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PROGRESS REPORT E.L. 27/76

ELLIOTT BAY SOUTH WEST TASMANIA

1980-1981 FIELD SEASON

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DEVONPORT,

OCTOBER, 1981

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INTRODUCTION

1. Exploration Licence 27/76 was granted to Geopeko in January 1977. The E.L. occupies an area of 329 square kilometers and is centred on the Elliott Bay area of South-West Tasmania (figure 1).

Progress on Geopeko's exploration of the area has been reported by Strickland (1978, 1979) and by Large (1981). This report details the exploration which was completed during the field season from December 1980 to April 1981. During this period field operations were run from a semi-permanent field camp which was established at the edge of the forest some 2km SSW of Wart Hill (AMG 379 750E, 5 250 800N). The camp was located in a central position to the areas of geological interest which had been defined in the course of the previous season's exploration (Large, 1981). Field personnel at the main camp ranged from between 8 and 18, in addition to 2-3 people based in a mobile drilling camp. The centralisation of the camp enabled all the field work to be carried out on foot by personnel walking to their respective work areas. Heavy vehicles were used only for auger soil sampling and transporting bulky geophysical equipment. Vehicle tracks were therefore kept to an absolute minimum.

The exploration program consisted of:

1. Drilling of two 200m diamond drill holes on geophysical/ geochemical targets defined in the preceeding season. A third 'stratigraphic' hole was drilled to 100m and is to be completed in the forthcoming field season.

2. Approximately 80 line km of grids was surveyed over areas of geological interest in the Wart Hill Pyroclastics.

3. Collection of some 2200 C horizon soil samples by Jacro power auger or hand auger at 25m intervals along the grid lines.

4. A panned concentrate stream sampling program was completed and covered an area of 12 sq km with an effective sample density of 10 per sq km.

5. Detailed geological mapping (1:2500 scale) on all the grids.

6. Reconnaissance (1:10 000 scale) geological mapping and stream sediment sampling (density 8 samples per sq km) were completed over the western portion of the E.L. over an area of 12 sq kms.

7. Geophysical surveys were completed on all the grids.

Technique	Quantity
Magnetics	38 line km (12.5m stations)
IP gradient array	44 line km
IP Dipole-Dipole	8.4 line km (a=50m)
SP	3.4 line km (25m centres)
MST EM	3.2 line km (25m centres)
Gravity	1.75 line km (90 stations)

8. Six shallow costeans were manually excavated across soil geochemical anomalies and totalled 150m,

9. Plotting of all results, compilation of geological maps drafting of plans and reporting.

Expenditure for the year ending June, 1981 is presented in a graphical format (figure 2) to illustrate the seasonal component of the field operations. A breakdown by principal cost category is presented in Table 1.

SUMMARY OF PROGRESS AND TARGET PRIORITY FOR THE 1981 - 1982 FIELD SEASON VOYAGER PROSPECTS

PRIORITY ORDER	PROSPECT	DEFINITION	STYLE OF MINERALIZATION	RESULTS	FUTURE WORK
1	V19	. Large alteration zone . Anomalous rock chip samples	. Stratiform Cu-Pb-Zn-Ag	. Good Pb-Zn anomalies . Massive galena-sphalerite mineralization discovered	. Detailed gravity . Drill 6 holes 1000m total
2.	V24	. Au drainage anomaly	. Vein or porphyry gold in rhyolite agglomerates	. Anomalous gold in streams traced to quartz veins within sulphide-bearing agglomerates and volcanics	. Deepen V24-1 by 100m . Bank sampling to locate source . Drill one more hole 200m
3	V9	. Alteration zone . Aeromagnetic anomaly	. Disseminated Cu-Au	. Cu soil geochem . Coincident Pb-Zn/IP anomaly	. Reconnaissance gravit . Drill Pb-Zn/IP anomal . Drill magnetic anomal
4	V31	. Favourable stratigraphic setting top of volcanic sequence west of V19	. Stratiform or vein type Cu-Pb-Zn-Ag-Au	. Pyrite-galena-sph mineralization located during reconnaissance	. Mapping . Rock chip sampling . Gridding . Soil sampling
5	V22	. Alteration zone east of Osmund Syncline	. Stratiform Pb-Zn-Cu-Ag (Au)	. Pb-Zn-Ag soil geochem . Anomalous rock chip samples	. Mapping . Infill gridding . Costeaning
6	V29	. Southerly strike of V19 west flank of Osmund Syncline	. Stratiform Cu-Pb-Zn-Ag-Au	. Pb-Zn-Ag soil geochem	. Infill gridding . Soil sampling . Selective gravity . Costeaning
7	V33	. Northern strike continuation of V19	. Stratiform Cu-Pb-Zn-Ag	. None	. Mapping . Rock chip sampling . Gridding
8	V30 (V24S)	. Au drainage anomalies	. Vein of porphyry gold	. Au in pan con . Cu Pb Zn anomaly	. In-fill gridding . Dipole-Dipole IP . Jacro sampling
9	V16	. Aeromagnetic anomaly . Pb Zn drainage anomaly	. Disseminated Cu-Au?	. Au drainage anomaly . Cu-Pb-Zn soil anomaly	. Bank sampling . In-fill gridding . Mapping . Soil sampling . IP
10	V20	. Gossanous zone . Pb-Zn stream anomaly	. Stratiform Pb-Zn-Cu	. Anomalous Pb-Zn-Ag in rock chips	. Gridding . Mapping . Soil sampling
11	V32	. Sedimentary-volcanic interface north of V3	. " "	. Pb-Zn in rock chips, gossanous fragments	. Gridding . Mapping . Soil sampling
12	V26	. Airborne EM anomaly	. Cu - dolomite	. Gridding and soil sampling completed	. MST survey

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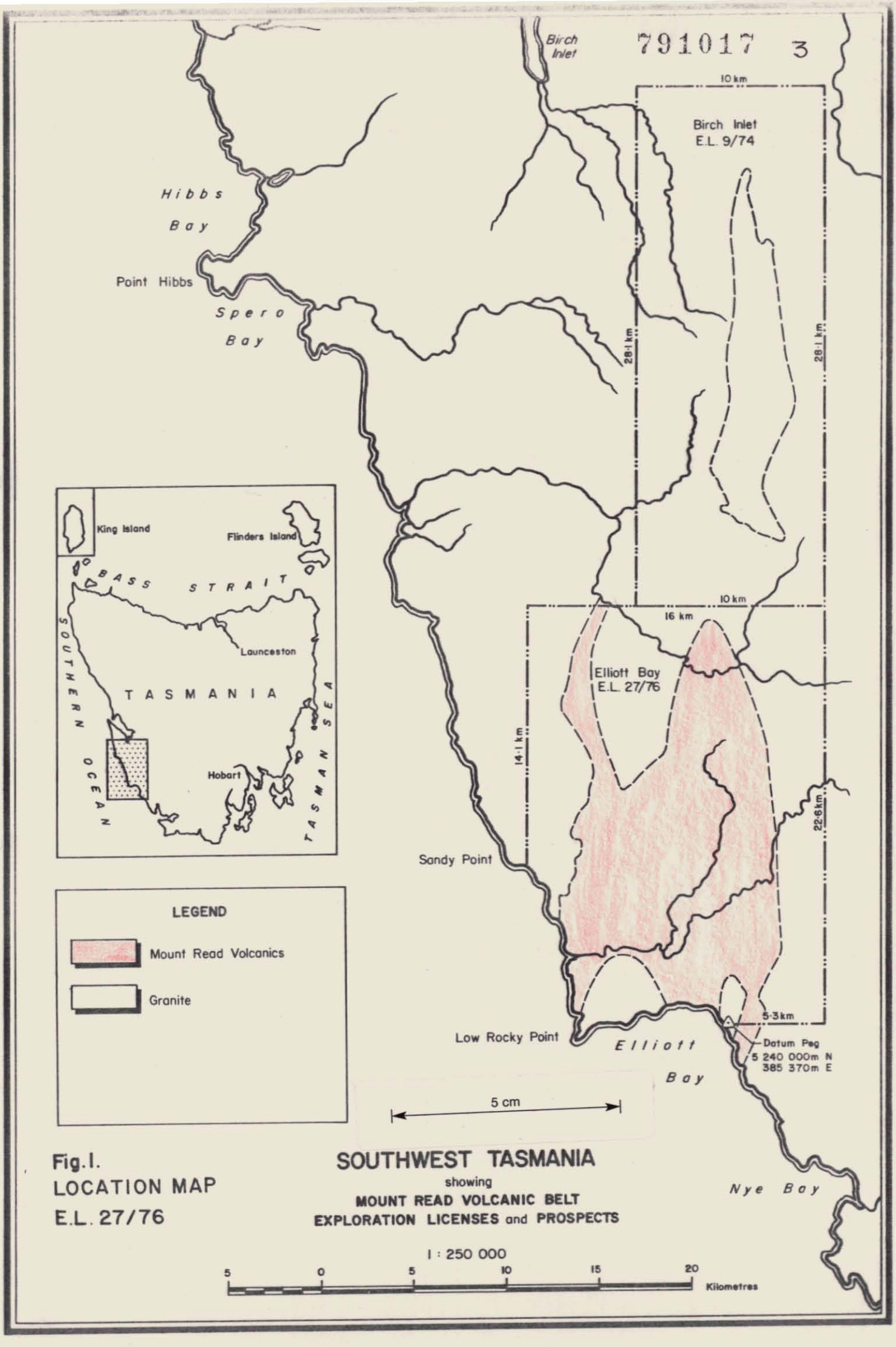

Fig.1.
LOCATION MAP
E.L. 27/76

SOUTHWEST TASMANIA
showing
MOUNT READ VOLCANIC BELT
EXPLORATION LICENSES and **PROSPECTS**

TABLE 1 EXPENDITURE INCURRED DURING THE 1980 - 1981 FIELD SEASON

Category		% of Total
Professional Salaries	$49 150.00	10.3
Field Hand Wages	$46 127.00	9.7
Vehicles	$13 588.00	2.8
Freight Charges	$ 1 679.00	0.35
Contractors*	$36 503.00	7.6
Maintenance	$247.00	-
Field Sustenance	$15 667.00	3.3
Field Supplies, Equipment	$19 246.00	4.0
Geology	$5 531.00	1.16
Survey Gridding	$14 811.00	3.11
Geochemistry	$48 526.00	10.2
Drafting	$19 656.00	4.13
Drilling Diamond	$49 621.00	10.4
Soil Auger	$4 320.00	0.9
Tenement Expenses	$3 224.00	0.68
Management Charges	$45 557.00	9.6
Indirect Costs	$42 523.00	8.9
TOTAL EXPENDITURE	$476 232.00	

* Dominantly helicopter and light aircraft support.

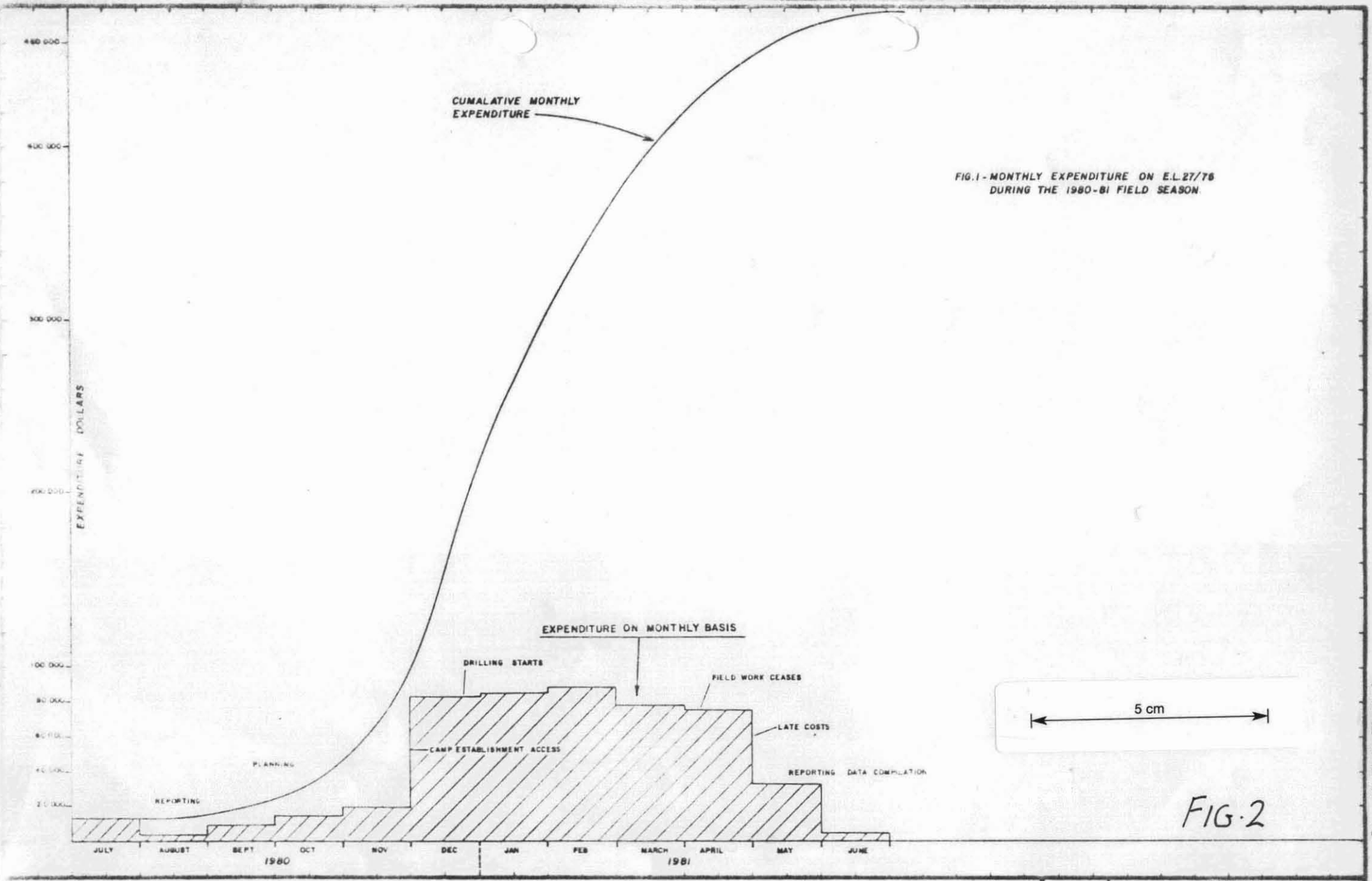

FIG.1 - MONTHLY EXPENDITURE ON E.L.27/76 DURING THE 1980-81 FIELD SEASON.

FIG·2

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DEVONPORT BASE, TASMANIA

E.L.27/76 ELLIOTT BAY, TAS.
EXPENDITURE

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REPORT FORMAT

Exploration of E.L. 27/76 has resulted in the recognition of 28 principal areas of interest which have been designated VOYAGER PROSPECTS. This notation whilst useful in the field, can precipitate confusion to the reader unfamiliar with the area. Since the system is based on the chronological order of discovery it does not neccesarily conform to anomaly type or geological environment. Therefore, and for the purpose of this report, the Voyager nomenclature will be adhered to but the report will consider three prospective lithostratigraphic environments which occur as three N-S oriented belts in the E.L. These are shown in fig 3 and have been described in detail by Large 1981. A brief summary is given below;

The Mainwaring Group - of basic volcanics, conglomerates and argillites which outcrop on the western boundary of the E.L.

The Wart Hill Pyroclastic Formation

- a sequence of rhyolitic pyroclastics, acid lavas and with thin arenaceous sedimentary horizons. Their outcrop occupies a median position in the E.L. They are conformably overlain by the Mainwaring Group to the west and unconformably by the Ordovician sediments in the north.

The Hudson River Volcanic Formation

- a thick sequence of chloritic pyroclastics and lavas with thick interbeds of arenaceous sediments. They outcrop on the eastern margin of the E.L. and probably underlie the Wart Hill Pyroclastics.

(Units 2&3 collectively comprise the Lewis River Volcanic Group.)

Gold exploration, although in effect confined to the Wart Hill Pyroclastics, is treated under separate coverage in the final part of this report.

It is hoped that this approach will illustrate the important similarities between the Voyager prospects which fall within these three environments and emphasise in particular, the economic importance of the contact between the Wart Hill Pyroclastics, and the overlying Ordovician strata.

Field work involved the collective effort of five field geologists engaged on the numerous projects and this is reflected in the reporting:

Section	Author
Gold exploration (V24, V30)	R.R. Large
V3 grid geology and regional	P. Heithersay
V29, V31, V30	W. Herrmann
V19 geology	W. Herrmann
Western portion of E.L. (Mainwaring Group)	R. Poltock
Remainder of the report, compilation and editing (V9, V3, V22, V19, V26 V16)	P.A. Wilson

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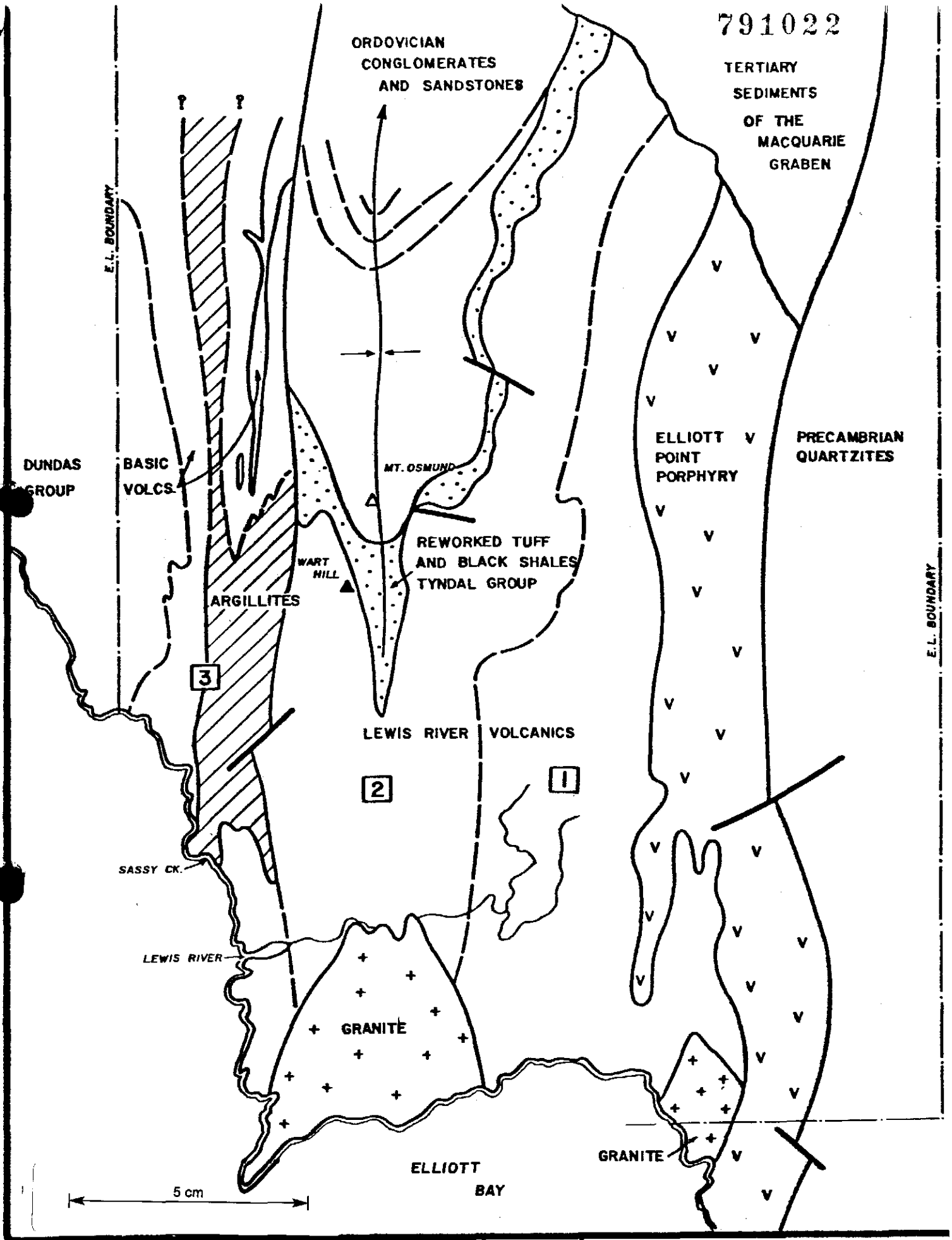

LEGEND:

Generalized geological map of E.L.27/76 showing the:

- 1 Hudson River Volcanics
- 2 Wart Hill Pyroclastics
- 3 Mainwaring Group

GEOPEKO

SCALE 1:100 000

Fig. 3

ELLIOTT BAY

E.L. 27/76

GENERALISED GEOLOGICAL MAP.

2. EXPLORATION OF THE HUDSON RIVER VOLCANICS

2.1 INTRODUCTION - PREVIOUS WORK

Rocks which are assigned to the Hudson River Volcanics outcrop along a 1-5km wide northerly trending belt which extends from Elliott Bay to the Wanderer River, some 18km to the north (fig 3). The eastern boundary of the Hudson River Volcanics is marked by the Elliott Point porphyry, a distinctive coarse-grained quartzo-feldspathic biotite porphyry. In the southern portion of the E.L. the Hudson River Volcanics occupy a 5 km wide coastal belt which is bounded by the Lower Rocky Point granite to the west and the aforementioned porphyry to the east.

In the main, they are a sequence of acid pyroclastics and lavas with an overall rhyolite-dacite composition. According to Large (1981) they differ from the Wart Hill Pyroclastics due to the greater abundence of true tuffaceous sedimentary units and their higher chlorite content. Some problems are encountered with the precise location of the boundary of this unit with the Wart Hill Pyroclastics and indeed whether there is sufficient justification for this bipartite subdivision of the Lewis River Volcanics. The older age of the Hudson River Volcanics is assumed on the grounds that the stratigraphy at Elliott Bay is upward facing and youngs progressively to the west.

The intercalations of true sedimentary depositional cycles with periods of volcanicity suggests a good potential for distal (Rosebery style) Cu-Pb-Zn-Ag stratiform mineralization. Previous exploration by Geopeko has resulted in the recognition of nine anomalous areas, defined by airborne geophysical surveys, stream sediment sampling and geological mapping (Large 1981).

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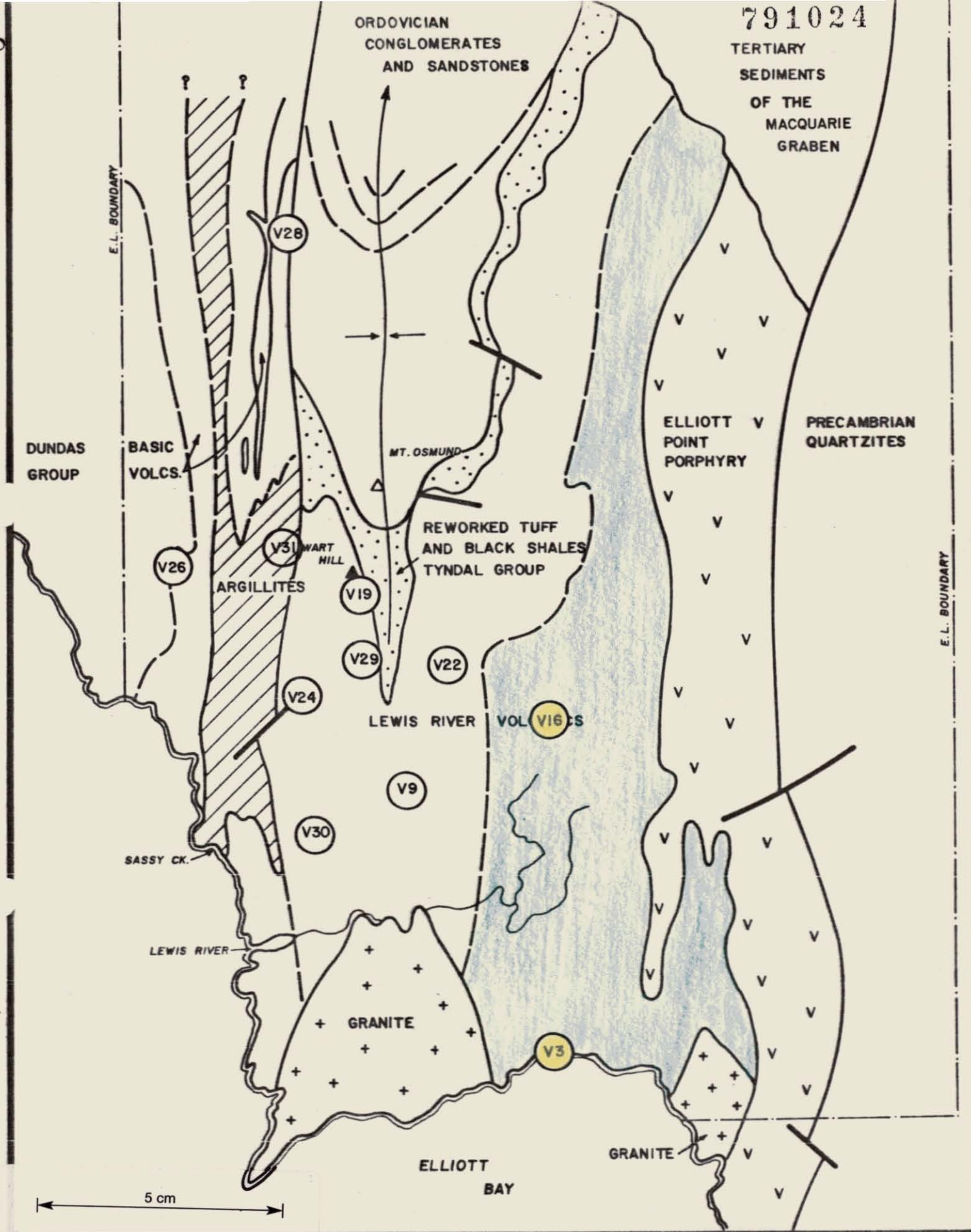

LEGEND:

Generalized geological map of E.L.27/76 showing:

e.g., (V9) Location of Voyager 9

DISTRIBUTION OF THE HUDSON RIVER VOLCANICS

DATE: 30/10/81
GEOL: W.H, PAW
DWN: R.TOG.
CHKD:

GEOPEKO

SCALE 1:100 000

Fig. 4

ELLIOTT BAY
E.L. 27/76
VOYAGER LOCATION MAP.

Category	Voyager Designation
AEM anomaly	V4
Aeromagnetic anomaly	V16
Old prospects	V2, V3
Drainage anomalies	V8 (Sn in Tertiary gravels)
	V10, V25, V27, (all Pb-Zn) & V12

All of these anomalies have been the focus of detailed follow up work, the findings of which are summarised in earlier reports. Exploration in the area during the 1980-1981 field season concentrated at two different levels and included both prospect development and regional investigations (fig 4).

Voyager 3	Drilling of one 200m hole on a coincident IP, lead soil anomaly.
Voyager 16	Gridding, geochemical sampling and magnetics over a major aeromagnetic anomaly.
Voyager 3 - Voyager 10	Geological mapping and appraisal of the sediment volcanic interface as a locus for mineralization, in an area extending from the coast to the Lewis River.

2.2 THE GEOLOGY OF THE SOUTHERN PART OF THE HUDSON RIVER VOLCANICS

i) Introduction

The southern part of the Hudson River Volcanics were re-examined with the primary objective of assessing their potential as host rocks for stratabound Cu-Pb-Zn-Ag-Au mineralization of 'Rosebery' style. Particular attention was given to the relationship between the sedimentary units which had been mapped on the coastline and again on the Voyager 2 grid, some 3-4 kms further north. The investigation took the form of a geological mapping and a rock chip sampling programme. As part of this study the Voyager 3 grid and coastal sections were mapped at 1:2500 scale and the area between the Lewis River and Elliott Bay was mapped at 1:10,000 scale on the enlarged aerial photos (plans 1-2).

ii) Generalised Stratigraphy of the Coastal Section

Before discussing stratigraphy the point should be made that the area has been subject to several phases of deformation. This complexity makes definite conclusions about the true vertical stratigraphy difficult to make. However, graded bedding and rare cross-stratification in the sediments indicate that the consistently west dipping sequence also faces to the west.

An arbitrary base to the Hudson River Volcanics is taken to be the Elliott Point Porphyry. Within the porphyry, xenoliths of altered volcanics were recognised, suggesting that the porphyry may represent a sub-volcanic intrusion genetically related to the overlying acid pyroclastics and lavas. Veins of quartz, chlorite with pyrite and minor chalcopyrite were noted in outcrops of the porphyry on the coast.

Immediately overlying the porphyry is a conspicuous fine grained to coarse grained chloritic quartz crystal tuff. Manganese and iron staining are common in the tuffs as are fractures coated with malachite. Grain size changes frequently with visible gradational boundaries indicating rapid facies changes.

A sharp contact marks the volcanic/sediment interface. The base of the sedimentary sequence is a fine to medium grained sandstone. The rocks are generally finely laminated with graded bedding being common. Minor current features include scour and fill structures and trough cross stratification. Dewatering structures were also noted.

The sequence shows an overall fining upwards so that very fine grained siltstones predominate at the top of the sequence with some minor tuff beds intercalated. The sediments are generally arenaceous with no argillaceous beds occurring in the sequence, the sand grains are angular to well rounded.

This type of sediment is consistent with a moderate to high energy depocentre which allowed winnowing and reworking to occur. An acid pyroclastic terrain as a source is most likely for these sediments.

A gradational contact with the overlying pyroclastics marks the top of the sequence. These pyroclastics are lithologically different to those encountered below the sediment pile. They are generally more felsic show a greater variation in grain size and range in composition from fine grained quartz feldspar crystal tuffs to lithic tuffs. They have a variable chlorite content which occurs as thin wisps in the groundmass. Malachite is again seen in fractures. Some outcrops develop a limonitic capping while others exhibit fine veinlets of pyrite and galena.

Two 4m wide basic dykes occur near the western end of the sequence.

Complex isoclinal folding is displayed in the pyroclastics near Barrel Creek. Jointing further complicates the picture. The small scale isoclinal folds have an axial plane which trend 165°/85W. However at least one other cleavage is superimposed on this trend. Large scale closures are rarely seen. The overall impression is that the sequence dips consistly to the west. There is only minor repitition of strata, as indicated by the consistent facings. The indicated vergence from small scale folds and bedding-cleavage relationships indicates a syncline closing to the west and an anticline to the east.

iii) Geology of the Voyager 3 grid

The Voyager 3 grid was remapped at 1:2500 scale (see plan 1). Outcrop was extremely poor so correlation was found impossible. The rock types consisted mainly of felsic fine to medium grained quartz feldspar crystal tuff and felsic vitric tuffs. On the western side of the grid the pyroclastics were conspicuously sericitic. The only possible volcaniclastic sediment was mapped in the north western corner of the grid. It is quite clear that the sequence of sediments that outcrop on the coast do not extend through the V3 grid.

iv) Geology of the area between Voyager 3 and the Lewis River

The region north of Voyager 3 to the Lewis River was reconnaissance mapped at 1:10,000. The area is largely obscured by Tertiary gravels and conglomerates from the Tertiary peneplain surface (plan 2).

The pyroclastics are similar to those encountered on the Voyager 3 grid but are distinctly more chloritic and more schistose in the area south of the Voyager 10 grid. Outcrop is again insufficient to correlate along strike.

The sediment/volcanic interface was picked up 1km north of Voyager 3. The boundary is sharp, being marked by a fine grained white siltstone with graded sandstone interbeds on one side and a generally iron stained chloritic quartz crystal tuff on the other. This interface can be traced confidently northwards to the Voyager 2 area. These sediments are very similar in nature to those described from the coastal section. Graded bedding was the main criteria used for differentiating reworked pyroclastics from primary pyroclastics.

The main structure is a fairly open syncline plunging to the north. This was established by reversal of dip and facing criteria. Several strike/slip faults offset the sediment/volcanic boundary and such faulting may account for the disappearance of sediments on the Voyager 3 grid. On an outcrop scale 2 cleavages can be seen, the main one being at 165/80W and the more subordinate one trending at 190/80-85W.

2.3 VOYAGER 3

i) Introduction and Previous Work

The Voyager 3 grid covers an area of 700m by 900m of low lying southerly sloping button grass plain adjacent to the Elliott Bay coastline in the south of the E.L. (figure 5) Sporadic Cu and Pb mineralization was recorded from coastal outcrops in the course of regional mapping during the 1976-1977 field season. Two areas of particular interest were recognised near Barrell Creek, one of which has been referred to as the Drakes Creek Prospect in earlier reports.

In 1977-1978 a grid was surveyed over the area representing the northerly strike extension of this mineralization.

Subsequent exploration of the grid between the years 1977 and 1979 included C horizon geochemistry, IP, SP, and VLF-EM geophysical surveys and the drilling of two shallow diamond drill holes. This work is comprehensively reported by Mudge (1979) and by Strickland (1978, 1980) and is summarised in figure 5.

The Voyager 3 area represents the southern extremity of the Hudson River Volcanics. Outcrop on the grid area is virtually absent but the presence of a thick sequence of fine arenaceous sediments is inferred from the continuous coastal outcrops. As a consequence the geological control is very poor and explanation of the anomalous geochemical and geophysical patterns is inconclusive. For this reason the 1980-1981 field program was designed for a two-fold purpose.

1. To drill a 200m hole on the best IP/geochem anomaly and:
2. To map the coastal geology of Elliott Bay and extend this inland to include the Voyager 3 grid and northwards towards Voyager 10. (this work has been detailed in the preceeding section 2.2.)

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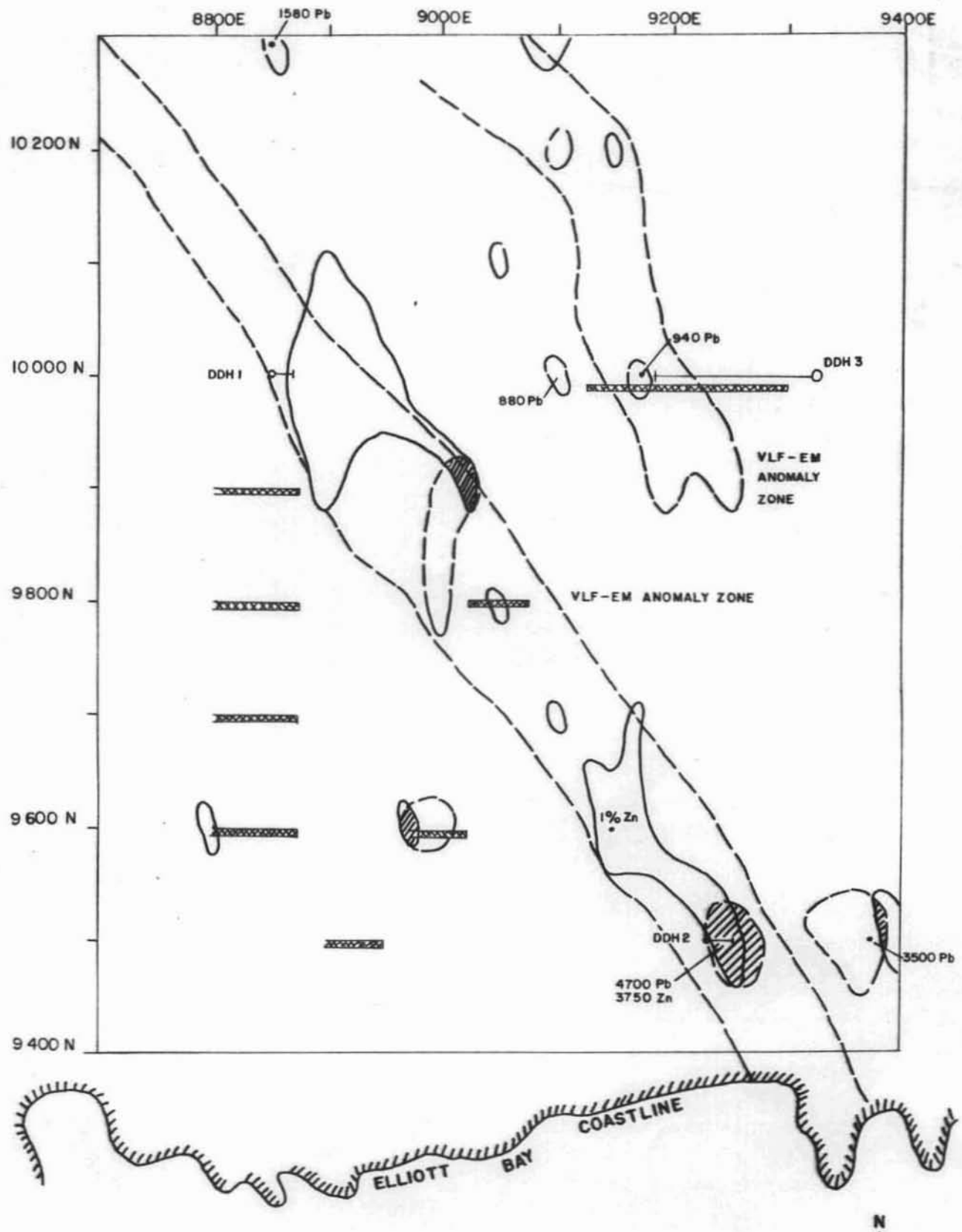


FIG. 5

LEGEND:

- ZINC ANOMALY (>1000ppm)
- LEAD " (>800ppm)
- AREAS OF COINCIDENT Pb–Zn geochemistry.
- IP ANOMALY

DATE:
GEOL: P.W.
DWN: M. vdS.
CHK'D: PW

GEOPEKO

Scale:

Nº K

E.L 27/76 ELLIOTT BAY TAS.
VOYAGER 3
GRID EXPLORATION SUMMARY MAP

ii) Geophysics

One line of Dipole-dipole IP with 50m line spacings was completed on line 10,000N to further define a drilling target over the chargeable zone which was outlined by the broader survey. A well defined chargeability anomaly was located between 9225E and 9300E, and the pseudosection of apparent chargeability suggested a likely source dipping to the east (plan 3). This anomaly is displaced 100m to the east of the Pb (Zn) soil anomaly which indicates the two anomalies may be unrelated (see fig 6).

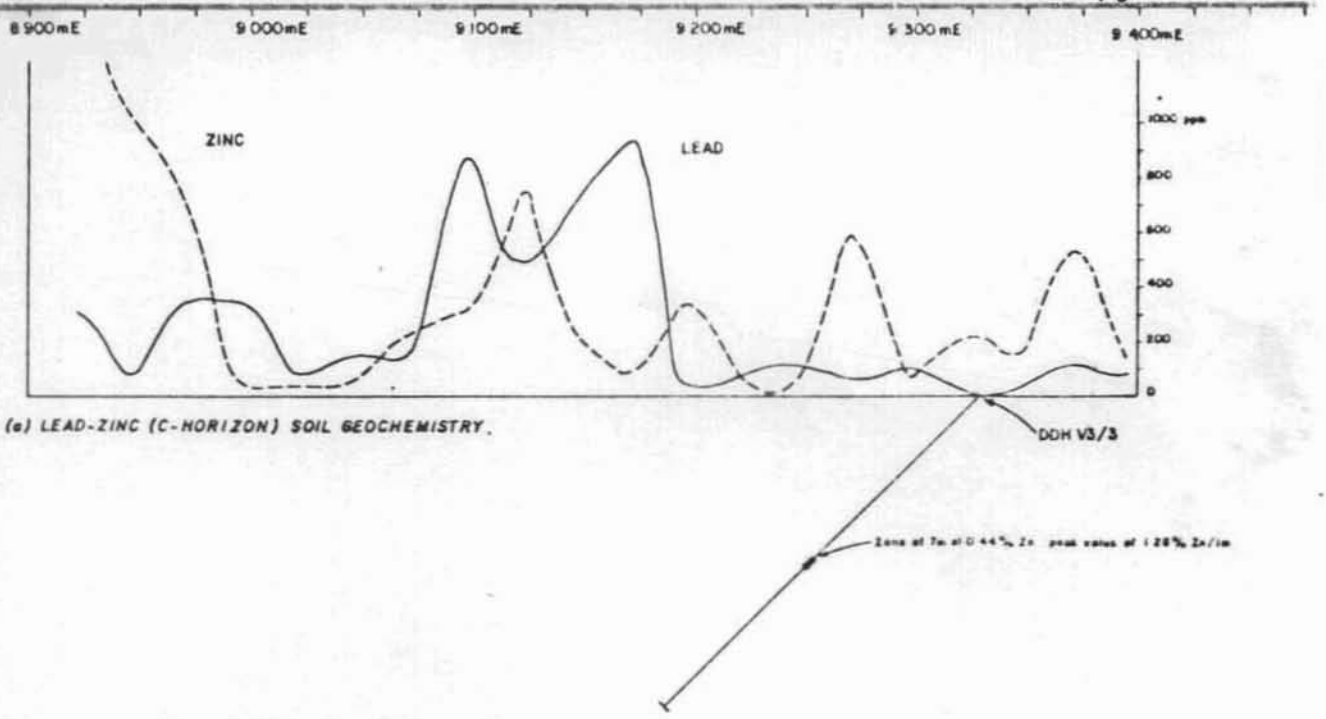
iii) Drilling

Drill hole DDH V3/3 was collared at 9325E on line 10 000N and drilled at -45° to the west on the assumption of the easterly dipping chargeable zone. The hole was drilled to a final depth of 201.10m and intersected a varied sequence of fine to medium grained crystal tuffs, chloritic vitric tuffs and flow banded dacitic and rhyolitic lavas (plan 4).

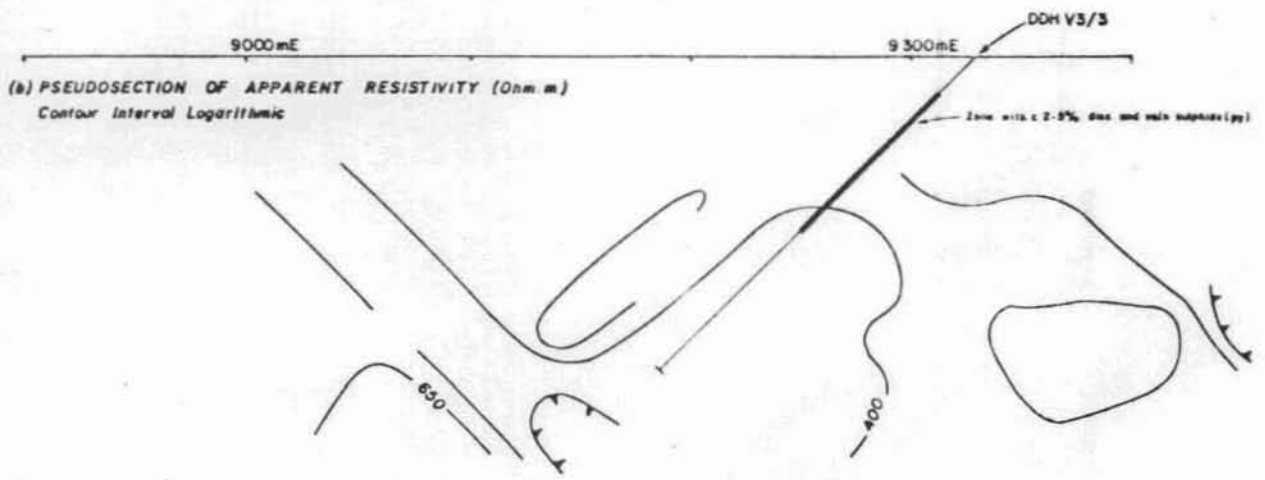
Bedding-cleavage relationships in the core indicate the hole was drilled in the same direction as the dip of bedding and cleavage. Although the core was not oriented, this observation is consistent with the observed 75°-85° dip of the cleavage to the west as observed in coastal and outcrops on the grid. Furthermore the down dip drilling accounts for the poor drilling conditions with the core constantly breaking and wedging in the core barrell which resulted in short runs and breakage of the core.

The sense of minor folding and the steeper angle of cleavage with respect to bedding indicate the hole penetrated the eastern limb of a synformal structure with its axis to the west of the collar.

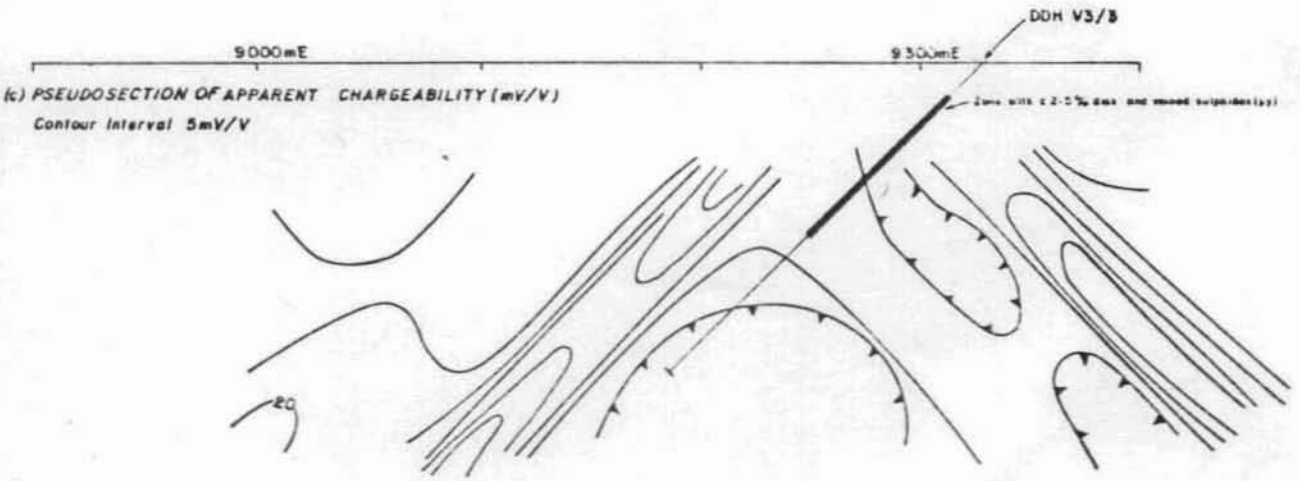
LEGEND



(a) LEAD-ZINC (C-HORIZON) SOIL GEOCHEMISTRY.



(b) PSEUDOSECTION OF APPARENT RESISTIVITY (Ohm.m)
Contour Interval Logarithmic



(c) PSEUDOSECTION OF APPARENT CHARGEABILITY (mV/V)
Contour Interval 5mV/V

FIG 6.

5 cm

GEOPEKO
DEVONPORT BASE TASMANIA

E.L.27/76 ELLIOTT BAY, TAS.
DDH V3/3
SUMMARY SECTION WITH INDUCED POLARI
AND GEOCHEMICAL PROFILES

DATE
GEOL. R.A.W.

Mineralization was ubiquitous throughout the hole as 1-3% disseminated pyrite in crystal tuffs and 'vein' pyrite along cleavage and fractures. Galena, chalcopyrite and sphalerite were observed along the margins of minor quartz veinlets in the interval 22m-102m.

Analytical results from samples of halved core are presented in Appendix 1 and summarised diagrammatically in plan 3.4 The highest value of 1.28% Zn was recorded in the chlorite rich 'andesitic tuff' which furnished a value of 0.37%Zn over an apparent width of 8m (102-110m).

iv) Conclusions and Recommendations for Additional Work

On the basis of the geochemistry it is unlikely that the hole explained the lead anomaly on line 10 000N. This is hardly surprising given the easterly dip of the Hudson River Volcanics in this area. However, the 2-3% disseminated pyrite in the quartz crystal lapilli tuffs between 26-110m is likely to have been responsible for the chargeability anomaly. These findings do not negate the economic potential of the Hudson River Volcanics in Voyager 3 and surrounding area.

C horizon Pb-Zn geochemistry on the Voyager 3 grid has a higher background and better anomaly contrast to the Voyager 19 area which is described in a later section. So far the best soil geochemistry on the southern part of the Voyager 3 grid remains untested.

On a more regional basis the volcanic/sediment interface north of the Voyager 3 grid is an excellent environment for 'Rosebery Style' distal Pb-Zn-Cu-Ag deposits. A rock chip sample collected from gossanous rocks at this contact returned a value of 900 ppm Cu.

The following work is recommended:

1. Excavate costeans across the main Pb-Zn-(Cu) soil anomalies on Voyager 3 to relate the soil geochemistry to geology. Drill the most favourable target which develops.

2. Grid the area of arenaceous sediments to the north of Voyager 3 and collect C horizon soil samples at a close density across the inferred contact.

2.4 VOYAGER 16

i) Introduction

Voyager 16 defines a large circular aeromagnetic anomaly situated immediately to the north of the confluence of the Hudson River with Waterloo Creek and approximately 2km east of Voyager 9 (see fig 3). Coincident with this anomaly is an area of anomalies Pb-Zn stream geochemistry. Reconnaissance mapping in the vicinity of Voyager 16 during the 1980 field season led to recognition of chlorite alteration in a sequence of rhyolitic agglomerates (Large, 1981). On these three counts the area was given a priority rating due to its recognition as a potential environment for stratiform Cu-Pb-Zn mineralization.

Field work during the 1980/1981 field season was conducted under contract to the Poltock Bros. A N-S 1.2km long base line was surveyed across the area. Geological mapping, soil sampling and a magnetic survey were completed along four 400m spaced E-W cross lines. The findings of this work are summarised in this section and for a more detailed account the reader is referred to the report by Poltock (1981).

ii) Geology

Topography on the gridded area is undulating and well incised and consequently outcrop is good. The dominant rock types are a variable sequence of rhyolitic pyroclastics which strike in a N-S direction and dip steeply to the west (plan 5).

Seven distinct lithologies were recognised (Poltock 1981). A sequence of vitric tuffs with phenocrystic quartz and feldspar (porphyritic lavas?) crop out on the eastern margin of the grid. They are overlain by a ± 200m succession of crystal tuffs which differ from the underlying rocks in their greater crystal component, occasional lithic fragments and local chloritic alteration.

A thick sequence ± 300m of pink-orange weathering porphyritic rhyolite lavas comprise the dominant lithology and outcrop in the central part of the grid. Interbedded with this unit are bands of fine to medium grained siltstones which display gradational contacts with the rhyolite. Lithic bearing crystal tuffs are exposed in Waterloo Creek on the west of the base line. The lithic fragments are of pink rhyolite and reach 5cm in size and are enclosed in a weakly chloritic matrix.

Marking the western most boundary of the grid is a poorly exposed sequence of chloritic, quartz-feldspar, crystal, lapilli-tuffs which contain narrow lenticular bands of basic to intermediate volcanics. Outcrop of this sequence is confined to the south-west portion of the grid and is obscured to the north by cover of Tertiary gravels.

iii) Geochemistry

156 C horizon soil samples were collected by power auger at 25m intervals along the four grid lines. The thick covering of Tertiary gravels made C horizon sampling ineffective over the north-western part of the grid. All the samples were analysed for Cu, Pb, Zn, Ag, Fe and Mn and two major anomalous areas were outlined and are worthy of note.

The first anomaly occurs in the south-western part of the grid and corresponds to an area of poorly outcropping quartz-feldspar crystal tuffs and is associated with a broad low order magnetic anomaly. Here a broad zone of anomalous Pb/Zn geochemistry, with a maximum value of 1950 ppm Pb and 760 ppm Zn, has locally coincident values of Cu, Fe and Mn.

On line 10 000N a small Pb-Zn anomaly is centred on station 10 150E and has a maximum value of 1150 ppm Pb and 2850 ppm Zn. It is open to the west because of the Tertiary gravel cover (plan 11 and fig 7).

15 panned stream sediment samples were collected to assess the gold potential of the area. Gold was visually observed in four of the panned concentrates but correlation between visible gold and assay result was poor (see Voyager 24). The best value of 6.93 ppm Au was recorded in a stream which drains the area of anomalous soil geochemistry on line 8800N. All the panned concentrates returned high zinc values in the range 27-3300 ppm but had no relationship with the Zn anomalies observed in the C horizon geochemistry.

iv) Geophysics

Total field magnetic intensities were recorded at 12.5m intervals along the grid lines, the profiles are presented in plans 8 to 11. Two anomalies can be recognised, the main one occurs on lines 9200N and 9600N between stations 10200 - 10600E. Weaker and more 'spikey' magnetic anomalies are present on all lines to the west of the base line and culminate in a broad anomaly on line 10 000N between 9800E and 9500E.

It appears unlikely that these westerly magnetic anomalies can be explained by outcropping geological features. The chlorite-magnetite alteration described by Poltock (1981) is restricted to a small area west of the base line on 9200N and may be the cause of the two minor magnetic anomalies centred on 9700E and 9925E respectively (see fig 7).

In general there is little coincidence between magnetics and geochemistry. The relief on the Voyager 16 gridded area suggests that the source of the magnetic anomaly lies at depth. This is somewhat re-inforced by the continuity of the geology across and beyond the area of the magnetic anomaly.

v) Conclusions

Additional work is warranted at Voyager 16 particularly in the south-west of the grid to explain the Cu-Pb-Zn-Fe ± Au geochemistry. Infill gridding and soil sampling is recommended.

At this stage the magnetic anomaly on the eastern part of Voyager 16 appears to be similar and possibly genetically related to the Voyager 9 magnetic anomaly. Any further work should await the outcome of the proposed drilling at Voyager 9.

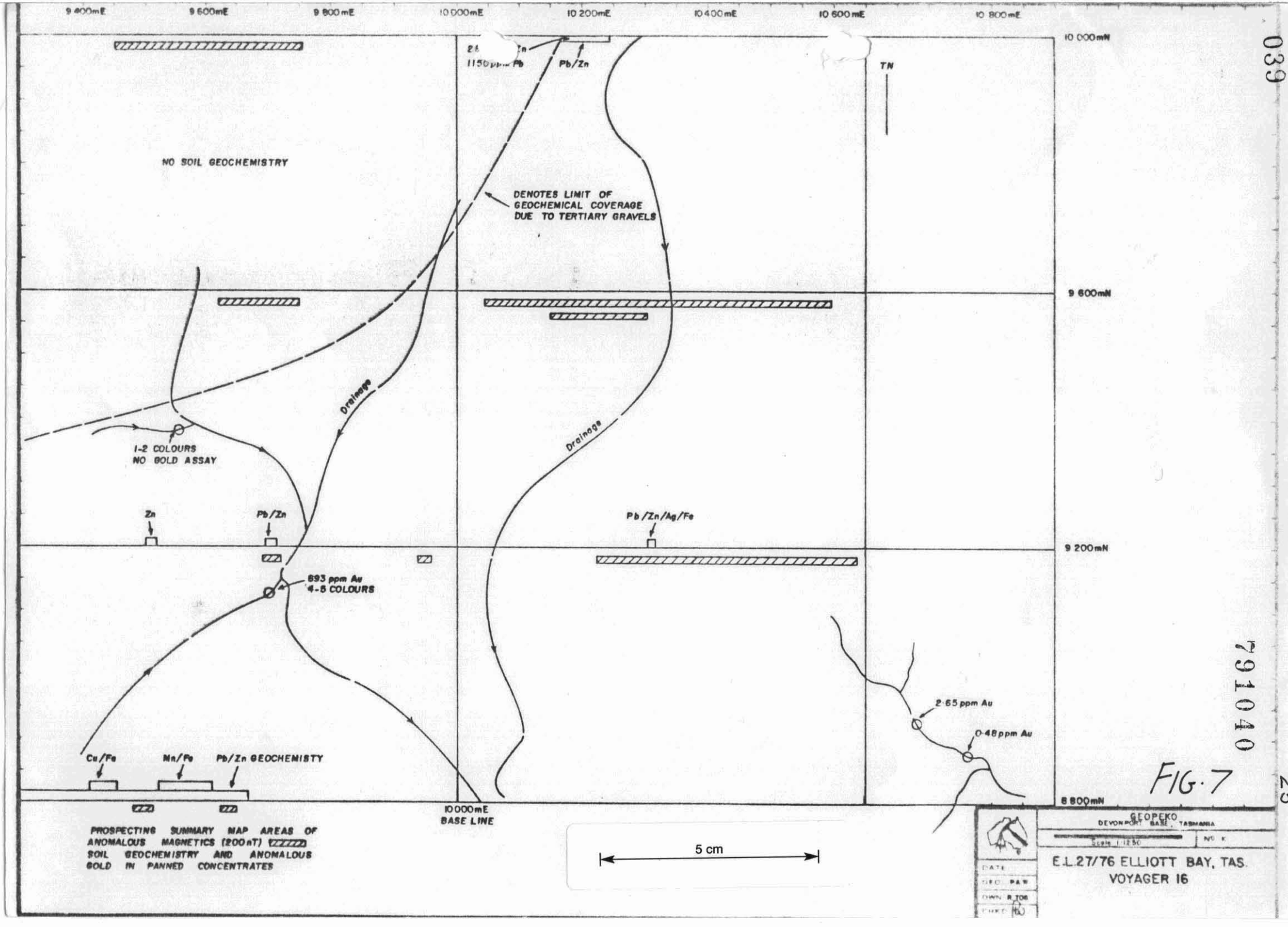


FIG. 7

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3. EXPLORATION IN THE WART HILL PYROCLASTICS

3.1 GENERAL GEOLOGICAL SETTING

Rocks which are assigned to the Wart Hill Pyroclastic Formation occupy a 5km wide belt of open button-grass plains in the central part of the E.L. They extend from the Lewis River, where they are intruded by the Rocky Point Granite, to the north where they are unconformably overlain by Ordovician black shales, siltstones and conglomerates which comprise the Mt. Osmond syncline. The eastern contact is diffuse and gradational to the underlying Hudson River pyroclastics. To the west the Wart Hill Pyroclastics are overlain by basic volcanics and phyllites of the Mainwaring Group (see fig 3).

In the main, they are a thick monotonous sequence of creamy-grey coloured quartz-feldspathic crystal lapilli tuffs, lithic crystal tuffs (locally agglomeratic) porphyritic lavas, rhyolites and dacites. The predominant lithic fragments in the tuffs are ovoid in shape and consist of very fine grained, olive-green rhyolite which may be aligned to define a crude bedding.

Outcrop is generally good but lack of marker horizons make correlations difficult. It is not uncommon for lithology to be traceable for only a few tens of metres along strike. Field evidence, notably the persistence of the intercalated sedimentary units, suggest this is a function of 'facies changes' away from eruptive centres and a possible irregular topography rather than later tectonism. Nevertheless the pyroclastics always retain a strong penetrative fracture cleavage and this can be useful in distinguishing the fragmental rock from the more massive lavas. The main cleavage appears to be axial planar to the Osmond synclinal structure and is therefore of Tabberaberan age.

There is also evidence of an oblique (earlier ?) more pervasive cleavage, and the intersection of the two cleavages results in the 'diamond shaped' outcrop pattern of the rocks.

Another common feature of the Wart Hill Pyroclastics is the strong lineation which generally plunges from 5°-85° to the south. This can be manifested by;

1. Bedding cleavage intersections.
2. Mineral rodding (lineation) and mullion structures especially in the lavas, and the alignment of lithic fragments in the tuffs.
3. Plunge of minor folds.
4. Outcrop patterns, especially in the intermediate volcanics which have discontinous 'boudin' like outcrop patterns.

Within the Wart Hill Pyroclastics three main arenaceous sedimentary episodes have been recognised (Large, 1981). Primary sedimentary structures such as grading and cross-bedding show a consistent facing direction to the west and indicate the sequence is probably upward facing. On the aerial photographs it appears that a number of major N-S trending lineaments are present, notable of which is the one marking the western boundary of the Ordovician sequence. This linear could represent a very early (basement shear ?) and deep fundamental structure which bounded the Ordovician depositional trough. Conglomerates and sandstone beds in the Osmund syncline can be seen to wedge out against this structure. The lineament can be extrapolated across the Lewis River to mark the western contact of the Rocky Point Granite.

For the greater part of their outcrop the Wart Hill Pyroclastics are essentially leucocratic and unmineralized. Regional mapping in the preceeding field season resulted in the recognition of 3 areas having significant hydrothermal alteration of the otherwise 'fresh'-leucocratic volcanic pile. The areas were designated Voyagers 9, 19 and 22 (see fig 8), and Large (1981) suggested that the pyrite-sericite-chlorite alteration observed at these locations was typical of footwall alteration zones in volcanogenic massive sulphide terrains. With this model in mind the Wart Hill Pyroclastics were given very high priority for the 1980-1981 field season which resulted in the discovery of massive Pb-Zn-Ag-Cu (Au) mineralization at Voyager 19. General conclusions and recommendations for further work are presented in the final part of the section when each area is treated collectively.

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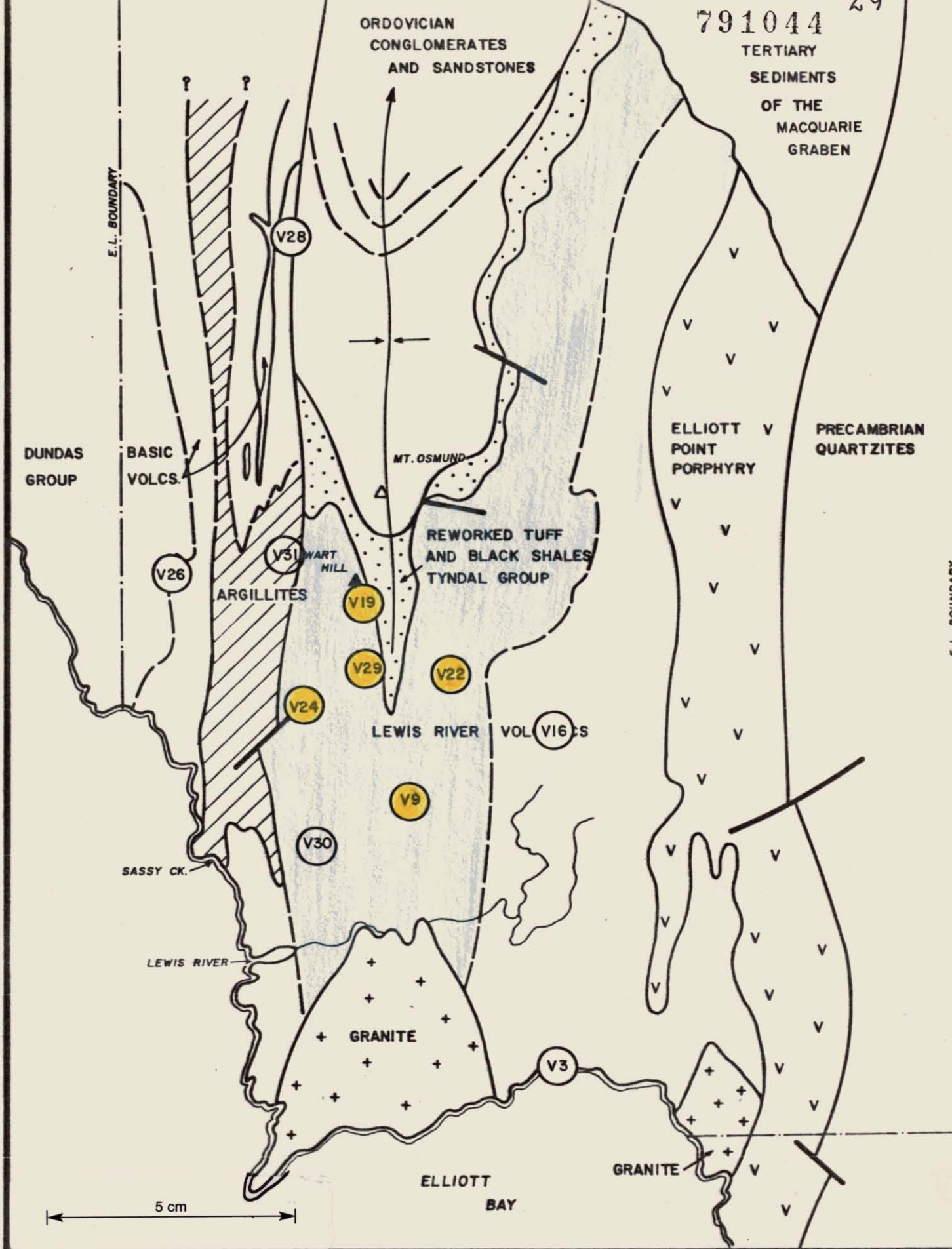

LEGEND:

Generalized geological map of E.L.27/76 showing:

e.g., (V9) Location of Voyager 9

DISTRIBUTION OF THE WART HILL PYROCLASTICS. ☐

DATE : 30/10/81
GEOL: W.H, PAW
DWN : R.TOG.
CHKD:

GEOPEKO

SCALE 1:100 000

Fig. 8

ELLIOTT BAY
E.L. 27/76
VOYAGER LOCATION MAP.

3.2 VOYAGER 9

i) Introduction - Previous Work

Voyager 9 defines the northern part of a pronounced aeromagnetic anomaly which extends over an area of 4 x 1km centred on AMG 380000 5244000. A 1200m x 1000m grid was placed over the area in 1980 with 100m line spacing closing up to 50m across the peak of the magnetic anomaly. Detailed ground magnetics, VLF-EM and geological mapping were conducted over the area at the close of the 1980 field season (for details see Large, 1981).

Examination of the geology showed the Voyager 9 area to be a typical of the Wart Hill Pyroclastics, due to the presence of a wide diversity of rock types and an extensive hydrothermal alteration. Rock chip samples furnished anomalous Cu, Pb, Zn values compared ot the normal background of the unaltered pyroclastic sequences (see Large, 1981).

C horizon soil sampling was completed only across the northerly lines of the grid from 11450N-11750N and outlined a significant WNW trending copper anomaly with values of 200-2400ppm Cu and with coincident iron (> 1%).

A 60m auger core hole (DDH V9-1) was drilled to test the peak of magnetic anomaly on line 10950N. Although the analyses showed depressed base metal values the presence of bedded 'syngenetic' magnetite was recorded.

The Voyager 9 area was given a very high priority rating for additional work on the following grounds:

1. The extensive pyrite-sericite and chlorite-magnetite alteration of the pre-dominantly volcanic sequences make the environment highly favourable for volcanogenic proximal Cu-Au mineralization of Mt. Lyell type.

2. The copper anomaly on the northern part of the grid.

3. The high intensity magnetic anomaly.

This follow up work was to utilise gradient array IP to locate the most geophysically favourable areas and to target a drill hole on the copper anomaly with Dipole-Dipole array IP. The C horizon soil sampling program was to be completed across the remainder of the grid.

ii) Geology

A 1:2500 scale geological map of the Voyager 9 area was completed in the previous field season (plan TS 27/76 V9-9) the mapping concentrated on the alteration and mineralogy of the rocks and recognised a broad distinction between a chlorite-magnetite alteration assemblage to the south east which passes northwards into a dominantly pyrite-sericite alteration.

The area was re-examined by the writer with the aim of recognising a local mappable stratigraphy and to gain an understanding of the structure to aid in the interpretation of the anomalous character of the area.

Aerial photo examination of the Voyager 9 area shows it is an area of positive relief bounded by two major lineaments which are recognisable by the drainage systems marking the western and eastern boundaries of the area. Structures within this 'fault' bounded segment are difficult to recognise due to the extensive quartz float.

Outcrop is generally good and four broad lithologies can be recognised in the field (plan 13).

Andesite/Dacitic Volcanics - This group are represented by very fine grained dark grey-blue chlorite rich rocks. They have a distinctive outcrop pattern usually brown rustic weathering and display a 'splintery' pencil like fracture pattern. They are best developed on the eastern margin of the grid and extend over an area of 25 x 400m adjacent to the Stoney Creek fault. Outcrops are often discontinuous and "boudin like pods" of the rock are often 'enclosed' by leucocratic quartz crystal tuffs. This irregular outrcop pattern suggests a dyke-like intrusive; nature to the andesite. However where bedding is visible the andesites appear to be conformable and the 'podiform' diamond shaped outcrop pattern is probably structurally controlled. In the area around 11050N 10380E magnetite rich layers or bands were recognised in this lithology.

Chloritic-quartz porphyry - A grey-brown weathering rock conspicuous in the field due to the prominence of rounded quartz 'phenocrysts' usually equigranular, 2-5mm in diameter and forming up to 30 vol % of the rock. The matrix is fine grained dark green and rich in chlorite. They outcrop prominently in the SE of the Voyager 9 grid and form a complex outcrop pattern always retaining a good close spaced fracture cleavage. Although they are readily distinguished from other rock types on the grid they are often associated with the andesite/dacite outcrops described in the preceding section.

Rhyolite (rhyo-dacite) lavas - Very fine grained sometimes flow banded rocks have been identified at two principal locations on the grid. They outcrop north of line 10600N and in the SW of the grid where they overlay the chlorite-quartz porphyry. Lithologies within this unit vary from pale-glassy green rhyolite to dark grey, fine-grained dacite. Parallel bands interpreted as flow banding have been recognised in all these lithologies.

Lithic crystal-lapilli tuffs - By volume, lithic crystal tuffs are the most dominant rock type on the Voyager 9 grid. This unit is extremely variable and is commonly represented by a pale, green-grey, streaky-textured quartz crystal tuff containing yellow-green fragments of glassy rhyolite or porphyritic lava. The lithic fragments concentrate in definite bands often defining bedding. Variation in this basic lithology occurs due to changes in grain size of the host tuff and to the composition, size, or number of lithic fragments.

Structures

The prominent structural feature on the Voyager 9 grid is a closely spaced penetrative fracture cleavage which strikes between 320°-340° and dips steeply to the west. This cleavage is frequently oblique to bedding (by 20°) and also cuts obliquely across earlier minor fold structures. It is believed to be related to the Mt. Osmund Synclinal structure.

A pronounced lineation is ubiquitous in the volcanic rocks at Voyager 9, and is probably best recognised by the alignment of lithic fragments, rodding, and bedding cleavage intersections. As yet the degree of deformation (stretching) connected with this lineation is uncertain and more structural work is warranted because of the importance of deformation and the attitude of any mineralized body.

iii) Geochemistry

Approximately 450 C horizon soil samples were collected using the Jacro rig at 25m intervals along all grid lines exclusive of lines 10850N and 11450-11750N. The -80 mesh fraction of the samples was analysed for Cu, Pb, Zn, Fe Mn ang Ag. The results are presented in plans 15-18 respectively and outline a number of significant anomalies.

1. The WNW striking copper anomaly centred on 11600N 10000E which was outlined by the previous years sampling proved to be the most anomalous area for copper on the Voyager 9 grid. Background values on the grid were generally below 10ppm with threshold taken to be 20ppm.

2. A major northerly trending Pb-Zn anomaly with values of up to 2100ppm zinc occurs over 6 grid lines on the eastern part of the grid adjacent to Stoney Creek (11250N 10400E). The anomaly has lead support with values of up to 1050ppm Pb. The lower dispersion of the lead defines two separate anomalies as outlined by the 100ppm contour interval.

   This anomaly lies immediately to the west of a small outcrop of gossanous material which returned values of 48% Fe, 920ppm Pb, 500ppm Zn, 3000ppm Ba and 3ppm Ag (sample KR 6873, Large 1981).

3. A broad diffuse area of anomalous Cu-Pb-Zn occupies the SW portion of the Voyager 9 grid. Spot values of 835 and 585Pb fall in a broad area of weakly elevated zinc values.

iv) Geophysics

A gradient array IP survey totalling 16 line km was completed over the Voyager 9 grid, the results are presented in plans 28 to 29. The survey outlined a prominent N-S trending resisitive zone on the eastern portion of the grid centred between lines 10200 and 10300E which is thought to correspond to outcrop of unaltered, pale-grey, rhyolitic lithic crystal tuff.

Chargeability contours suggest a NE-SW trend to the rocks which conflicts with the NNW-trend of the VLF-EM and predominant N-S trend depicted by the resisitivity contours.

A well defined chargeability high centred on 11750N 10500E was delineated and has an coincident lead anomaly with a spot value of 1700ppm. A broader more diffuse chargeability high and with a roughly coincident resistivity low was observed on the southern part of the grid at 10650N centred on 10150E and is thought to correspond to an outcrop of the chlorite-quartz porphyry.

A Dipole-Dipole IP follow up survey was conducted over the areas of interest outlined by the gradient array survey. The location of the 9 spreads are shown in figure 9 and pseudosections of IP and resistivity are presented in plans 19 to 27. The best IP anomaly on the grid proved to be on the eastern end of lines 11850N and 11750N. The complex configuration centred on 1000E 11650N was to aid with the siting of DDH V9-2 (see fig 9).

v) Drilling Diamond Hole V9-2

A Mindrill F30 rig was used to drill a 232.15m inclined hole under the copper soil anomaly on the northern part of the grid. The hole was collared at 11525N 9975E and was drilled at -45° into the nose of an inferred southerly plunging anticlinal structure.

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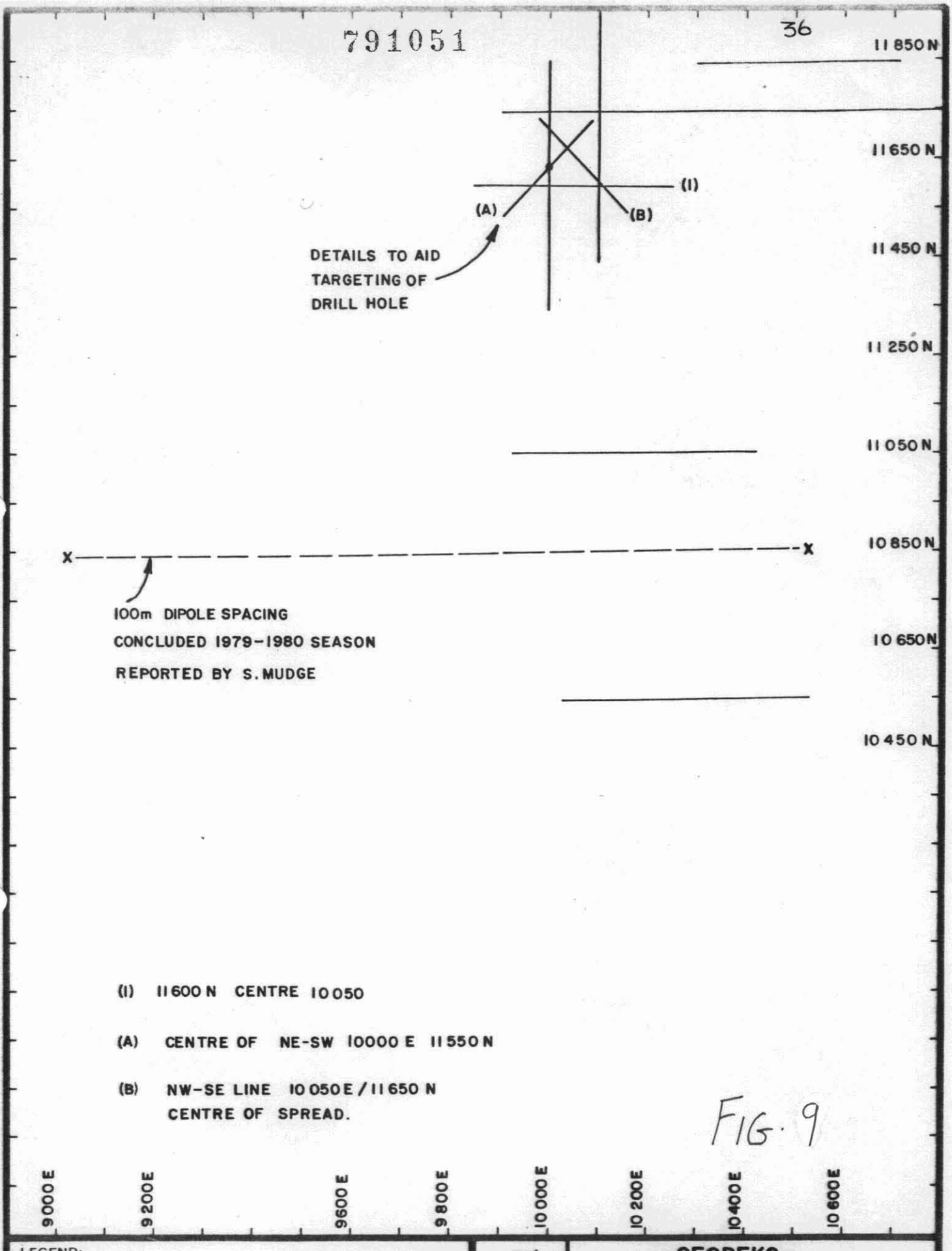


FIG. 9

LEGEND:

GEOPEKO

Scale:

Nº K

E.L. 27/76 ELLIOTT BAY TAS.
VOYAGER 9
DIPOLE - DIPOLE IP

DATE:
GEOL: P.W.
DWN: M.v.d.S.
CHKD: PW

The hole penetrated a sequence of pyritic coarse-grained lithic tuffs and agglomerates which overlie a thick sequence of vitric tuffs and rhyolites. The finer grained rocks are intensely brecciated and massive chlorite-pyrite assemblages occupy the interstices between breccia fragments in places. Elsewhere the rhyolites are cut by narrow anastamosing veins of magnetics ? which contain occasional chalcopyrite grains. These features occur in the interval between 54 and 126m. From 126m to the end of the hole the rocks are buff coloured, leucocratic, sericitised, crystal tuffs and are devoid of any mineralization. Magnetic susceptibility readings were recorded on the core and are presented in figure 10.

Geochemical values from split core are presented in Appendix 2. Copper values fall in the range 5-415ppm which suggests the hole did not explain the copper soil anomaly. Similarly the virtual absence of sulphides in the bottom 100m of the hole does not explain the IP anomaly in the area.

On a more positive note, the hydrothermal alteration within the coarse lithic tuffs and lavas at the top of the hole indicates a favourable stratigraphic environment for base metal mineralization.

Summary

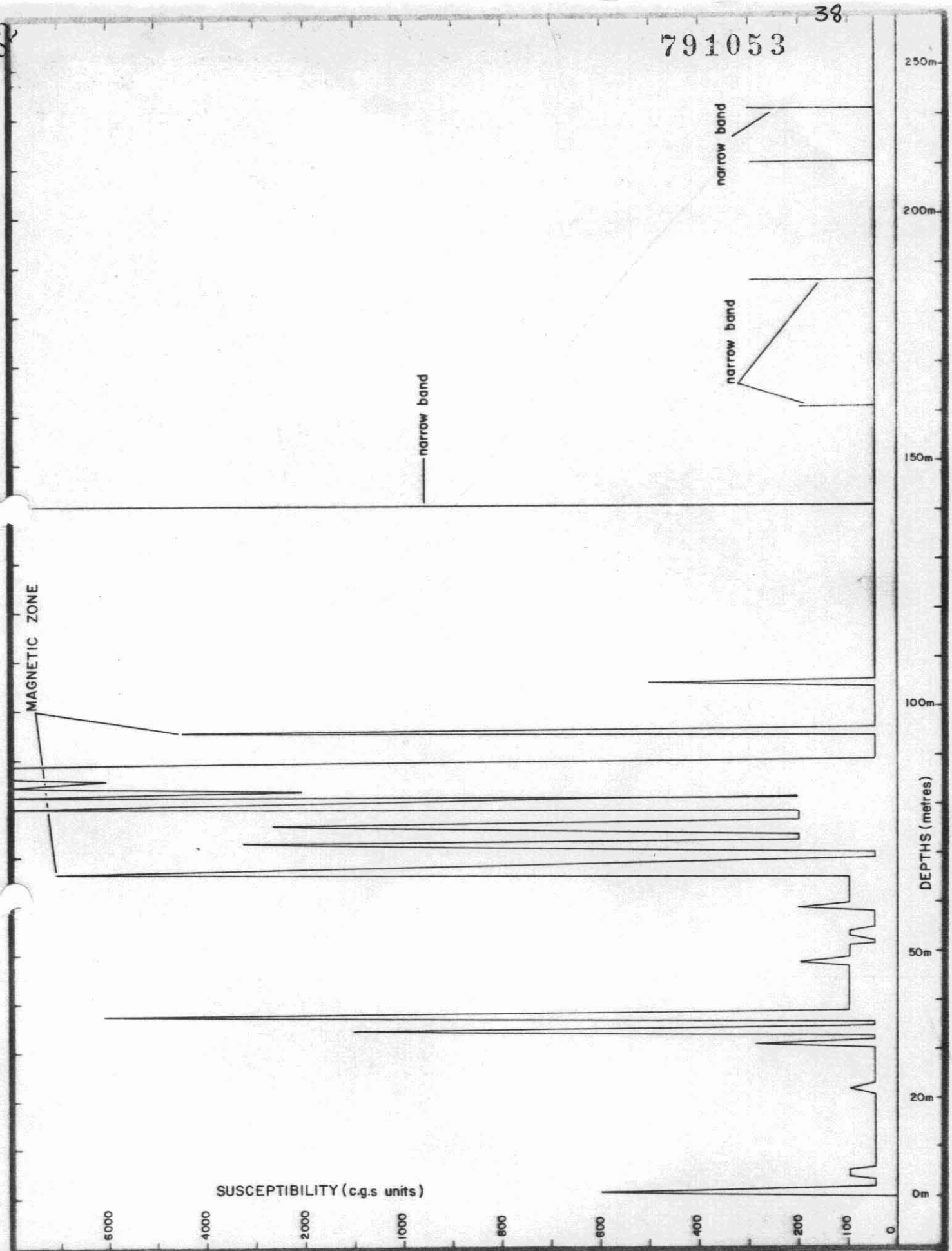
The Voyager 9 area still warrants a high priority rating for the following reasons:

1. The structural setting of the Voyager 9 area, it is bounded by two major lineaments similar to the Great Lyell Fault in the Queenstown area.

2. The complex association between acidic pyroclastics and lavas of intermediate composition suggest proximity to an effusive centre.

052

791053



LEGEND:

FIG. 96

GEOPEKO
DEVONPORT BASE, TASMANIA

Scale:

Nº K

DATE:

GEOL: P.A.W.

DWN: R.TOG.

CHKD:

E.L.27/76 ELLIOTT BAY TAS.
VOYAGER 9
MAGNETIC SUSCEPTIBILITY
(MAXIMUM VALUES PER METRE INTERVAL ONLY)

3. The ubiquitious hydrothermal alteration thoughout the area and anomalous base metal values from soils and rock samples.

4. The high intensity magnetic anomaly.

Proposals for further work at Voyager 9 are presented in the concluding part of this section (see 3.7).

3.3 VOYAGER 19

i) Introduction

Voyager 19 defines a 500m square zone of highly altered Wart Hill Pyroclastics, centred on Wart Hill (AMG 379700E, 525800N). The alteration is recognisable due to the strong iron staining, which is caused by the oxidation of finely disseminated pyrite, and sericitic alteration of rhyolitic, lithic, lapilli-tuffs, crystal lapilli tuffs, agglomerates and lavas.

Reconnaissance rock chip sampling showed anomalous Cu, Pb, Zn and Fe values in the altered lithologies (Large, 1981). Other features of economic significance are the nearly coincident weak AEM anomalies from the Geoex survey lying to the north (56) south (57) and west (55) of the alteration zone, respectively. However it is noteworthy that geochemical response in the streams draining the area was generally low. A zinc value of 60ppm was recorded from a stream draining the southern end of the alteration zone. Gold furnished anomalous levels in the -80 mesh stream sediments collected from the southern and western extremeties of the alteration zones.

On this evidence the main rationale for the high priority rating ascribed to the Voyager 19 area was on geological grounds (Large 1981). The other supporting factors were partly instrumental in controlling the position and dimensions of the grid which was surveyed over the area. Initial ground-work in the 1980-1981 field season, following construction of a 1.3km x 1.8km grid included geological mapping, G-horizon soil sampling and gradient array IP. The results of these surveys are summarised in the following sections.

ii) Geology

Most of the Voyager 19 area is underlain by rhyolitic volcanics of the Wart Hill Pyroclastics. On the eastern side, these are uncomformably overlain by reworked tuffs and clastic sediments tentatively correlated with the Tyndall Group of the Jukes-Darwin area (see plan 32).

Wart Hill Pyroclastics:

In the central part of the grid, across Wart Hill itself (10150E/12650N), the rocks are differentiated into the following 'stratigraphy', from west to east.

Chloritic quartz-feldspar crystal tuff	- Commonly with coarse lithic or conglomeratic bands, chlorite in matrix, quartz and feldspar approx. equal.
Quartz porphyritic rhyolite	- Small (1-2mm) phenocrysts quartz (and occasional minor biotite flakes and feldspar) evenly distributed in fine grained creamy felsic matrix. Massive, locally brecciated, considered extrusive.
Sericitic quartz crystal tuff	- Fine to medium grained quartz crystals closely crowded in sheared sericitic matrix. Generally massive sometimes, crudely layered with minor lithic fragment component (more distinct in southern parts). Includes thin micaceous sandstone/siltstone bed in the southern parts.
Chloritic tuff (Wart Hill)	- Fine-medium grained non stratified greenish chloritic tuff with very sparse quartz crystals and locally abundant coarse lithic fragments. Generally more or less iron-stained, especially on fractures but also as fine disseminated specks probably after pyrite (~ 1% volume)

Laminated vitric - quartz crystal tuff	- Thin (2cm) bands of siliceous (cherty) vitric tuff laminated with quartz crystal tuffs.
Sericitic crystal - lithic tuff and chloritic quartz crystal tuff	- Similar to that on Wart Hill but more quartz crystals less iron staining.

These rocks dip consistently and steeply to the west, no facings are known locally but they are generally assumed to be upright.

There appears to be considerable local thickening and interfingering of units, especially the porphyritic rhyolite. The micaceous sandstone/siltstone unit of the south western part of the grid is a clastic sediment probably derived from the metasedimentary Tyennan Block to the east and marking a pause in pyroclastic sedimentation. It is a useful marker horizon and apart from some structural complication at around 9950E/12200N, where it peters out, maintains a regular strike and dip for over 3km to the south.

The rocks in general display a strong lineation or 'rodding', in outcrops as indicated by stretched lithic fragments, which plunge at about 60° to the south. (This extension is not parallel to the intersections of bedding and the principal cleavage which plunge steeply to the north-west.)

Tyndall Corelates:

These rocks strike generally NNW and dip steeply (80°) to the east, forming the western limb of the Mt. Osmund syncline.

They appear to rest unconformably on the underlying pyroclastics. Despite the strongly linear nature of the contact as seen on aerial photographs, there is no field evidence suggesting a faulted contact.

From the base up (west to east) the following succession is typical:

Base: Coarse conglomeratic/agglomeratic reworked tuffs - compositionally identical to sericitic members of the Wart Hill Pyroclastics.
Thickness: 10-40m.

Massive or cross bedded medium to coarse grained tuffaceous sandstone, sometimes quite pyritic.
Thickness: 100m.

Fine grained grey siliceous siltstones and carbonaceous/pyrite shales. Contain upto 5% pyrite (disseminated)
Thickness: unknown but greater than 200m.

In the northern part of the grid, the unconformity is laterally offset by several ENE trending faults. The lensoidal nature of the units within the Tyndall Group correlate in this vicinity (deduced from logging of C-horizon rock chips) suggests these faults may have been active and partly controlled sedimentation during deposition of the Tyndall rocks.

Alteration and Mineralization

Local iron staining occurs in small patches within the sericitic quartz crystal tuff units and the lava immediately west of Wart Hill and also in one small patch at the base of the Tyndal Group near 13100N. In the first case the iron staining is associated with some pervasive chlorite. The most prominent iron staining occurs on the Wart (Proper) as shown by the shaded areas on the map, but is thought to be related to oxidation of chlorite. Chlorite in the Wart area is quite pervasive and appears to represent an original more iron rich composition rather than hydrothermal alteration. There is little variation in 'intensity' of chlorite,

Often don't see this in other areas eg Woodlawn

no concentration in fractures, veins etc. as one might expect in footwall stringer zone. Admittedly the contacts with adjacent sericitic tuffs are rather vague and the chloritic mineralogy might cross textural boundaries.

iii) Soil Geochemistry

Some 625 C-horizon soil samples were collected at 25m intervals along 100m spaced grid lines using the Jacro soil auger. Machine access proved to be a problem on the eastern, thickly forested, part of the grid, here a further 161 soil samples were collected by hand auger at 25m centres along 200m spaced lines. This wider sampling interval was selected due to the lower prospectivity of the black siltstones which occupy the eastern margin of the grid. All samples were screened and the -80 mesh analysed for Cu, Pb, Zn, Ag, Fe and Mn. Results are presented in contour format in plans 34 to 38 respectively.

Zinc values are lognormally distributed and range from 10-88000ppm. The highest value of 8.8% Zn also contained 2.1%Pb and 1050ppm Cu and was recorded at station 13300N 10075E and provided the focal point for infill sampling and the excavation of a shallow costean.

The zinc contours form an irregular pattern in the northern part of the grid (figure 10), where two small, but high level, anomalies are centred on lines 13100N and 13300N at 9050E. Elsewhere, and especially in the southern part of the grid, the >100ppm zinc contours are more regular and continuous between grid lines.

The two zinc anomalies around line13200N have supporting lead values but with a much narrow dispersion and spot values of over 1600ppm Pb (maximum 2%Pb). A major discrepency in the normally sympathetic Pb/Zn values occurs on Wart Hill itself where zinc values are generally below 100ppm whilst lead values are typically in the range 200-400ppm.

Background values for copper are in the general range of 10-25ppm but peak values of 1050ppm were observed coincident with the Pb-Zn anomaly at 13300N 10075E.

Threshold silver values are taken to be 1ppm and spot values range as high as 40ppm, for example at 1015E 11900N.

iv) Infill Soil Geochemistry

In order to test the continuity of the Pb-Zn geochemical results the sample density was closed up in the northern Zn-Pb anomaly between 12900N and 13400N, over an area of 400m x 500m.

Intermediate grid lines were surveyed and sampled resulting in an effective sample density of 50m x 25m.

Figures 10 to 11 illustrate the effect of infill sampling on the shape and continuity of the zinc contours. The lack of continuity of the zinc values along strike is at this juncture, thought to be due to complex faulting in the area. A remarkable feature is the sharp contrast between the barren (100ppm) country rock and the high zinc values associated with the mineralized areas which reflects the virtual absence of any secondary dispersion in this environment.

Geochemical samples were collected with the Jacro rig at 2m intervals on line 13200N (9815E-9835E) and line 12000N (9950E-10275E and 10380E-10418E) in order to examine the influence of the single or dual station zinc anomalies. The results are presented as profiles on plan 39 and confirm the narrow 'spikey' nature of the geochemical values.

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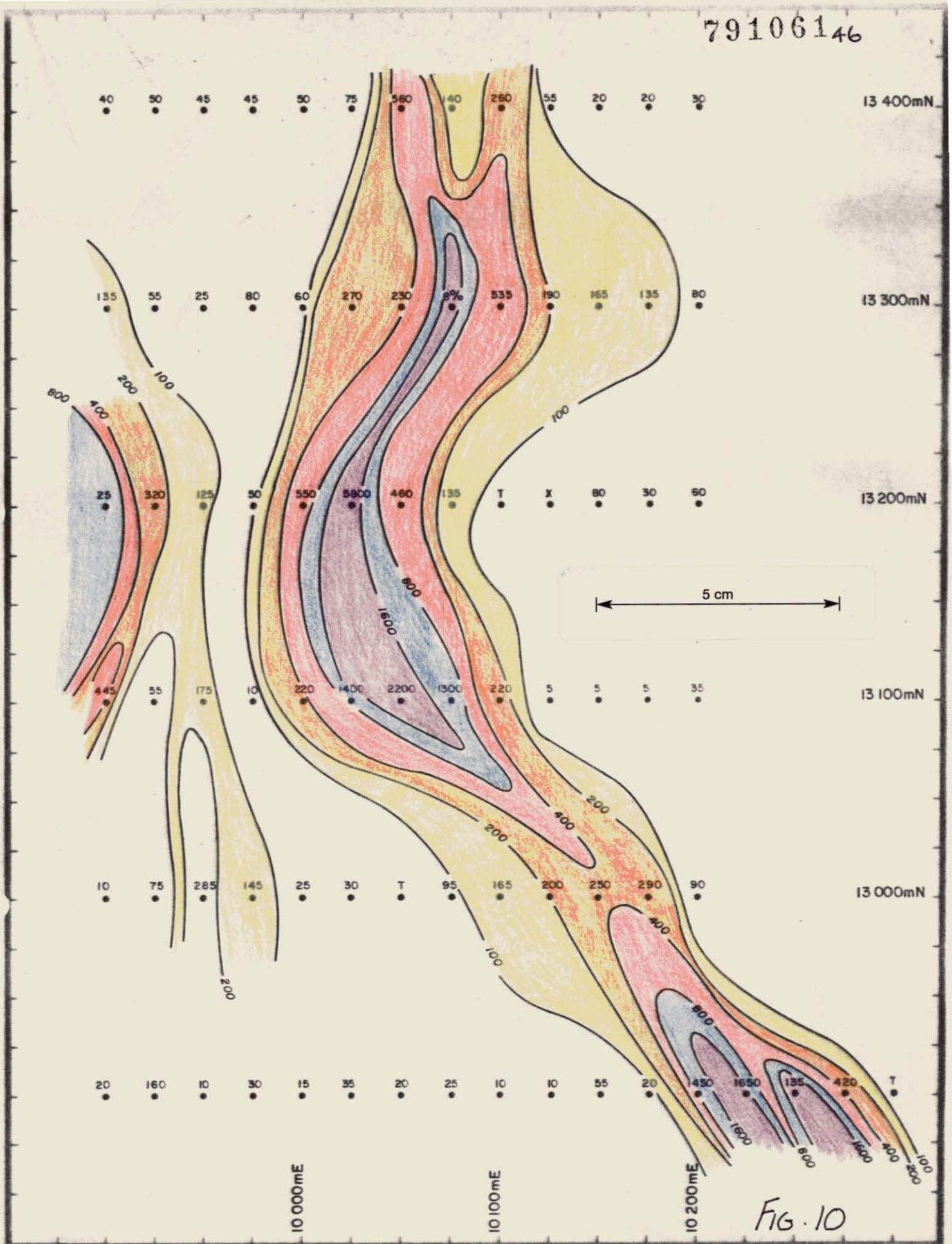

FIG. 10

LEGEND

100 - 199 ppm
200 - 399 ppm
400 - 799 ppm
800 - 1599 ppm
1600+

T TRACE SAMPLE
X BELOW LEVEL OF DETECTION
35 SAMPLE LOCATION

GEOPEKO
DEVONPORT BASE, TASMANIA

Scale: 1:2 500

Nº K

DATE:
GEOL: P.A.W
DWN R.TOG.
CHK'D:

E.L.27/76 ELLIOTT BAY TAS.
VOYAGER 19N
Zn CONTOURS
100m x 25m SAMPLE DENSITY

061

791062 47

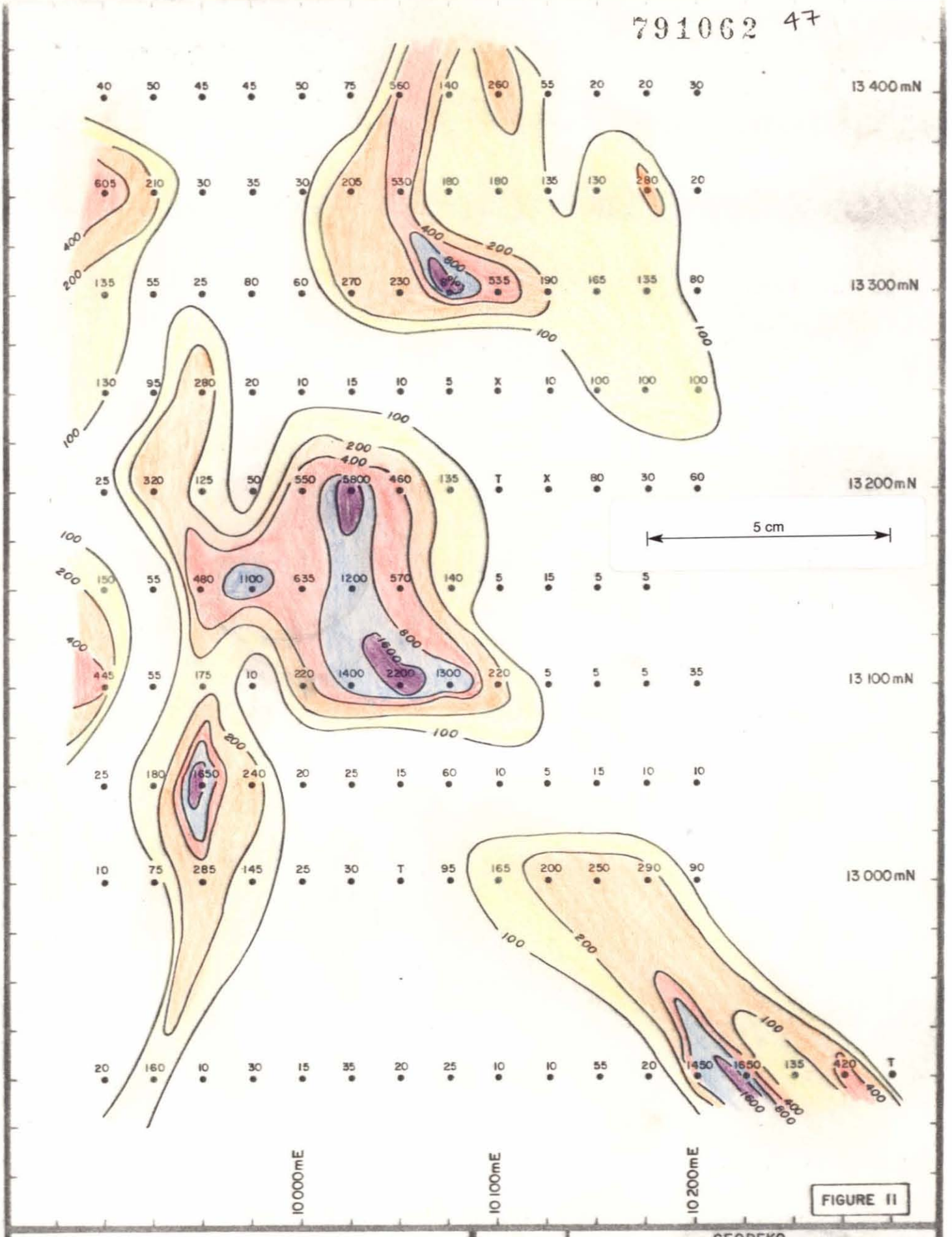

FIGURE 11

LEGEND

- 100 - 199 ppm
- 200 - 399 ppm
- 400 - 799 ppm
- 800 - 1599 ppm
- 1600+
- T TRACE SAMPLE
- X BELOW LEVEL OF DETECTION
- 35 SAMPLE SAMPLE LOCATION

DATE: APRIL 81
GEOL: P.A.W
DWN: R.TOG.
CHKD:

GEOPEKO
DEVONPORT BASE, TASMANIA

Scale: 1:2500

TS27/76-V19N-6

E.L.27/76 ELLIOTT BAY TAS.
VOYAGER 19N
Zn CONTOURS

50m x 25m SAMPLE DENSITY

v) Geophysics

A gradient array IP survey was completed over the Voyager 19 grid. The chargeability contours, although not outlining any significant anomalies, illustrate the clear distinction between a broad strongly chargeable area on the eastern boundary of the grid and a less chargeable zone to the west. The boundary between the zones is outlined by a steep gradient which approximates the Ordovician unconformity, and separates pyritic black siltstones and shales from the siliceous Wart Hill pyroclastics to the west. This linear feature extends in a NW direction from 10700E, 11800N to 10200E, 13600N, where it broadens into a more diffuse zone.

Contours of apparent resistivity also support this distinction, with a broad resistivity low corresponding to the more conductive sediments. Weak inflections in the contours suggests there is a wide but subtle resistivity low centred on line 13200N (plans 45-47).

Three lines of Dipole-Dipole IP, using a 50m Dipole spacing, were completed over the three most interesting areas arising from the gradient array survey. The spreads were centred at 9900E on lines 12400N, 12300N and 12100N. A very weak chargeability anomaly was outlined on line 12500N (plan 48).

Total field magnetic intensities were read at 12.5m centres across the grid. Although the magnetic character of the rock proved to be flat a number of small ± 100nT peaks were continuous over several lines (see plan 49).

After interest was focused on the geochemical anomaly on line 13300N a variety of geophysical methods were adopted on a more detailed level.. The principal aim being to try and ascertain the response of the sphalerite-galena-pyrite mineralization and its

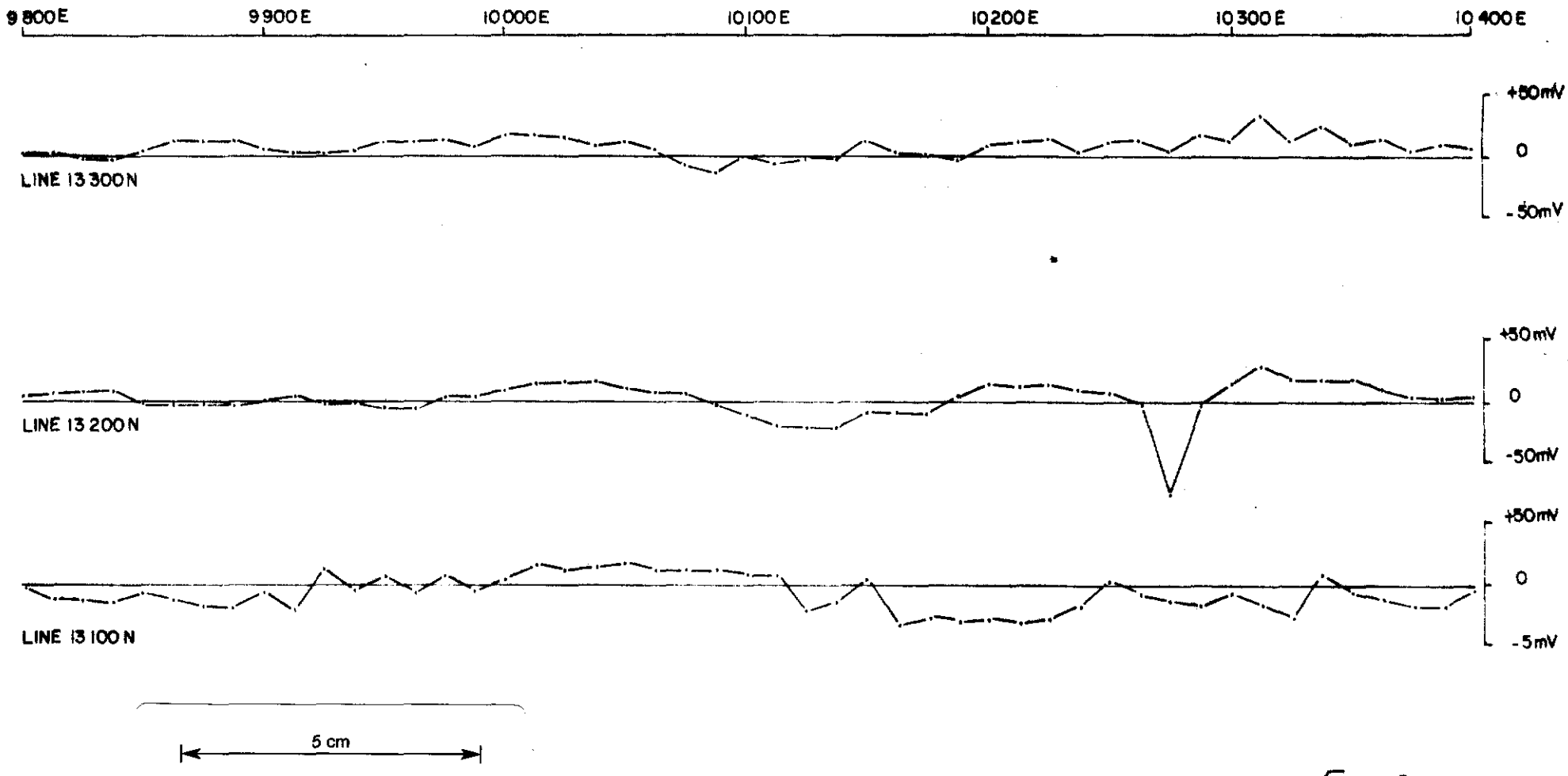

FIG. 12

GEOPEKO Geophysical Surveys Plan no.	Inst	FLUKE	Datum	0mV	AREA	ELLIOTT BAY, TASMANIA
	Obs	R.J. Goodwin	Drwn	R.Tognoni	PROSPECT	VOYAGER 19
	H.Scale	1:2500	Date	March 1980	PLAN SHOWS	PROFILES OF SELF POTENTIAL
	V. Scale	1cm = 50mV				

791064 49

subsurface continuity. Dipole-Dipole IP, SP, moving source Turam EM (MST), and three lines of gravity were read across and on the lines adjacent to the mineralization.

SP was recorded on lines 13100-13300 between eastings 9800-10400 across the areas where the massive sulphide lenses were recorded. Response was generally flat as shown in the accompanying profiles (fig 12). A weak-20mV anomaly occurs immediately to the east of 10100E on all 3 lines but is of doubtful significance. Considering the virtual absence of oxidation of the mineralization and the very shallow water table it is unlikely that an SP response could be expected.

The same 3 lines were surveyed with MST. This technique produced little response across the areas of known mineralization probably as a result of the poor conductivity of the sulphide.

Bouger gravity profiles are presented for lines 12900N, 13100N and 13300N (plan 51) respectively. Readings were taken at 25m intervals. Problems were encountered with instrument stability and a precision of only 0.05m gals was obtainable. Although the reconnaissance survey did not outline any large anomalies numerous small residual anomalies of 0.1-0.2m gals were in evidence. The significance of the anomalies is yet unclear because of the currently inadequate knowledge of the regional gradient in the area.

vi) Costean Sampling

Introduction

A small pit was excavated at the peak of the geochemical anomaly at station 13300N 10075E. Disseminated to semi-massive sphalerite-galena-pyrite ± chalcopyrite mineralization was observed in a narrow ± 30cm wide band in greyish chlorite bearing 'shaley'

tuffs which were overlain by 60cm of recent quartz gravels. A small suboutcropping 'gossan' was subsequently located at 13297N 10083E. The gossan was a leached, highly porous, grey siliceous crust over fresh massive sulphide.

Analytical results from grab samples collected from the pit, the 'gossan' and associated sulphide mineralization are presented in the table below (all elements in ppm except where indicated).

Sample	Grid Location	Cu	Pb%	Zn%	Ag	Au	Fe	Ba	Mn	As	Cd	Mo	Bi
KR9504	13300N, 10073E	3125	11·92	11·05	130	·064	8600	30	505	75	420	2·5	26
KR9505	" "	3725	11·46	14·71	112	·096	7600	20	635	77	460	0·5	21
KR9506	" "	3650	6·3	8·72	87·5	·048	1·15	10	680	140	310	3·0	77
KR9507	" "	2500	3·37	13·6	47·5	·080	4500	10	280	85	465	1·5	20
KR9508	" "	1·33%	7·66	14·24	227	·080	1·950	X	740	150	535	1·0	260
KR9509	13297N, 10083E	2125	8·43	25·7	130	·664	2100	10	50	370	715	5·5	4·0
KR9510	13296N, "	175	2100	·84	12·5	·816	1·75	60	25	700	18	0·5	1·0
KR7033	" "	200	1·0	·595	35·5	·212	17·0	40	1650	480	12·5	3·0	X
KR7032	13296N, 10083E	1500	6300	17·0	76·5	·768	3100	20	65	410	495	2·5	X
KR6453	" "	475	16·16	38·74	390	2·3	4·86	30	150	900	1450	12	X

On the strength of these results, six shallow costeans were excavated on the northern part of the Voyager 19 grid between lines 12900N and 13400N. They were centred on the peaks of the soil geochemical anomalies but were excavated at the close of the field season and before the results of the infill sampling was available. Control was therefore based on the 100m x 25m sample density (see fig 10 and fig 13 for location of the costeans).

990

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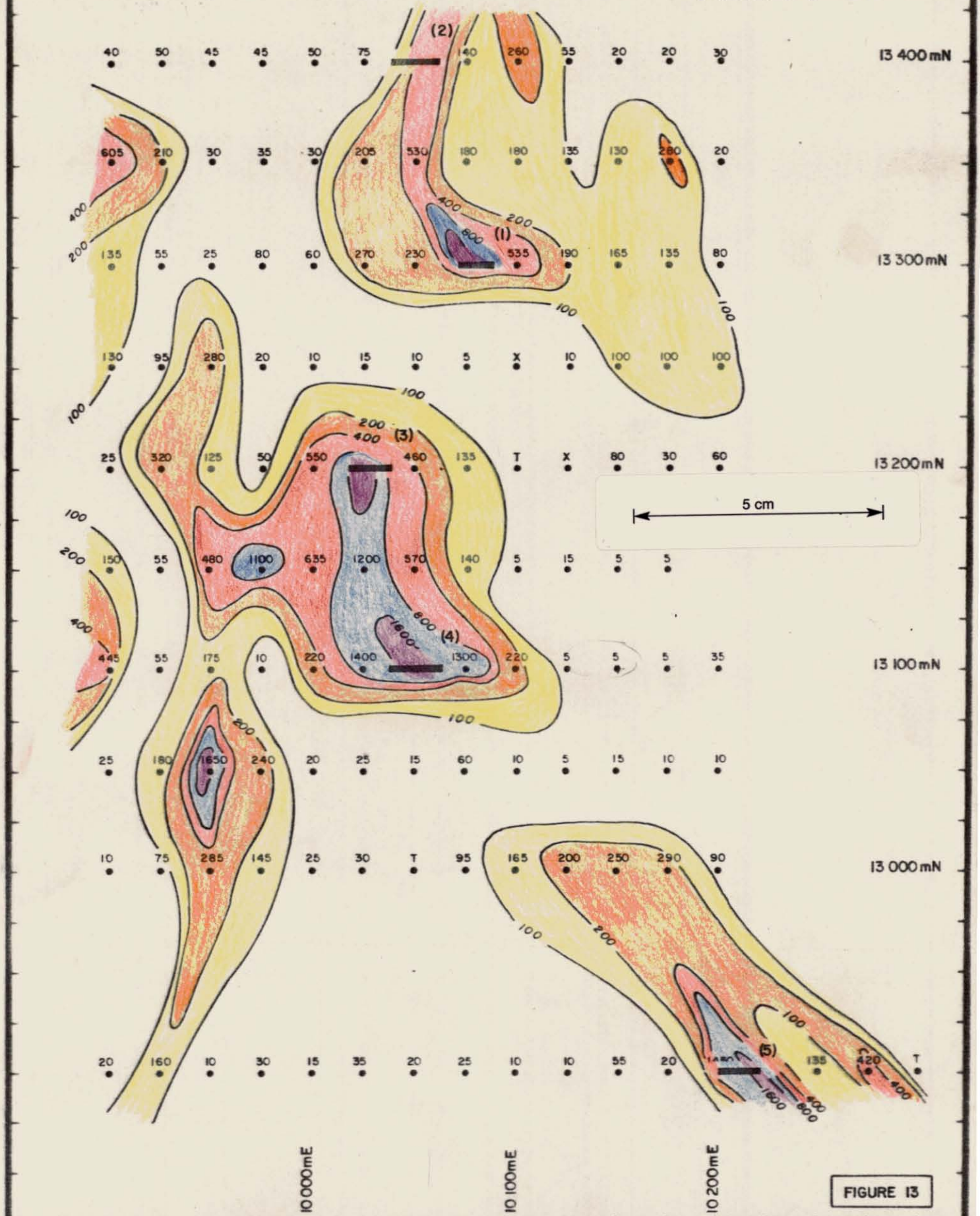


FIGURE 13

LEGEND

- 100 - 199 ppm
- 200 - 399 ppm
- 400 - 799 ppm
- 800 - 1599 ppm
- 1600+
- T TRACE SAMPLE
- X BELOW LEVEL OF DETECTION
- 35 SAMPLE SAMPLE LOCATION
- (2) COSTEAN

DATE: APRIL 81
GEOL: P.A.W
DWN: R.TOG.
CHK'D:

GEOPEKO
DEVONPORT BASE, TASMANIA

Scale 1:2 500

TS27/76-V19N-7

E.L.27/76 ELLIOTT BAY TAS.
VOYAGER 19N
LOCATION OF COSTEAN + Zn GEOCHEMISTRY

The purpose of the costeans was to expose bedrock and to collect bedrock channel samples to relate the C-horizon soil anomalies to host lithology.

Costean No. 1 Line 13300N 10074E - 10088E

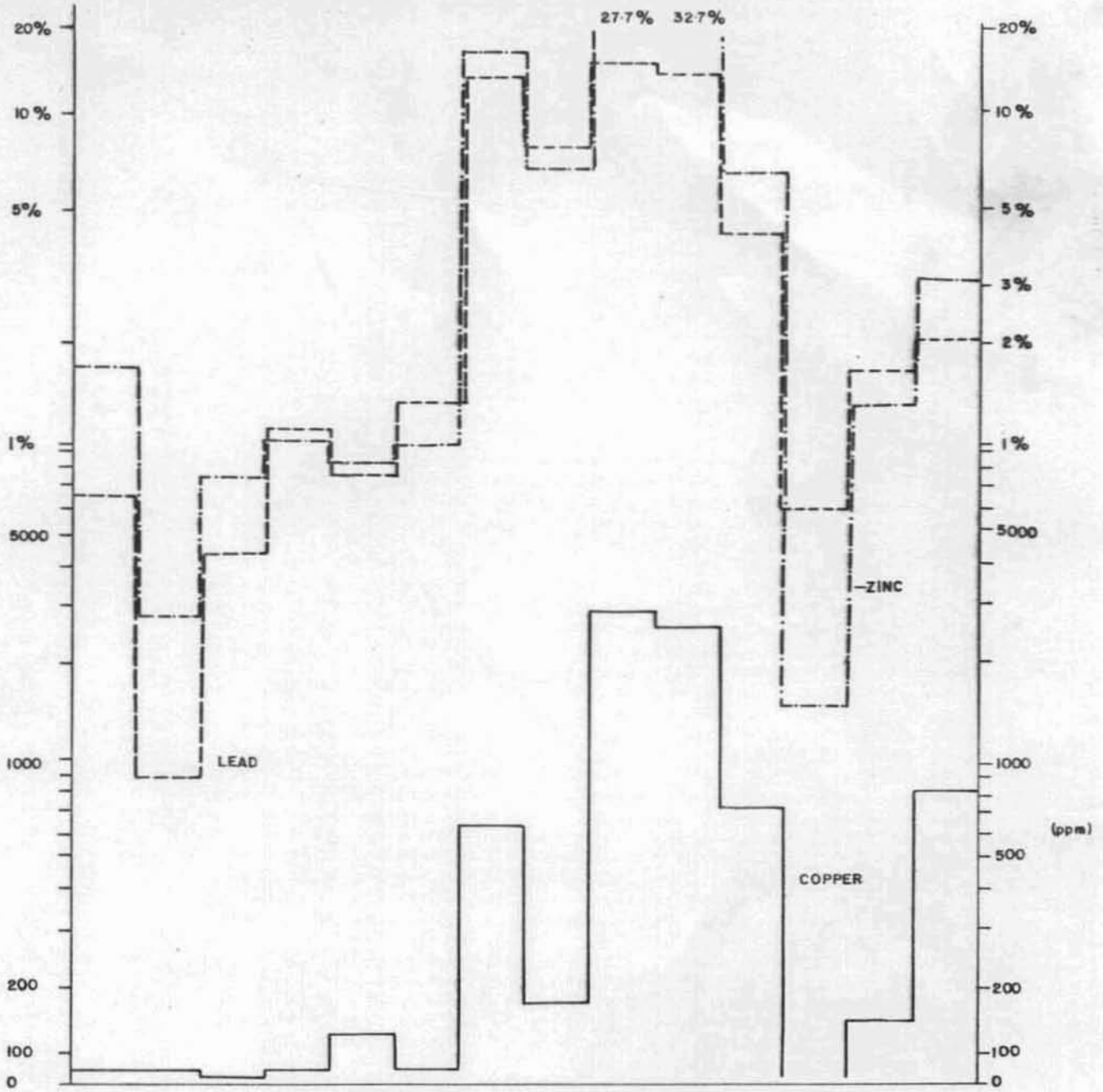
This costean was excavated from the aformentioned 'discovery' pit east along the grid line to intersect the massive sulphide lense north of the gossan outcrop (fig 4). The costean exposed a sequence of kaolinised and iron stained, quartz crystal, lapilli tuffs and a 6 meter wide sequence of well cleaved, dark-grey, chloritic, tuffaceous shales which contain three lenses of massive sphalerite-galena pyrite mineralization. The main lense is over 1m in width and comprises of competent brown to dark grey weathering banded sulphides. On a macro scale the sulphides display a mineral banding with honey-coloured, fine grained, 10-30mm thick sphalerite rich layers alternating with narrow 1-2mm wide coarsely crystalline bands of galena.

This banding parallels the regional cleavage which is near vertical throughout the costean. Bedding is readily apparent and is manifested on a macro-scale by the overall conformity of the sulphide lense with its host rocks. In hand specimen, relict bedding can be observed as irregular linear cavities which show evidence of primary slumping (plan 28).

Dips are everywhere near vertical and possibly indicate the ? sulphide lense occurs in the hinge zone of a minor antiform. At 10080E a minor sulphide lense displays bedding normal to the dominant cleavage in the hinge zone of a minor fold structure. Lineations produced by bedding cleavage intersections suggest a southerly plunge to the mineralized lenses.

068

791069 COSTEAN LINE 13300N 10074-100



Im CHANNEL SAMPLES GEOCHEMICAL RESULTS (LOGARITHMIC SCALE)

GEOLOGICAL SECTION

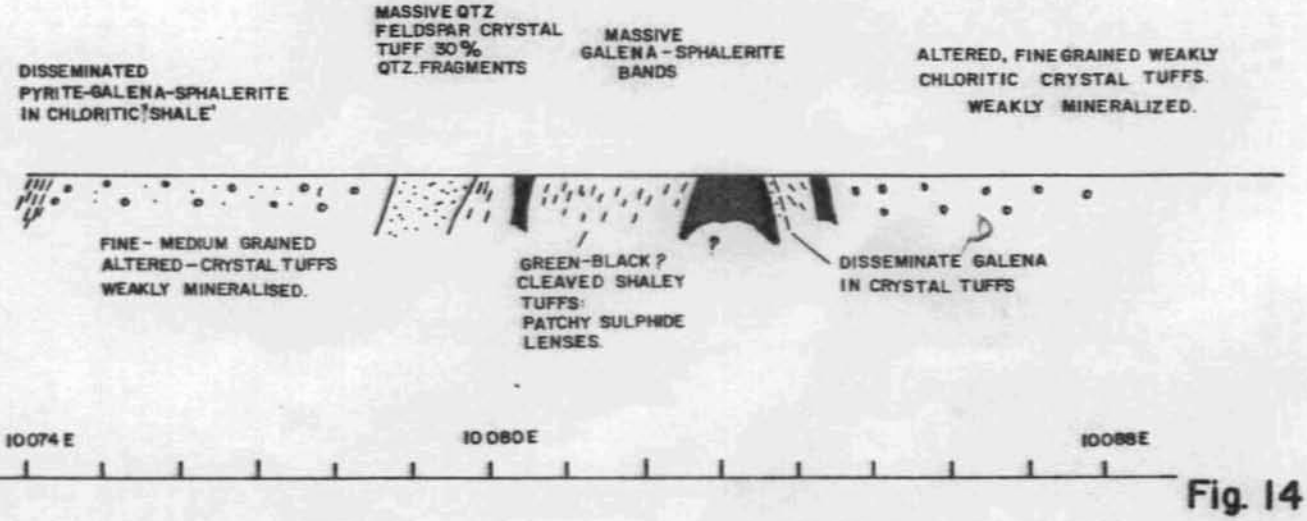


Fig. 14

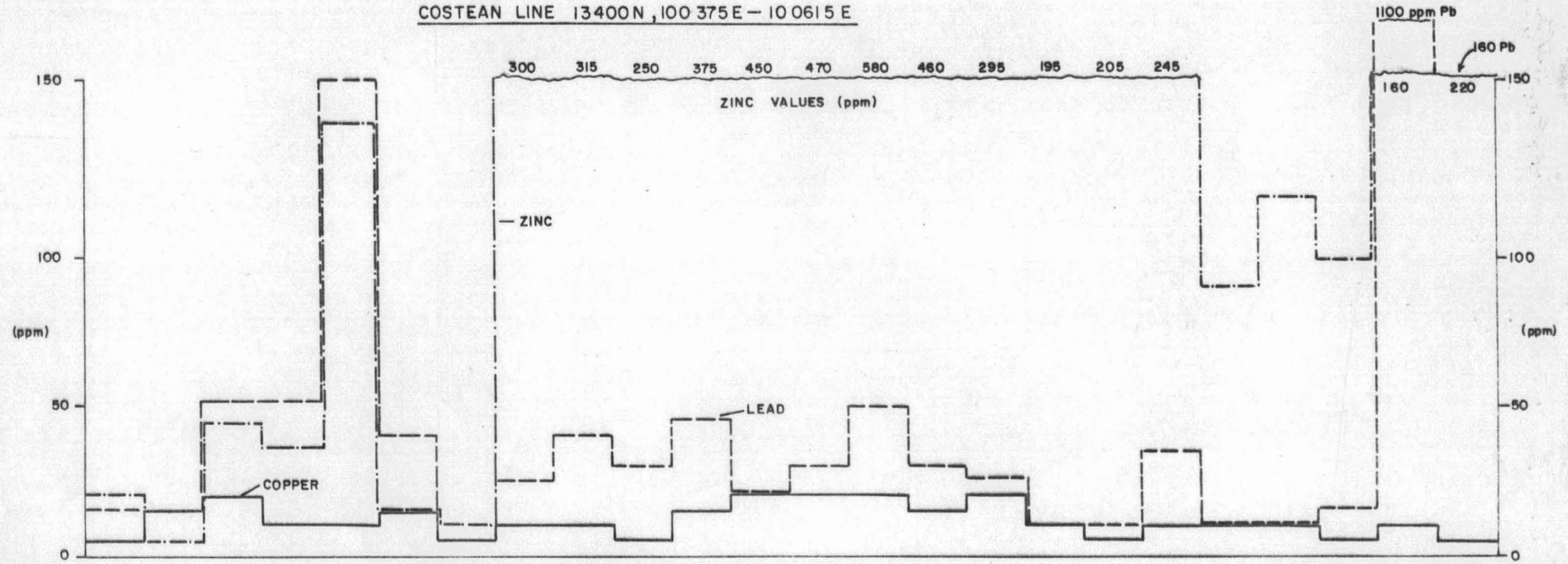
One metre channel samples collected along the base of the costean furnished the following results.

Sample No.	Interval (m)	Cu	Pb	Zn	Ag	Au
KR 9301	10074-75	50	6600	1.87%	X	0.017
KR 9302	10075-76	50	900	2825	X	X
KR 9303	10076-77	25	4650	7625	X	0.008
KR 9304	10077-78	50	1.14%	1.07%	2.5	X
KR 9305	10078-79	125	7600	8225	5	0.025
KR 9306	10079-80	50	1.36%	9900	10	0.075
KR 9307	10080-81	650	12.59%	15.89%	225	1.02
KR 9308	10081-82	175	7.75%	6.9%	20	0.067
KR 9309	10082-83	2900	13.95%	27.7%	175	0.733
KR 9310	10083-84	2650	12.72%	32.7%	220	0.658
KR 9311	10084-85	775	4.13%	6.53%	50	0.133
KR 9312	10085-86	25	6000	1700	X	X
KR 9313	10086-87	150	1.73%	1.3%	5	0.008
KR 9314	10087-88	800	2.16%	3.05%	22.5	0.067

An average grade of 10.23%Pb, 17.94%Zn and 138ppm Ag is indicated over the main 4m wide zone. The gold content of the sulphide lense is in the range 0.6-1.0ppm although a grab sample of massive sulphide returned a value of 2.3ppm suggesting that higher values may be expected.

Costean No. 2 13400N 10037.5E - 10062.5E

This costean was excavated to examine the minor Pb-Zn anomaly (165ppm Pb, 500ppm Zn) thought to represent the northern continuation of the mineralization observed on line 13300N.



1m CHANNEL SAMPLES GEOCHEMICAL RESULTS.

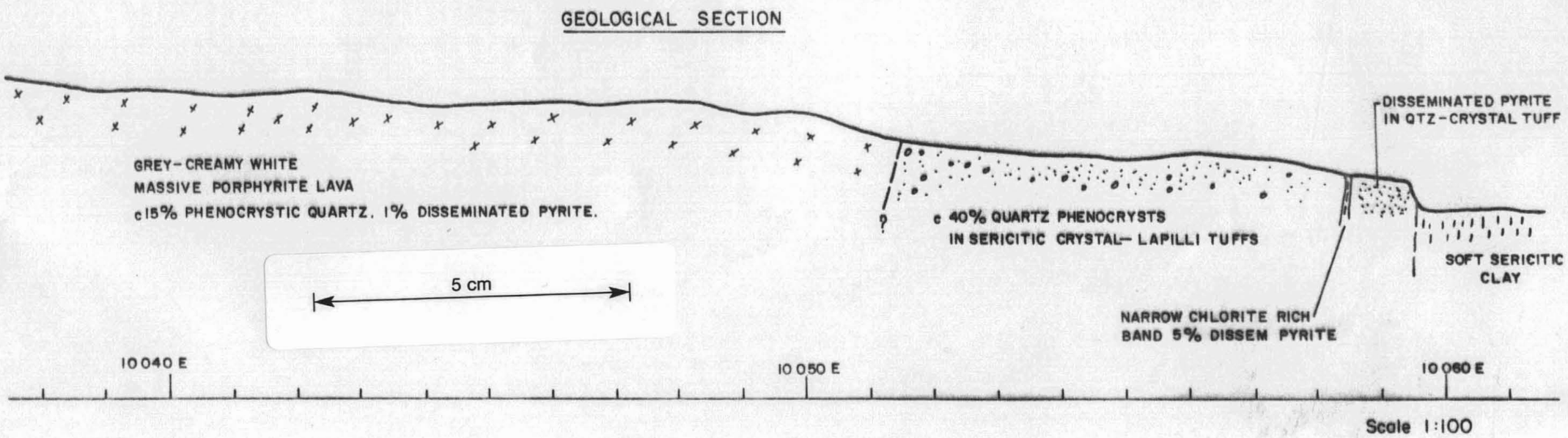


Fig. 15

The costean exposed a thick unit of creamy white lava containing between 15% and 30% phenocrystic quartz. This unit represents the eastern contact of the porphyritic lava which is a dominant lithology in the north-central part of the Voyager 19 grid. A deeply altered 'clayey sericitic tuff' was intersected in the final and most easterly 2m of the costean.

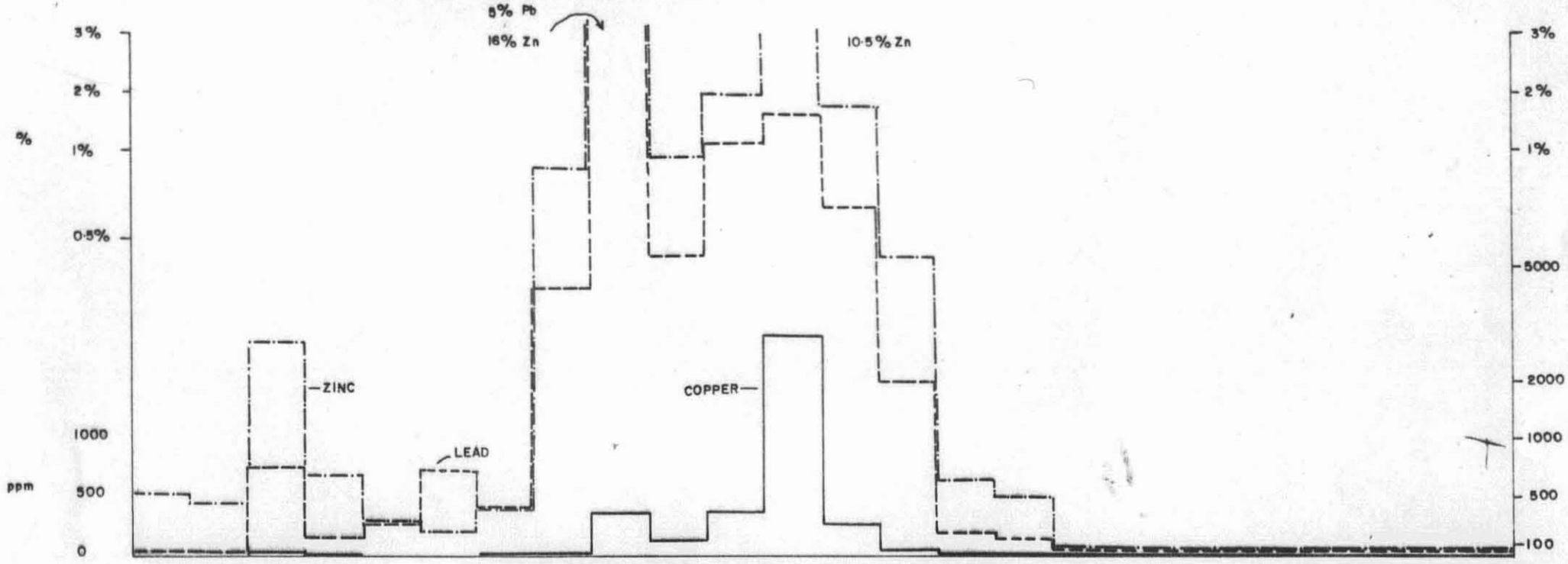
Channel samples returned low values which reflect the soil sample results across the porphyritic lava unit (see fig 15). However a increase in lead values of upto 1100ppm against a general background of 20-40ppm was recorded in the altered tuffs at the eastern extremity of the costean.

Costean No 3 13200N 10017.5E - 10036.5E

This costean was sited to check the anomalous C-horizon sample at 13200N 10025E (3000ppm Pb, 5800ppm Zn). In the eastern half of the costean a massive cream fine grained porphyritic lava was exposed which is similar to the porphyry described in costean No. 2. A varied sequence of well cleaved chlorite rich, quartz crystal lapilli tuffs occupy the western part of the costean. Mineralization was observed as disseminated pyrite throughout the tuffs and two narrow 5-10cm bands of massive sphalerite-galena-pyrite mineralization were noted (fig 16).

Channel samples returned values of 2.01% Pb, 5.83% Zn and 34.5ppm Ag over the 5m interval between 10021.5-10025.5E with a peak value of 17% combined Pb-Zn from 10021.5-10022.5m. These values indicate the presence of disseminated Pb-Zn mineralization in the tuffs as a 'halo' around the two massive sulphides bands.

COSTEAN LINE 13 200 (N) 10 013·5 E — 10 037·5 E



1m CHANNEL SAMPLES GEOCHEMICAL RESULTS.

GEOLOGICAL SECTION

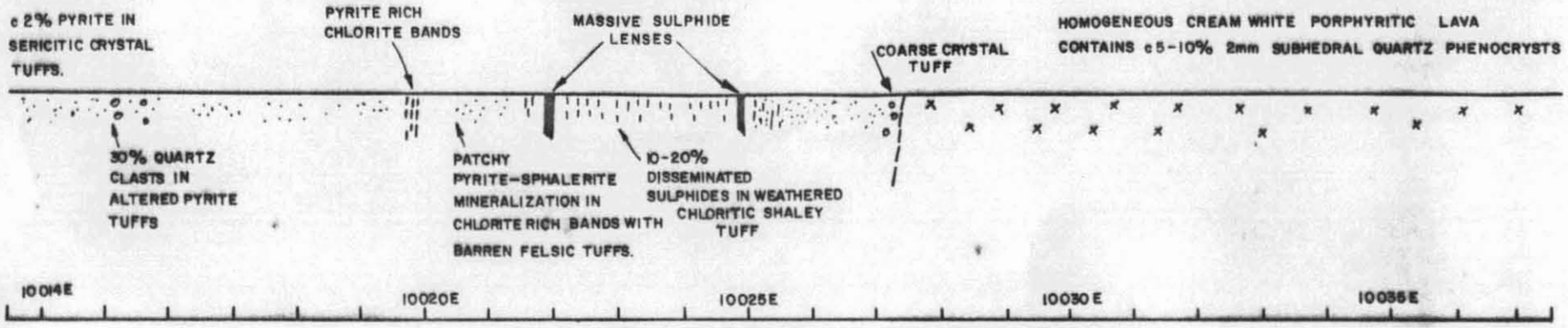


Fig. 16

79 10 73 58

The sharp contact between the 'footwall' porphyritic lavas is very apparent in the geochemical profile presented in figure 17. A coarsening of grain size in the tuffs at this contact could indicate a facing to the west. If this mineralization is to equated with main 'lense' on line 13300N then a fault displacement of 50m has to be involved.

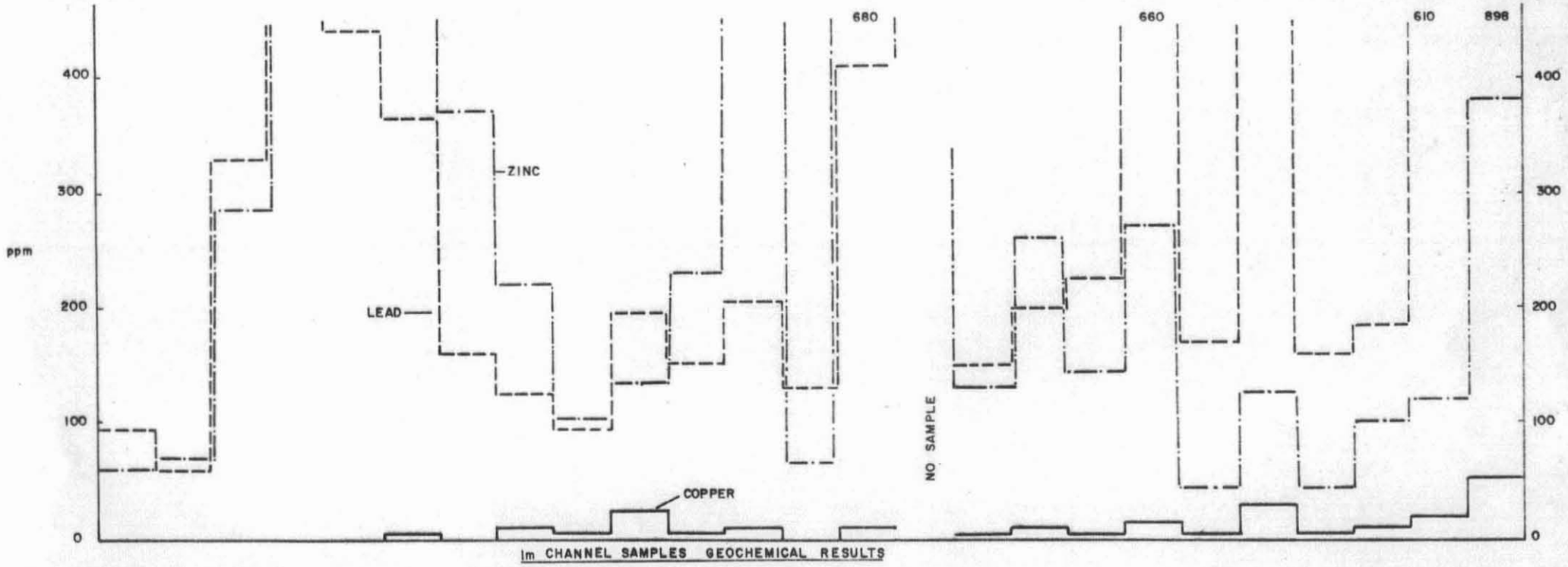
Costean No. 4 Line 13100N (10037.5-10062.5E)

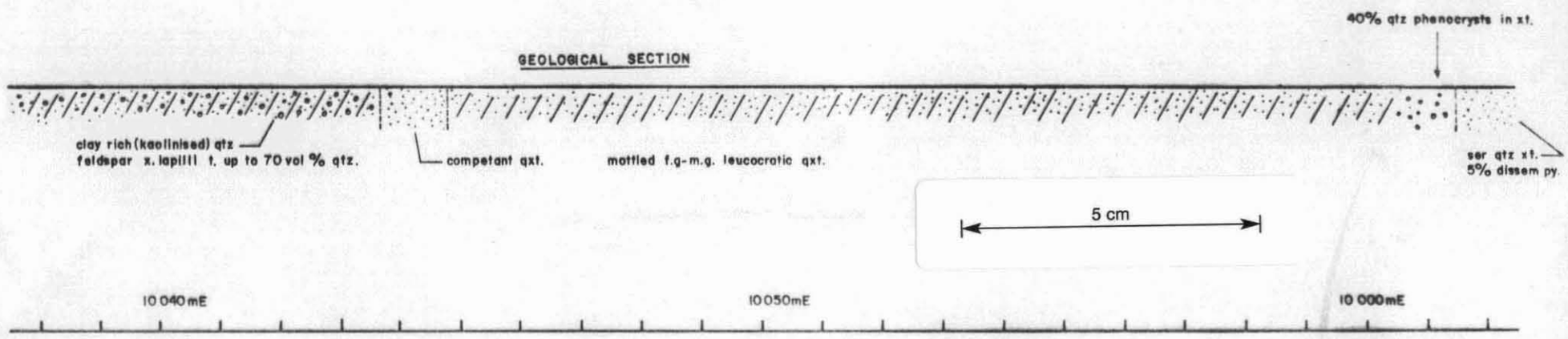
This costean was excavated on the southern extremity of the flat lying strip of marshy ground adjacent to the outcrops of porphyritic lavas and tuffs on the northern flank of Wart Hill. A soil sample value of 850ppm Pb and 2200ppm Zn was recorded at 13100N 10050E and marks the southern boundary of the main Pb-Zn soil anomaly.

A sequence of quartzo-feldspathic crystal tuffs was exposed in the costean. The tuffs contained between 30% and 70% rounded quartz 'phenocrysts' but are different to the porphyritic lavas in their colour, high sericite content and higher cleavage retention. Apart from a narrow pyrite-chlorite rich band in the eastern extremity of the costean (10062E) mineralization was absent. This conclusion is confirmed by the geochemistry which returned values of 60-895ppm Pb and 60-835ppm Zn (fig 17).

During the excavation of the costean a small outcrop of massive sphalerite-galena pyrite mineralization was recorded at 10080E 1304E.

COSTEAN LINE 13 100mN, 10 037·5-10 062·5mE





SCALE 1:100

Fig. 17

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60

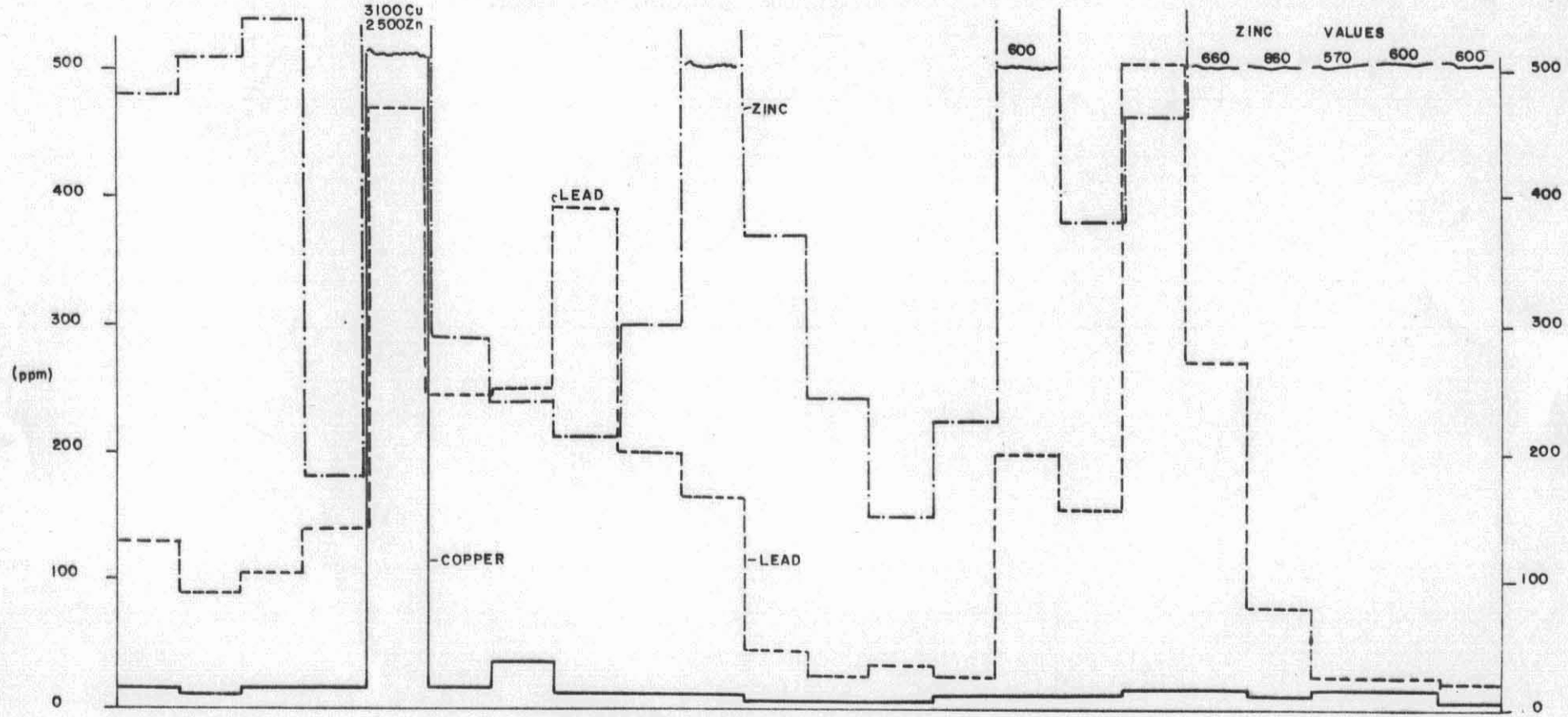
Costean No. 5 12900N (1020E - 1022E)

This trench was excavated on the north-eastern slope of Wart Hill and exposed a sequence of grey-buff coloured quartzo-feldpathic crystal lapilli tuffs. Mineralization was noted in the form of widely disseminated pyrite cubes and in pyrite rich, ovoid, chloritic lithic fragments upto 2cm in diameter. Geochemical results were disappointing with a highest value of 3100ppm Cu, 470Pb and 2500ppm Zn in apparently unmineralized tuffs over the interval 10204-10205E (fig 18).

Costean No. 6 12100N (10062.5E-10088.5E)

The final costean was excavated on the southern slope of Wart Hill in order to explain the spot high value of 915ppm Cu, 885ppm Pb and 4700ppm Zn. A uniform sequence of sericitically altered crystal tuffs was exposed in the costean. A thin veneer of iron oxides was present as a resistant coating above the tuffs which made the sampling very difficult. Geochemical results were generally low (fig 19) but showed a positive increase to the east.

COSTEAN LINE 12900 N 10200–10222 E



1m CHANNEL SAMPLES GEOCHEM RESULTS

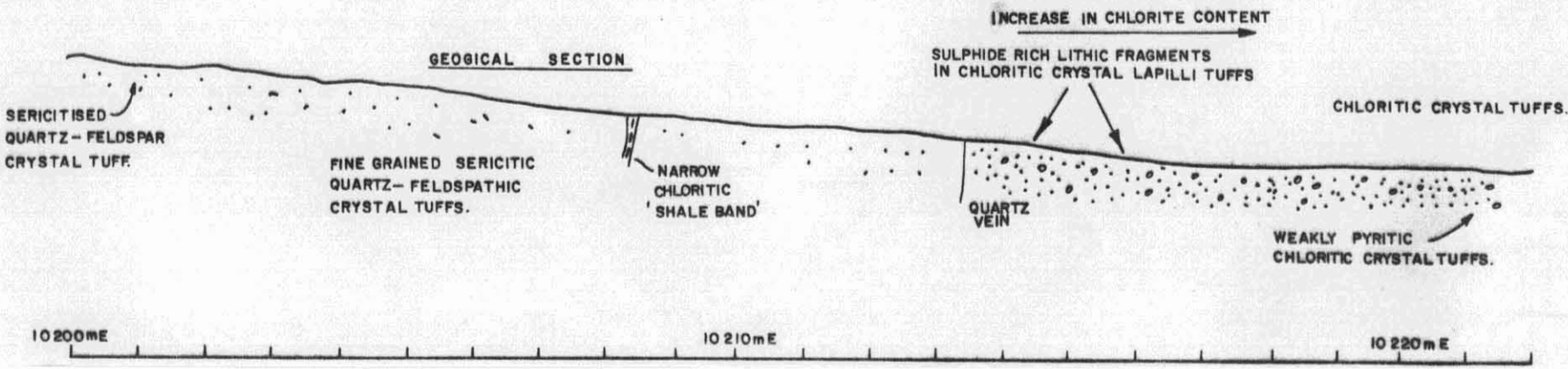
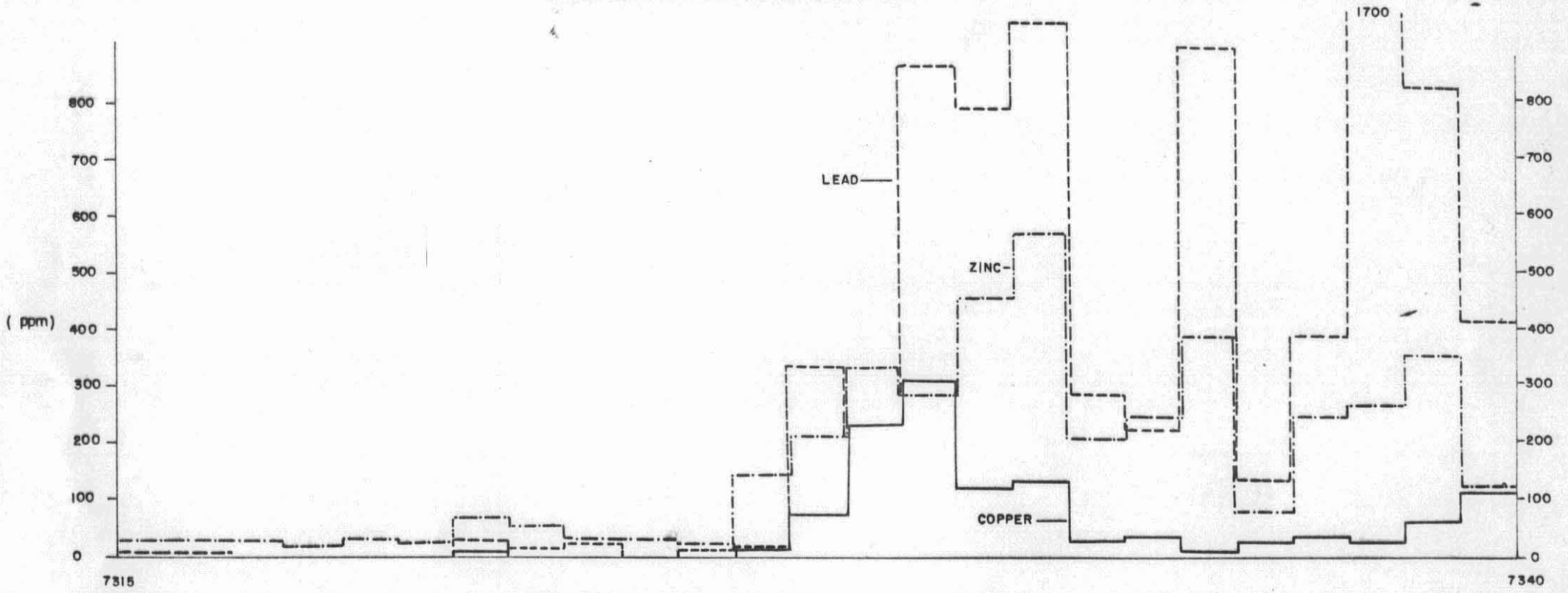
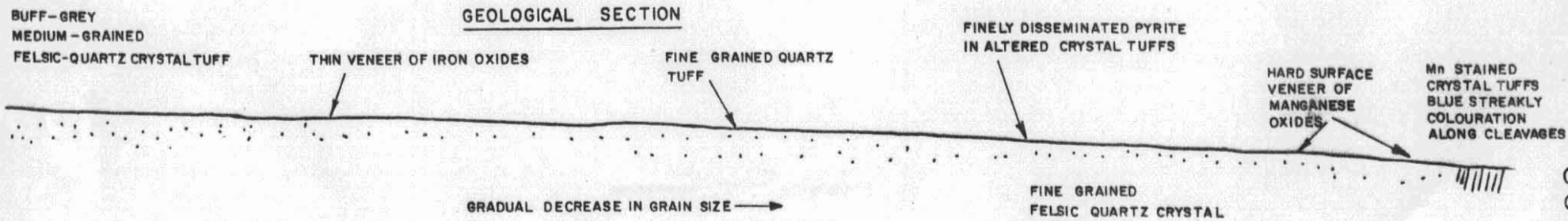


Fig.18

COSTEAN LINE 12 100 N 10062·5 — 10088·5



GEOLOGICAL SECTION



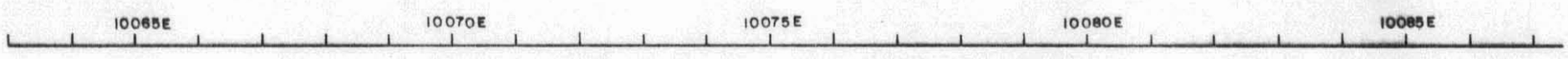


Fig. 19

3.4 VOYAGER 29

i) Introduction

Voyager 29 is the area immediately south of Voyager 19 and west of Voyager 22. Line 11000E denotes the line of demarcation between Voyager 29 and Voyager 22, the two grids being contiguous. The area initially attracted interest following the discovery of strong zinc anomalies in soils at the western ends of reconnaissance grid lines over the Voyager 22 alteration zone (R.R. Large, 1981).

Voyager 29 has been gridded from 10000E to 11000E on lines spaced 200m apart between 10000N to 11600N.

ii) Geology

Most of the area is open button grass plain with large patches of white quartz rubble but very little geological exposure. However, the available outcrops have been inspected and a rough geological plan was compiled at 1:2500 scale (plan 52). The plan is self-explanatory; geological boundaries are inferred rather than mapped, due to lack of exposure.

The rocks of the Wart Hill Pyroclastics are typical of this area and include chloritic quartzo-feldspathic crystal/lithic tuffs, sericitic quartz crystal tuffs and fine grained quartz (feldspar) porphyritic extrusives identical to that exposed north and west of Wart Hill.

Included in the pyroclastic group, at the west of the grid is a narrow horizon, generally no more than 5-10 metres thick, of laminated micaceous quartz sandstone, evidently representing a period of clastic sedimentation of Tyennan Block provenance.

This bed is a useful marker horizon amongst the generally massive pyroclastics and has a regular northerly strike, steep westerly dip and appears also to face to the west.

At the eastern end of the grid the pyroclastics are in (probably unconformable) contact with correlates of the Tyndall Group which consist of coarse pebbly sandstones, fine quartz sandstones and pyritic carbonaceous siltstones which occupy the much thickened 'nose' of the Mt. Osmund syncline.

iii) Geochemistry

C-horizon soil samples were obtained by Jacro power auger on lines spaced 200m apart between 10400N and 11600N inclusive. Samples were taken at 25m intervals along lines and the -80 mesh fractions were analysed for Cu, Pb, Zn, Ag, Fe and Mn.

The analytical results, contoured for zinc and iron, are shown on plans 53-57 and several significant zinc anomalies are indicated, occurring as narrow, north-south elongate zones mainly at the western and eastern edges of the sampled area. The eastern anomalies are considered most interesting; they lie within the acid pyroclastics adjacent and parallel to the Tyndal unconformity and are perhaps stratigraphicially equivalent to the known mineralization at Voyager 19.

This anomly peaks at 3.2% zinc (which is comparable to Voyager 19 results) and is vaguely supported by iron, lead and copper.

The elongate form of the anomalies is clearly due to the sampling interval of 200x25m. There is plenty of 'room' for a massive sulphide occurrence to exist within this spacing. It has been shown at Voyager 19 that, due to the lack of a geochemical dispersion halo, a soil sample spacing of 50x12.5m is barely adequate for anomaly definition. (see 3.3 iv.)

Further infill sampling in this area and probable extensions to the south will be required.

iv) Geophysics

A Gradient Array induced polarization survey of the Voyager 29 grid was completed late in the 1981 season, the results are presented in plans 58-60.

3.5 VOYAGER 22

i) Introduction

Voyager 22 represents an area of hydrothermally altered Wart Hill Pyroclastics on the south-eastern flank of the Osmund Syncline. The alteration is manifested by patchy, fracture controlled iron staining representing the oxidised pyrite alteration.

In the previous field season four 400m spaced grid lines were surveyed across the area from the northern extension of the Voyager 9 base line. C-horizon soil samples were collected along these lines at 25m intervals using the Jacro rig and anomalous values were recorded for zinc.

An orientation rock chip sampling program showed the rocks to be anomalous in Cu, Pb, Zn, Ag and Au. Consequently the area was designated priority 5 for the 1980-1981 field season a rating which was dependent upon the conclusions arising from the investigation of the Voyager 19 and Voyager 9 areas.

A grid measuring 1.2km by 1.6km was surveyed over the area as an extension of Voyager 19-Voyager 24- Voyager 29 system. Cross lines were placed at 200m intervals and sampled by a combination of Jacro rig and hand held power auger in the more inaccessible areas.

ii) Geology

At this stage geological mapping of the Voyager 22 area is still at a reconnaissance stage. A 1:10000 geological map was compiled using the enlarged aerial photographs as a base map in order to control the extent of the proposed grid (plan 61). Four principal lithological units were recognised and are from east to west:

1. A sequence of quartzo feldspathic lapilli crystal tuffs.

2. An extensive unit of fine-grained white-grey porphyritic lava.

3. A variable sequence of medium to coarse grained lithic crystal tuffs, agglomerates and lavas.
The pyroclastics have an overall rhyolitic composition and vary from coarse felsic agglomerates in the east and pass upwards into a thin discontinuous chloritic tuffaceous shale unit and iron stained chloritically altered lithic crystal tuffs.

4. Flanking the Osmond Syncline on the western margin of the Voyager 22 grid are a mappable sequence of well bedded lapilli crystal tuffs and lithic tuffs. They are patchily iron stained and difficult to isolate from the underlying pyroclastics. However a noticeable decrease in grain size and degree of sorting occurs in outcrops further to the west thought to be indicative of re-working. Here the rocks can be termed tuffaceous sandstones and probably correspond to the Tyndall Group correlates as recognised on the eastern margin of the Voyager 19 and Voyager 29 grids.

iii) Geochemistry

18 rock chip samples were collected in the course of the reconnaissance mapping and furnished the following results:

Sample No	Cu	Pb	Zn	Ag	Fe	Mn
KR 7010	10	X	60	X	1.2%	30
KR 7011	300	20	370	0.1	0.5%	380
KR 7012	145	20	305	0.1	12.1%	470
KR 7013	50	15	390	0.1	0.95%	645
KR 7014	5	X	15	X	5950	30
KR 7015	15	10	25	0.1	1.9%	180
KR 7016	705	590	410	9.3	7.9%	190
KR 7017	15	10	300	0.2	2.5%	500
KR 7018	5	X	15	X	2650	40
KR 7019	5	X	X	X	2200	50
KR 7020	15	10	175	0.1	5.9%	205
KR 7021	5	5	30	X	5150	35
KR 7022	5	15	115	X	2.8%	310
KR 7023	5	10	110	X	2.15%	580
KR 7024	5	35	60	0.1	1.5%	155
KR 7025	115	35	125	0.1	6.5%	950
KR 7026	X	5	70	X	1.25%	90
KR 7027	140	15	45	1.2	7.55%	105

Sample locations are shown in plan 61.

262 C-horizon soil samples were collected at 25m centres along 200m spaced grid lines. The results Pb and Zn are plotted in contour format in plans 63 and 64.

Element	Range(ppm)	Mean	Standard deviation
Cu	X - 150	5 (approx)	-
Pb	X - 585	25.2	61.5
Zn	10 - 2000	114	20.6

X is below the detection limit of 5ppm. (zero was used in calculation of mean and standard deviations.)

Three Pb-Zn anomalies, as defined by the 100ppm contour interval, are considered to be of importance on the Voyager 22 grid. Two occur as linear anomalies and cross lines 10400N-10600N with spot vales of upto 0.2%Zn. The most westerly of the two anomalies follows the contract of the Tyndall Group correlates and the eastern anomaly occupies flat-lying ground. A third single station anomaly occurs in the extreme NE corner of the grid and has values of 585ppm Pb and 1400ppm Zn.

3.6 VOYAGER 31

i) Geology and Rock Geochemistry

The name Voyager 31 refers to the general environs of lead-zinc-silver mineralization discovered in the bank of Copper Creek at about 5,250,700N (AMG) during reconnaissance mapping and stream sediment sampling in March, 1981.

Copper Creek more or less follows the contact of the Sassy Creek Argillites with the Wart Hill Pyroclastics. The contact is generally sharp and apparently conformable with layering in the argillites, suggesting a depositional rather than faulted boundary. It is considered that the contact is broadly conformable with minor local disconformities.

Mapping has so far been confined to the main stream of Copper Creek north of 5,248,000N and a major tributary stream, Pleasant Creek, which drains the northern edge of the Voyager 19 grid (plan 65). The Wart Hill Pyroclastics are represented by siliceous and commonly chloritic lithic and crystal tuffs rather similar to those found on the western part of the Voyager 19 grid. The argillites are typically grey to black, massive to finely laminated phyllites, slates and siltstones, often containing minor pyrite. They invariably have a strong cleavage striking NNE sub-parallel to layering and are locally tightly crenulated with minor fold axes plunging moderately to steeply to the north. The tuffaceous siltstones, sandstones and conglomerates in Pleasant Creek are considered to 'belong' to the Sassy Creek Argillite group and were probably deposited in localized shallow-water facies at the onset of clastic sedimentation.

Regional geol, outcrop pattern & style of mineralization suggest Wart Hill Pyroclastic - Sassy Ck Argillite contact may be a major fault!

The mineralization consists of pyrite, galena and sphalerite in a network of fine veinlets in brecciated and silicified acid volcanics immediately adjacent to the contact.

The principal observed occurrence outcrops over a length of about 80 metres in the east bank of Copper Creek at 377,800E/5,250,700N (AMG). Three chip samples from this zone returned the following assays:

Sample No	Cu	Pb	Zn	Fe	As	Ba	Mn	Ag	Au
	%	%	%	%	%	ppm	ppm	gm/t	gm/t
KR 9491	0.003	5.46	4.75	5.0	2.8	180	140	52.5	0.204
KR 9492	0.0021	1.78	2.28	2.2	0.62	260	385	20.0	0.056
KR 9493	0.001	1.24	0.24	5.2	3.2	260	45	27.5	0.320

Average grade over the length of the exposure is estimated at 2.0% combined lead and zinc with 10-20gm/t silver.

Similar but weaker mineralization was also observed about 500 metres downstream from the above locality (no assays available) and also 1.2km north-east in Pleasant Creek. In the latter case, mineralization consists of disseminated galena-sphalerite in silicified volcanics adjacent to the 'argillite' contact. They are exposed in the stream for about 100m, apparently across strike. The argillite/pyroclastic contact in this area is complicated by a spectacular intrusion breccia in which evidently mobile black pyritic siltstone has been intruded amongst coarsely brecciated fragments and blocks of the volcanic rocks, probably during tectonic deformation.

Three chip samples from this area were analysed as follows:

Sample No	Cu	Pb	Zn	Fe	Mn	Ba	Ag	Au	Sn	W
	ppm	ppm	ppm	%	ppm	ppm	gm/t	gm/t	ppm	ppm
KR 9479	25	170	1150	1.17	165	1150	0.5	0.008	3	10
KR 9480	20	75	125	2.13	25	1100	0.5	0.008	3	10
KR 9481	35	370	1200	0.68	25	1250	1.0	0.008	8	10

* KR 9481 is a sample of pyritic black siltstone involved in the intrusion breccia.

ii) Stream Geochemistry

-80 mesh stream sediments in the lower 300m of Pleasant Creek and for about 3km down Copper Creek are anomalous in zinc. Two small west flowing tributaries and one sample from the main stream are also anomalous in lead. Values range upto 470ppm Zn and 140ppm Pb compared with regional threshold levels of 35 and 30ppm respectively. (Refer to plans 69 and 70.) All tributary streams draining both the volcanics and the argillite units are anomalous in zinc.

Several sporadic tin and tungsten anomalies exist in -80 mesh sediments of Copper Creek (KT 27/76, 5E) but curiously, these are not supported by the panned concentrate analyses.

iii) Discussion

The mineralization is structurally controlled within breccia zones apparently localized along the pyroclastic/argillite contact but possibly fairly extensive in terms of strike length. Proposals for additional work are presented in the summary section.

3.7 GENERAL CONCLUSIONS AND RECOMMENDATIONS

i) Summary

The discovery of massive sphalerite-galena mineralization north of Wart Hill on the Voyager 19 grid has not only confirmed the pedigree of this part of the Mt. Read Volcanics but has also confirmed the effectiveness of Geopeko's exploration approach in this area. Recognition of hydrothermal alteration in the volcanic pile at a regional reconnaissance level, followed by soil geochemistry and detailed mapping resulted in the location of galena-sphalerite-chalcopyrite-pyrite mineralization at three localities on the Voyager 19 grid (fig 13).

The principal controls of the mineralization are as yet unclear but it appears to be stratabound and related to a thin (< 20m) chloritic tuffaceous shales horizons within quartzo feldspathic crystal tuffs, adjacent to a barren porphyritic lava unit. The close proximity of the upper Cambrian unconformity could also be a significant factor.

The mineralization has many features in common with the Rosebery style of mineralization, but a notable difference being the absence of a barite rich mineralized zone and absence of an underlying copper rich zone (Braithwaite 1974). However the complex association of altered rock types, which include course agglomerates on Wart Hill (ss), may represent an eruptive centre and be the host rocks to a copper rich 'proximal' style of mineralization.

A similar stratigraphy to Voyager 19 has been traced to the south into the Voyager 29 area where a value of 3% Zn was recorded in a soil sample at 10400N 10750E. This sample could lead to the location of another massive sulphide lense. If this is the case then a favourable mineralized horizon, with a strike length of over 3km, is indicated.

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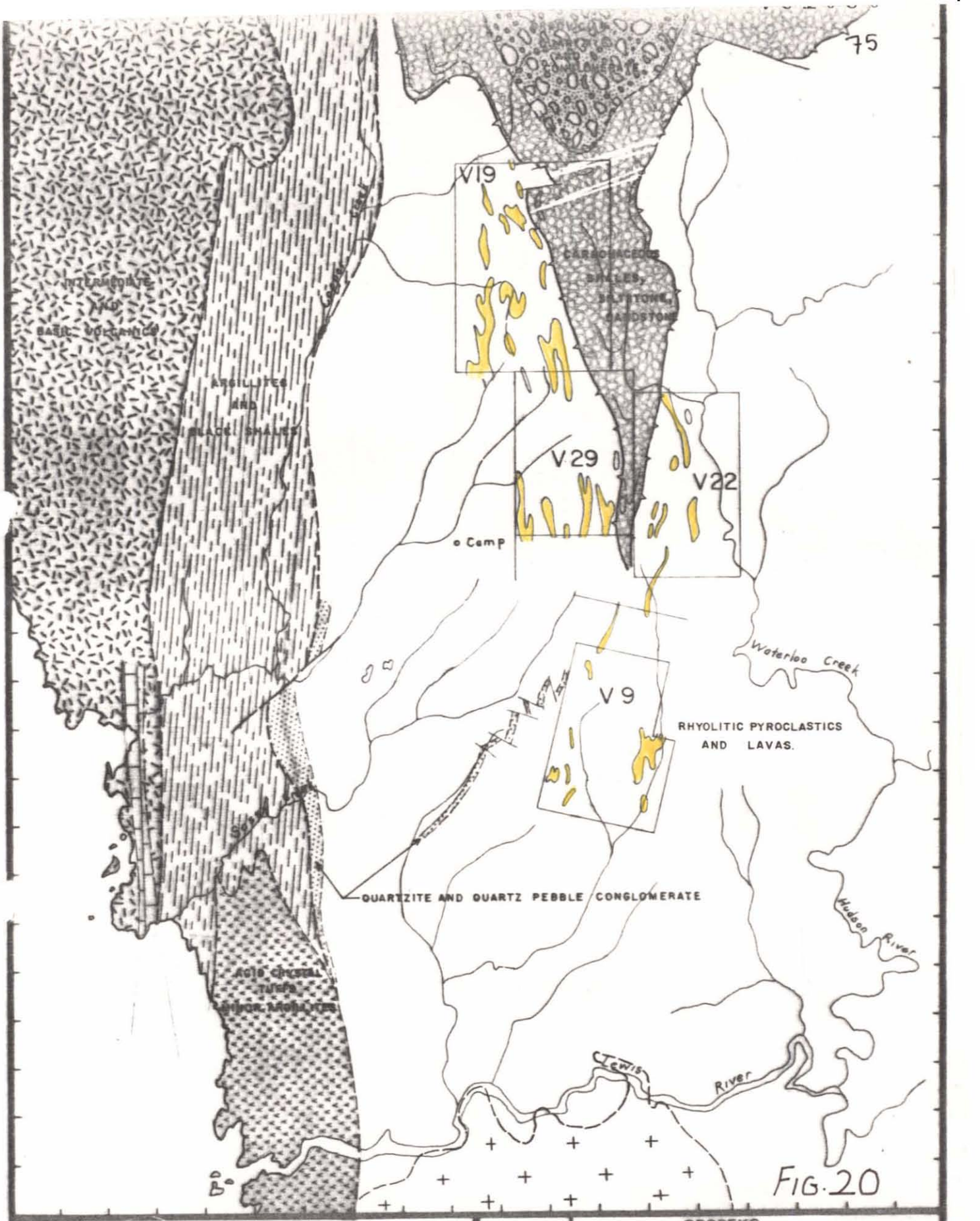

FIG. 20

LEGEND:

C- HORIZON ZINC ANOMALIES
(200 - 20 000 ppm Zn)

5 cm

GEOPEKO

Scale: 1:42 000

ATTACHMENT 4

ELLIOTT BAY
ANOMALOUS ZINC (>100 ppm)
IN WART HILL PYROCLASTICS

DATE:
GEOL:
DWN:
CHKD:

On the eastern side of the Osmund syncline a broadly similar lithological sequence is present. Here a barren porphyritic lava, similar in composition to the Voyager 19 porphyry, has shaley chloritic tuffs marginal to it which are anomalous in Pb and Zn.

At the top of the Wart Hill Pyroclastics along Copper Creek, Pb-Zn mineralization was recorded over a continuous strike length of 200m and is associated with brecciated acid volcanics adjacent to the contact of the Sassy Creek Argillites. Further reconnaissance suggests this mineralization extends for over a total strike length of 2km adjacent to this contact (see section 3.6).

In the vicinity of Voyager 9 a different style of mineralization to Voyager 19 is suggested by the diverse rock types and style of alteration. Drilling of a copper soil anomaly and IP zone in the northern part of the grid highlighted the hydrothermal chlorite-magnetite-pyrite alteration which accompanied brecciation and silicification of the host rocks. The location of this Voyager 9 area adjacent to an inferred lineament places it in a similar structural/stratigraphic setting to Mt. Lyell. The large, high intensity magnetic anomaly on the Voyager 9 grid remains a good target for a magnetite-chalcopyrite (gold) mineralized body. Furthermore a significant Pb-Zn soil anomaly occurs on the eastern margin of the Voyager 9 grid and also remains untested.

The two principal styles of mineralization which are represented in the Mt. Read Volcanics in the Queenstown-Rosebery area are also likely to be present in the Wart Hill Pyroclastics:

1. 'Distal' stratabound volcano-sedimentary Pb-Zn-Cu-Ag mineralization similar in style to the Rosebery and Que River deposits has been located at Voyager 19 and is likely to occur in the Voyager22-Voyager 29 and Voyager 31 areas.

2. Proximal style disseminated Cu (Au) mineralization hosted in tuffs and lavas is likely to be present at Voyager 9 and in the Wart Hill (ss) area of Voyager 19.

ii) Exploration Procedures and Problems

C-horizon geochemistry has proven to be an effective technique for locating mineralized lenses as a follow up to an initial geological reconnaissance reliant on the recognition of hydrothermal alteration in the volcanic pile. Stream sediment geochemistry is of little use in this environment (Large, 1981) for two principal reasons. 1) there appears to be very little dispersion of metals into the zone of weathering as shown by the fresh sulphides at Voyager 19 and

2) once in solution the metals do not appear to precipitate in the streams, there is no drainage anomaly downstream from the Voyager 19 sulphides.

The grid sampling configuration is extremely important for the location of mineralized lenses which have virtually no secondary dispersion halo and only a very narrow primary halo.

A 100m x 25m sample density can be considered an absolute minimum for the initial definition of anomalous areas. Optimum sample spacing for definition of mineralized bands for costean work or drill targetting purposes is in the order of 25m x 5-10m.

The responsiveness of the Pb-Zn mineralization to electrical geophysical techniques is very sensitive to the sphalerite/total sulphide ratio and the volume of disseminated sulphide around the massive lenses. At Voyager 19 the massive sulphide lenses have a sphalerite-galena ratio of approximately 2:1 and only a narrow halo of disseminated sulphides. Moreover, the proximity of the mineralized horizon to a suboutcropping thick sequence of black, pyritic siltstones may mask any marginal response to EIP and EM techniques. However in hand specimen the massive sulphide mineralization is weakly conductive. As yet there is insufficient geological evidence to be able to ascertain the subsurface extent of the mineralization or the attitude of the contact between the pyritic siltstones and the volcanics.

Further exploration in the area should build upon the framework of the 1980-1981 field season which was led to the recognition of a favourable environment which has a good chance of hosting an economically viable deposit.

(iii) Proposals to further work

At this stage the full potential of the Wart Hill Pyroclastics has not been totally assessed and further exploration should adopt a two-fold philosophy:

- To investigate the geological setting and economic potential of the mineralization on the Voyager 19, Voyager 29 and Voyager 22 grids by detailed geological mapping, infill sampling, costeaning and drilling.

- To extend these findings to include adjacent areas with similar stratigraphy by gridding mapping and sampling the areas north and west of Voyager 19 and incorporating the Copper Creek mineralization. Particular emphasis being placed on the contact between the Ordovician strata and underlying volcanic sequences.

At a more specific level the following is recommended:

Voyager 19

- To complete a detailed gravity survey over the Voyager 19 grid initially with readings at 25m centres along 100m spaced grid lines, with the aim of assessing the potential for an economic size deposit and to aid with the targetting of drill holes.

- To drill a number of holes on selected geochemical targets commencing with the costean on line 13300N. Holes should only be targetted after infill geochemical sampling at 50m x 12.5m centres and costeaning.

- Detailed mapping and geological studies on the Voyager 19 grid.

Voyager 29

- Infill gridding and C-horizon soil sampling along lines 10900N, 10700N, 10500N and 10300-10000N inclusive.

- Extension of the Voyager 29 grid to the west to close off the Pb-Zn anomalies on the southern part of Voyager 19 and to link with the Voyager 24 gold investigation.

- Costeaning and infill gridding over anomalies defined by the above program.

Voyager 22

- Detailed mapping of the Voyager 22 grid at a scale of 1:2500.

- Infill gridding and geochemical sampling on the southern part of the grid.

- Costeaning across peaks of geochemical anomalies.

- Reconnaissance gridding and sampling north of Voyager 22 concentrating on the volcanics adjacent to the unconformity.

Voyager 9

- Drill the Pb-Zn soil anomaly on the eastern margin of the grid.

- Drill one deep hole into the magnetic anomaly after geophysical modelling for targetting purposes.

Voyager 31

- Extend the Voyager 19 grid to the west across Copper Creek initially at 200m line spacing.

- Mapping, C-horizon soil sampling along the grid lines.

- Systematic rock chip sampling, and mapping of the main zone of mineralization along Copper Creek.

4. EXPLORATION IN THE MAINWARING GROUP

4.1 Introduction - Previous Work

Rocks which are assigned to the Mainwaring Group occupy a ± 3 kilometer wide, thickly forested zone which marks the north-western boundary of the E.L. (fig 21). Previous exploration of this suite of predominantly basic volcanic rocks and argillites has been limited due to access problems. B.H.P. conducted exploration over an AEM anomaly in the Cypress Creek area which culminated in the drilling of 3 holes in a sequence of otherwise barren pyritic black shales (Flood, 1973).

Regional stream sediment geochemical sampling over this part of the E.L. is incomplete, with the exception of the Sassy Creek drainage system which cuts the southern extremity of the Sassy Creek Formation. Exploration by Geopeko has been confined to the examination of copper mineralization which is exposed on the coast near Veridian Point (Voyager 23) and at the estuary of Copper Creek (Voyager 18).

The Geoex airborne geophysical survey of the Elliott Bay area highlighted the distinctive magnetic character of the basic members of the Mainwaring Group and formed the basis for extrapolation of the coastal geology through the forested area to the north.

Large (1981) proposed that a regional reconnaissance be carried out across to the central part of the Mainwaring Group in the 1980/1981 field season. The work was conducted by contractors and included:

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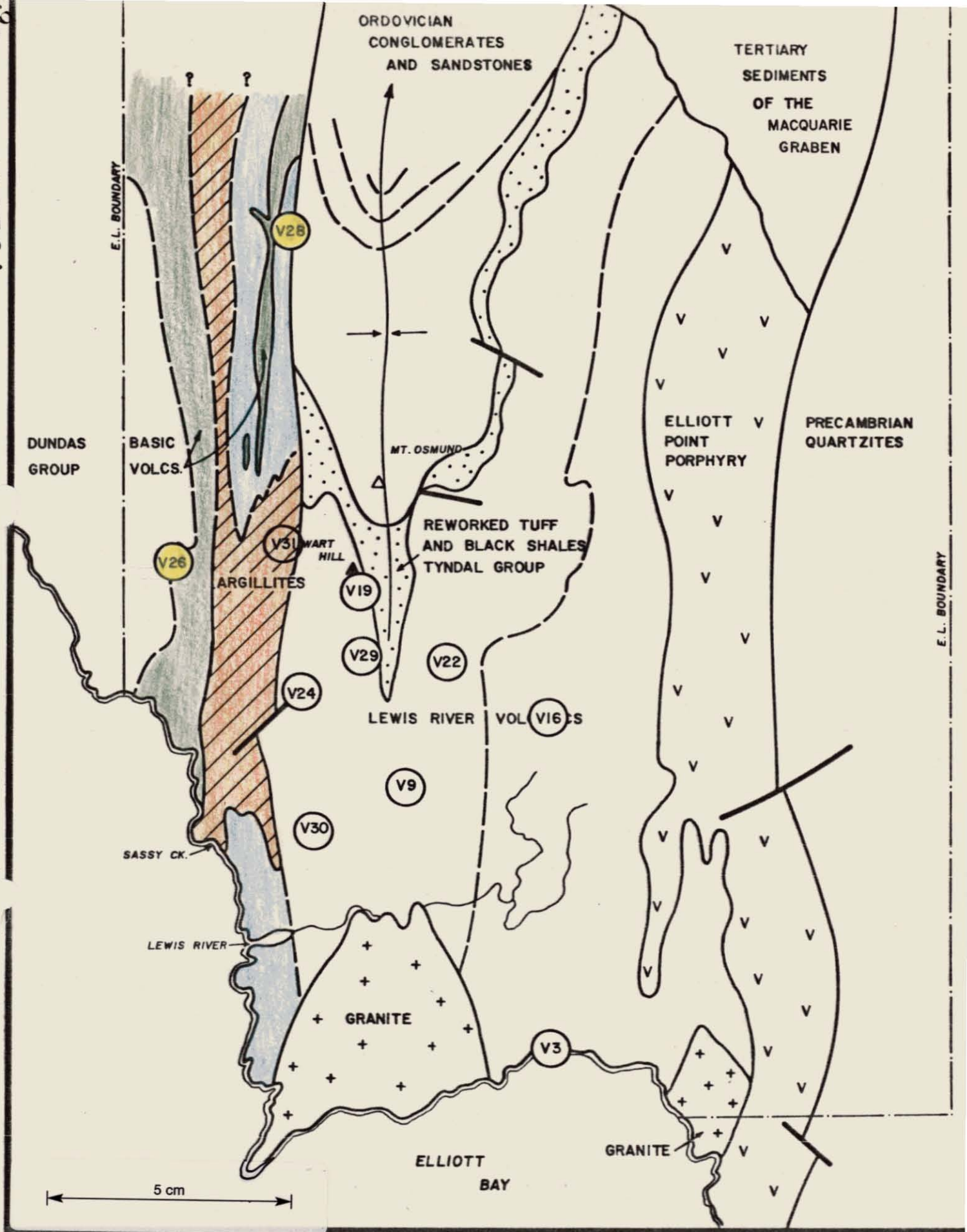

LEGEND:

Generalized geological map of E.L.27/76 showing:

e.g., V9 Location of Voyager 9

DISTRIBUTION OF THE MAINWARING GROUP.

DATE : 30/10/81
GEOL: W.H, PAW
DWN : R.TOG.
CHKD:

GEOPEKO

SCALE 1:100 000

Fig. 21

ELLIOTT BAY
E.L. 27/76
VOYAGER LOCATION MAP.

1. Traversing along the old B.H.P. access track from the Ordovician unconformity westwards to the E.L. boundary and encompassing the complete Mainwaring succession across the area. Soil samples, were to be collected at 50m intervals along the track.

2. Stream sediment sampling and geological mapping along the Mainwaring River and its main tributaries.

3. Ground examination of the coincident AEM-Aeromagnetic anomalies which are referred to as Voyager 26.

In the following section the results of these three projects are summarised from a more detailed report by Poltock (1981) and are supplimented by field observations and follow up work which was conducted by Geopeko geologists.

4.2 Regional Geology

Where facing directions are visible in the uppermost sedimentary units of the Wart Hill Pyroclastics they consistently indicate a westerly younging direction. The Mainwaring Group therefore rests with apparent conformity on the acid volcanics of the Lewis River Group.

Large (1981) divides the Mainwaring Group into three formations based on lithostratigraphic evidence;

1. The Veridian Point Formation

2. The Sassy Creek Argillites

3. The Penders Tuffs

Where the distinction between the Lewis River Volcanic Group and Mainwaring Group is drawn is debatable because of the apparent interfingering of the Sassy Creek Argillites with the Penders Tuffs. The writer's preference is to include the Penders Tuffs as a local Formation at the top of the Wart Hill Pyroclastics and for the base of the Mainwaring Group to be defined by the virtual cessation of acid volcanicity and the onset of basic volcanicity with deposition of finer grained sediments. The difference of viewpoint will be reconciled in the course of further exploration in and around this economically important 'transition zone'.

Mapping of two E-W traverses, firstly along the B.H.P. track and secondly along the Mainwaring River, confirmed the general stratigraphy which is presented on the 1:42000 regional map of the E.L. (Large 1981). The Mainwaring Group rocks strike between N and NNW and display vertical or steep dips inclined to the west. A well developed slatey cleavage is ubiquitous in the argillaceous units and is subparallel to bedding. From east to west the following sequences were recognised on the two traverses (see plans 71 and 71a).

1. Rhyolitic crystal tuffs and lavas outcrop for some 1-2km between the Tyndall unconformity and the main outcrop of phyllites. The tuffs are correlated with the Penders tuffs by Poltock (1981) due to their stratigraphic position at the top of the Wart Hill Pyroclastics. On the Cypress Creek track these acid volcanics have two interbedded units of basic lava and a 50m wide black siltstone bed (see plan 71a).

2. Separating the acid volcanics from the main basic volcanic succession is a 200-400m thick black siltstone unit. The unit is pyritic and is sporadically stained with secondary copper minerals. It is thought to represent the northerly extension of the Sassy Creek Argillites and probably increases in thickness between the Mainwaring River and Cypress Creek track.

3. Basaltic tuffs and lavas; generally massive vesicular, fine-grained rocks containing magnetite and finely disseminated native copper. Their outcrop pattern can be easily traced due to the prominent aeromagnetic anomaly which they cause.

4. The overlying sequence consists of black, pyritic, laminated siltstones containing thin bands of conglomerate, tuffaceous wackes and cherts and attaining a thickness of approximately 200m. They are best exposed along the Mainwaring River at 376000E, 5253800N and according to Poltock (1981) attain their maximum width of 800m about 1km north of the Mainwaring River.

5. The final sequence is represented by brown-black phyllites with interbedded basic volcanics and these extend as far as the western boundary of the E.L. Carbonates occur as thin laminae within the phyllites which also contain narrow conglomerate lenses.

4.3 Regional Stream Geochemistry

100 stream sediment samples were collected at approximately 200m intervals along the Mainwaring River and its' tributaries. An effective sample density of 8 per sq km was achieved.. The -80 mesh fraction was analysed for Cu, Pb, Zn, Fe, Mn, Ag, Au, Sn and W.

Prior to statistical treatment, the data was grouped into two separate populations as defined by A.M.G. longitude 377000E which roughly corresponds to the boundary between acidic volcanics to the east and basic volcanics/phyllites to the west. Background and threshold values have been calculated by Poltock (1981) and are summarised:

	Basic volcanics and phyllites		Acid volcanics	
	Background (ppm)	Threshold (ppm)	Background (ppm)	Threshold (ppm)
Copper	30	125	5	40
Lead	5	15	5	15
Zinc	35	170	5-10	40
Iron	3.6%	7.0%	0.5%	3.4%
Manganese	500	1200	70	250

Two anomalous associations were recognised; Cu, Fe, Zn and Au only. The best Cu-Pb-Zn anomaly was developed in phyllites and carbonates on the western margin of the lease (see plan 72). An area of anomalous gold geochemistry was outlined at the headwaters of the Mainwaring River where values of 25-183ppb Au were recorded. Adjacent to the contact of the acid volcanics and argillites on the Mainwaring River (377000E/5253500N) two values of 290 and 740ppm Pb were recorded. For further information the reader is referred to the report by Poltock (1981). Do we have a copy?

4.4 Soil Geochemistry - Cypress Creek Track

90 C-horizon soil samples were collected by power auger at approximately 50m intervals along the Cypress Creek track. Geochemical results for Cu, Pb and Zn are plotted in profile form and can be correlated with various lithotypes as shown in the accompanying geological section (plan 73).

Like the stream sediment values, the analytical results from the soil sampling exercise can be divided into two geological populations about A.M.G. 377000E:

Mainwaring Group (ss) W of 377000E (40 samples)

Element	Mean	Standard Deviation	C.O.V.*	Anomalous Samples
Cu	81.5	72	88	TS 7472, 7478
Pb	14	13.5	96	TS 7487
Zn	90	55	61	TS 7478
Fe	5.11%	2.75%	54	TS 7455
Mn	411	298	73	TS 7469

Acid Volcanic Sequence E of 377000E (50 samples)

Cu	41.4	111	268	TS 5874, 5892,5880
Pb	21.3	35.7	168	TS 5870, 5900,5898
Zn	77.9	137	176	TS 5898, 5900
Fe	1.66%	2.21%	133	TS 5874, 5876,5892
Mn	156	198	127	TS 5876, 5892,5894

C.O.V. Is the coefficient of variation which is the standard deviation expressed as a percentage of the mean. This figure allows comparison of sample variability for different populations.

Not surprisingly, background values of Cu, Fe and Mn are highly in the basic volcanic rocks and variance is lower as expressed by the coefficient of variation. Any single anomalous values (assumed to be mean +2 standard deviations) are screened by relating geochemistry with host lithology and upgrading if they have other anomalous metal associations. On this basis the following samples merit ground follow up:

Acid Volcanic Sequence	Sample Number	Association
	TS 5874	Cu-Fe
	TS 5892	Cu-Fe-Mn
	TS 5898	Pb-Zn
	TS 5876	Fe-Mn
	TS 5880	Cu only
Basic Volcanics	TS 7478	Cu-Zn
	TS 7472	Cu
	TS 7487	Pb
	TS 7455	Fe

Gold assays of the -80 mesh samples collected along the Cypress Creek track outlined three broadly anomalous areas in the succession:

1. An area of approximately 200m adjacent to the contact of the reworked acid tuffs and black shales is thought to represent the contact with the Ordovician and underlying acid volcanic sequence. Values here range from 8-700ppb. This area was designated Voyager 28 and the details of follow up work are summarised in a later section.

2. Two values of 150 and 925ppb in an area of basic volcanic rocks and talc schists at approximately 3500W.

3. 'Spotty' erratic values of 8-67ppb occur over an area of 500m marking the western boundary of the E.L.

4.5 Magnetics - Cypress Creek Track

Magnetic field intensities were measured along the Cypress Creek track, from 00W (at the Ordovician contact) to 4550W (at the western boundary of the E.L.). Readings were taken at 12.5m intervals (paced between 50m flags) with a Geometrics G816 magnetometer having the sensor 2.5m above ground level. The magnetic profile thus obtained is shown in plan 74 at a horizontal scale of 1:10,000.

The basic volcanics mapped by R. Poltock between 3000-4000W give a broad positive anomaly with very spiky profile. Two horizons of 'fine basic volcanics and associated chloritic phyllites' within the acid volcanic unit at about 1400W and 1200W give similar high amplitude anomalies.

Perhaps the most interesting anomalies occur at 1900W and 2150W. These are of modest amplitude (100 and 600nT) but occur in an area of very quiet magnetic character within the acid volcanics and may correlate to black siltstones mapped by R. Poltock at 1800W and 2200W. The latter, westernmost, occurrence is pyritic and appears to be associated with a zone of quartz veining (see plan 73) with a roughly co-incident Cu-Pb-Zn soil anomaly (Cu and Zn around 400ppm, Pb about 70ppm).

These siltstone horizons, especially considered in the light of geochemical and magnetic response, may represent favourable stratigraphic levels for massive sulphide mineralization.

4.6 VOYAGER 26

i) Introduction

Voyager 26 defines an area of anomalous airborne EM and magnetics centred on AMG 375500E, 5251500N and which were located as a result of the 1975 Geoex Survey. The anomalies are located in an economically favourable stratigraphic position being on strike to the copper-mineralization which was observed in an dolomitic horizon at Copper Creek on the coast (Voyager 18).

Voyager 26 was graded as priority number 6 for the field season (Large, 1981) with gridding soil sampling, mapping, magnetics and ground EM technique as the recommended follow up procedures.

The area falls within the densely forested area immediately south of the Mainwaring River approximately equidistant between Wart Hill and the coast. The ground work was conducted by a contract team and a summary of this work follows. For futher details the reader is referred to Poltock (1981).

ii) Geology of the Voyager 26 Grid

An area of approximately 800m x 1000m was gridded by way of 3x400m spaced grid lines. The grid is located at the contact between basic volcanics with siltstones and black pyritic shales which are assigned to the Veridian Point Volcanics of the Mainwaring Group (Large, 1981).

Although outcrop on the grid is generally poor the soil type, magnetic and geochemical characteristics have enabled the recognition of 3 distinct lithotypes (see plan 75a).

Basic volcanics - these are prevelant on the eastern part of the grid and contain minor magnetite and quartz-epidote veining. They were not seen in outcrop.

Black chloritic phyllites

Phyllites - with possible carbonates and basic volcanics, recognised on the basis of a clay soil and vegetation cover.

No stratigraphy was discernable, the rocks are strongly cleaved and probably dip steeply to the west. Mineralization was observed in brown phyllites associated with blocks of hematitic chert on the northern line of the grid (100N/10021E KR 8440).

iii) Geochemistry

127 C-horizon soil samples were collected by power auger at 25m intervals. The -80 mesh fraction was analysed for Cu, Pb, Zn, Ag, Fe, Mn, Sn and W. Due to the 200m wide grid line spacing the values are not contourable and the results are presented in profile format (plans 76-78). Background and threshold values for Cu, Pb and Zn are reported to be 100ppm/340ppm, 12ppm/20ppm and 80ppm/170ppm respectively.

iv) Geophysics

Total magnetic field intensities were measured at 12.5m centres along the three grid lines. The results distinguish a broad area of generally flat 'undulating' magnetics west of line 10300 from an area of higher magnetic intensity to the east. This 200-300m wide zone marking the eastern edge of the grid is typified by steep

and sharp magnetic gradient and reversals and is probably indicative of basic volcanics. It forms the western margin of the main aeromagnetic linear which extends through the Mainwaring Group.

A moving source turam EM survey commenced but had to be cancelled due to instrument problems.

v) Conclusions

The previous work conducted over coastal outcrops of this stratigraphic sequence especially at Veridian Point (Voyager 23) shows that copper values in chloritic shales, dolomites and basic tuffs average about 150ppm with local concentrations of up to 1300ppm in dolomitic lithologies (Large, 1981). Values of up to 0.98%Cu have been recorded in rock chip samples at Voyager 18.

Mapping on the grid has shown it unlikely that a thick sequence of dolomite is present in the Voyager 26 area.

It is unlikely that the Voyager 26 grid was placed over the wrong area but the follow up EM survey should be completed prior to any decision being made to downgrade the area.

4.7 VOYAGER 28

i) Introduction

Voyager 28 designates an area centred on AMG co-ordinates 378,000E/5 258 000N where the old Cypress Creek Track (B.H.P.) crosses the Mainwaring River. Reconnaissance mapping and C-horizon soil sampling carried out by the Poltock Brothers, indicated the prescence of anomalous gold in soil samples between 650 and 900m west (see section 4.4).

The two principal anomalous samples contained 0.700 and 0.283gm/tonne Au and were located immediately east of the Mainwaring River at 900W and 850W, respectively. This is within an alternating sequence of black siltstones and lithic-tuffaceous greywackes lying between acid volcanics west of the Mainwaring and the Ordovician quartzose conglomerates, sandstones and siltstones of the Mt. Osmund Syncline to the east. The Poltocks also reported prescence of 'sulphide clasts' within the coarser members of this black siltstone-greywacke unit which is considered equivalent to the Tyndal Group (Mt. Lyell area).

Accordingly, the Voyager 28 area was visited in the latter part of the field season with a threefold objective:

a. to verify the Poltock's Au soil anomaly and to determine the source of the gold.

b. to examine the 'sulphide clasts' in the Tyndal Group equivalents.

c. to obtain a magnetic profile of the length of the Cypress Creek track (detailed in section 4.5).

ii) Geology

A rapid geological reconnaissance of the track from 00W to 1000W was made and the rock chips from Jacro power auger holes between 700W and 987.5W were logged. The details are sketchily presented in plan 79.

West of the Mainwaring River the rocks consist of fine grained acid volcanics, weathered to a creamy buff or grey colour, and characteristically containing pale feldspar phenocrysts or crystals but no megascopically visible quartz. The prescence of small quartz chips in a couple of the auger hole cuttings suggests some local quartz veining.

Immediately east of the Mainwaring the rocks are fine grained black (sometimes pyritic) siltstones and coarser lithic tuffaceous greywackes. The latter are clearly composed of acid volcanic detritus and reworked tuffaceous material and commonly contain small irregular to tabular fragments and disjointed 'beds' of black siltstone, indicative of turbidity and slumping during sedimentation. Small subrounded 'sulphide clasts', generally in the range 2-10mm, and composed of fine granular pyrite, were noted in several specimens of the lithic tuffaceous greywacke, notably at about 850 west and 550 west, regrettably not in outcrops (KR's 7411, 7420, 7421).

It is considered that the pyritic clasts may have had a similar origin to the black siltstone fragments with which they sometimes occur. That is, the pyrite was probably syngenetically deposited as lenses or thin beds interbedded with black (pyritic) siltstones and then (in part) broken up and redistributed as clasts by sedimentary slumping. A similar phenomenan was recorded in costean No. 5 on the Voyager 19 grid.

The contact between the Tyndall rocks and the acid volcanics to the west is not exposed, and could well be faulted. The coarse conglomeratic, pebbly reworked tuffs and sandstones, so characteristic of the base of the 'Tyndal Group' further south (at Voyager 33 and Voyager 19) were not seen at Voyager 28.

The contact between the lithic greywackes and the quartz rich clastics of the Mt. Osmund syncline to the east appears to be gradational over some 50 metres. This relationship questions the existence of the lineament which is postulated to form the western contact of the Mt. Osmund syncline. Rather the abrupt change from volcanic derived sediments to the dominantly quartzitic arenites may merely reflect a change in sediment provenance caused by the uplift of the Tyennan block.

iii) Geochemistry

A Jacro power auger was used to obtain C-horizon soil samples, at 12.5 metre intervals along the track betwen 700 west and 987.5 west to cover the Poltock's gold anomaly. Samples were collected at depths ranging from 1-2 metres (average about 1.5m) and the -80 mesh fractions analysed for Cu, Pb, Zn, Fe, Mn, Ag and Au. Analytical results are shown as profiles in plans 80-81.

The maximum gold value was 0.030gm/t at 962.5W which is west of the Mainwaring River.

The Poltock's gold anomaly was therefore unsubstantiated by C-horizon sampling. Comparison of the geochem profiles of figure 80 and figure 81 (Jacro) indicates that the former has much 'flatter' and rather lower profiles, (especially for iron) and it seems probable that the hand held power auger used by the Poltock's did not penetrate to true C-horizon and that the anomalous gold

is present in some higher horizon, perhaps related to flood levels of the Mainwaring (in which anomalous gold has been found in stream sediments further upstream - Poltock 1981). The depths at which the initial hand-held power auger samples were collected are not known but are unlikely to have exceeded 0.5-1m.

Fifteen rock chip samples of representative rocks within the 'Tyndall Groups' and including some with sulphide clasts and others with minor fine iron stained quartz veinlets, were collected and analysed for the same elements as the soils (KR 7410-7424, refer to fig 79 for locations).

None of these rocks contained gold above the lower detection limit (0.008gm/t) or significant amounts of other metals and it is concluded that the Poltock's gold anomaly is not locally derived.

However, the Jacro sampling did indicate a strong (single sample) C-horizon geochemical anomaly west of the Mainwaring at 962.5m west, within the acid volcanics. This sample contained (in ppm) 80Cu, 5100Pb, 2400Zn, 17.0Ag and 0.03Au (all distinctly anomalous) and, curiously, 770ppm Fe which is no more than half the local background value.

iv) Conclusions

The soil geochem gold anomaly was unsubstantiated by Jacro C-horizon sampling and it seems likely that the anomaly relates to gold bearing alluvium coming from further up the Mainwaring River.

The source of the -80 mesh gold in stream sediments further upstream is not known. The magnitude of the anomalies is down to about an order of magnitude lower than -80 mesh values from the Voyager 24 area.

Some initial follow-up mapping and panned-concentrate stream sediment sampling is probably warranted but should be tempered by the outcome of Voyager 24 investigations.

Several geochemical 'peaks' have been defined over the area of acid volcanics extending from about 925W (Mainwaring River) to about 3000W. Some of these soil geochemical anomalies appear to be associated with (pyritic) black siltstones and possibly magnetic anomalies.

More detailed geological mapping should be carried out over the zone of acid volcanics with the object of defining the relationships between geochem/magnetic anomalies and the underlying rock types.

In the light of Voyager 19 geochemical results it would probably be instructive to resample the whole zone (Mainwaring River to 3000W) with a Jacro auger at 12.5m intervals or even closer.

5. GOLD EXPLORATION

5.1. INTRODUCTION

Field work in 1979/80 defined a zone of anomalous gold values over the upper (western) portion of the Wart Hill pyroclastics about 3km south west of Wart Hill. the gold values in the minus 80 mesh samples ranged from 50 to 3000ppb and covered an area of about 1sq km, subsequently designated Voyager 24. This area was followed up in detail in the 1980/81 season to determine the bedrock gold distribution, and ultimately the source of the anomalous gold drainage.

The following programme was completed:

a) - Panned concentrate drainage sampling to define the full extent of the gold anomalies.

b) - Gridding an area of 1.3km x 1.0km on 100m line spacing over the central section of the gold drainage anomaly (Voyager 24).

- Detailed geological mapping of the gridded area.

- B-horizon soil geochemistry on the grid to determine Cu, Pb, Zn and gold distribution.

- Reconnaissance lines of magnetics, IP and SP.

- Detailed gradient array IP over the grid.

- Drilling of a 130m stratigraphic hole.

c) - Reconnaissance grid lines and Jacro geochemical sampling at the southern end of the drainage anomaly (VOYAGER 30).

5.2 DRAINAGE GEOCHEMISTRY

Panned concentrate and minus 80 mesh sampling was carried out in all streams draining the stratigraphic top of the Wart Hill Pyroclastics between 5 245 000N and 5 251 000N i.e. up to 4km north and 2km south of the original gold drainage discovery.

i) Panned Concentrates: Results of Au, Sn and W in the panned concentrates are given in plan 82. The final concentrates averaged 30 to 70 grams in weight after panning a full dish of bottom sediment taken from creek bed. Detailed weighing of the original sample and panned concentrate were not undertaken and thus the results are not strictly quantitative However, the programme has clearly defined a zone of highly anomalous gold values extending the full length of the surveyed area. Samples with values above 500ppb Au (i.e. 0.5g/t) fall into an elongate zone 300-800m wide extending north and south for over six kilometres (see fig 22). Coincident anomalous tin values (greater than 100ppm) occur over the southern portion of the gold anomaly, in Stoney Creek and its tributaries. This area has been designated VOYAGER 30 and is discussed further in section 5.4. Visible gold was observed in most pans which recorded above 1000ppb Au. At one location in Gerard Creek (KD 6001) a small nugget of gold 2mm across was discovered adhered to a fragment of milkly quartz.

North of VOYAGER 24, the gold anomaly extends along Boyles Creek to Walters Creek, draining the western side of the Voyager 19 mineralized zone. Two anomalous tungsten values (750 and 110ppm) occur within the gold zone in the upper reaches of Boyles Creek around 379 000E, 5 249 600N.

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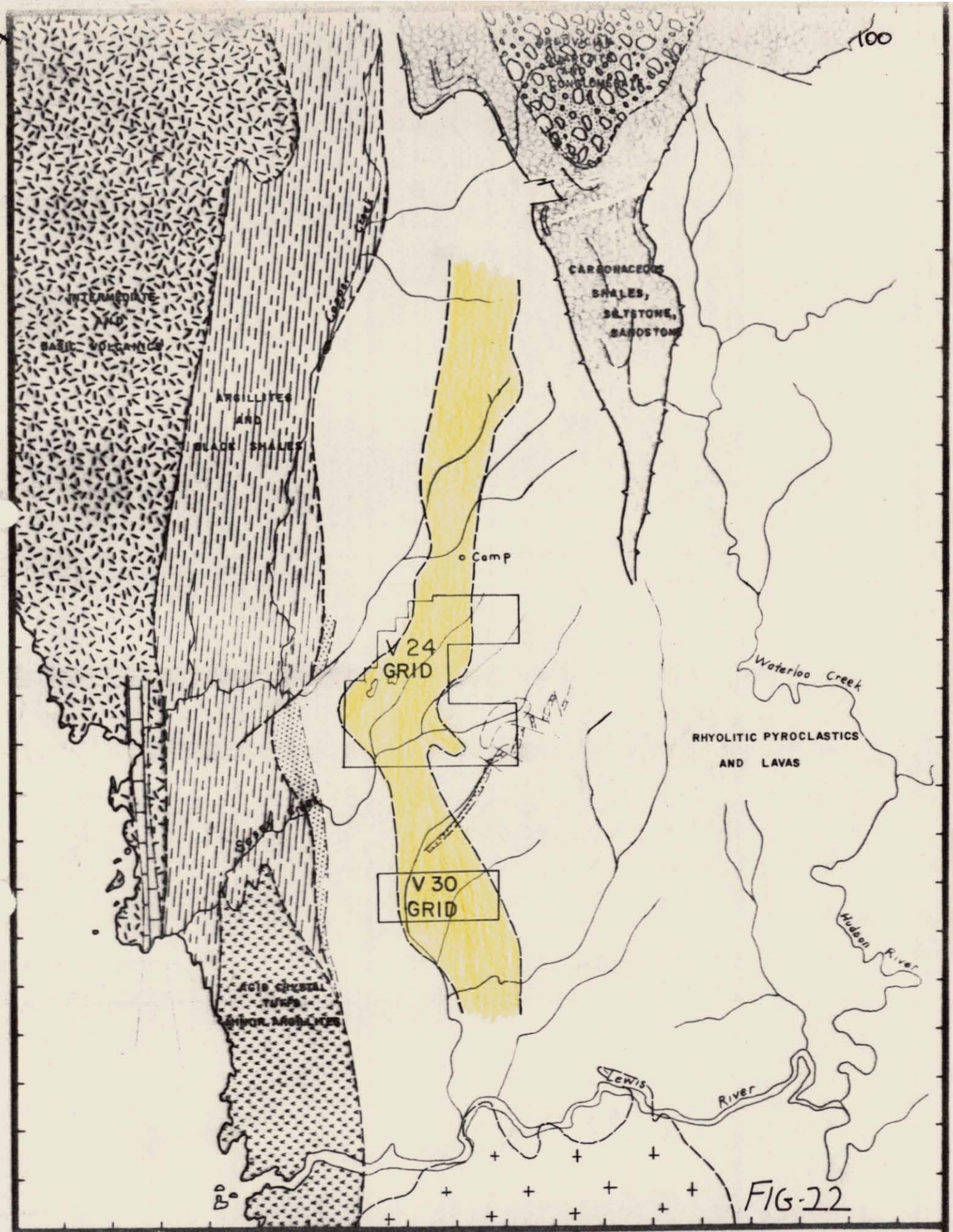

LEGEND

ZONE OF ANOMALOUS GOLD IN STREAM SEDIMENTS
> 0·5 gm/t IN PANNED CONCENTRATE

5 cm

GEOPEKO

Scale: 1:42 000

ATTACHMENT 4

ELLIOTT BAY

GOLD DRAINAGE ANOMALLY

DATE:
GEOL:
DWN:
CHKD:

ii) Minus 80 mesh sampling: Gold values from the minus 80 mesh sampling are given on plan 83 and show a erratic distribution of anomalous values (greater than 40ppb) coincident with the anomaly defined by the panning survey. A comparison of the two sets of results indicates the effectiveness of panning over -80 mesh sampling. It is noteworthy that no significant copper, lead or zinc drainage anomalies occur with the gold (see plan 85).

5.3 VOYAGER 24

i) Grid Geology

The central portion of the gold drainage anomaly covering the most anomalous values was selected for gridding and detailed prospect development. The position of the grid is shown on fig 22.

This grid is located over the upper part of the Wart Hill Pyroclastics covering a sequence of rhyolitic tuffs, lavas and minor sediments. The interpretive geology map (plan 86) shows a number of stratigraphic units generally striking NE-SW and dipping steeply to the north west. Details of the major rock types are given below (from the stratigraphic top down).

1. Fine crystal tuffs: Consist of a sequence of re-worked fine rhyolitic crystal tuffs with occasional beds of conglomeratic tuff and black shale. Cross bedding in the crystal tuff indicates a north-west facing sequence dipping at about 80°. The conglomeratic tuff horizons contain rounded pebbles 1-3cm of siliceous volcanics in a crystal tuff matrix. Scouring at the base of the horizon also indicates a west facing sequence. An horizon of pyritic black shale outcrops in the creek between 9500N and 9700N and represents the stratigraphic top of the Voyager 24 succession. A similar black shale was exposed in rubbish pits 1km north, at the camp site, 379 000E, 5 248 800N.

2. Coarse rhyolitic-crystal tuffs and agglomerates: Outcrops along the ridge between Gerrard Creek and Steele Creek. Fragments within the tuffs and agglomerates are typically angular, vary from 2mm to 30mm across, an consist of rhyolitic quartz porphyry. They are set in a matrix of quartz and feldspar crystals in a foliated quartzo-feldspathic ground mass. These rocks are considered to be the product of explosive rhyolitic volcanicism with a minimium of reworking prior to deposition. Minor disseminated pyrite (1-3%) occurs within the coarse tuffs around 9350N, 8900E.

3. Quartz porphyritic rhyolite lava: Outcrops in a lenticular body upto 200m wide and over 600m long in the centre of the gridded area. Typically the unit has a massive blocky outcrop pattern, occassionally developing a ropy surface texture with moderate to weak cleavage development. The rock contains from 5 to 10% quartz phenocrysts 1-2mm across and scattered fine albite phenocrysts in a white to green groundmass of sericite, K-feldspar and minor quartz. Chlorite aggregates after biotite are present in places. Similar porphyritic lavas have been mapped in the Voyager 19 area.

4. Non porphyritic dacite lavas: Consist of fine grained light green well cleaved rocks with a characteristic fine ropy texture on the weathered outcrop. Quartz phenocrysts are generally lacking, although a complete gradation exists between these non porphyritic lavas and quartz porphyritic lavas. Dacite lava is strictly a field term to indicate the lack of phenocrystic quartz and presence of abundant fine albitic feldspar in a chloritic feldspathic matrix. Flow banding was observed in places and interbedded lithic-crystal tuff horizons are common particular on the eastern boundary of the lavas.

5. Quartz porphyritic tuff-lavas: These are strongly cleaved rhyolitic volcanics which outcrop in the north-east portion of the grid and extend southward as a lens within the dacite lavas. Because of the strong cleavage and presence of lithic fragments the distinction between tuff and lava is difficult. Some horizons may be auto brecciated lavas.

6. Ropy chloritic q p lava: Outcrops as a narrow unit (150m wide) in the south-east portion of the grid. This is a distinctive rock type with coarse grained 2-4mm rounded quartz phenocrysts set in a dark green chloritic-feldspathic matrix. The unit is classified as a lava because of the ropy surface texture and occassional horizons with flow banding. A characteristic feature is the presence of manganese oxide coating the quartz phenocrysts and as dendrite growths within the groundmass.

7. Sandstone, pebble conglomerate: Outcrops in the south east corner of the grid as major quartz veined ridges striking north-easterly. These outcrops form part of a conglomerate-sandstone unit with strike length of about 2km and width of 50 to 100m. A detailed description of the lithologies is given by Large (1981, p9-10).
A second sandstone horizon outcrops, in Gerrards Creek between 9800N and 10 000N. This horizon which directly underlies the coarse rhyolitic lithic tuffs is probably only 5-10m wide.

8. Quartz veining: Two styles of quartz veins have been mapped on the grid:

a) Massive steeply dipping veins of milky quartz commonly 2-5m wide and upto 30m long. These are concentrated in the south-east portion of the grid within the dacite lavas, where they show a consistent north easterly strike.

b) Narrow, shallow dipping vugy white to grey quartz veins which form an irregular network or parallel sheeted system. These veins occur in patchy zones from 5m to 30m wide and are concentrated within the coarse lithic tuff-agglomerate unit and the underlying quartz porphyritic lavas. The individual veins vary from 5mm to 30mm thick and commonly dip shallowly to the north. Rock chip sampling and drilling indicate these sheeted veins carry anomalous amounts of gold, arsenic and antimony.

ii) Rock Chip Geochemistry

Analytical data on rock chip samples from various lithologies on the grid are given in table 1. The reproducability of gold analyses, as seen from column 1 and column 9 in the table is not good. The background for gold is considered to be 1-10ppb with significantly anomalous values above 30ppb. The maximium rock chips gold values were 5.92ppm in KR 7220 (quartz vein float) and 2.77ppm in KR 6818 (repeat analysis-pyritic black shale). Most samples of the sheeted quartz vein outcrop and float material are anomalous which suggest these rocks are contributing to the drainage gold anomaly.

TABLE 1 : VOYAGER 24 ROCK CHIP GEOCHEMICAL RESULTS

SAMPLE NO.	Au ppb	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Mn ppm	Fe%	As ppm	Repeat Au ppb	Co-ordinate	Description
KR 6804	336	10	<5	<5	<0.5	80	0.36	<1	67	9110N, 8945E	Quartz float in creek.
KR 6806	<8	5	<5	45	<0.5	25	0.62	<1	<8	9160N, 8935E	Quartz porphyritic lava
KR 6807	<8	5	<5	75	<0.5	35	1.20	<1	<8	9120N, 8948E	Chloritic quartz porphyritic lava
KR 6808	<8	5	<5	20	<0.5	60	0.55	<1	<8	9210N, 9340E	Dacite lava
KR 6809	<8	5	110	80	<0.5	445	1.50	8	<8	9320N, 9380E	Fe stained crystal tuff
KR 6810	<8	5	<5	10	<0.5	35	0.39	<1	<8	9255N, 9050E	Porphyritic lava with quartz veining
KR 6811	<8	10	<5	5	<0.5	85	0.37	<1	<8	9255N, 9050E	Sheeted quartz veins
KR 6812	<8	10	25	35	<0.5	60	0.52	9	<8	9350N, 8870E	Pyritic lithic tuff
KR 6813	32	10	<5	10	<0.5	105	0.38	<1	33	9390N, 8960E	Sheeted quartz veins
KR 6814	200	10	50	10	<0.5	40	0.30	<1	33	9500N, 9220E	Porphyritic lava with quartz veinlets
KR 6815	40	20	80	260	<0.5	1050	2.00	12	33	9510N, 9040E	Red spotted lithic tuff
KR 6816	8	10	5	145	<0.5	480	2.00	<1	50	8600N, 9580E	Chloritic rhyolite lava
KR 6818	40	10	5	70	<0.5	30	0.24	5	2770	9560N, 8900E	Pyritic black shale
KR 6819	16	15	<5	5	<0.5	95	0.57	<1	33	10000N, 9360E	Sheeted quartz veins
KR 7216	<8									8950N, 8940E	Quartz vein float in Creek
KR 7217	188									8990N, 8800E	Quartz vein float in Creek
KR 7218	8									9010N, 8860E	Quartz vein float in Creek
KR 7219	316									9060N, 8920E	Quartz vein float in Creek
Kr 7220	5920									9115N, 8945E	Quartz vein float in Creek

The rock chip sample of black shale (KR 6818) was re-analysed to check the original poor reproducibility (0.04ppm and 2.77ppm). The following fire assay results were obtained by Analabs.

	Analysis	Auppm
Original pulp	1	0.550
	2	0.025
Split of residue repulverised	3	0.025
	4	1.20
	5	2.95

These variable results suggests the gold occurs at coarse grained specs within the black shale. The average of all seven analyses on KR 6818 is 1.08ppm. Further sampling of the black shale is required to confirm this result.

iii) Bank Sampling

Bank samples were collected along Gerrard Creek from 9000N-9400N to check the usefulness of this sampling technique to locate gold input into the stream. The samples were collected by shovel at a depth of 20-50cm and consisted of the soil sitting on bedrock plus chips of bedrock. The results are plotted on plan 91. Although the sampling is incomplete the data indicates that gold input into Gerrard Creek occurs between 9200N and 9400N. This fits with the positions of the soil anomlies.

Further bank sampling of all streams on the grid is required to define all sites of gold input.

iv) Soil Geochemistry

Soil samples were collected over the western portion of the grid from line 9100N to 10 000N. The samples were collected by hand auger from a depth of 0.3 to 0.7m and in most cases constitute a

mixed humus B horizon sample. The results are plotted on plans 88-91. Due to the problems of sampling and analysing for gold two laboratories using different analytical techniques were used during the survey.

Gold geochemical values determined by Analabs are given on plan 5 and results on duplicate samples from line 9100N to 9600N determined by Australian Laboratory Services are given on plan 6. The geochemical gold analysis technique used by Analabs involves solvent extraction followed by AAS (method LG5 and LG40) while the technique by Australian Laboratory Services is AAS-Carbon rod furnace (method 120A).

An initial reconnaissance line at 45° to the grid shown on plan 91 was analysed by Analabs using the fire assay technique (method RG50).

A comparison of plans 90 and 91 indicates a series of irregular anomalies with the major concentration of gold in the soils between lines 9300N and 9500N from 8900E to 9100E.

Three hand auger samples taken in Steele Creek recorded highly anomalous values (see plan 91);

9500N, 8850E 1280ppb Au
9700N, 9012.5E 430ppb
9800N, 9112.5E 510ppb

These samples are probably contaminated by alluvial gold in the creek bed, however, the high gold content of the black shale sample KR 6818 from 9560N, 8900E outcropping in the Creek bed raises the possibility of a bedrock source. Further sampling is required to resolve this problem.

Soil geochemical results for zinc and lead are plotted on plans 88 and 89. No anomalous values for copper were recorded and the results are not plotted. Two contourable Pb-Zn soil anomalies have been defined on the grid. The southern anomaly is roughly coincident, with the major gold anomaly, but more dispersed. The northern Pb-Zn anomaly shows a less defined correlation with gold.

v) Geophysics

Reconnaissance lines of Dipole-Dipole IP, magnetics and SP along lines 9200N and 9400N were initially carried out to determine local responses. The SP and magnetic data was featureless however, the IP suggested a possible correlation between quartz veining and resistivity (plan 93). Subsequently a detailed gradient array IP survey was carried out over the western half of the grid. The gradient array profiles are shown on plan 92b. It is apparent from this data that linear north-west trending zones of moderately high chargability (greater than 25 mv/v) and low resistivity (less than 750 ohm-m) extend through the gridded area. These anomalies do not show any systematic correlation with the quartz vein outcrops.

The zone of high chargability and low resistivity on the western end of the grid lines probably relates to the pyritic black shales exposed in Steele Creek. The anomalous IP zone centred around 9500N, 9025E roughly coincides with the gold soil anomaly and may relate to sulphides at depth within the rhyolite lithic tuffs and agglomerates.

vi) Drilling

Prior to the completion of the soil sampling programme in March 1981, it was decided to drill a stratigraphic hole to determine the distribution, frequency and mineralogy of quartz veining

within the lithic tuff-agglomerate unit and underlying quartz porphyritic lava unit. The hole was drilled to a depth of 129.3m. A detailed geological log with assays is given in the appendix and the cross section shown on plan 95.

The hole penetrated a sequence of silicified rhyolitic lithic tuffs and agglomerates with a significant interval of intense silicification and primary brecciation cut by quartz veins, and associated with weak pyrite-galena-sphalerite mineralization from 18m to 64m. The quartz veins vary from 2mm to 150mm thick and contain very minor sphalerite-galena, chalcopyrtie and pyrite.

The variation in basemetals through the altered zone is given below:

Element	Range		
Copper	5ppm	to	2750ppm
Lead	45ppm	to	5300ppm
Zinc	120ppm	to	3700ppm
Gold	8ppb	to	392ppb
Silver	0.1ppm	to	46ppm
Antmony	1.0ppm	to	1750ppm
Arsenic	13ppm	to	190ppm

Anomalous values of gold (greater than 30ppb) occur throughout the altered zone with maximum values of 275ppb (and 46ppm Ag) from 392ppb Au from 63-64m.

The central core of the altered zone intersected in the drill hole is occupied by a silicified and weakly mineralized rhyolitic agglomerate. Silicified pyritic grey porphyry fragments from 2 to 10cm across occur throughout the agglomerate. The rounded

shape and pre-mineralized nature of the fragments suggest a mineralization vent breccia.

Inspection of the geochemical plans 88-91 indicates the drill hole was terminated prior to passing beneath the major gold-lead-zinc soil anomaly (this data was not available until the drilling had finished). It is planned to continue the drill hole a further 150m next season to pass under the anomaly and into the porphyritic rhyolite unit.

vii) Summary and Conclusions

The following points indicate the Voyager 24 zone has considerable potential and requires further investigations.

1. The gold drainage anomaly is a major regional feature covering an area of at least six kilometres strike length draining rhyolitic volcanics in the upper part of the Wart Hill pyroclastics.

2. Tungsten and tin are associated with sections of the drainage anomaly.

3. Soil sampling over the central gridded zone has revealed a number of gold-lead-zinc anomalies.

4. Rock chip sampling indicates the sheeted quartz veins carry anomalous gold. Also one sample of black shale returned 2.77ppm Au.

5. Gradient array IP revealed a chargeable zone coincident with the major geochemical anomaly.

6. Drilling to evaluate the quartz veining intersected a siliceaous and pyritic series of agglomerates and volcanic breccias carrying minor sphalerite-galena mineralization and anomalous gold values. The drill hole needs to be deepened by 150m to adequately test the main soil geochemical anomaly.

7. The results to date suggest the mineralization is a quartz vein Au-Ag (-Pb -Zn) association within agglomeratic and brecciated proximal rhyolite volcanics.

It is speculated that the source of the Au-Ag mineralization is the Low Rocky Point Granite intrusion of Cambrian age. Assuming that this intrusion plunges shallowly to the north, then the Au-Ag veining would occupy an apical position in the overlying volcanics (see fig 22).

viii) Recommendations

Grid Area:

1. Extend DDH V24/1 a further 150m to test below the coincident Au-Pb-Zn soil anomaly and IP anomaly.

2. Detailed rock chip and bedrock sampling of the black shale horizon to check the previous anomalous gold value.

3. Complete bank sampling over the entire grid to evaluate gold input into the streams.

Outside Grid:

1. Bank sampling of all anomalous streams to define places of gold input..

2. Grid extension to cover all input bank anomalies with follow up hand auger sampling

3. Dipole-Dipole IP over all soil Au-Pb-Zn anomalies defined in 2.

5.4 VOYAGER 30

i) General

Voyager 30 designates the southern portion of the gold drainage anomaly about 2km south of Voyager 24, in the upper tributaries of Stoney Creek.

Three grid lines 1000m long and 200m apart were placed over the area of highest gold drainage values.

The area covered by the grid is a flat button grass plain with no outcrop. A thin veneer of white quartz gravels (Tertiary) upto a maximium thickness of 20cm covers the area. Rhyolitic lithic tuffs, agglomerates and lavas outcrop to the north and most probably underlay the gridded area.

Maximium values of gold in the panned concentrate samples were 18.3ppm Au (TD 6022) and 18.12ppm Au (TD 6031). These samples are located 400m apart in separate tributaries of Stoney Creek (see plan 83).

Anomalous tin and zinc are also associated with the gold. For example, the full analysis of panned concentrate TD 6022 gave the following result.

Au	18.3ppm
Cu	5ppm
Pb	5ppm
Zn	205ppm
Ag	1.5ppm
Mn	275ppm
Fe	1.5%
Sn	1900ppm
W	45ppm

A portion of this sample was sent to Central Mineralogical Services for mineralogical description and the following report was received;

> "The sample contained a fairly high portion (about 50%) of quartz, and was therefore separated in TBE to further concentrate the heavy minerals.
>
> The heavy fraction consists dominantly of opaque grains (ilmenite, leucoxene, chromite), with major zircon; this is mostly clear and colourless, with a few grains of hyacinth (purple), and much of it is very well-rounded, though euhedral unabraded crystals also occur. Accessory amounts of rutile (rounded) and topaz (very well-rounded, with high sphericity) are present. There are traces (1%) of well rounded tourmaline, hornblende, sillimanite, kyanite and dumortierite.
>
> One grain of gold was detected; it is 150x300 micron in size, of irregular branching shape, but with a smooth, polished surface.
>
> Cassiterite is present, as generally cloudy, colour-zoned, brown to smoky colour, upto 150x300 micron is size, ranging from rough to subrounded grains.
>
> Grain sizes of the opaques and zircon range between 100 and 300 microns with an average around 200 micron."

The presence of trace amounts of sillimanite and kyanite indicates a Precambrian source for some of the heavy concentrate. The rough to subrounded shape of the cassiterite suggest little reworking and therefore a local Cambrian rather than Precambrian source.

ii) Pitting

Two pits were excavated on the grid to ascertain bedrock types and background geochemistry.

PIT 1: Located at 9360N, 7340N was dug on a ridge of scattered quartz vein float. The pit measures 2mx1m and 1.5m deep. The rock exposed is a brown oxidized medium grained homogenous quartz porphyritic lava. Irregular quartz veins

1cm to 10cm thick cut the altered rhyolite. Black and brown coatings of iron oxide commonly cover the quartz veins and extend into the altered rhyolite. The quartz veins are vugy with iron staining coating the inside of vugs. The vugs maybe after an iron carbonate. Iron oxide alteration extends into the rhyolite adjacent to the veins and is associated with minor pyrite development.

PIT 2: Located at 8959E, 7338N, was dug into an area of Tertiary gravels to test the thickness of gravels and their Au, Sn content. Gravels were found to be from 6 to 10cm thick and composed of small (3cm) rounded quartz pebbles and angular fragments poorly cemented in a brown-black sand-iron-oxide matrix. Bedrock is a foliated medium grained quartz crystal tuff. A few minor quartz veins cut the tuffs.

Bulk samples from pits 1 and 2 were analysed for Cu, Pb, Zn, Au, Ag, Sn and W, but no anomalous values were recorded.

iii) Soil Geochemistry

Samples were collected using the Jacro power auger along the three grid lines covering the area. Two sets of samples were collected.

1. Set C: Sample of peat and gravel above bedrock- usually at a depth of 0.2-0.5m.

2. Set A: Sample of weathered bedrock - usually at a depth of 1-1.5m.

The purpose of this was to compare the distribution of tin and gold in the overlying gravels to the bedrock. It was suspected that the source of the gold and tin could be the Tertiary gravels rather than bedrock.

The soil sample numbers are plotted on location plan 96 and analytical listings for Cu, Pb, Zn, Ag, Au, Sn and W are given in the appendix.

Profiles of Cu, Pb, Zn and Sn in the bedrock samples on lines 7200N, 7400N and 7600N are given in plan 97 and contours for Zn are shown in plan 99. Profiles for the peat/gravel samples on line 7400N are given in plan 97 for comparison.

No anomalous gold values were recorded in any of the samples, however Cu, Pb, Zn and Sn show considerable variation especially on line 7400N. the most significant bedrock anomaly, is centred at 9700E, 7400N with peak values (not coincident) of 1350ppm Cu, 425ppm Pb, 340ppm Zn, 2ppm Ag and 25ppm Sn. Although the bedrock tin values over the anomaly are of low order (15-25ppm) they are consistently above the background of 2-5ppm Sn.

Tin in the gravels on line 7400N (see plan 97) is also of low order but shows a distinct anomaly coincident with the bedrock Cu, Pb, Zn, Sn anomaly.

iv) Conclusions

1. The Cu, Pb, Zn, Sn bedrock anomalies on line 7400N require further investigation.

2. The source of the drainage tin anomaly is most probably mineralization in the local bedrock rather than concentration from the Tertiary gravels.

3. No anomalous gold values were recorded in the soil sampling. The source of the drainage gold anomaly may lie either to the north of the grid or between the grid lines.

v) Recommendations

1. Lines 7300N and 7500N be pegged and bedrock sampled to define the limits of the Cu, Pb, Zn, Sn anomaly.

2. Dipole-Dipole IP and gravity be read along line 7400N.

3. A costean be dug between 9650E and 9725E, 7400N to determine the nature of the bedrock mineralization.

4. Pegging and bedrock sampling of lines 7800N and 8000N to trace the source of the gold drainage anomaly.

Appendix 1

LOG OF VOYAGER 9 DDH 2 ELLIOTT BAY E.L. 27/76

Proposed:	R.R. Large January 1981
Depth:	200m
Location:	Northern part of the Voyager 9 grid
Collar co-ordinates:	11525N 9975E
Collar inclination:	-45°
Collar azimuth:	045° magnetic
Purpose of hole:	To test copper soil anomaly in area of hydrothermally altered lavas and pyroclastic rocks.
Final depth:	232.15m.
Summary result:	The hole intersected a sequence of weakly mineralised chlorite-pyrite veined and brecciated coarse lithic tuffs and magnetite bearing lavas. A probable fault zone at 125m separates this from a barren sequence of feldspathic ash and sericitised crystal tuffs. The hole probably missed the peak of the copper soil anomaly.

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Drilling Details

Rig	Mindrill F30
Driller	G. Steel
Commenced	10-2-1981
Completed	4-3-1981
Drilling conditions	Generally good, water return was poor especially in the interval 124-126 which had to be cemented and redrilled. Drought conditions prevailed and caused major delays due to poor water return.
	Core recovery approximately 97%

DDH V9-2 SUMMARY LOG P.A. WILSON

0-11.5m

Lithic crystal tuff-agglomerate

Dominantly a pale grey-green coloured medium grained crystal lithic tuff. Sub-rounded-angular rhyolite, porphyritic lava and quartzose fragments up to 2cm across, set in a pale grey quartzo-feldspathic matrix. Some brecciation in evidence caused by narrow anastomosing veinlets and irregular patches of chlorite/pyrite.

11.5-13.2

Chloritic lithic crystal tuff

Angular, brecciated fragments of fine grained-buff coloured acid volcanics in a chloritised matrix of fine-grained quartz crystal tuff.

13.2-30m

Mottled quartz-crystal tuff

Rounded subangular (1-2mm) quartz 'plenocrysts' set in mottled, fine-grained tuffaceous matrix. Occasional chlorite flecks (fiamme?) and 1-2 vol % euhedral disseminated pyrite. Quartz 'phenocrysts' form locally 70% of the rock.

30-33.8m

Mottled crystal tuff

As above but extensively veined by chlorite subparallel to long core axis. Pyrite occurs both disseminated and in chlorite veins where it comprises upwards of 15% of the rock. Chlorite veins cut by yellow 'siderite' veins.

33.8-35m

Coarse lithic crystal tuff

Blotchy textured, lithic fragments of acid volcanics (1-2cm size). Set in groundmass of fine-grained pale grey quartz tuff.

35-50m

Vitric crystal tuff (porphyritic rhyolite?)

Pale yellow-green very fine grained vitric crystal tuff. Coarse chlorite veins in interval 36.1-36.6. Traces of disseminated pyrite throughout. Rounded quartz 'phenocrysts' up to 2mm across occur in a very fine-grained, streaky textured siliceous matrix.

50-54m

Chloritic-vitric crystal tuff

Flattered discoid and wispy chlorite fragments give a mottled appearance to pale grey fine grained tuff. Chlorite veining is locally intense and upto 30-50% of the core causing brecciation of the tuff. Pyrite is associated with the chlorite veins.

54-62.4m

Brecciated 'rhyolite'

Pale grey very fine grained streaky textured lava. Occasional quartz 'phenocrysts'. Brecciation intense towards the top but volume of chlorite veinwork decreases to the base.

62.4-80m	Fine grained quartz crystal tuff. Generally honogeneous rock composed of rounded to subangular (> 1mm) quartz 'eyes' in a fine grained streaky textured green siliceous matrix. Volume of phenocrystic quartz varies to possible porphyritic lava? Alteration present as pyrite-chlorite veining from 71-73.8m.
80-88.5	Rhyolite Similar lithology to above but devoid of quartz phenocrysts. Fine grained disseminated magnetite forms up to 5 vol % in the interval 87-88m. Irregular hair line magnetite-chlorite-pyrite veins with traces of chalcopyrite.
88.5-90.8	Pale green mottled siliceous volcanic very broken core.
90.8-126.5	Rhyolite Pale-dark grey very fine grained with disseminated specks of black metallic mineral (magnetite?) and occasional $\pm$ 1mm size quartz phenocrysts also upto 2 vol% disseminated pyrite in groundmass. Good colour banding present on 5mm scale probably representing flow fabric 'antobrecciation' visible at 113-114m. Some displacement of flow bands by small scale reversed faults. Interval 118-124 very massive homogeneous cream 'weathering'.

126.5 - 131 Acid lava (rhyolite)

Massive homogeneous, very fine grained unit. Weathers to a rustic brown but fresh surface is greenish-grey thighly altered to a sericite rich rock with a powdery 'porcellanous' texture.

Two narrow quartz crystal tuff bands with c 30 modal % subrounded quartz phenocrysts (max 2mm) and 10 modal % feldspar phenocrysts have irregular contact with the fine grained lava at 50° to L.C.A.

131 - 143.85 Flow banded rhyolites

Pale grey-olive green, very fine grained siliceous rhyolite. Weak colour banding on cm scale alternating 'pink' and green bands. Cut by orange-brown anastomosing veinlets of platey 'sponge-like' siderite from 10-1mm across. Interval 139.2 - 141.2 is a coarse magnetite bearing lithic tuff, fragments in the tuff are of rhyolite and are cut by chlorite-magnetite ± chalcopyrite-pyrite veinlets and red jasperiodal veins c 90° to L.C.A. A massive vfg olive-green rhyolite persists for the remainder of the interval with occassional thin crystal tuff bands defining bedding at 50° to L.C.A.

143.85 - 146 Sericitized acid lava

Same lithology as interval 126.5 - 131.

146 - 153.2 Rhyolite

Predominatnly a very fine grained olive green massive rock. Occassional black-grey veinlets of chlorite in an otherwise fine-grained matrix. Very broken core with sericite on breaks 90° to L.C.A.

153.2 - 163.4 Vitric crystal tuffs

Approximately 5 modal % quartz (0.5mm diameter rounded fragments in very fine grained altered siliceous matrix. Interval 157.3 - 158.8 chlorite plates or flattened fragments (fiamme') comprise 15% of the rock.

163.4 - 167.4 Chloritic-quartz crystal tuff

Grey fine grained rock with rounded 1-2mm diameter quartz crystals in buff siliceous matrix. Flattened discoid chlorite fragments (5% - 30%). Occassional chlorite-jasperiodal veinlets normal to L.C.A.

167.4 - 180 Volcanic ash (lapilli crystal tuff)

Highly sericitic creamy buff coloured crystal tuff. Sub-rounded quartz crystals (1-3mm) form 15% of rock in variable creamy matrix of sericitised/ kaolinised feldspars. Reddish staining of felspars on oxidised core surface and 1-2mm wide veinlets of siderite.

180 - 188	Crystal tuff/chloritic crystal tuff Bands of grey 'chloritic' (fiamme' ?) fine grained crystal tuff with 1% disseminated pyrite, alterating with medium grained sericitic quartz crystal tuff.
188 - 194.8	Altered volcanic ash As interval 167.4 - 180.
194.8 - 209	Chloritic quartz crystal lapilli tuff Flattened chlorite fragments up to 30 modal % and quartz crystals (5%) aligned at 90° to L.C.A. Weakly veined by massive ± 4mm greenish chlorite veinlets. Interval 200 - 201.6 massive dark green chlorite with sporadic quartz phenocrysts and 2% disseminated pyrite.
209 - 217.3	Leucocratic crystal tuff Fine-grained, buff-pale green sencitically altered highly porous rock.
217.3 - 220	Chloritic crystal tuff Flattened chlorite fiamme' and rounded quartz phenocrysts in fine grained siliceous matrix. Cut by chlorite-pyrite veinlets c45° to L.C.A. causing local brecciation and silicification of the rock.

220 - 225	Quartz-feldspar crystal tuff Sencitically altered fine grained siliceous crystal tuffs.
225 - 232.15	Lapilli crystal tuffs Buff weathering sericite rich altered quartzo-feldspathic tuffs. Brown carbonate (siderite ?) replacing pre-exisiting minerals.

Appendix 2 !

APPENDIX NO 1 cont.

SAMPLE NO	METRES	CORE RECOVERED	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Sn ppm	W ppm
KR 7640	89-90	100	65	x	20	x	0.91	
KR 7641	90-91	90	215	5	30	x	1.95	
KR 7642	91-92	100	150	x	70	x	2.80	
KR 7643	92-93	100	140	x	60	0.5	2.05	
KR 7644	93-94	100	75	x	50	x	3.15	
KR 7645	94-95	100	5	x	40	0.5	3.05	
KR 7646	95-96	100	5	x	30	x	2.05	
KR 7647	96-97	100	5	x	45	x	3.80	
KR 7648	97-98	100	20	x	45	x	3.85	
KR 7649	98-99	100	115	x	60	0.5	4.43	
KR 7650	99-100	100	200	5	55	x	5.00	
KR 7651	100-101	100	105	x	35	x	2.40	
KR 7652	101-102	100	80	x	35	x	1.85	
KR 7653	102-103	100	65	5	40	0.5	3.65	
KR 7654	103-104	100	170	x	20	x	1.40	
KR 7655	104-105	100	35	x	25	x	1.50	
KR 7656	105-106	100	30	x	25	x	1.75	
KR 7657	106-107	100	385	x	45	x	2.35	
KR 7658	107-108	100	355	x	110	x	4.85	
KR 7659	108-109	100	145	x	35	x	1.65	
KR 7660	109-110	100	25	x	30	0.5	3.75	
KR 7661	110-111	100	15	x	15	x	3.25	
KR 7662	111-112	100	10	10	15	x	2.20	
KR 7663	112-113	100	5	x	15	x	2.80	
KR 7664	113-114	100	30	x	40	0.5	3.50	
KR 7665	114-115	79	200	x	45	0.5	4.05	
KR 7666	115-116	77	90	x	35	x	2.50	
KR 7667	116-117	100	115	x	55	x	4.20	
KR 7668	117-118	86	135	20	30	0.5	2.15	
KR 7669	118-119	100	150	x	65	x	1.45	
KR 7670	119-120	100	25	10	15	0.5	1.35	
KR 7671	120-121	100	80	15	30	0.5	1.60	
KR 7672	121-122	100	65	5	10	x	0.92	
KR 7673	122-123	100	75	5	15	x	1.15	
KR 7674	123-124	100	15	10	10	0.5	0.41	
KR 7675	124-126.45	50	110	10	20	x	0.67	
KR 7676	126.45-127	55	40	20	15	x	0.92	
KR 7677	127-128	88	30	x	10	x	0.41	
KR 7678	128-129	100	10	x	10	x	1.90	
KR 7679	129-130	100	45	5	10	x	1.05	
KR 7680	130-131	100	130	15	10	x	2.20	
KR 7681	131-132	100	15	x	10	x	0.30	
KR 7682	132-133	100	115	x	10	x	1.00	
KR 7683	133-134	100	130	x	10	x	1.85	
KR 7684	134-135	100	40	5	10	x	0.74	
KR 7685	135-135	100	155	10	10	x	0.47	

APPENDIX NO cont.

SAMPLE NO	METRES	CORE RECOVERED	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au pprb	Sn ppm	W ppm
KR 7686	136-137	100	175	15	10	x	1.60		
KR 7687	137-138	100	65	x	5	x	1.60		
KR 7688	138-139	100	210	x	15	x	1.15		
KR 7689	139-140	100	185	x	20	x	1.85		
KR 7690	140-141	100	100	x	30	x	2.05		
KR 7691	141-142	100	50	x	15	0.5	0.29		
KR 7692	142-143	100	145	15	25	0.5	0.81		
KR 7693	143-144	100	30	5	50	x	0.85		
KR 7694	144-145	100	25	55	585	0.5	3.15		
KR 7695	145-146	100	5	65	230	x	0.94		
KR 7696	146-147	100	135	115	145	0.5	0.32		
KR 7697	147-148	100	65	60	40	0.5	0.32		
[redacted]698	148-149	80	35	50	30	0.5	0.34		
KR 7699	149-150.05	37	65	45	25	0.5	0.20		
KR 7700	150.05-151	95	35	40	20	0.5	0.21		
KR 7701	151-153	100	40	15	20	x	0.18		
KR 7702	153-154	100	120	5	25	0.5	0.19		
KR 7703	154-155	100	180	x	25	0.5	0.19		
KR 7704	155-156	100	15	10	15	x	0.12		
KR 7705	156-157	100	145	x	20	0.5	0.62		
KR 7706	157-158	100	60	x	65	0.5	1.40		
KR 7707	158-159	100	30	x	50	0.5	0.84		
KR 7708	159-160	100	25	x	15	0.5	0.26		
KR 7709	160-161	100	260	x	20	x	0.26		
KR 7710	161-162	100	290	5	75	x	1.55		
KR 7711	162-163	100	170	5	40	0.5	0.91		
KR 7712	163-164	100	185	x	50	0.5	1.40		
KR 7713	164-165	100	120	x	65	x	1.60		
KR 7714	165-166	100	110	x	65	0.5	1.65		
KR 7715	166-167	100	80	x	40	0.5	0.98		
KR 7716	167-168	100	5	x	25	0.5	1.2		
[redacted]717	168-169	100	5	5	20	x	1.2		
KR 7718	169-170	100	30	x	25	x	1.0		
KR 7719	170-171	100	15	30	25	0.5	1.30		
KR 7720	171-172	100	20	10	45	x	2.55		
KR 7721	172-173	100	5	x	15	x	1.65		
KR 7722	173-174	100	x	x	15	0.5	1.85		
KR 7723	174-175	100	10	5	15	x	1.25		
KR 7724	175-176	100	5	5	10	x	2.50		
KR 7725	176-177	100	x	x	10	x	2.50		
KR 7726	177-178	100	10	15	20	x	2.40		
KR 7727	178-179	100	5	5	40	x	2.85		
KR 7728	179-180	100	x	5	15	0.5	2.60		
KR 7729	180-181	100	x	x	0	0.5	3.10		
KR 7730	181-182	100	x	x	35	x	2.40		
KR 7731	182-183	100	5	x	30	x	1.50		
KR 7732	183-184	100	x	x	130	x	4.30		
KR 7733	184-185	100	x	x	30	x	1.90		

APPENDIX NO cont.

SAMPLE NO	METRES	CORE RECOVERED	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Sn ppm	W ppm
KR 7734	185-186	100	385	170	65	1.0	2.15	
KR 7735	186-187	100	1650	150	50	1.5	3.0	
KR 7736	187-188	100	35	x	20	x	2.0	
KR 7737	188-189	100	65	10	40	0.5	1.8	
KR 7738	189-190	100	5	5	20	x	3.15	
KR 7739	190-191	100	5	20	20	0.5	3.10	
KR 7740	191-192	100	40	15	15	0.5	2.15	
KR 7741	192-193	100	5	10	15	x	2.65	
KR 7742	193-194	100	15	x	20	0.5	2.75	
KR 7743	194-195	100	20	x	30	0.5	2.0	
KR 7744	195-196	100	55	x	55	0.5	2.65	
KR 7745	196-197	100	35	x	105	x	3.55	
KR 7746	197-198	100	40	x	60	0.5	2.05	
KR 7747	198-199	100	90	x	110	0.5	4.0	
KR 7748	199-200	100	105	x	75	0.5	2.85	
KR 7749	200-201	100	10	x	120	0.5	5.05	
KR 7750	201-202	100	20	x	110	0.5	4.05	
KR 7751	202-203	100	130	x	80	x	3.20	
KR 7752	203-204	100	10	x	70	0.5	2.85	
KR 7753	204-205	100	5	x	20	0.5	1.00	
KR 7754	205-206	100	25	x	35	0.5	1.65	
KR 7755	206-207	100	20	x	25	0.5	1.15	
KR 7756	207-208	100	20	x	20	0.5	0.83	
KR 7757	208-209	100	15	x	20	1.0	1.00	
KR 7758	209-210	100	15	x	15	0.5	1.6	
KR 7759	210-211	100	30	x	20	1.0	1.2	
KR 7760	211-212	100	25	x	15	0.5	1.4	
KR 7761	212-213	100	30	x	25	1.0	1.0	
KR 7762	213-214	100	35	x	15	1.0	0.78	
KR 7763	214-215	100	5	x	10	0.5	2.05	
KR 7764	215-216	100	5	x	10	1.0	2.6	
KR 7765	216-217	100	x	x	25	x	1.4	
KR 7766	217-218	100	x	x	25	0.5	1.05	
KR 7767	218-219	100	5	x	50	0.5	2.50	
KR 7768	219-220	100	10	x	35	0.5	1.60	
KR 7769	220-221	100	10	x	45	1.0	1.3	
KR 7770	221-223	100	40	x	20	0.5	0.48	
KR 7771	223-224	100	110	10	20	1.0	0.32	
KR 7772	224-225	100	35	x	25	x	0.66	
KR 7773	225-226	100	50	5	20	0.5	0.49	
KR 7774	226-227	100	20	5	20	x	0.36	
KR 7775	227-228	100	15	x	15	x	0.59	
KR 7776	228-229	100	5	x	15	0.5	1.70	
KR 7777	229-230	100	15	x	15	0.5	2.80	
KR 7778	230-231	100	5	x	20	0.5	1.60	
KR 7779	231-232.15	115	15	x	15	x	1.85	

TOTAL CORE 225.34m %RECOVERY 97%

APPENDIX 2

LOG OF VOYAGER 3 DDH 3 ELLIOTT BAY E.L. 27/76

Proposed:	R.R. Large, December, 1980
Depth:	200m
Location:	Voyager 3 grid AMG
Collar coordinates:	10000N 9325E
Collar inclination:	-45°
Collar azimuth:	270° true
Purpose of hole:	To test a chargeability (IP) anomaly and a Pb-Zn soil anomaly in a sequence of acid pyroclastics and arenaceous sediments.
Final depth:	201.10m
Summary result:	The hole intersected a sequence of rhyolitic crystal tuffs, lavas, chloritic vitric tuffs and quartz veins. Disseminated and vein pyrite in the crystal tuffs probably explain the IP anomaly. Up to 1.28% Zn was recorded from a chlorite rich zone with visible disseminated sphalerite in the interval 102.8 - 110.95m. The hole did not explain the soil Pb anomaly, the hole was drilled subparallel to bedding and cleavage.

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Drilling Details

Rig:	Mindrill F30
Driller:	G. Steel
Commenced:	21-12-1980
Completed:	24-1-1981
Core sizes:	HQ 0-18m NQ 18-107.25 BQ 107-25-201.1
Drilling conditions:	Generally good, core recovery overall about 90%. Major problem was wedging of the core in the barrell due to drilling only slightly oblique to the cleavage. Short runs were therefore neccesitated and the core was very broken.

DDH V3-3 SUMMARY LOG P.A. WILSON

0 - 3	No core
3 - 21	Tuffaceous sandstone Massive, fine-grained generally homogoneous buff weathering felsic tuff/sandstone. Fine grained black specks of biotite? visible in dominantly rustic brown quartzo-feldspathci matrix. Bedding where visible 5 - 45° to L.C.A.
21 - 102.8	Banded quartz crystal lapilli tuff Medium to coarse grained porphyritic crystal tuff. Streaky texture parallels cleavage. Rounded quartz phenocrysts upto 3mm set in fine grained streaky quartzo-feldspathic sericitised matrix. Post cleavage pyrite filled fracture zones and pyrite along cleavage placies. Disseminated pyrtie upto 5 vol% occurs towards base of sequence. Cleavage consistently 30°-50° to core axis.
102.8 - 110.95	Laminated vitric tuff Green chlorite rich fine-grained homogeneous rock. Sphalerite occurs as isolated reddish spots upto 1mm across or in narrow veinlets with chalcopyrite. Chlorite content decreases down hole to an olive-green colouration.
110.95 - 125.1	Quartz crystal tuff/rhyolites Interbedded sequence of brown fine grained - vitric crystal tuffs and banded, spotted rhyolites. Bands alternate on 0.6-2m scale. Where defined bedding is 10-30° to L.C.A. as defined by alignment of quartz phenocrys in porphyritic lava.

125.1 - 149.23 Quartz Veins

Zone of extensive milky white quartz veins constitute about 70% of this interval. Vary in thickness from 15-480cm, they are emplaced within green banded vitric tuffs with 1-5% disseminated pyrite. Core loss was high in the interval 135-140m and may be indicative of faulting associated with the vein network.

149.23 - 152.1 Chloritic Breccia

Well cleaved and contorted chloritic rich breccia.

152.1 - 157 Crystal Vitric tuff

Pale grey quartz-feldspathic 'phenocrysts' rounded and embayed margins in a pale very fine grained groundmass.

157 - 166.7 Spotted Vitric tuff (lava)

Rounded 1-2mm yellow sericitic? Spots probably pseudonoephir early feldspar phenocrysts up to 5% of rock. Set in fine dusty, butt-coloured matrix. Interval 163.6 - 166.7 adopts a streaky texture with abundant quartz phnocrysts.

166.7 - 172.4 Vitric Tuff (lava)

Yellow - butt coloured weakly laminated, of very fine grained tuff. Pyrite is ubiquitous up to 10Vol% and is restricted to cleavage or margined to irregular (1-3mm) quartz veins.

172.4 - 181.2 Vitric tuffs - (porphyritic lava?)

Pale brown - olive green prophyritic lavas with augon shaped 1-2mm quartz phenocrysts and flaltered wispy chlorite treaks, alignment defines bedding at 40° to LCA.
groundmass is pale green and very fine grained.
Occassional pyrite rich turfaceous units.
Evidence of primary slump structures towards base of the sequence.

181.2 - 188.8 Banded rhyolite

Very fine-grained buff coloured porphyritic lava. Rounded (±1mm) quartz phenocrysts and orange sericite pseudomorphs in flattened streaky (lutaxitic?) fabric. (40° to LCA). Pyrite is present throughout the interval forming narrow lensoid bands parallel to bedding and in veinlets which displace banding.

188.8 - 192.6 Crystal lithic tuff

Fine grained, grey-green coloured poorly sorted tuff. Chlorite rich lithic fragments occur sporadically. Yellow-buff colour in matrix reflects sericitization of feldspars. 1-2% pyrite disseminated throughout the interval.

192.6 - 202.10 Banded rhyolite/crystal lithic tuff

Alternating sequence of flow banded weakly porphyritic rhyolite and dirty, dark grey, sericitized, quartz-feldspar crystal tuffs. Bedding is well defined at 45° to LCA.

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VOYAGER 9 DDH 2

ANALYTICAL RESULTS

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APPENDIX NO 2 cont.

SAMPLE NO	METRES	CORE RECOVERED	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Fe ppm	Mn ppm	W ppm
KR 7551	0-1	100	5	30	35	0.5	2.95	2650	
KR 7552	1-2	100	490	20	30	x	2.95	220	
KR 7553	2-3	100	150	10	25	x	2.5	1750	
KR 7554	3-4	100	155	x	35	x	3.35	2650	
KR 7555	4-5	100	10	x	40	x	3.15	2100	
KR 7556	5-6	100	75	5	45	x	4.30	3450	
KR 7557	6-7	100	50	x	30	x	1.10	435	
KR 7558	7-8	37	5	5	25	0.5	0.67	50	
KR 7559	8-9	100	30	5	25	x	2.70	2250	
KR 7560	9-10	100	5	5	25	x	2.20	1800	
KR 7561	10-11	100	x	5	25	0.5	1.40	710	
KR [illegible]62	11-12	100	x	x	30	0.5	2.60	1550	
KR [illegible]63	12-13	100	x	x	40	x	2.75	1400	
KR 7564	13-14	100	x	x	45	x	2.65	1350	
KR 7565	14-15	100	x	x	35	x	2.50	1100	
KR 7566	15-16	100	x	x	30	0.5	2.90	1700	
KR 7567	16-17	100	5	5	40	x	2.75	1500	
KR 7568	17-18	100	105	10	50	0.5	0.97	125	
KR 7569	18-19	100	75	x	30	x	2.30	1350	
KR 7570	19-20	100	5	5	55	0.5	2.90	920	
KR 7571	20-21	100	x	x	35	0.5	2.30	1150	
KR 7572	21-22	100	10	x	45	0.5	3.70	2300	
KR 7573	22-23	100	10	x	60	x	2.75	1300	
KR 7574	23-24	100	55	x	60	0.5	2.55	1500	
KR 7597	46-47	100	335	10	45	0.5	4.3		
KR 7598	47-48	100	30	5	60	0.5	5.10		
KR 7599	48-49	100	35	280	5900	2.5	2.85		
KR 7600	49-50	100	50	5	30	0.5	2.85		
KR 7601	50-51	100	110	10	45	x	3.05		
KR [illegible]02	51-52	100	40	x	40	x	3.65		
KR 7603	52-53	86	10	x	40	0.5	3.7		
KR 7604	53-54	100	20	x	45	x	4.65		
KR 7605	54-55	100	40	5	60	0.5	6.10		
KR 7606	55-56	100	35	x	30	x	3.45		
KR 7607	56-57	100	25	x	25	0.5	1.96		
KR 7608	57-58	100	50	x	25	x	1.35		
KR 7609	58-59	100	32	5	60	0.5	10.5		
KR 7610	59-60	100	30	5	40	x	5.3		
KR 7611	60-61	100	10	5	20	0.5	1.7		
KR 7612	61-62	86	70	5	20	0.5	2.10		
KR 7613	62-63	100	30	5	20	0.5	1.60		
KR 7614	63-64	100	50	5	35	0.5	2.65		
KR 7615	64-65	100	35	5	45	0.5	3.55		
KR 7616	65-66	100	85	15	35	0.5	2.75		
KR 7617	66-67	100	25	x	15	0.5	1.85		
KR 7618	67-68	100	15	5	15	0.5	0.97		

APPENDIX NO 1 .cont.

SAMPLE NO	METRES	CORE RECOVERED	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Fe ppm	Mn ppm
KR 7619	68-69	100	15	x	20	0.5	2.40	
KR 7620	69-70	100	15	x	20	0.5	0.91	
KR 7575	24-25	100	30	x	40	0.5	2.25	1450
KR 7576	25-26	100	20	5	45	0.5	2.30	1350
KR 7577	26-27	100	5	5	45	0.5	1.35	425
KR 7578	27-28	100	25	5	40	0.5	2.10	1400
KR 7579	28-29	100	10	10	30	x	1.55	1400
KR 7580	29-30	100	5	15	30	1.0	2.10	2100
KR 7581	30-31	100	5	10	45	1.0	1.95	640
KR 7582	31-32	100	5	25	50	0.5	4.0	2400
KR [illegible]83	32-33	100	10	15	55	x	3.95	2200
KR 7584	33-34	100	205	10	35	0.5	2.05	785
KR 7585	34-35	100	20	5	30	0.5	1.35	425
KR 7586	35-36	100	160	5	20	1.0	1.10	500
KR 7587	36-37	100	100	10	30	0.5	2.65	1550
KR 7588	37-38	76	35	10	25	0.5	2.25	1450
KR 7589	38-39	100	35	25	25	0.5	2.3	2150
KR 7590	39-40	100	15	10	35	0.5	2.85	2150
KR 7591	40-41	100	25	20	55	x	3.60	3500
KR 7592	41-42	100	85	20	55	x	2.65	2150
KR 7593	42-43	100	60	10	35	x	2.65	2250
KR 7594	43-44	100	35	5	30	x	2.55	2250
KR 7595	44-45	100	10	5	30	x	2.40	2350
KR 7596	45-46	100	115	20	35	0.5	2.80	
KR 7621	70-71	100	35	x	30	x		1.55
KR 7622	71-72	100	20	x	45	0.5	2.60	
KR [illegible]23	72-73	100	335	10	40	x		3.30
KR [illegible]24	73-74	100	70	45	20	0.5	1.9	
KR 7625	74-75	100	70	90	20	0.5	4.0	
KR 7626	75-76	100	10	x	15	x	2.10	
KR 7627	76-77	100	25	5	20	0.5	1.7	
KR 7628	77-78	100	5	x	35	0.5	2.25	
KR 7629	78-79	100	15	x	25	0.5	1.80	
KR 7630	79-80	100	5	x	20	x	1.75	
KR 7631	80-81	100	21	x	15	0.5	1.45	
KR 7632	81-82	86	315	x	25	x	2.0	
KR 7633	82-83	100	70	5	25	x	1.35	
KR 7634	83-84	100	85	5	50	0.5	2.15	
KR 7635	84-85	100	65	x	40	0.5	3.40	
KR 7636	85-86	100	135	10	30	0.5	3.25	
KR 7637	87-88	100	125	20	35	x	2.60	
KR 7638	88-89	100	415	20	50	x	4.80	
KR 7639	89-90	100	160	x	25	0.5	1.90	

ANALYTICAL RESULTS

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APPENDIX NO 2 cont.

VOYAGER 3 DDH 3

SAMPLE NO	METRES	CORE RECOVERED	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	Sn ppm	W ppm
KR 7041	4-5	100	5	40	360	X			
KR 7042	5-6	100	10	30	350	X			
KR 7043	6-7	100	10	55	340	X			
KR 7044	7-8	100	10	45	305	X			
KR 7045	8-9	100	10	50	200	X			
KR 7046	9-10	100	5	50	125	X			
KR 7047	10-11	100	10	75	145	X			
KR 7048	11-12	100	10	50	155	X			
KR 7049	12-15	100	30	125	265	X			
KR 7050	13-14	35	35	295	285	X			
KR 7341	14-15	100	35	810	330	0.5			
KR 7342	15-16	100	80	225	405	1.0			
KR [illegible]43	16-17	60	55	215	260	X			
KR 7051	17-18	100	70	110	365	0.5			
KR 7052	18-19	100	40	55	300	1.5			
KR 7053	19-20	100	45	185	150	1.0			
KR 7054	20-21	100	75	60	200	1.0			
KR 7055	21-22	100	95	25	320	3.5			
KR 7056	22-23	76	25	30	230	X			
KR 7057	23-24	100	10	60	220	X			
KR 7058	24-25	100	5	155	250	X			
KR 7059	25-26	80	10	55	120	1.0			
KR 7060	26-28.2	70	10	165	185	0.5			
KR 7061	28.2-29.4	35	20	40	95	0.5			
KR 7062	29.4-31.2	20	40	20	735	X			
KR 7063	31.2-32	80	30	100	290	0.5			
KR 7064	32-33	100	30	75	240	1.0			
KR 7065	33-34	100	15	110	675	1.0			
KR [illegible]66	34-35	100	20	10	80	0.5			
KR [illegible]67	35-36	100	25	30	60	X			
KR 7068	36-37	100	10	190	355	1.0			
KR 7069	37-38.15	100	10	235	315	1.0			
KR 7070	38.15-39.55	90	30	30	30	0.5			
KR 7071	39.55-40.55	55	30	260	130	2.0			
KR 7072	40.55-41.9	46	25	205	200	1.5			
KR 7073	41.9-43	70	15	130	300	1.0			
KR 7074	43-44	100	5	500	715	0.5			
KR 7075	44-45	100	25	600	1000	2.0			
KR 7076	46-47	100	10	230	500	0.5			
KR 7077	46-47	100	15	170	415	1.0			
KR 7078	47-48	100	15	20	80	X			
KR 7079	48-49	97	X	190	180	X			
KR 7080	49-50	100	10	145	90	0.5			
KR 7081	50-51	100	15	390	475	0.5			
KR 7082	51-52	100	15	260	405	0.5			

APPENDIX NO 2 cont.

SAMPLE NO	METRES	CORE RECOVERED	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	Sn ppm	W ppm
KR 7083	52-53	100	15	120	95	0.5			
KR 7084	53-54	100	15	190	795	0.5			
KR 7085	54-55	100	15	160	310	1.0			
KR 7086	55-56	100	15	490	785	1.0			
KR 7087	56-57	100	15	260	360	0.5			
KR 7088	57-58	100	10	140	245	X			
KR 7089	58-59	100	10	175	170	0.5			
KR 7090	59-60	100	X	215	900	1.0			
KR 7091	60-61	100	15	270	410	0.5			
KR 7092	61-62	100	35	75	85	X			
KR 7093	62-63	100	85	85	115	X			
KR 7094	63-64	100	70	35	40	X			
KR 7095	64-65	100	25	35	220	X			
KR 7096	65-66	100	15	65	315	X			
KR 7097	66-67	100	40	120	270	X			
KR 7098	67-68	100	20	240	215	X			
KR 7099	68-69	100	5	135	195	X			
KR 7100	69-70	100	5	230	255	X			
KR 7101	70-71	100	15	125	230	X			
KR 7102	71-72	100	5	175	370	X			
KR 7103	72-73	100	15	95	115	X			
KR 7104	73-7	100	15	40	50	X			
KR 7105	74-75	100	20	45	55	X			
KR 7106	75-76	100	5	90	150	X			
KR 7107	76-77	100	25	95	230	0.5			
KR 7108	77-78	100	20	90	195	X			
KR 7109	78-79	100	25	460	1050	1.0			
KR 7110	79-80	100	5	275	360	1.0			
KR 7111	80-81	100	15	255	340	1.0			
KR 7112	81-82	100	20	210	290	0.5			
KR 7113	82-83	100	20	130	280	1.0			
KR 7114	83-84	100	20	120	145	0.5			
KR 7115	84-85	100	55	80	1250	1.0			
KR 7116	85-86	100	265	60	120	1.0			
KR 7117	86-87	100	135	70	95	1.0			
KR 7118	87-88	100	1250	1200	6200	20.5			
KR 7119	88-89	85	60	220	780	2.0			
KR 7120	89-90	70	45	80	395	1.0			
KR 7121	90-91	87	30	25	125	X			
KR 7122	91=92	96	30	235	115	2.0			
KR 7123	92-93	100	10	45	105	X			
KR 7124	93-94	100	25	40	135	1.0			
KR 7125	94-95	95	45	45	330	0.5			
KR 7126	95-96	100	75	30	300	X			
KR 7127	96-97	95	60	30	310	X			
KR 7128	97-98	90	165	245	375	2.0			
KR 7129	98-99	100	20	30	105	X			
KR 7130	99-100	100	15	35	95	X			

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APPENDIX NO 2 cont.

SAMPLE NO	METRES	CORE RECOVERED	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au pprb	Sn ppm	W ppm
KR 7131	100-101	100	25	100	65	1.0			
KR 7132	101-102	100	35	150	255	1.0			
KR 7133	102-103	100	40	190	1250	1.0			
KR 7134	103-104	100	650	1250	6700	7.0			
KR 7135	104-105	100	175	1650	1.25%	8.0			
KR 7136	105-106	100	1000	415	3150	4.0			
KR 7137	106-107	100	275	475	3450	4.0			
KR 7138	107-108	100	90	470	2550	4.0			
KR 7139	108-109	100	1200	120	1100	1.5			
KR 7140	109-110	100	1350	610	1150	9.5			
KR 7141	110-111	100	765	80	1550	1.5			
KR 7142	111-112	100	60	55	255	X			
KR 7143	112-113	100	75	130	340	0.5			
KR 7144	113-114	100	50	100	355	1.0			
KR 7145	114-115	100	50	135	850	1.0			
KR 7146	115-116	941	55	350	1300	2.5			
KR 7147	116-117	97	30	75	235	0.5			
KR 7148	117-118	92.	15	30	130	X			
KR 7149	118-119	100	25	15	95	X			
KR 7150	119-120	90	25	10	175	0.5			
KR 7151	120-121	100	35	20	165	X			
KR 7152	121-122	100	25	20	260	X			
KR 7153	122-123	98	20	45	210	X			
KR 7154	123-124	80	15	20	115	X			
KR 7155	124-125.05	78	5	45	220	0.5			
KR 7156	125.05-128	80	X	20	140	0.5			
KR 7157	128-129	100	X	10	45	0.5			
KR 7158	129-130	100	X	15	105	0.5			
KR 7159	130-131	100	X	10	45	0.5			
KR 7160	131-132	100	5	15	80	0.5			
KR 7161	132-133.4	95	10	15	125	x			
KR 7162	138.4-139.15	74	70	30	730	x			
KR 7163	142-143	97	30	110	220	2.0			
KR 7164	143-144	60	5	35	100	0.5			
KR 7165	144-145	100	120	40	250	x			
KR 7166	145-146	87	65	30	195	0.5			
KR 7167	146-147	100	150	45	475	0.5			
KR 7168	147-147.6	60	85	35	225	x			
KR 7169	152.9-155.25	80	50	95	355	1.0			
KR 7170	155.25-156	75	65	90	395	0.5			
KR 7171	156-157	100	95	45	260	0.5			
KR 7172	157-158	100	90	45	250	x			
KR 7173	158-159	100	80	65	225	1.0			
KR 7174	159-160	100	50	90	275	x			
KR 7175	160-161	77	35	50	235	x			
KR 7176	161-162	100	20	20	130	x			
KR 7177	162 163	78	40	45	150	x			
KR 7178	163-164	96	85	105	530	1.0			

APPENDIX NO 2 cont.

SAMPLE NO	METRES	CORE RECOVERED	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au pprb	Sn ppm	W ppm
KR 7179	164-165	100	55	65	220	0.5			
KR 7180	165-166	100	65	80	370	x			
KR 7181	166-167	100	50	150	850	1.0			
KR 7182	167-168	100	50	85	325	0.5			
KR 7183	168-169	100	35	115	260	0.5			
KR 7184	169-170	100	75	190	370	1.5			
KR 7185	170-171	100	115	75	235	x			
KR 7186	171-172	80	70	415	1400	1.5			
KR 7187	172-173	92	40	165	1150	1.0			
KR 7188	173-174	100	75	195	1750	1.0			
KR 7189	174-175	100	70	210	840	1.0			
KR 7190	175-176	100	245	600	2300	3.5			
KR 7191	176-177	100	80	75	410	0.5			
KR [redacted]	177-178	100	40	35	425	x			
KR 7193	178-179	100	60	80	305	x			
KR 7194	179-180	100	55	75	240	x			
KR 7195	180-181	100	25	65	240	x			
KR 7196	181-182	100	10	20	220	x			
KR 7197	182-183	100	x	10	185	x			
KR 7198	183-184	97	T	25	175	x			
KR 7199	184-185	100	T	135	190	x			
KR 7200	185-186	90	T	95	169	x			
KR 7201	186-187	100	T	20	215	x			
KR 7202	187-188	100	5	25	235	x			
KR 7203	188-189	100	15	5	85	x			
KR 7204	189-190	100	10	80	570	0.5			
KR 7205	190-191	100	10	115	250	x			
KR 7206	191-192	100	50	100	330	T			
KR 7207	192-193	100	85	100	200	x			
KR 7208	193-194	100	25	T	55	x			
KR 7209	194-195	100	15	25	70	x			
KR 7210	195-196	100	15	235	215	x			
KR [redacted]	196-197	100	10	160	230	x			
KR 7212	197-198	100	15	1050	1250	1.0			
KR 7213	198-199	100	35	70	85	T			
KR 7214	199-200	100	15	180	220	T			
KR 7215	200-201.1	110	25	95	145	x			

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791156

LOG OF VOYAGER 24 DDH 1: ELLIOTT BAY E.L. 27/76

Proposed:	R.R. Large
Planned Depth:	250m
Location:	Centre of Voyager 24 Grid
Collar Co-ordinate:	9418N, 8952E
Collar Inclination:	45°
Collar Azimuth:	135° Magnetic
Purpose of Hole:	Stratigraphic hole to drill through sequence of rhyolitic lithic tuffs and porphyritic lavas exposed at Voyager 24 in the area of quartz veining
Final Depth:	129.3m (to be continued to 250m)

791157

GEOPEKO TASMANIA DRILL LOG

ELLIOTT BAY EL 27/76 SHEET 1 OF 4

Prospect: VOYAGER 24 Hole no. DDH V24/1.

DEPTH (m) from	DEPTH (m) to	GRAPHIC LOG	ANGLE TO CORE AXIS So	ANGLE TO CORE AXIS Si	GEOLOGICAL DESCRIPTION	Alteration	MINERALISATION py	MINERALISATION ga	MINERALISATION sp.	MINERALISATION	Fracturing
0	1				0-0.5 No core.						
1	2				0.5-20.4 Oxidised and bleached						
2	3			50°	white-cream rhyolitic coarse grained	bleached	patchy				
3	4				lithic-crystal tuff with bands of coarse		~2%				
4	5				crystal tuff and agglomerates, very						
5	6				minor narrow 2-5mm quartz veins,		1/4				
6	7				about 1 per metre, typically normal						
7	8				to core axis. Fine disseminated oxidised						
8	9				pyrite (2-3%) occurs from 5.2 to						
9	10				5.5m, 10.6 to 10.8m and also in						
10	11				narrow fracture controlled bands (3)		1/4				
11	12				between 16.8 and 17.3m, and 18.4 to						
12	13				19.1m. Iron staining occurs with some						
13	14				of the quartz veins suggesting a sulphide						Quartz veins
14	15				association. The dominant fragments in						increase from
15	16				the tuffs are (1) rounded white quartz-						1 vein per m
16	17				porphyritic lava (2) elongate wispy green				minor		to 2-5 per m
17	18				chloritic quartz crystal tuff? Many fragments		1%		gn,		over this
18	19				are alligned parallel to foliation S1. Average		cc		sp.		interval.
19	20				size of lithics is 0.5 to 2cm.		1/4				
20	21				20.4-27.8 SILICIFIED RHYOLITIC TUFFS						QTZ VEINS
21	22				with a trace of disseminated galena.	Silicification	1/4				0.5-2cm.
22	23				The silicification of this zone is		1/4				
23	24				pervasive and has led to a fine		1/4				23.5
24	25				grained grey recrystallized lithic tuff						24.4 24.5
25	26				with bands of crystal tuff. Some of the frags.						24.7 25.2
26	27				are grey silicified pyritic porphyry						
27	28				28.3-43.5 MINERALIZED RHYOLITE AGG-						
28	29				LOMERATE OR TUFF BRECCIA. Minor	Silicific.	2-5%	VM	VM		
29	30				2-5% disseminated py and very minor galena, sphalerite		fine				
30	31				occur throughout. Silicified pyritic grey porphyry		through out.				
31	32				fragments from 2 to 10cm across are						
32	33				common. The rounded shape and pre-						
33	34				mineralized nature suggest a possible						
34	35				VENT BRECCIA origin. Quartz veins are						
35	36				common 37.5-43.5m, vary 0.2 to 2cm thick,						Quartz veins
36	37				with frequency of ~5 per metre. They						concentrated
37	38				carry minor ga, sp and post date				minor		37.5-43.5m
38	39				Hematite ... To ... metre 10				sp, ga →		Almost spar

Sample No.	From (m)	To (m)	Rec (m)	ASSAYS (Lab: ANALABS) Au ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Sb ppm	As ppm.
KR										
KR8228	0.5	2	1	0.017	x	10	30	x	x	x
8229	2	3	1	x	x	5	20	x	x	x
8230	3	4	1	x	5	10	15	0.1	x	x
8231	4	5	1	x	x	x	20	0.1	x	x
8232	5	6	1	x	5	x	15	x	x	x
8233	6	7	0.9	x	5	x	25	x	x	x
8234	7	8	0.95	x	x	5	25	0.1	x	x
8235	8	9	1	x	x	10	20	x	x	x
8236	9	10	0.9	x	x	10	25	0.2	x	x
8237	10	11	1	x	5	10	30	0.2	1.0	x
8238	11	12	0.9	x	5	45	25	0.2	x	x
8239	12	13	0.95	x	10	45	45	0.2	x	x
8240	13	14	0.75	x	5	35	30	0.1	x	x
8241	14	15	1	0.008	20	40	40	0.2	x	x
8242	15	16	1	x	5	25	30	0.3	x	x
8243	16	17	1	x	55	165	430	0.3	1.0	x
8244	17	18	1	0.008	40	210	210	0.4	2.0	x
8245	18	19	1	x	75	910	2400	0.5	2.0	x
8246	19	20	1	0.008	140	1150	3250	0.4	1.0	x
8247	20	21	1	0.008	40	455	1550	0.4	1.0	x
8248	21	22	1	0.017	35	490	465	0.4	3.0	x
8249	22	23	1	x	45	420	690	0.2	2.0	x
8250	23	24	1	x	20	165	620	0.2	2.0	x
KR7451	24	25	1	0.008	15	55	220	0.3	1.0	x
7452	25	26	1	0.017	10	45	215	0.1	1.0	x
7453	26	27	1	0.025	10	85	260	0.1	2.0	x
7454	27	28	1	0.033	30	230	1150	0.4	7.0	x
7455	28	29	1	0.050	30	735	830	1.0	5.0	x
7456	29	30	1	0.025	15	280	840	0.3	3.0	x
7457	30	31	1	x	20	235	1500	0.3	2.0	x
7458	31	32	1	0.017	20	205	120	0.2	4.0	x
7459	32	33	1	0.025	15	230	240	0.2	2.0	x
7460	33	34	1	0.025	10	285	250	0.1	3.0	x
7461	34	35	1	x	5	225	375	x	15	x
7462	35	36	1	x	35	285	405	0.2	2.0	x
7463	36	37	1	0.017	10	470	605	0.4	3.0	x
7464	37	38	1	0.008	15	780	1950	0.8	4.0	x
7465	38	39	1	x	20	415	650	0.2	11.0	x

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GEOPEKO TASMANIA DRILL LOG

EL [illegible]TT BAY EL 27/76.

Prospect VOYAGER 24 Hole no. V24/1.

DEPTH (m) from	DEPTH (m) to	GRAPHIC LOG	ANGLE TO CORE AXIS So	ANGLE TO CORE AXIS Si	GEOLOGICAL DESCRIPTION	Alteration	MINERALISATION py	MINERALISATION ga	MINERALISATION sp	MINERALISATION cpy	Fracturing	Sample No.	From (m)	To (m)	Rec (m)	ASSAYS (Lab: ANALABS) Au	Cu	Pb	Zn	Ag	Sb	As
39	40				silicification and mineralisation							KR 7466	39	40	1	0.025	60	650	3100	1.0	7.0	X
40	41				of this unit resembles the							7467	40	41	1	0.017	25	700	2550	0.7	6.0	X
41	42				mineralised Main Lode outcrop at							7468	41	42	1	0.017	20	725	2300	0.5	3.0	X
42	43				Mt. Chalmers and the silicified footwall							7469	42	43	1	x	20	1150	3700	0.5	2.0	X
43	44				at Mt Morgan.							7470	43	44	1	0.008	10	485	835	0.3	1.0	X
					43.5-58.0m. ALTERED LITHIC-CRYSTAL						Qtz veins										
44	45				TUFFS, sericitised and weakly	Sericitised & Weakly Silicified	1-3%	<0.5%	<0.5%			7471	44	45	1	0.192	15	280	1700	0.3	X	X
45	46		50°		silicified with 1-3% pyrite. The							7472	45	46	1	0.058	15	625	1500	0.4	3.0	X
46	47				most common lithic fragments are							7473	46	47	1	0.033	10	630	2750	0.3	5.0	X
47	48				wispy flattened white rhyolite							7474	47	48	1	0.117	5	200	650	0.1	2.0	X
48	49				porphyry. Silicified grey porphyry							7475	48	49	1	0.067	5	375	1550	0.1	3.0	X
49	50				fragments are rare.							7476	49	50	1	0.017	5	205	670	0.1	1.0	X
50	51											7477	50	51	1	0.017	5	535	1650	0.1	2.0	X
[illegible]	52											KR 8201	51	52	1	0.033	15	735	1200	0.5	2.0	45
52	53											8202	52	53	1	0.833	45	370	1150	0.5	24.0	68
53	54											8203	53	54	1	0.850	80	655	1900	1.5	25.0	95
54	55											8204	54	55	1	0.058	60	640	2050	0.5	4.0	22
55	56											8205	55	56	1	0.058	80	5300	1000	12.0	19.0	13
56	57											8206	56	57	1	0.083	40	285	670	0.5	6.0	54
57	58				58.0-62.0 ZONE OF INTENSE QUARTZ							8207	57	58	0.85	0.025	35	400	2050	0.5	2.0	21
58	59				VEINING, within moderately silicified	Silicification					Intense quartz veining	8208	58	59	1	0.025	85	1200	3700	0.5	6.0	19
59	60				crystal-lithic tuffs. Veins very 0.2cm		1-2%	minor	minor	minor		8209	59	60	1	0.058	40	440	960	0.5	7.0	65
60	61				to 15cm at 40 to 90° to ca, with							8210	60	61	1	0.275	2750	280	880	46.0	1750	190
61	62				majority at 75-90° to ca. A total of 57							8211	61	62	1	0.050	95	105	295	1.5	28.0	120
62	63				veins occur over the zone and amount to about 12%							8212	62	63	1	0.042	50	65	200	0.5	25.0	20
63	64				of the rock. Minor ga, sp, cpy & py is present in the veins							8213	63	64	1	0.392	125	250	1300	1.5	23.0	15
64	65				The most intense veining is 60.2-61.4m. An unidentifiable							8214	64	65	1	0.033	40	155	335	0.5	21.0	11
65	66				grey sulphide (arsenopyrite ??) fills fractures between qtz veins							8215	65	66	1	0.058	15	45	280	x	4.5	14
66	67				from 61 to 61.4m.							8216	66	67	1	0.033	5	25	170	x	1.5	10
67	68				62.0-75.5 ALTERED CREAM-ORANGE	Se-sericite					7 quartz veins	8217	67	68	1	0.058	10	40	170	x	2.0	22
68	69				LITHIC-CRYSTAL TUFF. The orange							8218	68	69	1	0.042	10	55	315	x	x	8
69	70				colouration is probably due to iron bearing							8219	69	70	1	0.042	5	35	125	x	x	11
70	71				sericite as an alteration mineral. Quartz							8220	70	71	1	0.033	5	135	190	x	x	29
71	72				veins average 1-2 per metre.							8221	71	72	1	0.025	15	70	250	x	x	98
72	73											8222	72	73	1	0.025	5	25	130	x	x	10
73	74											8223	73	74	1	0.050	5	15	130	x	x	21
74	75											8224	74	75	1	0.042	15	30	170	x	x	1500
75	76				75.5-77.0 STRONGLY QUARTZ VEINED	Sericite	-	-	~30% of 10cm		1cm to 10cm qtz veins	8225	75	76	1	0.033	20	195	180	x	x	600
76	77				LITHIC-CRYSTAL TUFFS.							8226	76	77	1	0.033	10	140	230	x	x	600

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GEOPEKO TASMANIA DRILL LOG

ELLIOTT BAY EL 27/76. SHEET 3 OF 4

Prospect VOYAGER 24 Hole no. V24/1.

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ANGLE TO CORE AXIS So	ANGLE TO CORE AXIS Si	GEOLOGICAL DESCRIPTION	Alteration	MINERALISATION py	MINERALISATION	MINERALISATION	MINERALISATION	Fracturing
77	78				77.0-129.3 MEDIUM TO COARSE						
78	79				ALTERED LITHIC -	Fe -					
79	80				CRYSTAL RHYOLITE TUFFS.	sericite					
80	81				Fragment types are generally	&					qtz Vein
81	82				porphyritic rhydite varying	Silica.		- minor			qv
82	83				from 0.3 cm to 2.0 cm. Less			disseminated			
83	84				common are larger fragments			sp, ga, py.			qv
84	85				of grey silicified and weakly						
85	86				pyritic quartz porphyry identical						
86	87				to the fragments within the						
87	88				breccia zone from 28.3-43.5m.						
88	89				These fragments are angular to						
89	90				subrounded and up to 5cm						
90	91				across. Groundmass of the tuff						
91	92				consists of rounded 0.5-10mm						
92	93				quartz crystals and aligned						
93	94				sericite with quartzose ashy						
94	95				material. On the cut surface						
95	96				the sericite has oxidized						
96	97				to give a distinct brown						
97	98				colouration.						
98	99										
99	100										
100	101										
101	102										qv
102	103										
103	104										
104	105										
105	106										qv
106	107										
107	108										
108	109										
109	110										
110	111										
111	112										
112	113										
113	114										
114	115										
115	116										Narrow qv's

Sample No.	From (m)	To (m)	Rec (m)	ASSAYS (Lab: ANALABS.) Au.	Cu	Pb	Zn	Ag	Sb	As
KK8227	77	78	1	0.017	45	285	1300	x	x	13
KK7478	78	79	1	x	45	600	760	0.5	x	14
7479	79	80	1	x	80	840	1450	0.7	3	8
7480	80	81	1	x	85	440	1650	0.4	x	5
7481	81	82	1	0.067	65	420	1550	0.3	x	5
7482	82	83	1	x	65	420	1250	0.4	x	7
7483	83	84	1	0.050	130	610	2750	0.5	x	7
7484	84	85	1	0033	25	170	185	0.3	x	9
7485	85	86	1	0.033	15	85	145	0.3	1	9
7486	86	87	1	0.025	35	185	165	0.3	x	9
7487	87	88	1	x	135	415	225	0.4	x	12
7488	88	89	1	0.050	65	210	230	0.3	x	9
7489	89	90	1	0.067	10	15	125	0.2	3	7
7490	90	91	1	0.042	10	10	160	0.3	1	8
7491	91	92	1	0.025	10	25	195	0.3	1	9
7492	92	93	1	0.042	10	40	95	0.3	1	6
7493	93	94	1	0.067	15	75	130	0.4	1	7
7494	94	95	1	0.142	10	60	125	0.5	1	5
7495	95	96	1	x	15	340	160	0.4	x	4
7496	96	97	1	0.175	10	150	140	0.4	x	5
7497	97	98	1	0.050	15	145	125	0.3	x	6
7498	98	99	1	0.050	10	325	170	0.5	x	5
7499	99	100	1	0.108	15	115	240	0.4	x	5
7500	100	101	1	0.308	5	195	225	0.6	x	7
7501	101	102	1	0.050	5	125	200	0.5	x	6
7502	102	103	1	0.042	15	390	365	0.5	1	6
7503	103	104	1	0.100	10	95	220	0.5	x	6
7504	104	105	1	0.092	5	75	150	0.4	x	6
7505	105	106	1	0.125	5	70	115	0.4	x	5
7506	106	107	1	0.150	5	105	205	0.4	x	4
7507	107	108	1	0.158	5	100	210	0.4	x	4
7508	108	109	1	0.108	10	65	215	0.3	x	6
7509	109	110	1	0.175	10	130	240	0.5	x	5
7510	110	111	1	0.158	5	165	230	0.4	x	5
7511	111	112	1	0.150	10	145	130	0.3	x	6
7512	112	113	1	0.242	5	135	180	0.4	x	5
7513	113	114	1	0.033	15	275	615	0.5	x	6
7514	114	115	1	0.025	10	130	215	0.5	x	5
7515	115	116	1	x	10	125	165	0.4	x	17

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GEOPEKO TASMANIA DRILL LOG

ELLIOTT BAY EL 27/76

SHEET 4 OF 4 159

Prospect VOYAGER 24 Hole no. V24/1.

DEPTH (m) from	DEPTH (m) to	GRAPHIC LOG	ANGLE TO CORE AXIS So	ANGLE TO CORE AXIS Si	GEOLOGICAL DESCRIPTION	Alteration	MINERALISATION py				Fracturing
116	117										1 qv.
117	118										
118	119										
119	120										
120	121										
121	122										
122	123										
123	124										
124	125										
125	126										
126	127										
127	128					strong silicification plus sericite & chlorite.					
128	129										
TOH	129.3										

Sample No.	From (m)	To (m)	Rec (m)	Au	Cu	Pb	Zn	Ag	Sb	As.
KR7516	116	117	1	X	20	290	2300	0.7	1	12
7517	117	118	1	X	10	185	205	0.7	9	31
7518	118	119	1	0.033	10	135	350	0.7	8	21
7519	119	120	1	0.167	10	165	160	0.6	7	20
7520	120	121	1	0.150	5	145	130	0.6	3	14
7521	121	122	1	0.017	5	40	100	0.5	3	15
7522	122	123	1	0.100	5	30	90	0.5	2	11
7523	123	124	1	X	5	35	105	0.4	3	12
7524	124	125	1	X	5	25	90	0.5	2	11
7525	125	126	1	X	5	20	85	0.4	5	7
7526	126	127	1	X	5	20	70	0.4	4	14
7527	127	128	1	X	20	25	80	0.4	2	13
7528	128	129	1	0.017	5	25	65	0.4	2	10
7529	129	129.3	0.3	0.092	15	15	65	0.3	2	9
Analytical Methods:				Fire Assay	AAS	AAS	AAS	AAS	AAS	AAS
Analabs Code:				RG50	A1/1	A1/1	A1/1	A1/2	A1/1	A1/1/A1/3

Note Arsenic analyses 0–51 metres technique A1/1 declimit 50
51–129 " technique A1/3 declimit 1.0

8500 E

8800 E

9000 E
383000 mE
AMG

9200 E

9400 E

9600 E

10800 N

10600 N

10400 N

10200 N
5 242 000 N
AMG

10000 N

9800 N

9600 N

9400 N

9200 N
5 241 000 m N

ser xt

felsic mg qf xt

felsic xlt

felsic mg xt

lxt

mg xlt

felsic fg xt

clvcl felsic vt

brown altered
sericitic vt

ser mg qf xt

felsic xt

xlt

alt servt?

servt

servt?

Voyager 3 DDH 1
Co-ordinates-10 000N, 8875E
Dip 60°
Bearing 030°
Depth 0-30·8m

ser vt?

Voyager 3 DDH3
Co-ordinates 10 000N, 9325E
Bearing 270° TN
Dip 45°
Depth 0-163·2m

servt?

felsic vt

servt?

ser fg vxt minor sulphide boxworks

mg poorly sorted qf xt

ser mg qfxt
iron staining

ser xlt

sil qfxt

sericitic vt

fg qfxt

felsic qfxt

ser mg poorly sorted qfxt

felsic vt

felsic mg poorly sorted xt.

ple vxt

felsic mg poorly sorted qfxt

clvd fg xvt

grey mg poorly sorted xt.

brown altered? xvt

ser mg xvt

white brown altered? xvt

Voyager 3DDH2
Co-ordinates 9500N, 9235E
Dip 60°
Bearing 090° TN
Depth 0-30·7m

1-3cm qtz vein with galena, chlorite (tension gash)

massive to finely laminated tuffaceous siltstone silicified chlorite rich concretions

finely laminated sst
quartz veining

felsic qvxt interbed

hematitic sandstone

arg cg hematitic sandstone

grey fg lithic silt stone

fg-mg sandstone - finely laminated graded bedding trough crosslamination silicified rich layers and joints
malachite staining

mg poorly sorted qfxt prominent jointing

massive xvt galena veins

qxt-2m wide zone with py on cleavage surfaces

felsic qflxt
andesitic frag 1-5cm banded

very hem sl and finely laminated sandstone

chlxlt bedded zone pyrite 10cm

white-grn ser rich lxt

lxt

mg xvt concretions

qfxt siliceous veins

felsic mg xvt

fgvt interfingers with xt in graded contact

lim chl mg xt
manganese staining
limonite in fractures

small scale isoclinal folds
axial plane 165/85w
veinlets of galena

basic dyke

agglomerate frag 73cm

1m wide quartz veining

fg massive siltstone

chl mg qf xt vt interbeds

xlt strained qtz eyes

basic dyke

poorly sorted felsic lxt
flattened feldspar fragments
rare disseminated sulphides
hem rich lxt
manganese coating

cg-fg finely lam sst.

grey siltstone with vt? interbeds

chl mg xvt vt interbeds
disseminated pyrite banding

mg xt and xvt chl flakes

finely laminated, banded vt
py disseminated on bedding planes

ser qf xt
vt interbeds

3m qtz vein containing minor py

siliceous mg xt
some lithic fragments

fine grained siltstone
2-10cm hem concretions
malachite along cleavage planes
preferred orientation

white grey fg sandstone
to siltstone mg hem
sandstone interbeds

massive fg
sand stone

mgps qfxt - minor lithic fragments
narrow chlorite rich fractures
malachite in fractures

chl mg qfxt
hematite ? lathes throughout

fg-mg qfxt
some lithic fragments
coaser grained interbeds

grey green ser qfxt
prominent jointing

grey qf xvt
minor py blebs

mg green grey xvt

A

B

COMPLEX ISOCLINAL FOLDING

COMPLEX ISOCLINAL FOLDING

PLAN·1

791161

LEGEND:

- outcrop
- bedding
- cleavage
- jointing
- fold axis
- major lithological boundaries: sharp: gradational
- overturned bedding
- structural trend lines

5 cm

GN MN
12°06'

- Power auger hole
- Hand auger hole
- Grid position

DATE JAN 1981
GEOLOGIST P.H.
DRAWN R.TOGNONI

GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD

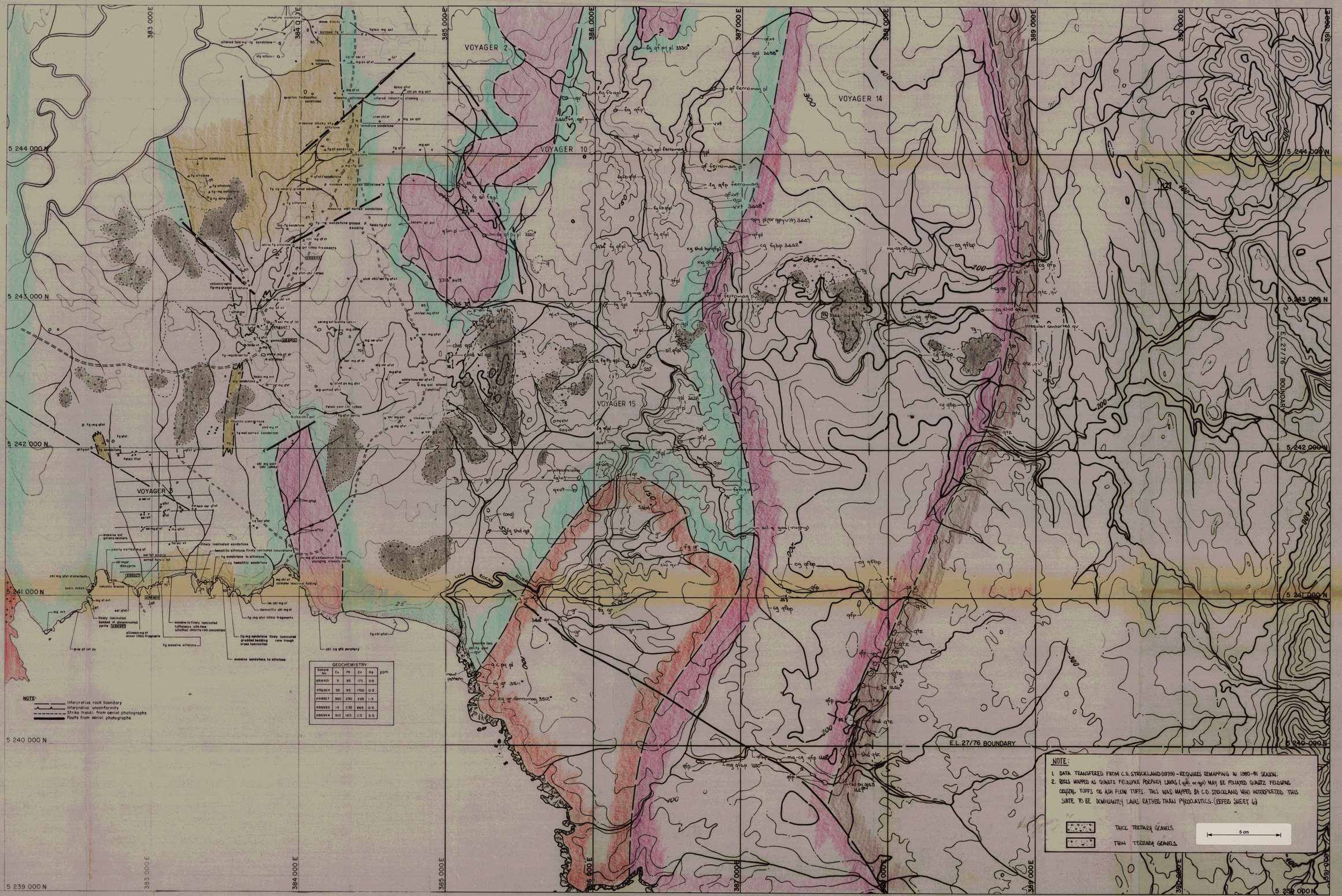
1:2500

No. ES27/76-V3-2(b)

E.L. 27/76 ELLIOTT BAY, TASMANIA
VOYAGER 3
GEOLOGY

001

82 1745 2/7



LEGEND:

VOLCANIC ROCKS
lt lithic tuff
xt crystal tuff
vt vitric tuff
xlt crystal lithic tuff
agg agglomerate rounded clasts 32 mm
fr fragmental angular clasts 32 mm
ut undifferentiated tuffs
l tuff
qp quartz porphyry
qfp quartz feldspar porphyry
qfbp quartz feldspar biotite porphyry
l as a suffix denotes lava
lap lapilli
PREFIXES (no prefix indicates acid composition)
a- acid
i intermediate
rhy rhyolite or rhyolitic
dac- dacite or dacitic
and andesite or andesitic
b basalt or basaltic
ba basic

SEDIMENTARY ROCKS
sh shale
sl siltstone
blksh blackshale
sst sandstone
qtz quartzite
gwk greywacke
ch chert
lmst limestone
dol dolomite
cgl conglomerate
cong conglomerate
vs volcaniclastic sediment

METAMORPHIC ROCKS
phy phyllite
sch schist
gns gneiss
hfs hornfels
mb marble

INTRUSIVE ROCKS
gr granite
gd granodiorite
dd adamellite
dl dolerite
lp/lamp lamprophyre
bd basic dyke
ap aplite
pg pegmatite
qv quartz veins

STRUCTURAL AND TEXTURAL
p porphyritic
clvd strongly cleaved
shd sheared
an oxidised
vns veined
lam laminated
bx brecciated
ser sericitised
vug vuggular (vugty, vug)
cren crenulated

MINERALOGICAL PREFIXES (only use if diagnostic)
sil siliceous
chl chloritic
ser sericitic
cal calcareous
fe ferruginous
py pyritic
hem, hm hematitic
goss gossanous
ox oxidised
arg argillic
feld feldspathic
ep epidote

AGE DESIGNATION PREFIXES
Q Quaternary
T Tertiary
J Jurassic
TR Triassic
P Permian
D Devonian
S Silurian
O Ordovician
C Cambrian
Pre C Precambrian

STRUCTURAL
outcrop
float
bedding
strike/dip of flow layering in volcanic rocks *schistosity (metamorphic foliation)
fault
interpretive contact
jointing
cleavage
fold axis
vertical cleavage

GRAIN SIZE
fg fine grained 0 – 3 mm fragments
mg medium grained 3 – 10 mm fragments
cg coarse grained 10 – 32 mm fragments
agg agglomerate or vole breccia > 32

GEOLOGICAL INTERPRETATION
Recce No.
Qa QUATERNARY alluvium
19-70 Tg TERTIARY gravels and unconsolidated sediments
19-17 O ORDOVICIAN conglomerate and quartzite
CAMBRIAN
1. Tyndall Group Correlates
19-4 Grey shales and black shales
19-43 Reworked rhyolitic lithic tuffs and agglomerates
2 Dundas Group ?
19-26 Greywackes and shales
3. Mainwaring Group
a. Veridian Basic Volcanics
19-47 Andesitic to basaltic tuffs, lavas, lava breccias and tuffaceous shales
19-46 Dolomites and dolomitic shales
b. Sassy Creek Argillites
19-57 Phyllitic brown, grey shales, argillites, greywackes and minor black shales
c. Penders Tuffs
19-30 Rhyolitic crystal tuffs and minor chloritic sediments
d. Undifferentiated
19-51 Undifferentiated lithologies in the N.W. of the E.L. include, intermediate to basic volcanics, siltstones, conglomerates and tuffs
4. Lewis River Volcanics
a. Wart Hill Pyroclastics
19-29 Rhyolitic quartz-rich lithic and crystal tuffs, agglomerates, lavas and vitric tuffs
19-63 Quartz-pebble conglomerates quartzites and minor shales
19-67 Basic dykes and flows? intruding rhyolitic tuffs
19-10 Chlorite and/or sericite alteration of acid pyroclastics with 2 – 5 % pyrite
b. Wanderer River Tuff
19-23 Pink hematitic rhyolitic crystal and lithic tuffs, minor lavas
c. Hudson River Pyroclastics
19-40 Chloritic quartz-feldspar crystal and lithic tuffs plus biotite bearing rhyolite porphyries (lavas?)
19-58 Shales, greywackes and fine tuffaceous sediments
d. Elliott Point Porphyry
19-22 Coarse grained quartz-feldspar-biotite porphyry probably a sub-volcanic intrusive
e. Cambrian Granites
19-19 Undifferentiated granite and granite porphyry
PRECAMBRIAN
19-65 Undifferentiated quartzites and meta sediments

DATE: OCT 1980
GEOLOGIST: GDS PSH
DRAWN: DB, RHo.
CHECKED: RH

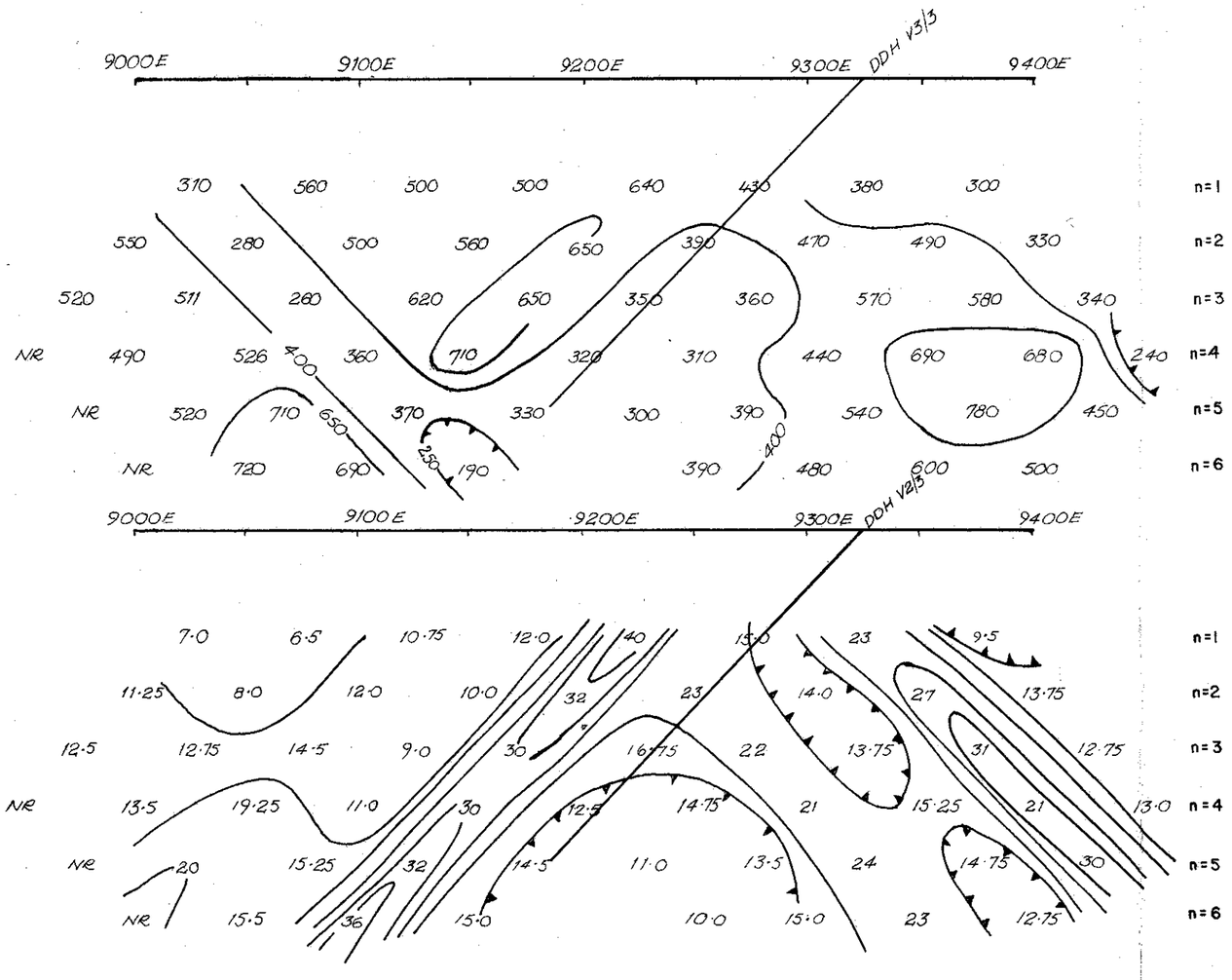
GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD
SCALE: 1:10,000
No. KT27/76-8 A

E.L. 27/76 002
ELLIOTT BAY, TASMANIA
GEOLOGICAL MAP

KT27/76-1	KT27/76-2
KT27/76-3	KT27/76-4
KT27/76-5	KT27/76-6
KT27/76-7	KT27/76-8

791162

PLAN-2 82-1745 (1)



Apparent Resistivity (Ohm·m)

Contour Interval Logarithmic

Apparent Chargeability (mV/v)

Contour Interval 5m V/v

Note : Chargeability plotted is slice with mean delay time of 910mS.

791163

2 - 1745 2/7

PLAN-3

PSEUDOSECTION OF APPARENT CHARGEABILITY AND RESISTIVITY

VOYAGER 3 . ELLIOTT BAY, TASMANIA. LINE 10000N

Obs J.S. M.J.
Rx SCINTREX IPR·8
Tx HUNTEC 2·5 kW

DATE: DEC 80
GEOL:
DWN: JC
CHKD: JS

GEOPEKO LIMITED
DEVONPORT

Scale: 1:2500 | No K

ELLIOTT BAY, TASMANIA. 003
VOYAGER 3

LEGEND:
Zinc
Lead

LEAD

ZINC

C Horizon
Soil Geochemistry

Lead - Zinc ppm
(sampled 25m centres)

1000
900
800
700
600
500
400
300
200
100
0

LINE 10 000mN

Collar 9325E
DDH V3/3

no core

homogeneous fine grained
felsic tuff/siltstone

medium grained
quartz-feldspathic
crystal and lithic tuffs
2-3% pyrite

medium grained
quartzo-feldspathic
crystal tuffs

sphalerite 2mm wide quartz vein

sense of minor folding
in finer grained units

local reversal
of bedding-cleavage
relationship

chlorite rich tuffs
with sphalerite

chalcopyrite in fine grained
crystal tuff

chloritic breccia

galena sphalerite chalcopyrite
in minor quartz veinlets

chalcopyrite rich veinlet 2mm
thick cuts banding in quartz 'eye' tuff

brecciation at contact
possibly indicative of faulting

zone of intensive
quartz veining

spotted very fine
grained rhyolites

disseminated sphalerite
and pyrite in laminated
chloritic vitric tuff

quartz veins
cutting spotted
vitric tuff/rhyolite

sequence of interbedded
porphyritic lavas, flow banded
rhyolites and fine grained tuffs

chlorite rich
brecciated
tuff lava

'glassy' rhyo-dacite
lava

porphyritic lava

quartz crystal tuff/lava

porphyritic lavas

flow banded
rhyolites

5-10% pyrite
disseminated and along
cleavages in interbedded
fine grained and vitric tuffs

banded rhyolites

pink grained poorly
sorted lithic tuff
c1-2% disseminated pyrite

E.O.H.
201·1m

3500
3000
2500
2000
1500
1000
500
0
n.s.
ppm

ZINC ppm

LEADppm

1500
1000
500
0
15
10
5
0
ppm

SILVER ppm

750
500
250
0
ppm

COPPER ppm

GEOCHEMICAL RESULTS
FROM 1m SAMPLES OF
HALF CORE

5 cm

DATE JUNE 1981
GEOLOGIST PAW
DRAWN R.TOG
CHECKED

GEOPEKO

SCALE 1:500

No. TS27/76-V3-13

E.L.27/76 ELLIOTT BAY
VOYAGER 3
PROFILE OF DDH V3/3
GEOLOGY AND GEOCHEMISTRY

004

82-17451 27

PLAN 4
791164

382000 E.

383000 E.

384000 E.

5249000 N.

5248000 N.

5247000 N.

5246000 N.

Fine silic sed. or lava?

60

Basic pods < 2m. 45-80

Chl. mag

65

80

Weaber Ck

85

80

80

85

80

River

Hudson

5 cm

SCALE

100 0 100 300 500 600 Metres

Scale 1 : 10,000.

KEY

Tertiary — Gravel-sand, qartz quartzite derived.

Undifferentiated ~ no outcrop.

Cambrian

(i) Siliceous silts, tuffaceous wackes.

(ii) Tuff crystal lithic (~5cm.) with epidote (lichs nodules?)

(iii) Tuff &/or rhyolite lava, quartz feldspar phenocrysts.

(iv) Tuff quartz ≤ felaspar crystal -chloritic, minor liths.

GEOPEKO EXPLORATION ~ E.L. 27/76	
VOYAGER 16 RECONNAISSANCE GEOLOGY	
Date FEB '81	E.L.27/76-V16-3
Compiled, R.A.P.	PLAN-5 005
Drawn N.S.P.	
Checked R.A.P.	82/1745 2/7

791165

5249000 N.

382000 E

383000 E.

384000 E.

9300 E.

10,650 E.

10000 N.

5248000 N.

9600 N.

6206

6207

6203

8489

6205

6202

6204

9200 N.

6215

6216

8488

Waterloo Ck.

8457

8486

6208

6214

8493

6212

8492

6213

5247000 N.

8800 N.

6210

8435

6209

6211

River

Hudson

8481

8482

8433

8434

8490

8491

5246000N.

Key

Pan cons 6202 :- 16

Rock samples 8481 :- 93

SCALE

100 0 100 200 300 400 600 800 Metres

Scale 1 : 10,000.

5 cm

GEOPEKO EXPLORATION, E.L.27/76.

VOYAGER 16, LOCATION PLAN.
Grid ~ Pan cons.~ Rock samples.

Date FEB 1981.

Compiled R.A.P.

Drawn . N.S.P.

Checked R.A.P.

E.L.27/76-V16-4

PLAN - 6

006

1745

2/7

791166

382000 E.

383000 E.

5248000 N.

5247000 N.

Waterlee Ck.

HUDSON

RIVER.

15 | .5
16 | 90
265 | 4600
X

X | X
5 | 50
540 | 4100
X

X | 115
10 | 5500
70 | 625
X

.5 | X
80 | 3650
X | 10
27
X

5 | 6
20 | 4
340 | 450
6.93 | 6100

X | X
10 | 60
585 | 2950
X

5 | .5
10 | 85
1750 | 5000
X

X | 115
10 | 4950
65 | 3300
X

X | .5
10 | 90
730 | 3550
X

X | .5
10 | 155
355 | 4500
X

5 | X
5 | 80
640 | 7300
X

X | .5
10 | 65
590 | 3750
2.65

5 | X
15 | 95
275 | 4250
.48

X | .5
10 | 70
1000 | 3750
X

X | .5
5 | 70
290 | 3100
X

Key

Cu. Ag.
Pb. Mn.
Zn. Fe.
Au.

5 cm

Scale. ~ metres.

100 0 100 300 600 800

Scale 1:10,000.

82-1745 217

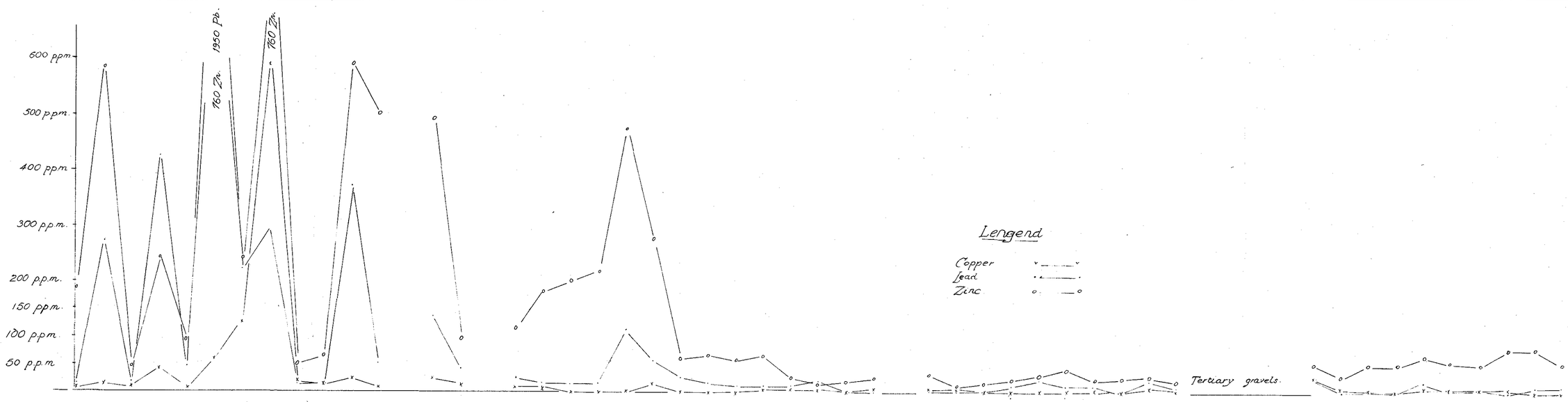
GEOPEKO EXP. E.L.27-76.

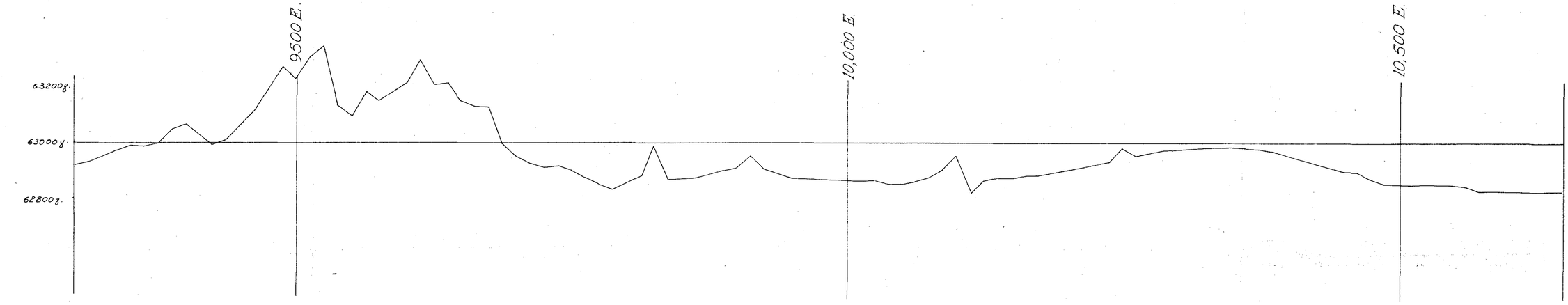
Voyager 16
Pan Con. Results

007

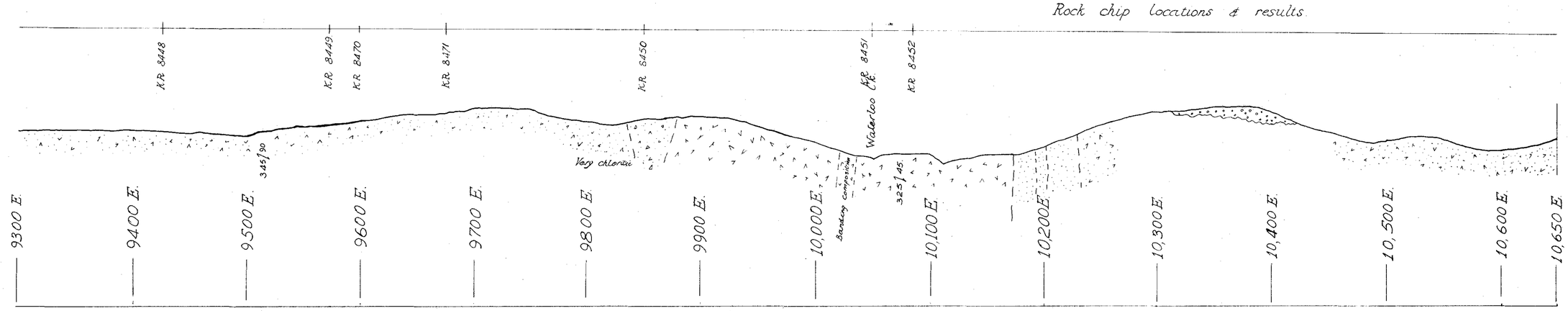
Date Feb. 1981.	E.L.27/76-V16-5
Compiled R.A.P.	PLAN - 7
Drawn N.S.P.	Checked R.P.G.

791167





Rock chip locations & results



Grid lines 270° ~ 090° True.

Undifferentiated ~ no outcrop

KEY

Tertiary — Gravel/sand quartz & quartzite derived

Cambrian
(i) Siliceous silts ~ tuffaceous wackes.
(ii) Tuff & rhyolite lava, quartz feldspar phenocrysts in vitric ground mass.
(iii) Tuff, crystal lithic (< 5c m) with epidote (Lith,-nodules?).
(iv) Tuff quartz ≥ feldspar crystal chloritic, minor liths

SCALE

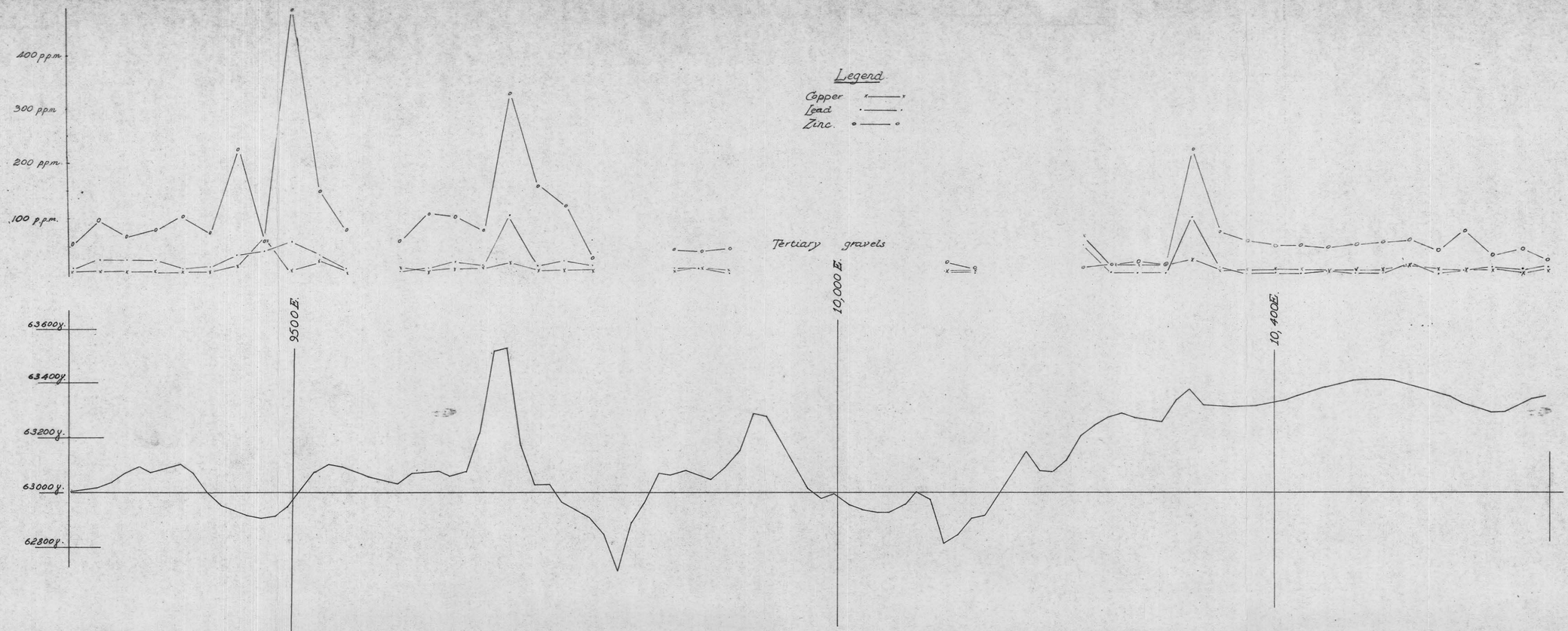
50 0 100 200 Metres.

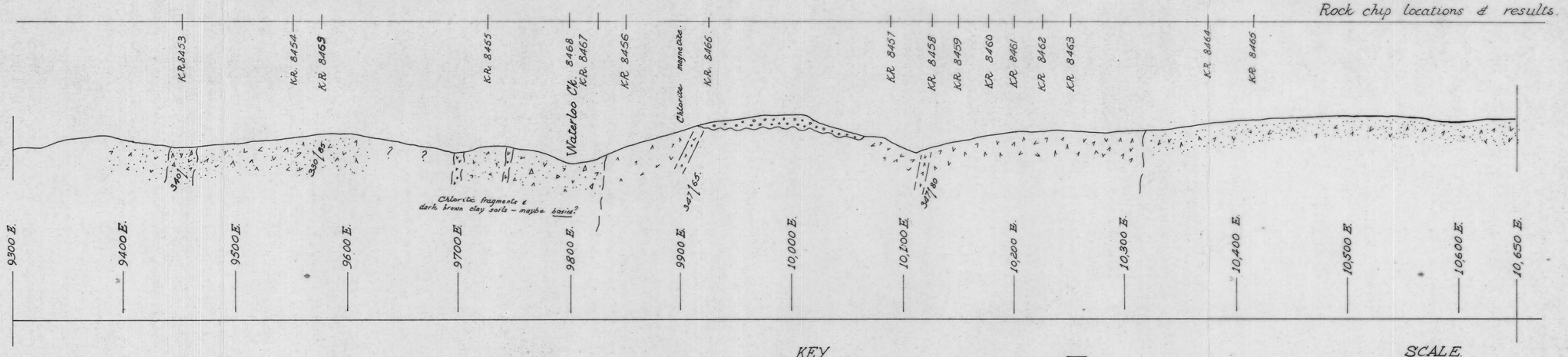
Scale 1:2500.

5 cm

791168

GEOPEKO EXPLORATION E.L. 27 76	
ELLIOTT BAY, TAS. VOYAGER 16 GRID ~ Line 8800 NORTH	
Date FEB. 1981	E.L.27/76-VI6-6
Compiled R.A.P.	008
Drawn N.S.P.	PLAN-8
Checked	82-1745





Grid lines 270° ~ 090° True.

5 cm

KEY

Tertiary — Gravel/sand quartz quartzite derived.

Cambrian (i) Tuff quartz ≥ feldspar crystal, generally chloritic, minor liths.

(ii) Tuff crystal lithic (<5c.m.) with epidote (lith - nodules?)

(iii) Tuff &/or rhyolite lava, quartz feldspar phenocrysts in vitric ground mass.

(iv) Basic fine grained chloritic lenses < 2 metres thick.

Undifferentiated ~ no outcrop.

SCALE.

50 0 100 200 Metres.

Scale 1:2500.

791169

GEOPEKO EXPLORATION E L 27 76

ELLIOTT BAY, TAS.
VOYAGER 16 GRID ~ Line 9200 North

Date FEB. 1981	EL 27/76-V16-7
Compiled R.A.P.	PLAN-9 009
Drawn N.S.P.	
Checked R.A.P.	

9200 V16

82-1745 27

Legend

Copper
Lead
Zinc

Cu 51, Pb 20, Zn 55.
+ Fe 35% Mn 10~in ppm.

150 ppm
100 ppm
50 ppm

Tertiary gravels & Sands

9700 E.
10,000 E.
10,300 E.

63600 y.
63,400 y.
63200 y.
63000 y.

Rock chip locations & results

KR 8473
KR 8472
KR 8471
KR 8475
KR 8476

9300 E.
9400 E.
9500 E.
9600 E.
9700 E.
9800 E.
9900 E.
10,000 E.
10,100 E.
10,200 E.
10,300 E.
10,400 E.
10,500 E.
10,600 E.
10,650 E.

Volcanics deeply weathered under thin gravel cover.

Grid lines 270° ~ 090° True.

KEY

Recent — Angular quartz float
Tertiary — Gravel-sand, quartz quartzite derived
Cambrian (i) Tuff &/or rhyolite lava, quartz feldspar phenocrysts in vitric ground mass.
(ii) Tuff, quartz ≤ feldspar crystal chloritic, minor liths.
Undifferentiated ~ no outcrop.

SCALE
50 0 100 200
Scale 1:2500

5 cm

GEOPEKO EXPLORATION E.L. 27/76

ELLIOTT BAY, TAS.
VOYAGER 16 GRID ~ Line 9600 North

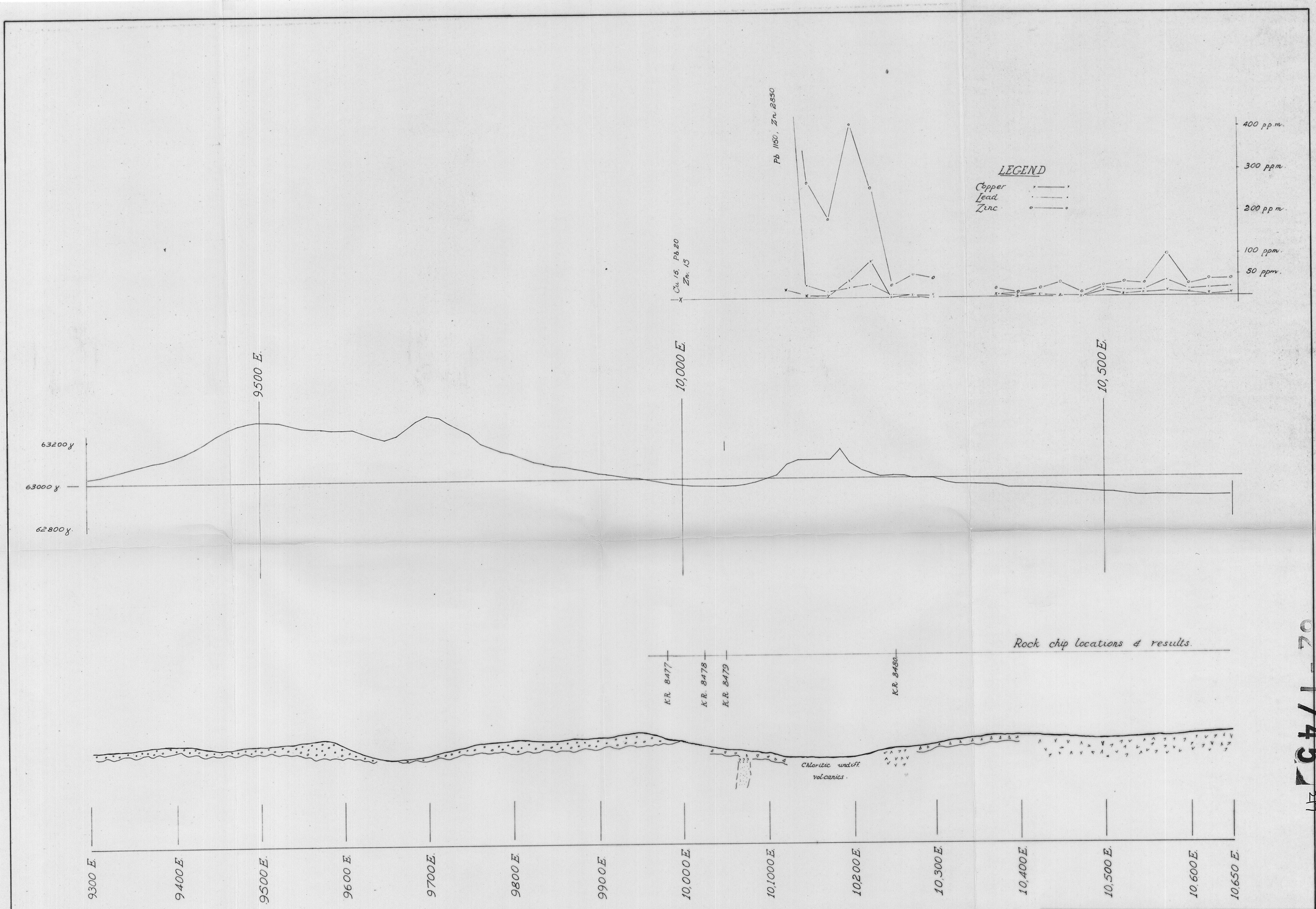
Date FEB. 1981
Compiled R.A.P.
Drawn N.S.P.
Checked R.A.P.

E.L. 27/76-VI6-8 010

PLAN - 10

791170

-1745 217



Grid lines 270° ~ 090° True.

KEY

RECENT — Angular quartz float

TERTIARY — Grav-sand quartz quartzite derived

CAMBRIAN — Siliceous silts, tuffaceous wackes

Tuff & or rhyolite lava, quartz feldspar phenocrysts.

SCALE

50 0 50 100 200 300 Metres.

Scale 1:2500

5 cm

GEOPEKO EXPLORATION E.L. 27 76	
ELLIOTT BAY, TAS VOYAGER 16 GRID ~ Line 10,000 North	
Date FEB. 1981.	E.L.27/76-V16-9
Compiled R.A.P.	PLAN-11 011
Drawn N.S.P.	791171
Checked R.A.P.	

92-1745 27

PLAN-12

GEOPEKO
A DIVISION OF PEKO-WALLSEND

SCALE: 1:5000	
DATE: JUNE 1981	
GEOL: P.A.WILSON	
DRAWN: R.TOGNONI	
CHKD:	

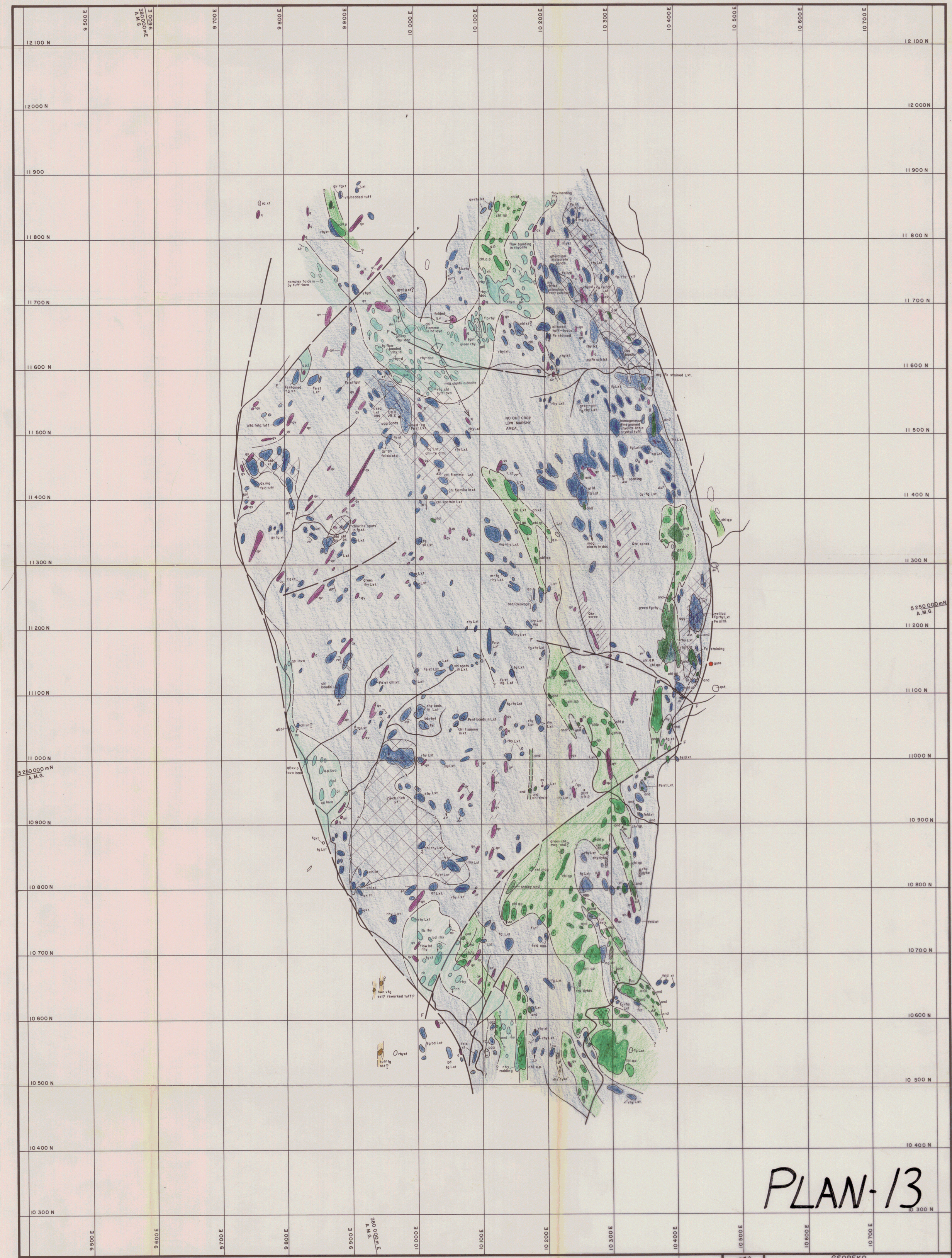
ELLIOTT BAY, TASMANIA
VOYAGER 16 GRID 012
SOIL SAMPLE LOCATION

791172

TS 27/76-V16-1

GN MN
13°00'

5 cm



STRIKE AND DIP OF LAYERING BEDDING
" " CLEAVAGE
PLUNGE OF LINEATION
INFERRED FAULT
GEOLOGICAL CONTACT INFERRED
INFERRED ANTICLINE AXIS

QUARTZ VEINS
VEIN QUARTZ RUBBLE
ZONE OF STRONG ALTERATION NOTABLY IRON STAINING AND CHLORITE ALTERATION
MAJOR CREEK

(NO CHRONOLOGY INFERRED)

RHYOLITIC PYROCLASTICS, GENERALLY LITHIC AND CRYSTAL LAPILLI TUFFS (SERICITICALLY ALTERED LOCALLY)

QUARTZ PORPHYRY LAVAS & FLOW Bnd. RHYOLITES, RHYO-DACITES AND UNDIFFERENTIALED VITRIC TUFFS

MASSIVE 'ANDESITE-DACITE' VERY FINE GRAINED, SPLINTERY CHLORITE RICH ROCK. POSSIBLY INTRUSIVE.

QUARTZ-CHLORITE PORPHYRY MASSIVE ROCK WITH UP TO 30% PHENOCRYSTIC (1-3mm) QUARTZ CRYSTALS IN ALTERED CHLORITIC MATRIX.

5 cm

MN

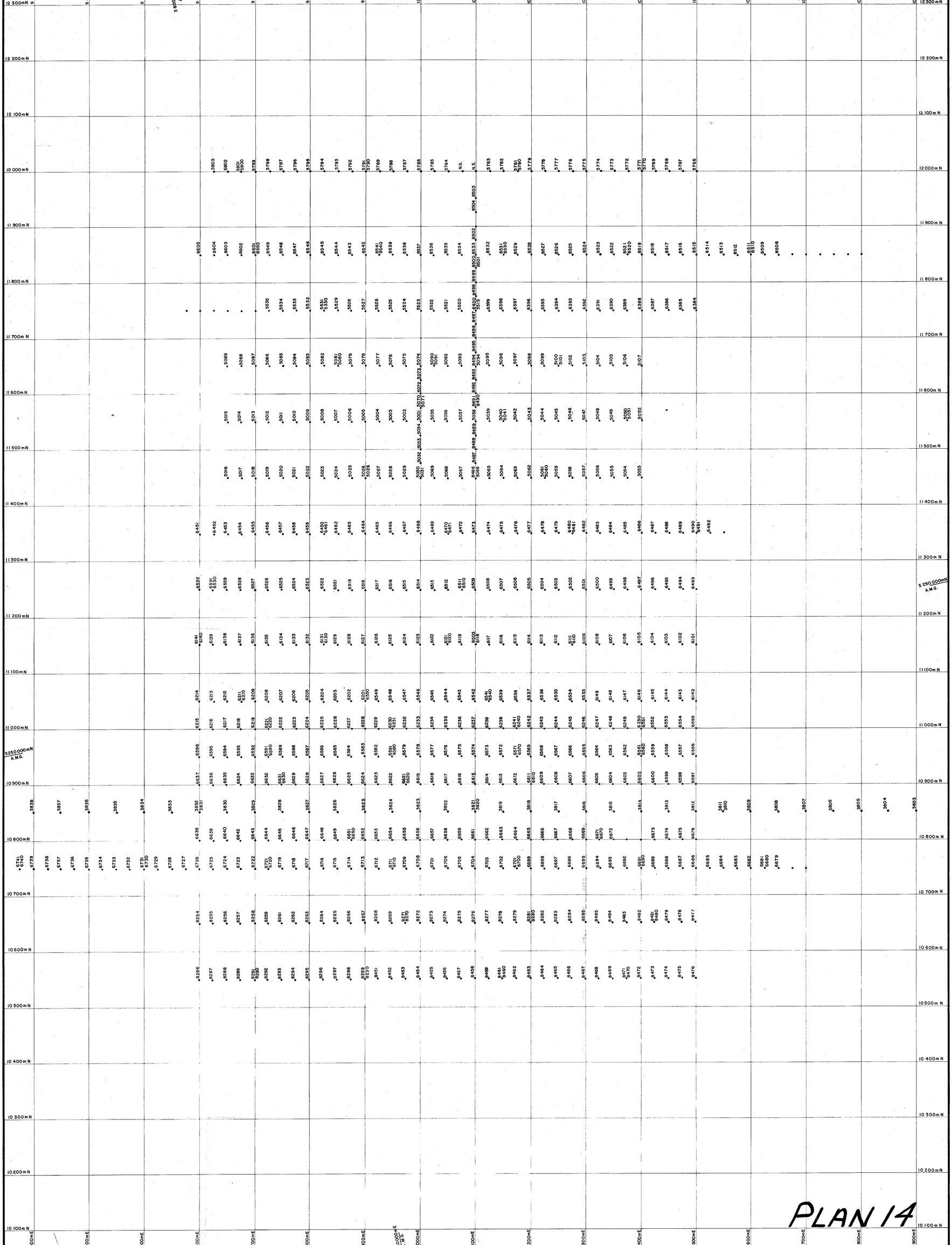
GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.
SCALE 1:2500
No. TS 27/76 V9-14

E.L. 27/76 ELLIOTT BAY
VOYAGER 9
GEOLOGICAL PLAN
013

DATE 1981
GEOLOGIST P.A.W.
DRAWN R.T., M.v.dS.
CHECKED

PLAN-13

791173 82-1745 2/7



PLAN 14

LEGEND:

- Grid position
- Power auger
- Hand auger
- Power hand auger/mate

SAMPLE POSITION — 20 Cu ppm, 15 Pb ppm, 10 Zn ppm, 5 Fe %

15, 15, 5, 10 DUPLICATE SAMPLE

NS NO SAMPLE
X BELOW LEVEL OF DETECTION

CONTOUR INTERVAL ppm
Pencil No.

82-1745 2/7

5 cm

MN

DATE: 1981
GEOLOGIST: P.A.W.
DRAWN: M.vdS.
CHECKED:

GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.

791174

SCALE: 1:2500

No. TS 27/76 V9-15

E.L. 27/76 ELLIOTT BAY, TASMANIA
VOYAGER 9

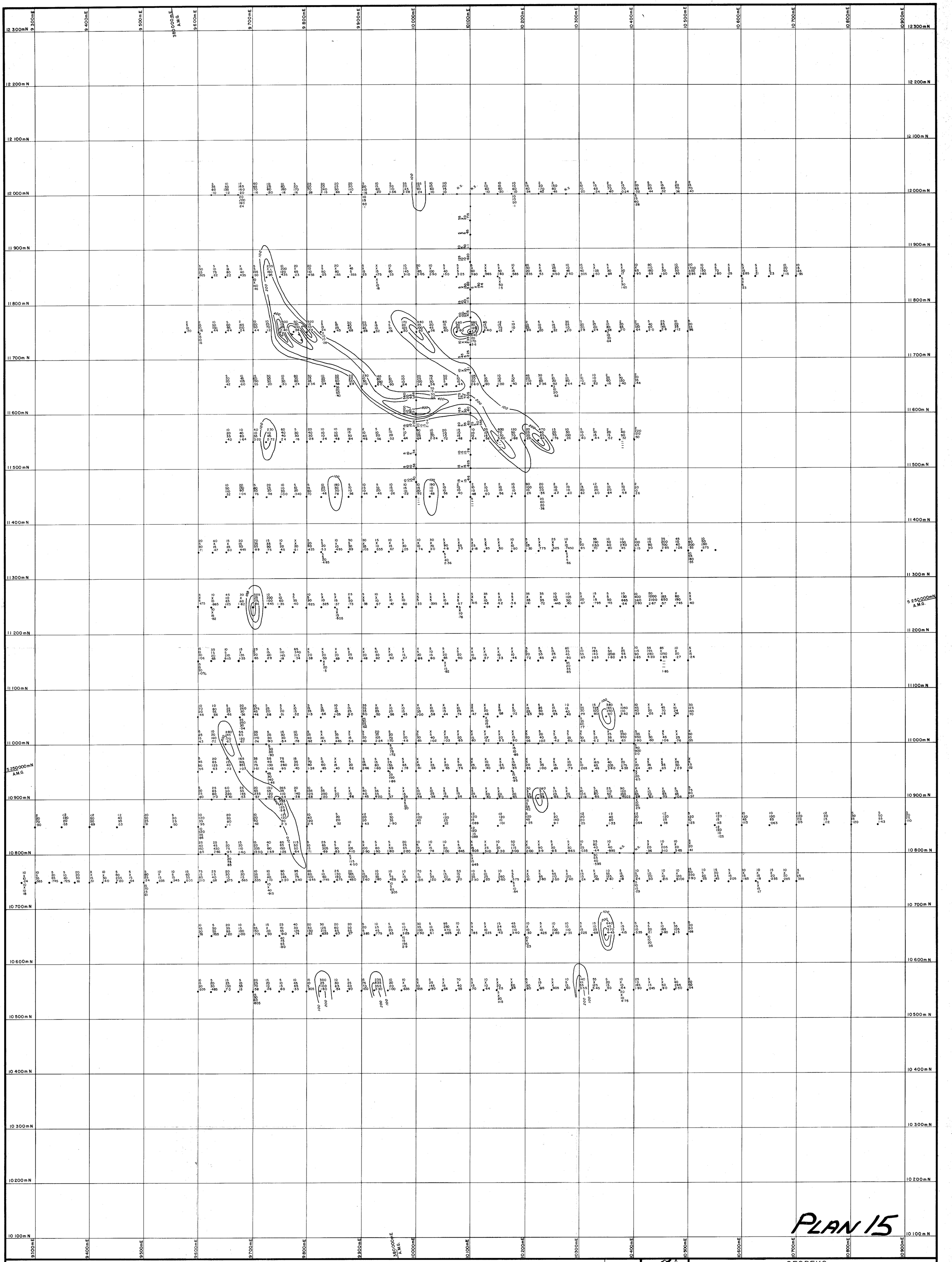
014

C-HORIZON GEOCHEMISTRY RESULTS
CONTOURS

9300mE | 9400mE | 9500mE | 380000mE A.M.G. | 9600mE | 9700mE | 9800mE | 9900mE | 10000mE | 10100mE | 10200mE | 10300mE | 10400mE | 10500mE | 10600mE | 10700mE | 10800mE | 10900mE

12300mN
12200mN
12100mN
12000mN
11900mN
11800mN
11700mN
11600mN
11500mN
11400mN
11300mN
11200mN
11100mN
11000mN
10900mN
10800mN
10700mN
10600mN
10500mN
10400mN
10300mN
10200mN
10100mN

5250000mN A.M.G.



LEGEND:

- Grid position
- Power auger
- Hand auger
- Power hand auger / mate

SAMPLE POSITION — 20 Cu ppm; 15 Pb ppm; 10 Zn ppm; 5 Fe %; CHECK SAMPLE 15 15 5 10

NS NO SAMPLE
X BELOW LEVEL OF DETECTION

CONTOUR INTERVAL ppm

Pencil No.	
19-6	100 – 199
19-10	200 – 399
19-15	400 – 799
19-22	> 800

82-1745 T 27

5 cm

791175

MN

GEOPEKO
A DIVISION OF PEKO–WALLSEND OPERATIONS LTD.

SCALE: 1:2500

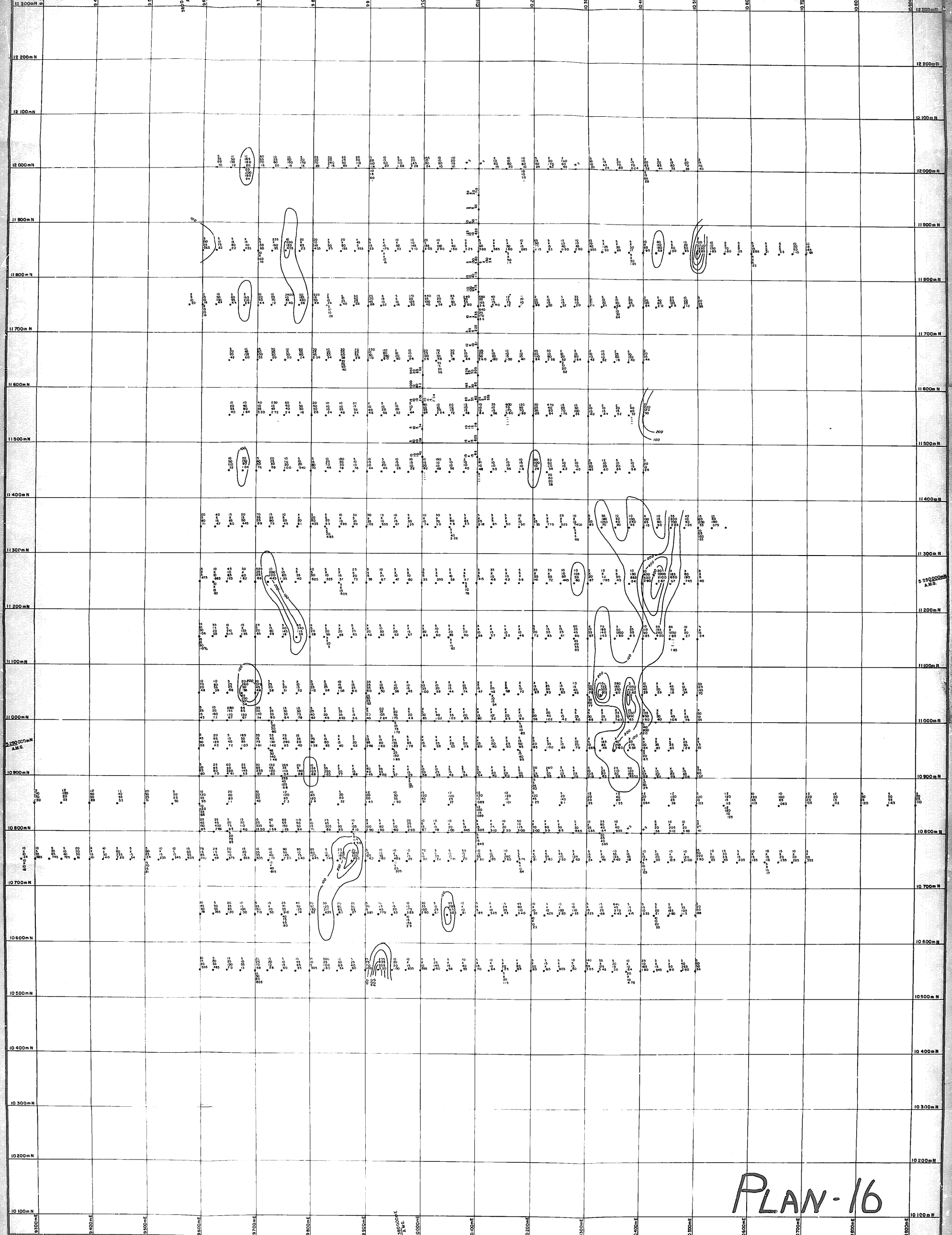
No. TS 27/76 V9-17

DATE: 1981
GEOLOGIST: P.A.W.
DRAWN: M.vdS.
CHECKED:

E.L. 27/76 ELLIOTT BAY, TASMANIA
VOYAGER 9
C-HORIZON GEOCHEMISTRY RESULTS
Cu CONTOURS

015

PLAN 15



PLAN-16

LEGEND:

- Grid position
- Power auger
- Hand auger
- Power hand auger/mate

SAMPLE POSITION — 20 Cu ppm, 15 Pb ppm, 10 Zn ppm, 5 Fe %

15, 15, 5, 10 — CHECK SAMPLE

NS NO SAMPLE

X BELOW LEVEL OF DETECTION

CONTOUR INTERVAL ppm

Period No	
19-6	100 - 199
19-10	200 - 399
19-15	400 - 799
19-22	>800

C 1745 211

GEOPEKO

A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.

SCALE: 1:2500

No. TS 27/76 V9 18

DATE: 1981

GEOLOGIST P.A.W.

DRAWN: M.v.d.B.

CHECKED: RO

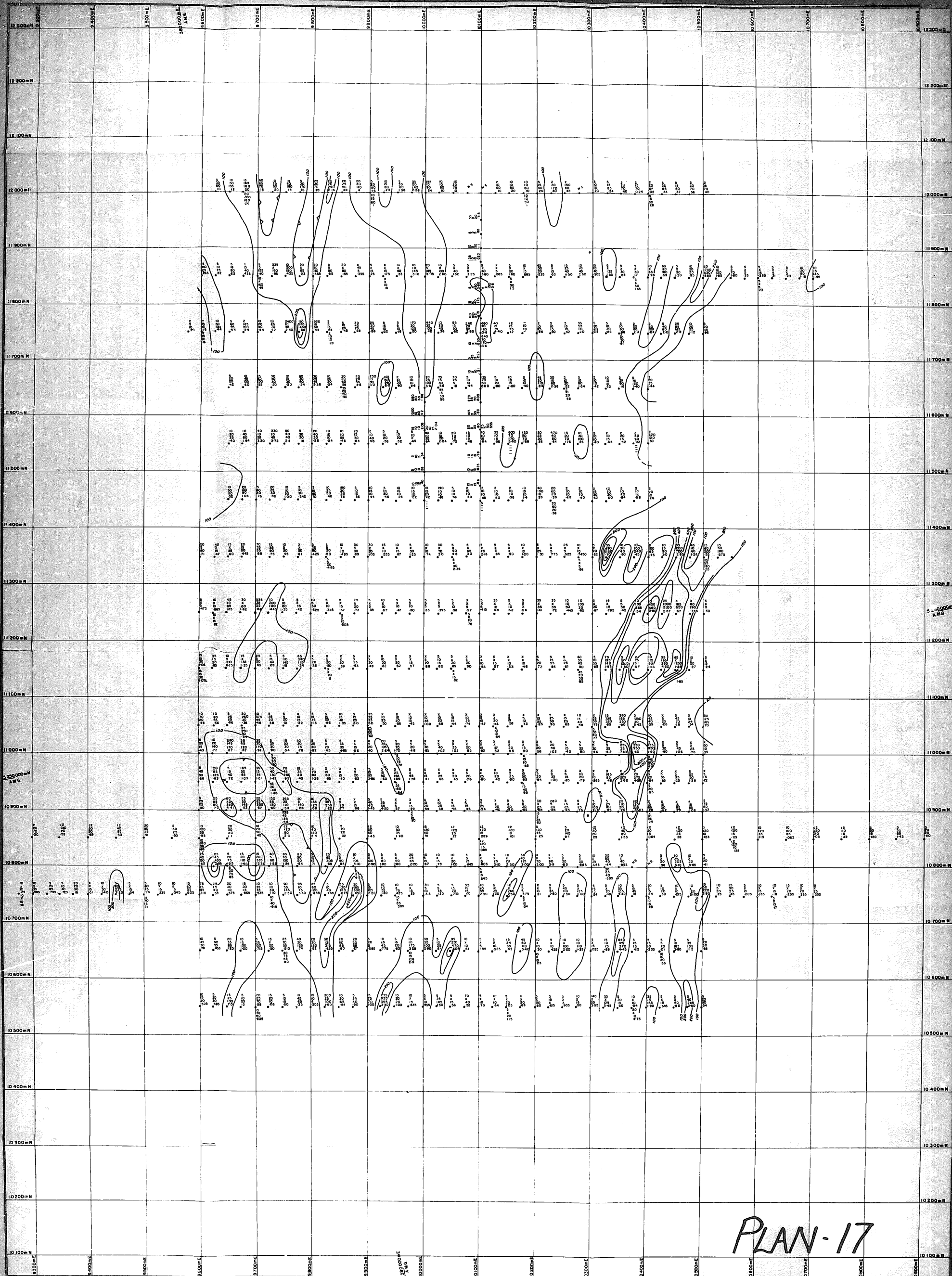
E.L. 27/76 ELLIOTT BAY, TASMANIA

VOYAGER 9

C-HORIZON GEOCHEMISTRY RESULTS

Pb CONTOURS

016



PLAN-17

LEGEND:

- Grid position
- Power auger
- Hand auger
- Power hand auger / mate

SAMPLE POSITION: 20 Cu ppm, 15 Pb ppm, 10 Zn ppm, 5 Fe %; 15, 10, 5, 10 — CHECK SAMPLE

NS NO SAMPLE

X BELOW LEVEL OF DETECTION

CONTOUR INTERVAL ppm

Pencil No.	
19-6	100-199
19-10	200-399
19-15	400-799
19-22	> 800

82-1745 217

MN

DATE 1981

GEOLOGIST P.A.W.

DRAWN M.v.d.S.

CHECKED K

GEOPEKO

A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.

SCALE: 1:2500

No. TS 27/76 V9-19

E.L. 27/76 ELLIOTT BAY, TASMANIA

VOYAGER 9

C-HORIZON GEOCHEMISTRY RESULTS

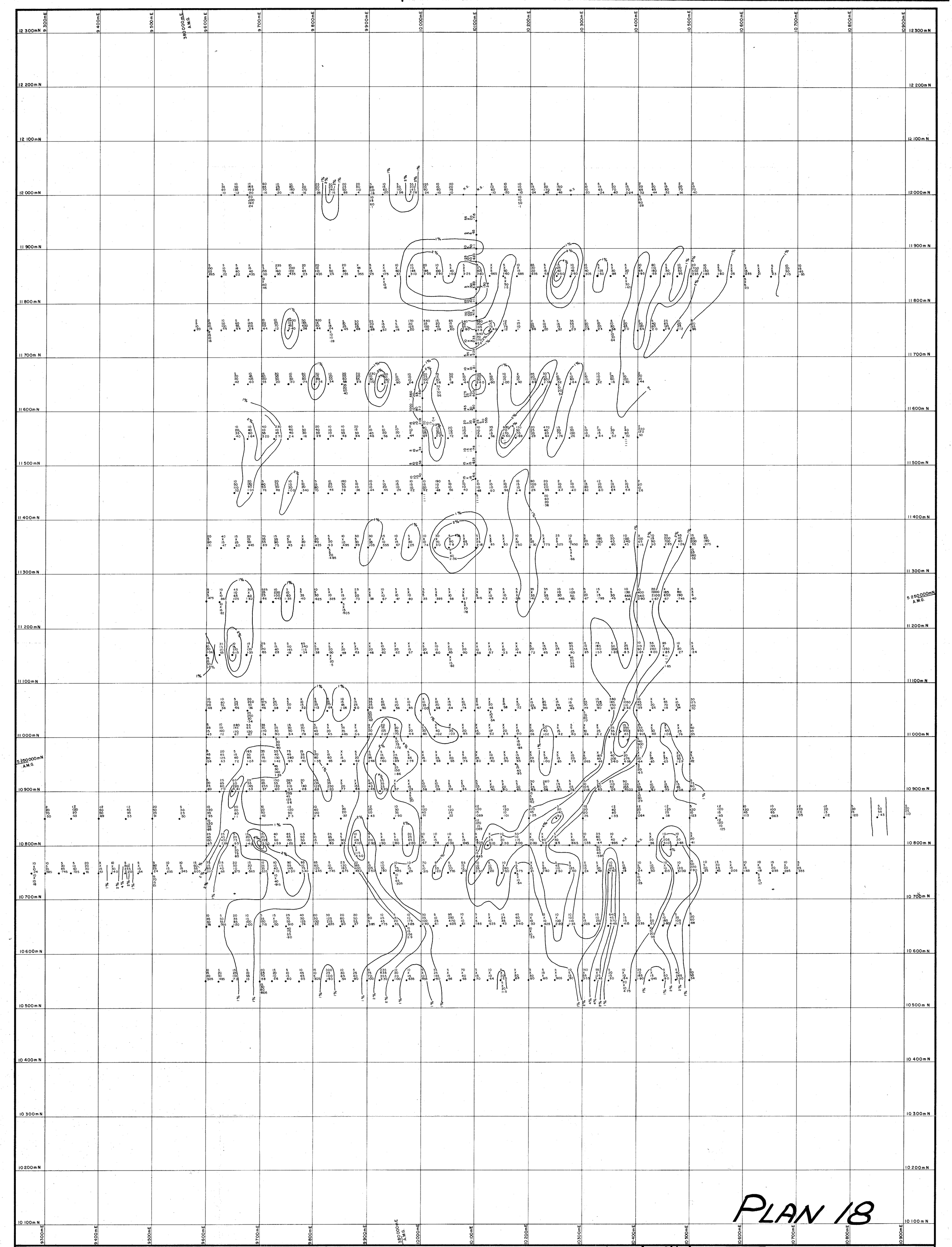
Zn CONTOURS

017

9300mE 9400mE 9500mE 380000mE A.M.G. 9600mE 9700mE 9800mE 9900mE 10000mE 10100mE 10200mE 10300mE 10400mE 10500mE 10600mE 10700mE 10800mE 10900mE

12 300mN
12 200mN
12 100mN
12 000mN
11 900mN
11 800mN
11 700mN
11 600mN
11 500mN
11 400mN
11 300mN
11 200mN
11 100mN
11 000mN
10 900mN
10 800mN
10 700mN
10 600mN
10 500mN
10 400mN
10 300mN
10 200mN
10 100mN

5 250000mN A.M.G.



LEGEND:

- Grid position
- Power auger
- Hand auger
- Power hand auger / mate

SAMPLE POSITION — 20 Cu ppm, 15 Pb ppm, 10 Zn ppm, 5 Fe %; CHECK SAMPLE 15, 15, 5, 10

NS NO SAMPLE
X BELOW LEVEL OF DETECTION

CONTOUR INTERVAL ppm

Pencil No	
19-6	1%
19-10	2%
19-15	4%
19-22	>8%

82-1745 217

5 cm

MN

DATE: 1981
GEOLOGIST P.A.W.
DRAWN: M.vdS.
CHECKED

791177 GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.

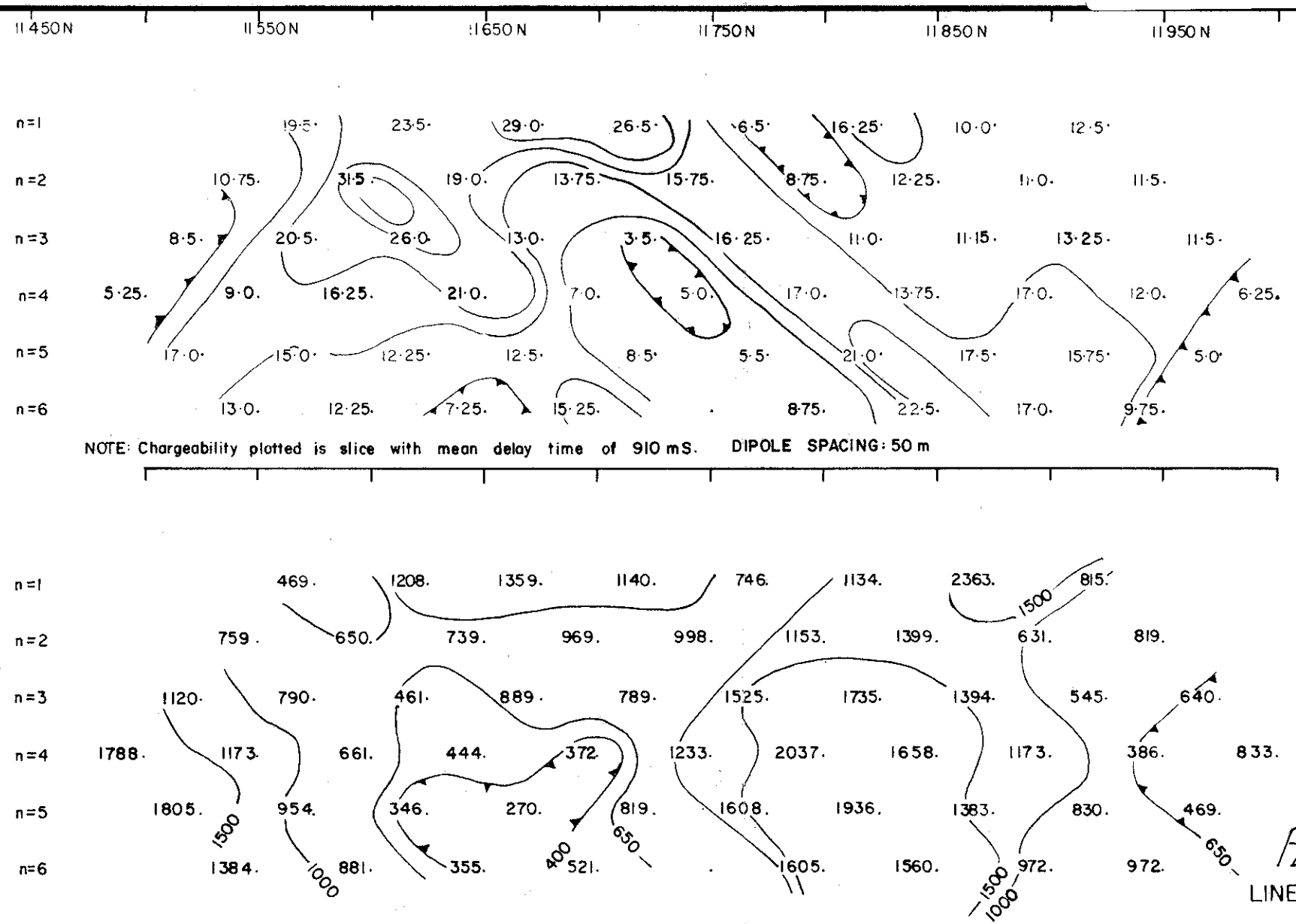
SCALE: 1:2500

No. TS 27/76 V9-20

E.L. 27/76 ELLIOTT BAY, TASMANIA
VOYAGER 9 013
C-HORIZON GEOCHEMISTRY RESULTS
Fe CONTOURS

PLAN 18

5 cm

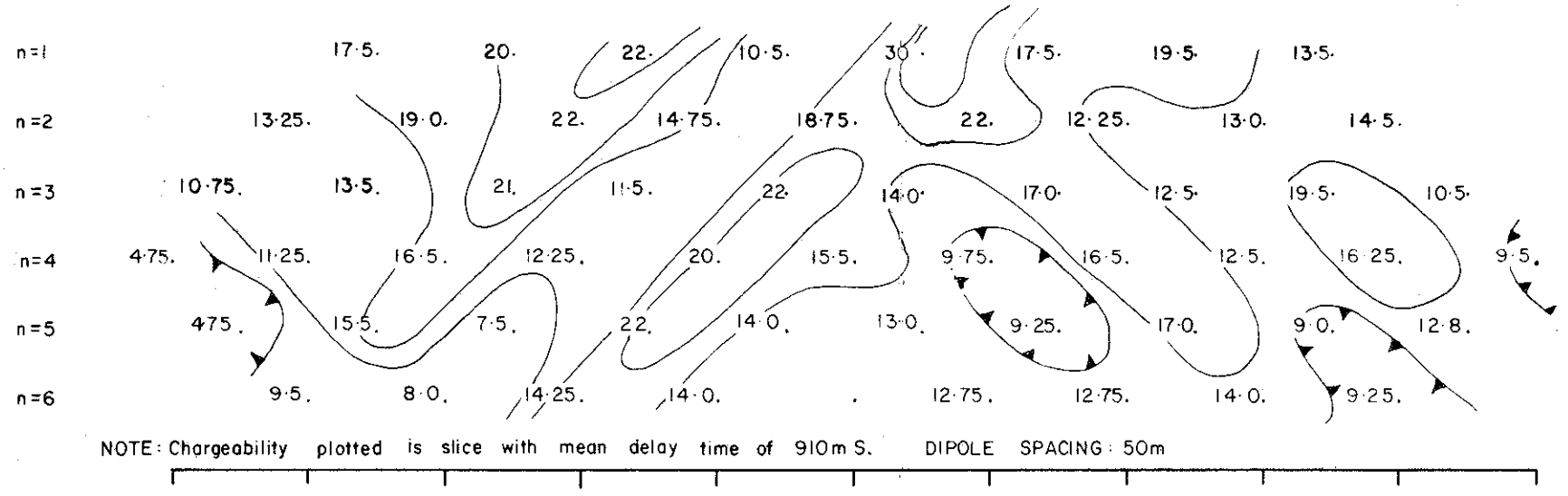


GEOPEKO Geophysical Surveys Plan no.						
	Trans	Elliot 1·5 kW	Obs	R.G.	AREA	ELLIOTT BAY, TASMANIA
	Recvr	Scintrex IPR-8	Drwn	R.Tognoni	PROSPECT	VOYAGER 9
	Scale	1:2500		JS	PLAN SHOWS	PSEUDOSECTION OF DIPOLE-DIPOLE I.P./RESITIVITY
	Date	Jan 1981				

79 1179

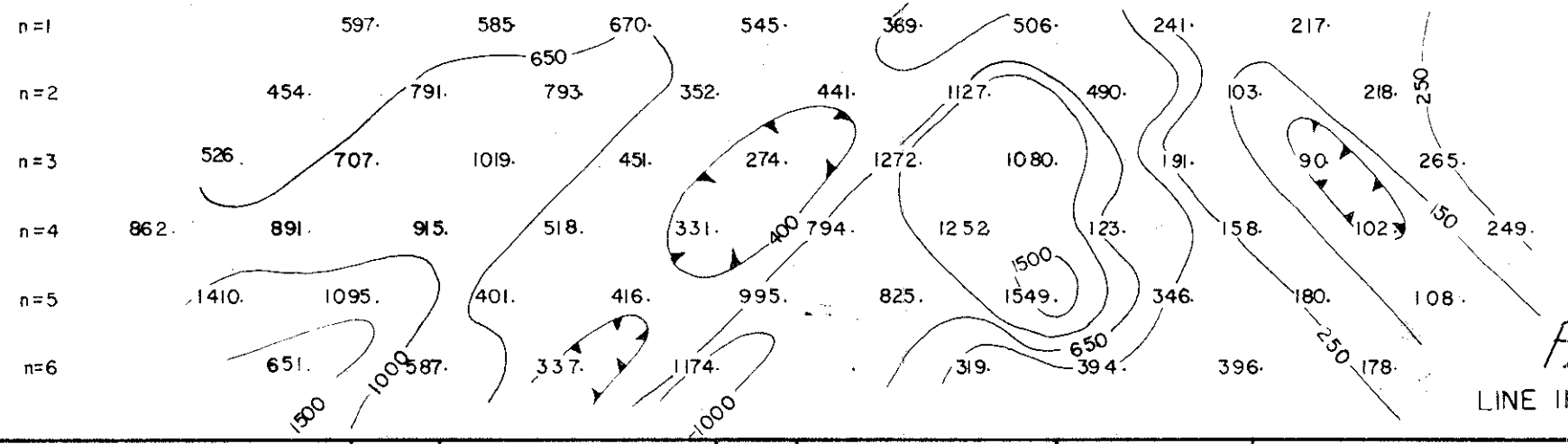
5 cm

9900 E | 10000 E | 10100 | 10200 E | 10300 E | 10400 E



Apparent Chargeability (M232) mV/V
Cont Int: 5mV/V

NOTE: Chargeability plotted is slice with mean delay time of 910m S. DIPOLE SPACING: 50m



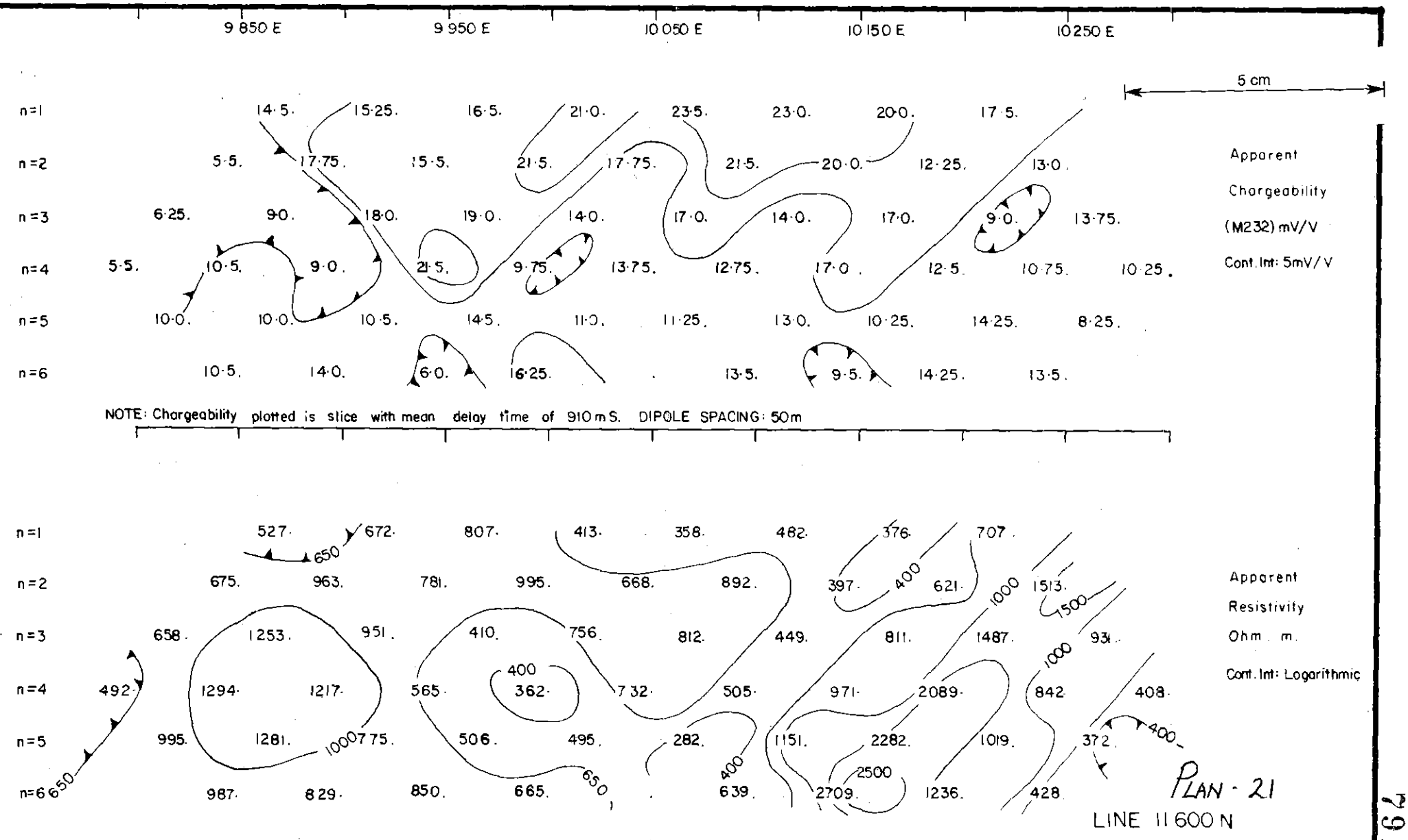
Apparent Resistivity
Ohm. m.
Cont. Int: Logarithmic

PLAN - 20
LINE 11050N

GEOPEKO Geophysical Surveys Plan no.	Trans	Elliot 1·5 kW	Obs	J.S.	AREA	ELLIOTT BAY, TASMANIA
	Recvr	Scintrex IPR-8	Drwn	R.Tognoni	PROSPECT	VOYAGER 9
	Scale	1:2500			PLAN SHOWS	PSEUDOSECTION OF DIPOLE-DIPOLE I.P./RESISTIVITY
	Date	Jan 1981				

791178

82-1745 S/T 020

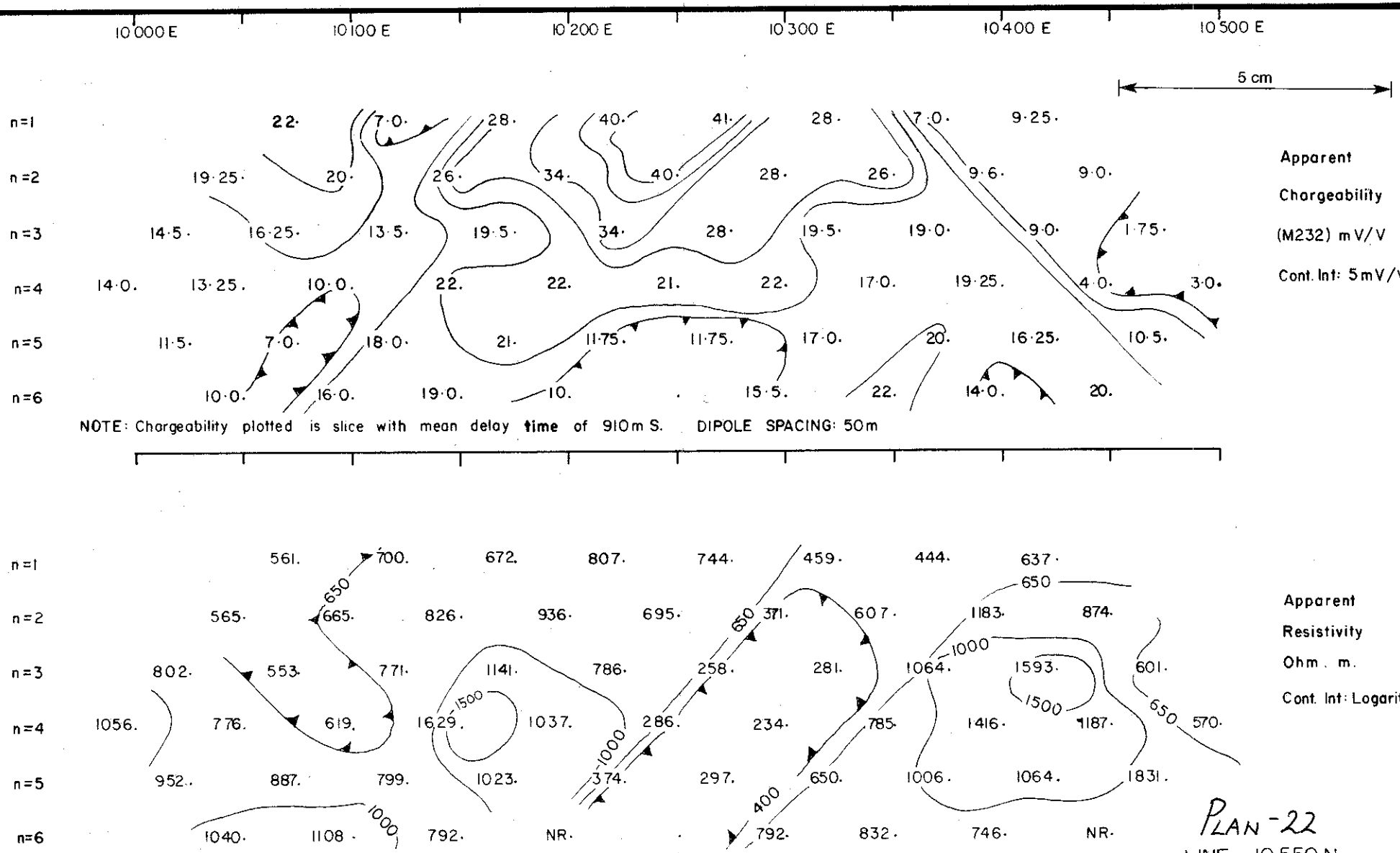


GEOPEKO Geophysical Surveys Plan no.	Trans	Elliot 1·5 kW	Obs	R.G.	AREA	ELLIOTT BAY, TASMANIA
	Recvr	Scintrex IPR-8	Drwn	R.Tognoni	PROSPECT	VOYAGER 9
	Scale	1:2500		S.S.	PLAN SHOWS	PSEUDOSECTION OF DIPOLE-DIPOLE I.P/RESITIVITY
	Date	Jan 1981				

82-1745 3/7

021

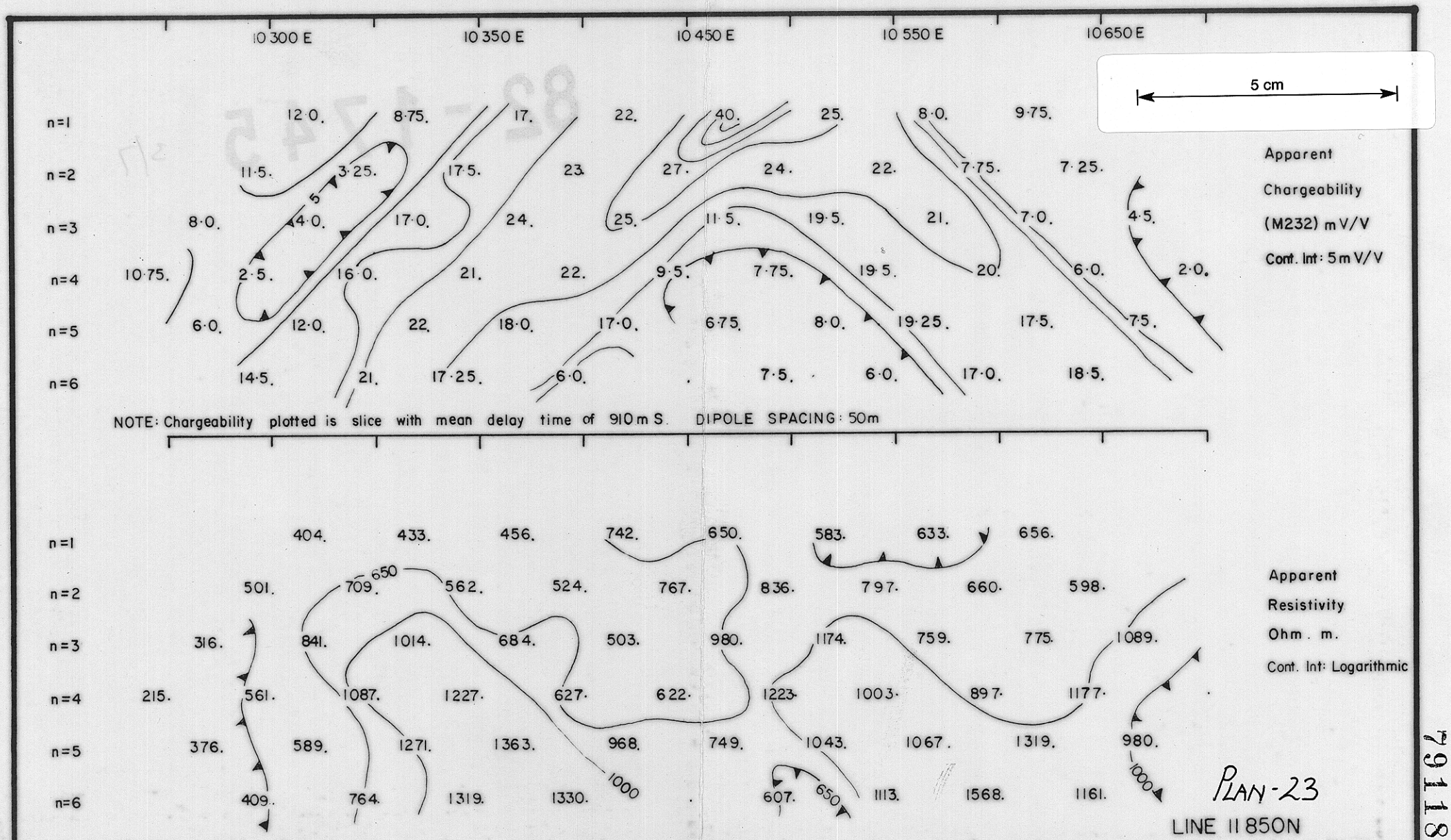
2911180



GEOPEKO Geophysical Surveys Plan no.	Trans	Elliot 1·5kW	Obs	R.G.	AREA	ELLIOTT BAY, TASMANIA
	Recvr	Scintrex IPR-8	Drwn	R.Tognoni	PROSPECT	VOYAGER 9
	Scale	1:2500		S.S.	PLAN SHOWS	PSEUDOSECTION OF DIPOLE-DIPOLE I.P/RESITIVITY
	Date	Jan 1981				

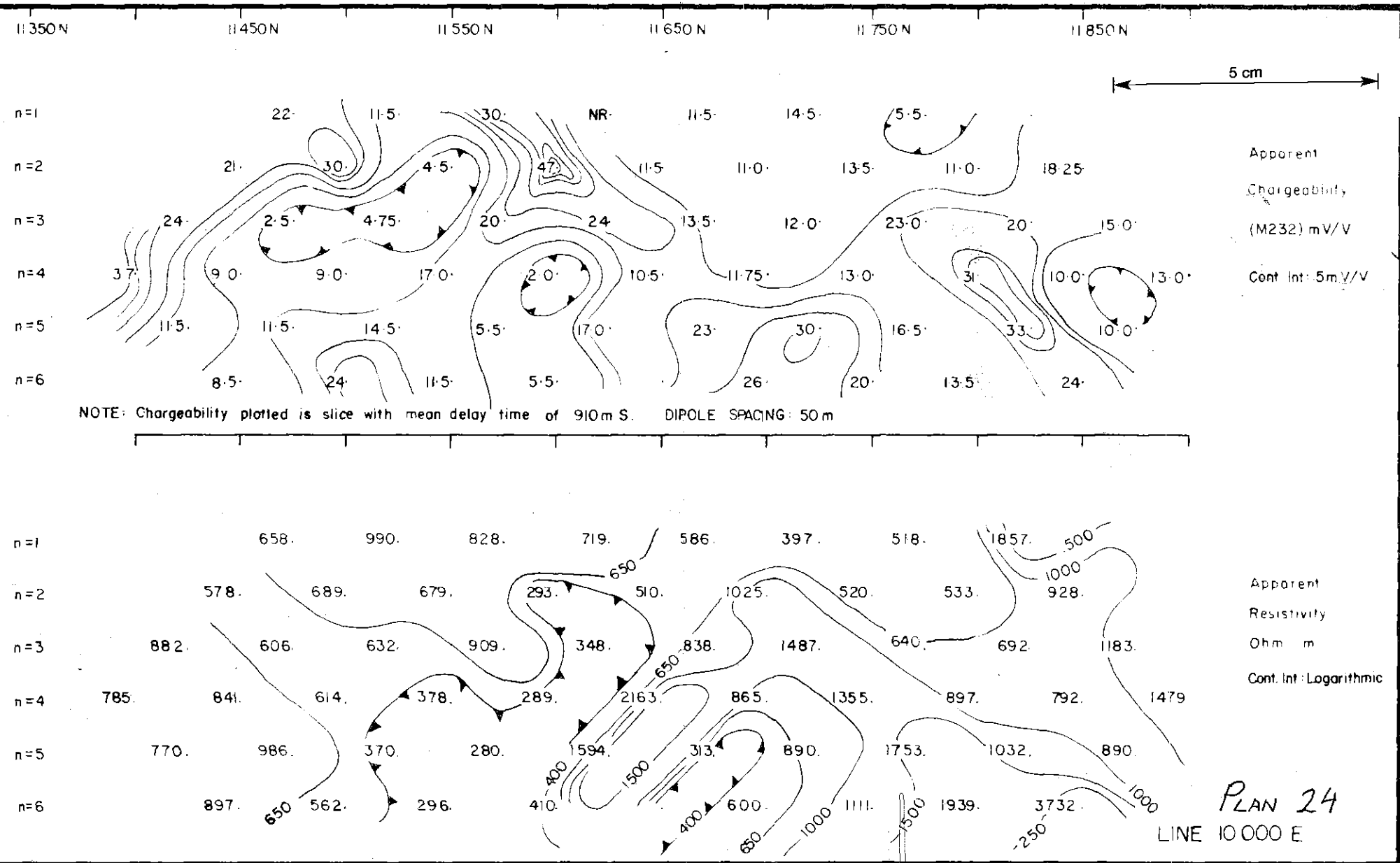
Wilson '81 Vol.3. 022

791181



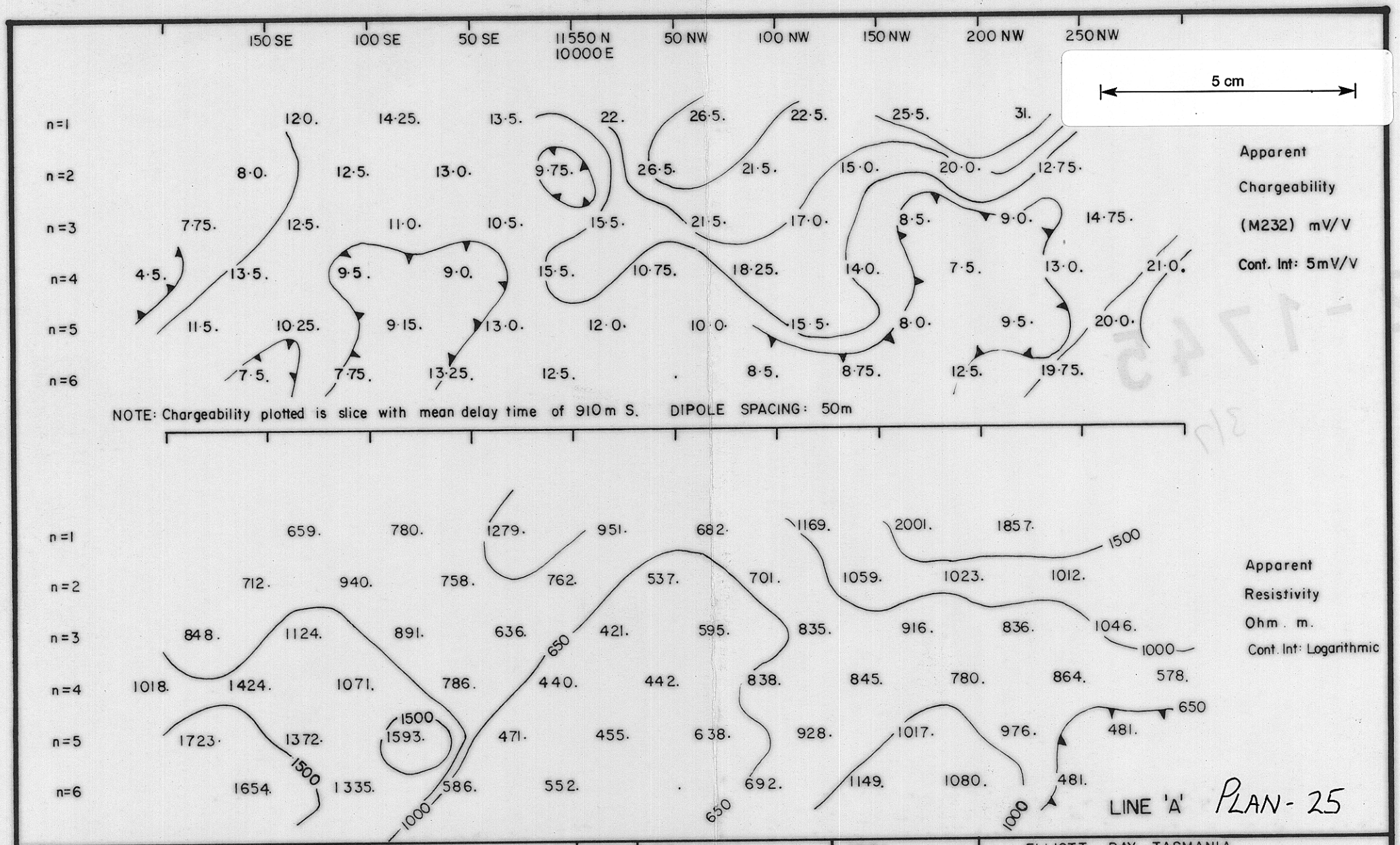
GEOPEKO Geophysical Surveys Plan no.	Trans	Elliot 1·5kW	Obs	J.S.	AREA	ELLIOTT BAY, TASMANIA
	Recvr	Scintrex IPR-8	Drwn	R.Tognoni	PROSPECT	VOYAGER 9
	Scale	1:2500		J.S.	PLAN SHOWS	PSEUDOSECTION OF DIPOLE-DIPOLE I.P./RESITIVITY
	Date	Jan 1981				

791182



GEOPEKO Geophysical Surveys Plan no.						
	Trans	ELLIOT 1·5 kW	Obs	R.G.	AREA	ELLIOTT BAY, TASMANIA
	Recvr	Scintrex IPR-8	Drwn	R.Tognoni	PROSPECT	VOYAGER 9
	Scale	1:2500		S.S.	PLAN SHOWS	PSEUDOSECTION OF DIPOLE-DIPOLE I.P/RESITIVITY
	Date	Jan 1981				

79 11 23



GEOPEKO Geophysical Surveys Plan no.	Trans	Elliot 1·5 kW	Obs	J.S.	AREA	ELLIOTT BAY, TASMANIA
	Recvr	Scintrex IPR-8	Drwn	R.Tognoni	PROSPECT	VOYAGER 9
	Scale	1:2500		J.S.	PLAN SHOWS	PSEUDOSECTION OF DIPOLE-DIPOLE I.P/RESITIVITY
	Date	Jan 1981				

791184

NW

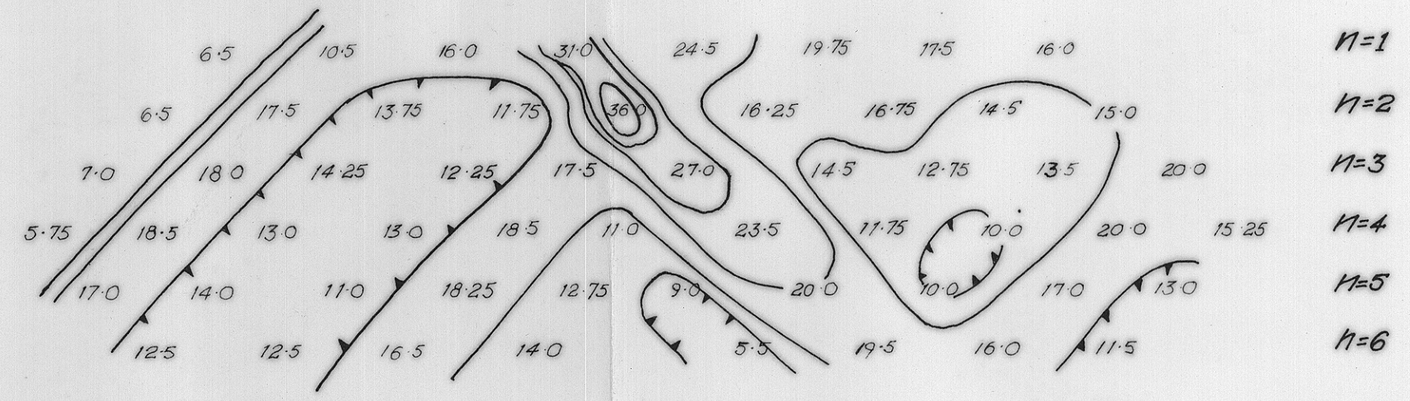
SE.

11650 N
10050 E

250 NW | 200 NW | 150 NW | 100 NW | 50 NW | 50 SE | 100 SE | 150 SE

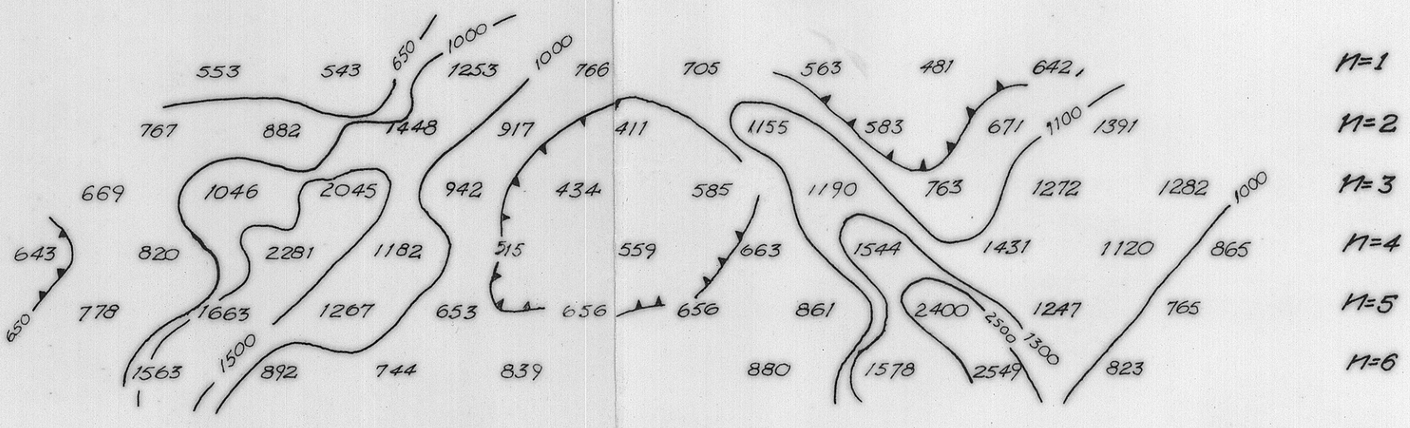
Apparent Chargeability (M232)

M v/v Cont. Int. 5m V/V



Apparent Resistivity

Ohm.m Cont. Int. Logarithmic.



Note : Chargeability plotted is slice with mean delay time of 910 mS

: Dipole Spacing 50m

8 - 1745 3/7

PLAN · 26

LINE 'B' PSEUDOSECTION OF DIPOLE - DIPOLE I.P.

5 cm

Obs R.G.
Tx ELLIOT 1.5 kW
Rx SCINTREX IPR-8

791185

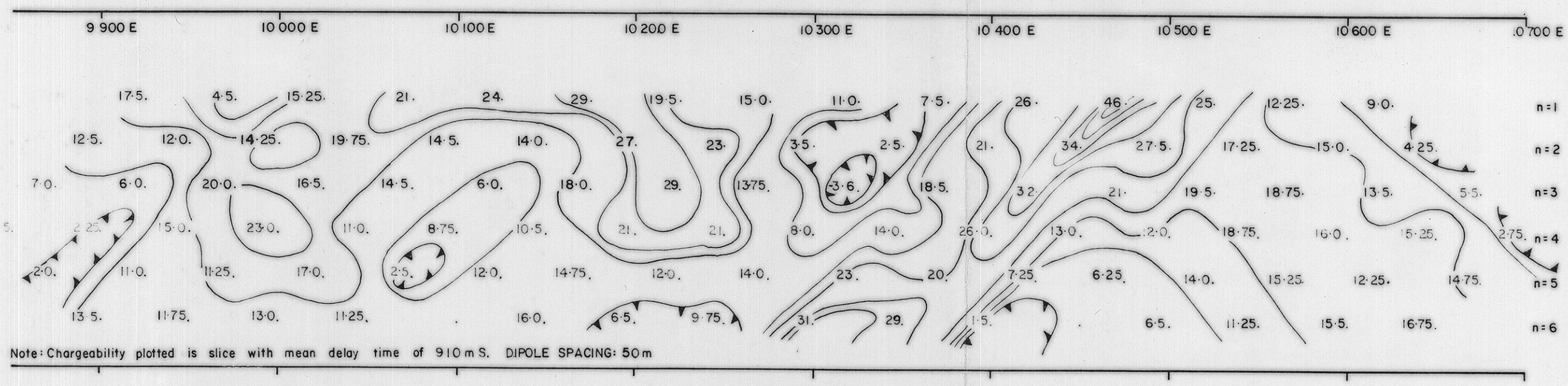
DATE: Jan 81
GEOL: J.S.
DWN: J.C.
CHKD: JS

GEOPEKO LIMITED
DEVONPORT TASMANIA

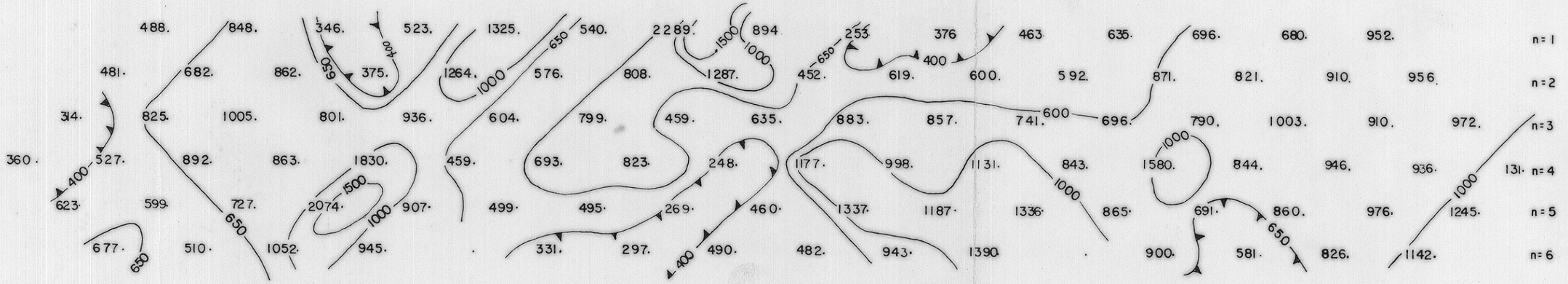
Scale: 1:2500 | Nº K

ELLIOT BAY, TASMANIA.
VOYAGER 9

026



Note: Chargeability plotted is slice with mean delay time of 910 m S. DIPOLE SPACING: 50 m



5 cm

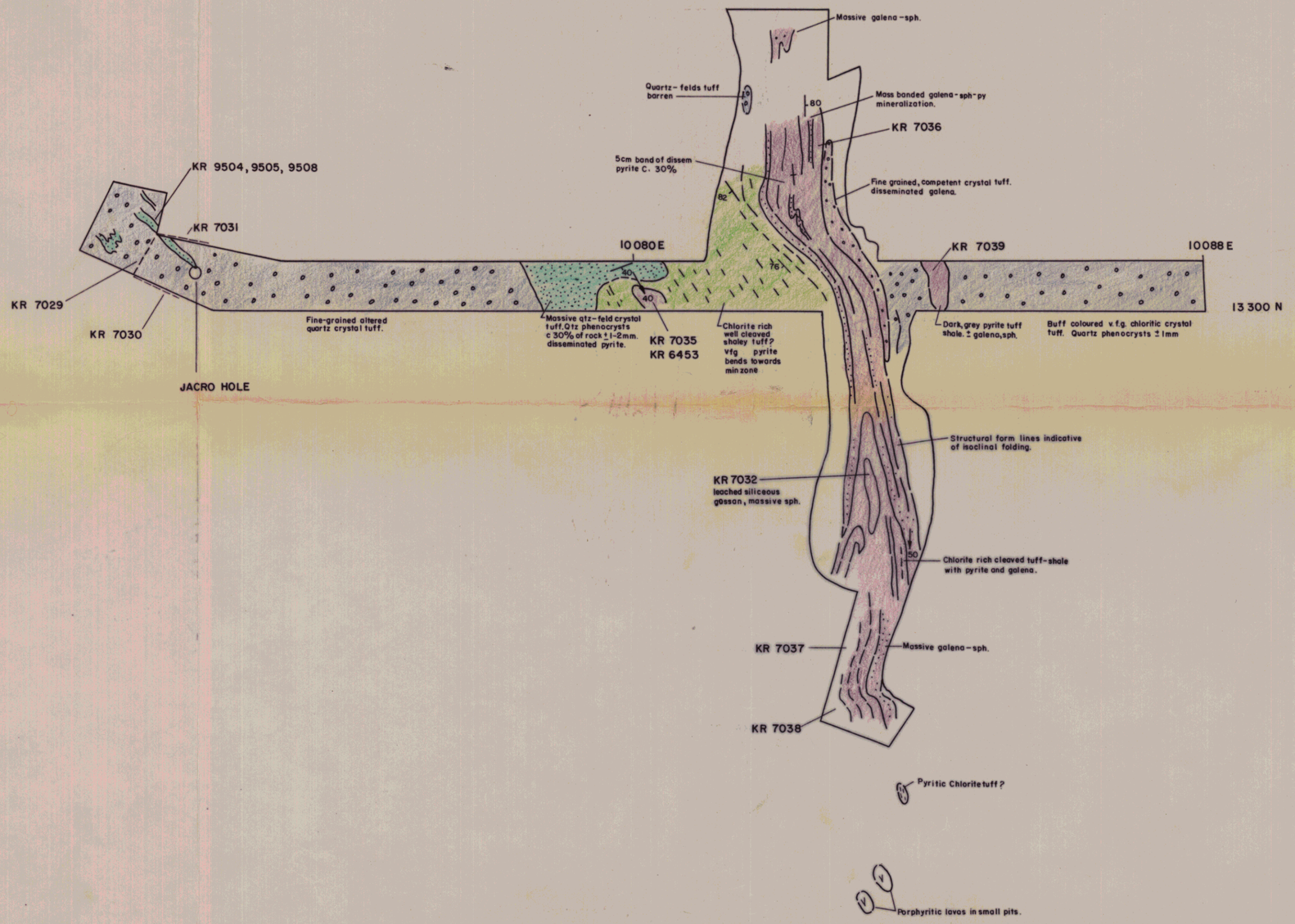
82-1745

791186

LINE 11 750 N

PLAN-27

GEOPEKO	Trans.	Elliot 1·5kW	Observer	R.G, J.S			AREA	ELLIOTT BAY, TASMANIA
Geophysical Surveys	Receiver	Scintrex I.P.R-8	Drawn	R.Tognoni			PROJECT	VOYAGER 9
Plan no.	Scale	1:2500	Checked	J.S.			PLAN SHOWS	PSEUDOSECTION OF DIPOLE-DIPOLE I. P/RESITIVITY 027
	Date	Jan 1981						



791219
82-1745 3/7
PLAN-28

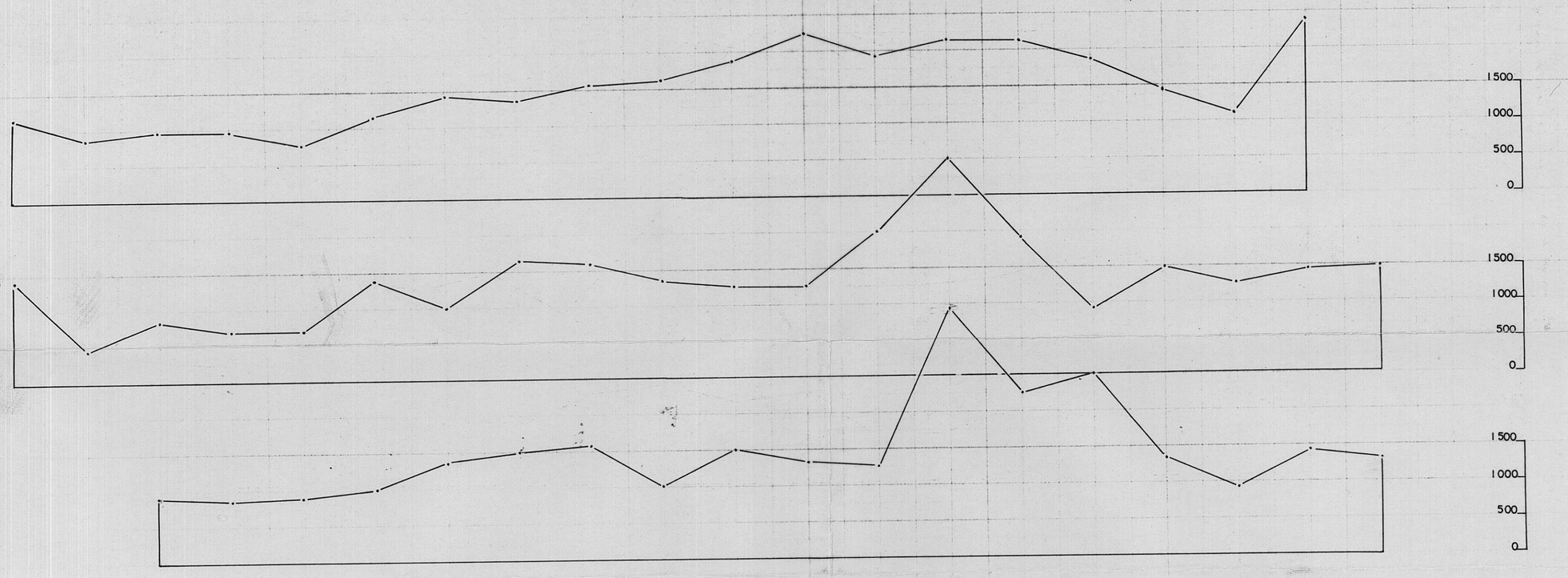
GEOPEKO

SCALE: 1:50

No. TS27/76-V19-2(b)

EL 27/76 ELLIOTT BAY TASMANIA.
VOYAGER 19
GEOLOGY OF COSTEAN LINE 13300·N

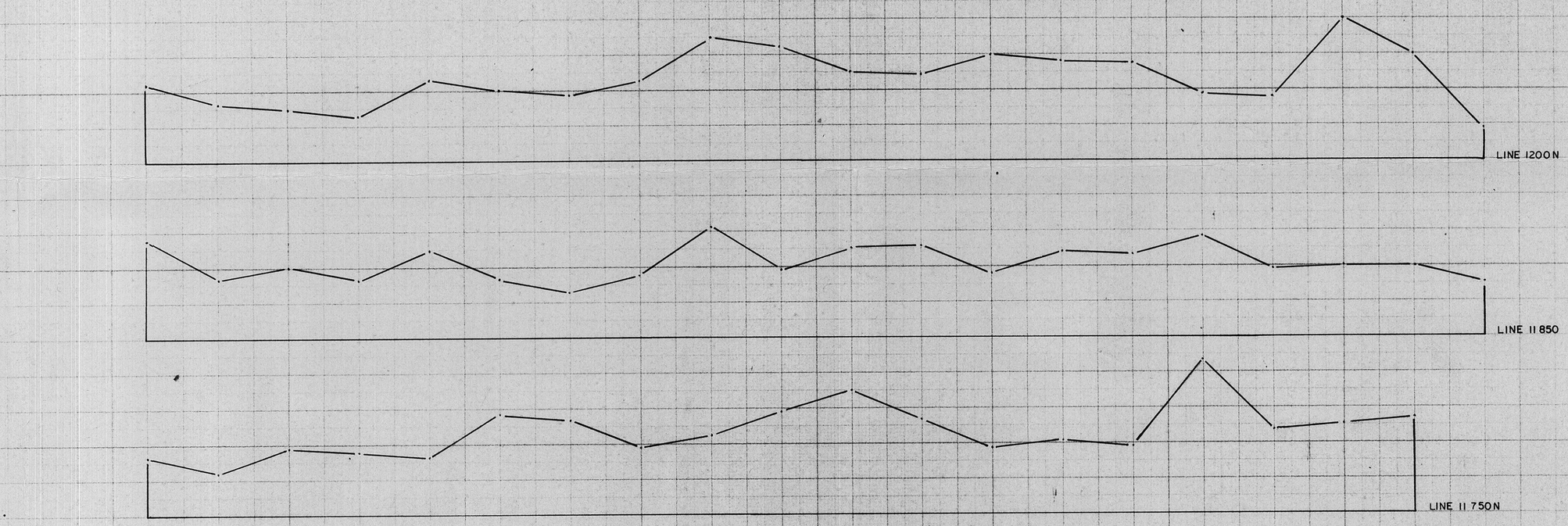
DATE: MARCH 81
GEOLOGIST: P.W.
DRAWN: M. vdS.
CHECKED:



GEOPEKO LTD.	Instrument	Tx: Scintrex IPR 8 Rx: Elliot 1.5kW	Datum.	0Ωm	Hor. Scale	1:2500	AREA: ELLIOTT BAY, TASMANIA 029
Geophysical Surveys	Observer	J.S., R.G.	Drawn	R. Tognoni	Vert. Scale	1 cm=500Ω m	PROSPECT: VOYAGER 9 791187
Plan No.	Scale Fact.		Date		Cont. Int.	Checked J.S.	PLAN SHOWS: PROFILES OF APPARENT RESISTIVITY (GRADIENT ARRAY)

82-1745 3/4

PLAN-29



NOTE:
Chargeability plotted is slice with
Mean Delay Time of 910mS (M232)

82-1745 W2

PLAN 30

GEOPEKO LTD.	Instrument	Rx: Scintrex 1·5kW Tx: Elliot IPR-8	Datum	0m V/V	Hor. Scale	1:2500	AREA	ELLIOTT BAY, TASMANIA 030
Geophysical Surveys	Observer	J.S., R.G.	Drawn	R. Tognoni	Vert. Scale	1cm = 5m V/V	PROSPECT	VOYAGER 9
Plan No.	Scale Fact.		Date	January 1981	Cont. Int.	Checked JS.	PLAN SHOWS	PROFILES OF APPARENT CHARGEABILITY (GRADIEN

791188

10550N 10650N 10750N 10850N 10950N 11050N 11150N

9500E 9500E

9600E 9600E

9700E 9700E

9800E 9800E

9900E 9900E

10000E 10000E

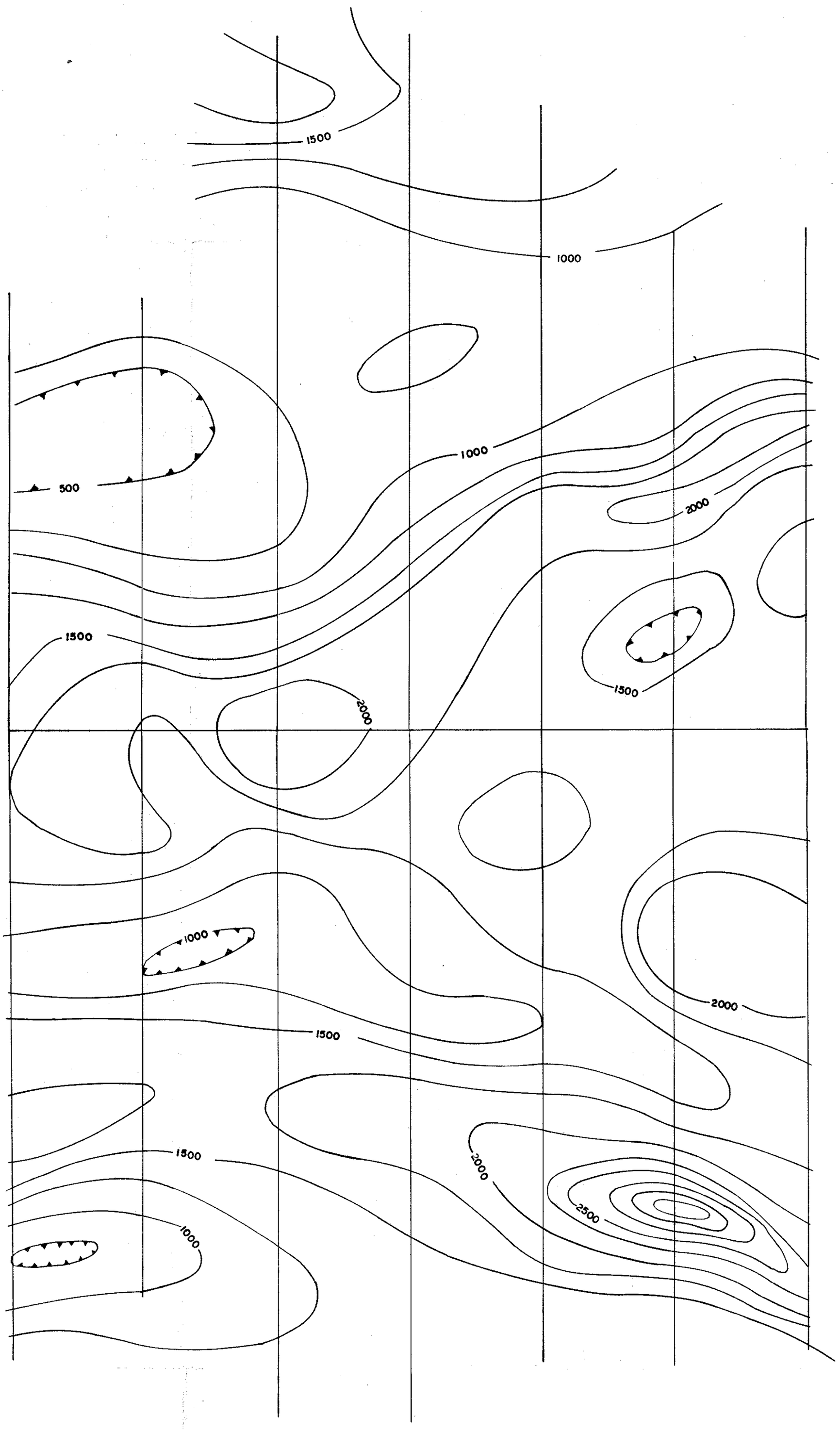
10100E 10100E

10200E 10200E

10300E 10300E

10400E 10400E

10500E 10500E



Note: Current Electrodes
10850 N, 9000E
10850 N, 11000E

791189

5 cm

80-1745 3/7

PLAN-3(a)

10550N 10650N 10750N 10850N 10950N 11050N 11150N

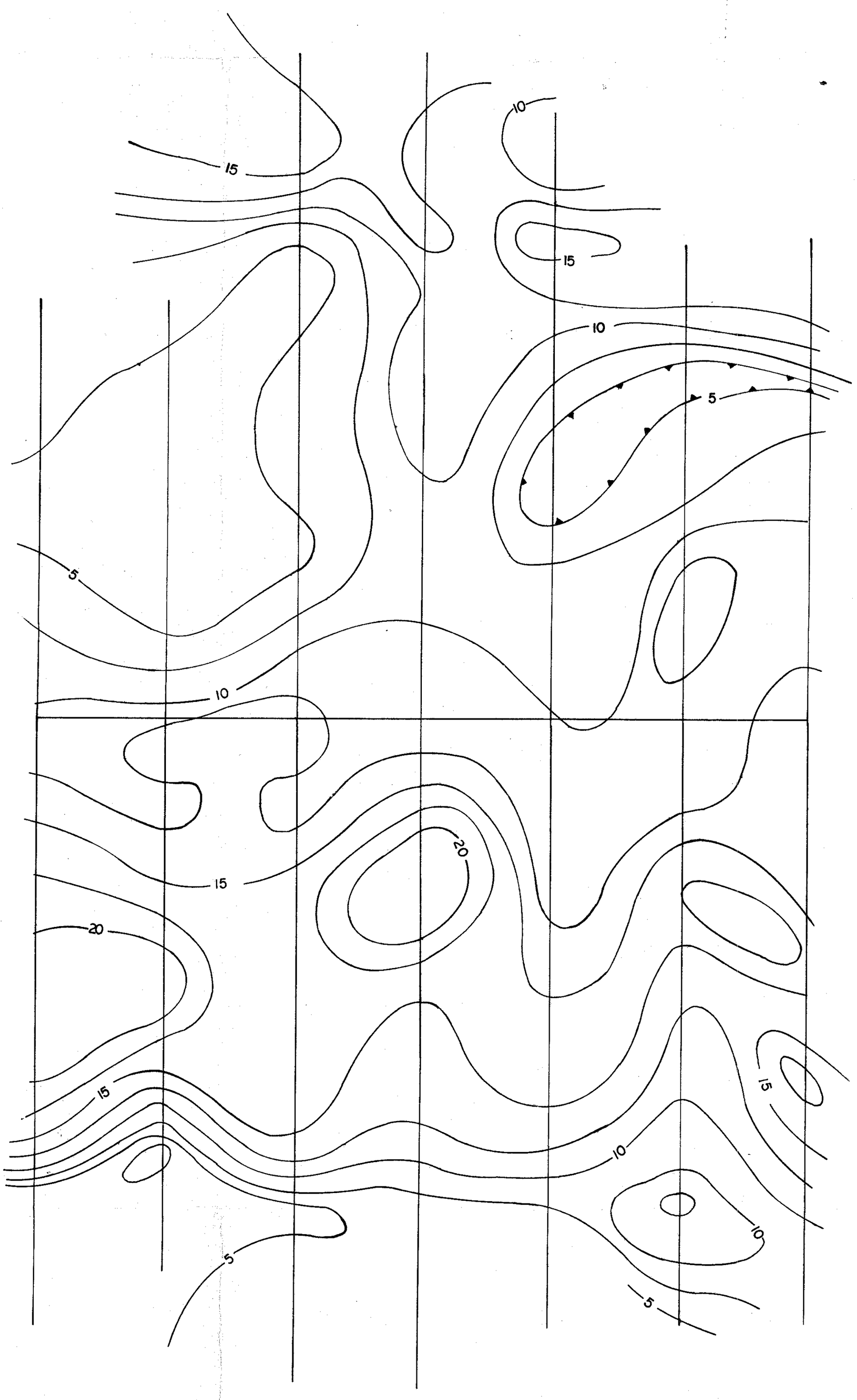
031

GEOPEKO LTD. Geophysical Surveys. Plan No SHEET 2	Instrument	Tx:Elliot 1.5kw Rx:Scintrex IPR8	Drawn By	R.TOGNONI	Hor. Scale	1:2500	AREA	Elliott Bay Tasmania
	Observer	J.S, R.G.	Base Peg		Vert Scale		PROSPECT	VOYAGER 9
	Scale Fact.		Date	JAN 1981	Cont. Int.	250 ohm m	PLAN SHOWS	CONTOURS OF APPARENT RESISTIVITY (GRADIENT ARRAY)

10 550 N | 10 650 N | 10 750 N | 10 850 N | 10 950 N | 11 050 N | 11 150 N

5 cm

9 500 E | 9 600 E | 9 700 E | 9 800 E | 9 900 E | 10 000 E | 10 100 E | 10 200 E | 10 300 E | 10 400 E | 10 500 E



5 cm

Note: Current Electrodes
10 850 N, 9 000 E
10 850 N, 11 000 E

82-1745 3/7

PLAN-31(b)

10 550 N | 10 650 N | 10 750 N | 10 850 N | 10 950 N | 11 050 N | 11 150 N

032

GEOPEKO LTD. Geophysical Surveys.	Instrument	Tx:Elliot 1·5kW Rx:Scintrex IPR 8			Hor. Scale	1:2500	AREA	Elliott Bay Tasmania
	Observer	J.S, R.G	Base Peg		Vert Scale		PROSPECT	VOYAGER 9
Plan No. SHEET 2	Scale Fact.		Date	Jan '81	Cont. Int.	2·5 mV/V	PLAN SHOWS	Contours of Apparent Chargeability (M232) (Gradient Array)

791190

Note: Current Electrodes
11550N 9100E
11550N 11100E

5 cm

9500E
9600E
9700E
9800E
9900E
10000E
10100E
10200E
10300E
10400E
10500E

11250N
11350N
11450N
11550N
11650N
11750N
11850N
12000N

1000
2000
1500
2500

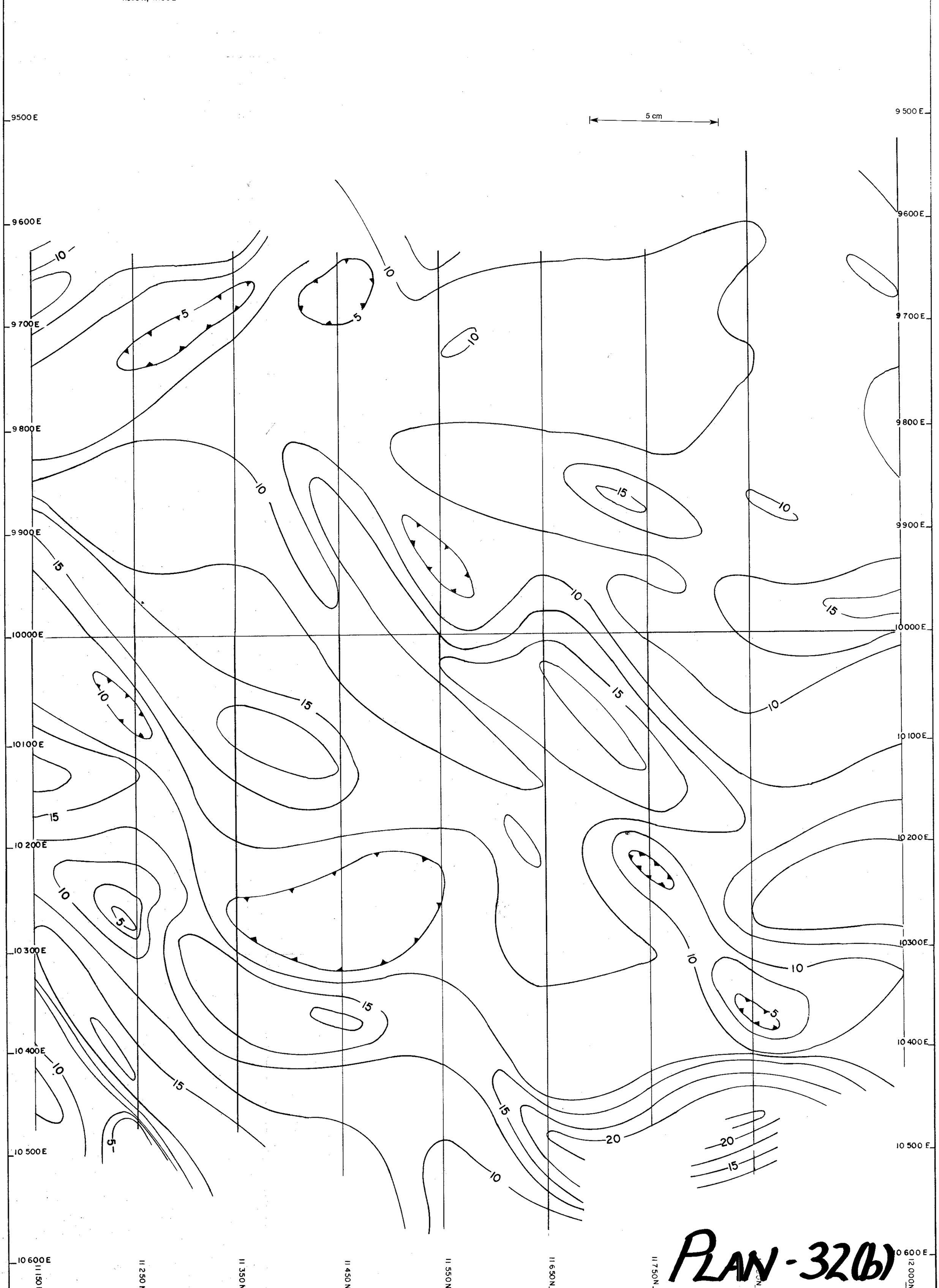
PLAN·32(a)

GEOPEKO LTD. Geophysical Surveys. Plan No. SHEET 1	Instrument	Rx: Scintrex IPR8 Tx: Elliot 1·5 kW	Drawn By	R.TOGNONI	Hor. Scale	1:2 500	AREA	Elliott Bay, Tasmania 033
	Observer	J.S, R.G	Base Peg		Vert. Scale		PROSPECT	VOYAGER 9
	Scale Fact.		Date	Jan 1981	Cont. Int.	250Ωm	PLAN SHOWS	CONTOURS OF APPARENT RESITIVITY (GRADIENT ARRAY)

791191

Note: Current Electrodes 11550 N, 9100E
11550N, 11100E

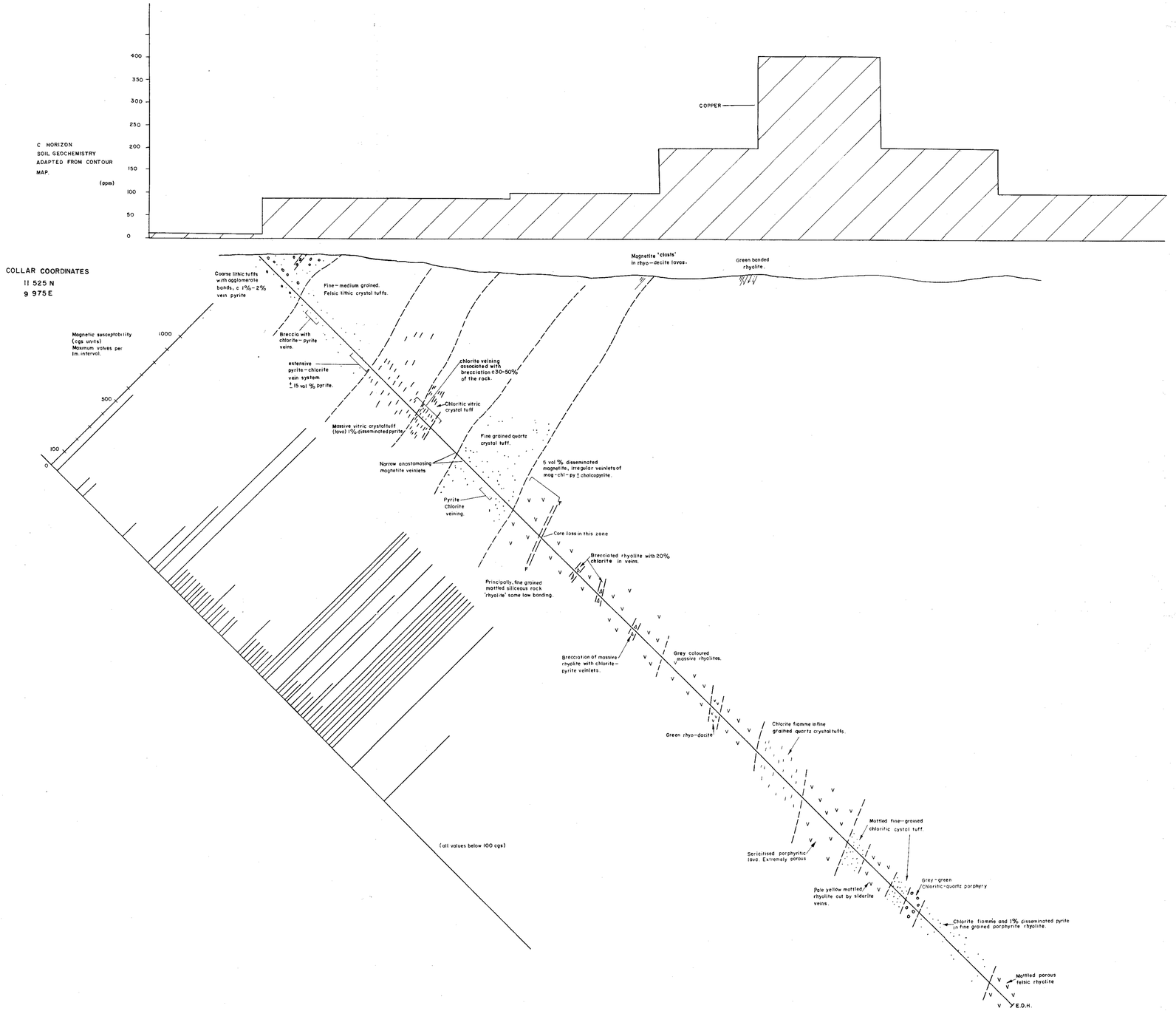
5 cm



PLAN-32(b)

GEOPEKO LTD. Geophysical Surveys. Plan No. SHEET 1	Instrument	Tx:Elliot 1.5kW Rx:Scintrex IPR 8		Hor. Scale	1:2500	AREA	Elliott Bay Tasmania 034
	Observer	J.S, RG.	Drawn By R.TOGNONI	Vert. Scale		PROSPECT	VOYAGER 9
	Scale Fact.		Date Jan '81	Cont. Int.	2.5m V/V	PLAN SHOWS	CONTOURS OF APPARENT CHARGEABILITY(M232) (GRADIENT ARRAY)

791192



82-1745 sh

PLAN-33

791193

5 cm

GEOPEKO
A DIVISION OF PEKO-WALLSEND

SCALE 1:500 | No. K

E.L.27/76 ELLIOTT BAY TASMANIA
VOYAGER 9
2 DDH, GEOLOGICAL SECTION

DATE: 1981
GEOLOGIST: PAW
DRAWN: M.vdS.
CHECKED:

035

PLAN-34

GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.

SCALE: 1:2 500

No. TS.27/76-V19-2.

DATE: FEB. 1981
GEOL: W. HERRMANN
DRAWN: R.TOGNONI
CHECKED:

E.L27/76 ELLIOTT BAY, TASMANIA
VOYAGER 19
GEOLOGICAL PLAN

036

791194

83-1745

LEGEND:

- lithic (pebbly, reworked) tuff.
- medium-course grained tuffaceous sandstone.
- fine grained, generally pyritic, carbonaceous, siltstone/shale.
- quartz vein outcrop.
- surface rubble, white vein quartz.

TYNDAL GROUP CORRELATES

- "chloritic" quartz-feldspar crystal tuff, commonly lithic or with course lithic bands
- "sericitic" quartz crystal tuffs / lithic quartz crystal tuffs.
- fine grained quartz (feldspar-biotite) porphyritic extrusives; possible intrusives?

WART HILL PYROCLASTICS

- fine-medium grained laminated micaceous sandstone, tuffaceous sandstone, minor carbonaceous siltstone.
- (thinly laminated) siliceous vitric-quartz crystal tuff.
- fine-medium grained "chloritic" tuff commonly coarse lithic fragments, generally minor quartz crystal component.

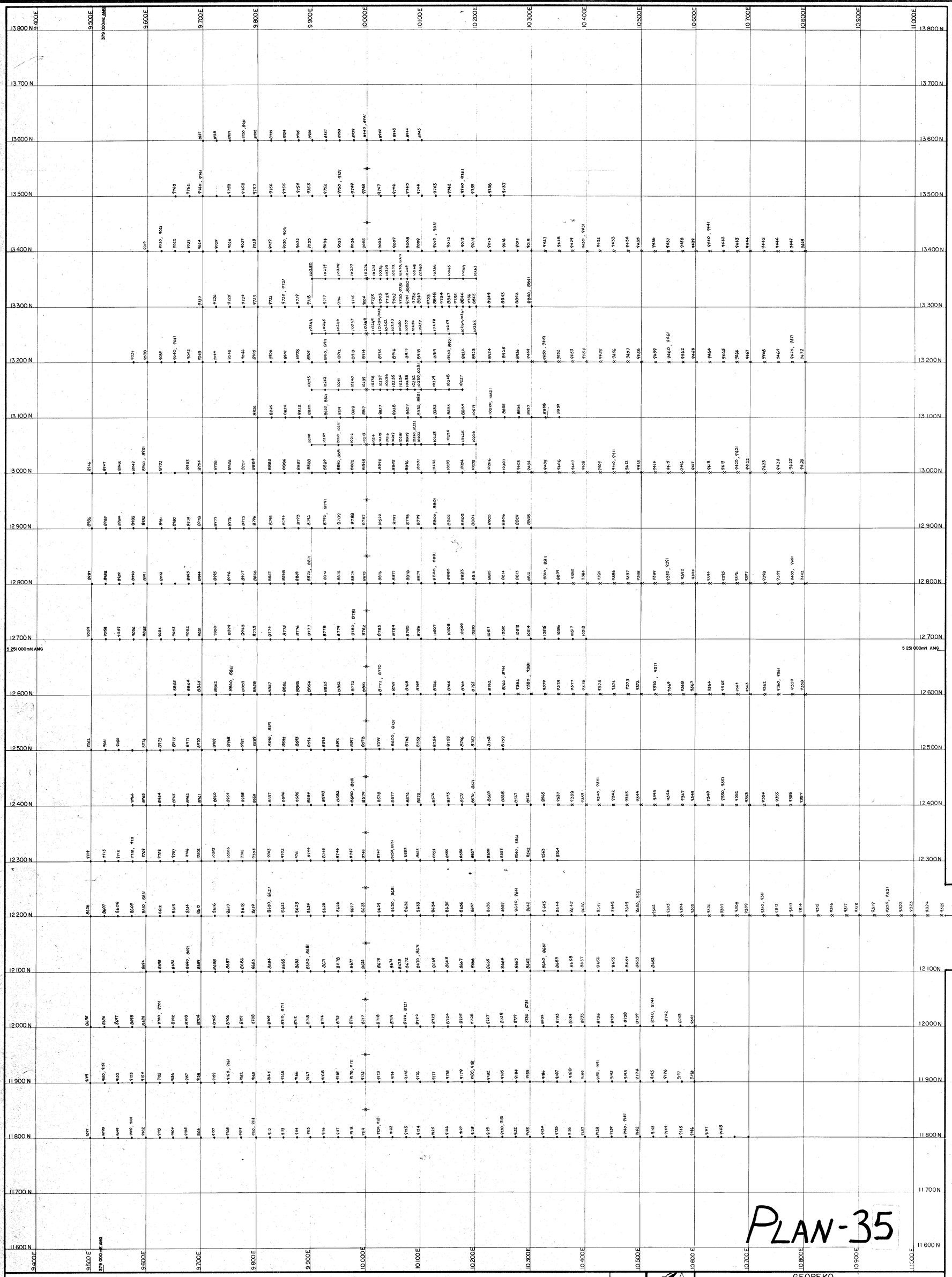
STRUCURAL:

WART HILL PYROCLASTICS OF LEWIS RIVER VOLCANICS

- layering (or bedding)
- cleavage
- flow layering (extrusive)
- plunge of lineation
- possible unconformity
- inferred fault
- geological contact, mapped or inferred (?)
- drainage channel

GN MN 13°00'

zone of strong Fe staining — D26 specimen locality — KR9471 Assay sample locality



LEGEND:

- ✳ ..... Grid Position
- • ..... Power Auger Hole
- ○ ..... Hand Auger Hole

5 cm

GN MN 13°00'

DATE: FEB 1981
GEOLOGIST: W.H.
DRAWN: R.T, B.S
CHECKED: [illegible]

GEOPEKO
DEVONPORT BASE, TASMANIA

SCALE: 1:2 500

No T.S27/76-V19-6

E.L.27/76 ELLIOTT BAY, TASMANIA

VOYAGER 19

SOIL SAMPLE LOCATION

82-1745 3/7

037

9 400 E | 9 500 E | 379 000mE AMG | 9 600 E | 9 700 E | 9 800 E | 9 900 E | 10 000 E | 10 100 E | 10 200 E | 10 300 E | 10 400 E | 10 500 E | 10 600 E | 10 700 E | 10 800 E | 10 900 E | 11 000 E

13 800 N | 13 700 N | 13 600 N | 13 500 N | 13 400 N | 13 300 N | 13 200 N | 13 100 N | 13 000 N | 12 900 N | 12 800 N | 12 700 N | 12 600 N | 12 500 N | 12 400 N | 12 300 N | 12 200 N | 12 100 N | 12 000 N | 11 900 N | 11 800 N | 11 700 N | 11 600 N

5 251 000mN AMG

LEGEND:

- ×- Grid Position
- • Power Auger Hole
- ∝ Hand Auger Hole

Cu — x, Pb — 55, Zn — 160 → Original Sample
⊕ Sample Position
Cu — x, Pb — 55, Zn — 140 → Duplicate Sample

NOTE: All values in ppm

CONTOUR INTERVAL

- 100 ppm
- 200 ppm
- 400 ppm
- 800 ppm
- 1600 ppm

5 cm

GN MN 13°00'

DATE FEB 1981
GEOLOGIST W.H.
DRAWN R TOGNONI
CHECKED RJ

GEOPEKO
DEVONPORT BASE, TASMANIA
791196

SCALE 1:2500

No. T.S27/76-V19-5

E L 27/76 ELLIOTT BAY, TASMANIA
VOYAGER 19
038
C-HORIZON GEOCHEMISTRY RESULTS
Zn CONTOURS

82 - 1745

PLAN - 36

9 400E | 9 500E | 379 000mE AMG | 9 600E | 9 700E | 9 800E | 9 900E | 10 000E | 10 100E | 10 200E | 10 300E | 10 400E | 10 500E | 10 600E | 10 700E | 10 800E | 10 900E | 11 000E

13 800 N
13 700 N
13 600 N
13 500 N
13 400 N
13 300 N
13 200 N
13 100 N
13 000 N
12 900 N
12 800 N
12 700 N

5 251 000 mN AMG

12 600 N
12 500 N
12 400 N
12 300 N
12 200 N
12 100 N
12 000 N
11 900 N
11 800 N
11 700 N
11 600 N

9 400E | 9 500E | 379 000mE AMG | 9 600E | 9 700E | 9 800E | 9 900E | 10 000E | 10 100E | 10 200E | 10 300E | 10 400E | 10 500E | 10 600E | 10 700E | 10 800E | 10 900E | 11 000E

PLAN-37

LEGEND:

- Grid Position
- Power Auger Hole
- Hand Auger Hole

Cu — x
Pb — 55
Zn — 160
Original Sample

Sample Position

Cu — x
Pb — 55
Zn — 140
Duplicate Sample

NOTE: All values in ppm

CONTOUR INTERVAL

Pencil No°	
	100 ppm
	200 ppm
	400 ppm
	800 ppm
	1600 ppm

5 cm

GN MN
13°00'

DATE FEB 1981
GEOLOGIST W.H.
DRAWN R.TOGNONI
CHECKED

GEOPEKO
DEVONPORT BASE, TASMANIA
791197

SCALE 1:2 500

No T.S27/76-V19-3

E.L.27/76 ELLIOTT BAY, TASMANIA
VOYAGER 19
039
C-HORIZON GEOCHEMISTRY RESULTS
Pb CONTOURS

82-1745 3/71

9 400E | 9 500E | 379 000mE AMG | 9 600E | 9 700E | 9 800E | 9 900E | 10 000E | 10 100E | 10 200E | 10 300E | 10 400E | 10 500E | 10 600E | 10 700E | 10 800E | 10 900E | 11 000E

13 800 N
13 700 N
13 600 N
13 500 N
13 400 N
13 300 N
13 200 N
13 100 N
13 000 N
12 900 N
12 800 N
12 700 N
12 600 N
12 500 N
12 400 N
12 300 N
12 200 N
12 100 N
12 000 N
11 900 N
11 800 N
11 700 N
11 600 N

5 251 000mN AMG

9 400E | 9 500E | 379 000mE AMG | 9 600E | 9 700E | 9 800E | 9 900E | 10 000E | 10 100E | 10 200E | 10 300E | 10 400E | 10 500E | 10 600E | 10 700E | 10 800E | 10 900E | 11 000E

LEGEND:

- Grid Position
- Power Auger Hole
- Hand Auger Hole

Cu — x
Pb — 55
Zn — 160
Original Sample

Sample Position

Cu — x
Pb — 55
Zn — 140
Duplicate Sample

NOTE: All values in ppm

CONTOUR INTERVAL ppm

Pencil No.			
19-6	< 50	19-28	< 800
19-10	100-199		
19-15	200-399		
19-22	400-799		

5 cm

GN MN
13°00'

DATE: FEB 1981
GEOLOGIST W.H.
DRAWN: R.TOGNONI
CHECKED

GEOPEKO
DEVONPORT BASE, TASMANIA

SCALE 1:2 500

No T.S 27/76-V19-7

E.L. 27/76 ELLIOTT BAY, TASMANIA
VOYAGER 19
040
C-HORIZON GEOCHEMISTRY RESULTS
Cu, Pb, Zn Results
791198

82-1745 17

PLAN - 38

9400E 9500E 379 000E A.M.G. 9600E 9700E 9800E 9900E 10000E 10100E 10200E 10300E 10400E 10500E 380 000mE 10600E 10700E 10800E 10900E 11000E

13800N 13700N 13600N 13500N 13400N 13300N 13200N 13100N 13000N 12900N 12800N 12700N 12600N 12500N 12400N 12300N 12200N 12100N 12000N 11900N 11800N 11700N 11600N

5251000N A.M.G.

PLAN-39

LEGEND:

- Grid Position
- Power Auger Hole
- Hand Auger Hole

Ag 1.6, Mn 45, Fe 4700 — Original Sample
Sample Position
Ag 1.0, Mn 70, Fe 1.9% — Duplicate Sample

NOTE: All values in ppm

CONTOUR INTERVAL
0·5%
1·0%
2·0%
4·0%

82-1745

5 cm

GN MN -13°00'

GEOPEKO
DEVONPORT BASE, TASMANIA
791199

SCALE 1:2 500

No T.S 27/76-V19-4

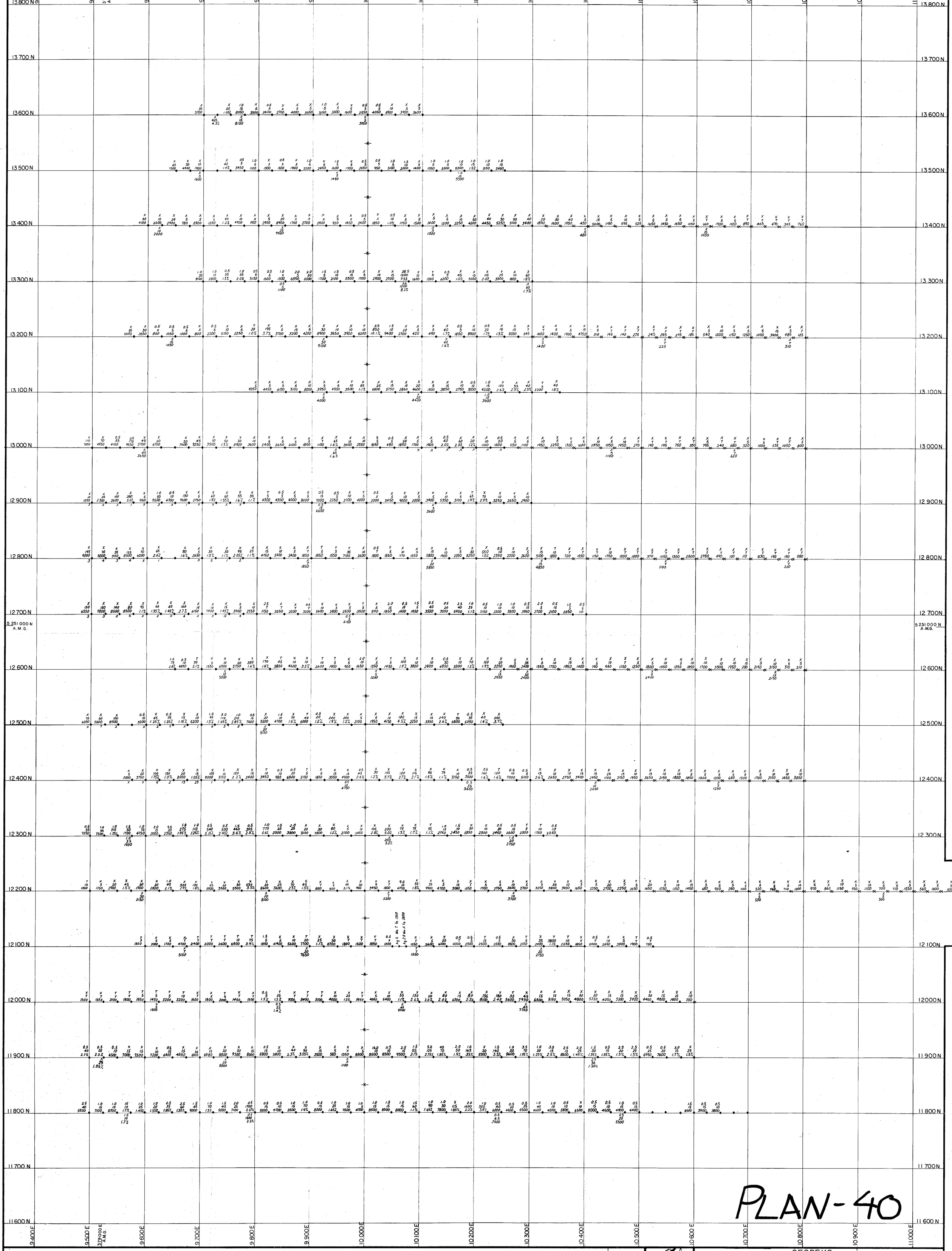
E.L. 27/76 ELLIOTT BAY, TASMANIA
VOYAGER 19
C-HORIZON GEOCHEMISTRY RESULTS
Fe CONTOURS

041

DATE: FEB 1981
GEOLOGIST W.H.
DRAWN B.J.S.
CHECKED W.H.

9.400E | 9.500E | 379 000E A.M.G. | 9.600E | 9.700E | 9.800E | 9.900E | 10.000E | 10.100E | 10.200E | 10.300E | 10.400E | 10.500E | 10.600E | 10.700E | 10.800E | 10.900E | 11.000E

13.800 N
13.700 N
13.600 N
13.500 N
13.400 N
13.300 N
13.200 N
13.100 N
13.000 N
12.900 N
12.800 N
12.700 N
5 251 000 N A.M.G.
12.600 N
12.500 N
12.400 N
12.300 N
12.200 N
12.100 N
12.000 N
11.900 N
11.800 N
11.700 N
11.600 N



LEGEND:

- ×..... Grid Position
- ●..... Power Auger Hole
- ∝..... Hand Auger Hole

Ag 1·5 / Mn 10 / Fe 1·7% — Original Sample
● — Sample Position
Ag 1·5 / Mn 10 / Fe 1·7% — Duplicate Sample

NOTE: All values in ppm

82 - 1745 3/7

5 cm

GN MN
13°00'

GEOPEKO
DEVONPORT BASE, TASMANIA
791200

SCALE 1:2 500

No T.S27/76-V19-8

E.L.27/76 ELLIOTT BAY, TASMANIA
VOYAGER 19
C-HORIZON GEOCHEMISTRY RESULTS
042

DATE: FEB 1981
GEOLOGIST: W.H.
DRAWN: B.J.S.
CHECKED:

PLAN-40

9 800 E | 379 000mE A.M.G. | 9 900 E | 10 000 E | 10 100 E | 10 200 E | 10 300 E | 10 400 E

13 600 N | 13 500 N | 13 400 N | 13 300 N | 13 200 N | 13 100 N | 13 000 N | 12 900 N | 12 800 N

5 251 500mN A.M.G.

5 251 500m N. A.M.G.

BED LINE

PLAN-41

LEGEND

- Grid position
- Power auger
- Hand auger
- Power hand auger/mate

Sample Location: 5 / 610 / 5 — Cu / Pb / Zn — ppm; 5 / 600 / 10 — Duplicate Sample

NS NO SAMPLE
X INSUFFICENT SAMPLE
T TRACE

CONTOUR INTERVAL

Pencil No.	ppm
19-6	100–199
19-10	200–399
19-15	400–799
19-22	800–1500

ppm >1600

5 cm

82-1745

3/7

GN MN 13°00'

DATE April,81
GEOLOGIST W H
DRAWN MvdS
CHECKED RJ

GEOPEKO
A DIVISION OF PEKO WALLSEND OPERATIONS LTD

SCALE 1:1250 | No TS27/76-V19N-4

E.L. 24/76 ELLIOT BAY, TASMANIA
VOYAGER 19 NORTH 043
SOIL GEOCHEM: Cu, Pb and Zn VALUES
ZINC CONTOURS

791201

9 800 E | 379 000 mE A.M.G. | 9 900 E | 10 000 E | 10 100 E | 10 200 E | 10 300 E | 10 400 E

13 600 N | 13 500 N | 13 400 N | 13 300 N | 13 200 N | 13 100 N | 13 000 N | 12 900 N | 12 800 N

5 251 500 mN A.M.G.

LEGEND

- Grid position
- Power auger
- Hand auger
- Power hand auger/mate

Sample Location: 0·5 — Silver, gm/t; 1050 — Iron, ppm or %; 15 — Maganese, ppm; 0·608 — Gold, gm/t; 0·5 / 1000 / 20 — Duplicate Sample

NS NO SAMPLE
X INSUFFICENT SAMPLE
T TRACE

CONTOUR INTERVAL

Pencil No.	%
19-6	0·5 — 1·0
19-10	1·0 — 2·0
19-15	2·0 — 4·0
19-22	> 4·0

5 cm

82-1745

4/7

GN MN — 13°00'

GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.

SCALE 1:1250 — No. TS 27/76-V19N-5

E.L. 24/76 ELLIOT BAY, TASMANIA
VOYAGER 19 NORTH
SOIL GEOCHEM: Ag, Fe, Mn and Au VALUES
Fe CONTOURS

DATE April, 81
GEOLOGIST W.H.
DRAWN M.v.d.S.
CHECKED

PLAN-42

791202 C 044

9 800 E | 379 000 mE AMG | 9 900 E | 10 000 E | 10 100 E | 10 200 E | 10 300 E | 10 400 E

13 600 N

13 500 N

13 400 N

13 300 N

13 200 N

5 251 500 mN AMG

13 100 N

13 000 N

12 900 N

12 800 N

PLAN-43

791203

9 800 E | 379 000 mE AMG | 9 900 E | 10 000 E | 10 100 E | 10 200 E | 10 300 E | 10 400 E

LEGEND

- Grid position
- Power auger
- Hand auger
- Power hand auger/mate

Sample Location: 5 / 610 / 5 — Cu / Pb / Zn — ppm; 5 / 600 / 10 — Duplicate Sample

NS NO SAMPLE
X INSUFFICENT SAMPLE
T TRACE

CONTOUR INTERVAL

Pencil No. 19-6	ppm	ppm
	100–199	>1600
19-10	200–399	
19-15	400–799	
19-22	800–1500	

5 cm

82-1745
4/7

GN MN 13°00'

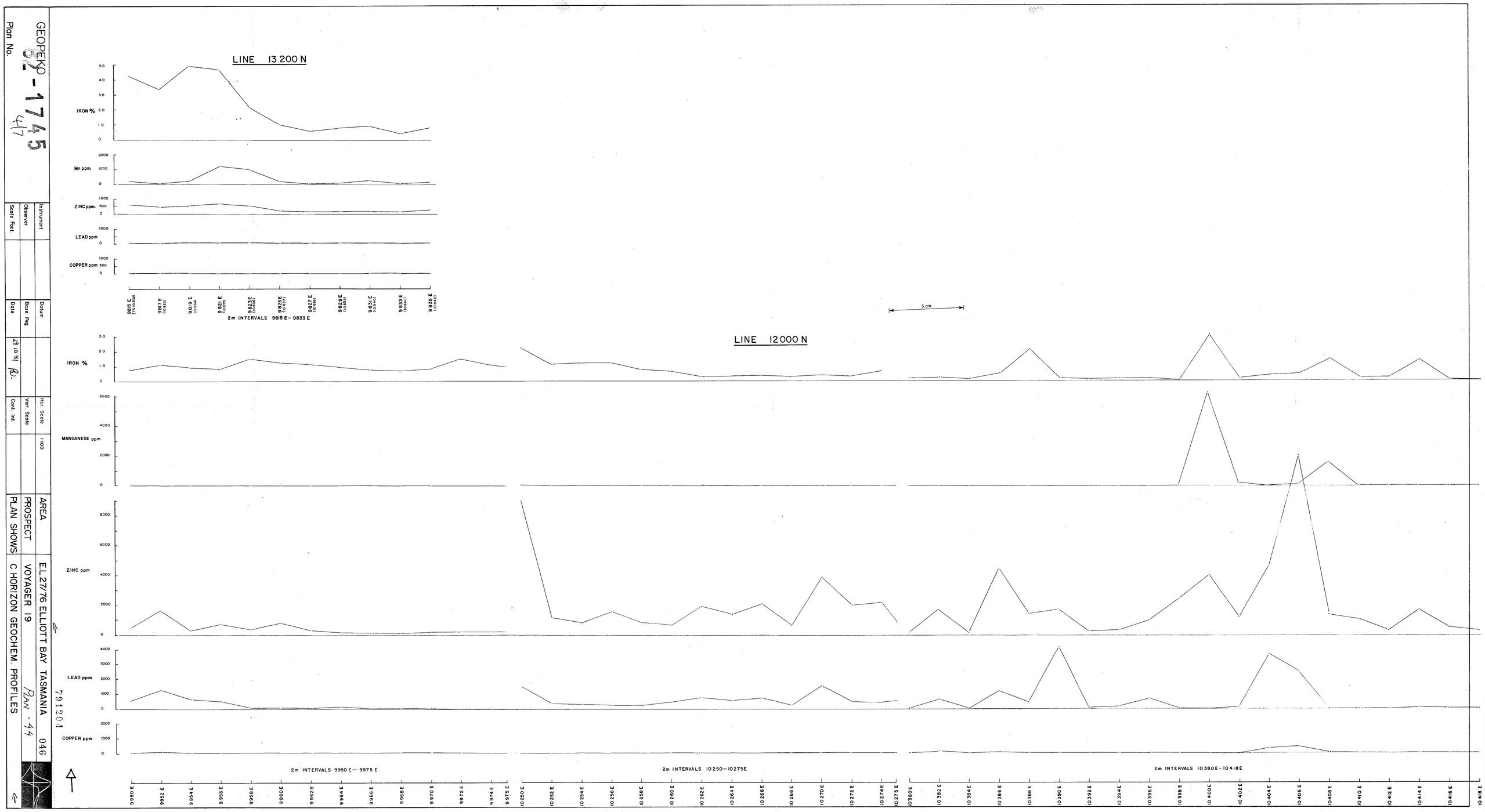
DATE April, 81
GEOLOGIST W.H.
DRAWN M.v.d.S.
CHECKED

GEOPEKO
A DIVISION OF PEKO WALLSEND OPERATIONS LTD.

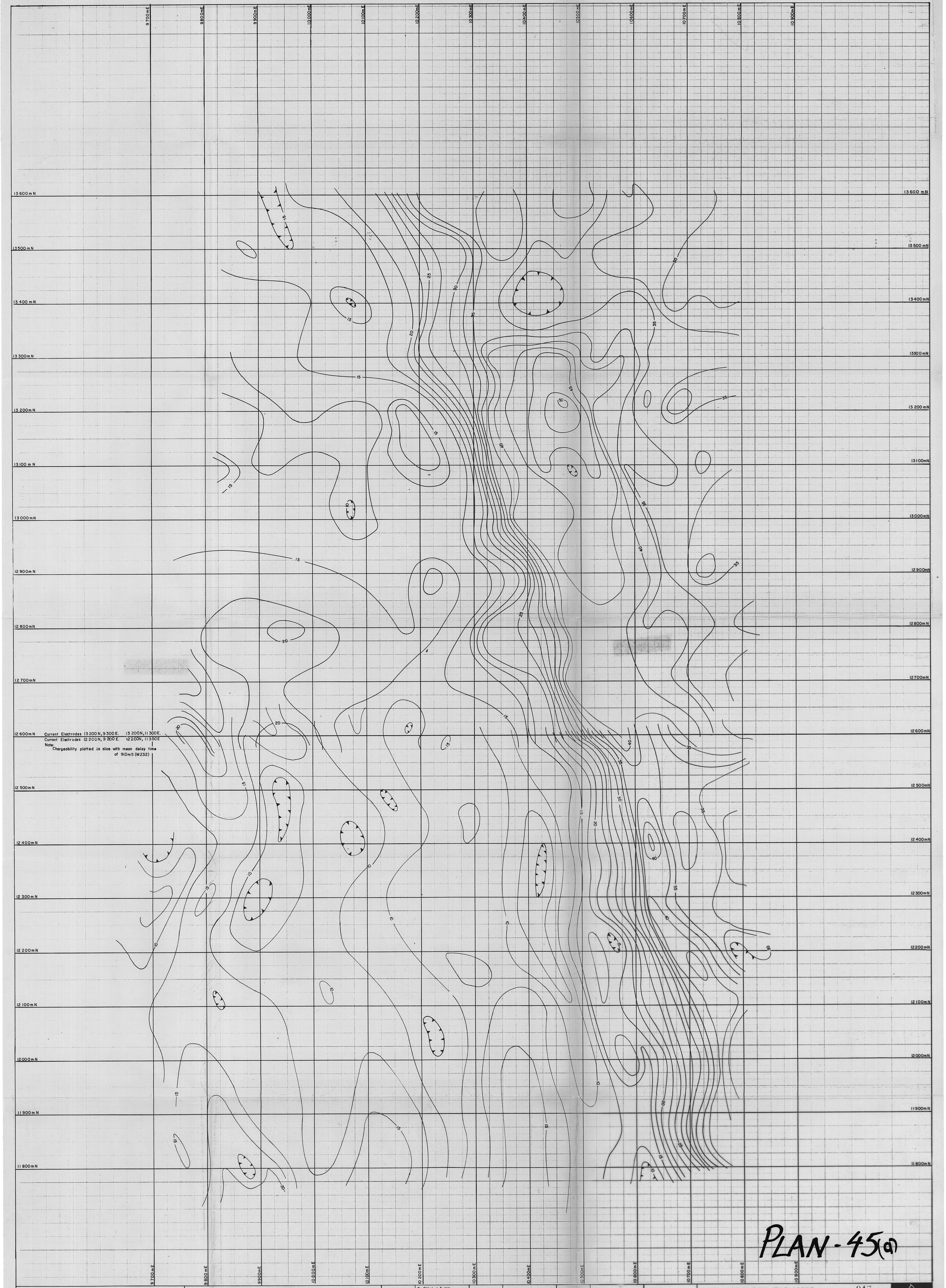
SCALE 1:1250 | NoTS27/76-V19N-3

E.L. 24/76 ELLIOT BAY, TASMANIA
VOYAGER 19 NORTH
SOIL GEOCHEM: Cu, Pb and Zn VALUES
LEAD CONTOURS

045



GEOPEKO
82-1745
4/7
Plan No.
Instrument
Observer
Scale Fact.
Datum
Base Peg
Date
29 10 81
Hor. Scale
1:100
Vert. Scale
Cont. Int.
AREA
PROSPECT
PLAN SHOWS
E.L.27/76 ELLIOTT BAY TASMANIA 046
VOYAGER 19
PLAN - 44
C HORIZON GEOCHEM. PROFILES
791204
LINE 13 200 N
IRON %
Mn ppm.
ZINC ppm.
LEAD ppm
COPPER ppm
2m INTERVALS 9815 E - 9833 E
5 cm
LINE 12000 N
IRON %
MANGANESE ppm
ZINC ppm
LEAD ppm
COPPER ppm
2m INTERVALS 9950 E — 9975 E
2m INTERVALS 10250 — 10275 E
2m INTERVALS 10380 E - 10418 E



GEOPEKO LTD.
Geophysical Surveys
Plan No.

82-1745 4/7

791205

5 cm

Instrument	Tx: Elliot 1-5 KW Rx: Scintrex IPR 8	Datum		Hor. Scale	1:2500
Observer	R.J. Goodwin	Base Peg		Vert. Scale	
Scale Factor		Date	January 1981	Cont. Int.	2·5 mV/V

AREA	ELLIOTT BAY, TASMANIA 047
PROSPECT	VOYAGER 19
PLAN SHOWS	Contours of Apparent Chargeability (Gradient Array)

PLAN-45(a)

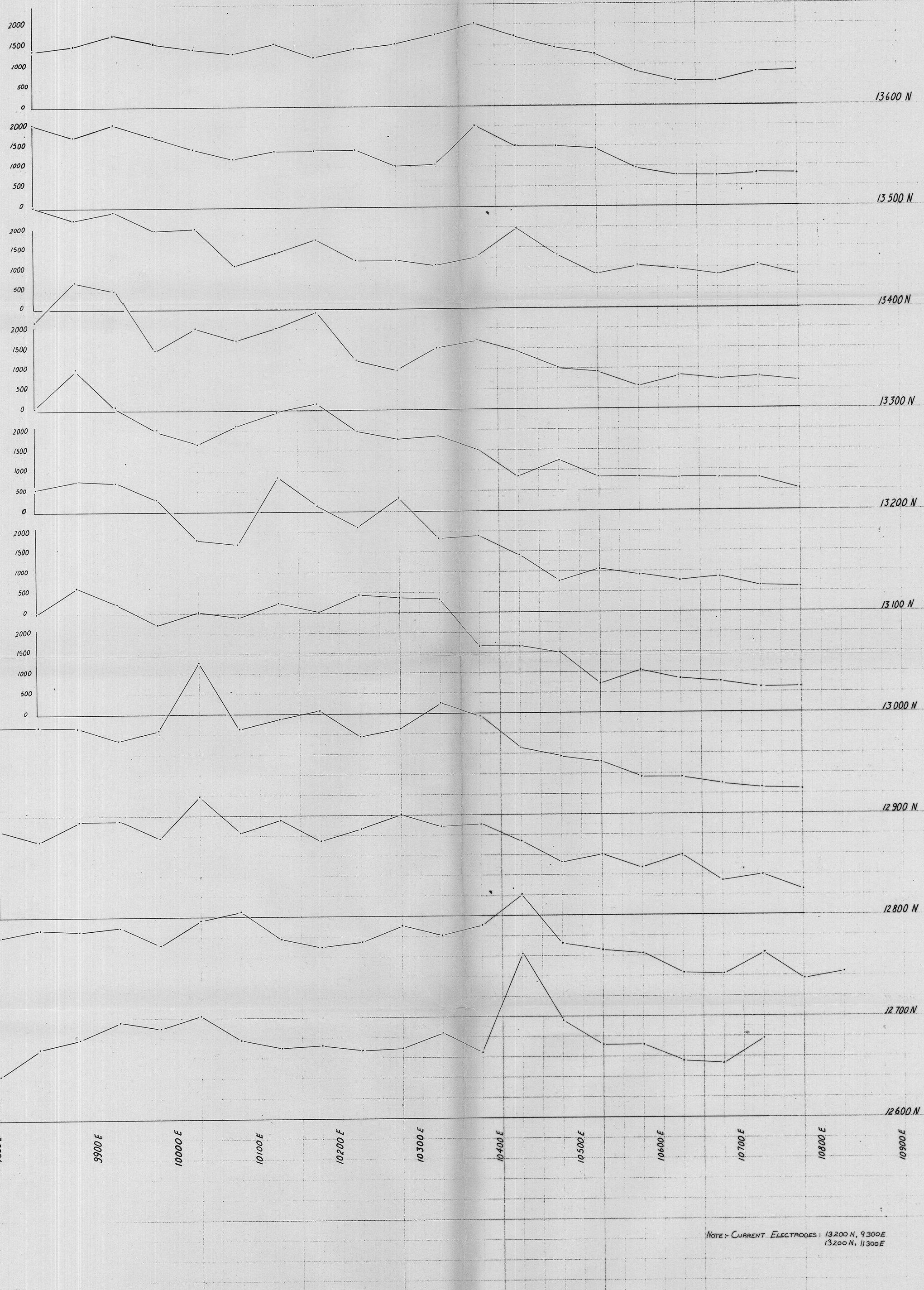
9800E 9900E 10000E 10100E 10200E 10300E 10400E 10500E 10600E 10700E 10800E 10900E

13600N 13500N 13400N 13300N 13200N 13100N 13000N 12900N 12800N 12700N 12500N 12400N 12300N 12200N 12100N 12000N 11900N 11800N

Current Electrodes 13200N, 9300E., 13200N, 11300E
Current Electrodes 12200N, 9200E., 12200N, 11350E

5 cm

GEOPEKO LTD. Geophysical Surveys	Instrument	Rx: IPR-8 Tx: Elliot 1·5 kW	Datum		Hor. Scale	1:2500	AREA	ELLIOTT BAY, TASMANIA 791206 048
	Observer	R.G., M.I.	Drawn by	B. Stedman	Vert. Scale		PROSPECT	VOYAGER 19 PLAN - 45(b)
Plan No. 82 - 1745 4/7	Scale Fact.		Date	Jan, Feb 1981	Cont. Int.	500 Ohm.m	PLAN SHOWS	Contours of Apparent Resitivity (Gradient Array)



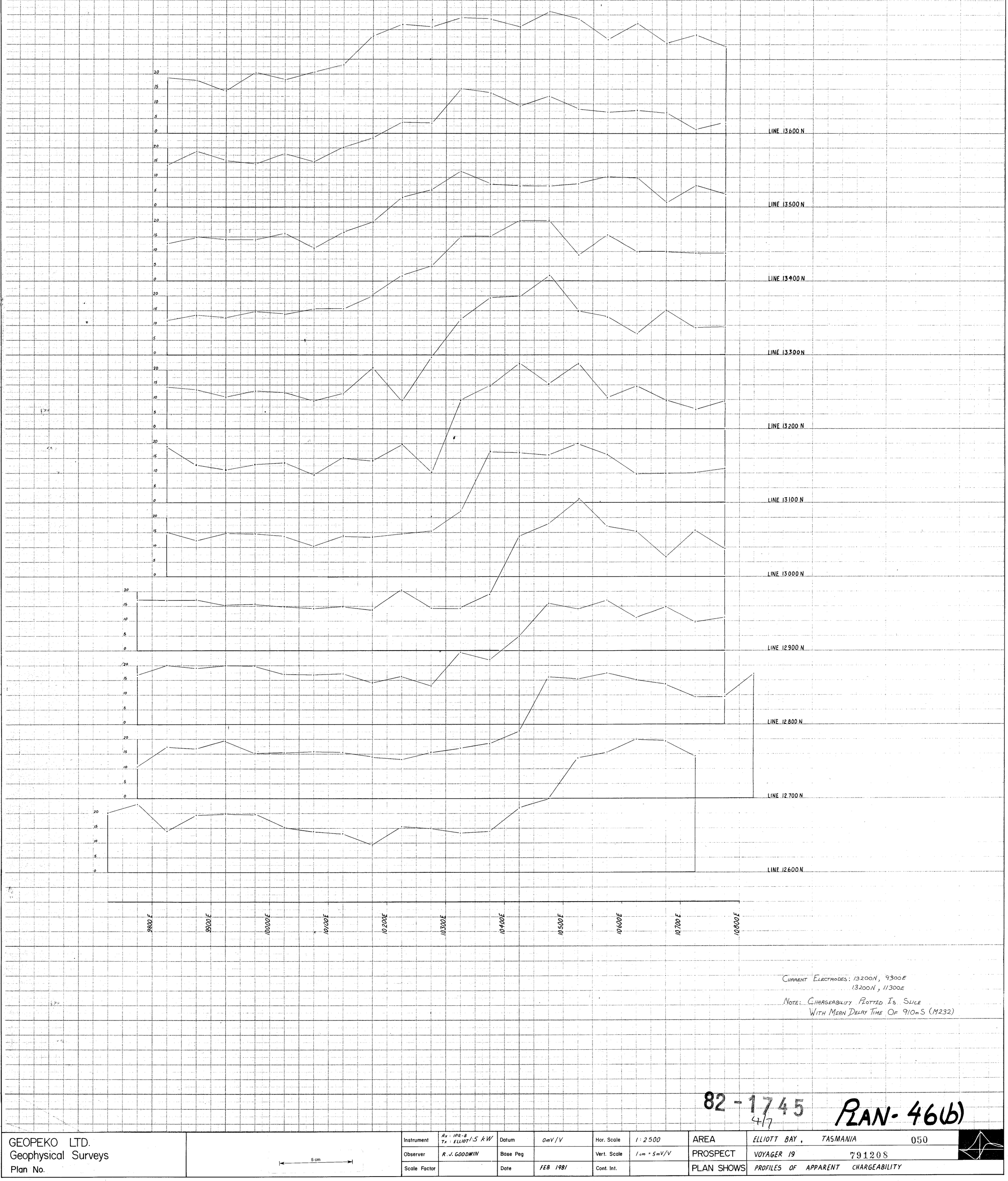
NOTE :- CURRENT ELECTRODES : 13200 N, 9300 E
13200 N, 11300 E

5 cm

82-1745 417

PLAN · 46 (a)

GEOPEKO LTD. Geophysical Surveys Plan No.	Instrument	R_x : SCINTREX I.P.R8	Datum	0 Ohm.m	Hor. Scale	1 : 2500	AREA	ELLIOT BAY, TASMANIA 049
		T_x : HUNTEC 1.5 KW	Base Peg		Vert. Scale	1cm = 500 ohm.m	PROSPECT	VOYAGER 19 791207
	Scale Fact.		Date	FEB. 1981	Cont. Int.		PLAN SHOWS	PROFILES OF APPARENT RESISTIVITY (GRADIENT ARRAY)



CURRENT ELECTRODES: 13200N, 9300E
13200N, 11300E

NOTE: CHARGEABILITY PLOTTED IS SLICE
WITH MEAN DELAY TIME OF 910mS (M232)

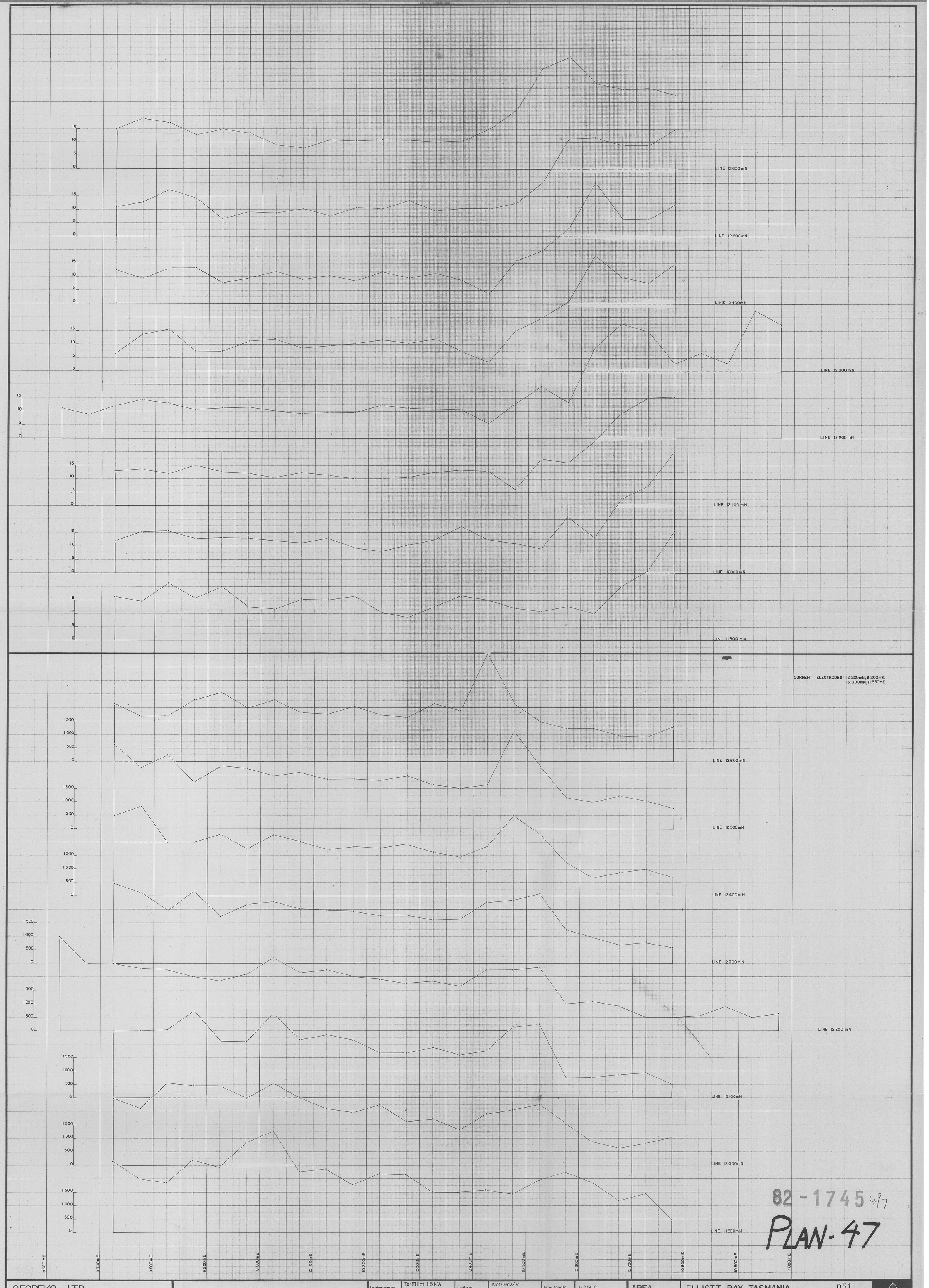
82-1745
4/7

PLAN-46(b)

GEOPEKO LTD.
Geophysical Surveys
Plan No.

5 cm

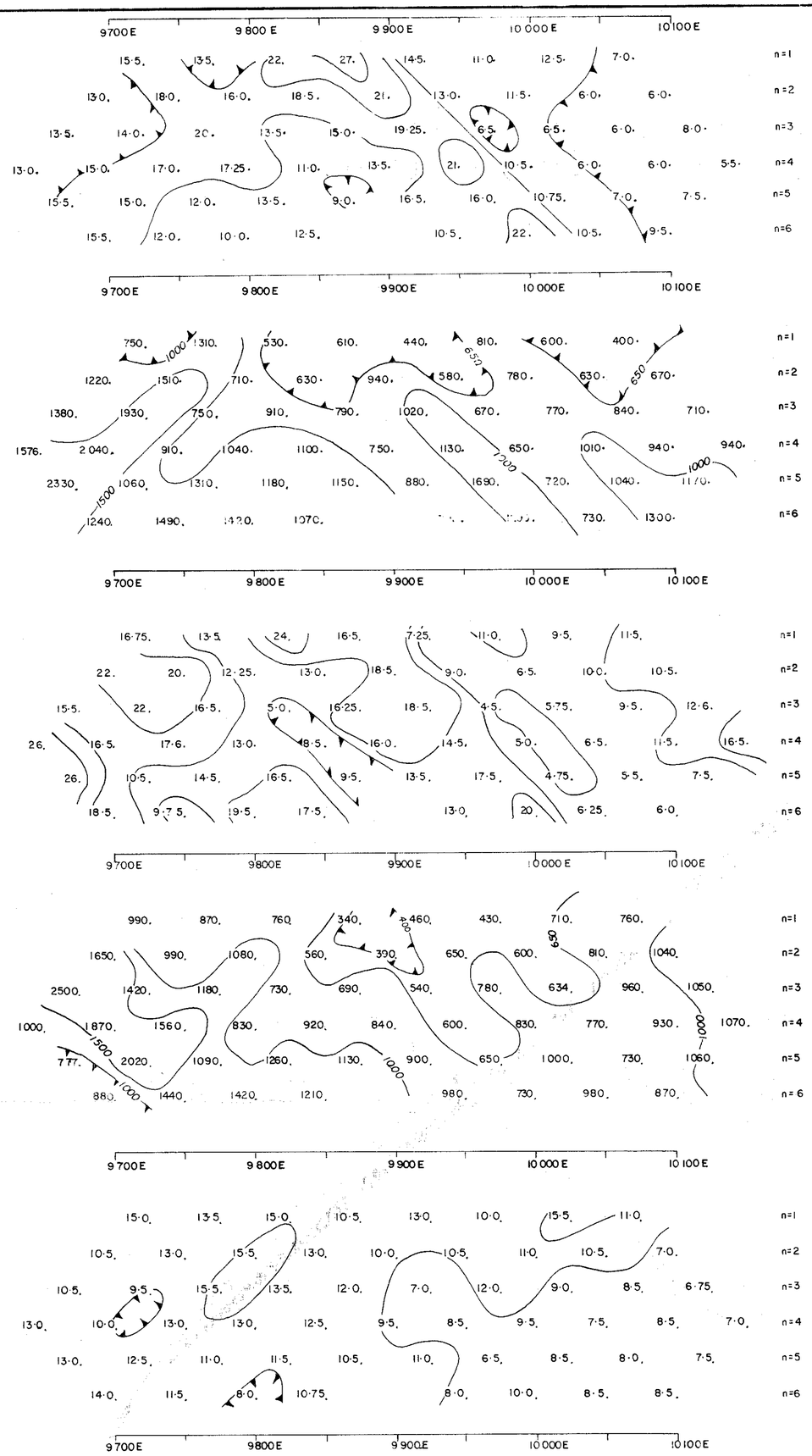
Instrument	Rx : IPR-8 Tx : ELLIOT/5 kW	Datum	0mV/V	Hor. Scale	1:2500	AREA	ELLIOTT BAY, TASMANIA 050
Observer	R.J. GOODWIN	Base Peg		Vert. Scale	1 cm = 5mV/V	PROSPECT	VOYAGER 19 791208
Scale Factor		Date	FEB 1981	Cont. Int.		PLAN SHOWS	PROFILES OF APPARENT CHARGEABILITY



GEOPEKO LTD.						AREA	ELLIOTT BAY, TASMANIA. 051
Geophysical Surveys	Instrument	Tx: Elliot 1·5 kW Rx: Scintrex IPR-8	Datum	Na: 0 mV/V ρa: 0 Ω m	Hor. Scale	1:2500	PROSPECT	VOYAGER 19 791209
Plan No.	Observer	R.G.	Drawn	R.T.	Vert. Scale	Ma: 1cm - 5mV/V ρa: 0Ωm	PLAN SHOWS	Profiles of apparent Chargeability and Resistivity.
5 cm	Scale Factor		Date	Jan 1981	Cont. Int.			

82-1745 4/7

PLAN-47



Apparent Chargeability
LINE 12 500 N

Apparent Resitivity
LINE 12 500 N

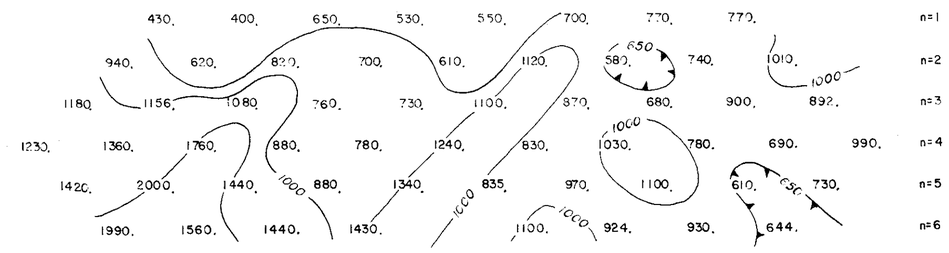
Apparent Chargeability
LINE 12 300 N

Apparent Resitivity
LINE 12 300 N

Apparent Chargeability
LINE 12 100 N

NOTE:

Apparent Resitivity Ohm.m
Apparent Chargeability (M232) mV/V
Chargeability plotted is slice with mean delay time of 910m S.



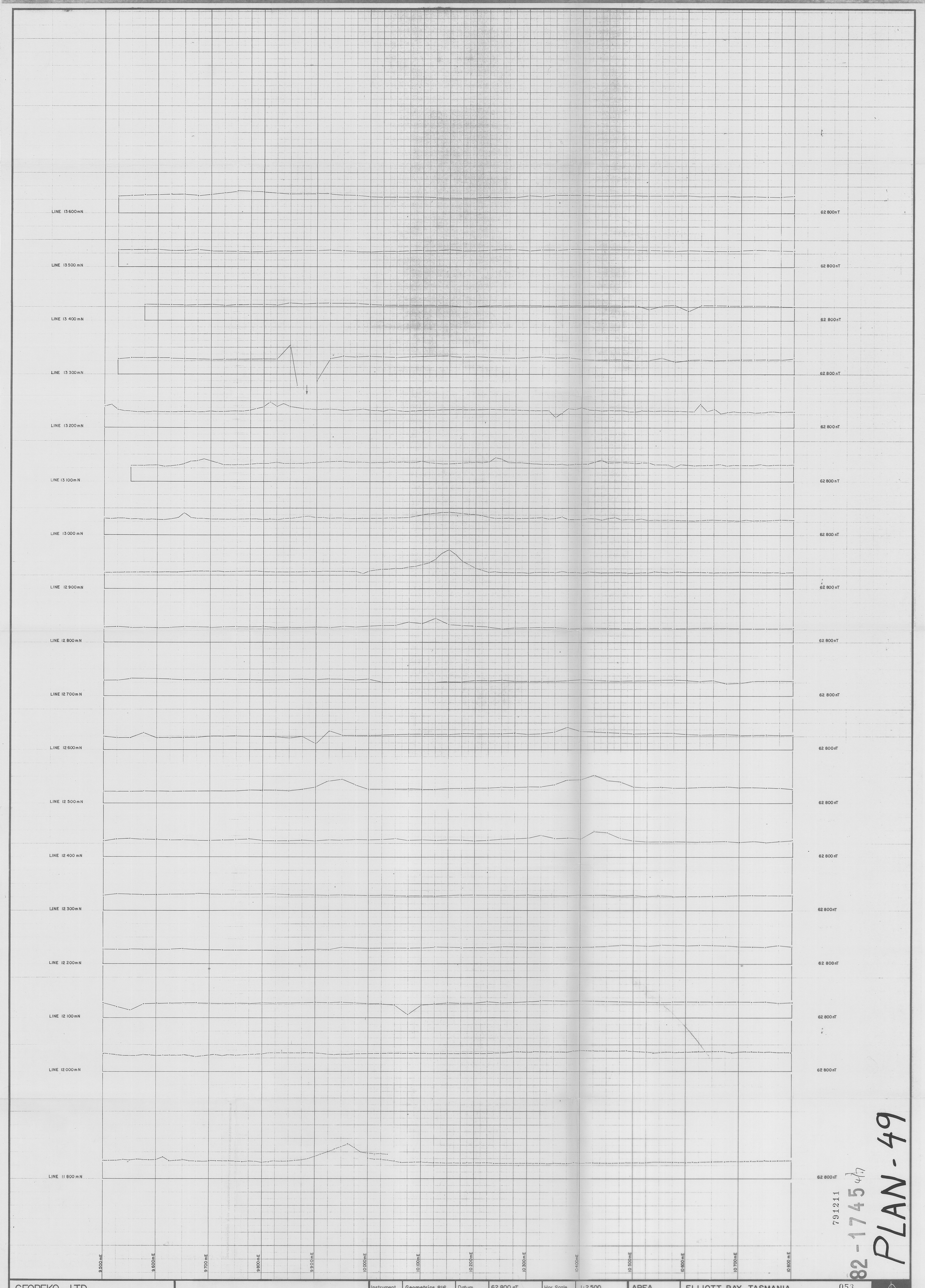
Apparent Resitivity
LINE 12 100 N

791210

82-1745 4/7

PLAN-48

GEOPEKO LTD Geophysical Surveys	Instrument	Tx: Elliot 1·5 kW Rx: Scintrex IPR-8	Drawn By	R.Tognoni	AREA	ELLIOTT BAY, TASMANIA 052
	Observer	R.J. Goodwin	Hor. Scale	1:2 500	PROSPECT	VOYAGER 19 5 cm
Plan No.	Date	Feb-March 1981	Cont. Int	Ma 5mV/V P Logarithmic	PLAN SHOWS	PSEUDOSECTION OF DIPOLE-DIPOLE I.P./RESITIVITY.



791211

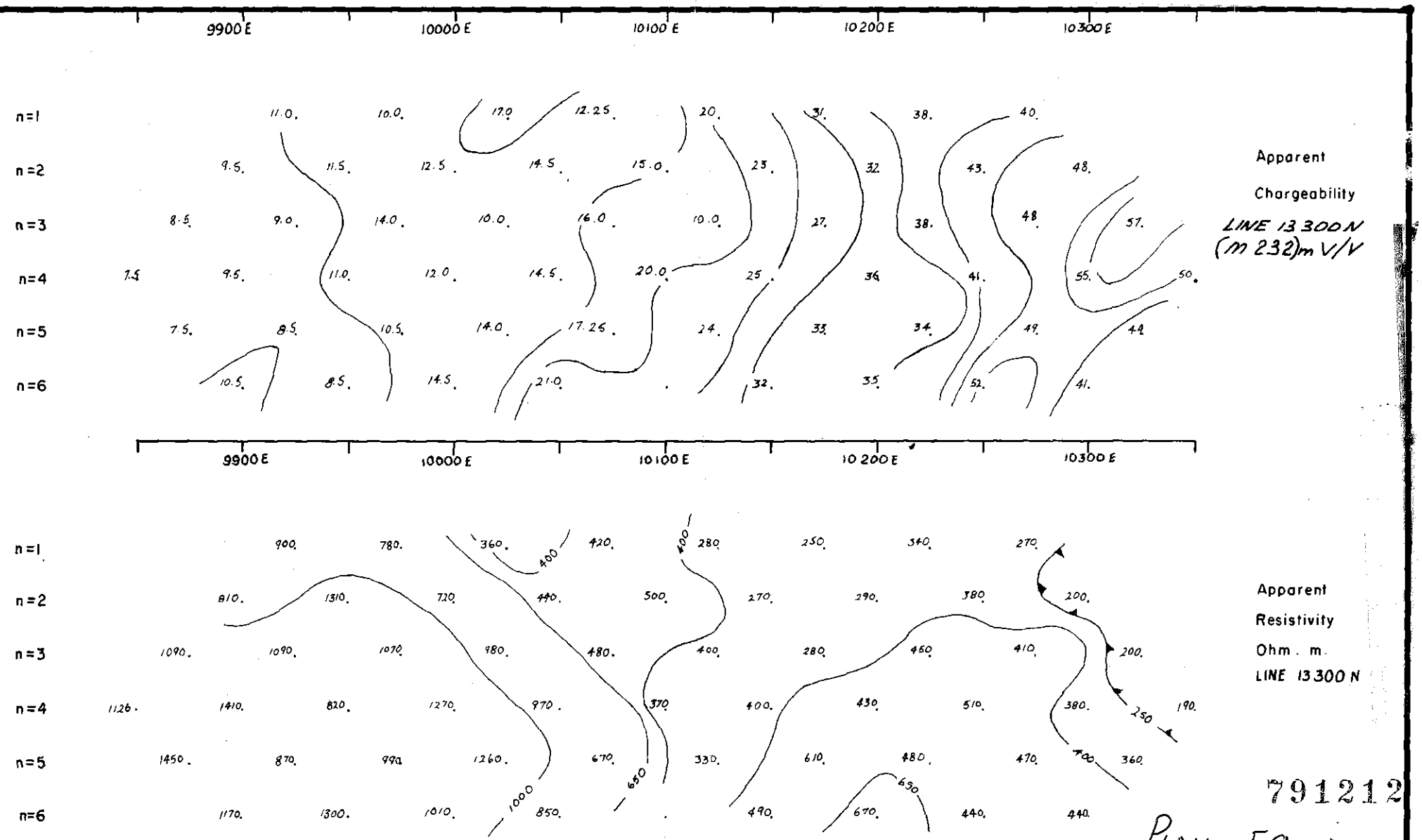
82-1745 4/7

PLAN-49

GEOPEKO LTD. Geophysical Surveys Plan No.	5 cm	Instrument	Geometrics 816	Datum	62 800 nT	Hor. Scale	1:2 500
		Observer	M.I.	Base Peg		Vert. Scale	1cm = 100nT
		Scale Factor		Date	Febuary 1981	Cont. Int.	

AREA	ELLIOTT BAY, TASMANIA 053
PROSPECT	VOYAGER 19
PLAN SHOWS	Profiles of TOTAL MAGNETIC INTENSITY

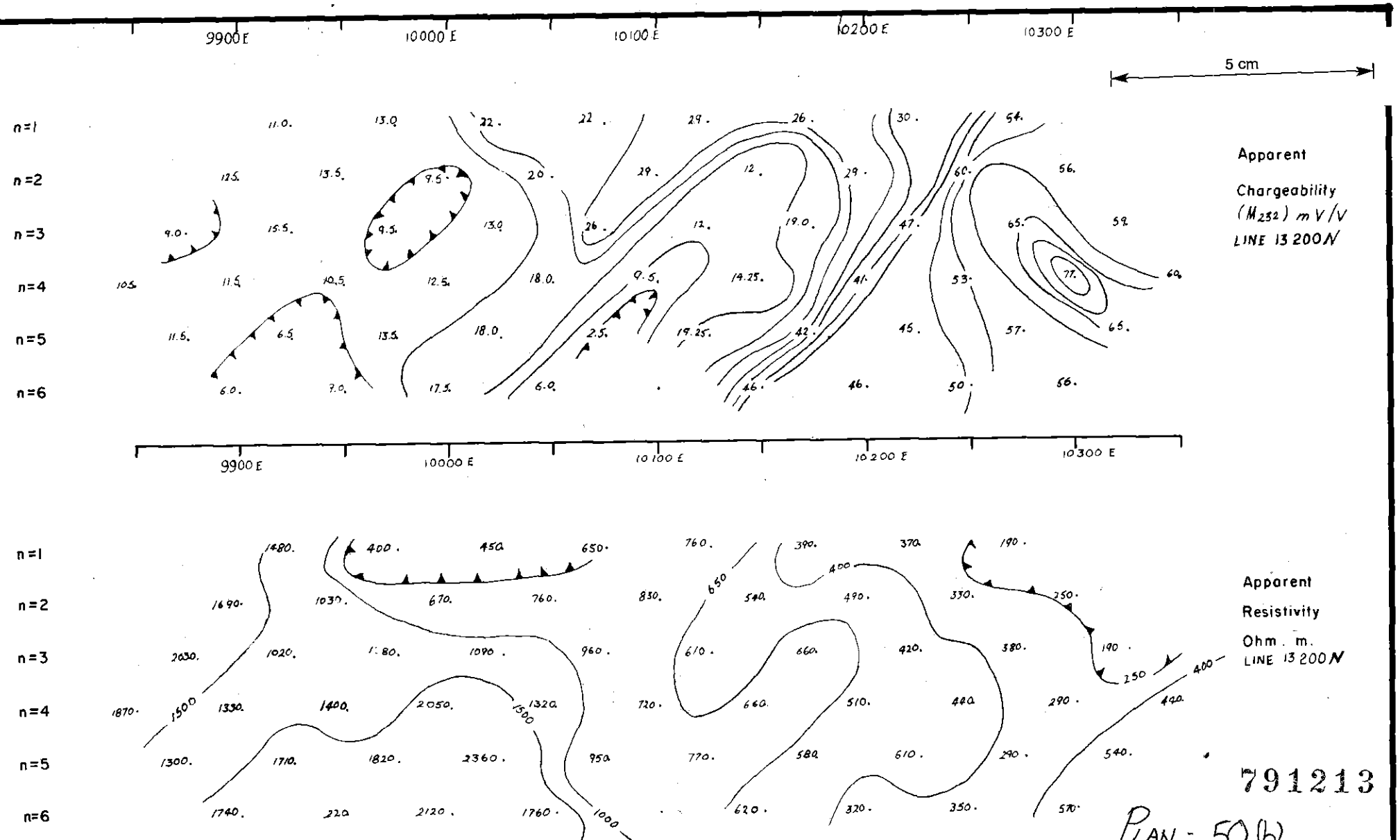
5 cm



791212

PLAN - 5a (a)

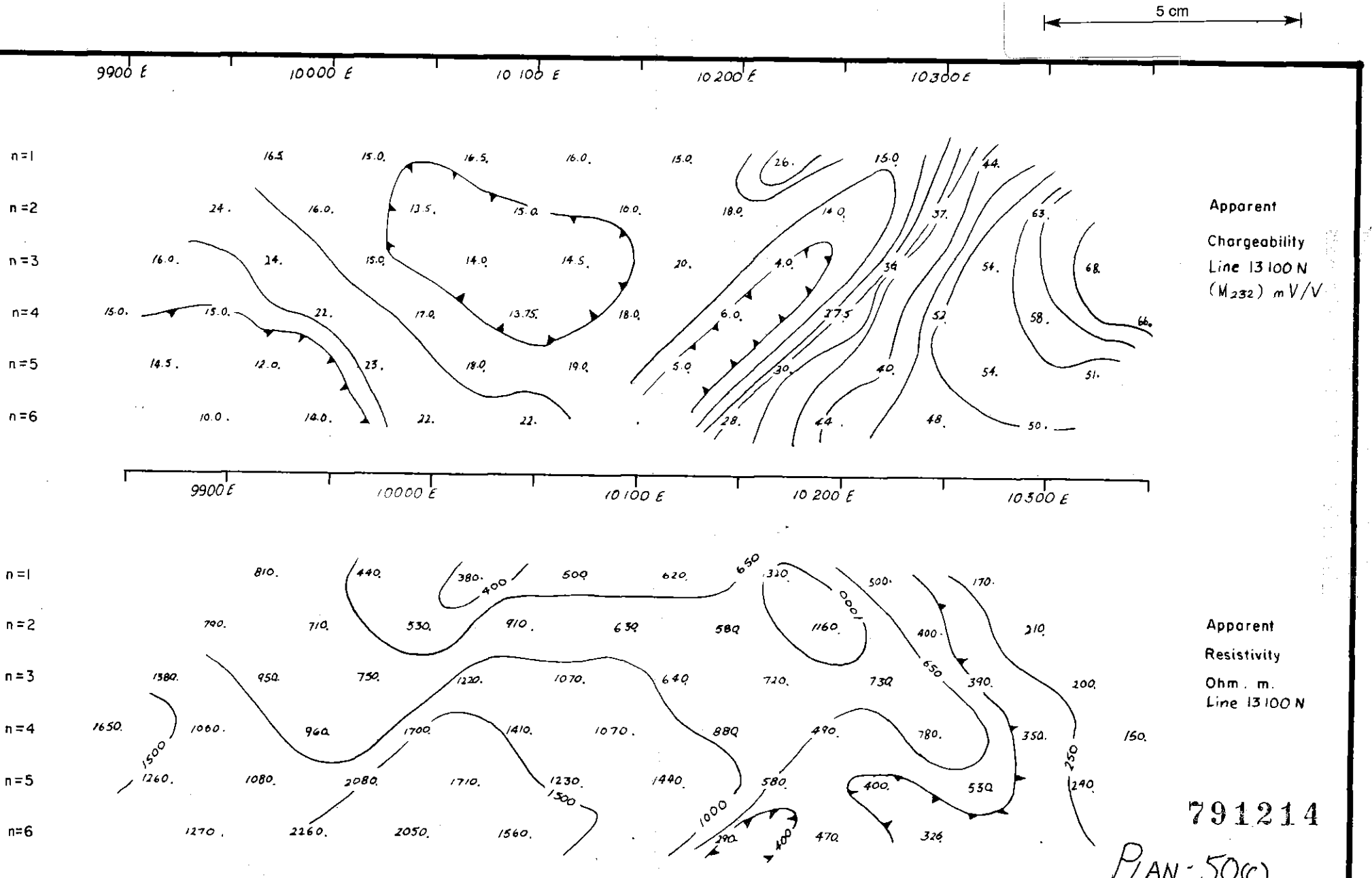
GEOPEKO Geophysical Surveys Plan no.	Trans	ELLIOT 1.5 kW	Obs	R.J. GOODWIN	AREA	ELLIOTT BAY, TASMANIA
	Recvr	ELLIOT IPR8	Drwn	B.J.S	PROSPECT	VOYAGER 19
	Scale	1 : 2 500	Cont. Int.	Ma 5m V/V ρ_a LOGARITHMIC	PLAN SHOWS	PSEUDOSECTION OF DIPOLE - DIPOLE I.P / RESISTIVITY
	Date	FEB 1981	Checked			



791213

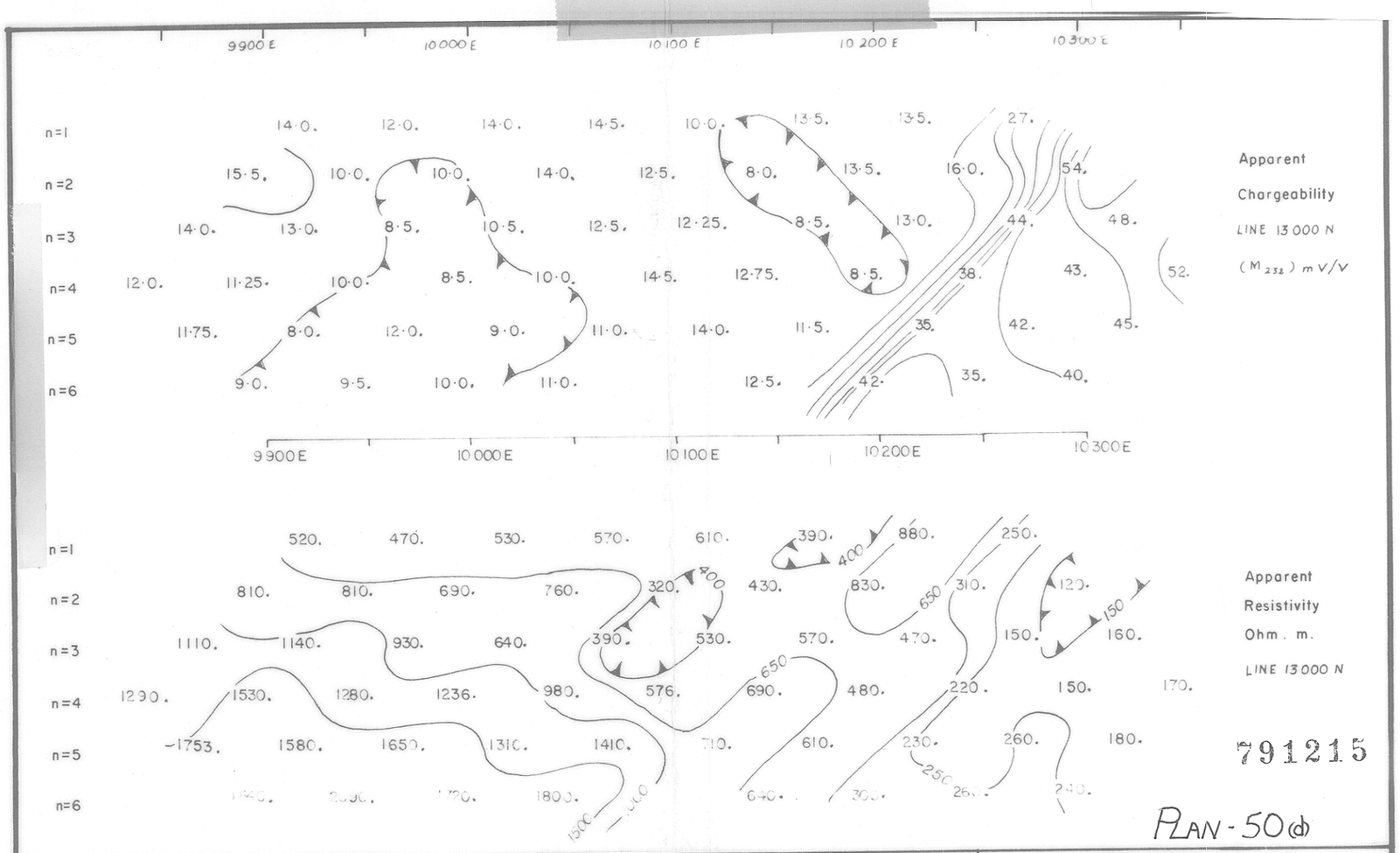
PLAN - 50(b)

GEOPEKO Geophysical Surveys Plan no.	Trans	ELLIOT 1.5 kW	Obs	RUSSEL J. GOODWIN	AREA	ELLIOTT BAY, TASMANIA
	Recvr	SCINTREX I.PR8	Drwn	B.J.S.	PROSPECT	VOYAGER 19
	Scale	1 : 2 500	Cont. Int.	Ma 5m V/Vpa LOGARITHMIC	PLAN SHOWS	PSEUDOSECTION OF DIPOLE-DIPOLE I.P./ RESITIVITY
	Date	MARCH 1981	Checked by			



GEOPEKO Geophysical Surveys Plan no.						
	Trans	ELLIOT 1.5 kW	Obs	R.J. GOODWIN	AREA	ELLIOTT BAY, TASMANIA
	Recvr	SCINTREX IPR-8	Drwn	B.J. STEDMAN	PROSPECT	VOYAGER 19
	Scale	1 : 2 500	Cont. Int.	Ma 5mV/V pa logarithmic	PLAN SHOWS	PSEUDOSECTION OF DIPOLE-DIPOLE I.P. / RESISTIVITY
	Date	FEB 1981				

5 cm

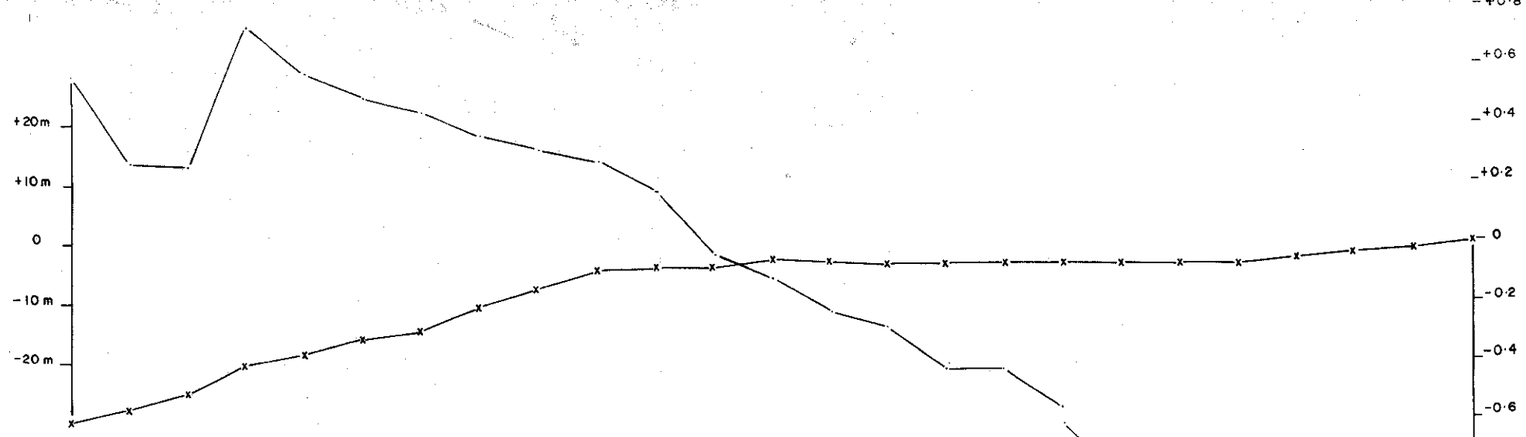


791215

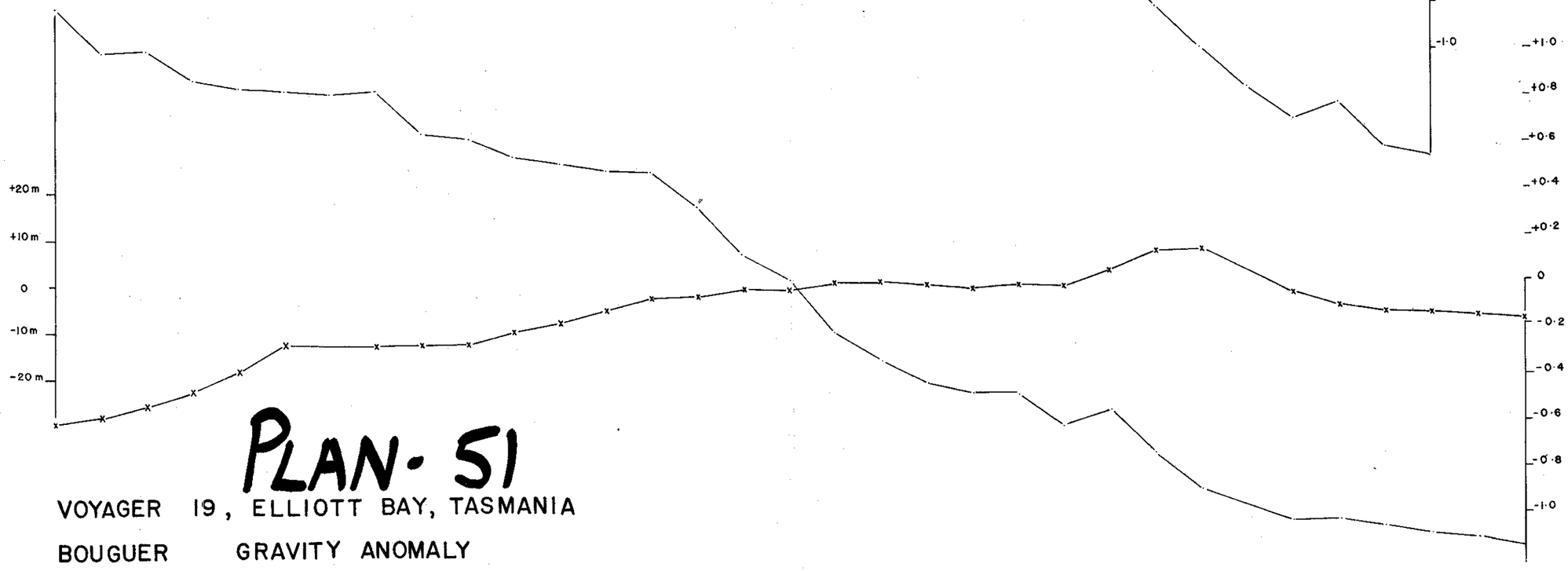
PLAN - 50

GEOPEKO Geophysical Surveys Plan no.	Trans	Elliot 1.5 kW	Obs	R.J.Goodwin	AREA	ELLIOTT BAY, TASMANIA
	Recvr	IPR-8	Drwn	R.Tognoni	PROSPECT	VOYAGER 19
	Scale	1:2500	Cont Int	Ma 5m V/V pa Logarithmic	PLAN SHOWS	Pseudosection of dipole-dipole I.P/Resitivity
	Date	Febuary 1981				

054



LINE 13 300 N



LINE 13 100 N

PLAN· 51

VOYAGER 19, ELLIOTT BAY, TASMANIA

BOUGUER GRAVITY ANOMALY

GRAVITY

TOPOGRAPHY

82 - 1745 4/7

Scale Horiz — 1:2500

Vert — 1cm = 10 (Vert Exaggeration 2·5)

1cm = 0·2 mg al

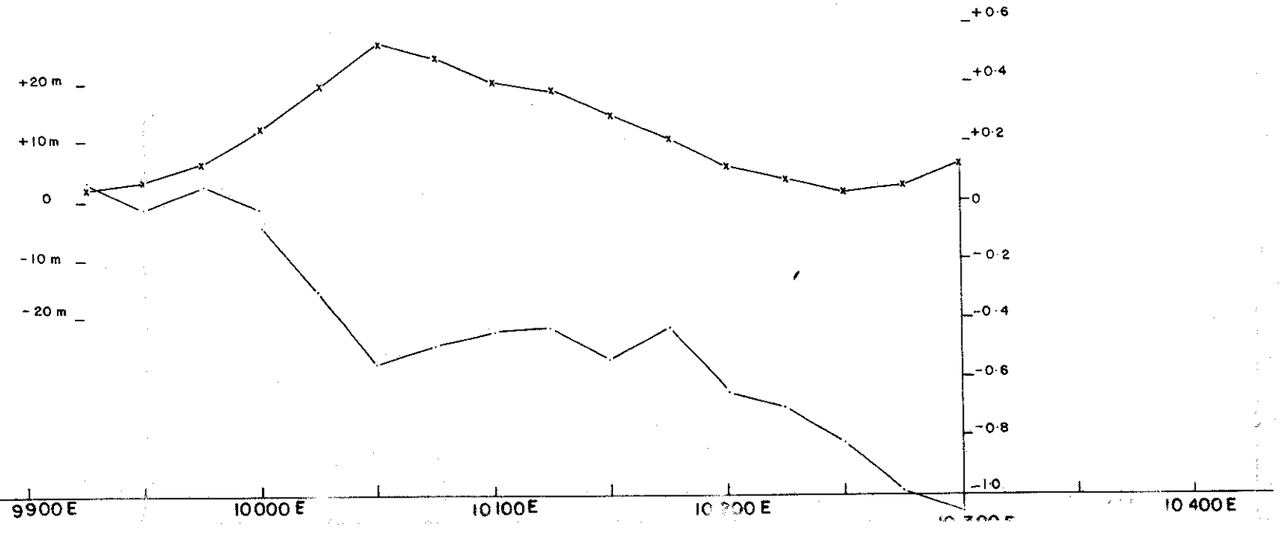
791216.

Date — March-April 1981

5 cm

Obs. — J.S., R.G.

Inst. — Worden No.-592 (Consiant 0·09781)



LINE 12 900 N

9600 E 9700E 9800E 9900E 10000E 10100E 10 200 E 10 400E

9 700mE 9 800mE 9 900mE 10 000mE 10 100mE 10 200mE 10 300mE 10 400mE 10 500mE 380 000mE AMG 10 600mE 10 700mE 10 800mE 10 900mE 11 000mE 11 100mE

11 700mN / 5 250 000mN AMG

11 600mN

11 500mN

11 400mN

11 300mN

11 200mN

11 100mN

11 000mN

10 900mN

10 800mN

10 700mN

10 600mN

10 500mN

10 400mN

10 300mN

10 200mN

10 100mN

10 000mN

9 900mN

9 800mN

9 700mN

fg. tuffaceous sst and sl

mg. chl qxt

mg. ser(l) qxt

fg. clvd qpl

mg. ser qxt

ser f qxt

mg. ser f qxt

weath. chl qf xt

chl chips

tuffaceous sst

ser f qxt

mg. ser f qxt

mg. ser qxt

fg. micaceous sst and f- sst

mg. chl (l) qxt

fg. ser qxt

(contact strikes 010°)

mg. ser qxt

fg. micaceous sst

clvd qpl

rhy qf pl

rhy qpl

mg. ser qxt

clvd qpl

fg. micaceous, tuffaceous sst with minor carb sl

fg. micaceous sst

fg. chl qxlt

fg. (chl) qxlt

chl f(q)xt trace ox py

facing: West

clvd qpl

rhy qpl

clvd rhy qpl

fg. ser vitric? tuff

fg. layered vitric (bedding // cleavage)

m-cg. tuffaceous sst

(vertical)

fg. clvd rhy qpl

mg. ser qxt

rhy qpl

fg. white qtz sst

chips: blk carb sl/shale

chips: ser qxt (1% diss py

cg. tuff sst

"ladder" qtz veins (2cm)

mg. white sst

cg. ser qxt

cg. pebbly l tuffaceous sst

mg. chl qf xt

mg. ser qxt

rhy qfp l

mg. ser qxt

mg. chl f (q) x t

mg. ser qxt

mg. chl qf xt

mg. ser q xt

mg. -cg. locally chloritic

cg. chl qf lxt (extremely flattened frags)

fg. ser tuff

fg. qtz sst

f-mg. layered ser. qxt

fe stained l qxt

fg. qtz sst

fg. micaceous sst

chl qf xt

chl q xlt

fg. ser qxt

fg. qxt?

weath. rhy qpl

fe. stained pyritic qxt 1% py

mg. ser qxt

chl f g. xlt

"rodding lineation plunge 55°-200°"

fg. qxt

≈D73 mg. ser (chl) qf xt

D74 KR9486 (chl) qf xt 2% diss ox py

D71 mg. chl f (q) x t

fg. qtz xt

D73 massive m-cg ser (chl) qf xt

NOTE:
BOMBARDIER TRACK

PLAN-52

LEGEND:

- fine grained qtz. sandstone, pebbly 'reworked' tuffaceous sandstone / fine grained (pyritic) carbonaceous siltstone and shale
- quartz outcrop
- surface rubble, white vein quartz

TYNDAL GROUP CORRELATES

- fine grained, micaceous quartz sandstone minor tuffaceous sandstone, siltstone
- rhyolitic - dacitic, chloritic qtz-feldspar crystal and lithic-crystal tuffs
- rhyolitic, sericitic qtz crystal and crystal-lithic tuffs

- rhyolitic quartz-feldspar porphyritic extrusive
- rhyolitic fine grained (laminated) vitric tuffs

WART HILL PYROCLASTICS

82-1745 1 47

5 cm

GN MN 13°00'

DATE: APRIL 1981
GEOLOGIST: W.H
DRAWN: R.TOGNONI
CHECKED:

GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.

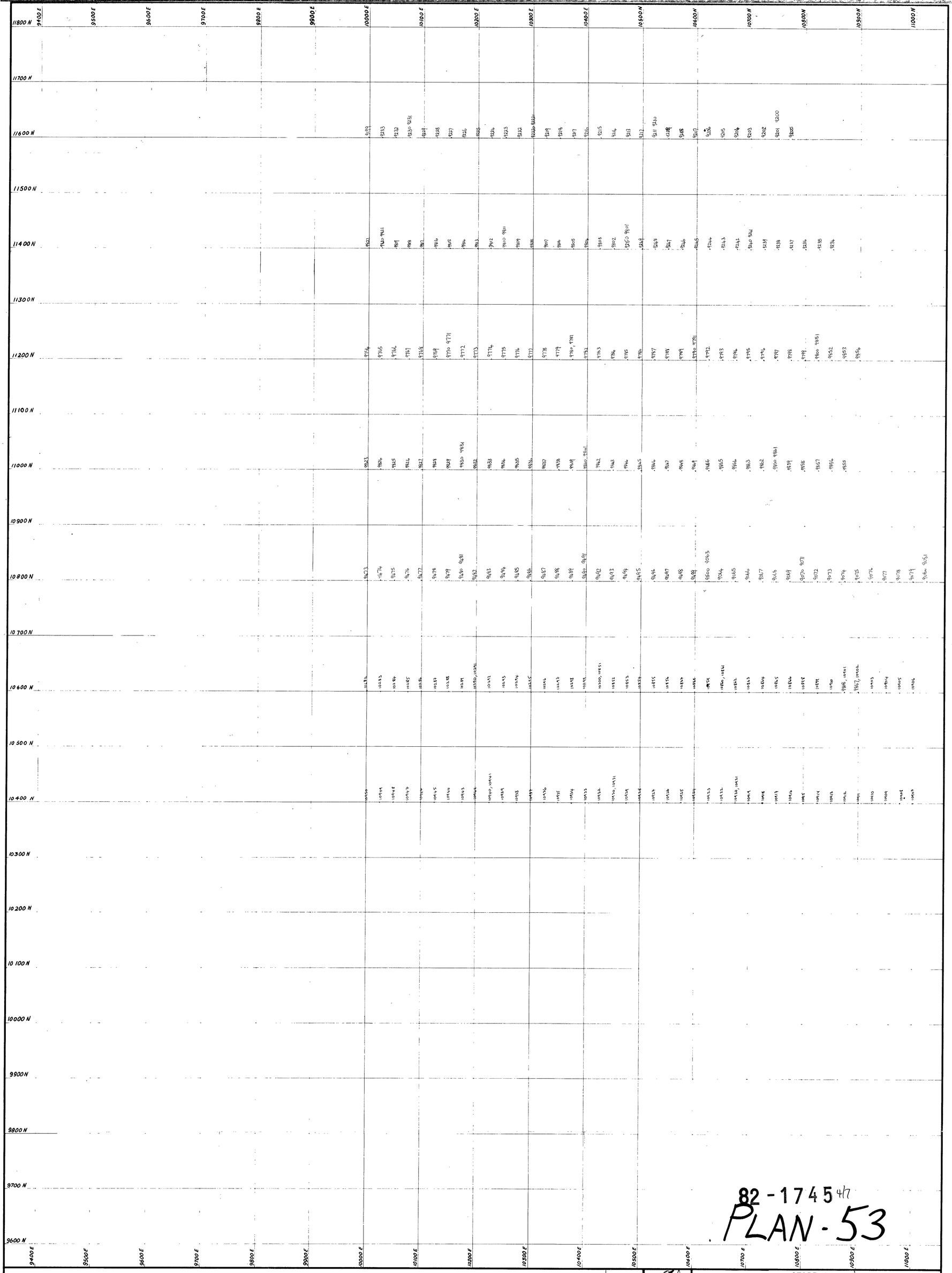
SCALE: 1:2500

No. TS 27/76-V29-2

E.L27/76 ELLIOTT BAY, TASMANIA
VOYAGER 29
GEOLOGICAL PLAN

791218

056



82-1745 47

PLAN-53

5 cm

GN MN

-9°00'

GEOPEKO
DEVONPORT BASE, TASMANIA

0 50 100 150 200 250
SCALE 1:2 500

No TS27/76-V29-3

E.L 27/76 ELLIOTT BAY, TASMANIA

VOYAGER 29

SOIL SAMPLE LOCATION

791218

057

DATE APRIL 1981

GEOLOGIST W H

DRAWN B. STEDMAN

CHECKED

9400E 9500E 9600E 9700E 9800E 9900E 10000E 10100E 10200E 10300E 10400E 10500 380 000mE AMG 10600E 10700E 10800E 10900E 11000E

11800N 11700N 11600N 11500N 11400N 11300N 11200N 11100N 11000N 10900N 10800N 10700N 10600N 10500N 10400N 10300N 10200N 10100N 10000N 9900N 9800N 9700N 9600N

5 250 000mN AMG

5 250 000mN AMG

380 000mE AMG

LEGEND

.....Grid Position

.....Power Auger Hole

Ag 0.5 / Fe 125 / Mn X — Original Sample

Sample Position

0.5 / 130 / X — Duplicate Sample

NOTE: All values in ppm

CONTOUR INTERVAL ppm

Pencil No.			
19-6	100-199	19-28	1600+
19-10	200-399		
19-15	400-799		
19-22	800-1599		

5 cm

GN MN 13°00'

DATE: APRIL 1981

GEOLOGIST: W.H.

DRAWN: B.STEDMAN

CHECKED:

GEOPEKO
DEVONPORT BASE, TASMANIA

791220

0 50 100 150 200 250
SCALE: 1:2 500

No. T.S27/76-V29-4

E.L. 27/76 ELLIOTT BAY, TASMANIA

VOYAGER 29

C-HORIZON GEOCHEMISTRY RESULTS

Ag, Fe, Mn RESULTS

058

82-1745 4/7

PLAN-54

11800N
11700N
5 250 000mN AMG
11600N
11500N
11400N
11300N
11200N
11100N
11000N
10900N
10800N
10700N
10600N
10500N
10400N
10300N
10200N
10100N
10000N
9900N
9800N
9700N
9600N
9400E
9500E
9600E
9700E
9800E
9900E
10000E
10100E
10200E
10300E
10400E
10500E
380 000mE AMG
10600E
10700E
10800E
10900E
11000E

PLAN-55

LEGEND

×.....Grid Position

●.....Power Auger Hole

Ag 0·5 / Fe 1·25 / Mn X — Original Sample

● — Sample Position

0·5 / 130 / X — Duplicate Sample

NOTE: All values in ppm

CONTOUR INTERVAL

Pencil No.		
19-6		0·5-0·99%
19-10		1·0-1·99%
19-15		2·0-3·99%
19-22		<4·0%

82-1745
4/7

5 cm

GN MN
13°00'

DATE: APRIL 1981
GEOLOGIST W.H.
DRAWN B.STEDMAN
CHECKED

791221 GEOPEKO
DEVONPORT BASE, TASMANIA

0 50 100 150 200 250
SCALE 1:2 500

NoT.S27/76-V29-6

E.L.27/76 ELLIOTT BAY, TASMANIA
VOYAGER 29
C-HORIZON GEOCHEMISTRY RESULTS
Fe Contours

059

PLAN-56

LEGEND

Grid Position

Power Auger Hole

Cu x 40 / Pb 40 / Zn 135 — Original Sample

Sample Position

x 40 / 160 — Duplicate Sample

NOTE: All values in ppm

CONTOUR INTERVAL: ppm

Pencil No			
19-6	100-199	19-28	1600+
19-10	200-399		
19-15	400-799		
19-22	800-1599		

5 cm

88 - 1745 47

GN MN 13°00'

DATE APRIL 1981

GEOLOGIST W H

DRAWN B.STEDMAN

CHECKED

791222 GEOPEKO

DEVONPORT BASE, TASMANIA

SCALE 1:2 500

No. TS27/76-V29-7

E.L.27/76 ELLIOTT BAY, TASMANIA

VOYAGER 29

C-HORIZON GEOCHEMISTRY RESULTS

Zn CONTOURS

060

9400E 9500E 9600E 9700E 9800E 9900E 10000E 10100E 10200E 10300E 10400E 10500 380 000mE AMG 10600E 10700E 10800E 10900E 11000E

11800N

11700N

5 250 000mN AMG

11600N

11500N

11400N

11300N

11200N

11100N

11000N

10900N

10800N

10700N

10600N

10500N

10400N

10300N

10200N

10100N

10000N

9900N

9800N

9700N

9600N

9400E 9500E 9600E 9700E 9800E 9900E 10000E 10100E 10200E 10300E 10400E 10500 380 000mE AMG 10600E 10700E 10800E 10900E 11000E

LEGEND

Grid Position

Power Auger Hole

Cu X
Pb 40
Zn 135
Original Sample

Sample Position

X
40
160
Duplicate Sample

NOTE: All values in ppm

CONTOUR INTERVAL ppm
Pencil No.
19-6 100-199
19-10 200-399
19-15 400-799
19-22 800-1599
19-29 1600+
5 cm

82-1745 4/7

GN MN
13°00'

DATE APRIL 1981
GEOLOGIST W.H.
DRAWN B.STEDMAN
CHECKED

791223 GEOPEKO
DEVONPORT BASE, TASMANIA

0 50 100 150 200 250
SCALE 1:2500

N.O.T.S 27/76-V29- 8

E.L.27/76 ELLIOTT BAY, TASMANIA

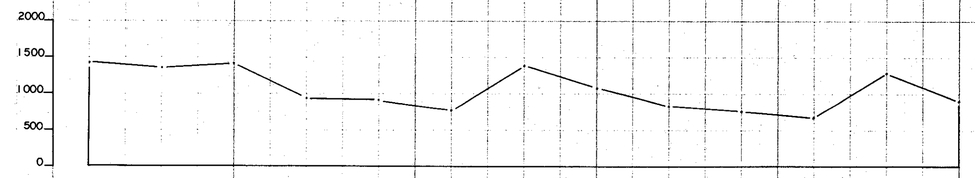
VOYAGER 29

C-HORIZON GEOCHEMISTRY RESULTS

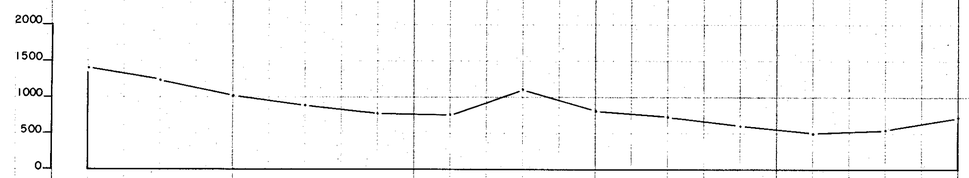
Pb CONTOURS

061

PLAN-57

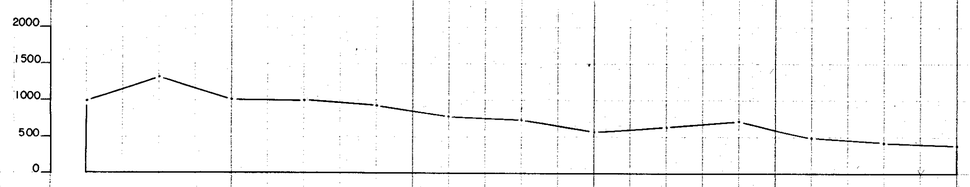


LINE 11 200 mN

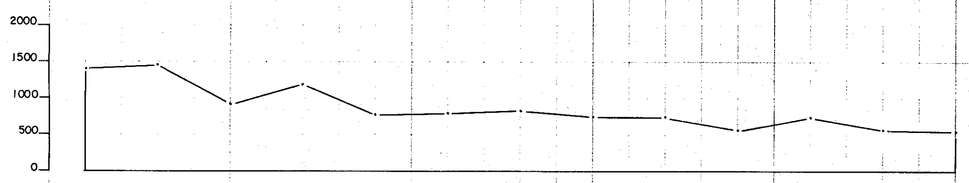


LINE 11 000 mN

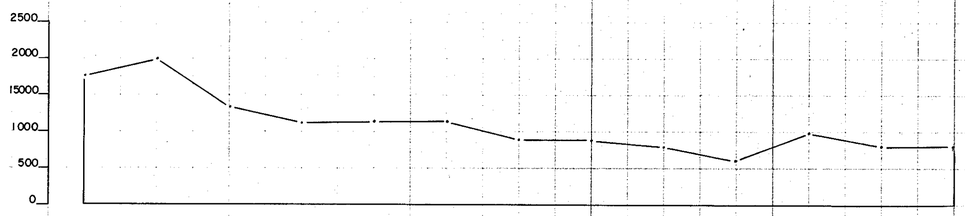
NOTE: Gradient Array Current Electrodes: 10 800 mN, 9 500 mE.,
10 800 mN, 11 130 mE.
Rx Dipole Spacing: 50 m



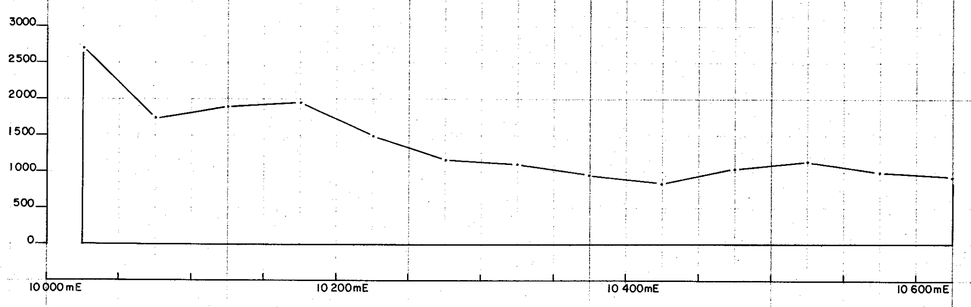
LINE 10 800 mN



LINE 10 600 mE



LINE 10 400 mN



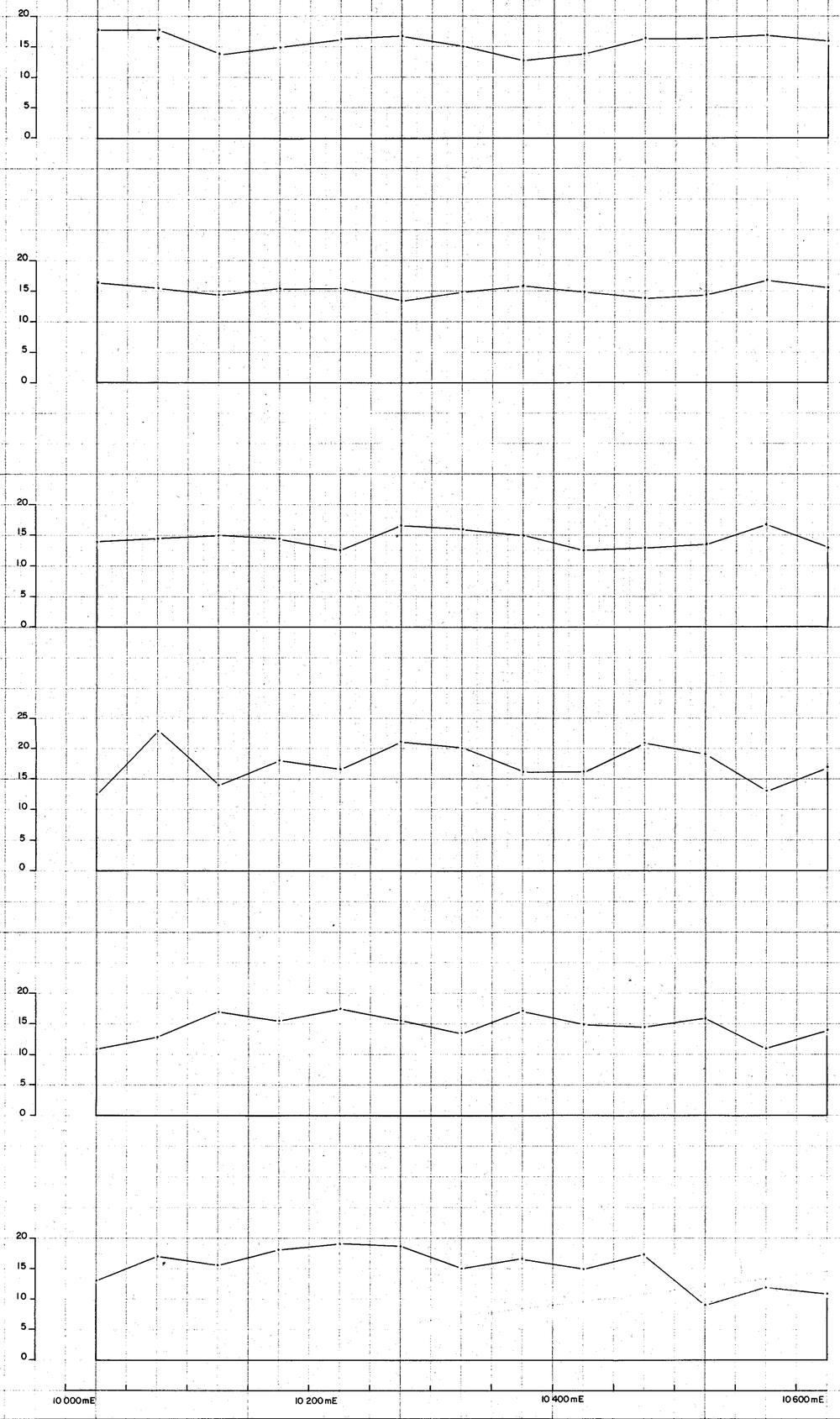
LINE 10 200 mN

82-1745 4/7 791224

PLAN-58

GEOPEKO Geophyshical Surveys Plan No.							AREA	ELLIOTT BAY, TASMANIA
		Instruments	Tx: Elliot 1-5 kW Rx: Scintrex IPR-8	Datum	0 Ohm.m	Hor. Scale	1:2 500	PROSPECT VOYAGER 29 062
		Observer	R. GOODWIN	Drawn by	R. TOGNONI	Vert.Scale	1cm = 500m	PLAN SHOWS Profiles of Apparent Resistivity
		Scale Fact		Date	March 1981	Cont. Int.		

5 cm



NOTE: Chargeability plotted is slice with mean delay time of 910 mS(M232)
Gradient Array Current Electrodes: 10 800 mN, 9 500 mE.,
10 800 mN, 11 300 mE.

Rx Dipole: 50m

82-1745 (1)

PLAN-59

GEOPEKO Geophyshical Surveys Plan No.	5 cm	Instruments	Rx: IPR-8	Datum	0mV/V	Hor. Scale	1:2 500	AREA	ELLIOTT BAY, TASMANIA 791225
		Observer	R.GOODWIN	Drawn by	R. TOGNONI	Vert.Scale	1cm = 5mV/V	PROSPECT	VOYAGER 29 063
		Scale Fact		Date	March 1980	Cont. Int.		PLAN SHOWS	Profiles of Apparent Chargeability

10 000E | 10 100E | 10 200E | 10 300E | 10 400E | 10 500E | 10 600E

11 200 N

11000N

10 800 N

10 600 N

10 400 N

10 200 N

1000

1200

1000

1000

1000



82-1745

791227

PLAN-61

GEOPEKO
A DIVISION OF PEKO-WALLSEND LTD

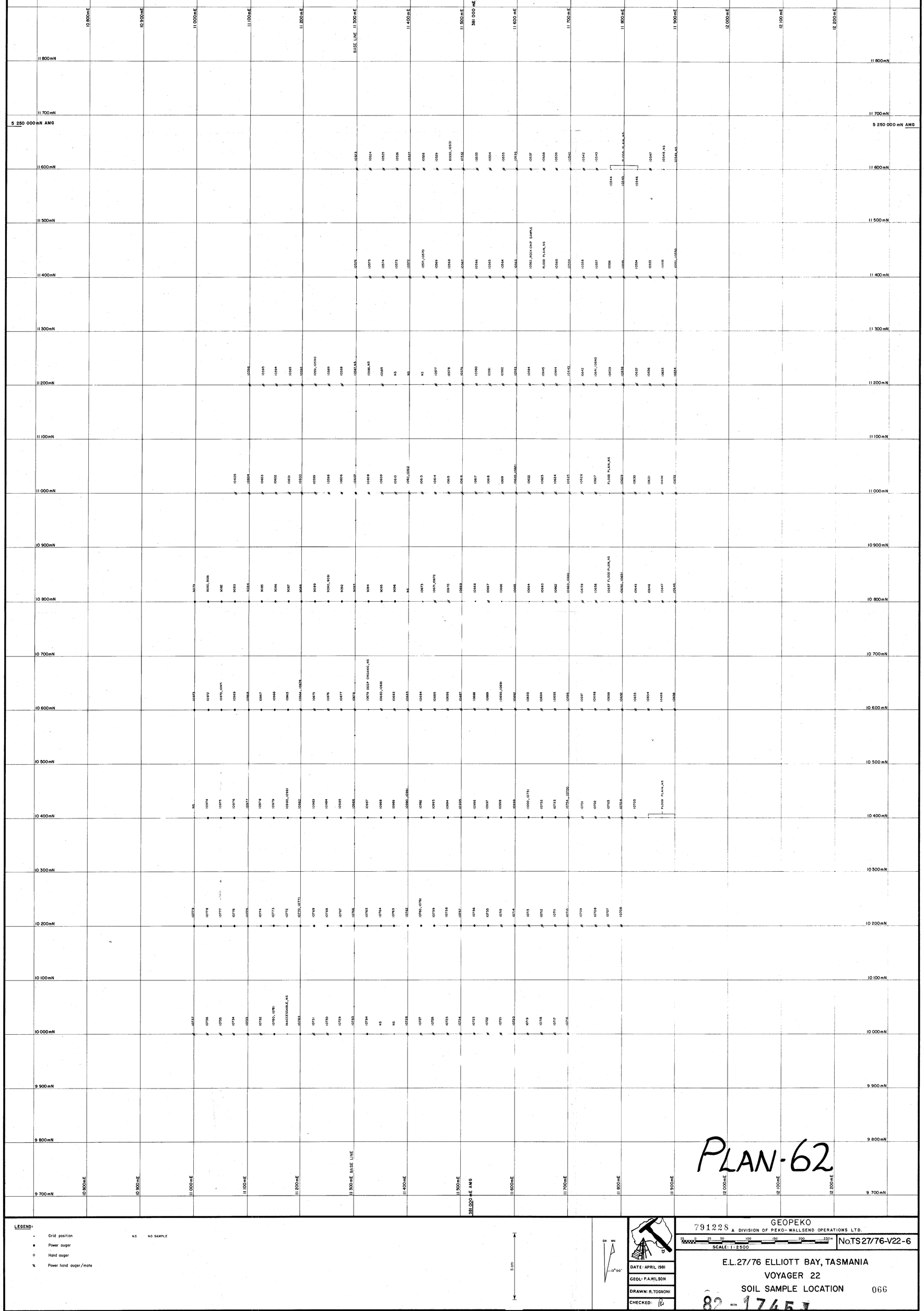
SCALE: 1:5 000

No.TS27/76-V22-3

DATE: FEBUARY '81
GEOL: P.A. WILSON
DRAWN: R. TOGNONI
CHECKED

E.L.27/76 ELLIOTT BAY
VOYAGER 22
GEOLOGICAL PLAN

065



PLAN-62

LEGEND:

- Grid position
- Power auger
- Hand auger
- Power hand auger/mate

NS NO SAMPLE

5 cm

GN MN 13°00'

DATE: APRIL 1981
GEOL: P.A.WILSON
DRAWN: R.TOGNONI
CHECKED:

GEOPEKO
791228 A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.

SCALE: 1:2500

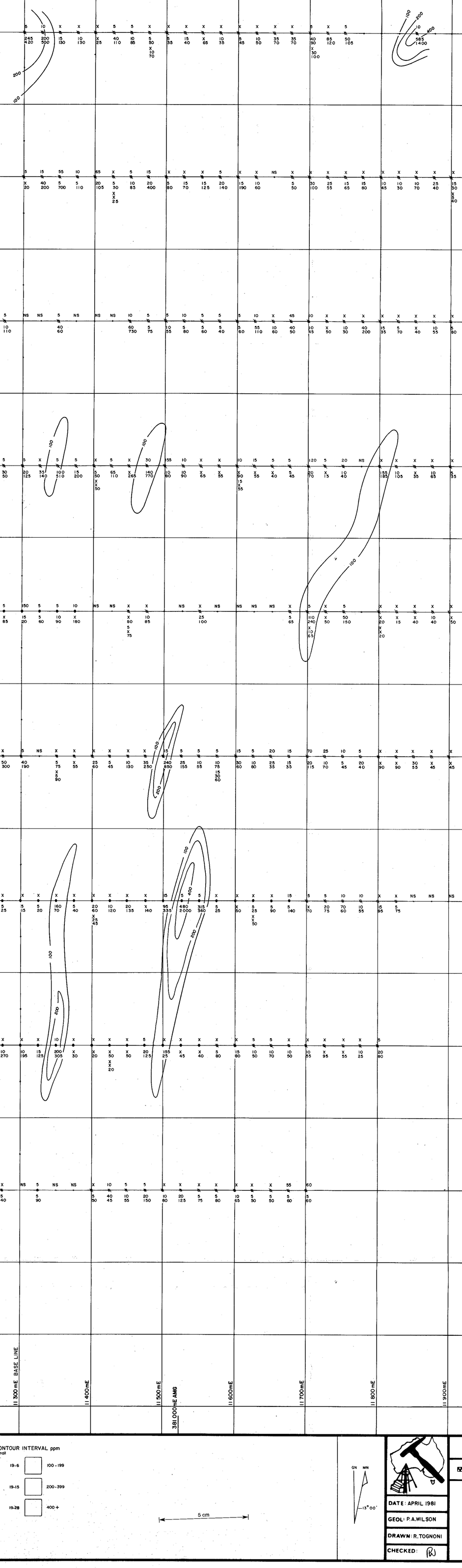
No.TS 27/76-V22-6

E.L.27/76 ELLIOTT BAY, TASMANIA
VOYAGER 22
SOIL SAMPLE LOCATION 066

82-1745 1 S/7

10 800mE | 10 900mE | 11 000mE | 11 100mE | 11 200mE | BASE LINE 11 300mE | 11 400mE | 11 500mE | 381 000mE AMG | 11 600mE | 11 700mE | 11 800mE | 11 900mE | 12 000mE | 12 100mE | 12 200mE

11 800mN — 5 250 000mN AMG — 11 700mN — 11 600mN — 11 500mN — 11 400mN — 11 300mN — 11 200mN — 11 100mN — 11 000mN — 10 900mN — 10 800mN — 10 700mN — 10 600mN — 10 500mN — 10 400mN — 10 300mN — 10 200mN — 10 100mN — 10 000mN — 9 900mN — 9 800mN — 9 700mN



PLAN-63

LEGEND:

- Grid position
- Power auger
- Hand auger
- Power hand auger/mate

10 — Cu ppm
SAMPLE POSITION
5 / 315 — Pb ppm / Zn ppm
20 / 370 — CHECK SAMPLE

NS NO SAMPLE
X INSUFFICENT SAMPLE

CONTOUR INTERVAL ppm

Pencil No.	
19-6	100-199
19-15	200-399
19-28	400+

5 cm

GN MN — 13°00'

DATE: APRIL 1981
GEOL: P.A.WILSON
DRAWN: R.TOGNONI
CHECKED: RJ

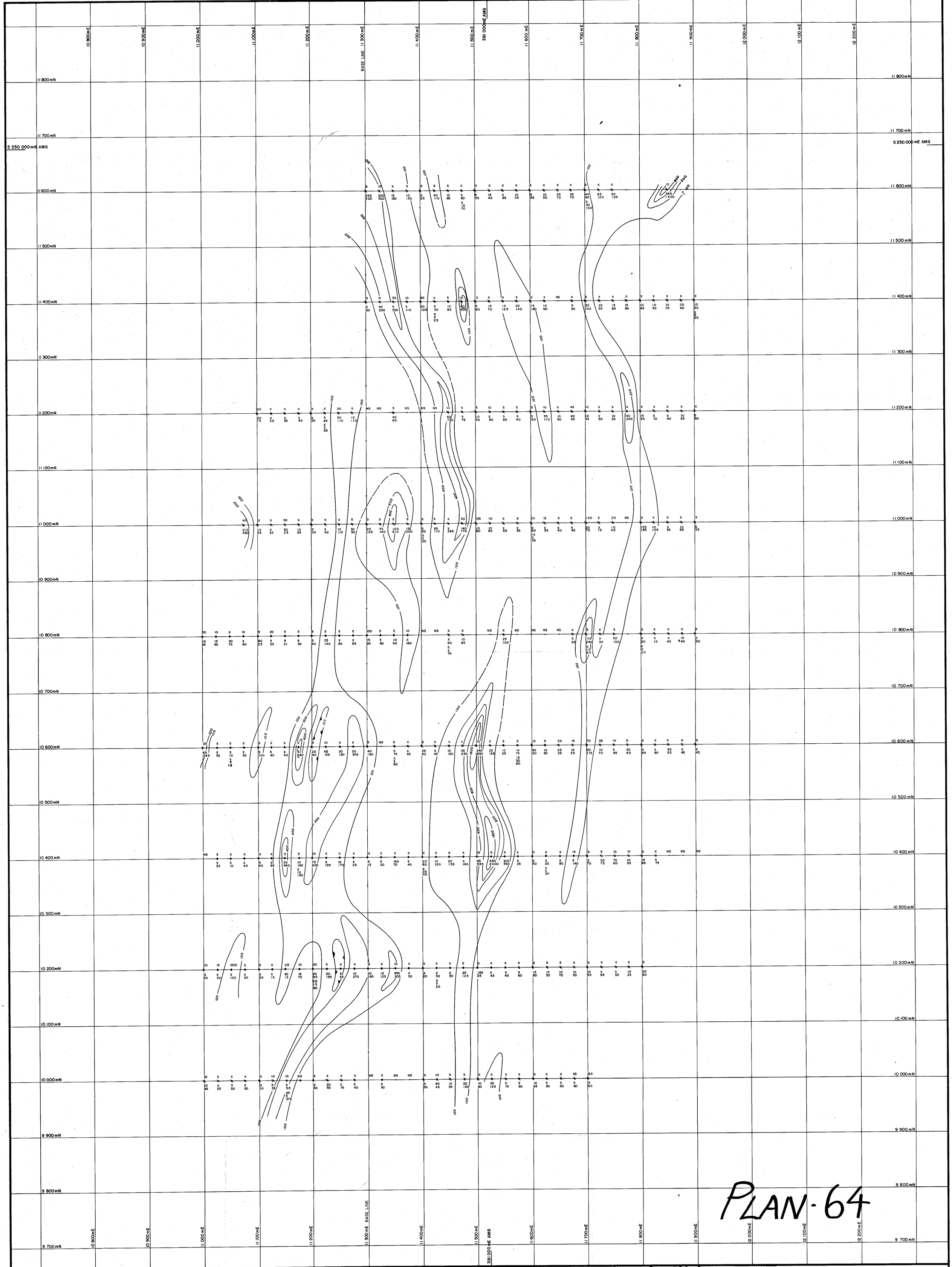
791229 GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.

SCALE: 1:2500 — No.TS 27/76-V22-4

E.L.27/76 ELLIOTT BAY, TASMANIA
VOYAGER 22
C-HORIZON GEOCHEMISTRY RESULTS
Pb Contours

067

82-1745



LEGEND:

- Grid position
- Power auger
- Hand auger
- Power hand auger/mate
- 10 — Cu ppm
- SAMPLE POSITION
- 5 / 315 — Pb ppm / Zn ppm
- 20 / 5 / 370 — CHECK SAMPLE
- NS NO SAMPLE
- X BELOW LEVEL OF DETECTION

CONTOUR INTERVAL ppm

Pencil No.		Pencil No.	
19-6	100-199	19-28	1600+
19-10	200-399		
19-15	400-799		
19-22	800-1599		

5 cm

GN MN 13°00'

DATE: APRIL 1981
GEOL: P.A.WILSON
DRAWN: R.TOGNONI
CHECKED:

GEOPEKO 791230
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.

SCALE: 1:2500

No.TS27/76-V22-5

E.L.27/76 ELLIOTT BAY, TASMANIA
VOYAGER 22
C-HORIZON GEOCHEMISTRY RESULTS
Zn Contours

068

PLAN·64

E.L. - 1745 5/7

PLAN 65

374 000 E | 375 000 E | 376 000 E | 377 000 E | 378 000 E | 379 000 E | 380 000 E | 381 000 E | 382 000 E

5 250 000 N | 5 249 000 N | 5 248 000 N | 5 247 000 N | 5 246 000 N | 5 245 000 N

E.L. 27/76 BOUNDARY

VOYAGER 19 | VOYAGER 29 | VOYAGER 22 | VOYAGER 9 | VOYAGER 21

AEM | AEM 30 approx

CAMP

BOMBARDIER | TORNADO

NOTE:
- INTERPRETIVE ROCK BOUNDARY
- INTERPRETIVE UNCONFORMITY
- STRIKE TRENDS FROM AERIAL PHOTOGRAPHS
- FAULTS FROM AERIAL PHOTOGRAPHS

5 cm

LEGEND

VOLCANIC ROCKS
- vt vitric tuff
- xt crystal tuff
- vlt vitric-lithic tuff
- xlt crystal-lithic tuff
- cgg agglomerate rounded clasts 32 mm
- fr fragmental angular clasts 32 mm
- ut undifferentiated tuffs
- r ruff
- qp quartz porphyry
- qfp quartz feldspar porphyry
- qfbp quartz feldspar biotite porphyry
- l as a suffix denotes lava
- top / topalli

PREFIXES (no prefix indicates acid composition)
- a acid
- int intermediate
- hy hyalo or hypohyalo
- doc dacite or dacitic
- and andesite or andesitic
- b basalt or basaltic
- ba basic

SEDIMENTARY ROCKS
- sh shale
- si siltstone
- bksh backshale
- sst sandstone
- qtz quartzite
- gwk greywacke
- cgl conglomerate
- ms mudstone
- dol dolomite
- bx breccia
- congl conglomeratic sediment
- vs volcaniclastic sediment

METAMORPHIC ROCKS
- phy phyllite
- sch schist
- gns gneiss
- hfs hornfels
- ms marble

INTRUSIVE ROCKS
- gr granite
- gd granodiorite
- ad adamellite
- d dolerite
- ip/porp porphyry
- bd basic dyke
- ad dacite
- peg pegmatite
- qv quartz veins

STRUCTURAL AND TEXTURAL
- p porphyritic
- sl/vsl strongly / weakly sheared
- shd sheared
- ox oxidised
- vns veined
- qm quartz mineralised
- bx brecciated
- sch schistose
- vug/vugs vughy, vug
- cen cataclastic

MINERALOGICAL PREFIXES (only use if diagnostic)
- ab albitic
- act actinolitic
- chl chloritic
- dol dolomitic
- ep epidotic
- gt garnetic
- hem hematitic
- mt magnetitic
- ox oxidised
- py pyritic
- qtz quartzose
- ser sericitic
- tm tourmaline
- tr tremolitic

GRAIN SIZE
- fg fine grained 0 3 mm fragments
- mg medium grained 3 10 mm fragments
- cg coarse grained 10 32 mm fragments
- agg agglomerate or vole breccia > 32

AGE DESIGNATION PREFIXES
- Q Quaternary
- T Tertiary
- O Ordovician
- D Devonian
- S Silurian
- C Cambrian
- pCm Precambrian

STRUCTURAL
- outcrop
- ridge
- bedding
- strike/dip of flow layering in volcanic rocks
- schistosity/metamorphic foliation
- fault
- intrapetrive contact
- jointing
- cleavage
- fold axis
- vertical cleavage

GEOLOGICAL BOUNDARIES

Qa QUATERNARY alluvium

Tg TERTIARY gravels and unconsolidated sediments

O ORDOVICIAN conglomerate and quartzite

CAMBRIAN

Tyndall Group Formations

19-47 Arkosic to basaltic tuffs, lavas, agglomerates, lavas and tuffaceous shales

19-46 Dolomites and dolomitic shales

b Solvay Creek Argillites

19-57 Rhyolitic brown, grey shales, argillites, greywackes and minor black shales

c Penkala Tuffs

19-30 Rhyolitic crystallic tuffs and minor clastic sediments

d undifferentiated

undifferentiated lithologies in the N.W. of map sheet, include, intermediate to basic volcanics, schistose, conglomeratic and tuffs

3 Mainwaring Group

a Verdun Basic Volcanics

19-67 Basic dykes and flows intruding rhyolitic tuffs

19-10 Chlorite epidote sericite alteration of acid pyroclastics with 2-5% pyrite

b Wanderer River Tuff

19-23 Pink hematitic rhyolitic crystal and lithic tuffs, minor lavas

4 Lewis River Volcanics

a Mart Hill Pyroclastics

19-29 Rhyolitic quartz-rich lithic and crystal tuffs agglomerates, lavas and vitric tuffs

19-65 Quartz-pebble conglomerates, Quartzites and minor shales

19-67 Basic dykes and flows intruding rhyolitic tuffs

19-10 Chlorite epidote sericite alteration of acid pyroclastics with 2-5% pyrite

b Wanderer River Tuff

19-23 Pink hematitic rhyolitic crystal and lithic tuffs, minor lavas

c Hudson River Pyroclastics

19-40 Chloritic quartz feldspar crystal and lithic tuffs plus biotite bearing rhyolite porphyries (lavas?)

19-58 Shales, greywackes and fine tuffaceous sediments

d Elliott Point Porphyry

19-22 Coarse grained quartz feldspar biotite porphyry probably a sub-volcanic intrusive

e Cambrian Granites

19-19 Undifferentiated granite and granite porphyry

PRECAMBRIAN

19-65 Undifferentiated quartzites and meta sediments

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SCALE: 1: 10,000

No. KT27/76-5A

KT27/76-1	KT27/76-2
KT27/76-3	KT27/76-4
KT27/76-5	KT27/76-6
KT27/76-7	KT27/76-8

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CHECKED:

E.L. 27/76
ELLIOTT BAY, TASMANIA

GEOLOGICAL MAP
1981 UPDATE 069