C O N F I D E N T I A L

COMPANY REVIEW REPORT ON CERTAIN GEOLOGICAL FINDINGS RELATED TO EXPLORATION IN NORTH WEST TASMANIA

AND

PROPOSALS FOR FUTURE WORK

NOVEMBER 1959

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1. INTRODUCTION

In the course of the past two field seasons, R.T.A.E. geological parties have completed mapping over most of the area lying between Waratah, Zeehan and Queenstown. A comprehensive report placing on record the detailed results of this major undertaking is in preparation.

The net results of the regional mapping work include the elucidation of the stratigraphic and structural environment of the major West Coast mines, and the identification of principles of importance in exploration in both R.T.A.E. and E. Z. Company exploration licences. A summarised account of our data and conclusions, in as much as they apply to ore search, is therefore presented in this preliminary statement.

2. CAMBRIAN STRATIGRAPHY

One of our principal objectives and achievements last season was to complete mapping along the western margin of the Cambrian volcanic rocks between the basaltic plateau of the Waratah district and Mt. Lyell. This work was undertaken in accordance with our belief that the contact of the Cambrian bedded rocks and the volcanics marked the position of a major fault lineament (Owen Rift Fault) along which are localised the major ore-bodies of the region, including Mt. Lyell, Hercules and Rosebery.

In concentrating our exploration activities along this zone, an essential approach was to firstly undertake a systematic study and analysis of the Cambrian stratigraphic record, a subject which was surprisingly little known in view of the important ore-body associations in West Tasmania. One of the few previous stratigraphic studies was by Elliston (1954) in the Dundas district, as a result of which a bedded fossiliferous sequence lying between Mt. Razorback and Mt. Misery was defined as the Dundas Group. This term has been loosely applied to any rocks of the Cambrian system in West Tasmania, to the extent that some authors (Banks, 1956) use the term Cambrian system and Dundas Group as synonomous.

As a result of our investigations, we are able to identify and to map three distinct levels within the Cambrian system. Thesso-called Dundas group, described by Elliston (1954), which is the youngest and least mineralised level, rests on the older Cambrian formations with angular unconformity.

The divisions within the Cambrian System are briefly described hereafter:-

1. <u>The Cambrian Upper Sequence</u>: This sequence, of Middle to Upper Cambrian age, comprises argillaceous sediments passing upwards into a greywacke suite and gritty and conglomeratic deposits. It includes at the base the argillite sequence of the Pieman River (Taylor, 1954), while the upper fossiliferous sediments are represented in the Dundas type section of Elliston (1954), in the Huskisson River area (Huskisson Group of Taylor, 1954), and in the Que River area, north of Rosebery.

2. <u>The Massive Volcanics</u>: The great thickness of acid to intermediate lavas and pyroclastics flanking the West Coast Range and corresponding to the porphyroids of early authors can now be shown to pre-date part at least of the upper Cambrian sequence and are considered to be of Lower Middle Cambrian age. The unconformable relations with the overlying sediments (correlates of the Dundas Group) are admirably exposed in railway and river cuttings in the Que River area.

3. <u>The Cambrian Basal Sequence</u>: A distinctly arenaceous and dolomitic group of sediments may be observed to dip beneath the massive volcanic belt along its western margin, the two groups being separated however by a zone of major shearing. These sediments include the beds west of Rosebery, referred to as the Rosebery Series by Finucane (1932), which locally dip west, but have been shown to be overturned by Hall et alia (1953). The same sequence may be observed bordering the volcanics in normal attitude (easterly dipping) north of Rosebery to Que River, and southerly to Moores Pimple and the upper Henty River. Elsewhere, the same sequence has been described as the Carbine Group of Mount Dundas (Elliston, 1954) and the Success Creek Group of the Pieman River and Renison Bell (Taylor, 1954).

The age of the group is thought to be Lower Cambrian.

A typical section of the basal Cambrian succession is well exposed in the cuttings and river courses between the Rosebery golf links and the sheared footwall rocks of the Rosebery Mine, and is summarised in descending stratigraphic order (east to west geographically) below:

(a) Footwall pyroclastics and slates. These are composed of bedded tuffs and slate, and some bands of massive volcanic rock which may be lava flows, occurring between the Black P.A. mine and the Footwall of the Rosebery Mine. Thickness about 4,000 feet.

(b) Quartzite of Stitt River, for which the name Stitt Quartzite is used in this report. This is a white saccharoidal quartzite with alternations and partings of shale. Thickness 1,800 feet.

(c) Volcanics (rhyolitic tuffs) of the Natone Creek area, approximately 400 feet thick.

(d) The fuchsite breccia-conglomerate of the Natone Creek area, thickness exceeding 200 feet.

(e) The purple dolomitic beds, best exposed along strike to the north, in the Pieman River west of Bobadil Plain. Thickness exceeds 300 feet.

(f) The lower graphitic slates and saccharoidal quartzites in the road cuttings east of the golf links.

An identical sequence as that above has also been observed to the west of the massive volcanics in the White Spur - Moores Pimple area, and the lower members, including the distinctive Stitt Quartzite and the fuchsite conglomerate beds, have been traced northerly of Rosebery to Higgins Creek, west of Pinnacles.

3. MIDDLE CAMBRIAN UNCONFORMITY

In the Que River area, the Upper Cambrian Sequence (Dundas Group) rests with marked unconformity on the formations of the massive volcanic belt. An important epoch of Cambrian folding can therefore be inferred at this interval. The same folding movements are reflected with less precise evidence of dating by the unconformably relation of the Upper Cambrian (Dundas Group) and Basal Cambrian (Carbine Group) at Mount Dundas, and by the angular relation of the volcanics and Ordovician sediments as at Tullah and Gooseneck, in the West Coast Range.

4. GEOLOGICAL PROBLEMS OF THE ROSEBERY-GOOSENECK AREA

In the last few years, a great deal of field work and thought have been devoted to the regional geology of the Rosebery-Gooseneck area, in connection with geophysical surveys and exploratory diamond drilling conducted independently by R.T.A.E. and the E.Z. Company. Despite these intensive studies, a number of stratigraphic and mineralisation phenomena remained to be satisfactorily determined or embraced within the regional geological framework, while various interpretations of the regional structures and their bearing on ore localisation have been advanced (Campana et al. 1958; Hall & Cottle, 1959; Scott, 1959).

The main geological problems which appeared to us to require further explanation are as follows :-

(a) <u>The relation of the bedded rocks of the Cambrian basal sequence and the massive volcanics:</u> In some places, such as west of White Spur, the bedded rocks (Cambrian Basal Sequence) are apparently conformable and pass gradationally into the massive volcanics, while in other areas, such as at

Jupiter, the contact of the two rock groups is sharp and discordant. The boundary between the bedded rocks and the volcanics assumes a pronounced bulge to the west between Rosebery and Moores Pimple, although the attitude of the bedding both sides of the boundary remains constant in a meridional direction.

This boundary has been variously interpreted by earlier workers as intrusive (Finucane, 1932; Dallwitz, 1946), unconformable and faulted (Hall et alia, 1953), and conformable (Hills, 1915).

(b) Position of the Owen Rift Fault North of Gooseneck: It is generally agreed that part of this structure, known at Mt. Lyell as the Great Lyell Fault, extends northerly from Mt. Lyell near the margin of the Owen Conglomerate range to Gooseneck. Hall and Cottle (1959) consider that beyond Gooseneck the shear swings N.N.E. to Tullah, while we have inferred that it continues northerly through Rosebery and beyond (Campana et al, 1958).

Independent of these views, it will be admitted that the intense zones of shearing which are to be seen locally in the porphory (volcanic) rocks in the footwall of the Rosebery and Hercules Mines, and at Chester, are singularly identical to those of the Lyell Schists of Mt. Lyell. It is therefore essential for the conduct of our exploration programmes that this common environment of the principal mines should be clearly understood geologically, and not dismissed as fortuitous local effects.

(c) Relations of the Rosebery and Hercules Mines: The Rosebery and Hercules Mines, distant four miles from one another, lie within an identical wall rock environment comprising easterly-dipping hanging wall slates, host rock tuffs, and footwall pyroclastics (Hall et al. 1953). Intense shearing is common to the footwall rocks of both mines, while the ore is stated to be "markedly similar and uniform in texture and composition." It would therefore be reasonable to assume as a working hypothesis that the ore-bodies occur at the same stratigraphic level, and possibly along the same structure.

The strike of the host rocks and lode formations of the two mines are roughly parallel, but by projection, there is a lateral off-set of about two miles between the lines of lode. The presence of a major cross-structure - possibly post-ore - is to be implied, or at least suspected, from this relationship.

Also to be considered is the fact that a similar sequence of host rocks marginal to an important shear structure was encountered in drilling of the Gooseneck Anomaly, four miles S.E. of the Hercules Mine.

(d) The Role of Post-Permian Faulting: Large scale block faulting of the Permian peneplain surface can be readily inferred between the high level (3,000 ft.) Permian outcrops on Mt. Dundas and Mt. Read, and the lower level (500 ft.) Permian surface of Zeehan and North Heemskirk. The discovery by us of Permian tillite at the 500 ft. level three miles westerly of Rosebery (Exe River) enables one to predict the position of this 2,500 ft. displacement to between the Exe River road crossing and near the Hercules Mine, on Mount Read.

(e) Cross Structures: The presence of an important cross structure near the latitude of Rosebery has been suspected for a number of years by E. Z. Coy. and R.T.A.E. geologists. Among the reasons for this belief are the pronounced change of strike (20 degrees) of the massive volcanic boundary which occurs just south of Rosebery, and the local overturning of the bedded sequence to the immediate west of Rosebery. At the same latitude, but on a regional scale, an obvious cross structure is reflected by the base level of the Owen Conglomerate between Mt. Murchison and Mt. Farrell, while a regional pitch change west of Rosebery is suggested by the relative positions of the Zeehan and Huskisson Ordovician-Silurian basins.

5. REGIONAL GEOLOGY OF THE ROSEBERY-HERCULES AREA.

The geological map accompanying this report (Plan No. T611) shows the factual results of our mapping in the area embracing Rosebery, Mt. Murchison, Gooseneck and Moores Pimple, much of which lies within the bounds of the E.Z. Company prospecting licence (E.L. 6/59). In considering the geological setting of the two main mines within this area, it would firstly be instructive to examine more closely the stratigraphy across the contact of the bedded rocks and the volcanic belt in the area under discussion, between Bobadil Plain and Moores Pimple.

In the northern portion of this area, two well defined marker horizons can be identified within the bedded sequence, namely the Stitt Quartzite and the fuchsite breccia-conglomerate (Plan No. T611). Near Rosebery, these formations are conformable in strike with an adjacent and younger succession of interbedded slates and pyroclastics comprising the footwall rocks of the Rosebery mine. A useful marker level within the upper sequence is the tuffaceous slate (Barker Road slate) which can be traced from east of Primrose to just north of the rifle range.

In the southern part of the area an identical conformable sequence has been mapped between Moores Pimple, White Spur, and the footwall rocks of the Hercules Mine. The fuchsite breccia conglomerate formation occurs on the eastern flank of Moores Pimple, succeeded a few hundred feet to the east by the Stitt Quartzite beds, and overlain in turn by an alternation of slates and pyroclastics which can be readily correlated by facies, sequence and structural setting with the Rosebery footwall rocks. The upper portion of the section is well exposed along the headwaters of White Spur Creek from one to three miles south-east of Moores Pimple, and the lower part along the Hercules to Comet pack-track in the vicinity of Moores Pimple. Throughout the section the bedding mostly dips steeply east and is considered to be normal, but reversals occur near the shear zone which divides the upper members of the group from the massive volcanics of Mount Read.

We therefore differ with Elliston (1954) in his correlation of the Moores Pimple and White Spur beds with the Dundas Group, as defined by him, but he admits that "a rigorous correlation was not obtained with the type section of the Dundas Group of which it should be the equivalent" and that "the structure is not entirely understood."

The identification of these two areas of common stratigraphic reference provides an invaluable clue to the structural setting of the Rosebery and Hercules mines.

It will be observed from the geological plans (Nos. T.610 & T.611) that, between the Salisbury Mine and Moores Pimple, there is a sharp and angular contact between the bedded rocks and the margin of the volcanic belt. On pre-existing evidence, it could be assumed that this boundary was either unconformable or faulted. Detailed mapping revealed that the bedding was consistently north-south and at an angle to the boundary in both the bedded and volcanic rock groups. Accordingly we inferred that the contact in this area marked an important fault.

The displacement along the fault, for which the name Jupiter Fault is suggested, is admirably shown between the Salisbury workings and Moores Pimple by the off-set of the fuchsite conglomerate and Stitt Quartzite marker beds. The conglomerate, for example, is cut off by the fault between the Rosebery Cemetery and Jupiter Mine, and displaced south-westerly to reappear about half a mile north-east of Moores Pimple. The horizontal movement involved in this faulting is considerable with a horizontal component normal to the bedding of the order of two miles. The relative direction of movement is south block moving south-west.

Reference to the geological map will show that the fault intersects successively higher formations of the bedded sequence between the Jupiter and Salisbury workings. It would be expected to enter the level of the footwall pyroclastics and slates just north of the Salisbury workings.

The strike of the fault, where well established between Williamsford and the Salisbury workings, is 25 degrees (true), and by projection, would extend N.N.E. through Rosebery township. The actual trace of the fault approximately along this line is demonstrated by the abrupt termination of the bedded footwall pyroclastics against the massive volcanics of Koonya Hill, well shown in particular by the Barker Road slate beds which abut against the volcanics between the rifle range clubhouse and the main road. In the Rosebery township area, the fault would be marked by the southern limit of the Rosebery host rocks, as mapped by the E.Z. Company geologists, near the Catholic Church.

This major break trending N.N.E. through Rosebery township, and for several miles beyond, corresponds with a lineament defined by the aeromagnetic survey.

The position of the Jupiter Fault and the principal stratigraphic marker levels are shown on the generalised plan No. T.610 (Fig. 1). In the adjoining figure (Fig. 2), a diagrammatic reconstruction of the pre-fault geological boundaries is given based on a transposition of the southern block to its original position relative to the northern block.

These figures serve to illustrate that the Rosebery and Hercules mines lie at the same stratigraphic level, as previously suspected but not explained, and along zones of shearing which are dismembered portions of the one major structure.

6. REGIONAL GEOLOGY OF THE WHITE SPUR - GOOSENECK AREA

The Gooseneck Anomaly, which occurs partly within E.Z. Company leases and partly within R.T.A.E. ground, about four miles E.S.E. of the Hercules Mine, was identified early in 1948 by the R.T.A.E. geophysical team. A well defined conducting body with magnetic and gravimetric correlation, the prospect was tested by three drill-holes in the summer of 1948-49. The drilling revealed disseminated pyrrhotite-pyrite mineralisation throughout tuff and slate which are intercalated with the Cambrian Volcanics of the area. Traces of lead, zinc, and copper sulphides were revealed by the drilling.

The geological setting of the Gooseneck Prospect has features in common with both the Mount Lyell and the Rosebery-Hercules mine areas. As in the case of the Mt. Lyell ore-bodies, the anomaly occurs within a stressed Cambrian volcanic assemblage in close proximity to the base of the Owen Conglomerate, and along the northern extension of the Great Lyell (or Owen Rift Valley) Fault. It is also true that the Gooseneck mineralised slates and enclosing volcanics are comparable in lithology and sequence to the host rocks of the Rosebery and Hercules Mines, and in each case, a zone of major shearing occurs in the volcanics to the immediate west of the slate beds. The strike of the slate and the shearing zone at Gooseneck and Rosebery is approximately the same, and by projecting strikes, they lie along the same straight line. There is thus good reason for concluding that the Gooseneck and Rosebery mineralised levels may occur within a common stratigraphic and structural environment.

We have already shown that the Rosebery and Hercules Mines are cross-faulted portions of the same mineralised (or favourable host rock) zone, and if our correlations of the Gooseneck, Rosebery, and Hercules geology are correct, the presence of second major transcurrent fault between Hercules and Gooseneck would also be indicated.

An important line of faulting extending along the western scarp of Gooseneck and Mt. Murchison towards Stirling Valley and Tullah, and corresponding with a well defined linear on the aerial photographs, has been accepted by most Tasmanian geologists and is regarded by some (Carey, 1953; Hall & Cottle, 1959) as the northerly extension of the Great Lyell Fault. The position of the fault can be accurately pin-pointed on the ground near the waterfall along the powerline between Gooseneck and Rosebery. South-westerly of Gooseneck, the trace of the photo linear marking the fault continues along strike to follow the northern margin of the Henty River Gorge, as shown by Carey (1953, Fig. 6).

In the Henty River area, the position of a major fault and the relative movement has been established by our mapping work. The massive volcanics and the underlying bedded pyroclastics of White Spur have been observed to continue southerly along strike to a line corresponding approximately with the northern bank of the Henty River gorge, where they are in sharp faulted contact with similarly trending quartzitic and slatey bedded rocks of the basal Cambrian sequence. The western boundary of the bedded pyroclastics has been traced on both sides of the fault, extending southerly from just east of Moores Pimple to Halls Rivulet, beyond which it is off-set north-easterly to lie approximately one mile west of the Mt. Tyndall Owen Conglomerate scarp.

An off-setting of beds with a horizontal component of about two miles, measured normal to the bedding strike, resulted from the faulting in this area. This fault structure is described as the Henty Fault in succeeding sections of this report.

The Gooseneck mineralised zone is truncated by the Henty Fault to reappear to the west in the White Spur and Hercules Mine area.

7. REVIEW OF THE FAULT SYSTEMS

(i) Cambrian Faulting:

The term Owen Rift Fault was suggested by us (Campana et al, 1958) to define a major north-south fault lineament which has played an obviously important role in localising the major Cu-Pb-Zn deposits of West Tasmania. This fault, being dismembered by later cross-faulting, was not recognised by earlier authors as a single structure.

The Owen Rift Fault belongs to a system of faults which developed with the thick accumulations of Cambrian volcanics, and is therefore considered by us to have commenced in early Cambrian time and have been rejuvenated in later periods.

The wide zone of shearing which is characteristic of the Owen Rift Fault at Mt. Lyell, Hercules, and Rosebery, has been observed north of Rosebery at Chester. Between Rosebery and Chester the structure has not been recognised but could have been truncated by a younger fault.

(ii) Post Cambrian and Pre Permian Faulting:

The Jupiter and Henty Faults, both of which strike at a 25 to 30 degree angle to the meridional trends of the Cambrian rocks, are complementary fractures defining the limits of an essentially horizontal block movement of the Cambrian (and older) formations, in a south-westerly direction relative to the Gooseneck and Rosebery areas.

A critical result of this movement was the displacement of the Owen Rift Fault and associated mineralisation to the west in the White Spur and Hercules area.

The line of the Henty Fault corresponds with the western margin of the Owen Conglomerate of Gooseneck and Mt. Murchison and may therefore mark a Cambro-Ordovician rift-valley fault along which transcurrent movement also occurred.

An observation which may be relevant to the dating of this cross-faulting, but which requires further investigation, is that three of the old mine workings which lie in close proximity to the assumed position of the Jupiter Fault, namely the Chamberlain, Salisbury, and Mt. Black Mines, are featured by a locally unusual mineral assemblage, including tourmaline fluorite and wolfram (Waller, [illegible]). These are minerals which we would associate with a granitic source, and in West Tasmania, with the Devonian mineralisation, so that the cross faulting may be Devonian or older.

In the absence of any positive evidence at this stage, the age of the Jupiter-Henty movements is considered to be early in the middle Palaeozoic, to be correlated with other N.N.E. faults of Palaeozoic age described by Carey (1953).

(iii) Post Permian Faulting:

Post Permian block faulting has occurred on a large scale, some evidence of which has been described earlier in this report. A relative vertical movement of about 2,500 feet can be demonstrated between the Mt. Dundas-Mt. Read and Zeehan-Exe River Permian surfaces, and this may well have occurred along the line of the Jupiter Fault between Moores Pimple and Rosebery. No relative movements of the Permian peneplain appear to have occurred on respective sides of the Henty Fault, judging from the similar elevations of the Mt. Read and Mt. Sedgwick Permian outcrops.

It may be noted that it is within the downthrown blocks that the Ordovician-Silurian marine sediments occur as infolded synclinal remnants.

8. AGE OF THE MINERALISATION

In our earlier contribution (Campana et al, 1958) we excluded detailed discussion of the age relationships of the West Tasmanian ore deposits. We regarded this subject as outside the scope of the paper but we made brief reference to the fact that there is evidence of an important mineralisation phase in Cambrian time. On the basis of our increased knowledge of the Cambrian stratigraphy we have been able to establish and to compare the stratigraphic position of the principal mines along the Owen Rift Fault and elsewhere. The main conclusions of this study are given in the following table :-

TABLE SHOWING STRATIGRAPHIC SETTING
OF THE PRINCIPAL WEST TASMANIAN MINES

HOST ROCK STRATIGRAPHY	MINERALISATION
Upper Cambrian Sequence (Dundas Group, Huskisson Group)	No major mines. Cuni (Ni), Razorback & Grand Prize (Sn) Prospects.
- - - - - - Angular unconformity	

MASSIVE VOLCANICS	Mineralisation of Owen Rift Fault, near base of volcanics - Mt. Lyell, Rosebery, Hercules Chester.
CAMBRIAN BASAL SEQUENCE (Carbine Group, Rosebery Group, Success Creek Group).	Renison Bell, Comet, Success, Owen Meredith, Mt. Bischoff, Montana-Western group and Spray of Zeehan.

The conclusion to be drawn from this analysis, in the absence of any contrary evidence, is that important mineralisation phenomena in West Tasmania are likely to have occurred in Cambrian time. They are possibly related to the Orogenic phase separating the Cambrian basal sequence and the Massive volcanics from the Dundas beds.

9. MINERALISATION CONTROLS

Whilst the geological and geophysical work over the past three years has revealed many complexities in the configuration of the Owen Rift structures, and substantiated its continuity over 50 miles and more, the most vital evidence acquired is related to its importance as a zone of major mineralisation.

Over its length this fault has provided access for the mineralised solutions, and the development of the major ore-bodies along it are then related to localized features such as particular beds and structures. For example, a localized control which has a very definite application at the Rosebery and Hercules Mines is the presence of the orebodies within a favourable bed described as the host rock "tuff" (Hall et al., 1953).

In a recent contribution, Hall & Cottle (1959) state that cross-structures have played an important role in localising the Mt. Lyell ore-bodies, as earlier described by Wade (1958), and they apply this as a regional criterion as follows :-

> "Barren stretches along the faults or shears on each side of the supposed rift demonstrate that ore deposition cannot be controlled by those faults themselves ..... Ore cannot therefore be identified solely with the supposed rift valley structure, and the cross structures appear to offer a more fertile clue to regional mineral distribution."

These are ore control features which are taken into account in any normal scientific prospecting when the more detailed study of smaller areas is undertaken.

As matters stand at present, we find, after our regional examination of the Owen Rift Fault zone between Mt. Lyell and Chester, that mineralization, rocks and structure with a common origin or at least with a close genetic relationship are exposed in the following localities within this area :

Mt. Lyell and Comstock
Between Gooseneck and Red Hills.
White Spur - Hercules area.
Rosebery area.
Chester Mine area.

Important mines occur in three of them. These localities are not isolated in the sense of being separate mineralized areas. They each lie along the mineralized rift structure, now broken by cross faults and with many of its segments concealed under varying thicknesses of younger rock. These segments are covered by superficial glacial and scree deposits, and in places, by an overlap of the Owen Conglomerate beds.

In general, our programme of further work must concentrate on the more intensive study of the areas listed above and our thinking on concealed orebodies must extend to the finding and testing of the Owen Rift Valley fault under all manner of cover rocks.

We can now change our emphasis to drilling with the necessary supporting geological and geophysical and geochemical supervision and further minor field studies to define drilling targets more precisely. The programme for consideration and approval is as follows :-

REVIEW OF EXPLORATION TARGETS

The areas which warrant further investigation can be considered in four broad categories :-

1. THE STRAIGHTEDGE PROJECT: The vital importance of the Owen Rift Fault (Straightedge) as a zone of major Cu, Pb, Zn mineralisation, including the largest producing mines of West Tasmania, has been fully described in previous Company reports.

Significant mineralisation has been recognised along this structure in R.T.A.E. ground at Chester and Gooseneck, where the characteristically schistose rocks of the Owen Rift Fault are observed in outcrop. These and other areas where the fault zone is covered by superficial glacial and scree deposits must be considered as outstandingly attractive exploration targets for concealed ore deposits.

Portions of this favourable zone were covered by geophysical surveys during the past two seaons and revealed a number of anomalies which are considered to warrant test drilling. In other areas, geophysical and geochemical work has yet to be undertaken or completed.

The main areas of interest along Straightedge which are within the bounds of the R.T.A.E. Exploration Licence are briefly described hereunder :-

Chester. The interest in this area is two-fold.

(a) The large pyrite body exposed in the Chester open-cut workings has not been tested in depth for possible enrichment in economic sulphides. The geological environment is identical with the Mt. Lyell Mines and a programme involving at least two drill-holes is warranted.

(b) As a result of geophysical surveys in the Pinnacles-Chester area last season encouraging results were obtained in the Chester area where significant gravity anomalies were indicated over the Chester Mine (suggesting a depth persistence of mineralization to 600 feet) and in a virgin area 800 feet to the west of the Chester Mine. A surprising feature was the absence of any electromagnetic correlation at the Chester deposit. These anomalies are near the limit of the area covered last season, both being open to the south. Extensions of the survey towards the Pieman River should therefore be considered a work of high priority.

White Spur. This is an area of outstanding possibilities along the Owen Rift Fault south of the Hercules Mine. Track-cutting as a preliminary to geophysical surveys is at present in progress.

Gooseneck. Geophysical surveys and subsequent diamond drilling of the Gooseneck anomaly were completed here during 1958-59 and revealed weakly mineralised slates of no economic importance. As a result of new geological data, it is now believed that the Gooseneck slates are equivalent to the hanging wall rocks of Rosebery, and it is recommended that extensions of the geophysical work be carried out in the schist zone to the immediate west and north of the Gooseneck hill. A number of small copper showings have been observed in this area.

Howard. Geophysical and geochemical surveys were completed at Howard (R.T.A.E. name for area west of Mt. Tyndall) during 1957-59. One diamond drill-hole is recommended to test an electromagnetic anomaly found near the margin of the Owen Conglomerate scarp. Geologically, the Cambrian rocks exposed in the vicinity of the anomaly are considered to be too massive to be a favourable setting for mineralization.

West Sedgwick. The West Sedgwick geophysical (and geochemical) anomaly is an approved drilling target which has been adequately described in earlier reports.

Comstock. Two electromagnetic anomalies were recorded by ground survey (1957-58) beneath glacial deposits of the Comstock Valley. Later gravimetric and magnetic coverage suggest a line of weak mineralization extending easterly from the Tasman Mine (Mt. Lyell leases) into R.T.A.E. ground. It is proposed to try the I.P. method over the Comstock anomalous zones.

Gormanston West. I.P. and gravity surveys have been recommended in an area west of Gormanston where it is suspected that the Lyell shear may be concealed beneath glacial deposits of the Gormanston Moraine, and where there is some evidence of cross-structures which may be important mineralization controls. The area is partly within the R.T.A.E. Exploration Licence.

2. EXPLORATION OF TIN-BEARING PYRRHOTITE DEPOSITS.

Additional exploration work is required to complete investigations of existing and possible recurrences of the tin-bearing pyrrhotite mineralization of West Tasmania, the most important deposits of which outcrop at Mt. Bischoff and Renison Bell.

The Mt. Bischoff Mine, formerly an important tin producer, lies within a Government Reservation in which R.T.A.E. have been granted a special prospecting tenure. Detailed geological mapping of the Mt. Bischoff workings was undertaken last field season. As a result of this study, it was concluded that a dolomite which is the locus of mineralization at Mt. Bischoff can be expected to occur at relatively shallow depths in the area between Don Hill and Happy Valley workings, and a series of drill-holes were recommended to test for possible repetitions of mineralization. Drilling with a percussion plant was tried in this area, but the plant proved unsuitable and drilling was abandoned before reaching target depth in the first hole.

Ground magnetic surveys conducted over part of this area revealed a 100 gammas anomaly in close proximity to one of the drill sites, which could be due to a buried body of pyrrhotite (Seigel, 1959).

Diamond drilling of these targets would be the most appropriate method of testing and should be included in the programme for the forthcoming season.

The tin mines at Renison Bell, and smaller deposits of a similar type at Cleveland and Razorback, have been investigated by R.T.A.E. under option but the options were not exercised.

Another deposit in a remote area at Mt. Lindsay (leases held by M. D. Garretty) has not been examined in the field by R.T.A.E.

The Mt. Bischoff and Renison Bell tin mines occur within a similar host rock environment comprising quartzites, slates and dolomites of the basal Cambrian sequence (Carbine Group). The regional distribution of this apparently favourable rock series has been broadly defined by the regional mapping work and should receive special consideration as areas of possible ore repetitions. Further geological mapping work is recommended in areas of this category between Mt. Bischoff and Magnet, (in the area shown as pre-Cambrian on Plan T.531) and westerly of Renison Bell in the Dunkleytown-Cuni region.

The magnetic properites of the tin-bearing sulphide bodies render these deposits especially favourable for geophysical prospecting methods. However, as the presence of tin can be readily identified by the panning technique employed by prospectors, the advantage of geophysics is mainly confined to the possible definition of concealed ore-bodies.

The aeromagnetic and aero-electromagnetic surveys carried out during 1956-57 provide a valuable framework in exploration for this type of mineralization.

Ground investigations of the resultant airborne anomalies led to the identification of two areas of interest, both of which lie within the favourable Carbine Group sedimentary rocks and where supporting ground geophysical work is required prior to deciding upon the need for drilling.

Patterson Hill. Additional S.P. and magnetometer work is required to test an A.E.M. conductor which was also outlined on the ground by S.P. methods in 1957.

Cuni Area. During the last field season a preliminary magnetic traverse was run across this broad aeromagnetic anomaly. A small sharp ground anomaly was recorded in confirmation of the air-response. A systematic ground magnetic survey is required here, followed by electrical and geochemical surveys in areas of near-surface magnetic relief.

3. SAVAGE RIVER IRON DEPOSITS

Investigations of the large magnetite ore deposits at Savage River commenced in 1957 and are still in progress with R.T.A.E. working in close collaboration with the Tasmanian Government. Two of the main deposits are contained within a Government Reservation, and another which was detected by aeromagnetic survey lies within R.T.A.E. ground. Drill-holes have been completed at each of these deposits and a fifth hole is at present in progress.

The selection of drill sites has been largely governed by the ground magnetometer surveys and the results have shown a good correlation of iron ore zones and the magnetometer predictions.

Future exploration will involve additional drilling, ground magnetic and gravimetric surveys and possibly bulk sampling of the ore to provide material for benefaciation and smelting tests.

Another deposit of the same type occurs nearby in R.T.A.E. ground at Rocky River. This area will be investigated geologically and samples obtained for assay during the forthcoming field season.

Elsewhere outcrops of iron ore at Hampshire, Highclere and Blythe have been mapped in detail by R.T.A.E. but were found too small to be of interest.

4. MISCELLANEOUS PROJECTS.

The following are miscellaneous areas of interest -

Stirling Valley - Tullah. The sheared slate zone which extends from north of Tullah to Stirling Valley has been explored in detail both geologically and geophysically.

Geophysical ground surveys using E.M. gravity and magnetics are completed in the area south of the Murchison River and three drill targets, one of which is conditional, were selected on the basis of the results. The most important drill site is designed to test an anomalous gravity zone on the structure proper.

Only E.M. coverage is completed in the area between the Murchison River and the Tullah leases and complementary gravity and magnetic coverage is planned for the coming season.

Gold Hill Area. Regional geological traverses in this area revealed ubiquitous pyrite mineralization associated with inter-bedded porphery flows and slatey sediments. A detailed geological appraisal of this occurrence is considered warranted.

A.E.M. Anomalies - Area 14. A number of A.E.M. anomalies recorded in the Stanley River-Wilson River area have not been examined on the ground.

The site of the anomalies is very difficult of access. An investigation of these and the nearby Mt. Lindsay tin mine will be undertaken this season.

NOTES ON GEOPHYSICAL METHODS

An appraisal of exploration methods as applied to Tasmanian conditions is given in a recent report by H. O. Seigel, Consultant Geophysicist to Rio Canex, who visited this area last August. The following are some of his suggestions, which will be adopted in the forthcoming season.

1. Self-potential method (rather than E.M.) is the most effective and simplest method for primary exploration.
2. Electro-magnetic surveys to supplement the S.P. method in flat areas.
3. Induced polarization equipment would be useful and will be available for (a) resolving sulphide-graphite (electronic) responses from ionic responses (water-filled shears, etc.); (b) where the anticipated mineralization is disseminated, say, of the Mt. Lyell type.
4. Use of the gravimeter in tonnage estimate at the Savage River iron deposits.
5. A review of the aeromagnetics as compared to the associated altimeter records is suggested in important areas such as the Savage River iron belt.
6. Twin Pioneer A.E.M. unit would be useful for regional exploration where terrain and tree heights are not too severe. An analysis of these features in the following areas of interest is being undertaken -

   Coldstream; Chester-Gold Hill; Marionoak;
   White Spur; Gooseneck; Comstock; West Renison;
   Waratah; Mt. Cleveland-Magnet.

   (The location of these areas is shown on accompanying maps).

AREAS SUGGESTED FOR GEOPHYSICAL SURVEY 1959-1960 SEASON

White Spur Area:

This is an area of slates which are located on the supposed continuation of the Lyell Shear, and south of Hercules. A grid 3 miles long by 4,000 feet wide is being cut in this area with traverses spaced 400 feet apart.

Pyrite is known to occur in the slates.

Primary survey will be by Turam with the "base line gap" being filled in with vertical-loop. We expect the pyrite in the slates will be conducting and will give Turam and vertical loop indications. What we can hope to achieve with electrical methods is to outline the more heavily mineralized zones in the slates.

In laying out the geophysical programme, an allowance has to be made for checking by S.P., gravity and magnetic methods of recorded indications. Therefore, amount of work by these surveys is more or less a guess, based on previous surveys in the area.

The S.P. survey will serve only to confirm the E-M results, giving perhaps some qualitative indication of dip and depth from which anomaly is recorded.

The magnetic survey will give an idea if there is any pyrrhotite association and may give some hint on the general geological picture.

The gravity survey will outline mineralized zones if sufficiently dense mineralization occurs close to the surface. It is expected that the heavier slate horizons will show up on the gravity results.

The I.P. method, which will distinguish between conductors due to sulphide and graphite on one hand and ionic conductors on the other, is expected only to confirm the E-M results.

Of these methods, I.P. will be the most costly in man hours per line foot to operate. It is recommended it be used only if good indications by other methods suggest the presence of an ore body.

Patterson Hill:

This is an area where an S.P. anomaly of good shape and form was recorded during 1957. It is in an area disturbed aeromagnetically.

In 1957, no definite grid was pegged here and consequently a grid will need be laid. It is considered that no track cutting will be required and the grid can be pegged when the S.P. anomaly has been re-located.

Gravity and magnetic checking as laid down in the table is warranted over the recorded anomaly.

Patterson Hill (Contd.):

Depending upon recorded results, it may be necessary to extend this survey.

I.P. checking is not operationally practicable, unless a heliport is prepared and a helicopter used for transport.

Cuni Aeromagnetic Anomaly:

Purpose of the survey is to delineate an airborne magnetic anomaly. Harry Seigel suggested it could be the stock responsible for the nickel rich dykes and sills of the Cuni Mine area. Rocks exposed are said to resemble those at Renison Bell. Gravity, S.P. and electrical surveys have been allowed for in the table. All these may not be required.

Chester:

The survey is designed to test a possible gravity anomaly recorded on the most southerly line surveyed last year. In this area last year the vertical loop equipment did not show up the Chester body. A possible explanation of this is that the transmitter position was poorly chosen, or that the Chester body is not highly conductive, although it contains massive sulphides. However, the cause of the possible gravity anomaly on the West of Chester should be established and electrical methods should be used to find any coincident conductor.

Turam, gravity and magnetic surveys have been designed to test this indication. Most of the track cutting was completed last season, only 1,500 feet of track need be cut.

The use of I.P. (and Turam) would not be practical, without helicopter transport. I.P. would be operationally difficult to use.

Gold Hill:

The surveys at Gold Hill are to test an area of slates reported by Geologist D. McKenna. The slates are reported to be similar to those in the White Spur area. No detailed area has been delineated. The table allows for four lines spaced 400 feet each 3,000 feet long. This may not be adequate when the full geological significance of the area is known.

Tullah:

The geophysical work at Tullah will consist of (1) more closely controlled E-M work over the grid put down last year, (2) continuation of the last year's grid to link up with the area north which has been covered by B.M.R. geophysical survey, (3) only electromagnetic surveys will be undertaken.

The purpose of the survey is to outline the continuation of the zone containing mineralization at Tullah.

Gormanston Area:

No area has been outlined by the geological section in the Gormanston area. Graham Hall indicated that the off-set continuation of the Lyell Shear could be under the Gormanston area. However, combining the sketch by Graham Hall and the geological map by M. Wade, the area of interest appears to be within Mt. Lyell ground. No geophysical surveys have been designed for this area.

Comstock:

Three I.P. lines have been allowed to cover the E-M anomaly recorded in 1957-58 season. I.P. here could distinguish between an anomaly due to conducting clays and an electronic conductor.

West Sedgwick:

Three I.P. traverses have been designed to test E-M anomaly recorded during 1957-58 season. Testing of this anomaly would not be as necessary as the Comstock anomaly. What would be the course pursued if the E-M anomaly were confirmed ? Would it be a drill target ?

Savage River, R.T.A.E.:

The survey designed here is to test the potential of the airborne magnetic indication. A combination of magnetic and gravity surveys should give some estimation of the dimension of the ore body (or bodies).

A decision will need be made if the cost of the survey is warranted.

Savage River South Govt. Deposit:

It is considered that the spacing of the traverse lines on the B.M.R. magnetic survey was too large. Eight lines, intermediate between lines put down by the B.M.R. personnel, would assist in determination of the massive or lenticular nature of the main southern deposit.

Savage River North Govt. Deposit:

As at Savage River South, extra lines have been designed to test the continuity of the northern ore body. No gravity work has been recommended for this area because of the rough nature of the topography.

A question may be asked here that surveys in this area could be considered a Government responsibility and B.M.R. may undertake the work.

Other Geophysical Targets:

Before the last season attention was drawn to a number of helicopter-borne E-M anomalies which should be investigated. No anomalies were investigated during last season.

Other Geophysical Targets (Contd.):

An order of priority for the anomalies is 3/14, 5/14, 8/14, 10/14 and 15/14, on the Corinna sheet and 7/30 and 8/30 in the Waratah area. Of all of these, it is thought 3/14 is the most likely to be a genuine conductor.

AMOUNT OF GEOPHYSICAL SURVEYING TO BE DONE

From Table 1, it is evident that the amount of surveying set down is beyond capabilities of a six-man party for the season. A nine-man party would be required to meet the requirements. We cannot contemplate a nine-man geophysical team as we do not have the trained personnel to supervise the work of nine men.

Therefore, it becomes necessary to prune this programme considerably and lay down a list of priorities. From geophysical point of view, the recommended priorities are listed as follows :-

1. Patterson Hill.
2. Chester
3. E-M Anomaly 3/14.
4. White Spur
5. Cuni
6. Comstock
7. E-M Anomalies 5/14, 8/14, 10/14 and 15/14.
8. Gold Hill Area.
9. E-M Anomalies 7/30 & 8/30.
10. West Sedgwick.
11. Savage River Iron Ore Deposits.

These priorities are contingent upon transport facilities being available.

Staff:

The geophysical team must be built around R. Pinney and D. Johnstone. Assuming a party of six, four others are required. These could come from the following -

(1) Ron Mattocks, if he can be released from Chillagoe.
(2) Ian Parkinson, if he returns to Zeehan.
(3) Geologist D. Berkman.
(4) University student R. J. Smith.
(5) Fill positions by advertising.

Track Cutting:

Experience over the last two seasons has shown that track cutting is a bottleneck. Some definite steps must be taken now to ensure the same bottleneck does not develop this season.

It will be seen from Table 1 that the estimated time for track cutting at White Spur is 180 man-days and estimated time for geophysical surveys, without I.P. survey, is 159 man days. With a geophysical party of 4, the survey could be finished in 40 days. At least 5 track cutters are required to keep ahead of the geophysical team; and a

Track Cutting (Contd.):

further 3 track cutters are required to meet the requirements of the second geophysical party. Therefore, a team of 8 track cutters is required.

It would be far better to employ a larger team of track cutters in the early part of the season and normal wastage would prune the team down in site, as the season progressed. This would allow the track cutting to get ahead of the geophysical party.

It would be advantageous to have the track cutting done on contract.

Note: As at 5/11/1959, 4 track cutters are employed. One man's main duty is to provision the camp. So far, only the base line has been completed in the White Spur area and no grid lines laid as yet. The northern part of this area is heavily wooded and track cutting so far has maintained a progress rate of between 500 and 600 feet per man-day. This is just over half the rate of progress allowed in Table 1. As a consequence, the 8 track cutters mentioned above would not keep ahead of the geophysical parties.

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T A B L E 1

Details of Geophysical Surveys

Area Name	Area Size Ft.	TRACK CUTTING Length of Line ft.	Man Days	Est. Cost £	E-M SURVEYS Line Ft.	Man Days	Crew	S-P SURVEYS Line Ft.	Man Days	Crew	MAGNETIC SURVEYS Line Ft.	Man Days	Crew	GRAVITY SURVEYS Line Ft.	Man Days	Crew	I. P. CHECKING Move Eq. in (Man-days.)	Move Eqpt out	No. Lines Checkd	Man Days	No. of Crew	Total Man-Day Geophysical	Total Man-days Exclusive of I.P.
White Spur	15840 x 4000	176000	180	720	Turam 160000 Vert loop 20,000	100 25	4 2	18000	8	2	18000	8	2	18000	18	3	16	16	6	32	4	223	159
Patterson Hill	2400 x 1200	Pegging only 9600	10	40	-			9600	6	2	9600	8	2	9600	12	3	16	16	3	12	4	70	26
Cuni (Aeromagnetic)	2800 x 2000	16280	18	72	Vert loop 16,000	10	2	16000	10	2	16000	16	2	16000	9	3						45	45
Chester	3200 x 2000	1500	2	8	Turam 18,000	18	4	18,000	6	2	7000	6	2	14000	12	3	16	16	2	8	4	82	42
Gold Hill	1200 x 3000	13200	13	52	Vert loop 12000	6	2	12000	6	2	12000	6	2	12000	9	3						27	27
Tullah	2100 x 2000	15500	16	64	Vert loop 30000	18	2															18	18
Comstock	3 lines																10		3	20	4	40	-
West Sedgwick	3 lines																10	12	3	20	4	32	-
Savage R. RTAE	10000 x 1500	52000	60	240							52000	50	2	52000	48	3	-					98	98
Sav.River Gvt.South	8 lines	11700	28	112							11700	20	2									20	20
Sav.River Gvt.North	21 lines	22000	56	224							22000	40	2									40	40
Airborne Helicopter) E-M Anomalies)	no work can be laid down areas until areas are inspected geologically.																						
Totals:		317,780	383	£1532	Turam 178,000 Vert.Loop 78,000	118 59		73600	36		146,600	154		121,600	108		68	60	17	92		695	475

Length of Field Season : Dec.1 to April 30.

No. of Weeks : 21 weeks.

Estimated effective geophysical days: 84.

Discussion of Table 1

(a) The cost of track cutting has been estimated at £4 per 1000 feet except for work in the Savage River Area, where a figure of £10 per 1000 feet has been allowed.

(b) In estimation of time for geophysical surveys, no allowance has been made for getting the party and equipment in and out of each area, except in the case of the I.P. equipment.

(c) The estimates of man-days does not allow for time wasted during wet weather.

(d) Items not revealed in Table 1 include :-

- (i) establishment of camps in each area
- (ii) breaking of camps in each area
- (iii) provisioning of each camp
- (iv) mode of transport to and from each area
- (v) means of access to areas across the Pieman River, i.e. Patterson Hill, Chester and Mt. Lindsay.

SUGGESTED EXPLORATION PROGRAMME

1. AIRBORNE GEOPHYSICS "EM" TWIN PIONEER.

(a) Coldstream
(b) Chester - Gold Hill
(c) Marionoak
(d) White Spur
(e) Gooseneck
(f) Comstock
(g) West Renison
(h) Waratah
(i) Mt. Cleveland-Magnet.
at $\frac{1}{8}$ mile spacing on EW grid, where practical.

2. GROUND GEOPHYSICS.

(a) Patterson Hill - S.P. I.P. Magnetic and Gravity
(b) White Spur - EM, S.P., Mag. Gravity and I.P. (check)
(c) Chester - E.M., I.P. Gravity Magnetic, S.P.
(d) Gormanston - I.P. and Gravity
(e) Comstock - I.P.
(f) Mt. Sedgwick - I.P.
(g) Cuni - Mag., S.P. Gravity
(h) Savage - Gravity and Magnetic.
(i) Mt. Farrell - E.M., S.P. Mag.
(j) Mt. Lindsay - E.M., S.P. Mag.
(k) Gold Hill - E.M., S.P., Etc.

3. GEOLOGICAL AND GEOCHEMICAL.

To be geared to geophysics and drilling.

4. DRILLING.

1.	Chester (a) mine - 2 drills x 1000 ft.	2000 ft.
	(b) West Chester geophysical 2 drills x 500 ft.	1000 ft.
2.	West Sedgwick - 2 drills x 1000 ft.	2000 ft.
3.	Howard - 2 drills x 500 ft.	1000 ft.
4.	Stirling Valley 3 drills x 500 ft.	1500 ft.
5.	Gooseneck - 3 drills x 1000 ft.	3000 ft.
6.	White Spur - 4 drills x 500 ft.	2000 ft.
7.	Patterson Hill - 3 drills x 500 ft.	1500 ft.
8.	Cuni - 1 drill x 1000 ft.	1000 ft.
9.	Mt. Lindsay - 2 drills x 500 ft.	1000 ft.
10.	Gold Hill - 2 drills x 500 ft.	1000 ft.
11.	Savage River - 4 drills x 1000 ft.	4000 ft.
		21,000 ft.

The regional exploration programme in Tasmania has reached what may be described as the half-way mark.

The regional geological and geophysical work, carried out over the last two and a half years enabled us to define areas of special interest for more detailed investigation and these have been listed and briefly described (see previous section). The locations are shown on the accompanying maps. The drilling programme of 20,000 feet will largely depend on findings and is visualized as being spaced over two years.

For the summer field season 1959-60 it is proposed to operate as follows :-

Period:	Jan. 1 to April 30, inclusive - 4 months
Geophysical:	Officer-in-Charge: E. McCarthy Assistants: 6.
Geological:	Officer-in-Charge (Field Operations) D. King. Assistants: Warren Atkinson, R. B. Frazer. 2 Students.
Zeehan Office:	Resident Clerk.

Periodical Visits: Dr. B. Campana, H. Jensen, S. B. Dickinson.

Period:	May 1 to December 31 - 8 months.
Geological:	Officer-in-Charge (Field Operation) D. King. Assistants: Warren Atkinson.
Zeehan Office:	Resident Clerk.

Periodical Visits: Dr. B. Campana, H. Jensen, S. B. Dickinson.

Expenditures are estimated as follows :-	£
Salaries & Wages	20,000
Diamond Drilling - 5,000 ft.	25,000
Airborne Geophysics (Straightedge)	7,500
Underground exploration (Tullah)	10,000
Helicopter Charter	5,000
Track cutting	2,500
Field Expenses	15,000
Overheads R.T.M.S. & R.T.A.E.	15,000
	£100,000

It is proposed that the foregoing be the basis for a discussion with the E. Z. Company representatives and this report is circulated for study prior to a meeting to be arranged.

Managing Director
R. T. A. E.

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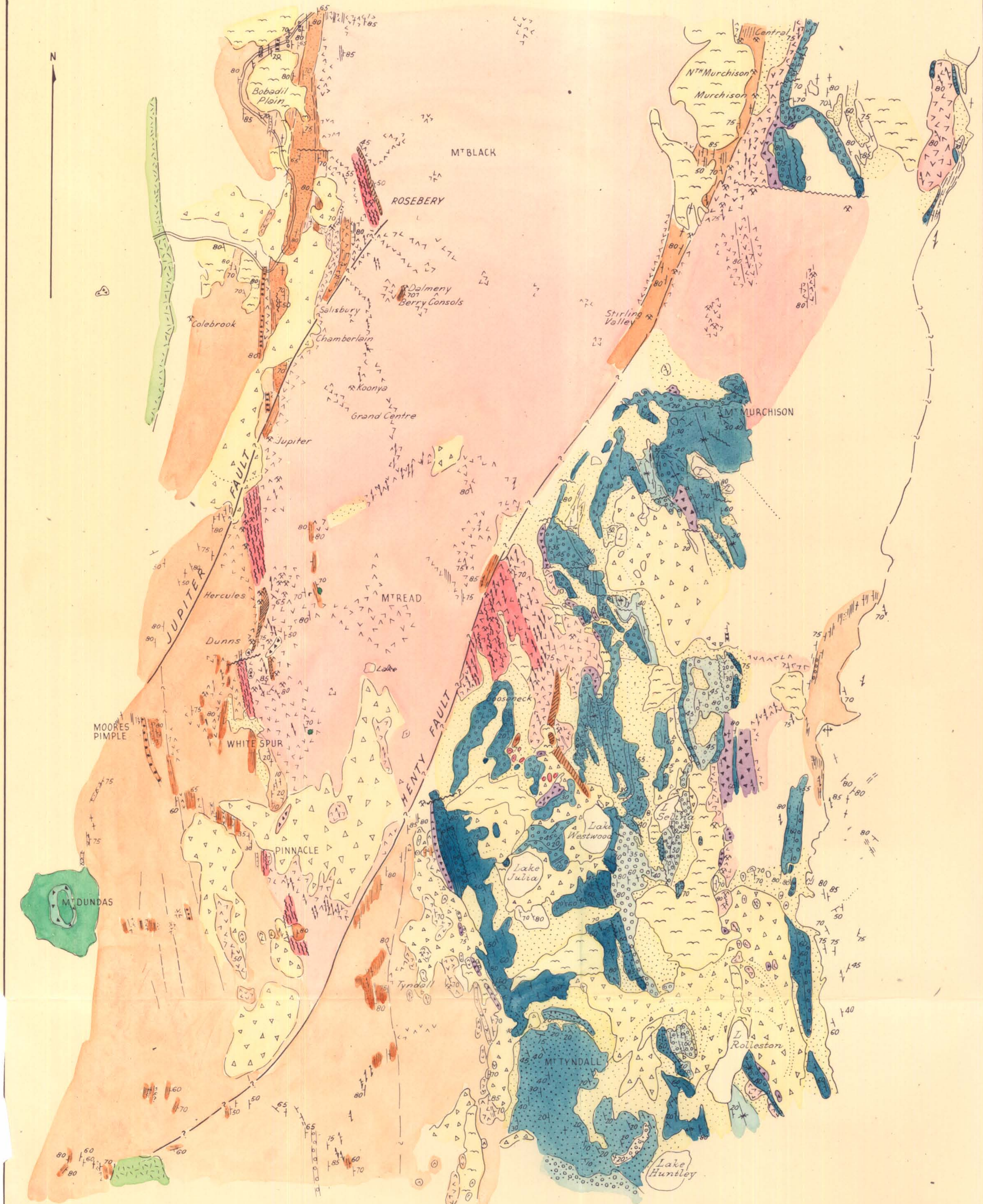


LEGEND

Scree, debris, generally less than 10 feet in thickness

Alluvial and eluvial deposits, generally less than 25' in thickness

PLEISTOCENE

Morainic deposits: 20' to 40' thick

Frontal and lateral moraines: up to 120' thick

JURASSIC

Dolerite

PERMIAN

Tillite & Permian beds undifferentiated

ORDOVICIAN

MIDDLE OWEN CONGLOMERATE:

Light coloured conglomerate at top and purple quartzite, pebble conglomerate and breccia

LOWER OWEN CONGLOMERATE:

Light coloured cobble conglomerate (Mt Tyndall Congl.)

Light coloured quartzites & pebbly quartzites (Lake Julia Quartzite)

BASAL OWEN CONGLOMERATE

Coarse siliceous conglomerate light grey to pinkish (Gooseneck Conglomerate)

JUKES BRECCIA

Greywacke breccia conglomerate

CAMBRIAN &/or DEVONIAN AGE

Gabbros & Serpentine

CAMBRIAN

VOLCANIC BELT

Porphyries, keratophyres, felsites with tuffs

Bands of slates & tuffaceous slates

Chiefly, massive pyroclastics with porphyries & lavas

(Symbols refer to observed outcrops of volcanics)

SEDIMENTARY BELT

BASAL SEQUENCE

Quartzites, slates, tuffs, conglomerates dolomitic beds of the Carbine, Rosebery, Success Ck - Groups

Bedded Volcanics, Slate bands } Footwall pyroclastics, Volcanics of Natone Ck

Stitt quartzite

Fuchsite breccia conglomerate

PRE-CAMBRIAN (inferred)

Quartzite, slate & schists (Undifferentiated)

402 31

FAULTS

Owen Rift Fault & related schists. Earliest movements predated massive volcanics

Devonian age

Post Permian or undifferentiated

GEOLOGICAL FACT MAP

ROSEBERY GOOSENECK AREA

Scale 1 inch to 1 mile

5 cm

Plan No T 611

Nov. 1959

Geology by B Campana & D. King

GENERALISED INTERPRETATION MAPS - ROSEBERY - GOOSENECK AREA WEST TASMANIA

Fig 1

STRATIGRAPHIC BOUNDARIES AND FAULT SYSTEMS

(Interpretation based on Geological Fact Plan No T 611)

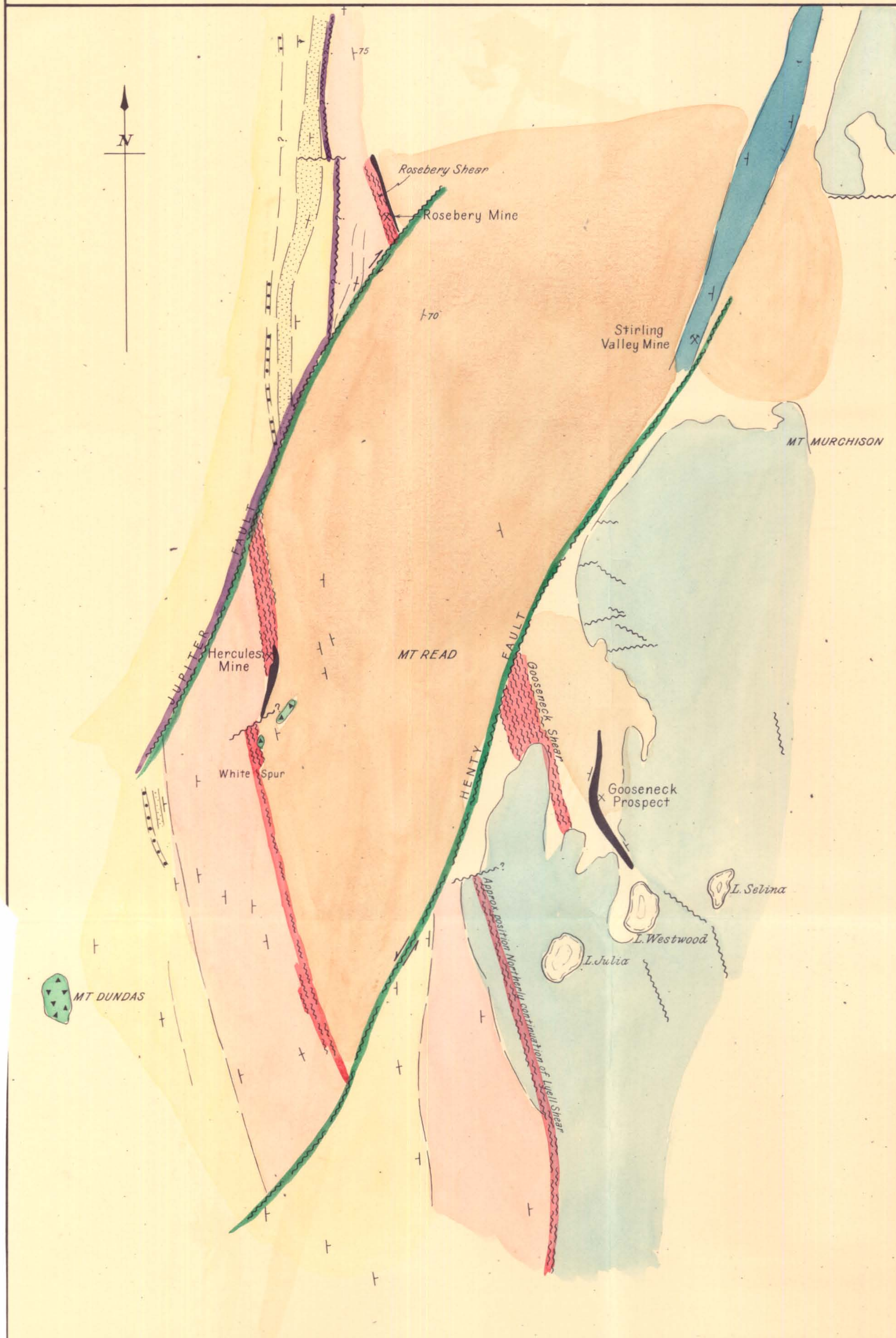
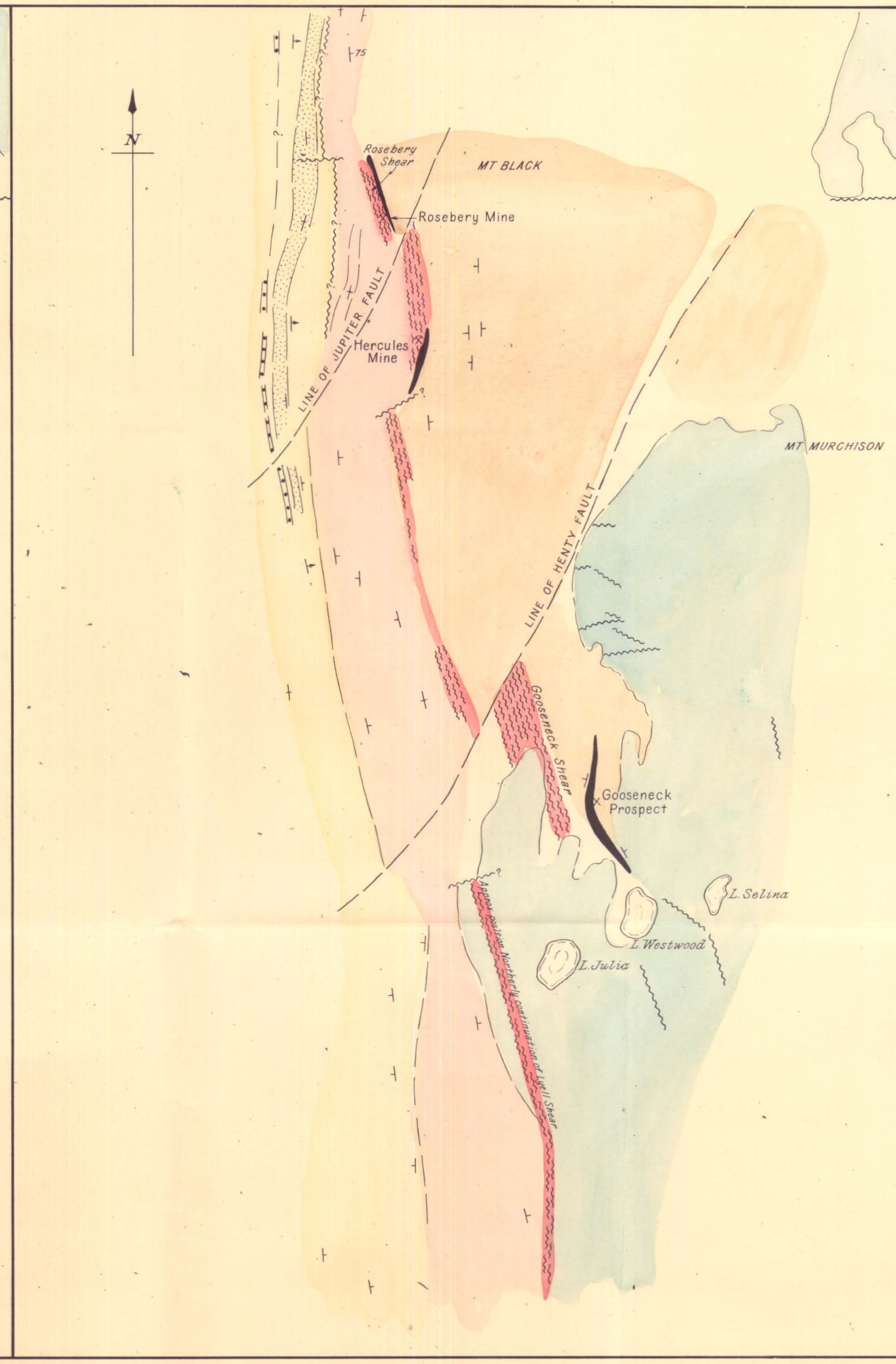


Fig 2

HYPOTHETICAL RECONSTRUCTION OF STRATIGRAPHIC BOUNDARIES AND FAULT SYSTEMS PRE-DATING JUPITER AND HENTY FAULTS.



LEGEND

STRATIGRAPHY

PERMIAN
- Tillite

ORDOVICIAN
- Owen Conglomerate and Jukes Breccia (undifferentiated)

CAMBRIAN
- Massive volcanics (porphyries, felsites etc.)
- Mineralised slatey sediments of Stirling Valley - Tullah
- Slate level of Rosebery, Hercules and Gooseneck
- Footwall volcanics and slates of Rosebery and White Spur
- Basal sedimentary sequence
- Stitt quartzite marker formation
- Fuchsite conglomerate marker formation

MAJOR FAULT SYSTEMS

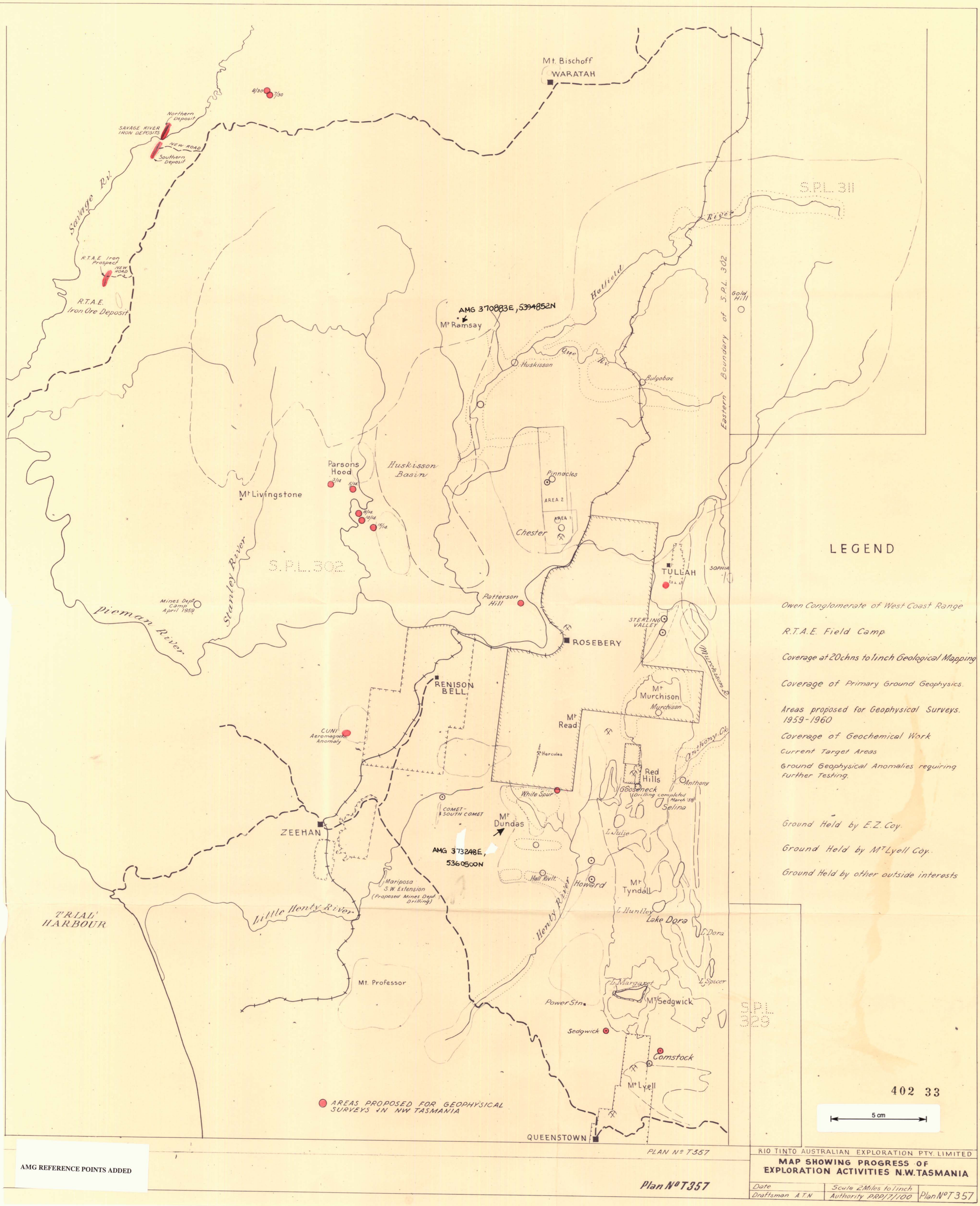
- POST - PERMIAN: Block faulting of the Permian peneplain surface
- CAMBRO - ORDOVICIAN(?): Read - Dundas Thrust. Dismembering of the Owen Rift Fault
- CAMBRIAN: Owen Rift Fault. Earliest movements predated massive volcanics
- Undifferentiated faults

5 cm

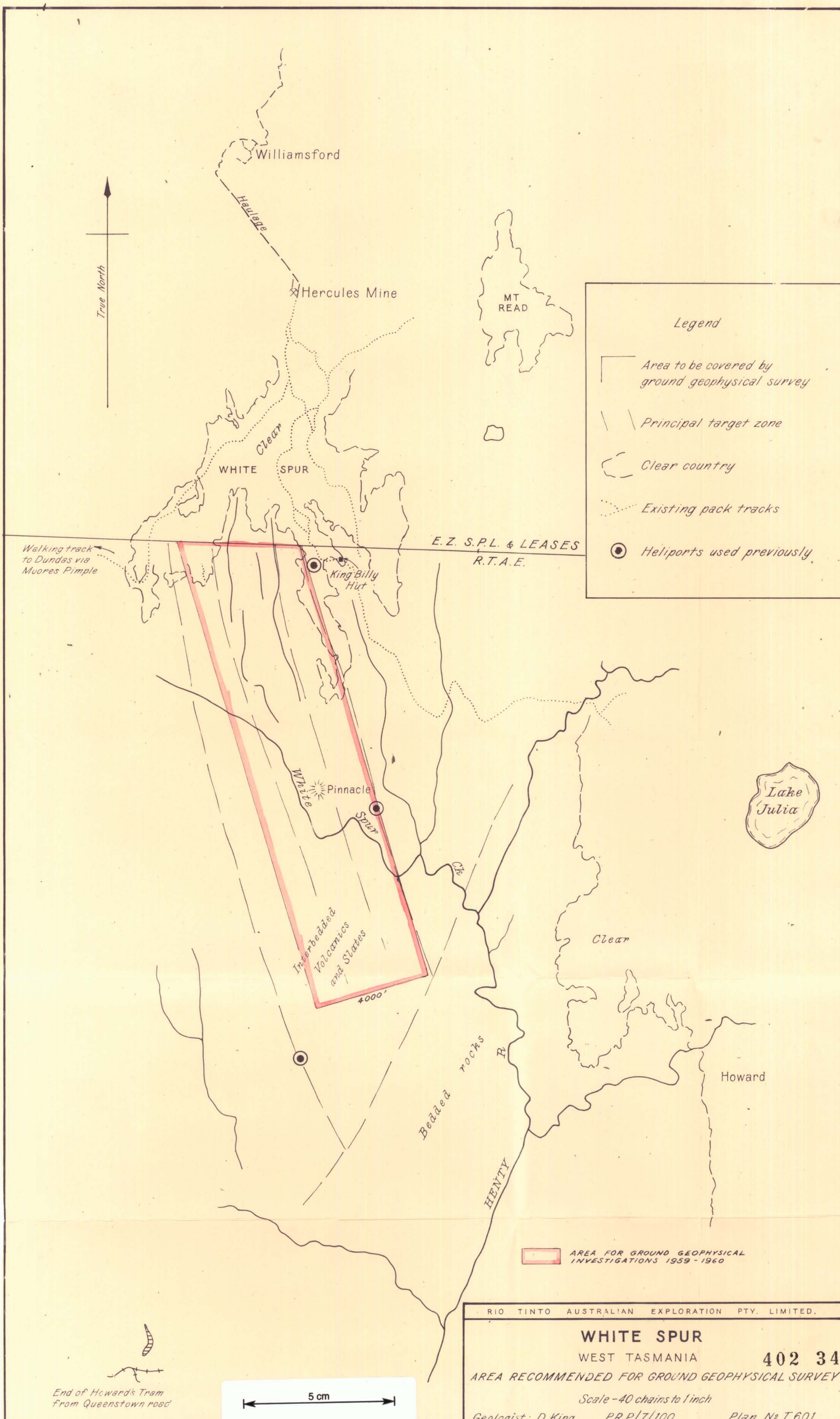
402 32

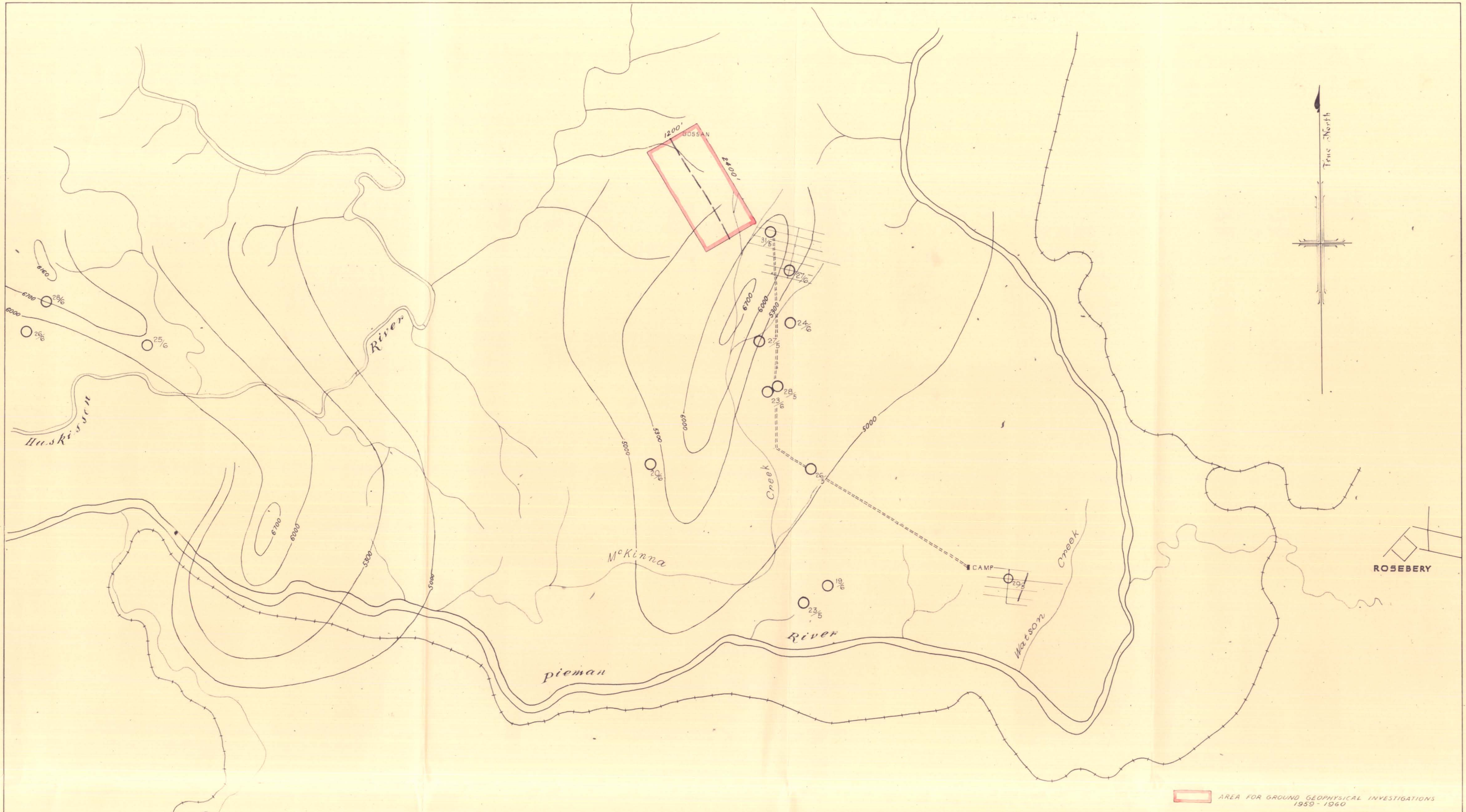
Geologist: D. King. October, 59. Scale: 1 mile to 1 inch. P.R.P./7/100

Plan No T 610



Mt. Bischoff
WARATAH
SAVAGE RIVER IRON DEPOSITS
Northern Deposit
NEW ROAD
Southern Deposit
Savage Rv.
R.T.A.E. Iron Prospect
NEW ROAD
R.T.A.E. Iron Ore Deposit
S.P.L. 311
River
Hatfield
Eastern Boundary of S.P.L. 302
Gold Hill
AMG 370883E, 5394852N
Mt Ramsay
Huskisson
Bulgobac
Parsons Hood
Huskisson Basin
Mt Livingstone
Pinnacles
AREA 2
AREA 1
Chester
S.P.L. 302
Stanley River
Mines Dept Camp April 1959
Pieman River
Patterson Hill
TULLAH
SOPHIA
STERLING VALLEY
ROSEBERY
Murchison R.
RENISON BELL
Mt Murchison
Murchison
Mt Read
CUNI Aeromagnetic Anomaly
Hercules
Anthony Ck
Red Hills
Gooseneck (Drilling completed March '59)
Anthony
Selina
White Spur
COMET-SOUTH COMET
Mt Dundas
ZEEHAN
AMG 373248E, 5360500N
L. Julia
Hall Rivlt.
Howard
Mt Tyndall
Mariposa S.W. Extension (Proposed Mines Dept. Drilling)
Little Henty River
Henty River
TRIAL HARBOUR
L. Huntley
Lake Dora
L. Dora
Mt. Professor
L. Margaret
L. Spicer
Mt Sedgwick
Power Stn.
S.P.L. 329
Sedgwick
Comstock
Mt Lyell
AREAS PROPOSED FOR GEOPHYSICAL SURVEYS IN NW TASMANIA
QUEENSTOWN
LEGEND
Owen Conglomerate of West Coast Range
R.T.A.E. Field Camp
Coverage at 20chns to 1inch Geological Mapping
Coverage of Primary Ground Geophysics.
Areas proposed for Geophysical Surveys. 1959-1960
Coverage of Geochemical Work
Current Target Areas
Ground Geophysical Anomalies requiring further Testing.
Ground Held by E.Z. Coy.
Ground Held by Mt Lyell Coy.
Ground Held by other outside interests
402 33
5 cm
PLAN No T357
AMG REFERENCE POINTS ADDED
Plan No T357
RIO TINTO AUSTRALIAN EXPLORATION PTY. LIMITED
MAP SHOWING PROGRESS OF EXPLORATION ACTIVITIES N.W. TASMANIA
Date
Draftsman A.T.N
Scale 2 Miles to 1 inch
Authority PRP/7/100
Plan No T357


Williamsford
Haulage
Hercules Mine
True North
MT READ
Clear
WHITE SPUR
Legend
Area to be covered by ground geophysical survey
Principal target zone
Clear country
Existing pack tracks
Heliports used previously
E.Z. S.P.L. & LEASES
R.T.A.E.
Walking track to Dundas via Muores Pimple
King Billy Hut
White Pinnacle Spur
Cr
Lake Julia
Interbedded Volcanics and Slates
Clear
4000'
Bedded rocks
R
Howard
HENTY
AREA FOR GROUND GEOPHYSICAL INVESTIGATIONS 1959 - 1960
End of Howard's Tram from Queenstown road
5 cm
RIO TINTO AUSTRALIAN EXPLORATION PTY. LIMITED.
WHITE SPUR
WEST TASMANIA
402 34
AREA RECOMMENDED FOR GROUND GEOPHYSICAL SURVEY
Scale - 40 chains to 1 inch
Geologist: D. King
P.R.P/7/100
Plan No T601



5 cm

E.M. Anomalies.
Aeromagnetic Contours.
S.P. Anomalies.
S.P. Traverses.

RIO TINTO AUSTRALIAN EXPLORATION PTY. LIMITED

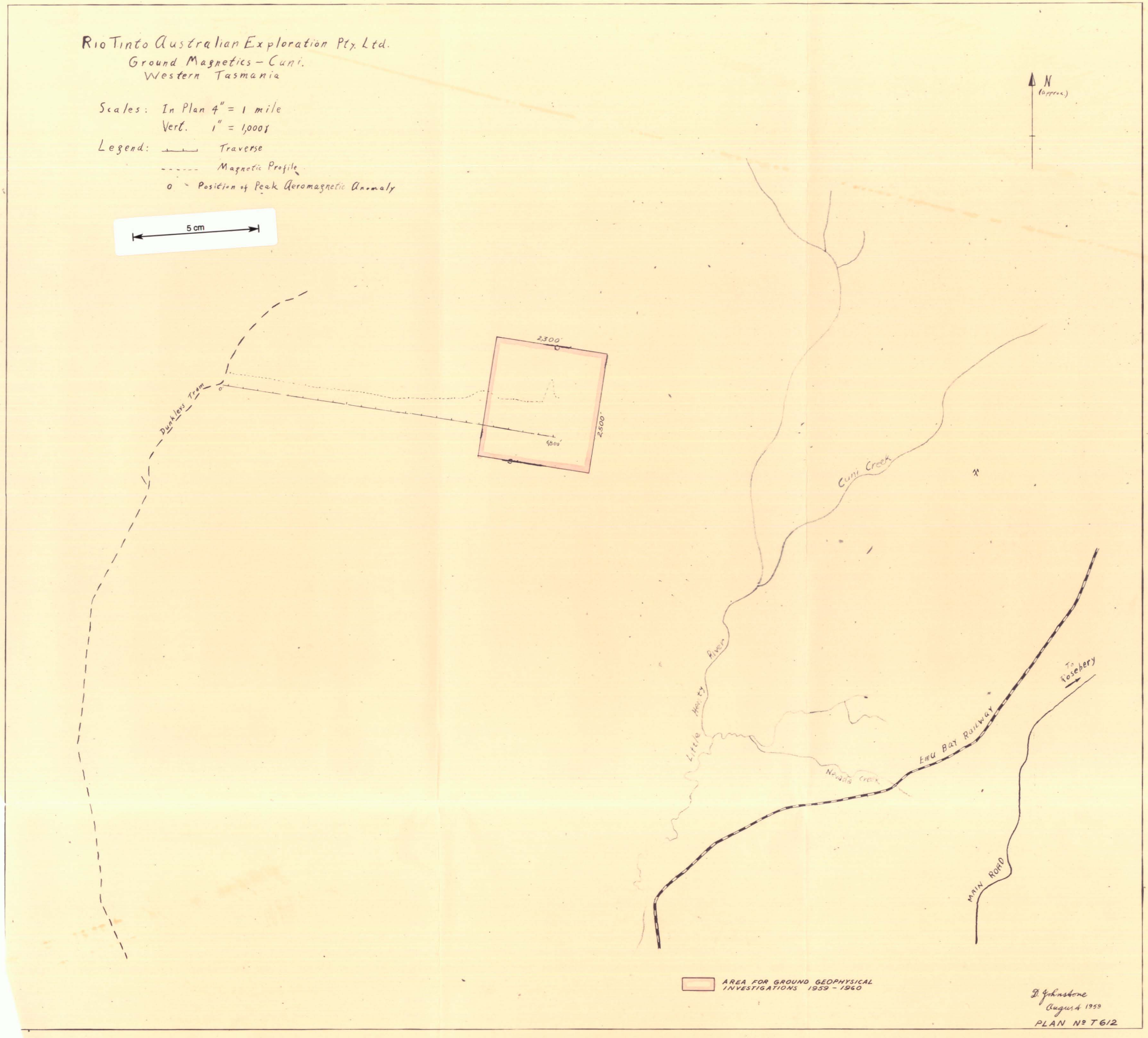
N.W. TASMANIA

PATTERSON HILL AREA
SHOWING S.P. SURVEYS

DATE: April, 1957	SCALE 20 Chains to 1 Inch
Geologist: J. H. Rattigan	Geophysicist:
Draftsman: D.J.L.	Authority: PRP/7/100

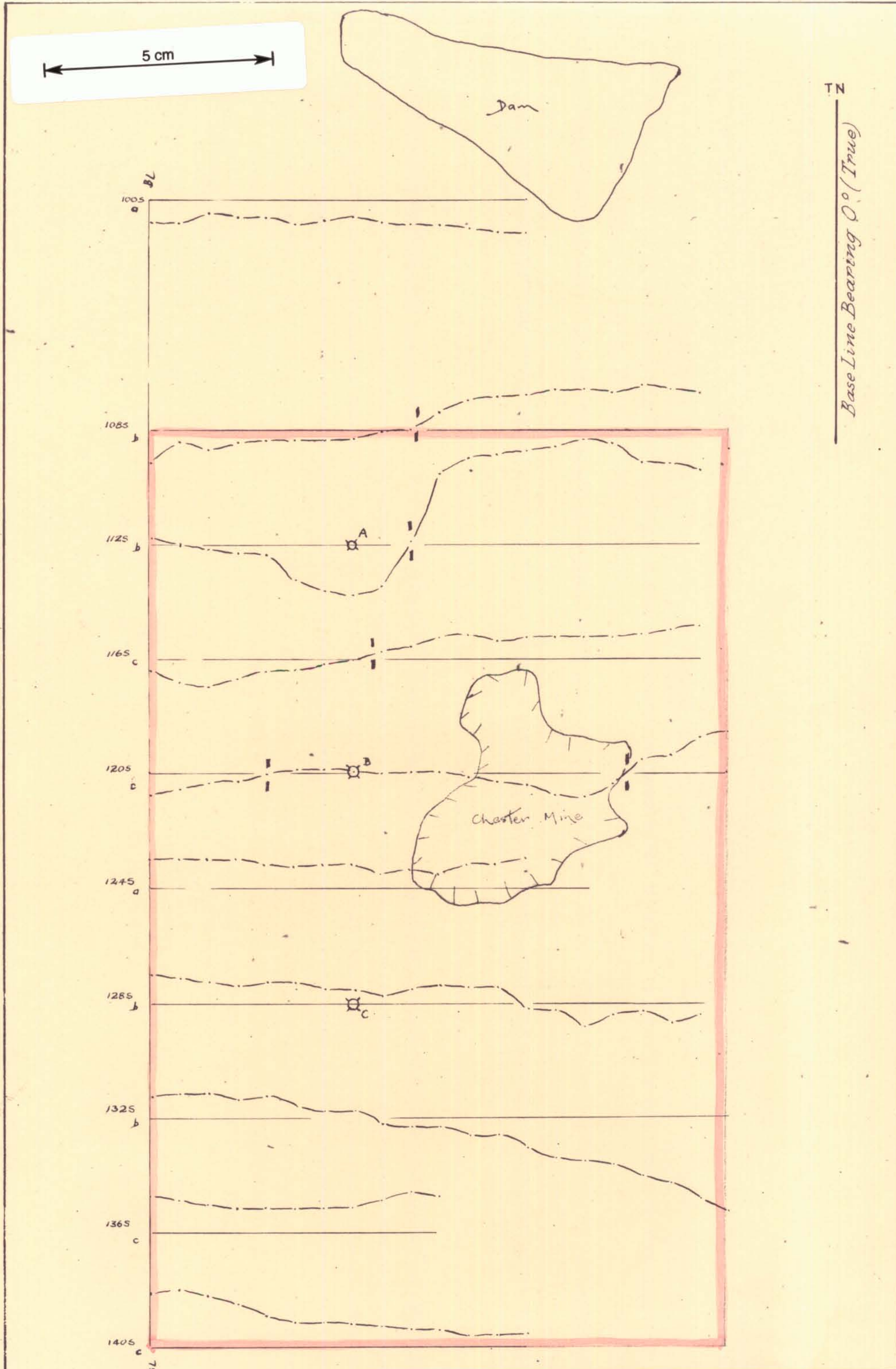
402 35

T 44



Rio Tinto Australian Exploration Pty. Ltd.
Ground Magnetics – Cuni.
Western Tasmania
Scales: In Plan 4" = 1 mile
Vert. 1" = 1,000γ
Legend: Traverse
Magnetic Profile
o – Position of Peak Aeromagnetic Anomaly
5 cm
N (approx.)
Dunkleys Tram
2300'
2500'
Cuni Creek
Little Henty River
Nevada Creek
Emu Bay Railway
To Rosebery
Main Road
AREA FOR GROUND GEOPHYSICAL INVESTIGATIONS 1959 – 1960
D. Johnstone
August 1959
PLAN Nº T612

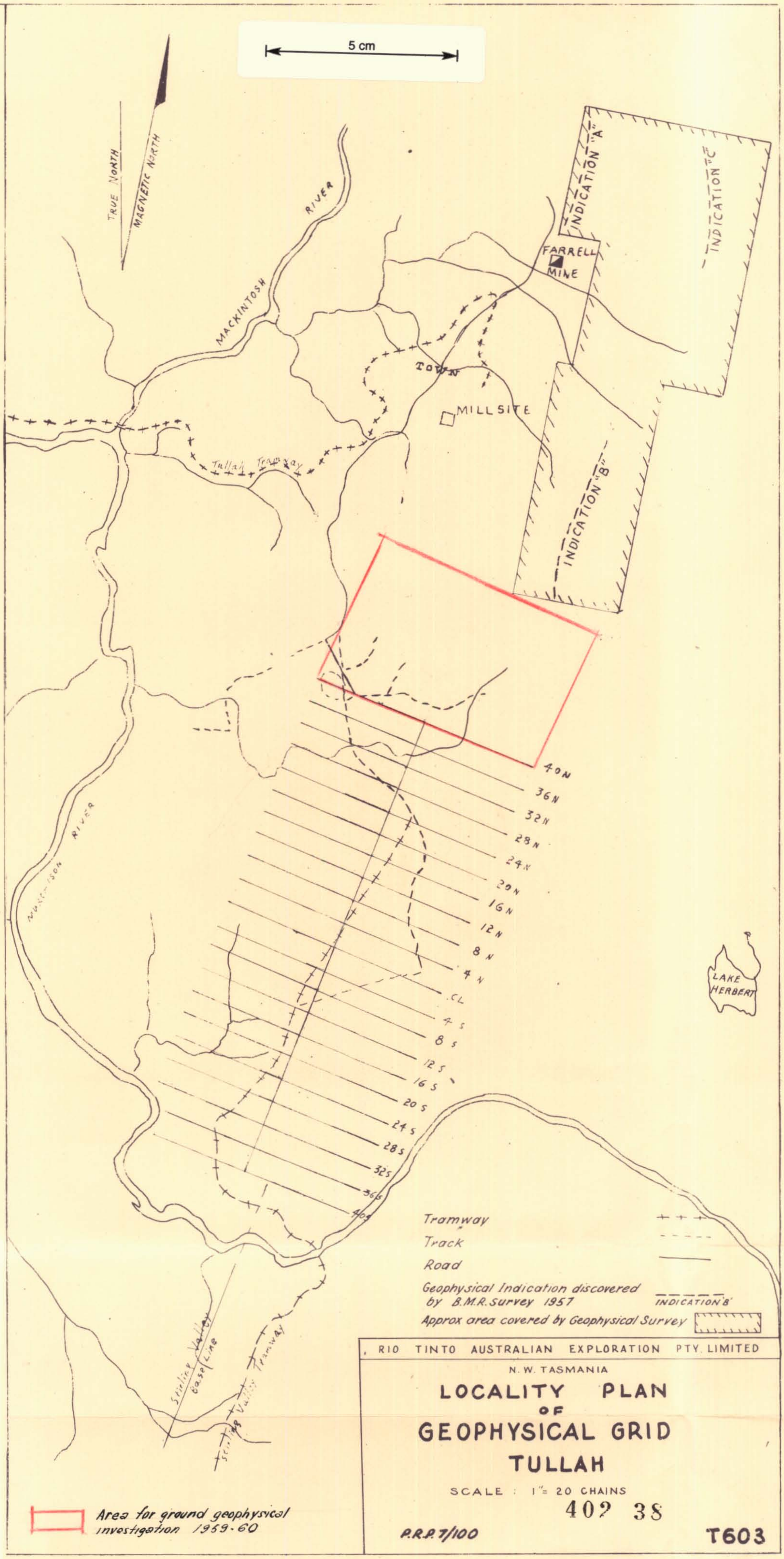
402 36



Area for ground geophysical investigations 1959-1960

402 37

RIO TINTO AUSTRALIAN EXPLORATION PTY. LIMITED		
CHESTER MINE AREA VERTICAL LOOP - E.M PROFILES		
Scales Vert. 1" to 20° tilt. Plan 1" to 400 ft		Plan No T579
Date May 1959	PRP/1/100	



5 cm
TRUE NORTH
MAGNETIC NORTH
MACKINTOSH RIVER
INDICATION "A"
INDICATION "C"
FARRELL MINE
TOWN
MILLSITE
Tullah Tramway
INDICATION "B"
MURCHISON RIVER
LAKE HERBERT
40N
36N
32N
28N
24N
20N
16N
12N
8N
4N
CL
4S
8S
12S
16S
20S
24S
28S
32S
36S
40S
Sterling Valley Base Line
Sterling Valley Tramway
Tramway
Track
Road
Geophysical Indication discovered by B.M.R. Survey 1957
INDICATION B
Approx area covered by Geophysical Survey
Area for ground geophysical investigation 1959-60
RIO TINTO AUSTRALIAN EXPLORATION PTY. LIMITED
N. W. TASMANIA
LOCALITY PLAN OF GEOPHYSICAL GRID TULLAH
SCALE : 1" = 20 CHAINS
402 38
P.R.P. 7/100
T603

RIO TINTO AUSTRALIAN EXPLORATION PTY LIMITED

SAVAGE RIVER AREA LOCALITY PLAN
SHOWING
MAIN MAGNETIC ANOMALIES

DATE	SCALE 40 CHAINS TO 1 INCH	
GEOLOGIST	GEOPHYSICIST	PLATE
DRAFTSMAN	AUTHORITY PRP 7/100	1

402 39

T 82


TRAVERSE G
TRAVERSE F
TRAVERSE E5
TRAVERSE E
TRAVERSE D27
TRAVERSE D16
TRAVERSE D12
TRAVERSE D
TRAVERSE C32
TRAVERSE C31
TRAVERSE C29
TRAVERSE C12
TRAVERSE C
TRAVERSE B8
TRAVERSE B
TRAVERSE A
Halls Creek
Savage River
Whyte Creek
Webster
BMR TRAVERSE LINES
RTAE PROPOSED TRAVERSE LINES
5 cm
RIO TINTO AUSTRALIAN EXPLORATION PTY. LTD.
PLAN SHOWING PROPOSED TRAVERSE LINES
SAVAGE RIVER
402 40
4th November 1959
SCALE 1" : 400'
PRP/7/100/2
PLAN No T 613