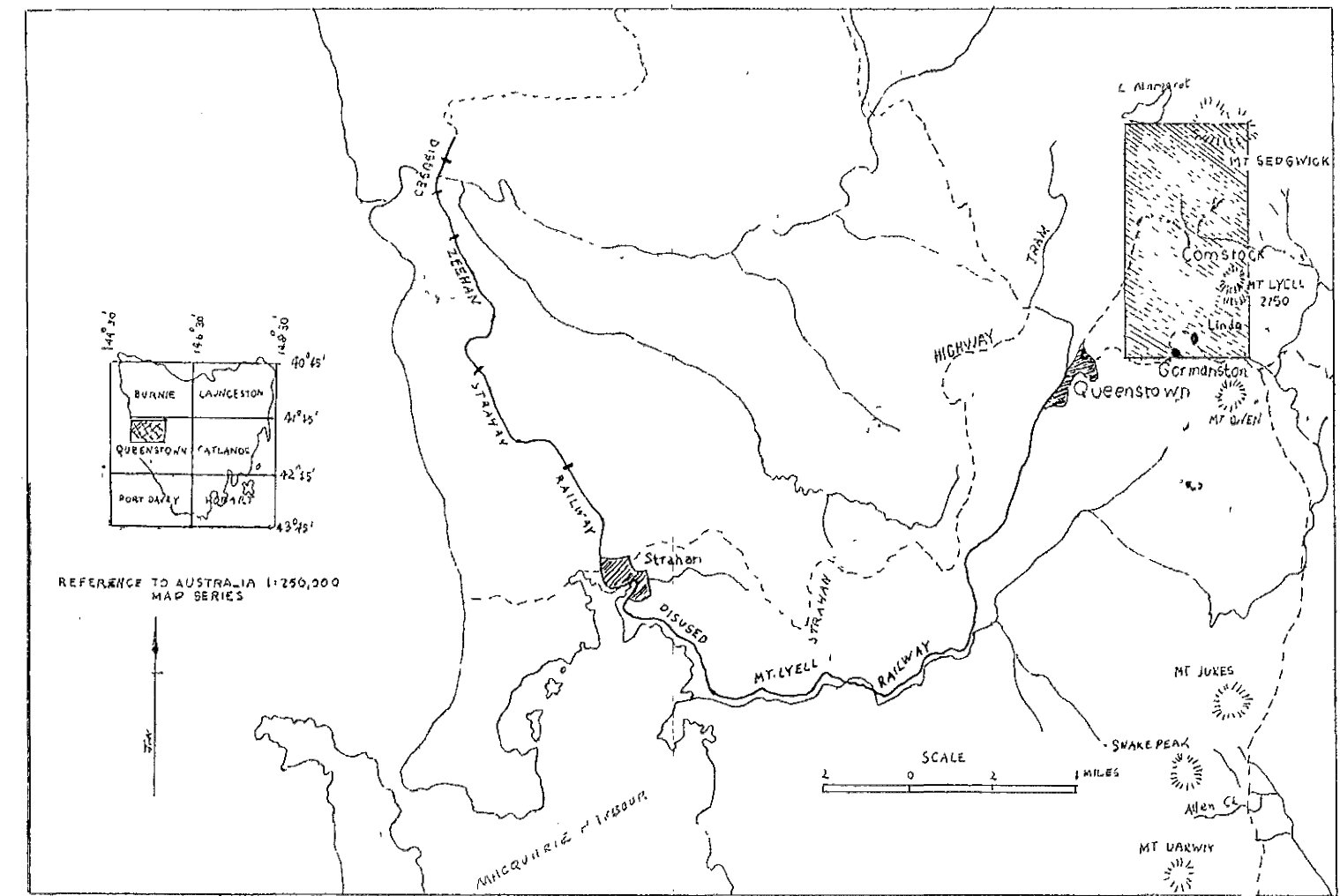
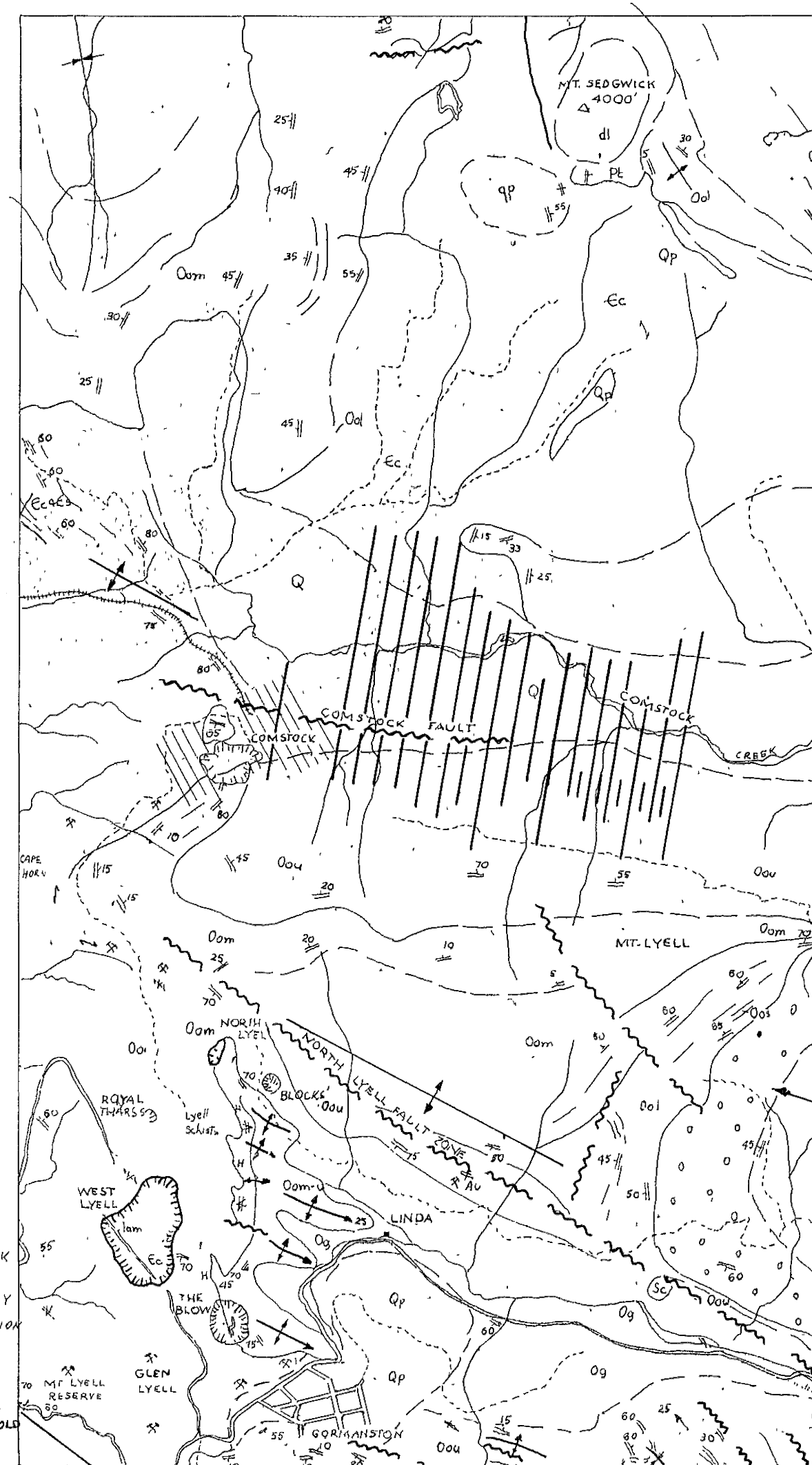
FAULTS.

- OBSERVED
- - - APPROXIMATE.

BEDDING.

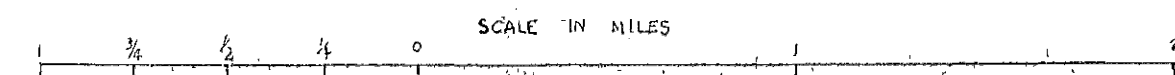
- 70 STRIKE & DIP
— VERTICAL
— HORIZONTAL
70 OVERTURNED
— DITCH
70 SCHISTOSITY
70 CLEAVAGE
— SYNCLINE
— ANTICLINE.
— MAIN ROAD

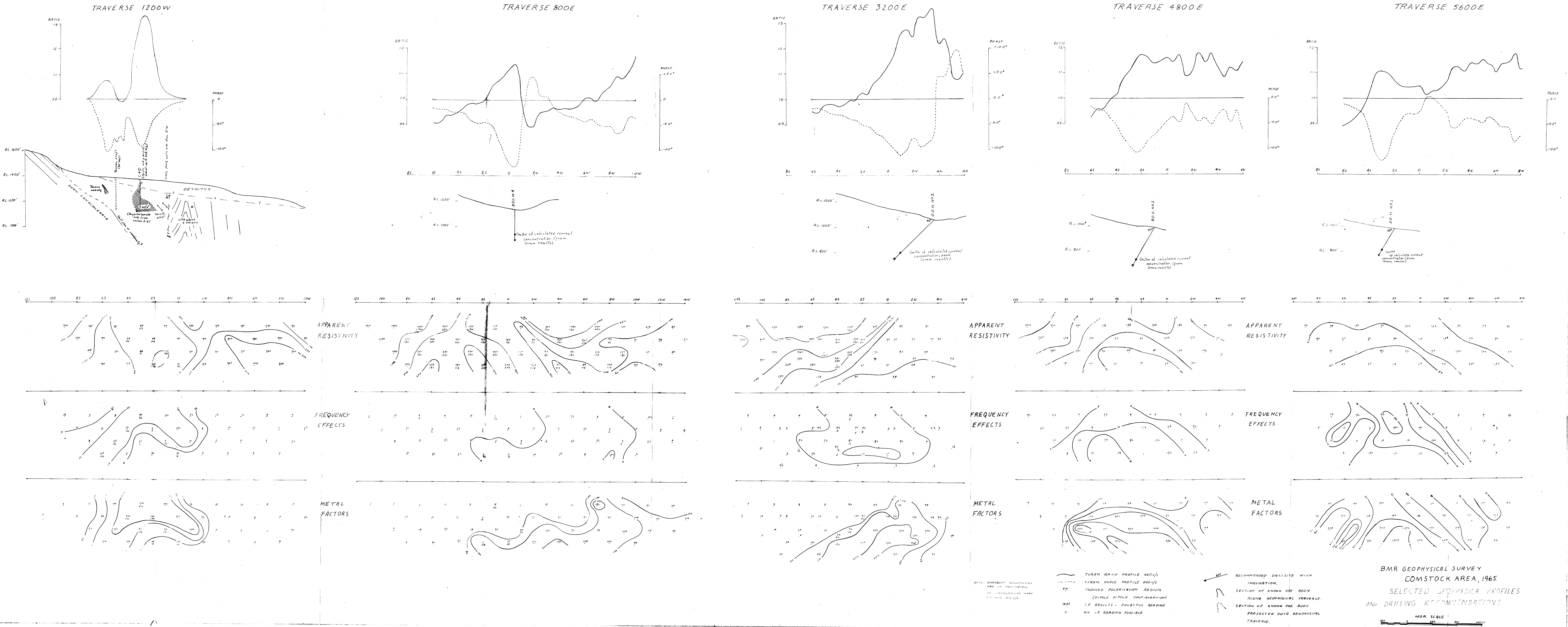
- MAIN ROAD
— VEHICULAR TRACK
— FOOT TRACK
— RAILWAY OR TRAMWAY
△ TRIANGULATION STATION
— RIVER OR CREEK
— QUARRY
— MINE FOR COPPER
— UNLESS MARKED GOLD
H. HEMATITE

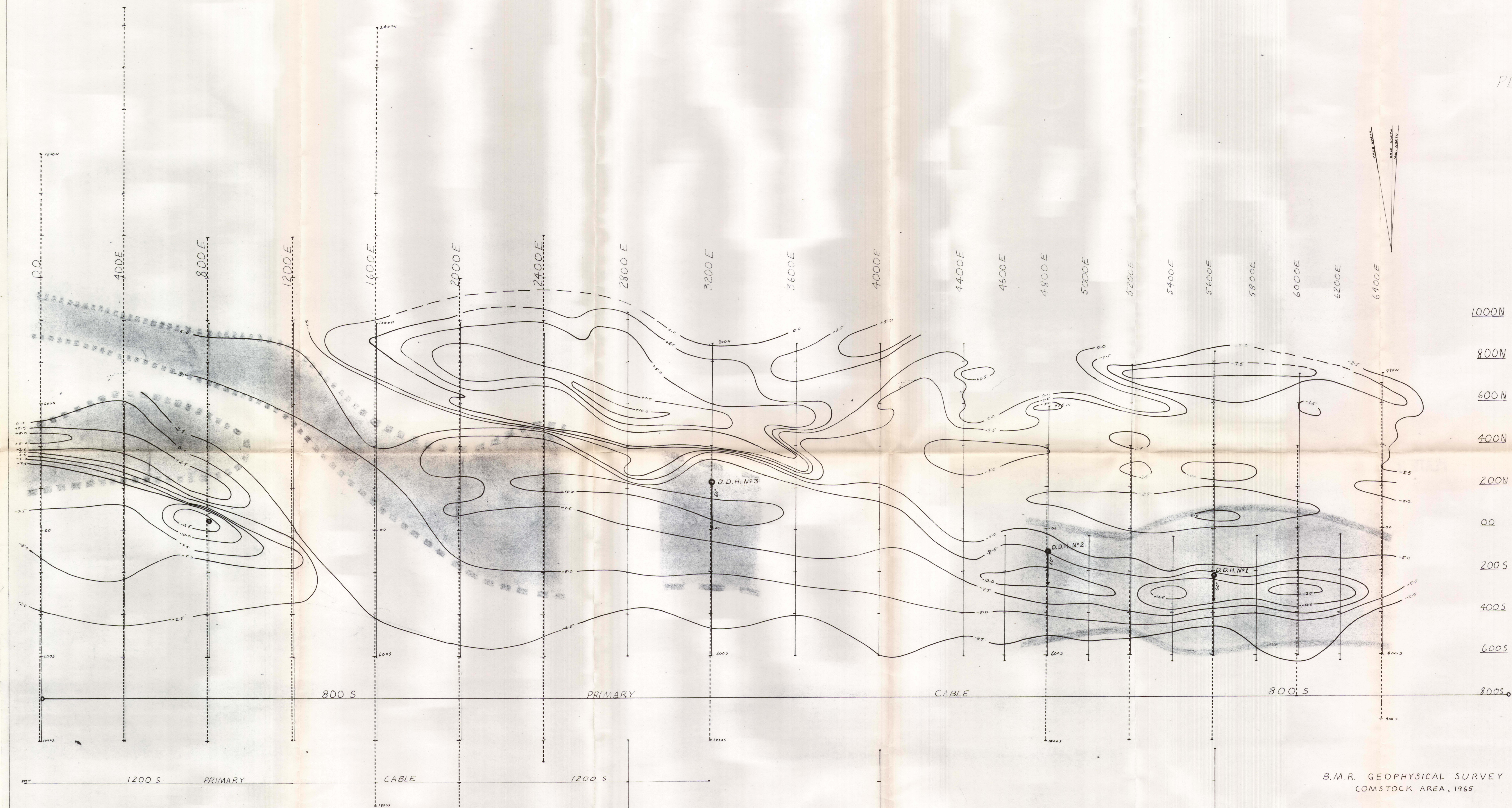


GEOLOGICAL SURVEY MT. LYELL QUEENSTOWN, TASMANIA 1965 LOCALITY AND GEOLOGICAL MAP

AFTER MT. LYELL M. & R. CO. LTD. QUEENSTOWN AREA GEOLOGICAL MAP







B.M.R. GEOPHYSICAL SURVEY
COMSTOCK AREA, 1965.

SHOWING CONTOURS OF TURAM PHASE DIFFERENCES
MEASURED AT 660 cps.
AND APPROXIMATE ZONE OF INDUCED POLARISATION
ANOMALIES.

HORIZONTAL SCALE.
0 400 800 1200 1600 2000

● D.D.H. No. 1 RECOMMENDED DIAMOND DRILL HOLE
(VERTICAL).
● D.D.H. No. 2 RECOMMENDED DIAMOND DRILL HOLE
60° SHOWING INCLINATION.

— TRAVERSE SURVEYED BY TURAM METHOD USING A PRIMARY
CABLE AT 800S
— TRAVERSE SURVEYED BY TURAM METHOD USING A PRIMARY
CABLE AT 1200S
--- TRAVERSE SURVEYED BY INDUCED POLARISATION METHOD.
--- TURAM PHASE CONTOURS (2.5° CONTOUR INTERVAL).
--- APPROXIMATE BOUNDARY OF STRONG I.P. ANOMALY
--- APPROXIMATE BOUNDARY OF MEDIUM I.P. ANOMALY
--- APPROXIMATE BOUNDARY OF WEAK I.P. ANOMALY



B.M.R. GEOPHYSICAL SURVEY
COMSTOCK HARBOR, 1965

SHOWING CONTOURS OF TURAM PHASE DIFFERENCES
MEASURED AT 660 Hz.

— TURAM SURVEYED BY TURAM METHOD USING A
PRIMARY CABLE AT 1800N.
- - - - - TURAM SURVEYED BY 12 METHOD (ADDITIONAL TO
SURVEYS SHOWN ON PLATE 3A).
- - - - - TURAM PHASE CONTOURS (2.5° CONTOUR INTERVAL)