

CONTENTS

1. SUMMARY	1
2. INTRODUCTION.....	2
3. TENURE	3
4. REGIONAL GEOLOGY	4
5. PREVIOUS EXPLORATION	6
6. WORK COMPLETED.....	10
6.1 GIS Data Compilation.....	10
6.1.1 Historical Geochemical Sampling	10
6.1.2 Historical Drilling	10
6.2 Heli-magnetics.....	10
6.3 Geological Mapping	11
6.3.1 Stratigraphy.....	11
6.3.2 Intrusives.....	13
6.3.3 Structural History.....	13
6.3.4 Alteration and Mineralisation	15
7. PLANNED WORK 1999-2000.....	17
8. CONCLUSIONS & RECOMMENDATIONS	19
8.1 Devonian Play.....	19
8.2 Cambrian Play	19
9. ENVIRONMENTAL DISTURBANCE AND REHABILITATION	20
10. EXPENDITURE	21
11. REFERENCES.....	22
12. KEYWORDS & LOCALITY	24

LIST OF FIGURES

Figure No	Title	Scale
Fig 1	Location Map EL 3/98	1:50,000
Fig 2	Land Tenure EL 3/98	1:50,000
Fig 3	Regional Geology - Mt Read Belt	1:500,000
Fig 4	Prospect Areas and Previous Exploration - Cethana Area	1:50,000
Fig. 5	Heli-magnetic Image & 1:250,000 geology polygons	1:50,000
Fig. 6	Summary geological interpretation map	1:25,000
Fig. 7	Planned soil sampling program	1:25,000

LIST OF TABLES

Table 1 Exploration History of the Lake Barrington area

LIST OF APPENDICES

1 Digital Copy of Report

LIST OF ENCLOSURES

Plate 1	Outcrop Map, Cethana area	1:5,000
Plate 2	Geological Interpretation Map, Cethana area,	1:5,000

1. SUMMARY

Exploration activities in the first year of tenure of EL 3/98 were focussed on developing a robust understanding of the geology of the area, together with an evaluation and compilation of historical data sets (Plutonic, Noranda, CRAE).

While the data capture is ongoing, it is apparent that the focus of previous activities has been largely within the sericite and pyrite alteration (Cethana Alteration Zone, CAZ) developed in the quartz-feldspar phytic sequence. The two main prospect areas, West and East Cethana, have been fairly extensively explored with C-horizon soil geochemistry, IP and drilling. The CAZ is characterised by narrow "stringer" vein style zones of base metal mineralisation. There seems to be little remaining potential for a sizeable massive sulphide deposit within the top 200m in both prospect areas. The down dip potential is worthy of further investigation, through a program utilising partial leach soil geochemistry, CSAMT and drilling of viable targets which may emerge.

Geological mapping at 1:5,000 scale was completed over the southern (Cethana) portion of the EL. This has advanced the understanding of the stratigraphy, structure, intrusive history, alteration, and mineralisation. Significant observations are:

- the stratigraphy comprises a lower sequence of mainly fine-grained clastic sediments progressively overlain by quartz-feldspar phytic volcanoclastics and flows. These are followed northwards by andesitic/intermediate epiclastics, mainly greywacke sandstones, with significant detrital magnetite and local Precambrian metamorphic detritus.
- an inferred Cambrian age granitoid in the western parts of the area.
- strike extensive sericite (with pyrite) alteration associated with zones of cleavage intensification.
- a potential Cambrian mineralised position, at the contact of the altered felsic volcanogenic pile and the overlying epiclastics, which is correlated with the Lynchford Member in western Tasmania, is recognised and has not been explored by previous companies.
- south directed thrusting during ductile and brittle deformation which is linked to southward fluid flow from the altered felsic pile into the Moina/Owen siliciclastics. Potential trap sites are at anticlinal crests in the Devonian rocks, with evidence for this mechanism argued for the Round Hill base metal deposits.
- a NE-SW transfer fault is inferred through the central parts of the Cethana area, separating the East and West Cethana prospects. This may have originated as a Cambrian structure, but is expressed as a Devonian lateral ramp.

2. INTRODUCTION

This report documents work undertaken within Exploration Licence 3/98 Lake Barrington in Northern Tasmania, covering the period April 1998 to March 1999.

Exploration on the Lake Barrington EL is managed and operated by Pasmaenco Exploration, a division of Pasmaenco Australia Limited (Pasmaenco).

The EL covers 16km² of Cambrian Mt Read Volcanics, and lies 15km west of Sheffield (Figure 1). The principal target of exploration on the licence is volcanic hosted auriferous base metal massive sulphide, similar to mineralisation at Rosebery and Hercules in Western Tasmania.

The current EL consists of two portions, the Staverton area in the north, and the Cethana area in the south. The Cethana area consists of two prospects, East Cethana and West Cethana. These prospects are almost certainly contiguous, with alluvium blanketing the intervening area. However, all reporting to date has separated the two areas as distinct entities. These areas have been the focus of a sustained exploration effort over 20 years, which has left a legacy of good access tracks, however grid lines are in need of refurbishment as regrowth and fire has left little trace of them.

During the period covered by this report, exploration has concentrated on the Cethana portion of the exploration licence, with minor reconnaissance of the Staverton area in the north. Work completed includes:

- A literature review of previous exploration.
- Compilation and digitising of most previous soil geochemical data.
- Reprocessing of the 1990 heli magnetics
- The entire Cethana proportion of the EL was mapped at 1:5000 scale onto an orthophoto mosaic.
- Completion of a geological interpretation.

3. TENURE

EL 3/98, Lake Barrington, was granted for a five year term on 7th April 1998 to Pasmenco Limited.

The EL is subject to a number of land classifications. The current land tenure includes land vested in the Hydro-Electric Commission in the area immediately surrounding Cethana Dam and the Transmission Lines, State Forest, Private Land holdings and a Recreation Reserve (Figure 2).

4. REGIONAL GEOLOGY

The regional geological framework of the Mt Read Belt (MRB) is subdivided, from an exploration perspective, into three elements (Figure 3): the Central MRB covering the area of outcrop from south of Queenstown to north of Hellyer, the Northern MRB covering the area from Back Bluff eastwards through Gowrie Park and Mole Creek, and the Southern MRB comprising areas west and south of Macquarie Harbour. EL 3/98 is centrally situated in the Northern MRB.

Basement in the Central and Northern MRB is of Precambrian age, comprising predominantly greenschist facies meta-sediments with minor basalts and dolerites. Higher grade amphibolite and eclogite facies are also present within the Precambrian. This Precambrian basement, termed the Tyennan Block, lies to the south of the Lake Barrington licence (Figure 3).

Cambrian volcanism and sedimentation developed on the Precambrian continental crust and, in the Central MRB, is subdivided into the Eo-Cambrian tholeiitic Crimson Creek Formation (CCF), the mid to late Cambrian Dundas Group and the predominantly calc-alkaline, Mt Read Volcanics (MRV).

The CCF was deposited in shallow but rapidly subsiding basins (Brown, 1986) comprising basaltic lavas and volcanoclastics, turbidites, carbonates, chert and minor evaporites. This formation is not exposed in the licence area.

Ultramafic cumulates and volcanic equivalents were thrust onto the CCF in the mid Cambrian (Crawford and Berry, 1991). They are absent from the licence area.

The MRV, in the Central MRB, form a 200km long by 20km wide north-south trending belt along the eastern side of the Dundas Trough, adjacent to and in some areas onlapping and intruding the Precambrian basement. The northern extension of the MRV swings eastwards around the northern margin of the Tyennan Precambrian block. The volcanics include intermediate to felsic lavas, subvolcanic porphyries and granites, volcanoclastics and basement-derived sedimentary rocks. The MRV host five economically significant volcanic hosted massive sulphide deposits, all of which lie in the Central MRB (Figure 3).

Cambrian volcanism and sedimentation was followed by predominantly basement derived late Cambrian to Devonian age sedimentation, which includes siliciclastic conglomerate, sandstone and limestone. These sequences occur within and peripheral to the licence.

At least two phases of regional compression were associated with the mid Devonian Tabberabberan Orogeny (Keele, 1991). The development of folding, cleavage and regional thrusts in lower Paleozoic rocks were associated with this event. Fold trends in the licence area are approximately E-W.

Deformation was followed by the extensive intrusion of Devonian to Carboniferous granitoids of batholithic proportions. One such intrusion, the Dalcoath Granite, and associated hornfels aureole, outcrop south of the licence. The Devonian granites are associated with carbonate replacement Sn mineralisation at Renison Bell and Mount

Bischoff, and the Pb-Zn-Ag vein deposits of Zeehan and possibly the Tullah Fields. A similar setting may be interpreted for the base metal vein deposits in the Round Hill workings, immediately south of the licence area (Figure 4).

After substantial erosion of this terrane, extensive Tertiary flood basalts and subvolcanic sediments were deposited. Basalt flows occupy the north of the licence.

5. PREVIOUS EXPLORATION

The current tenement area has been held previously by Asarco, CRAE, Noranda and Plutonic. Exploration programmes (Figure 4) completed include mapping, soil and stream geochemistry, IP and TEM surveys, helicopter borne magnetics, percussion (8 holes for 571 metres) and diamond drilling (13 holes for 2261.4m). A full appraisal of pre-1996 work is given in Herrmann (1997) and is summarised below, in chronological order:

CRAE (1976-88)

The ground was originally held by Asarco under EL 7/73. CRAE joint ventured into this tenement in 1976 to assess targets generated through Asarco's stream sampling programme. CRAE, who also held EL 10/76, explored the area from 1976-1988. Porter probably recognised the potential of the area while following up anomalous stream sediment results.

During 1976-77 (Purvis 1977a), CRAE completed geochemical sampling, mapping, gradient array IP surveys. Although no large amplitude anomalies were detected in the IP, three diamond drillholes were drilled at West Cethana (Figure 4; DD77CC1-DD77CC3; Purvis, 1977b) for 460m. A strongly altered sequence of acid volcanics with anomalous Pb and Zn was recognised. The most encouraging result was in drillhole DD77CC1 which intersected 0.4m @ 8.2% Zn, 0.2 % Pb from 78.6-79.0m in siliceous schists, and 2.6m @ 0.92% Zn, 0.91% Pb from 98.0-100.6m as bedded Pb-Zn sulfides in a black tuff.

During 1976-77, at East Cethana (Figure 4, Purvis, 1977b) CRAE completed geochemical sampling, mapping, gradient array IP, EM, magnetics and two diamond drillholes (DD77CC4 and DD77CC5) for 314m. A zone of coincident geochemical and IP anomalism 1300m long and 250m wide was recognised at the eastern end of the prospect. The two drillholes encountered significant sulfides with a best result of 1.0m @ 3.88% Zn, 0.8 % Pb 1.18%Cu and 185 ppm Ag from 37.8-38.8m, and from 78.6-79m in DD77CC5 bands of sulfides occur in a dark chloritic tuff-shale. Several other intersections of 0.5-1.0% combined Pb-Zn over 2-3 metres were intersected in the holes.

During 1977-1979, at East Cethana (Purvis, 1979) three drillholes (DD77CC6, DD77CC7, and DD78CC8) were completed for 495.5m, a dipole-dipole IP survey was completed and a small amount of additional gridding, geochemical sampling and mapping. The three drillholes were targeted at the IP anomalies recognised in the 1976 programme (Purvis, 1977b). The results were regarded as being poor, however two separate intersections were recorded with Pb+Zn >1% and a best result of 4.5m @ 1.2%Zn, 0.4% Pb, and 2.4m of 1%Pb and 0.65% Zn.

In 1981 (Flis, 1983), a DIGHEM II survey detected an anomaly near the western end of the East Cethana grid.

During 1984-1985 (Temby, 1985), the previous stream sediment, grid soil sampling and geophysical data was compiled. At West Cethana, two percussion drill holes

(PD84CC9 and PD84CC10) were drilled with base metal poor sulphides intersected over 24m in PD84CC9. Downhole EM in these two drill holes failed to identify a conductor. Core from previous drill holes was re-assayed for gold but no significant values were returned. Other work included rock chip sampling of the Roland Conglomerate and Moina Sandstone in the Claude Mountain Lookout area (17 samples) to test for gold. These samples were assayed for Cu, Pb, Zn, Ag, As, Sb, and Au but no anomalies were detected.

During 1986-87 (Caithness and von Strokirch, 1987), at West Cethana, three diamond drill holes (DD86CC11 (abandoned), DD86CC12 and DD86CC13) were completed for 496.5m. The holes were targeted to test a UTEM response and a soil geochemical response in an inferred prospective geological sequence. They failed to intersect any significant mineralisation.

CRA relinquished EL's 7/73 and 10/76 in 1988.

NORANDA (1988-92)

In August 1988 Noranda successfully tendered for the ground which was granted as EL 10/88. Noranda immediately joint ventured this ground with Plutonic Operations Ltd. During 1988, a review of CRA geophysics by Zarzavatjian (in Jones, 1989) revealed that some alteration zones had not been covered by IP and UTEM and that numerous IP anomalies that occurred at the end of lines and others with coincident geochemical anomalism had not been followed up. Pb isotope studies of core samples indicated that the mineralisation has an isotopic signature similar to Rosebery.

During 1989-90 (Jones, 1990), a gravity survey was done and a helicopter-borne high-resolution aeromagnetic survey was completed. An honours thesis titled "The geology and mineralisation of the Cethana Pyrite Zone" (Hicks, 1989) was completed. A 50m dipole IP survey on 6 widely spaced lines produced strong well-defined responses on lines 21700E and 21800E.

PLUTONIC (1992-97)

On 2 June 1992 Plutonic became the operator of the licence with Noranda retaining a 10% NPR. A further review of previous work was completed (MacDonald and Tomlinson, 1992). Zarzavatjian (in MacDonald and Tomlinson, 1992) completed a geophysical review which identified many weak anomalies in the IP including anomaly CHAR-CE1 that was interpreted to be a single continuous chargeability anomaly running E-W between 21600E and 22600E. Ten diamond drill holes were proposed to test this anomaly in East Cethana.

During 1993, Crone PEM covered 2 lines and 13 lines on West and East Cethana respectively. MacDonald (1993) suggested that the northern contact between the quartz-sericite schist and overlying volcano-sedimentary rocks represented a favourable horizon for a VMS deposit. The schist was regarded as footwall alteration. An EL area reduction then resulted in fragmentation of the licence.

During 1994-95, 2 diamond drillholes (CED1 and CED2; Figure 4) were completed at East Cethana for 495m. CED1 was targeted at an IP anomaly and CED2 was targeted

along strike of mineralised sediments intersected in 77DDCC5 and at the same IP trend as CED1. No significant intersections were found. Downhole EM was completed on these two holes and CC4, 6, 7 and 8 with no off-hole responses. It was concluded that the zone of high chargeability in East Cethana between 21600E and 22600E tested by CC4, CC7, CED1 and CED2 is a broad zone of stringer mineralisation interpreted to be a VMS footwall zone with the favourable horizon occurring to the north. A recommendation was made to test this northern zone by drilling a fence of percussion holes along the track at 21400E.

During 1995-96, exploration efforts by Plutonic were concentrated on the Gog Range portion of their tenement (east of the current EL 3/98).

During 1996-97 (Close and Reid, 1997), a six-hole reverse circulation programme (CERC 1 to 5; Figure 4) for 373 metres was completed at East Cethana. The aim of this programme was to define an exhalative VMS horizon in the northern part of the tenement. Results from this programme were not encouraging. Our mapping indicates this program was poorly located and should have targeted further to the north.

In August 1997, Plutonic relinquished the portions of EL 10/88 that covered the Cethana area.

Table 1: Summary Exploration History of Lake Barrington area

YEAR	EXPLORATION ACTIVITY	CONDUCTED BY
1973	Stream sediment sampling	Asarco
1976-77	Cethana: Soil sampling, mapping, gradient array IP, EM, ground magnetics, drilling	CRAE
1978-79	Cethana: dipole-dipole IP, soil and rock chip sampling, drilling	CRAE
1981	DIGHEM Survey	CRAE
1984-85	Data compilation and review, drilling, rock chip sampling	CRAE
1986-87	Drilling	CRAE
1988	Geophysical review, Pb isotopes	Noranda
1989-90	Gravity survey, helicopter-borne magnetic survey, dipole-dipole IP	Noranda

Table 1: Summary Exploration History of Lake Barrington area (cont)

YEAR	EXPLORATION ACTIVITY	CONDUCTED BY
1992	Data review, drilling	Plutonic
1993	Crone PEM, EL reduction	Plutonic
1994-95	Drilling, downhole EM	Plutonic
1996-97	Drilling, EL relinquished	Plutonic

6. WORK COMPLETED

Work completed within the licence area during the period April 1998 to March 1999 has consisted of:

- A literature review of previous exploration.
- Compilation and digitising of most previous soil geochemical data into a GIS platform.
- Re-processing and imaging of the 1990 heli magnetics
- The entire Cethana proportion of the EL was mapped at 1:5000 scale using an orthophoto mosaic.
- A geological interpretation was completed.

6.1 GIS Data Compilation

6.1.1 *Historical Geochemical Sampling*

There has been extensive conventional soil sampling through the central and southern part of the EL (Figure 4). Sample points were digitised from hard copy maps and, where available, assay values of Cu, Pb, Zn and Mn assigned to the points. However sample numbers are not attributed to sample points shown on the maps, and cross referencing with appendices proved unsuccessful. Capture of the data is approximately 75% complete.

6.1.2 *Historical Drilling*

Most drill collars were located during the geological mapping (Figure 4).

Historical assay values from drill core have been captured, but not evaluated at this stage.

No re-logging has been undertaken to date, with core being available at MRT's core inspection facility in Hobart. However, samples were retrieved from Plutonic's reverse circulation (CERC 1 to 5) program, as these were being disposed of on withdrawal of Plutonic from exploration in Tasmania these are stored in the Tullah Core Compound.

6.2 Heli-magnetics

Digital data was acquired from the MRT and a series of images were produced. Figure 5 shows the processed data overlain with the 1:250,000 geology polygons. There is a good correspondence between the high intensity responses and outcropping Tertiary Basalts. There are a number of other signatures which can be attributed to responses in the Lower Palaeozoic bedrock geology, including:

- high intensity signatures tentatively interpreted as related to Cambrian granitoids (cf. the Murchison granite, western Tasmania).

- strike parallel discontinuities and gradients interpreted as structural breaks, mainly WNW-ESE trend.
- across strike discontinuities and gradients interpreted as structural breaks, with the most prominent trend being NE-SW.

6.3 Geological Mapping

The entire Cethana portion of the tenement was mapped at 1:5000 scale. The geological observation map is included as Plate 1 and the interpretation map is included as Plate 2. A summary map at 1:25,000 scale is shown in Figure 6. Earlier mapping by Noranda was digitised at 1:10,000 scale, but it became necessary to re-map the area, particularly to understand the distribution of lithotypes, alteration styles and structural geometries. A number of new outcrops were found during the mapping which have significantly advanced the interpretation from that of earlier workers. The mapping was undertaken by a team of 4 geoscientists who covered the EL in a time and cost effective campaign. Once a scheme of lithotypes was agreed upon, each geologist mapped separate areas and, on completion, the team visited each others area to evaluate the results and advance the interpretations. This, too, is ongoing.

6.3.1 Stratigraphy

This is subdivided into four sequences:

- Cambrian Quartz Feldspar-phyric Volcanogenic sequence
- Cambrian Intermediate/Andesitic Epiclastic sequence
- Cambro-Ordovician Silicic Conglomerate (Owen Conglomerate)
- Cambro-Ordovician Silicic Sandstone (Moina Sandstone)

Quartz - Feldspar phyric Volcanogenic Sequence

These comprise quartz-feldspar porphyry sub-volcanic intrusives, lavas and related quartz-feldspar phyric sediments, and they occupy a large proportion of the area, to the north of the Owen Conglomerate contact. This sequence strikes east-west to northwest-southeast and generally dips steeply towards the north. It is interpreted that the sequence also faces to the north, although evidence to support this interpretation is largely based on the occurrence of quartz porphyry detritus within the interpreted overlying intermediate/andesitic volcanoclastics to the north.

A basal sequence of quartz-phyric sandstones and siltstones are mapped in the southwestern portion of the area north of Round Hill. This distinctive unit, which grossly dips and faces to the north, consists of mixed sediments that are typically well-bedded fine grain black-grey shales and minor sandstones. The volcanic component in these sediments gradually increases to the north, with shale and siltstone units becoming more ashy and volcanic quartz crystals becoming more prominent in the sandstone horizons.

Volcaniclastics are weakly sericite altered and moderately cleaved. Deformation in this sequence around, and to the west of Round Mountain, is restricted to domains of cleavage intensification and ductile shearing, possibly associated with local folding. Rocks interpreted to be equivalent to this unit along Olivers Road to the east are strongly altered and deformed, rendering them to quartz sericite (and locally chloritic) schists.

This sedimentary unit is overlain by a thick sequence of quartz-feldspar-phyric lavas, volcaniclastics and undifferentiated volcanics. Domains dominated by lavas and volcaniclastics were recognised during the mapping, but continuity is difficult to show. This unit is host to mineralisation at Cethana East and West Prospects. In the vicinity of the Cethana bridge, this unit is intruded by a magnetic granite. The lavas are typically porphyritic and, where they become more cleaved (eg. on Olivers Road), are mapped as quartz augen ("quartz eye") schists. A similar sequence outcrops on the Staverton Road where relatively coherent quartz feldspar porphyry is overlain to the north by quartz-phyric fine grained sandstones, siltstones and a thin unit of dark grey shale.

The quartz-phyric nature of this sequence bears some comparison with the White Spur Formation which overlies the Central Volcanic Sequence of Western Tasmania.

Intermediate/Andesitic Epiclastics

These are identified in the north parts of the Cethana area, apparently overlying the more acid sequence, and are unconformably overlain by the Tertiary Basalts in the plateau area to the north. The basal units, seen in the creek north of the junction of Claude and Olivers Road, comprise greywacke sandstones and chlorite-sericite schists. The latter unit locally contains rounded to subrounded muscovite-quartzite pebbles which are interpreted to be derived from Precambrian basement. Overlying this is a thick sequence of variable magnetic andesitic lava, mafic volcaniclastics and polymict mafic conglomerate. In the west and mafic conglomerates are interbedded with variably magnetic lithic sandstones, massive, coarse, grained quartz crystal rich sandstones and fine ashly volcaniclastics. The mafic conglomerate is massive to diffusely graded and less commonly bedded. It is comprised of matrix supported pebble-cobble sized clasts of subangular to subrounded feldspar-phyric andesite ($\leq 200\text{mm}$), rounded pale pink to yellow Pre-Cambrian quartzite ($\leq 100\text{mm}$), minor chert, and feldspar \pm quartz phyric volcanics. The matrix is lithic rich and strongly chloritic. The conglomerate is interbedded with occasional lenses of lithic (quartzite and chert), crystal (feldspar, minor quartz) sandstone. Further west these rocks are much finer grained and consist of andesitic siltstones and lavas. Several parasitic folds have been mapped through the mafic unit in the central north of the area implying that there may be a broad synclinal axis through the mafic unit.

There is evidently a profound change in volcanic facies architecture and provenance from the acid/felsic sequence to the south. These rocks are very similar to the Lynchford Member of the Tyndall Group in Western Tasmania.

6.3.2 *Intrusives*

Cambrian Granitoid

Granite outcrops were found in Bellana Creek above the Cethana Road and on the Cethana Road on the west side of Cethana Gorge. The granite is magnetic and varies from a pink-green coarse-grained equigranular type to fine-grained, siliceous aplitic and more porphyritic (feldspar) varieties, with all types hosting minor (<0.1-0.5 modal %) disseminated pyrite. It is unclear whether the granite is Devonian (Dolcoath Granite?) or Cambrian in age, however, its magnetic nature and general appearance are suggestive of a Cambrian origin. Spatially associated with the granite (on the ridge south of Bellana Creek and on the eastern side of the Cethana bridge) are outcrops and float of a quartz-biotite(muscovite?)-porphyry. Both the granite and the porphyry intrude the lower volcano-sedimentary sequence of the felsic volcanics.

Devonian Granitoid

The Dolcoath Granite lies to the south of the licence area and is a major intrusive body. Gold and minor base metals related to this body are being explored by Jervois Mining to the west, with some encouraging results.

6.3.3 *Structural History*

The main observational elements of the deformation history are ductile zones of cleavage development, brittle faulting and an inferred major transfer fault.

Ductile Deformation

The deformation is partitioned into strike parallel zones with variable strain intensity indicated by variations in cleavage development. These zones of deformation can range up to several hundred metres wide, locally contain cataclasites, and appear to be more prevalent and wider in the eastern part of the mapped area. The regional cleavage generally dips steeply north and, as it is continuous though into the Cambro-Ordovician Owen and Moina sequence, the age of deformation is assigned to the Devonian Tabberaberan Orogeny.

Within areas of more intense deformation, such as along Olivers and Staverton roads and in the western parts of the Cethana road, the cleavage contains a stretching lineation which is steeply plunging to the north. Associated with this elongation direction are rare kinematic indicators, such as asymmetric augen and shear bands, which indicate a southerly transport direction on north dipping foliation planes. This is interpreted as

resulting from high angle reverse shearing during ductile deformation. Sericite and lesser pyrite alteration is typically associated with the cleaved zones.

Kink zones

Within domains of strong cleavage development, particularly in East Cethana, there are zones where the cleavage dip direction varies from north to south dipping. These zones are up to several hundred metres wide, dip directions are internally consistent and the boundaries are fairly well defined. The domains resemble mega-scale kink bands and the interpreted vergence relationship is that the south dipping domains lie on the short limb. This geometry is consistent with extensional displacements (north side down) along the cleavage zones, and is interpreted as resulting from orogenic collapse following the compressional event.

Brittle Faulting

Brittle to brittle-ductile faulting is best displayed within the Owen-Moina sequence as a series of thrust faults and fault-related folds, particularly in road cuts near Cethana Dam. In this area, the north dipping thrusts indicate transport to the south, bringing the felsic sequence up over the Owen/Moina sequence. This sense of displacement is consistent with the kinematic indicators in the ductile shear zones to the north. The implication is that the ductile shearing continued through to higher crustal levels in the brittle regime.

Eastwards from the Dam, the north dipping thrust contact between the Owen and the felsic sequence can be traced towards Round Hill. However on the old Lorinna Road, immediately east of Round Hill, there is a clear angular unconformity between the Owen Conglomerate and the Cambrian sediments. A small south dipping thrust fault is present immediately beneath the contact. This relationship is clearly shown in Jennings (1958, Figure 3). To the east of Round Hill, on Olivers Road, the contact is a south dipping thrust fault, immediately above which is a remnant block of felsic rocks overlain by Owen Conglomerate. The interpretation is that the unconformity in this area has been exploited as a competency contrast along which faulting has propagated with a north directed sense of displacement. The change in displacement direction to a backthrust sense is opposite to that seen in the western part of the licence.

Transfer Fault

One interpretation of the variation in thrust geometry is that there is a transfer fault or lateral ramp between the East and West Cethana prospects. This is inferred as a NE-SW dislocation through the Round Hill area (Figure 6). While no major structure has been mapped on the ground, the existence of a transfer fault is inferred from small scale faults of this orientation where it is projected across the Cethana road. Northwards from here, the fault is projected beneath the Tertiary Basalts. There is a significant mismatch in the position of the boundary between the felsic

sequence and the intermediate/andesitic sequence from east to west across the area (Figure 6). This is interpreted as a sinistral offset in the sub-Tertiary sequence across the inferred transfer fault position. The heli-magnetic data shows a NE-SW trending dislocation in the approximate position of the inferred transfer fault (Figure 5).

The existence of a transfer fault remains a preliminary interpretation of the data. There are complex geometrical problems to resolve, from the apparent large offset in the felsic/intermediate sequences (in the north), to the little apparent offset in the central area (around Cethana road), and the change in the basal Owen contact relationship from thrust (in the west) to unconformity (in the east) in the area of the transfer structure around Round Hill. It may be that this is more than a discrete fault, and that it links into the strike parallel shear zones (thereby transferring displacement). The latter alternative may account for the apparently complex relationship to the interpreted shear zones. Further mapping is warranted to resolve these relationships.

6.3.4 *Alteration and Mineralisation*

One of the most visually impressive features of the Cethana area is its alteration, to the extent it has been called the Cethana Pyrite Zone (Hicks, 1989). This is a bit of a misnomer, however, as most of the alteration within the felsic volcanogenic sequence is sericitic, with pyrite mainly in narrow zones and disseminated through the sericite. It is here termed the Cethana Alteration Zone (CAZ). The cleavage zones are typically mapped out by the sericite distribution, suggesting a causal timing relationship (of the "chicken and egg" scenario). This zone has been a focus of exploration activity in the past and, with the lack of success, it has been regarded as a "footwall" alteration system.

This is large (>6km long) for a footwall alteration to a massive sulphide. Alternatively, the alteration could simply relate to the strike extensive nature of the shear zones themselves. This is strongly indicated by the progressive development of the alteration and cleavage that effects the quartz porphyries, such that relatively unstrained and unaltered quartz porphyry is transformed across strike into quartz augen ("quartz eye") sericite (with pyrite) schists. Such zones are weakly mineralised, mostly with narrow veins carrying base metals (as found in drilling). Only one quartz vein carrying sphalerite and galena was located on the Olivers Road (Sample 167617) associated with a small cross cutting fault. On this basis, it seems the mineralised tenor of the CAZ is quite low. Certainly, large volumes of fluid have focussed through the zone, perhaps depositing metals in traps elsewhere.

Hence Plutonic tried to evaluate a higher exhalative stratigraphic position (their six hole RC program of 1996-97). It is apparent from our mapping that, if such an exhalative position exists, then it lies further north than the

area tested by Plutonic, at the change from the felsic sequence to the andesitic sediments. The lithologies at this boundary, seen in the creek north of Olivers Road, are strongly cleaved and chlorite altered. Some historical copper prospecting in the immediate area was reported (by a landholder) and fragments of clayey azurite (?) were retrieved from a recently dug pit. In addition, the heli magnetics indicates the presence of discrete magnetic features along strike of this contact to the east which need to be evaluated in future programs.

The most pervasive and visually impressive pyritic alteration is seen within the Moina Sandstone and Owen Conglomerate. It is best developed subjacent to the thrust contact with the felsic sequence in the SW of the EL. This is interpreted as indicating that mineralising fluids were focussed into the sandstones during south directed thrusting of the volcanogenic sequence, with fluids expelled southwards from depth into a receptive sandstone reservoir. The distribution of base metal mineralisation at Round Hill suggests that these fluids became trapped in anticlinal positions. The interpretation of a transfer fault in this area would also provide an effective conduit for fluid flow during Devonian deformation.

7. PLANNED WORK 1999-2000

Core Logging:

A total of 13 diamond drill holes have been completed on the Cethana East and West prospects for a total of 2261.4m. This drilling is concentrated in the felsic volcanics but relogging of this core will allow a better understanding of the geology and mineralisation of the area.

Conventional Soil and Orientation Partial Leach sampling:

This is planned on a total of 4 lines for 7.1 line kilometres (Figure 7).

Line 400E: 700N-300S and then to the north. (2km)

This requires refurbishing from 300S-700N. It is proposed to extend this line due north (348 magnetic) from 700N/400E for 1km. This line will then transect an aeromagnetic anomaly at 5408800mN 428750mE and the major magnetic anomaly in this northern area which is interpreted to be related to the mafic volcanics.

Line 19800mE: 2000-3550S. (1.55km)

This line needs to be refurbished from 2500-3550S and recut in a northern direction (Magnetic north) from 2500-2000S. This line will cover the Owen Conglomerate contact and a magnetic anomaly to the north. This line is stopped at the northern boundary of the tenement.

Line 21700mE: 2200-4050S. (1.85km)

This line needs to be refurbished from 2900-3975S and recut in a northern direction (Magnetic north) from 2900-2200S, and a southerly direction from 3975-4050 (this line is just to take the track through to Olivers Rd). This line will cover the Owen Conglomerate/rhyolite volcanic contact and the magnetic anomaly to the north (this anomaly is probably due to the andesitic volcanics).

Line 22600mE: 2225-3850S. (1.625km)

This line needs to be refurbished from 2425-3725S and recut in a northern direction (Magnetic north) from 2425-2225S, and a southerly direction from 3725-3850. This line will cover the Owen Conglomerate/rhyolite volcanic contact and the magnetic anomaly to the north (This anomaly is probably due to the andesitic volcanics).

Data Capture and Validation

Soils: the soil geochemical data capture is approximately 70% complete.

Drilling: all assay values from historic drilling has been captured, but not interpreted to date.

Rock Chips

Approximately 20 rock chip samples were collected during the mapping campaign which have been submitted for multi-element assay. Results are pending and will be presented in the next annual report.

Geophysical Review

Collation of all ground geophysical data is planned. This will be integrated with data from the adjacent Gowrie Park licence (EL 26/98) so as to provide comprehensive coverage. This review will help determine work programs in the coming year.

8. CONCLUSIONS & RECOMMENDATIONS

The extent of the Cethana Alteration Zone (CAZ) requires large volumes of fluids to have passed through these rocks. The fluids evidently carried base metal sulphides (stinger type veins), but the metals may have been deposited elsewhere. However the depth potential of the CAZ requires further evaluation (initially through partial leach soil sampling). Two exploration plays arise from the potential of metal deposition elsewhere in the area. One is a Devonian play and the other is an ostensibly Cambrian play.

8.1 Devonian Play

Southward directed fluid migration expelled from the felsic pile during ductile and brittle shearing. Fluids exited through the Moina/Owen siliciclastics, mixed with meteoric and magmatic fluids and were trapped in fold and fault positions. This would explain the existence of the Round Hill series of workings and suggest the need, also in light of the transfer fault interpretation, to re-evaluate this area for Pb, Ag and Zn potential.

8.2 Cambrian Play

This relates to the contact of the felsic sequence and the overlying magnetite bearing epiclastics, and implies the alteration (CAZ) is a Cambrian footwall system. If a correlation is made with western Tasmania stratigraphy, it is suggested this contact is equivalent to the base of Tyndall Group (similarity to Zig Zag Hill Formation?; White and McPhie, 1996). It is also apparent that this contact has not previously been explored to any significant degree within the EL area. RGC held the adjoining EL to the east (Gowrie Park, currently Pasminco EL 26/98) and targeted this stratigraphic position, although results were not encouraging from the work they undertook. The recognition of a possible Cambrian age granite in West Cethana could impact on the prospectivity of this area.

9. **ENVIRONMENTAL DISTURBANCE AND REHABILITATION**

No disturbance involved in program undertaken to date. Some of the old drill collars are making water and should be capped.

10. EXPENDITURE

Expenditure on EL 3/98 during the 12 month period ending February 1999 was \$30,048. A detailed expenditure statement is presented below.

Personnel	16,464
Travel & Accommodation	2,513
Consultants & Contractors	3,132
Drilling	31
Stores & Supplies	947
Vehicles Plant & Equipment	327
Land	1,362
Computing	480
Office	2,060
Administration Fee 10%	2,732
Total Tenement Expenditure	30,048

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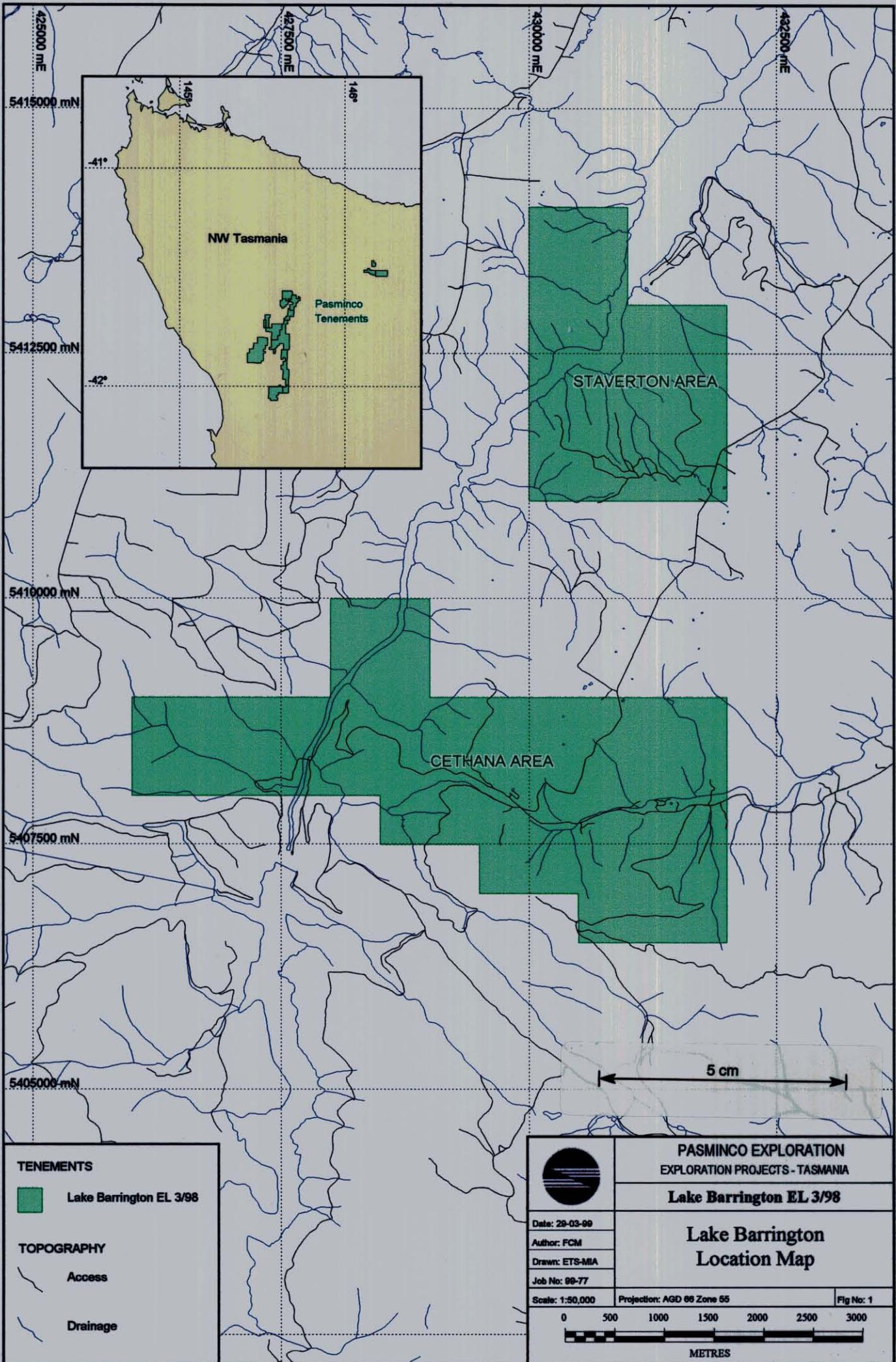
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12. KEYWORDS & LOCALITYKeywords

COPPER, ZINC, LEAD, GOLD, ANDESITE, RHYOLITE, VOLCANICS, FAULT, SHEAR ZONE, FOLD, PYRITE, CHLORITE, SERICITE, GEOCHEM SOIL, GEOL MAPPING DETAILED, GEOPHYS MAGNETICS, ALTERATION, ORE POTENTIAL, NORTHERN MT READ VOLCANICS, CETHANA, ROUND HILL

Locality

1:250,000	SK55-NW & SW
1:100,000	Forth 8115
	Mersey 8114



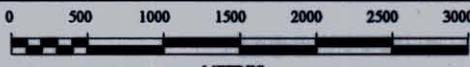
TENEMENTS

 Lake Barrington EL 3/98

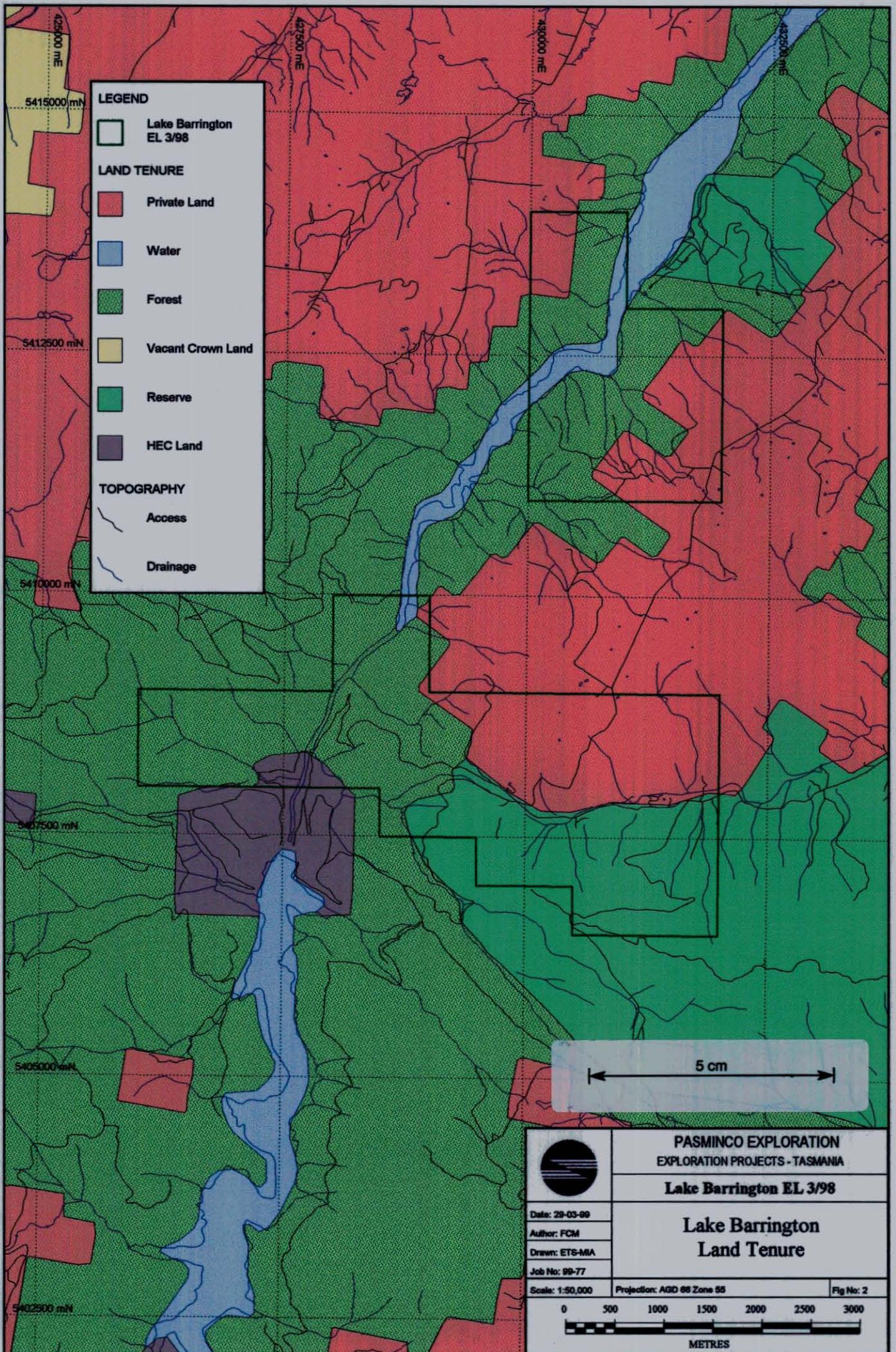
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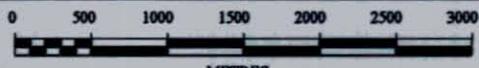
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 Drainage

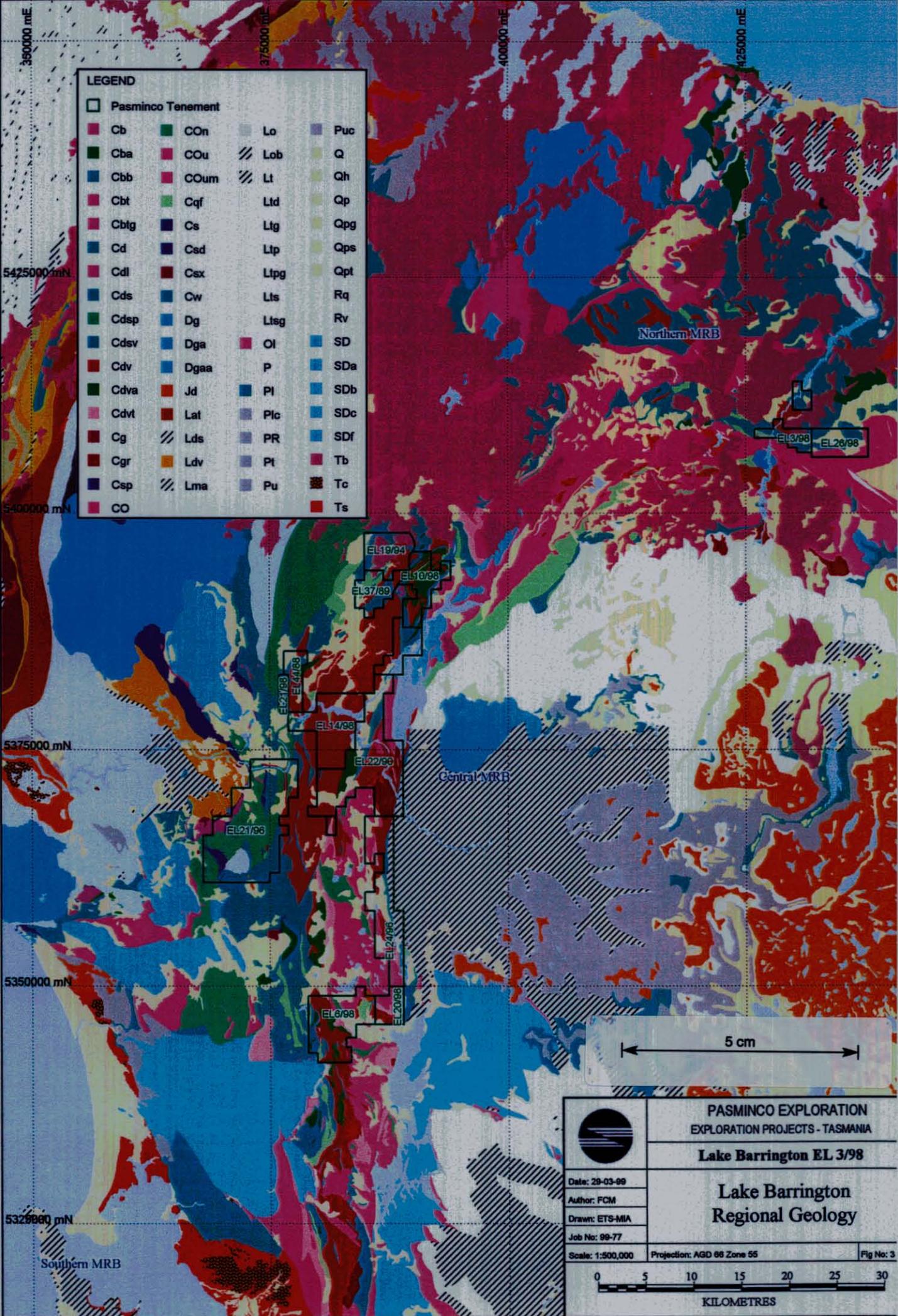
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	EXPLORATION PROJECTS - TASMANIA	
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Lake Barrington		
Location Map		
Date: 28-03-98		
Author: FCM		
Drawn: ETS-MIA		
Job No: 98-77		
Scale: 1:50,000	Projection: AGD 86 Zone 55	Fig No: 1
		
METRES		

569031



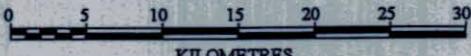
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569032

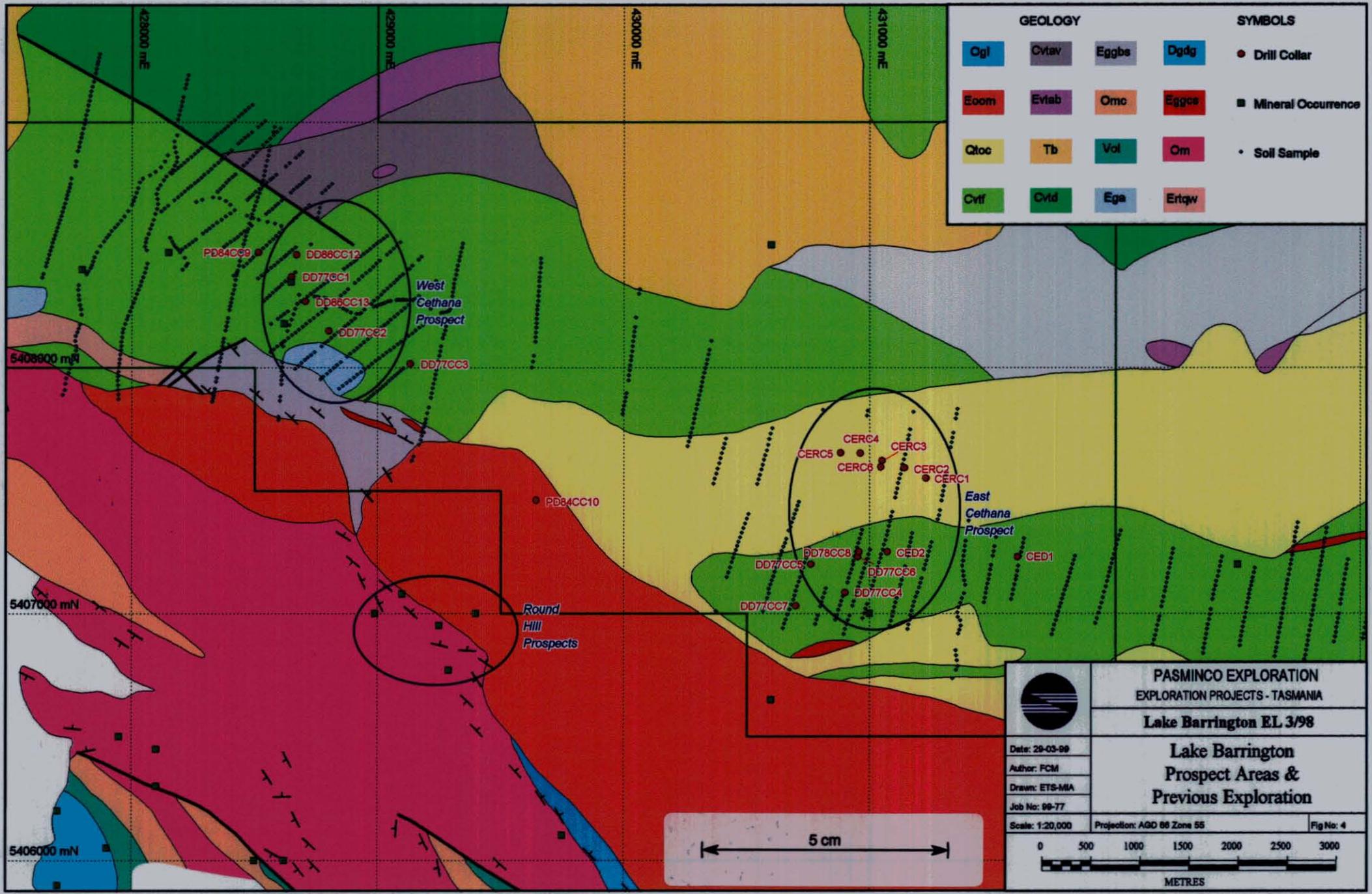


LEGEND

Pasminco Tenement			
Cb	COu	Lo	Puc
Cba	COu	Lob	Q
Cbb	COum	Lt	Qh
Cbt	Cqf	Ltd	Qp
Cbtg	Cs	Ltg	Qpg
Cd	Csd	Ltp	Qps
Cdl	Csx	Ltpg	Qpt
Cds	Cw	Lts	Rq
Cdsp	Dg	Ltsg	Rv
Cdsv	Dga	Ol	SD
Cdv	Dgaa	P	SDa
Cdva	Jd	PI	SDb
Cdvt	Lat	Plc	SDc
Cg	Lds	PR	SDf
Cgr	Ldv	Pt	Tb
Csp	Lma	Pu	Tc
CO			Ts

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Lake Barrington Regional Geology		
Date: 29-03-99	Scale: 1:500,000	
Author: FCM	Projection: AGD 88 Zone 55	
Drawn: ETS-MIA	Fig No: 3	
Job No: 99-77		

569033



GEOLOGY				SYMBOLS	
Ogl	Cvtav	Eggbs	Dgdg	●	Drill Collar
Eoom	Evlab	Omc	Eggcs	■	Mineral Occurrence
Qtoc	Tb	Vol	Om	•	Soil Sample
Cvtf	Cvtd	Ega	Ertqw		



PAMINCO EXPLORATION
EXPLORATION PROJECTS - TASMANIA

Lake Barrington EL 3/98

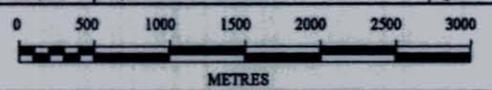
Lake Barrington
Prospect Areas &
Previous Exploration

Date: 29-03-99
Author: FCM
Drawn: ETS-MIA
Job No: 99-77

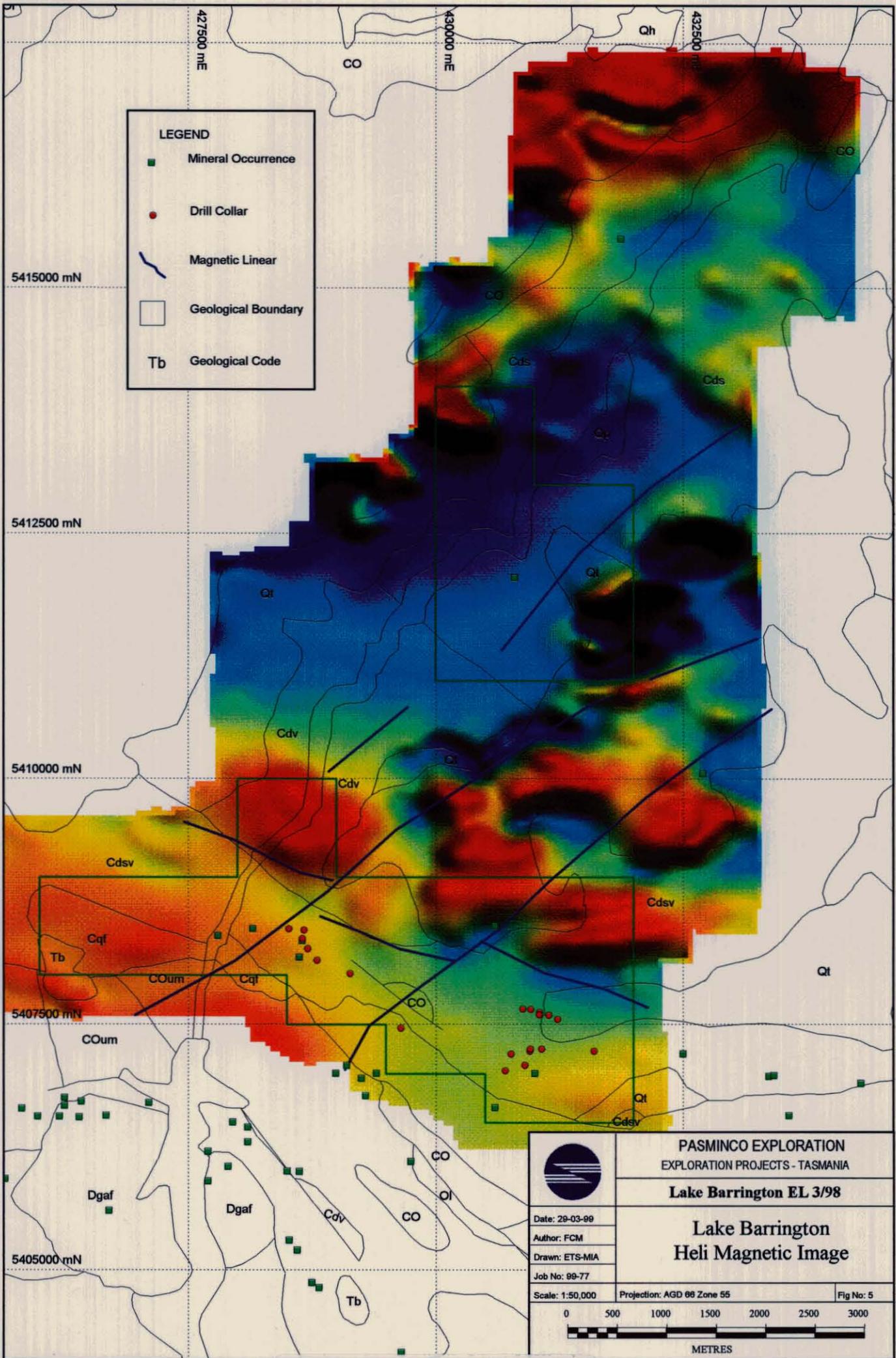
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Projection: AGD 86 Zone 55

Fig No: 4



569034



LEGEND

- Mineral Occurrence
- Drill Collar
- Magnetic Linear
- Geological Boundary
- Tb Geological Code

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5412500 mN

5410000 mN

5407500 mN

5405000 mN

427500 mE

430000 mE

432500 mE



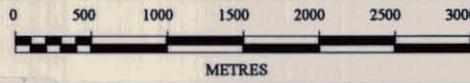
PASMINGO EXPLORATION
EXPLORATION PROJECTS - TASMANIA

Lake Barrington EL 3/98

Lake Barrington
Heli Magnetic Image

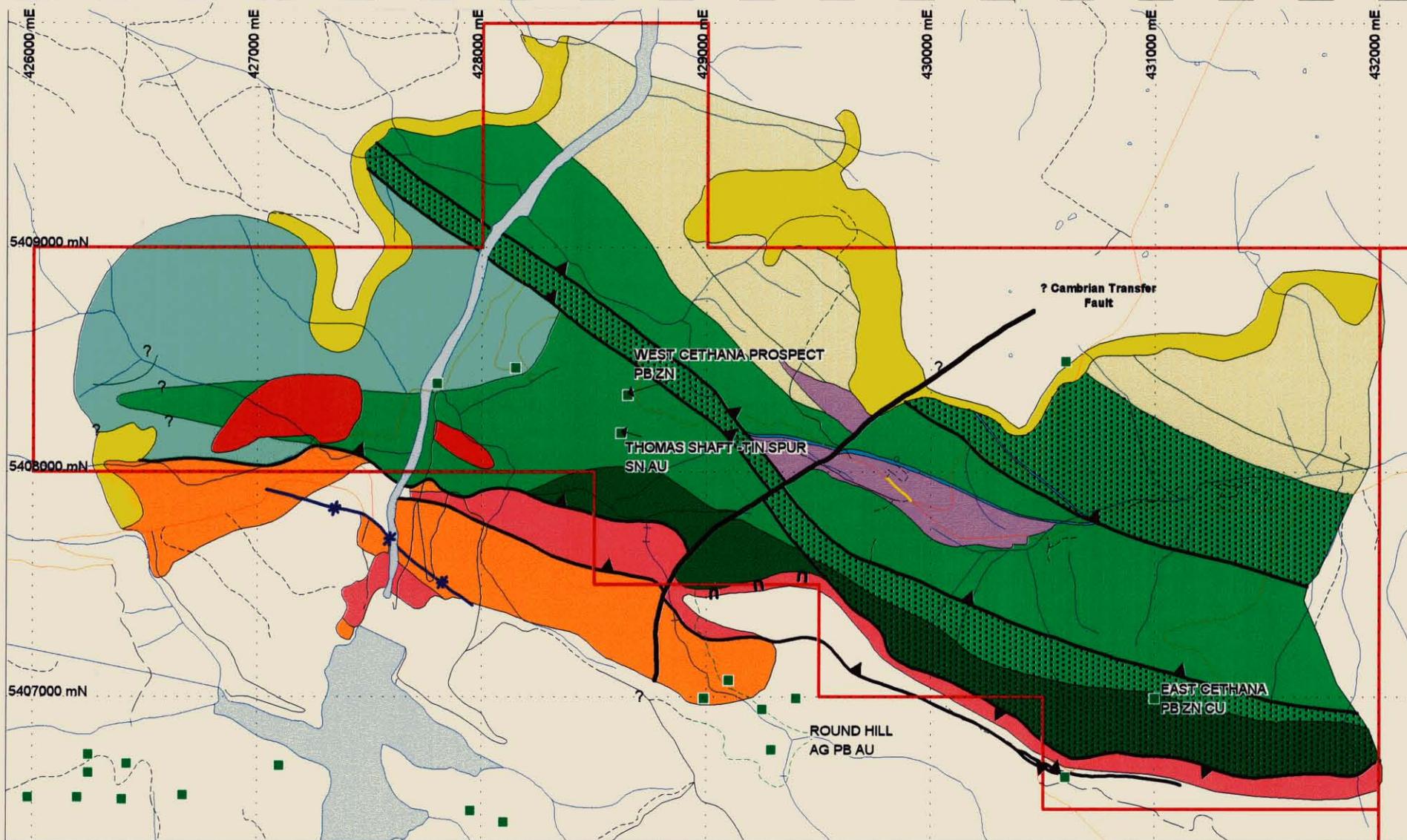
Date: 29-03-99
Author: FCM
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Scale: 1:50,000 Projection: AGD 86 Zone 55 Fig No: 5



5 cm

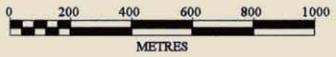
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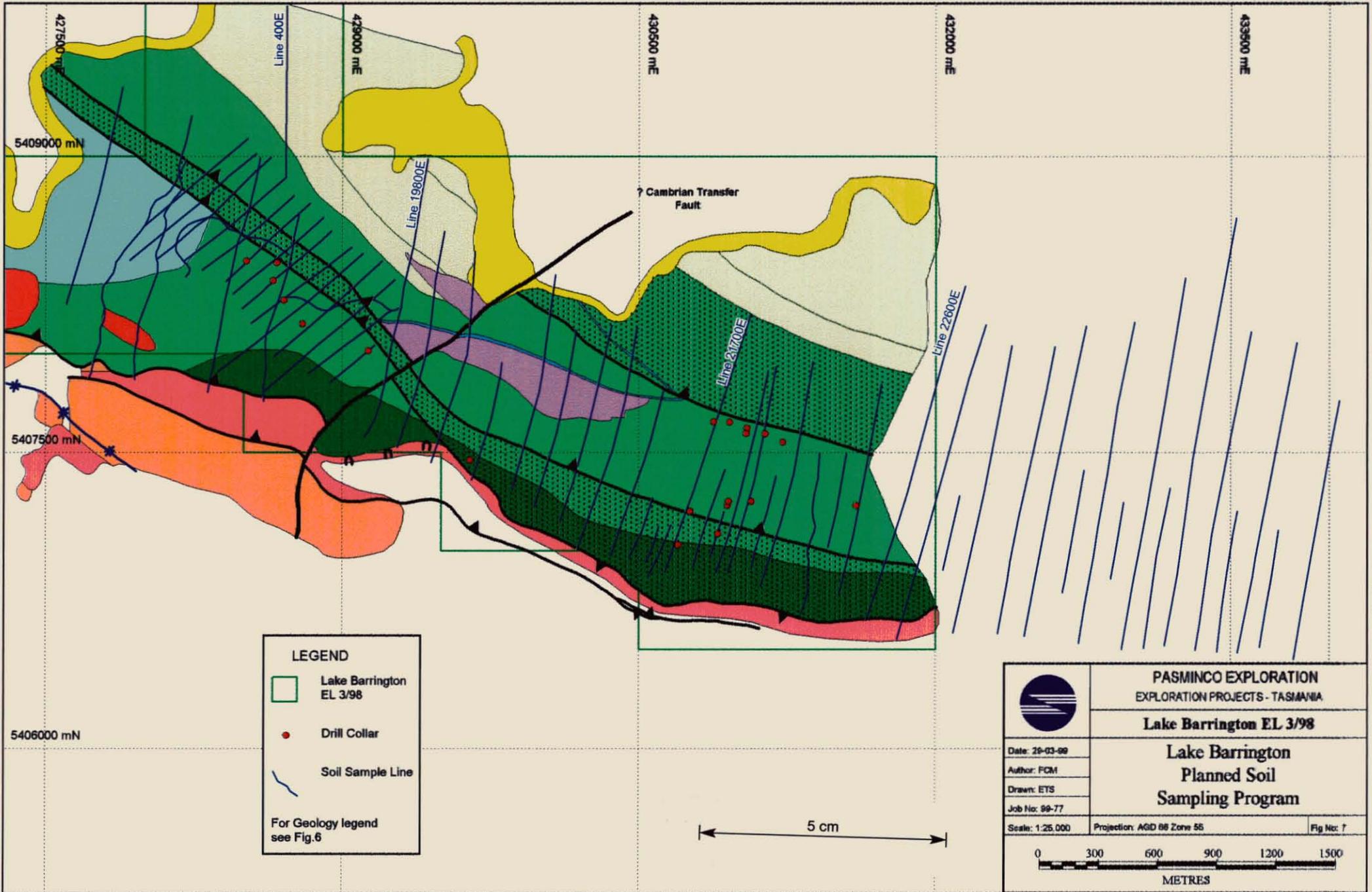
LEGEND

- | | |
|---|---|
|  Tertiary Basalt |  Granite |
|  Silicic Sandstone (Moina Sandstone) |  Quartz Porphyry |
|  Silicic Conglomerate (Owen Conglomerate) |  Gray Slate |
|  Andesitic Volcaniclastics |  Geological boundary |
|  Quartz Volcanics (lavas, sediments, undifferentiated) |  Geological boundary (uncertain) |
|  Sediments: qtz phyric SST, SLT |  Unconformity |
|  Dominantly diffusely bedded qtz phyric volcaniclastics (qtz, crystal sandstones, ashy siltstones) |  Thrust Fault |
|  Shear Zone |  Transfer Fault |
| |  Fold Axis |
| |  Mineral Occurrence |

5 cm

	PASMINGO EXPLORATION TASMANIA	
	Lake Barrington EL 3/98	
Summary Geological Interpretation Map		
Date: 3/3/1999	Author: FCM	
Office: ETS		
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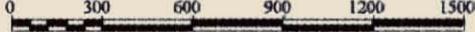
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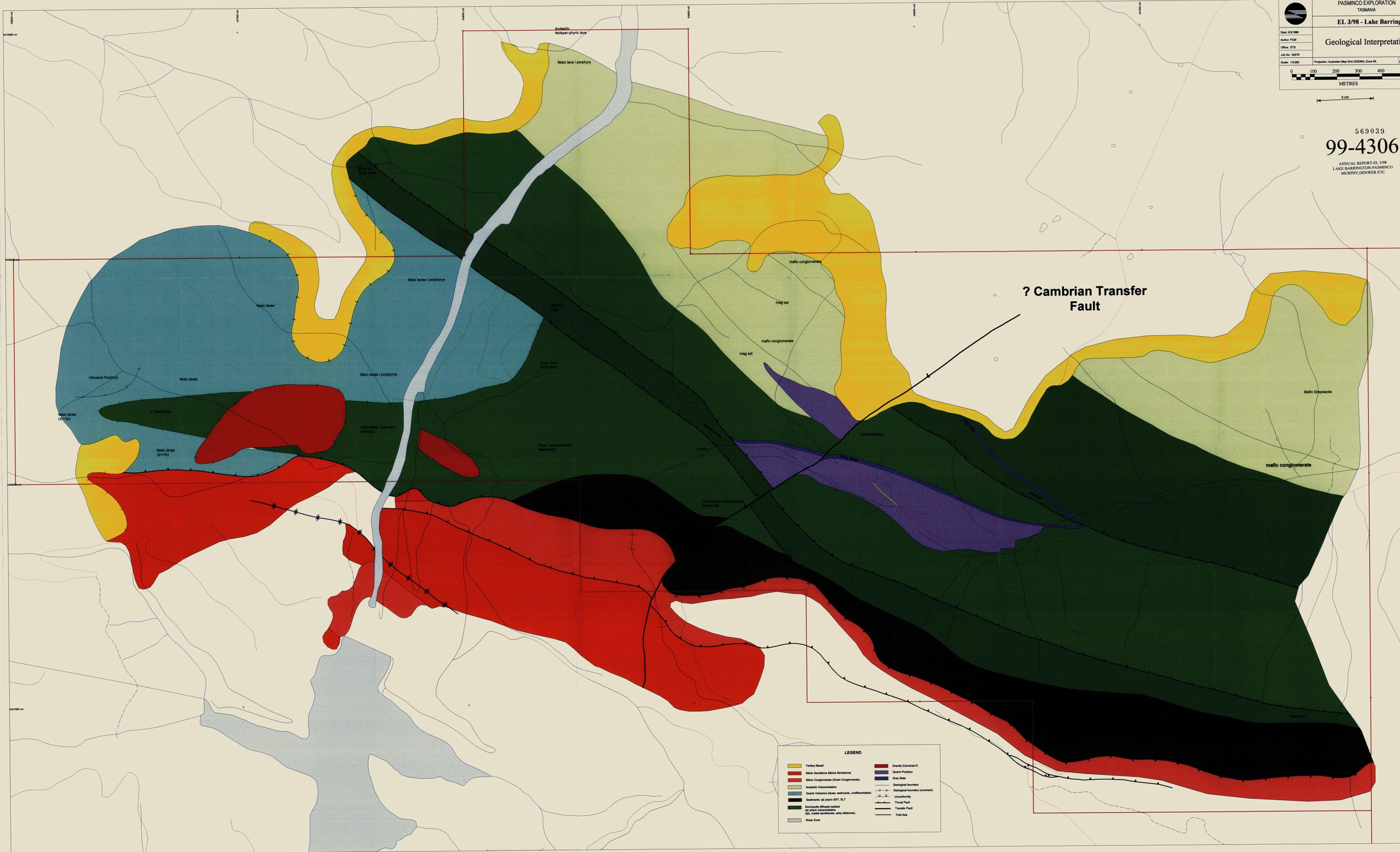
LEGEND

- Lake Barrington EL 3/98
- Drill Collar
- Soil Sample Line

For Geology legend see Fig.6

	PASMINCO EXPLORATION EXPLORATION PROJECTS - TASMANIA	
	Lake Barrington EL 3/98	
Lake Barrington Planned Soil Sampling Program		
Date: 28-03-99		
Author: FCM		
Drawn: ETS		
Job No: 99-77		
Scale: 1:25,000	Projection: AGD 86 Zone 55	Fig No: 7
 METRES		

569037



LEGEND

	Tertiary basalt		Quartz (Cambrian?)
	Silica Sandstone (Maine Sandstone)		Quartz Porphyry
	Silica Conglomerate (Dum Conglomerate)		Grey Siltstone
	Andesitic Volcanics		Geological boundary
	Quartz Volcanics (bas. sediments, unroofed)		Geological boundary (uncertain)
	Sediments: @ phytic SST, SLT		Uncertainty
	Dominantly diffusely bedded @ phytic volcanics (UC, crystal sandstone, silty siltstone)		Thrust Fault
	Shear Zone		Transfer Fault
			Fault Axis