

CONTENTS

	Page	
1	SUMMARY	1
2	INTRODUCTION	3
3	TENURE	5
4	GEOLOGY	6
5	RESULTS OF 1992-93 EXPLORATION	8
5.1	Sock Creek	8
	5.1.1 Review	8
	5.1.2 Deep Drillhole BHD4	11
	5.1.3 In-Fill Gravity Survey	12
	5.1.4 Reassessment of UTEM at Sock Creek (N.Hughes)	13
5.2	High Point	14
	5.2.1 Aberfoyle Data Swap	14
	5.2.2 Review	15
	5.2.3 Hole BHD3 - Lithogeochemical & Petrological Results	21
5.3	Mapping at Bulgobac Hill	22
5.4	Tullabardine Gorge	22
5.5	In-Fill Aeromagnetic Survey, Lake Mackintosh	23
6	SOUTH MT CHARTER ELA 7/93	24
7	CONCLUSIONS	25
8	RECOMMENDATIONS	26
9	REFERENCES	27
10	KEYWORDS & LOCALITY	29

LIST OF FIGURES

Figure No.	Title	Scale
In Text:		
1	LOCATION MAP	1:500 000
2	LAND TENURE	1:50 000
3	REGIONAL GEOLOGY	1:140 000
4	EL 37/89 GEOLOGY	1:5 000
5	WORK COMPLETED 1992-93	1:50 000
6	SOCK CREEK PLAN	1:5 000
7	SOCK CREEK - SECTION AT 5392425mN	1:1 000
8	SOCK CREEK - SECTION AT 5292500mN	1:1 000
9	SOCK CREEK - SECTION AT 5392575mN	1:1 000
10	SOCK CREEK - SECTION AT 5392650mN	1:1 000
11	1993 IN-FILL GRAVITY SURVEY, SOCK CREEK AREA	1:20 000
12	COUPLING DIAGRAM: LOOPS MB01 & 02, SOCK CREEK	1:2 500
13	UTEM INTERPRETATION MAP, SOCK CREEK	1:25 000
14	HIGH POINT PLAN	1:25 000
15	HIGH POINT DRILLHOLES - P_2O_5/TiO_2 v SiO_2	nts
16	HIGH POINT DRILLHOLES - Ti/Zr v SiO_2	nts
17	HIGH POINT DRILLHOLES - Fe_2O_3 v SiO_2	nts
18	P_2O_5 v Cr PLOT OF SAMPLES FROM BASAL MAFIC VOLCANIC UNITS IN DRILLHOLES, HIGH POINT AREA	nts
19	DIAGRAM SHOWING ONLY HOLE BHD3 INTERSECTED MIXED SEQUENCE AT HIGH POINT	nts
In pockets at back of report:		
20	CROSS SECTION, HOLE BHD4, SOCK CREEK	1:1 000
21	INTERPRETATED SECTION, HIGH POINT PROSPECT	1:2 500
22	INTERPRETATED LONG SECTION, HIGH POINT PROSPECT	1:5 000
23	MAPPING ALONG NEW SECTION OF MURCHISON HIGHWAY	1:1 000
24	FLIGHT PATHS, AEROMAGNETIC SURVEY, LAKE MACKINTOSH	1:10 000
25	RESIDUAL MAGNETIC CONTOURS, LAKE MACKINTOSH	1:10 000

LIST OF APPENDICES

- APPENDIX 1: LOG OF DRILLHOLE BHD4, SOCK CREEK
APPENDIX 2: IN-FILL GRAVITY SURVEY, SOCK CREEK AREA
APPENDIX 3: LITHOGEOCHEMICAL & PETROLOGICAL RESULTS,
HOLE BHD3, HIGH POINT

LIST OF TABLES

- TABLE 1: SUMMARY LOG OF HOLE BHD4, SOCK CREEK
TABLE 2: LITHOGEOCHEMICAL SAMPLE LEDGER, HIGH POINT DRILLHOLES

1 SUMMARY

Work on EL 37/89 in the period February 1992 to August 1993 concentrated principally at **High Point** and **Sock Creek**. Drillhole BHD4 was drilled to 616.8m below the known mineralization at **Sock Creek** without success (best intersection: 2m @ 0.5% Zn), and no further work is recommended there.

Major reviews were undertaken at both **Sock Creek** and **High Point**. At **High Point** the review (which is continuing) was initiated by a data swap with the licence holder immediately to the east (Aberfoyle Resources).

Elsewhere on the EL only minor work was undertaken, the most significant being an in-fill aeromagnetic survey in the **Lake Mackintosh** area. An additional 12 sq km was pegged in the **South Mt Charter** area to cover the intersection of the Henty Fault and Mt Charter Fault. Approval to amalgamate this ELA (7/93) with the Bulgobac Hill EL will be sought once the ELA is granted.

At **High Point** the review determined (from lithogeochemical data but confirmed by Aberfoyle drill results further east), that all existing drillholes in the main prospect area are entirely within the Que-Hellyer Hangingwall Volcanics (ie: equivalents of the Hellyer Basalt), as is the known zone of dispersed zinc mineralization. The principal massive sulphide target, the Mixed Sequence horizon, occurs at depth and is estimated to be 200m below the deepest existing drillhole and 800m below surface.

Unfortunately, none of the existing holes are suitable for deepening and a new 1000m hole is recommended to test the Mixed Sequence adjacent to the Mt Charter Fault at **High Point**.

Other important findings of the review at **High Point** include:

- 1 The Mt Charter Fault is vertical in the main prospect area and will not limit the areal extent of the prospective zone at depth as previously thought.
- 2 The zinc mineralized zone in the upper part of the Hangingwall Volcanics is stratiform and

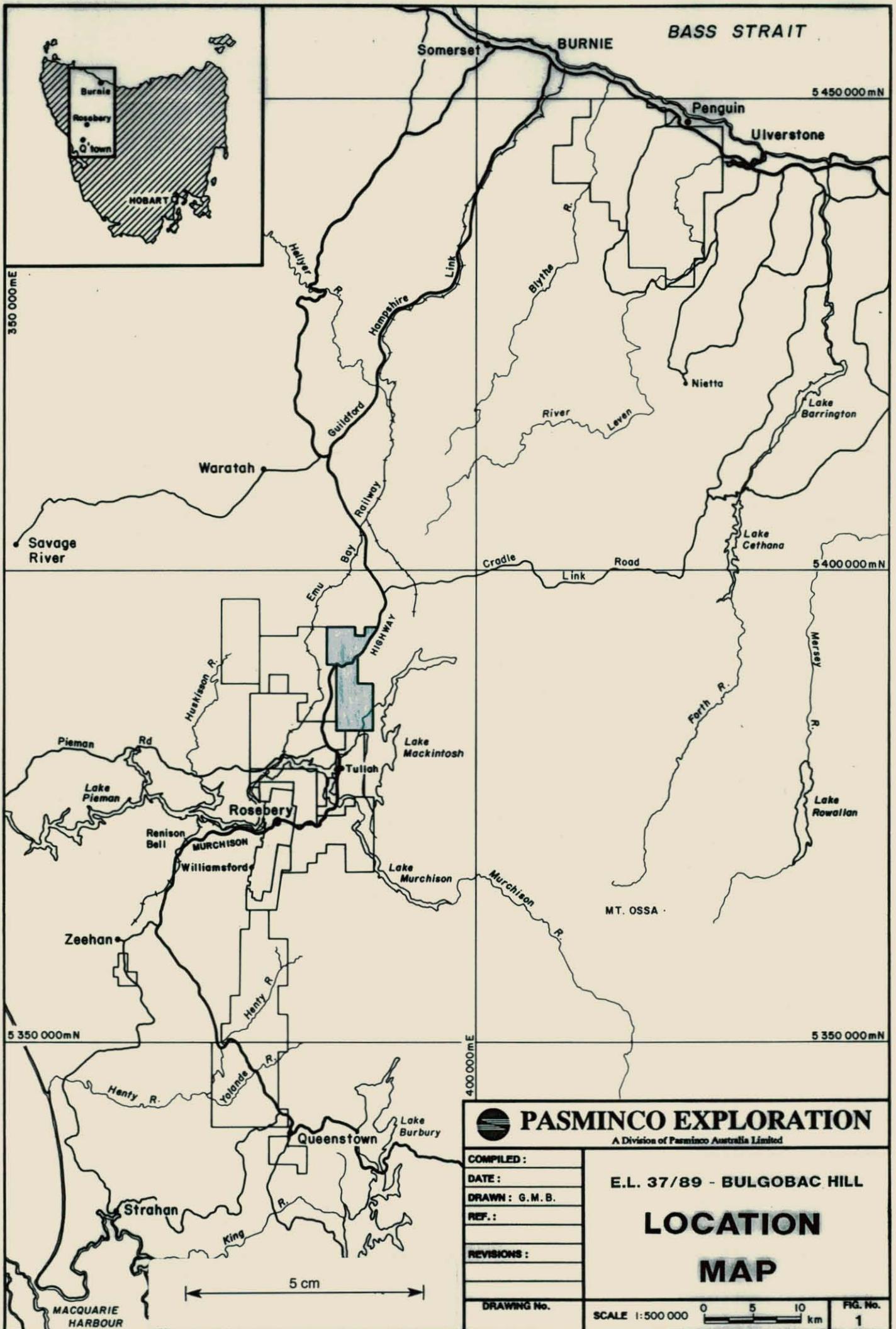
has a known extent 1.5km N-S x 1km E-W. It is thickest (200m) on Pasminco's ground beside the Mt Charter Fault, but has slightly better grade in Aberfoyle holes further east.

The potential for this zone to host an ore deposit cannot be ruled out.

- 3 It is highly likely the zinc zone (and Mixed Sequence at depth) extends along the Mt Charter Fault into the undrilled NW part of the **High Point** prospect.
- 4 A review of the UTEM results suggests all anomalies present at **High Point** are due to the conductive Que River Shale.

Surface investigations will be initiated on the **South Mt Charter** area once it has been amalgamated into the Bulgobac Hill EL. Work will concentrate in the vicinity of the Henty Fault - Mt Charter Fault intersection, and initially comprise mapping, geochemical sampling and gravity measurements.

The review at **Sock Creek** found there is slight potential for up to 200,000t of open-cuttable mineralization grading perhaps 5-10% Zn, around holes SK1&2 within the known zone of Pb-Zn, but this is not a viable exploration target for Pasminco.



PASMINGO EXPLORATION
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COMPILED :	E.L. 37/89 - BULGOBAC HILL LOCATION MAP
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	FIG. No. 1

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2 INTRODUCTION

This report details all exploration work done on the Bulgobac Hill EL 37/89 in the period February 1992 to July 1993, and outlines the work programme planned for the coming year.

The Bulgobac Hill EL covers 41sq km of the Cambrian Mt Read Volcanics, situated 5km to the SW of the Hellyer volcanogenic massive sulphide deposit in Western Tasmania (see Figure 3).

A Hellyer-type auriferous Pb-Zn-Cu-Ag deposit is the principal target of the exploration programme on the EL.

The EL comprises rugged and heavily vegetated country bisected by the Murchison Highway. Access away from the highway is via occasional 4WD tracks, but mostly on foot along cut gridlines.

Previous exploration on the EL area (ie: pre Pasma's involvement in 1990), was largely carried out in the period 1963 to 1989 when the ground was part of Comstaff's EL 5/63. No mineralized shows or old workings are known within the EL from any prospecting that may have occurred prior to Comstaff.

The Comstaff consortium and its Joint Venture partners (Pruessag after 1977 and BHP after 1985), using regional EM and/or stream sediment surveys, discovered and drilled zinc-dominated mineralization in the volcanics at **Sock Creek** (14 diamond drillholes), **Sock Creek South** (4 holes) and **High Point** (4 holes).

In addition, BHP drilled 9 shallow diamond drillholes (each less than 50m) at **Tullabardine Gorge**, without encountering any mineralization.

In the period to February 1992, Pasma covered the EL with detailed aeromagnetics and photogrammetry, while regional-scale gravity surveys were extended over a majority of the EL area. Detailed exploration was concentrated on the mineralized zone in buried Que-Hellyer Volcanics at **High Point**, where Pasma drilled a further 3 holes.

Exploration in the past 18 months has included:

- * A 616.8m deep drillhole at the **Sock Creek** prospect.
- * Total review of all exploration at **Sock Creek** and **High Point**, including a data swap with Aberfoyle over ground immediately to the east of High Point.
- * In-fill gravity survey at **Sock Creek**.
- * Additional aeromagnetic survey over **Lake Mackintosh** area.
- * Mapping and sampling at **Bulgobac Hill** and **Tullabardine Gorge**.
- * Application for an additional 12sq km in the **South Mt Charter** area.

The work completed is shown in Figure 5.

3 TENURE

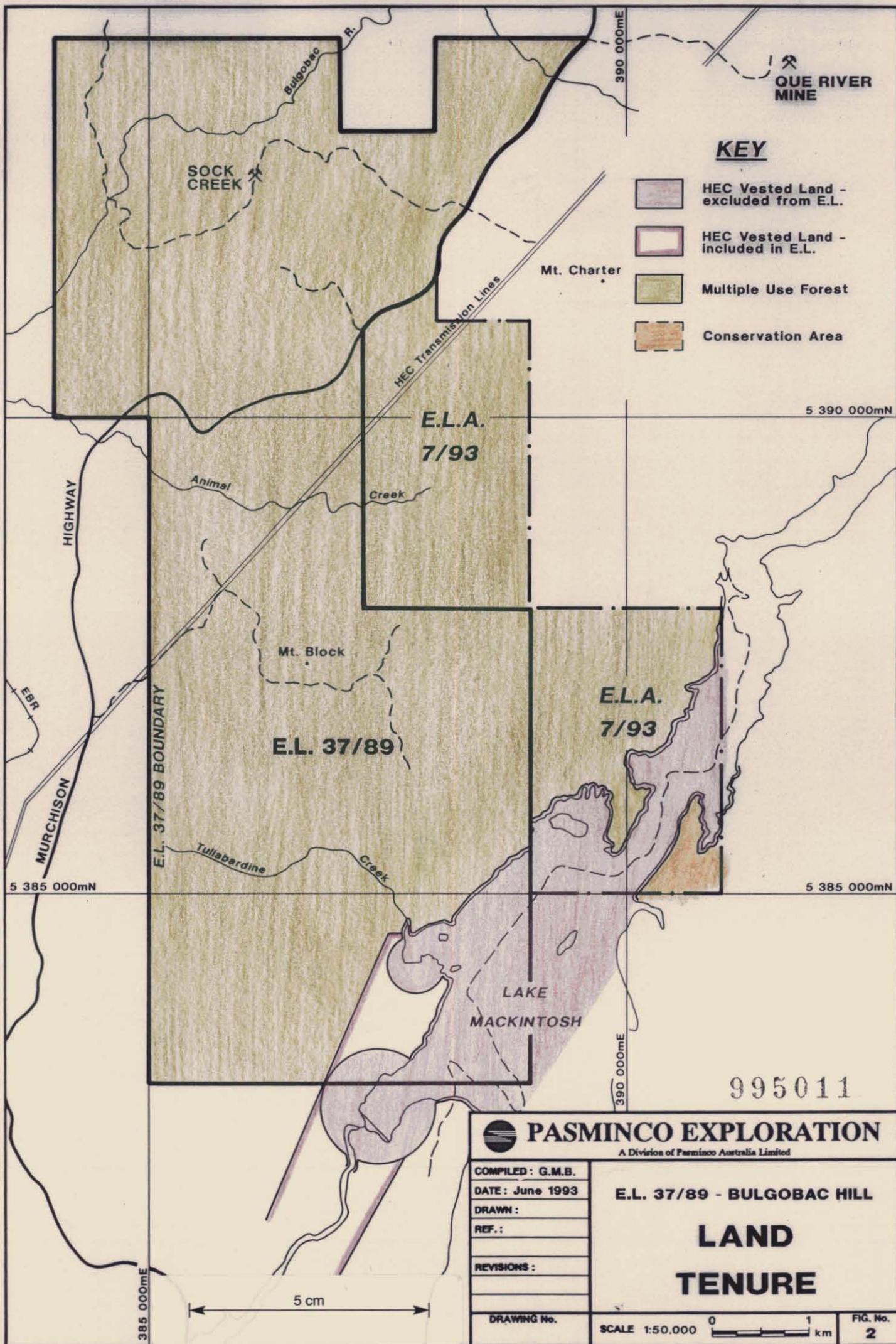
The Bulgobac Hill Exploration Licence 37/89, initially covering 32sq km, was granted to Pasminco Mining Rosebery in March 1990 and transferred to Pasminco Exploration in August that year.

In May 1992 a further 9sq km in the Lake Mackintosh area was acquired and added to the Bulgobac Hill EL, as a result of recommendations contained in the 1991-92 Annual Report (Purvis,1992).

A further 12sq km in the South Mt Charter area (see Figure 2), was applied for by tender in April 1993 (ELA 7/93). Subject to approval being received from the Division of Mines, it is intended that this area be amalgamated into EL 37/89 when it is granted.

In March 1992 the Division of Mines allowed EL 37/89 to be renewed for 18 months (rather than the normal 12 months), so that the annual reporting period would fall in the winter off-season (ie: August 1993), rather than during the peak summer field season in February. A 12 month renewal of EL37/89 is being sought from September 1993 until September 1994.

The EL is almost entirely Unallocated Crown Land (see Figure 2).



QUE RIVER MINE

KEY

- HEC Vested Land - excluded from E.L.
- HEC Vested Land - included in E.L.
- Multiple Use Forest
- Conservation Area

E.L.A. 7/93

5 390 000mN

E.L. 37/89 BOUNDARY

E.L. 37/89

E.L.A. 7/93

5 385 000mN

5 385 000mN

LAKE MACKINTOSH

390 000mE

995011



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E.L. 37/89 - BULGOBAC HILL

LAND TENURE

SCALE 1:50,000 FIG. No. **2**

5 cm

385 000mE

4 GEOLOGY

The geology of the EL area is shown in Figures 3 & 4.

EL 37/89 covers two main rock groups of the Cambrian Mt Read Volcanics – the Central Volcanic Complex (CVC), and correlates of the Dundas Group. The Central Volcanic Complex units occur in the southern part of the EL and comprise rhyodacitic lavas and volcanoclastics (mostly pyroclastics with minor epiclastics).

Rocks of the Dundas Group and correlates cover the northern half of the EL. They comprise the Que–Hellyer Volcanics (a mafic volcanic complex), sediments, quartz–feldspar porphyry bodies, and dacitic volcanics (mainly lavas).

Work by Pasmenco Exploration over the past two years has shown fairly conclusively that the boundary between the Central Volcanic Complex and the Dundas Group within the EL area is gradational, facing and dipping to the west, with the Dundas Group apparently conformably overlying the CVC. This finding disagrees with that of Corbett & Komysan (1989), who described the contact as a faulted unconformity, but is similar to the conclusion reached by Aberfoyle following their exploration in the area (Wallace, 1993).

Major structures on the EL area include the NE–trending Henty Fault and the N–S trending Mt Charter Fault. However, magnetic and gravity data highlights the presence of several major unmapped or poorly–mapped structures, largely buried and mainly trending E–W (see Figure 4).

The Mt Charter Fault has a branch (here termed Collins Fault after it was mapped by P. Collins in 1980 [Collins et al 1981]), that extends WNW through the Sock Creek prospect and appears to have had some influence on the siting of the mineralization there.

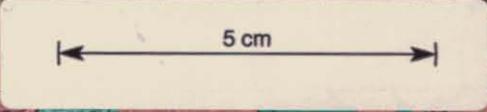
Three zinc–dominated and gold–silver–poor sulphide occurrences are known on the Bulgobac Hill EL. These comprise a zone of broadly stratiform dispersed sp–py mineralization in altered Que–Hellyer Volcanics adjacent to the Mt Charter Fault at **High Point**, sp with lesser py–gn–cp in net–veins on the contact between quartz–feldspar porphyry and black shale at **Sock Creek**, and weak disseminated sp in black shale at **Sock Creek South**. At **Sock Creek** the

mineralization attains grades up to 10% Zn over 1.7m, but the general tenor of grades on the prospect is around 2–5% Zn over 5–10m. At **High Point** the mineralization consistently averages 0.2–0.5% Zn over intervals typically 10–100m thick.

The mineralization at **Sock Creek South** has a best intersection of 1m @ 2.5% Zn (hole SCS 3).

No other sulphide occurrences of note are known anywhere on the EL.

- QUATERNARY**
 - Q Glacial deposits, alluvium, etc.
- TERTIARY**
 - Tb Basalt
 - Tr Sediments - gravel, sand, clays
- JURASSIC**
 - Jd Dolerite
- PERMIAN - CARBONIFEROUS**
 - P Undifferentiated
- DEVONIAN**
 - Dd Dolerite
 - Dg Granite
- DEVONIAN - SILURIAN**
 - Ds Bell Shale
 - Df Florence Sandstone
 - S Silurian
- ORDOVICIAN**
 - Og GORDON GROUP limestone
- EARLY ORDOVICIAN - LATE CAMBRIAN**
 - COu Upper sandstone sequence including Pioneer Beds (COou)
 - COo Undifferentiated conglomerate and sandstone (COo)
 - COon Newton Creek Sandstone (COon) - interbedded sandstone siltstone and conglomerate with marine fossils



MT. READ VOLCANICS

**NORTH AND WEST OF HENTY FAULT
DUNDAS GROUP AND CORRELATES**

- Ep Quartz-feldspar porphyry, mostly intrusive
- Eds Mostly sedimentary rocks - graywacke, siltstone, conglomerate
- Edt Interbedded tuffs and sedimentary rocks
- Edi Quartzwacke-slate-siltstone units, e.g. Silt Quartzite
- Edj Mostly felsic volcanics - mainly tuffs
- Edk Mixed felsic and mafic volcanics and epiclastic breccias, Quo-Hellyer area
- Edl Basaltic to andesitic volcanics

CENTRAL VOLCANIC COMPLEX

- Ccv Mainly feldspar-phyric volcanics - dacite, rhyolite, minor andesite (Ccv)
- Ccp Felsic porphyry, mainly intrusive
- Ccpv Mainly pyroclastic rocks
- Ccs Sedimentary rocks, mainly shale and sandstone
- Cca Andesitic volcanics

**SOUTH AND EAST OF HENTY FAULT
TYNDALL GROUP AND CORRELATES**

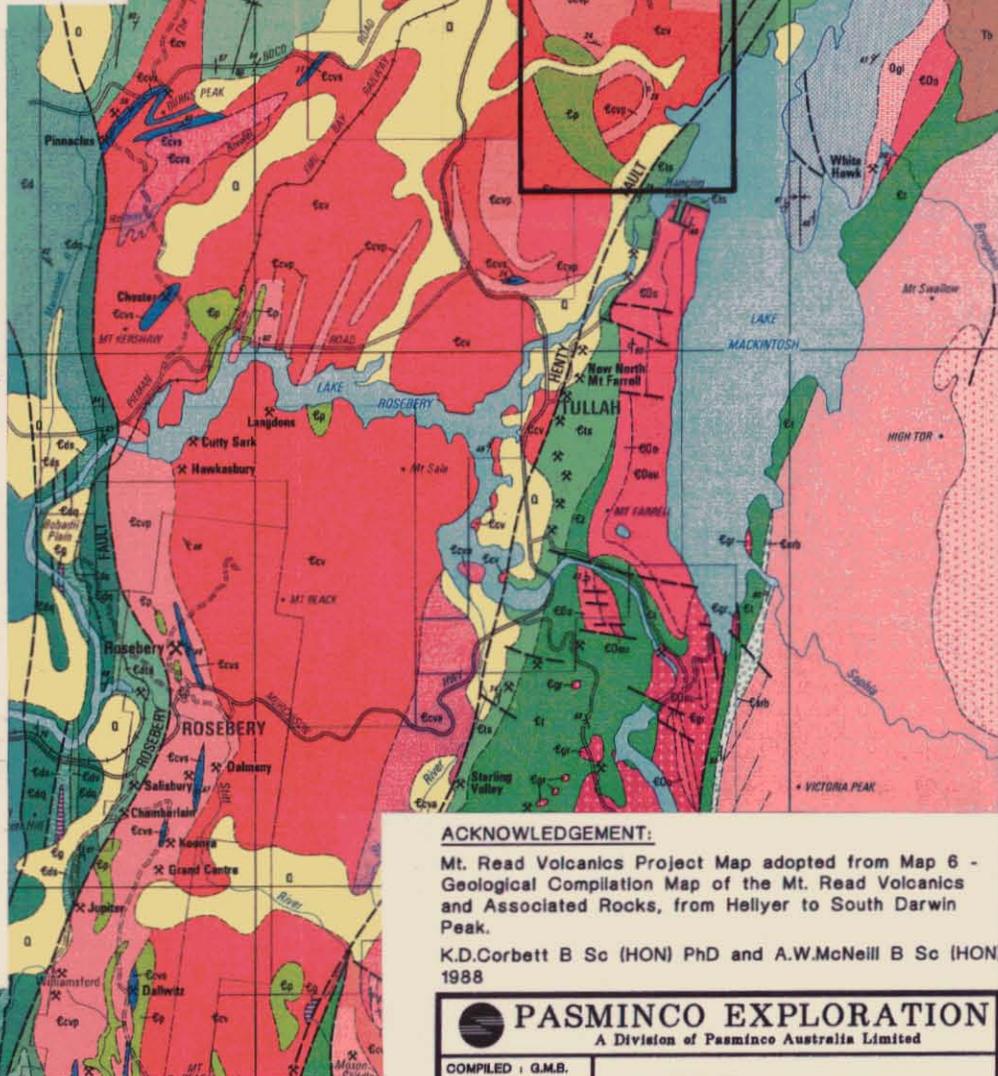
- Et Mainly sed. rocks, incl Farrell Slates
- Etv Mainly quartz-feldspar-phyric volcanic and volcanoclastic rocks (Et)
- Etv Mainly volcanoclastic congl. and sandstone
- Est Sticht Range Beds - sandstone, siltstone, siliciclastic conglomerate

CAMBRIAN INTRUSIVE ROCKS

- Cg Granite
- Cp Felsic porphyry
- Cgbb Gabbro
- Cum Ultramafic rocks & serpentinite

PRECAMBRIAN

- Qs Quartzite-slate sequences - correlates of Oonah Formation
- Qm Metamorphosed sequences of Tyennan Region. Major lithological boundary trends shown



ACKNOWLEDGEMENT:

Mt. Read Volcanics Project Map adopted from Map 6 - Geological Compilation Map of the Mt. Read Volcanics and Associated Rocks, from Hellyer to South Darwin Peak.

K.D. Corbett B Sc (HON) PhD and A.W. McNeill B Sc (HON) 1988

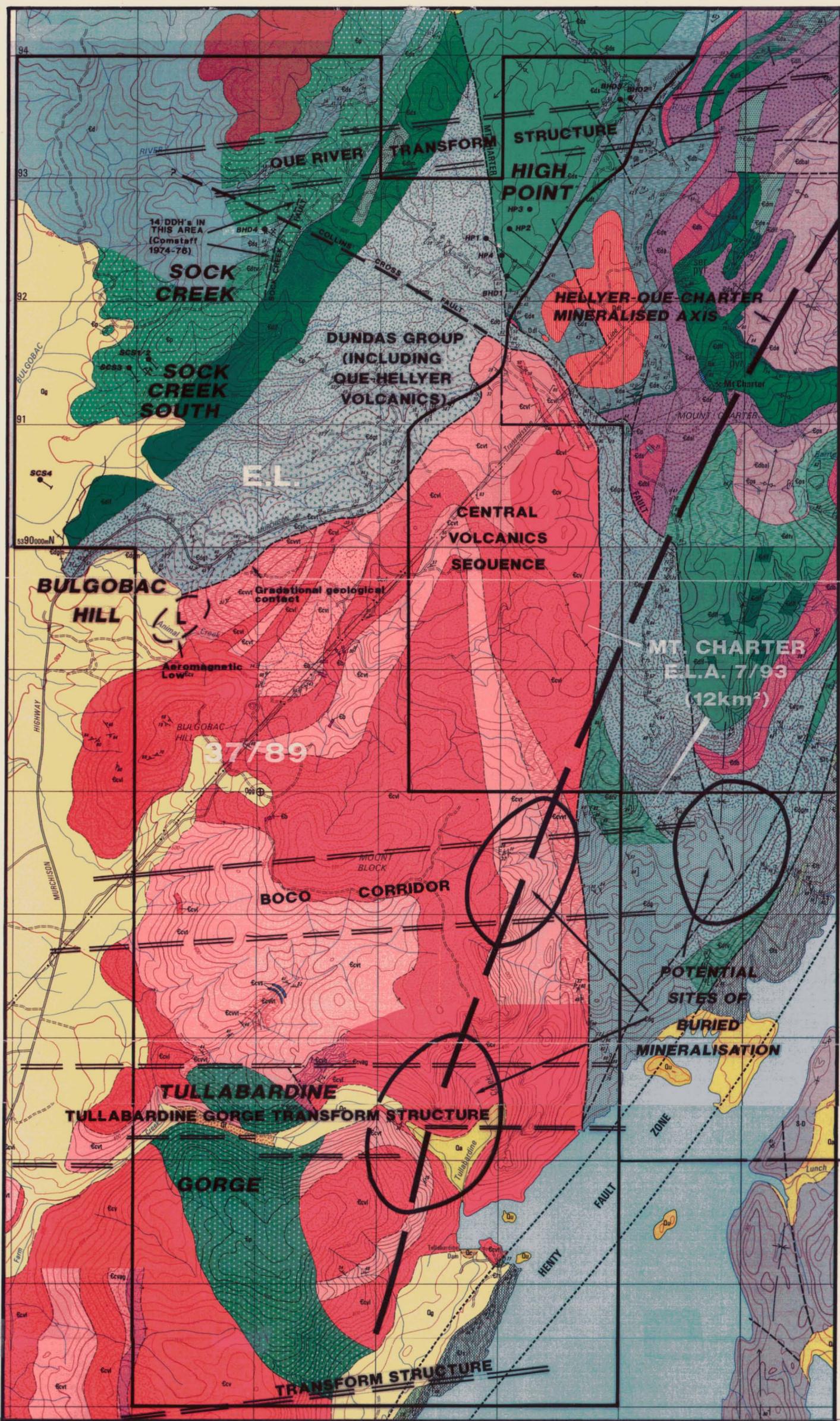
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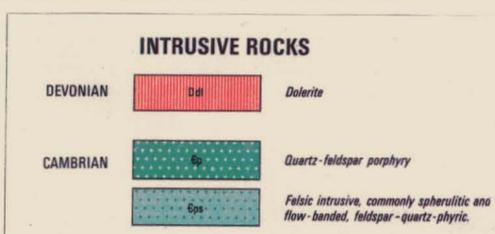
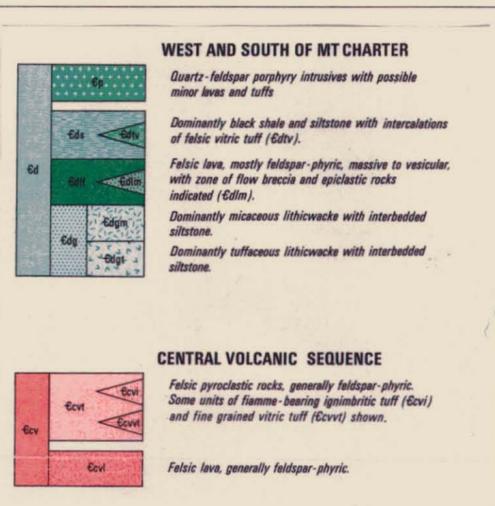
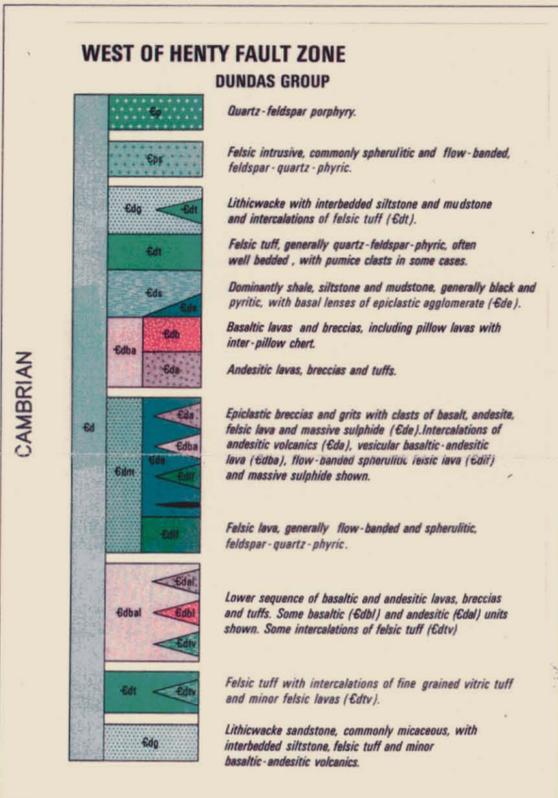
E.L. 37/89 - BULGOBAC HILL

REGIONAL GEOLOGY

FROM MAP 6 OF THE
MT. READ VOLCANICS PROJECT



QUATERNARY	Qa	Alluvium, swamp deposits.
	Qg	Glacial deposits, mostly till.
TERTIARY	Tb	Basalt.



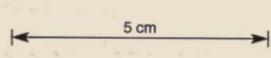
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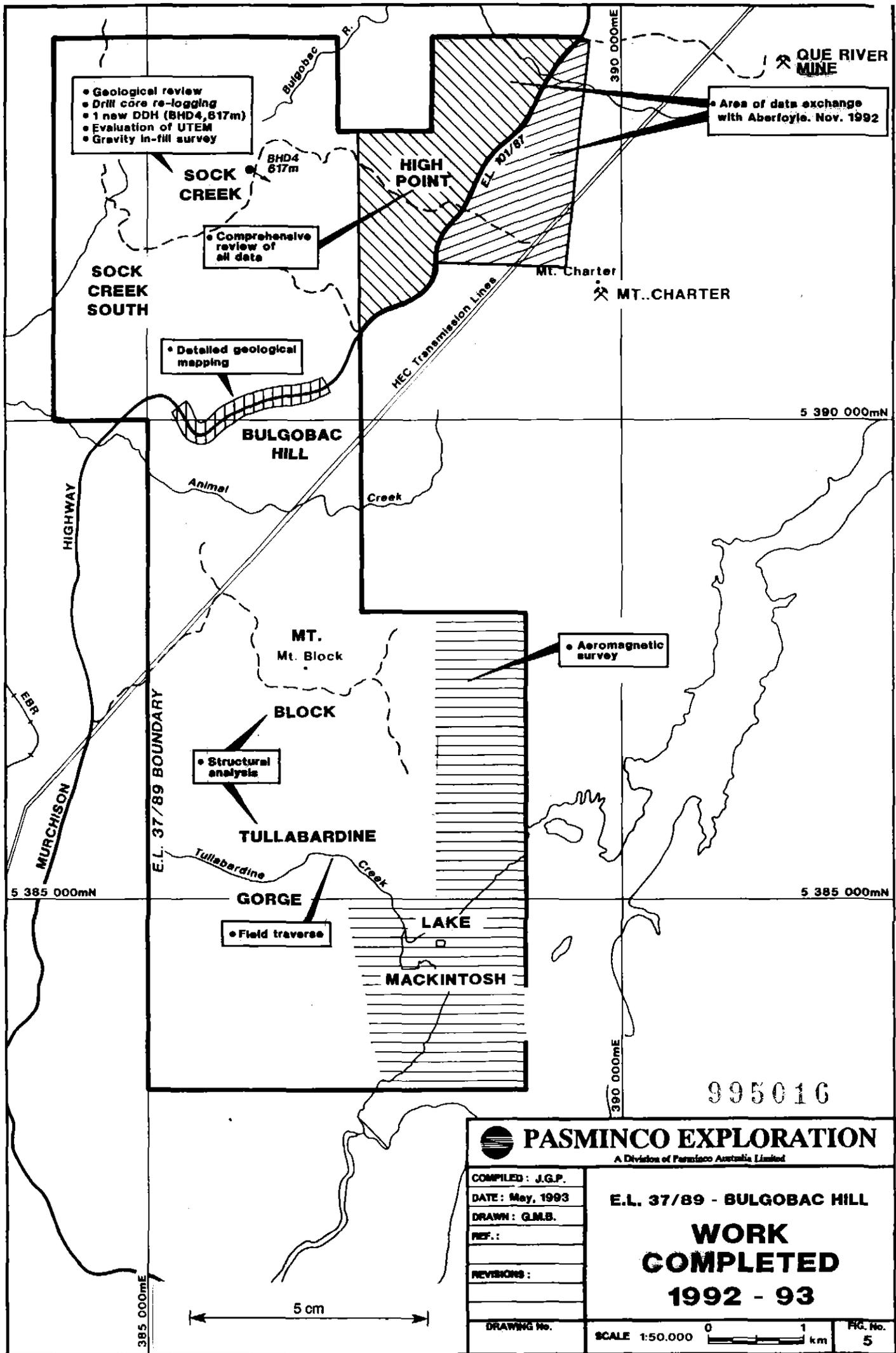
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DRAWN : G.M.B.
REFERENCE : Maps 1 & 2 of The Mt. Reed Volcanics Project.
REVISIONS :

E.L. 37/89 - BULGOBAC HILL

GEOLOGY

DRAWING No. SCALE 1:25,000 0 500 m FIG. No. 4





- Geological review
- Drill core re-logging
- 1 new DDH (BHD4, 617m)
- Evaluation of UTEM
- Gravity in-fill survey

• Area of data exchange with Aberfoyle, Nov. 1992

• Comprehensive review of all data

• Detailed geological mapping

• Aeromagnetic survey

• Structural analysis

• Field traverse

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5 RESULTS OF 1992-93 EXPLORATION

5.1 Sock Creek

5.1.1 REVIEW

All previous exploration on the Sock Creek prospect was re-evaluated and selected drillcore examined. New geological sections were drawn through the central portion of the mineralized zone - see Figures 7-10.

The review confirmed the limited economic potential of the known mineralization. There is a slight chance for an open-cuttable flat-lying body of up to 5-10% Zn, at depths less than 60m below surface in the area around holes SK1 & 2 (see Figures 6, 8 & 9). Optimistically, if it exists such a body would be measurable in terms of one to two hundred thousand tonnes at most.

The Sock Creek mineralization is located on and immediately south of the intersection of two major structures: the N-S Sock Creek Fault and a WNW branch off the Mt Charter Fault (here termed Collins Fault). Most of the mineralization is in a diffuse 300m long zone lying west and parallel to the Sock Creek Fault, although a small proportion also occurs east of the fault (see Figures 6 & 8).

The mineralization occurs as diffuse veins of sphalerite with minor pyrite-galena-chalcopyrite, in the quench-brecciated upper part of a quartz-feldspar porphyry unit adjacent to its contact with overlying black shale and porphyry-derived epiclastics, both of which are also mineralized in places. These rocks are correlates of the Southwell SubGroup in the upper part of the Dundas Group.

The sulphide veins are occasionally massive, up to 400mm thick, and some display beautiful colloform textures. The mineralization is associated with quartz (\pm carbonate) flooding, with a peripheral halo of sericite-carbonate alteration which is sufficiently manganeseiferous to produce a characteristic stain on the old drillcore. This stain is not present in altered but unmineralized core.

The mineralization is relatively pyrite-poor with sphalerite generally the most common sulphide species present. This contrasts with the widespread pyritization which is a characteristic of volcanogenic ore-producing systems. This feature gives the impression that the Sock Creek mineralizing system lacked strength, despite the flashy zinc values in some holes (eg: 1.7m @ 10.1% Zn in SK1, 5m @ 7.5% Zn in SK2 and 8m @ 4.3% Zn in SK3).

Both lead and sulphur isotopic signatures indicate the mineralization is Cambrian with affinities to both VMS and vein-style systems. The Pb plots midway between Rosebery and Que-Hellyer deposit values, while the S, at +7% to +9%, is similar to the values at Que-Hellyer (Barwick, 1991). The Zinc Number (mean 77, standard deviation 20), is closer to those associated with Cambrian VMS systems than Cambrian vein systems (Huston & Large, 1987).

The Sock Creek Fault itself is normally unmineralized, comprising a steeply east-dipping 2-10m wide zone of crushed and altered rock containing large broken up quartz veins. The faulted zone widens to almost 50m where it intersects Collins Fault, which according to Barwick (1991) dextrally offsets the Sock Creek Fault 50-100m. Movement on the Sock Creek Fault was normal (east block down), but substantial - the rocks to the east have the regional moderate westerly dip, while immediately west of the fault they have been dragged into a broad flat anticlinal fold. Facings indicate the rocks are upright.

Other important factors localizing the mineralization include the favourable ground preparation provided by the brecciation in the upper part of the porphyry, and the capping effect of the overlying black shale west of the Sock Creek Fault. **It is in brecciated porphyry and porphyry detritus immediately beneath this shale that the best potential for mineralization exists at Sock Creek.** (This is the site of the postulated mineralized body mentioned earlier - see Figures 6 & 9).

Although the quartz-feldspar porphyry has previously been accepted as intrusive (Hopwood 1977, Barwick 1991, and others), there is evidence it is essentially extrusive and syn-depositional with the surrounding sediments, which to a large extent comprise products of its degradation. Commonly, quench-brecciated porphyry passes gradationally to flanking epiclastic detritus of identical composition, ie: there is evidence of reworking on many porphyry margins and this must indicate extrusion.

Some peperite breccias occur on the contact of the porphyry and black shales, and the shales are occasionally baked but generally not. Lenses and horizons of epiclastics and black shale (the latter commonly disrupted by flowage) also occur within porphyry, features which cannot be attributed solely to "burrowing" of intrusive porphyry into wet sediments because of the relationship of the porphyry with the epiclastics as detailed above. While some intrusive "burrowing" into wet shale probably occurred, overall evidence points to the porphyry comprising several essentially-extrusive flow units.

Regionally, some volcanic units in the Sock Creek area possess unusual chemistry. Dacite lavas on the eastern side of the prospect are peralkaline, with Zr values +700ppm (Barwick, 1991). Mafic units at Sock Creek South show some geochemical affinities with the Henty Dyke Swarm along the Henty Fault (Crawford et al 1992). These features have been taken by both Barwick and Crawford as indications that a deep extensional suture may have extended through the Sock Creek - Sock Creek South area during the Cambrian. Support for this theory comes from the unusual occurrence of corroded quartz xenocrysts from Precambrian basement in both the dacitic and mafic volcanics, apparently incorporated during ascent of these magmas.

From the review it was concluded that the Sock Creek mineralization was probably immediately post the deposition of its hosting rocks, the porphyry and adjacent sediments. Fluid ingress was controlled by the Sock Creek Fault and its intersection with Collins Fault, with mineralization localized by the favourably-prepared brecciated upper margin of the porphyry beneath the impervious shale caprock. The lack of precious metals in the mineralization could possibly be explained by boiling of the fluid at greater depths. The deep extensional suture suggested by some of the geochemical and petrological evidence was regarded as potentially providing the conduit for major hydrothermal fluid inflows.

Consequently, it was decided that a deep drill test beneath the mineralized zone immediately west of the Sock Creek Fault was warranted, on the basis that this might represent the last gasp of a system that had deposited more significant mineralization within a local graben at greater depths. As the deepest existing drillhole on the property had only penetrated 200m below the surface, the new hole was designed to test to a depth of at least 600m.

TABLE 1: SUMMARY LOG OF HOLE BHD4, SOCK CREEK

AMG Coords: 5392584.3N / 386044.7E, 569.2mRL. Dip: -63°. Azimuth: 115° AMG.

- 0 - 27.4m: **PYRITIC BLACK SHALE**
Common sp-gn veinlets.
(Best intersection: 3m @ 0.14% Pb & 0.27% Zn, @ 7.7-10.7m).
- 27.4 - 60.5m: **VARIABLE CRYSTAL-LITHIC EPICLASTICS**
Derived from qtz-feld porphyry. Uphole-fining. Minor py.
- 60.5 - 104m: **QUARTZ-FELDSPAR PORPHYRY BRECCIA**
Quench-brecciation of hot porphyry. V coarse gr. Trace py.
- 104 - 151.9m: **QUARTZ-FELDSPAR PORPHYRY**
Strong silica-albite alteration. No sulphides.
- 151.9 - 179.7m: **MIXED MARGINAL PORPHYRY ZONE AND PYRITIC BLACK SHALE**
Mixed porphyry, porphyry detritus & shale. Minor sp-gn veins.
- 179.7 - 213.4m: **QUARTZ-FELDSPAR PORPHYRY**
Strong silicification. Trace pyrite.
- 213.4 - 236.4m: **BLACK SHALE AND VOLCANOMICT EPICLASTIC BRECCIA**
1-3% py, cp & sp-gn veinlets, mainly in shale.
(Best intersection: 2m @ 0.46% Zn, 221-223m).
- 236.4 - 382.1m: **FINELY BRECCIATED NON-PORPHYRITIC RHYODACITE LAVA**
Quench-brecciated highly vitric lava with quartz amygdales.
Strong silica-albite-chlorite alteration. Trace pyrite.
- 382.1 - 489.5m: **FELDSPAR-PORPHYRITIC DACITE LAVA**
Green, silica-chlorite altered. Quartz amygdales. Trace py.
- 489.5 - 616.8m: **FINE QUARTZ-MICA SANDSTONE AND BLACK SHALE**
Sandstone non-volcanic. Shale graphitic & pyritic.
Major faulted zone (Sock Creek Fault?) 513 - 523m.

END OF HOLE

5.1.2 DEEP DRILLHOLE BHD4

Hole BHD4 was drilled to 616.8m in February–April 1993. The hole was sited 150m west of the Sock Creek Fault and designed to test centrally beneath the known mineralization (see Figure 6). The hole was angled east to go down parallel to the Sock Creek Fault with the aim of swinging through the fault at about 500m below surface. In fact, due partly to the notable lack of cleavage in the rocks, the hole went gun–barrel straight and only intersected the fault because the structure steepened at depth and cut across the hole.

The hole did not intersect any mineralization of consequence. A summary log of BHD4 appears in Table 1. The detailed log is in Appendix 1 and the drill section in Figure 20.

The upper 27.4m of the hole was in the flat–lying black shale caprock unit, which as usual contained veinlets of sp–gn. However, possibly as a consequence of the distance of the hole collar from the Sock Creek Fault, this mineralization was weak, with best values of 3m @ 0.3% Zn & 0.1% Pb.

From 27.4m to 236.4m the hole encountered a variable and sometimes intermixed sequence of quartz–feldspar porphyry extrusives (with common quench and peperitic breccias), porphyry–derived epiclastics and black shale. These rocks are Southwell SubGroup correlates.

The rocks face uphole and dip gently east. Although the known Sock Creek mineralization occurs in this sequence a short distance east of the hole it is absent from BHD4. The pyritic black shale units contain veins of cp and sp–gn, but the best intersection was only 2m @ 0.5% Zn.

From 236.4 to 489.55m, the hole encountered two large barren units of glassy (perlitic) quartz–amygdaloidal rhyodacitic lavas, the upper non–porphyritic and the lower feldspar–porphyritic. In terms of time–stratigraphic units, these lavas occupy the position of the Que–Hellyer Volcanics east of the Mt Charter Fault (viz: between the underlying Animal Creek Greywacke and overlying Southwell Subgroup). The upper non–porphyritic lava has an

abnormally high Zr content, averaging 800ppm. Breccia fragment orientation and consistent flow banding, suggest both these lava units dip gently east towards the Sock Creek Fault.

At the base of the lavas there is an abrupt, steeply west-dipping, apparently-unconformable contact to black shale and chromite-bearing quartz-mica sandstone: typical Animal Creek Greywacke. Petrology shows the provenance of the sandstone to be unequivocally Precambrian, but rare thin clastic bands of glassy felsic volcanic material do occur in this unit and attest to some (distal?) volcanic activity during its deposition. Apart from disseminated pyrite in the shales, the unit is unmineralized.

Orientated core shows the Animal Creek Greywacke dips steeply west. At 513–523m in the hole the sandstone is affected by abundant barren quartz-carbonate veining and flooding, with zones of cemented fault breccias. This is considered to be the Sock Creek Fault (here dipping vertically), although no change in rock attitude or lithology is evident across the structure.

The negative results from BHD4 severely downgrade the mineral potential of the Sock Creek area. The relatively shallow depth of the Animal Creek 'basement' means the postulated mini-rift or graben extending broadly along the trend of the Sock Creek Fault, does not exist.

5.1.3 IN-FILL GRAVITY SURVEY

In February 1993, 48 new gravity stations were read in the Sock Creek and South Sock Creek areas to in-fill earlier coverage (see Figure 11). The survey was carried out by Dr R. Richardson of the Division of Mines under contract to Pasmenco Exploration.

Station spacing was approximately 200–250m, along existing access (tracks, gridlines etc). Stations were either levelled to an accuracy of 3m or better using a barometer, or placed at previously-surveyed points (mainly along the drill tracks in the main Sock Creek and South Sock Creek prospect areas).

Full details of the survey and the results, are given in Appendix 2.

5.1.4. REASSESSMENT OF UTEM AT SOCK CREEK (N.HUGHES)

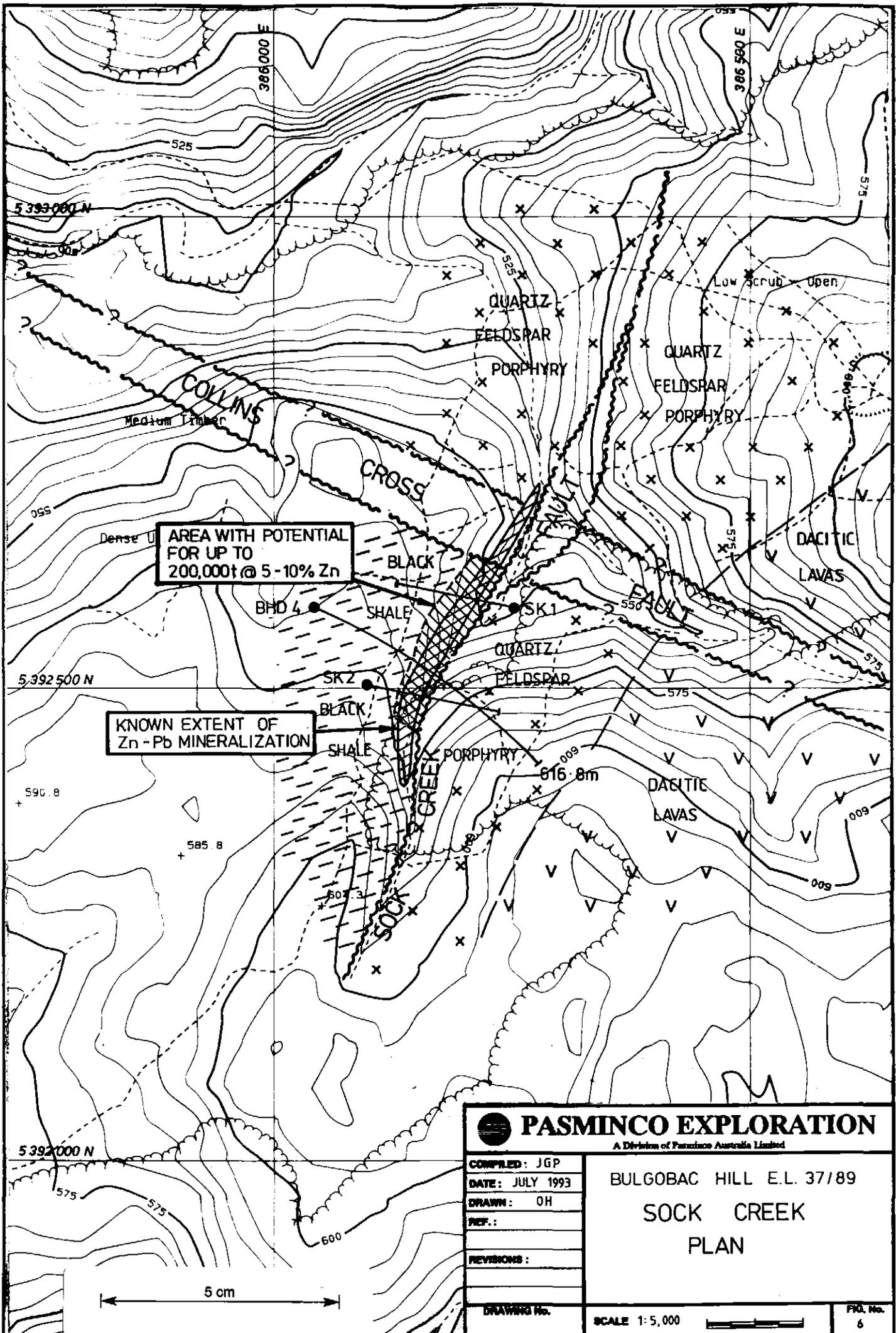
The data has been reassessed to detect any anomalies worthy of follow up in the vicinity of the Sock Creek mineralization. The UTEM data was collected by Lamontagne Geophysics on behalf of BHP Exploration during 1987.

Two loops were used to energize the ground in the vicinity of the Sock Creek mineralization, MB01 and MB02. Gridlines 5000N to 8200N were surveyed west of 2500E from these loops. The line separation was 200m and reading interval 50m.

Only lines 6600N and 6800N pass directly over the Sock Creek mineralization. Neither shows a distinct anomalous response at the position of the mineralization. Figure 12 shows the expected coupling between the energizing loop and the mineralization. The expected anomaly could have one of several forms depending on the actual dip of the mineralization and closeness to the plane of the loop edge. Modelling of a conductor of similar size (360m x 40m) which is flat lying and at a depth of 75m, and having a conductance of 10 Siemens indicates that it would (probably) not be detected from a surface survey.

The surveys detected numerous early time anomalous EM responses. Presumably most are related to current channelling at the contact of different units or due to variations in surficial conductivity. However, it is noted that several of the profiles show smooth variations, indicating conductors at depth, and as such it may be well to ground check these trends. The position of the trends is shown on the 1988 Lamontagne Interpretation Map (see Figure 13).

In summary, only early time conductors were detected with the UTEM surface surveys over Sock Creek. The cause of these conductors is thought to be current channelling at contacts or variations in surficial conductivity. Several of these conductor trends should be ground checked to establish a unit boundary or change in overburden characteristic as the cause. From modelling, the mineralization at Sock Creek would not be detectable from the surface surveys.

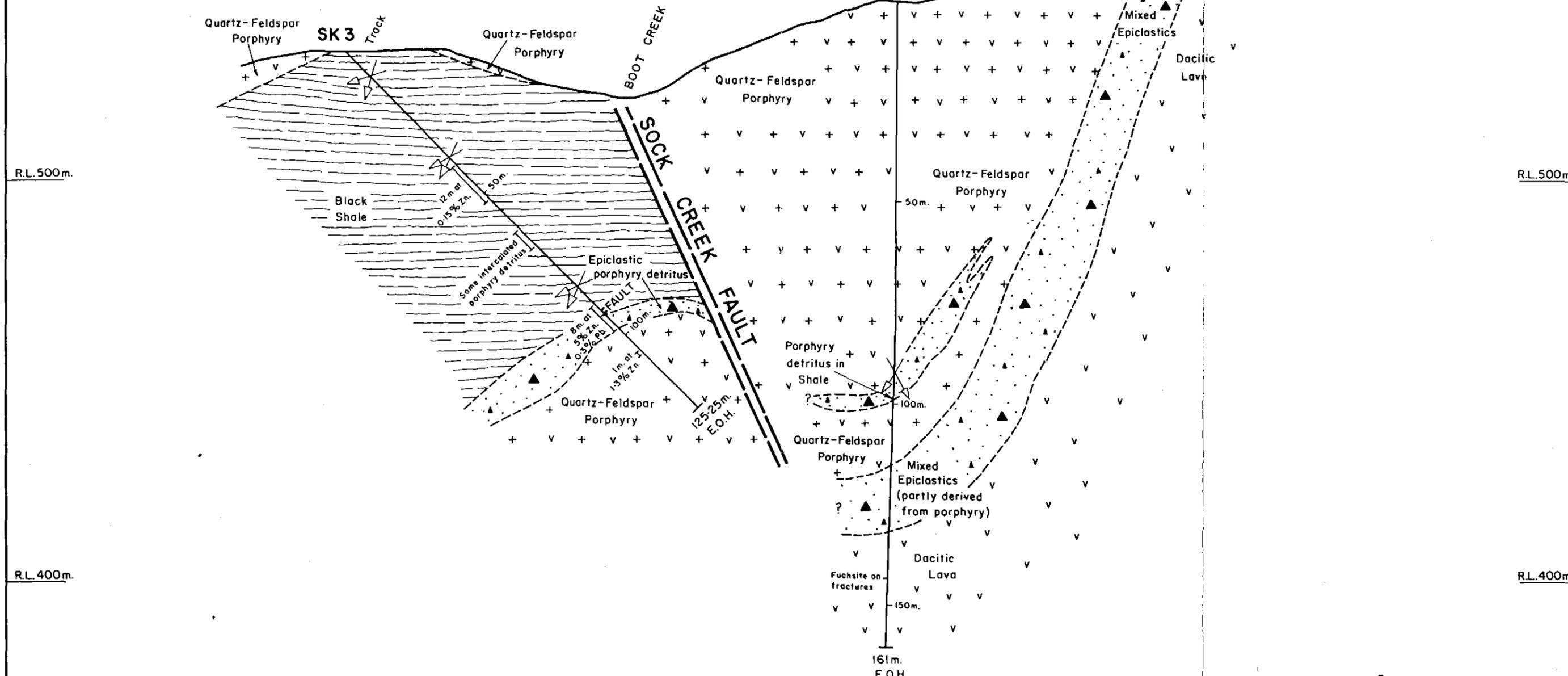


PASMINCO EXPLORATION <small>A Division of Pasminco Australia Limited</small>	
COMPILED: JGP	BULGOBAC HILL E.L. 37/89 SOCK CREEK PLAN
DATE: JULY 1993	
DRAWN: OH	
REF.:	
REVISIONS:	
DRAWING No.	SCALE 1:5,000
	FIG. No. 6

WEST

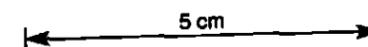
EAST

SKI2



LEGEND

-  Quartz-Feldspar Porphyry.
-  Mixed Epiclastics.
-  Black Shale.
-  Dacitic Lava.
-  Andesite Dyke.

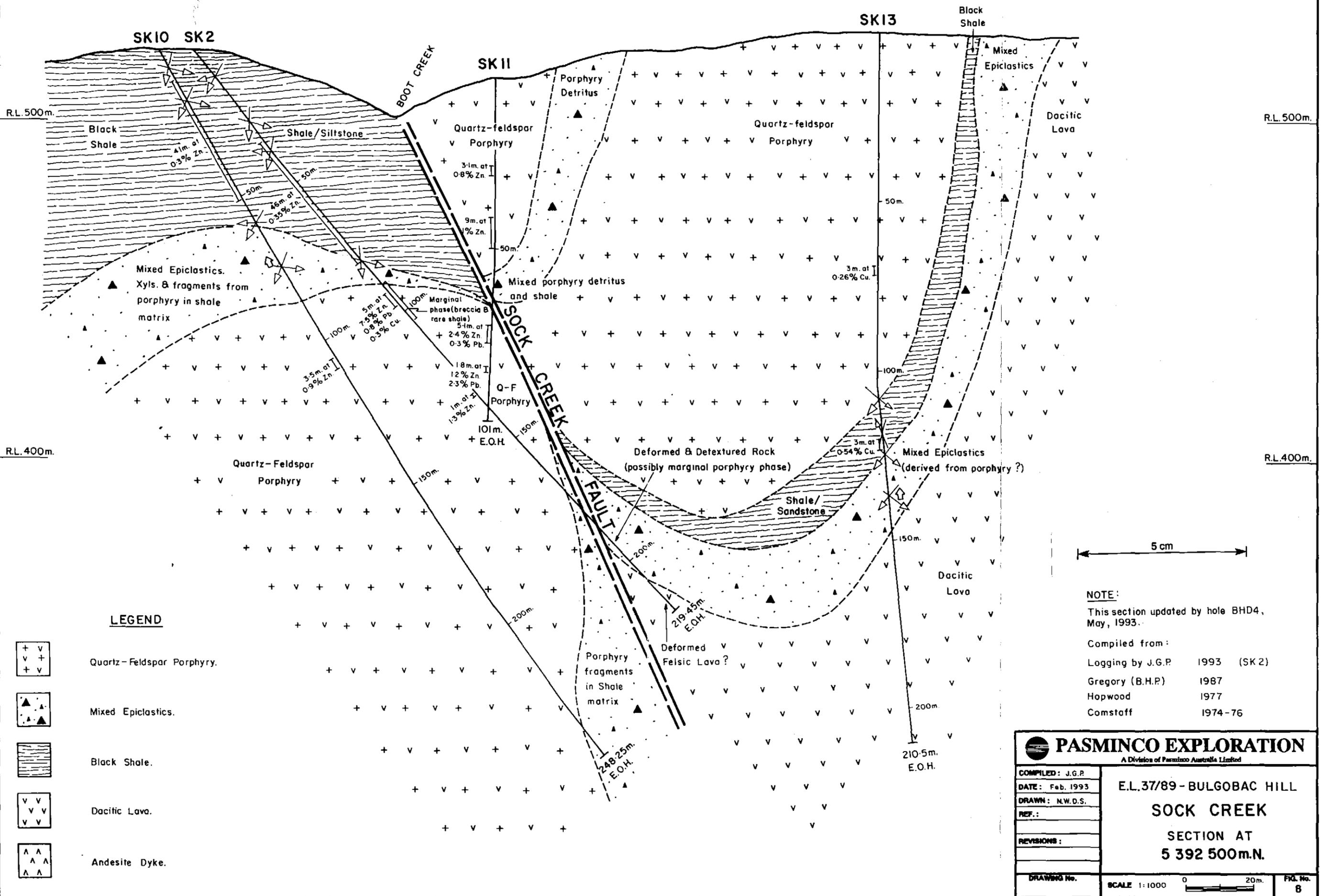


Compiled from:
 Gregory (B.H.P.) 1987
 Hopwood 1977
 Comstaff 1974-76

PASMINCO EXPLORATION <small>A Division of Pasminco Australia Limited</small>	
COMPILED: J.G.P.	E.L.37/89-BULGOBAC HILL SOCK CREEK SECTION AT 5 392 425 m.N.
DATE: Feb. 1993	
DRAWN: N.W.D.S.	
REF.:	
REVISIONS:	
DRAWING No.	SCALE 1:1000  20m. FIG. No. 7

WEST

EAST

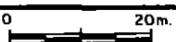


LEGEND

-  Quartz-Feldspar Porphyry.
-  Mixed Epiclastics.
-  Black Shale.
-  Dacitic Lava.
-  Andesite Dyke.

NOTE:
 This section updated by hole BHD4, May, 1993.

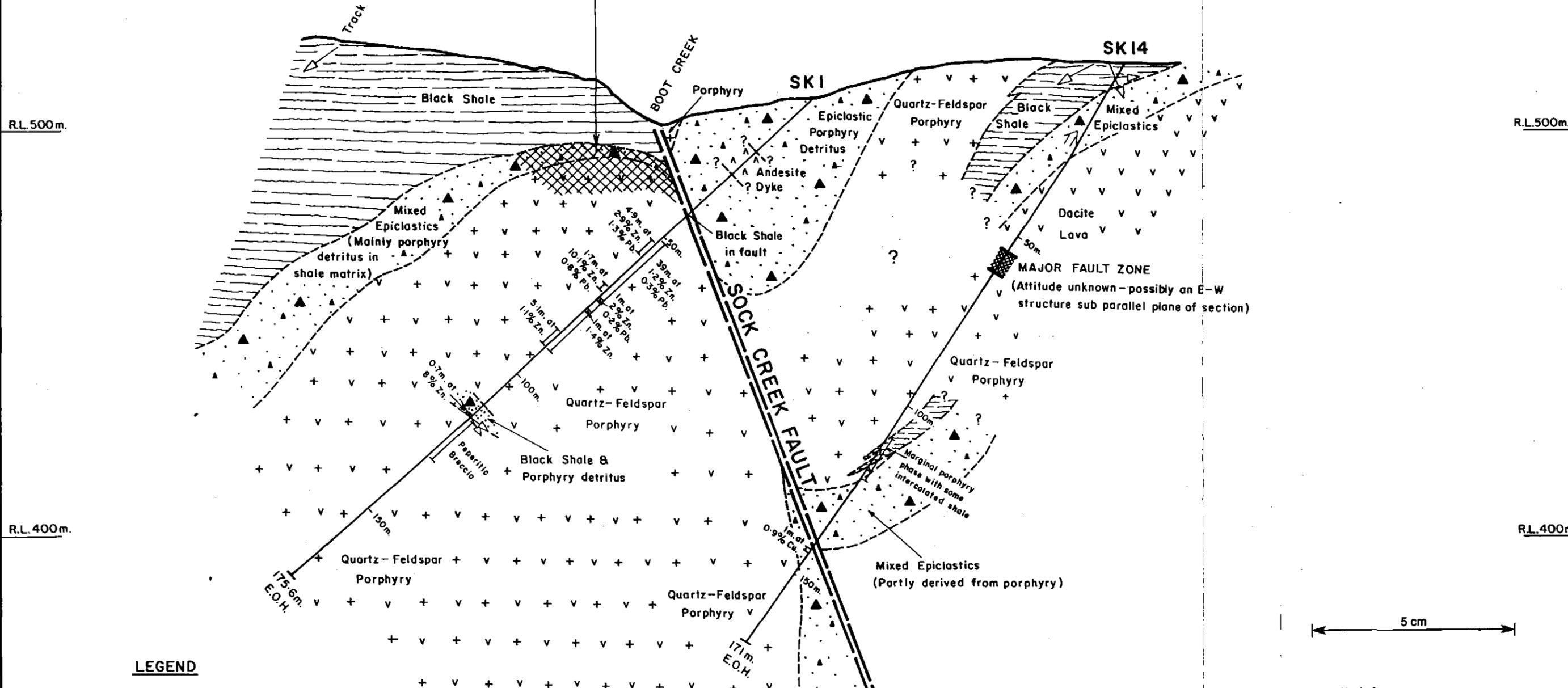
Compiled from:
 Logging by J.G.P. 1993 (SK 2)
 Gregory (B.H.P.) 1987
 Hopwood 1977
 Comstaff 1974-76

PASMINCO EXPLORATION <small>A Division of Pasminco Australia Limited</small>	
COMPILED: J.G.P.	E.L.37/89 - BULGOBAC HILL SOCK CREEK SECTION AT 5 392 500m.N.
DATE: Feb. 1993	
DRAWN: N.W.D.S.	
REF.:	
REVISIONS:	
DRAWING No.	SCALE 1:1000  FIG. No. 8

WEST

EAST

POTENTIAL MINERALIZED ZONE



R.L. 500m.

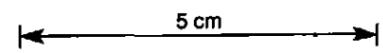
R.L. 500m.

R.L. 400m.

R.L. 400m.

LEGEND

-  Quartz-Feldspar Porphyry.
-  Mixed Epiclastics.
-  Black Shale.
-  Dacitic Lava.
-  Andesite Dyke.



Compiled from:
 Logging by J.G.P. 1993 (SK1)
 Gregory (B.H.P.) 1987
 Hopwood 1977
 Comstaff 1974-76

PASMINCO EXPLORATION <small>A Division of Pasminco Australia Limited</small>	
COMPILED: J.G.P.	E.L.37/89 - BULGOBAC HILL SOCK CREEK SECTION AT 5 392 575 m.N.
DATE: Feb. 1993	
DRAWN: N.W.D.S.	
REF.:	
REVISIONS:	
DRAWING No.	
SCALE 1:1000	0 20m. 9

WEST

995028 EAST

SK5

Track

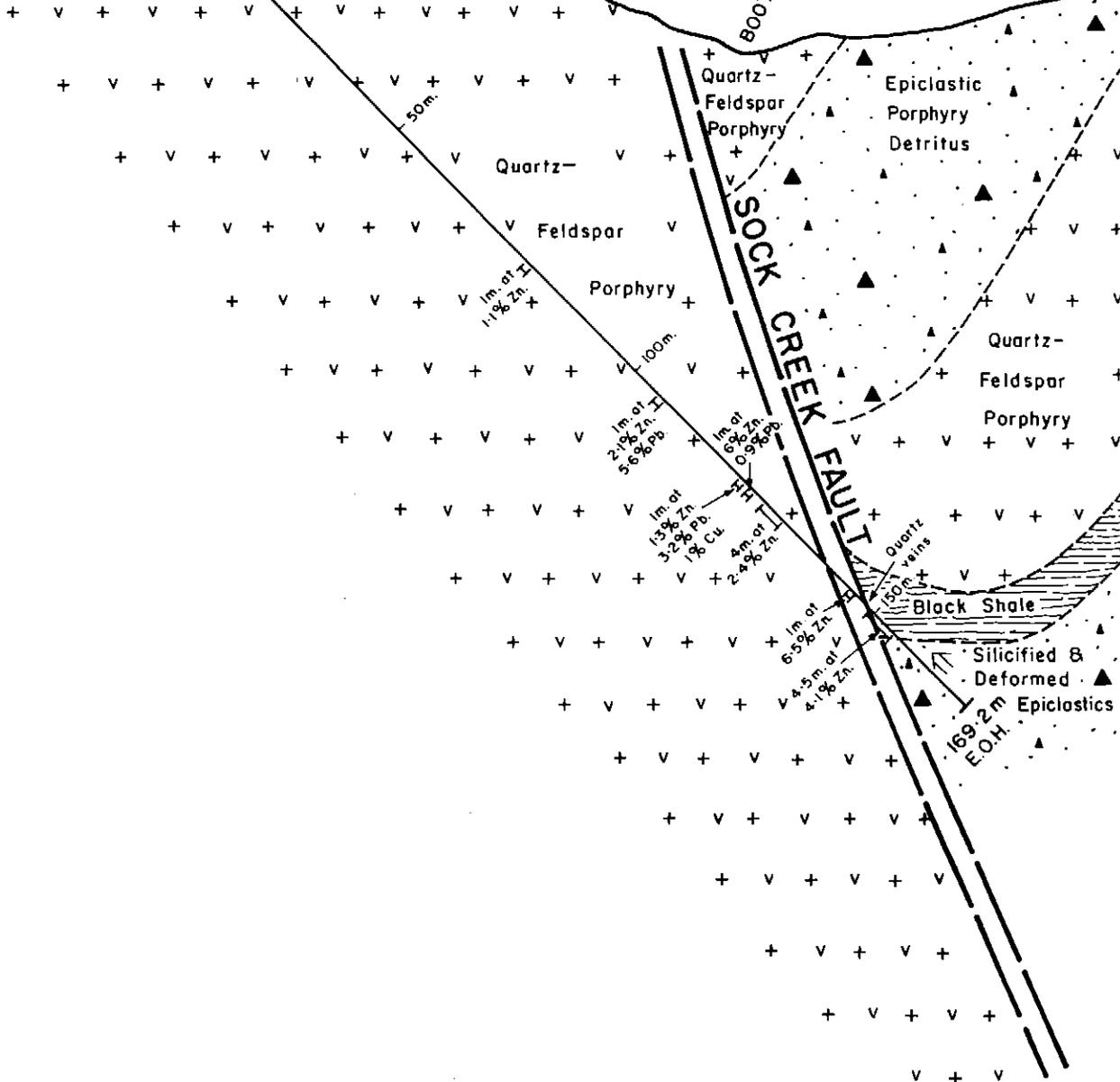
R.L.500m.

R.L.500m.

R.L.400m.

BOOT CREEK

SOCK CREEK FAULT



LEGEND



Quartz-Feldspar Porphyry.



Mixed Epiclastics.



Black Shale.



Dacitic Lava.



Andesite Dyke.

5 cm

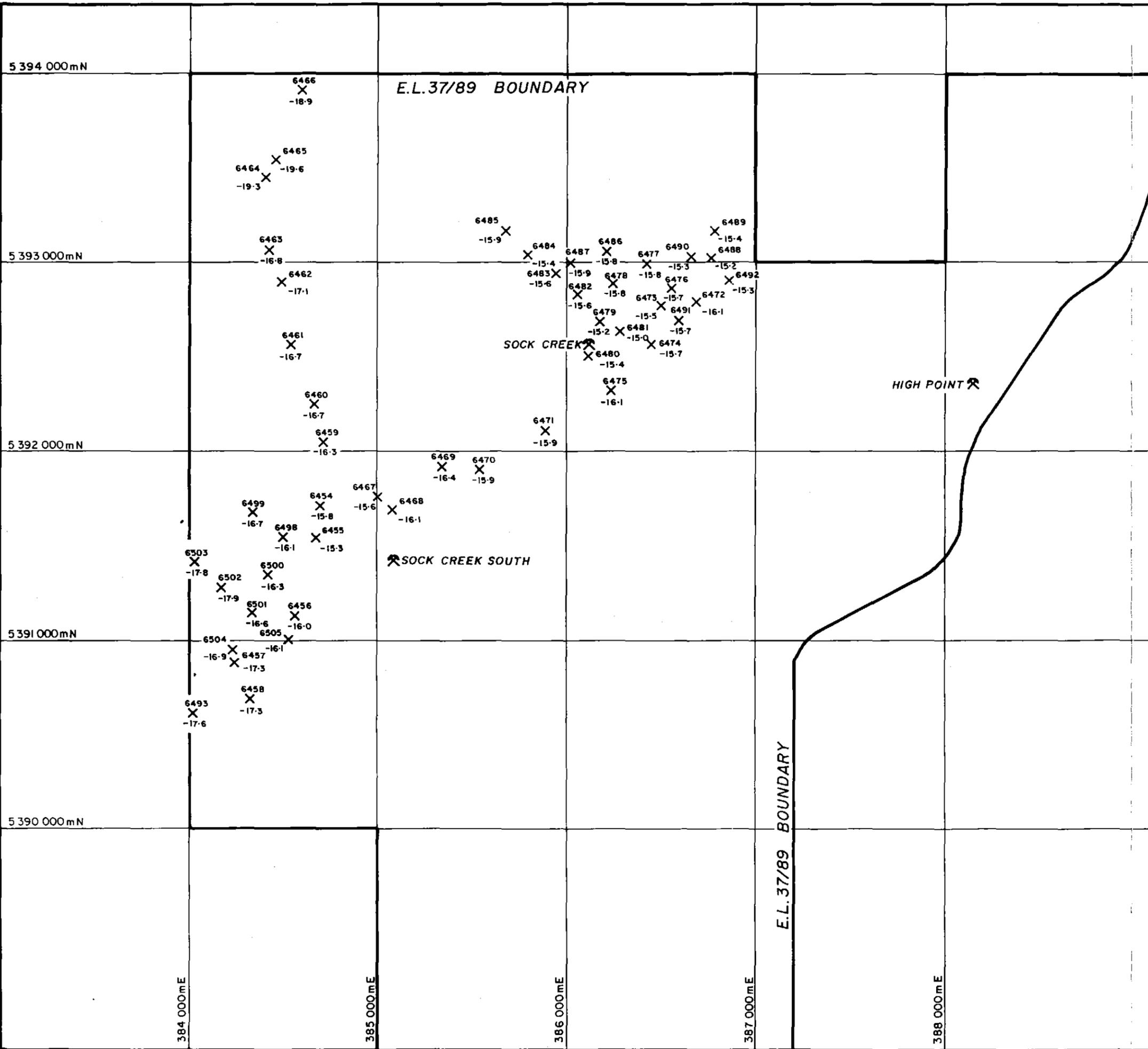
Compiled from:

Gregory (B.H.P) 1987

Hopwood 1977

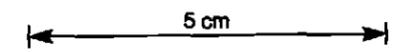
Comstaff 1974-76

 PASMINCO EXPLORATION <small>A Division of Pasminco Australia Limited</small>	
COMPILED: J.G.P.	E.L.37/89 - BULGOBAC HILL SOCK CREEK SECTION AT 5 392 650 m.N.
DATE: Feb. 1993	
DRAWN: N.W.D.S.	
REF.:	
REVISIONS:	
DRAWING No.	SCALE: 1:1000 
	FIG. No. 10



LEGEND

-  Station Number
-  Bouguer Anomaly Value
-  Year Code: 9351
-  SOCK CREEK
-  Area of Mineralization



PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED: R.R.
DATE: JULY, 1993
DRAWN: N.W.D.S.
REF.:
REVISIONS:

E.L.37/89 BULGOBAC HILL
1993 IN-FILL GRAVITY SURVEY
SOCK CREEK AREA

2200E

2300E

2400E

2500E

2600E

2700E

50m

0m

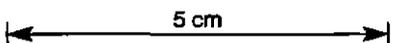
-100m

-200m

-300m

LOOP

CONDUCTOR



Coupling Diagram : Loops MB01 & MB02, Scale 1:2500

995030

Figure 12



COMPILED : N.Hughes

DATE : July 1993

DRAWN : N.W.D.S.

REF.:

REVISIONS :

E.L. 37/89 BULGOBAC HILL

UTEM INTERPRETATION MAP

SOCK CREEK

(LAMONTAGNE 1988)

DRAWING No.

SCALE 1:25,000

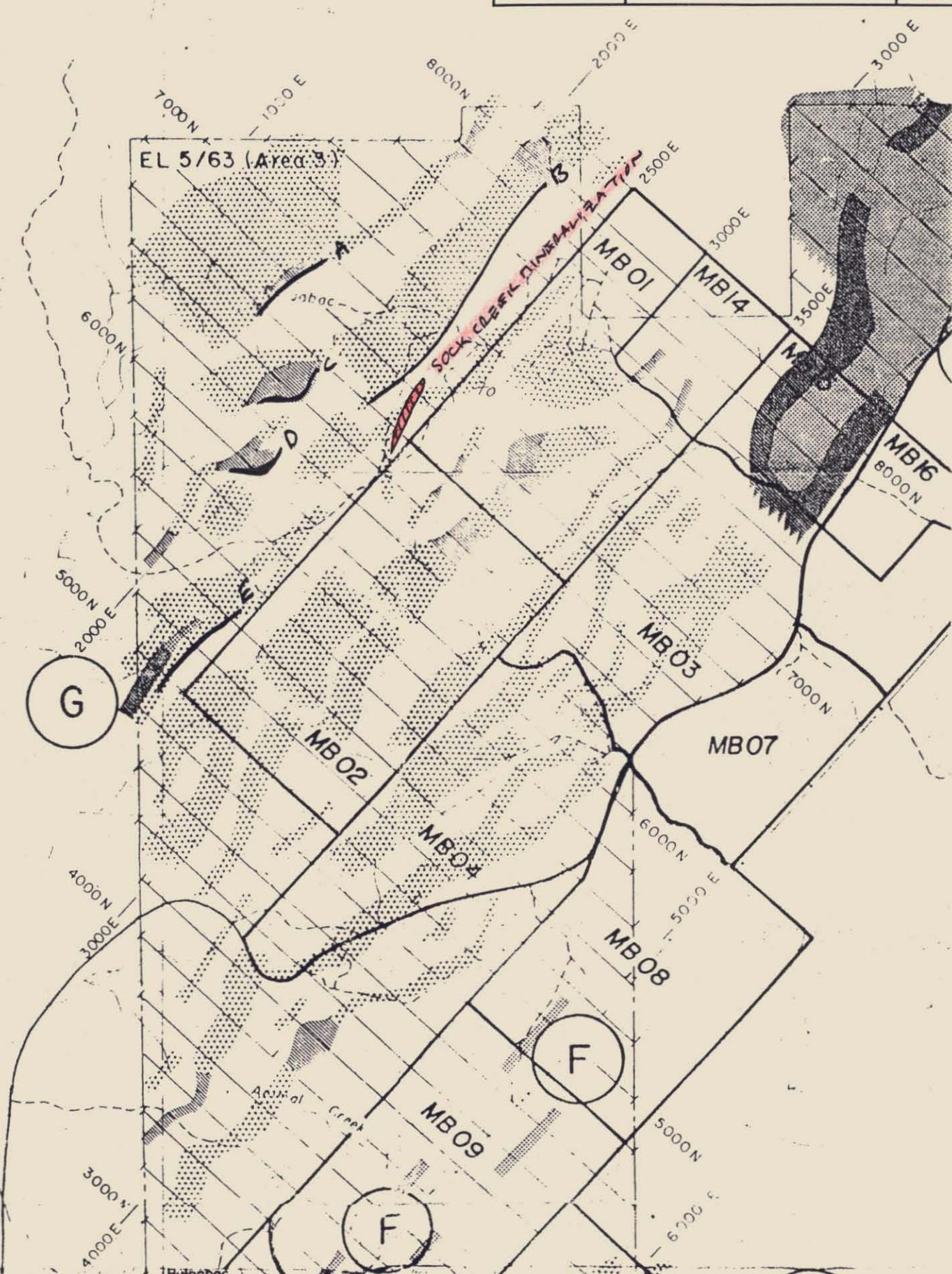
FIG. No.

13

5 cm

385 000 E

995031



5.2 High Point

5.2.1 ABERFOYLE DATA SWAP

Aberfoyle Resources and Pasminco Exploration share a common tenement boundary along the Murchison Highway on the eastern side of the High Point prospect. The drillholes at High Point have all been collared within 500m of this boundary and at least two holes were stopped prematurely when they threatened to go across it. To the east, Aberfoyle have put down holes as close as 100m from the boundary.

Because of the similarities in geology and drill targets on both sides of the boundary, in November 1992 Pasminco and Aberfoyle agreed to swap data from exploration on their respective tenements in the general High Point area.

The swap involved data from 3 sq km of EL 37/89 and an adjacent similarly-sized area on Aberfoyle's Mackintosh EL 106/87 east of the highway (see Figures 5 & 14). In addition, some data from the Aberfoyle/Placer JV's Bulgobac River EL 39/85, immediately north of High Point, was included in the swap.

Data exchanged included all information from drillholes HP1-4A & BHD1-3 (Pasminco), HAT1-2A, MC11-15 & MAC27 (Aberfoyle), and BRD05 (Placer); all soil and rock chip geochemical data; geological fact mapping; ground magnetics; recent aeromagnetic and radiometric coverage; UTEM, EM37, gravity and downhole DHEM survey data. The core from the designated holes was made available for examination and additional sampling by the opposite party.

At the time of writing, July 1993, the processes of the data swap were continuing.

5.2.2 REVIEW

Aims:

Following commencement of the information swap with Aberfoyle, a major review of exploration at High Point was undertaken using the expanded database. This review was still in progress at the time of writing. The aims of the review were two-fold:

- 1 To clarify the geology of the prospect and resolve the arguments.
- 2 To determine if further drilling was warranted and define specific targets.

At the completion of hole BHD3 in early 1992, work stopped at High Point because:

- a) *It was felt there was insufficient untested space in the main prospect area to host a major orebody.*
- b) There was uncertainty and disagreement over the stratigraphic correlations between holes and particularly the stratigraphic position of the zinc mineralization.
- c) There were no obvious good-quality untested targets in the area.

The principal questions revolved around whether the dispersed zinc mineralization at High Point was within the Que-Hellyer Hangingwall, Footwall, or Mixed Sequence (the latter unit hosts the Que and Hellyer orebodies), and whether the holes had finished in the Footwall Volcanics.

The supposedly consistent trends published by researchers working around the Hellyer and Que orebodies, eg: the predominance of basalts in the Hangingwall Volcanics and andesites in the Footwall Volcanics, are not seen at High Point nor in the Aberfoyle holes further east.

Lithogeochemistry:

It was decided to use lithogeochemistry to try and resolve the stratigraphic relationships as it had *already been proven that this could not be done by lithological mapping.* The changeable and lensoid nature of the mafic volcanic units in the Que-Hellyer Volcanics means individual units are of limited areal extent. Lithological correlations between even close-spaced holes is almost impossible (vividly seen in Figure 21), but correlations are evident in the lithogeochemical patterns.

It seemed important to use lithogeochemical suites that might be of more regional scope than ones that were applicable solely to the Que–Hellyer Volcanics, (which are in reality based on research conducted locally around the Hellyer and Que River orebodies. High Point prospect lies 4km SW of the Que River Mine and almost 7km SW of Hellyer). A.Lorrigan had previously tried unsuccessfully to use the Ti/Zr ratio to map out stratigraphic correlations in the High Point holes (Purvis, 1992).

Suites defined by Crawford et al (1992) were used as a basis for the study, as these included suites that separately defined the Que–Hellyer Footwall Volcanics (Suite 1), and the Que–Hellyer Hangingwall Volcanics, ie: Hellyer Basalt, (Suite 3).

The lithogeochemical database comprised 38 core samples from the Pasminco and BHP High Point drillholes – see Table 2. Sample quality is varied but generally good. Sample distribution is less than perfect and more sampling is presently being done to overcome this. A minority of samples are affected by excessive CaO and Loss on Ignition values, having been taken from highly carbonatized volcanics or peperite breccias with black shale matrix. The effect of this is to give these samples a reduced SiO₂ value. This could be overcome by recalculating the values "volatile-free", but the overall results are clear enough without doing this.

In fact, the results are a spectacular demonstration of the value of lithogeochemical sampling. As can be seen in Figures 15–17, the ratios of P₂O₅/TiO₂ v SiO₂, Ti/Zr v SiO₂, and Fe₂O₃ v SiO₂, all show that only the volcanics below 650m in hole BHD3 (at the northern end of High Point), belong in Suite 1 – the classification including the Que–Hellyer Footwall.

These rocks were originally logged as Mixed Sequence and Footwall Volcanics (Purvis,1992). In all three plots the grouping of these samples within the Suite 1 field is tight and unequivocal. Apart from one aberrant sample (an obviously–silicified basalt from the top of the volcanic section in HP4), no other volcanics from any of the High Point holes plot in the Footwall field.

To confirm these results, the High Point data was compared with data in Crawford (1990), from holes on the Placer/Aberfoyle Bulgobac River JV area north of High Point and from areas on the Aberfoyle leases around the two mines. Two Placer holes (BRD01A and BRD03) intersected

the Que-Hellyer Footwall Volcanics. P_2O_5 and Cr values from these intersections and Crawford's Table A5 of definite Que-Hellyer Footwall lavas around the mines, were plotted with samples of mafic volcanics in the basal 40m of holes BHD1, BHD3 and HP4A at High Point.

The results are shown in Figure 18 and demonstrate that only hole BHD3 bottomed in the Que-Hellyer Footwall Volcanics. The samples from deep holes BHD1 and HP4A plot clearly outside the Footwall field.

As a further check, geochemical data from Placer hole BRD05 was compared with the High Point holes. BRD05 intersected the important Mixed Sequence unit and was sampled in detail by Crawford (1990), who showed that this unit (amongst others) had a distinct immobile element signature. The results of the comparison with units at High Point are clearly evident on the P_2O_5 v Ti/Zr plot in Figure 19.

Samples from below 650m in BHD3 (including the Que-Hellyer Footwall Volcanics in the base of the hole and again suggesting a geochemical link between the two units), cluster tightly within the Mixed Sequence field defined in BRD05. All other High Point samples plot distinctly separate from it. The Mixed Sequence below 650m in BHD3 was recognized during logging so the geochemical interpretation is no surprise, but the results dispel any thoughts that other holes at High Point intersected this important horizon.

From the litho-geochemistry it is evident that only hole BHD3 at High Point has extended deep enough to intersect the critical Mixed Sequence and the Que-Hellyer Footwall Volcanics. All other holes on the prospect are entirely in the Hangingwall Volcanics (ie: equivalents of the Hellyer Basalt), as is the zone of dispersed zinc mineralization.

MAC27:

Following these findings, data from the Aberfoyle work to the east of High Point was examined to see if it could shed some light on how deep the Mixed Sequence would be below the limit of present drilling at High Point. It was also intended to see how far east the zone of dispersed zinc mineralization in the Hangingwall Volcanics extended.

Aberfoyle intersected 40m of Mixed Sequence 840m below surface in the bottom of MAC27, a vertical hole collared only 100m east of the EL boundary immediately adjacent to the main High Point prospect area (see Figures 14 & 21). The Mixed Sequence in MAC27 was examined and is not very attractive, lacking epiclastic material and comprising moderately silicified and pyritic dacite lava and lava breccia, with minor dispersed sphalerite (best intersection: 10m @ 0.27% Zn).

(This compares with the Mixed Sequence in BHD3, which although unmineralized, at least had some epiclastic character).

MAC27 bottomed in a 7m interval of basalt which at the time of logging (1990), Aberfoyle considered to be the Que-Hellyer Footwall Volcanics. However, as can be seen in Figure 18, on a P_2O_5 v Cr plot this basalt lies well outside the normal Footwall field. It is probably a mafic intercalation within the Mixed Sequence, similar to that in Placer hole BRD01A (see Figure 22). Aberfoyle have also come to this conclusion (S.Richardson, pers comm, July 1993).

This means it is highly likely that an unknown thickness of untested Mixed Sequence lies beneath MAC27, and that the Mixed Sequence in the area immediately east of High Point is substantially more than 40m thick. The gentle westward dip of the rocks will bring the Mixed Sequence beneath the main High Point prospect area at a depth interpreted to be about 200m below the deepest hole, HP4A, and approximately 800m below surface (see Figure 21).

Unfortunately, hole HP4A experienced drilling difficulties and there is no possibility of deepening it (P.Sharp, Tasmanian Diamond Drilling, pers comm July 1993). None of the other High Point holes are suitably located for deepening.

Interpretative Geological Sections:

Two interpretative geological sections through the High Point prospect have been constructed using all the available drillhole information (Pasminco, Aberfoyle, Placer). These are Figure 21 – a 1:2500 scale NW-SE cross section covering 2.5km from hole HP1 at High Point to the Mines Department hole MCH1 on Mt Charter; and Figure 22 – a 1:5000 scale N-S longitudinal section covering 5km from hole BHD1 at High Point to hole BRD03 at the northern end of the Bulgobac

River EL. The location of both section lines is shown on Figure 14.

There are several interesting features on the sections worth noting:

- 1 The main High Point prospect area occurs in a local zone of enhanced faulting and folding clearly associated with the adjacent Mt Charter Fault. Further east and north away from the fault the rocks appear less disturbed.
- 2 The zone of dispersed zinc mineralization in the Hangingwall Volcanics is broadly stratiform. Close to the Mt Charter Fault the shape of the mineralization clearly mimics the folding in the volcanics and overlying sediments.
- 3 The zinc mineralization generally lies in the upper part of the Hangingwall Volcanics and base of the Que River Shale, but close to the Mt Charter Fault less-mineralized mafic volcanic units separate the mineralized zone from the shale, due to local thickening of the volcanic pile.
- 4 The zinc mineralization is thickest in the vicinity of HP1 at High Point (200m @ 0.2% Zn), but has better grade in the Aberfoyle holes further east (95m @ 0.5% Zn in MC14). It extends NE from the Mt Charter Fault in a zone approximately 1.5km N-S and 1km E-W (shown in Figure 14). The zone is not present in BHD3 at the northern end of High Point.
- 5 There is a primary thickening of the Hangingwall Volcanics adjacent to major structures such as the Mt Charter Fault, suggesting these structures were sites of lava extrusion. Over the thickened zones the Que River Shale is thinner than normal, indicating the thickened lava formed mounds on the sea floor. Such structural lava conduits are likely also to have been conduits for hydrothermal fluids and therefore it is probable there is genetic association between the mineralization and faults such as the Mt Charter Fault (or more correctly, their precursors).
- 6 The Mt Charter Fault appears essentially vertical. If the fault dipped steeply NE (as previously thought), HP4A should have hit it at depth. HP4A, a vertical hole, collared only 40m NE of the fault and despite drifting 25m back towards it, finished at 600m still in Que-Hellyer Volcanics.

Interpretation and Modelling of DHEM Anomalies at High Point (C.Durrand)

A review of all the TDEM data collected for the High point prospect at Bulgobac, Tasmania (EL 37/89) has been completed.

Interpretation and modelling using the Multiloop computer modelling software and the known geology and drilling results suggest that there are no anomalies present in the data that are not consistent with the presence of the conductive Que River Shale. This however does not preclude the possibility that an orebody is present in the area and is being masked by the electrically more conductive massive shale body.

The Multiloop and PLATE TDEM computer software were reviewed and compared (see Appendix). Suggested amendments to the Multiloop programme are listed in the Appendix.

(The above is the Summary only of Durrand's report. For the full text and appendices, see Durrand,1993).

Review Conclusions:

Although the review is not yet completed several important findings have been made. These are:

- * The existing drilling at High Point has all been in the Hangingwall Volcanics (except hole BHD3).
- * The likely principal massive sulphide target horizon, the Mixed Sequence, occurs at depth beneath High Point, about 200m below the deepest hole and 800m below surface.
- * The known zone of dispersed zinc mineralization occurs in the upper part of the Hangingwall Volcanics. The zone is stratiform, up to 200m thick, and covers an area about 1.5km N-S and 1km E-W, adjacent to the Mt Charter Fault.
- * The Mt Charter Fault has a vertical dip in the main prospect area.

Future Direction of the Review:

The geological significance of the zone of dispersed zinc mineralization in the Hangingwall Volcanics at High Point has yet to be fully established. Do such zones occur elsewhere in the Que-Hellyer Volcanics? Do they lie above the known orebodies? Could a massive sulphide body occur within the zone? (A massive sulphide lens occurs within the Hellyer Basalt 50m above the Hellyer orebody – S.Richardson, pers comm, July 1993).

It would seem the possibility of the High Point zinc zone hosting economic mineralization cannot be dismissed at this stage. Contouring of metal distribution within the zinc zone, along with study of its associated alteration and host rocks, may help determine the factors controlling the mineralization and point to areas where it could be better developed.

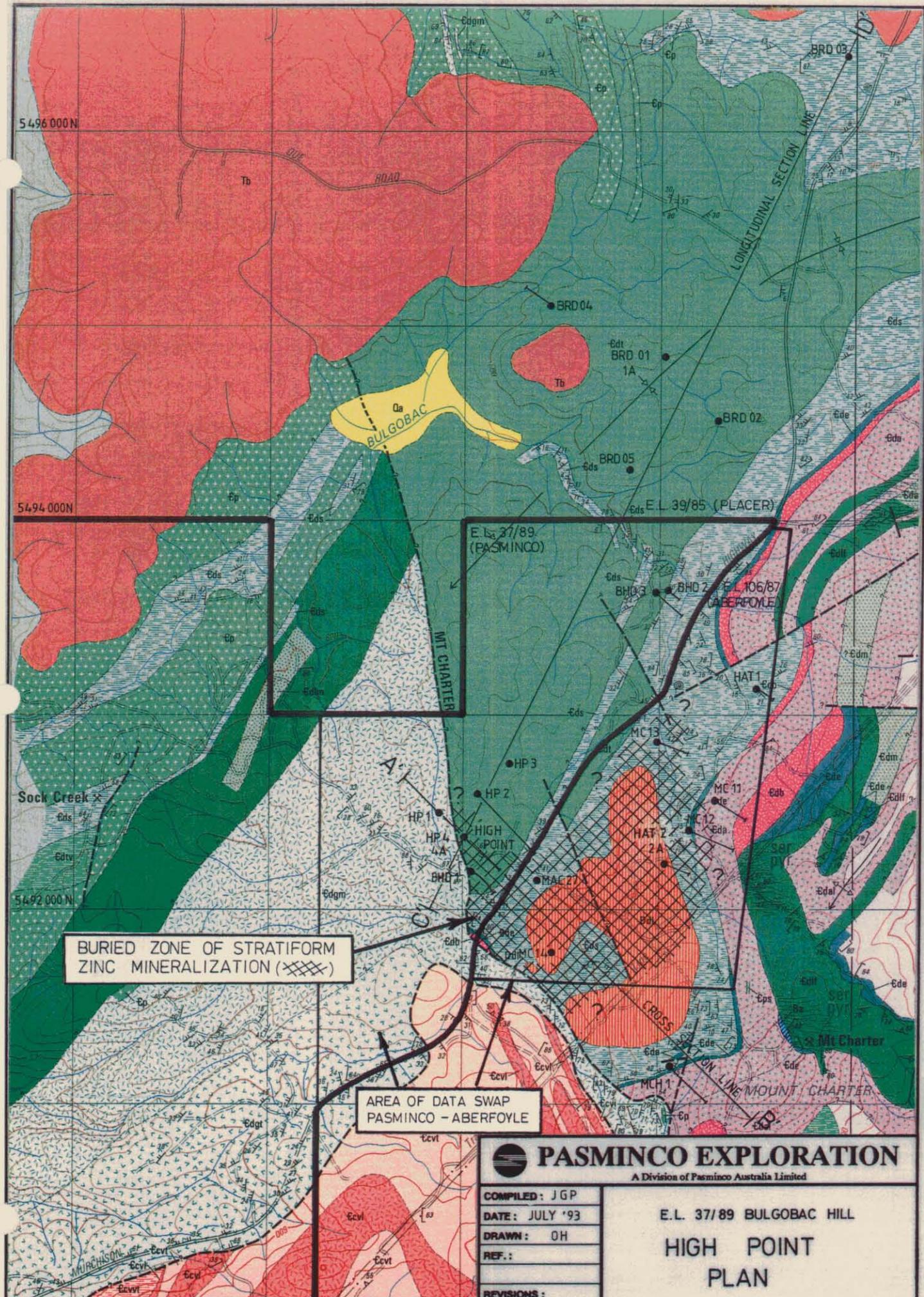
The dip of the Mt Charter Fault has a critical bearing on whether there is enough room for a major orebody in the prospective rocks at depth at High Point, in that if it dips NE towards the EL boundary the wedge of prospective ground narrows with depth. While indications are that the fault is vertical in the area of hole HP4A, more study of the structure is warranted elsewhere.

The possible extension of the zinc zone along the Mt Charter Fault into the lightly-explored NW corner of the High Point area, requires investigation. The mineralization is likely to extend in this direction, given its spatial relationship with the Mt Charter Fault and that the zone is now known to cover a large area well beyond High Point itself.

5.2.3 HOLE BHD3 – LITHOGEOCHEMICAL & PETROLOGICAL RESULTS

Hole BHD3 was drilled in the northern part of the High Point area in January 1992. Lithogeochemical and petrological results from the hole were not available at the time the annual report was written in February 1992. These are included in this report as Appendix 3.

Both sets of data confirm the geological core logging that both the Mixed Sequence and Footwall Volcanics are present in the hole.



BURIED ZONE OF STRATIFORM ZINC MINERALIZATION (XXXX)

AREA OF DATA SWAP PASMINGO - ABERFOYLE

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

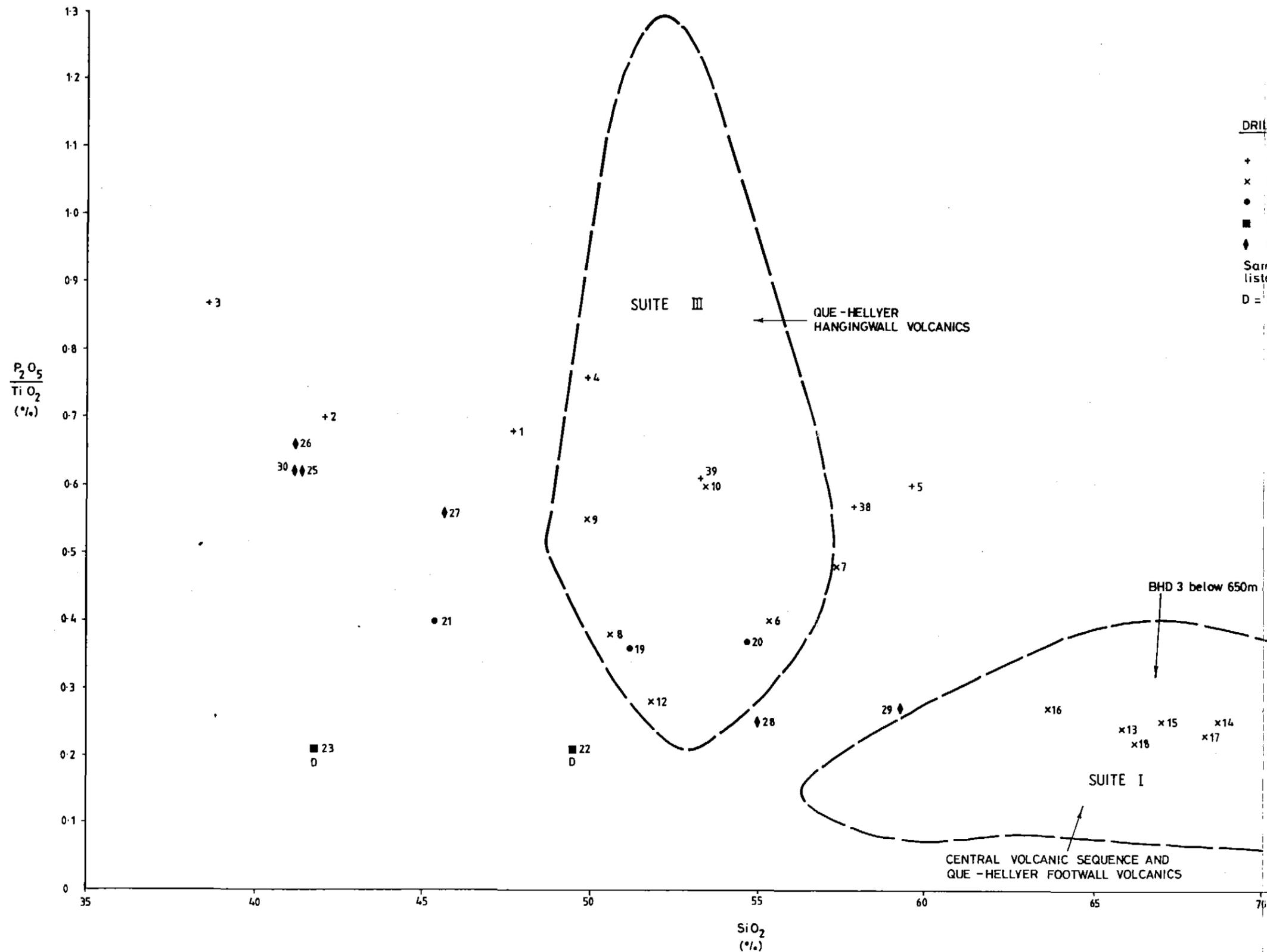
COMPILED: JGP
DATE: JULY '93
DRAWN: OH
REF.:
REVISIONS:

E.L. 37/89 BULGOBAC HILL
HIGH POINT PLAN

DRAWING No. SCALE 1:25 000 0 500m FIG. No. 14

5 cm

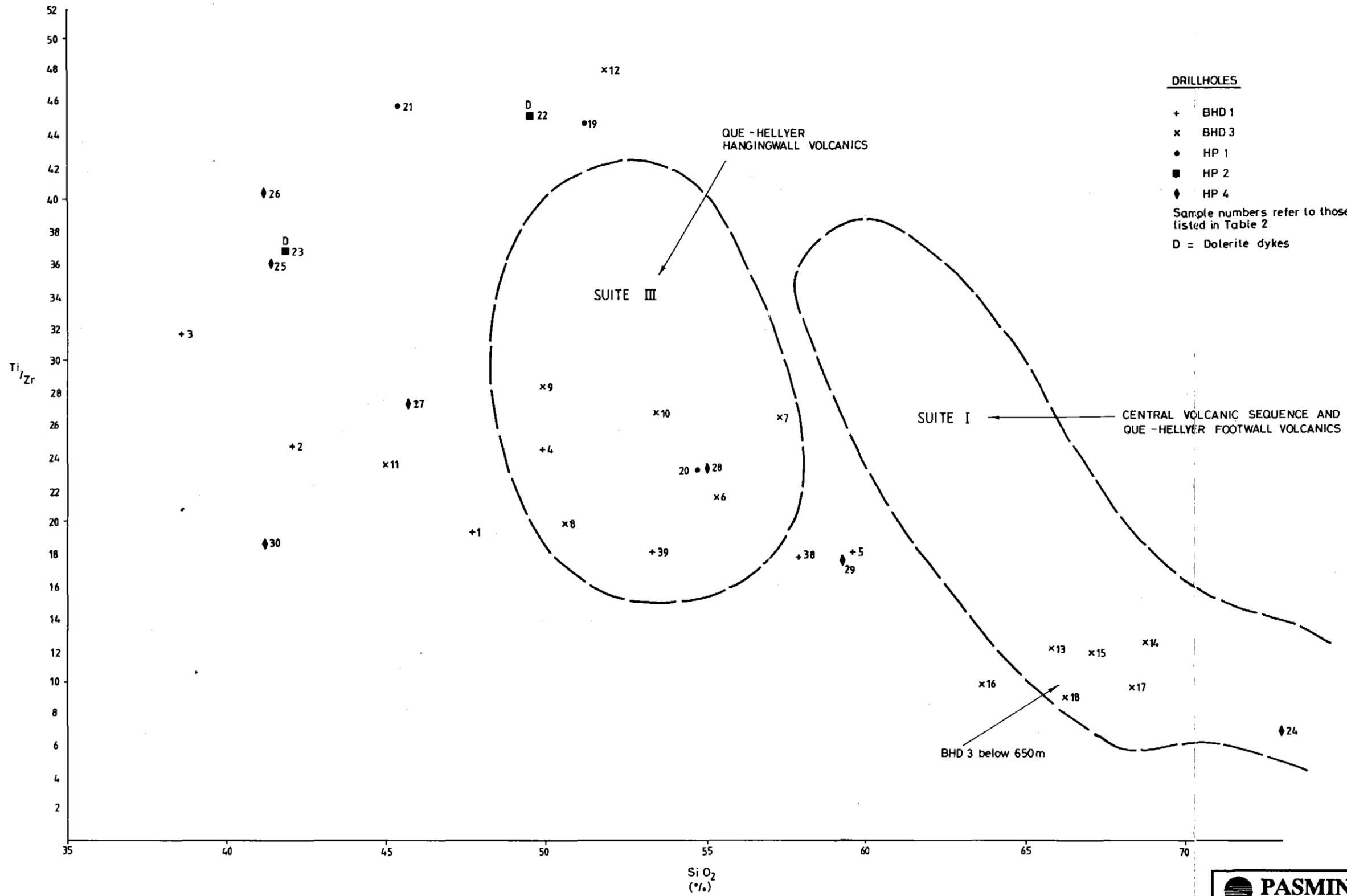
995041



5 cm

995042

PASMINCO EXPLORATION <small>A Division of Pasminco Australia Limited</small>	
COMPILED: JGP	HIGH POINT DRILLHOLES $\frac{P_2O_5}{TiO_2}$ v SiO_2 <small>(SUITES FROM CRAWFORD et al, 1992)</small>
DATE: 7-7-93	
DRAWN: OH	
REF.:	
REVISIONS:	
DRAWING No.	SCALE nts
	FIG. No. 15



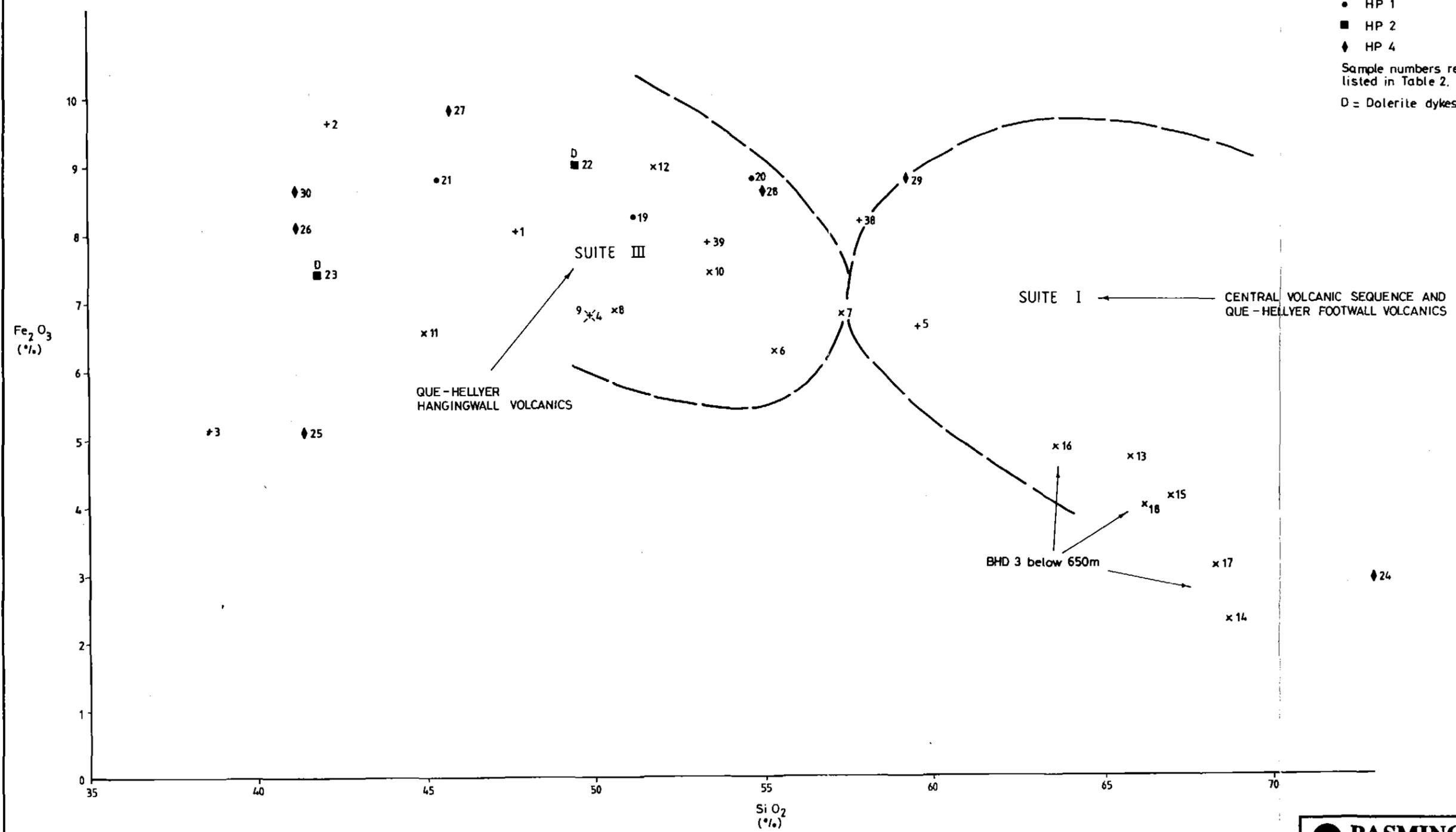
5 cm

PASMINCO EXPLORATION <small>A Division of Pasminco Australia Limited</small>	
COMPILED: JGP	HIGH POINT DRILLHOLES Ti/Zr v SiO_2 (SUITES FROM CRAWFORD et al, 1992)
DATE: 7-7-93	
DRAWN: OH	
REF.:	
REVISIONS:	
DRAWING No.	SCALE nts
FIG. No. 16	

DRILLHOLES

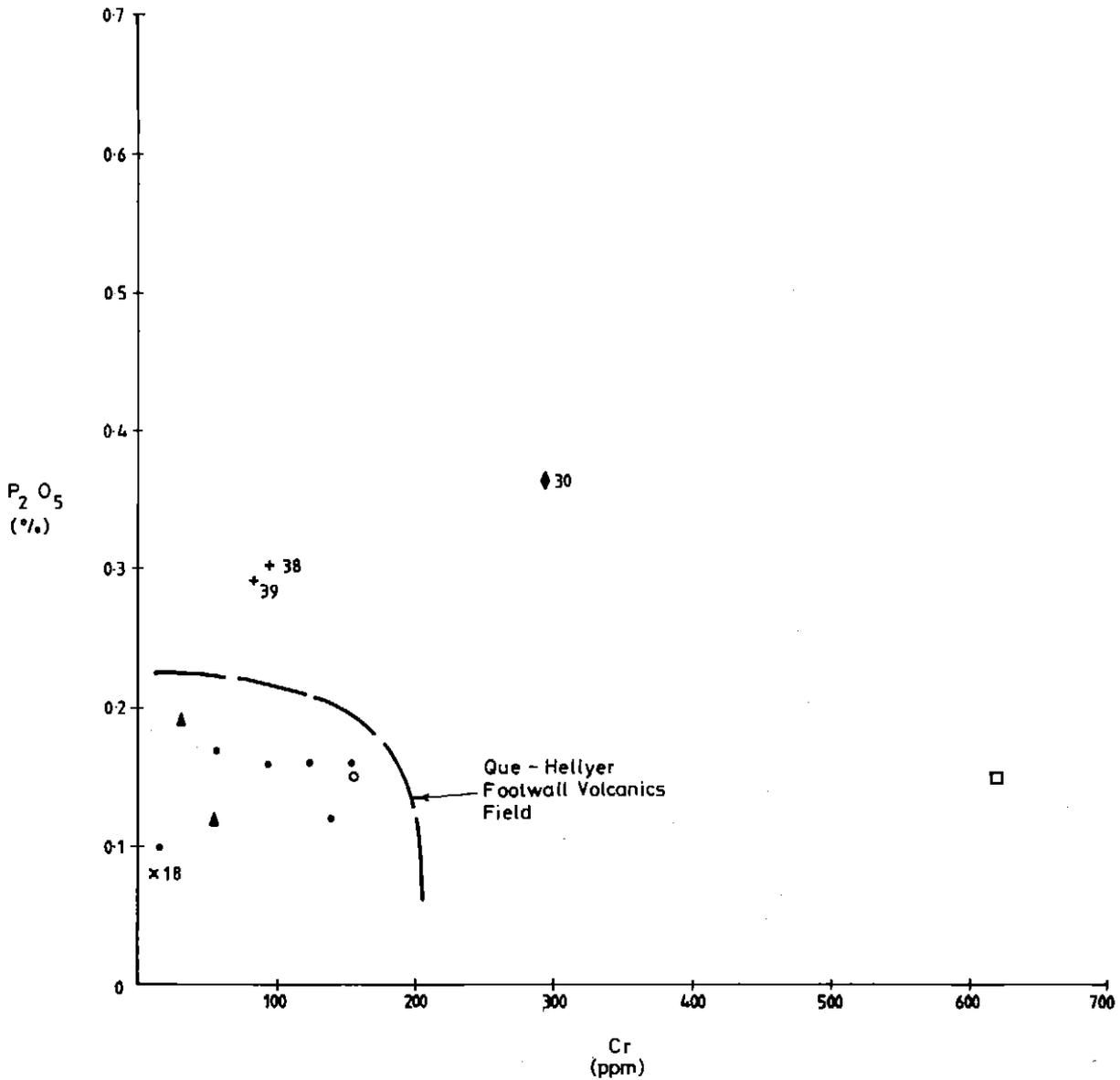
- + BHD 1
- x BHD 3
- HP 1
- HP 2
- ◆ HP 4

Sample numbers refer to those listed in Table 2.
D = Dolerite dykes



5 cm

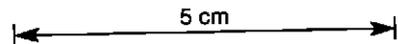
PASMINCO EXPLORATION <small>A Division of Pasminco Australia Limited</small>	
COMPILED: JGP	HIGH POINT DRILLHOLES Fe_2O_3 v SiO_2 (SUITES FROM CRAWFORD et al, 1992)
DATE: 7-7-93	
DRAWN: OH	
REF.:	
REVISIONS:	
DRAWING No.	SCALE nts
	FIG. No. 17



LEGEND

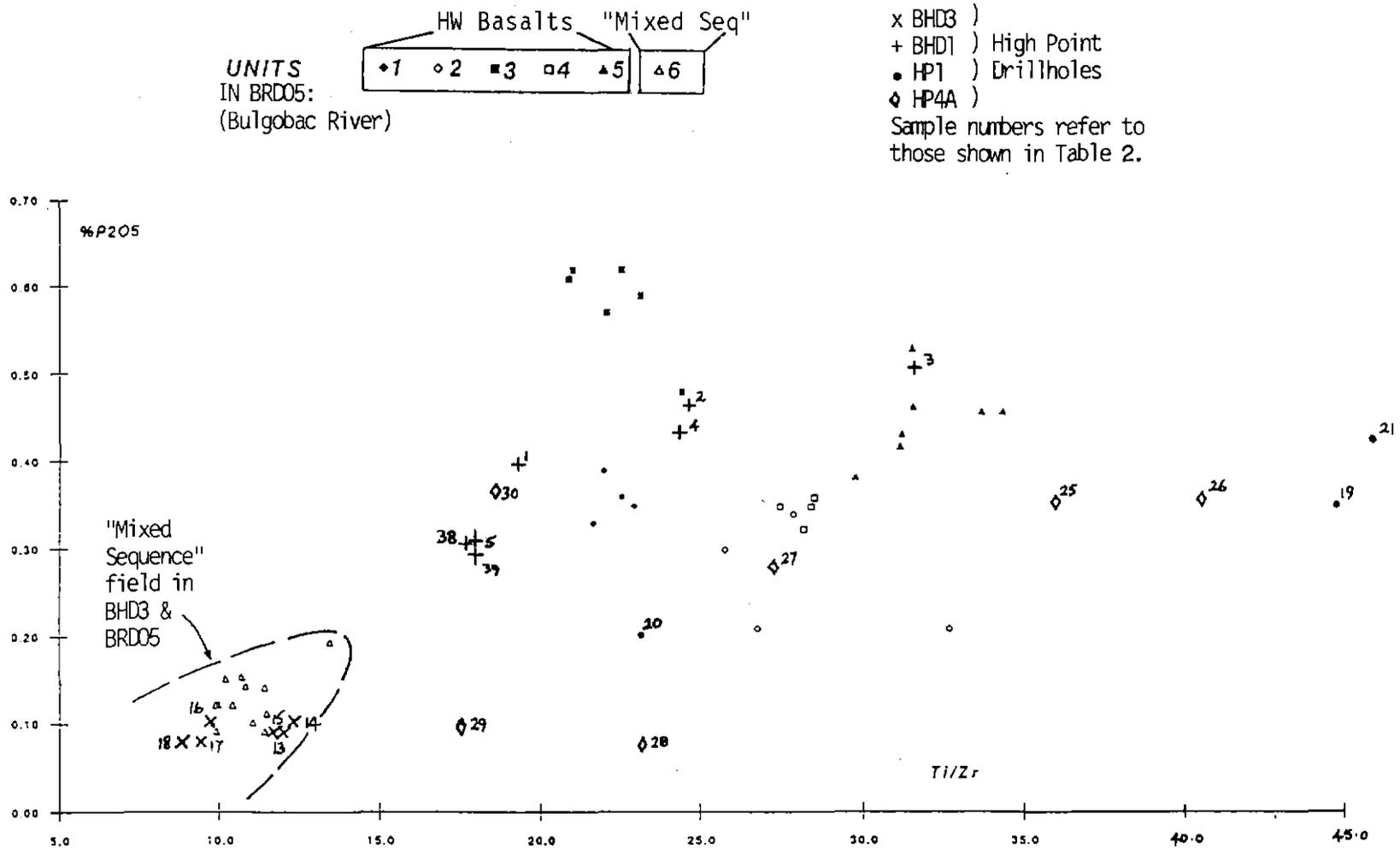
DRILLHOLE	LOCATION	SAMPLE DETAILS
+ BHD 1	HIGH POINT	Samples from basal 40m of holes. Sample numbers refer to those shown in Table 2.
x BHD 3	HIGH POINT	
◆ HP4A	HIGH POINT	
▲ BRD 01A	BULGOBAC RIVER	Unit 8, 1052 - 1086 m
○ BRD 03	BULGOBAC RIVER	Unit 4, 427 - 458 m
□ MAC 27	MACKINTOSH	Basal 7m, 877 - 884 m

- QUE - HELLYER FOOTWALL VOLCANICS
(From Crawford, 1990, Table A5)



<p>PASMINGO EXPLORATION A Division of Pasmingo Australia Limited</p>	
COMPILED: JGP DATE: 7-7-93 DRAWN: OH REF.: REVISIONS:	P ₂ O ₅ v Cr PLOT OF SAMPLES FROM BASAL MAFIC VOLCANIC UNITS IN DRILLHOLES, HIGH POINT AREA
DRAWING No.	SCALE nts
	FIG. No. 18

FIGURE 19 : DIAGRAM SHOWING THAT ONLY HOLE BHD3 HAS INTERSECTED THE "MIXED SEQUENCE" AT HIGH POINT
 (Based on Crawford, 1990)



Immobilized element variation diagrams showing the effective separation of compositional fields of the various lithological -geochemical units recognized in BRD05. The same applies equally as well for rocks from BRD01/01A. (CSR/Placer Bulgobac River holes, 1987 & 1990).

5.3 Mapping at Bulgobac Hill

In November 1992, A.Lorrigan mapped outcrops recently exposed during roadworks along a 1.1km stretch of the Murchison Highway on Bulgobac Hill – see Figure 23.

The section covers part of the contact zone between the rhyodacitic Central Volcanic Complex to the east and sediments of the Dundas Group to the west. The rocks are partly–volcanomict sediments, generally striking N or NE and dipping west, although locally disrupted by several large faults and small–scale folding. The only facing observed suggested the sequence youngs to the west.

The volcanic component decreases to the west across the section and the most westerly exposed sediments are clean quartz–mica sandstones of the Animal Creek Greywacke, whereas to the east even the fine–grained sediments carry a noticeable glassy tuffaceous component.

The road mapping tends to confirm the results of Pasmenco's exploration work in 1991–92 in the area immediately to the east (Purvis, 1992), which pointed to the CVC / Dundas contact being a wide gradational zone marked by a westward increase in sedimentation and accompanying decrease in volcanic component. Recently, it has become known that Aberfoyle's exploration work in the area has led them to much the same conclusion (Wallace, 1993).

5.4 Tullabardine Gorge

Following recommendations contained in the 1991–92 Annual Report (Purvis, 1992), investigations were begun at Tullabardine Gorge in September 1992 with a view to designing a deep (+800m) drillhole on the postulated Tullabardine Transform Structure.

Aerial and ground field reconnaissances were made, and a further evaluation of existing gravity and magnetic data undertaken after it was decided the planned detailed gravity survey would not be cost effective in the extremely rugged and inaccessible terrain.

As planning for the deep drillhole proceeded, it became clear that the risky conceptual target was out of balance when compared with other excellent shallow-depth undrilled targets available to Pasminco at present. Although the deep drillhole test is still considered warranted on geological criteria, its execution has been deferred.

5.5 In-Fill Aeromagnetic Survey, Lake Mackintosh

In March 1993 approximately 170 line km of high-resolution low-level aeromagnetics was flown by helicopter over the Lake Mackintosh area in the SE corner of the EL (see Figure 5). The survey was undertaken in order to complete aeromagnetic coverage over an area that had been added to EL 37/89 since the original aeromagnetic survey was flown in early 1990.

A plan of the flight lines is shown in Figure 24. Residual magnetic contours are shown in Figure 25.

The results of the survey are presently being interpreted by consultant D. Leaman and will be integrated into Pasminco's regional aeromagnetic coverage.

6 SOUTH MT CHARTER ELA 7/93

In April 1993 a 12 sq km area to the south of Mt Charter was applied for when it came up for tender. The area was previously incorporated within Aberfoyle's Mackintosh EL 106/87 and was relinquished as part of a statutory reduction of that EL.

Pasminco's tender was successful and at present the Company has an EL application, ELA 7/93, over the area (see Figure 2). When the new EL is granted the intention is to apply for it to be amalgamated with the Bulgobac Hill EL 37/89. The exploration programme on the ELA area would then form part of an expanded programme on the Bulgobac Hill EL.

ELA 7/93 was applied for principally because it covers the important structural "triple junction", involving the intersection of the Mt Charter Fault, Henty Fault and the buried E-W trending 'Boco Corridor' (a feature evident on gravity data but lacking any surface expression). It is felt that this structural node was probably a site of considerable tension during the Cambrian, and as such a site of potential hydrothermal fluid inflow and mineralization. The ELA was extended to the NW to take in prospective ground available adjacent to the Mt Charter Fault. The geological setting of the ELA is shown in Figure 4.

Initially, it is intended the exploration programme on the ELA 7/93 area will involve surface investigations (mapping, geochemical sampling and gravity measurements), pending decisions on possible geophysical surveys and drilling.

7 CONCLUSIONS

- 1 All drillholes in the main High Point prospect area are entirely within the Que–Hellyer Hangingwall Volcanics, as is the zone of dispersed zinc mineralization.
- 2 The principal massive sulphide target, the Mixed Sequence horizon, occurs at a depth beneath High Point estimated at 800m below surface and 200m below the deepest existing drillhole.
- 3 The Mt Charter Fault is vertical in the main prospect area. It will not decrease the areal extent of the prospective zone at depth as previously thought.
- 4 The zinc zone in the upper part of the Hangingwall Volcanics is stratiform and has a known extent 1.5km N–S x 1km E–W. It is thickest (200m) on Pasmaenco's ground beside the Mt Charter Fault, but better grade in Aberfoyle holes further east. The potential for this zone to host an ore deposit cannot be ruled out.
- 5 It is highly likely the zinc zone (and Mixed Sequence at depth) extends along the Mt Charter Fault into the undrilled NW part of the High Point prospect.
- 6 Thickness increases in Hangingwall Volcanics and corresponding decreases in overlying Que River Shale, adjacent to the Mt Charter Fault and other major structures west of the Murchison Highway, indicate these were sites of lava extrusion and as such likely conduits of hydrothermal fluid outflow.
- 7 A review of the UTEM results at High Point suggests all anomalies present are due to the conductive Que River Shale.
- 8 Unsuccessful deep drillhole BHD4 has severely downgraded the mineral potential at Sock Creek. Evaluation of the BHP UTEM data has not defined any responses considered due to mineralization.
- 9 There is slight potential for up to 200,000t of open–cuttable mineralization grading perhaps 5–10% Zn around holes SK1&2 within the known zone of Pb–Zn at Sock Creek, but this is not a viable exploration target for Pasmaenco.

8 RECOMMENDATIONS

- 1 A 1000m deep vertical drillhole should be put down in the main High Point prospect area to test the prospective Mixed Sequence close to the Mt Charter Fault. The favoured site for this hole is 100m SE of hole HP4A at about 100m from the Mt Charter Fault.
- 2 Depending on the results of the deep drillhole, it is recommended future exploration in this area be directed towards the untested NW part of the High Point property alongside the Mt Charter Fault.
- 3 The High Point review should continue, with one aim being to determine the significance of the known zinc zone and the factors controlling its location and strength.
- 4 Surface investigations to be initiated on the South Mt Charter area once this has been amalgamated into the Bulgobac Hill EL. Work should concentrate in the vicinity of the Henty Fault – Mt Charter Fault intersection, and initially comprise mapping, geochemical sampling and gravity measurements.
- 5 No further work is recommended at Sock Creek or Tullabardine Gorge.

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10 KEYWORDS & LOCALITY

Keywords

LEAD, ZINC, VOLCANOGENIC, MASSIVE SULPHIDE, MT READ VOLCANICS, QUE-HELLYER VOLCANICS, GEOLOGY, LITHOGEOCHEMISTRY, DRILLING, REVIEW.

Locality

BURNIE SK55-3: BULGOBAC HILL, QUE RIVER, HELLYER.

APPENDICES

APPENDIX 1

LOG OF DRILLHOLE BHD4, SOCK CREEK

PASMINGO EXPLORATION DIAMOND DRILL CORE RECORD

LOCATION	OBJECTIVE						LOCATION/SURVEY DATA (AMG)						
PROJECT	TO TEST FOR A MASSIVE SULPHIDE DEPOSIT BESIDE THE SOCK CREEK FAULT BENEATH THE KNOWN SHALLOW ZONE OF Pb-Zn VEINING.						Grid	AMG			RL Collar m 569.2		
PROSPECT							Northing m	5392584.3			Bearing Collar 115°		
DESIGNED BY							Easting m	386044.7			Dip Collar -63°		
LOGGED BY							DH Survey Type	EASTMAN SINGLE SHOT CAMERA					
RELOGGED	RESULT						Depth m	Bearing	Dip	Depth m	Bearing	Dip	
COMMENCED	NO SIGNIFICANT MINERALIZATION INTERSECTED. ABOVE 236m HOLE INTERSECTED A MIXTURE OF QUARTZ-FELDSPAR PORPHYRY, PORPHYRY DETRITUS AND SHALE; FROM 236-490m GLASSY BRECCIATED RHYODACITIC LAVAS, AND FINISHED IN ANIMAL CREEK GREYWACKE. PROBABLE SOCK CREEK FAULT INTERSECTED 513-523m.						31	115°	-63°				
COMPLETED							61	116.25°	-63°				
DRILLED BY							91	117°	-62.5°				
DRILL RIG							121	118°	-62.25°				
SIGNIFICANT INTERSECTIONS													
From m	To m	Interval m	Pb	Zn	Ag		Comments	151	118.75°	-62.5°			
7.7	10.7	3.0	1433	2706	2		BLACK PYRITIC SHALE, sp-gn veins	181	119°	-63°			
221	223	2.0	159	4554	<1		BLACK SHALE, 2-3% py, 1% sp-gn	211	119.5°	-62°			
								241	126°	-61.75°			
								271	126.5°	-62°			
								301	127.25°	-62°			
								331	127.5°	-62°			
								361	128.5°	-62°			
								391	128.5°	-62.25°			
SIGNIFICANT CORE LOSS			POOR GROUND CONDITION ZONES						421	129.25°	-62°		
From m	To m	% Lost	From m	To m	Condition			451	129.5°	-62°			
			0	27.4	BADLY BROKEN WITH CLAYEY ZONES			481	130°	-62°			
			69.3	70.7	BADLY BROKEN IN FAULT ZONE			511	130°	-61.5°			
			155.5	163	BROKEN, DUE TO FAULT 160.4-160.7m			541	130°	-61°			
HOLE SIZE			HOLE CONDITIONS AFTER COMPLETION						571	131°	-61°		
Size	Depth m	Collar	6.5m STEEL CASINGS CEMENTED AT COLLAR WITH STEEL SCREW-ON CAP						601	130.5°	-60°		
HQ	60	Steel Casing	AS ABOVE										
NQ	616.8	PVC Casing	PLACED TO BOTTOM, 40mm, UNSLOTTED										
		Ground Water	-										
		Wedge	-										
		Drill Pad											

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**PASMINCO EXPLORATION
SUMMARY DIAMOND DRILL CORE LOG**

HOLE No. BHD 4

PROJECT: SOCK CREEK, BUGGABAC HILL EL

Graphic Scale 1:

Page 2 of

From m	Interval m	Code	Description	Depth	Graphic	From m	Interval m	Code	Description	Depth	Graphic
TABLE 1: SUMMARY LOG OF HOLE BHD4, SOCK CREEK											
AMG Coords: 5392584.3N / 386044.7E, 569.2mRL. Dip: -63°. Azimuth: 115° AMG.											
0 - 27.4m:			PYRITIC BLACK SHALE Common sp-gn veinlets. (Best intersection: 3m @ 0.14% Pb & 0.27% Zn, @ 7.7-10.7m).								
27.4 - 60.5m:			VARIABLE CRYSTAL-LITHIC EPICLASTICS Derived from qtz-feld porphyry. Uphole-fining. Minor py.								
60.5 - 104m:			QUARTZ-FELDSPAR PORPHYRY BRECCIA Quench-brecciation of hot porphyry. V coarse gr. Trace py.								
104 - 151.9m:			QUARTZ-FELDSPAR PORPHYRY Strong silica-albite alteration. No sulphides.								
151.9 - 179.7m:			MIXED MARGINAL PORPHYRY ZONE AND PYRITIC BLACK SHALE Mixed porphyry, porphyry detritus & shale. Minor sp-gn veins.								
179.7 - 213.4m:			QUARTZ-FELDSPAR PORPHYRY Strong silicification. Trace pyrite.								
213.4 - 236.4m:			BLACK SHALE AND VOLCANOMICT EPICLASTIC BRECCIA 1-3% py, cp & sp-gn veinlets, mainly in shale. (Best intersection: 2m @ 0.46% Zn, 221-223m).								
236.4 - 382.1m:			FINELY BRECCIATED NON-PORPHYRITIC RHYODACITE LAVA Quench-brecciated highly vitric lava with quartz amygdals. Strong silica-albite-chlorite alteration. Trace pyrite.								
382.1 - 489.5m:			FELDSPAR-PORPHYRITIC DACITE LAVA Green, silica-chlorite altered. Quartz amygdals. Trace py.								
489.5 - 616.8m:			FINE QUARTZ-MICA SANDSTONE AND BLACK SHALE Sandstone non-volcanic. Shale graphitic & pyritic. Major faulted zone (Sock Creek Fault?) 513 - 523m.								
END OF HOLE											

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PASMINGO EXPLORATION DIAMOND DRILL CORE LOG

HOLE No. **BHD4**

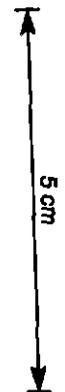
PROJECT: **SOCK CREEK**

Graphic Scale 1: 250

Page 3 of

CORE RECOVERY				DESCRIPTION				CODES						
From m	Interval m	%	RQD	From m	Interval m	(Incl. LITHOLOGY, STRUCTURE & ALTERATION)	Depth	Graphic Lithology	Struct.	MINERALISATION	LITHO	STRUCT	ALTR	MIN
LOG OF HOLE BHD4														
(Note: all rocks in hole lack cleavage).														
0 - 27.4m: PYRITIC BLACK SHALE														
Lithology: Badly broken, with clayey zones. Much core loss. Black shale; finely bedded; carbonaceous; pyritic. Fine volcanoclastic sst @ 12-14.3m: pale yellowish-green; qtz-feldspathic; with sericitic matrix composed of tiny pumice frags.														
Alteration: Partially oxidised. Weak limonite stains to 6m. Sst @ 12-14.3m is mod sericitised & bleached.														
Structure: Bedding (to LCA): 25° @ 8m; 50° @ 18.4m; 45° @ 26.3m. Zones of abund microfracturing, esp above 12m; frags at all angles, overall zones at low angle to LCA. Faults at top & bottom of sst @ 12-13.4m & 14.3-14.5m (latter 50°/LCA). Basal contact clayey & broken - probable structure.														
Sampling: 034247-034258 (assay, 0-27.4m).														
27.4 - 52.85m: GRADED CRYSTAL-LITHIC EPICLASTICS														
Lithology: Uphole-lining epiclastic detritus largely ex qtz-feld porph. Pale grey; massive; hard. Fine volcanoclastic sst at top, grading to med-coarse gr xyl-lithic sst below 33m, & to xyl-lithic breccia below 50m. Upper sst: even-grained (av <1mm); qtz-feldspathic; sericitic matrix with abund tiny pumice shards; occ lithic grains (incl black shale). Xyl-lithic sst: feld>qtz xyls & xyl frags, av 1-3mm; minor fi gr lithic grains 1-3mm; silif matrix gen lacking visible pumice. Below 42m angular lithic clasts inc in size & number to matrix-supported breccia below 50m, with clasts av 10-50mm (to 150mm). Clasts: hard, coarse gr, silica-alb alt qtz-feld porph; soft, irreg & equant, sericitic/chloritic qtz-feld porphyritic "stylolitic" types (some wispy-banded); also black shale (semi-lith), li gr silica-alb alt volcs, & carb.														
Alteration: Mod silicification & weak albite-sericite-chlorite. Carb veins assoc with local weak carbonatisation.														
Structure: Indistinct bedding in sst (to LCA): 50° @ 31.6m (orientated core: 208°M/13°); 48° @ 40m.														

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PASMINGO EXPLORATION DIAMOND DRILL CORE LOG

HOLE No. *BHD 4*

PROJECT: *SOCK CREEK*

Graphic Scale 1: 250

Page *4* of

CORE RECOVERY				DESCRIPTION							CODES			
From m	Interval m	%	RQD	From m	Interval m	(Incl. LITHOLOGY, STRUCTURE & ALTERATION)	Depth	Graphic Lithology	Struct.	MINERALISATION	LITHO	STRUCT	ALTM	MIN
						Basal contact abrupt & irreg.	55							
						52.85 - 60.5m: MIXED & DISTURBED ZONE OF SHALE & PORPHYRY- DERIVED EPICLASTICS	54							
						Lithology: Grey, dark grey, & pink. To 56.5m: disturbed (soft-sed) dk grey shale bands intermixed with coarse qtz-feld xyl sst; 56.5 - 59m: uphole-fining xyl-lithic breccia pulse; Below 59m: shale & fine qtzo-feldspathic volcanoclastic sst. Xyl sst: qtz to 6mm, feld to 3mm, packed in sericitic fine pumice matrix. Breccia: abund angular & irreg clasts (to 150mm) of hard silica-alb alt coarse gr qtz-feld porphyry; & soft, irreg, sericitic/chloritic qtz-feld porphyritic "stylolitic" frags (to 50mm); in matrix of qtz-feld xyls & abund fine pumice. Alteration: Overall: weak. Felds albitised. Pumice sericitised. Breccia matrix mod silicified (porph clasts v strongly silica-albite alt). Structure: Bedding 58°/LCA @ 59m. Broken above 56.5m. Basal contact abrupt, 35-40°/LCA: sl irreg 1° surface on unit below.	53			52.85 - 60.5m: Minor dissem py. Trace sp-gn, mainly in carb veinlets.				
						60.5 - 104m: QUARTZ-FELDSPAR PORPHYRY BRECCIA	52							
						Lithology: Formed by quench-brecciation of hot porphyry. Blotchy orange-red & greenish-grey. Massive; v coarse-gr; hard. Angular frags & diffuse irreg patches of qtz-feld porph in compositionally-identical matrix that has snowflake devitrification texture & net-vein habit in places. Frgs typically <50mm, some zones av <10mm. Both matrix & frags contain abund feld (1-4mm, gen euhedral), & qtz (av 3-5mm, commonly 5-12mm, partly rounded & fractured). Alteration: Gen porph frags mod-strongly silica-albite(-hematite) alt. Some smaller soft frags of sericite-chlorite alt porph ("stylolitic" type). Breccia matrix gen strongly sillif. Minor calcite veining. Structure: No primary or structural lineation. Badly broken around strong brittle faults @ 69.3-70.7m (30°/LCA), & 75.8m (35°/LCA). Elsewhere, sl broken at intervals by fract sub-// LCA. Basal contact gradational.	51			60.5 - 104m: Trace py. Minor ubiquitous leucoxenised opaques.				

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5 cm

**PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG**

HOLE No. **BHD4**

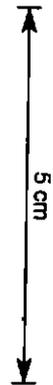
PROJECT: **SOCK CREEK**

Graphic Scale 1: 250

Page **5** of

CORE RECOVERY				DESCRIPTION							CODES			
From m	Interval m	%	RQD	From m	Interval m	(incl. LITHOLOGY, STRUCTURE & ALTERATION)	Depth	Graphic Lithology	Struct.	MINERALISATION	LITHO	STRUCT	ALTN	MIN
						104 - 135.0m: QUARTZ-FELDSPAR PORPHYRY	104	<p>COARSE GRAINED QUARTZ- FELDSPAR PORPHYRY</p>						
					Lithology: Grey with pink tinge. Coarse gr; massive; uniform; v hard. Porphyritic xyls of feld (euhedral, av 2-4mm), & qtz (2-6mm, gen sl rounded by alt/corrosion), in fi gr silica-albite-sericite groundmass.	108				104 - 135m: No sulphides. Trace leucoxenised opaques.				
					Alteration: Strong silica>albite; weak sericite>chlorite (ser strongest in basal 5m). Calcite veinlets & patchy weak pervasive carbonatisation.	130								
					Structure: Some flow-banding in upper 2m, variable but gen =60°/LCA.	132								
					Largely unbroken - occ frags. Small brittle fault 40°/LCA @ 123.6m. Basal contact abrupt: mixing of shaley material & quenched porphyry over 150mm, with flow banding // contact @ 55°/LCA.	134								
					Sampling: 034259 (lithogeochem, 115-116m).	136								
					135.0 - 138.2m: MIXED BLACK SHALE & QUARTZ-FELDSPAR PORPHYRY DETRITUS	138								
					Lithology: Black & pinkish-grey. Upper 1m baked black carbonaceous shale. Variably-textured coarse sandy material derived from qtz-feld porphyry. Clots of deformed (unlith) black shale & rare porph clasts to 15mm.	140				135m - 136m: 1% cp-sp-gn as clots in calcite veinlets. Minor dissem py.				
					Some tiny sericitic (glassy) frags appear formed by quench brecciation. Qtz xyls fractured & often rounded, to 10mm. Pink albitised felds gen euhedral & 2-3mm (rarely to 7mm). Rock matrix mainly soft green soapy sericite after glassy material, commonly with fine dispersed carbonaceous matter.	142								
					Alteration: Weak sericite-silica-albite-carbonate. Patchy silif of matrix. Veinlets & net-vein fracture-fillings of calcite (±sericite).	144								
					Structure: Bedding variable 15-30°/LCA. Sl fract & broken. Basal contact indistinct.	146								
					Sampling: 034260 (assay, 135-136m).	148								
					138.2 - 151.9m: QUARTZ-FELDSPAR PORPHYRY	150								
					Lithology: Pink & greenish-grey. Coarse gr, massive, hard.	152								
					Abund porphyritic qtz & feld in subord sericitic groundmass. Qtz av 3-4mm, to 7mm, commonly rounded. Feld av 1-3mm, to 6mm, gen	154								
						156								
						158								
						160								
						162								
						164								
						166								
						168								
						170								
						172								
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995061



**PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG**

HOLE No. **BHDA**

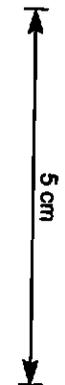
PROJECT: **SOCK CREEK**

Graphic Scale 1:

Page **6** of

CORE RECOVERY				DESCRIPTION						CODES				
From m	Interval m	%	RQD	From m	Interval m	(incl. LITHOLOGY, STRUCTURE & ALTERATION)	Depth	Graphic Lithology	Struct.	MINERALISATION	LITHO	STRUCT	ALTN	MIN
						<p>euhedral. Alteration: Moderate silica-albite, weaker sericite-chlorite. Alt is variable & patchy. Some zones strongly silif. Structure: Slightly broken by fract set 15-30°/LCA. Shear 55°/LCA @ 143.65m. Flow banding @ 140.8m: 25°/LCA (opp sense to fract). At base, highly irreg & disturbed zone where porphyry contacts un lith black shale, with some fine peperite breccia in base of porph.</p>				<p>138.2 - 151.9m: Rare dissem & veinlet py.</p>				
						<p>151.9 - 179.75m: MIXED MARGINAL PORPHYRY ZONE & SHALE Lithology: Complexly intermixed black carbonaceous shale, qtz-feldspar porphyry, & porphyry detritus incl fine peperite breccias. Black & pale greyish-green. Variable grainsize, texture & hardness. Predom shale above 163m. Shale disturbed & deformed while un lith - gen occurs as irreg bands, clots or frags in porph material. Porph & porph detritus varies from coarsely-porphyrific to sparsely & finely porphyritic. Feld (gen <3mm) & qtz (gen <4mm & rounded), in sericitic (glassy) matrix/groundmass with perlitic cracks & snowflake devit text in places. Porph detritus ranges from epiclastic to peperitic types, incl fine to coarse xyl sst & fine lithic breccias (alt porph frags av 5-40mm). Alteration: Alt patchy & variable. Mod sericitisation, strongest below 170m esp around faults where occ veins of soft soapy sericite. Lesser silica-albite-chlorite-bleaching. Shale baked in places (eg: 1.4m shale band at top contact of unit). Structure: Flow lineation in shale @ 152.4m: 40°/LCA. Shale clots and felds in sst gen orientated <30°/LCA, commonly <20°/LCA. Broken 155.5-163m & 172.5-179m, due to strong faults (see below), & also to fract set <15°/LCA. Faults: 160.4 -160.7m (20°/LCA, leached breccia zone); 162.6m (15°/LCA puggy); 175.1m (80°/LCA, puggy & sericitic); 177.9m (leached, broken). Basal contact abrupt, v irreg, broken.</p>				<p>151.9 - 153.3m: 1-2% sp>gn-py. Dissem & veinlets in baked shale.</p> <p>153.3 - 160.6m: Minor to 1% py> sp-gn. Dissem & veinlets, mainly in shale clots/bands.</p> <p>160.6 - 163m: 1% sp-gn-py in shale band. In veinlets (±qtz-carb), & dissem.</p> <p>163 - 179.75m: Minor dissem py, locally 1% in shale clots. Ubiquitous fine leucogenised oxide grains.</p>				
						<p>Sampling: 034261 (assay, 151.9-153.3m).</p>								
						<p>179.75 - 213.4m: QUARTZ-FELDSPAR PORPHYRY Lithology: Greenish-grey; med-coarse gr; massive; uniform; hard.</p>								

995062



**PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG**

HOLE No. **BHD 4**

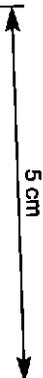
PROJECT: **SOCK CREEK**

Graphic Scale 1:

Page **7** of

CORE RECOVERY				DESCRIPTION							CODES			
From m	Interval m	%	RQD	From m	Interval m	(incl. LITHOLOGY, STRUCTURE & ALTERATION)	Depth	Graphic Lithology	Struct.	MINERALISATION	LITHO	STRUCT	ALTN	MIN
						<p>Abund felds & qtz xyls evenly scattered through fi gr silica-sericite groundmass. Feld av 2-3mm, to 5mm, euhedral. Qtz av 3-4mm, to 7mm, often rounded. At 212m, sharp contact 30°/LCA to basal peperitic zone comprising porphyry mixed with porph-derived qtz-feld xyl sst containing fine carbonaceous material. Alteration: Mod-strong silif, weak-mod sericite. Felds gen weakly albitised or sericitised. Minor bleaching, gen assoc with fract. Thin qtz-carb veins throughout. Structure: Mod broken at intervals, by fract. gen at low angle to LCA. Basal contact sharp, sl irreg (shale below un lith), 50°/LCA.</p> <p>Sampling: 034262 (lithogeochem, 199-200m).</p>				<p>179.75 - 213.4m: Trace dissem py. Minor leucoxenised oxide grains.</p>				
						<p>213.4 - 226.05m: BLACK SHALE Lithology: Finely-bedded black carbonaceous shale, mod calcareous below approx 220m. V minor beds of fine grey sst & siltst. From 224.3m-225.4m, band of med gr sericitic qtz-feld xyl sst (porph-derived) containing highly irreg clots of (un lith) black shale. Alteration: Net-veinlets of qtz-carb±sericite-chlorite, v common above 222m. Structure: Bedding (to LCA): 63° @ 214m, 66° @ 219m, 64° @ 223m. Largely unbroken except in faulted zone @ 214.4m (45°/LCA). Basal contact sharp 65°/LCA (bedding). Basal 50mm of shale sl sheared.</p> <p>Sampling: 034263-034268 (assay, 213.6-226m).</p>				<p>213.4 - 218.8m: 1-3% fi gr dissem py. Common (1%?) cp(±py) in qtz-carb veinlets. At 215.85m: 10mm massive cp vein 70°/LCA approx same sense bedding.</p> <p>218.8 - 223m: 2-3% fi gr dissem py. 1% sp>gn in calcite veinlets (no cp).</p> <p>223 - 226.05m: 3% fi gr dissem py.</p>				
						<p>226.05 - 236.4m: FINE CRYSTAL-LITHIC EPICLASTIC BRECCIA Lithology: Up-hole fining epiclastic debris. Grey with orange-pink flecks. Hard. Unbroken. Mainly xyl-lithic volcanomict breccia, with abund angular to subangular clasts av 5-15mm, in sandy matrix containing feld, qtz & lithic grains. In basal 0.6m clasts to 150mm. Clasts predom fi gr glassy silica-alb alt rhyodacite lava with perlitic cracks. Others incl feld-porphyrific dacite lava, black shale, bleached & alt poss mafic volcs, amygdaloidal lavas, and minor tubular pumice. Above 229.3m unit fines abruptly to bedded fine qtz-feldspathic sst. Alteration: Mod silif. Weak albite-sericite-chlorite. Calcite</p>				<p>226.05 - 236.4m: 1% dissem py, trace sp-gn or cp in carb veinlets. 10mm massive py clast @ 231.5m.</p>				

995063



**PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG**

HOLE No. **BHD 4**

PROJECT: **SOCK CREEK**

Graphic Scale 1:

Page **8** of

CORE RECOVERY				DESCRIPTION										CODES				
From m	Interval m	%	ROD	From m	Interval m	(Incl. LITHOLOGY, STRUCTURE & ALTERATION)	Depth	Graphic		MINERALISATION	LITHO	STRUCT	ALTN	MIN				
								Lithology	Struct.									
						veinlets. Many frags strongly silica-alb alt, apparently prior to incorp in unit. Small fuchsitic clast @ 232m. Structure: Bedding (to LCA): 55°/LCA @ 227.5m; 60°/LCA @ 231m. Basal contact abrupt, broken.												
						236.4 - 382.15m: FINELY BRECCIATED RHYODACITE LAVA Lithology: Dark grey-green with pink tinge. Massive. Hard. Unbroken. Fi gr. Non-porphyrific. Highly vitric. Perlitic. Qtz-amygdaloidal. Brecciated lava / lava breccias of flow & hyaloclastite types, largely formed by subaqueous quenching of compositionally-identical hot glassy lava pulses. Top 3m is fine hyaloclastite breccia similar in appearance to overlying epiclastics & reflecting gradational nature of upper lava contact. Trace black shale in breccia matrix to 242.5m. Ubiquitous perlitic cracking. Local flow-banding. Amygdales mostly sl chalcedonic qtz; gen <8mm; locally tiny & abund. Some amygdales in breccia matrix. Classic quench-fragmentation features, incl highly angular frags with delicate subconchoidal edges, & net-vein brecciation. Most breccia frags <50mm. Prob interpulse zones marked by abund tiny pumiceous and flow-banded frags (eg: at top of unit and at 285-290m). Abund tiny (<<1mm) leucocratic flecks throughout - prob devit text. Alteration: Gen strong sillf - varies from intense to weak (breccia matrices gen replaced by silica & occ carb). Mod albite-chlorite alt. Weaker patchy sericite & bleaching. Qtz-carb(±chlor) veins & veinlets throughout. Structure: Lineation of frags in some breccias, amygdales, or flowage in lava, all gen v approx around 40°/LCA. Lineation of breccia frags (/LCA): 35° @ 271.8m (oriented core: 205°M/20°); 40° @ 287m; 20° @ 331m; Amygdale lineation (/LCA): 55° @ 257m; 25° @ 301.4m (orientated: 097°M/vert); 35° @ 343m; 50° @ 370m. Basal contact sharp, sl irreg, 35-55°/LCA, with minor deformed clots of baked black shale in breccia matrix for 0.75m above contact.												
						Sampling: 034269 (petrology, 257m); 034270 (lithogeochem, 257-258m) 034271 (petrology, 339.5m); 034272 (lithogeochem, 339.5-340.5m).												

236.4 - 382.15m:
Trace dissem &
fract-fill py.

995064

**PASMINCO EXPLORATION
DIAMOND DRILL CORE ASSAY DATA**

HOLE No. BHD 4

PROJECT: SOCK CREEK

Page 12 of

SAMPLE						ASSAYS (ppm unless specified)																	COMMENTS											
Number	Type	From m	To m	Interval m	Recovered m	Cu	Pb	Zn	Ag	Au	As	Ba	Rb	Sr	V	Nb	Y	Zr	Al ₂ O ₃	SiO ₂	TiO ₂	Fe ₂ O ₃		MnO	Na ₂ O	CaO	K ₂ O	HgO	P ₂ O ₅	S	L.O.I.			
034268	SPLIT BQ	223.0	226.0	3.0	3.0	42	104	789	<1		4.0																					Black shale ± 3% disse. py		
034270	SPLIT NQ	257.0	258.0	1.0	1.0	3	<3	98	<1		1430		100	<5	10	37			15.07	67.8	0.68	5.55	0.21	3.98	0.75	2.07	1.60	0.133	0.020	2.36	Brecciated rhyodacite lava			
034272	SPLIT NQ	339.5	340.5	1.0	1.0	3	<3	82	<1		491		61	<5	15	36			15.08	66.8	0.67	5.14	0.16	5.11	1.31	0.98	1.76	0.136	0.010	2.60	Qtz-amphiboloidal rhyodacite lava			
034273	SPLIT NQ	439.3	440.3	1.0	1.0	4	<3	47	<1		1071		109	<5	10	31			15.36	68.3	0.43	3.32	0.08	4.18	1.20	3.35	1.07	0.071	0.050	2.27	Feld-phosphritic dacite lava. Silica > chlor alt.			
034275	SPLIT NQ	475.0	476.0	1.0	1.0	3	7	37	<1		921		103	<5	11	21			13.61	72.4	0.40	2.97	0.06	3.56	1.19	3.02	0.92	0.075	0.015	2.18	Feld-phosphritic dacite lava. Amphiboloidal.			
034277	SPLIT NQ	490.0	492.0	2.0	2.0	66	255	1222	<1		30																				Black graphitic shale ± 2-3% py + rare sp.			
034278	"	492.0	493.5	1.5	1.5	54	53	187	<1		17																				" " " " " "			
034279	SPLIT NQ	554.3	555.3	1.0	1.0	5	5	70	<1		191		49	65	28	6	20		6.94	71.2	0.38	4.28	0.14	0.20	4.32	0.79	3.83	0.091	0.110	7.44	Quartzose sst ± carb veinlets			
034281	SPLIT NQ	598.2	599.2	1.0	1.0	5	<3	53	<1		152		48	65	25	7	23		5.99	71.5	0.35	3.83	0.17	0.25	6.41	0.93	2.68	0.100	7.22	Quartzose sst ± graphitic matrix.				
034283	SPLIT NQ	535.5	537.5	2.0	2.0	9	13	94	<1		21																				Quartzose sst + graphitic shale, ± qtz-carb min			
034284	SPLIT NQ	576.5	577.5	1.0	1.0	7	11	78	<1		7																				Quartzose sst + graphitic shale, ± qtz-carb min			
Laboratory ANALABS, COGEE						Analytical Method																												
Job-No. 111310-60-09494						AAS						AAS		AAS		AAS		FA		HAIH		XRF		XRF		XRF		XRF		XRF		LECO		
Date 4.6.93						2						3		2		1		1		5		5		5		5		5		0.05		0.01		
						0.008						0.008		0.008		0.008		0.008		0.008		0.008		0.008		0.008		0.008		0.005				
						DL = 5 ppm						DL = 3 ppm		DL = 3 ppm		DL = 3 ppm		DL = 3 ppm		DL = 3 ppm		DL = 3 ppm		DL = 3 ppm		DL = 3 ppm		DL = 3 ppm		DL = 3 ppm				

995068

PASMINCO EXPLORATION

HOLE No. BHD4

PROJECT: SOCK CREEK, EL 37/89 DIAMOND DRILL HOLE SUPPLEMENTARY DATA (PETROLOGY)

Page 13 of

SAMPLE NUMBER: 034269 BHD4: 257m

SUMMARY:

This is a weakly chloritized, sparsely plagioclase-phyric, formerly largely glassy dacitic to rhyodacitic lava.

HAND SPECIMEN:

This is a dark green-grey virtually aphyric mottled felsic lava.

THIN SECTION:

This sample is a rather distinctive, very sparsely plagioclase-phyric felsic lava with a bimodal population of plagioclase phenocrysts and microphenocrysts. Small rather lath-like albitized plagioclase microphenocrysts define a pilotaxitic (trachytic) texture with a pronounced preferred orientation; these make up about 1 modal% of the rock. A few larger albite phenocrysts are also present, up to about 1mm long. A few very small altered FeTi microphenocrysts are present, but there were no mafic silicate phenocrysts in this evolved felsic lava.

The groundmass of this sample is a very even-textured intergrowth of tiny albite microlites set in almost isotropic devitrified glass. Distinct perlitic cracks are present in several parts of the slide. The altered glass contains a surprising amount of disseminated fine-grained chlorite, probably hydrothermal alteration related. Intersecting hairline veinlets of polycrystalline quartz are not uncommon through this rock, and numerous rather meandering stylolitic planes marked by insoluble opaques transect the rock, and show some clear displacement of quartz veins. Calcite veinlets cut across and post-date the quartz veinlets.

This is sparsely plagioclase-phyric dacitic to rhyodacitic lava with a significant amount of chlorite that is possibly related to mild hydrothermal alteration.

SAMPLE NUMBER: 034271 BHD4: 339.5m

SUMMARY:

This is a weakly chloritized very sparsely plagioclase-phyric dacitic to rhyodacitic lava.

HAND SPECIMEN:

This is a pale grey-green sparsely plagioclase-phyric felsic lava with some streaky quartz veinlets.

THIN SECTION:

This is a very sparsely plagioclase-phyric, weakly vesicular formerly glassy felsic lava with less than 1 modal% of perfectly euhedral albitized plagioclase phenocrysts mainly less than 1mm long. Vesicles are ovoid, around 0.5-1.5mm long, make up less than 1 modal% of the rock, and are filled by radiating chalcedonic silica. There are no former mafic phenocrysts in this sample.

The groundmass of this rock was originally glassy to vitrophyric, and has altered to a rather unusual mottled intergrowth of randomly orientated albite microlites set in dark, rather chloritic devitrified glass that has recrystallized to a very fine-grained quartzo-feldspathic intergrowth. Fine-grained disseminated chlorite is fairly abundant throughout the groundmass of this sample, and as for the previous rock (034269), is rather more abundant than normally developed in burial metamorphosed felsic lavas. This suggests that weak hydrothermal alteration has affected this sample too. Bifurcating and meandering narrow quartz veinlets are common in this sample, and sometimes have chloritic rims. A few chalcedonic silica segregations have intergrown subidiomorphic pyrite grains and overprinting calcite.

SAMPLE NUMBER: 034274 BHD4: 430.3m

SUMMARY:

This is a moderately plagioclase-phyric dacitic lava with weak hydrothermal alteration (silica-chlorite-calcite±pyrite); it is significantly less chloritized than the two preceding samples of the overlying almost aphyric felsic lava unit.

HAND SPECIMEN:

This is a massive grey-green plagioclase-phyric dacitic lava with anastomosing quartz veinlets up to about 4mm thick.

THIN SECTION:

This sample is a quite abundantly plagioclase-phyric felsic lava. Albitized plagioclase euhedral to subhedral phenocrysts make up around 12-15 modal% of the rock and are mainly 0.5 to 2mm long discrete crystals that also occur in occasional multi-crystal clots. Most a lightly overprinted by a streaky sericite alteration. Rare former mafic phenocrysts in this rock were probably small augite euhedra, but have been totally replaced by chlorite. Rather sparse former FeTi oxide microphenocrysts have been altered to leucoxenitic aggregates of sphene, magnetite and possibly chlorite.

The groundmass of this sample was largely glassy, with common tiny plagioclase (now albitized) microlites. It has devitrified to a rather heterogeneous, ragged, fine-grained, quartzo-feldspathic aggregate with occasional patches of blebby, anhedral, secondary quartz and disseminated very fine-grained chlorite and sericite. The latter tends to form hairline veinlets and light meshworks through the groundmass. Several more substantial quartz-calcite veins and gashes are present, and a few patches of polygonal secondary quartz and chlorite contain four or five pyrite euhedra in each.

This is a plagioclase-phyric dacitic lava that has suffered very mild hydrothermal alteration (quartz-chlorite-calcite-sericite±pyrite). It is not as chloritized as the two preceding samples (034269 and 034271).

995069

PASMINGO EXPLORATION

PROJECT: SOCK CREEK EL 37/89. DIAMOND DRILL HOLE SUPPLEMENTARY DATA (PETROLOGY)

SAMPLE NUMBER: 034276 BHD4: 476 m.

SUMMARY:

This is a moderately plagioclase-phyric dacitic lava essentially identical to the previous sample 034274; it suffered weak hydrothermal alteration (silica-chlorite-calcite-sericite).

HAND SPECIMEN:

This is a massive grey felsic lava with sericitized plagioclase phenocrysts and a fine network of fractures that are healed by silica.

THIN SECTION:

This sample is almost identical in thin section to the previous sample from the same lithostratigraphic unit (034274), being a moderately plagioclase-phyric dacitic lava with an originally largely glassy groundmass. Plagioclase phenocrysts are perhaps slightly less abundant in this sample than 274 (~7-10 modal%), and are certainly more strongly sericitized. As for 274, former FeTi oxide phenocrysts are totally altered to leucoxene, and often disaggregated. No convincing former augite phenocrysts are noted in this thin section, but there were only a few in the section of sample 274, suggesting that this is simply a 'sampling problem'.

The groundmass of this sample has an identical texture to sample 274, being a ragged fairly fine-grained quartz-feldspathic intergrowth after glass, with abundant small albite microlites. Anhedral blebs and discontinuous tiny veinlets of secondary quartz are common throughout the groundmass, and fine-grained chlorite and sericite vary in concentration from fairly low abundance areas similar to most of 274, to rather strongly chloritized patches. Sericite also forms a weak mesh through the rock. As for 274, meandering and bifurcating quartz-calcite veinlets are common, but no associated pyrite is present in this section.

This is a plagioclase-phyric dacitic lava essentially identical to the previous sample 034276.

SAMPLE NUMBER: 034280 and 034282 BHD4: 555m + 598-9m.

SUMMARY:

These are essentially identical quartz-mica greywackes derived almost exclusively from pelitic metamorphics, with no input from Mount Read Volcanics; occasional chromites are derived from the ophiolites. Both are typical Animal Creek Greywackes.

HAND SPECIMEN:

These are identical massive grey medium- to fine-grained quartz mica greywackes, unbedded in the hand specimen, but with abundant calcite and quartz veinlets.

THIN SECTION:

These two greywackes are essentially identical in thin section in every way. Both are rather poorly sorted greywackes composed dominantly of angular grains of quartz to a maximum size of about 1 mm across (average more like 0.2mm or even smaller). These rocks are clearly framework-supported, with matrix forming only about 20-30 modal% of both. The detrital quartz grains are angular, often polycrystalline, and all show undulose extinction typical of metamorphic quartz. This assertion is supported by the presence of occasional grains of quartz enclosing well-formed muscovite crystals. The same mineral occurs quite abundantly (perhaps 3-5 modal%) as a discrete detrital phase in crystals up to 0.4mm long. Lithic clasts include quartz-mica schist, very fine-grained siliceous rock, probably chert, and some sericite-opaque-dominated, rather flat elongate grains that are either altered biotite, or carbonaceous shale lithic clasts. Several distinctive red detrital chromite grains are present in each section, and more abundant than chromite are subhedral strongly pleochroic grains of detrital tourmaline.

The matrix of these greywackes is very fine-grained siliceous material, possibly recrystallized silt and clay. However, it has been quite strongly overprinted by calcite, which probably forms 20-30 modal% of any field of view. Several rather diffuse-edged calcite veins to about 2mm max thickness cut both rocks.

These are, in my opinion, 'type-location' Animal Creek Greywackes, lacking any input whatsoever from the Mount Read Volcanics, but being dominantly derived from pelitic metamorphics with a small (chromite) component from the 'ophiolites'.

APPENDIX 2

IN-FILL GRAVITY SURVEY, SOCK CREEK AREA



Division of Mines

Operations Report — Gravity survey of Silver Falls and Sock Creek areas for Pasmenco Exploration

by R. G. Richardson, B.Sc. (Hons), Ph. D.

Abstract

At the request of Pasmenco Exploration the Division of Mines acquired gravity data at 282 points in the areas of interest. Of these approximately half were levelled to an accuracy of 0.3 m or better using an electronic hydrostatic level; the remainder were levelled to an accuracy of 3 m or better using a barometer or surveyed. Station spacing was 100 m when using the level and 200–250 m when using the barometer. The survey was conducted from 2 February 1993 to 19 February 1993 and involved 13.5 days of meter operation.

BASE STATION

The Boco base station of Richardson (1992) was used. This is station number 9151.6638 and has an observed gravity value of 980230.87 mgal. The height is 401.45 metres. Base readings were made twice per day.

GRAVITY METERS

Only Worden meter number 913, with a constant of 0.09558 mgal/scale division and a reading accuracy of better than 0.1 mgal, was used.

DATA PROCESSING

All data were corrected for linear drift between base readings. The gravity data were integrated with the height

data and reduced to Bouguer Anomalies using the 1930 International Gravity Formula and a Bouguer Density of 2.67 t/m^3 . Station numbers are of the form 9351.NNNN. Terrain corrections were computed to a radius of 21 km using a density of 2.67 t/m^3 . The data were then combined with the pre-existing data that had been corrected and reduced in the same manner.

DATA SUPPLIED

- (i) Floppy disc of reduced data. Columns are station number, easting, northing, elevation, observed gravity, theoretical gravity, terrain correction and Bouguer Anomaly. All data collected for Pasmenco Exploration in the 1992/93 summer season are included (Silver Falls 252 stations, Sock Creek ~~20~~⁴⁸ stations).
- (ii) A listing of the contents of the floppy disc.
- (iii) One set of handwritten field maps showing station positions.

REFERENCE

RICHARDSON, R. G. 1992. *Operations report — Gravity survey of Western Tasmania exploration tenements for Pasmenco Exploration*. Department of Mines, Tasmania

R.G. Richardson

SUPERVISING GEOPHYSICIST

February 1993

Station No	East (m)	North (m)	Residual (mgal)
9351.6441	376280.0	391560.0	6.43
9351.6442	374660.0	390320.0	6.19
9351.6443	374210.0	390480.0	4.64
9351.6444	373880.0	390180.0	5.48
9351.6445	373360.0	390120.0	6.16
9351.6446	373220.0	389740.0	6.30
9351.6447	373470.0	389240.0	6.85
9351.6448	373400.0	388780.0	6.09
9351.6449	372900.0	389440.0	7.20
9351.6450	372900.0	388960.0	7.09
9351.6451	372860.0	388500.0	8.29
9351.6452	372940.0	387980.0	7.89
9351.6453	373390.0	387660.0	6.90
<hr/>			
9351.6454	384690.0	391710.0	0.41
9351.6455	384670.0	391530.0	0.90
9351.6456	384560.0	391120.0	0.21
9351.6457	384240.0	390870.0	-1.20
9351.6458	384320.0	390680.0	-1.10
9351.6459	384700.0	392040.0	-0.14
9351.6460	384650.0	392250.0	-0.57
9351.6461	384530.0	392570.0	-0.64
9351.6462	384480.0	392900.0	-1.14
9351.6463	384410.0	393070.0	-0.81
9351.6464	384400.0	393460.0	-3.37
9351.6465	384450.0	393550.0	-3.72
9351.6466	384590.0	393910.0	-2.97
9351.6467	384990.0	391760.0	0.74
9351.6468	385070.0	391690.0	0.32
9351.6469	385330.0	391910.0	0.07
9351.6470	385530.0	391900.0	0.67
9351.6471	385880.0	392110.0	0.86
9351.6472	386680.0	392800.0	0.94
9351.6473	386490.0	392780.0	1.40
9351.6474	386430.0	392570.0	1.27
9351.6475	386220.0	392320.0	0.72
9351.6476	386540.0	392870.0	1.27
9351.6477	386410.0	393000.0	1.03
9351.6478	386230.0	392900.0	0.97
9351.6479	386160.0	392700.0	1.63
9351.6480	386110.0	392510.0	1.44
9351.6481	386270.0	392640.0	1.84
9351.6482	386050.0	392840.0	1.14
9351.6483	385930.0	392950.0	1.07
9351.6484	385790.0	393050.0	1.18
9351.6485	385670.0	393180.0	0.59
9351.6486	386200.0	393070.0	0.93
9351.6487	386010.0	393010.0	0.84
9351.6488	386750.0	393030.0	1.86
9351.6489	386770.0	393180.0	1.62
9351.6490	386650.0	393040.0	1.68
9351.6491	386580.0	392700.0	1.24
9351.6492	386850.0	392910.0	1.79
9351.6493	384020.0	390610.0	-1.58
9351.6494	383780.0	390640.0	-1.51
9351.6495	383530.0	390650.0	-1.41
9351.6496	383290.0	390650.0	-1.16
9351.6497	383090.0	390660.0	-1.19

SOCK CREEK AREA ↓

Station No	East (m)	North (m)	Residual (mgal)
9351.6498	384490.0	391540.0	0.04
9351.6499	384330.0	391670.0	-0.59
9351.6500	384410.0	391340.0	-0.20
9351.6501	384340.0	391140.0	-0.48
9351.6502	384170.0	391270.0	-1.83
9351.6503	384030.0	391400.0	-1.86
9351.6504	384230.0	390940.0	-0.77
9351.6505	384530.0	390990.0	0.15
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9351.6506	383950.0	391520.0	-2.02
9351.6507	383700.0	391540.0	-1.95
9351.6508	383450.0	391560.0	-2.05
9351.6509	383200.0	391580.0	-1.73
9351.6510	382950.0	391600.0	-1.63
9351.6511	383950.0	391780.0	-2.26
9351.6512	383950.0	392020.0	-2.19
9351.6513	383950.0	392270.0	-2.17
9351.6514	383950.0	392520.0	-2.31
9351.6515	383700.0	392520.0	-2.17
9351.6516	383450.0	392520.0	-1.85
9351.6517	383700.0	392020.0	-2.33
9351.6518	383450.0	392020.0	-1.86

SOCK CREEK AREA ↑

Station No	East (m)	North (m)	Elev (m)	Gobs	Gtheo	Terr Corr	B.A. (mgal)	File Name
9351.6441	376280.0	391560.0	416.00	980.233800	980.324864	3.40	-5.83	*PAS913Q
9351.6442	374660.0	390320.0	307.00	980.257944	980.325842	2.20	-5.31	*PAS913Q
9351.6443	374210.0	390480.0	260.00	980.265762	980.325707	2.17	-6.63	*PAS913Q
9351.6444	373880.0	390180.0	217.00	980.275798	980.325944	1.84	-5.62	*PAS913Q
9351.6445	373360.0	390120.0	172.00	980.286264	980.325985	1.20	-4.69	*PAS913Q
9351.6446	373220.0	389740.0	202.00	980.281198	980.326290	0.88	-4.48	*PAS913Q
9351.6447	373470.0	389240.0	232.00	980.275674	980.326697	1.33	-4.06	*PAS913Q
9351.6448	373400.0	388780.0	222.00	980.277117	980.327067	1.49	-4.79	*PAS913Q
9351.6449	372900.0	389440.0	182.00	980.286570	980.326527	0.74	-3.42	*PAS913Q
9351.6450	372900.0	388960.0	178.00	980.287621	980.326915	0.75	-3.53	*PAS913Q
9351.6451	372860.0	388500.0	190.00	980.286551	980.327285	1.06	-2.30	*PAS913Q
9351.6452	372940.0	387980.0	197.00	980.285069	980.327706	1.15	-2.74	*PAS913Q
9351.6453	373390.0	387660.0	244.00	980.274546	980.327970	1.47	-3.96	*PAS913Q
9351.6454	384690.0	391710.0	413.00	980.226871	980.324856	0.92	-15.82	*PAS913Q
9351.6455	384670.0	391530.0	419.00	980.226116	980.325001	1.12	-15.34	*PAS913Q
9351.6456	384560.0	391120.0	433.00	980.223200	980.325331	0.92	-16.03	*PAS913Q
9351.6457	384240.0	390870.0	396.00	980.229891	980.325528	0.43	-17.31	*PAS913Q
9351.6458	384320.0	390680.0	398.00	980.229709	980.325683	0.41	-17.27	*PAS913Q
9351.6459	384700.0	392040.0	403.00	980.228142	980.324590	0.83	-16.34	*PAS913Q
9351.6460	384650.0	392250.0	399.00	980.228438	980.324420	0.76	-16.73	*PAS913Q
9351.6461	384530.0	392570.0	431.00	980.221939	980.324160	0.73	-16.71	*PAS913Q
9351.6462	384480.0	392900.0	479.00	980.211769	980.323894	0.75	-17.15	*PAS913Q
9351.6463	384410.0	393070.0	473.00	980.213107	980.323755	0.83	-16.77	*PAS913Q
9351.6464	384400.0	393460.0	485.00	980.207984	980.323441	0.77	-19.28	*PAS913Q
9351.6465	384450.0	393550.0	497.00	980.205126	980.323369	0.83	-19.64	*PAS913Q
9351.6466	384590.0	393910.0	528.00	980.199296	980.323080	1.01	-18.91	*PAS913Q
9351.6467	384990.0	391760.0	457.00	980.218049	980.324820	1.24	-15.63	*PAS913Q
9351.6468	385070.0	391690.0	493.00	980.210612	980.324877	1.19	-16.09	*PAS913Q
9351.6469	385330.0	391910.0	516.00	980.205461	980.324703	1.31	-16.43	*PAS913Q
9351.6470	385530.0	391900.0	565.00	980.196467	980.324714	1.17	-15.93	*PAS913Q
9351.6471	385880.0	392110.0	592.00	980.191449	980.324549	0.77	-15.87	*PAS913Q
9351.6472	386680.0	392800.0	607.00	980.187893	980.324002	0.63	-16.07	*PAS913Q
9351.6473	386490.0	392780.0	588.00	980.192051	980.324016	0.76	-15.53	*PAS913Q
9351.6474	386430.0	392570.0	551.00	980.199286	980.324185	0.84	-15.67	*PAS913Q
9351.6475	386220.0	392320.0	606.00	980.188457	980.324384	0.56	-16.15	*PAS913Q
9351.6476	386540.0	392870.0	592.00	980.191114	980.323944	0.70	-15.67	*PAS913Q
9351.6477	386410.0	393000.0	555.00	980.198053	980.323838	0.77	-15.83	*PAS913Q
9351.6478	386230.0	392900.0	523.00	980.204495	980.323916	0.72	-15.82	*PAS913Q
9351.6479	386160.0	392700.0	562.00	980.197585	980.324076	0.76	-15.17	*PAS913Q
9351.6480	386110.0	392510.0	578.00	980.194536	980.324229	0.63	-15.36	*PAS913Q
9351.6481	386270.0	392640.0	542.00	980.201771	980.324126	0.71	-15.02	*PAS913Q
9351.6482	386050.0	392840.0	537.00	980.201962	980.323962	0.77	-15.59	*PAS913Q
9351.6483	385930.0	392950.0	500.00	980.209074	980.323872	0.85	-15.59	*PAS913Q
9351.6484	385790.0	393050.0	520.00	980.204973	980.323789	1.11	-15.41	*PAS913Q
9351.6485	385670.0	393180.0	531.00	980.202144	980.323683	1.15	-15.93	*PAS913Q
9351.6486	386200.0	393070.0	516.00	980.205356	980.323778	1.09	-15.83	*PAS913Q
9351.6487	386010.0	393010.0	499.00	980.208882	980.323824	0.93	-15.85	*PAS913Q
9351.6488	386750.0	393030.0	584.00	980.192978	980.323818	0.79	-15.16	*PAS913Q
9351.6489	386770.0	393180.0	574.00	980.194641	980.323697	0.75	-15.39	*PAS913Q
9351.6490	386650.0	393040.0	582.00	980.193389	980.323808	0.64	-15.29	*PAS913Q
9351.6491	386580.0	392700.0	598.00	980.189891	980.324082	0.81	-15.74	*PAS913Q
9351.6492	386850.0	392910.0	614.00	980.187042	980.323916	0.79	-15.29	*PAS913Q
9351.6493	384020.0	390610.0	394.00	980.230331	980.325735	0.29	-17.61	*PAS913Q
9351.6494	383780.0	390640.0	392.00	980.230923	980.325708	0.24	-17.43	*PAS913Q
9351.6495	383530.0	390650.0	392.00	980.231172	980.325696	0.21	-17.20	*PAS913Q
9351.6496	383290.0	390650.0	392.00	980.231363	980.325693	0.37	-16.85	*PAS913Q
9351.6497	383090.0	390660.0	392.00	980.231525	980.325683	0.28	-16.77	*PAS913Q

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Station No	East (m)	North (m)	Elev (m)	Gobs	Gtheo	Terr Corr	B.A. (mgal)	File Name
9351.6498	384490.0	391540.0	397.00	980.230206	980.324991	0.57	-16.12*	PAS913Q
9351.6499	384330.0	391670.0	397.00	980.229614	980.324884	0.52	-16.66*	PAS913Q
9351.6500	384410.0	391340.0	396.00	980.230436	980.325151	0.48	-16.34*	PAS913Q
9351.6501	384340.0	391140.0	396.00	980.230359	980.325312	0.45	-16.61*	PAS913Q
9351.6502	384170.0	391270.0	392.00	980.229910	980.325205	0.31	-17.87*	PAS913Q
9351.6503	384030.0	391400.0	393.00	980.229700	980.325098	0.27	-17.82*	PAS913Q
9351.6504	384230.0	390940.0	398.00	980.229910	980.325472	0.40	-16.87*	PAS913Q
9351.6505	384530.0	390990.0	412.00	980.227740	980.325435	0.56	-16.09*	PAS913Q
9351.6506	383950.0	391520.0	393.00	980.229518	980.325000	0.24	-17.93*	PAS913Q
9351.6507	383700.0	391540.0	393.00	980.229719	980.324981	0.21	-17.74*	PAS913Q
9351.6508	383450.0	391560.0	393.00	980.229738	980.324961	0.20	-17.72*	PAS913Q
9351.6509	383200.0	391580.0	395.00	980.229690	980.324942	0.27	-17.28*	PAS913Q
9351.6510	382950.0	391600.0	399.00	980.229021	980.324922	0.35	-17.06*	PAS913Q
9351.6511	383950.0	391780.0	394.00	980.228916	980.324790	0.23	-18.14*	PAS913Q
9351.6512	383950.0	392020.0	394.00	980.228801	980.324597	0.24	-18.05*	PAS913Q
9351.6513	383950.0	392270.0	395.00	980.228409	980.324395	0.28	-18.00*	PAS913Q
9351.6514	383950.0	392520.0	397.00	980.227645	980.324193	0.33	-18.12*	PAS913Q
9351.6515	383700.0	392520.0	397.00	980.227989	980.324190	0.25	-17.86*	PAS913Q
9351.6516	383450.0	392520.0	406.00	980.226555	980.324187	0.35	-17.42*	PAS913Q
9351.6517	383700.0	392020.0	394.00	980.228820	980.324593	0.20	-18.07*	PAS913Q
9351.6518	383450.0	392020.0	397.00	980.228801	980.324590	0.21	-17.48*	PAS913Q

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APPENDIX 3

**LITHOGEOCHEMICAL & PETROLOGICAL RESULTS,
HOLE BHD3, HIGH POINT**

**PASMINCO EXPLORATION
SUMMARY DIAMOND DRILL CORE LOG**

HOLE No. BHD3

PROJECT: HIGH POINT, BULGOBAC HILL EL

Graphic Scale 1:

Page 2 of 24

From m	Interval m	Code	Description	Depth	Graphic	From m	Interval m	Code	Description	Depth	Graphic
TABLE 1: SUMMARY LOG OF HOLE BHD3											
0 - 52.9m: <u>SOUTHWELL SUBGROUP:</u>											
0 - 52.9m:			PUMICEOUS CRYSTAL-LITHIC BRECCIO-CONGLOMERATE Mod silicified. 1% pyrite. Clasts of massive py below 36m.								
52.9 - 453.0m: <u>QUE RIVER SHALE:</u>											
52.9 - 257.2m:			BLACK SHALE Carbonaceous, graphitic & calcareous. 1-2% bedded pyrite, with zones to 5%.								
257.2 - 453.0m:			MIXED SEQUENCE OF BLACK SHALE, FELDSPATHIC SANDSTONE & FELDSPAR-PHYRIC AMYGDALOIDAL MAFIC LAVAS Dolerite 441 - 448m. Sediments calcareous, mafics carbonatised. 1-3% pyrite in shale. Gen minor to 1% py in volcs, with limited intervals to 3% (best: 416.7 - 423m: 2-3% py, trace sp).								
453.0 - 784.4m: <u>QUE-HELLYER VOLCANICS:</u>											
453.0 - 461.7m:			CLEAVED, SERICITISED & PYRITIC FINE MAFIC BRECCIA Probable major ductile structure. Mod-strong sericite-carbonate alteration. 5-10% pyrite, minor sp-gn in calcite veinlets.								
461.7 - 580m:			BRECCIATED AMYGDALOIDAL MAFIC LAVAS Carbonatised & chloritised. Bleached & silif lava clasts 485 - 498m. Gen minor to 1% pyrite, except 2-3% py in faulted zone @ 466.5 - 474m.								
580 - 646.4m:			PARTLY-PEPERITIC FELDSPAR-PHYRIC MAFIC (TO DACITIC?) LAVA BRECCIA Carbonatised & chloritised. Minor fuchsite in v strong fault @ 610 - 611m. Minor to 1% pyrite, decreasing with depth.								
646.4 - 695.4m:			ALTERED POLYMICT EPICLASTIC VOLCANIC BRECCIA Dacitic & andesitic composition. Apparent primary debris-flow lineation. Strong-silica-albite alteration. Minor pyrite.								
695.4 - 709.8m:			FELDSPAR-PHYRIC (ANDESITIC?) LAVA Carbonate-chlorite-sericite alteration. V minor pyrite.								
709.8 - 757.7m:			ALTERED DACITIC VOLCANIC BRECCIA Dacitic fragments in possibly more-andesitic matrix. Extensively detextured by strong silica-albite-chlorite-carbonate alteration. Several amygdaloidal mafic dykes to 5m. V minor pyrite.								
757.7 - 784.4m:			PEPERITIC FELDSPAR-PHYRIC LAVA BRECCIA Andesitic to possibly dacitic composition. Chloritised, with patchy silicification. Minor pyrite.								
END OF HOLE											
Best intersection: 453 - 456m: 3m @ 0.15% Zn, 0.04% Pb, 1g/t Ag, 0.01g/t Au.											

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**PAJMINCO EXPLORATION
DIAMOND DRILL CORE ASSAY DATA**

HOLE No. BHD 3

PROJECT: HIGH POINT, BULGOBAC HILL EL

Page 19 of 24

SAMPLE						ASSAYS (ppm unless specified)																	COMMENTS										
Number	Type	From m	To m	Interval m	Recovered m	Cu	Pb	Zn	Ag	Au	As	Ba	Rb	Sr	V	Nb	Y	Zr	Al ₂ O ₃	SiO ₂	TiO ₂	Fe ₂ O ₃		MnO	CaO	MgO	P ₂ O ₅	LOI	SO ₂	Cr			
032731B	SPLIT NQ	284.0	285.0	1.0		60	254	315	<0.5		18	210	8	280	140	7	20	140	15.49	0.50	0.50	6.24	0.13	6.33	3.93	0.20	0.201	4.72	5.42	1.59	140		
732B	"	338.0	339.0	1.0		32	53	223	<0.5		3	1050	30	330	160	6	20	150	13.65	0.66	0.68	4.15	0.20	4.97	5.10	0.318	5.68	0.24		280			
733B	"	424.0	425.0	1.0		64	9	222	<0.5		5	1900	20	570	120	3	18	100	11.45	0.33	0.33	6.87	0.28	3.20	11.14	0.94	7.25	0.127	1.37	780			
032734	SPLIT NQ	453.0	454.5	1.5		109	125	1740	0.8	0.008																							
735	"	454.5	456.0	1.5		114	629	1220	1.3	<0.008																							
736	"	456.0	457.5	1.5		121	240	560	1.0	<0.008																							
737	"	457.5	459.0	1.5		125	29	67	0.7	<0.008																							
738	"	459.0	460.5	1.5		136	26	57	<0.5	<0.008																							
739	"	460.5	461.7	1.2		143	17	91	<0.5	<0.008																							
032740B	SPLIT NQ	464.0	465.0	1.0		116	5	104	<0.5		6	250	35	580	260	6	20	140	16.93	0.44	0.44	6.79	0.12	4.83	5.09	0.89	6.15	0.360	6.13	1.84	110		
032741	"	466.5	467.5	1.0		130	95	168	<0.5	0.008																							
742	"	467.5	469.0	1.5		110	40	133	<0.5	<0.008																							
743	"	469.0	470.5	1.5		39	<5	154	<0.5	<0.008																							
744	"	470.5	472.0	1.5		95	<5	108	<0.5	<0.008																							
745	"	472.0	474.0	2.0		71	<5	142	<0.5	<0.008																							
032746B	"	487.0	488.0	1.0		118	72	285	<0.5		3	1650	35	510	250	5	20	130	15.21	0.58	0.58	7.39	0.16	4.06	5.97	1.75	5.57	0.347	5.58	0.39	210		
747B	"	534.0	535.0	1.0		124	218	491	<0.5		5	160	5	420	170	7	20	120	9.79	0.47	0.47	6.56	0.30	3.16	17.16	0.18	5.96	0.630	10.02	0.33	660		
748B	"	585.0	586.0	1.0		43	<5	153	<0.5	<0.008	2	550	35	330	250	<3	15	55	15.80	0.44	0.44	8.94	0.26	4.10	6.21	0.89	4.70	0.125	0.13	20			
749B	"	650.5	651.4	0.9		12	<5	42	<0.5	<0.008	25	470	85	120	6	9	35	190	14.66	0.38	0.38	4.64	0.18	4.09	2.24	2.11	1.52	0.093	3.96	0.58	10		
032753B	"	659.0	660.0	1.0		17	<5	13	<0.5	<0.008	<2	320	75	80	<5	11	30	200	13.39	0.41	0.41	2.26	0.26	4.66	2.86	1.90	0.90	0.103	4.17	0.19	5		
754B	"	687.0	688.0	1.0		6	<5	25	<0.5	<0.008	4	510	95	150	<5	12	35	190	13.59	0.37	0.37	4.08	0.21	3.88	3.57	2.07	0.91	0.091	4.39	0.17	5		
755B	"	699.0	700.0	1.0		<5	<5	28	<0.5	<0.008	4	550	140	75	17	11	35	240	15.00	0.39	0.39	4.81	0.20	2.27	3.24	1.23	0.105	5.26	0.03	25			
756B	"	742.5	743.5	1.0		<5	<5	16	<0.5	<0.008	4	320	90	75	<5	15	30	220	13.35	0.35	0.35	3.04	0.15	3.34	3.72	1.92	1.06	0.080	4.23	0.33	13		
757B	"	770.0	771.0	1.0		<5	<5	37	<0.5	<0.008	<2	290	85	150	6	14	35	250	14.58	0.37	0.37	3.95	0.10	4.47	3.10	1.31	0.080	3.79	0.01	11			
Laboratory ANALABS CODEE + PERTH						Analytical-Method																											
Job No. 0175, 0174						Date JANUARY 1992																											
Detection-Limit						5	5	5	0.5	0.008	2	10	5	5	5	3	5	5															5

995080

(11316.60.08526/27 - ANALABS 388 NP)

PASMINGO EXPLORATION

PROJECT: HIGH POINT, EL 37/89

DIAMOND DRILL HOLE SUPPLEMENTARY DATA (PETROLOGY)

Page 22 of 24

SAMPLE NUMBER: 032731A 284m

SUMMARY:

This is a sparsely plagioclase-phyric andesitic lava with quite strong calcite overprinting of groundmass.

HAND SPECIMEN:

This is an aphyric or finely plagioclase-phyric andesitic or basaltic lava with calcite veining and sparse calcite-filled vesicles.

THIN SECTION:

This is a plagioclase-phyric andesitic lava with quite strong pervasive calcite alteration. Plagioclase phenocrysts make up about 3 modal% of the rock and are quite small, averaging around 0.5-1mm long, and are tabular to stubby prisms with clear rims of albite and sericite speckled albite cores. They are often quite rounded, suggestive of reaction with the host magma, and commonly occur in multi-crystal clots. Only a few former mafic phenocrysts were present; these are now replaced by calcite and minor magnetite, and were probably augite.

The groundmass of this sample is texturally well-preserved, despite extensive calcite overprinting. It consists of an intergrowth of well-formed, tabular to lath-like albitized plagioclase crystals, varying from microphenocryst sized to tiny acicular microclites, and far less abundant chloritized granular augite and tiny FeTi oxide grains. The plagioclase laths in the groundmass show weak flow-alignment around phenocrysts, and are set in volumetrically subordinate formerly glassy mesostasis that has altered to pale green chlorite. Patchy calcite alteration overprints up to about 50 modal% of the groundmass of this rock, and is quite patchily distributed. Several veinlets, fractures and vesicles are lined by polygonal quartz, and cored by calcite. Many of the larger calcite-quartz intergrowths also contain minor opaque phases intergrown with them, and shapes suggest that they are pyrite.

I have seen several flows intercalated in the basal Que River Shale. In the Placer deep holes these are quite unusual low-Ti basalt, and markedly different from this rock. This is unambiguously a sparsely plagioclase-phyric andesitic lava. It may have burrowed into the shale rather than having been erupted on to the shale; core logging will solve this better than the thin section, but the groundmass texture is typical of a lava rather than a more slowly-cooled dyke.

The whole-rock analysis is very typical of a Hellyer andesite, with 55% SiO₂ and 4.7% MgO, and a Ti/Zr value of 21. The low P₂O₅ content (compared to the more 'shoshonitic' Hellyer andesites) suggests compositional affinities with the less-enriched end of the Que-Hellyer compositional spectrum.

SAMPLE NUMBER: 032740A 465m

SUMMARY:

This is a fairly evolved plagioclase+augite+olivine-phyric basaltic lava breccia, typically of the upper Hellyer basalts.

HAND SPECIMEN:

This is a basaltic lava breccia, probably monomict, with weakly vesicular augite-phyric basaltic fragments to at least 3cm across, and minor calcite filling vesicles.

THIN SECTION:

This is definitely a monomict lava breccia. Most of the rock consists of petrographically identical plagioclase+augite+olivine-phyric basaltic lava fragments, some clearly with a jigsaw fit against adjacent fragments. This, and the hand specimen, suggest to me that this sample is actually a 'false breccia', fractured in situ during either eruption, or later hydrothermal alteration. Plagioclase phenocrysts make up about 5-8 modal% of this rock and are well-formed rather narrow tabular prisms usually at least 50% replaced by sericite and occasional spots of granular, messy, almost isotropic epidote. Former augite phenocrysts are larger but somewhat less abundant and totally replaced by calcite, minor epidote and green chlorite. Even less abundant former olivine phenocrysts are totally replaced by pale green chlorite and minor calcite and magnetite.

The groundmass of the lava fragments shows a vitrophyric texture with tiny plagioclase laths (sericitized) set in glass that devitrified then altered to chlorite and messy brown epidote aggregates. The altered groundmass is charged with small equidimensional magnetite(?) grains. Round and oval vesicles are not uncommon, and are filled by pale green chlorite, or calcite with marginal magnetite(?) grains. Interfragment matrix is considerably more altered than the fragments themselves. It consists of albite-sericite-altered plagioclase phenocrysts identical to those in the fragments, but more concentrated, and a few obliterated former mafic phenocrysts, all set in a fine-grained quartzo-feldspathic intergrowth that has recrystallized from the devitrified original glassy groundmass of the rock, but only in zones of more intense fluid-flow and dissolution. Wispy trails of augite are common in the altered inter-fragment areas.

This sample is a basaltic breccia, the presence of plagioclase phenocrysts indicating that the basalt was relatively evolved (i.e. non-primitive, in contrast to many Hellyer-type basalts). It is fairly typical of many Hellyer basalt sections, and is not petrographically diagnostic of any particular unit that I am familiar with. Its relatively low MgO (6.1%) and Ti/Zr value (28) support the petrographic assignment as an evolved basalt, but the higher P₂O₅ suggests it is transitional to shoshonitic affinities.

SAMPLE NUMBER: 032745A 488m

SUMMARY:

This sample was a vesicular sparsely augite-phyric evolved andesitic lava. It has been strongly silicified before incorporation in the basaltic lava breccia host.

HAND SPECIMEN:

This sample is a basaltic lava breccia containing quite large fragments (at least 5cm across) of pale pinkish feldspar-phyric felsic lava.

THIN SECTION:

This thin section is of the felsic lava fragments that characterize this rock. It consists of plagioclase+augite-phyric felsic andesite or rather 'mafic' dacite. The plagioclase phenocrysts make up less than 2 modal% of this rock and are totally pseudomorphed by polycrystalline sugary secondary quartz. Much smaller plagioclase microphenocrysts, really only large groundmass microclites, are far more abundant and are albitized. Perhaps unusual in a rock with such a felsic 'look' about it is the relative abundance of well-formed, stubby augite phenocrysts. Although these make up probably less than 2 modal% of the rock, 'normal' Hellyer felsic lavas usually contain only 4 or 5 augite phenocrysts per thin section, whereas this rock has perhaps 30-40 augite phenocrysts, often occurring in tiny gabbroic clots with altered plagioclase.

The groundmass of this rock was quite glassy and strongly vesicular. The glass contained abundant albitized plagioclase microclites and tiny FeTi oxide grains. Much of the former glassy groundmass has devitrified, then crystallized as an extremely fine-grained quartzo-feldspathic intergrowth in which larger ragged quartz grains have grown. However a characteristic feature of this sample is the presence of abundant vesicles that have filled with secondary quartz that shows rosette habits and radial extinction. Patchy calcite overprints small areas of groundmass and quartz veinlets, and occasional clinzoisite (Fe-poor epidote) is a very minor secondary phase.

This is a strongly silica-altered evolved andesite, rather different to the typically perlitic, sparsely plagioclase-phyric dacites and rhyolitic lavas typically occurring in the Hellyer sequence; moreover, the relatively abundant augite in this rock suggests that it was in the more low-Si end of the dacite spectrum, or at the high SiO₂ end of the andesite compositional range. There is little doubt that the rock has been strongly silicified. The analysis provided of this sample is far more basaltic than the thin section allows, indicating that it is from a 1m interval and represents a mixture of basaltic host and evolved andesitic fragments.

PASMINCO EXPLORATION

PROJECT: HIGH POINT, EL 37/89 **DIAMOND DRILL HOLE SUPPLEMENTARY DATA (PETROLOGY)**

SAMPLE NUMBER: 032748 585.9m

SUMMARY:

This is a strongly plagioclase-phyric andesitic lava with much less abundant augite phenocrysts in a formerly glassy groundmass.

HAND SPECIMEN:

This is a plagioclase+augite-phyric massive basaltic lava.

THIN SECTION:

Thin section examination shows that this sample is a strongly plagioclase-phyric basaltic andesite rather than a basalt. It contains upwards of 30 modal% of strongly altered albitized plagioclase phenocrysts, and less than a few modal% of chloritized augite phenocrysts in an altered formerly largely glassy groundmass. Plagioclase phenocrysts are up to 4mm long, and are mainly quite euhedral tabular prismatic crystals. They contain abundant sericite and fairly fine-grained granular yellow epidote alteration. Former augite phenocrysts were less than 1mm long, and were mainly rather long narrow prismatic crystals that are totally replaced by green chlorite and minor fluffy secondary quartz.

The groundmass of this rock was largely glassy, and it has altered to an irresolvable intergrowth of quartz, dirty epidote, sericite and chlorite, and possible albite. Irregular fractures and discontinuous angular 'tension gashes' are filled by green chlorite and fluffy quartz, with occasional granular epidote embedded in the chlorite. Rather dirty amorphous patches of fine-grained calcite overprint large areas of the groundmass, and a single 3mm-wide vein of foliated polycrystalline calcite transects the rock.

This rock is a fairly typical Hellyer basaltic andesite petrographically, even if slightly more plagioclase-phyric than many from this area. However, the compositional data provided are strange in that the major elements are as expected from the petrographic diagnosis (low-Si andesite), but the Ti, Zr and Nb data are unusually low, leading to a Ti/Zr value of 48. This high Ti/Zr is among the highest recorded for Hellyer basalts and andesites, and this might be a chemically distinctive horizon for future inter-hole correlation purposes.

SAMPLE NUMBER: 032750 597m

SUMMARY:

This is a formerly glassy plagioclase+augite+olivine-phyric basaltic lava typical of the less primitive Hellyer basalts. It is quite strongly hydrothermally altered (silica-sericite-chlorite).

HAND SPECIMEN:

This sample is listed as a 'clast of quartz-amygdaloidal lava (mafic?)'. Without that information I would have described it as a mafic lava breccia, probably dominated by augite+plagioclase-phyric basalt.

THIN SECTION:

This sample is a quite abundantly porphyritic basaltic lava dominated by phenocrysts of plagioclase, but with common altered augite and olivine phenocrysts, all set in a very altered, formerly glassy matrix. Albitized plagioclase phenocrysts are up to about 3mm long, and are mainly euhedral prisms that are quite heavily sericitized. They make up around 10 modal% of the sample. About 2-3 modal% of the rock is made up of former augite phenocrysts, mainly 1-2mm sized euhedra that are totally replaced by pale yellowish green chlorite, whereas slightly less abundant are characteristically-shaped former olivine phenocrysts, also 1-2mm long euhedra, that are replaced by patchy intergrowths of chlorite and sugary polygonal secondary quartz. A few former olivine phenocrysts contain small chromite euhedra.

The formerly largely glassy groundmass of this sample is very weakly foliated, and composed dominantly of almost isotropic chlorite containing patchy secondary quartz and intense sericite alteration. A lack of calcic secondary minerals suggests that this rock has been severely depleted in Ca during hydrothermal alteration. An irregular streaky zone of very fine-grained silica or silica-albite intergrowth cuts across the sample, and contains significantly more disseminated pyrite than the remainder of the rock. This 'vein' is rimmed either side by 8mm-wide intense sericite alteration zones that contain patches of much coarser-grained polycrystalline quartz.

This was a fairly typical Hellyer basalt, glassy and multiply saturated with plagioclase, augite and olivine. It has suffered much stronger alteration than normal, and I would argue that this was hydrothermal in origin, rather than the regional pervasive burial metamorphic degradation.

SAMPLE NUMBER: 032749A 650.6m

SUMMARY:

This is a fairly coarse-grained volcanogenic epiclastic sediment derived entirely from felsic volcanics and fragmental rocks.

HAND SPECIMEN:

This is a quite strongly altered grey-green plagioclase-phyric andesitic lava breccia or epiclastic.

THIN SECTION:

This rock is clearly a clast/framework-supported volcanogenic epiclastic coarse sandstone or pebble conglomerate. Most clasts are 0.5-1cm across and rather angular, and were clearly highly glassy, sparsely plagioclase-phyric dacites and rhyolites. The great variety of textures, degrees of crystallinity, phenocryst modes, and styles of groundmass recrystallization show unambiguously that a variety of felsic flows or sources contributed detritus to this epiclastic. Glassy groundmasses have invariably recrystallized to quartz-feldspathic intergrowths, a few of which retain perlitic cracks. Intense sericitic alteration overprints some clasts, whereas strong calcite alteration of other clasts shows that much of the alteration-recrystallization of these felsic lavas occurred prior to erosion and transport.

The matrix of this rock makes up probably less than 10 modal% of the rock, and was probably largely winnowed out before burial. What little matrix there is consists of totally recrystallized formerly glassy ash and abundant discrete grains (liberated phenocrysts?) of albitized plagioclase that usually show strong sericite alteration. Calcite veinlets cut the rock, and very insignificant disseminated pyrite grains occur in both clasts and matrix.

This is an epiclastic sediment derived virtually entirely from felsic lavas of the type that constitute large volumes of the Central Volcanic Complex, as well as dacitic levels observed in the basal sections of the deep Placer holes in the High Point area.

PASMINGO EXPLORATION

PROJECT: HIGH PLACER, EL37/89 DIAMOND DRILL HOLE SUPPLEMENTARY DATA (PETROLOGY)

Page 24 of 24

SAMPLE NUMBER: 032753A 659m

SUMMARY:

This is a formerly glassy sparsely plagioclase-phyric dacitic or rhyodacitic lava with moderate calcite overprinting of the recrystallized quartz-feldspathic groundmass.

HAND SPECIMEN:

This is a quite strongly altered buff-coloured plagioclase-phyric felsic lava.

THIN SECTION:

This was clearly originally a felsic lava. It consists of about 5 modal% of rather small labular to slightly resorbed albitized plagioclase phenocrysts in a formerly glassy groundmass. Margins of most plagioclase phenocrysts have regrown with the recrystallizing glassy groundmass, and are quite ragged, and most are strongly sericitized. There are no signs of the former presence of mafic phenocrysts, nor of FeTi oxide phenocrysts or microphenocrysts.

The groundmass of this sample is a uniform-textured sugary intergrowth of quartz and albite pervaded by a very fine unorientated meshwork of sericite. It has a typical texture of a quartz-feldspathic intergrowth developed from devitrified felsic glass, and I have no doubt that this was originally a highly glassy lava. A major feature of this sample is the quite abundant calcite that overprints the groundmass as irregular patches and discontinuous veinlets.

This sample is absolutely characteristic of the glassy dacitic to rhyodacitic lavas that occur in the lower section of the deep holes in the former Placer lease further north.

SAMPLE NUMBER: 032755A 7427m

SUMMARY:

This is a glassy felsic lava breccia very similar to 032753A

HAND SPECIMEN:

This is a pink felsic lava breccia with angular fragments of sparsely plagioclase-phyric dacitic or rhyolitic lava to at least 3cm across.

THIN SECTION:

The magmas that gave rise to the felsic lava fragments in this rock were essentially identical to that which formed sample 032753A. All fragments in this rock are of sparsely plagioclase-phyric formerly glassy dacitic or rhyodacitic lava. The only difference between these fragments and sample 032753A is the texture of the recrystallized groundmass, which for the present rock is a patchy mosaic-texture, and contrasts with the even-grained sugary texture of 032753A. The significance of these textural variations in recrystallized devitrified felsic glasses is not understood, even for modern rocks.

This sample contains less pervasive sericitization of the groundmass (although sericite is quite abundant), and less abundant calcite overprinting than 53A. This rock is a felsic lava breccia.

SAMPLE NUMBER: 032755A 699m

SUMMARY:

This rock was a felsic vitric crystal tuff or tuff breccia composed of glassy rhyolitic or rhyodacitic, often vesicular lava fragments and finer-grained tuff fragments and ash. It has suffered quite strong sericite-calcite alteration.

HAND SPECIMEN:

This is a grey green, highly altered, plagioclase-phyric intermediate lava breccia, with fragments to about 1cm across.

THIN SECTION:

The fragmental texture of this sample is immediately obvious in hand specimen, with fragments varying from non-vesicular, aphyric, felsic devitrified glass with excellent perlitic cracking, through to plagioclase-phyric highly vesicular felsic pumice and some occasional darker more chloritic fragments possibly from more andesitic lavas. Most fragments were highly glassy, and the glass has devitrified and crystallized to quartz-feldspathic intergrowths of varying textures, with variable amounts of sericitic overprinting and interstitial chlorite. Former plagioclase phenocrysts are always albitized and strongly altered to sericite. Many are angular, probably broken phenocrysts, and may be crystal detritus in glassy ash. Many larger fragments appear to be composed of smaller angular (formerly) glassy fragments, all lithologically identical, and may represent felsic hyaloclastites.

This rock is strongly altered, with fairly intense sericite-calcite alteration dominant. The rock is a felsic vitric crystal tuff, or tuff breccia, rather than a lava. The analysis provided suggests that most fragments were broadly dacitic in composition, although the strong sericite-calcite alteration would normally decrease SiO₂, suggesting a dominant fragment population of rhyodacitic or rhyolitic composition.

SAMPLE NUMBER: 032757A 770m

SUMMARY:

This rock was a glassy plagioclase-phyric dacitic lava that developed weak flow banding due to variable devitrification and crystallization of the devitrified glass.

HAND SPECIMEN:

This is a massive, weakly flow-banded plagioclase-phyric felsic lava with patchy alteration and common calcite and quartz veins.

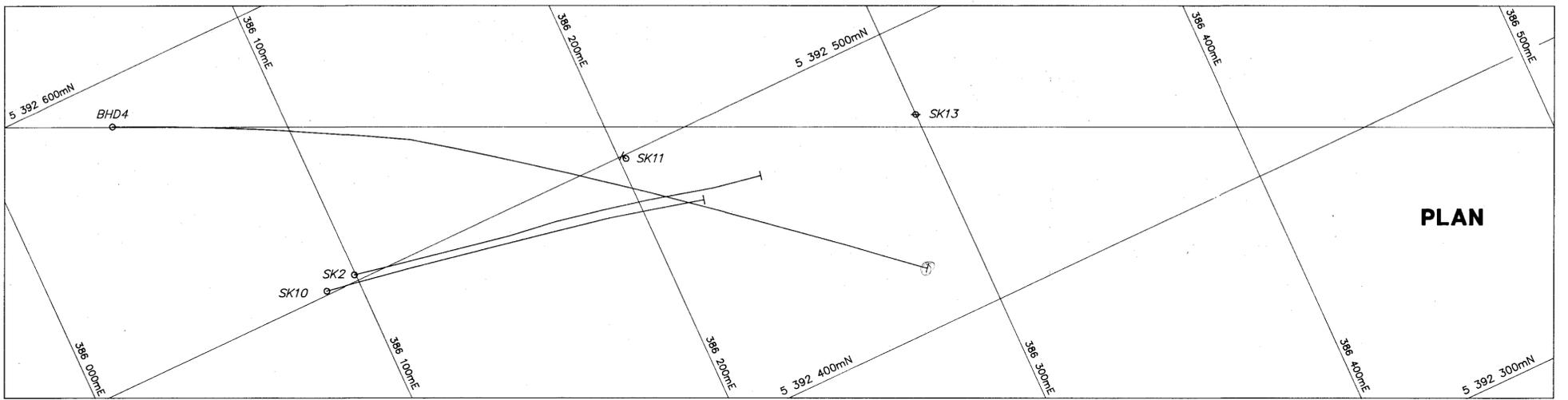
THIN SECTION:

This is a petrographically simple and texturally well-preserved plagioclase-phyric felsic lava. It consists of around 3-5 modal% of blocky albitized plagioclase euhedra, often with lines of chloritized melt inclusions, in a formerly glassy groundmass. The plagioclase phenocrysts are mainly less than 1mm long, only weakly sericitized and commonly occur in multi-crystal clots. A few small former augite phenocrysts are altered to green chlorite, and small leucoxene-altered FeTi oxide grains are not uncommon.

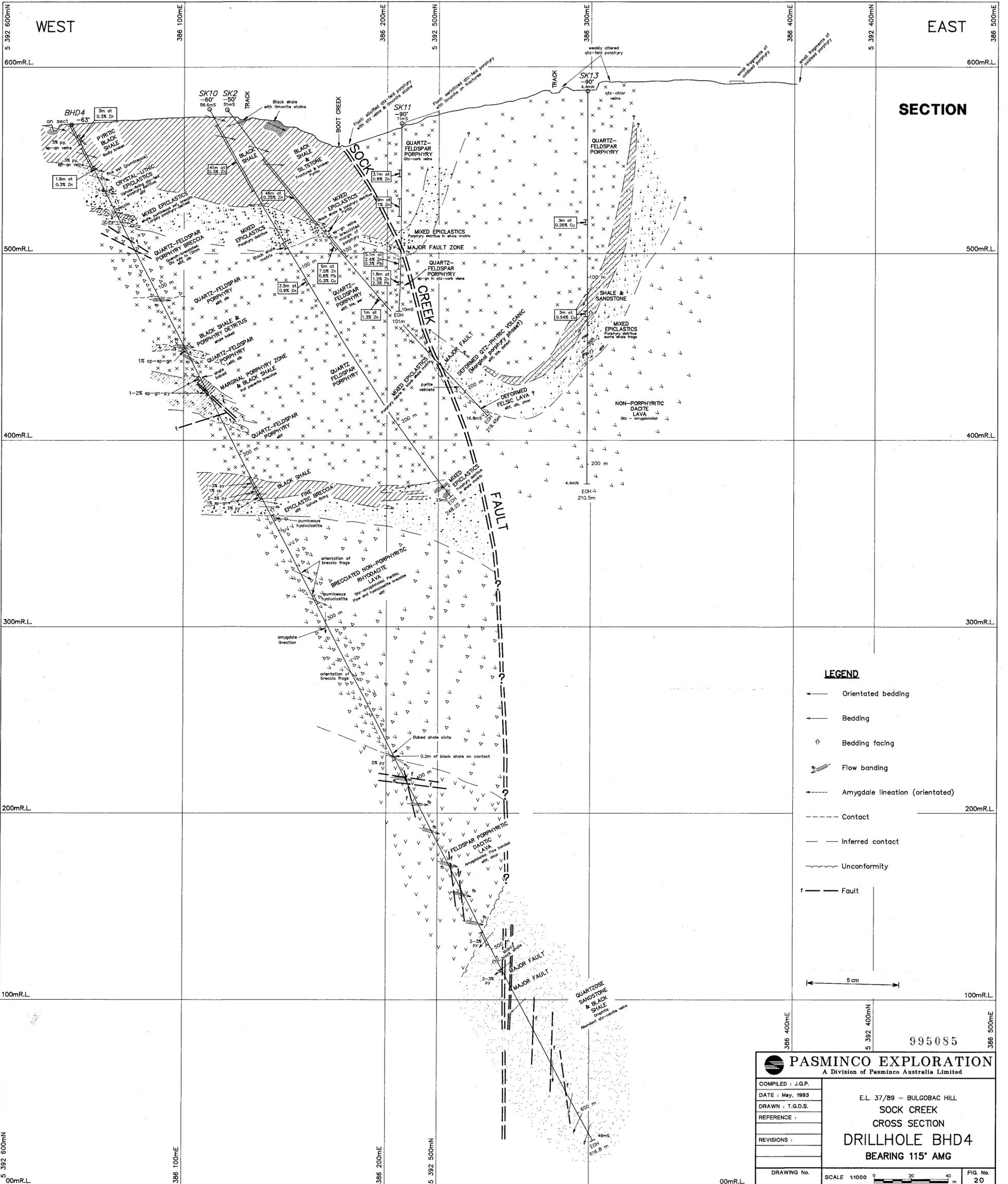
The groundmass of this rock was entirely glassy. It has variably devitrified then crystallized, to produce the banding evident in the hand specimen. Most of the groundmass consists of an even-textured quartz-feldspathic mosaic after glass, with sericite and minor chlorite in the interstices between the blebby quartz and feldspar. Less chloritic and finer-grained bands are lighter in the hand specimen. Alteration is weak compared with most of the samples in this set. Quartz veins composed of relatively coarse-grained polygonal quartz and minor calcite are overprinted in places by later calcite patches and veinlets.

This was a glassy plagioclase-phyric dacitic or rhyodacitic lava, as indicated by the petrography and supported by the analysis provided. It is identical petrographically to the flow-banded dacites in the lower section of Placer holes 1 and 5 further north, and is compositionally very similar to these same rocks.

FIGURES



PLAN



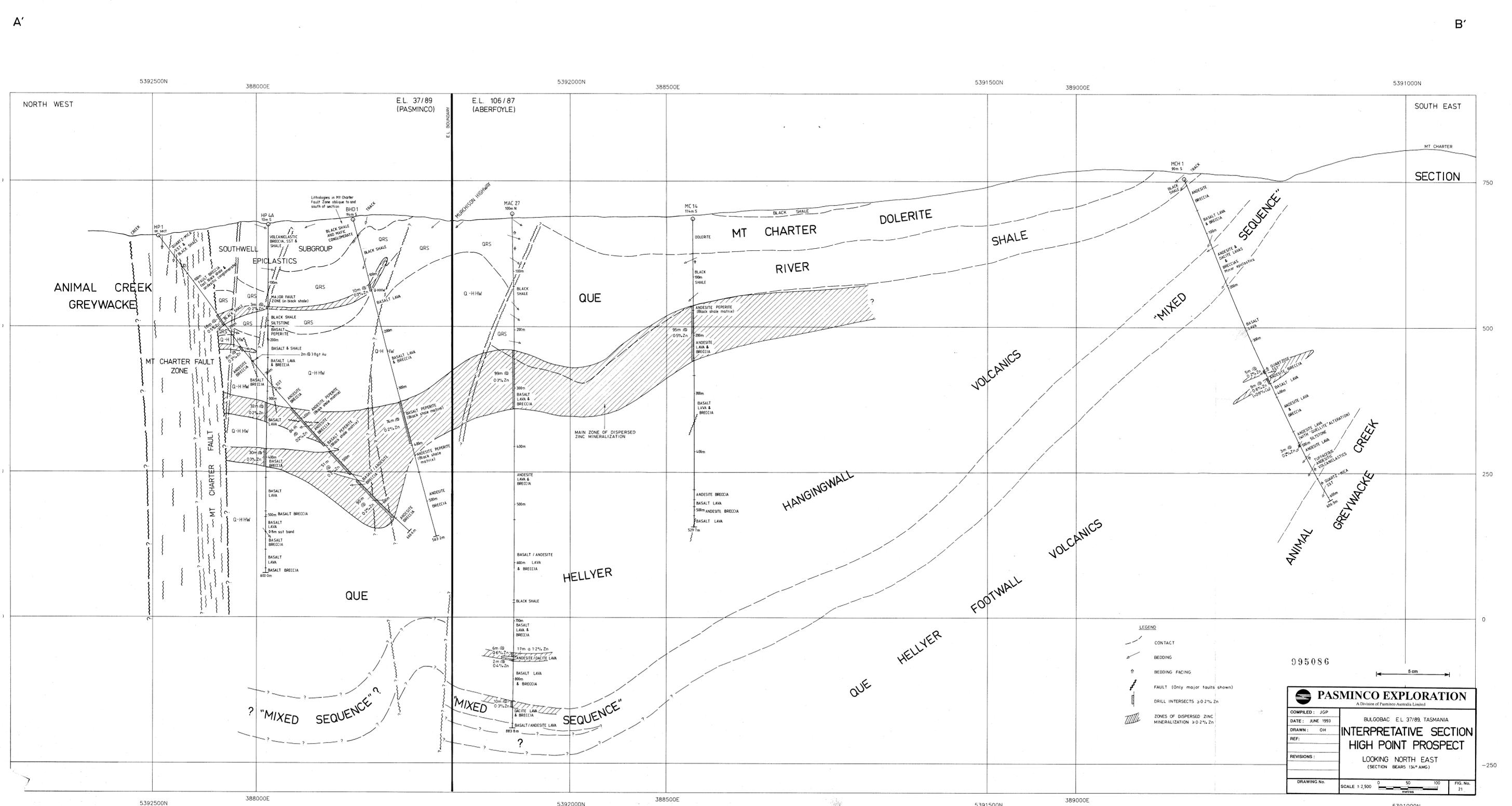
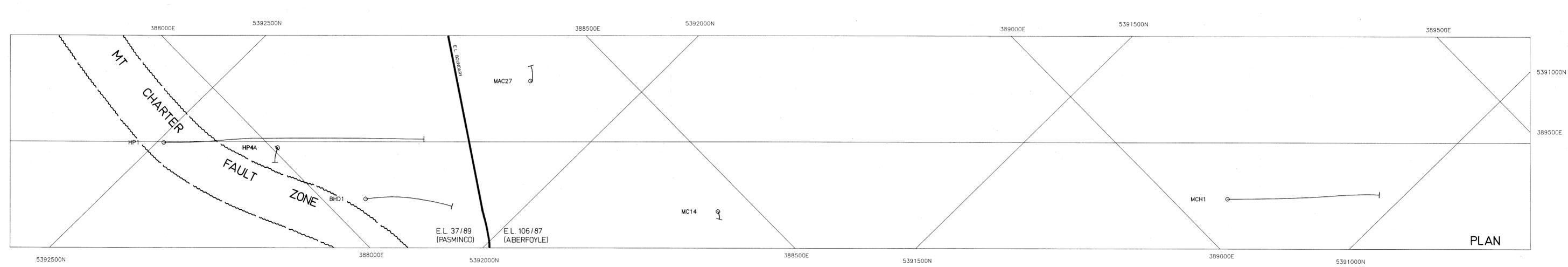
SECTION

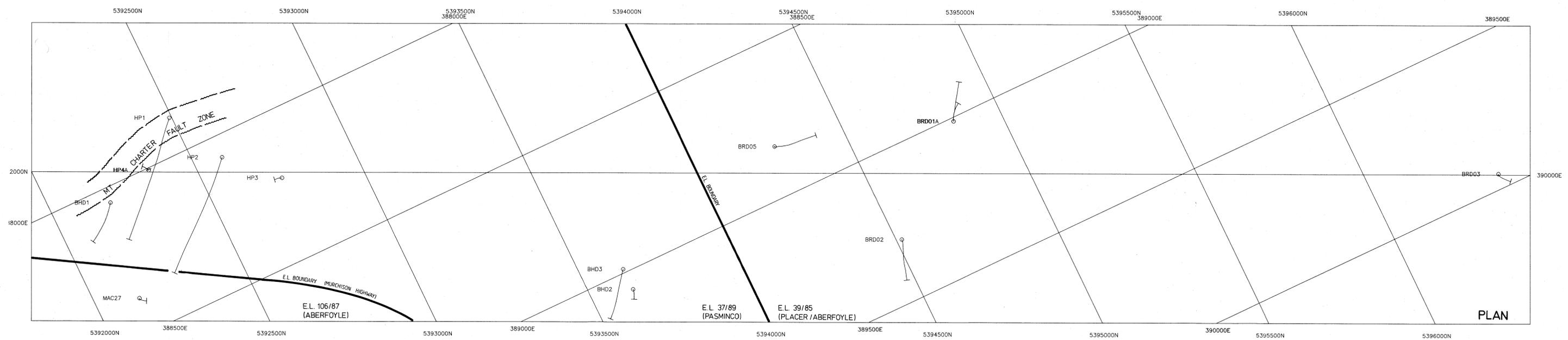
LEGEND

- Orientated bedding
 - Bedding
 - ↑ Bedding facing
 - ▨ Flow banding
 - Amygdale lineation (orientated)
 - Contact
 - - - Inferred contact
 - ~ Unconformity
 - f Fault
- 5 cm

995085

<p>PASMINCO EXPLORATION A Division of Pasminco Australia Limited</p>	
COMPILED : J.G.P. DATE : May, 1993 DRAWN : T.G.D.S. REFERENCE : REVISIONS :	E.L. 37/89 - BULGOBAC HILL SOCK CREEK CROSS SECTION DRILLHOLE BHD4 BEARING 115° AMG
DRAWING No.	SCALE 1:1000
	FIG. No. 20

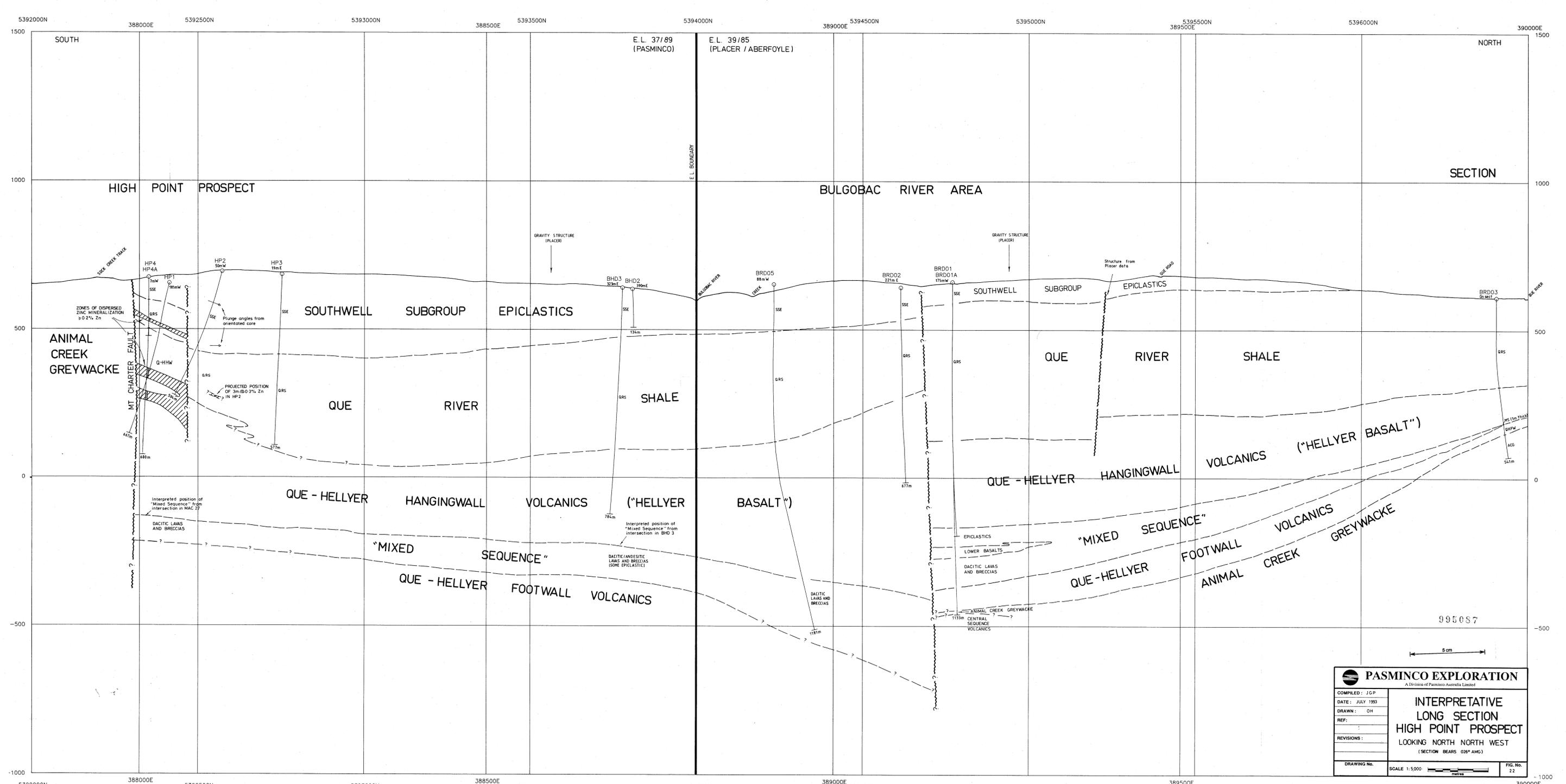




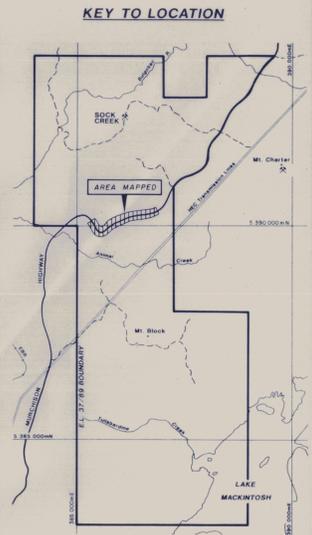
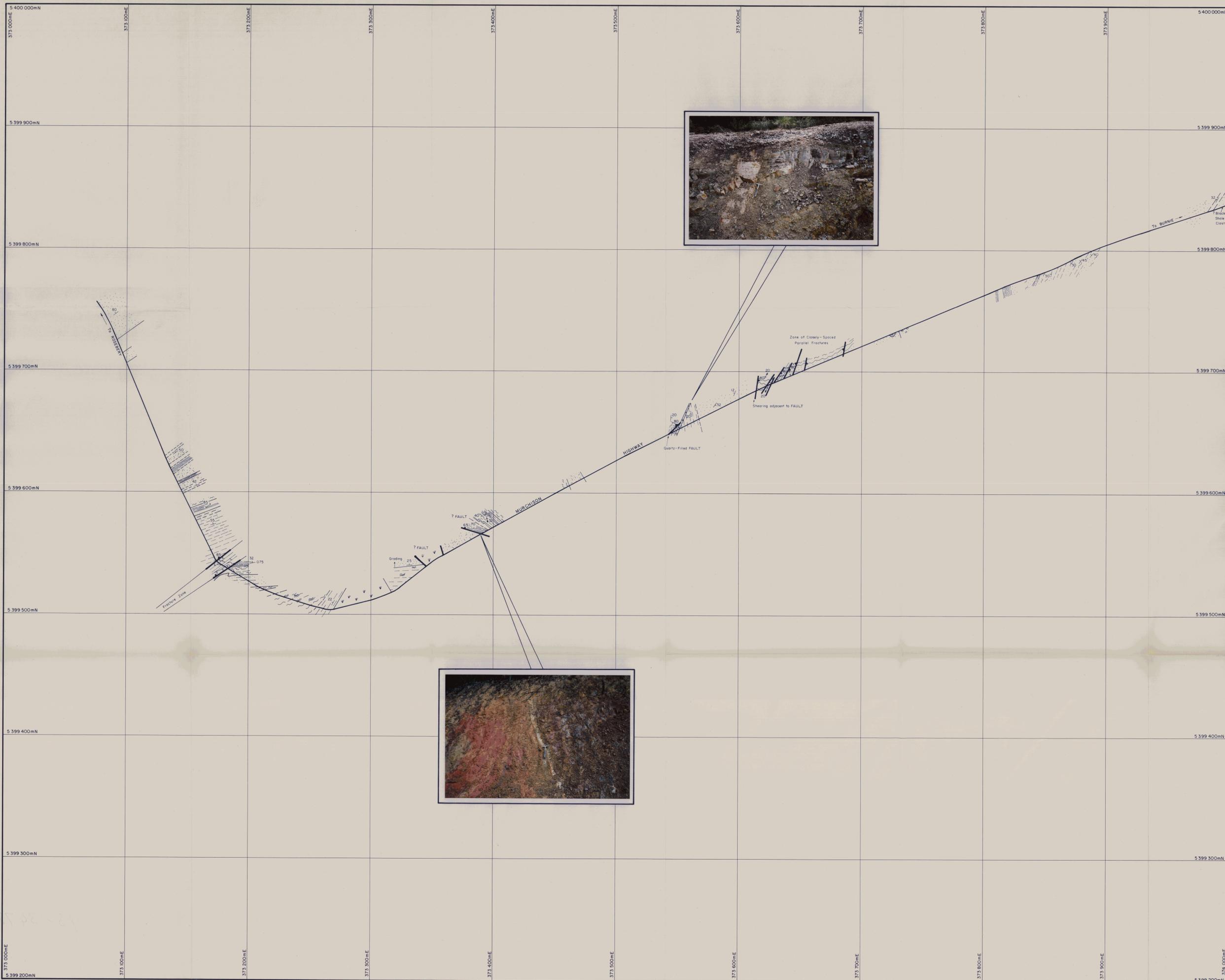
PLAN

C'

D'



PASMINCO EXPLORATION <small>A Division of Pastco Australia Limited</small>	
COMPILED: JGP	INTERPRETATIVE LONG SECTION HIGH POINT PROSPECT LOOKING NORTH WEST <small>(SECTION BEARS 026° AMG)</small>
DATE: JULY 1993	
DRAWN: OH	
REF:	
REVISIONS:	
DRAWING No. 995087	FIG. No. 22



LEGEND

	FLUVIO-GLACIAL DEPOSITS
	MAFIC INTRUSIVE
	BLACK SHALE
	SILTSTONE/SHALE
	BRECCIA (SEDIMENT) WITH SERICITIC (OR VITRIFIED) VOLCANIC FRAGMENTS
	SANDSTONE WITH VOLCANIC (CLEAR) QUARTZ
	SANDSTONE WITH MICA
	SANDSTONE
	FAULT



PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPLETED: A.N.L.
DATE: NOV 1992
DRAWN: N.W.D.S.
REF:
REVISIONS:

EL. 37/89 BULGOBAC HILL AREA
MAPPING ALONG NEW SECTION OF THE MURCHISON HIGHWAY

DRAWING NO. 23
SCALE 1:1000

386000E

387000E

388000E

389000E

390000E

41°39'00"S

41°40'00"S

41°41'00"S

41°42'00"S

AIRBORNE SURVEY SPECIFICATIONS

AIRCRAFT : Squirrel Helicopter
MAGNETOMETER : SCINTREX cesium vapour optical absorption mounted on a bird
Sensitivity : 0.05 nT

5388000N RECORDING INTERVAL : 0.1 sec
NOMINAL TERRAIN CLEARANCE : Sensor in towed bird at 80 m
SPECTROMETER : Nuclear Data 256 channel ADC
Volume : 16.8 litres

TOTAL COUNT WINDOW : 0.4 - 3.00 MeV
POTASSIUM WINDOW : 1.35 - 1.57 MeV
URANIUM WINDOW : 1.63 - 1.89 MeV
THORIUM WINDOW : 2.42 - 2.82 MeV

RECORDING INTERVAL : 1.0 sec
DATA RECORDING : Geotrex MADACS acquisition system
Digital to magnetic tape
Detectors in aircraft at 110 m

NOMINAL TERRAIN CLEARANCE : Traverse lines 100 m
NOMINAL LINE SPACING : Tie lines 1.0 km

FLIGHT PATH NAVIGATION : SERCEL NR103 GPS and SERCEL NDS100
UHF DGPS navigation system
real time from UHF DGPS system
corrected for selected availability

FLIGHT PATH

Grid notation refers to Australian Map Grid Zone 55
Navigation file 32768

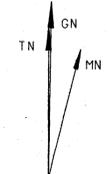
5387000N

5386000N

5385000N

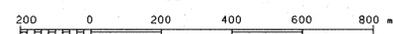
5384000N

5383000N



Grid Convergence = 0.89°
Declination = 13.20°

SCALE 1:10000



5 cm



JOB NO : 3-446
Surveyed by GEOTREX PTY LTD : March 1993
Compiled by GEOTREX PTY LTD, SYDNEY
Processed by GEOTREX PTY LTD, SYDNEY

995089

PASMINCO EXPLORATION

LAKE MACKINTOSH EL 37/89

FLIGHT PATH

BURNIE SK55-3

SHEET 1 OF 1

Figure 24

DRAWING NO :

DATE : 13-MAY-1993

145°37'30"E

145°38'00"E

145°39'00"E

145°40'00"E

145°41'00"E

386000E

387000E

388000E

389000E

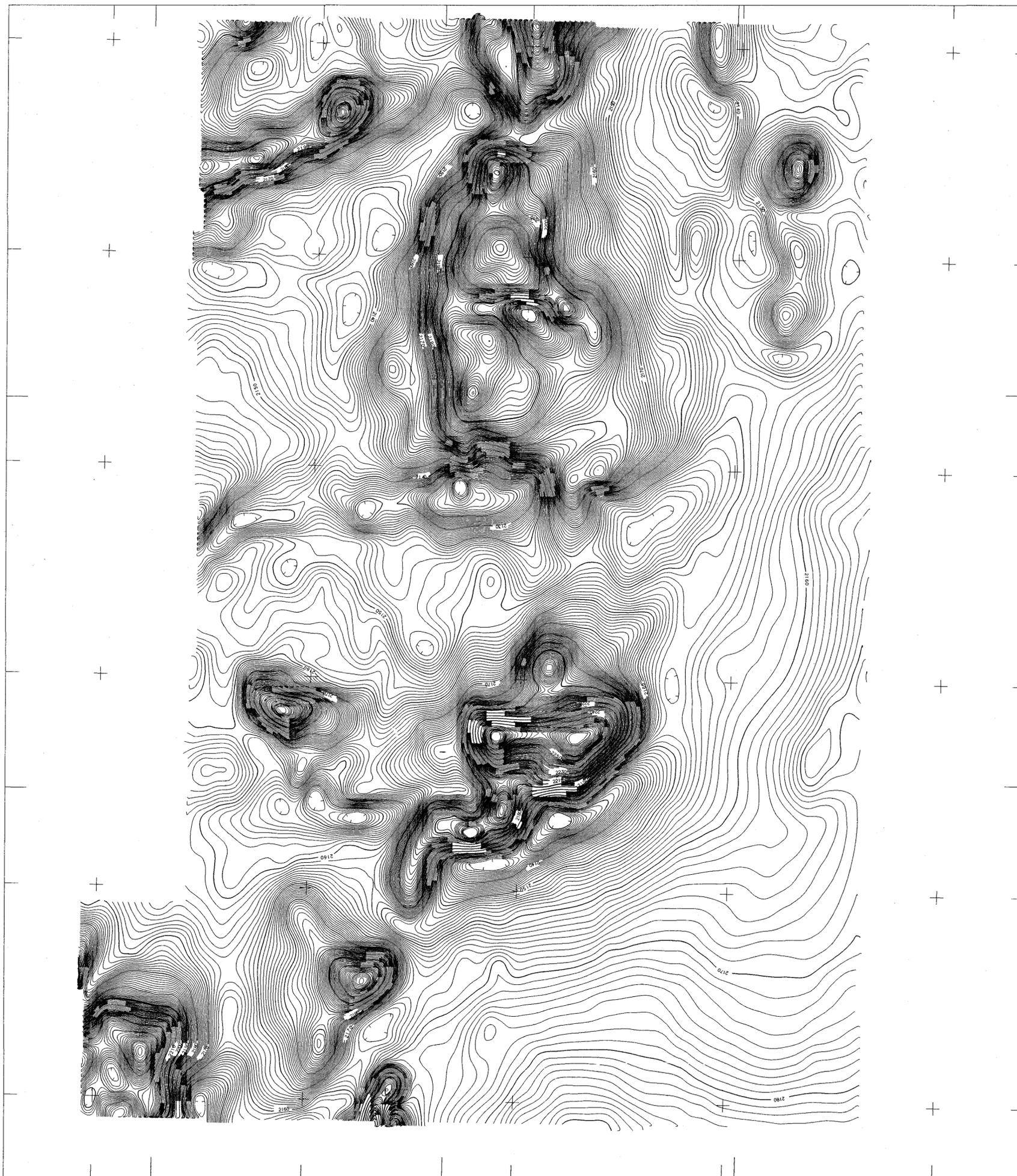
390000E

41°39'00"S

41°40'00"S

41°41'00"S

41°42'00"S



AIRBORNE SURVEY SPECIFICATIONS

5388000N

AIRCRAFT : Squirrel Helicopter
MAGNETOMETER : SCINTREX cesium vapour optical absorption mounted on a bird
Sensitivity : 0.05 nT
0.1 sec
RECORDING INTERVAL : Sensor in towed bird at 80 m
NOMINAL TERRAIN CLEARANCE : Nuclear Data 256 channel ADC
SPECTROMETER : Volume : 15.8 litres
TOTAL COUNT WINDOW : 0.4 - 3.00 MeV
POTASSIUM WINDOW : 1.35 - 1.59 MeV
URANIUM WINDOW : 1.63 - 1.89 MeV
THORIUM WINDOW : 2.42 - 2.82 MeV
RECORDING INTERVAL : 1.0 sec
DATA RECORDING : Geotrex MADACS acquisition system
Digital to magnetic tape
Detectors in aircraft at 110 m
NOMINAL TERRAIN CLEARANCE : Traverse line 100 m
NOMINAL LINE SPACING : Line line 1.0 km
FLIGHT PATH NAVIGATION : SERCEL NR103 GPS and SERCEL NDS100
UHF DGPS navigation system
FLIGHT PATH RECORD : real time from UHF DGPS system
corrected for selected availability

RESIDUAL MAGNETIC CONTOURS

5387000N

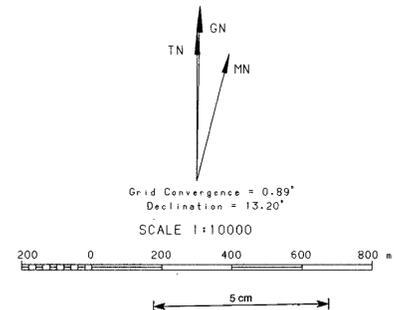
Grid notation refers to Australian Map Grid Zone 55
Magnetic : Diurnal removed, line-line levelled
IGRF : 1990 model (updated for secular variation to March 1993) removed, datum 2000 m added
Total Field : 62154 nT (at 414000E, 1454000E)
Inclination : 75 degrees S
Declination : 13.2 degrees E
Grid mesh size : 25 x 25 metres
Grid filler : None
Contour interval : 1, 10 and 100 nT

5386000N

5385000N

5384000N

5383000N



JOB NO : 3-446
Surveyed by GEOTERREX PTY LTD : March 1993
Compiled by GEOTERREX PTY LTD, SYDNEY
Processed by GEOTERREX PTY LTD, SYDNEY

995090

PASMINCO EXPLORATION
LAKE MACKINTOSH EL 37/89
RESIDUAL MAGNETIC CONTOURS
BURNIE SK55-3
SHEET 1 OF 1

Figure 25

DRAWING NO: DATE : 26-MAY-1993

145°37'30"E

145°38'00"E

145°39'00"E

145°40'00"E

145°41'00"E