Exploration Licence 29/91

Final Report

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Introduction:

Exploration Licence 29/91 covers about 23.5 km strike length of Dundas Formation on the east, separated from Crimson Creek Formation on the west by the Bobadil Fault which strikes more or less north south through the centre of the tenement. PreCambrian Oonah Formation occurs in the north west corner of the tenement.

The area of EL 29/91 was previously explored for base metals by CRA(1950's), Comstaff (1960's to mid 1970's), Asarco (mid 1970's), Aberfoyle and Shell (mid 1970's to 1988), and Sipa Exploration NL (1993-4). The exploration programmes by Aberfoyle and Shell are summarized by Mc Neill (1988) and Hosking (1993). The EL was taken up by A J Hosking in 1991 and transferred to Golden Reef Enterprises Pty Ltd in September 1995.

Some geophysical surveys including IP, gravity, Utem, Dighem, CSAMT and magnetics have been carried out in parts of the EL, and three diamond drill holes have been completed for a total of 1318m to test EM anomalies, without finding significant base metal sulphide mineralization. The EL was taken up by Golden Reef Enterprises Pty Ltd as part of a reconnaissance program searching for gold in early Palaeozoic terrains in eastern Australia, but was not renewed because it did not fit with the company's present exploration strategy.

Location and access:

The location of EL29/91 is shown in Figure 1. The south eastern corner of the EL is 4 km north west of Rosebery.

The southern part of the EL is crossed by the Pieman Road and the central northern part is accessible by a track which leaves the Murchison Highway in the vicinity of the Pinnacles Mine. Access to the northeastern corner is gained by a track to the Silver Falls mine. Apart from the Pieman Road and the tracks, access to the EL is difficult, since it is mostly covered by dense scrub or forest. The Marionoak River affords reasonable foot access, but otherwise the normal access problems for exploration on the Tasmania west coast apply to the licence area.

Previous exploration:

The licence area has been covered by quite thorough first phase exploration of mapping and geochemical sampling by Aberfoyle and Billiton. This work outlined a series of base metal stream sediment anomalies more or less along the Bobadil Fault (Figure 2), most of which remained untested. Considerable reliance was placed on the ability of electrical geophysical prospecting methods to support or rule out anomalies as possible drilling targets, and only one geochemically anomalous area has been tested by drilling.

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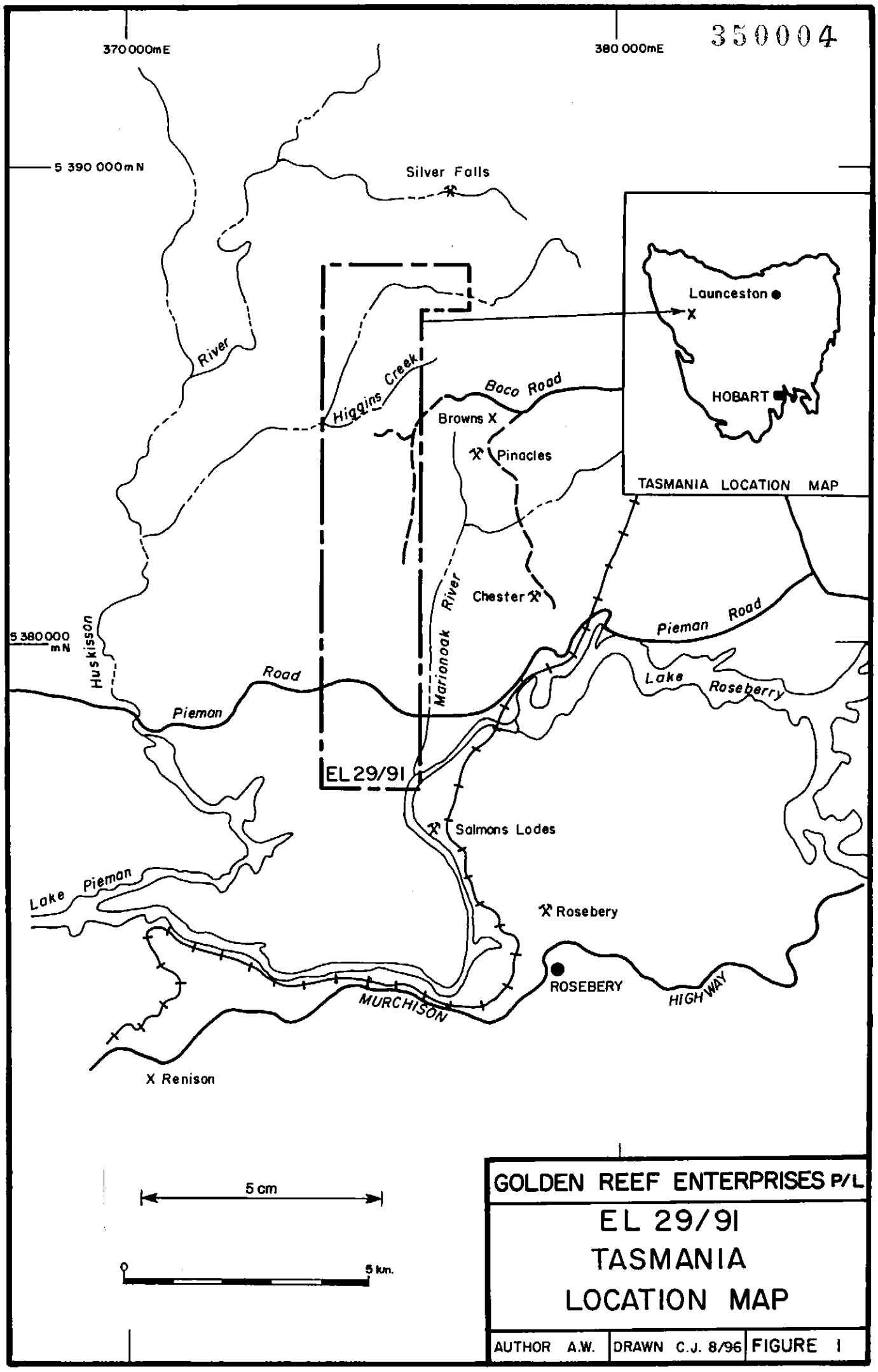

GOLDEN REEF ENTERPRISES P/L

EL 29/91 TASMANIA LOCATION MAP

AUTHOR A.W.	DRAWN C.J. 8/96	FIGURE 1

Confliction IP and UTEM results, and the lack of drill hole evidence of mineralization discouraged previous explorers.

Geology:

The EL is covered by soil, alluvial slope debris, in places several metres thick and weakly cemented, and glacial deposits. Outcrop is restricted to road cuttings, ridges and creek/river beds. Weathering of outcrop is significant.

The geology of the licence area consists of three geological domains, separated by the north striking Rosebery and Bobadil faults.

Oonah Formation;

The oldest rocks in the licence area are part of the Oonah Formation, and occur in a fault bounded sliver in the north western corner of the licence. The area where the Oonah Formation is recorded was not visited by the present licence holder, and little work appears to have been done on the rocks, which are recorded in previous reports as "meta sediments".

Crimson Formation:

The next oldest rocks in the licence area belong to the Crimson Creek Formation. These rocks occur along the western side of the licence area, west of the Bobadil Fault in a north trending belt, and consist of andesitic volcanic derived coarse to fine grained turbidites. However, reconnaissance by Golden Reef Enterprises indicates that part of the area mapped as Crimson Creek Formation west of the Bobadil Fault includes thin bedded, pink felsitic tuffs. The tuffs strike east west, and are exposed in the roadside cutting for about two kilometres. They are fine grained, (probably ash fall tuffs) now completely composed of fine grained sericite, with coarser sericite clots possibly after feldspar phenocrysts. The tuffs are much less deformed than the sediments belonging to younger formations described below, but are brecciated. Thin iron coatings occur on the fracture surfaces in weathered outcrop, but there is no evidence that the iron oxide coatings are formed from a pyrite precursor, and the sericite does not appear to be due to phyllic alteration.

Rosebery Group:

A sequence of lithic sandstones, greywacke, siltstones and polymict conglomerates occupy about half the EL in a general north trending belt west of the Rosebery Fault. Brown (1986) has interpreted this belt as including rocks from the Cambrian Dundas, Huskisson and Rosebery groups, but Morant (1994) ascribes them to the Rosebery Group on the basis that they lack significant felsitic volcanics. The conglomerates contain chert, sandstone and volcanic clasts and the sandstones contain abundant detrital mica.

A window of Rosebery Group rocks is exposed in the Pieman Road just west of the Marionoak River, and consists of interbedded black shale, strongly pyritic in bands up to 5cm wide, and greenstone (chlorite-altered) andesitic greywacke. This has become known as the Bastyan Dam prospect, and has received most attention from previous explorers. A weak schistosity is developed in the black shale, and bedding parallel zones of silicified breccia - blebs of carbonaceous pelitic schist in a silicified matrix occur in the black shale/greywacke sequence. The foliation in the shale strikes north north west and dips steeply (80°) east. The shale and greywacke are extensively quartz veined, (almost a quartz vein stock work), with veins ranging from <1mm to 10mm wide, normal to bedding / foliation.

Pitting carried out by Billiton indicated "various siltstones and a possible tuffaceous unit", with "trends" of strike 65°, SE dip at 45°, and strike 100°, dip 70° north. A diamond drill hole just north of the Pieman Road exposure intersected altered ferruginous tuff, tuffaceous greywacke, carbonaceous shale which is sheared and quartz veined, tuffaceous siltstone and pyritic carbonaceous siltstone. Fander (1982) suggested that some pyrite in the shale and siltstone was syngenetic, being banded and framboidal.

Dundas Group:

The extreme north eastern part of the EL is comprised of subcrop of Dundas Formation. In this area, coarse volcaniclastic breccias of acid to intermediate volcanic origin are interbedded with carbonaceous mudstones. The Rosebery Fault, which forms the western boundary to this small area of Dundas Formation, is believed to hade east at a shallow angle, and therefore there is little prospect of a significant thickness of Dundas Formation being present in this part of the licence.

Geochemistry:

The licence area was stream sediment sampled at around 250m intervals by Aberfoyle Pty Ltd and Billiton between 1975 and 1985. Anomalies of more than 3x threshold values were followed up with further stream sediment sampling, geological traverses, soil sampling and trenching.

First order Zn-Pb-Cu stream sediment anomalies found at Lynch Creek (Figure 2) were interpreted by Aberfoyle to be related to minor quartz veins, sphalerite and gossan in silicified black mudstones considered to belong to the Oonah Formation (Freytag, 1978).

Billiton followed up lower order anomalies (Higgins Creek, South Central, Areas A, C(1) C(II) and D) with soil and rock chip sampling programs. The base metal anomalies are spatially closely major faults such as the Bobadil Fault, and Purvis (1986) identified a fault bounded wedge of the base metal anomalous Oonah Formation adjacent to anomally C(II).

Aberfoyle carried out Pb isotope studies of the minor galena vein mineralization found in diamond drill hole MO-1 at the Bastyan Dam prospect (Carr and Gulson, 1985). These studies indicated that the lead isotope ratios were inconsistent with the lead having been remobilized from a Cambrian massive sulphide deposit. Two populations of lead were recognized; one from a possible PreCambrian source, and the other from a Devonian source.

Geophysics:

The Licence has been covered by a significant amount of geophysical exploration. Aberfoyle covered the area in 1978 with an airborne EM survey (flown by Geoex using a McPhar H400 dual frequency EM system at 150m line spacing and bird height of 80m). Billiton reflew the area in 1981 with a Dighem AEM system at 200m line spacing and bird height of 36m to provide better data in areas where terrain clearance had been excessive in the previous survey. Both surveys detected a low resistivity zone about 2km west of Bastyan Dam.

Billiton subsequently carried out ground Utem, gravity and magnetic surveys over the above area of low resistivity, and there is a regional magnetic map of the district which indicates a north trending magnetic ridge just west of the zone of low resistivity.

Structure and geophysics:

The Bobadil and Rosebery Faults are shown on current geological maps as generally trending north south. Geophysical investigations by Shell in the Bastyan Dam prospect area were interpreted by Shell personnel (Smyth, 1983) to indicate north south trending gravity features, but their map (Figure 3) shows a north west striking inferred fault and parallel EM anomalies, and a north north west trending IP anomaly.

A reinterpretation of this geophysical work indicates that there is a valid alternative, namely a set of north striking faults sub parallel to the gravity anomaly (Figure 4). If continuity of EM anomalies from one grid line to the next is not assumed, it is valid to interpret the anomalies as being spatially closely associated and aligned with the faults. This does not solve the conflicting north east gravity trend which crosses the foliation and newly interpreted fault trends. The assumptions about the EM anomalies are not certain without more closely spaced data, and it is possible that these are also discordant with both the faults and the gravity. A major fault between the window of Rosebery Group and the felsitic tuffs to the north west helps explain the 90° difference in strike of the two formations.

The divergence of strike of foliation in the Rosebery Group sediments in the vicinity of the Bastyan Dam suggests that the structure of these sediments is quite complex, and this would also mitigate against a single, simple explanation of the geophysical data. Because of the extensive overburden of glacial debris and alluvial slope wash, unravelling the structure would be an expensive exercise, but one that may need doing before electrical

geophysical data can be properly interpreted. This conclusion was one of the major reasons for Golden Reef Enterprises' decision not to apply for renewal of the licence.

Mineralization:

The exploration licence area contains Pb-Ba mineralization at the Lynch Creek prospect (which was not located in this program) and stream sediment geochemical sampling carried out by Aberfoyle and Shell between 1975 and 1985 identified several first order base metal anomalies along the Bobadil Fault (Figure 2). Some follow up work was done to test these anomalies but no encouraging results were obtained. The Dundas Group which is generally considered the most prospective unit in the district for VHMS type deposits occurs in such a small area, and is likely to have such a small section preserved above the Rosebery Fault, in the far north east of the licence, that it was not investigated by the present licence holder or previous holders.

The main area of interest in the licence has been the window of mineralised rock exposed in the Pieman Road 100m west of Marionoak River, named the Bastyan Dam prospect in previous Shell investigations. Here minor pyrite / pyrrhotite / sphalerite vein mineralisation is hosted by interbedded black shale, strongly pyritic in bands up to 5cm wide, and greenstone - chlorite altered andesitic greywacke.

A shallow drill hole failed to find any thing more than a repetition of the minor sphalerite veining, and the two deep diamond holes (MO 2 & 3) drilled to test a deep conductor at Bastyan Dam intersected graphitic black shales, which were concluded to be the likely source of the EM anomaly (Morant, 1994). Samples from the first drill hole, MO-1 were examined by Fander (1982) who observed that the sphalerite in thin banded intersections of sulphides in the core was low iron sphalerite. Fander also suggested that the sulphides were of syngenetic origin, with an epigenetic overprint due to tectonism and remobilization.

The intriguing aspect of the Bastyan Dam Prospect is that a spring issues from the mineralised rock in the roadside drain, and the spring is depositing remarkable quantities of iron oxide on gravel and anything else in the drain, at a rapid rate (Plate 1). Sipa Exploration sampled sludge from the spring and this assayed 130 ppm Zn, 295 ppm Pb and 513 ppm Cu. In gross appearance the iron deposition from the spring is similar to the iron deposits in streams pictured downstream from the Currawong base metal deposit in Victoria, and Red Dog in Alaska.

Prospecting:

As Sipa Exploration noted in their report (Morant, 1994), the EL has not been prospected for gold. Golden Reef Enterprises P/L took the opportunity when offered to take up the licence to test for gold. A field reconnaissance was carried out, and the intense quartz veining and small scale silicification associated with the minor sphalerite mineralisation at

the Bastyan Dam prospect was the most promising potential gold host found. Stream sediments were panned in the Marionoak River upstream and downstream from the prospect, and four large rock chip samples collected of the quartz veined rock (presumed to be Rosebery Group). These same rocks were sample for base metals by Sipa Resources (Appendix1). No visible gold was found in heavy mineral concentrates from the panning (using binocular microscope) and the highest gold assay from the samples obtained by Golden Reef Enterprises was 0.028ppm Au (Appendix 1).

Conclusions:

The area within the licence is regarded as being prospective for base metals. The sphalerite veining in pyritic/pyrrhotitic black shale host rocks at Bastyan Dam indicates that mineral bearing fluids have travelled through the system possibly in the Devonian. The opportunity exists for CSA style zinc lead replacement deposits in Dundas Group rocks in appropriate structural settings along the Bobadil Fault.

However, since evidence from scant outcrop and some shallow pits indicates that the structural geology of the area, especially the Rosebery Group, is quite complex, a search for structurally focused ore concentrations beneath extensive alluvial and remnant glacial cover, in densely vegetated terrain, is likely to be a long and expensive exercise. Fander's (1982) note that the sphalerite found in Billiton's MO-1 drill hole was low iron (and hence non conductive) may also indicate that any concentration of sphalerite is unlikely to be detected by electrical geophysical methods which depend on identifying conductors. The presence of probable syngenetic pyrite in black shale lenses, which may be faulted into Rosebery Group strata, further complicates the problem of how electrical geophysical prospecting methods might be used to see through the overburden and also discriminate conductors which host base metal sulphides.

The present licence holder is for strategic business development reasons not willing to pursue zinc lead prospects in this type of terrain and has therefore decided to withdraw from exploration of the area. Following the reconnaissance, the EL is not deemed highly prospective for gold.

References

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Analabs

ANALYSIS DESCRIPTION

Job number : BN001721 Order number : AHW-96-4

Scheme code : D101 - Perchloric acid digest (0.2g sample)

Perchloric acid digest (0.2g sample)

Scheme code : GA101 - AAS determination

AAS determination - Perchloric acid digestion

Cu	: Copper
Pb	: Lead
Zn	: Zinc

Scheme code : GG309 - Fire assay fusion; AAS

Fire assay fusion; AAS

Au	: Gold
Au(R)	: Gold (repeat)

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Analabs

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Order No: AHW-96-4
Project Code:
Report Date: 03/05/96
Report Status: Final

Job No: **BN001721**

ANALYTICAL DATA

Sample	Cu	Pb	Zn	Au	Au(R)
EL 29/91 01	87	120	296	0.009	--
EL 29/91 02	6	5	90	<0.008	--
EL 29/91 03	109	20	95	0.016	--
EL 29/91 04	62	155	53	0.028	--

Method	GA101	GA101	GA101	GG309	GG309
Units	ppm	ppm	ppm	ppm	ppm
Detection Limit	4	5	4	0.008	0.008

Notes:
N.A. = not analysed
– = element not determined
I.S. = insufficient sample
L.N.R. = listed not received

5 390 000mN

375 000mE

378 000mE

N

LEGEND

TERTIARY

Tb — Basalt

CAMBRIAN

Eum — Ultramatic intrusives

DUNDAS GROUP

Eds — Greywacke , siltstone & conglomerate

Edts — Interbedded tuffs & sedimentary rocks

CENTRAL VOLCANIC COMPLEX

Ecv — Felsic to intermedicte volcanics & volcaniclastics

CRIMSON CREEK FORMATION

Ecc — Mafic- andesitic greywacke , mudstone, basalt, conglomerate

PRECAMBRIAN

OONAH FORMATION

Pa — Quartzite , black slate

Fault

Fault (possible)

Geological contact

STREAM SEDIMENT BASE METAL GEOCHEMICAL ANOMALIES

Aberfoyle

Billiton

Dighem anomaly

Prospect

Mine

Road

Track

Railway

5 380 000mN

NORTH LYNCH CREEK

SOUTH LYNCH CREEK

BOBADIL FAULT

Eds

Edts

Po

Boco Road

HIGGINS CREEK

Ecv

AREA 'D'

Ecc

Eds

Tb

AREA 'A'

AREA 'C' (I)

MARIONOAK FAULT ?

ROSEBERY FAULT ?

Ecv

chester pyrite

To Tullah

Eum

AREA 'C' (II)

MO 2 643·2m.

Edts ?

Lake Rosebery

MO 1 451·1m.

Pieman Road

SBD 1 221m.

Lower Pieman Dam

Bastyan Dam Prospect

Bastyan Dam

Edts ?

Ecc

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SCALE 1:25000

0 1 2km.

5 cm

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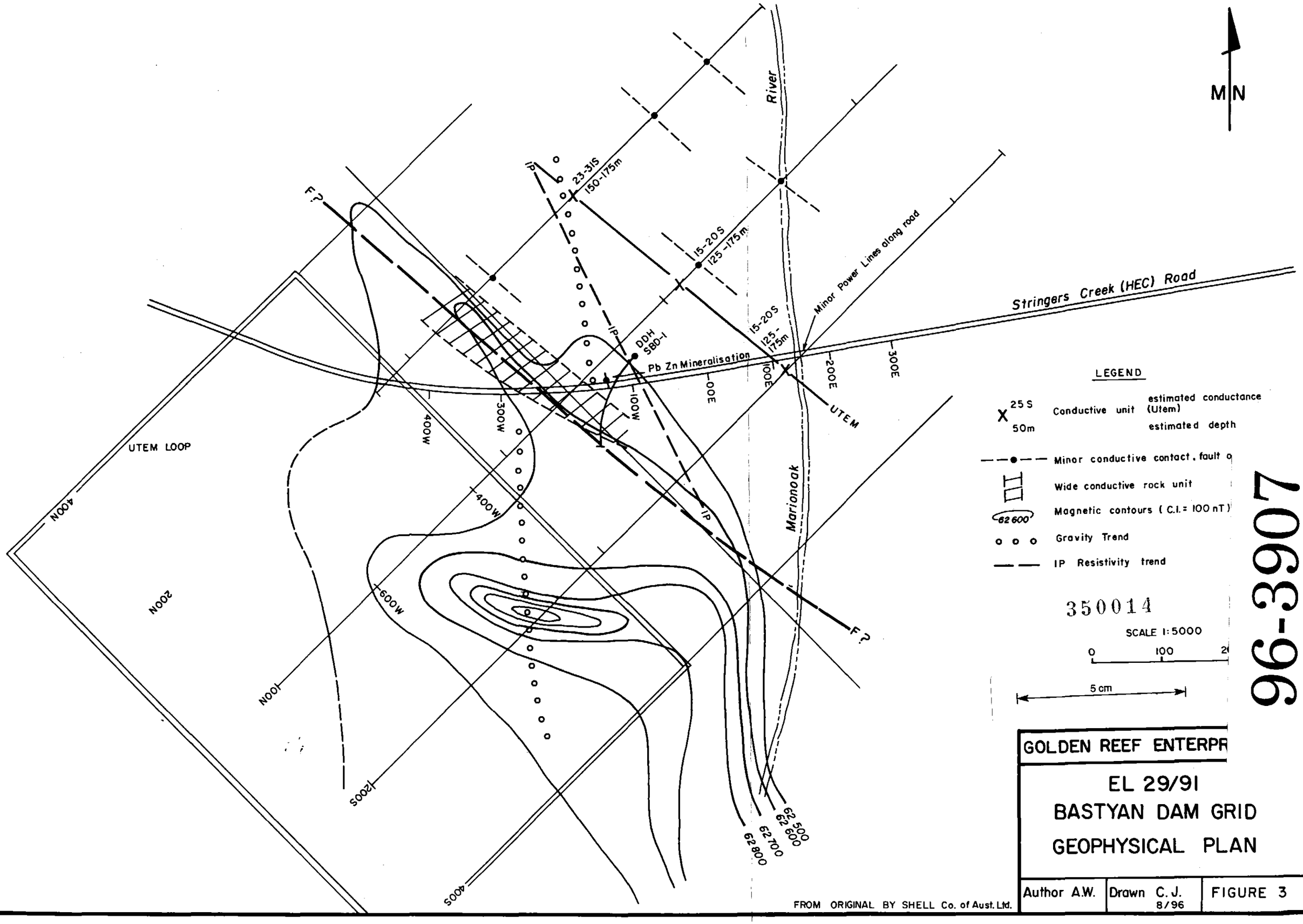
EL 29/91
GEOLOGICAL MAP SHOWING LOCATION OF STREAM SEDIMENT BASE METAL GEOCHEMICAL ANOMALIES

Author A.W.	Drawn C. J. 8/96	FIGURE 2


MN
River
Stringers Creek (HEC) Road
Minor Power Lines along road
Marionoak
UTEM LOOP
UTEM
DDH SBD-1
Pb Zn Mineralisation
IP
F.?
23-31S
150-175m
15-20S
125-175m
400W
300W
200W
100W
100E
200E
300E
400N
200N
100N
200S
400S
600W
62 500
62 600
62 700
62 800
LEGEND
25 S
50m
Conductive unit
estimated conductance (Utem)
estimated depth
Minor conductive contact, fault
Wide conductive rock unit
62 600
Magnetic contours (C.I. = 100 nT)
Gravity Trend
IP Resistivity trend
350014
SCALE 1:5000
0
100
5 cm
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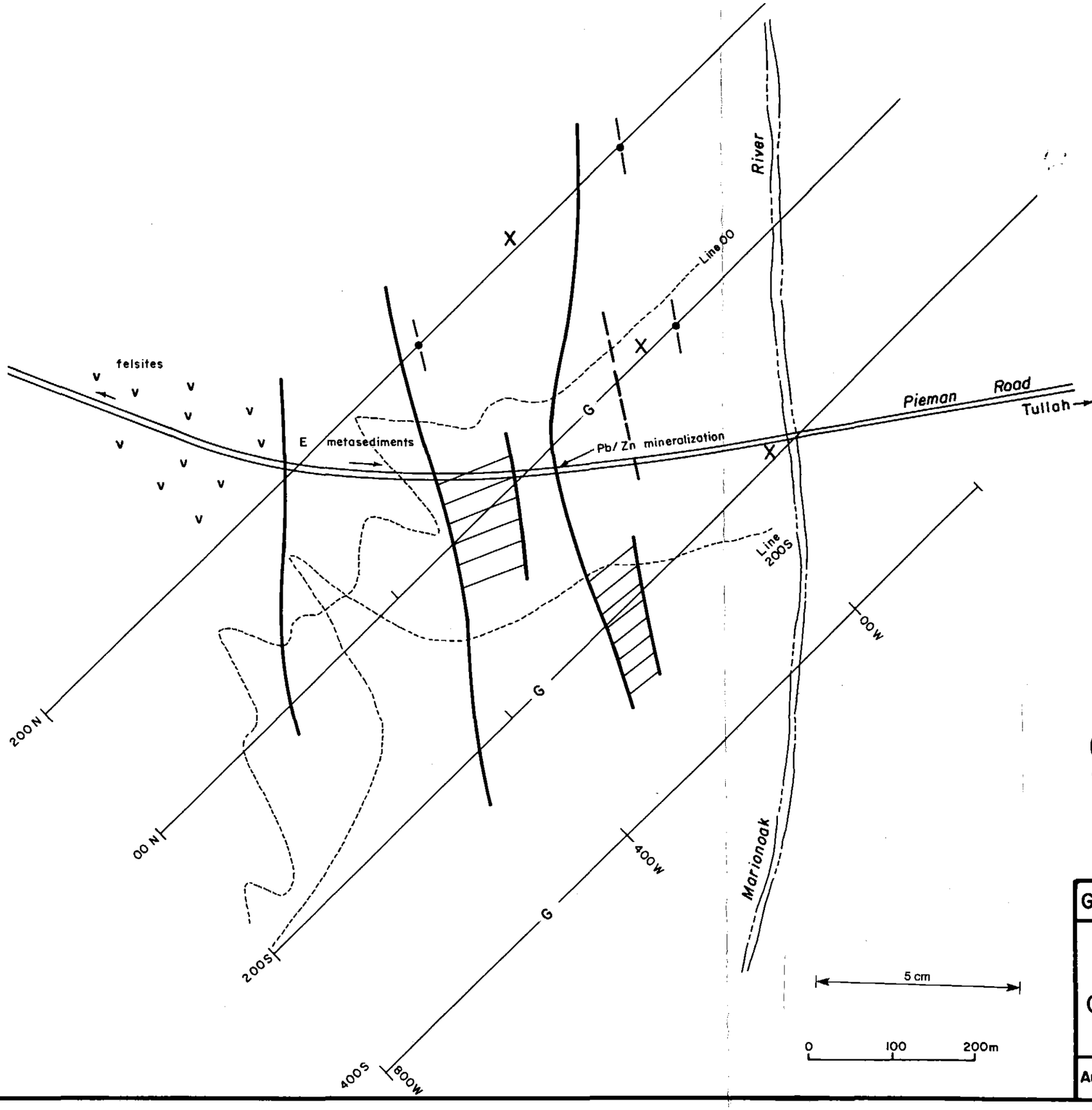
GOLDEN REEF ENTERPR
EL 29/91
BASTYAN DAM GRID
GEOPHYSICAL PLAN
Author A.W.
Drawn C. J. 8/96
FIGURE 3
FROM ORIGINAL BY SHELL Co. of Aust. Ltd.



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LEGEND

- Fault
- Magnetics (ground)
- X Conductive unit (UTEM)
- Minor conductive contact
- Wide conductive rock unit
- G Gravity anomaly
- IP Resistivity trend

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EL 29/91 REINTERPRETATION OF GEOPHYSICS & STRUCTURE BASTYAN DAM

Author A.W.	Drawn C.J. 8/96	FIGURE 4