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**PASMINCO EXPLORATION**

**WALFORD PEAK EL 24/96**

**ANNUAL REPORT  
FOR THE PERIOD ENDING OCTOBER 1997**

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EL 2496, Walford Peak - by Wendy Aliano

**1. SUMMARY**

During the first year of title Pasmenco has completed a detailed review of past exploration in the Walpole Peak EL 24/96. The tenement contains previously recognised Cu/Au and Pb/Zn mineralisation. Previous exploration has focussed on the Cu/Au potential at the Lake Selina Prospect which has its southern extension within EL 103/87 held by Acacia Minerals. The review has identified several other prospective area including - Selina, North Selina, Dora and Lake Rolleston areas.

During 1997 Wendy Aliano recognised that the Selina conglomerate contained marked similarities to the Mount Leyshon vent breccia in Queensland and noted that this portion of the stratigraphy has not been routinely sampled for gold by previous explorers.

Further exploration on the tenement is recommended.

## 2. INTRODUCTION

This report details exploration work undertaken on the Walford Peak EL 24/96 since the granting of title in October 1996. The tenement (Figure 1) is the southernmost property of Pasmaenco's holdings in Tasmania. It contains part of an area of Mt Read Volcanics to the east of the Henty Fault, the volcanic belt stretching from north of the Cambrian Murchison Granite in the north to east of Mt Lyell in the south. To the west of the tenement the volcanic belt is separated from the Henty Fault by a package of Cambro-Ordovician sediments of the Owen Conglomerate.

A review of past exploration of the area covered by EL 24/96 shows exploration effort (Figure 3) has been focussed on the central area around Mt Selina, where significant work has been done in the search firstly for a Mt Lyell analogue, and later for a Rosebery - or Hellyer style - base metal deposit. Work in the Mt Selina area included drilling of thirteen diamond drill holes. Much of the work focussed on the areas to the southwest and east of Mt Selina which is not part of the Pasmaenco tenement. Only three of the thirteen drill holes were in the area now included in EL 24/96.

Outside the Mt Selina area there has been some reconnaissance work to the north, at North Selina, and to the south as far as Lake Dora. The area between Lake Rolleston and Lake Dora has been gridded (Figure 3) and various geophysical techniques have been used in the search for base metal targets. There appears to have been little or no work in the southernmost part of the tenement. Soil and rock chip sampling programs have been conducted on only parts of the extant grids (Figure 3).

Gold exploration has comprised some surface and core assaying at Mt Selina (Figure 3) which may be of dubious quality, together with some surface rock chip sampling. The northern part of the tenement was covered by sparsely spaced stream sediment sampling and some rock chip sampling while, in the Lake Dora area, rock chip and dump sampling predominated (a somewhat limited exploration tool in a region of poor outcrop). At Mt Selina, gold appears to have been a part of the search strategy based on the Mt Lyell model, but only limited assaying was done. The reconnaissance stream sediment and rock chip programmes may have been driven by the discovery of the Henty gold deposit in the 1980s. The little work that has been done for gold appears to have operated on the assumption that there may be gold associated with the known mineralisation and alteration. Only at North Selina has there been an attempt at grass roots gold exploration on a regional basis.

Examination of the regional geology around Mt Selina suggests comparisons with the geology at Mt Leyshon in Queensland. There are also similarities in the alteration patterns at Selina and Mt Leyshon, the parallels drawn here leading to a new interpretation of the "Selina Conglomerate" unit which falls mainly within EL 24/96 as a breccia vent, like the Mt Leyshon Vent Breccia. This new perspective suggests potential for the discovery of a significant gold deposit within the Pasmaenco tenement. Mt Leyshon is host to a *ca* 3 million ounce deposit.

### 3. REGIONAL GEOLOGY

Figure 2 is derived from the published 1:25,000 scale maps. The northern boundary of the tenement contains the southernmost extremities of the Murchison Granite, a Cambrian intrusive complex about 7.5km long by up to 3km wide. Whole rock analyses of unaltered Murchison Granite indicate a dioritic composition, high potassium content and a high  $Fe_2O_3/FeO$  ratio. This suggests the Murchison Granite could have been a good source for gold mineralised fluids and a possible source rock for gold and copper/gold deposits in the area. There is significant hydrothermal alteration surrounding the Murchison Granite.

The eastern edge of EL 24/96 comprises Precambrian Tyennan basement, a metamorphic terrain described as predominantly phyllites and quartzites. The basement is unconformably overlain by the Cambrian Mt Read Belt comprising the Sticht Range Beds and Tyndall Group. To the west, and overlying them, are the Cambro-Ordovician Owen Conglomerates. The contact between these two units appears to be unconformable in some places, and faulted in others.

The Sticht Range Beds comprise sediments from pebble-cobble conglomerates to siltstones and minor black shales and volcanoclastic units.

The Tyndall Group comprises predominantly volcanoclastics with some tuffs, volcanoclastic conglomerates, porphyritic lavas and massive to flow banded porphyries. The rocks range from andesitic to rhyolitic in composition.

## 4. REGIONAL GEOPHYSICS

### 4.1 Aeromagnetics

The northern boundary of EL 24/96 is close to the southernmost extremity of the Murchison Granite which has a complex signature of magnetic highs and lows (Figure 4). The Cambrian volcanics comprise a south trending ridge with a positive magnetic signature which extends from the southeastern edge of the Murchison Granite for some 17km to the south. Although the geology map of the area suggests the volcanics extend further south than this, the magnetics suggest a northwest trending fault or unconformity pinches out the unit at or around Lake Spicer.

There are a number of stronger aeromagnetic highs along the volcanic belt, and these are proximal to the known areas of alteration and mineralisation.

Two strong magnetic highs underlie the Selina Prospect and they cover an area of about 2 square kms. Between the two highs is a magnetically quiet area about 0.5km wide. The magnetic anomaly underlies a unit of the Mt Read Belt variously described as a conglomerate or a breccia. This unit will be discussed in some detail below.

A small magnetic high underlies known minor base metal mineralisation approximately midway between Lake Selina and Lake Rolleston, which was originally explored as part of the Selina Prospect (LS 1, LS 2 and LS 3 tested this area, which is around the old Lake Selina workings).

A group of three magnetic highs is associated with the old copper workings at Lake Dora, with a further two less strong magnetic highs proximal to the workings at the northern end of the Dora system.

### 4.2 Gravity

There are a number of subdued gravity highs (Figure 5) within the tenement that appear to be associated with the aeromagnetic highs. These gravity highs could be associated with accumulations of sulphides (and associated gold). At the Lake Selina workings (outside EL 24/96) base metal mineralisation is associated with a gravity high and to the immediate north, a small aeromagnetic high. At the Selina Prospect the gravity high underlies the central part of the "Selina Conglomerate", and is juxtaposed between the two aeromagnetic highs. Similarly at the Dora Prospect, the gravity high lies in the central part of the area covered by the three magnetic highs. There are two further gravity highs in the Lake Rolleston area, one of which is associated with an aeromagnetic high.

Both the aeromagnetic and gravity data will be discussed further in the context of the various prospects within the tenement.

## 5. SELINA PROSPECT

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### 5.1 Access and Infrastructure

The new bitumen highway between Tullah and Queenstown, the Anthony Road, passes within 1km of the Selina Prospect. There is a dirt road through the centre of the area, but access to it has been cut off by the waters of the new Hydro dam, Lake Plimsoll. Access via the road over the dam wall allows travel by vehicle to within 15-20m of the dirt road.

Water is readily available in the natural lakes and Hydro dams in the immediate vicinity, including the new Lake Plimsoll, directly on the edge of the Prospect. Major power lines traverse the area within sight of the prospect.

The railway line is 15-20km away at Rosebery.

### 5.2 Past Exploration

Modern exploration commenced in the area (Figure 6) following the granting of EL 9/66. Exploration around Selina began when the Mt Lyell Mining and Railway Co extended their area of investigation northward from old workings near Lake Selina. Initially, in the early 1970s, their work encompassed the area to the south of Mt Selina (outside EL 24/96). Seven diamond holes were drilled to test geophysical targets, specifically a north-south striking zone of chargeability highs coincident with magnetic highs which became known as the Western Pyrite Zone (Figure 6). Drilling intersected a zone of pyrite with associated minor chalcopyrite, sphalerite and galena. The area of investigation was then extended to the northeast, and in 1980-1981 a second zone, the Eastern Pyrite Zone was discovered. A further five diamond holes were drilled by Gold Fields Exploration, three to test the newly discovered Eastern Pyrite Zone (2 within EL 24/96), and two to test the northern extent of the Western Pyrite Zone (1 within EL 24/96). One final hole was drilled in 1985 to test a lead zinc soil geochemical anomaly on the southern extremity of the Eastern Pyrite Zone.

The soil geochemistry, ground magnetics and IP surveys covered the whole Selina area, including that part of it which lies within EL 24/96. However most of the Western Pyrite Zone and a significant part of the Eastern Pyrite Zone areas are outside Pasmaenco's tenement. Only diamond drill holes LS 8, LS 11 and LS 12 fall within Pasmaenco's ground.

Gold Fields dropped the northern part of the Selina area, the part now encompassed by EL 24/96, and it was taken up by Aberfoyle Resources as EL 5/85. They did some regional work, concentrating on the North Selina area. The "Selina Conglomerate", in the far southwestern square kilometre of the tenement, was not mapped or sampled as part of their work programme. They relinquished the area in 1993.

When Gold Fields dropped the rest of the Selina area, Acacia (Billiton) took it up as EL 103/87. They proposed to look for volcanic-hosted massive sulphide deposits at depths greater than 200m. The Acacia tenement contained the major portion of the Western and Eastern Pyrite Zones. Their exploration, therefore did not cover the "Selina Conglomerate", as it lay only marginally along the tenement border to the northwest.

The division of the area into two separate tenements may have hampered a proper evaluation of the "Selina Conglomerate", which lies at the centre of a major alteration zone beginning with the Western Pyrite Zone in the south and ending at the northern end of the Eastern Pyrite Zone in the north, and overlying two significant magnetic highs and a gravity high. These features will be discussed further below.

### 5.3 Geology

The Selina area (Figure 6) is predominantly formed of Tyndall Group rocks: Cambrian age epiclastics or pyroclastics, with minor quartz feldspar phyric lavas and crystal tuffs. These units are steeply dipping and west facing. They are underlain by the Cambrian Sticht Range Beds, a sequence of siliceous conglomerates, quartz sandstones, siltstones and minor black shales. Unconformable underlying the Sticht Range beds is the Precambrian basement. The basement outcrops about 3km east of the Prospect.

Within the Selina area a number of intrusive units have been identified (Figure 6 & 7), comprising rhyolitic-dacitic quartz feldspar biotite porphyries and coarser textured granite. Whether these intrude into the volcanics or have been tectonically emplaced has not been determined. To the west, the volcanic sequence is in faulted contact with the younger sediments of the Owen Conglomerates.

Within the central part of the Selina area is an area approximately 1.8km by 0.65km which has been variously described as Jukes Breccia, Jukes Conglomerate, Dora Conglomerate and Selina Conglomerate. Steve Hunns, in his honours thesis (1987), described the unit as the "Selina Conglomerate" whose contacts with the Selina Volcanics are obscured by soil and vegetation, but the contact is crossed in LS 10, where it is a sharp boundary. Hunns (1987) concluded that there was a disconformity with the Selina Volcanics.

The "Selina Conglomerate" is described by Hunns (1987) as "a grey-green, purple, weakly to strongly foliated, massive, poorly sorted and poorly bedded matrix-supported polymict conglomerate with rare to occasional intercalated 'tuffaceous' beds (up to 20cm thick). The clasts vary from quartzite pebbles, quartz, feldspar and quartz/feldspar-phyric volcanoclastics, compared with the Sticht Range Sediments of, red chert(?) fragments, haematitic pebbles, quartz grains (up to 2.5mm in diameter), rare granitic fragments and rare sulphide fragments (G. Purvis *pers. comm*). The clasts are angular to rounded in form and

have a variable range size from  $\leq 1$ cm up to 1-2m long and 1m wide. Some of the larger clasts are weakly to moderately fractured, with limonitic coatings along the fracture planes. The matrix is fine grained and pale green in colour. Lenses of larger clasts are separated by thin lenses of grit size material. Numerous milky white quartz veins with specular hematite, +/- chlorite and quartz, chlorite and potassium feldspar veins cut the Selina Conglomerate." Hunns also noted clasts within the "Selina Conglomerate" which were exotic to the area. It is here *speculated* that the source of the clasts lies beneath the "Selina Conglomerate", and that the unit is a vent breccia. A comparison of the "Selina Conglomerate" with the Mt Leyshon Vent Breccia shows a striking number of similarities, outlined in Table 1.

**Table 1**

**Comparison of Mt Leyshon Vent Breccia and Selina "Conglomerate"/Breccia**

	Mt Leyshon Vent Breccia	Selina "Conglomerate"/Breccia
Rock general description	polymict - matrix supported	polymict - matrix supported
Clast size	cobble to pebble but up to 1m	$\leq 1$ cm up to 1m
Clast size	subrounded to angular	rounded to angular
Clast composition	various country rocks	various country rocks - presence of granitic clasts - lack of obvious source regions for some volcanic clasts suggests source below rather than lateral to deposit
Matrix	clay, chlorite, muscovite and fine rock	fine grained, pale green
Matrix colour	grey green to black green	pale green, some black-green
Contacts	possibly fault bounded	fault boundaries interpreted by geophysics and mapping - contacts not evident on ground, sharp in drill hole LS10
Size of unit	1.5km diameter	1.8km x 0.65km
Layering	crudely layered in sequences up to 30m thick; upper portions boulder rich grading to finer metasedimentary-porphry lapilli tuffs	occasional intercalated tuffaceous beds

Geological sections (Figure 7) based on the six drill holes in the "Selina Conglomerate" area and the mapped surface geology, suggest structures dip to the east on the western side of the "Selina Conglomerate". The only diamond drill hole to pass through the unit, LS 10, shows the probably faulted eastern contact dipping moderately to the west. This structural pattern is consistent with the interpretation of the unit as a vent breccia.

Drill holes and surface mapping both suggest the volcanics immediately adjacent to the "Selina Conglomerate" are brecciated, with the breccia matrix comprising alteration minerals including hematite, silica, magnetite and chlorite. The apparent concentration of brecciation in the volcanics to the area adjacent to the "Selina Conglomerate" supports the hypothesis that the "Selina Conglomerate" is related to the brecciation.

#### 5.4 Geophysics

Ground magnetic surveys suggest a strong magnetic source beneath Mt Selina in line with the aeromagnetics. Shallow magnetic sources correspond to the Western Pyrite Zone and Eastern Pyrite Zones of Gold Fields. The IP data (Figures 8 and 9) shows the two Zones as conductivity highs. More resistive zones occur in the eastern part of the "Selina Conglomerate", and on its western border.

When the magnetics (Fig 4) is combined with the IP data, it becomes apparent that the eastern aeromagnetic high corresponds with the eastern chargeability high, and these can be roughly correlated with the Eastern Pyrite Zone. However, in the west the magnetic high does not correspond to the chargeability high, which is at some distance to the south. Instead it is associated with a more resistive region.

It can therefore be deduced that the magnetic and IP signatures of the area have different associations. A possible interpretation is that there has been more than one episode of intrusive/hydrothermal events in the area. Multiple events are a necessary precursor to the Mt Leyshon style of mineralisation.

Figure 10 is an interpretation of the geophysical data illustrating the different associations of the magnetic and resistive areas in the east and west of the Selina area.

#### 5.5 Geochemistry

The Selina area was subjected to grid soil geochemical sampling (Figure 11A, 11B, 11C, 11D). 'C' horizon soil was assayed for copper, lead and zinc. However the survey results proved to be unreliable, with drill hole intersections of anomalous base metals being overlain by soil samples with assays below or close to detection limits. Any future work in the area should take this fact into account. This surface leaching is widespread in Western Tasmania. Figure 11 shows the distribution in ppm for Zn(A), Cu(B), Pb(C) and Au(D).

The soil sample plots show that it is only over the Eastern pyrite zone that close spaced soil sampling were completed. In the Lake Dora area samples are approximately 200 metres apart and should be disregarded. No geostatistical interpretations have been completed on the results as evidence by the bottom population in the Figure 11A being 0-350ppm Zn comprising 82.6% of the sample population. The plot of copper values in Figure 11B is more meaningful, but the lead values in Figure 11C are again meaningless because of the cut offs used.

In regard to gold values it is believed there is a mixture of assay results which were reported as ppm and ppb Au and these will be further checked.

For all the shortcomings of the plots several deductions can be made:

- The eastern most pyrite zone associated with the Sticht Range Beds has not been gridded, soil or rock sampled.
- The Dora-Spicer workings are highly anomalous in samples for Cu-Zn and gold, and should be gridded and soil sampled.
- The northern extensions to the eastern and western Selina pyrite zones appear to be anomalous in copper and have not been soil sampled.
- The Dora-Spicer-Goldfield workings also appear to be anomalous in gold, copper and lead.

### 5.6 Diamond Drilling

Thirteen diamond drill holes were completed in the general area (Figure 6). Three of these were to the south around the Lake Selina workings, five were drilled in the alteration zone to the southwest of the "Selina Conglomerate". One hole was drilled on the southeastern edge of the system. LS 10, the only hole collared in the "Selina Conglomerate" was the most silicified of the drill holes. Two holes (LS 8 and LS 11) were drilled into the northern part of the alteration system. One hole, LS 12 was drilled directly to the east of the "Selina Conglomerate". Of these holes, only LS 8, LS 11 and LS 12 are within EL24/96. Most of the holes were targeted at the pyrite halo around the outer part of the alteration zone. They intersected areas of weak to strong pyrite and magnetite with associated weak base metal sulphides - chalcopyrite, sphalerite and galena. In most cases only zones of visible sulphides were assayed. LS 12 was not even cut as it did not have any significant pyrite mineralisation. Significant gold zones may have been missed in this exploration.

### 5.7 Alteration

The Selina alteration zone is 3 kms long by up to 1km wide (Figure 12). The southern part of this alteration system merges with the northern part of the Lake Selina system, which appears from the aeromagnetics to have a different source. Selina's major alteration minerals are chlorite, sericite, potassium feldspar, quartz, pyrite, magnetite and haematite. Other alteration minerals include calcite, dolomite, epidote and apatite. Chlorite has the widest abundance, and potassic and sericite/quartz alteration zones forming north-south elongate zones within it.

Pyrite and magnetite are roughly concentrated on the northeastern and southwestern parts of the system, and around the southern and eastern margins of the "Selina Conglomerate". The central part of the alteration zone is the "Selina Conglomerate", where haematite predominates with quartz, chlorite and potassium feldspar (could this be alunite?) veining. Chlorite alteration is described as minor

and sporadic. The rough zonation from pyrite through pyrite/magnetite to magnetite/haematite to hematite alteration suggests that the lower temperature, possibly later stage, fluids are concentrated in the central part of the system, in and directly adjacent to the "Selina Conglomerate".

### 5.8 Mineralisation

The described mineralisation in the area amounts to pyrite and pyrite/magnetite zones within the alteration envelope with associated minor chalcopyrite, sphalerite and galena. Lead isotope work on these sulphides suggests a hydrothermal source which had been generally concluded to be related to the Murchison Granite. A later overprint has been suggested related to the Tabberaberan Orogeny. Hunns (1987) concludes that there has been some amount of remobilisation of sulphides at a local level. This would exaggerate the concentration of alteration halo mineralisation into zones of structural weakness and more chemically receptive host rock, thus producing or simply enhancing pyrite rich linear zones, the Western and Eastern Pyrite Zones.

Examination of the area for gold began after the first drilling programme. The first few drill holes, from the Lake Selina area, were re-assayed for gold - presumably the areas of visible sulphides. It is unclear how much of the first seven drill holes were assayed for gold, but the results are open to question in any event, as the core was assayed at the Mt Lyell laboratory using a method with a detection limit of 0.1ppm Au. LS 4 is noted as containing 5.2m at 0.2g/t Au and 3.4g/t Ag. LS 6 was noted as containing 15ft at 57.2g/t Ag and 25ft at 16g/t Ag.

Drill holes LS 8 through LS 11 are stated to have been assayed for gold with 2m in every 6m being assayed. The stated detection limit for this series was 0.01ppm Au. However assay results on drill logs suggest more limited zones within the core were sampled at this level. LS10 is recorded as containing an interval of 23m at 0.01g/t Au and 2.1g/t Ag with a best 1m at 0.21g/t Au. LS 11 had 2m at 0.15g/t Au. Rock chip samples from the surface near the collar sites of LS 8 and LS 10 gave results of 0.3g/t Au and 0.1g/t Au respectively. It is not known at this stage whether gold assaying was done by AAS or FIRE assay.

Gold and silver drill hole information is set out in Table 2.

**Table 2**

#### **Au and Ag Assaying of Drill Core from the Selina Area**

Drill Hole	Core assayed for Au	Laboratory	Detection Limit (ppm)	Results
LS4	?	Mt Lyell	0.1	5.2m @ 0.2g/t Au 3.4g/t Ag
LS5	?	Mt Lyell	0.1	
LS6	?	Mt Lyell	0.1	15' @ 57.2g/t Ag 25' @ 16g/t Ag
LS7	?	?	?	

LS8*	stated 2m in every 6m recorded 222-224m and 240-355.2m 2m in 10m	Mt Lyell	0.1	
LS9	193-201m, 208-216m, 241-245m, 257-275m	?	0.01	
LS10	2m in every 6m 34.4-126.4m, 250.4-300.4m, all core 202.3-246.4m	?	0.01	23m @ 0.01g/t Au 2.1g/t Ag including 1m @ 0.21g/t Au
LS11*	2m in every 6m from 107m to 361m	?	0.01	2m @ 0.15g/t Au
LS12*				
LS13	1m in every 2m from 230-295m	?	0.005	1m @ 16g/t Ag

## 5.9 Discussion

As has been already stated, there is evidence to support a reinterpretation of the "Selina Conglomerate" as a Vent Breccia, with characteristics similar to the Mt Leyshon Vent Breccia. Thus, the alteration and mineralisation at Selina may be seen to focus around a breccia pipe. Comparisons of the regional geology and alteration at Selina with Mt Leyshon shows similar geological settings, alteration haloes, sulphides and oxides. The aeromagnetic anomaly that underlies the "Selina Conglomerate" is similar to the magnetic signature of Mt Leyshon. Even the proposed paragenesis of Mt Leyshon has some parallels with the proposed paragenesis of Hunns (1987), despite the fact that Hunns did not draw any comparisons between the Mt Leyshon Vent Breccia and his interpreted sedimentary "Selina Conglomerate". A new paragenetic sequence, based on a vent breccia interpretation, draws even closer parallels with Mt Leyshon. Comparisons between Mt Leyshon and Selina are set out in Table 3:

**Table 3**  
**Comparison of Mt. Leyson and Selina Areas**

	Mt Leyshon	Selina
Regional Geology	Basement  Ravenswood Granodiorite Cape River Beds - metasediments: slates siltstones and sandstones Rhyolite and dolerite dykes	Proterozoic metamorphics Murchison Granite Stitch Range Beds - siliceous Conglomerates quartz sandstones Siltstones and black shales
	Lapilli tuffs - ash tuff or metasediment originally interpreted as the early explosive phase of a diatreme	Epiclastics or pyroclashes; rhyolitic to andesite, clasts from mm to cm size

	Mt Leyshon Vent Breccia	Selina Breccia (see Table 1)
	Porphyry plugs - trachytic to rhyolitic. Zoned from fresh to completely altered from core to margins	Porphyries - dacitic to rhyolitic - variable chlorite, sericite, potassic alteration
	Contact breccias and breccia dykes and brecciated sediments and porphyry fringes	Brecciation of volcanics, volcaniclastics, noted in drill holes proximal to the Selina Breccia
	Major host of the gold mineralisation Mt. Leyshon Breccia - clast supported breccia in NW section of the Mt. Leyshon Vent Breccia	?????????
Alteration	Sericite-pyrite. Most strongly developed in the crystal tuff porphyry flow sequence. Sometimes overprinted by propylitic alteration	Sericite-quartz. Sericite replacement of ground mass. Silica alteration associated with crosscutting pyrite veins
	Potassic alteration - predominantly biotite. Actinolite and magnetite occur with biotite in altered dolerites. Alunite in upper parts of deeply weathered orebody - associated with kaolinite, Fe oxides, jarosite and silicification - lower temperature epithermal association	K Feldspar replacement in cross cutting veins. Usually replaced by later chlorite-pyrite-magnetite overprint. Biotite noted associated with porphyries - primary or alteration? Lower temperature phase represented by haematite-silica alteration? Focus of haematite silica alteration in Selina Conglomerate/Breccia
	Pervasive chlorite - carbonate anatase believed to be associated with the introduction of gold and base metal sulphides	Intense chlorite alteration noted in areas directly to E,W and south of Selina Conglomerate as well as in the Breccia unit itself. Breccia fill in volcanics is predominantly chlorite. Chlorite is generally associated with pyrite and magnetite. Carbonate veins occur with or without other types of alteration
Mineralisation Association	Sulphides Major pyrite Low Fe and high Fe sphalerite -	Sulphides Major pyrite Sphalerite

	<p>disseminated and as vein and cavity fill.</p> <p>Galena in vein and cavity fill Chalcopyrite in vein and cavity fill</p>	<p>Galena Chalcopyrite</p>
Paragenesis	<p>Stage 1</p> <p>Localised development of quartz molybdenite stock works formed at temperature &gt;450° and high salinities. Limited Kalteration</p> <p>Stage 2</p> <p>Chlorite-pyrite matrix replacement with associated basemetal sulphide and bismuth sulphide vein and cavity fill. Temperature 300° - 400° . Low - moderate salinity, appreciable CO<sup>2</sup></p> <p>Stage 3</p> <p>Quartz basemetal sulphide-bismuth sulphide - electrum veins and veinlets especially in tuffs, pyroclastics and porphyries</p>	<p>Occurrence of molybdenite could suggest existence of this phase</p> <p>Stage 1 (Hunns 1987) Magnetite-pyrite ± chlorite with associated chalcopyrite as veins and disseminations. Pyrite silica-sericite in schists. Temp ≤ 300°</p> <p>Stage 2 (Hunns 1987) Quartz carbonate ± chlorite veins. Temp &lt;300°</p> <p>Stage 3 (Hunns 1987) Tabberabberan remobilisation and recrystallisation of base metal sulphides Gold ??????</p>
	<p>Late stage. Predominantly within cavities and veins in the Mt. Leyshon Breccia and rebrecciated host rocks, tuffisite dyke breccias and the latest porphyry units</p>	<p>Recrystallisation of base metal sulphides</p> <p>Gold</p> <p>????????</p>
Geophysics	<p>Geomagnetics</p> <p>Geomagnetic anomaly of 3km<sup>2</sup> containing a series of intense lows elongate along axis of anomaly (Low = magnetic high due to the "Late Palaeozoic Reversal Interval). High magnetism resulting from magnetic alteration associated with biotite and magnetite in veins and veinlets. Magnetic anomaly commences proximal to the ore deposit, but most intense</p>	<p>Geomagnetics</p> <p>Geomagnetic anomaly (high) divided into two zones covering about 2.5km<sup>2</sup>. Zones are elongate N-S, about 1.4km long and 0.3km wide and they underlie the Selina Conglomerate/Breccia on its E and SW</p> <p>Gravity</p>

	1.5 to 2km to SW	Underlying the centre of the aeromagnetic high, between the two ridges is a gravity high
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Crucial to the mineralisation at Mt Leyshon is the post-vent breccia. The vent breccia at Mt Leyshon is not itself mineralised, only the one area, the late stage Mt Leyshon Breccia and its immediate surroundings, hosts the ore body. This unit lies near the northern perimeter of the vent breccia. A description of the Mt Leyshon Breccia is set out in Table 4. Kidston, another multimillion ounce breccia pipe hosted deposit, is also variably mineralised, with gold concentrated in various deposits around the edges of the pipe. At Selina, geological mapping and investigation of the breccia has been neglected as a result of the division of the area into two tenements, and by the interpretation of the unit as an overlying sedimentary unit. So although no equivalent of the Mt Leyshon Breccia has been identified, it cannot be concluded that one will not be located. There is one small piece of evidence to support a second brecciation event within the Selina vent breccia. Hydrothermal fluids bearing the sulphide mineralisation would have post-dated the original breccia vent creation. G. Purvis' report of sulphide fragments within the vent breccia could only have got there by some later brecciating event.

**Table 4**

**Mt. Leyshon Breccia**

Clast size:	Polymict, clast supported, cobble to pebble up to 4m
Clast shape:	Angular to subrounded
Clast composition:	Various country rocks, locally monomict
Matrix:	Fine fragments, crystals and chloritic rock flour
Size:	300 m diameter
Location:	Edge of Vent Breccia, next to and under sediments and tuffs

The mineralisation at Mt Leyshon is interpreted to have resulted from a number of geological and hydrothermal events over a considerable time frame, with gold bearing hydrothermal fluids being very late in the sequence of events. As has been suggested above, the geophysical signature of the Selina area hints at a multiplicity of events. In addition, lead isotope work has given more than one answer for the age/source of the alteration minerals in the Selina area. However, it took years of detailed work to unravel the sequence of events at Mt Leyshon, and this type of scrutiny has not been given to the Selina area. Gulson and Porritt (1983) completed lead isotope analyses on seven drill hole core samples most contained

isotopic compositions similar to the massive sulphide deposits in the Mount Read Volcanics, and the mineralisation is greater than 1000Ma.

Traces of gold have been located at Selina in and around the drill holes, but no systematic sampling of the "Selina Conglomerate" has ever been undertaken (Figure 12). So it is possible to conclude that sporadic trace gold is present around the edges of the Selina vent breccia, but whether there is any significant gold concentration remains to be discovered.

Hunns (1987) examined the question of gold potential in the Selina area. Gold is widespread in the Mt Read Volcanics, as adjuncts to the base metals at Rosebery and Hellyer, as an important by-product at Mt Lyell, and as the primary metal at Henty. He was therefore concerned at the apparent lack of gold in the Selina area. He examined the phase diagrams for pyrite-magnetite-hematite and concluded that the Selina area was barren of gold because the path taken by the fluids did not cross any of the solubility boundaries for gold. This work can be seen in another perspective, and different conclusions will result. The fluids at Selina were apparently capable of carrying gold. It is evident that there was plenty of gold in the hydrothermal systems in that general area at the relevant time, as this is evidenced by the known deposits close by. The gold may have stayed in solution, as Hunns (1987) suggests, but it would have eventually precipitated with the low temperature last fluids phases in the system, for example, quartz and hematite. These alteration phases are centred on the Selina Vent Breccia. One might therefore conclude that any gold accumulations would be related to the breccia.

However another question has also to be addressed. At Mt Leyshon the vent breccia is virtually intact, with some of the overlying volcanoclastics still evident. At Selina the breccia is exposed. The southern portion is two or three hundred metres higher than the northern edge. Is that part of the pipe missing, and has any possible gold deposit already been weathered away? This is not an easy question to answer. Firstly, the pipe may not be oriented in the same way as it was when it was formed. The country rocks dip steeply and face west. If they had been horizontal at the time the pipe was emplaced, this would make the upper part of the pipe on the eastern edge. Any orientation from horizontal to vertical is therefore theoretically possible. Detailed geological mapping should determine the question. From another perspective, Hunns (1987) mentions the occurrence of potassium feldspar as vein material in the "Selina Conglomerate". This material might be re-examined to determine whether it might be alunite. Alunite is symptomatic of the upper epithermal level of the Mt Leyshon mineralisation.

#### 5.10 Conclusions

- The Selina area geology, alteration and aeromagnetism have similarities to the Mt Leyshon area in Queensland. Mt Leyshon contains a gold deposit of at least 3 million ounces.

- The “Selina Conglomerate” could be reinterpreted as a vent breccia, similar to the Mt Leyshon Vent Breccia.
- There is some evidence to support a complex history for the Selina area with more than one hydrothermal event, a necessary precursor for a Mt Leyshon style deposit.
- There is scattered low level gold anomalism at Selina identified in the wall rocks of the postulated vent breccia.
- Despite the loss of some of the postulated breccia pipe to erosion, the possible occurrence of alunite could indicate that the upper levels of a deposit might still exist.

### 5.11 Follow up Work

Some rock chip samples were collected in the eastern and northern parts of the “Selina Conglomerate”. These were small samples from outcrop in the Anthony River and a subsidiary creek. Gold assays were low, with a best 0.012g/t Au from a dark green/grey chloritic schist (Appendix 1).

The top 30m of LS 12 was cut and for Au assay (Appendix 2). LS 12 was collared in brecciated volcanics near the eastern perimeter of the “Selina Conglomerate”, and it was drilled to the east, away from the “Selina Conglomerate”. Results show low gold values, with best intercept of 0.006g/t Au.

The current work is an attempt to shortcut systematic exploration of the area, and as such its failure to identify a gold deposit should not be considered as discouraging. The gold distribution at Mt Leyshon is known to be extremely erratic, and large scale rock chip samples of at least 5-10kg each made up of a number of smaller chips over an area are necessary in order to effectively test for the occurrence of gold. The samples sent for assay were small, and in some cases only single rock chips. It is consequently risky to draw conclusions from the rock chip data, however there is an apparent trend from lower to higher gold from the eastern edge of the “Selina Conglomerate” towards the west. The rock chip results are shown in Figure 11A-D.

## 6. NORTH SELINA PROSPECT

### 6.1 Access and Infrastructure

North Selina (Figure 13) is about 2km north of the Selina Prospect. The Anthony Road runs directly through it. Infrastructure is similar to that for Selina.

### 6.2 Past Exploration

The only significant phase of exploration at North Selina comprised detailed mapping, reconnaissance -80 mesh stream sediment sampling and reconnaissance rock chip sampling by Aberfoyle Resources when they held the ground under EL5/85 (Figure 14). This work included testing for gold. Aberfoyle relinquished the area in 1993.

### 6.3 Geology

The North Selina area (Figure 13) comprises Mt Read Volcanics similar to the Selina area to the south. The volcanics comprise volcanoclastics and lavas of dacitic to rhyolitic composition. The area is intruded by a porphyritic rhyolite unit. There is no equivalent to the "Selina Conglomerate", and there is no indication of significant brecciation in the area.

### 6.4 Geophysics

Aeromagnetism shows a high, elongate in a north-south direction (Figure 14). For much of its length it appears to follow the narrow band of volcanics and sediments between the intrusive porphyry and the Owen Conglomerate contact. There is an associated gravity high to the north east of the porphyry unit directly to the east of the northern part of the magnetic high. This area is covered by glacial moraine, so that its significance is difficult to evaluate.

### 6.5 Alteration

Mapped alteration appears to be confined to the areas peripheral to the porphyry intrusive and along a northwest striking fault some 200-300m east of the porphyry (Figure 15). The fault strikes approximately parallel to the long axis of the intrusive. Chlorite, sericite and silica alteration are noted, along with haematite, magnetite and pyrite. Aberfoyle described the alteration as vein-associated potassium feldspar plus magnetite, with lesser quartz +/- epidote +/- tourmaline +/- calcite. The intensity of the alteration increases towards the north and northwest of the area. A later stage alteration, varying from chlorite +/- pyrite or magnetite to quartz +/- chlorite or sericite transects the earlier potassium feldspar plus magnetite alteration phase.

## 6.6 Mineralisation

There is little known mineralisation at North Selina. One rock chip assay from a magnetite pyrite vein in volcanoclastics on the western edge of the area between the porphyry and the Owen Conglomerates assayed 0.43g/t Au and 1.5g/t Ag. A slightly elevated gold value was registered from the stream draining the northwest trending fault. Two areas of slightly elevated base metals were indicated. Apart from this no significant results came from the reconnaissance work.

## 6.7 Discussion

The geology, geophysics and alteration show a similar style to the Selina area to the south. However here the alteration is more sporadic and less intense. There are no noted areas of brecciation, and the alteration is described as veining rather than stockworking. In the context of a breccia hosted model this would suggest a weak or deep seated source. The northwest trending fault and the porphyry/volcanic contacts may have acted as a locus for hydrothermal fluids, thus giving rise to the present distribution of alteration.

It has been noted that the strength of the alteration increases towards the north. The gravity high is in the north part of the prospect in an area covered by glacial scree. That high represents the projected point where the northwest trending fault approaches the northeastern extent of the porphyry intrusive. This northern glacial covered area may warrant further investigation. The balance of the prospect does not appear to have a high degree of prospectivity, although it is not impossible that mineralisation could be focussed along the northwest trending fault.

## 6.8 Conclusions

- The geophysical signature of North Selina is similar to the Selina Prospect, however geology differs in that there is no significant brecciation noted, and no equivalent of the "Selina Conglomerate".
- Alteration is two phased, but the second phase is predominantly veining, suggesting a weak or distal fluid source. Alteration appears to be concentrated in structural sites.
- Alteration, structure and gravity suggest a possible confluence at a point under glacials at the northern extremity of the prospect.
- Although not considered a high priority, the glacial covered area warrants further investigation.

## 7. DORA PROSPECT

Old workings and past explorers have considered that the Dora Mineral Field stretches from south of Lake Dora northwards to the area east of Lake Rolleston. As the aeromagnetics suggest other possible sources for the mineralisation around Lake Rolleston, the Dora Prospect will be treated as that part of the belt which lies to the west and south of Lake Dora. The mineralisation around Lake Rolleston will be considered separately.

### 7.1 Access and Infrastructure

The 1:25,000 topographic map of the area indicates access can be gained to the Dora area via a vehicular track which starts from the Anthony Road to the west of Newton Peak. It is about 16 kms from Anthony Road to the Dora Prospect, but the road passes directly through its centre.

### 7.2 Past Exploration

Modern exploration (Figure 16) began around the old copper workings in the area in 1969. Mt Lyell Mining and its successor Gold Fields, held the area as part of EL 9/66. As part of a regional exploration effort, the volcanic belt stretching from Lake Dora to the Selina area was gridded, mapped, soil and rock chip sampled. Geophysical surveys included pole-dipole IP, SP, fluxgate magnetics and EM. Petrology was carried out on a selection of samples. In 1983, following a data review, Gold Fields conducted some dump sampling. In 1985 they relinquished the area.

CRA took up the area in their tenement EL 5/85. Attracted by the Gold Fields best dump assay of 2.0g/t Au, CRA conducted a stream sediment, rock chip and dump reconnaissance programme aimed at ascertaining the gold potential of the area. They also conducted a UTEM survey to look for massive sulphides which might not have been apparent in the IP results due to the highly variable chargeability response of the area.

Aberfoyle took over management of EL 5/85 in 1988. Their work comprised field checking of the earlier mapping and some further petrology.

It should be noted that the southern part of the Dora Prospect was not part of this modern exploration effort. The Gold Field grid only extended south to the northern part of Lake Dora, and their maps indicate the southernmost part of the old mineral field was held under lease at the time of their exploration. Similarly, EL 5/85 only extended south as far as AMG 5354000N. Old workings extend for 1km to the south from there, and much of the aeromagnetic and gravity anomalies lie in this southernmost area.

### 7.3 Geology

The Dora Prospect area comprises similar geological units to the Selina area to the north. The Tyndall Group units of the Mt Read Volcanics in this area have been described as porphyritic lavas, tuffs, volcanoclastics-epiclastics and volcanoclastic conglomerate. Lavas range from rare andesites to more common dacites and rhyolites. Lavas have been altered to quartz chlorite schists. There is intense shearing throughout the area, with the shears and cleavage trending northwest to north-northwest. Two massive quartz feldspar hornblende porphyry units also occur with the area, one north west of Lake Dora, the other near Michael Tarn. It is unclear whether they are intrusive or extrusive. Aberfoyle describes them as hornblende plagioclase-phyric lavas.

It has been suggested that the volcanics of the Dora area represent a south plunging anticline, with Owen Conglomerates to both the west and east. There has even been the suggestion that part of the area may be underlain by the Gordon Limestone unit of the Cambro-Ordovician sequence.

Most contacts in the area are highly sheared/faulted. Northwest trending faults transect the area.

Aberfoyle describes a transition, from west to east, from coherent volcanics through a north-northwest trending zone of chlorite alteration with associated sporadic copper gold mineralisation to a belt of volcanoclastics-epiclastics with intrusive pods of biotite porphyry. The eastern end of the sequence is the Dora Conglomerate.

At the southern end of the Dora Prospect, in the area where exploration is lacking, the altered, variably mineralised zone containing the historic workings is mapped as extending into the Dora Conglomerate. The Dora Conglomerate is stated by Mt Lyell Mining to be a boulder conglomerate similar to the Jukes Breccia unit of the Cambro-Ordovician Owen Conglomerates. It is described as interfingering with the volcanics and volcanoclastics. It lacks the haematite and has less quartz pebbles than the "Selina Conglomerate". It dips west at about 60 degrees. These descriptions tend to support a sedimentary origin for the unit. However in light of the re-interpretation of the "Selina Conglomerate", the associations of the Dora Conglomerate are open to reconfirmation.

### 7.4 Geophysics

The Dora area lies in a narrow northwest trending block bounded to the east and west by major northwest magnetic lineaments. The southern part of the complex is underlain by a complex of magnetic highs with three main centres. This magnetically responsive area is about 2 km long by 1-2 kms wide. Central to this area is a gravity high. CRA interpreted this magnetically positive area as a single magnetic high with a major northwest trending structure transecting it and creating a central magnetic low which they suggested may have been a result of magnetite destruction (a classic porphyry copper signature). Their magnetic low corresponds

to the area of the gravity high. The magnetic and gravity anomalies fall within the area mapped as volcanoclastics, intrusive porphyries and Dora Conglomerate.

The ground geophysical surveys of the area conducted by Mt Lyell Mining/Gold Fields extend only to the northernmost boundary of the aeromagnetic anomalies. Mt Lyell Mining found that there were no well defined chargeability highs over the known workings, similar to those in the Selina and Rolleston areas to the north. The most northerly of the Dora workings had low level chargeability highs associated with them, but the workings around Lake Dora were noted for their lack of an IP response (by this Mt Lyell Mining meant chargeability highs; in the classic porphyry system the deposit is more resistive than the alteration halo).

### **7.5 Alteration**

Mt Lyell Mining described the alteration around the old workings as quartz chlorite dominated, with magnetite and haematite veins. CRA stated that the alteration was mostly chlorite, with sericite in some places. When Aberfoyle sent samples to Tony Crawford at the University of Tasmania for petrology, he described the alteration as compatible with regional burial metamorphism.

### **7.6 Mineralisation**

The workings in the northern part of the Dora area cover pyrite, chalcopyrite in quartz and quartz chlorite schists in three narrow shear zones. Minor sphalerite and erythrite (CoAs oxide) are associated with the mineralisation.

The old workings in the area are recorded as containing traces of gold and silver up to about 100g/t Ag, associated with the chalcopyrite ore. Gold Fields did some dump sampling and assaying for gold, obtaining one result of 2g/t Au. When CRA took up the area they followed up this anomalous value with a dump and rock chip sampling programme. Gold assays were in the 0.1g/t range, with a best 0.37g/t Au. Aberfoyle's best dump sample was 0.15g/t Au with 0.42% Cu.

Scant information on the southern workings can be obtained from a report of 1898 which includes a description of the Lake Dora Mine. In one trench 70 ft long, rock varied from hard breccia on the western end to schist. A zone of 25ft within the schist contained disseminated pyrite, several pyrite veins and associated disseminated chalcopyrite. In a further trench of 55ft length the entire trench contained disseminated chalcopyrite. A composite sample from the trench contained "...traces of gold, 3 ozs 18 dwts 8 grs of silver per ton and 1 per cent copper."

### **7.7 Discussion**

Exploration to date in the Dora area has examined the narrow structurally controlled chalcopyrite mineralisation in the northern part of the Dora belt of old workings. There, copper and low level associated gold appear to be confined to three narrow shears, and quartz chlorite pyrite alteration.

However, the area of the Dora Prospect which contains the major aeromagnetic and gravity anomalies has not been part of this exploration. It is also noteworthy that this is the area of mapped Dora Conglomerate.

The aeromagnetic and gravity signature of the southern Dora area are compatible with an intrusive source at depth, similar to the Murchison Granite analogues which are postulated to be associated with the other mineralisation in the Selina area to the north. CRA suggested the central area of the magnetic highs might possibly be a magnetic low caused by an area of magnetite destruction. One of the classic signatures of porphyry copper deposits is a ring shaped magnetic high due to magnetite alteration, with a central low resulting from magnetite destruction in the copper deposit itself. The occurrence of the gravity high in this area supports such an interpretation.

It is difficult to judge the significance of the alteration at Dora as the level of metamorphism in the area would be sufficient to disguise the chlorite alteration which is the most widespread outer zone associated with intrusive related copper/gold deposits. Deposits do not always show the classic alteration zones of the North American model, particularly the island arc porphyry systems, where chlorite alteration predominates, with a central potassic core. The minor nature of the sericite alteration at Dora is consequently of doubtful significance in the context of the intrusive model. In island arc porphyries potassic alteration may be more widespread, but may also only be associated with the immediate proximity of the deposit itself. (If a deposit is suspected at depth key indicators of the system might be the various epithermal indicators such as alunite or elevated levels of mercury or thallium.)

The known chalcopyrite mineralisation at Dora is structurally controlled and lies between the two major northwest trending structures of the area. Magnetic and gravity anomalies occur both at the northern and southern extremities of the line of workings. One possible interpretation of the geometry of the area is that mineralisation associated with an intrusive system in the southern Dora area has bled out into tensional shears to the north, either at the time the mineralisation was emplaced or later as a remobilisation event during the Tabberaberan Orogeny.

The structural nature of the known mineralisation at Dora also leaves open the possibility for the discovery of a significant shear hosted copper /gold deposit centred on the geophysical anomaly, or even a Henty style gold deposit.

The cobalt association of copper mineralisation in the Dora area could be of interest, as it suggests a possible analogy with the copper gold deposits of the Cloncurry Mineral Field. Cobalt occurs at Ernest Henry, a Proterozoic deposit with some similarities to Mt Lyell.

At this stage the Dora area may be considered to be a relatively untested target with known copper and associated gold mineralisation over a significant strike of about one km to the north and one km to the south of the central gravity high/magnetic low on the southwestern shore of Lake Dora. Geophysics and the

strike length of the known mineralisation both point towards a possible large system. The Dora system has high exploration potential for discovery of a significant copper gold deposit.

### **7.8 Conclusions**

- The Dora Prospect contains a significant geophysical signature compatible with an intrusive related copper/gold deposit.
- Known mineralisation is confined to narrow shear zoned between the northwest trending major structures of the area.
- The southern area of the Dora Prospect, including the major part of the area overlying the geophysical anomalies, has not been subject to any significant exploration, while the northern part of the area has had mainly ground geophysical exploration with a view to the discovery of mineralisation similar to the pyrite zones identified at Selina.
- Gold exploration within the northern area has been only at a reconnaissance stage, and has indicated that low level gold is associated with copper mineralisation.

## 8. LAKE ROLLESTON AREA

There are a number of old workings and several geophysical anomalies in the Lake Rolleston area. (See Figures 3 and 4)

The southern part of this area (between 5355000N and 5356000N) have been viewed as a northern extension of the Dora line of lode (Fig 16). However, the area is underlain by a small aeromagnetic anomaly, separate from the main Dora anomalies discussed above. (The northernmost workings, near Lake Rolleston, may be related to the aeromagnetic high-discussed below in the context of its proximity to a major fault and Dora Conglomerate.) These North Dora workings are associated with low level chargeability highs, whereas the Dora area workings have no such signature. The North Dora workings have been examined by Gold Fields, who describe them as minor zones of chlorite alteration with disseminated pyrite, magnetite and traces of base metals. There are no current indications that they may represent further significant mineralisation in this area.

There is a magnetic high to the east of the southern part of Lake Rolleston in an area of glacial moraine (centred at about 5357000N, 387000E). Along its western and southwestern edge is mapped a major northwest trending fault, with Dora Conglomerate in a narrow belt abutting the fault on the northeastern side (directly on the edge of the magnetic anomaly). Within the volcanics, to the southwest of the fault, is alteration which apparently is the most northern extremity of the Dora line of alteration. The geometry of the area suggests the possibility that the Dora Conglomerate could be a breccia unit related to the fault. As there is an associated geophysical anomaly, this area may be worth a reconnaissance visit to investigate the possibility of a fault controlled breccia-hosted gold deposit.

To the north of Lake Rolleston there is some known mineralisation within EL 24/96 to the east of the area first drilled as the southern extent of the Selina Western Pyrite Zone (the centre of this area is 5360200N, 386100E). Mt Lyell Mining costeanned the area and reported highly chloritised crystal lapilli tuffs with minor disseminated pyrite and trace chalcopyrite, sphalerite and galena. They had established the presence of a chargeability high in the area, and concluded that the known mineralisation was insufficient to explain the IP anomaly. However the area appears to have been considered insufficiently prospective to warrant any further follow up.

To the northeast of Lake Rolleston (centred at about 5359200N, 38700E) is a north-south elongate zone of coincident chargeability and ground magnetic highs with a gravity anomaly at its centre. The area is covered by up to 134m of glacial moraine, so that it was not been followed up by previous explorers. In the light of the other prospective areas within the tenement the area would warrant a very low priority for follow up.

### 9.1 Selina Area

- There is evidence to support the existence of a breccia at the Selina Prospect which has many similarities to the breccia vent at Mt Leyshon. The mineralisation at Mt Leyshon is considered to be a late stage event following a second brecciation event which formed the Mt Leyshon Breccia within the vent breccia. Although there is not a great deal of evidence at Selina, there are some indications that more than one hydrothermal episode has affected the area. There is also some indication of low level gold anomalism occurring sporadically over a large area. On the basis of the analogy with Mt Leyshon, the Selina Prospect is considered to have a high prospectivity for the discovery of a significant gold deposit.
- It is recommended that detailed gridding, geological mapping and C horizons soil sampling be completed over the 'Selina Conglomerate.'
- Sampling of the 'potassium feldspar' vein alteration to see if it is in fact Alunite (a low T mineral in epithermal gold deposits).
- The prospectivity at Selina is tempered somewhat by the possibility that the top of the breccia system may have been eroded away.

### 9.2 Dora Area

- Geology and geophysics at the Dora Prospect are compatible with the presence of a significant intrusive related copper/gold deposit. The prospectivity at Dora is enhanced by the presence of copper/gold mineralisation in shears in a zone of alteration in a northwest trending belt which transects the centre of the geophysically anomalous area.
- The Dora Prospect has not been subjected to modern exploration beyond its most northern extremity.

Reconnaissance geological mapping of the area to note the alteration associations per rock units with special reference to the Dora Conglomerate.

After gridding of the old workings and an orientation survey, a soil survey over the old workings together with geological mapping and detailed rock chip sampling of the old workings

Follow-up of elevated geochemical areas by I.P.

- The Dora Prospect has high potential for the discovery of a significant copper/gold system, but its exploration is at an early stage.

### 9.3 North Selina

- The North Selina Prospect has some potential for the discovery of a significant gold deposit, but indications to date suggest that this should not be a high priority area for follow up.

#### Other Areas

- There are other areas within EL 24/96 which warrant further investigation in any ongoing exploration programme, and a regional stream sediment sampling project for both gold and base metals be undertaken.
- In reviewing the historical soil geochemical sampling, it appears the soil samples were wide spaced apart from the immediate Mount Dora area. Gold results appear to be a mixture of ppm and ppb results and should be corrected. The geochemical plots in Fig's 11A to D have not been statistically appraised and this should be completed.
- The pyrite zone associated with the Sticht Range Beds on Fig 4, 5 and 6 is an interpretation from an I.P. survey conducted by Goldfields Exploration in EL 9/66. A distinctive anomaly occurs on the east end of each I.P. line and this has been interpreted as a pyrite zone. This zone had earlier been outlined in a Turain airborne anomaly in a Mount Lyell Mining and Railway Company survey flown in 1973. It is recommended that the source of this anomaly be explored for and assessed by some soil traversing and rock chip sampling.

**10. EXPENDITURE**

Total expenditure for all work undertaken by Pasminco Exploration within Walford Peak EL 24/96 for the twelve month period to the end of September 1997 was \$33,996. A detailed expenditure statement is given below.

Personnel	10,542
Travel and Accommodation	
Geological Consultants	
Geochemical Consultants & Assays	210
Geophysical Surveys & Consultants	246
Other Consultants	870
Drilling	55
Stores & Supplies	
Vehicles Plant & Equipment	
Land	1,353
Computing	
Office	17,630
Administration Fee 10%	3,090
<b>Total Tenement Expenditure</b>	<b>\$33,996</b>

**11. REFERENCES**

Aberfoyle Resources Ltd, EL 5/85, Technical Progress report for the Period October 1993 to September 1994, Open File Report 94-3638

Aberfoyle Resources Ltd, EL 5/85, Partial Relinquishment Report on Exploration to April 1993, Open File Report 93-3424

Aberfoyle Resources Ltd, EL 5/85, Report on Exploration for Area to be Relinquished Nov 1993, Open File Report 93-3524

Aliano W., Review of Gold and Copper Potential on EL 24/96 Walford Peak Pasmaenco Exploration Unpublished Report VC159

Billiton Australia, EL 103/87, Progress Report on Exploration for the Period ending 21<sup>st</sup> April 1989, Open File Report 89-2929

Billiton Australia, EL 103/87, Progress Report on Exploration for the Period Ending 21<sup>st</sup> April 1990, Open File Report 90-3104

Consolidated Syndicate, EL 9/66, Annual Report 1970-71, Open File Report 71-786

Consolidated Syndicate, EL 9/66, Annual Report 1971-72, Open File Report 72-882

Consolidated Syndicate, EL 9/66, Annual Report 1972-73, Open File Report 73-970

CRA Exploration Pty Ltd, EL 5/85, Progress Report for the Period 20 Sept 1986 to 30 July 1987, Open File Report 87-2705

Gold Fields Exploration Pty Ltd, EL 9/66, A Geological Review of the Tyndall Licence 9/66, Open File Report 83-1995

Gold Fields Exploration Pty Ltd, EL 9/66, Annual Report 1983-84, Open File Report 84-2137

Gold Fields Exploration Pty Ltd, EL 9/66, Annual Report 1985/86 for Parts II III and IV, Open File Report 86-2566

Gulson B.L., Porritt P.M., 1983 Lead Isotope Investigation of the Lake Selina Pyrite Prospect, Tasmania Amira Project 78/P97A

Hunns S.R., Mineralisation in the West Coast Range, Western Tasmania - The Lake Selina Prospect, University of Tasmania Honours Thesis, 1987

Mitre Geophysics Ltd, An Appraisal of the Geophysics carried out over the Selina, Rolleston and Dora Areas for the Mt Lyell Mining and Railway Co Ltd, Dec 1980, Open File Report 84-2253

Mount Lyell Mining and Railway Company Ltd, EL 9/66, A Review of the Area East of the Tyndall Range, Open File Report 75-1102

Mount Lyell Mining and Railway Company Ltd, EL 9/66, Annual Report 1979-80, Open File Report 81-1519

Mount Lyell Mining and Railway Company Ltd, EL 9/66, Annual Report 1979-80, Open File Report 81-1519

Mount Lyell Mining and Railway Company Ltd, EL 9/66, Annual Report 1980-81, Open File Report 81-1660

Mount Lyell Mining and Railway Company Ltd, EL 9/66, Annual Report 1981-82, Open File Report 82-1791

Mount Lyell Mining and Railway Company Ltd, EL 9/66, Report on Conductivity, Susceptibility, Chargeability and Resistivity Tests of Diamond Drill Core on Behalf of the Mt Lyell Mining and Railway Co Ltd, Open File Report 84-2222

Paull P.L., Hodkinson I.P., Morrison G.W. and Teale G.S., Mount Leyshon Gold Deposit in Geology and Mineral Deposits of Australia and Papua New Guinea, 1990, pp1471-1481

Sexton M.A., Morrison G.W., Foley A.M. and Wormald P.J., The Mount Leyshon Magnetic Anomaly in Exploration Geophysics (1995) 26, pp84-91

Smith, J. Harcourt, Report on the Mineral Fields in the Neighbourhood of Mt Black, Ringville, Mt Read and Lake Dora, 1898

**12. KEYWORDS & LOCALITY****KEYWORDS**

ZINC, LEAD, COPPER, GOLD, STRUCTURE, AEROMAGNETICS, GRAVITY, I.P., ALTERATION, MOUNT READ, TYENNAN, OWEN CONGLOMERATE, SELINA CONGLOMERATE

**LOCATION**

QUEENSTOWN SK55-5, SELINA, DORA, LAKE ROLLESTON, MURCHISON GRANITE

## APPENDIX 1

413036

## WALFORD PEAK SURFACE ROCK CHIP ANALYSIS

	Ag ppm	Mo ppm	Bi ppm	Fe %	As ppm	Au ppm	Cu ppm	Pb ppm	Zn ppm
164221	<1	<2	<5	1.96	21	0.012	3	16	122
164222	<1	3	<5	2.24	26	0.009	4	23	113
164223	<1	3	<5	2.03	34	0.007	4	17	93
164224	<1	<2	<5	2.67	590	0.003	4	23	118
164225	<1	3	<5	2.53	106	0.004	3	23	115
164226	<1	4	<5	3.06	54	0.001	9	13	25
164227	<1	<2	<5	3.23	9	0.006	6	<5	26
164228	<1	4	<5	2.75	46	0.007	5	61	180
164229	<1	3	<5	8.23	114	0.002	22	32	514
164230	1	<2	<5	28.72	131	0.003	4	14	14

DataSet	SampleID	Sample_Type	Ref_System	UTM_East	UTM_North	UTM_RL	UTM_Zone	UTM_Datum
WALFORDPEAK	164221	ROCKCHIP	UTM	386050	5364250	55	AGD66	
WALFORDPEAK	164222	ROCKCHIP	UTM	385600	5364300	55	AGD66	
WALFORDPEAK	164223	ROCKCHIP	UTM	385800	5364290	55	AGD66	
WALFORDPEAK	164224	ROCKCHIP	UTM	385950	5364290	55	AGD66	
WALFORDPEAK	164225	ROCKCHIP	UTM	385800	5364290	55	AGD66	
WALFORDPEAK	164226	ROCKCHIP	UTM	386000	5364350	55	AGD66	
WALFORDPEAK	164227	ROCKCHIP	UTM	385950	5363800	55	AGD66	
WALFORDPEAK	164228	ROCKCHIP	UTM	386000	5364250	55	AGD66	
WALFORDPEAK	164229	ROCKCHIP	UTM	385900	5363850	55	AGD66	
WALFORDPEAK	164230	ROCKCHIP	UTM	385300	5363700	55	AGD66	

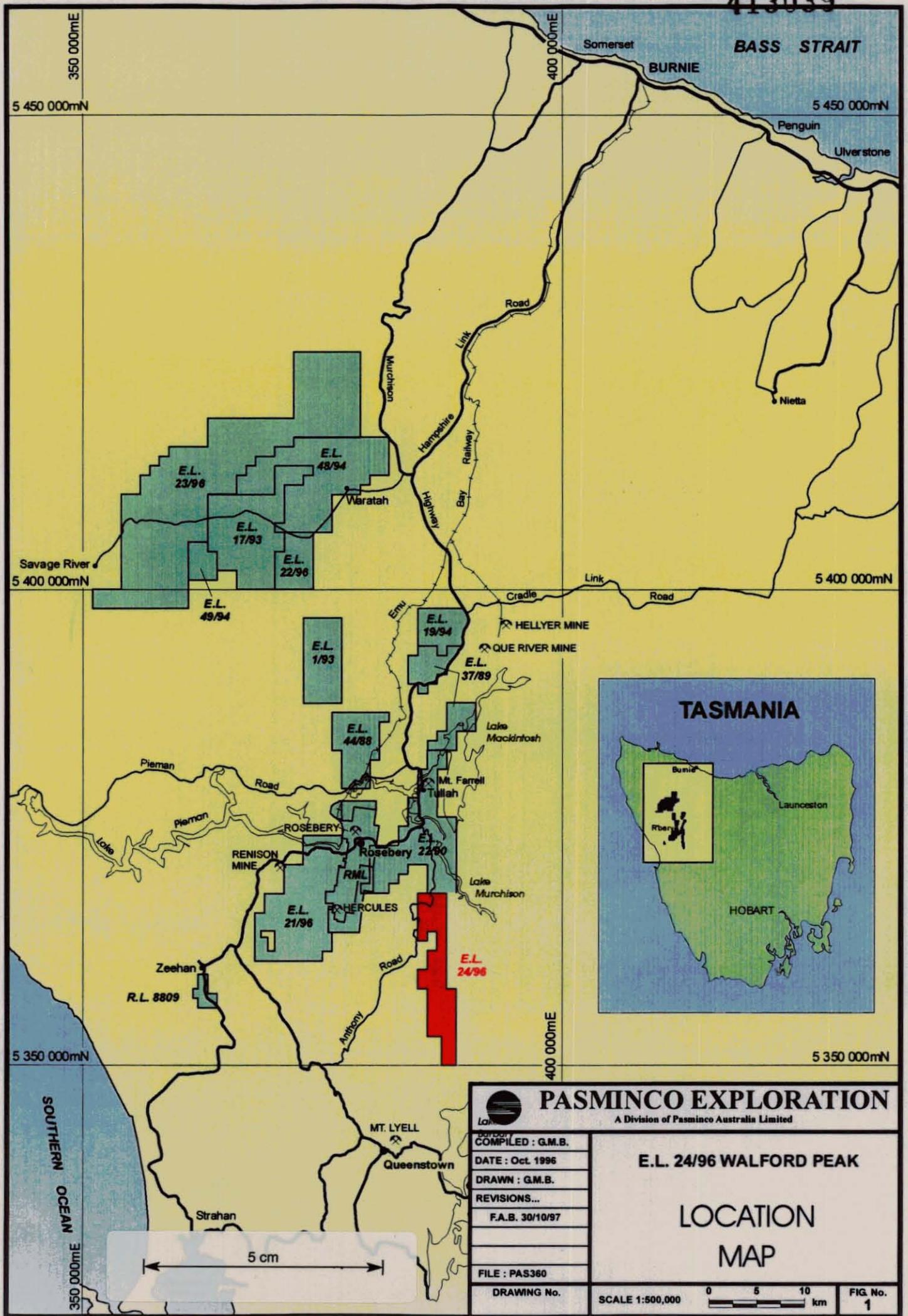
413037

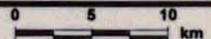
## APPENDIX 2

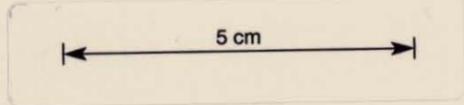
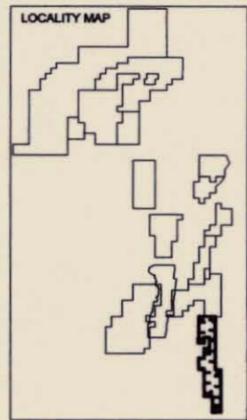
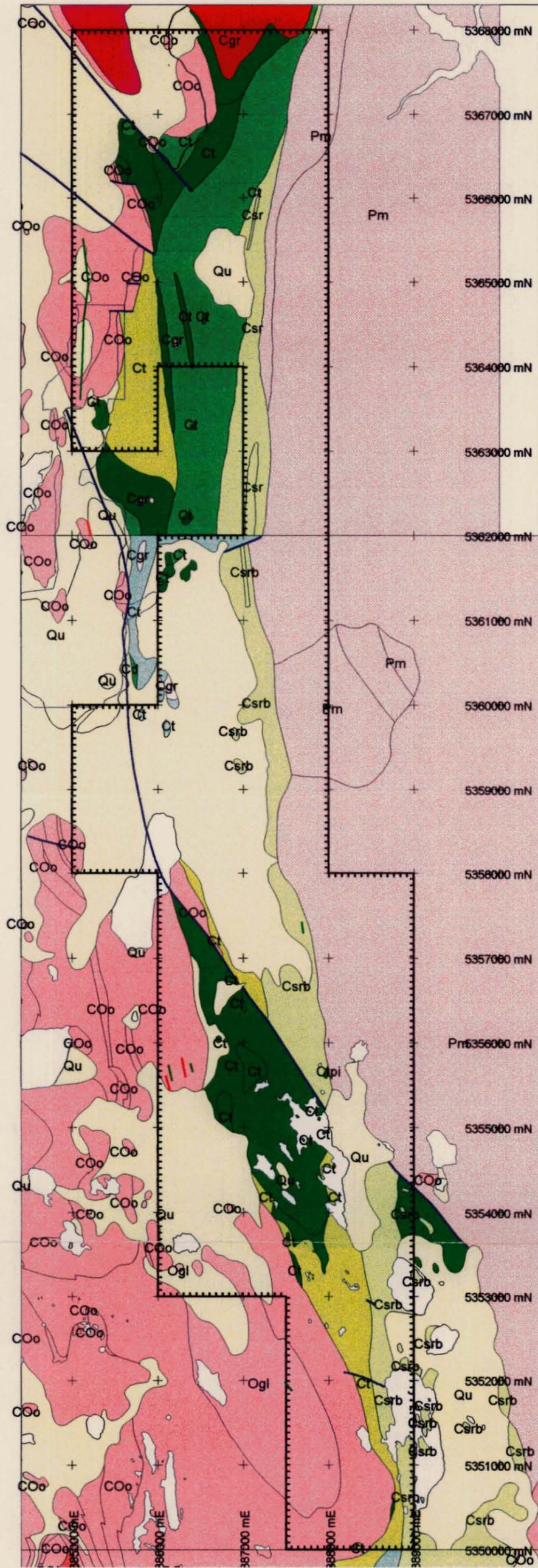
## HOLE LS12 Au ASSAYS FOR TOP 30M

	Au ppm
165001	<0.001
165002	0.001
165003	<0.001
165004	0.006
165005	<0.001
165006	0.003
165007	0.002
165008	<0.001
165009	0.004
165009A	0.254

413039



 <b>PASMINCO EXPLORATION</b> A Division of Pasminco Australia Limited	
COMPILED : G.M.B. DATE : Oct. 1996 DRAWN : G.M.B. REVISIONS... F.A.B. 30/10/97	<b>E.L. 24/96 WALFORD PEAK</b>  <b>LOCATION MAP</b>
FILE : PAS360 DRAWING No.	SCALE 1:500,000 
FIG. No. <b>1</b>	



**LEGEND**

**GEOLOGY**

- Quaternary
  - Platocene glacial deposits mainly till
- Less Cambrian-Early Ordovician
  - Deason Group
    - Massive conglomerate, minor sandstone lenses
    - Pink pebbly Sandstone & Conglomerate
  - Cambrian
    - Murchison Granite
    - Central Volcanic Complex
  - Tynnell Group & Sills
    - Undifferentiated Tynnell Grp
    - Volcaniclastic Conglomerate
    - Tynnell Group & Sills Siliclastic conglomerate & SST
    - Tynnell Group Q2-Feldspar-Phytic Volcaniclastics
    - Tynnell Grp & Sills Intrusive Porphyry
  - Pre-Cambrian
    - Precambrian Phyllite
- Structural Features
  - Anticline
  - Syncline
  - Fault
  - Creek
  - Road

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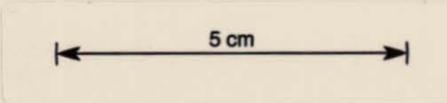
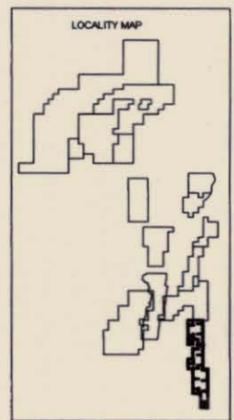
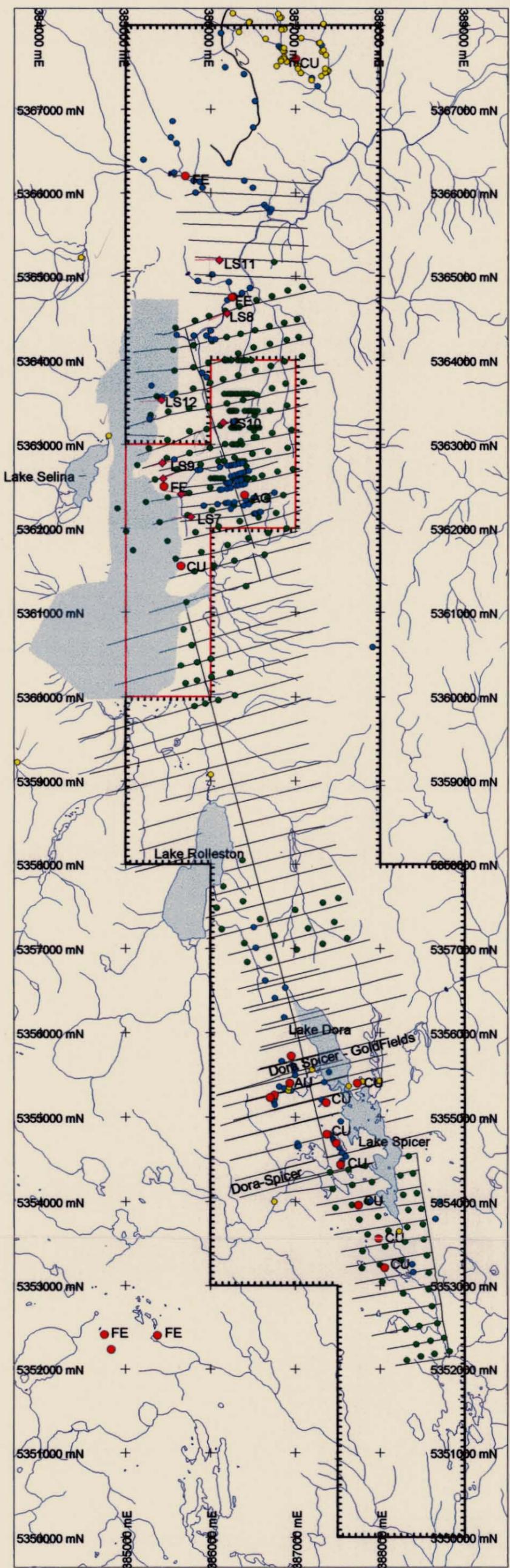
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 Author: FCM  
 Office: Melbourne  
 Drawing: MA

**EL24/96 Walford Peak  
 Fig.2 Regional Geology**

Scale: 1:50000  
 Projection: AMG Zone 56 (PGD 88)

0 0.5 1 2  
 Kilometres

413040

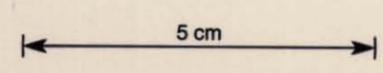
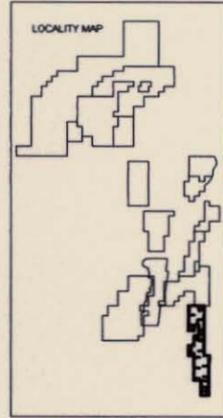
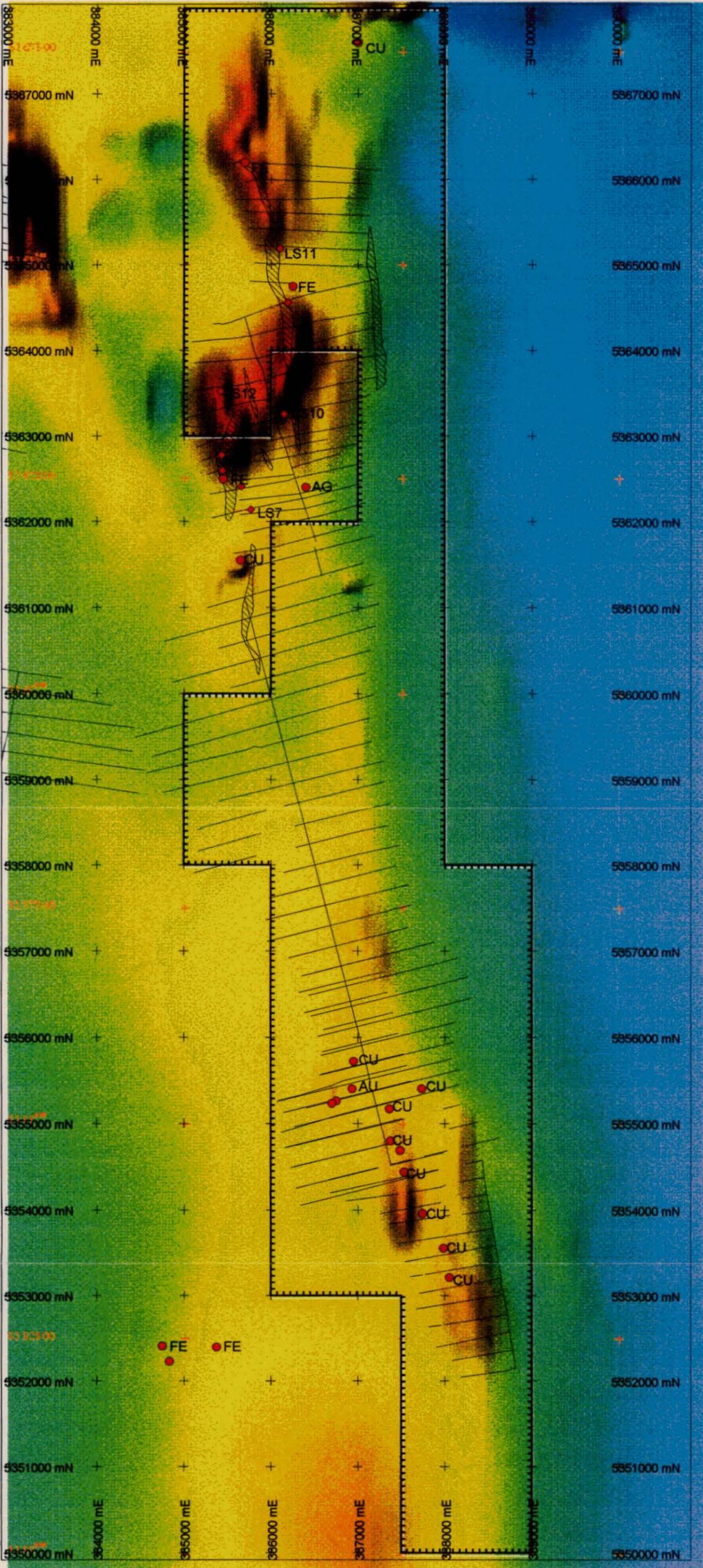


**LEGEND**

- Stream Sediment Sample Location
- Rock Chip Sample Location
- Soil Sample Location
- Pasmenco Mineral Occurrences
- ◆ Drillhole Collar and Trace
- Access Track
- Grid Line
- Drainage
- Lake
- ▬ Pasmenco Walford Peak Tenement
- ▭ EL103/87 Acacia

Pasmenco Ltd	
<b>EL24/96 Walford Peak Fig.3 Exploration Work</b>	
Drawn: 2/6/1997	
Author: FCM	
Office: Melbourne	
Drawing: MA	
Scale: 1:5000	Projection: AMG Zone 55 (AGD 86)

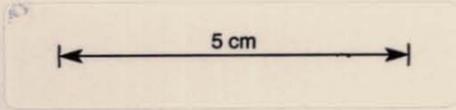
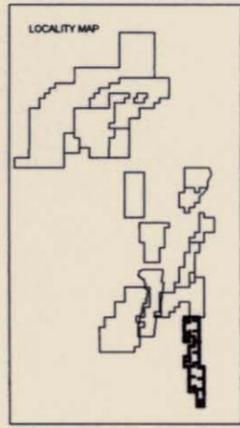
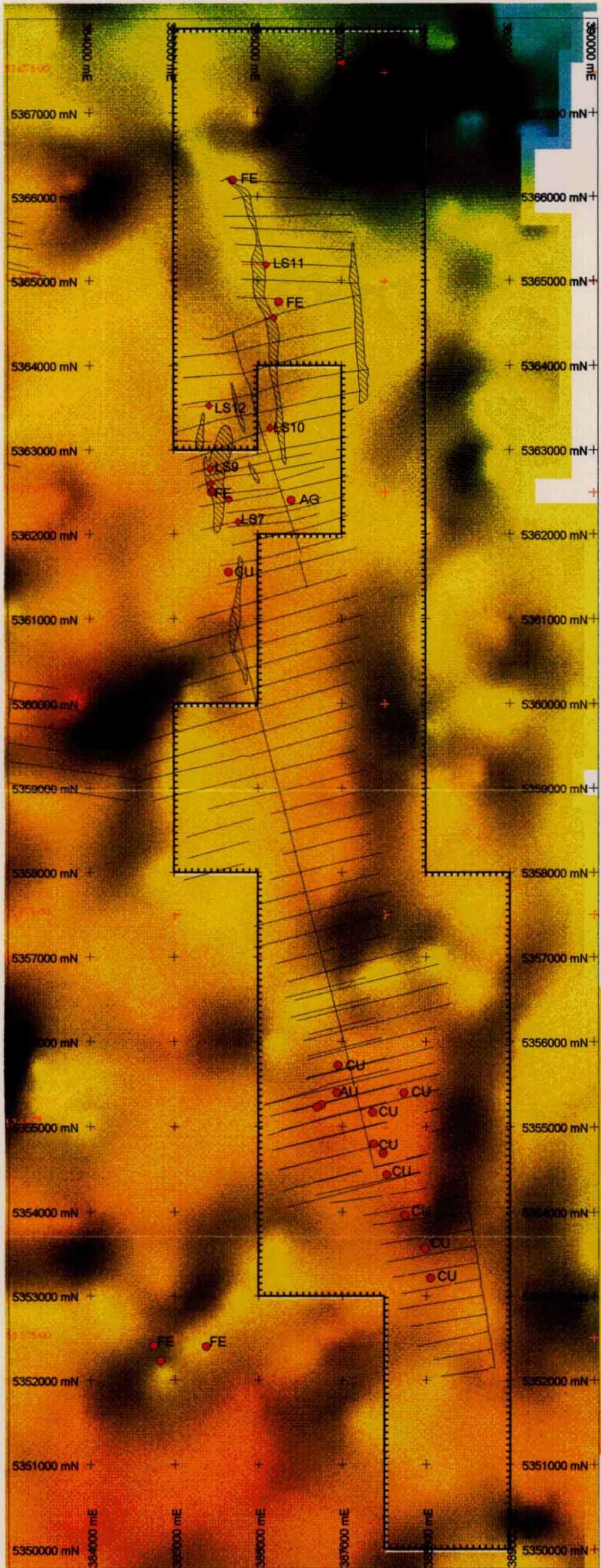
413041



LEGEND	
	Drillhole Collar and Trace
	Mineral Occurrence
	Grid Line
	Pyrite Zone
	Pasmenco Walford Peak Tenement

Pasmenco Ltd	
EL24/96 Walford Peak Fig.4 Magnetics	
Date: 17/6/97	
Author: FCM	
Office: Melbourne	
Drawing: MA	
Scale: 1:5000	Projection: AMG Zone 55 (GDA 96)

413042

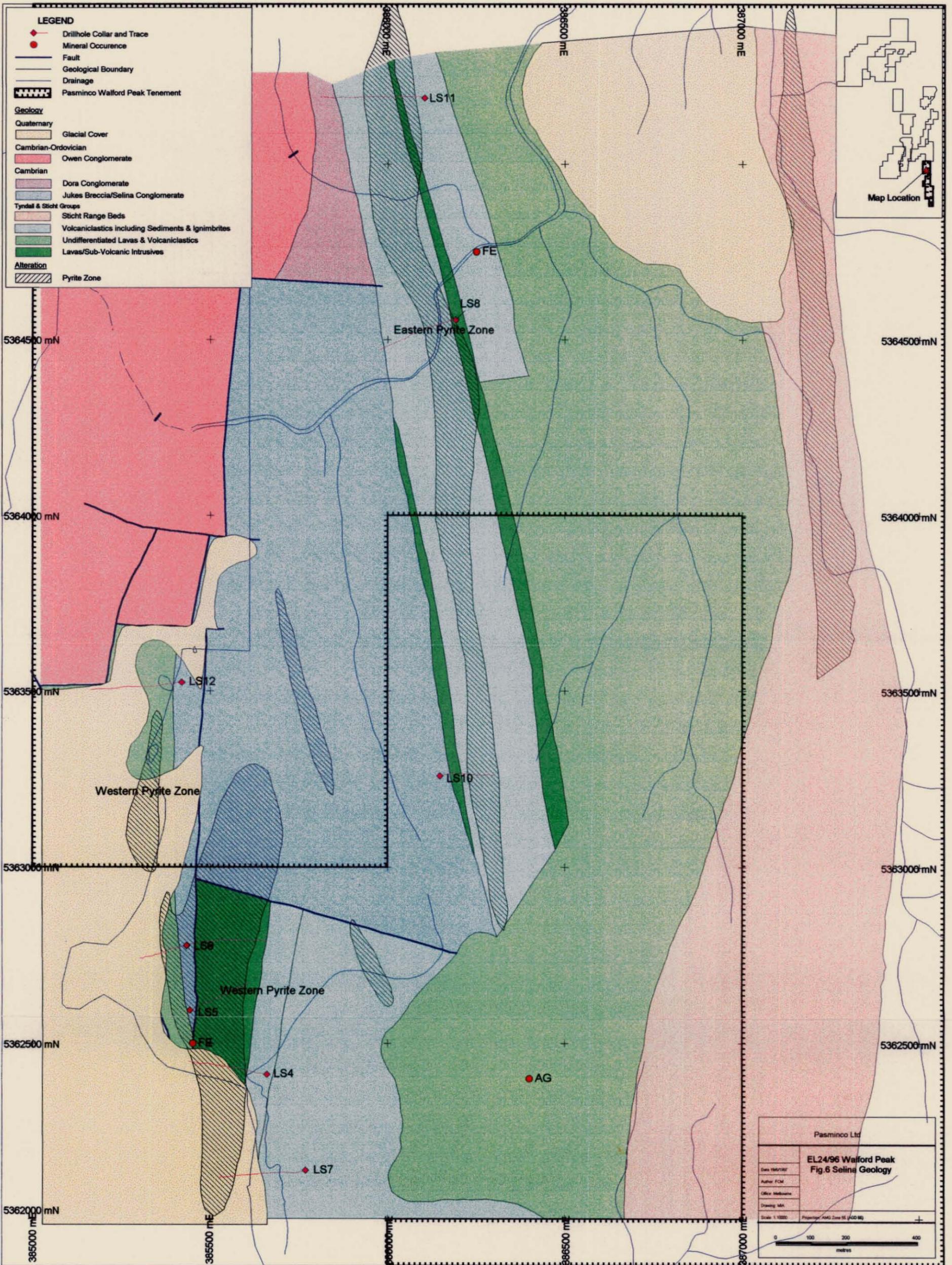


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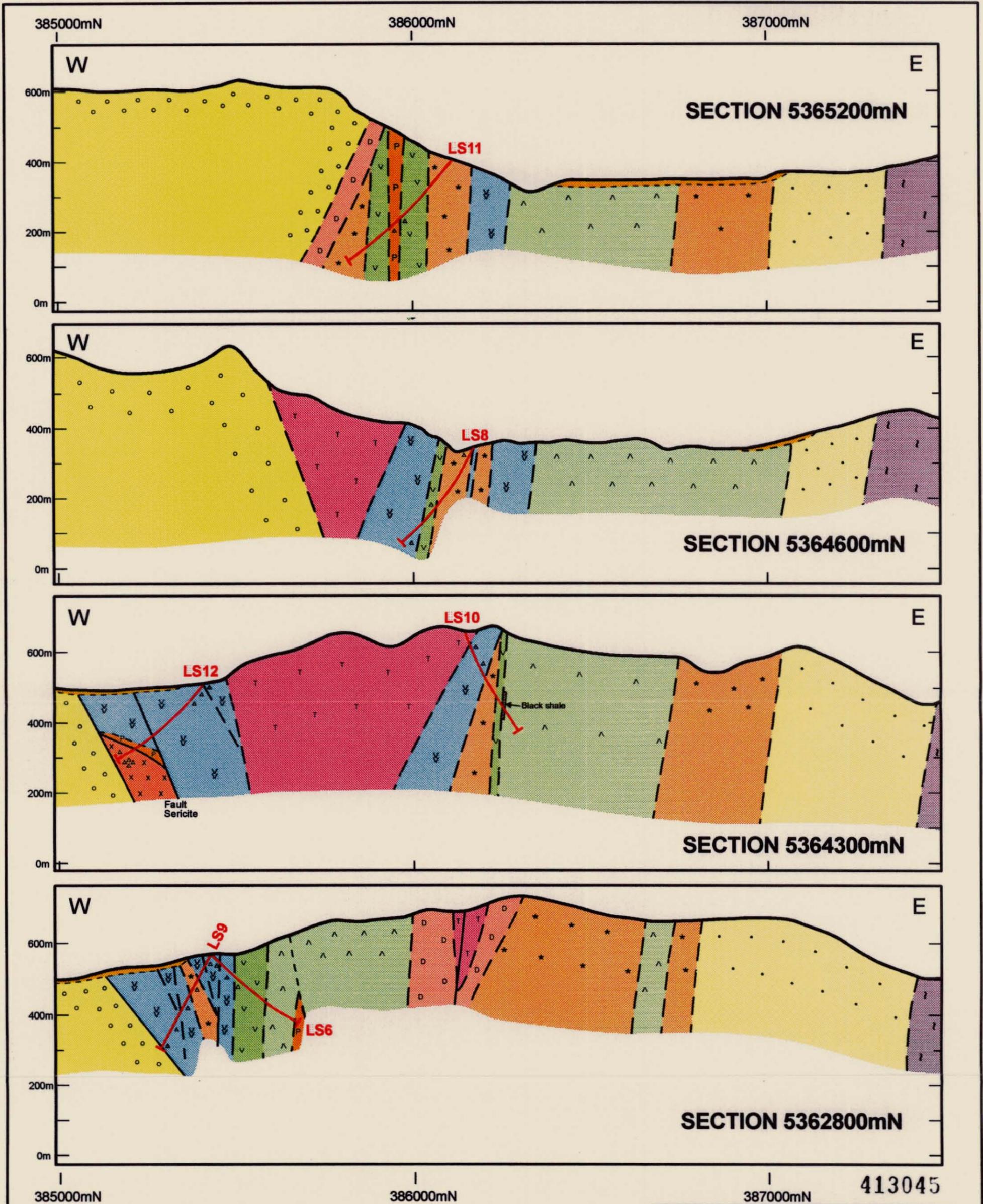
- ◆ Drillhole Collar and Trace
- Mineral Occurrence
- Grid Line
- Pyrite Zone
- Pasmenco Walford Peak Tenement

Pasmenco Ltd	
<b>EL24/96 Walford Peak</b>	
<b>Fig.5 Gravity</b>	
Date: 17/6/97	
Author: FCM	
Office: Melbourne	
Drawing: MA	
Scale: 1:5000	Projection: AMG Zone 56 (MGO 86)

413043

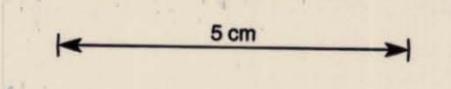


413044



**LEGEND**

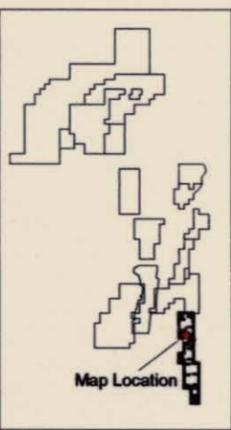
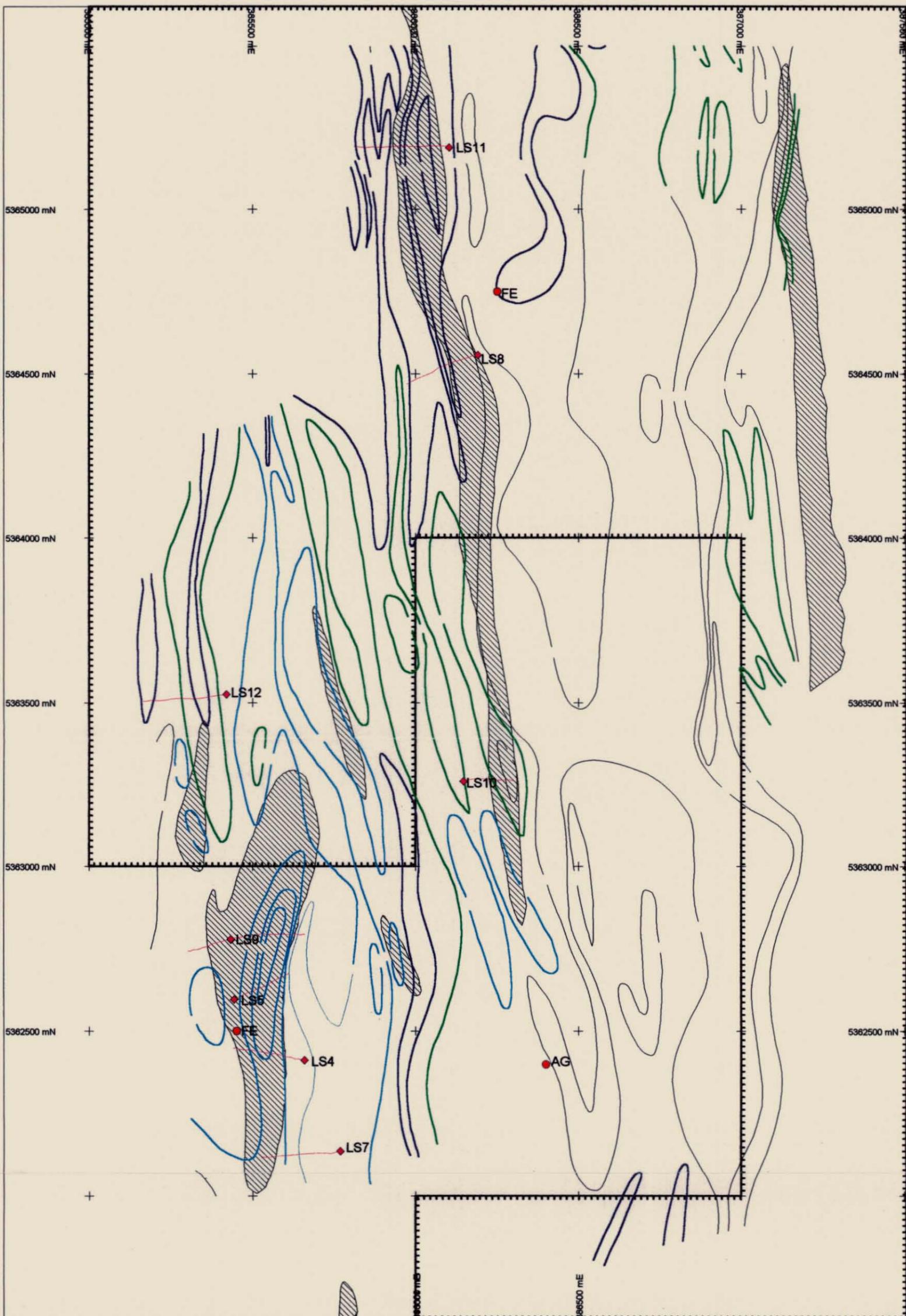
Quarternary	Felsic Volcaniclastics / Lavas	Volcaniclastics
Owen Conglomerate	Tuffaceous Sediments	Stitch Range Beds
Dora Conglomerate	Pumice Breccia	Precambrian
Jukes Breccia	Porphyry (Rhyodacite)	Pyrite / Magnetite / Hematite Alteration
Granite		



**PASMINCO EXPLORATION**

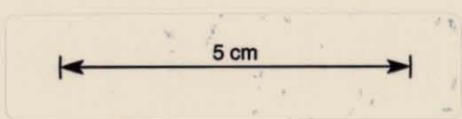
FIG No. 7 Date: 28/5/97 Author: WA Office: Melb Ref: VC159 Scale: As shown Projection AMG Zone : TCR 84-2137	<b>WALFORD PEAK</b> <b>EL 24/96</b> <b>SELINA</b> <b>CROSS SECTION</b>
--	---

0 500m

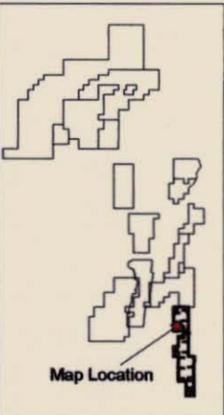
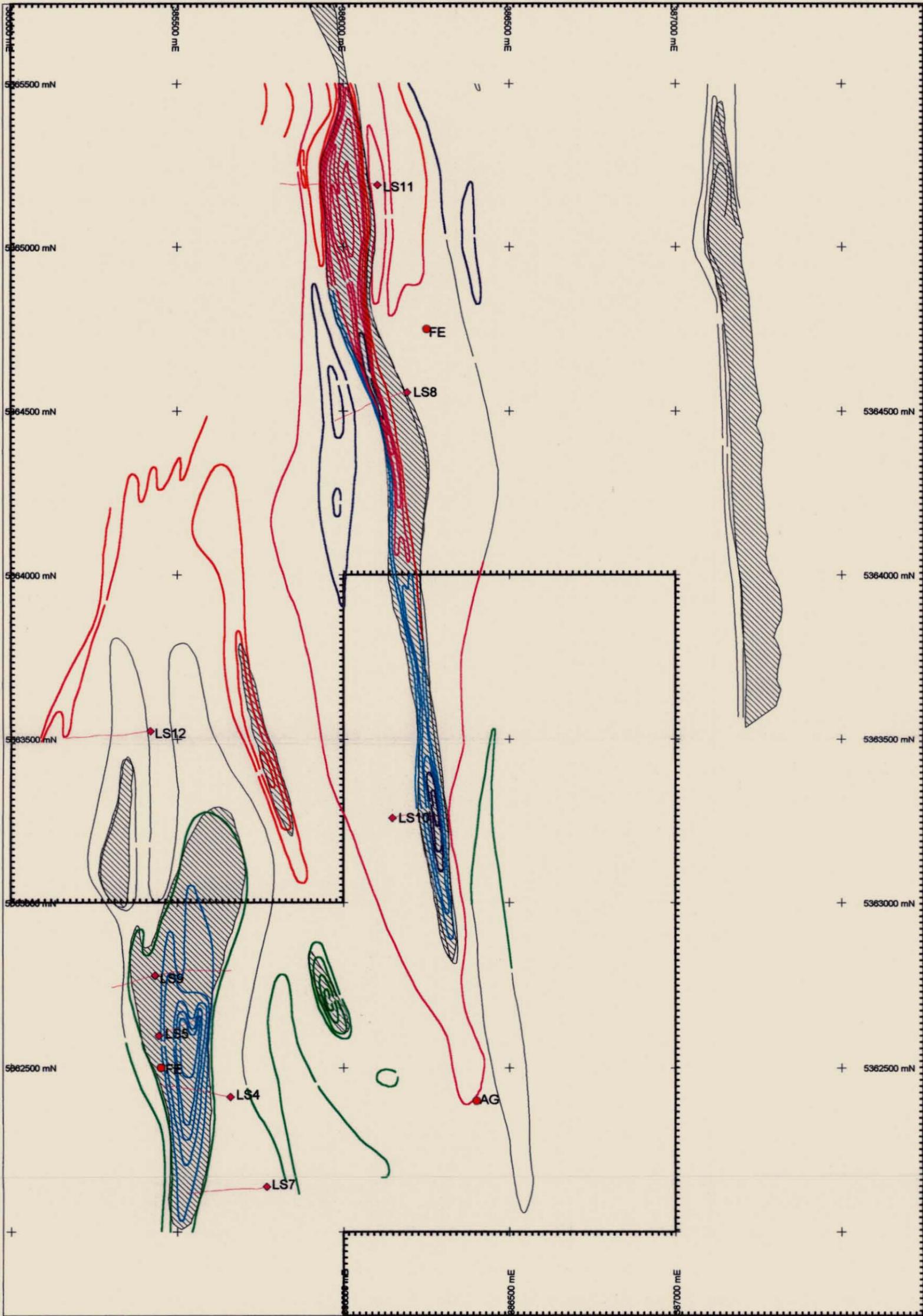


**LEGEND**

- ◆ Drillhole Collar and Trace
- Mineral Occurrence
- 76 to 99 Ohm Metres
- 51 to 76 Ohm Metres
- 26 to 51 Ohm Metres
- 1 to 26 Ohm Metres
- ▨ Pyrite Zone
- ▩ Pasmaenco Walford Peak Tenement

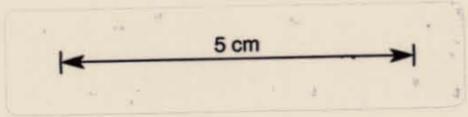


Pasmaenco Ltd	
Date: 16/1/97	<b>Fig.8 EL24/96 Walford Peak Selina Gradient Array IP - Resistivity</b>
Author: FCM	
Office: Melbourne	
Drawing: MA	
Scale: 1:1200	
Projection: AMG Zone 56 (AGD 84)	



**LEGEND**

- ◆ Drillhole Collar and Trace
- Mineral Occurrence
- 83 to 98 (16) mV/V
- 67 to 83 (16) mV/V
- 51 to 67 (16) mV/V
- 35 to 51 (16) mV/V
- 18 to 35 (17) mV/V
- 1 to 18 (17) mV/V
- ▨ Pyrite Alteration
- ▩ Pasmaenco Walford Peak Tenement

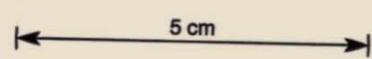
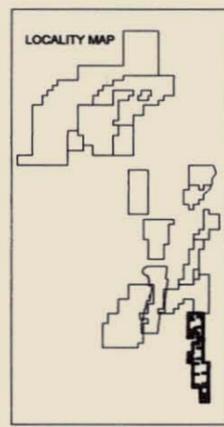
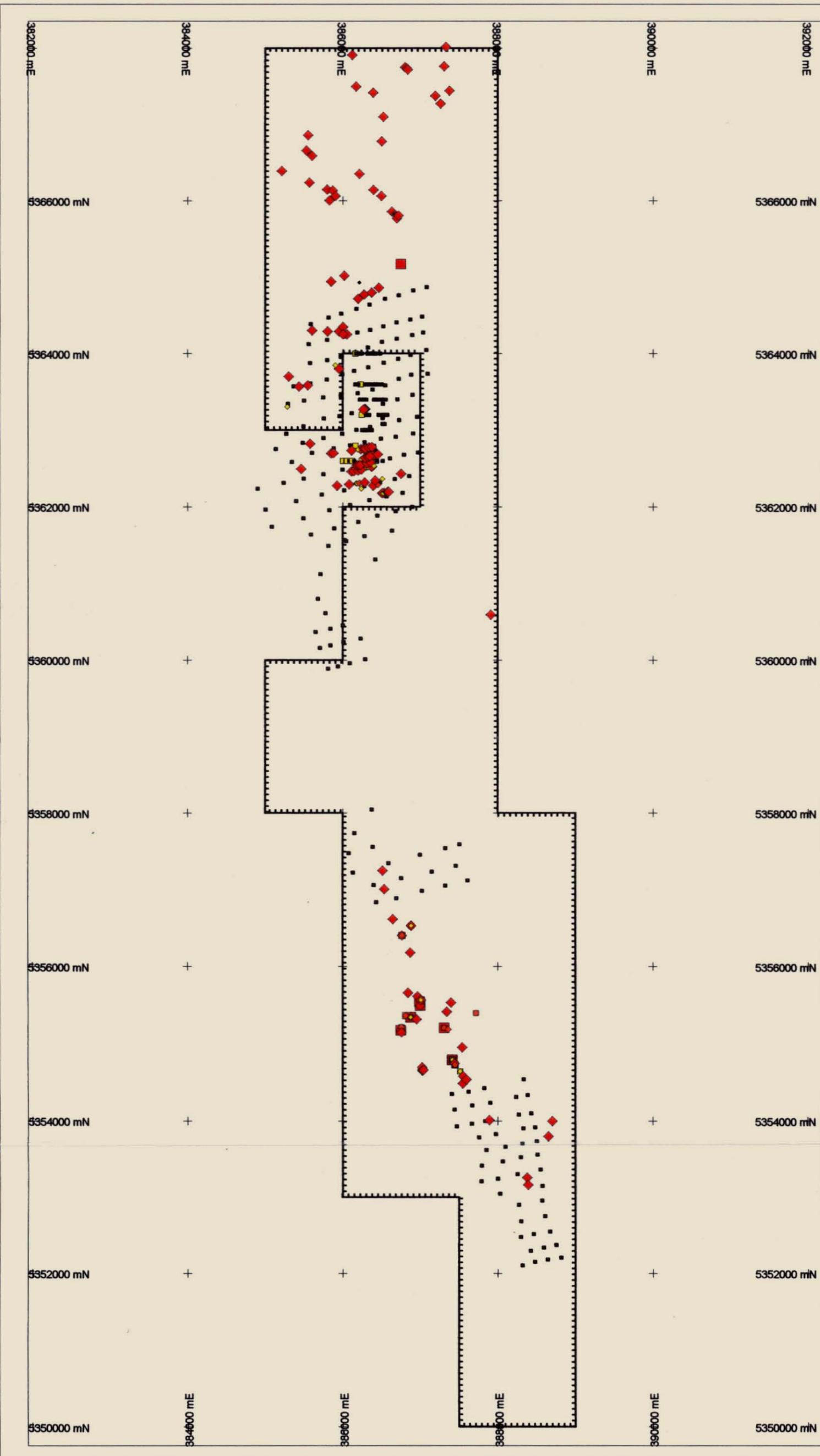


Pasmaenco Ltd	
Date: 16/11/97	<b>Fig.9 EL24/96 Walford Peak Selina Gradient Array IP - Chargeability</b>
Author: FCM	
Client: Melbourne	
Drawing: MA	
Scale: 1:1200	Projection: AMG Zone 55 (GSD 68)

413047



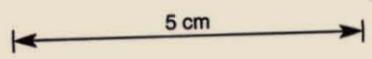
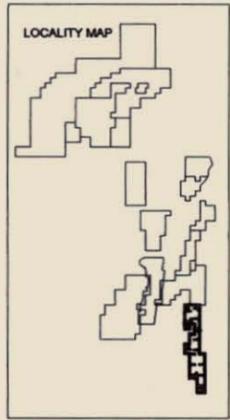
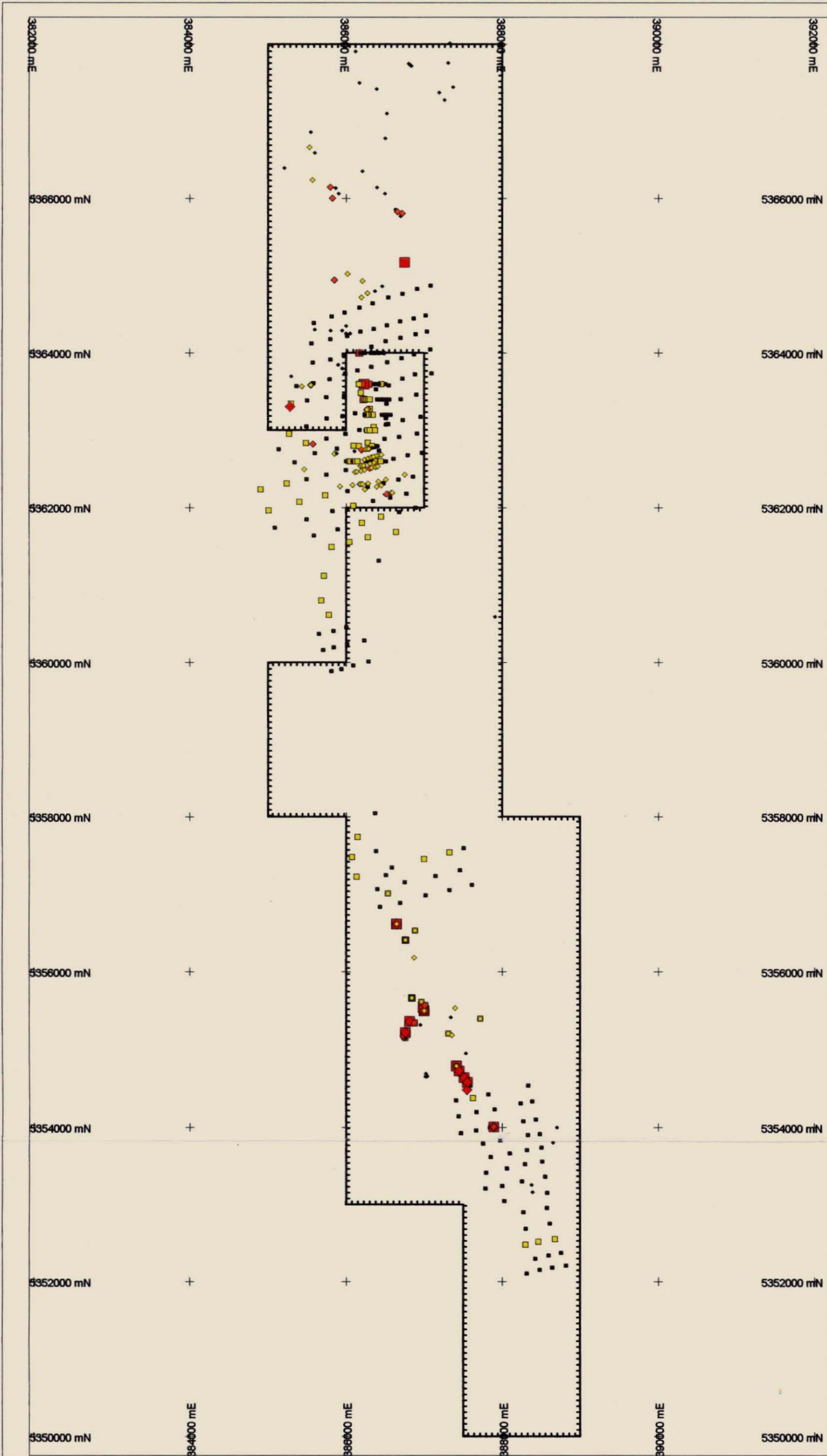
413048



WP_RockChip_by Zn_ppm	
•	4,000 to 8,300 (5)
◊	1,000 to 4,000 (22)
◇	500 to 1,000 (29)
◆	0 to 500 (137)
WP_Soil_by Zn_ppm	
■	2,500 to 8,300 (8)
■	1,500 to 2,500 (5)
■	350 to 1,500 (41)
■	0 to 350 (256)

Pasminco Ltd	
Date: 26/11/97	<b>EL24/96 Walford Peak Fig.11A Soil &amp; Rock Chip Zinc (ppm)</b>
Author: FCM	
Client: Melbourne	
Drawing: MA	
Scale: 1:5000	Projection: AMG Zone 55 (AGD 84)

413049



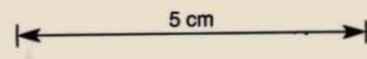
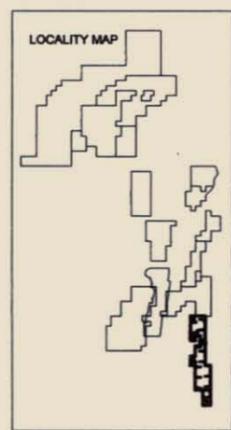
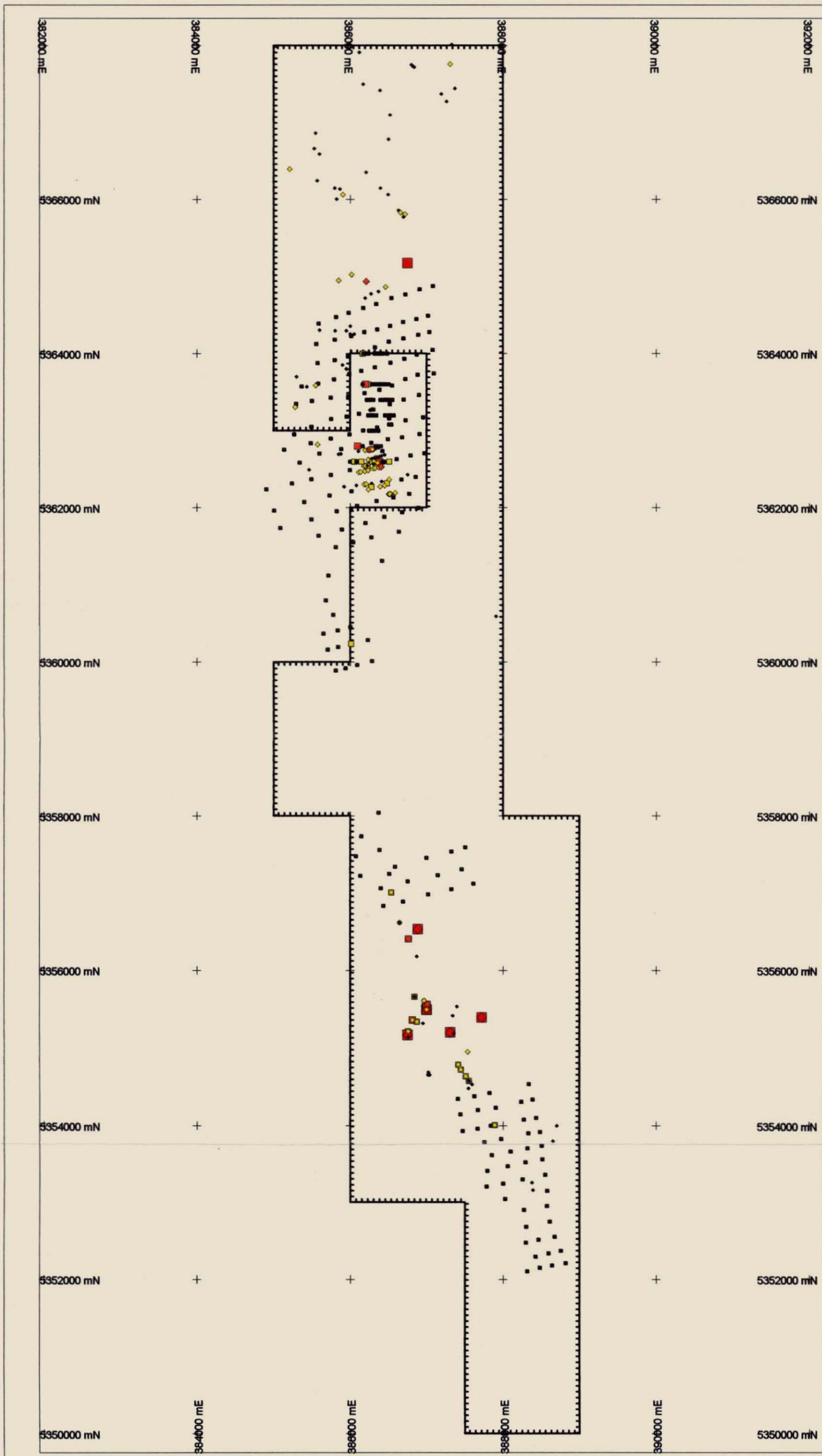
**WP\_RockChip\_by Cu\_ppm**

- ◆ 2,000 to 8,750 (23)
- ◆ 800 to 2,000 (4)
- ◆ 250 to 800 (22)
- ◆ 40 to 250 (85)
- 0 to 40 (59)

**WP\_Soil\_by Cu\_ppm**

- 1,450 to 8,750 (21)
- 600 to 1,450 (8)
- 200 to 600 (13)
- 15 to 200 (73)
- 0 to 15 (195)

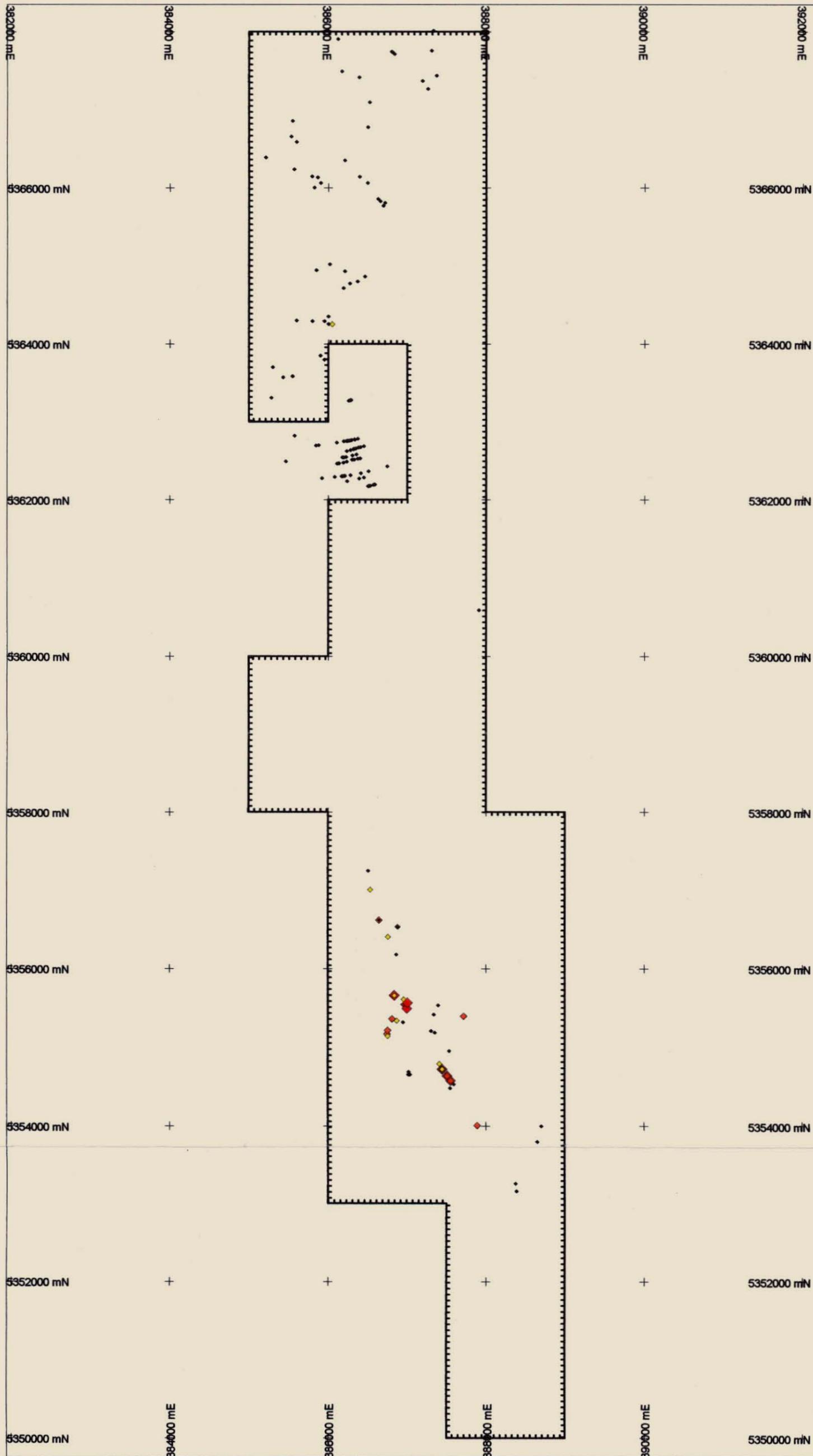
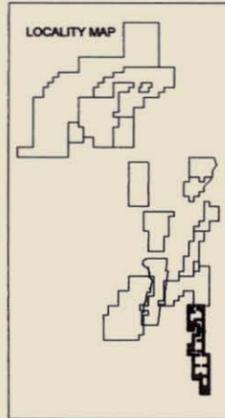
Pasmenco Ltd	
Date: 26/1/97	<b>EL24/96 Walford Peak Fig.11B Soil &amp; Rock Chip Copper (ppm)</b>
Author: FCM	
Office: Melbourne	
Drawing: MA	
Scale: 1:8000	Projection: AMG Zone 56 (AGD 86)



WP_RockChip_by Pb_ppm	
◆	2,800 to 8,600 (6)
◇	1,300 to 2,800 (15)
◇	150 to 1,300 (74)
•	0 to 150 (98)
WP_Soil_by Pb_ppm	
■	1,700 to 8,600 (9)
■	1,100 to 1,700 (9)
■	300 to 1,100 (33)
■	0 to 300 (259)

Pasminco Ltd	
Date: 26/1/97	EL24/96 Walford Peak Fig.11C Soil & Rock Chip Lead (ppm)
Author: FCM	
Office: Melbourne	
Drawing: MA	
Scale: 1:5000	Projection: AMG Zone 56 (AGD 86)

413051



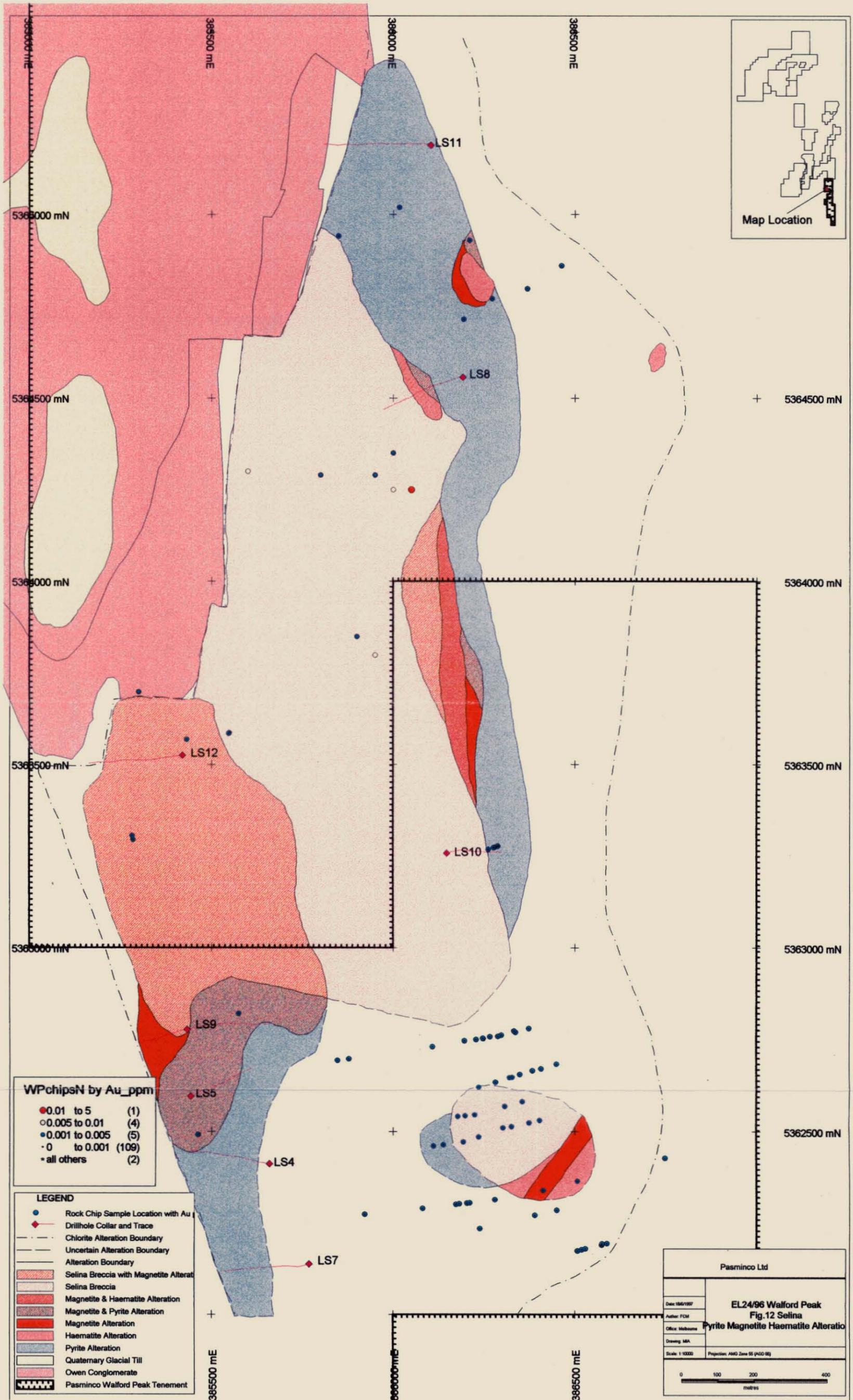
**WP\_RockChip\_by Au\_ppm**

◆	145 to 370	(8)
◇	60 to 145	(15)
◻	0.01 to 60	(27)
•	0 to 0.01	(143)

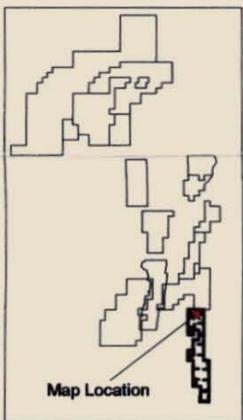
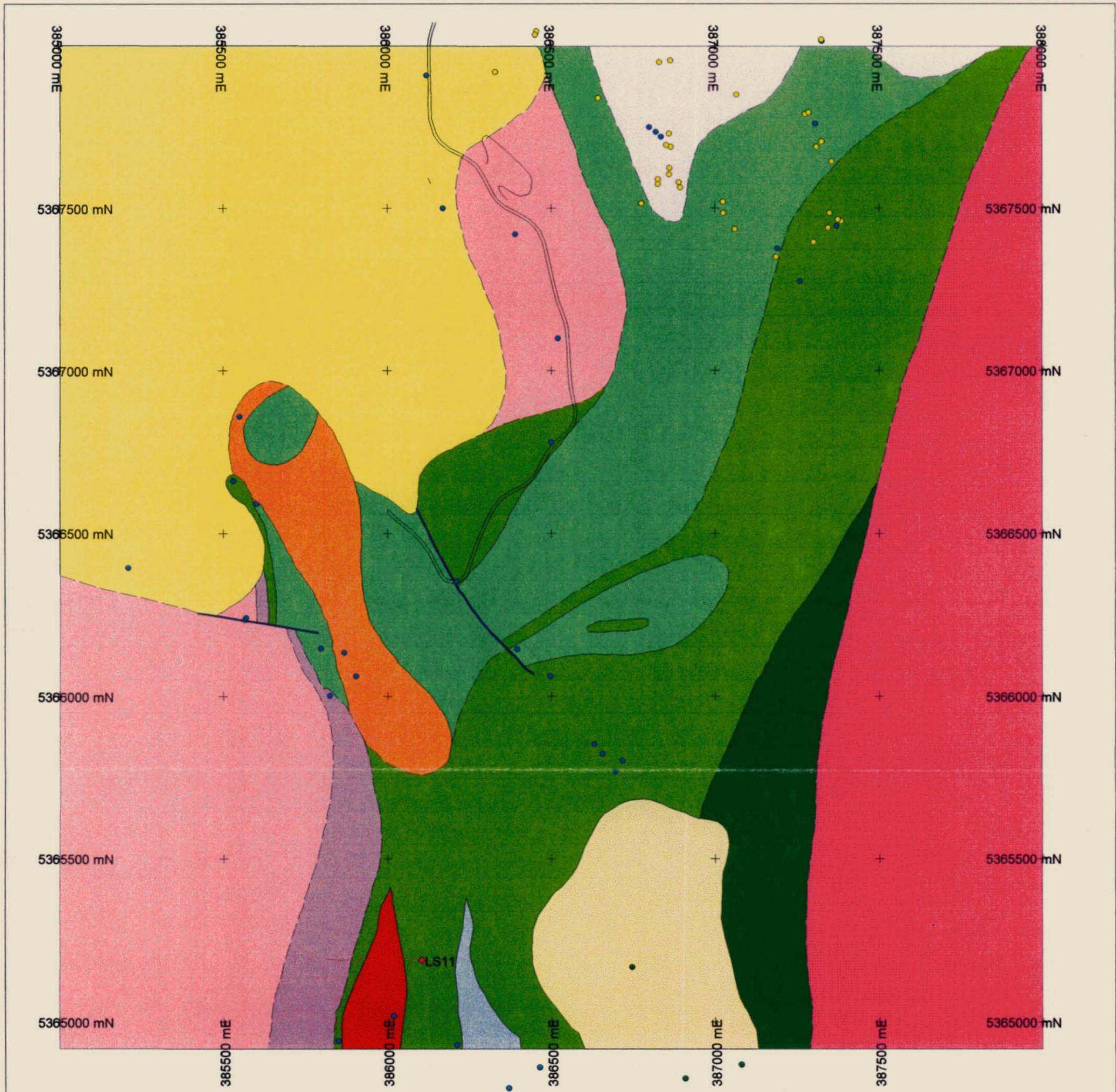
Pasmenco Ltd

<b>EL24/96 Walford Peak Fig.11D Soil &amp; Rock Chip Gold (ppm)</b>	
Date: 26/01/97	
Author: FCM	
Office: Melbourne	
Drawing: MA	
Scale: 1:5000	Projection: AMG Zone 55 (AGD 86)

413052

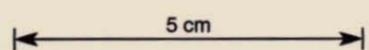


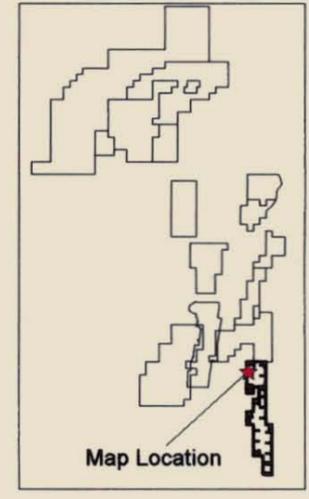
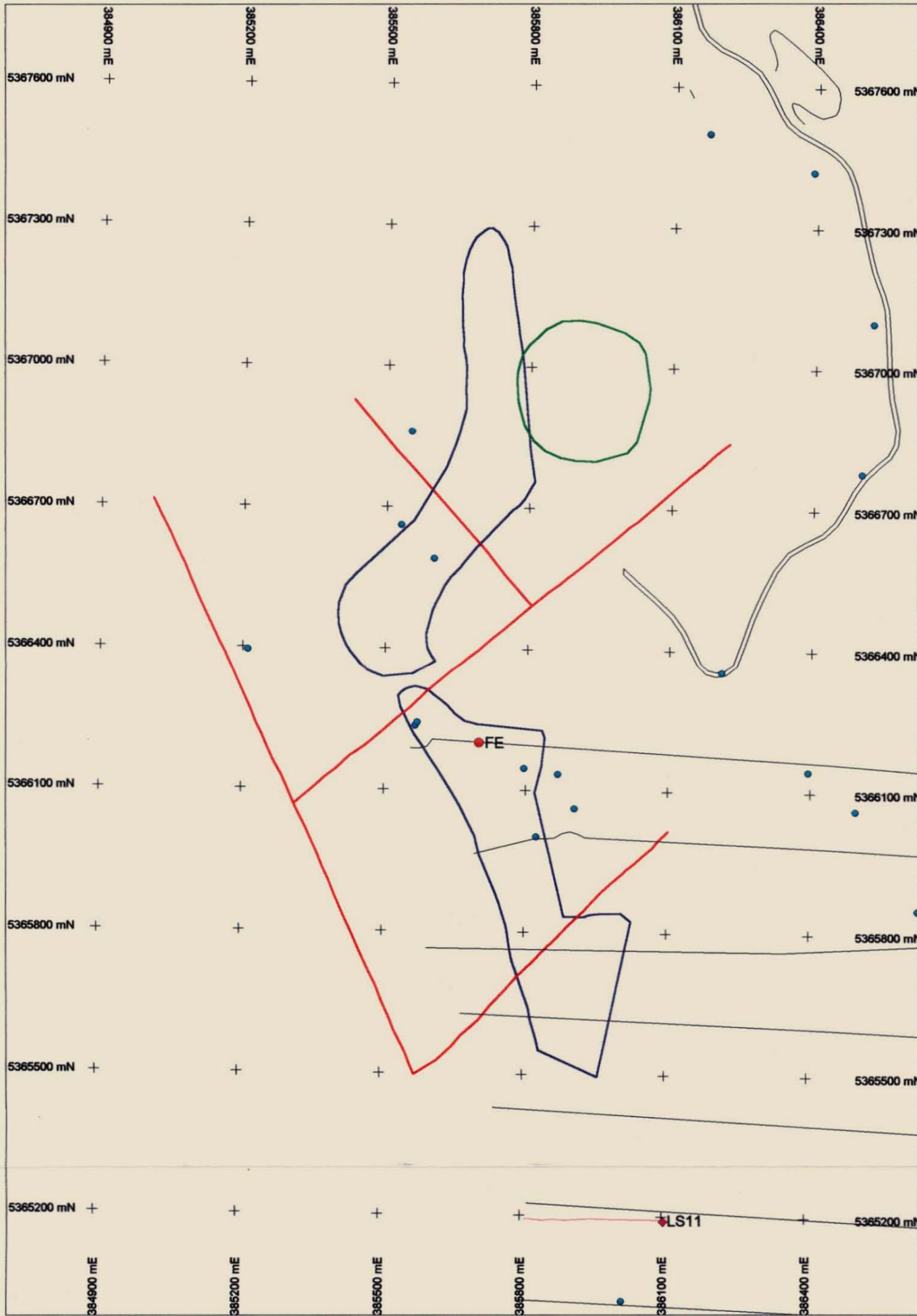
413053



LEGEND	
<span style="color: yellow;">●</span>	Stream Sediment Sample Location
<span style="color: blue;">●</span>	Rock Chip Sample Location
<span style="color: green;">●</span>	Soil Sample Location
<span style="color: red;">◆</span>	Drillhole Collar and Trace
---	Uncertain Geological Boundary
---	Geological Boundary
---	Fault
---	Access Track
<span style="background-color: orange; border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span>	Intrusive Porphyritic Rhyolite
<span style="background-color: yellow; border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span>	Quaternary Gravels
<span style="background-color: red; border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span>	Highly Altered
<span style="background-color: purple; border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span>	Dacite
<span style="background-color: green; border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span>	Lavas/Sub-Volcanic Intrusives
<span style="background-color: grey; border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span>	Pasminco Walford Peak Tenement
<span style="background-color: pink; border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span>	Precambrian Phyllite
<span style="background-color: white; border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span>	Granitic Rocks
<span style="background-color: lightgrey; border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span>	Glacial Till
<span style="background-color: lightpink; border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span>	Denison Group Conglomerate
<span style="background-color: darkgreen; border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span>	Tyndall Grp & Sticht
<span style="background-color: black; border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span>	Pasminco Walford Peak Tenement
<span style="background-color: green; border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span>	Volcanics

Pasminco Ltd	
Date: 19/01/97	<b>EL24/96 Walford Peak</b> <b>Fig.13 North Selina Geology</b>
Author: FCM	
Client: MIMOSA	
Drawing: MA	
Scale: 1:2500	Projection: AMG Zone 55 (GDA 88)



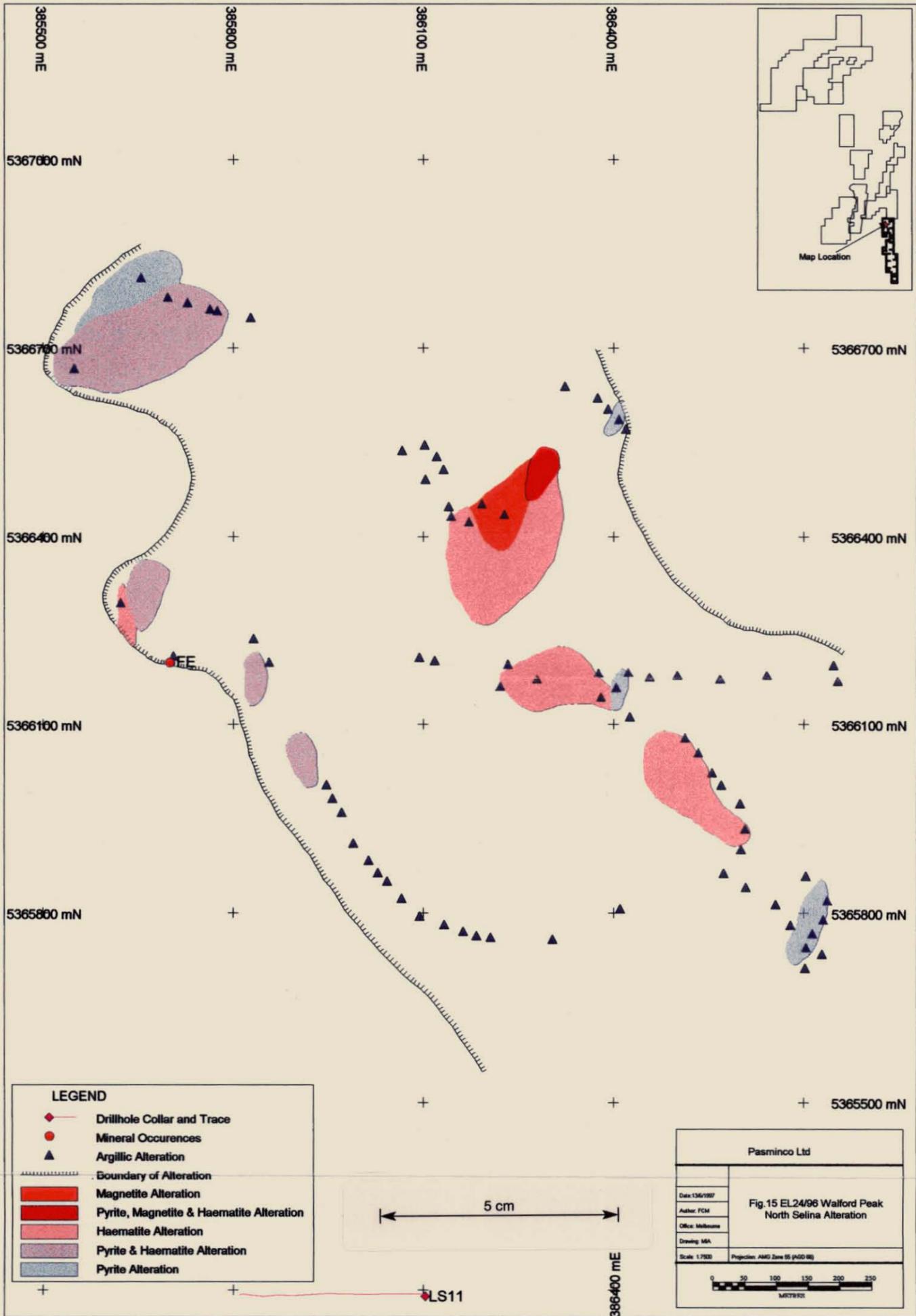


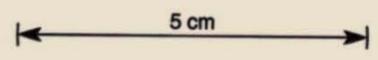
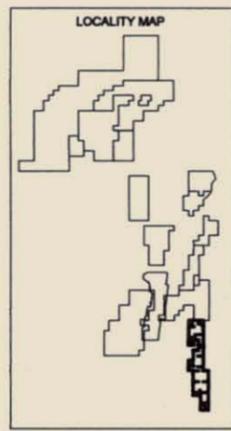
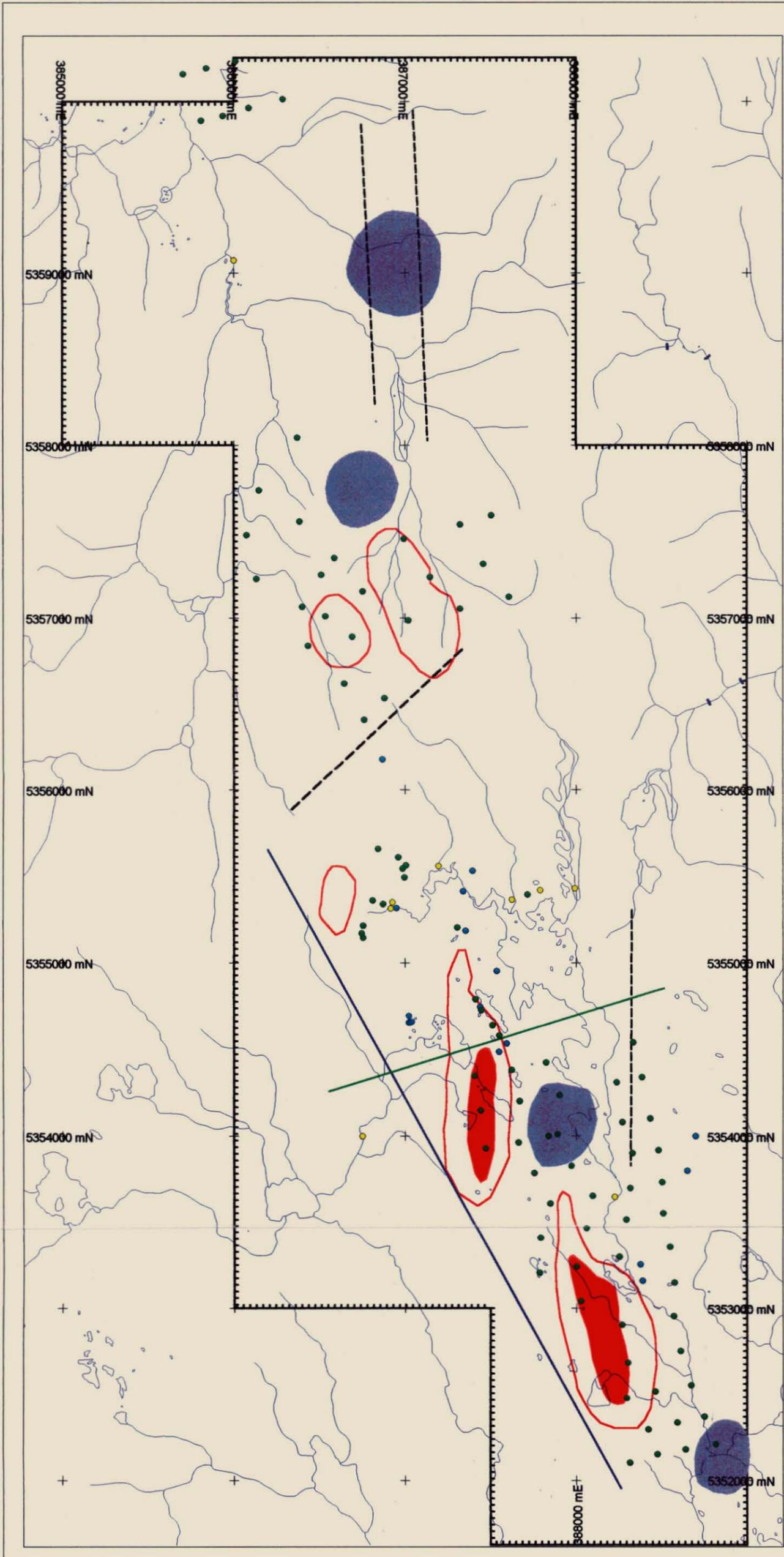
**LEGEND**

- ◆ Drillhole Collar and Trace
- Rock Chip Sample Location
- Mineral Occurrence
- Grid Line
- Access Track
- Aeromagnetic High
- Aeromagnetic Lineament
- Gravity High

Pasminco Ltd	
Date: 12/01/97	<b>Fig.14 EL24/96 Walford Peak North Selina Geophysical Interpretation</b>
Author: FCM	
Office: Melbourne	
Drawing: MA	
Scale: 1:10000	Projection: Longitude / Latitude (AGD 84)

5 cm

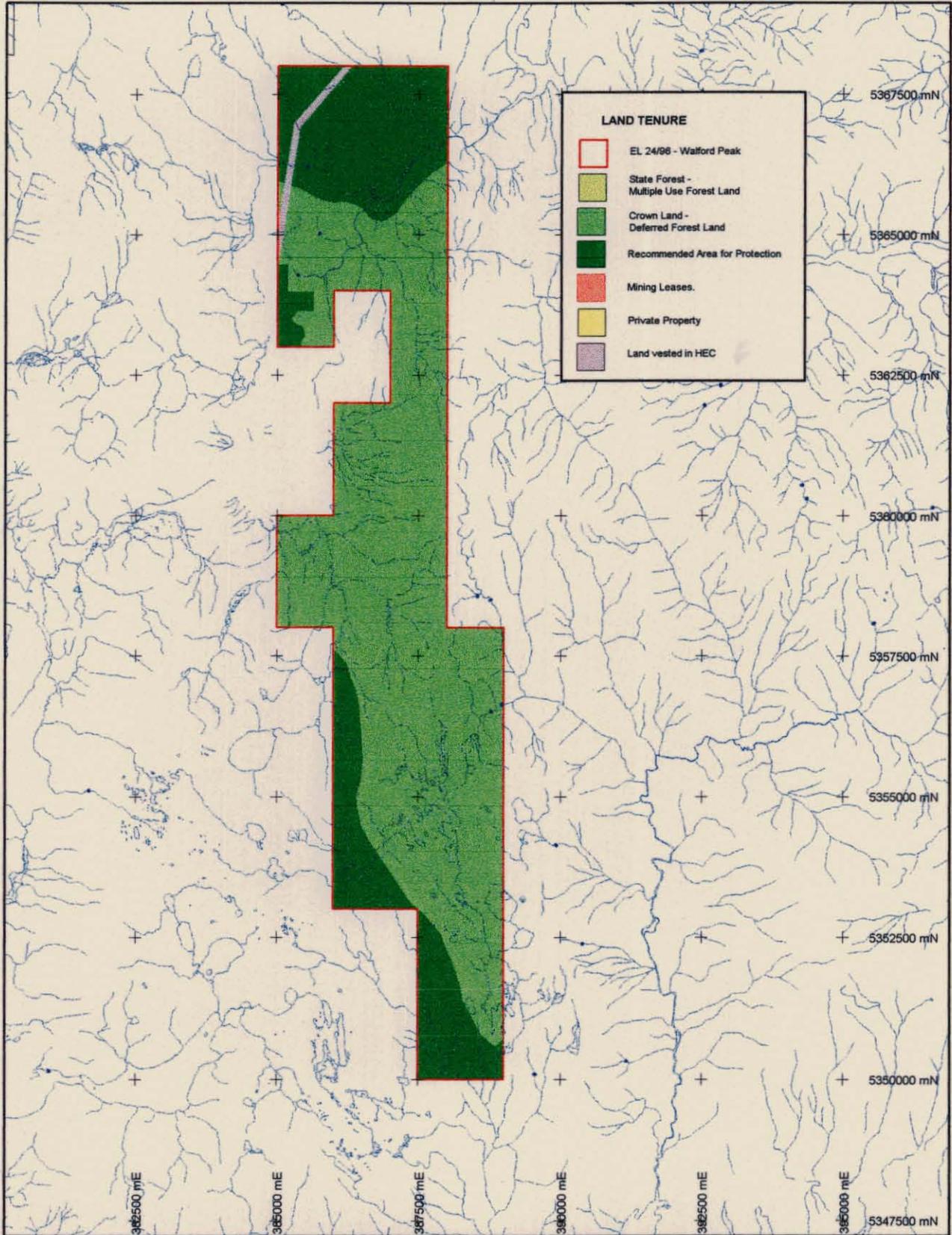




**LEGEND**

- Stream Sediment Sample Location
- Rock Chip Sample Location
- Top Soils
- Magnetic Lineament
- Lesser Magnetic High
- Creeks
- Southerly Limit of prior exploration
- Magnetic High
- Gravity High
- ▬ Pasmaingo Walford Peak Tenement

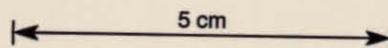
Pasmaingo Ltd	
Date: 17/6/99	<b>EL24/96 Walford Peak Fig.16 Dora and Rolleston Areas Aeromagnetic and Gravity Interpretation</b>
Author: FCM	
Client: Melbourne	
Drawing: MA	
Scale: 1:2500	Projection: AMG Zone 55 (AGD 85)



**PASMINCO EXPLORATION**

**Figure 17:  
EL 24/96 - Walford Peak,  
Land Tenure.**

Scale = 1:100,000



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Review of Gold and Copper Potential on EL 24/96,  
Walford Peak  
PasmaInco Exploration\*  
Aliann W FI 24/96

97\_4083A

Review of Gold and Copper Potential on EL 24/96,  
Walford Peak  
PasmaInco Exploration\*  
Aliann W



**PASMINCO EXPLORATION**  
A DIVISION OF PASMINCO AUSTRALIA LIMITED

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REVIEW OF  
GOLD AND COPPER POTENTIAL  
ON EL 24/96, WALFORD PEAK

**MICROFILMED**  
FICHE No. 014473<sup>A</sup> 73<sup>B</sup>

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**Date:** June 1997  
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**Copies To:** Exploration Office, Melbourne ( 1 )  
Exploration Office, Rosebery ( 1 )

**Submitted By:**

*Wia*

**Accepted By:**

*Jentw...*

Melbourne File No: VC159

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## APPENDICES

1	Rock Chip Multielement Assay Results
2	LS12, TOP 30m, Au Assay Results

(\* = in map sleeves, with reduced scale A4 versions bound in report)

This report details a review of past exploration in the Walford Peak area, in an area new to Pasminco Exploration (EL 24/96). The tenement area has recognised potential for Cu/Au and Pb/Zn mineralising systems. Much previous work has focussed on the Cu/Au potential, using soil and rock chip geochemistry together with aeromagnetics and electrical geophysical methods. This has identified several prospect areas - Selina, North Selina, Dora and Lake Rolleston areas - some of which have been drill tested with encouraging, but unspectacular, results.

The chloritic-potassic-pyritic alteration system associated with the Selina Prospect is up to 3km long by 1km wide and is linked to granitic fluids possibly sourced from the Cambrian Murchison granite which itself has a highly oxidised geochemistry - a good heat engine and source rock for driving the mineralising systems. The conglomeratic rocks that comprise the Selina conglomerate at the Selina Prospect are here re-interpreted as possible breccia vent deposits and are compared to those that form the gold-bearing Mt Leyshon vent breccia in Queensland. This interpretation has not been field tested, nor has the Selina conglomerate been adequately sampled for gold by previous explorers. This presents a window of opportunity which could be rapidly evaluated. The Selina Prospect is, however, divided across the tenement boundary with Acacia Minerals who hold a significant portion of the alteration system (EL 103/87).

The Dora Prospect, in the south of EL 24/96, has been only lightly explored in the past and is regarded as having good potential for Cu/Au mineralisation (best rock chip of 2g/t Au).

Other areas in the tenement have a lower priority and are more "grassroots" in character.

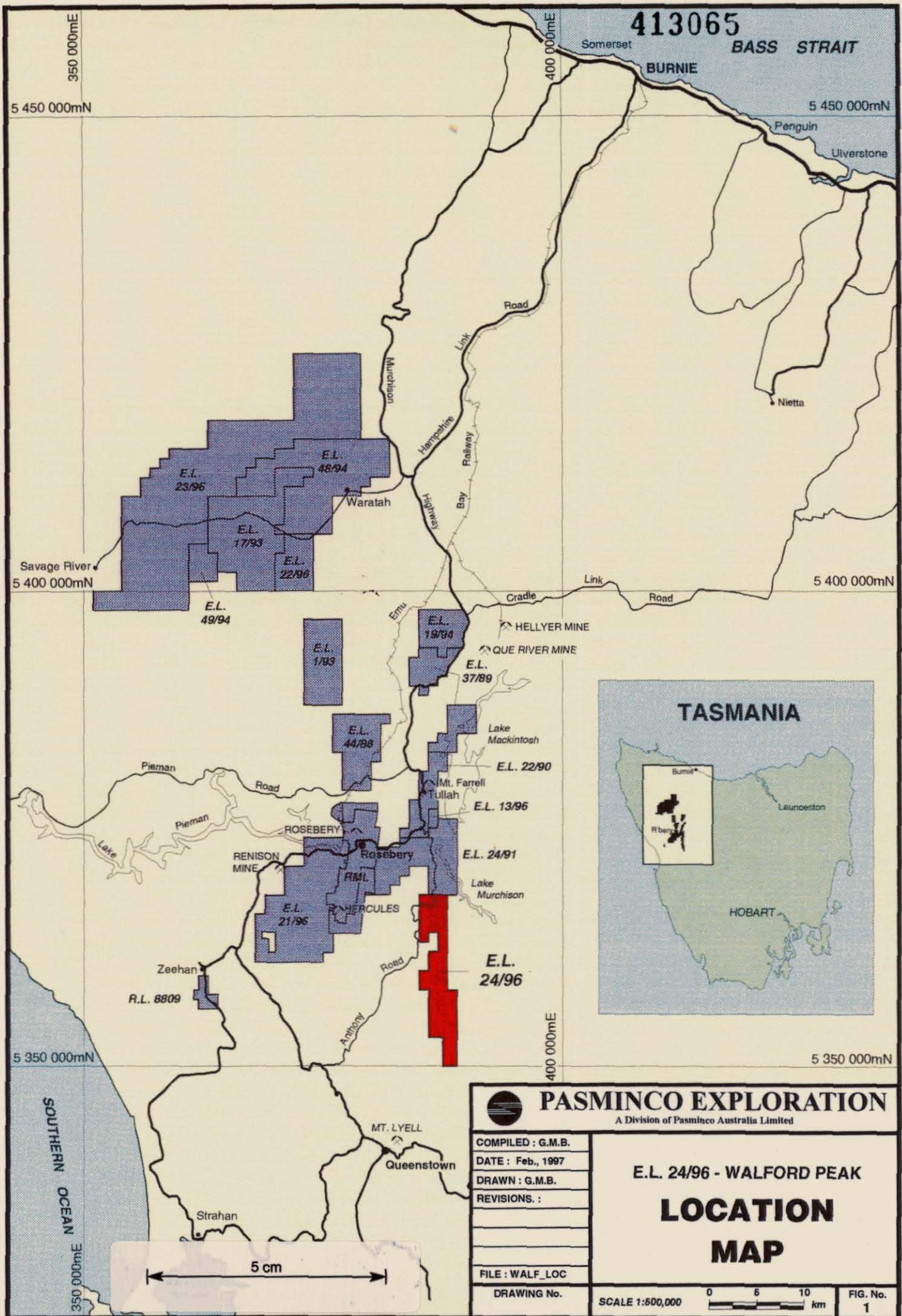
## 1 INTRODUCTION

The Walford Peak (EL24/96) tenement (Figure 1) is the southernmost property of Pasmaenco's holdings in Tasmania. It contains part of an area of Mt Read Volcanics to the east of the Henty Fault, the volcanic belt stretching from north of the Cambrian Murchison Granite in the north to east of Mt Lyell in the south. To the east of the tenement the volcanic belt is separated from the Henty Fault by a package of Cambro-Ordovician sediments of the Owen Conglomerate (Figure 2).

A review of past exploration of the area covered by EL 24/96 shows exploration effort (Figure 3) has been focussed on the central area around Mt Selina, where significant work has been done in the search firstly for a Mt Lyell analogue, and later for a Rosebery - or Hellyer style - base metal deposit. Work in the Mt Selina area included drilling of thirteen diamond drill holes. Much of the work focussed on the area to the south and east of Mt Selina which is not part of the Pasmaenco tenement. Only three of the thirteen drill holes were in the area now included in EL 24/96.

Outside the Mt Selina area there has been some reconnaissance work to the north, at North Selina, and to the south as far as Lake Dora. The area between Lake Rolleston and Lake Dora has been gridded (Figure 3) and various geophysical techniques have been used in the search for base metal targets. There appears to have been little or no work in the southernmost part of the tenement. Soil and rock chip sampling programs have been conducted on only parts of the extant grids (Figure 3).

Gold exploration has comprised some surface and core assaying at Mt Selina (Figure 3) which may be of dubious quality, together with some surface rock chip sampling. The northern part of the tenement was covered by sparsely spaced stream sediment sampling and some rock chip sampling while, in the Lake Dora area, rock chip and dump sampling predominated (a somewhat limited exploration tool in a region of poor outcrop). At Mt Selina, gold appears to have been a part of the search strategy based on the Mt Lyell model, but only limited assaying was done. The reconnaissance stream sediment and rock chip programmes may have been driven by the discovery of the Henty gold deposit in the 1980s. The little work that has been done for gold appears to have operated on the



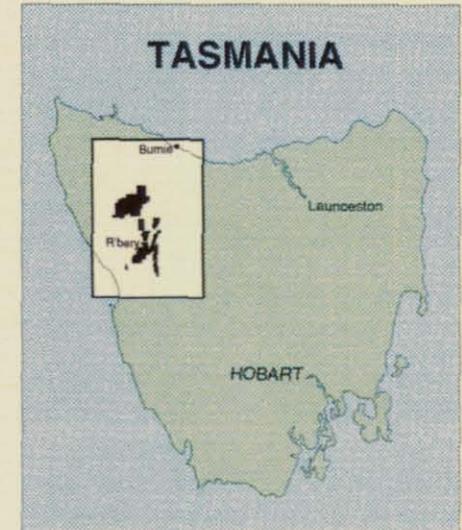
413065  
Somerset  
BURNIE  
BASS STRAIT

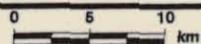
5 450 000mN

5 400 000mN

5 350 000mN

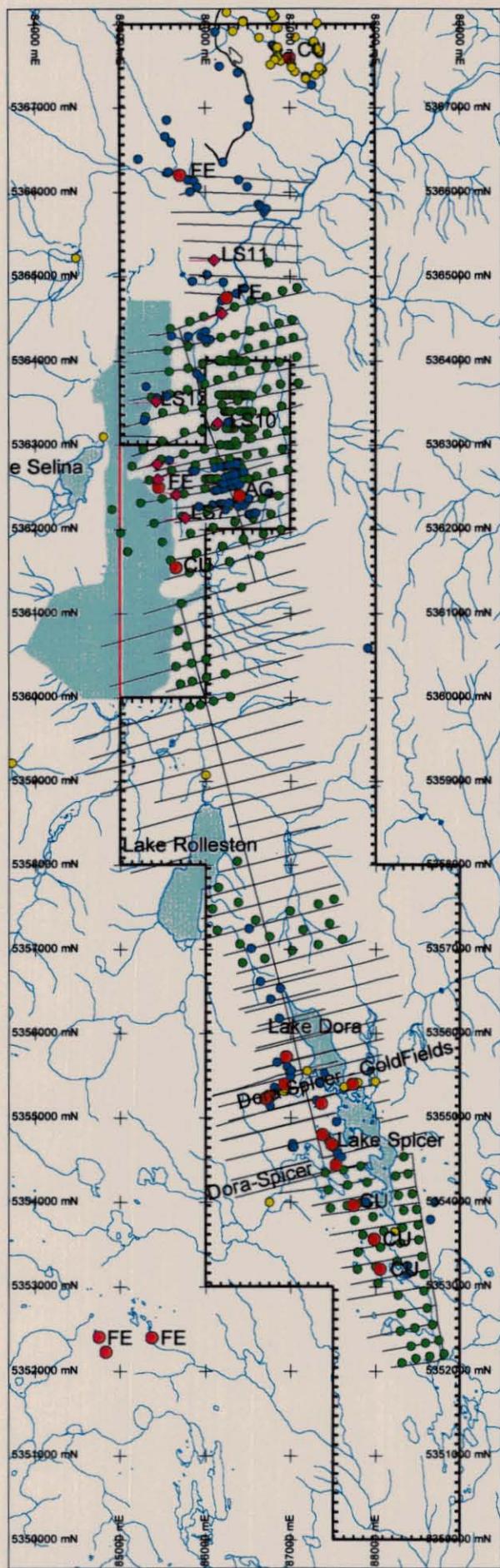
SOUTHERN OCEAN  
350 000mE



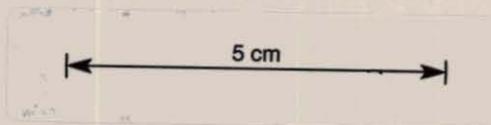
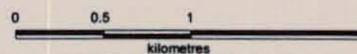
 <b>PASMINGO EXPLORATION</b> A Division of Pasma Australia Limited	
COMPILED : G.M.B. DATE : Feb., 1997 DRAWN : G.M.B. REVISIONS :	<b>E.L. 24/96 - WALFORD PEAK</b>  <b>LOCATION</b>  <b>MAP</b>
FILE : WALF_LOC  DRAWING No.	SCALE 1:500,000 
	FIG. No. <b>1</b>

5 cm





Pasmenco Ltd	
EL24/96 Walford Peak Fig.3 Exploration Work	
Date: 23/6/1997	
Author: FCM	
Office: Melbourne	
Drawing: MIA	
Scale: 1:75000	Projection: AMG Zone 55 (AGD 66)



**LEGEND**

- Stream Sediment Sample Location
- Rock Chip Sample Location
- Soil Sample Location
- Pasmenco Mineral Occurrences
- ◆ Drillhole Collar and Trace
- Access Track
- Grid Line
- Drainage
- Lake
- ▨ Pasmenco Walford Peak Tenement
- ▭ EL103/87 Acacia

assumption that there may be gold associated with the known mineralisation and alteration. Only at North Selina has there been an attempt at grass roots gold exploration on a regional basis.

Examination of the regional geology around Mt Selina suggests comparisons with the geology at Mt Leyshon in Queensland. There are also similarities in the alteration patterns at Selina and Mt Leyshon, the parallels drawn here leading to a new interpretation of the "Selina Conglomerate" unit as a breccia vent, like the Mt Leyshon Vent Breccia. This new perspective suggests potential for the discovery of a significant gold deposit within the tenement. Mt Leyshon is host to a *ca* 3 million ounce deposit.

## 2 REGIONAL GEOLOGY

Figure 2 is derived from the published 1:25 000 scale maps. The northern boundary of the tenement contains the southernmost extremities of the Murchison Granite, a Cambrian intrusive complex about 7.5km long by up to 3km wide. Whole rock analyses of unaltered Murchison Granite indicate a dioritic composition, high potassium content and a high  $Fe_2O_3/FeO$  ratio. This suggests the Murchison Granite could have been a good source for gold mineralised fluids and a possible source rock for gold and copper/gold deposits in the area. There is significant hydrothermal alteration surrounding the Murchison Granite.

The eastern edge of EL 24/96 comprises Precambrian Tyennan basement, a metamorphic terrain described as predominantly phyllites and quartzites. The basement is unconformably overlain by the Cambrian Mt Read Belt comprising the Sticht Range Beds and Tyndall Group. To the west, and overlying them, are the Cambro-Ordovician Owen Conglomerates. The contact between these two units appears to be unconformable in some places, and faulted in others.

The Sticht Range Beds comprise sediments from pebble-cobble conglomerates to siltstones and minor black shales and volcanoclastic units.

The Tyndall Group comprises predominantly volcanoclastics with some tuffs, volcanoclastic conglomerates, porphyritic lavas and massive to flow banded porphyries. The rocks range from andesitic to rhyolitic in composition.

**3.1 Aeromagnetics**

The northern boundary of EL 24/96 is close to the southernmost extremity of the Murchison Granite which has a complex signature of magnetic highs and lows (Figure 4). The Cambrian volcanics comprise a south trending ridge with a positive magnetic signature which extends from the southeastern edge of the Murchison Granite for some 17km to the south. Although the geology map of the area suggests the volcanics extend further south than this, the magnetics suggest a northwest trending fault or unconformity pinches out the unit at or around Lake Spicer.

There are a number of stronger aeromagnetic highs along the volcanic belt, and these are proximal to the known areas of alteration and mineralisation.

Two strong magnetic highs underlie the Selina Prospect and they cover an area of about 2 square kms. Between the two highs is a magnetically quiet area about 0.5km wide. The magnetic anomaly underlies a unit of the Mt Read Belt variously described as a conglomerate and a breccia. This unit will be discussed in some detail below.

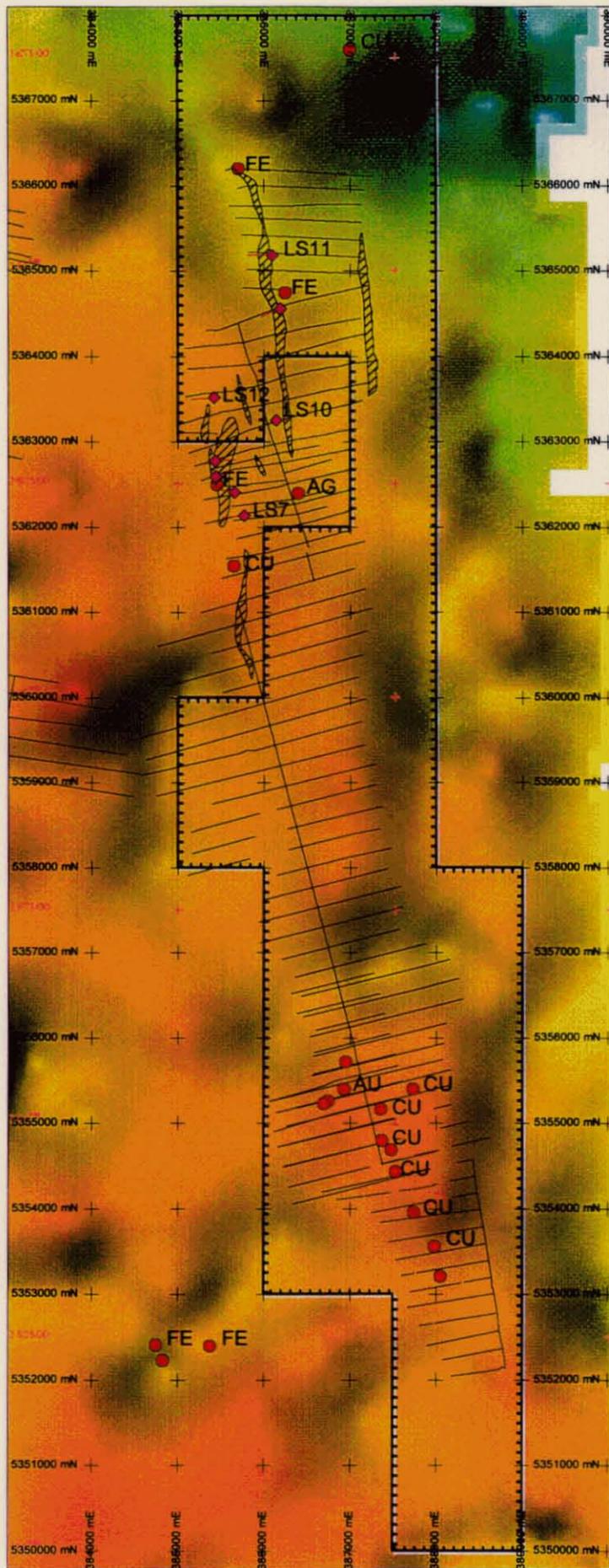
A small magnetic high underlies known minor base metal mineralisation approximately midway between Lake Selina and Lake Rolleston, which was originally explored as part of the Selina Prospect (LS 1, LS 2 and LS 3 tested this area, which is around the old Lake Selina workings)

A group of three magnetic highs is associated with the old copper workings at Lake Dora, with a further two less strong magnetic highs proximal to the workings at the northern end of the Dora system.

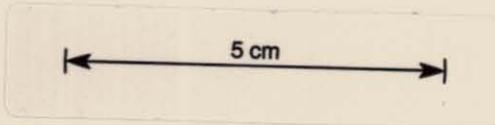
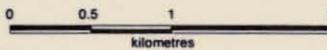
**3.2 Gravity**

There are a number of subdued gravity highs (Figure 5) within the tenement that appear to be associated with the aeromagnetic highs. These gravity highs could be associated with accumulations of sulphides (and associated gold). At the Lake Selina workings (outside





Pasmenco Ltd	
EL24/96 Walford Peak Fig.5 Gravity	
Date: 17/01/1997	
Author: FCM	
Office: Melbourne	
Drawing: MSA	
Scale: 1:75000	Projection: AMG Zone 55 (AGD 86)



LEGEND	
	Drillhole Collar and Trace
	Mineral Occurrence
	Grid Line
	Pyrite Zone
	Pasmenco Walford Peak Tenement

EL 24/96) base metal mineralisation is associated with a gravity high and to the immediate north, a small aeromagnetic high. At the Selina Prospect the gravity high underlies the central part of the "Selina Conglomerate", and is juxtaposed between the two aeromagnetic highs. Similarly at the Dora Prospect, the gravity high lies in the central part of the area covered by the three magnetic highs. There are two further gravity highs in the Lake Rolleston area, one of which is associated with an aeromagnetic high.

Both the aeromagnetic and gravity data will be discussed further in the context of the various prospects within the tenement.

## **4 SELINA PROSPECT**

### **4.1 Access and Infrastructure**

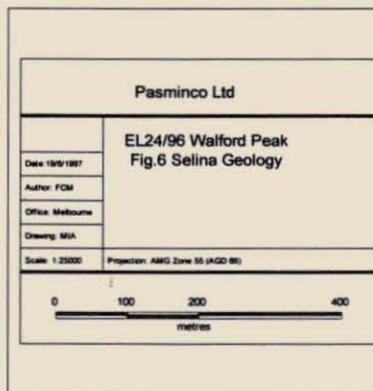
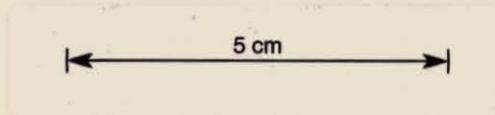
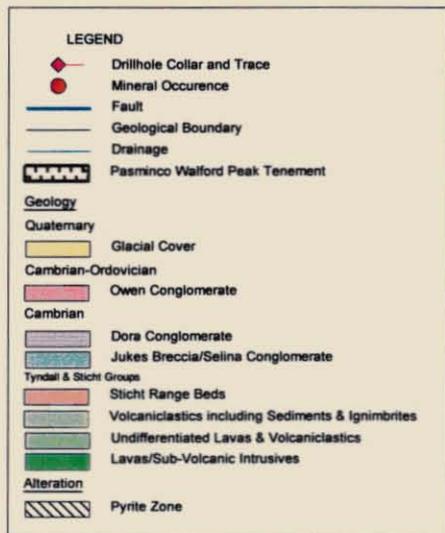
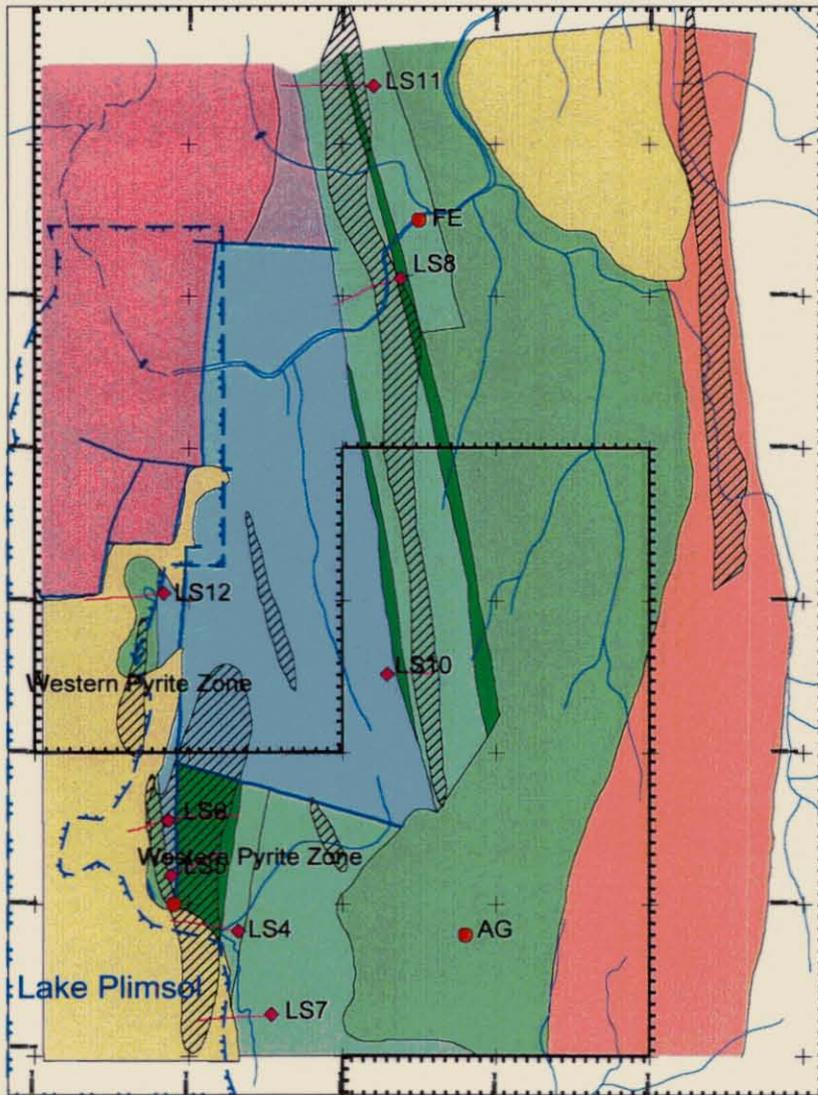
The new bitumen highway between Tullah and Queenstown, the Anthony Road, passes within 1km of the Selina Prospect. There is a dirt road through the centre of the area, but access to it has been cut off by the waters of the new Hydro dam, Lake Plimsoll. Access via the road over the dam wall allows travel by vehicle to within 15-20m of the dirt road.

Water is readily available in the natural lakes and Hydro dams in the immediate vicinity, including the new Lake Plimsoll, directly on the edge of the Prospect. Major power lines traverse the area within sight of the prospect.

The railway line is 15-20km away at Rosebery.

### **4.2 Past Exploration**

Modern exploration commenced in the area (Figure 6) following the granting of EL 9/66. Exploration around Selina began when the Mt Lyell Mining and Railway Co extended their area of investigation northward from old workings near Lake Selina. Initially, in the early 1970s, their work encompassed the area to the south of Mt Selina (outside EL 24/96). Seven diamond holes were drilled to test geophysical targets, specifically a north-south striking zone of chargeability highs coincident with magnetic highs which became



know as the Western Pyrite Zone (Figure 6). Drilling intersected a zone of pyrite with associated minor chalcopyrite, sphalerite and galena. The area of investigation was then extended to the northeast, and in 1980-1981 a second zone, the Eastern Pyrite Zone was discovered. A further five diamond holes were drilled by Gold Fields Exploration, three to test the newly discovered Eastern Pyrite Zone, and two to test the northern extent of the Western Pyrite Zone. One final hole was drilled in 1985 to test a lead zinc soil geochemical anomaly on the southern extremity of the Eastern Pyrite Zone.

The soil geochemistry, ground magnetics and IP surveys covered the whole Selina area, including that part of it which lies within EL 24/96. However most of the Western Pyrite Zone and a significant part of the Eastern Pyrite Zone areas are outside Pasmenco's tenement. Only diamond drill holes LS 8, LS 11 and LS 12 fall within Pasmenco's ground.

Gold Fields dropped the northern part of the Selina area, the part now encompassed by EL 24/96, and it was taken up by Aberfoyle Resources as EL 5/85. They did some regional work, concentrating on the North Selina area. The "Selina Conglomerate", in the far southwestern square kilometre of the tenement, was not mapped or sampled as part of their work programme. They relinquished the area in 1993.

When Gold Fields dropped the rest of the Selina area, Acacia (Billiton) took it up as EL 103/87. They proposed to look for volcanic-hosted massive sulphide deposits at depths greater than 200m. The Acacia tenement contained the major portion of the Western and Eastern Pyrite Zones. Their exploration, therefore did not cover the "Selina Conglomerate", as it lay only marginally along the tenement border to the northwest.

The division of the area into two separate tenements may have hampered a proper evaluation of the "Selina Conglomerate", which lies at the centre of a major alteration zone beginning with the Western Pyrite Zone in the south and ending at the northern end of the Eastern Pyrite Zone in the north, and overlying two significant magnetic highs and a gravity high. These features will be discussed further below.

### 4.3 Geology

The Selina area (Figure 6) is predominantly formed of Tyndall Group rocks: Cambrian age epiclastics or pyroclastics, with minor quartz feldspar phyric lavas and crystal tuffs. These units are steeply dipping and west facing. They are underlain by the Cambrian Sticht Range Beds, a sequence of siliceous conglomerates, quartz sandstones, siltstones and minor black shales. Unconformable underlying the Sticht Range beds is the Precambrian basement. The basement outcrops about 3km east of the Prospect.

Within the Selina area a number of intrusive units have been identified (Figure 6 & 7), comprising rhyolitic-dacitic quartz feldspar biotite porphyries and coarser textured granite. Whether these intrude into the volcanics or have been tectonically emplaced has not been determined. To the west, the volcanic sequence is in faulted contact with the younger sediments of the Owen Conglomerates.

Within the central part of the Selina area is an area approximately 1.8km by 0.65km which has been variously described as Jukes Breccia, Jukes Conglomerate, Dora Conglomerate and Selina Conglomerate. Steve Hunns, in his honours thesis (1987), described the unit as the "Selina Conglomerate" whose contacts with the Selina Volcanics are obscured by soil and vegetation, but the contact is crossed in LS 10, where it is a sharp boundary. Hunns (1987) concluded that there was a disconformity with the Selina Volcanics.

The "Selina Conglomerate" is described by Hunns (1987) as "a grey-green, purple, weakly to strongly foliated, massive, poorly sorted and poorly bedded matrix-supported polymict conglomerate with rare to occasional intercalated 'tuffaceous' beds (up to 20cm thick). The clasts vary from quartzite pebbles, quartz, feldspar and quartz/feldspar-phyric volcanoclastics, Sticht Range Sediments, red chert(?) fragments, hematitic pebbles, quartz grains (up to 2.5mm in diameter), rare granitic fragments and rare sulphide fragments (G. Purvis *pers. comm*). The clasts are angular to rounded in form and have a variable range size from  $\leq 1$ cm up to 1-2m long and 1m wide. Some of the larger clasts are weakly to moderately fractured, with limonitic coatings along the fracture planes. The matrix is fine grained and pale green in colour. Lenses of larger clasts are separated by thin lenses of grit size material. Numerous milky white quartz veins with specular hematite, +/- chlorite

and quartz, chlorite and potassium feldspar veins cut the Selina Conglomerate.” Hunns also noted clasts within the “Selina Conglomerate” which were exotic to the area. It is here *speculated* that the source of the clasts lies beneath the “Selina Conglomerate”, and that the unit is a vent breccia. A comparison of the “Selina Conglomerate” with the Mt Leyshon Vent Breccia shows a striking number of similarities, outlined in Table 1.

**Table 1**  
**Comparison of Mt Leyshon Vent Breccia and Selina “Conglomerate”/Breccia**

	Mt Leyshon Vent Breccia	Selina “Conglomerate”/Breccia
Rock general description	<i>polymict - matrix supported</i>	<i>polymict - matrix supported</i>
Clast size	<i>cobble to pebble but up to 1m</i>	<i>51cm up to 1m</i>
Clast size	<i>subrounded to angular</i>	<i>rounded to angular</i>
Clast composition	<i>various country rocks</i>	<i>various country rocks - presence of granitic clasts - lack of obvious source regions for some volcanic clasts suggests source below rather than lateral to deposit</i>
Matrix	<i>clay, chlorite, muscovite and fine rock</i>	<i>fine grained, pale green</i>
Matrix colour	<i>grey green to black green</i>	<i>pale green, some black-green</i>
Contacts	<i>possibly fault bounded</i>	<i>fault boundaries interpreted by geophysics and mapping - contacts not evident on ground, sharp in drill hole LS10</i>
Size of unit	<i>1.5km diameter</i>	<i>1.8km x 0.65km</i>
Layering	<i>crudely layered in sequences up to 30m thick; upper portions boulder rich grading to finer metasedimentary-porphyry lapilli tuffs</i>	<i>occasional intercalated tuffaceous beds</i>

Geological sections (Figure 7) based on the six drill holes in the “Selina Conglomerate” area and the mapped surface geology, suggest structures dipping to the east on the western side of the “Selina Conglomerate”. The only diamond drill hole to pass through the unit, LS 10, shows the probably faulted eastern contact dipping moderately to the west. This structural pattern is consistent with the interpretation of the unit as a vent breccia.

Drill holes and surface mapping both suggest the volcanics immediately adjacent to the “Selina Conglomerate” are brecciated, with the breccia matrix comprising alteration minerals including hematite, silica, magnetite and chlorite. The apparent concentration of brecciation in the volcanics to the area adjacent to the “Selina Conglomerate” supports the hypothesis that the “Selina Conglomerate” is related to the brecciation.

#### 4.4 Geophysics

Ground magnetic surveys suggest a strong magnetic source beneath Mt Selina in line with the aeromagnetics. Shallow magnetic sources correspond to the Western Pyrite Zone and Eastern Pyrite Zones of Gold Fields. The IP data (Figures 8 and 9) shows the two Zones as conductivity highs. More resistive zones occur in the eastern part of the "Selina Conglomerate", and on its western border.

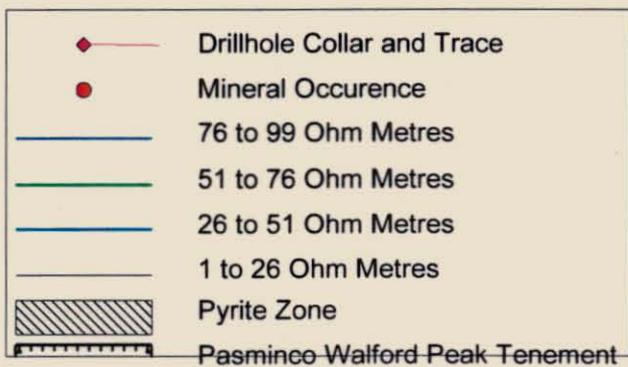
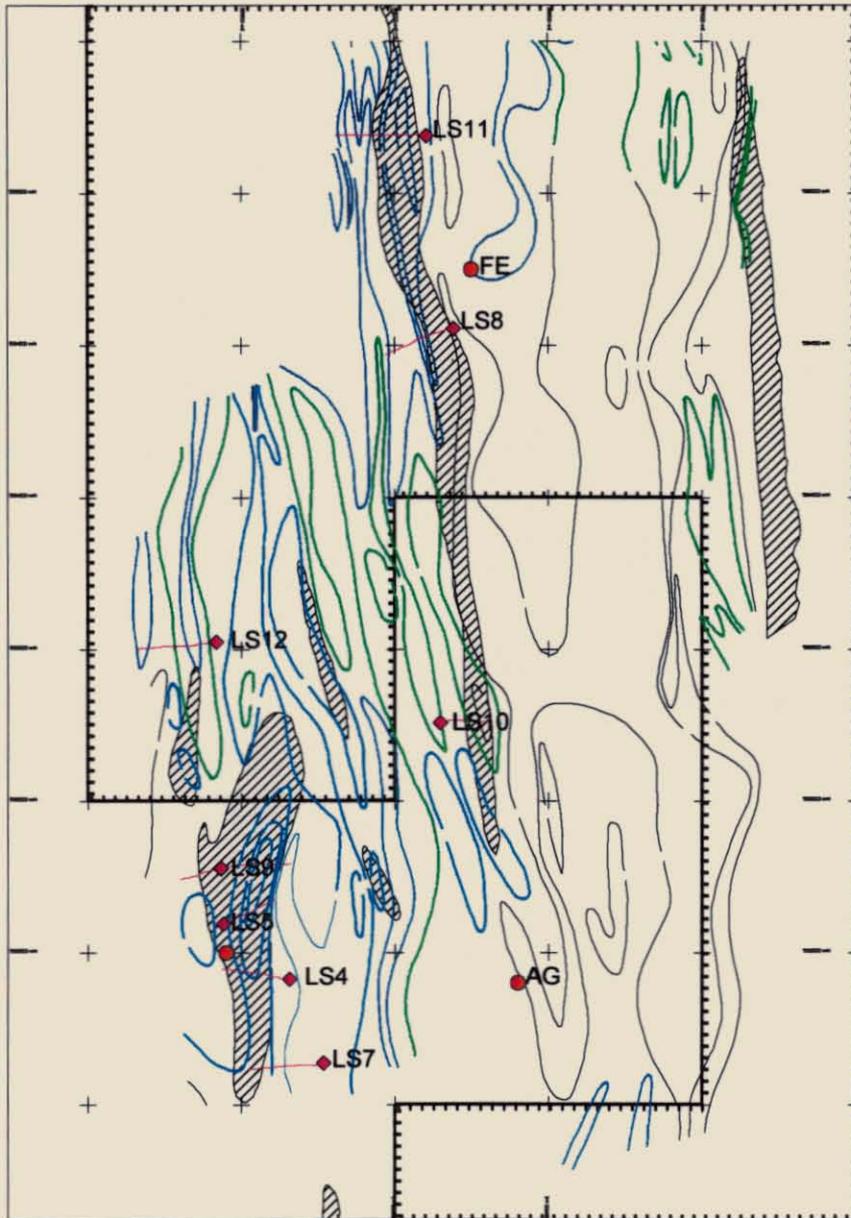
When the magnetics is combined with the IP data, it becomes apparent that the eastern aeromagnetic high corresponds with the eastern chargeability high, and these can be roughly correlated with the Eastern Pyrite Zone. However, in the west the magnetic high does not correspond to the chargeability high, which is at some distance to the south. Instead it is associated with a more resistive region.

It can therefore be deduced that the magnetic and IP signatures of the area have different associations. A possible interpretation is that there has been more than one episode of intrusive/hydrothermal events in the area. Multiple events are a necessary precursor to the Mt Leyshon style of mineralisation.

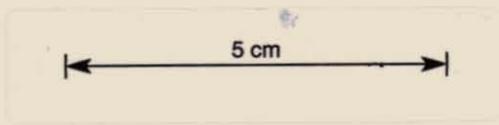
Figure 10 is an interpretation of the geophysical data illustrating the different associations of the magnetic and resistive areas in the east and west of the Selina area.

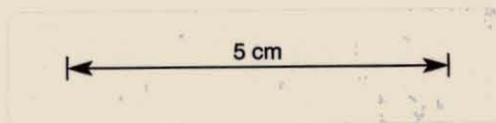
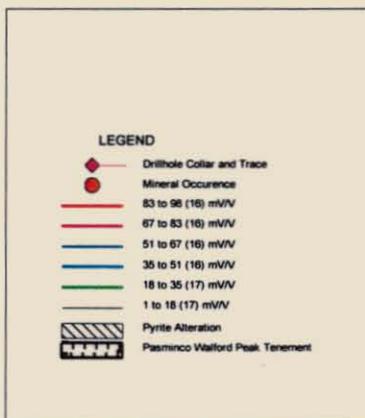
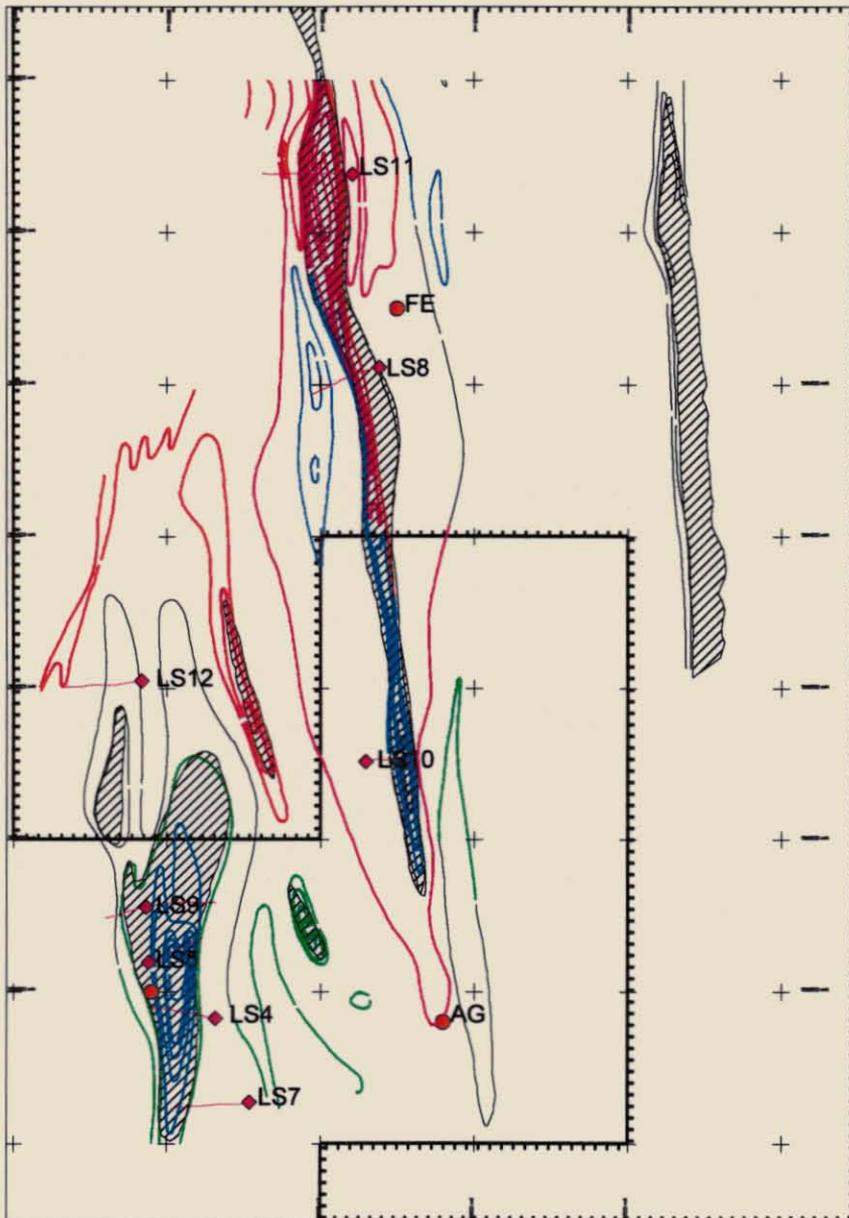
#### 4.5 Geochemistry

The Selina area was subjected to grid soil geochemical sampling (Figure 11A, 11D). 'C' horizon soil was assayed for copper, lead and zinc. However the survey results proved to be unreliable, with drill hole intersections of anomalous base metals being overlain by soil samples with assays below or close to detection limits. Any future work in the area should take this fact into account. Figure 11 shows the distribution in ppm for Zn(A), Cu(B), Pb(C) and Au(D).

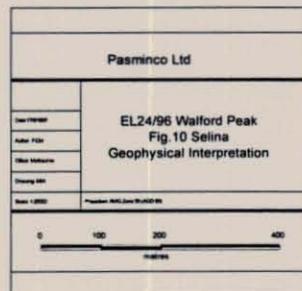
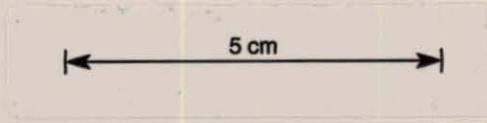
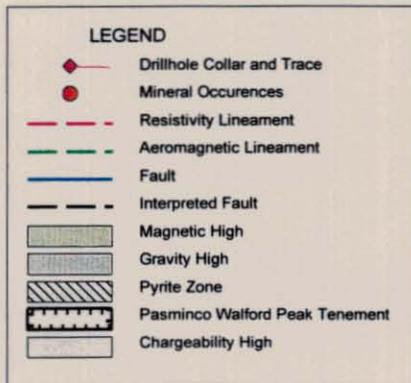
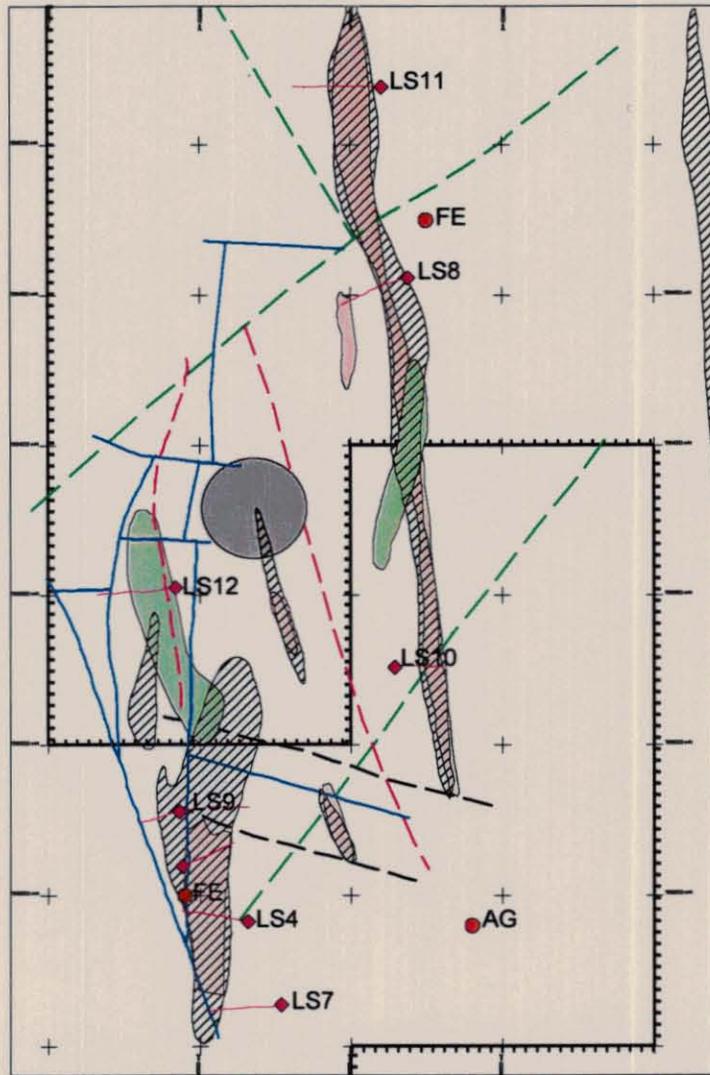


Pasmenco Ltd	
Date: 16/6/1997	Fig.8 EL24/96 Walford Peak Selina Gradient Array IP - Resistivity
Author: FCM	
Office: Melbourne	
Drawing: MIA	
Scale: 1:25000	
Projection: AMG Zone 56 (AGD 66)	

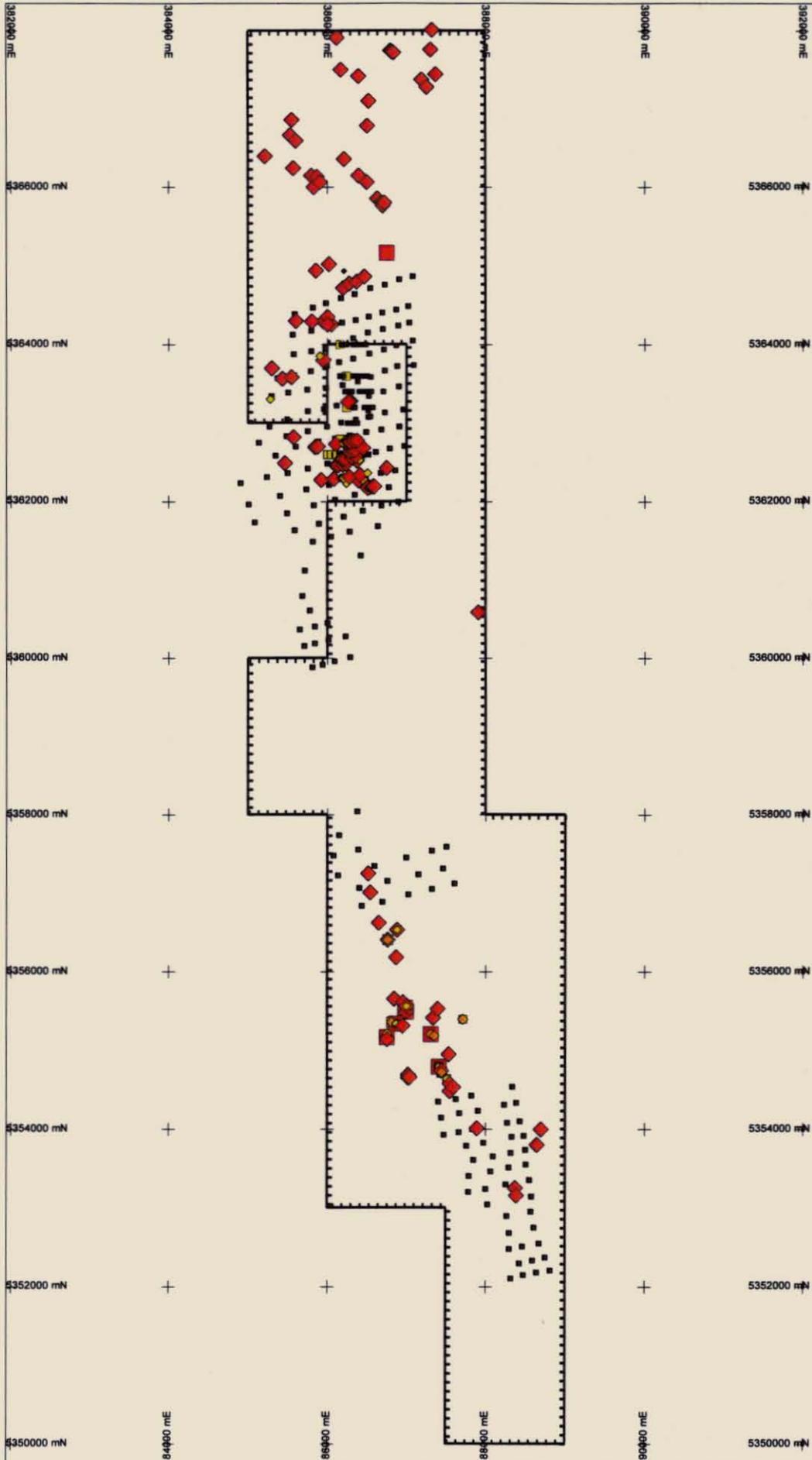




<b>Pasmenco Ltd</b>	
<b>Date:</b> 15/9/1997	<b>Fig.9 EL24/96 Walford Peak Selina Gradient Array IP - Chargeability</b>
<b>Author:</b> FGM	
<b>Office:</b> Melbourne	
<b>Drawing:</b> MIA	
<b>Scale:</b> 1:25000	
<b>Projection:</b> AMG Zone 58 (AGD 86)	



Pasminco Ltd	
EL24/96 Walford Peak Fig.11A Soil & Rock Chip Zinc (ppm)	
Author:	
Date:	
Scale:	

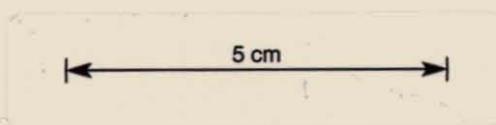


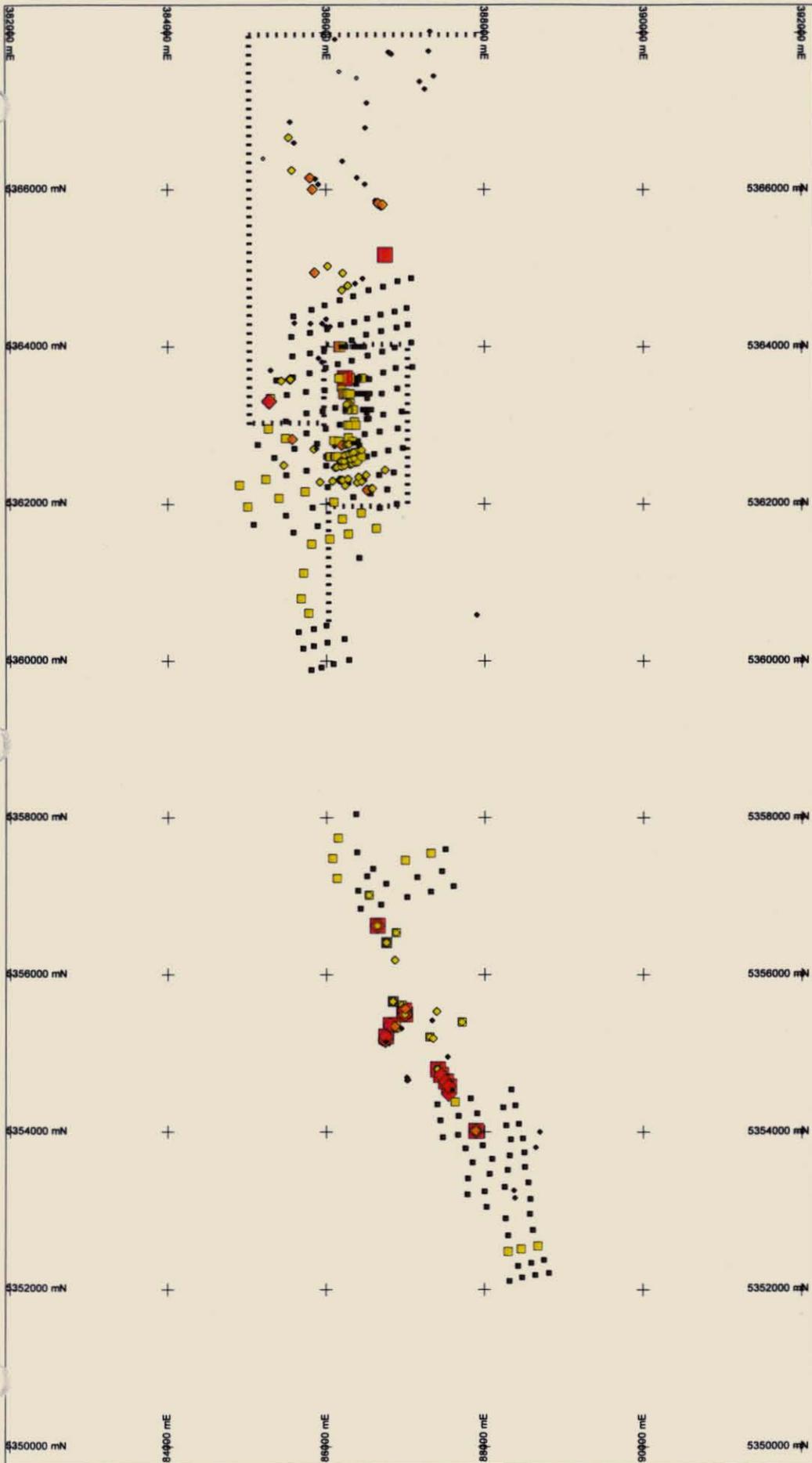
**WP\_RockChip\_by Zn\_ppm**

- 4,000 to 8,300 (5)
- ◊ 1,000 to 4,000 (22)
- ◊ 500 to 1,000 (29)
- ◊ 0 to 500 (137)

**WP\_Soil\_by Zn\_ppm**

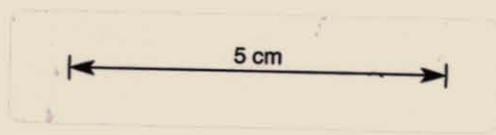
- 2,500 to 8,300 (8)
- 1,500 to 2,500 (5)
- 350 to 1,500 (41)
- 0 to 350 (256)



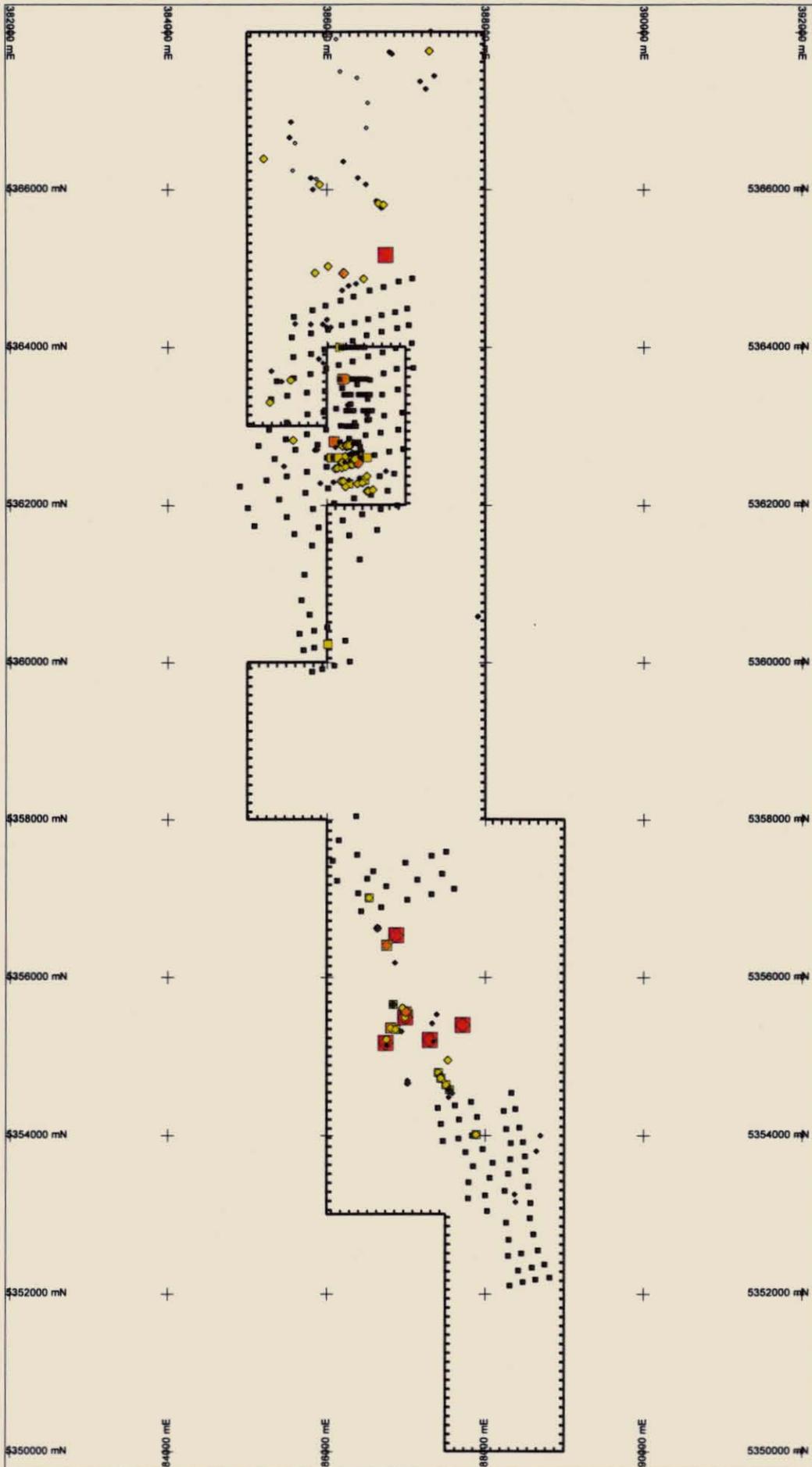


Pasminco Ltd	
Date: 20/9/1987	EL24/96 Walford Peak Fig.11B Soil & Rock Chip Copper (ppm)
Author: FCM	
Office: Melbourne	
Drawing: SEA	
Scale: 1:75000	Projection: AMG Zone 56 (AGD 86)

WP_RockChip_by Cu_ppm	
◆	2,000 to 8,750 (23)
◆	800 to 2,000 (4)
◆	250 to 800 (22)
◆	40 to 250 (85)
•	0 to 40 (56)
WP_Soil_by Cu_ppm	
■	1,450 to 8,750 (21)
■	600 to 1,450 (8)
■	200 to 600 (13)
■	15 to 200 (73)
■	0 to 15 (193)



413083



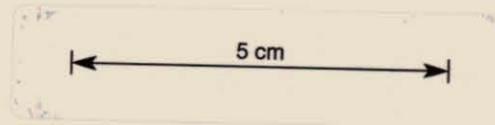
Pasmenco Ltd	
EL24/96 Walford Peak Fig.11C Soil & Rock Chip Lead (ppm)	
Date: 25/9/1997	
Author: FGM	
Office: Melbourne	
Drawing: MA	
Scale: 1:7500	Projection: AMG Zone 56 (AGD 86)

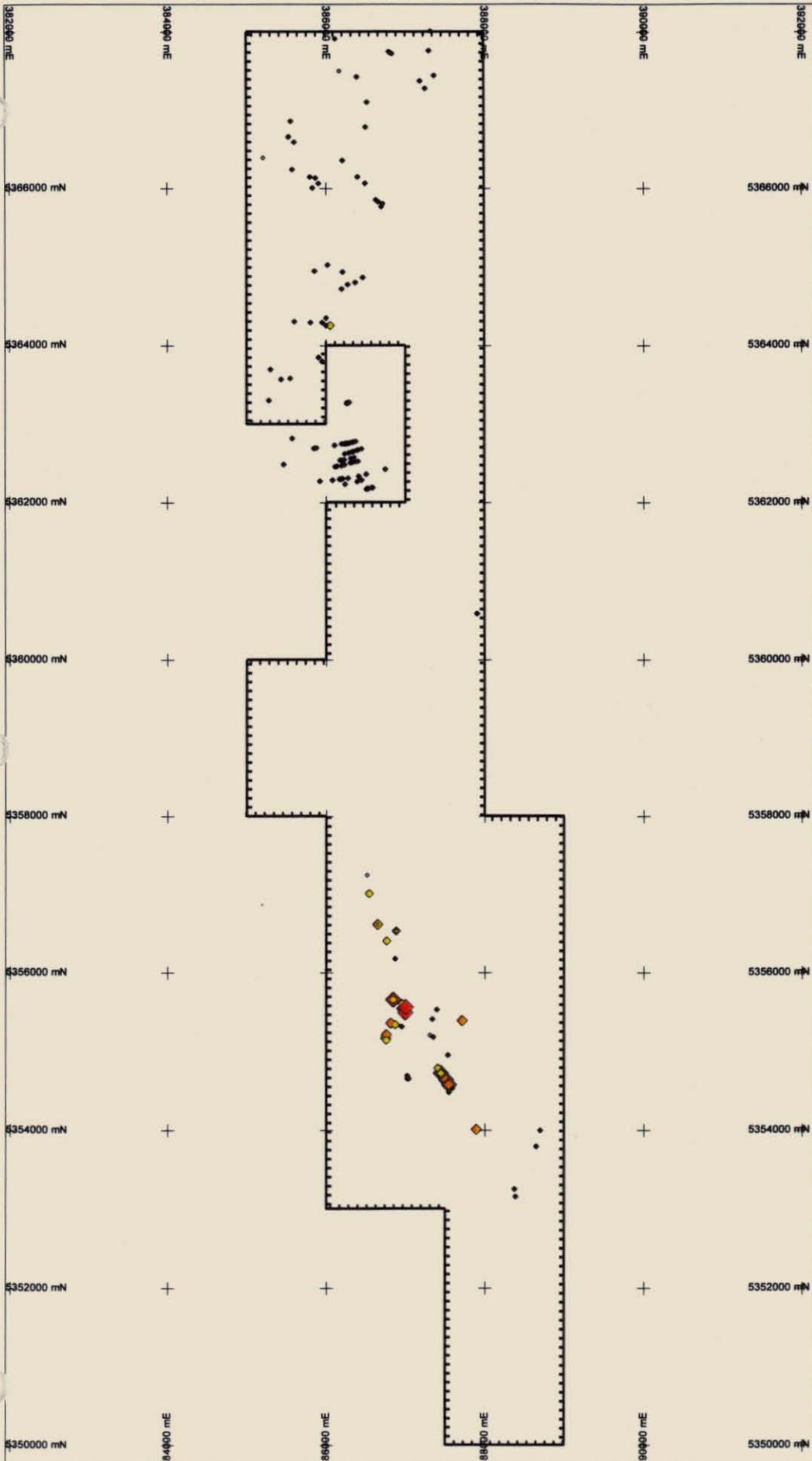
**WP\_RockChip\_by Pb\_ppm**

- ◆ 2,800 to 8,600 (6)
- ◇ 1,300 to 2,800 (15)
- ◇ 150 to 1,300 (74)
- 0 to 150 (89)

**WP\_Soil\_by Pb\_ppm**

- 1,700 to 8,600 (9)
- 1,100 to 1,700 (9)
- 300 to 1,100 (33)
- 0 to 300 (259)

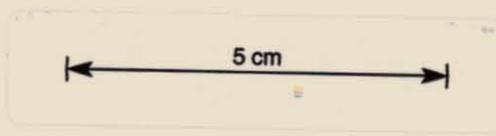




Pasmenco Ltd	
Date: 25/9/1997	EL24/96 Walford Peak Fig. 11D Soil & Rock Chip Gold (ppm)
Author: PGM	
Office: Melbourne	
Drawing: MIA	
Scale: 1:5000	Projection: AMG Zone 55 (AGD 86)

**WP\_RockChip\_by Au\_ppm**

◆	145 to 370	(8)
◇	60 to 145	(15)
◇	0.01 to 60	(27)
•	0 to 0.01	(133)



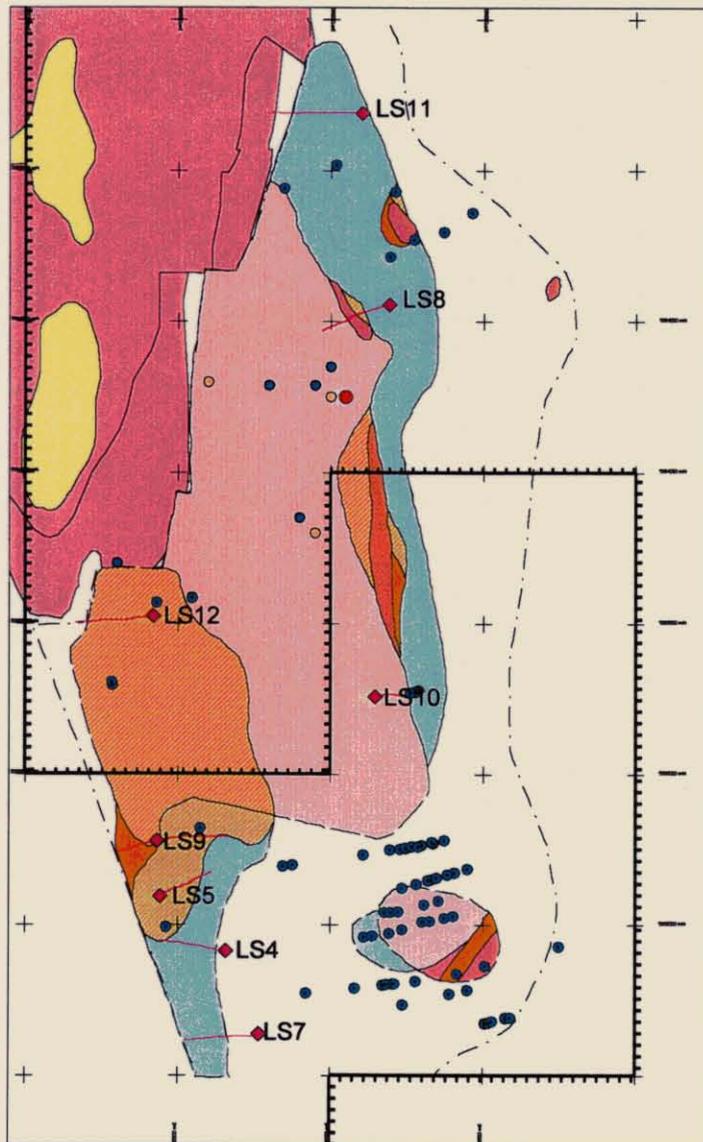
#### 4.6 Diamond Drilling

Thirteen diamond drill holes were drilled in the general area (Figure 6). Three of these were to the south around the Lake Selina workings, five were drilled in the alteration zone to the southwest of the "Selina Conglomerate". One hole was drilled on the southeastern edge of the system. LS 10, the only hole collared in the "Selina Conglomerate" was the most silicified of the drill holes. Two holes (LS 8 and LS 11) were drilled into the northern part of the alteration system. One hole, LS 12 was drilled directly to the east of the "Selina Conglomerate". Of these holes, only LS 8, LS 11 and LS 12 are within EL24/96. Most of the holes were targeted at the pyrite halo around the outer part of the alteration zone. They intersected areas of weak to strong pyrite and magnetite with associated weak base metal sulphides - chalcopyrite, sphalerite and galena. In most cases only zones of visible sulphides were assayed. LS 12 was not even cut as it did not have any significant pyrite mineralisation.

#### 4.7 Alteration

The Selina alteration zone is 3 kms long by up to 1km wide (Figure 12). The southern part of this alteration system merges with the northern part of the Lake Selina system, which appears from the aeromagnetics to have a different source. Selina's major alteration minerals are chlorite, sericite, potassium feldspar, quartz, pyrite, magnetite and hematite. Other alteration minerals include calcite, dolomite, epidote and apatite. Chlorite has the widest abundance, and potassic and sericite/quartz alteration zones forming north-south elongate zones within it.

Pyrite and magnetite are roughly concentrated on the northeastern and southwestern parts of the system, and around the southern and eastern margins of the "Selina Conglomerate". The central part of the alteration zone is the "Selina Conglomerate", where hematite predominates with quartz, chlorite and potassium feldspar (could this be alunite?) veining. Chlorite alteration is described as minor and sporadic. The rough zonation from pyrite through pyrite/magnetite to magnetite/hematite to hematite alteration suggests that the lower temperature, possibly later stage, fluids are concentrated in the central part of the system, in and directly adjacent to the "Selina Conglomerate".



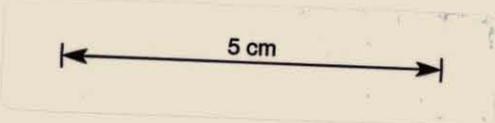
<b>LEGEND</b>	
	Rock Chip Sample Location with Au ppm
	Drillhole Collar and Trace
	Chlorite Alteration Boundary
	Uncertain Alteration Boundary
	Alteration Boundary
	Selina Breccia with Magnetite Alteration
	Selina Breccia
	Magnetite & Haematite Alteration
	Magnetite & Pyrite Alteration
	Magnetite Alteration
	Haematite Alteration
	Pyrite Alteration
	Quaternary Glacial Till
	Owen Conglomerate
	Pasminco Walford Peak Tenement

<b>WPchipsN by Au_ppm</b>	
	0.01 to 5 (6)
	0.005 to 0.01 (4)
	0.001 to 0.005 (5)
	0 to 0.001 (127)
	* all others (54)

Pasminco Ltd								
<table border="1"> <tr><td> </td></tr> </table>								EL24/96 Walford Peak Fig.12 Selina Pyrite Magnetite Haematite Alteration
Scale 1:2500	Project: PASL24/96-01-02-03							



The described mineralisation in the area amounts to pyrite and pyrite/magnetite zones within the alteration envelope with associated minor chalcopyrite, sphalerite and galena. Lead isotope work on these sulphides suggests a hydrothermal source which had been generally concluded to be related to the Murchison Granite. A later overprint has been suggested related to the Tabberaberan Orogeny. Hunns (1987) concludes that there has been some amount of remobilisation of sulphides at a local level. This would exaggerate the concentration of alteration halo mineralisation into zones of structural weakness and more chemically receptive host rock, thus producing or simply enhancing pyrite rich linear zones, the Western and Eastern Pyrite Zones.

Examination of the area for gold began after the first drilling programme. The first few drill holes, from the Lake Selina area, were re-assayed for gold - presumably the areas of visible sulphides. It is unclear how much of the first seven drill holes were assayed for gold, but the results are open to question in any event, as the core was assayed at the Mt Lyell laboratory using a method with a detection limit of 0.1ppm Au. LS 4 is noted as containing 5.2m at 0.2g/t Au and 3.4g/t Ag. LS 6 was noted as containing 15ft at 57.2g/t Ag and 25ft at 16g/t Ag.

Drill holes LS 8 through LS 11 are stated to have been assayed for gold with 2m in every 6 being assayed. The stated detection limit for this series was 0.01ppm Au. However assay results on drill logs suggest more limited zones within the core were sampled at this level. LS10 is recorded as containing an interval of 23m at 0.01g/t Au and 2.1g/t Ag with a best 1m at 0.21g/t Au. LS 11 had 2m at 0.15g/t Au. Rock chip samples from the surface near the collar sites of LS 8 and LS 10 gave results of 0.3g/t Au and 0.1g/t Au respectively.

Gold and silver drill hole information is set out in Table 2.

Table 2

## Au and Ag Assaying of Drill Core from the Selina Area

Drill Hole	Core assayed for Au	Laboratory	Detection Limit (ppm)	Results
LS4	?	Mt Lyell	0.1	5.2m @ 0.2g/t Au 3.4g/t Ag
LS5	?	Mt Lyell	0.1	
LS6	?	Mt Lyell	0.1	15' @ 57.2g/t Ag 25' @ 16g/t Ag
LS7	?	?	?	
LS8*	stated 2m in every 6m recorded 222-224m and 240-355.2m 2m in 10m	Mt Lyell	0.1	
LS9	193-201m, 208-216m, 241-245m, 257-275m	?	0.01	
LS10	2m in every 6m 34.4-126.4m, 250.4-300.4m, all core 202.3-246.4m	?	0.01	23m @ 0.01g/t Au 2.1g/t Ag including 1m @ 0.21g/t Au
LS11*	2m in every 6m from 107m to 361m	?	0.01	2m @ 0.15g/t Au
LS12*				
LS13	1m in every 2m from 230-295m	?	0.005	1m @ 16g/t Ag

## 4.9 Discussion

As has been already stated, there is evidence to support a reinterpretation of the "Selina Conglomerate" as a Vent Breccia, with characteristics similar to the Mt Leyshon Vent Breccia. Thus, the alteration and mineralisation at Selina may be seen to focus around a breccia pipe. Comparisons of the regional geology and alteration at Selina with Mt Leyshon shows similar geological settings, alteration haloes, sulphides and oxides. The aeromagnetic anomaly that underlies the "Selina Conglomerate" is similar to the magnetic signature of Mt Leyshon. Even the proposed paragenesis of Mt Leyshon has some parallels with the proposed paragenesis of Hunns (1987), despite the fact that Hunns did not draw any comparisons between the Mt Leyshon Vent Breccia and his interpreted sedimentary "Selina Conglomerate". A new paragenetic sequence, based on a vent breccia interpretation, draws even closer parallels with Mt Leyshon. Comparisons between Mt Leyshon and Selina are set out in Table 3:

**Table 3**  
**Comparison of Mt. Leyshon and Selina Areas**

	Mt. Leyshon	Selina
Regional Geology	<p>Basement</p> <p><i>Ravenswood Granodiorite</i>  <i>Cape River Beds - metasediments: slates siltstones and sandstones</i>  <i>Rhyolite and dolerite dykes</i></p>	<p><i>Proterozoic metamorphics</i>  <i>Murchison Granite</i>  <i>Stitch Range Beds - siliceous</i>  <i>Conglomerates quartz sandstones</i>  <i>Siltstones and black shales</i></p>
	<p><i>Lapilli tuffs - ash tuff or metasediment originally interpreted as the early explosive phase of a diatreme</i></p>	<p><i>Epiclastics or pyroclashes; rhyolitic to andesite, clasts from mm to cm size</i></p>
	<p><i>Mt. Leyshon Vent Breccia</i></p>	<p><i>Selina Breccia (see Table 1)</i></p>
	<p><i>Porphyry plugs - trachytic to rhyolitic. Zoned from fresh to completely altered from core to margins</i></p>	<p><i>Porphyries - dacitic to rhyolitic - variable chlorite, sericite, potassic alteration</i></p>
	<p><i>Contact breccias and breccia dykes and brecciated sediments and porphyry fringes</i></p>	<p><i>Brecciation of volcanics, volcanoclastics, noted in drill holes proximal to the Selina Breccia</i></p>
	<p><i>Major host of the gold mineralisation Mt. Leyshon Breccia - clast supported breccia in NW section of the Mt. Leyshon Vent Breccia</i></p>	<p>?????????</p>
Alteration	<p><i>Sericite-pyrite. Most strongly developed in the crystal tuff porphyry flow sequence. Sometimes overprinted by propylitic alteration</i></p>	<p><i>Sericite-quartz. Sericite replacement of ground mass. Silica alteration associated with crosscutting pyrite veins</i></p>
	<p><i>Potassic alteration - predominantly biotite. Actinolite and magnetite occur with biotite in altered dolerites. Alunite in upper parts of deeply weathered orebody - associated with kaolinite, Fe oxides, jarosite and silicification - lower temperature epithermal association</i></p>	<p><i>K Feldspar replacement in cross cutting veins. Usually replaced by later chlorite-pyrite-magnetite overprint. Biotite noted associated with porphyries - primary or alteration? Lower temperature phase represented by haematite-silica alteration? Focus of haematite silica alteration in Selina Conglomerate/Breccia</i></p>
	<p><i>Pervasive chlorite - carbonate anatase believed to be associated with the introduction of gold and base metal sulphides</i></p>	<p><i>Intense chlorite alteration noted in areas directly to E,W and south of Selina Conglomerate as well as in the Breccia unit itself. Breccia fill in volcanics is predominantly chlorite. Chlorite is generally associated with pyrite and magnetite. Carbonate veins occur with or without other types of alteration</i></p>
Mineralisation Association	<p>Sulphides</p> <p><i>Major pyrite</i>  <i>Low Fe and high Fe sphalerite - disseminated and as vein and cavity fill.</i></p> <p><i>Galena in vein and cavity fill Chalcopyrite in vein and cavity fill</i></p>	<p>Sulphides</p> <p><i>Major pyrite</i>  <i>Sphalerite</i>  <i>Galena</i>  <i>Chalcopyrite</i></p>
Paragenesis	<p>Stage 1</p> <p><i>Localised development of quartz molybdenite stock works formed at temperature &gt;450° and high salinities. Limited K-alteration</i></p>	<p><i>Occurrence of molybdenite could suggest existence of this phase</i></p> <p>Stage 1 (Hunns 1987)</p> <p><i>Magnetite-pyrite ± chlorite with associated chalcopyrite as veins and disseminations.</i></p>

	<p>Stage 2</p> <p><i>Chlorite-pyrite matrix replacement with associated basemetal sulphide and bismuth sulphide vein and cavity fill. Temperature 300° - 400°. Low - moderate salinity. appreciable CO<sub>2</sub></i></p> <p>Stage 3</p> <p><i>Quartz basemetal sulphide-bismuth sulphide - electrum veins and veinlets especially in tuffs, pyroclastics and porphyries</i></p>	<p><i>Pyrite silica-sericite in schists. Temp ≤ 300°</i></p> <p>Stage 2 (Hunns 1987)</p> <p><i>Quartz carbonate ± chlorite veins. Temp &lt; 300°</i></p> <p>Stage 3 (Hunns 1987)</p> <p><i>Tabberabberan remobilisation and recrystallisation of base metal sulphides</i></p> <p>Gold</p> <p>??????</p>
	<p><i>Late stage. Predominantly within cavities and veins in the Mt. Leyshon Breccia and rebrecciated host rocks, tuffite dyke breccias and the latest porphyry units</i></p>	<p><i>Recrystallisation of base metal sulphides</i></p> <p>Gold</p> <p>????????</p>
Geophysics	<p>Geomagnetics</p> <p><i>Geomagnetic anomaly of 3km<sup>2</sup> containing a series of intense lows elongate along axis of anomaly (Low = magnetic high due to the "Late Palaeozoic Reversal Interval"). High magnetism resulting from magnetic alteration associated with biotite and magnetite in veins and veinlets. Magnetic anomaly commences proximal to the ore deposit, but most intense 1.5 to 2km to SW</i></p>	<p>Geomagnetics</p> <p><i>Geomagnetic anomaly (high) divided into two zones covering about 2.5km<sup>2</sup>. Zones are elongate N-S, about 1.4km long and 0.3km wide and they underlie the Selina Conglomerate/Breccia on its E and SW</i></p> <p>Gravity</p> <p><i>Underlying the centre of the aeromagnetic high, between the two ridges is a gravity high</i></p>

Crucial to the mineralisation at Mt Leyshon is the post-vent breccia. The vent breccia at Mt Leyshon is not itself mineralised, only the one area, the late stage Mt Leyshon Breccia and its immediate surroundings, hosts the ore body. This unit lies near the northern perimeter of the vent breccia. A description of the Mt Leyshon Breccia is set out in Table 4. Kidston, another multimillion ounce breccia pipe hosted deposit, is also variably mineralised, with gold concentrated in various deposits around the edges of the pipe. At Selina, geological mapping and investigation of the breccia has been neglected as a result of the division of the area into two tenements, and by the interpretation of the unit as an overlying sedimentary unit. So although no equivalent of the Mt Leyshon Breccia has been identified, it cannot be concluded that one will not be located. There is one small piece of evidence to support a second brecciation event within the Selina vent breccia. Hydrothermal fluids bearing the sulphide mineralisation would have post-dated the original breccia vent creation. G. Purvis' report of sulphide fragments within the vent breccia could only have got there by some later brecciating event.

**Table 4****Mt. Leyshon Breccia**

Clast size:	Polymict, clast supported, cobble to pebble up to 4m
Clast shape:	Angular to subrounded
Clast composition:	Various country rocks, locally monomict
Matrix:	Fine fragments, crystals and chloritic rock flour
Size:	300 m diameter
Location:	Edge of Vent Breccia, next to and under sediments and tuffs

The mineralisation at Mt Leyshon is interpreted to have resulted from a number of geological and hydrothermal events over a considerable time frame, with gold bearing hydrothermal fluids being very late in the sequence of events. As has been suggested above, the geophysical signature of the Selina area hints at a multiplicity of events. In addition, lead isotope work has given more than one answer for the age/source of the alteration minerals in the Selina area. However, it took years of detailed work to unravel the sequence of events at Mt Leyshon, and this type of scrutiny has not been given to the Selina area.

Traces of gold have been located at Selina in and around the drill holes, but no systematic sampling of the "Selina Conglomerate" has ever been undertaken (Figure 12). So it is possible to conclude that sporadic trace gold is present around the edges of the Selina vent breccia, but whether there is any significant gold concentration remains to be discovered.

Hunns (1987) examined the question of gold potential in the Selina area. Gold is widespread in the Mt Read Volcanics, as adjuncts to the base metals at Rosebery and Hellyer, as an important by-product at Mt Lyell, and as the primary metal at Henty. He was therefore concerned at the apparent lack of gold in the Selina area. He examined the phase diagrams for pyrite-magnetite-hematite and concluded that the Selina area was barren of gold because the path taken by the fluids did not cross any of the solubility boundaries for gold. This work can be seen in another perspective, and different conclusions will result. The fluids at Selina were apparently capable of carrying gold. It is evident that there was plenty of gold in the hydrothermal systems in that general area at the relevant time, as this is evidenced by the known deposits close by. The gold may have

stayed in solution, as Hunns (1987) suggests, but it would have eventually precipitated with the low temperature last fluids phases in the system, for example, quartz and hematite. These alteration phases are centred on the Selina Vent Breccia. One might therefore conclude that any gold accumulations would be related to the breccia.

However another question has also to be addressed. At Mt Leyshon the vent breccia is virtually intact, with some of the overlying volcanoclastics still evident. At Selina the breccia is exposed. The southern portion is two or three hundred metres higher than the northern edge. Is that part of the pipe missing, and has any possible gold deposit already been weathered away? This is not an easy question to answer. Firstly, the pipe may not be oriented in the same way as it was when it was formed. The country rocks dip steeply and face west. If they had been horizontal at the time the pipe was emplaced, this would make the upper part of the pipe on the eastern edge. Any orientation from horizontal to vertical is therefore theoretically possible. Detailed geological mapping should determine the question. From another perspective, Hunns (1987) mentions the occurrence of potassium feldspar as vein material in the "Selina Conglomerate". This material might be re-examined to determine whether it might be alunite. Alunite is symptomatic of the upper epithermal level of the Mt Leyshon mineralisation.

#### 4.10 Conclusions

1. The Selina area geology, alteration and aeromagnetics have similarities to the Mt Leyshon area in Queensland. Mt Leyshon contains a gold deposit of at least 3 million ounces.
2. The "Selina Conglomerate" could be reinterpreted as a vent breccia, similar to the Mt Leyshon Vent Breccia.
3. There is some evidence to support a complex history for the Selina area with more than one hydrothermal event, a necessary precursor for a Mt Leyshon style deposit.
4. There is scattered low level gold anomalism at Selina identified in the wall rocks of the postulated vent breccia.

5. Despite the loss of some of the postulated breccia pipe to erosion, the possible occurrence of alunite could indicate that the upper levels of a deposit might still exist.

#### 4.11 Work in Progress

Some rock chip samples were collected in the eastern and northern parts of the "Selina Conglomerate". These were small samples from outcrop in the Anthony River and a subsidiary creek. Gold assays were low, with a best 0.012g/t Au from a dark green/grey chloritic schist (Appendix 1).

The top 30m of LS 12 was cut and for Au assay (Appendix 2). LS 12 was collared in brecciated volcanics near the eastern perimeter of the "Selina Conglomerate", and it was drilled to the east, away from the "Selina Conglomerate". Results show low gold values, with best intercept of 0.006g/t Au.

The current work is an attempt to shortcut systematic exploration of the area, and as such its failure to identify a gold deposit should not be considered as discouraging. The gold distribution at Mt Leyshon is known to be extremely erratic, and large scale rock chip samples of at least 5-10kg each made up of a number of smaller chips over an area are necessary in order to effectively test for the occurrence of gold. The samples sent for assay were small, and in some cases only single rock chips. It is consequently risky to draw conclusions from the rock chip data, however there is an apparent trend from lower to higher gold from the eastern edge of the "Selina Conglomerate" towards the west. The rock chip results are shown in Figure 11A-D.

#### 4.12 Recommendations

1. Detailed mapping of the geology and alteration of the "Selina Conglomerate" to test the re-interpretation of the unit as a vent breccia and with a view to locating a possible analogue of the Mt Leyshon Breccia.
2. Microscope or X-ray diffraction of the potassium feldspar vein alteration within the "Selina Conglomerate" to determine whether it is alunite, an indicator alteration

mineral for low temperature epithermal areas of gold deposits. Alunite occurs in the upper levels of the Mt Leyshon deposit.

3. Pit or costean sampling across the "Selina Conglomerate" with large samples of 5-10kg being taken for gold assay. The area of the gravity high, and the eastern edge of the area may warrant early attention. Line spacings should be sufficiently close to intercept an area of mineralisation like Mt Leyshon, which is about 300m in diameter.
4. The cutting and assaying of the two drill holes LS 8 and LS 12 should have a low priority, as they were drilled into the wall rocks of the interpreted vent breccia.

## **5 NORTH SELINA PROSPECT**

### **5.1 Access and Infrastructure**

North Selina (Figure 13) is about 2km north of the Selina Prospect. The Anthony Road runs directly through it. Infrastructure is similar to that for Selina.

### **5.2 Past Exploration**

The only significant phase of exploration at North Selina comprised detailed mapping, reconnaissance -80 mesh stream sediment sampling and reconnaissance rock chip sampling by Aberfoyle Resources when they held the ground under EL5/85 (Figure 14). This work included testing for gold. Aberfoyle relinquished the area in 1993.

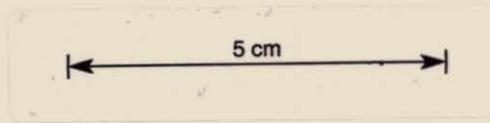
### **5.3 Geology**

The North Selina area (Figure 13) comprises Mt Read Volcanics similar to the Selina area to the south. The volcanics comprise volcanoclastics and lavas of dacitic to rhyolitic composition. The area is intruded by a porphyritic rhyolite unit. There is no equivalent to the "Selina Conglomerate", and there is no indication of significant brecciation in the area.

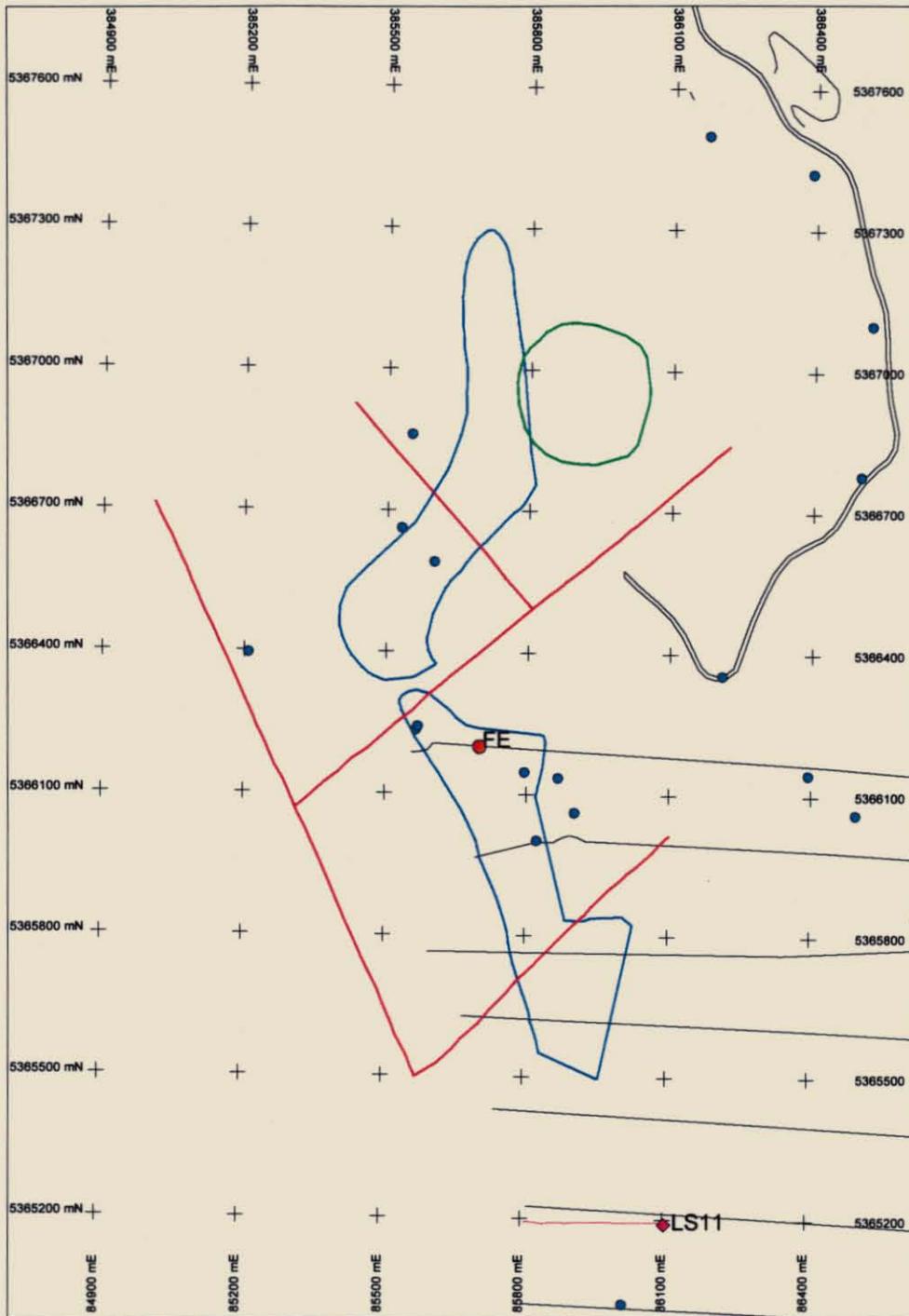


**LEGEND**

- Stream Sediment Sample Location
- Rock Chip Sample Location
- Soil Sample Location
- ◆ Drillhole Collar and Trace
- Uncertain Geological Boundary
- Geological Boundary
- Fault
- == Access Track
- Intrusive Porphyritic Rhyolite
- Quaternary Gravels
- Highly Altered
- Dacite
- Lavas/Sub-Volcanic Intrusives
- Pasmenco Walford Peak Tenement
- Precambrian Phyllite
- Granitic Rocks
- Glacial Till
- Denison Group Conglomerate
- Tyndall Grp & Sticht
- Pasmenco Walford Peak Tenement
- Volcanics

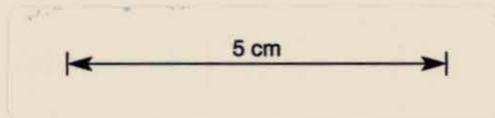


Pasmenco Ltd	
Date: 19/5/1997	EL24/96 Walford Peak Fig.13 North Selina Geology
Author: FCM	
Office: Melbourne	
Drawing: MIA	
Scale: 1:25000	Projection: AMG Zone 55 (AGD 66)



**LEGEND**

- ◆ Drillhole Collar and Trace
- Rock Chip Sample Location
- Mineral Occurrence
- Grid Line
- Access Track
- Aeromagnetic High
- Aeromagnetic Lineament
- Gravity High



Pasmaico Ltd	
Date: 13/6/1997	Fig. 14 EL24/96 Walford Peak North Selina Geophysical Interpretation
Author: FCM	
Office: Melbourne	
Drawing: MIA	
Scale: 1:15000	
Projection: Longitude / Latitude (AGD 86)	
0      100      200      400	

#### 5.4 Geophysics

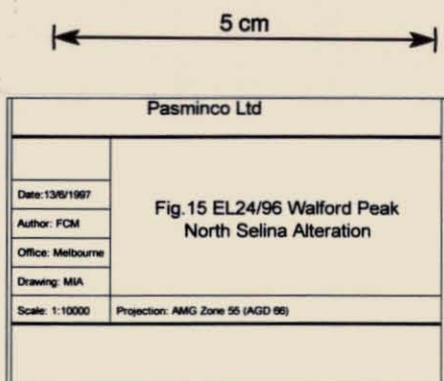
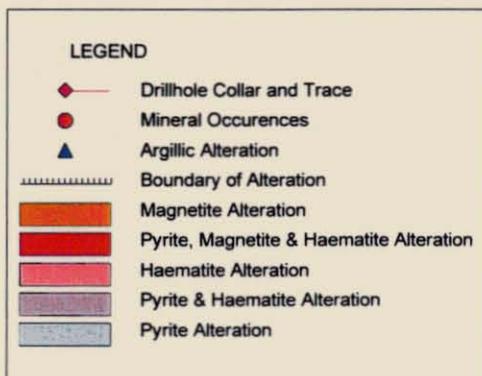
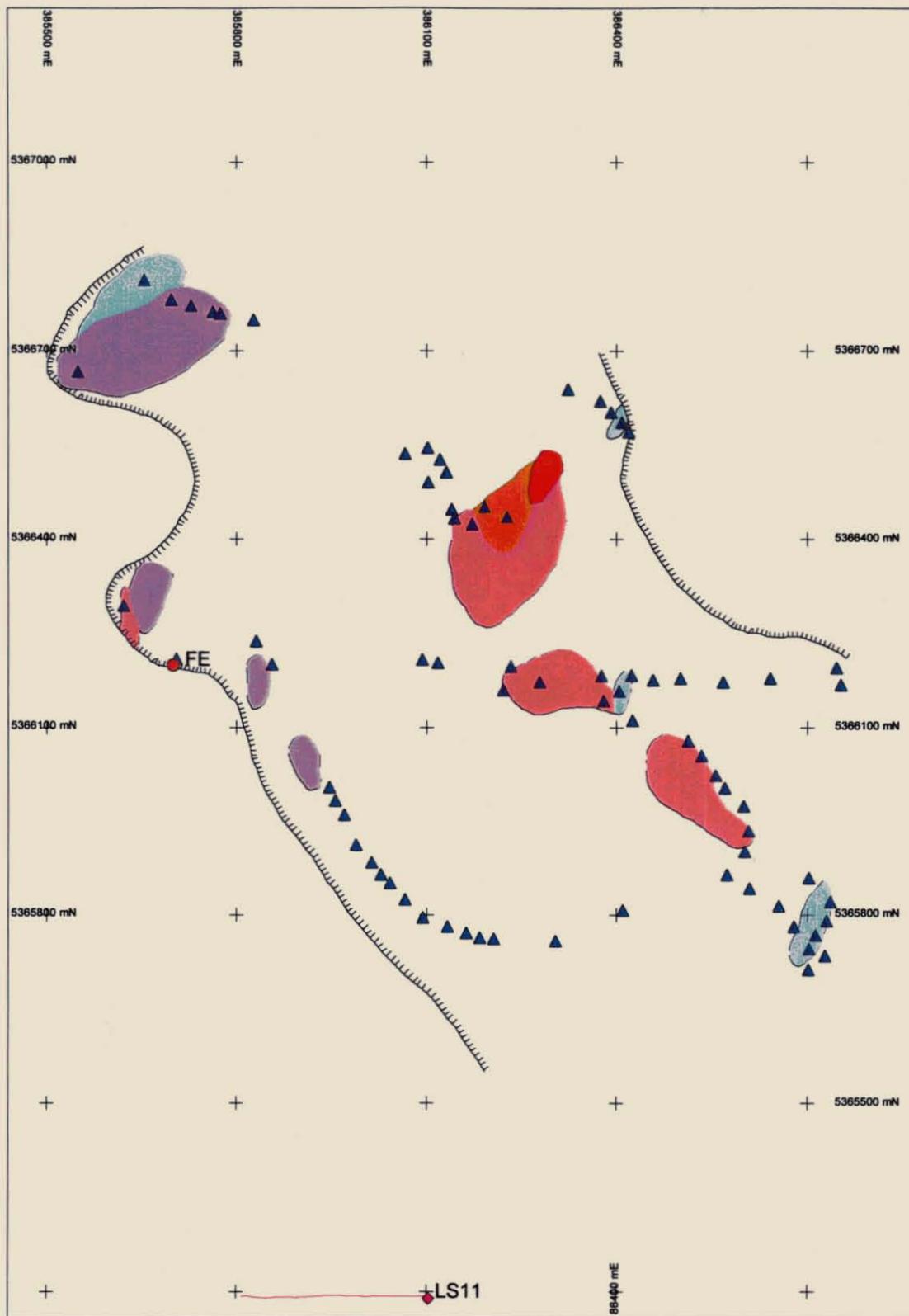
Aeromagnetics shows a high, elongate in a north-south direction (Figure 14). For much of its length it appears to follow the narrow band of volcanics and sediments between the intrusive porphyry and the Owen Conglomerate contact. There is an associated gravity high to the north east of the porphyry unit directly to the east of the northern part of the magnetic high. This area is covered by glacial moraine, so that its significance is difficult to evaluate.

#### 5.5 Alteration

Mapped alteration appears to be confined to the areas peripheral to the porphyry intrusive and along a northwest striking fault some 200-300m east of the porphyry (Figure 15). The fault strikes approximately parallel to the long axis of the intrusive. Chlorite, sericite and silica alteration are noted, along with hematite, magnetite and pyrite. Aberfoyle described the alteration as vein-associated potassium feldspar plus magnetite, with lesser quartz +/- epidote +/- tourmaline +/- calcite. The intensity of the alteration increases towards the north and northwest of the area. A later stage alteration, varying from chlorite +/- pyrite or magnetite to quartz +/- chlorite or sericite transects the earlier potassium feldspar plus magnetite alteration phase.

#### 5.6 Mineralisation

There is little known mineralisation at North Selina. One rock chip assay from a magnetite pyrite vein in volcanoclastics on the eastern edge of the area between the porphyry and the Owen Conglomerates assayed 0.43g/t Au and 1.5g/t Ag. A slightly elevated gold value was registered for the stream draining the northwest trending fault. Two areas of slightly elevated base metals were indicated. Apart from this no significant results came from the reconnaissance work.



## 5.7 Discussion

The geology, geophysics and alteration show a similar style to the Selina area to the south. However here the alteration is more sporadic and less intense. There are no noted areas of brecciation, and the alteration is described as veining rather than stockworking. In the context of a breccia hosted model this would suggest a weak or deep seated source. The northwest trending fault and the porphyry/volcanic contacts may have acted as a locus for hydrothermal fluids, thus giving rise to the present distribution of alteration.

It has been noted that the strength of the alteration increases towards the north. The gravity high is in the north part of the prospect in an area covered by glacial scree. That high represents the projected point where the northwest trending fault approaches the northeastern extent of the porphyry intrusive. This northern glacial covered area may warrant further investigation. The balance of the prospect does not appear to have a high degree of prospectivity, although it is not impossible that mineralisation could be focussed along the northwest trending fault.

## 5.8 Conclusions

1. The geophysical signature of North Selina is similar to the Selina Prospect, however geology differs in that there is no significant brecciation noted, and no equivalent of the "Selina Conglomerate".
2. Alteration is two phased, but the second phase is predominantly veining, suggesting a weak or distal fluid source. Alteration appears to be concentrated in structural sites.
3. Alteration, structure and gravity suggest a possible confluence at a point under glacials at the northern extremity of the prospect.
4. Although not considered a high priority, the glacial covered area warrants further investigation.

Ground magnetics and IP should be considered to examine further the area covered by glacials. However, this exploration is considered to be of a low general priority, as there is no strong indications of significant mineralisation in the area.

## **6 DORA PROSPECT**

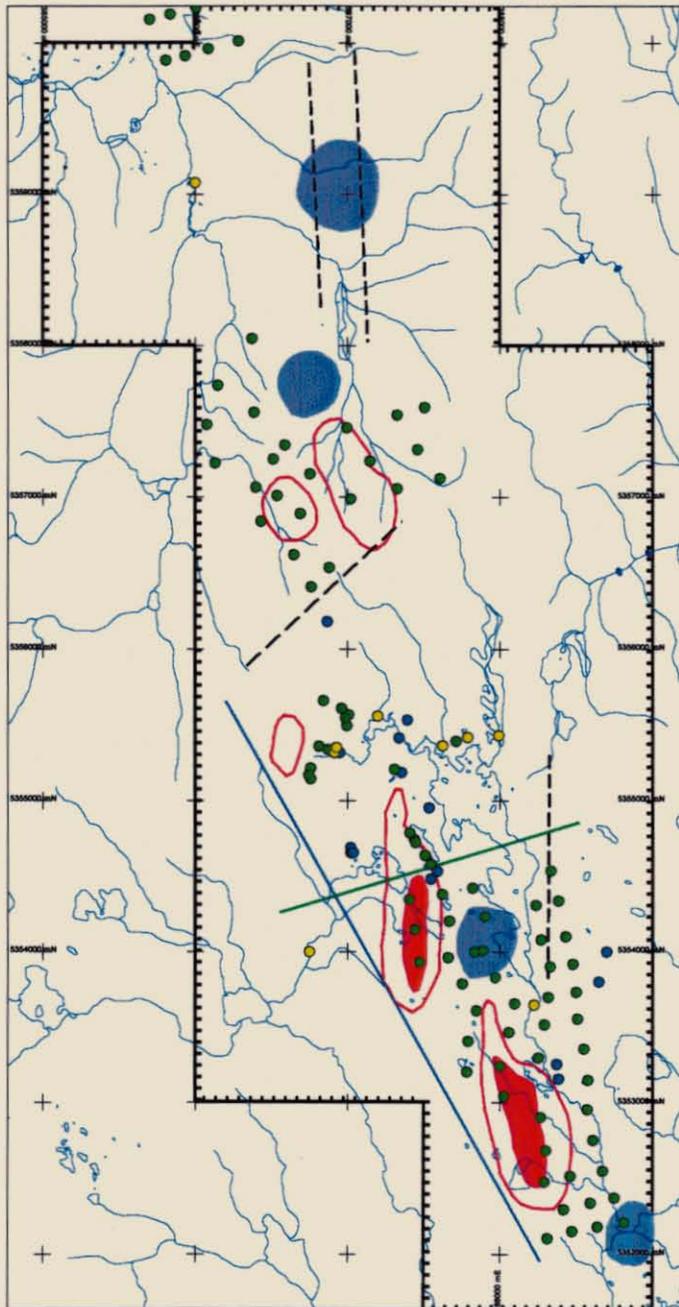
Old workings and past explorers have considered that the Dora Mineral Field stretches from south of Lake Dora northwards to the area east of Lake Rolleston. As the aeromagnetics suggest other possible sources for the mineralisation around Lake Rolleston, the Dora Prospect will be treated as that part of the belt which lies to the west and south of Lake Dora. The mineralisation around Lake Rolleston will be considered separately.

### **6.1 Access and infrastructure**

The 1:25,000 topographic map of the area indicates access can be gained to the Dora area via a vehicular track which starts from the Anthony Road to the west of Newton Peak. It is about 16 kms from Anthony Road to the Dora Prospect, but the road passes directly through its centre.

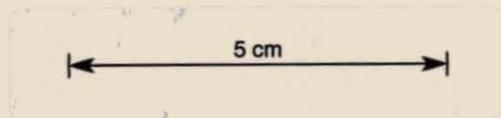
### **6.2 Past Exploration**

Modern exploration (Figure 16) began around the old copper workings in the area in 1969. Mt Lyell Mining and its successor Gold Fields, held the area as part of EL 9/66. As part of a regional exploration effort, the volcanic belt stretching from Lake Dora to the Selina area was gridded, mapped, soil and rock chip sampled. Geophysical surveys included pole-dipole IP, SP, fluxgate magnetics and EM. Petrology was carried out on a selection of samples. In 1983, following a data review, Gold Fields conducted some dump sampling. In 1985 they relinquished the area.



**LEGEND**

- Stream Sediment Sample Location
- Rock Chip Sample Location
- Tas Soils
- Magnetic Lineament
- Lesser Magnetic High
- Creeks
- Southerly Limit of prior exploration
- Magnetic High
- Gravity High
- ▬ Pasmenco Walford Peak Tenement



Pasmenco Ltd	
EL24/96 Walford Peak Fig. 16 Dora and Rolleston Areas Aeromagnetic and Gravity Interpretation	
Date: 17/6/1997	
Author: FDM	
Office: Melbourne	
Drawing: MJA	
Scale: 1:25000	Projection: AMG Zone 56 (AGD 86)

CRA took up the area in their tenement EL 5/85. Attracted by the Gold Fields best dump assay of 2.0g/t Au, CRA conducted a stream sediment, rock chip and dump reconnaissance programme aimed at ascertaining the gold potential of the area. They also conducted a UTEM survey to look for massive sulphides which might not have been apparent in the IP results due to the highly variable chargeability response of the area.

Aberfoyle took over management of EL 5/85 in 1988. Their work comprised field checking of the earlier mapping and some further petrology.

It should be noted that the southern part of the Dora Prospect was not part of this modern exploration effort. The Gold Field grid only extended south to the northern part of Lake Dora, and their maps indicate the southernmost part of the old mineral field was held under lease at the time of their exploration. Similarly, EL 5/85 only extended south as far as AMG 5354000N. Old workings extend for 1km to the south from there, and much of the aeromagnetic and gravity anomalies lie in this southernmost area.

### 6.3 Geology

The Dora Prospect area comprises similar geological units to the Selina area to the north. The Tyndall Group units of the Mt Read Volcanics in this area have been described as porphyritic lavas, tuffs, volcanoclastics-epiclastics and volcanoclastic conglomerate. Lavas range from rare andesites to more common dacites and rhyolites. Lavas have been altered to quartz chlorite schists. There is intense shearing throughout the area, with the shears and cleavage trending northwest to north-northwest. Two massive quartz feldspar hornblende porphyry units also occur with the area, one north west of Lake Dora, the other near Michael Tarn. It is unclear whether they are intrusive or extrusive. Aberfoyle describes them as hornblende plagioclase-phyric lavas.

It has been suggested that the volcanics of the Dora area represent a south plunging anticline, with Owen Conglomerates to both the west and east. There has even been the suggestion that part of the area may be underlain by the Gordon Limestone unit of the Cambro-Ordovician sequence.

Most contacts in the area are highly sheared/faulted. Northwest trending faults transect the area.

Aberfoyle describes a transition, from west to east, from coherent volcanics through a north-northwest trending zone of chlorite alteration with associated sporadic copper gold mineralisation to a belt of volcanoclastics-epiclastics with intrusive pods of biotite porphyry. The eastern end of the sequence is the Dora Conglomerate.

At the southern end of the Dora Prospect, in the area where exploration is lacking, the altered, variably mineralised zone containing the historic workings is mapped as extending into the Dora Conglomerate. The Dora Conglomerate is stated by Mt Lyell Mining to be a boulder conglomerate similar to the Jukes Breccia unit of the Cambro-Ordovician Owen Conglomerates. It is described as interfingering with the volcanics and volcanoclastics. It lacks the hematite and has less quartz pebbles than the "Selina Conglomerate". It dips west at about 60 degrees. These descriptions tend to support a sedimentary origin for the unit. However in light of the re-interpretation of the "Selina Conglomerate", the associations of the Dora Conglomerate are open to reconfirmation.

#### 6.4 Geophysics

The Dora area lies in a narrow northwest trending block bounded to the east and west by major northwest magnetic lineaments. The southern part of the complex is underlain by a complex of magnetic highs with three main centres. This magnetically responsive area is about 2 km long by 1-2 kms wide. Central to this area is a gravity high. CRA interpreted this magnetically positive area as a single magnetic high with a major northwest trending structure transecting it and creating a central magnetic low which they suggested may have been a result of magnetite destruction (a classic porphyry copper signature). Their magnetic low corresponds to the area of the gravity high. The magnetic and gravity anomalies fall within the area mapped as volcanoclastics, intrusive porphyries and Dora Conglomerate.

The ground geophysical surveys of the area conducted by Mt Lyell Mining/Gold Fields extend only to the northernmost boundary of the aeromagnetic anomalies. Mt Lyell Mining found that there were no well defined chargeability highs over the known

workings, similar to those in the Selina and Rolleston areas to the north. The most northerly of the Dora workings had low level chargeability highs associated with them, but the workings around Lake Dora were noted for their lack of an IP response (by this Mt Lyell Mining meant chargeability highs; in the classic porphyry system the deposit is more resistive than the alteration halo.)

## 6.5 Alteration

Mt Lyell Mining described the alteration around the old workings as quartz chlorite dominated, with magnetite and hematite veins. CRA stated that the alteration was mostly chlorite, with sericite in some places. When Aberfoyle sent samples to Tony Crawford at the University of Tasmania for petrology, he described the alteration as compatible with regional burial metamorphism.

## 6.6 Mineralisation

The workings in the northern part of the Dora area cover pyrite, chalcopyrite in quartz and quartz chlorite schists in three narrow shear zones. Minor sphalerite and erythrite (CoAs oxide) are associated with the mineralisation.

The old workings in the area are recorded as containing traces of gold and silver up to about 100g/t Ag, associated with the chalcopyrite ore. Gold Fields did some dump sampling and assaying for gold, obtaining one result of 2g/t Au. When CRA took up the area they followed up this anomalous value with a dump and rock chip sampling programme. Gold assays were in the 0.1g/t range, with a best 0.37g/t Au. Aberfoyle's best dump sample was 0.15g/t Au with 0.42% Cu.

Scant information on the southern workings can be obtained from a report of 1898 which includes a description of the Lake Dora Mine. In one trench 70 ft long, rock varied from hard breccia on the western end to schist. A zone of 25ft within the schist contained disseminated pyrite, several pyrite veins and associated disseminated chalcopyrite. In a further trench of 55ft length the entire trench contained disseminated chalcopyrite. A composite sample from the trench contained "...traces of gold, 3 ozs 18 dwts 8 grs of silver per ton and 1 per cent copper."

Exploration to date in the Dora area has examined the narrow structurally controlled chalcopyrite mineralisation in the northern part of the Dora belt of old workings. There, copper and low level associated gold appear to be confined to three narrow shears, and quartz chlorite pyrite alteration.

However, the area of the Dora Prospect which contains the major aeromagnetic and gravity anomalies has not been part of this exploration. It is also noteworthy that this is the area of mapped Dora Conglomerate.

The aeromagnetic and gravity signature of the southern Dora area are compatible with an intrusive source at depth, similar to the Murchison Granite analogues which are postulated to be associated with the other mineralisation in the Selina area to the north. CRA suggested the central area of the magnetic highs might possibly be a magnetic low caused by an area of magnetite destruction. One of the classic signatures of porphyry copper deposits is a ring shaped magnetic high due to magnetite alteration, with a central low resulting from magnetite destruction in the copper deposit itself. The occurrence of the gravity high in this area supports such an interpretation.

It is difficult to judge the significance of the alteration at Dora as the level of metamorphism of the area would be sufficient to disguise the chlorite alteration which is the most widespread outer zone associated with intrusive related copper/gold deposits. Deposits do not always show the classic alteration zones of the North American model, particularly the island arc porphyry systems, where chlorite alteration predominates, with a central potassic core. The minor nature of the sericite alteration at Dora is consequently of doubtful significance in the context of the intrusive model. In island arc porphyries potassic alteration may be more widespread, but may also only be associated with the immediate proximity of the deposit itself. (If a deposit is suspected at depth key indicators of the system might be the various epithermal indicators such as alunite or elevated levels of mercury or thallium.)

The known chalcopyrite mineralisation at Dora is structurally controlled and lies between the two major northwest trending structures of the area. Magnetic and gravity anomalies occur both at the northern and southern extremities of the line of workings. One possible

interpretation of the geometry of the area is that mineralisation associated with an intrusive system in the southern Dora area has bled out into tensional shears to the north, either at the time the mineralisation was emplaced or later as a remobilisation event during the Tabberaberan Orogeny.

The structural nature of the known mineralisation at Dora also leaves open the possibility for the discovery of a significant shear hosted copper /gold deposit centred on the geophysical anomaly, or even a Henty style gold deposit.

The cobalt association of copper mineralisation in the Dora area could be of interest, as it suggests a possible analogy with the copper gold deposits of the Cloncurry Mineral Field. Cobalt occurs at Ernest Henry, a Proterozoic deposit with some similarities to Mt Lyell.

At this stage the Dora area may be considered to be a relatively untested target with known copper and associated gold mineralisation over a significant strike of about one km to the north and one km to the south of the central gravity high/magnetic low on the southwestern shore of Lake Dora. Geophysics and the strike length of the known mineralisation both point towards a possible large system. The Dora system has high exploration potential for discovery of a significant copper gold deposit.

## 6.8 Conclusions

1. The Dora Prospect contains a significant geophysical signature compatible with an intrusive related copper/gold deposit.
2. Known mineralisation is confined to narrow shear zones between the northwest trending major structures of the area.
3. The southern area of the Dora Prospect, including the major part of the area overlying the geophysical anomalies, has not been subjected to any significant exploration, while the northern part of the area has had mainly ground geophysical exploration with a view to the discovery of mineralisation similar to the pyrite zones identified at Selina.

4. Gold exploration within the northern area has been only at a reconnaissance stage, and has indicated that low level gold is associated with copper mineralisation.

## 6.9 Recommendations

1. Reconnaissance geological mapping of the area taking note of the alteration associations of the various rock units, including the Dora Conglomerate, which should be examined with an open mind as to its possible sedimentary origins.
2. Reconnaissance soil sampling along a trial grid line across the line of workings to establish whether soil sampling is effective in the area and what soil horizon and sieve fraction best reflect mineralisation.
3. If the reconnaissance soil sampling proves to be effective it could be followed up by gridding and soil sampling. It may be noteworthy that outcropping porphyry copper deposits may have a soil geochemical signature of only 200-300ppm Cu. *(airfield was much lower)*
4. IP has always been considered an effective tool for exploration of intrusive related copper and copper/gold deposits. Lines should extend far enough to cover possible wall rock alteration zones. Two intersecting reconnaissance lines should be effective to establish the existence of an anomaly over the area. One of these could follow the road, thus alleviating the necessity for cutting the longer axis grid line. Positive results from this phase could be followed by a systematic gridding programme.
5. Rock chip sampling may be ineffective to test this area which is scrub covered with poor outcrop. Its usefulness should be determined on the ground.

## 7 LAKE ROLLESTON AREA

There are a number of old workings and several geophysical anomalies in the Lake Rolleston area. (See Figures 3 and 4)

The southern part of this area (between 5355000N and 5356000N) have been viewed as a northern extension of the Dora line of lode. However, the area is underlain by a small aeromagnetic anomaly, separate from the main Dora anomalies discussed above. (The northernmost workings, near Lake Rolleston, may be related to the aeromagnetic high-discussed below in the context of its proximity to a major fault and Dora Conglomerate.) These North Dora workings are associated with low level chargeability highs, whereas the Dora area workings have no such signature. The North Dora workings have been examined by Gold Fields, who describe them as minor zones of chlorite alteration with disseminated pyrite, magnetite and traces of base metals. There are no current indications that they may be any more significant mineralisation in this area.

There is a magnetic high to the east of the southern part of Lake Rolleston in an area of glacial moraine (centred at about 5357000N, 387000E). Along its western and southwestern edge is mapped a major northwest trending fault, with Dora Conglomerate in a narrow belt abutting the fault on the northeastern side (directly on the edge of the magnetic anomaly). Within the volcanics, to the southwest of the fault, is alteration which apparently is the most northern extremity of the Dora line of alteration. The geometry of the area suggests the possibility that the Dora Conglomerate could be a breccia unit related to the fault. As there is an associated geophysical anomaly, this area may be worth a reconnaissance visit to investigate the possibility of a fault controlled breccia-hosted gold deposit.

To the north of Lake Rolleston there is some known mineralisation within EL 24/96 to the east of the area first drilled as the southern extent of the Selina Western Pyrite Zone (the centre of this area is 5360200N, 386100E). Mt Lyell Mining costeanned the area and reported highly chloritised crystal lapilli tuffs with minor disseminated pyrite and trace chalcopryite, sphalerite and galena. They had established the presence of a chargeability high in the area, and concluded that the known mineralisation was insufficient to explain the IP anomaly. However the area appears to have been considered insufficiently prospective to warrant any further follow up.

To the northeast of Lake Rolleston (centred at about 5359200N, 38900E) is a north-south elongate zone of coincident chargeability and ground magnetic highs with a gravity anomaly at its centre. The area is covered by up to 134m of glacial moraine, so that it was

not been followed up by previous explorers. In the light of the other prospective areas within the tenement the area would warrant a very low priority for follow up.

## 8 CONCLUSIONS

1. There is evidence to support the existence of a breccia at the Selina Prospect which has many similarities to the breccia vent at Mt Leyshon.
2. The mineralisation at Mt Leyshon is considered to be a late stage event following a second brecciation event which formed the Mt Leyshon Breccia within the vent breccia. Although there is not a great deal of evidence at Selina, there are some indications that more than one hydrothermal episode has affected the area. There is also some indication of low level gold anomalism occurring sporadically over a large area.
3. On the basis of the analogy with Mt Leyshon, the Selina Prospect is considered to have a high prospectivity for the discovery of a significant gold deposit.
4. The prospectivity at Selina is tempered somewhat by the possibility that the top of the breccia system may have been eroded away.
5. Geology and geophysics at the Dora Prospect are compatible with the presence of a significant intrusive related copper/gold deposit.
6. The prospectivity at Dora is enhanced by the presence of copper/gold mineralisation in shears in a zone of alteration in a northwest trending belt which transects the centre of the geophysically anomalous area.
7. The Dora Prospect has not been subjected to modern exploration beyond its most northern extremity.
8. The Dora Prospect has high potential for the discovery of a significant copper/gold system, but its exploration is at an early stage.

9. The North Selina Prospect has some potential for the discovery of a significant gold deposit, but indications to date suggest that this should not be a high priority area for follow up.
  
10. There are other areas within EL 24/96 which warrant further investigation in any ongoing exploration programme, but they are a low priority compared with the Selina and Dora Prospects.

## 9 RECOMMENDATIONS

Detailed recommendations for each of the major prospect areas are set out above. With regard to the Selina area, it cannot be overemphasised that systematic sampling and large sample sizes are necessary to overcome the possible problem of erratic mineralisation distribution.

General recommendations are as follows:

1. The Selina area should be given the highest priority, as the large alteration zone around it suggests the occurrence of a significant volume of hydrothermal fluids, and the analogy with Mt Leyshon suggests the theoretical potential to host a major gold deposit.
2. The Dora area should be given a high priority as there is scope there for the discovery of a major deposit, although exploration is at an early stage.
3. Other areas within the tenement warrant further investigation as part of any on going exploration programme.

## 10 BIBLIOGRAPHY

Aberfoyle Resources Ltd, EL 5/85, *Technical Progress report for the Period October 1993 to September 1994*, Open File Report 94-3638

Aberfoyle Resources Ltd, EL 5/85, *Partial Relinquishment Report on Exploration to April 1993*, Open File Report 93-3424

Aberfoyle Resources Ltd, EL 5/85, *Report on Exploration for Area to be Relinquished Nov 1993*, Open File Report 93-3524

Billiton Australia, EL 103/87, *Progress Report on Exploration for the Period ending 21<sup>st</sup> April 1989*, Open File Report 89-2929

Billiton Australia, EL 103/87, *Progress Report on Exploration for the Period Ending 21<sup>st</sup> April 1990*, Open File Report 90-3104

Consolidated Syndicate, EL 9/66, *Annual Report 1970-71*, Open File Report 71-786

Consolidated Syndicate, EL 9/66, *Annual Report 1971-72*, Open File Report 72-882

Consolidated Syndicate, EL 9/66, *Annual Report 1972-73*, Open File Report 73-970

CRA Exploration Pty Ltd, EL 5/85, *Progress Report for the Period 20 Sept 1986 to 30 July 1987*, Open File Report 87-2705

Gold Fields Exploration Pty Ltd, EL 9/66, *A Geological Review of the Tyndall Licence 9/66*, Open File Report 83-1995

Gold Fields Exploration Pty Ltd, EL 9/66, *Annual Report 1983-84*, Open File Report 84-2137

Gold Fields Exploration Pty Ltd, EL 9/66, *Annual Report 1985/86 for Parts II III and IV*, Open File Report 86-2566

Hunns S.R., *Mineralisation in the West Coast Range, Western Tasmania - The Lake Selina Prospect*, University of Tasmania Honours Thesis, 1987

Mitre Geophysics Ltd, *An Appraisal of the Geophysics carried out over the Selina, Rolleston and Dora Areas for the Mt Lyell Mining and Railway Co Ltd*, Dec 1980, Open File Report 84-2253

Mount Lyell Mining and Railway Company Ltd, EL 9/66, *A Review of the Area East of the Tyndall Range*, Open File Report 75-1102

Mount Lyell Mining and Railway Company Ltd, EL 9/66, *Annual Report 1979-80*, Open File Report 81-1519

Mount Lyell Mining and Railway Company Ltd, EL 9/66, *Annual Report 1979-80*, Open File Report 81-1519

Mount Lyell Mining and Railway Company Ltd, EL 9/66, *Annual Report 1980-81*, Open File Report 81-1660

Mount Lyell Mining and Railway Company Ltd, EL 9/66, *Annual Report 1981-82*, Open File Report 82-1791

Mount Lyell Mining and Railway Company Ltd, EL 9/66, *Report on Conductivity, Susceptibility, Chargeability and Resistivity Tests of Diamond Drill Core on Behalf of the Mt Lyell Mining and Railway Co Ltd*, Open File Report 84-2222

Paull P.L., Hodkinson I.P., Morrison G.W. and Teale G.S., *Mount Leyshon Gold Deposit in Geology and Mineral Deposits of Australia and Papua New Guinea*, 1990, pp1471-1481

Sexton M.A., Morrison G.W., Foley A.M. and Wormald P.J., *The Mount Leyshon Magnetic Anomaly in Exploration Geophysics* (1995) 26, pp84-91

Smith, J. Harcourt, *Report on the Mineral Fields in the Neighbourhood of Mt Black, Ringville, Mt Read and Lake Dora*, 1898

APPENDIX 1

*WALFORD PEAK SURFACE ROCK CHIP ANALYSIS*

	Ag ppm	Mo ppm	Bi ppm	Fe %	As ppm	Au ppm	Cu ppm	Pb ppm	Zn ppm
164221	<1	<2	<5	1.96	21	0.012	3	16	122
164222	<1	3	<5	2.24	26	0.009	4	23	113
164223	<1	3	<5	2.03	34	0.007	4	17	93
164224	<1	<2	<5	2.67	590	0.003	4	23	118
164225	<1	3	<5	2.53	106	0.004	3	23	115
164226	<1	4	<5	3.06	54	0.001	9	13	25
164227	<1	<2	<5	3.23	9	0.006	6	<5	26
164228	<1	4	<5	2.75	46	0.007	5	61	180
164229	<1	3	<5	8.23	114	0.002	22	32	514
164230	1	<2	<5	28.72	131	0.003	4	14	14

413114

APPENDIX 2

413115

*HOLE LS12 Au ASSAYS FOR TOP 30M*

	<b>Au ppm</b>
165001	<0.001
165002	0.001
165003	<0.001
165004	0.006
165005	<0.001
165006	0.003
165007	0.002
165008	<0.001
165009	0.004
165009A	0.254