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REPORT ON E. L. 2/78

GRANITE TOR AREA

TASMANIA

OPEN FILE

ALCOA OF AUSTRALIA LIMITED

EXPLORATION DIVISION

MICROFILMED

78-1308

Prepared by
D.C. Speijers

File Report No. 35
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INTRODUCTION

Exploration Licence 2/78 is located about 5km east of Tullah and extends to the western boundary of the Cradle Mountain - Lake St Clair National Park (see Figure 2). It covers an area of approximately 322 square kilometres and is referred to as the Granite Tor Area. The topography is that of a heavily-dissected plateau with drainage into the Murchison River in the south and the Mackintosh River in the north. Elevations range from 200 metres A.S.L. in the west to 1120 metres A.S.L. in the east and most of the country is quite rugged.

Vegetation varies from open button-grass plain to dense rainforest and access can only be gained on foot or by helicopter.

The area straddles the boundary between the Burnie and Queenstown 1:250 000 sheet areas but is wholly contained within the Sophia 1:100 000 topographic sheet area. Air photograph coverage is as follows :

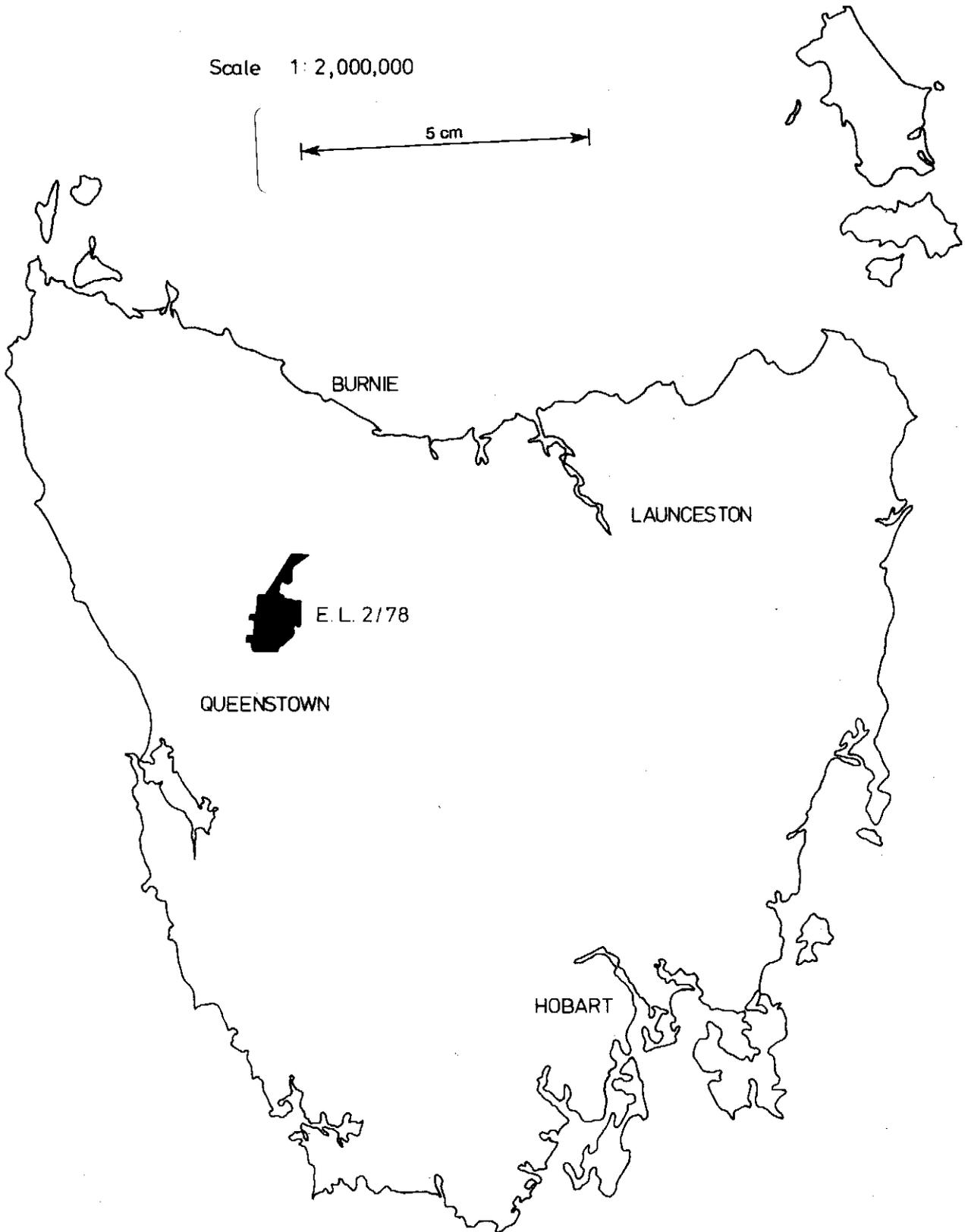
Conical Rocks - Sophia

Film No. T 679	Run 1	Nos. 117 to 119
	Run 2	Nos. 161 to 163
	Run 3	Nos. 7 to 9
	Run 4	Nos. 103 to 107
	Run 5	Nos. 56 to 61
	Run 6	Nos. 42 to 46
Film No. T 648	Run 7	Nos. 225 to 227

The Exploration Licence was applied for on 21st January 1978 and granted on 26th May 1978. It expires on 12th November 1978.

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Fig.1 LOCATION OF GRANITE TOR AREA, E.L. 2/78



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Fig 2 - Plan of E.L. 2/78

145°40'

145°50'

EL 10/74

DQ 010 000

DQ 070 000

DATUM POST

DP 010 948

EL 2/70

EL 2/70

DP 010 896

NATIONAL PARK BOUNDARY

CP 977 896

Cradle Mtn Lake St Clair
National Park

41°40'

41°40'

CP 928 852

CP 902 852

DP 050 835

322.4 sq. kms

SPL 3

DP 050 775

CP 902 779

CP 875 779

CP 904 762

EL 4/73

CP 873 762

CP 904 702

CP 880 702

EL 1/62

CP 878 686

CP 895 686

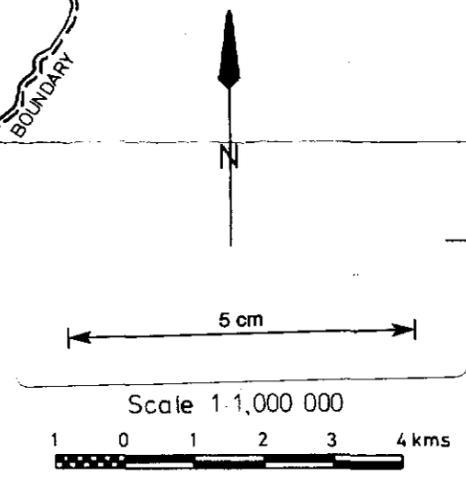
41°50'

41°50'

EL 9/66

CP 895 647

CP 974 647



NB. Grid references relate to Sophia 1:100,000 topographic plan.

145°40'

145°50'

KNOWN GEOLOGY AND MINERALISATION

As no mapping or prospecting has yet been undertaken, this discussion is restricted to what can be gleaned from published geological maps and the literature. An enlargement of the 1:250 000 scale geological maps is included as plan II.

The exploration licence area includes the Lower Carboniferous Granite Tor Intrusive and some of the surrounding Pre-Cambrian country rocks. The intrusive is dominantly a two-mica adamellite which is relatively unaltered apart from minor kaolinisation of feldspars. There is some evidence that small apophyses of the adamellite occur away from the contacts of the main body, for example at Bluff River.

The Pre-Cambrian rocks are part of the Tyennan Geanticline and are mapped as steeply dipping metamorphosed pelites and quartzites on the Burnie Sheet but remain undifferentiated on the Queenstown Sheet.

In the northern panhandle portion of the licence area there occur outcrops of volcanics and sediments of Cambrian Age, the Ordovician Owen Conglomerate and Gordon Limestone and various minor Siluro-Devonian sediments. These occupy what is known as the Sophia Synclinorium. Tertiary basalts and Pleistocene glacials are also present in this area. Glacials of both Pleistocene and Permian ages occur in the high country to the east of the Granite Tor Intrusive.

The majority of faults and fractures appear to trend north-north-west and one such fault transects and displaces the eastern portion of the intrusive.

Known mineralisation in the licence area is relatively minor and not well documented. Three small deposits are recorded in the literature :

- 1) Bluff River Tin Deposits - this was visited by A.J. Noldart and D.J. Jennings in January 1966, who provided the following information. Cassiterite occurs sporadically in a series of small quartz tourmaline veins and narrow greisen veins which strike northerly. They are contained within a weathered medium-grained muscovite granite which outcrops as a probable cupola-type body intrusive into Pre-Cambrian quartzites. Mining consisted of sluicing of eluvial enrichments and took place at intervals between 1910 and about 1945.
- 2) White Hawk Mine and vicinity - information on these deposits is taken from a description by the Government Geologist who visited the area in 1908. The rocks of the White Hawk district consist of a series of sediments, that is sandstone, limestone and pebbly grit, which have interbedded with them a broad microgranite dyke. This dyke contains porphyritic crystals of quartz, feldspar and biotite. Although there is considerable alteration to chlorite the rocks are noticeably free from signs of mechanical deformation.

The deposits occur as small lodes of galena and blende following joint planes in the limestone. However the size and structural features of the orebodies are rather vaguely recorded. Suffice it to say they were interesting enough to have given rise to several hundred feet of crosscuts, adits, etc.

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The ore carried a significant quantity of silver and one occurrence of chalcopyrite is noted.

- 3) Mount Remus - molybdenite associated with small amounts of cobalt and vanadium is recorded as occurring here in pyritic quartz bodies in Pre-Cambrian schist.

The only other mineralisation recorded within the boundaries of E.L.2/78 is a prospect shown at the northern contact of the main Granite Tor Intrusive on the Mackintosh 1-mile geological plan. This is probably a tin prospect although no reference to it can be found in the literature.

EXPLORATION TARGETS

Exploration Licence 2/78 is regarded principally as a tin and/or tungsten prospect and the exploration programme is oriented towards finding these commodities.

Three types of tin deposits are considered as targets in the area and the principal features of these which are relevant to exploration are discussed below :

- 1) Quartz vein and greisen-type occurrences might be expected within the intrusive and any associated cupola-like bodies. They might also occur in the country rocks within about one kilometre of the intrusive contact. Competent rocks such as quartzites are possibly the most favourable host rocks since they react to stress by forming open fissures and cavities. These are found to be ideal places for the accumulation of mineralising fluids and therefore faulting and fracturing are significant exploration features.
- 2) Replacement bodies can occur in any rock type capable of neutralising highly acid mineralising solutions and therefore carbonates are the most favourable hosts. The Gordon Limestone which outcrops in the north-west portion of the area is an excellent target for this type of occurrence.

Although genetically related to a granitic body the deposits may be removed some distance from this source. They are generally connected to it by mineralised fractures which control the location of the replacement bodies.

The most significant exploration feature is the common association of these bodies with the magnetic minerals pyrrhotite and/or magnetite. Other features include the fine-grained nature of the cassiterite and its typical association with large quantities of sulphide minerals.

- 3) Skarn-type mineralisation might occur where granitic bodies intrude suitable host lithologies, in particular carbonate rocks. The principal features here are the presence of the intrusive contact, the association with significant quantities of magnetite and the common occurrence of garnet and fluorite.

Secondary targets for exploration are volcanogenic massive sulphide deposits. These occur outside the area at Mount Farrell, Que River and Rosebery. The host formation is the Mount Reid Volcanics which outcrops in the north-west portion of the licence area. The presence in this area of the most favourable horizons of the volcanics remains to be proved.

EXPLORATION TECHNIQUES

The exploration programme in progress on E.L. 2/78 has been designed with the above targets in mind. As a first phase a combined airborne magnetic/radiometric survey has been completed. The magnetic survey was carried out firstly as an aid to geological mapping and secondly as a means of detecting any replacement and skarn-type mineralised areas. The radiometrics were to be used both as an adjunct to geological mapping and as a possible means of detecting areas of hydrothermal alteration.

The magnetic survey results have been examined in the light of the published geology and a discussion is presented in the next section. The radiometric results were found to have a negligible response to the geology and they suffered severely from variations in terrain clearance.

Presentation of the survey results has necessitated the preparation of a suitable base plan which is included with this report as Plan I.

The second phase of the exploration programme is composed entirely of field work and it has not yet been possible to proceed with this due to the inclement weather on the west coast during winter. Pending renewal of the licence the following programme is planned for the summer of 1978-79 :

- 1) A stream sediment sampling programme involving greater than 1000 samples at a density of about 3.5 samples per square kilometre, see Plan III. It is proposed to use a heavy mineral concentrate in an appropriate size fraction to provide maximum enhancement of geochemical dispersion haloes associated with tin-tungsten bodies. An appropriate light fraction will be used for base metal analyses. Orientation work to determine the exact parameters of the survey will be undertaken prior to the main sampling programme. Fluorine analyses of surface waters may also be used as a means of detecting mineralisation covered by heavy vegetation.
- 2) Rock chip sampling will be used to define geochemically the Granite Tor intrusive body and to compare it with other granitic intrusives.
- 3) Prospecting and collecting of geological data for the purpose of mapping will be undertaken concurrently with the sediment sampling programme. A high priority here will be the examination of fault and fracture systems. All the known mineral occurrences as well as the most prospective magnetic anomalies will also be examined in detail.

AIRBORNE MAGNETIC SURVEY

The airborne magnetic survey carried out on E.L. 2/78 was designed to have a reasonable probability of detecting a magnetic mineral-containing orebody of economic proportions and to provide the greatest amount of information for mapping purposes. These objectives were of course subject to expenditure constraints. The rugged topography necessitated the use of a helicopter and hence costs were abnormally high.

Approximately 1150 kilometres were surveyed along east-west lines in the bulk of the area and along northwest-southeast lines in the northern panhandle portion. The nominal flight line spacing was 400m closing down to 200m in areas considered more prospective. A towed bird sensor was used at a nominal ground clearance of 135m although in practice this distance varied within wide limits due to the steep terrain. Measurements were made at one-second intervals which approximates to 33m horizontal distance at the nominal aircraft speed. Five tie lines were flown at right angles to the survey lines.

The results of the survey are presented in contour form as Plan IV which is an overlay to Plan I. The Cambrian units and the Tertiary basalts are the most responsive magnetically with anomalies of up to 500 gammas. The Ordovician Owen Conglomerate is characterised by anomalies which are broader and of a lower order. This may simply reflect its damping effect on anomalies in the underlying Cambrian rocks. The Gordon Limestone and the various glacials have no recognisable responses. The main intrusive body is characterised by broad, flat magnetics with a number of small anomalies around its margins. The Pre-Cambrian rocks north of the intrusive have a magnetic expression which shows a well defined east-northeast structure. Those south of the intrusive have magnetics which suggest some structural complexity although an indistinct northeast trend is present.

Twenty-four magnetic anomalies have been selected for ground follow-up in the 1978-9 summer field season. These anomalies are marked on Plan III and their particulars are recorded below:

Designation	Latitude (mins)	Longitude (mins.)	Maximum Intensity (gammas)	Geology and Remarks
A	47.9	43.0	9	In Precambrian 1300m mapped intrusive contact
B	47.9	44.1	12	Precambrian, 900m from mapped intrusive contact
C	47.3	46.2	11	Precambrian, 700m from mapped contact
D	47.3	47.7	21	Precambrian
E	46.7	49.7	85	Precambrian, in Bluff River valley
F	46.0	49.2	60	Precambrian, 1600m west of tin deposits

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Designation	Latitude (mins)	Longitude (mins.)	Maximum Intensity (gammas)	Geology and Remarks
G	45.5	48.8	9	Precambrian, 100m from mapped intrusive contact
H	44.9	48.8	32	Precambrian metapelites dipping 80° NW, 500m from mapped intrusive contact
J	44.6	50.4	4	Possibly within intrusive very close to contact
K	43.7	49.7	9 & 12	Small double anomaly in Precambrian metaquartzite on fault structure close to intrusive contact
L	43.4	48.8	3	On faulted contact of intrusive
M	42.9	47.7	47	On Pleistocene glacials but intrusive contact with Precambrian metapelites probably underlies at shallow depth
N	42.6	46.5	35	Vertically foliated Precambrian metapelites probably close to intrusive contact which is obscured by glacials
P	42.8	45.6	28	Double anomaly on Pleistocene glacials which probably overlie intrusive contact
Q	42.7	44.4	24	On contact between intrusive and Precambrian metapelites
R	43.1	43.8	4	Four very small anomalies close to intrusive contact and possibly related to faulting
S	42.6	43.7	80	Extended anomaly overlying glacials and Precambrian metapelites and at right angles to intrusive contact
T	44.1	42.9	27	Precambrian metapelites, foliation 70°W, 700m from intrusive contact
U	44.8	42.4	15 & 16	Precambrian metapelites 900m from intrusive contact
V	41.5	43.3	55	Precambrian metapelites, close to contact with Mount Read Volcanics
W	41.4	42.2	35	Gordon Limestone close to White Hawk Mine

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Designation	Latitude (mins)	Longitude (mins.)	Maximum Intensity (gammas)	Geology and Remarks
X	40.9	42.1	10	Gordon Limestone
Y	37.0	46.4	15-20	Gordon Limestone, minor north plunging fold
Z	34.7	47.8	4 & 8	Small double anomaly in westerly dipping Gordon Limestone

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GRANITE TOR AREA

PLAN I

TOPOGRAPHIC BASE PLAN

Scale 1:40 000



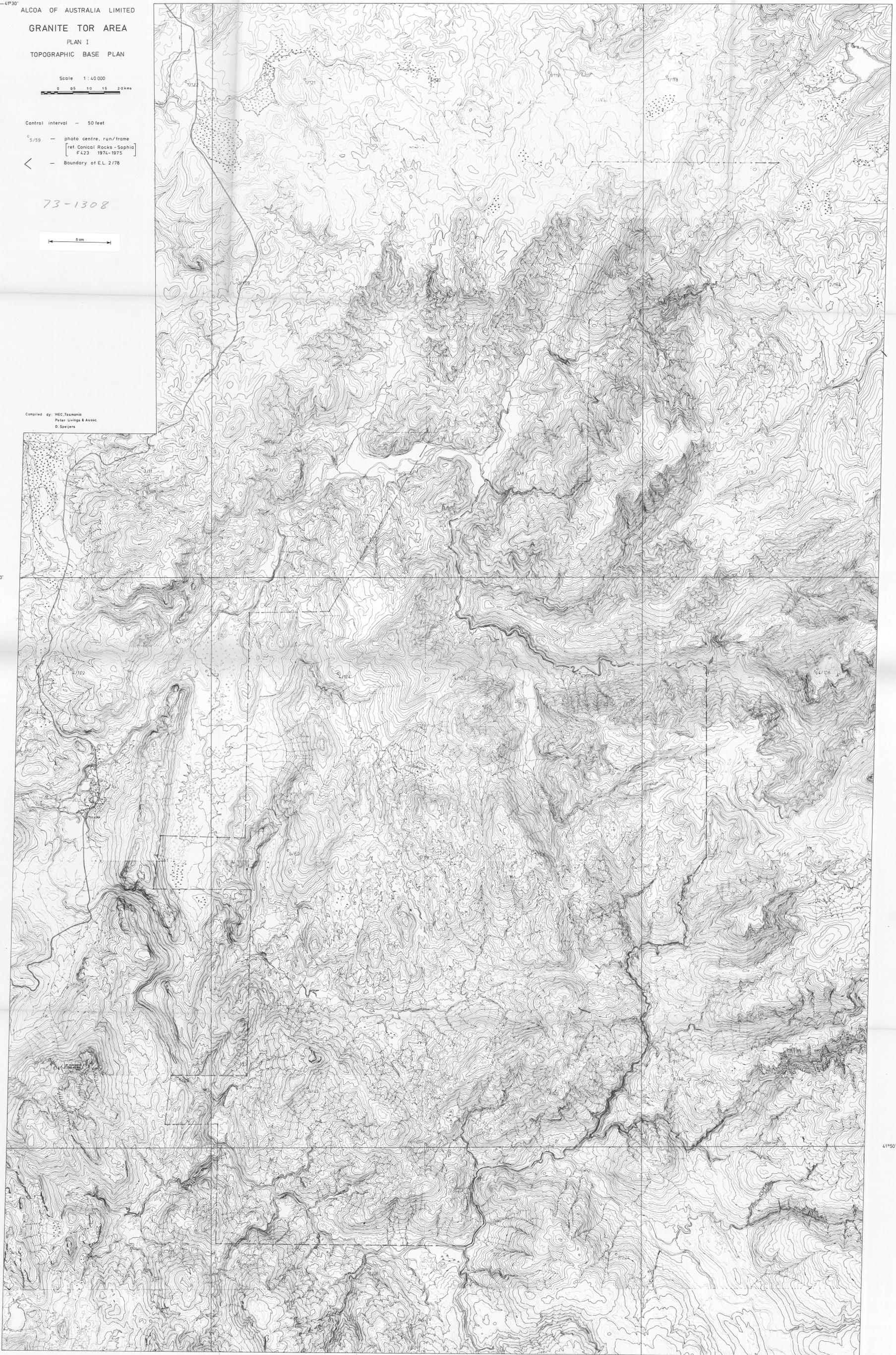
Control interval - 50 feet

- o 5/59 - photo centre, run/frame
- [ref Conical Rocks - Sophia
F423 1974-1975]
- < - Boundary of E.L. 2/78

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Compiled by: HEC, Tasmania
 Peter Livings & Assoc.
 D. Speijers



+ 346.3 +
 + 582.2 +
 + 345.2 +
 + 6.18 +

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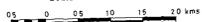
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GRANITE TOR AREA

PLAN II

PLAN SHOWING PUBLISHED GEOLOGY

Scale 1:40,000

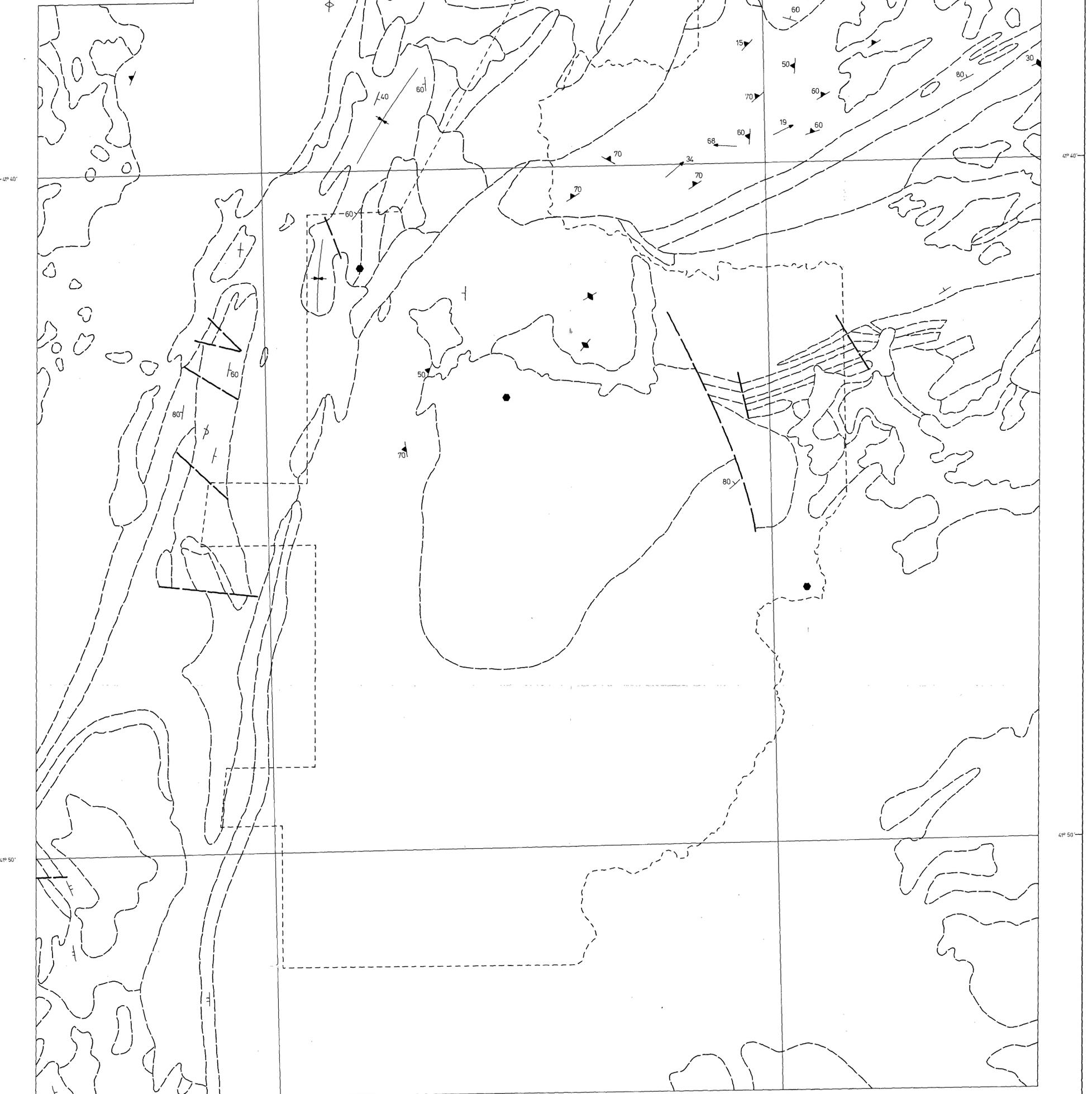


LEGEND

- Holocene alluvium, sand, gravel, talus
- Pleistocene glacials
- Tertiary basalts etc.
- Triassic, Permian & Upper Carboniferous assorted fresh water, marine & glacial sediments
- Lower Devonian quartzwacke sequence
- Gordon Limestone
- Owen Conglomerate with marine quartzwacke & siltstone
- Shallow water deposits (Upper Cambrian)
- Greywacke turbidite sequences (Middle to Upper Cambrian)
- Mainly sand & intermediate volcanics (Middle to Upper Cambrian)
- Greywacke turbidites
- Orthoquartzite sequence
- Pelitic sequences
- Metaquartzite sequences
- Undifferentiated
- Jurassic dolerite
- Upper Devonian granite & adamellite
- Cambrian granitic rocks

- Geological boundary
- Fault
- Syncline, anticline hinge line with plunge
- General strike & dip of beds, vertical, horizontal, overthrust
- General strike & dip of beds, facing unknown
- Strike & dip of igneous banding, vertical
- General strike & dip of cleavage
- General strike & dip of metamorphic foliation
- Minor fold hinge line with plunge
- Site of old mining activities

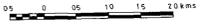
Compiled by: D. Speijers



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GRANITE TOR AREA
PLAN III
PROPOSED FIELD WORK
FOR 1978-9 SEASON

Scale 1:40 000



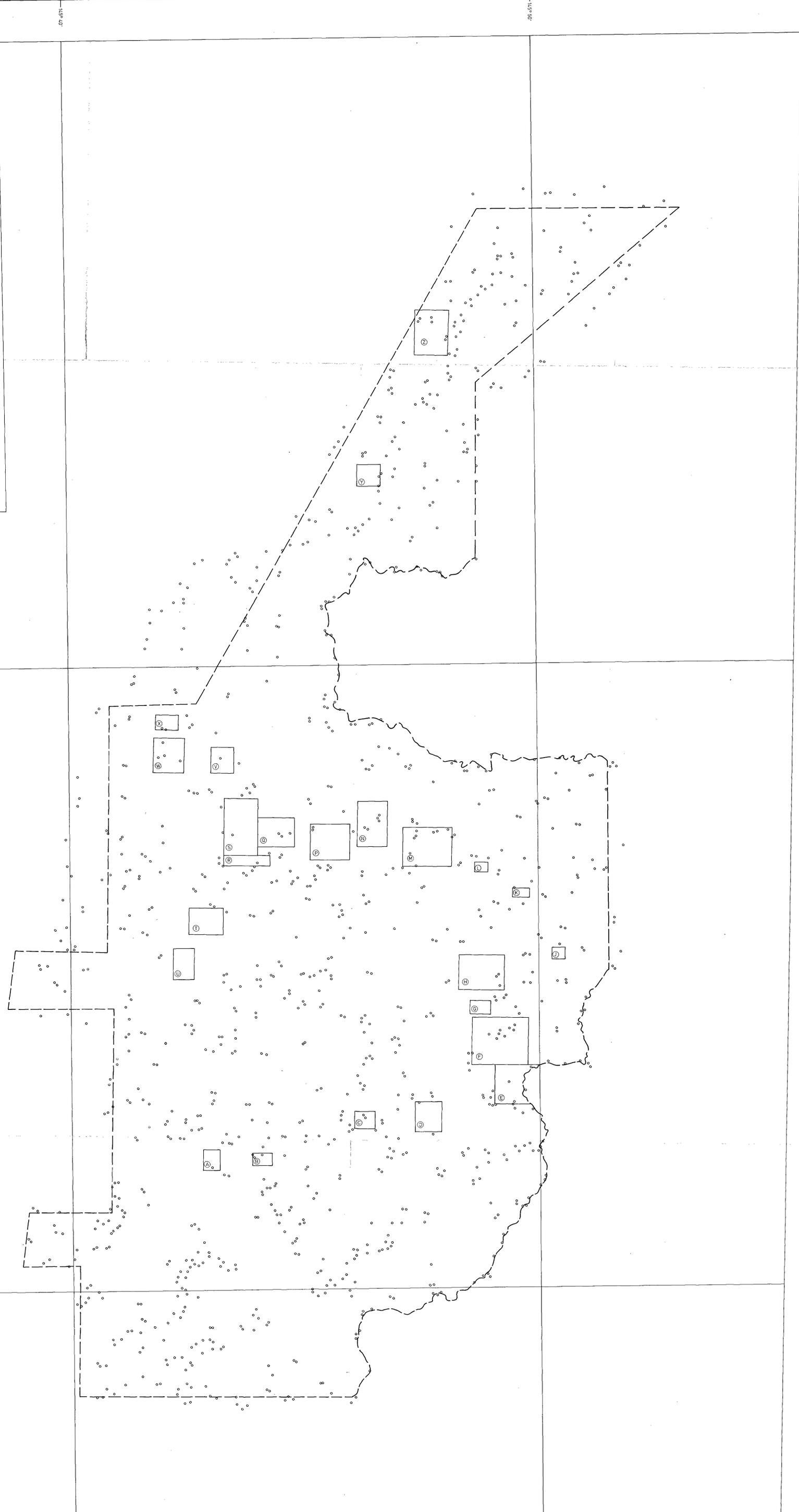
Note: This is an overlay to the topographic base plan.

o Proposed stream sediment sample points

⑤ Magnetic anomalies scheduled for ground examination



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GRANITE TOR AREA

PLAN IV

AIRBORNE MAGNETIC SURVEY
TOTAL INTENSITY CONTOUR PLAN



Note 1. This is an overlay to the topographic base plan.
 2. The data has been adjusted for diurnal variation with an adapted value of 62626 gammas at the diurnal base at H.E.C base camp helipad (4°44' 30" S & 149° 37' 20" E). The sensor height was 3 metres. The datum for the total magnetic intensity contours is the International Grid Reference Field 1978 3.

SURVEY SPECIFICATIONS

Aircraft Bell 206 B Helicopter
 Magnetometer Varian 4937A Proton Precession using towed bird configuration with 30 metre cable
 Radiometric System McPhar AV4 Radiation Spectrometer with 3.7 litres NaI crystal & Cs137 reference
 Diurnal Recorder Geometrics G826 Recording Base Station
 Altimeter Bonzer Mk 10
 Ancillary Equipment Geocex Interviometer, Geocex Film Digital Recorder, Century 44.8 channel analogue light beam recorder, Vinten 15mm ground tracking camera
 Reading Interval 1.0 seconds
 Nominal Aircraft Speed 65 knots
 Nominal Aircraft 150 metres
 Survey Altitude ie 135m sensor clearance
 Nominal Flight Line Spacings 400metres & 200 metres
 Time of Survey March 1978
 Contractor Geocex Pty Ltd
 Navigator J. McDougall
 Project Geologist D. Speijers



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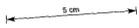
GRANITE TOR AREA

PLAN IV

AIRBORNE MAGNETIC SURVEY
FLIGHT LINE PLOT

Scale 1:40 000
0 5 10 15 20 kms

Recovered fiducial point



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