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E.L.23/84

GUILDFORD AREA

RELINQUISHMENT REPORT

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SUMMARY

E.L. 23/84 was acquired in 1984 in order to explore for carbonate replacement tin orebodies concealed beneath Tertiary basalt cover. Work planned for 1985 comprised a compilation of all existing company data on the area together with some computer treatment of existing aeromagnetics data. This work was shelved when it was realized that mineral rights over the area may be held by the private landholder in the district, a subsidiary of North Broken Hill.

The existing company data on the area was studied at some length but in less detail than had been originally planned. As a result, it was concluded that the expensive and high risk exploration approach required to further explore this area could not be justified in the light of the potential land tenure problems.

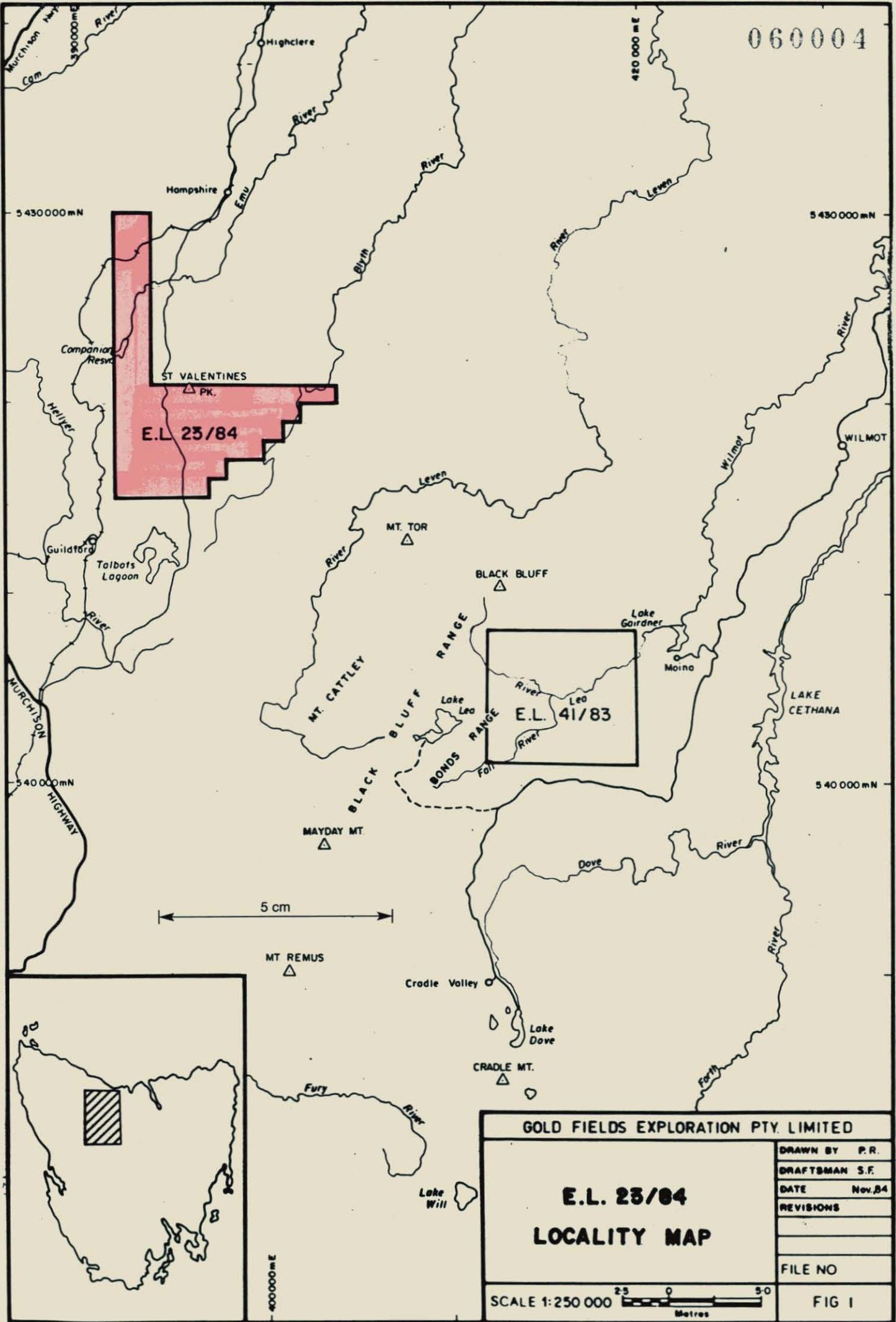
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GOLD FIELDS EXPLORATION PTY. LIMITED	
E.L. 23/84	DRAWN BY P.R.
LOCALITY MAP	DRAFTSMAN S.F.
	DATE Nov. 84
	REVISIONS
	FILE NO
SCALE 1:250 000	25 0 50 Metres
	FIG 1

1. INTRODUCTION

E.L. 23/84 covers an area of 68 sq. km. north-east of Guildford in North-West Tasmania (Figure 1). This is an area of moderate relief, rising to two peaks in its north-east section, St. Valentines Peak and Companion Hill.

The E.L. is heavily timbered throughout with a combination of eucalypt forest and lesser rainforest and is located within one of A.P.P.M.'s Tasmanian land holdings, the Surrey Hills block. A.P.P.M. has constructed a network of forestry roads throughout the block and consequently access into the area is excellent.

Geologically, the area comprises Cambrian volcanics and sediments, and Ordovician to Lower Devonian conglomerates, sandstones, shales and limestones, all of which are largely concealed by Tertiary basalt (Figure 2).

Until early 1984, the Guildford area was held by Comalco as part of their E.L. 1/76. Following that E.L.'s relinquishment, three companies applied for parts of the area. As a result, two E.L.'s were granted; of these, the western one was taken up by Australian Anglo-American and the eastern one was granted to R.G.C. as E.L.23/84.

The first two stages of work planned for this area were:

- (1) To compile all existing data onto a series of standard map sheets, and
- (2) To undertake sophisticated computer filtering and enhancement of the existing aeromagnetic data to generate targets for ground follow-up.

The above was designed to lead fairly directly into a program of drilling through the basalt cover to test for carbonate-replacement, massive pyrrhotite tin deposits. In the event, the above work was not carried out when it was recognized that the owner of the private land in which E.L.23/84 is located may have private mineral rights. Since the landholder, A.P.P.M., is a subsidiary of a major mining company, viz. North Broken Hill, this was seen as a significant problem.

Thus, instead of embarking on the proposed program, it was decided to examine the data on the area in some detail, without generating numerous maps, in order to assess if the area was sufficiently prospective to warrant a more substantial exploration effort, despite the land tenure complications. This report summarizes the result of that assessment.

2. EXPLORATION HISTORY2.1 Pre-1976

Some exploration was completed in the general area by Comstaff in the late 1960's and by Northern Prospecting in 1975. The latter company completed three vertical diamond drill holes: viz. GF1, 152.0m deep, GF2, 88.5m and GF3, 90.0m (Gould, 1975). None of these holes lie within E.L.23/84 (Figure 2), however the fact that all of them were completed in Tertiary basalt was an early indication of the thickness of the basalt and therefore the difficulty of searching for ore deposits concealed beneath it.

2.2 1976 to 1980

Comalco acquired E.L.1/76, which then covered an area of 264 sq. km. including all of what is now E.L.23/84, in 1976. Comalco's primary target in this area was fluorite-bearing tin/tungsten skarn. Secondary targets were carbonate replacement tin deposits and volcanic-hosted massive base metal sulfide orebodies.

During this period, Comalco completed the following work (Weste, 1978 and Weste, 1979):

- (1) Reconnaissance geological mapping. The results of this work are reproduced on Figure 2. Some follow-up mapping was undertaken in areas where carbonates were thought to be present.
- (2) Stream geochemistry. A number of different techniques were used:
 - (a) Conventional stream sediments (-80 mesh), assayed for Cu, Pb, Zn, Bi.
 - (b) Panned concentrates, assayed for Sn, W, Cu, Pb, Zn, Bi and scanned for scheelite under a U/V lamp.
 - (c) Magnetic concentrates, taken by working a magnet through stream sediments, assayed for same elements as for panned concentrates.
 - (d) Water samples, assayed for F by specific ion electrode.

- (3) Aeromagnetics survey of north-east section of E.L., primarily in areas of pre-Tertiary exposure.
- (4) Follow-up of stream sediment and aeromagnetic anomalies at five localities (see Figure 3) using a variety of techniques, including geological mapping, soil geochemistry, ground magnetics and gradient array I.P. Results in brief:
- (a) St. Valentines Peak Grid: Follow-up on north-south trending aeromagnetic anomaly which is the southern extension of the anomaly over the Kara tungsten skarn deposit. One drill hole was completed north of the E.L. boundary with disappointing results - a thin, tin-poor magnetic skarn was intersected.
 - (b) West of St. Valentines Peak. Weak tin and tungsten stream geochemical anomalies were found to be reflecting tin/tungsten anomalous quartz-tourmaline veins.
 - (c) Blythes Road. Small aeromagnetic anomalies over Tertiary basalt, thought to be concealing Ordovician limestone. Although some I.P. anomalies were obtained, the ground magnetics results were noisy and therefore probably reflected magnetic sources within the basalt.
 - (d) Gin Creek. Lead stream geochemical anomalies were traced to lead-enriched limonite-quartz veins in a sericitized and chloritized Cambrian quartz porphyry.
 - (e) Talunah Road. A broad N.E. trending aeromagnetic anomaly was followed up with ground magnetics. Very low magnetic gradients were observed probably indicating a deep source.

In 1980, Comalco entered into a Joint Venture with Shell on E.L.1/76. Shell then took over management of exploration on the E.L.

2.3 1980 to 1984

Shell's primary exploration targets on the E.L. were:

- (1) Bischoff style massive pyrrhotite tin orebodies.
- (2) Moina-Kara style tungsten-tin skarns.

In pursuit of the above targets, Shell carried out the following work (Smyth and Hungerford, 1984):

- (1) Detailed airborne magnetics/radiometrics survey over the basalt-covered portion of the E.L. The raw data was upward continued to 600m in order to remove high frequency noise caused by local sources within the basalt cover.
- (2) Regional gravity survey over the E.L. Readings were taken at 2 km spaced stations in an effort to determine the subsurface geometry of the Housetop Granite which outcrops to the north-east of the E.L.
- (3) Geophysical depth sounding techniques at seventeen different locations throughout E.L.1/76, of which four were on what is now E.L.23/84 (see Figure 3). Resistivity, SIROTEM, AMT and spectral analysis of the magnetics data were all used. Resistivity was found to be ineffective because the basalt appeared to be thicker than 100m (the method's maximum depth penetration) wherever it was tried. SIROTEM and AMT gave similar results (although they were only used together at one site) and indicated that the basalt is more than 200m thick within the E.L. (23/84) west of the Guildford road and south of the Companion Reservoir, thinning to 100m or less in the northern and eastern "salients" of the licence. In general, the depth soundings were not carried out over aeromagnetic anomalies.
- (4) Four aeromagnetic anomalies and one INPUT airborne EM anomaly were followed up on the ground (Figure 3) with a variety of techniques including ground magnetics, gravity, VLF-EM, Max-Min EM, I.P. and soil geochemistry. Results in brief:
 - (a) Peak Plain (3941/3). Follow-up of an aeromagnetic anomaly over basalt revealed a complex ground magnetic anomaly with a weak coincident I.P. response. This was tested with a vertical percussion/diamond drill hole which penetrated the basalt. Summary log:
 - 0.0- 71.2m Tertiary basalt and sediments.
 - 71.2-106.0m Partly calcareous siltstone, minor pyrite.
 - 106.0-113.3m Limestone, minor pyrite, including 20 cm massive pyrite, near siltstone contact. Tin and tungsten values are very low.

6.

- (b) Old Park Road (3941/4). Several weak aeromagnetic anomalies were followed-up on the ground but no discrete ground magnetic anomalies were located.
 - (c) Basils Road/Emu River (3942/2, 3942/7). Two of a series of NE trending aeromagnetic anomalies in the northern "salient" of the licence (cf. Comalco's Talunah Road anomaly). Shell's work suggested that these anomalies reflect a Tertiary basalt-filled valley.
 - (d) Reservoir West (3942/6). Aeromagnetic anomaly probably related to a basalt hill.
 - (e) Wey Road (3941/IL10). A six channel INPUT response here was followed up with several EM techniques without obtaining a significant response. The anomaly was ascribed to basalt weathering efforts.
- (5) One vertical stratigraphic hole was drilled on Bunkers Road just west of E.L.23/84's western boundary. The hole was drilled to 202.5m and was stopped in basalt. Subsequent SIROTEM and AMT depth soundings suggested that the basalt cover there is about 250m thick.

3. DISCUSSION AND CONCLUSIONS

The following points are relevant:

- (1) Good quality aeromagnetic data is available over the entire E.L. To date, treatment of that data has been confined to upward continuation and some limited spectral analysis. It should be possible to filter the data in other ways to remove the high frequency noise and then to use more sophisticated computer techniques to identify:
 - (a) Subtle "residual" anomalies which may reflect sub-basalt magnetic bodies.
 - (b) Linear features in the magnetics which may reflect structures and other geological contacts beneath the basalt cover.
- (2) The SIROTEM and AMT depth soundings have probably given a reasonably reliable indication of the thickness of the Tertiary basalt. Where the two techniques were tested together, they gave closely comparable results. In addition, elsewhere in the same district, BHP has confirmed the accuracy of multifrequency transient EM soundings to test the basalt thickness with drilling (Isles et al., 1984). Therefore, one can be reasonably confident that the basalt thickness is more than 200m west of the Guildford Road and south of the Companion Reservoir. Elsewhere on the E.L. the basalt is evidently thinner although large thickness variations should be expected as a result of the pre-basalt topography e.g. the possible pre-Tertiary valley in the Basils Road area.
- (3) Pre-Tertiary geology is exposed in the north-east section of the licence area in the vicinity of St. Valentines Peak and Companion Hill. The results of Comalco's work in this area were most discouraging for carbonate replacement tin search, or indeed for the discovery of their primary target, Kara style tungsten skarns.
- (4) In the southern and western two thirds of the E.L., the only outcropping lithologies are Tertiary basalts and interflow sediments. Stream geochemistry tin results were very poor throughout this area. As a result, there is virtually no potential here for carbonate replacement deposits which either:

- (a) subcrop beneath basalt soil, or
 - (b) are shallowly buried beneath the basalt, but which were eroded during the Tertiary into the interflow sediments, which now outcrop.
- (5) Although average basalt thickness may exceed 200m in the southwestern section of the E.L., basalt cover over a buried deposit may be substantially shallower than this, because, as at Bischoff, the deposit may form a hill. Unfortunately, if that were the case, it would probably result in a very subtle magnetic anomaly because the component of the response reflecting the pyrrhotite orebody would be partly negated by a reduction in the magnetic response caused by the relative thinness of the basalt.

In summary, a major professional effort has already been put into exploring for both outcropping and buried, magnetic pyrrhotite tin orebodies in the Guildford area with a conspicuous lack of success. Therefore, any further exploration in this area must rely on a more sophisticated approach than the one that has already been used. This would probably involve computer manipulation of airborne magnetic data, extensive depth sounding using a multifrequency transient EM system and a considerable drilling effort. Clearly, this approach involves a substantial commitment both in terms of professional time and expenditure. Given the inherently high risk nature of such exploration and the uncertainties of the land tenure situation in the Guildford area, such a commitment can not be justified. Accordingly, application has been made to relinquish the licence.

4. REFERENCES

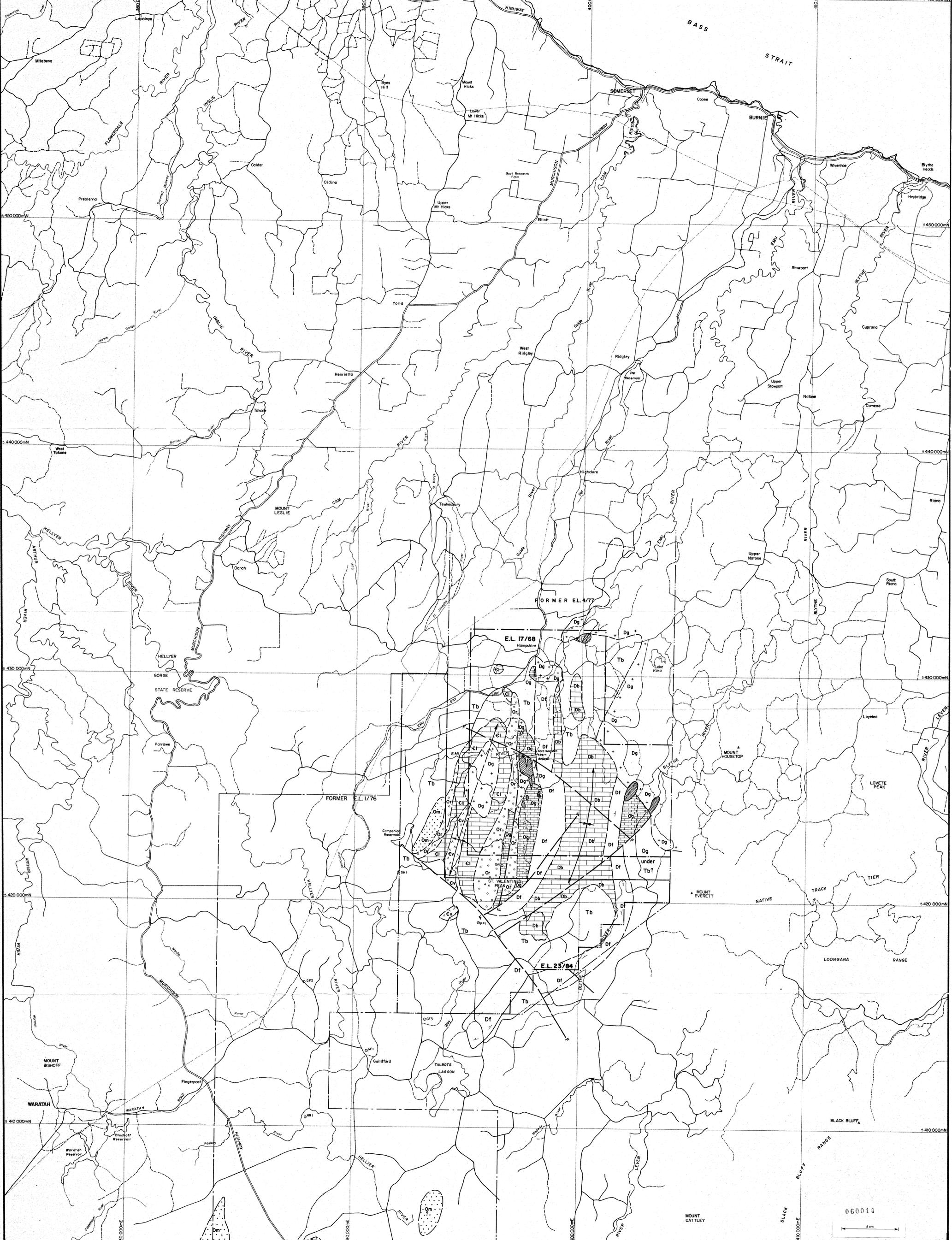
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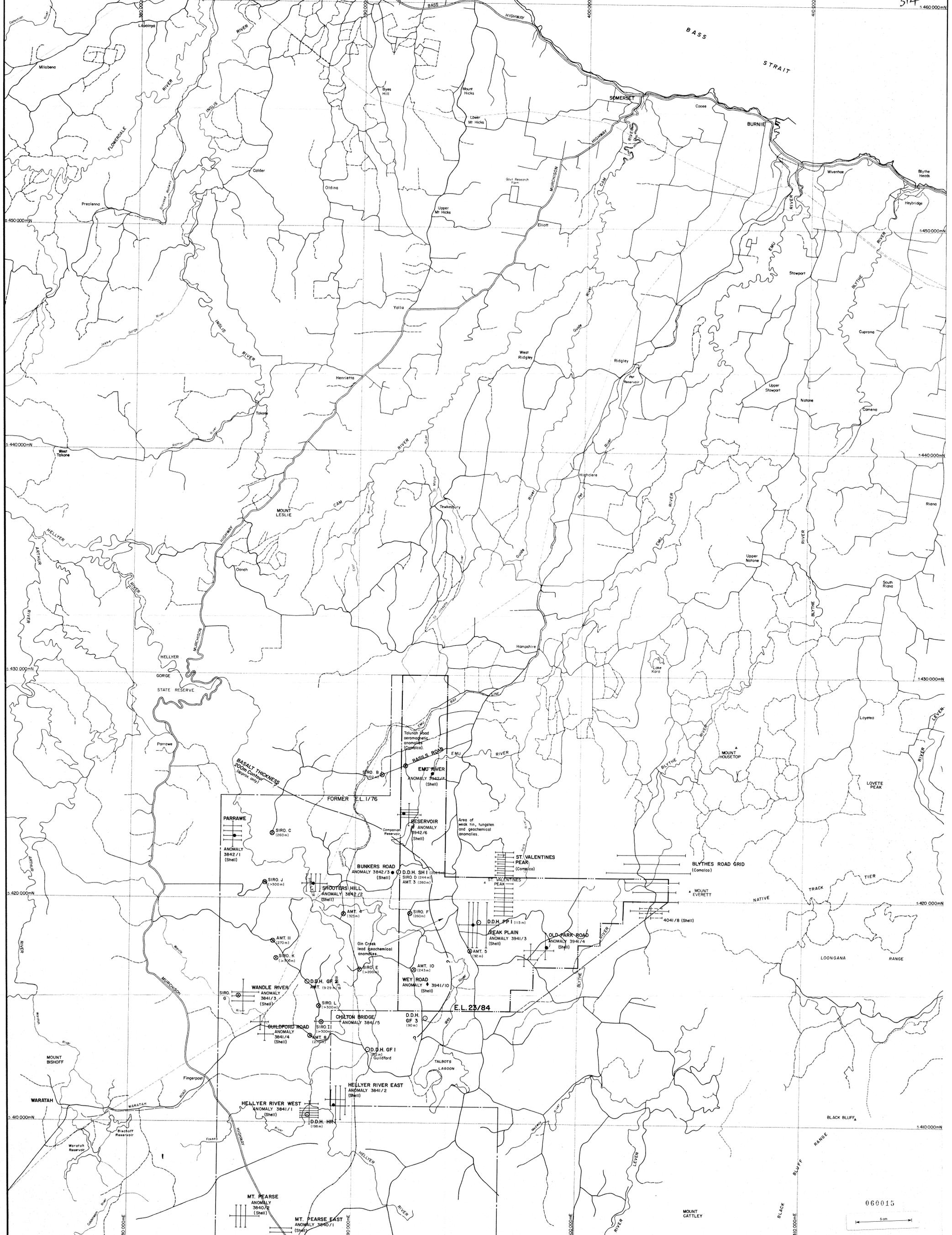
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<p>QUATERNARY</p> <p>Qa Alluvium</p> <p>TERTIARY</p> <p>Ts Conglomerate & grits</p> <p>PERMO-CARBONIFEROUS</p> <p>P Sandstone siltstone, siltite</p>	<p>SILURO-DEVONIAN</p> <p>Db Bell shale with carbonate beds</p> <p>Df Florence sandstone</p>	<p>ORDOVICIAN</p> <p>Og Limestone, lesser shale</p> <p>Om Sandstone</p> <p>Or Conglomerate</p> <p>CAMBRIAN</p> <p>Cl Limestone, mudstone</p>	<p>PRE-CAMBRIAN</p> <p>Acid/Intermediate volcanics & sediments</p> <p>pE Undifferentiated</p> <p>IGNEOUS ROCKS</p> <p>Tb Tertiary basalt</p>	<p>ALTERATION MINERALIZATION</p> <p>Jd Jurassic dolerite</p> <p>Dp Devonian porphyry</p> <p>Dg Devonian granite</p> <p>Ub Ultrabasic</p>	<p>Skarn</p> <p>DIAMOND DRILL HOLE</p>	<p>MAP INDEX</p> <p>HELLYER</p>	<p>GOLD FIELDS EXPLORATION PTY. LIMITED</p> <p>HELLYER INTERPRETIVE GEOLOGY</p> <p>35-2513 313</p> <p>SCALE 1:50000</p>	<p>DRAWN BY P. Roberts</p> <p>DRAFTSMAN T. S. D. S.</p> <p>DATE Dec. 1985</p> <p>REVISIONS</p> <p>FILE NO.</p> <p>FIG 2</p>
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LEGEND

- Cut grid lines
- Diamond drill hole
- ⊗ Geophysical depth sounding to base of Territory Basalt - systems used, SIRO, AMT - Audio-magnetic tellurics.
- Aeromagnetic anomaly
- ⚡ Airborne Input EM anomaly

MAP INDEX	
PROSPECT	MAP INDEX
ROAD	MAP INDEX
RIVER	MAP INDEX
RESERVE	MAP INDEX

GOLD FIELDS EXPLORATION PTY LIMITED

HELLYER

PROSPECT LOCATIONS

GUILDFORD AREA

85-2518 0 314

SCALE 1:50000

0 500 1000 2000 METRES

FIG 3

060015

