



J. G. PURVIS & ASSOCIATES PTY. LIMITED
CONSULTING AND CONTRACT GEOLOGISTS

A.B.N. 80 009 545 591

715 West Tamar Highway
Legana, Tasmania 7277

Telephone: (03) 6330 1434
Email: geraldpurvis@bigpond.com

AN APPRAISAL OF THE
RED HILLS PROSPECT
TASMANIA



The Red Hills, looking SE

J.G. Purvis
Consulting Geologist
February 2010

Submitted to:
A.N. Lorrigan
Exploration Manager – Tasmania
Bendigo Mining Ltd

CONTENTS

SUMMARY.....	1
INTRODUCTION	2
GEOLOGY	2
BRIEF EXPLORATION HISTORY.....	7
RH5 MASSIVE SULPHIDE	8
Discovery.....	8
Follow-up.....	8
Comment on Follow-up.....	9
Geophysical Surveys.....	9
Surface Indications	14
Recommended Drilling Programme.....	15
NORTHERN ADITS AREA.....	21
THE BROADER BASIN	21
FOLD REPETITION OF THE LMH?.....	22
POSSIBLE WESTERN CVC / TG BOUNDARY	23
HENTY-RED HILLS LINK.....	24
REFERENCES	25

LIST OF FIGURES

Figure 1	1: 25,000	Location and Summary Geology
Figure 2	1: 5,000	Plan of RH5 Area
Figure 3	1: 2,500	Longitudinal Projection
Figure 4	NTS	Scintrex Downhole IP Log of RH5
Figure 5	1: 1,500	Applied Potential Contours over RH5
Figure 6	1: 5,000	Applied Potential Contours, Primary Field
Figure 7	1: 5,000	Applied Potential Contours, Secondary Field
Figure 8	1: 1,500	Longitudinal Projection, RH5 Area
Figure 9	1: 1,500	Section 5365160N, showing Proposed Drillholes A & B
Figure 10	1: 1,500	Section 5365110N, showing Proposed Drillholes C & E
Figure 11	1: 1,500	Section 5365060N, showing Proposed Drillhole D
Figure 12	1: 1,000	Sites of Proposed Drillholes Around RH5
Figure 13	NTS	Structural Model for Red Hills – Henty Area

SUMMARY

1. The realistic target at Red Hills is a Zn and Au-rich massive sulphide, rather than Henty-style high-grade Au mineralization.

The lack of an adjacent major Henty Fault-like structure to upgrade the Cambrian synvolcanic mineralization is considered the crucial factor. Red Hills mineralization occurs in a similar setting to Henty, either on or a short distance below the CVC / Tyndall Group boundary.

2. There are geophysical indications of a modest-sized high-grade massive sulphide lens around the RH5 intersection, particularly above and along strike. A five-hole 1,000m diamond drilling programme is recommended.

The 2.8m thick massive sulphide was hit 155m below surface and the grade of 34.5% Zn, 11.3% Pb, 250g/t Ag & 6.5g/t Au, is worth around A\$1,500/t at current prices. An Applied Potential IP survey shortly after drilling led the geophysicist to conclude that the massive sulphide may extend 50-100m above RH5, at least 40m and possibly 140m north, and to the south. Only sketchy data is available from a more-extensive follow-up AP survey, which reportedly got "discouraging" results. There are no holes at or above the RL of RH5 in an area 500m long by 150m deep.

3. Such a massive sulphide lens could feasibly extend to depth between the existing wide-spaced drilling.

Follow-up drilling around RH5 has been wide-spaced and distant. Only three holes are within 200m radius and the nearest two, 100m below, leave a 140m horizontal gap directly under the massive sulphide. All holes intersected mineralization in the massive sulphide position, the best (1m @ 8.1g/t Au) 100m down-plunge of RH5.

4. Massive sulphide could be present elsewhere in the Red Hills basin but no vectors exist. Exploration of the broader basin is not recommended in the absence of such guides.

The 22 holes in the basin have hit widespread significant Zn-Pb-Au values up to 1.7km from RH5. Lithological and alteration studies have been unable to define basin areas more attractive for testing. Further studies or exploration of the broader basin is not recommended unless there is encouragement from drilling around RH5.

5. Potential exists for a small open-cut Cu-Au resource at the Northern Adits in the Red Hills lava. Mapping of this area is recommended before drilling.

Recent work indicates the mineralization is related to an E-W shear zone. The only two (earlier) holes were directed E-W and likely were ineffective. At best, values of 1% Cu & 1g/t Au could be anticipated.

INTRODUCTION

Red Hills lies within EL 8/2009 (100% Bendigo Mining), 2km NE of Bendigo's Henty Mine in western Tasmania. The area is open heathland and remnant rainforest at 600-850m altitude within the SW Conservation Area. There are tighter than usual environmental controls on exploration. [Figure 1](#).

At the request of Angela Lorrigan, Exploration Manager - Tasmania, an assessment of the prospect has been completed by reviewing the voluminous data from over 50 years of persistent exploration (1957-2008). The aim was to identify targets for future exploration. Recommendations are outlined, including immediate drilling.

Millions of dollars have been spent at Red Hills by a succession of major companies and 33 diamond drillholes put down. There are over 70 reports. The poor state of some of this information poses a problem to a brief assessment. A surprising amount of raw data is never even presented – a feature seemingly as prevalent in the computer age as it was 30 years ago.

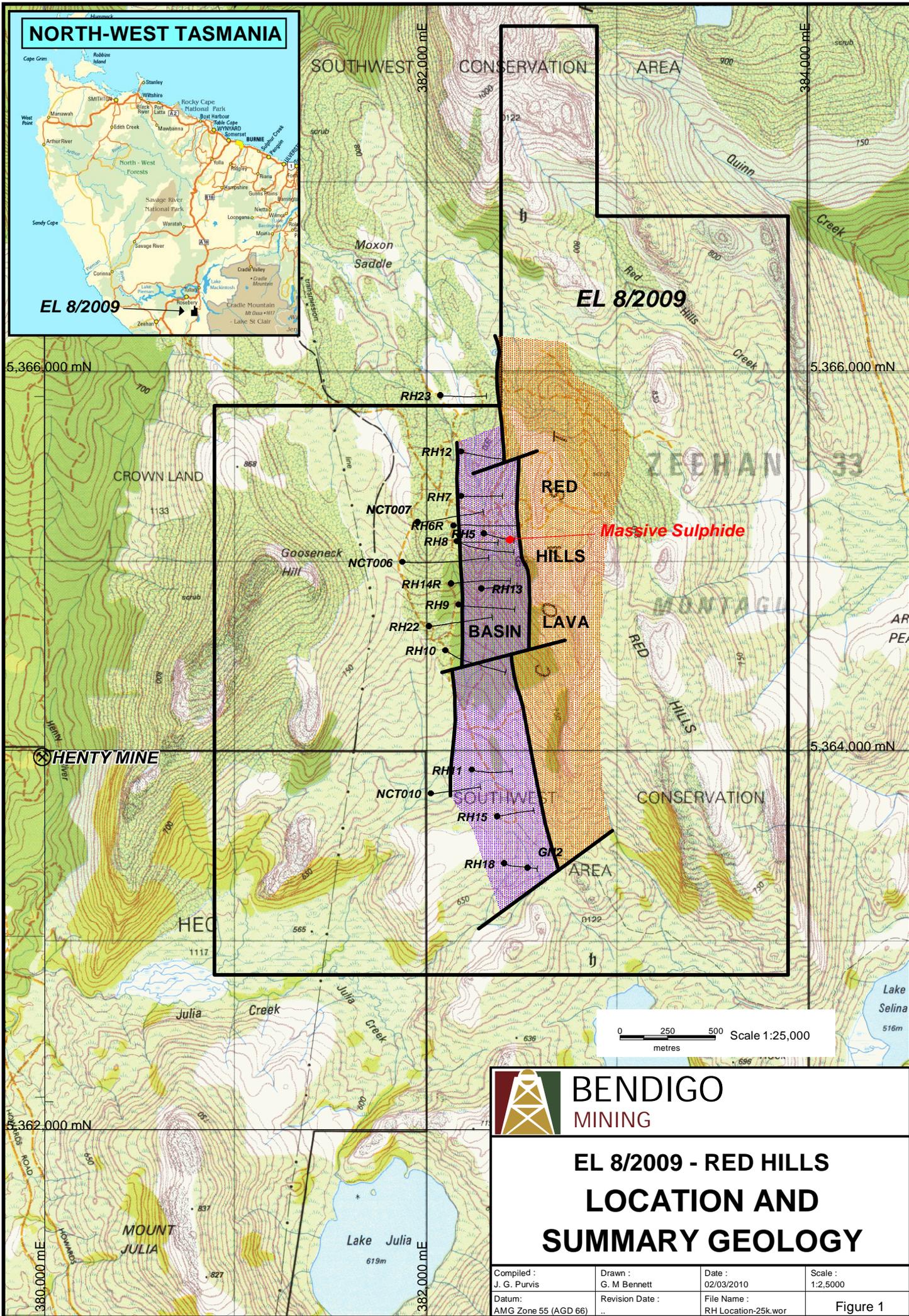
The author is familiar with Red Hills and worked there in 1982-84. However, the assessment is necessarily based on observations and interpretations of others. Contributions are knowledge wherever appropriate. The quality of data and interpretations drawn from it, varies greatly. Some are outstanding: FitzGerald (1983), Herrmann (1996) and Callaghan (2001), to name a few. Others are shallow, contradictory and fanciful. The multiplicity of geophysical surveys borders on the ludicrous - the massive sulphide hole RH5 has been surveyed at least 8 times: EIP (3 times), MIP, Sirotem (twice) and EM37 (twice).

GEOLOGY

Red Hills prospect occurs in the Cambrian Mt Read Volcanics. It comprises two principal geologic elements: a 3km long altered rhyodacitic lava (the "Red Hills"), and a 2km long 70° west dipping volcanosedimentary basin along its western side. The lava is chlorite-silica-k-feldspar-hematite-magnetite altered with patchy stringer-style Cu-Au mineralization. The basin is filled with west-facing subaqueously deposited pumice-lithic mass flows. Within these are two basin-wide mineralized marker horizons, the lower characterized by fine sediments, exhalative chert, Zn-Pb-Au sulphides and hydrothermal alteration, and the upper black shale-hosted Zn-Pb.

Focus of interest is a 2.8m thick massive sulphide, grading 45% Zn>Pb & 6.5g/t Au, intersected in the basin 155m below surface by 1977 drillhole RH5. [Figures 2, 3 & 10](#). The sulphide's Pb-S isotopic and Zn-number signatures, and C-O isotopic data from alteration carbonates, are all identical to the VHMS system at Rosebery. Wide-spaced drilling has traced the host horizon, the Lower Mineralized Horizon (LMH), over 1.7km from RH5. It contains widespread significant but uneconomic Zn-Pb-Au values (eg: 1.5m @ 8.1g/t Au in RH8, 100m below RH5).² Some holes have intersected semi-massive sulphide bands up to 20cm thick (eg: RH16).

² The RH8 intersection is actually better than discovery hole HFZ10 at Henty, which in 1982 hit 1.55m @ 5.1g/t Au – the first recognized evidence of the gold zone.



NORTH-WEST TASMANIA



EL 8/2009

EL 8/2009

Massive Sulphide



BENDIGO
MINING

**EL 8/2009 - RED HILLS
LOCATION AND
SUMMARY GEOLOGY**

Compiled : J. G. Purvis	Drawn : G. M Bennett	Date : 02/03/2010	Scale : 1:2,5000
Datum: AMG Zone 55 (AGD 66)	Revision Date : ..	File Name : RH Location-25k.wor	Figure 1

The LMH has variable lensy lithologies, from fine-grained bands up to 15m thick of bedded volcanoclastic sandstones, siltstones and chert, to breccias with clasts of lava, pumice, chert, carbonate and occasionally semi-massive sulphide. FitzGerald (1983) described the LMH in RH9 as: “..a sedimentary sequence with syngenetic basemetal sulphides forming but being repeatedly disturbed and disrupted by coarser influxes of pyroclastic or juvenile epiclastic material.” According to Reid & Close (1998) the LMH marks the appearance of sparse volcanic quartz crystals.³

Broadly strataform disseminated and occasionally semi-massive sp-gn-py, occurs in both the finer sediments and breccias of the LMH. The mineralized section can be up to 60m thick averaging 1-2% Zn-Pb. The RH5 massive sulphide lies at the top of 12m of cherty tuffaceous siltstones identical to Rosebery host rocks. The cherty siltstone is 5m thick in RH8 100m below, but the best mineralization here is in the top 5m of underlying breccias. Callaghan (2001) maps distinct gold and zinc-rich zones in the LMH, with the gold either at the top of the zinc zones or centrally within them.

The breccias in the LMH have led some geologists to consider the mineralization at least partly transported from source by these mass flows. Such thoughts are reinforced by the rather innocuous sericite-silica-chlorite-carbonate hydrothermal alteration zone associated with the mineralization. However, debris-flow disruption (if any) can't be great as the altered and mineralized LMH extends the full 2km length of the basin and to the drilling limit 700m down-dip. The mineralizing system clearly was extensive and its strength must have been considerable.

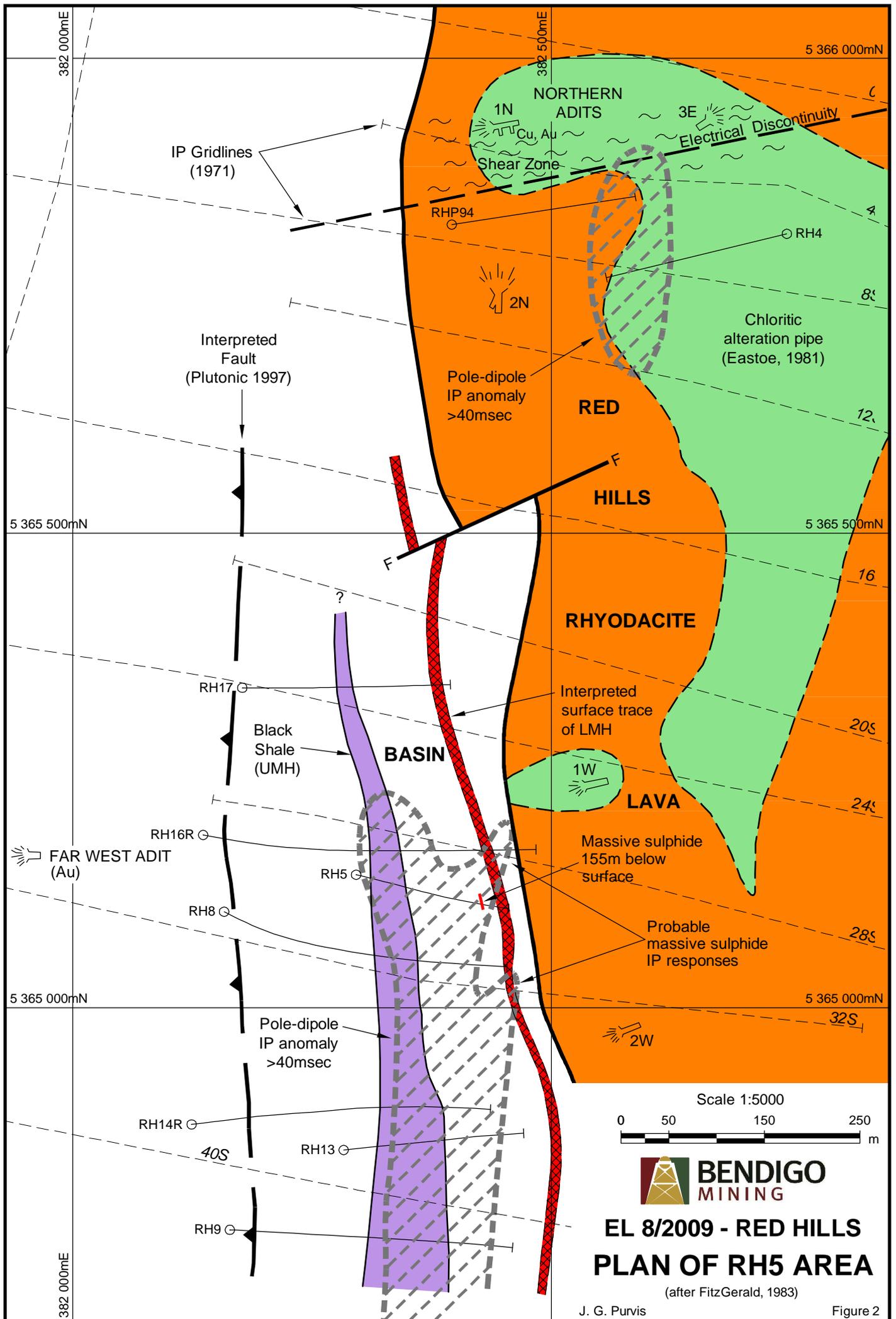
Since 1988 most companies have interpreted the mineralization to be on or just below the Central Volcanic Complex / Tyndall Group (CVC / TG) boundary – as at Henty. On the basis of lithologies, Ti/Zr ratios and appearance of volcanic quartz, they place the boundary either at the LMH or at the shale unit at the top of the basin sequence. The latter is a 2km long, thick folded black shale with limey horizons, typical of the Lynchford Member of the Lower TG. The shale thickens southwards where associated Zn-Pb mineralization (the Upper Mineralized Horizon or UMH), is locally stronger than in the LMH (best UMH intersection is 1.1m @ 5.8% Zn & 1.6% Pb in RH11). The UMH mineralization generally lacks gold values.

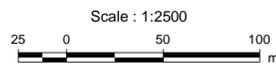
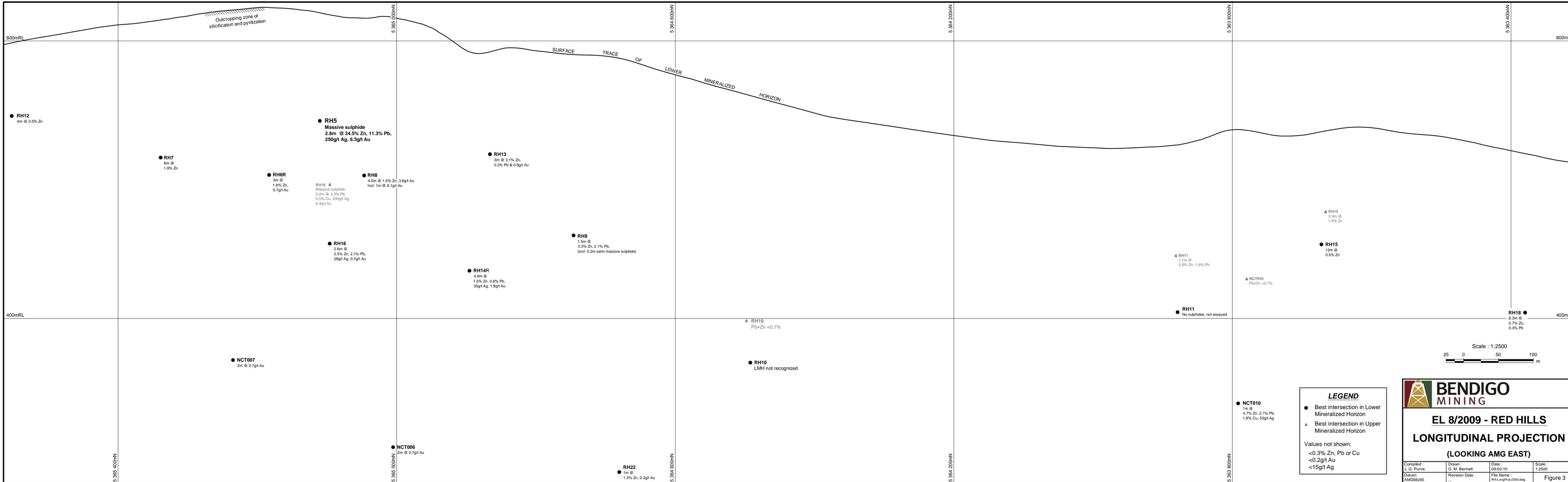
Overall, the parallels with Henty in terms of stratigraphic setting, host lithologies, alteration and mineralization type, are notable. However, there are no regionally-significant faults at Red Hills. The known structures are not in close proximity to the LMH except for an ENE dextral cross-fault at RH10 halfway along the basin, which offsets the sequence 100m. The most Henty Fault-like structure is a strike-parallel steep reverse fault just west of the basin and 300m west of the LMH (shown in Figure 2).

The probability is that gold at Red Hills will never reach Henty grades because there is no Henty Fault equivalent to upgrade it. Gold values obtained to date tend to support this view. The realistic principal target at Red Hills is a gold and zinc-rich massive sulphide.

The Red Hills lava hosts patchy stringer-style Cu-Au, regarded by most geologists as the footwall zone to the basin Zn-Pb-Au mineralization. The lava has been drilled as a bulk-low-grade Cu-Au target and found badly wanting. There remains limited potential in the intensely-altered mineralized zone at the Northern Adits for shallow Cu-Au ore, due to apparent inappropriate siting of the two drillholes here (see later). Magnetics show this is the centre of alteration in the lava.

³ Others note that rare to sparse quartz can occur throughout the sequence, including in the Red Hills lava.





LEGEND

- Best intersection in Lower Mineralized Horizon
- ▲ Best intersection in Upper Mineralized Horizon

Values not shown:
 <0.3% Zn, Pb or Cu
 <0.2g/t Au
 <15g/t Ag



**EL 8/2009 - RED HILLS
 LONGITUDINAL PROJECTION
 (LOOKING AMG EAST)**

Compiled : J. S. Purvis	Drawn : G. M. Bennett	Date : 09/02/10	Scale : 1:2500
Datum: AMG66255	Revision Date : ...	File Name : RH-LongProj-2500.dwg	Figure 3

BRIEF EXPLORATION HISTORY

Pre 1957:

Copper was discovered in the Red Hills lava about 1891. From 1905-08 the Mt Lyell Company mined a small amount of ore at the Northern Adits.

1957 - 1959: Rio Tinto Australian Exploration – EZ. SPL302

RTAE-EZ conducted geophysical surveys (including Turam, magnetics and gravity) and drilled four holes, three at EM anomalies due to black shale in the basin and one into the lava. It was the first helicopter-supported exploration in Tasmania.

1966 – 1985: Mt Lyell Co (JV with Getty from 1977). EL9/66

A huge semi-continuous effort that saw the discovery of massive sulphide, drilling of diamond holes RH1-17, 26 percussion holes into the lava, and multiple geophysical, geochemical and geological surveys, including an excellent compilation by Fitzgerald in 1982-83 as the JV headed towards forced relinquishment in 1985. Initial work tested the lava's Cu potential with poor results. After the massive sulphide discovery in RH5 in 1977, the focus was almost entirely on the basin where drilling encountered widespread significant Zn-Au values. Applied Potential IP surveys indicated the RH5 massive sulphide extended an unknown distance off-hole, but follow-up drilling was wide-spaced.

1985 – 1988: CRAE. EL5/85

CRA drilled no holes. They did BLEG drainage sampling, assayed rocks and core for gold (mostly insignificant results), and outlined a weak UTEM anomaly in the Northern Adits area within the lava. A DHEM survey of RH5 found the poorly conductive massive sulphide did not respond well to EM.

1988 - 1993: Aberfoyle (JV with holders CRAE). EL5/85.

The usual Aberfoyle geophysical approach, with EM surveys east and west of the Red Hills lava and downhole in RH5. The latter survey got noisy inconsistent data and no apparent anomalies. Holes RH18 & 19 were drilled at an EM response at the south end of the basin which turned out to be black shale. Aberfoyle put the CVC/TG boundary at the top of the basin sequence.

1994 – 2004: Plutonic – Goldfields JV. EL 29/94

It took ages for Plutonic and then Goldfields to get going, with the first hole not put down until 2001. From 1996-2001 several excellent geological reviews were done, finding that the mineralization in the LMH was at or just below the CVC/TG boundary, as at Henty. Goldfields drilled three holes (RH20, 22, 23) with subeconomic results. Only RH22 tested the basin, hitting the LMH 700m down-dip – the deepest test yet (1m @ 1.3% Zn, 0.2g/t Au). RH20 tested auriferous quartz-carbonate veining in a dacite at the Far West Adit west of the basin (best intersect: 2m @ 0.6g/t Au).

July 2005 – July 2008: Newcrest Mining. EL 9/2005

Newcrest committed to drilling early, with four +500m deep holes, one in the lava and three in the basin. Best result was 1m @ 5% Zn, 2% Pb in the LMH 450m down-dip at the south end of the basin (NCT010). They mapped and sampled the lava, sampled basin holes for TI-Sb alteration vectors (no useful trends), and soil sampled MRT's mapped CVC/TG boundary west of the basin (poor results).

RH5 MASSIVE SULPHIDE

RH5 Massive Sulphide: Discovery

The discovery was fortuitous. RH5 was drilled in February 1977 by Mt Lyell geologist Andy Walter to test an IP anomaly over the black shale (UMH), the target being Zn-Pb sulphides seen in shale outcrops. The hole planned to continue east to test the Red Hills lava near 2W Adit, but at the last minute site constraints forced it to be collared 80m further north.

RH5 duly hit the shale at 30-67m and 2.8m of sp-gn-rich massive sulphide at 196-198.8m, 22m short of the lava.

RH5 Massive Sulphide: Follow-up

Lyell immediately drilled holes RH6R (110m distant north and below), RH7 (235m north and below), and RH8 (100m south and below). The host horizon (LMH) was intersected in each but no massive sulphide, the best values being in RH8: 4.5m @ 1.5% Zn & 3.6g/t Au, including 1m @ 8.1g/t Au. In addition to being the hole closest to RH5, RH8 is also down the basin's southerly plunge.^{4 & 5}

Lyell stepped out further, drilling RH9 (400m south and below), RH10 (700m south and below) and RH11 (1250m south and below). The holes intersected minor mineralization. All these holes were put down within a year of the massive sulphide discovery. Lyell then ceased drilling for four years, although they conducted geophysical surveys in and around RH5. In the 32 years since, the closest hole to RH5 is RH16, drilled 180m below in late 1983 (2.6m @ 4.6% Zn-Pb & 0.7g/t Au). **Figure 3.**

Gold Field's 1983 review team (led by the author), calculated an "inferred gold resource" of 1Mmt @ 2g/t Au, 4.6% Zn, 1.3% Pb & 37g/t Ag, in the vicinity of RH5. The estimate was based on just five holes: RH5, 6R, 8, 13 & 14R, and is too heavily skewed by results in RH5 & RH8 to be valid. The zone was considered open above and below RH5, and to test these potential extensions four holes were recommended (two above RH5). Only RH16, a compromise midway between the two lower proposed holes, was drilled.

The review also concluded that drilling had shown that the RH5 massive sulphide body "*is less than one million tonnes and no further testing of this target is warranted.*" (FitzGerald in Purvis et al, 1983).

⁴ Dare (1998) measured a 33° south plunge for the fold axis in the black shale (UMH).

⁵ In 1987 the author contoured gold-equivalence in the holes around RH5, which showed a 45° south-plunging axis of better gold values extending down through RH5 (2.8m @ 6.5g/t), RH8 (4.5m @ 3.6g/t) and RH14R (4.9m @ 1.9g/t).

RH5 Massive Sulphide: Comment on Follow-up

In assessing the follow-up drilling, it is acknowledged that Zn-Pb massive sulphide was not the preferred target of the discoverer Mt Lyell or its subsequent exploration proxy, Gold Fields. Lyell wanted copper, Gold Fields 30 tonnes of gold minimum. These preferences coloured the early follow-up of RH5. However, many subsequent explorers have had massive sulphide as their main target.

Given that most orebodies in the MRV's are actually a collection of irregularly-shaped lenses of modest size, the approach to the follow-up of RH5 has been cavalier. No attempt has ever been made to define exactly how big the massive sulphide lens is, to find its top or to carefully trace it down-dip and down-plunge.

Blind pursuit of the big orebody ignores the logic and imperative of at least starting small and opening out once the "beast" you have by the tail is better known. There is too much at stake. To step out too far initially and obtain poor results, risks at best confusion and at worst the premature end of testing. This has happened at Red Hills: to this day nobody knows if RH5 is a tiny pod or part of an irregular lens of economic size. After 33 holes and millions of dollars this must be counted a massive failure of exploration strategy and tactics.

RH5 Massive Sulphide: Geophysical Surveys

RH5's shale IP target was outlined by a 1971 pole-dipole survey. After the massive sulphide discovery it was realized with hindsight that a response had also been detected over the sulphide, but almost swamped by that from the shale. In [Figure 2](#) the sulphide chargeability response (60msec maximum) appears as lobes off the shale response on lines 50m north and 90m south of RH5. Although not apparent in [Figure 2](#), it was regarded as still "moderately strong" on line 24S 180m north of RH5 near RH7 (Walter & Brophy, 1977). The southern limit was obscured by response from the thickening shale.

In downhole IP logging of RH5 the massive sulphide had a 224 msec chargeability peak and 45 ohm-m resistivity (adjacent rocks were 800-7000 ohm-m). The geophysicist described the sulphide's resistivity as "*high bearing in mind the chalcopyrite and galena content.....it cannot be considered to be conductive*". (Howland-Rose, 1978a). [Figure 4](#).

Costeaming over RH5 showed the massive sulphide did not outcrop. In December 1977 a test survey of EIP and MIP (MMR) Applied Potential was run over RH5. An electrode was placed in the massive sulphide downhole and the shape of the anomaly determined on an E-W line over the hole and another 40m north. [Figure 5](#). Howland-Rose's (1978b) comments on the results are worth quoting:

"The mineralized zone...is not of limited extent and extends at least 40m to the north, and perhaps at least as far as 140N..."

"The maximum depth to source appears to be between 60m and 100m."
(ie: 55-95m above the intersection).

"The data clearly demonstrates the very real possibility that the mineralized zone extends to the north and to the south...it is inferred to be of greater importance to the south."

Howland-Rose's recommended follow-up AP survey was finally undertaken four years later in December 1981, covering 420m north and 330m south of RH5. Lines were nominally 30m apart to 200m from RH5 and 60m thereafter. Unfortunately, Scintrex's report on this vital survey is missing. Two plans of the primary and secondary fields exist (Figures 6 & 7), as well as a geophysicist's brief comment that the "discouraging results should not be taken at face value", because the mineralization is not conductive (Bishop, 1982).

Since then Sirotem and EM37 (each twice) been run in RH5 by Lyell, CRA and Aberfoyle, without detecting the massive sulphide. This however, didn't deter them and others from conducting large-scale EM surveys over the basin looking for more massive sulphides.

The one thing the poor EM results around RH5 are confirming is that the thickness of any massive sulphide lens is probably measurable in metres and not tens of metres.

Bishop (1982) states: "If the mineralization intersected in RH5 was a consistent 3 to 5m thick with its top at 100m+ from the surface, and it maintained its composition and its position relative to the black shales, then it is probable that a substantial tonnage would not be detected by geophysical methods".

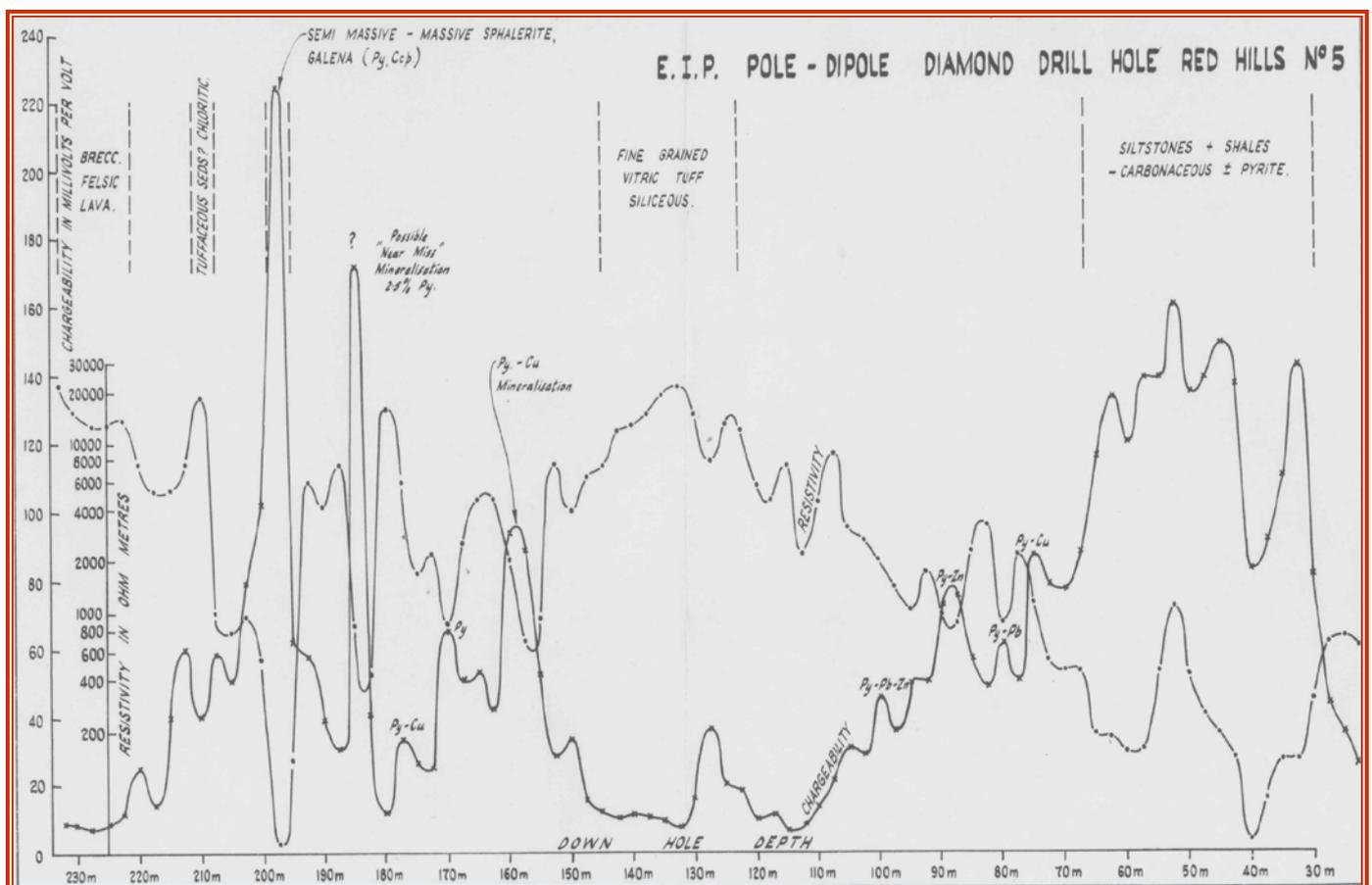
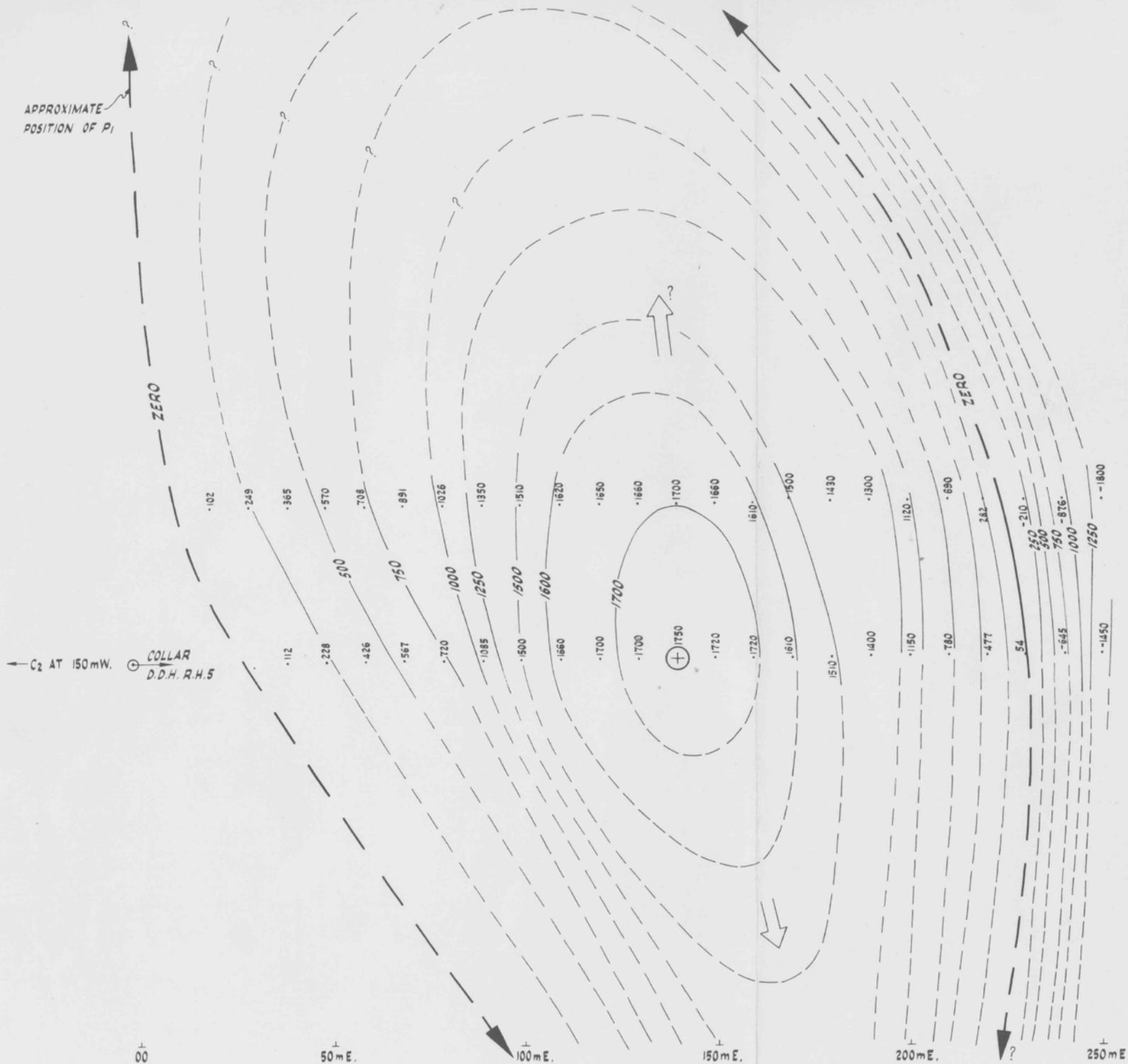


Figure 4: Scintrex downhole IP log of RH5 (from Walter, 1978)



LEGEND

- ZERO (P₁) EQUIPOTENTIAL.
- - - 250 mV EQUIPOTENTIALS.
- ⊕ VERTICAL PROJECTION OF CURRENT ELECTRODE C₁.

APPLIED POTENTIAL SURVEY
OVER D.D.H. R.H.5

Scale 1: 5,000

Figure 5: Applied Potential Contours RH5 (from Walter 1978)

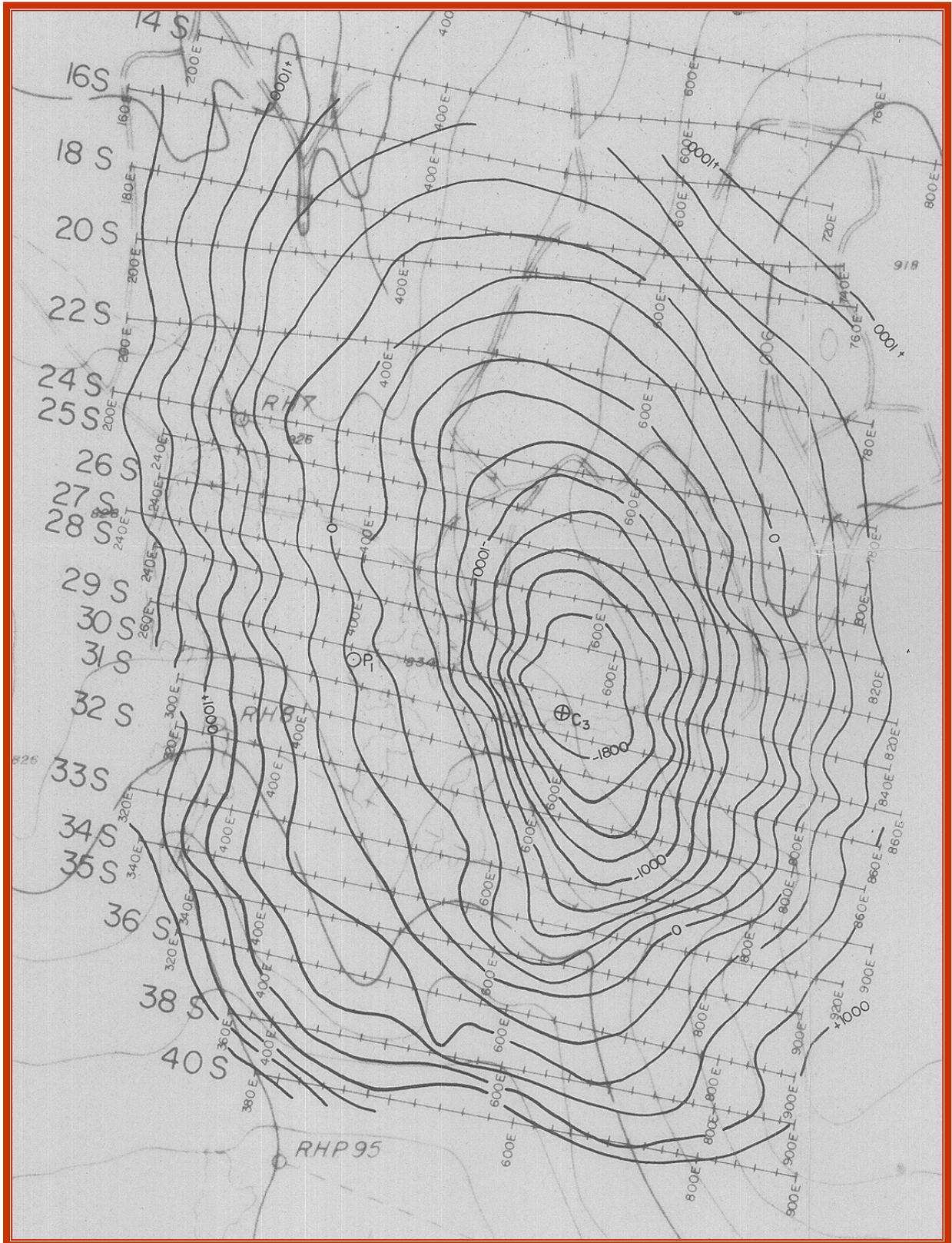


Figure 6: Primary Field, Applied Potential survey 1981-82 over RH5. Downhole Electrode C3 at 196m in RH5. Scale 1:5,000 (from Hutton, 1982)

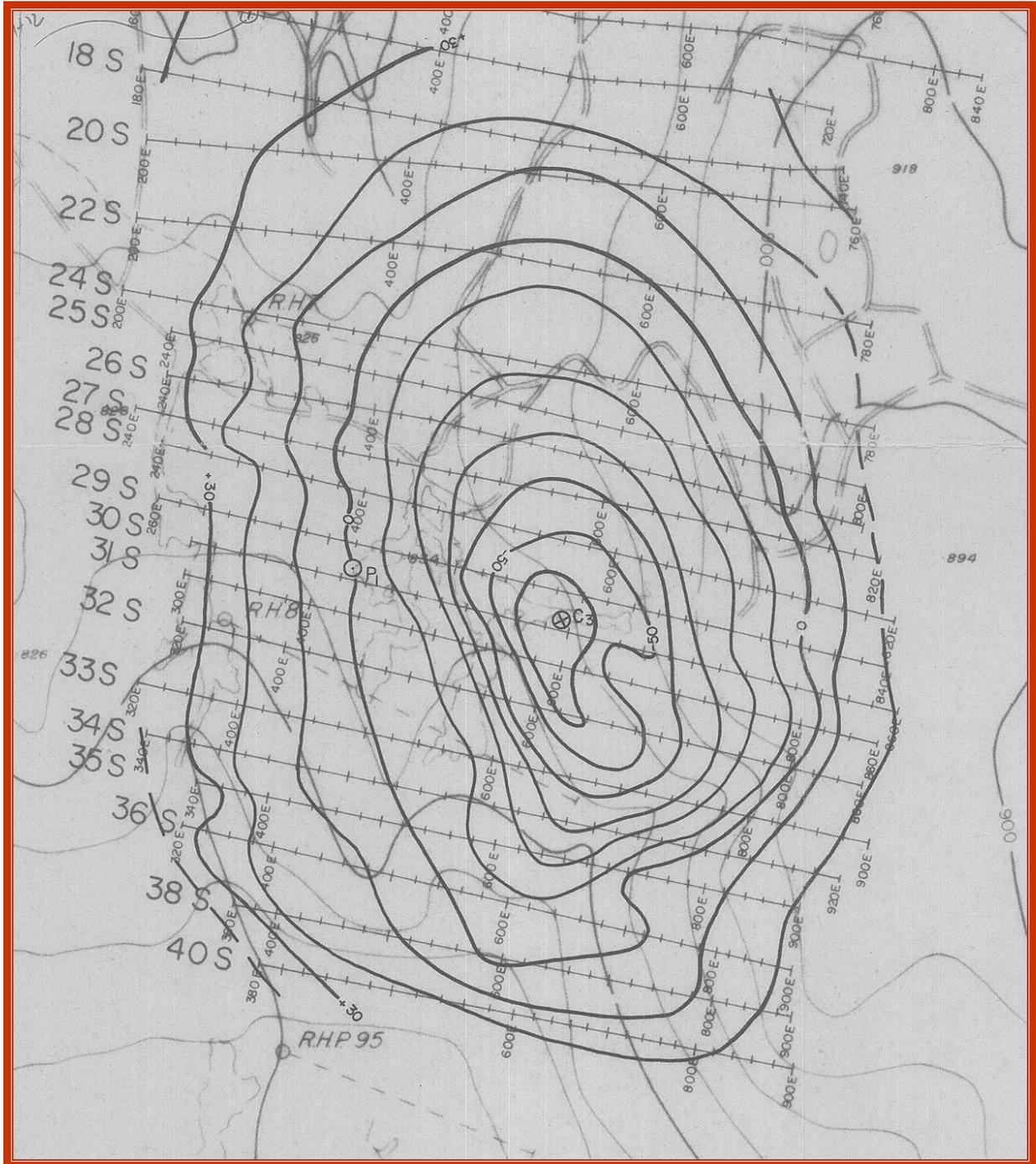


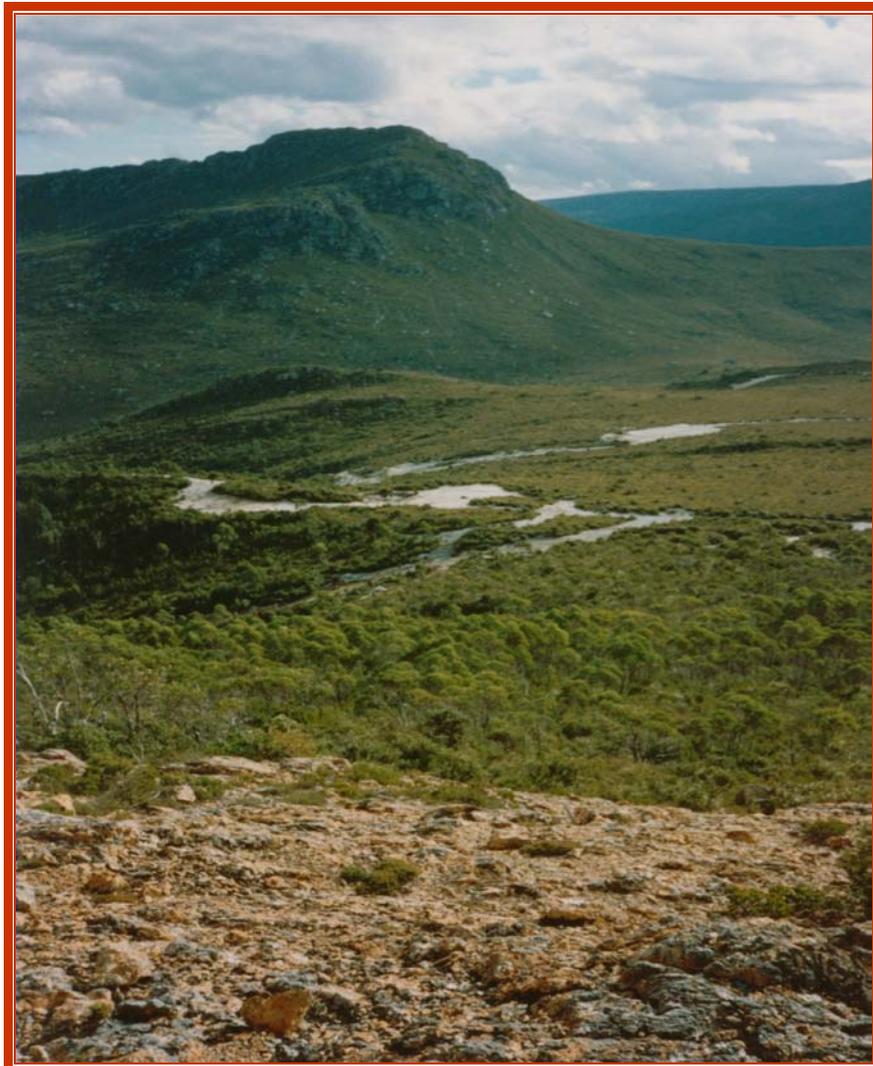
Figure 7: Secondary Field, Applied Potential survey 1981-82 over RH5. Downhole Electrode C3 at 196m in RH5. Scale 1:5,000 (from Hutton, 1982)

RH5 Massive Sulphide: Surface Indications

Costeaming confirmed the massive sulphide doesn't outcrop, at least directly above RH5. Lyell mapped a zone of silica-pyrite alteration to the north roughly in the up-plunge position. **Figure 8.**

In 1997 Plutonic sampled the northern half of Red Hills taking C-horizon soils on a 100m x 25m grid. They described gold anomalism as occurring along the LMH's surface trace. Goldfields reprocessed the data and embellished the story: *"prominent gold anomalies were located over the Far West Adit and the LMH-Black Shale sequence in the vicinity of the Inferred Resource"* (ie: 200m north and 100m south of RH5). (Callaghan & Vicary, 2000).

In fact, Plutonic's results show the massive sulphide around RH5 has no anomalous gold or basemetals expression in soils. Values over the LMH were all <0.02ppm Au for 200m north and 600m south of RH5. A single-point 1.2ppm Au value near the LMH 300m north of RH5 worried House (in Callaghan & Vicary 2001): *"the soil results could be transported from one of the adits above the anomaly"*. (This had happened in Plutonic's sampling at the Far West Adit.) A second single-point 0.27ppm Au value 300m SSW of RH5 was west of the black shale and nothing to do with the LMH. Soils over the black shale had elevated basemetal values but those along the LMH were uniformly low.



View SW over basin from Red Hills lava. RH5 drillsite (centre) massive sulphide beneath gully (lower-centre left), Gooseneck in distance.

RH5 Massive Sulphide: Recommended Drilling Programme

Five new diamond holes totalling 1000m are recommended. **Figures 8-12 & Table 1.** They test around the RH5 intersection, above, below and along strike, at 50m spacings with an additional hole 50m north and 50m above to test up-plunge. Lengths range from 160-270m and a shallowing in dip of 1° per 30m has been allowed for. Holes A, B & C (550m) should be drilled initially, with D & E to follow if results are satisfactory. From a purely technical viewpoint all five holes are required for an adequate test around RH5.

The aim of the drilling is to get an idea of the size and grade of the RH5 massive sulphide lens, and better judge its potential. This is crucial as to whether Bendigo should persist with Red Hills - in the event of failure further work could not be recommended. Success in the five proposed holes would initially see close-spaced drilling in the large untested area above the RL of RH5, but would eventually lead to close-spaced drilling at depth below RH5, to see if the massive sulphide trends down into the greater basin between the existing wide-spaced holes. There is sufficient space for this to be feasible and the tonnage potential would increase substantially. The horizontal gap directly under RH5, between RH6R and RH8, is 140m and the gap between RH8 and RH13, closer to the southerly plunge, is 180m. **Figure 3.**

All proposed holes are sited on bulldozed tracks existing in 1984, to minimize new earthworks. **Figure 12.** The condition of these tracks or whether they have been rehabilitated, is not known. The sites of D & E, particularly the former, are likely to be the most problematic due to the terrain. Drilling should be done with a small rig as this would suit the environmental constraints imposed in this area.

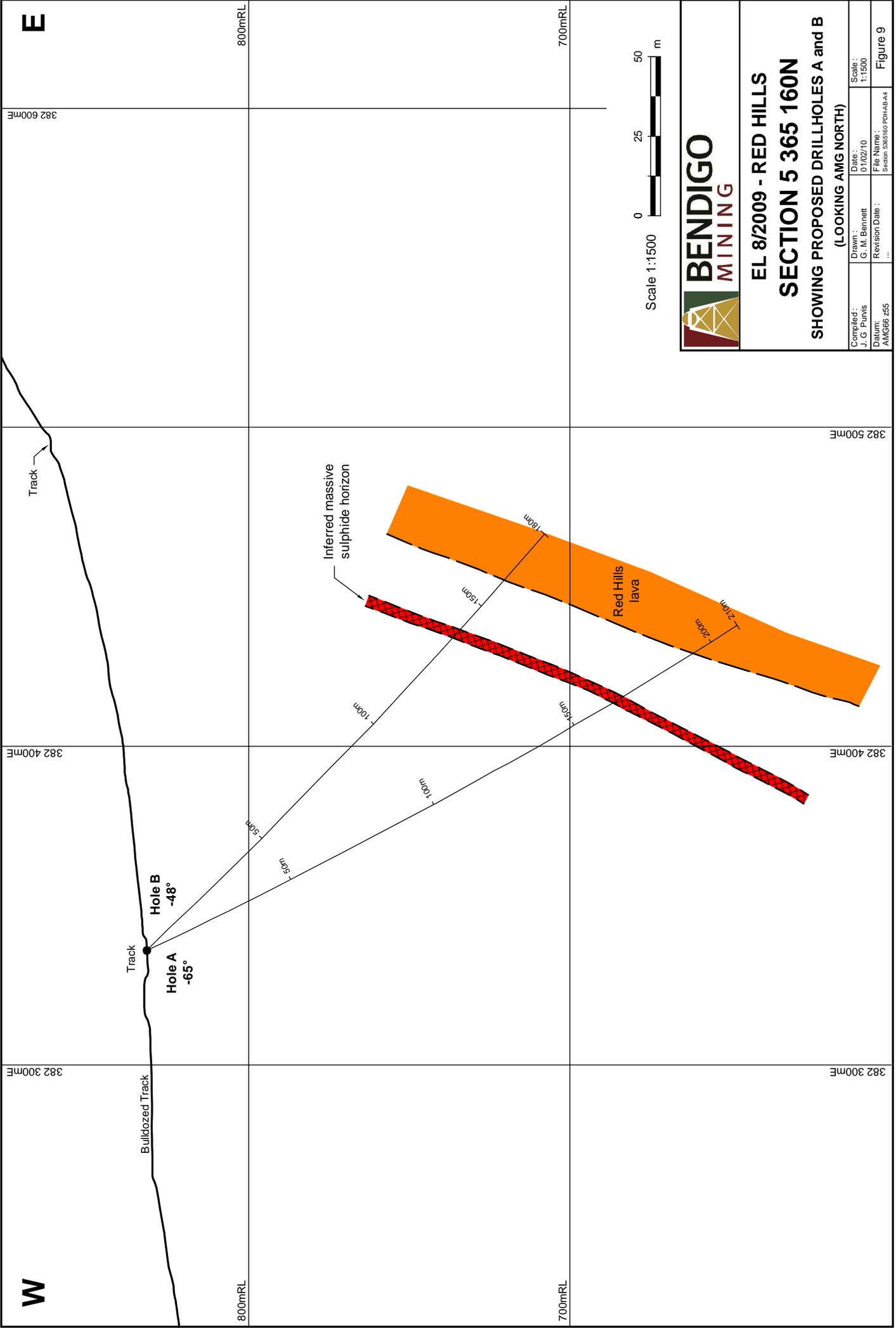
Table 1: Details of Proposed Holes Around RH5

Hole	Site	Location (AMG)	Dip	Azimuth (AMG)	Target Depth	EOH	Comments
A	Old track	5365160N 382336E 832RL	-65°	090°	165m	210m	Test 50m north of RH5 intersection at same RL (685m)
B	As for A	As for A	-48°	090°	140m	180m	Test 50m vertically above A on same section
C	Old track near costean (sloping)	5365110N 382360E 818RL	-45°	090°	120m	160m	Test 50m vertically above RH5 intersection
D	Old track down steep gully	5365060N 382360E 806RL	-65°	090°	135m	180m	Test 50m south of RH5 intersection at same RL
D (alternative)	Old track	5365060N 382280E 826RL	-50°	090°		240m	Ditto
E	Old track near RH5 site	5365110N 382306E 829RL	-67°	090°	215m	270m	Test 50m vertically below RH5 intersection



EL 8/2009 - RED HILLS
SECTION 5 365 160N
SHOWING PROPOSED DRILLHOLES A and B
(LOOKING AMG NORTH)

Compiled: J. G. Purvis AMG66 z55	Drawn: G. M. Bennett	Date: 01/02/10	Scale: 1:1500
Datum: AMG66 z55	Revision Date: ...	File Name: Section 5365160 PH4E44	Figure 9



E

W

382 600mE

382 400mE

382 300mE

382 500mE

382 400mE

382 300mE

800mRL

700mRL

800mRL

700mRL

Hole B
-48°
Hole A
-65°

Bulldozed Track

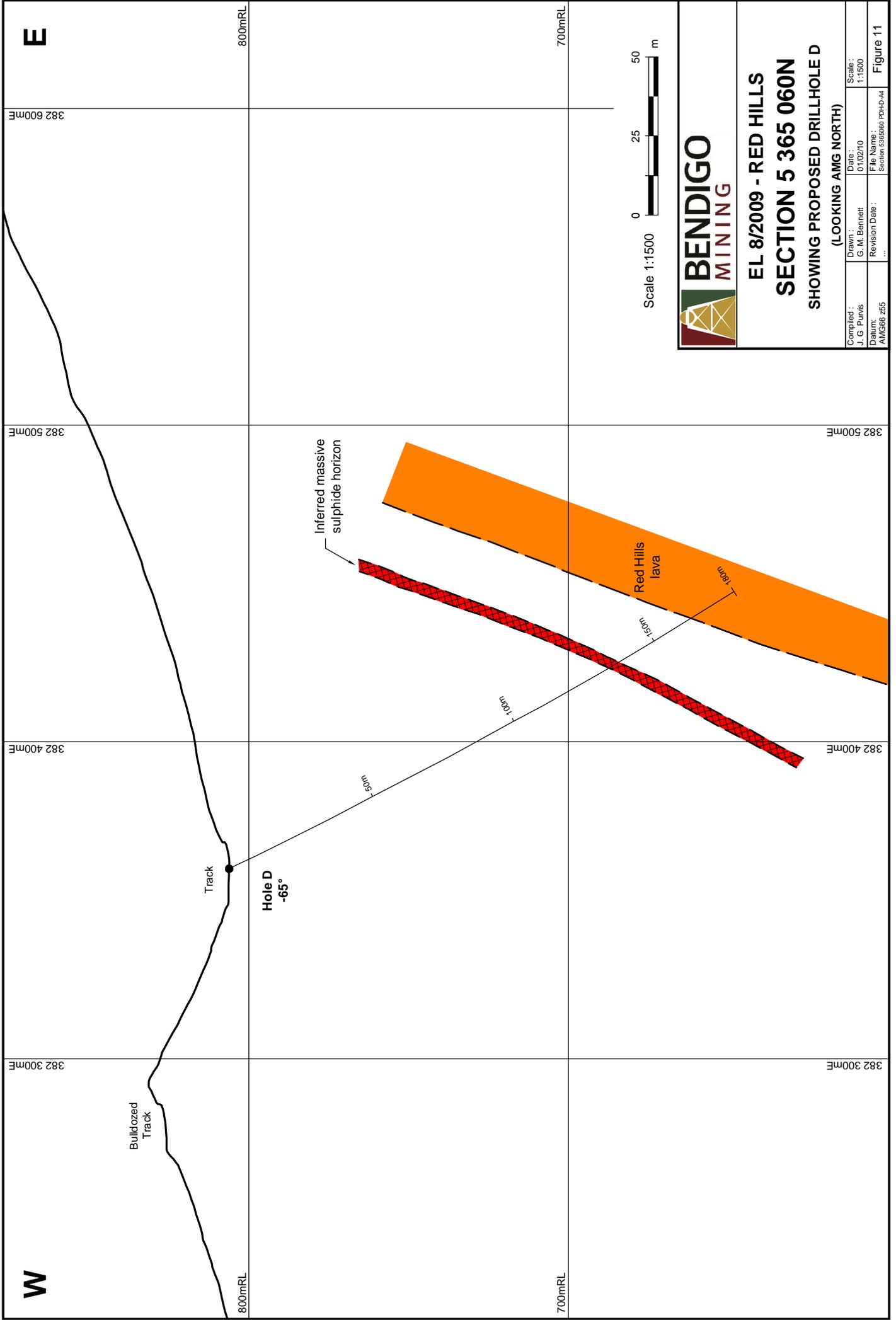
Track

Track

Inferred massive sulphide horizon

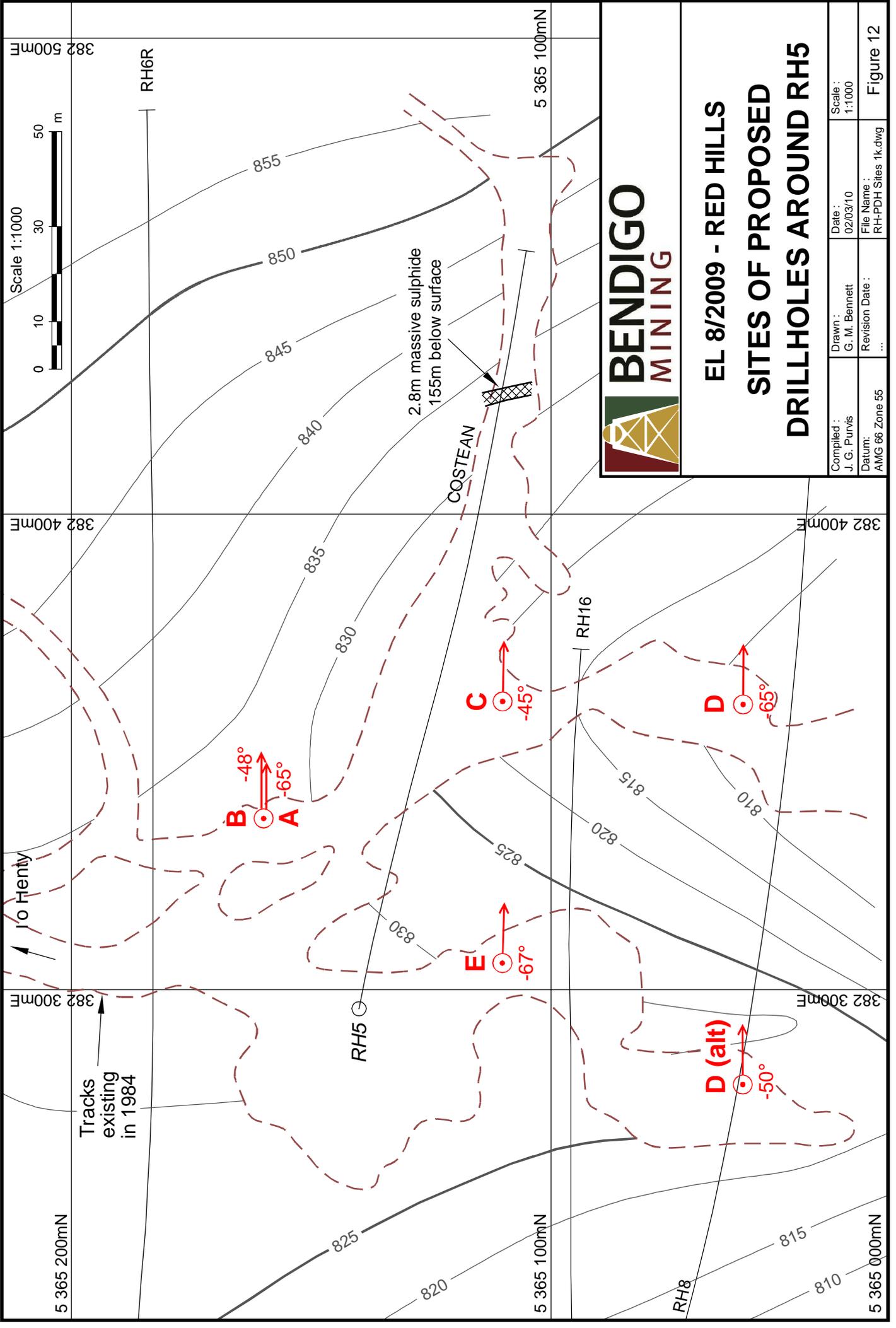
Red Hills lava

50m 100m 150m 180m 200m 210m 150m 100m 50m



EL 8/2009 - RED HILLS
SECTION 5 365 060N
SHOWING PROPOSED DRILLHOLE D
(LOOKING AMG NORTH)

Compiled: J. G. Purvis	Drawn: G. M. Bennett	Date: 01/02/10	Scale: 1:1500
Datum: AMG86 255	Revision/Date: ...	File Name: Section 5365060 PPH-D-04	Figure 11



EL 8/2009 - RED HILLS
SITES OF PROPOSED
DRILLHOLES AROUND RH5

Compiled : J. G. Purvis	Drawn : G. M. Bennett	Date : 02/03/10	Scale : 1:1000
Datum: AMG 66 Zone 55	Revision Date : ...	File Name : RH-PDH Sites 1k.dwg	Figure 12

↑ Jo Henty

Tracks existing in 1984

2.8m massive sulphide
155m below surface

COSTEAN

B -48°

A -65°

C -45°

D (alt) -50°

E -67°

D -65°

5 365 200mN

5 365 100mN

5 365 000mN

382 500mE

382 400mE

382 300mE

382 400mE

382 300mE

RH6R

RH16

RH5

RH8

855

850

845

840

835

830

825

830

825

820

815

810

820

815

810

815

810

NORTHERN ADITS AREA

Strongest Cu-Au mineralization within the Red Hills lava is at the Northern Adits near the northern end of the rhyodacite. These comprise three short tunnels: 1N 100m from the lava's western margin, 2N 200m to the south and 3E 200m east of 1N. From 1905-08 Mt Lyell mined small parcels of high-grade copper ore from these workings. **Figure 2.**

Eastoe (1981) mapped a mineralized chlorite-silica-magnetite alteration pipe extending E-W through 3E and 1N adits, and most intense around the latter. This alteration overprints earlier pervasive k-feldspar-chlorite-hematite (Jenkins, 1991). Mineralization comprises veinlets, disseminations and small massive lenses to 25cm thick of py-ccp and gold. Plutonic and Newcrest variously describe the mineralization as broad E-W orientated stockworks within an E-W chloritic shear centred around the vehicle track at 5365900N.

Soil and rock sampling showed better values are patchy and localized around 1N Adit. Chip sampling in the 59m long adit defined mineralized intervals up to 12m @ 0.94% Cu & 0.2g/t Au. Dump samples returned values up to 11% Cu & 2.4g/t Au, but a Newcrest "representative" sample assayed only 0.2% Cu & 0.05g/t Au. Five nearby outcrops averaged 2g/t Au. There are near-coincident UTEM, MLEM and pole-dipole IP responses over the alteration pipe in the adit vicinity. In 1970 Mt Lyell put down seven short (15m maximum) vertical percussion holes on the periphery of the area. Best result was only 3m @ 0.2% Cu, but it appears the holes were sited for ease of access rather than near mineralization.

Two diamond drillholes have tested the Northern Adits area. In 1957 EZ hole RHP94 (376m) was directed east between 1N and 2N adits but hit little: best assay was 0.14% Cu over 2.4m. In 1977 Mt Lyell hole RH4 (310m) was sited 150m SE of 3E Adit and directed west at an IP anomaly running N-S the length of the Red Hills lava. Best intersection was 3m @ 0.89% Cu & 0.2g/t Au at 249m. The crucial point is that both holes were directed E-W at a mineralized zone that has the same orientation and is apparently centred north of them. The conclusion is neither hole was an effective test of it.

It is recommended that the Northern Adits area be mapped and all existing assay data compiled on the plan, preparatory to drilling a series of short (<75m?) north-south orientated holes across the mineralized shear. The target mineralization, although opencuttable, is likely to be of limited extent and the best grade that could be anticipated is around 1% Cu & 1g/t Au.

THE BROADER BASIN

Identification of the remaining potential for gold and massive sulphides in the greater basin is not straightforward. At present no obvious drill targets exist, neither are there vectors to suggest where they might be. Most geophysical methods have been tried, including pole-dipole and gradient array EIP, multiple forms of EM (including Turam, UTEM, Sirotem, MLEM, Genie and EM37), magnetics and gravity.

The silica-sericite-chlorite-carbonate⁶ alteration zone associated with the LMH seems to lack the strength normally associated with VHMS systems and this has confused many workers at Red Hills. The Gold Fields 1983 review team speculated whether the drilled alteration was distal to an as-yet-unseen main plumbing system. Herrmann (1996) discussing alteration footwall to the LMH in RH11 sums up the situation: *“This is not typical of Australian VHMS proximal footwall alteration zones in which addition of Si, Fe, Mg and S and loss of Na are characteristic.”* (Albeit RH11 was a bad choice to study as it is the only basin hole in which the LMH is unmineralized.)

There has been patchy and rather ineffective use of alteration lithogeochemistry by explorers at Red Hills.⁷ Two examples:

a) Herrmann (1996) reported lithogeochemistry for 11 samples from RH11 and RH18, in which alteration in the LMH and its footwall varied greatly, with Na₂O from 0.03% to 2.55% and Al from 52 to 98. The holes are not ideal for study as neither contains a good example of mineralized LMH.

b) Newcrest (Kitto, 2007) analysed Tl and Sb in 34 rocks, 73 soils and 225 core samples from four holes at ~500m spacings along the basin. The holes (RH10, 11, 17 & 18) were badly chosen: as mentioned neither RH11 or RH18 are ideal and in RH10 the LMH appears missing due to faulting. RH17 didn't even drill the basin sequence. Newcrest concluded the results *“..display an apparent vectoring towards the gold-rich polymetallic horizon intersected in RH5”*. This isn't true. Of their 332 samples thalium exceeded 10ppm in only one (16.5ppm from shale in RH10). Antimony exceeded 10ppm in only three soils and eight core samples (best 18.5ppm from shale in RH10). For both Tl and Sb there was a clear association of better values with shales rather than the LMH. Newcrest's sampling doesn't rule out the potential effectiveness of Tl and Sb to provide alteration vectors at Red Hills.

There is scope for systematic lithogeochemical and isotopic alteration mapping by sampling core from all basin holes. It probably offers the best hope of identifying exploration vectors and is the recommended way forward. As mentioned earlier, if the shallow drilling proposed around RH5 strikes ore there is sufficient room for this to escape to depth into the greater basin between the existing wide-spaced drillholes. That is the logical time to take an interest in the basin as a whole. Work to establish vectors and generate targets in the basin is not recommended unless there is serious encouragement from the drilling around RH5.

FOLD REPETITION OF THE LMH?

A prominent synclinal fold in the thick black shale unit (UMH) at the top of the basin, has logically led some to suggest the LMH will be folded around the syncline and reappear west of the shale. Plutonic were the strongest exponents of this idea and produced a map showing the western limb of the LMH folded against the fault just west of the basin top (Reid & Close, 1998). This juxtaposition raises the possibility for Henty-style upgraded Au mineralization.

Plutonic's analysis supporting their fold repetition concept is disconcerting in its detail. Seemingly plausible, in critical instances it appears to fly in the face of facts or supporting evidence is missing. For example:

⁶ In some holes the carbonate is oolitic.

⁷ Research into alteration at Red Hills by Eastoe (1981) and Jenkins (1991) hasn't been sighted. The former was done before most basin holes were drilled. In the latter alteration was part of a broader study.

1. Reid & Close (1998) mention “*symmetry of mineralized volcanic breccias (LMH) both east and west of the black shale.*” However, breccias west of the shale are remarkably unmineralized. What little there is occurs immediately adjacent to the black shale and is probably part of the UMH. The best is a siliceous breccia in RH16 assaying 17m @ 0.8% Zn & 0.4g/t Au.
2. Breccias west of the shale are weakly albitized. They lack the hydrothermal alteration which accompanies the mineralization in the LMH.
3. Reid & Close (1998) talk of “*facing reversals downhole, as in RH16*”, as confirming the presence of the west synclinal limb. The author logged RH16 without seeing facings west of the shale. Similarly, FitzGerald’s 1982-83 detailed logging of RH6R, 8, 9, & 14R, which all supposedly drilled the western fold limb, found not one facing to support Plutonic’s theory.
4. Drilling shows the LMH and other basin rocks continue at least 700m downdip with their steep westerly dip unchanged. Only the shale is clearly folded.

I conclude that the shale syncline is intraformational, as I have seen this elsewhere in shale lenses in the MRV’s (albeit not on the scale of the Red Hills shale). There is no strong evidence for a fold repetition of the LMH.

POSSIBLE WESTERN CVC / TG BOUNDARY

Uncertainty surrounds whether the prospective CVC/TG boundary is structurally repeated in undrilled rocks west of the basin. This hinges on the stratigraphic affinity of the 400m of albitized feldspar-phyric pumice breccias west of the fault near the basin top. Herrmann (1996) and MRT (McNeill, 1987; Corbett, 2003), consider these rocks CVC. Callaghan & Vicary (2000) describe them as stratigraphically and visually similar to CVC at Henty-Tyndall Range, but “*their geochemistry has more similarities to the Tyndall Group... than the CVC.*”

The statement is slightly puzzling. These western Red Hills pumice breccias have a consistent Ti/Zr ratio of 5, which although similar to TG rhyolites (and the CVC Red Hills lava), is much lower than the 15-26 value for TG clastics at Henty-Tyndall Range (Callaghan & Vicary) and in the upper parts of RH18-19 in the southern Red Hills basin (Herrmann). Red Hills data from both parties shows the CVC has values <13 and the TG values >15, with the exception being 5 for TG rhyolites. The abrupt lowering in Ti/Zr occurs at the N-S fault just west of the basin.

The inference is the western pumice breccias are in fact primary rhyolitic volcanics - pumiceous lava flow(s) or ignimbrite(s) perhaps. The constant Ti/Zr value is typical of a compositionally-uniform single eruptive unit rather than a pile of true clastics – all other clastics in the area have a range of Ti/Zr values, as you would expect. My own observations are that these thick uniform rocks lack the layering, alteration and sulphides of the basin sequence, and thus mark a major change in the geology.

Further west on the Gooseneck, quartz-feldspar-phyric rhyolite lavas are identical in appearance and chemistry to TG Mt Julia rhyolite. If the pumice breccias west of the basin are TG, a simple west-facing stratigraphy from basin to Gooseneck is implied. If they are CVC, the contact with the rhyolite must be a structural repeat of the CVC/TG boundary. MRT map this contact as a fault but Herrmann found it unfaulted in outcrop. Magnetics mark a major discontinuity here. Some explorers Intended

drilling this possible CVC/TG boundary but it hasn't been done. It has been surveyed with soil geochemistry, IP and EM for little encouragement.

The lack of alteration, sulphides and geophysical/geochemical anomalies suggests to me that this contact, whether it be the CVC/TG boundary or not, is not prospective.

HENTY-RED HILLS LINK

Looking at the broader picture, there is a large open syncline centred on the Gooseneck ridge just east of Henty Mine. It is possible the Red Hills mineralized CVC/TG boundary folds around this axis at depth to come up and link with the mineralized CVC/TG boundary at Henty Mine. The author favours this structural model which was put forward by Callaghan & Vicary (2001). Their section is shown in Figure 13.

The model fits with the drill-proven unchanged steep westerly dip and facing of the Red Hills basin rocks to 700m depth. Under the model, rocks west of the basin are all classified as TG.

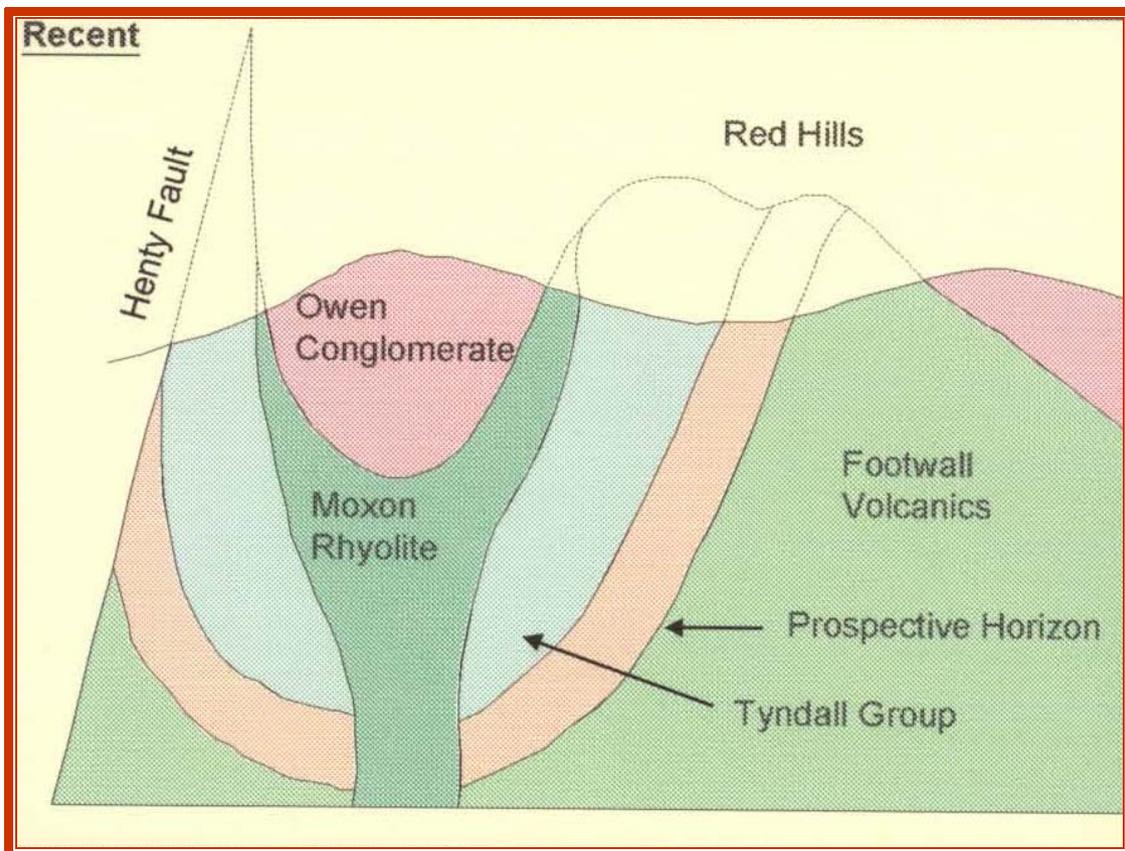


Figure 13: Structural model for Red Hills – Henty area (from Callaghan & Vicary, 2001)

REFERENCES

- | | | |
|---|--------------|--|
| Bishop, J.R. | 1982 | Red Hills Geophysics, Evaluation of Area 00S to 98S. Unpub Memo to J.G. Purvis, Gold Fields Exploration, November 1982. MRT No. 84-2271 |
| Callaghan, T. | 2001 | <u>in</u> Callaghan & Vicary, 2001: Interpretative Plans and Sections of Red Hills Basin. Unpub Rep. MRT No. 01-4604 |
| Callaghan, T.
Vicary, M. | 2000 | 1999-2000 Annual Report, Tasmanian Gold Project, Red Hills EL 29/94. Goldfields Exploration P/L. Unpub Rep. MRT No. 00-4487 |
| Callaghan, T.
Vicary, M. | 2001 | 2000-2001 Annual Report, Tasmanian Gold Project, Red Hills EL 29/94. Goldfields Exploration P/L. Unpub Rep. MRT No. 01-4604 |
| Dare, T. | 1998 | Annual Report for Period October 1997 to October 1998. EL 29/94 Red Hills. Plutonic Operations. Unpub Rep. MRT No. 98-4211 |
| Eastoe, C.R. | 1981 | Alteration and Mineralization in the Mt Read Volcanics, Western Tasmania. Unpub Consultant Rep to Mt Lyell-Getty Oil JV. |
| FitzGerald, F.G. | 1983 | <u>in</u> Purvis et al: EL9/66 Annual Report 1982-83. Gold Fields Exploration P/L, Unpub Rep. MRT No. 83-1996 |
| Herrmann, W. | 1996 | Appendix 1 in Reid & Close (1998). Memo to Plutonic Operations. Red Hills EL29/94; Geology of Southern Area. Unpub Rep. MRT No. 98-4127 |
| Howland-Rose,
A.W. | 1978(a) | Comments on "At Hole" Downhole EIP and Resistivity Logs Down Various Drillholes at Mt Lyell (including Red Hills). Unpub Scintrex Rep Tas-054E, July 1978. MRT No. 84-2242 |
| Howland-Rose,
A.W. | 1978(b) | Report on Applied Potential (EIP) and MMR (MIP) Down rveys, Red Hills Area. Unpub Scintrex Rep Tas-054F, August 1978. MRT No. 84-2243 |
| Hutton, M.J. | 1982 | <u>in</u> Meares et al: EL9/66 Annual Report 1981-1982. Mt Lyell Mining & Railway Co. Unpub Rep. MRT No. 82-1791 |
| Jenkins, D.R. | 1991 | Volcanology, Mineralization and Alteration of the Red Hills, Western Tasmania. Unpub BSc(hons) Thesis, University of Tasmania. |
| Kitto, J. | 2007 | Annual Report EL 9/2005, Red Hills, for Period 1 st July 2006 – 30 th May 2007. Newcrest Mining. Unpub Rep. MRT No. 07-5484 |
| Mc Neill, A.W.
Corbett, K.C. | 1987
2003 | Selina 1: 25,000 Geological Map Sheet 3836, with revisions. MRT. |
| Purvis, J.G.
Jones, M.T.
FitzGerald, F.G.
Poltok, R.A. | 1983 | A Geological Review of the Tyndall EL 9/66, Western Tasmania. Gold Fields Exploration P/L. Unpub Rep. MRT No. 83-1995 |
| Reid, R.O.
Close, R.J. | 1998 | Red Hills EL 29/94. Report on Exploration During Period 20 October 1995 to 21 October 1997. Plutonic Operations. Unpub Rep. MRT No. 98-4127 |
| Walter, A.C. | 1978 | EL 9/66 Annual Report 1977 / 78. Mt Lyell Mining & Railway Co. Unpub Rep. MRT No. 78-1286 |
| Walter, A.C.
Brophy, P. | 1977 | EL 9/66 Annual Report 1976 / 77. Mt Lyell Mining & Railway Co. Unpub Rep. MRT No. 77-1224 |