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EL 57/80

H. J. STACPOOLE

FINAL REPORT

**OPEN FILE**

T. G. Summons  
Summons Geoservices Pty. Ltd.  
March, 1983.

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EL 57/80

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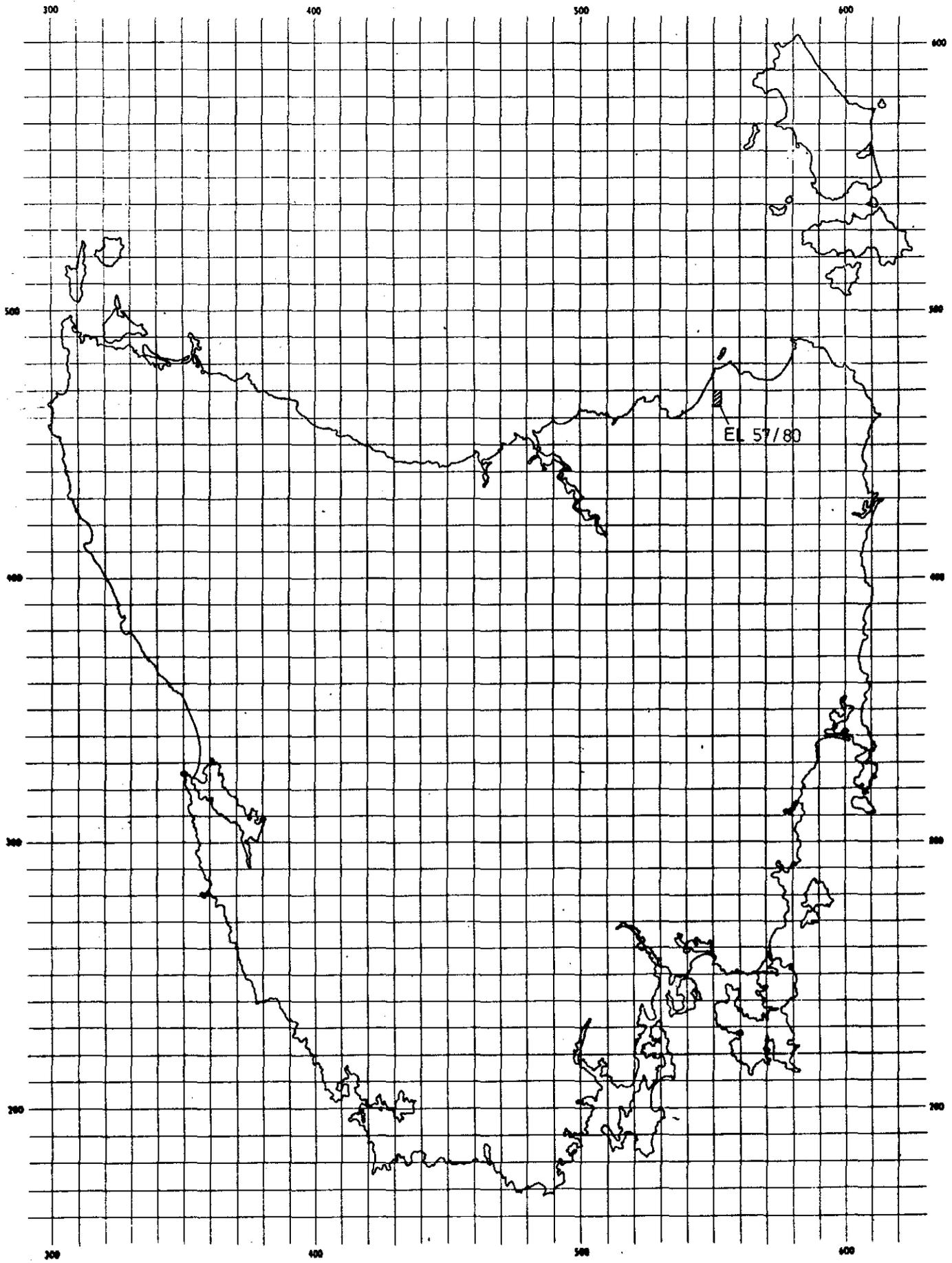
INTRODUCTION

EL 57/80 is located in north east Tasmania, approximately 25km NNE of Scottsdale, 20km SW of Bridport, and 2km west of Waterhouse (see Figure 1).

The licence was originally granted on 26th May 1981 covering an area of 4 sqr.km., following which in August 1981, an additional 17 sqr.km. was included, giving a total area of 21 sqr. km.

The licence expired on the 28th November 1982, and this relinquishment report details all exploration activity undertaken for the period 26th May 1981 to 28th November 1982.

The work done in EL 57/80 consisted of reconnaissance mapping, literature surveys, grab sampling of quartz reefs, a petrographic study, drilling, structural interpretation of the reefs, and analysis of the grab and drill core samples.



5 cm

FIGURE 1 LOCALITY PLAN OF EL 57/80

SCALE 1 2000 000  
(1cm = 20km)

lb.

SUMMARY

The auriferous veins in the Waterhouse Goldfield range from the gold - quartz to the gold sulphide type, with most apparently transitional between those two groups.

The sulphide assemblage (arsenopyrite, chalcopyrite, tetrahedrite, pyrite, galena and sphalerite), ranges up to approx 100% by volume of the veins, and hosts most of the gold (chiefly arsenopyrite).

Average grades of the gold - sulphide and gold - quartz veins suggest the former contain appreciably higher gold values.

Data on gold:silver ratios suggest a low temperature origin for the gold mineralization, although various petrographic evidence implies the possibility of high temperature gold mineralization. The co existence of the two generations of gold mineralization has been recognized elsewhere in the Mangana - Waterhouse Goldfield.

Assessment of the old records of the gold and silver grades indicated them to be authentic, based on assumptions about the sulphide assemblage and the type of enrichment.

The main structural control on the gold mineralization in the area was the development of shear faulting along a NNE - NE direction. Less significant controls were effected by portions of the Mathinna Beds country rock.

Available evidence suggests the auriferous veins to be of similar age to the Scottsdale Batholith (granodiorite), and consequently may be genetically related to the granodiorite.

### HISTORY AND PREVIOUS WORK

A literature survey of the Waterhouse Goldfield revealed several reports on the area, namely by Gould (1869), Thurean (1881), Nye (1931), Blake (1947), Keid (1950) and Holmes (1980).

The Waterhouse Goldfield was among the first discovered in Tasmania, but interest in the area was short lived apparently for a variety of reasons. The principal reefs were the Railway, Alliance, Pioneer, Southern Cross and North Southern Cross with less well developed reefs in the Hope, Martial Call and New Monarch workings. A considerable amount of gold was won from the field, but the proportion of alluvial to reef gold is not known. Apparently an excessive number of mineral leases were held by non residents of the area, for speculative purposes only, culminating in the salting of a supposedly barren mine.

#### Pioneer Reef.

This reef was the first to be discovered in the area (in ?1864) and by 1869 prospecting activity was in progress; initial gold grades ranged from 600 - 900 g/tonne (20 - 30 oz/ton) and significant silver values of 367 g/tonne (12oz/ton) were also obtained. In September 1869, the United Victorian and Tasmanian Quartz Mining Coy (UVTQM) commenced mining operations, following which crushing of the ore (on site) began in April 1870. Gold grades are reputed to be 30.6 g/tonne (1 oz/ton) at this time, but all activity had ceased by December 1870. In June 1871, the UVTQM Coy was refloated as the Tasmanian Quartz Mining Coy, which then moved the stamper battery closer to the town of Lyndhurst. However, by June 1873 mining had ceased, and all machinery was removed. The Pioneer Reef was held under mineral leases again in 1877, 1881 and 1907, but it seems little work was done in the way of mining operations, with the exception of the sinking of a 30m shaft to the reef in 1881.

#### Railway Reefs.

Auriferous quartz reefs were discovered in this area in 1870, and following prospecting of the Railway North and Western reefs, the main reef was mined to a shallow depth, following which it was abandoned by ?1873. In 1881 the Waterhouse Quartz and Pyrites Prospecting Association (WQPPA), obtained a yield of 63.3 g/tonne (2.07 oz/ton) from a 508kg parcel of ore from the Railway main reef. In 1888, a further revival of operations by the WQPPA

occurred, and by 1908 the property was held by the New Alliance Gold Mining Coy., which is believed to have done further work on the main reef.

Alliance Reef.

The Alliance main reef was discovered in 1870, and was worked by the Alliance Gold Mining Coy, but February 1872 the mine had closed. In 1887, the Waterhouse Quartz and Pyrites Prospecting Association did further development work on the reef, and also purchased the crushing plant from the Southern Cross area. In 1888, a 54.4 tonne parcel of ore yielded gold at 23.3 g/tonne (0.78 oz/ton), but by 1890 all mining operations had ceased. The New Alliance Gold Mining Coy held the property in 1909, but no significant mining and development took place.

Southern Cross Reefs.

The area contains several reefs, the main ones being the Southern Cross (two major reefs), the West, and the North Southern Cross. The original prospecting claim was taken up in 1870, and the Southern Cross Gold Mining Coy formed in 1878. However, this company ceased operations in 1880, following which the Royal Sovereign Gold Mining Coy attempted to work both the main and the North Southern Cross reefs, including the erection of an eight stamp battery, between 1881 and 1883. Details on development, production figures etc. are unavailable. The area was again held under claims in 1891, 1894, 1906 and 1911, but it seems minimal development work was achieved.

Reasons proposed for the early abandonment of the Waterhouse Goldfield include the inability to treat the apparently refractory (sulphide rich) ore, narrow reefs at depth, and inadequate capital to provide pumps to lower the shallow water table.

GEOLOGYREGIONAL SETTING

EL 57/80 lies between 20 and 80m ASL in the coastal district of the Boobyalla 1:50 000 map sheet of the Geological Survey of the Tasmanian Dept. of Mines (McClenaghan et. al., 1982).

Quaternary sediments cover the northern half of the EL, while the remainder is predominantly Mathinna Beds.

The licence area is situated at the northern end of the 80km long Mangana - Mathinna - Alberton - Warrentina - Waterhouse Goldfields. This region of goldfields consists of a linear zone (oriented NNW), of the Mathinna Beds (Ordovician - Silurian - early Devonian age), enclosed by the Scottsdale Batholith (granodiorite) to the west, and partly by the Blue Tier Batholith (granite/adamellite) in the east, both intrusives being of the Devonian age. The linearity of this zone is best seen commencing approx. 10km north of Mathinna, where it is 10 - 15km wide for approx. 35 km north to Forester, north from which it is 5km wide for the remaining 15km to Waterhouse. Threader (1967) suggested this zone of goldfields was composed of smaller strike faults (hosting gold mineralization) collectively defining a large sheared zone over the 80km distance.

The Mathinna Bed sequence consists of alternating beds of shale, siltstone and greywacke, variably metamorphosed to phyllites, slates, schists and quartzites. The western margin of the Blue Tier Batholith is represented by porphyritic biotite granite/adamellite on the eastern margin of the EL.

MAPPING

Reconnaissance mapping in the areas immediately surrounding Lyndhurst and Southern Cross failed to locate the evidence of many of the old prospecting and mining operations.

In the Lyndhurst area, superficial sediments of Quaternary age mask the Mathinna Beds, and this in conjunction with the fact that many of the old workings have collapsed or been filled in, means that the investigation of the area had to rely heavily on the work of Blake (1934 - 47).

The Mathinna Beds sequence was located north and west of the old town of Lyndhurst, and consists of shales, siltstones and greywackes, altered to schists, spotted slates and quartzites to the north and south of Lyndhurst. These altered rocks are presumably part of the contact metamorphic aureole surrounding the porphyritic granite of the Blue Tier Batholith.

The few mines that were located (e.g. Pioneer, Alliance and Southern Cross) were apparently in the same condition as when Blake mapped them in 1934.

The Alliance main shaft is 2.5 x 1.5m in size, and the top 3m is in a collapsed state, it was dewatered to a depth of 6m where it was seen to be lined with timber.

The Pioneer workings were located, including the Pioneer reef which is approx. 2m in width; this reef has only been partly worked, possibly implying low gold values.

Details of the reconnaissance mapping are shown in Figures 3 (sheet 1 and 2) and 4.

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PETROGRAPHIC STUDIESAlliance Mine

A sample of silicified rock from the Alliance workings was submitted to Minpet Services for identification, and the detailed description is given in Appendix 1. The rock was interpreted as a silicified quartz breccia, formed from an original quartz feldspar porphyry.

Pioneer Mine

A sample of silicified rock from the Pioneer workings was also submitted to Minpet Services for identification, as detailed in Appendix 1. The sample was also highly altered, and was interpreted as being a silicified and brecciated, (originally partly uralitized) gabbroic rock. Significantly, this sample indicated two periods of shearing or brecciation.

McClenaghan et. al. (1982) recognised several intrusive episodes of porphyritic rocks in the Boobyalla quadrangle, ranging from quartz feldspar porphyry, to porphyritic granite/adamellite, all of which post date their main phase of shearing.

The silicified gabbroic rock from the Pioneer mine is probably a variant of the dolerite dykes which intrude both granitic rocks and Mathinna Beds in NE Tasmania. These dykes are considered by Cocker (1977) to have been emplaced in localized zones of extension, after the intrusion of the granitic rocks. The uralitization of the pyroxenes may indicate the activity of late stage fluids associated with the granitic rocks.

GEOCHEMISTRYAlliance Mine

Two grab samples of grey vein quartz, containing minor sulphides and graphitic shale, were collected from the mullock dump near the main shaft, and submitted to Analabs for analysis of Au, Ag, As, Cu, Pb and Zn. Results are contained in Appendix 2.

Diamond drill core samples from drill hole A - 1 were also sent to Analabs for Au and As assays (Appendix 4).

Pioneer Mine

Two grab samples of white and grey vein quartz were collected from the outcropping quartz reef, and sent to Analabs for Au, Ag, As, Cu, Pb and Zn analysis.

The locality is shown in Figure 3, and the results contained in Appendix 2.

Southern Cross Mine

Two grab samples of white and grey vein quartz were collected from the mullock dump of the eastern two reefs present at the Southern Cross mine (Fig 4). Analysis of Au, Ag, As, Cu, Pb and Zn was also done by Analabs and the results are in Appendix 2.

The analytical results of the grab samples show a wide range in gold values, from 0.033 ppm to 6.78 ppm.

The Alliance samples probably represent some of the Alliance western reefs intersected in the main shaft, as it is unlikely that this shaft was sunk to a depth of 50m necessary to locate the main reef.

Blake (1947) quoted a grade of 13.8 g/tonne of gold, and 21.8 g/tonne of silver from a sample also taken from the dump adjacent to the main shaft.

The Pioneer sample results appear to confirm the results obtained by Blake (1947), who took a bulk sample from the Pioneer main shaft dump and found it to be devoid of gold and silver. These results, in conjunction with the very rich grades reported for the Pioneer Mine by the early miners (see Table 1), suggest an erratic distribution of gold in this reef.

The only significant gold analysis was that taken from the Southern Cross mine (6.78 ppm).

The Ag, As, Cu, Pb and Zn values suggest a sulphide assemblage including arsenopyrite, chalcopyrite, tetrahedrite, galena and sphalerite.

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DRILLING

A single cored drill hole (A - 1) was collared approx. 20m SW of the Alliance main shaft, and inclined at 63° on azimuth 042° (grid). The object of this hole was to test the down dip extension of the Alliance main reef.

The hole intersected a Mathinna Beds sequence of predominantly greywacke (silty sandstone), with interbedded subordinate siltstone (sandy shale), and minor shale.

Approximately half the sequence was found to be cut by quartz veins, which were mainly narrow stringers 1-20mm in width, with minor larger veins <100mm wide.

The greatest concentration of quartz veins (also sulphide bearing) was in the intervals 18 - 28m (?Alliance western reefs), and from 47 -80 m; this latter, broad interval includes two major and two minor sheared/crushed zones.

The major sheared zones occur from 56.37 - 59.86m and from 64.74 - 68.2m, one or both of which are considered to represent the down dip extension of the inferred shear zone hosting the Alliance main reef, as worked near the surface.

Approximately half the upper sheared zone was analysed for Au and As, compared to approx. one quarter of the lower sheared zone.

The lower most sheared zone (minor) was also analysed for Au and As, as shown in Figure 2 and Appendix 4.

The lithologic log of drill hole A - 1 is contained in Appendix 3.

Further details on the results obtained in hole A - 1 are given in the section on structure.

## MINERALIZATION

### Auriferous Veins

Descriptions given by Gould (1869) and Blake (1947) of the auriferous veins, reveal them to consist of "fine grained dense, semi-vitreous, blue/grey quartz" in fresh rock. Surface equivalents are milky white in colour, and frequently stained with iron oxides.

Associated sulphides consist of arsenopyrite, pyrite, galena and sphalerite. Threader (1967) studied samples of auriferous quartz from the Mangana - Waterhouse Goldfields belt, and observed the order of abundance of the sulphides to be: arsenopyrite, pyrite/chalcopyrite, covellite, sphalerite/galena/tetrahedrite/marcasite (pyrrhotite), and stannite. He regarded the paragenesis of the sulphide assemblages to be as follows:

chalcopyrite, stannite, sphalerite, tetrahedrite, covellite, pyrite, and arsenopyrite/gold. Gold was seen to occur both as free gold, and contained in the sulphides.

Threader also considered the petrographic evidence to indicate the occurrence of two generations of gold mineralization, namely:

- (i) Early, high temperature (> 500°C) generation - associated with sulphides, and having a high fineness;
- (ii) Later, low temperature (50 - 175°C) generation - discrete grains of gold, and of lower fineness.

The sole sample of auriferous quartz from the Waterhouse Goldfield contained gold filling fractures and lining grain boundaries in arsenopyrite, and also gold enclosing arsenopyrite.

This sample was interpreted as indicating that shearing post dated the deposition of the sulphides, but pre dating the gold deposition.

The gold in the Warrentina and Forester Goldfields is of a very low fineness, this high silver content presumably indicative of the low temperature generation of gold deposition. However, Threader (1967) viewed the gold in the adjacent Waterhouse Goldfield as being early (high temperature) generation gold.

Descriptions of the auriferous veins in the Waterhouse Goldfield by earlier workers suggest that the veins are essentially the gold - quartz veins of Edwards (1965), but that some of the veins containing considerable amounts of sulphides are the gold - sulphide type.

### Gold and Silver Grades

There is only a limited amount of data on the precious metals obtained from the Waterhouse Goldfield, and some of the figures have been reported by previous workers as being of suspect status. The known data on the precious metal grades are shown in Table 1.

TABLE 1.

Mine	Reef	Gold Ore Group	Gold Grade (g/tonne)	Silver Grade (g/tonne)	Au/Ag
Railway	Main	?oxid. gold-sulphide	63.3	-	-
Alliance	Western	gold-sulphide	13.8	21.8	0.63
Alliance	Main	gold-quartz gold-sulphide Combined:	12.9	-	-
Alliance	Main		50.9 23.3	- -	- -
Pioneer	Main	oxid. gold-sulphide	≈ 900	-	-
Pioneer	Main	oxid. gold-sulphide	107.1	367.3	0.29
Martial Call	(composite)	gold - quartz	1.2	0.4	3.0
Apparent averages		gold - quartz	7.0	-	-
		oxid. gold-sulphide	357.0	-	-
		gold - sulphide	32.0	-	-

Using the data compiled by Threader (1967) on the petrography of the auriferous samples from the Mangana - Waterhouse Goldfields, an attempt was made to estimate the average composition of the arsenic rich Waterhouse gold veins. Approximately 8 of the 24 polished slides contained visible gold and arsenopyrite, with minor chalcopyrite, tetrahedrite and pyrite.

The approx. mineralogy was then deduced assuming the average sulphide distribution to be the frequency of occurrence in the 8 samples.

The composition derived thus consisted of  $\approx 62$  vol.% arsenopyrite,  $\approx 15$  vol.% chalcopyrite,  $\approx 15$  vol.% tetrahedrite, and  $\approx 8$  vol.% pyrite, with an average SG of  $5.47 \text{ t/m}^3$ .

The gold ore in the Alliance main reef was reported to contain 34 -  $\approx 100$  wt.% of sulphides, (also expressed as  $\approx 66$  vol. %); a check on this latter figure using SG factors of 2.65 and  $5.5 \text{ t/m}^3$  (to allow for sphalerite and galena present), for quartz and sulphides respectively, indicated an equivalent of 80 wt.% for the 66 vol.% of sulphides.

A further assumption was made whereby all gold present in the primary gold - sulphide ore remained chemically inert during the oxidation and leaching processes which caused the removal of the sulphides.

The figures quoted as average values for each ore type in Table 1 were then assessed for their authenticity, as it was suspected the 900 g/tonne value from the Pioneer mine may have inflated for the benefit of potential investors in the mine.

(a). Authentic Gold - Sulphide Data.

If the primary gold - sulphide ore value of 32 g/tonne of gold is correct, then the degree of relative enrichment resulting from sulphide oxidation was calculated;

(i) Maximum enrichment ( of 99 wt% sulphide ore, 1 wt% quartz)

$$\approx 3200 \text{ g/tonne}$$

(ii) Minimum enrichment (of 34 wt % sulphide ore)

$$\approx 48 \text{ g/tonne.}$$

(b). Authentic Oxidised Gold - Sulphide Data.

If the oxidised gold - sulphide ore value of 357 g/tonne of gold is correct, then the required concentration of gold in the primary ore is as follows;

(i) Minimum concentration of gold in primary ore (99 wt% of sulphides)

$$\approx 3.6 \text{ g/tonne}$$

(ii) Maximum concentration of gold in primary ore (34 wt% sulphides)

$$\approx 235 \text{ g/tonne.}$$

(c). Authentic Primary and Oxidised Gold - Sulphide Data.

If both average figures of 32 g/tonne and 357 g/tonne are valid, the required amount of sulphide in the primary ore is 91 wt.%, which is in accord with the reported range of sulphides.

Thus it would seem that primary gold - sulphide ore can range in gold concentration from 4 - 235 g/tonne, and can be enriched (from a 34 - 99 wt.% sulphide host), to values ranging 48 - 3200 g/tonne.

Accordingly, all the gold values quoted in Table 1 assume credibility, including the 900 g/tonne value.

STRUCTURESouthern Cross Reefs.

The main and West Southern Cross reefs strike  $030 - 060^\circ$ , and dip  $45 - 65^\circ$  SE - ESE; little information on reef thicknesses are available, and the 0.2m wide value may not be representative. In the North Southern Cross area, several quartz reefs strike  $360 - 010^\circ$ , and dip  $45 - 75^\circ$  W and E, apparently accentuating the limbs of a NNE trending anticline.

Blake (1934 - 47) mapped N - NE trending anticlines in the general area of these mines. Additional folds in the form of synclines have been interpreted 200m NW and 200m E of the main Southern Cross reef, as shown in Figure 4. These interpreted folds have a wave length of approx. 200m, and plunge SW. Despite the presence of extensive surface workings (trenches, pits, shafts), the reefs in this area were not successfully traced along strike, and the reasons for this appear to be several;

(i) The quartz reefs have been dextrally offset across numerous E - ESE ( $090 - 105^\circ$ ) striking faults as shown in Figure 4. Although horizontal displacements are small ( $<10m$ ), the offset between the West and North Southern Cross reefs appears greater than 10m.

(ii) The quartz reefs, appear to partially mirror the folds, implying that certain lithologies in the country rock were more susceptible to replacement; the same rocks may also have acted as the loci for shear type faulting. Saddle reefs occur elsewhere in the (southern) goldfields.

(iii) The quartz reefs show a wide range in thickness (i.e. lenticular), implying that although a lithologically or structurally favourable horizon may be strike continuous, it is not of constant width.

This accords with the behaviour of different strength lithologies under a given stress regime, where the accompanying strain effects can be of several types.

The description of the Alliance mine given by the mine manager in 1888 (in Blake, 1947) clearly demonstrates the lensoidal nature of the Alliance main reef, which contracted and expanded from 0.05m - 0.30m over a strike distance of 20m.

The dextral E - ESE trending faults have cut the Mathinna Beds fold axes, and have also variously affected the quartz reefs. However, in at least one locality 200m east of the main Southern Cross reef, a quartz vein has intruded along a fracture trending  $095^\circ$ , implying a pre-ore vein origin

for the fracture and probably some of the similarly trending faults. In addition, many of the veins show only a slight sigmoidal warping across these faults, implying that faulting and emplacement of auriferous quartz veins were syntectonic.

#### Railway Reefs.

The Railway area contains four quartz veins, the main, west (two), and the north; strikes range 030 - 060° and dips 54 - 67° to the NW (?except the far western reef), while vein widths range 0.08 - 1.8m.

#### Alliance Reefs.

The western reef, although not referred to in the literature, appears to have been cut in the Alliance main shaft, as discussed previously. The western reef is best described as a zone of quartz stringer veins (e.g. in drill hole A - 1).

The two reefs strike 025°, and dip NW at 60 - 70°; the main reef ranges 0.05 - 0.30m (average 0.23m) in width in the upper levels, while the western reef is variable, but probably 0.01 - 0.11m thick.

The Alliance main reef, hosted by a shear zone, appears to have lensed out in depth (e.g. in A - 1), and now appears as a densely veined zone (or zones) of quartz stringers, (3 - 90mm wide).

The converse situation, whereby the two major sheared zones coalesce toward the surface, could explain the greater thickness of the main reef in the near surface levels. The upper major sheared zone (from 56.37 - 59.86m in A - 1), encompasses a lithological boundary between a siltstone/shale sequence and an underlying greywacke sandstone sequence. Such a boundary represents a likely focus for tectonic stress concentration during deformation. A similar situation may have existed in respect of the western reefs, where shales occur in contact with massive greywackes.

Additional evidence of shearing in this area occurs in drill hole A - 1 from 60.17 - 63.41m, and from 63.96 - 64.10m, where foliated fabrics of quartz and siltstone/shale occur; this "book/ribbon" structure was described by Threader (1967) as being "the characteristic structure of the goldfields lodes".

The quartz veins seen in hole A - 1 are generally of two types;

- (i) Narrow (<2mm) stringers sub parallel to the core axis and typically devoid of sulphides;
- (ii) Wider (>2mm) stringers and veins, inclined >45° to the core axis, typically vuggy and carrying sulphides.

The former group are considered to have been intruded along a cleavage in the Mathinna Beds and their orientation gradually changes down hole from 80°NE to 85°SW near the base of the drill hole.

This cleavage fanning suggests an initial proximity to a synformal structure, progressively changing to proximity to an antiformal structure.

#### Pioneer Reef.

A single quartz reef strikes 030°, dips westward, and ranges in width from 3.66m on the surface to 0.91m at shallow depth. This (Pioneer) reef is cut by two W - E trending dextral faults, and in common with the Southern Cross area, displays an almost perfect sigmoidal warping across the northern fault. (Figure 3).

By analogy, with the Southern Cross area, folding of the Mathinna Beds appears to have been mirrored by the quartz veins in the Lyndhurst area. Examples occur at the northern end of the Pioneer reef, 150m north of the Alliance reef, and in the Hope workings.

Several folds are inferred in the Railway/Alliance/Pioneer area, as shown in Figure 3; the principal fold being an anticline trending NNE - NE. The folding has an apparent wavelength of 300m, and the synclines appear to plunge to the SW.

The interpretation implies that the Railway main and north reefs, the Alliance main reef, the Pioneer reef, and part of the Hope reefs are related to a single phase of vein emplacement.

The inferred positions of the quartz veins shown in Figure 3, do not necessarily imply the presence of a quartz vein, rather the strike extension of the favourable (for replacement, dilation etc.) host rocks.

It should be noted however, that despite considerable surface excavations by the early prospectors, none of the veins were shown to be discontinuous along strike.

Similarly to the Southern Cross area, where the veins show a preferred orientation (dipping east), the Lyndhurst area is characterised by a dominance of west dipping reefs, again suggestive of thrust fold limbs.

COMMENTS

Structural controls on the emplacement of the auriferous reefs in the Waterhouse Goldfields are due to two factors as follows:

- (i) Folding of the Mathinna Beds sequence along NNE - NE trending axes;
- (ii) Overturning of folds and thrusting of fold limbs, possibly with a (?sinistral) strike slip component of movement in a NNE - NE direction; earliest movement (?dextral) along the E - ESE trending faults.

Subsequent, partial reactivation along the E - ESE trending faults imposed a dextral displacement of the reefs.

The second factor was the most significant episode in items of auriferous vein mineralization, as it permitted access for the hydrothermal gold bearing solutions in to the Mathinna Beds via the sheared zones, and ultimately access to the lithologically favourable (folded) host rocks.

The distinction between lithologically and structurally favourable (i.e. amenable to replacement by hydrothermal solutions) host rocks may be artificial, as they may be the same horizons.

At least two phases of shearing occurred along the NNE - NE trending faults, as shown by the mafic dyke rocks at the Pioneer mine, and the petrographic evidence of the auriferous - sulphide - quartz sample from the Waterhouse Goldfield.

The NNE - NE and E - ESE episodes of shearing are probably related to the NNW and NE conjugate shearing recognised in the Ringarooma - Lyndhurst tract by Turner (in McClenaghan et al 1982); a simple clockwise rotation of approx. 60° in the Waterhouse area would account for the discrepancy.

However, Turner timed the conjugate shearing as pre dating the intrusion of the Blue Tier granites, porphyries etc., a feature which is not in accord with the observations in the Waterhouse area.

The likely explanation is that the sheared rock from the Alliance mine is related to the Scottsdale granodiorite, which was emplaced pre shearing. In addition, the doubly sheared mafic rock from the Pioneer mine would appear to have been related to the Scottsdale granodiorite.

Gold mineralization may have occurred during two episodes:

- (i) Emplacement of quartz - sulphides veins <sup>+</sup> gold;
- (ii) Emplacement of gold bearing solutions after shearing.

The early gold (high temperature) would have a higher fineness than the later (low temperature) gold.

Limited evidence available suggests the gold mined in the Waterhouse area was mainly of the low temperature, silver rich type.

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APPENDIX 1

Petrographic Studies

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MINPET SERVICES

57/80

Report No. 40/81

Brief Petrographic Notes on  
A-1 and P-1 Specimens from Tasmania

(For M. Zapata, Consulting Geologist)

JULY, 1981

P.J. CURTIS

023

INTRODUCTION

Two highly silicified specimens from Tasmania were submitted to Minpet Services for identification on the 30th June, 1981.

SUMMARY

Both specimens A-1 and P-1 were thin sectioned. Sections indicated a high degree of brecciation and silicification. Apart from traces of limonite and clay mineral all mineral present is quartz. After study of both sections in subdued light differences in density of fine iron oxide particles indicated a porphyry texture for A-1 and possible gabbroic texture (but this is very tentative) for P-1.

PETROGRAPHIC INVESTIGATIONA-1 : MPS 1966

Quartz:feldspar porphyry, now silicified quartz breccia (very tentative recognition).

All quartz, except for a little clay mineral along open fractures. Brecciation and recrystallisation have taken place. Where brecciation is less severe, phenocrysts (now completely silicified approximately 0.6 x 0.4 mm) are seen including some stellate growth. Phenocrysts are identifiable because of fine limonite inclusions as per commonly seen in fresh orthoclase. Other than this recrystallisation and/or strain characteristics are only seen in the large quartz plates.

Possibly a feldspar (or quartz) porphyry rock of very fine groundmass. The latter would explain why only the phenocrysts are identifiable.

024

P-1 : MPS 1967

Part uralitised gabbroic rock now entirely silicified. A mosaic of squat unoriented equigranular euhedral crystals are recognisable. Identifiable are grain margins and some alteration characteristics, platy uralite growths ?

This is superficially similar to MPS 1966, about 99V% silicified but apparently is more intensely brecciated a second time, i.e., an early brecciation period as in MPS 1966 and after intense silicification, a further brecciation period shows much fragmented quartz. However, there are some clear areas and using subdued plain light, grain boundaries of squat medium euhedral prism forms are seen and yet other forms of more elongate prisms but of similar size range. Possible plagioclase:pyroxene intergrowths. Zones of uralitised pyroxene are thought to be indicated.

As in A-1 the application of ghost mineralogy by crystal forms is fraught with difficulties.

P.J. CURTIS

025

APPENDIX 2

Analysis of Grab Samples



027

599028

APPENDIX 3

Lithological Log of Drill Hole A - 1

# DIAMOND DRILL LOG

## GEOLOGY SHEET

Project *Tasmania Recce* Co-ordinates *approx. 20m southwest of Alliance Main Shaft* Declination *63°* Drilled by *H. J. Steepole*  
 Location *LYNDHURST GOLDFIELD Alliance Reef* Elevation ..... Bearing *055° (magnetic)* Drill *Mobile Drill B.10*  
 Date commenced *16th December 1981* Date completed *30th December 1981* Logged by *D. A. Hamlyn*

Depth (m)		Core Size	Core (m) Recovered	% Recovery	DESCRIPTION
From	To				
0	8.50		nil	nil	No core
8.50	11.07	NQ	0.60	23%	Broken light grey and khaki silty sandstones with siltstone interbeds
11.07	11.09	NQ	0.02	100%	Quartz vein containing minor sulphides (pyrite)
11.09	17.17	NQ	4.78	79%	Grey silty sandstones
17.17	17.28	NQ	0.06	55%	Dark grey shales
17.28	17.45	NQ	0.16	94%	Grey silty sandstone
17.45	17.53	NQ	0.06	75%	White quartz vein containing minor sulphides
17.53	21.03	NQ	3.22	72%	Grey silty sandstone with occasional shaly interbeds, irregular quartz stringers, generally less than 1mm in width cut the core at approx 115° to core axis, larger quartz veins which are vuggy and contain sulphides, cut core at 19.97m (1cm wide) and a 3mm wide vein at 19.99 with prominent stringers of quartz at 20.35m and 20.78m.
21.03	21.13	NQ	0.10	100%	Snaky band grading into silty sandstone at 21.13.
21.13	21.54	NQ	0.41	100%	Grey silty sandstone
21.54	21.75	NQ	0.21	100%	Dark grey shales
21.75	21.84	NQ	0.09	100%	Grey silty sandstone
21.84	22.09	NQ	0.25	100%	Dark grey shale
22.09	22.29	NQ	0.20	100%	Grey silty sandstone - bedding at 120° to core axis?
22.29	23.82	NQ	1.53	100%	Dark grey shale containing some disseminated sulphides and pyrite on fracture surfaces, narrow vein core at 22.64 to 22.71 containing some quartz and pyrite blebs up to 1.5mm in diameter

599029

# DIAMOND DRILL LOG

Hole No... *A.1.* .....

Page... *2 of 7* .....

## GEOLOGY SHEET

Project... *Tasmania Recce* ..... Co-ordinates *approx 20 m southwest of Alliance Reef* ..... Declination... *63°* ..... Drilled by... *H. J. Steepool* .....  
 Location... *LYNDHURST GOLDFIELD Alliance Reef* ..... Elevation..... Bearing... *055° (magnetic)* ..... Drill... *Mobile Drill B 40* .....  
 Date commenced... *16th December 1981* ..... Date completed... *30th December 1981* ..... Logged by... *D. A. Hamlyn* .....

Depth (m)		Core Size	Core (m) Recovered	% Recovery	DESCRIPTION
From	To				
23.82	25.60	NQ	1.79	101%	Grey silty sandstone/quartzite with occasional narrow shaley interbeds and quartz veins at 23.84 (4mm wide) 24.05 (8mm wide, containing sulphides and sericite, at 165° to core axis)
25.60	25.70	NQ	0.10	100%	Dark grey shale
25.70	26.54	NQ	1.06	126%?	Grey silty quartzite with pyrite on fracture surfaces
26.54	26.87	NQ	0.30	9%	Dark grey shales with pyrite on fracture surfaces
26.87	27.79	NQ	0.92	98%	grey silty quartzite
27.79	27.90	NQ	0.09	13%	Vuggy quartz vein containing minor sulphides and sericite
27.90	29.92	NQ	1.10	81%	grey silty quartzite with occasional shaley interbeds and narrow quartz stringers at 28.00, 28.04, 28.05, 28.80 and a 2mm wide quartz vein at 28.91
29.92	30.03	NQ	0.11	100%	Grey silty quartzite containing narrow quartz vein approx 3mm wide which contain some sulphides and sericite and are sub-parallel (110°) to the core axis
30.03	31.74	NQ	0.91	100%	Grey silty quartzite with narrow quartz stringers and veinlets at 30.18 and 30.91
31.74	31.72	NQ	0.18	100%	Dark grey shale with sulphides on fracture surfaces and containing narrow quartz stringers at 31.04 and 31.00, shales grade into quartzite at 31.12
31.72	32.40	NQ	0.19	121%?	Grey silty quartzite with a 2mm wide quartz vein sub-parallel to the core axis from 31.90 to 32.30
32.40	32.76	NQ	0.48	95%	Dark grey shales with more sandy interbeds and sulphides on irregular fracture surfaces
32.76	33.76	NQ	0.80	100%	Grey silty quartzite with minor quartz stringers sub-parallel to the core axis
33.76	34.00	NQ	0.24	100%	Dark grey shale grading into quartzite at 34.00

509030

# DIAMOND DRILL LOG

## GEOLOGY SHEET

Project. Tasmania Recce..... Co-ordinates... of Allaire Main Shaft approx 20 m southwest Declination. 63°..... Drilled by. H. J. Steppak.....  
 Location. Allaire Reef..... Elevation..... Bearing... 055° (magnetic)..... Drill... Mobile Drill B 40.....  
 Date commenced 16th December 1981 Date completed. 30th December 1981..... Logged by. R. A. Hamlyn.....

Depth (m)		Core Size	Core (m) Recovered	% Recovery	DESCRIPTION
From	To				
34.00	43.05	NQ	9.05	100%	Grey silty quartzite with occasional dark grey shale interbeds with sulphides on fracture surfaces, minor quartz veins at 36.68 (3mm wide) 38.64 (1mm wide) 38.85 (3mm wide) and numerous closely spaced quartz stringers from 41.52 to 41.65
43.05	44.46	NQ	1.27	90%	Dark sandy shale with sulphides on fracture surfaces, core fractured and broken, numerous small irregular quartz veinlets particularly from 43.54 to 43.66 where shale more highly sheared
44.46	47.65	NQ	3.19	100%	Fine grained silty quartzite with very few quartz stringers, small scale fold from 46.33 to 46.44
47.65	47.82	NQ	0.17	100%	Sheared sandy shales with quartz (and siderite?) in fracture zones.
47.82	48.02	NQ	0.20	100%	Massive dark grey silty quartzite
48.02	48.04	NQ	0.02	85%	Yuggy quartz vein containing minor sulphides and sericite?
48.04	48.21	NQ	0.17	100%	Dark grey sandy shale
48.21	49.08	NQ	0.67	77%	Fractured and broken sandy shale
49.08	49.57	NQ	0.49	100%	Dark grey sandy shale
49.57	50.46	NQ	0.35	39%	Fractured and broken sandy shale
50.46	50.61	NQ	0.15	100%	Dark grey sandy shale containing very fine irregular quartz stringers
50.61	52.83	NQ	0.97	44%	Fractured and broken sandy shale with numerous quartz stringers and sulphides on fracture surfaces.
52.83	53.83	NQ	0.98	98%	Dark grey sandy shale containing numerous irregular quartz stringers and veinlets generally trending perpendicular to the core axis.
53.83	55.02	NQ	1.19	100%	Massive dark grey sandy shale.

599031

# DIAMOND DRILL LOG

GEOLOGY SHEET

Project *Tasmania Recce*..... Co-ordinates of *Alliance Main Shaft* <sup>*approx 20 m southwest*</sup> Declination *63°*..... Drilled by *H. J. Steppole*.....  
 Location *LYNDHURST GOLDFIELD Alliance Reef*..... Elevation..... Bearing *055° (magnetic)*..... Drill *Mobile Drill B40*.....  
 Date commenced *16th December 1991* Date completed *30th December 1991*..... Logged by *D. A. Hamlyn*.....

031

Depth (m)		Core Size	Core (m) Recovered	% Recovery	DESCRIPTION
From	To				
55.02	55.82	NQ	0.80	100%	Dark grey shales with quartz veinlets at 55.05 (1mm wide), 55.23 (2mm wide, wuggy) 55.26 (3mm wide, wuggy) 55.31 (4mm wide) and lesser quartz stringers
55.82	56.22	NQ	0.40	100%	Massive dark grey shale.
56.22	56.37	NQ	0.15	100%	Irregular coarse sandy band within the dark grey shale
56.37	56.46	NQ	0.09	100%	Sheared dark grey shales with irregular quartz veins up to 3mm wide trending sub-parallel to the core axis
56.46	56.56	NQ	0.07	70%	Fractured and broken dark grey sandy shales with quartz in the sheared zones
56.56	57.44	NQ	0.88	100%	Intermixed grey silty quartzite and dark grey sandy shales and numerous irregular quartz veinlets.
57.44	57.45	NQ	0.01	100%	Quartz vein containing some sericite and traces of sulphide, trending at 115° to the core axis
57.45	58.27	NQ	0.82	100%	Grey silty quartzite, sheared 57.51 to 57.60 and sheared with quartz in breccia zone 57.84 to 57.93.
58.27	59.20	NQ	1.03	111%?	Grey silty quartzite with numerous irregular quartz veins from 58.27 to 58.38 quartz vein 8mm wide sub parallel to the core axis from 58.59 to 58.91 with generally perpendicular crosscutting veins at 58.63 (8mm wide) 58.85 (5mm wide), an irregular network of veinlets 58.89 to 58.99 and thin quartz stringers parallel to the core axis from 58.89 to 59.20.
59.20	59.86	NQ	0.66	100%	Intermixed grey silty quartzite and dark grey sandy shale with irregular quartz stringers in brecciated zones and abundant sulphides on fracture surfaces.

599032

# DIAMOND DRILL LOG

Hole No... A.1.....

Page... 5 of 7....

## GEOLOGY SHEET

032

Project... *Tasmania Recce*..... Co-ordinates... *approx 20m southwest of Alliance Main Shaft*... Declination... *63°*..... Drilled by... *H. J. Stapp*.....  
 Location... *LYNDHURST GOLDFIELD Alliance Reef*..... Elevation..... Bearing..... Drill... *Mobile Drill B40*.....  
 Date commenced... *16th December 1981*... Date completed... *30th December 1981*... Logged by... *D. A. Hamlyn*.....

Depth (m)		Core Size	Core (m) Recovered	% Recovery	DESCRIPTION
From	To				
59.86	60.03	NR	0.17	100%	Grey silty quartzite containing a network of irregular quartz veins containing some sulphides and sericite, quartzite quite massive 59.86 to 59.92 with little veining.
60.03	60.17	NR	0.14	100%	Grey silty quartzite with minor irregular quartz stringers generally subparallel to core axis.
60.17	63.41	NR	3.07	95%	Grey silty quartzite with some silty stringers and numerous quartz veins and stringers randomly orientated, some veins vuggy and engulfing fragments of country rock.
63.41	63.45	NR	0.04	100%	Shaley band truncating narrow quartz vein.
63.45	63.94	NR	0.49	100%	Silty quartzite with quartz veins subparallel to core axis at 63.50 to 63.57, veins trending at 125° to core axis at 63.63, 63.67 and 63.74, and quartz stringers at 205° to core axis at 63.90, also minor sulphides on fracture surfaces.
63.94	63.96	NR	0.02	100%	Quartz vein
63.96	64.10	NR	0.14	100%	Dark grey sandy shale with foliated irregular quartz veins from 64.01 to 64.02 containing minor sulphide and sericite.
64.10	64.43	NR	0.33	100%	Grey silty quartzite with silty stringers and narrow quartz vein subparallel to core axis from 64.10 to 64.26.
64.43	64.56	NR	0.13	100%	Grey silty quartzite, less silty than above, with numerous irregular quartz veinlets and stringers trending at approximately 110° to the core axis.
64.56	64.61	NR	0.05	100%	Silty band with quartz on fractures, trending 220° to core axis.
64.61	66.52	NR	1.91	100%	Grey silty quartzite with shear zone infilled by irregular quartz veinlets and trending at 115° to core axis, from 64.74 to 64.78; minor quartz infilled shear trending at 220° to core axis at 65.27 and minor quartz veinlets at 115° to core axis at 66.18, 66.19, 66.23, 66.26, 66.27.

599033

# DIAMOND DRILL LOG

## GEOLOGY SHEET

Project... *Tasmania Recce*..... Co-ordinates *approx. 20m southwest of Moxes (Air Strip)* Declination... *63°*..... Drilled by... *H. J. Steepook*.....  
 Location... *LYNDHURST GOLDFIELD*..... Elevation..... Bearing... *055° (magnetic)*..... Drill... *Mobile Drill B40*.....  
 Date commenced... *16th December 1981*..... Date completed... *30th December 1981*..... Logged by... *D. A. Hamlyn*.....

Depth (m)		Core Size	Core (m) Recovered	% Recovery	DESCRIPTION
From	To				
66.52	68.20	NQ	1.68	100%	Sheared grey silty quartzite with numerous quartz veins and stringers, main quartz veins at 66.52 (12mm wide at 145° to core axis), 66.58 (vegy, 10mm wide at 210° to core axis) numerous stringers from 66.65 to 66.74, an irregular vein from 66.80 to 66.82, veins at 66.86 (13mm wide at 230° to core axis) 66.97 (8mm wide) contain minor sulphides, more intense irregular veining 66.94 to 67.13, irregular veining 67.22 to 67.28 and 67.44 to 67.63, vein 10mm wide at 67.60 and irregular quartz veining from 67.95 to 68.20
68.20	68.94	NQ	0.14	100%	Dark grey silty quartzite, more silty than above, with only very minor quartz stringers
68.94	74.90	NQ	5.96	100%	Massive grey silty quartzite with occasional silty bands and minor quartz veins and stringers, some irregular quartz veining from 71.19 to 71.81, quartz veins at 74.06 (7mm wide) 74.09 (8mm wide) 74.37 (15mm wide) containing small blebs of sulphides, some small irregular veining from 74.49 to 74.51 and a 6mm wide quartz vein at 74.55
74.90	74.96	NQ	0.04	67%	Quartz vein, no visible sulphides but minor sericite.
74.96	76.93	NQ	1.97	100%	Massive grey silty quartzite with minor quartz veins trending at 130° to core axis at 75.1, 75.61 and 76.05.
76.93	77.23	NQ	0.30	100%	Slightly oreccinized grey silty quartzite, vuggy quartz vein 1mm wide at 76.94, vein 20mm wide cut by minor shear and displaced 20mm at 77.04 and vuggy quartz vein 10mm wide at 77.15, all these veins contain small blebs of sulphides, and some smaller sulphide blebs in country rock, small quartz vein at 77.22

599034

## DIAMOND DRILL LOG

## GEOLOGY SHEET

Project *Tasmania Recce* Co-ordinates *approx 20 m southwest of Alliance Main Shaft* Declination *63°* Drilled by *H. J. Steadock*  
 Location *LYNDHURST GOLDFIELD Alliance Reef* Elevation ..... Bearing *055° (magnetic)* Drill *Mobil Drill B40*  
 Date commenced *16th December 1981* Date completed *30th December 1981* Logged by *D. A. Hamlyn*

034

Depth (m) From	Depth (m) To	Core Size	Core (m) Recovered	Recovery	DESCRIPTION
77.23	80.40	NQ	3.17	100%	Massive grey silty quartzite with occasional quartz veins and stringers from 77.32 to 77.41, wuggy quartz vein with minor sulphides 12 mm wide at 77.50, small irregular veins at 77.76, 77.86, 77.92, vein 6 mm wide containing minor sulphides and sericite at 78.01, quartz stringer at 78.25, vein 5 mm wide at 78.29, 20 mm wide at 78.49, 6 mm wide at 78.66 also contains minor sulphide, irregular veins from 78.66 to 78.70 and 78.88 to 79.05, dark silty shear semi-parallel to core axis from 78.83 to 79.03 and a band of shaly material running the length of the core from 78.96 to 79.45, narrow quartz veins from 79.52 to 79.62.
80.40	81.41	NQ	1.01	100%	Grey silty quartzite with increased quartz veining, irreg. vein 5 mm wide at 80.42, 5 mm wide trending at 220° to core axis at 80.56, irregular vein 7 mm wide at 80.57, intense veining from 80.69 to 80.73, a large quartz vein 30 mm wide at 80.84 containing some sericite but no visible sulphides, similar barren veins 5 mm wide at 80.91 and 20 mm wide at 80.95; irregular veining from 81.08 to 81.14, vein 10 mm wide at 81.29 and irregular veining from 81.33 to 81.41.
81.41	88.87	NQ	7.46	100%	Massive grey silty quartzite with occasional irregular quartz veinlets and stringers
88.87	89.10	NQ	0.17	74%	Quartzite more silty than above, core broken, veining more abundant, a large quartz vein up to 40 mm wide from 88.98 to 89.05 (approximately)
89.10	89.23	NQ	0.11	85%	Grey silty quartzite
89.23	89.48	NQ	0.25	80%	Fractured and broken grey silty quartzite with irregular quartz stringers
89.48	92.46	NQ	2.99	100%	Grey silty quartzite with occasional quartz veinlets and irregular stringers and some sulphide on fracture surface.
END OF HOLE					

599035

APPENDIX 4

Analyses of Drill Core from A - 1

599037  
230666

Project: *Tasmania, Recce.*  
**LYNDHURST GOLDFIELD**  
*Alliance Reef*

**DIAMOND DRILL LOG**

ASSAY DATA SHEET

Depth (m)		Core Recovered (m)	Recovery %	Core/bedding angle	DESCRIPTION	ASSAY DATA							
From	To					Sample	AU	AS					
58.27	58.77	0.54	100%?		Grey silty quartzite with numerous irregular quartz veins and stringers	A1-1	0.006	7					
58.77	59.20	0.49 <sup>(0.4)</sup>	114%?		as above	A1-2	0.010	7					
59.86	60.36	0.50	100%		Grey silty quartzite containing some irregular quartz veins and stringers	A1-3	x	3					
60.36	60.86	0.50	100%		Grey silty quartzite with numerous quartz veins and stringers	A1-4	0.005	3					
60.86	61.36	0.50	100%		as above	A1-5	x	6					
61.36	61.86	0.50	100%		as above	A1-6	x	5					
61.86	62.36	0.48 <sup>(0.50)</sup>	96%		as above	A1-7	0.010	5					
62.36	62.86	0.50	100%		as above	A1-8	0.006	4					
66.52	67.02	0.50	100%		Shaded grey silty quartzite with numerous quartz veins and stringers	A1-9	x	2					
66.93	77.23	0.30	100%		Grey silty quartzite with some raggy quartz veins containing minor sulphide blebs	A1-10	0.005	2					

230

037

599038

# ANALABS

Department of Health and Human Services, U.S. Dept. of Justice

## ANALYTICAL DATA

SAMPLE IDENTIFICATION      REPORT NUMBER      REPORT DATE      CLIENT ORDER NO.      PAGE

3.1.08 947

19.2.82

1 OF 2

NO.	UNIT	REP.	RES.						
1	H1 1	7	0.005						
2	H1 2	7	0.010						
3	H1 3	3	X						
4	H1 4	3	0.005						
5	H1 5	6	X						
6	H1 6	5	X						
7	H1 7	5	0.010						
8	H1 8	4	0.005						
9	H1 9	2	X						
10	H1 10	2	0.005						
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									

Results in ppm unless otherwise specified  
 T = element present; but concentration too low to measure  
 X = element concentration is below detection limit  
 — = element not determined

AUTHORIZED OFFICER: *[Signature]*

83-1951

69  
24

# WATERHOUSE GOLDFIELD

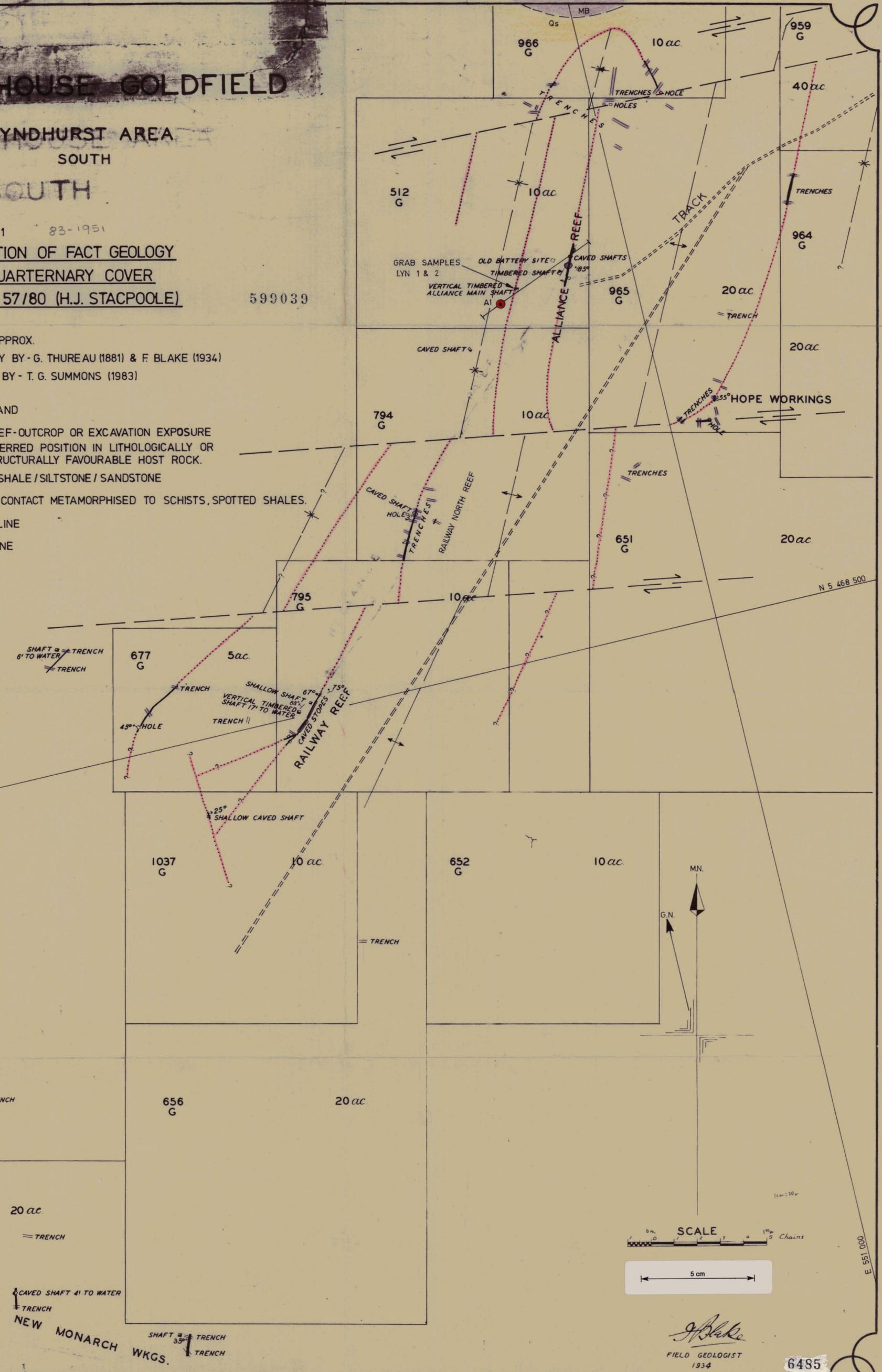
## WATERHOUSE WYNDHURST AREA SOUTH SOUTH

FIGURE 3 SHEET 1 83-1951  
INTERPRETATION OF FACT GEOLOGY  
BENEATH QUARTEINARY COVER  
PART OF EL 57/80 (H.J. STACPOOLE)

599039

SCALE - 1:2000 APPROX.  
ORIGINAL GEOLOGY BY - G. THUREAU (1881) & F. BLAKE (1934)  
INTERPRETATION BY - T. G. SUMMONS (1983)

- Qs QUARTEINARY SAND
- QUARTZ VEIN REEF-OUTCROP OR EXCAVATION EXPOSURE
- QUARTZ VEIN - INFERRED POSITION IN LITHOLOGICALLY OR STRUCTURALLY FAVOURABLE HOST ROCK.
- MB MATHINNA BEDS-SHALE/SILTSTONE/SANDSTONE
- MBs MATHINNA BEDS CONTACT METAMORPHISED TO SCHISTS, SPOTTED SHALES.
- INFERRED ANTICLINE
- INFERRED SYNCLINE
- INFERRED FAULT



*F. Blake*  
FIELD GEOLOGIST  
1934

6485

E 551 000

697D/24

# WATERHOUSE GOLDFIELD

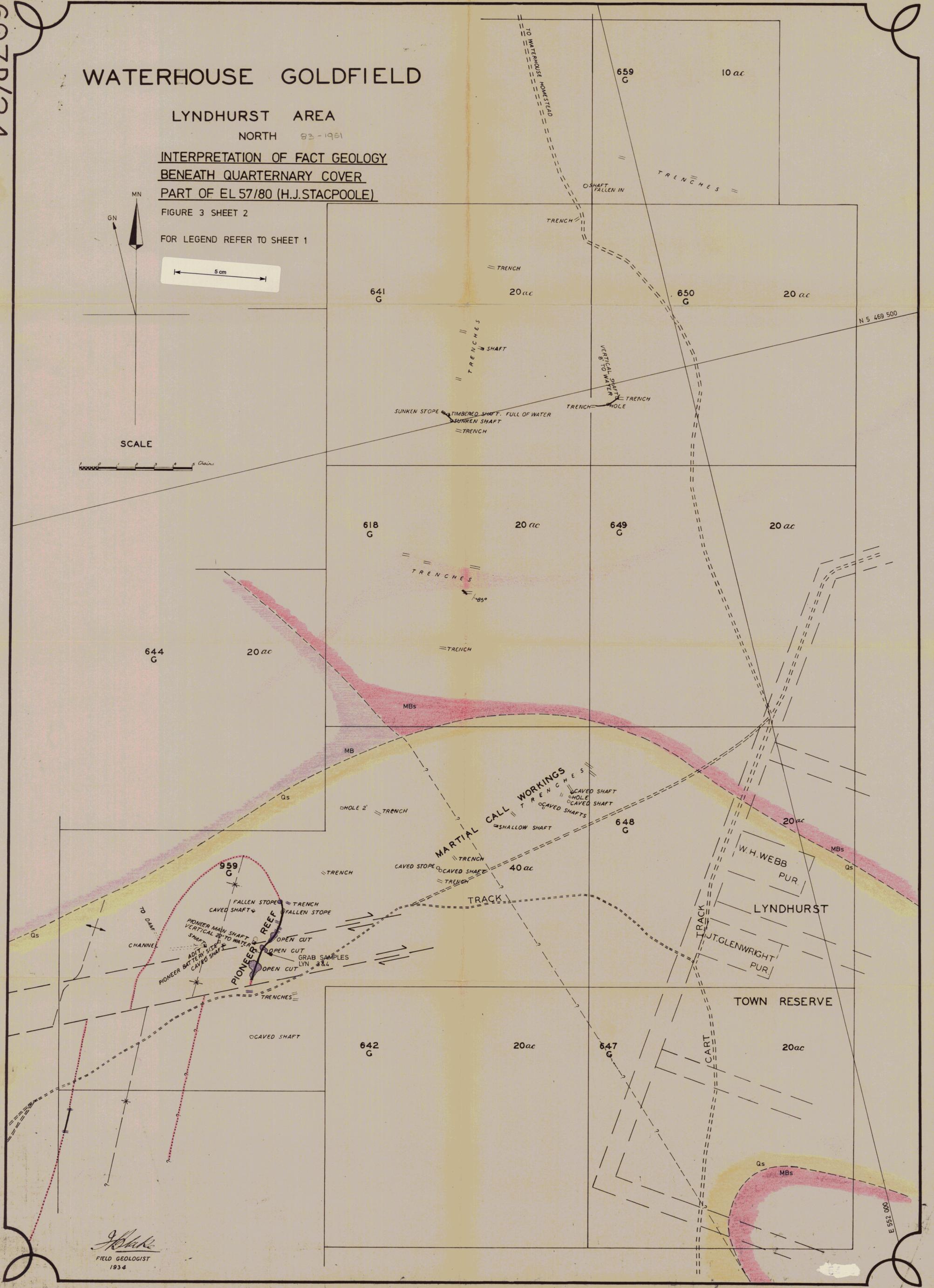
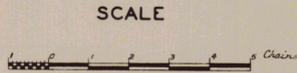
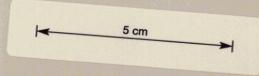
## LYNDHURST AREA

NORTH 83-1951

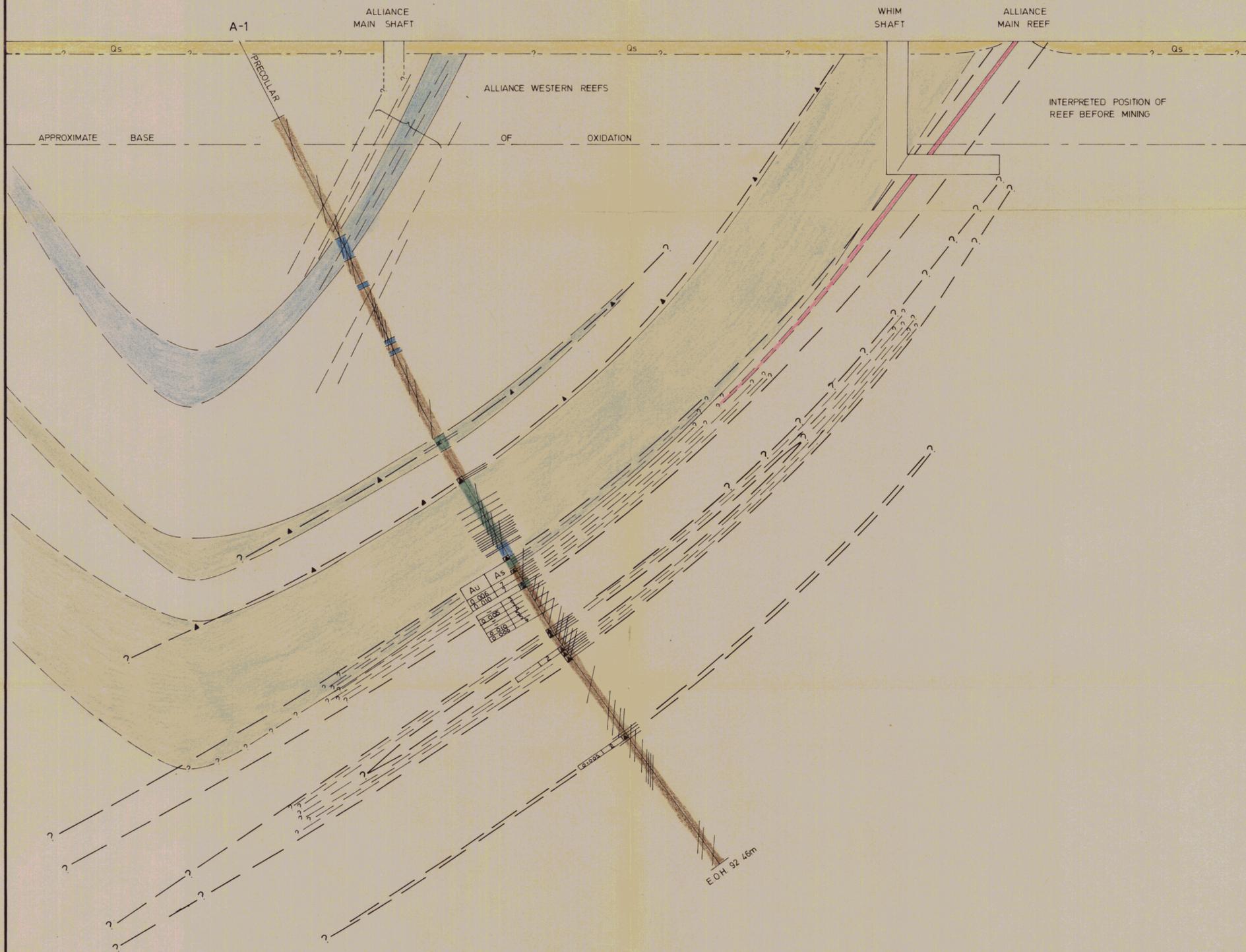
### INTERPRETATION OF FACT GEOLOGY BENEATH QUATERNARY COVER PART OF EL 57/80 (H.J. STACPOOLE)

FIGURE 3 SHEET 2

FOR LEGEND REFER TO SHEET 1



*H. J. Stacpoole*  
FIELD GEOLOGIST  
1934

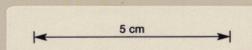


- |                                 |                           |                                    |
|---------------------------------|---------------------------|------------------------------------|
| QUATERNARY                      | Qs                        | SAND                               |
| ? DEVONIAN                      | [Pink box]                | QUARTZ VEIN REEF (>0.2m WIDE)      |
|                                 | [Hatched box]             | QUARTZ VEIN/STRINGER (<<0.2m WIDE) |
| MATHINNA BEDS<br>(ORD. - eDEV.) | [Blue box]                | SHALE                              |
|                                 | [Green box]               | SILTSTONE (SANDY SHALE)            |
|                                 | [Brown box]               | GREYWACKE (SILTY SANDSTONE)        |
|                                 | [Dashed line with arrows] | SHEARED / CRUSHED ZONE             |
|                                 | [Solid line]              | SHEARED / CRUSHED ZONE ENVELOPE    |
| Au                              |                           | GOLD, ANALYSIS IN PPM              |
| As                              |                           | ARSENIC, ANALYSIS IN PPM           |

FIGURE 2  
WATERHOUSE GOLDFIELD  
LYNDHURST AREA  
PART OF EL 57/80  
SECTION ACROSS ALLIANCE QUARTZ REEFS  
IN THE PLANE OF DRILL HOLE A-1

SECTION STRIKES APPROX. SW-NE (042° GRID)  
 SCALE 1:250 V/H=1  
 GEOLOGY - D.A. HAMLYN, T.G. SUMMONS  
 DRAWN - M. DOWLING, 10 MAR. 1983

83-1951



599041

6494

83-1951

# WATERHOUSE GOLDFIELD SOUTHERN CROSS AREA

697F/24

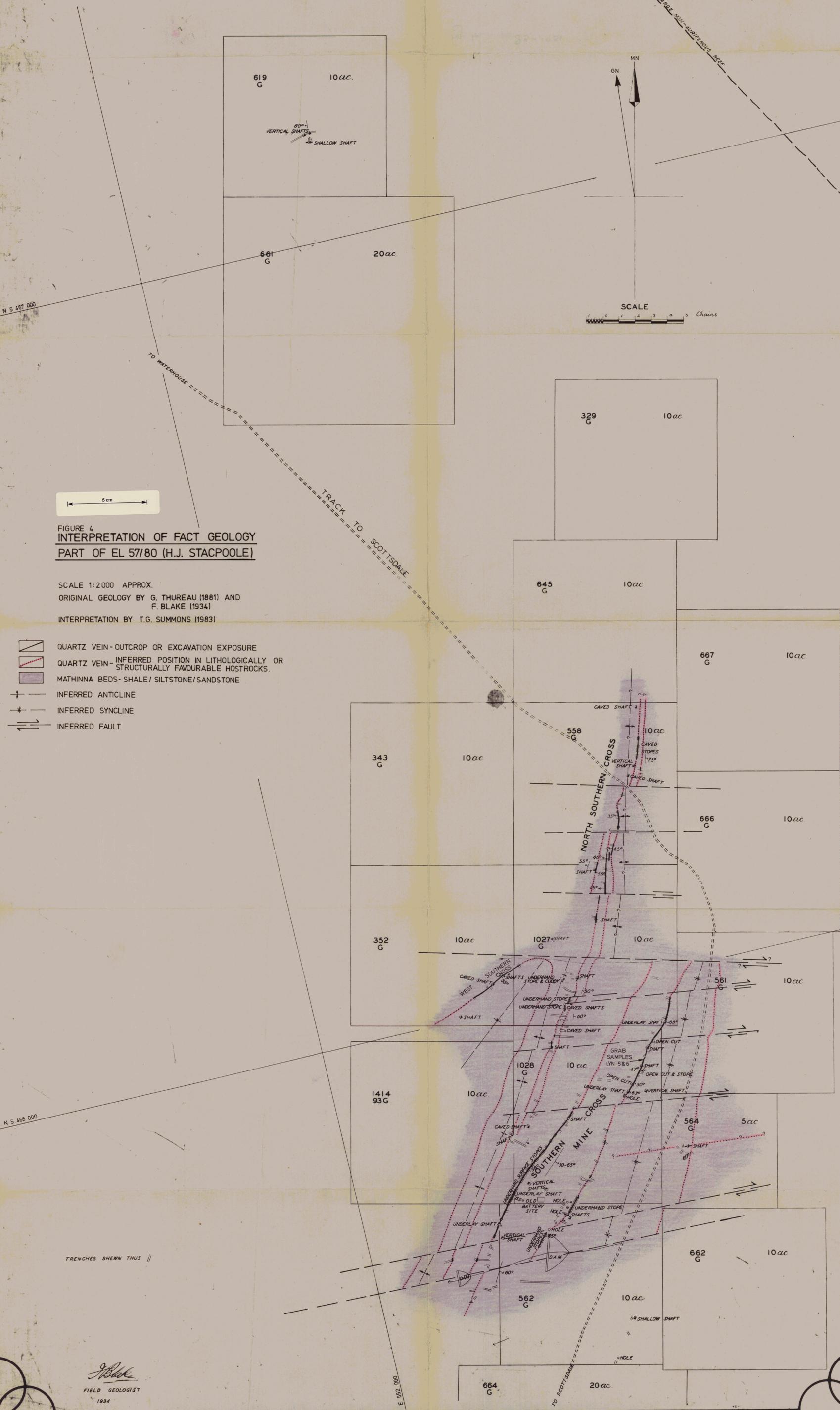


FIGURE 4  
INTERPRETATION OF FACT GEOLOGY  
PART OF EL 57/80 (H.J. STACPOOLE)

SCALE 1:2000 APPROX.  
ORIGINAL GEOLOGY BY G. THUREAU (1881) AND  
F. BLAKE (1934)  
INTERPRETATION BY T.G. SUMMONS (1983)

- QUARTZ VEIN - OUTCROP OR EXCAVATION EXPOSURE
- QUARTZ VEIN - INFERRED POSITION IN LITHOLOGICALLY OR STRUCTURALLY FAVOURABLE HOSTROCKS.
- MATHINNA BEDS - SHALE / SILTSTONE / SANDSTONE
- INFERRED ANTICLINE
- INFERRED SYNCLINE
- INFERRED FAULT

TRENCHES SHOWN THUS //

*G. Blake*  
FIELD GEOLOGIST  
1934