

575001

209

000

74-1035

MICROFILMED

AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY

OPEN FILE

REPORT
ON THE
RESULTS OF EXPLORATION
ON
EXPLORATION LICENCE NO. 17/68

OCTOBER 1971 to MAY 1974

By
R.T. Brandt
Burnie, Tasmania
July, 1974.

001

CONTENTS

	<u>Page</u>
1. <u>INTRODUCTION</u>	1
2. <u>GEOLOGY OF E.L. 17/68</u>	3
(a) Stratigraphy	3
(b) Structure and Geological History	5
(c) Intrusion and Metamorphism	6
(d) Petrography and Mineralization of the Skarn	6
(e) Petrography of the Granites	7
(f) Tungsten Mineralization Process	8
(g) Geology of the Kara Area	9
3. <u>GEOCHEMICAL EXPLORATION</u>	11
4. <u>EXPLORATION OUTSIDE THE KARA AREA</u>	12
(a) The Laurel Creek-Redwater Creek Area	12
(b) The Loongana-Leven River Area	12
(c) The Upper Blythe River Area	12
5. <u>EXPLORATION WITHIN THE KARA AREA</u>	13
(a) Anomalous Localities	13
(b) Location L.1 (Limestone Creek)	13
(c) Location L.2 (Sutton's Skarn)	14
(d) Locations L.3 and L.4 (Loudwater Junction)	14
(e) Location L.5	14
(f) Locations L.9 to L.12	14
(g) Location L.13	15
(h) Location T.3 (Hampshire Magnetite)	15
6. <u>EXPLORATION OF THE KARA PROSPECTS</u>	16
(a) Magnetometry	16
(b) Geochemical Sampling	16
(c) Trenching	17
(d) Power Auger Drilling	17
(e) Diamond Drilling	17
(f) Ore Categorization and Metallurgical Testwork	19
7. <u>TONNAGE AND GRADE</u>	20
(a) Kara No.1 West Limb	20
(b) Kara No.1 East Limb	22

002

575003

CONTENTS (Cont.)

	<u>Page</u>
(c) Kara North	22
(d) Kara Eastern Ridge, Sections 138 x 144	23
(e) Kara Eastern Ridge, Sections 114 x 117	23
(f) Total Resources	23
8. <u>FINAL REMARKS</u>	23

TABLES

1. Stratigraphic Succession in E.L. 17/68	4
---	---

PLATES

VOL I

	<u>Scale</u>
1. Geological Map of E.L. 17/68 .	1"= 4290'
2. Geological Map of the Kara Area .	1"= 7200'
3. Index Map of the Kara Area .	1"= 7200'
4. Geological Map, Kara North .	1"= 2400'
5. Geological Map, Kara No.1 .	1"= 2400'
6. Geological Map, Kara South	1"= 2400'
7. Location L.13 Geology	1"= 2400'
8. Location L.13 Trenching & Auger Holes	1"= 600'
9. Location L.13 Auger Holes, Trench A.1	1"= 300'
10. Location L.5 Magnetometry & Trenching	1"= 2400'
11. Location L.9 Trench Sampling	1"= 600'
12. Location L.2 Auger Drilling Pattern	1"= 300'

VOL II

13. Drillhole Section 137	1"= 300'
14. Drillhole Section 138	1"= 600'
15. Drillhole Section 117	1"= 300'
16. Drillhole Section 114	1"= 300'
17. Drillhole Section 143	1"= 600'
18. Drillhole Section 144	1"= 600'
19. Drillhole Section 146	1"= 1200'
20. Drillhole Section 147	1"= 600'
21. Drillhole Section 148	1"= 600'
22. Drillhole Section 149	1"= 300'
23. Drillhole Section 150	1"= 600'

003

PLATES (Cont.)

	<u>Scale</u>
24. Drillhole Section 151	1"= 600'
25. Drillhole Section 152	1"= 300'
26. Section through Auger Holes 86-96	1"= 300'
27. Section through Auger Holes 112-124	1"= 300'
28. Section through Auger Holes 97-103	1"= 300'
29. Section through Auger Holes 104-111	1"= 300'
30. Ore Reserve Drillhole Section 104	1"= 300'
31. Ore Reserve Drillhole Section 101	1"= 300'
32. Ore Reserve Drillhole Section 115	1"= 300'
33. Ore Reserve Drillhole Section 109	1"= 300'
34. Ore Reserve Drillhole Section 108	1"= 300'
35. Ore Reserve Drillhole Section 130	1"= 300'
36. Trench Assay Plan Kara No.1	1"= 600'
37. Magnetic Contour Map, Kara Prospects	1"= 2400'

INTRODUCTION

1. A Joint Venture Agreement between Australia and New Zealand Exploration Company and Tasminex N.L., in respect of Exploration Licences 17/68 and 44/71 (subsequently amalgamated with 17/68) was concluded in 1971. Under the terms of this Agreement, field exploration of these areas was undertaken by Australia and New Zealand Exploration Company and was commenced on 15th October, 1971. Periodical progress reports on this were submitted as follows :-
- (a) September, 1972: Summary of Field Work in Exploration Licence areas 17/68, 44/71 and 5/72 during the period October 1971 to June 1972.
 - (b) July 12th, 1973: Report on Exploration Licence 17/68 for the period to January 1973.
 - (c) November 6th, 1973: Summary report on Exploration Licence 17/68 for the period January to September 1973.

The report deals with all the work accomplished from the commencement of operations up to May, 1974, and includes, in summarized form, most of the information presented in the earlier reports.

The objective of the exploration program was to locate and prove a viable tungsten deposit or deposits within the Exploration Licence area. With this end in view, field work was conducted in two phases, running concurrently.

Phase 1: Regional geological and geochemical exploration with a view to the discovery of geologically favourable localities containing anomalous tungsten of potential economic significance.

Phase 2: Detailed investigation of known tungstiferous localities. Since previous work by Tasminex N.L. had already delineated significant tungsten mineralization at the localities known as the Kara Prospects, phase 2 was actually commenced before phase 1.

The following is a brief summary of the work performed in each of these two phases.

Phase 1 Investigations

Geological Mapping: Geological mapping of the greater part of E.L. 17/68 was completed, as shown in Plate 1. Areas not mapped by geologists of this Company have been left blank.

Geochemical Sampling: Systematic stream sediment and rock sampling was carried out in all areas considered geologically favourable for tungsten. A total of 806 geochemical samples, mostly of panned stream sediment, were collected and analysed for tungsten, and 157 of these were analysed in addition for other metals. As a result, a number of localities of anomalous tungsten, exclusive of the Kara Prospects, were discovered and subjected to closer examination. The locations and tungsten values of most of the samples are shown on maps submitted with our report of 6th November, 1973.

005

Magnetometry: An airborne magnetometer and scintillometer survey was flown over a strip of country approximately 5 kilometres wide, extending northwards from St. Valentines Peak to beyond the boundary of E.L. 17/68. Ground magnetometry was used extensively within this zone, with the particular aim of tracing hidden extensions of the magnetite-bearing skarn rocks of the Kara Prospects.

Phase 2 Investigations

The tungstiferous localities discovered in phase 1 were examined and sampled in greater detail and some were investigated by magnetometry, soil sampling, trenching and power auger drilling. At the Kara Prospects, extensive diamond drilling was also carried out. As a result of the initial surface work, the area of interest was narrowed down to approximately 65 square kilometres surrounding the Kara Prospects (Plates 2 and 3) and all sub-surface investigations took place within this area.

Trenching: Trenching as a means of obtaining sub-surface geological information and samples for analysis was used extensively at the Kara Prospects and elsewhere. Trench exposures of skarn and other mineralized rocks were usually channel-sampled in 5-foot lengths. Approximately 3270 trench samples were taken and analysed for tungsten, and a few for other metals as well.

Power Auger Drilling: A Gemco power auger drill was used in a number of places to sample skarn and other rocks at depth and in an attempt (not always successful) to penetrate a cover of Tertiary basalt and reach the rocks underneath. Where mineralization was suspected, the auger sludges were geochemically sampled at 3-foot intervals and the samples were sent for tungsten analysis. In all, 275 auger holes were drilled, with a total footage of 7984 feet.

Diamond Drilling: Diamond drilling at the Kara Prospects was carried out in four stages. The positions of the drillholes are shown in Plates 4, 5 and 6. Between October, 1971, and June, 1972, 29 diamond holes, numbered DH 101 to 129, and two rotary test holes, were drilled in the mineralized area of the Kara No.1 Prospect (Plate 5), the total footage drilled being 5319 feet. In September - November, 1972, 3 diamond holes, number DH 130 and 132 and totalling 779 feet, were put in at the Kara North Prospect. In February - June, 1973, 4 additional holes, numbered DH 133 to 136 and totalling 470 feet, were drilled at Kara No.1, not for exploratory purposes but to obtain large diameter core samples for metallurgical test work. Special drilling methods were used to ensure full core recovery. Exploratory drilling was resumed in January, 1974, and terminated in April. During this period, 16 diamond holes, numbered DH 137 to 152 and totalling 5938 feet, were completed.

Metallurgical Test Work: Metallurgical tests on the cores of drillholes 133 - 136 were carried out in the U.S.A. Tests on sample residues from other drillholes, and on bulk samples of weathered mineralized material from trenches, were carried out in the U.S.A. and in Sydney.

Field Personnel: Throughout the period from October, 1971, to May, 1974, the approximate average number of Company personnel working in E.L. 17/68 was two geologists and three field assistants. The number present at any one

006

time varied from a minimum of one geologists and one field assistant in mid-1972, to a maximum of four geologists, six field assistants and 7 contract drillers in early 1974.

2. GEOLOGY OF E.L. 17/68

(a) Stratigraphy

The general outlines of the geology of most of E.L. 17/68 were previously established by the work of G.P. Pike (1964) and others.

The oldest rocks present are a series of volcanics and clastics with a complex structure, believed to be mainly of Cambrian age. These are overlain unconformably by a thick sequence of folded Ordovician sediments, dominantly clastic, but including calcareous formations which have been correlated with the Upper Ordovician Gordon Limestone. The Ordovician rocks are intruded in the north of the area by granites of Devonian age, which have locally metamorphosed the calcareous members to skarn-type rocks. Post-Ordovician Palaeozoic rocks are scarce, but some Silurian sediments of the Eldon Group have been mapped. The Palaeozoic formations and intrusive granites are overlain unconformably by extensive Tertiary basalt flows, with underlying and interbedded gravels, sands, tuffaceous rocks, etc. Recent alluvium, scree and boulder accumulations occur in parts of the valleys of the major rivers.

Plate 1 shows the geology as mapped by geologists of this Company and tied in to the adjacent Geological Survey map Sheet No.37 on the east side. This interpretation differs in certain detailed aspects from that of G.P. Pike. During geological examination, particular attention was paid to the distribution of the Gordon Limestone, as this formation was believed to be the best rock for tungsten mineralization at the Kara Prospects. Field observations cast doubt on this supposition. Very little true limestone comparable to that of the Gunn's Plains area occurs within E.L. 17/68, and where calcareous horizons were found, these tended to be sporadic and limited in thickness. The conclusion was reached that the dominantly arenaceous lower Ordovician Moina Sandstone grades into the overlying Gordon Limestone through transitional beds consisting of sandstones with thin calcareous and cherty members. Formations of this type, stratigraphically above the Moina Sandstone, have been identified in a number of places, including the Kara area, and are believed to represent a Transition Series rather than the local equivalent of the Gordon Limestone proper. A stratigraphic succession, worked out on the basis of experience and found applicable to E.L. 17/68, is shown in Table 1.

Areas not mapped by geologists of this Company, or in which the formations could not be certainly identified, have been left blank in Plate 1. Time and pressure of other work did not permit a detailed study of these areas. The geology according to G.P. Pike was shown on a map enclosed with our report of 6th November, 1973.

TABLE 1

STRATIGRAPHIC SUCCESSION IN E.L. 17/68

Tertiary		Basalt flows
Devonian		Granite intrusives
Silurian	Eldon Group	Sandstones, quartzites
	Gordon Limestone	Essentially limestones, with minor calcareous sandstones
	Transition Series	Calcareous sandstones, sandstones, siltstones, minor limestones
Ordovician	Moina Sandstone	Essentially sandstones, with quartzites, siltstones, shales, slates and minor conglomerate bands
	Owen/Roland Conglomerate	Essentially conglomerates and quartz sandstones
	Unconformity	
Cambrian	Undifferentiated	Greywackes, slates, quartzites, cherts, acidic lavas, keratophyres, mudstones, siltstones

008

(b) Structure and Geological History

A brief account of the structures and geological history of the area was given in our report of 6th November, 1973, and the essentials are repeated here.

Rocks assigned to the Cambrian System are most extensively developed in the eastern and southern parts of the E.L. and are also present to the west of the Kara area. They form complex anticlinal inliers bordered by outward-dipping Ordovician sediments.

Cambrian deposition was terminated by intense folding, faulting and uplift, resulting in deposition of the coarse molasse-type terrestrial Owen-Roland conglomerates which form the base of the Ordovician System. These were succeeded by 3000-5000 feet of marine sediments, grading in composition from the dominantly arenaceous Moina Sandstone to the dominantly calcareous Gordon Limestone. Sedimentation continued at least into the Silurian and was brought to a close by the Devonian Tabberabberan orogeny and accompanying acidic intensive phase represented by the Blythe River (or Hampshire Hills) granite pluton and various smaller bodies.

The Devonian orogenic and plutonic phases were followed by a long period of deep erosion during which the granites and associated metamorphic rocks were exposed at the surface. The resulting land surface was irregular, with some deep valleys filled with clastic deposits of various types. Outpourings of basalt and related volcanic rocks occurred in the Tertiary and much of the irregular land surface was buried under basalt flows. Since the basaltic phase there have been epigenetic uplifts and broad warpings, and part of the original basalt cover has been removed by erosion.

The major pre-basalt structural features of the area can be ascribed essentially to the Tabberabberan orogeny. They consist of broad anticlinal uplifts and synclinal downwarps, transected in some places by major faults. Superimposed on the major structural pattern are innumerable minor structures, including close and complete minor folding, which is exhibited particularly by the thinly-bedded formations of the Ordovician Transition Series. Where Cambrian rocks are exposed, as in the Loongana Anticlinorium (Plate 1), they display a complex pattern of pre-Ordovician folding on which the Tabberabberan structures are superimposed.

The portion of the E.L. which has been studied in greatest detail is the Kara structural zone, shown in Plates 2 and 3. This zone is flanked on the eastern side by a synclinal structure roughly coaxial with Limestone Creek (Plate 2) and on the western side by an anticlinal structure (the St. Valentines Peak anticlinorium) in which rocks assigned to the Cambrian System form a broad anticline trending northwards from west of St. Valentines Peak. The Kara zone consists of a complex series of tight minor folds partly engulfed by granite. The sediments involved are sandstones with calcareous horizons, formerly regarded as part of the Gordon Limestone sequence but now thought to belong to the Transition Series. In the vicinity of the intrusive granites, the calcareous members are metamorphosed to skarns. Skarn rocks have been traced intermittently over a north-south strike length of about 6

009

kilometres. The lateral limits of the zone are uncertain. On the east side, a cover of Tertiary basalt conceals the older rocks. On the west side, the geology is very imperfectly known and the position of the unconformable junction between the Ordovician and Cambrian Systems is somewhat conjectural.

(c) Intrusion and Metamorphism

The Palaeozoic formations were intruded by the Devonian Blythe River (or Hampshire Hills) granite pluton and its smaller offshoots to the west (Plate 1). The granite is evidently post-orogenic and, where its intrusive contact is not concealed under Tertiary basalt, it has generally discordant cross-cutting relations with the adjacent sediments. The marginal parts of the granite are generally medium-grained and quartz-rich. Fine-grained chilled margins are not in evidence. Pegmatitic dykes are very rare, but some internal phases of the main pluton have a coarse pegmatitic texture. This feature suggests that aqueous magmatic differentiates were retained within the granite until a late stage in its cooling history, and may then have been released into the surrounding rocks in the form of hydrothermal solutions.

Contact metamorphism by the granite is highly variable in width and intensity. Sandstones are recrystallized and feldspathized in the near vicinity of the granite, but are otherwise unaffected. At one point in Limestone Creek, there is a local development of wollastonite in calcareous rocks, associated with a small stock of intrusive granite (Location L.1, Plate 3). Skarn rocks are best developed in the Kara structural zone. These are mostly garnet-diopside-amphibole rocks with considerable magnetite, believed to have been formed by metasomatism of calcareous layers in the Ordovician Transition Series. In most places, the skarn horizons are relatively thin and are interbedded or interfolded with other sediments, generally sandstones. Granite is not always seen in contact with the skarn, but is present in the near vicinity. Where broad and extensive areas of skarn rocks occur, as at the Kara No.1 Prospect, the appropriate sedimentary horizons have evidently been tectonically thickened by isoclinal folding. Outside the Kara structural zone, only a few isolated occurrences of skarn have been located at and near the margin of the Blythe River granite pluton, where calcareous rocks of the Transition Series are present at the contact.

(d) Petrography and Mineralization of the Skarn

To assist in an understanding of the occurrence and distribution of tungsten in the skarn, a number of specimens from the Kara drill cores were sent for petrographic examination. This showed that the skarn was formed by intense calcium-iron metasomatism of original host rocks of unknown composition, hardly any of the original minerals remaining. The chief mineral constituents of the skarn are diopside garnet and magnetite, or their supergene alteration products, which are mainly clay minerals and limonite. Subordinate constituents include epidote, vesuvianite, biotite, tremolite, ferrohastingsite, chlorite, quartz, orthoclase, sphene, apatite, fluorite, scheelite and occasional chalcopyrite. The skarn minerals appear to have been formed in a fairly definite paragenetic sequence in which magnetite was a late stage development and most of the scheelite was introduced later than the

magnetite. There is evidence of a final stage of minor fracturing and veining in which small amounts of ferrohastingsite, fluorite, apatite, carbonate, scheelite and sulphides were formed as the latest products of metasomatism. It is inferred that, although scheelite may occur throughout the paragenetic sequence, it was formed dominantly during the late or final stages of the process.

(e) Petrography of the Granites

A megascopic study of the granites of the Kara region was undertaken with a view to the discovery of a possible correlation between skarn-type tungsten mineralization and the petrographic character of the adjacent granite. Hand specimens of granite from outcrops and diamond drill cores were polished and studied under a hand lens. The conclusions reached from this study were as follows.

The granites of the Kara region are mostly medium to coarse grained, quartz-rich and leucocratic with a very small percentage of mafic minerals, generally biotite. Potash feldspar is dominant over plagioclase, which puts them in the class of true granites.

The most widespread type is a medium to coarse-grained uniformly crystalline rock with an interlocking "granite" texture and an estimated average composition as follows :

35% Quartz
40% Potash feldspar (pink)
24% Plagioclase feldspar (white)
1% Mafic minerals (biotite)

Locally, the percentage of mafic minerals may be higher and, conversely, some varieties consist dominantly of quartz and pink potash feldspar, with little plagioclase and no mafics.

A few sub-types with distinctive characteristics occur in association with the main type :

Pegmatitic granite - has a non-uniform texture, being mostly medium to fine grained and granophyric, with patches of much coarser pegmatitic quartz-feldspar intergrowth.

Microgranite - very fine-grained, uniformly crystalline and even-textured.

Quartz prophyry - fine-grained with patches of granophyric texture and phenocrysts of quartz and feldspar.

Pegmatite - a rare type consisting of very coarse interlocking quartz and potash feldspar crystals and no mafic minerals.

The granite which is most commonly found in close association with tungsten-bearing skarn rocks is a distinctly porphyritic type, containing large phenocrysts of quartz, potash feldspar and plagioclase in a fine grained ground mass. The mineralogical composition is similar to that of the principal type described above, but the phenocrysts tend to have rounded outlines and the most distinctive feature is the presence of reaction rims or coronas of white

011

plagioclase feldspar surrounding cores of pink potash feldspar. Mafic minerals do not generally amount to more than 1% of the rock and include some hornblende as well as biotite.

This rock has been called the Kara Megagranite and its distinctive characteristics are thought to be directly connected with the skarn formation and mineralization processes. It has been suggested that it represents a separate volatile rich intrusive phase and the plagioclase coronas around potash feldspar are due to absorption of calcium during reaction with adjacent calcareous rocks. There is also some evidence from drill cores that the Megagranite may be a deuteric or hydrothermal alteration product of the normal granite; due to the activity of solutions which may also have been responsible for tungsten mineralization. In any event, the field distribution of the Megagranite indicates strongly that its presence is a controlling factor in the mineralization process. Analyses of the granites for tungsten did not provide any confirmatory evidence, as all the specimens analysed, irrespective of type, yielded only low background tungsten values.

A study was also made, from diamond drill cores, of the metamorphic rocks in immediate contact with the granite. In many drillhole intersections of the contact between skarn and granite, there is an intervening layer of quartz-epidote rock, which also occurs as inclusions within the granite. This had previously been logged as meta-quartzite or metamorphosed sandstone. Closer examination, however, provided evidence that this rock is not of sedimentary origin, but is a quartz-rich epidote-bearing contact facies derived from the skarn or the marginal granite itself. This conclusion was of importance in a re-interpretation of the structure of the Kara Prospects, as discussed below.

(f) Tungsten Mineralization Process

The mineral paragenesis of the skarn, described briefly above, indicates a late-stage origin for the scheelite, much of which is associated with micro-fracturing and veining. This tends to be confirmed by field observations that scheelite mineralization is strongest in skarns which are closely folded and fractured, the fractures exercising a large measure of control over the scheelite distribution.

Intensive stream sediment sampling of large areas of the Blythe River granite pluton (mostly in E.L. 1/69, north of the area described in this report) has revealed a number of tungsten anomalies. These have been found to originate, not from skarn rocks or from the granite itself, but from small hydrothermal veins and disseminations containing abundant titano-hematite, with tungsten present in an unidentified form. The pattern of the veins suggests a system of conjugate shear zones in the granite, which acted as channelways by which iron and tungsten-bearing hydrothermal solutions arose through the already solidified hood of the batholith. It can be inferred that where these solutions encountered hospitable carbonate-bearing host rocks on the granite margin or in roof pendants, the iron was precipitated as magnetite and the tungsten as scheelite.

Thus the scheelite, much of the magnetite, and possibly other skarn materials as well, are not products of true contact metasomatism by the intruding granite magma, but were formed at a later stage by hydrothermal solutions, possibly after consolidation of most of the granite. These solutions

012

required channels of access into the host rocks. Consequently, the state of fracturing of the host rocks and granite may be a controlling factor in mineralization as important as the presence of replaceable carbonate horizons. The sporadic nature of scheelite distribution in the skarn, and its frequent association with fractures, tends to confirm this.

(g) Geology of the Kara Area

The locality known as the Kara No.1 Prospect originally attracted attention as a possible source of iron ore in the form of magnetite. A similar occurrence of magnetite, approximately 5 kilometres to the east, came to be known as the Kara No.2 Prospect (Plate 1). The presence of scheelite at the Kara No.1 Prospect was first recorded in 1950 and was confirmed by Tasminex N.L. during investigations in 1970 and 1971. No significant tungsten values were found at Kara No.2. During these investigations, skarn rocks similar to those of Kara No.1 were discovered at points approximately 1½ kilometres to the north and to the south, and these localities were named the Kara North and Kara South Prospects respectively. Significant tungsten values were found at Kara North but have not been discovered at Kara South.

The geology of the area containing these three prospects is shown in Plates 4, 5 and 6. The sedimentary rock types present, apart from sediments associated with Tertiary basalt flows, are skarn and sandstones believed to belong to the Ordovician Transition Series. These rocks are closely folded about north-south axes and intruded transgressively by Devonian granites, which possibly underlie the whole area at various depths. Within the area covered by Plates 4, 5 and 6, the calcareous sediments have evidently been converted entirely to skarn-type rocks, while the interbedded sandstones are little metamorphosed. What are considered to be unmetamorphosed equivalents of the skarns are found to the east, towards Limestone Creek (Plate 2) and also to the north-west, near Loudwater Creek, though in this western area there is some doubt as to the correlation of the stratigraphic units and the position of the unconformity between the Ordovician and Cambrian Systems.

Close diamond drilling at the Kara No.1 Prospect (Plate 5) revealed what was first thought to be a simple asymmetrical northward-plunging syncline, with its apex near the Kara No.1 trig beacon and its axis plunging northwards at approximately 16°. On the east side, separated by an intervening rib of granite, a parallel synclinal structure, partly covered by Tertiary basalt, was thought to exist.

Subsequent studies of the layered structures in the skarn, and the nature of the "sandstone" intersected by drillholes before passing into the granite, have tended to invalidate this simple interpretation. The steep layering in the skarn, formerly regarded as a cleavage or shearing phenomenon, is now thought to be a reflection of steep, isoclinally folded bedding. The "sandstone" underlying the skarn has been shown to be a metamorphic quartz-epidote contact rock, not to be correlated with the sedimentary sandstones occurring on the limbs of the structure.

Under this interpretation, the skarns and associated sandstones represent a large roof pendant of closely folded sediments enclosed on either side by granite and intruded by granite from below. The observed northerly plunge

of the folded mass, which penetrates increasingly deeply into the granite in a northerly direction, could possibly represent the original plunge of a major fold structure, which existed prior to the intrusion of the granite.

Northwards from Kara No.1, the detailed geology is obscure, due to scarcity of outcrops and an extensive cover of Tertiary basalt. Two divergent belts of magnetite-bearing skarn rocks have been traced intermittently northwards, both in outcrop and by magnetometer, the western belt as far as Location L.13, and the eastern belt as far as the Hampshire area at Location T.3 (Plates 2 and 3). The existence of these two divergent skarn belts might suggest the limbs of a major pre-granite synclinal fold plunging northwards, with its apex somewhere south of Kara No.1, but there is no means of confirming this.

The western skarn belt contains the Kara North Prospect, where the skarn is relatively narrow, has a steep to vertical attitude and carries significant tungsten. Diamond drill hole No.146 penetrated a considerable depth of skarn, barren of tungsten, under basalt immediately to the east. At Location L.13, the skarn horizons are narrow and inter-bedded with thick sandstones and other clastic sediments. Tungsten values are poor. The eastern skarn belt is largely hidden under a cover of basalt, but its continuity has been established magnetically. Where exposures of skarn occur, they are mostly narrow and apparently discontinuous intercalations in sandstone which is the prevailing rock type. Tungsten values in the skarn are very low, except at the southern end of the belt immediately to the east of Kara No.1, where drill holes have penetrated considerable thicknesses of skarn with some very sporadic but significant values in tungsten.

Southwards from Kara No.1, sandstones are prevalent, with only local patches of skarn, except at the Kara South Prospect, where a relatively large area of skarn is exposed but contains little or no tungsten. Investigations were not carried further southwards because of the absence of any indications, from stream sediment sampling, of anomalous tungsten in this area.

The conclusion drawn from all investigations in the Kara area is that skarn rocks of a type favourable for tungsten mineralization are relatively abundant and widespread, but mineralization is very localised and sporadic, being dependent on a combination of favourable factors which evidently exist at Kara No.1, but hardly anywhere else in the area. The principal factors appear to be :

- (i) Skarn rocks of hospitable composition. Such rocks appear to be widespread in the area.
- (ii) A magmatic source for tungsten, possibly indicated by the presence of the granite type known as the Kara Megagranite, which is most abundant in and around the mineralized parts of Kara No.1.
- (iii) Favourable structural conditions providing a means of ingress for mineralizing fluids into hospitable host rocks.

All three conditions would be best fulfilled at Kara No.1, where the host rocks are closely folded, tectonically thickened, well fractured and

situated at a high structural level towards which mineralizing fluids would tend to migrate. These favourable conditions have evidently existed, on a much smaller scale, at the Kara North Prospect and on the Kara Eastern Ridge (east of Kara No.1), but elsewhere the absence of one or more of the above controlling factors has inhibited mineralization of the skarn.

3. GEOCHEMICAL EXPLORATION

In early 1972, a large part of E.L. 17/68 was covered by stream sediment sampling of a reconnaissance nature, at widely separated points, with largely negative results. Some more closely spaced sampling was then carried out in the Kara area and picked up several anomalies previously missed, demonstrating that the dispersal train of tungsten in stream sediments can be relatively short and a close pattern of sampling is necessary to delineate anomalous zones of limited extent.

During 1973, a widespread program of stream sediment and rock sampling was undertaken, the guiding principle being to sample every creek and tributary at intervals of not more than $\frac{1}{4}$ mile until it became apparent, from lack of values, that further sampling was not justified. All stream sediment samples were panned and the concentrates were examined for scheelite before being sent for analysis. As a rough guide, based on a statistical study of the 1972 work, values less than 85 ppm W were not regarded as anomalous. Values higher than 85 ppm W were regarded as possibly significant, provided they were consistent and reproducible.

Altogether 806 geochemical samples, mostly of panned stream sediment, were collected during this and the earlier program and were analysed for tungsten. Of these, 157 samples from stream draining the Cambrian sedimentary-volcanic terrains were analysed in addition for tin, copper, lead, zinc and gold. Maps showing the sites and tungsten values of most of the samples, and a list of the analytical results for other metals, were submitted with our summary report of 6th November, 1973, and are not included in this report.

The geochemical sampling work was carried out simultaneously with geological studies of the areas sampled, with the particular aim of correlating the geochemical anomalies with lithologies and structures considered favourable for skarn-type mineralization. One result of these studies was the realization that high tungsten anomalies in themselves are meaningless without knowledge of the geological environment, since small and insignificant tungsten sources, such as small veins in granite, can yield geochemical samples as high in tungsten as those yielded by mineralized skarns of possible economic importance.

The geological information gathered in the course of this work was compiled into the map shown in Plate 1. Certain areas and localities were selected for special attention on grounds of favourable geology and/or interesting geochemical anomalies and these are described in the succeeding sections below.

4. EXPLORATION OUTSIDE THE KARA AREA

(a) The Laurel Creek-Redwater Creek Area

Stream sediment sampling of the portion of the Blythe River granite pluton traversed by Laurel Creek yielded a number of tungsten anomalies which were found to originate from small hematite-bearing veins in the granite, as described above in section 2 (f). No occurrences with any economic potential were found. Exploration was extended southwards to the granite margin in the hope of discovering contact sediments or roof pendants of a composition suitable for skarn development. At the point marked "Adit Prospect" (Plate 1), a body of chlorite-quartz-actinolite skarn, about 60 metres long and 25 metres wide, into which an old adit has been driven, is enclosed within the granite. Lamping failed to reveal any scheelite in this rock and samples sent for analysis gave very low tungsten values. No other occurrences of skarn within the granite were found.

The contact rocks along the south-eastern margin of the Blythe River pluton are folded Ordovician sediments, chiefly Moina Sandstone, with two broad synclinal structures, near Redwater Creek and Mount Everett, involving the Transition Series. An occurrence of magnetite, devoid of tungsten, occurs at Redwater Creek in Moina Sandstone bordering the granite. Some evidence of skarn development in calcareous horizons of the Transition Series were found, but stream sediment sampling of drainages along the granite contact failed to show any tungsten anomalism. Work was discontinued when it was apparent that conditions favourable for skarn-type tungsten deposits did not exist.

(b) The Loongana-Leven River Area

This large area in the south-east of E.L. 17/68 includes the Cambrian inliers of Loongana and south of the Leven River, and a limited area of Gordon Limestone in the Leven River valley. Beds of the Transition Series, though they probably exist, could not be specifically identified and mapped because of poor rock exposures

Widespread stream sediment sampling was carried out with a view to assessing the mineral potential of both the Ordovician and the Cambrian areas. Samples from streams draining the Cambrian terrain were analysed for tin, copper, lead, zinc and gold, as well as for tungsten. No anomalous tungsten values were recorded, but two samples from the Cambrian terrain yielded zinc values of 1100 ppm Zn and 2000 ppm Zn respectively. This has since been followed up by further sampling and analysis of the unpanned stream sediment. The unpanned samples, screened to -12 and -100 mesh size, gave zinc values up to a maximum of 160 ppm Zn, with an average of 64 ppm Zn. Such values were not regarded as anomalous and work was discontinued.

(c) The Upper Blythe River Area

This area comprises the south-western intrusive margin of the Blythe River granite pluton from Mount Everett to Location L.2, known as "Suttons Skarn", (Plates 1 and 2). The rocks in contact with the granite are not everywhere identifiable, but the Moina Sandstone is probably the most widespread

formation and may be continuous along the granite margin from Location L.2 southwards. Skarn rocks are developed at Location L.2, where beds of the Transition Series come into contact with the granite. Further south, the magnetite-bearing skarns of the Kara No.2 Prospect are enclosed within the granite and are assumed to represent metamorphosed roof pendants of Transition Series rocks. No similar rocks have been found on the adjacent granite margin.

Intensive stream sediment sampling of the granite marginal zone and adjacent sedimentary area disclosed several tungsten anomalies, around Location L.2 and around the Kara No.2 skarns. The latter anomalies, when followed to their sources, were found to originate from small tungsten sources within the granite or from weak mineralization on the margins of the magnetite bodies. Sampling of the Kara No.2 skarns themselves yielded no significant tungsten, thus confirming the findings of previous investigators that these skarns are barren of tungsten. The absence of mineralization in the skarns, in spite of its presence in the granite, is somewhat surprising, but emphasises the conclusion that a combination of favourable circumstances, which did not exist here, is necessary for the generation of skarn-type tungsten deposits.

The sampling indications at Location L.2 were later followed up by power-auger drilling and these investigations are described in the next section of this report.

5. EXPLORATION WITHIN THE KARA AREA

(a) Anomalous Localities

Geochemical exploration of E.L. 47/68 and the adjacent McClarm Syndicate Permit to Enter and Search revealed a number of anomalous localities within the Kara area (Plates 2 and 3), many of which were subsequently investigated by more intensive methods, including magnetometry, trenching and power auger drilling. A map showing these localities, together with the results of the geochemical sampling was enclosed with our report of 6th November, 1973. Plate 3 shows the same localities under their original identification numbers, and the work done in each is described below. Diamond drilling and other exploration at the Kara Prospects (Plates 4, 5 and 6) is dealt with separately in the succeeding section of this report.

(b) Location L.1 (Limestone Creek)

This location was considered of interest on account of the presence of a small stock of granite intrusive into calc-silicate rocks of the Ordovician Transition Series. Wollastonite is developed in these rocks and has been described in a Government Geological Report by M.J. Longman (Tasmania Department of Mines Technical Report No.6, 1961, page 11). Geochemical samples yielded only very low tungsten values up to 30 ppm W. In view of this, and the absence of any skarn formation associated with the granite, it was considered of no potential value and no further work was done.

(c) Location L.2 (Suttons Skarn)

In this locality, a body of magnetite-bearing skarn some 500 metres long is developed in rocks of the Transition Series at the contact of the Blythe River granite. Stream sediment samples from creeks draining the skarn showed values in excess of 1000 ppm W, and surface samples of the skarn yielded up to 700 ppm W. At a later date, 54 power auger holes, totalling 1032 feet, were drilled, with disappointing results. A few values up to 670 ppm W were recorded in the surface layers, but at depth the skarn was shown to be barren of tungsten. A plan of the auger drilling pattern is shown in Plate 12.

(d) Locations L.3 and L.4 (Loudwater Junction)

A thin bed of skarn, interbedded with sandstone, is exposed in Location L.4, but is traceable for a short distance only. Samples of the skarn showed only negligible tungsten values up to 60 ppm W. Stream sediment sample values up to 2100 ppm W were recorded in Location L.3, but may be derived from sources in granite rather than skarn. A ground magnetometer survey of Location L.4, to trace any skarn zones along strike, was planned but was not proceeded with, owing to lack of time.

(e) Location L.5

Anomalous stream sediment samples with values up to 2170 ppm W first drew attention to this locality, suggesting the possible existence of skarns within sandstone or beneath a basalt cover. Basalt and underlying sandstone were the only rocks identifiable in the vicinity, but ground magnetic anomalies indicated the probably extension of the skarns of the Kara Eastern Ridge into the area. Bulldozer trenching in the bed of the creek was successful in exposing one bed of skarn, 30 feet thick, within sandstone but samples of this showed values up to 8 ppm W only. Magnetometer readings pointed to another skarn horizon being present further west, under basalt. An attempt was made to reach this by power auger drilling but was unsuccessful. A plan of the geology and magnetometric results is shown in Plate 10.

(f) Locations L.9 to L.12

These anomalous localities occur in an area which was thoroughly stream sediment sampled but, due to lack of time, little knowledge was gained of the detailed geology. The high anomaly of 2.83% W at Location L.9 was observed to occur at the contact of granite with well-bedded cherty sediments, but the geological environments at the other locations could not be determined. Two trenches were cut at Location L.9 and revealed granite in contact with sediments similar to those of the Ordovician Transition Series at Limestone Creek and containing one thin skarn horizon. The values of the trench samples were unexpectedly poor, ranging up to 1310 ppm W only. A plan of the trenches and sampling is shown in Plate 11. Some scheelite was observable in thin veinlets in the granite near its margin, and these are assumed to be the sources of the geochemical anomalies. A trench was also cut and sampled at Location L.10, in sedimentary rocks, and similarly low tungsten values were obtained. In spite of the disappointing results of trench sampling and the possibility that the geochemical anomalies derive from

018

small sources in the granite, much further study of the geology of this relatively unknown area is called for before its potential can be properly assessed.

(g) Location L.13

In the course of stream sediment sampling at this location, magnetite skarn outcrops with tungsten values up to 1750 ppm W were discovered and were interpreted as a probable northerly extension of the skarn at the Kara North Prospect. Magnetometer traverses across the intervening terrain confirmed the connection between these two occurrences. Extensive track cutting and trenching then revealed two skarn horizons interbedded with sandstones and other clastic sediments and intruded by granite on the eastern side. The structures are somewhat complex and involve deviations from the regional strike, possible repetition of the beds by folding and up-warping around the granite.

The geology of the area from Kara North to L.13 is shown in Plate 7. Plate 8 shows in detail the trench sampling and power auger drilling carried out, and the sampling results of auger drilling in the northern-most trench are shown in Plate 9. Thirty auger holes were drilled with a total footage of 1118 feet. Values up to 2700 ppm W were obtained near the surface, but such values invariably decreased to less than 1000 ppm W at depth. Some rather weak magnetic anomalies indicated a northerly extension of the skarn under basalt, but an attempt to penetrate the basalt by auger drilling was unsuccessful. A diamond drill hole passing underneath trench A.1 was contemplated, but in view of the poor results of the auger drilling and the unlikelihood of encountering ore grade tungsten values at depth, the project was abandoned.

(h) Location T.3 (Hampshire Magnetite)

This locality, referred to in previous reports as the "Hampshire Magnetite Prospect", was one of the earliest to be investigated, being apparently situated on the northerly strike extension of the Kara Prospects. A narrow belt of magnetite skarn enclosed by westerly-dipping sandstones, with granite on the eastern side, is traceable for approximately 500 metres and disappears under basalt in a southward direction. In 1972, the locality was closely investigated by magnetometry and soil sampling, with very poor results. Most of the samples were non-anomalous and only one isolated sample yielded 1000 ppm W. In 1973-74, 28 power auger holes, with a total footage of 994 feet, were drilled, some of them in an attempt to penetrate the basalt cover. The auger holes showed values in the skarn up to a few hundred ppm W only, with no indications of any richer or thicker patches. In view of these results, and the lack of any indication of a large underground extension to the deposit, a proposal for diamond drilling was abandoned. A final report on this prospect by D.R. Kruger was presented on 12th April, 1974.

6. EXPLORATION OF THE KARA PROSPECTS

For the purpose of this report, the locality defined as the "Kara Prospects" is that covered by the three adjacent map sheets shown as Plates 4, 5 and 6. This includes the original Locations T.1, T.2 and L.6, shown on the map enclosed with our report of 6th November, 1973.

Exploration of the Kara Prospects began in 1971 with diamond drilling and trenching at Kara No.1 and Kara North. The first geological maps were prepared largely from trenching and drilling data. Geochemical work, magnetometry and more widespread geological mapping followed later. It is proposed to deal with these latter activities first.

(a) Magnetometry

Ground magnetometer surveys of limited extent were first carried out by Tasminex N.L. at Kara No.1 and Kara North, and used as a guide for the siting of percussion drill holes. The magnetic anomalies at Kara No.1 were very strong and complex and the overall magnetic pattern gave an accurate picture of the distribution and geological limits of the magnetite-skarn rocks.

In the course of subsequent exploration by ANZECO, the greater part of the area from Kara No.1 to Kara North (Plates 4 and 5) was covered by magnetometer traverses, which were extended northwards to Locations L.5 and L.13. A magnetic contour map covering part of Plates 4 and 5 is shown in Plate 39. This demonstrates clearly the continuity, subsequently confirmed, of the two divergent skarn belts referred to in Section 2 (g) above.

The Magnetic pattern at Kara No.1 itself is not shown on this map because of its too great complexity, the magnetite bodies being very shallow at this point.

Magnetic mapping was found to be of great assistance, particularly in basalt-covered areas, in tracing geological contacts and as a guide in the siting of drill holes. In several instances, skarn rocks hidden under soil or basalt were first located magnetically, then revealed by trenching or drilling.

(b) Geochemical Sampling

Intensive stream sediment sampling of tributary streams entering the Companion River was undertaken in an effort to discover tungsten sources other than the skarns already delineated by trenching and drilling. The geochemical results are shown on maps submitted with our report of 6th November, 1973.

This work, combined with geological examination of rocks exposed in the creeks, led to the discovery of hitherto unknown skarn outcrops in East Kara Creek (Plate 5). This discovery provided confirmation of the northward continuity of the Kara eastern skarn belt and subsequently became the site of diamond drill holes 138 and 139.

020

Particularly encouraging stream sediment anomalies were obtained from Horizontal Creek, which enters East Kara Creek from the south (the old Location T.1). In the expectation of finding mineralized skarns further upstream, the creek was closely examined, but no skarns were found. The course of the stream is along the contact between granite and sandstone and it is assumed that the high anomalies were derived from small local sources in the granite. This again emphasises the misleading nature of geochemical sampling alone, without knowledge of the local geology.

(c) Trenching

Trenching by bulldozer or backhoe was used extensively during the early stages of exploration at Kara No.1 and Kara North. The trenches were normally channel-sampled in 5-foot lengths and were geologically examined and logged. Trenching and diamond drilling went hand-in-hand and the trench information was correlated geologically with that obtained from the drillholes.

During later stages of more widespread exploration, trenching was used more selectively. Known or suspected occurrences of skarn were trenched wherever possible, and some trenches were put in after diamond drilling, in order to check the surface expressions of the drillhole intersections. Of the total of approximately 3270 trench samples taken in the Kara area, more than 3000 were from the Kara Prospects. The positions of the trenches are shown in Plates 4 to 6.

(d) Power Auger Drilling

Power auger drilling at the Kara Prospects accounted for 134 holes out of the total of 275 drilled in the Kara area. The positions of the holes are shown in Plates 4 to 6. Most of them were drilled within, or close to, known areas of mineralization in order to check the lateral extent and grade of the mineralized material. Some holes were drilled to obtain geological information in places devoid of outcrops, and others in an attempt, sometimes successful, to penetrate basalt and identify the rocks below. Sections through some of the auger holes are shown in Plates 15, 16, 26 to 29 and 35.

(e) Diamond Drilling

The initial drilling program, which commenced in October 1971, was based on the work done previously by Tasminex N.L. and called for the drilling of a minimum of three diamond holes at the Kara No.1 Prospect. These holes, numbered D.H.101-103, were completed, with results sufficiently encouraging to justify an indefinite continuation of the program. Drilling continued until June, 1972. During this period, 5319 feet of drilling was accomplished, mostly in what was then termed the Kara No.1 main syncline. Five of the holes, numbered D.H.114, 117, 119, 122 and 123, were sited in the area known as the Kara Eastern Ridge, where trenching had revealed mineralized skarns and interbedded sandstones, which were interpreted as the eastern limb of another syncline parallel to that at Kara No.1.

The simple synclinal interpretation of the Kara No.1 structure has since been revised, as described in Section 2 (g) above. Revised drillhole sections for

021

Kara No.1, with re-interpretation of the structure, are included in this report as Plates 30 to 34, and replace the sections submitted previously. They are discussed later under Ore Reserves. Sections through drill holes 114, 117 and 123 on the Eastern Ridge supplemented by later diamond and auger holes on the same section lines, are shown in Plates 15 and 16. These also replace the sections submitted previously.

In September-November, 1972, diamond drilling was undertaken at the Kara North Prospect in order to check the downward and lateral extensions of a good trench exposure of well-mineralized skarn. Three holes, numbered D.H. 130-132, and totalling 779 feet, were drilled. Results were disappointing and indicated the small and localised character of this occurrence. The northernmost hole, No.132 (Plate 4) passed through a substantial thickness of basalt into very decomposed skarn, with no tungsten. The skarn horizon has since been traced northwards to Location L.13, but there also the tungsten values are poor. A section through drill holes 130, including some later auger holes, is shown in Plate 35.

In February-June, 1973, four holes, numbered D.H.133-136 and totalling 470 feet, were drilled at Kara No.1 in what was known, from previous drilling, to be the most richly mineralized portion of the skarn. These were not for exploratory purposes but in order to obtain large diameter core samples for metallurgical test work. Special drilling methods, including a specially constructed split-tube drive pipe, were used to ensure as complete a core recovery as possible. The core samples were sent to the U.S.A. for metallurgical tests.

The final program for exploratory drilling commenced in January, 1974, and was concluded in April. The prime purpose of this was to locate reserves of fresh scheelite ore additional to those already outlined at Kara No.1, an object which unfortunately was not achieved. Sixteen diamond drill holes were drilled, numbered D.H. 137-152, and with a total footage of 5938 feet. The positions of the holes are shown in Plates 4 to 6.

The area selected for most of the drilling was the Kara Eastern Ridge and its northerly extension. Mineralized skarns, including some ore-grade scheelite, had been intersected by earlier drillholes on section lines 114 and 117 (Plate 5), and the same mineralized formation had been found 500 metres to the north in East Kara Creek. Magnetometry had indicated the continuity of the skarn and basalt between these two points and it was hoped that the scheelite mineralization would continue likewise, a hope that was not realized. Eleven holes, numbered 137-145 and 150-151, were drilled along this stretch. Eight of the holes were almost totally barren of tungsten and three of them intersected sporadic mineralization of doubtful value.

Five holes were drilled at other localities and intersected no significant mineralization. Nos. 146 and 147 were sited on high magnetic anomalies in the western skarn zone. No. 148 penetrated a local body of highly weathered skarn containing mineralization at the surface but not at depth. Nos. 149 and 152 were sited at Kara No.1, but failed to intersect any extensions of the known mineralization either laterally or at depth.

022

Detailed logs of all diamond drill holes have been submitted from time to time with monthly progress reports and are not included here. Drillhole sections prepared during the latest drilling program are shown in Plates 13 to 25.

The principal outcome of all the diamond drilling accomplished is that ore-grade mineralization of any significance has been found only at Kara No.1, with some very small additional tonnages of rather doubtful value at Kara North and the Kara Eastern Ridge.

Another very important feature brought to light by the first drill hole is the deeply weathered state of most of the tungsten-bearing skarn. In the zone of weathering, which has been found to extend to depths as great as 450 feet below the surface, much of the magnetite is oxidized to limonite and all or most of the scheelite is decomposed to amorphous secondary products contained in or associated with the limonite. Weathering of the skarn was found to be particularly deep under a cover of unconsolidated sediments surmounted by Tertiary basalt, due either to pre-basalt weathering or to current deep weathering fostered by the presence of an overlay of water-logged sediments. This was displayed particularly by drill holes 132, 150 and 151, and was one of the factors which discouraged any further drilling for skarn rocks through a thick cover of basalt.

The weathered and partly weathered tungsten-bearing skarn at Kara No.1 was found by tests to be non-amenable to beneficiation by magnetic or flotation methods, which posed serious problems if this material was to be utilized as tungsten ore. Hence, in order to assess the potential value of the deposit, it was necessary to divide the ore-grade material into weathered, partly weathered and non-weathered categories, as described below.

(f) Ore Categorization and Metallurgical Testwork

By inspection of diamond drill cores and sludges in ordinary and ultra-violet light, it was found possible to classify the ore-grade material at Kara No.1 roughly into three categories as follows:

- (i) Completely weathered - no scheelite present
- (ii) Transition - tungsten present partly as scheelite and partly as weathered products
- (iii) Unweathered - all tungsten present as scheelite.

Exhaustive metallurgical tests on all three categories have been conducted in the U.S.A. and in Sydney, but have not succeeded in finding an economic method of treating the weathered and transitional material. Considerable research work has been done locally in an effort to estimate, by inspection, the scheelite content of the transitional material, in case any of it should prove to be treatable as scheelite ore, but the problem is not yet solved. Consequently, for ore reserve estimation purposes, it has been necessary to designate only the fresh scheelite material as possible ore, and the weathered and transitional materials as only potential ore. Since the upper limit of the fresh zone is fairly well defined in drill cores, it is possible to work out tonnages and grades for the two categories, scheelite-bearing material and oxidized material, with reasonable confidence.

7. TONNAGE AND GRADE

The amount of known tungsten-bearing material has been calculated as Indicated or Inferred, according to the accepted definitions of these terms. In some cases, the distinction between the two is somewhat arbitrary, but as a general principle, blocks bounded by fully drilled cross-sections and delineated at the surface by trenches are classed as Indicated; while those which are projected from single drill hole inter-sections, or from drillholes too widely spaced to be sure of continuity between them, are in the Inferred class.

These figures should not be taken as "ore reserves" due to uncertainty that the scheelite-bearing material can be mined and processed by existant economic technology. Metallurgical test work on the oxidized material has shown that no economic method for the recovery of adequate amounts of tungsten material from this material could be found. This material cannot be considered to be "ore" without first establishing an economic recovery scheme.

Further, the Joint Committee on Ore Reserves of the Australasian Institute of Mining and Metallurgy (1972) has recommended that material calculated as "inferred" should not be classed with "indicated" or "measured" material as ore reserves.

The figures presented below do not make any allowance for mining dilution or extraction. In addition, the figures have been divided into five sub-classes, according to their category and the cut-off grade used, as follows:

INDICATED	(Scheelite-bearing material, cut-off 2000 ppm W (Oxidized material, cut-off 2000 ppm W
INFERRED	(Scheelite-bearing material, cut-off 2000 ppm W (Oxidized material, cut-off 2000 ppm W (Oxidized material, cut-off 1000 ppm W

In accordance with the above scheme, the tonnage and grade have been estimated individually for five separate zones in which ore-grade material occurs:

- (a) Kara No.1 West Limb
- (b) Kara No.1 East Limb
- (c) Kara North
- (d) Kara Eastern Ridge, Sections 138 and 144
- (e) Kara Eastern Ridge, Sections 114 and 117

Without going into details of the calculations, the estimation methods used for each zone are described below.

(a) Kara No.1 West Limb

The great bulk of the Kara tungsten-bearing material is concentrated within a small area on the western side of the Kara No.1 structure which, according to our original interpretation, was a simple asymmetrical northward plunging syncline embedded in granite, with a slightly overturned western limb and a

024

gently dipping eastern limb. The distribution of mineralization appeared to conform with the synclinal structure and was thought to be stratigraphically controlled by a favourable horizon within the skarn, lying some 20 to 50 feet above the basalt contact. The mineralized horizon was assumed to be continuous northwards down the plunge of the syncline, but becoming progressively thinner and less mineralized in that direction.

This simple picture appeared plausible enough where the mineralization was rich, but it failed to account for the more sporadic mineralization controlled by steep or vertical structures, which was encountered outside the main zone. Evidence then came to light that the "sandstone" at the base of the structure was not a sedimentary rock and the underlying granite had intrusive and not conformable relations with the sediments.

This led to a revised interpretation of the Kara structure, as mentioned in section 2 (g) above. A steep or vertical layered structure in the skarn and magnetite had been observed and was interpreted as a cleavage or shearing phenomenon, transgressing the original bedding of the sediments, which was invisible. It was now recognised that this layering could represent steep isoclinally-folded bedding and the Kara structure could be more complex than was first thought. Under this new interpretation, the original "syncline" is now seen as an isoclinally folded mass of sediments enclosed on either side by granite and intruded by granite from below. In this situation, stratigraphic control of scheelite mineralization could be expected to manifest itself in the form of steep layers or lenses of ore separated by barren zones representing unmineralized interbeds.

There is much evidence that the steep layering observed in trench exposures of skarn and magnetite is indicative of the attitudes of steep lenticular bodies of ore which can be correlated from trench to trench and in drill-hole intersections. The Trench Assay Plan, shown in Plate 36, illustrates the results of outlining individual bodies of ore, and sub-ore grade oxidized material in this matter. In Plates 30 to 34 are shown the appropriate drill-hole sections revised in accordance with this new interpretation. A feature which is very marked is the existence of a barren zone about 50 feet wide, immediately above the granite. This zone contains considerable magnetite in diopside skarn, but is practically devoid of scheelite. It is interpreted as a barren "front" adjacent to the granite. The scheelite mineralization is strongest immediately above the barren zone. Here the steep ore lenses tend to thicken and merge into a continuous body parallel to the granite contact. This feature, seen in the earliest drillholes, supported the idea of a simple synclinal structure with granite concordant with the bedding of the sediments. At higher levels, the mineralization splits up into steep discrete lenses, which become thinner and more sporadic with increasing distance from the granite.

The calculated figures are confined to an area from south of drillhole section 104, to approximately 100 feet north of drillhole section 108 (Plates 5 and 36), with some small additions further north. The tonnages have been estimated from the drillhole sections by the usual method of area measurement and strike length, using previously obtained tonnage factors of 9 cubic feet per short ton for fresh scheelite-bearing material and 11 cubic feet per short ton for oxidized material. The blocks can be summarized as follows.

	INDICATED		INFERRED	
	Short Tons	% WO ₃	Short Tons	% WO ₃
Scheelite-bearing material	189,700	0.90	99,700	0.61
Oxidized, cut-off 2000 ppm	746,100	0.72	89,800	0.64
Oxidized, cut-off 1000 ppm	---	--	398,600	0.20

The inferred 99,700 tons of scheelite-bearing material would mostly be too deep and narrow for open-pit mining.

(b) Kara No.1 Eastern Limb

This zone lies on what was originally regarded as the gentle eastern limb of the Kara No.1 syncline. Mineralization was intersected by several trenches and by one diamond drillhole, No.124, (Plates 5 and 36). The granite-skarn interface dips westwards at an angle not much greater than the topographic slope. According to the new interpretation, this is an intrusive contact and the basal "sandstone" is a metamorphic quartz-epidote contact rock derived from skarn. The trench exposures of the skarn exhibit a strong layered structure dipping westwards at angles from 40° up to vertical (Plate 36). This is regarded as a reflection of folded sedimentary bedding. Plate 36 shows the results of correlating zones of equivalent grade from trench to trench in the direction of the observed layering. The mineralized bodies can be visualized as steep, westerly-dipping lenses which continue downwards as far as the top of the barren zone, estimated from drillhole D.H.124 to be at a depth of approximately 50 feet at that point (see auger hole sections in Plates 28 and 29). The ore grade material intersected by the trenches and drillholes contains a substantial amount of scheelite, but it is not fresh and has all been placed in the category of oxidized material. Tonnages, in the Inferred class, have been calculated by measuring the surface areas outlined in Plate 36 and assuming an average depth of 40 feet to the top of the barren zone. On this basis, the figures are as follows:

	INFERRED	
	Short Tons	% WO ₃
Oxidized material, cut-off 2000 ppm	110,000	0.61
Oxidized material cut-off 1000 ppm	156,000	0.23

(c) Kara North

A section through part of the small Kara North orebody is shown in Plate 35. Rich oxidized material containing a substantial amount of scheelite was originally intersected in a trench. Diamond drillholes 130 and 131 showed this body to be shallow but with a possible strike extension to the north. Trenches and auger holes to the south indicated a possible extension in this direction also. By reasonable projection along strike from section 130, the tungsten-bearing material has been estimated as follows:

	INFERRED	
	Short Tons	% WO ₃
Oxidized material, cut-off 2000 ppm	61,000	0.77
Oxidized material, cut-off 1000 ppm	158,000	0.17

(d) Kara Eastern Ridge, Sections 138 and 144

Very narrow and apparently concordant bodies of ore-grade material were intersected on these sections in two westerly-dipping skarn formations separated by a bed of sandstone. Intrusive granite occurs on the eastern side (Plates 14 and 18). In this area, unlike at Kara No.1, the layering of the skarn appears to be relatively conformable with the adjacent granite contact. The mineralization has only a limited strike length. By reasonable projections along strike and down dip, the following figures were estimated:

	INFERRED	
	Short Tons	% WO ₃
Scheelite-bearing material	113,000	0.70
Oxidized material, cut-off 2000 ppm	78,000	0.51

Very little, if any, of this would be shallow enough for open-pit mining.

(e) Kara Eastern Ridge, Sections 114 and 117

A shallow but high-grade body of oxidized ore has been outlined by trenching, diamond drilling and auger drilling on section 114 (Plate 16), and its strike extension southwards is indicated by an intersection of high-grade scheelite ore on section 117 (Plate 15). By projection between these two sections and for a reasonable distance beyond, it is estimated that approximately 10,000 tons of scheelite ore could exist in this zone, the remainder being oxidized material. The estimated figures are:

	INFERRED	
	Short Tons	% WO ₃
Scheelite-bearing material	10,000	1.00
Oxidized material, cut-off 2000 ppm	54,700	0.94

(f) Total Resources

The estimated total tonnages of tungsten-bearing material are as summarized below:

	INDICATED		INFERRED	
	Short Tons	% WO ₃	Short Tons	% WO ₃
Scheelite-bearing material, open-pit	189,700	0.90	---	--
Scheelite-bearing, non open-pit	---	--	222,700	0.67
Oxidized, cut-off 2000 ppm W	746,100	0.72	393,500	0.67
Oxidized, cut-off 1000 ppm W	---	--	703,600	0.20

8. FINAL REMARKS

In conclusion, it is fair to say that all known anomalous localities in the Kara structure zone, except Locations L.11 and L.12, have been examined and, apart from the Kara Prospects, none of them any any potential for tungsten.

It may be argued that there is still much unexplored ground available, especially that covered by basalt flows, but such exploration inevitably demands "blind" diamond drilling. Experience at Kara of drilling through basalt has not been encouraging. Although ground magnetic anomalies have proved a reliable guide to the presence of skarn rocks below basalt, the basalts are commonly deep, underlain by unconsolidated sediments, and the underlying skarns are deeply eroded, thoroughly decomposed and devoid of scheelite. Such experience does not lend encouragement to any proposal to drill basalt areas on a widespread scale, guided only by geological projections or magnetic anomalies. More positive evidence would be needed of the existence of geological and structural conditions favourable for scheelite mineralization. Such evidence would be hard to find and is not known in the Kara area.

Priority in regional exploration was given, in the first instance, to the contact zones and marginal sedimentary areas of known granite masses as being the most likely habitat of skarn-type tungsten deposits. Thus, the main exploration effort became concentrated in the area north and east of the Kara Prospects and all along the intrusive margin of the Blythe River granite.

Secondly, the south-eastern portion of the E.L. was selected for more widespread exploration on account of the presence there of the Gordon Limestone, a known host rock for mineralization. The absence of any anomalous tungsten in this area discouraged any further exploration in places remote from known granites, and this was deferred in favour of more urgent work in the Kara area.

Exploration of the area immediately west of Kara took place during the final stages of the program. Four highly anomalous locations, Nos. L.9 to L.12, were discovered by stream sediment sampling in an area of rocks supposedly of Cambrian age, but which, on lithological and structural grounds, could be representatives of the Ordovician Transition Series. Trenching at locations L.9 and L.10 revealed very little skarn development and very low tungsten values.

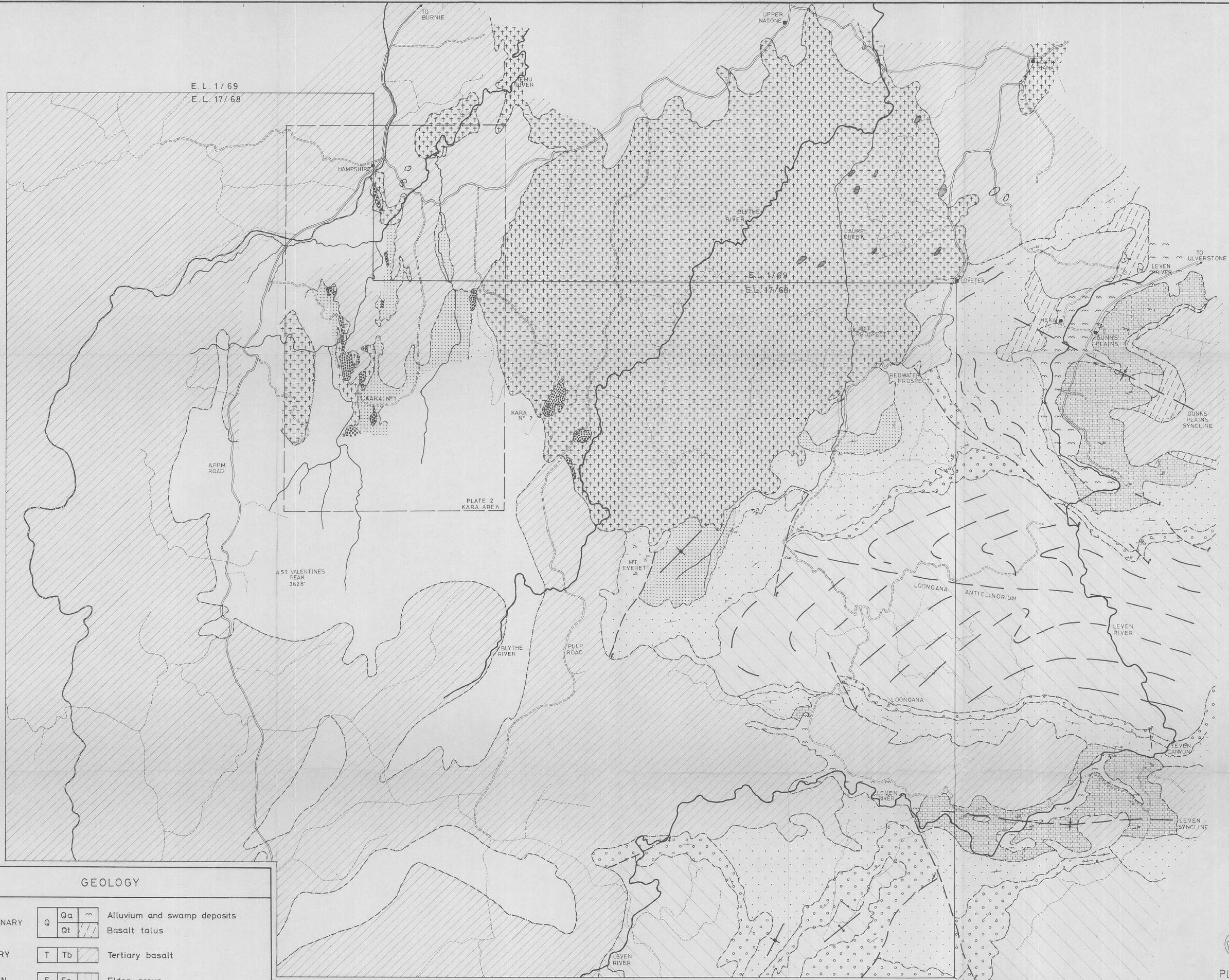


PLATE 1.

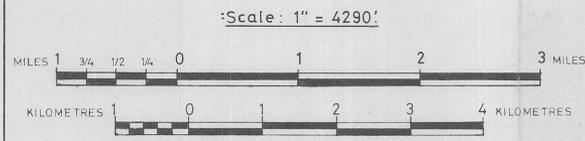
GEOLOGY

QUATERNARY	Q	Qa	Alluvium and swamp deposits
		Qt	Basalt talus
TERTIARY	T	Tb	Tertiary basalt
SILURIAN	S	So	Eldon group
ORDOVICIAN	O	Og	Gordon limestone
		Ot	Transition zone
		Om	Moina sandstone
		Oo	Conglomerate zone (Owen, Roland)
Unconformity www			
CAMBRIAN	E	Ea	Cambrian (Unassigned)
DEVONIAN	D	Dg	Devonian granite
		Dgs	Devonian specularite zone
		Dgm	Magnetite skarn zone

REFERENCE

TOPOGRAPHICAL	GEOLOGICAL
= Major road	= Geological boundary
= Minor road	= Fault
= Track	= Fold structure
= Railway	= Structural trends
= River	= Strike and Dip measurement
= Creek	= Regional Dip
= Trig. Beacon	
= Township	

SCALE



Base plan prepared from aerial photographs.
Balfour - Valentine - Project No 1457.
Scale: 65 Chns; Date: 20.2.64; Altitude: 30,000 Feet.

AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY

GEOLOGICAL MAP OF
EXPLORATION LICENCE 17/68
575029

74-1035

Prepared by, CHW	Drawn by, ALL
Scale, 1" = 4290'	Date, June 6, 1974.
Drawing No	Report No
	Lib. No

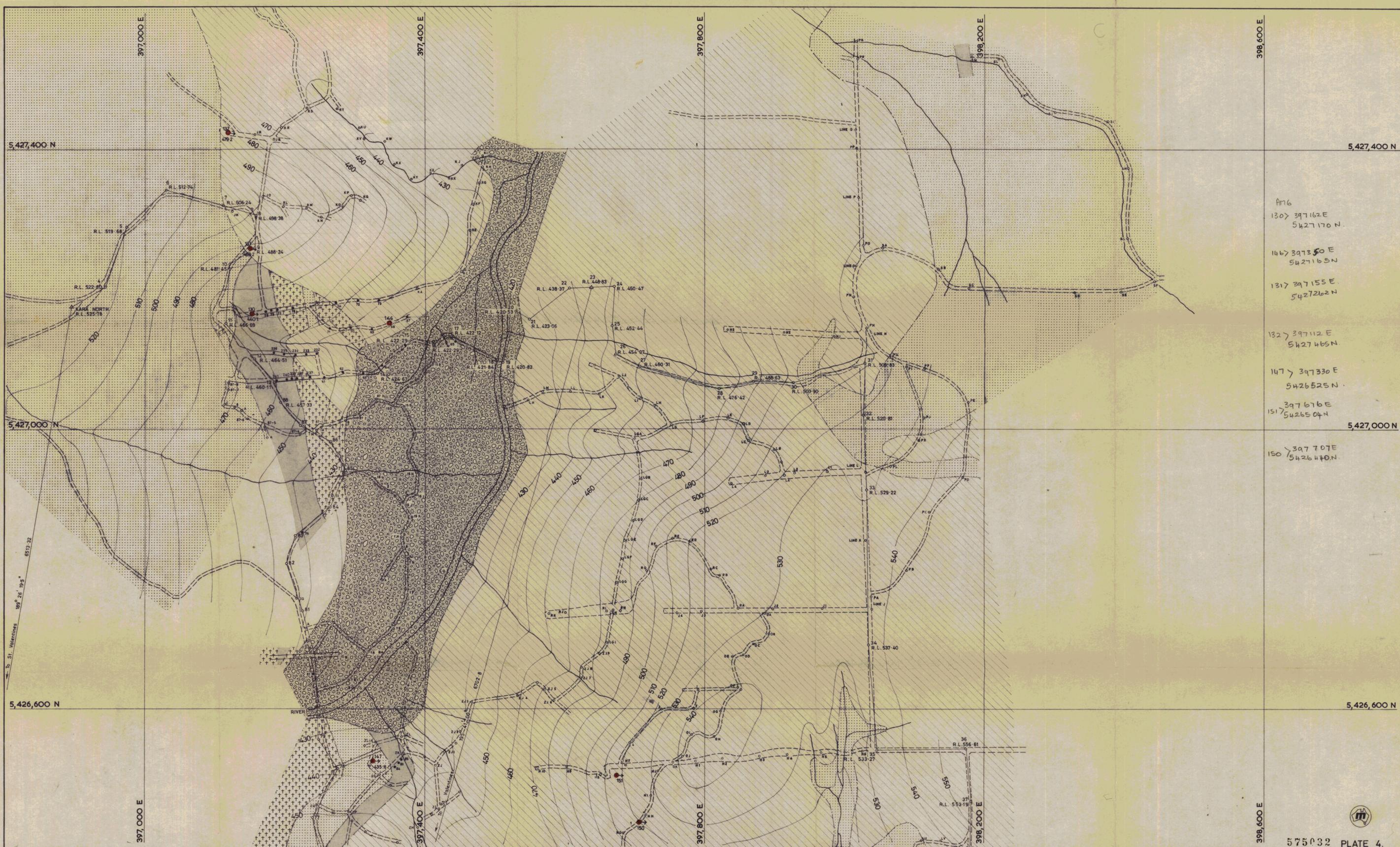


PLATE 2.

GEOLOGY		REFERENCE 74-1035	
TERTIARY	Basalt Conglomerates, breccias etc.	= River	= Creek
DEVONIAN	Granite	= Road	= Track
ORDOVICIAN	Limestone	= Trig Beacon	= Railway
GORDON LIMESTONE	Sandstones with calcareous members	= Geological Boundary	
TRANSITION BEDS	Tactite	= Inferred Geological Boundary	
MOINA SERIES	Sandstone and quartzite Sandstones, quartzites and conglomerates		
SCALE		AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY	
<p>Metres 100 0 100 200 300 400 500 600 Metres Feet 600 0 600 1200 1800 Feet</p>		<p>GEOLOGICAL MAP OF KARA PROSPECTS 575030 AND SURROUNDING AREAS</p> <p>Prepared by, C.H.W. Drawn by, A.L.L. Scale, 1 inch=600 Feet Date, June 5, 1974. Proj. N^o, X827-003 Drawing N^o, Report N^o, Lib. N^o, </p>	
Scale: 1" = 600' (Approx)			



GEOLOGY		REFERENCE 74-1035	
TERTIARY	Basalt Conglomerates, breccias etc.	— = River	— = Creek
DEVONIAN	Granite	==== = Road	- - - = Track
ORDOVICIAN	Limestone	Δ = Trig Beacon	— = Railway
GORDON LIMESTONE	Sandstones with calcareous members	- - - = Geological Boundary	- - - = Inferred Geological Boundary
TRANSITION BEDS	Tactite		
MOINA SERIES	Sandstone and quartzite Sandstones, quartzites and conglomerates.		
SCALE		AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY	
Metres 100 0 100 200 300 400 500 600 Metres Feet 600 0 600 1200 1800 Feet Scale: 1" = 600' (Approx)		INDEX MAP OF KARA PROSPECTS AND SURROUNDING AREAS 575031 Prepared by: C.H.W. Drawn by: A.L.L. Scale: 1 inch = 600 Feet Date: June 5, 1974 Proj. N ^o : X87-003 Drawing N ^o : Report N ^o : Lib. N ^o :	



A176
 130 > 397162 E
 5427170 N

 146 > 397350 E
 5427165 N

 131 > 397155 E
 5427262 N

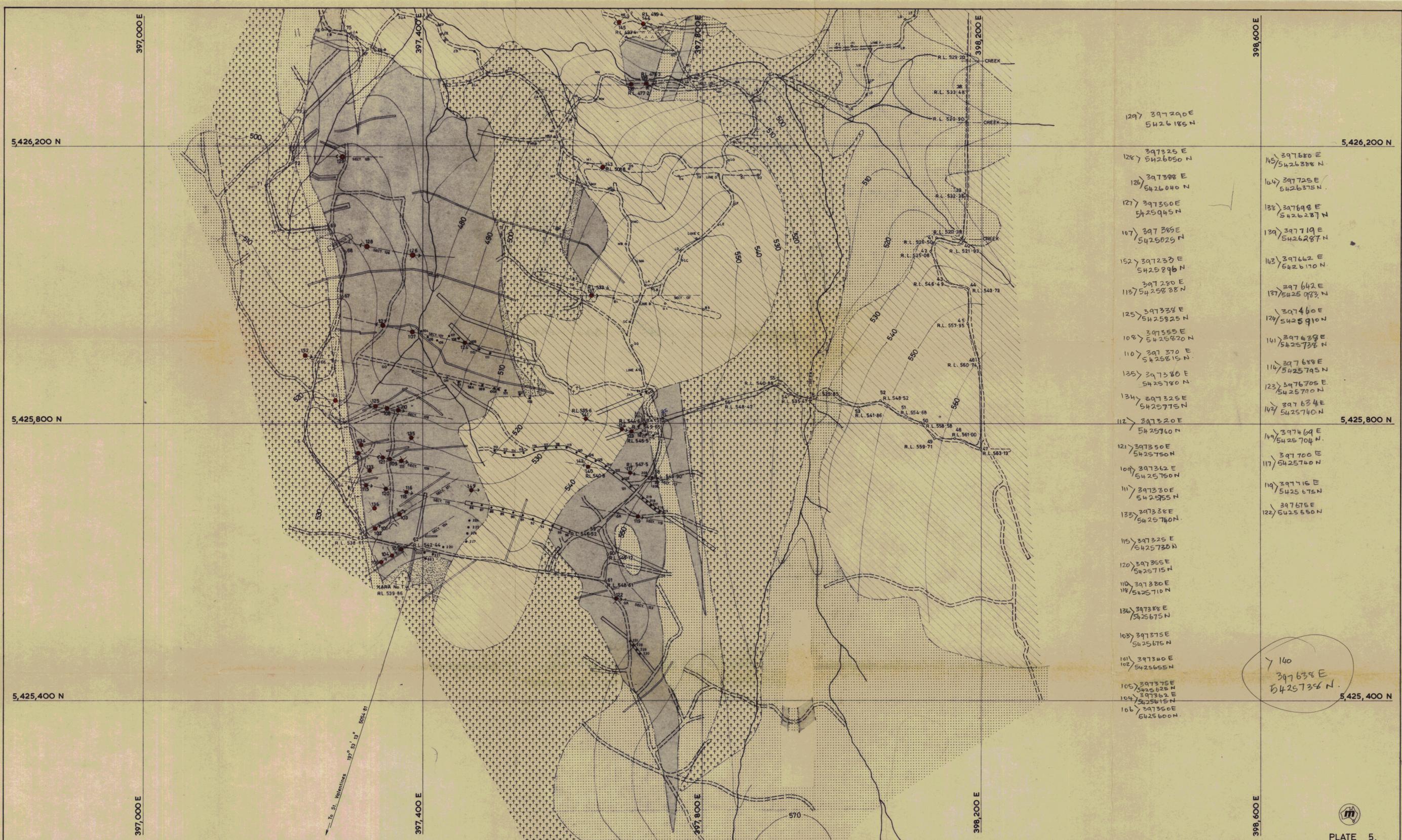
 132 > 397112 E
 5427465 N

 147 > 397330 E
 5426525 N

 151 > 397676 E
 5426504 N

 150 > 397707 E
 5426440 N

ADDITIONS & NOTES	GEOLOGY	REFERENCE	SCALE	AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY
	<p>RECENT Alluvium, scree, boulders</p> <p>TERTIARY Basalt</p> <p> Conglomerate, breccia etc.</p> <p>DEVONIAN Quartz-epidote contact rock</p> <p> Granite</p> <p>ORDOVICIAN Tactite (Skarn) M = Magnetite</p> <p> Limestone, dolomite</p> <p> Sandstone, quartzite</p>	<p> River</p> <p> Creek</p> <p> Track</p> <p> Bulldozed Cut</p> <p> Backhoed trench</p> <p> Trig. beacon</p> <p> Survey peg</p> <p> Coordinated survey point (Altitude in metres)</p> <p> Topographic contour in metres above sea level datum.</p> <p> Diamond drill hole</p> <p> Power auger hole</p> <p> Geological boundary</p> <p> Strike and dip of bedding</p> <p> Strike and dip of foliation or banding</p>	<p>1:2400</p> <p>metres</p> <p>1 inch to 200 feet</p> <p>feet</p> <p>5 cm</p>	<p>575032 PLATE 4.</p> <p>KARA TUNGSTEN PROJECT BURNIE TASMANIA MAP SHEET KARA NORTH</p> <p>74-1035 Vol. 7</p> <p>Prepared by: R.T. BRANDT. Drawn by: R.T.B. & A.L.L.</p> <p>Scale: 1:2400 Date: 26th March 1974 Proj. No. X 827-003</p> <p>Dwg. No. Rept. No. Lib. No.</p> <p>1655</p>



129) 397290 E 5426185 N	145) 397680 E 5426388 N
126) 397325 E 5426050 N	144) 397725 E 5426375 N
127) 397388 E 5426040 N	138) 397698 E 5426287 N
107) 397350 E 5425945 N	139) 397719 E 5426287 N
152) 397233 E 5425896 N	143) 397662 E 5426170 N
397250 E 5425838 N	137) 397642 E 5425993 N
125) 397338 E 5425825 N	124) 397460 E 5425910 N
108) 397555 E 5425820 N	141) 397639 E 5425738 N
110) 397370 E 5425615 N	114) 397688 E 5425795 N
125) 397380 E 5425780 N	123) 3976705 E 5425790 N
134) 397325 E 5425775 N	142) 397634 E 5425740 N
112) 397320 E 5425760 N	149) 397469 E 5425704 N
121) 397350 E 5425750 N	117) 397700 E 5425740 N
109) 397362 E 5425750 N	119) 397716 E 5425675 N
111) 397330 E 5425755 N	122) 397675 E 5425650 N
133) 397388 E 5425740 N	
115) 397325 E 5425735 N	
120) 397365 E 5425715 N	
118) 397380 E 5425710 N	
136) 397388 E 5425675 N	
103) 397375 E 5425675 N	
101) 397340 E 5425665 N	
105) 397375 E 5425625 N	
104) 397362 E 5425615 N	
106) 397350 E 5425600 N	

140
397638 E
5425738 N

ADDITIONS & NOTES

GEOLOGY

REFERENCE

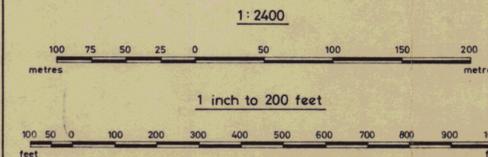
SCALE

AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY

575033
KARA TUNGSTEN PROJECT
BURNIE TASMANIA
MAP SHEET KARA No. 1

RECENT		Alluvium, scree boulders
TERTIARY		Basalt
		Conglomerate, breccia etc.
DEVONIAN		Quartz-epidote contact rock
		Granite
ORDOVICIAN		Tactite (Skarn) M = Magnetite
		Limestone, dolomite
		Sandstone, quartzite

	River
	Creek
	Track
	Buildozed cut
	Backhoed trench
	Trig beacon
	Survey peg
	Co-ordinated survey point (Altitude in metres)
	Topographic contour in metres above sea level datum
	Diamond drill hole
	Power auger hole
	Geological boundary
	Strike and dip of bedding
	Strike and dip of foliation or banding



Prepared by: R.T. BRANDT.	Drawn by: R.T.B. & A.L.L.
Scale: 1:2400	Date: 26th. March 1974
Dwg. No.	Proj. No. X 827-003
Rept. No.	Lib. No.

74-1035
Vol 1

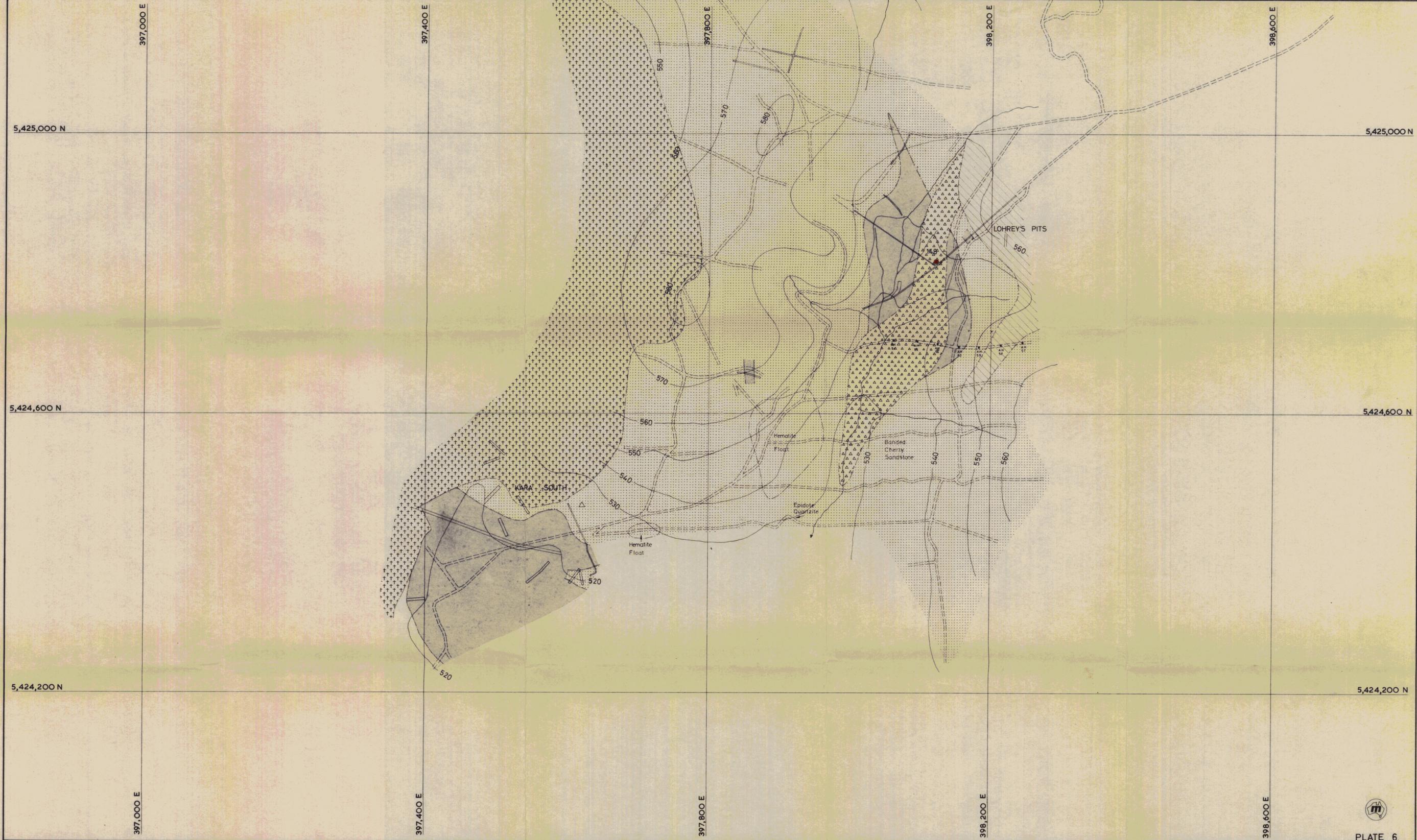
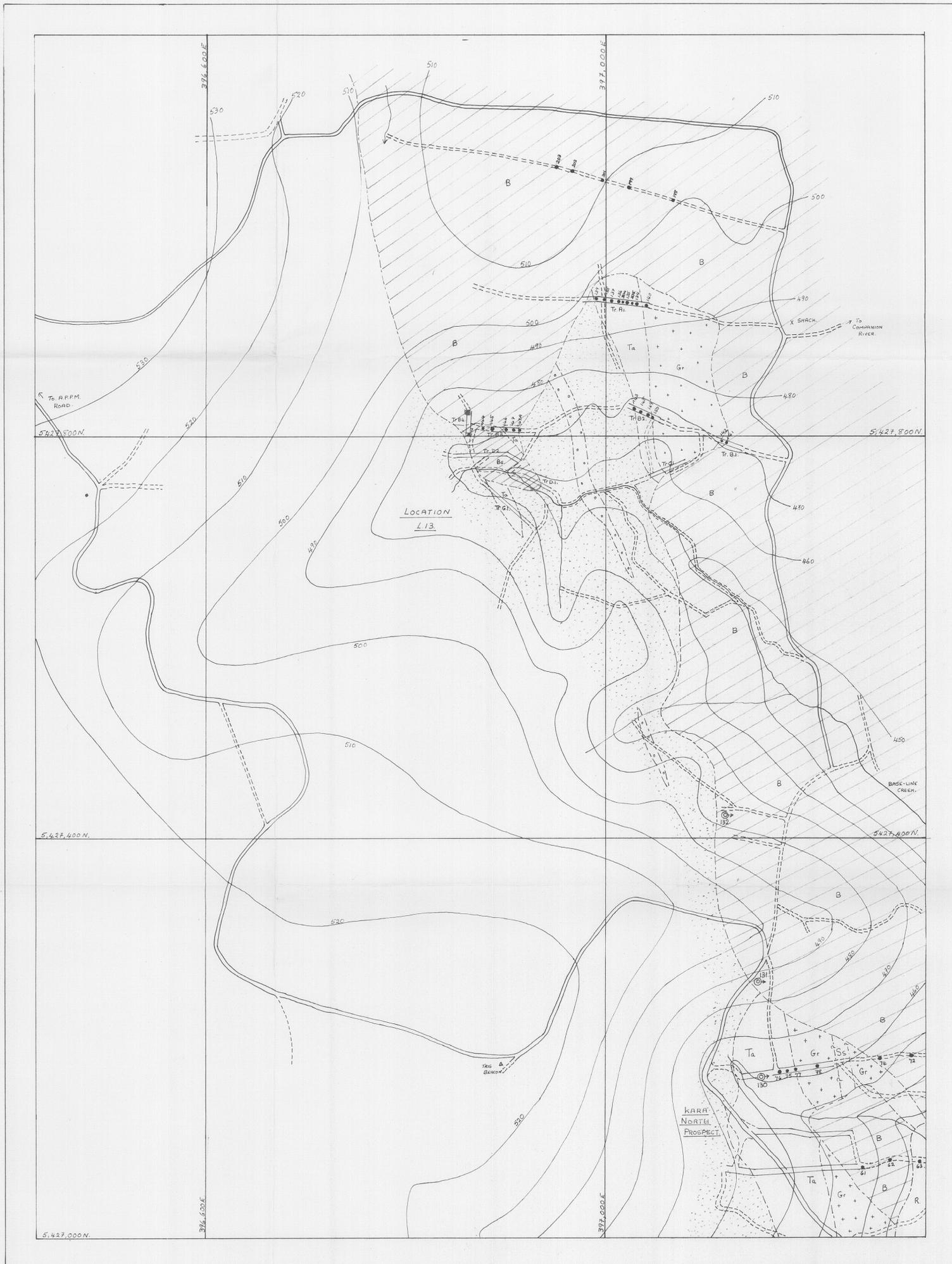


PLATE 6.

ADDITIONS & NOTES	GEOLOGY	REFERENCE	SCALE	AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY
	<p>RECENT Alluvium scree boulders</p> <p>TERTIARY Basalt</p> <p> Conglomerate breccia etc</p> <p>DEVONIAN Quartz-epidote contact rock</p> <p> Granite</p> <p>ORDOVICIAN Tactite (Skarn) M = Magnetite</p> <p> Limestone dolomite</p> <p> Sandstone quartzite</p>	<p> River</p> <p> Creek</p> <p> Track</p> <p> Bulldozed cut</p> <p> Backhoed trench</p> <p> Trig. beacon</p> <p> Survey peg</p> <p> Co-ordinated survey point (Altitude in metres)</p> <p> Topographic contour in metres above sea level datum</p> <p> Diamond drill hole</p> <p> Power auger hole</p> <p> Geological boundary</p> <p> Strike and dip of bedding</p> <p> Strike and dip of foliation or banding</p>	<p>1:2400</p> <p>metres</p> <p>1 inch to 200 feet</p> <p>feet</p> <p>5 cm</p>	<p>575034</p> <p>KARA TUNGSTEN PROJECT</p> <p>BURNIE TASMANIA</p> <p>GEOLOGICAL PLAN</p> <p>KARA SOUTH 16577</p> <p>74-1035</p> <p>Prepared by: R.T. BRANDT Drawn by: R.T.B. & A.L.L.</p> <p>Scale: 1:2400 Date: 5th June 1974 Proj. No. X 827-003</p> <p>Dwg No. Rept No. Lib No.</p>



GEOLOGY

- R = ALLUVIUM.
- B = BASALT.
- Bs = SUB-BASALTIC MATERIAL.
- Gr = GRANITE.
- Ta = TACTITE.
- = QUARTZITE (ORDOVICIAN).
- = SANDSTONE, CLAYS (ORDOVICIAN).
- ① = DIAMOND DRILL-HOLE.
- = POWER PAPER HOLE.
- - - = GEOLOGICAL BOUNDARY.

GENERAL

- ~ = CREEK.
- == = ROAD.
- - - = TRACK.
- Bs = BULDOZED TRENCH.
- △ = TRIS BEACON.
- 490 = CONTOUR (IN METRES ABOVE S.L.)

SCALE

1:2400

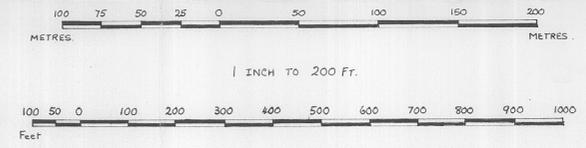


PLATE 7

AUSTRALIA AND NEW ZEALAND
EXPLORATION COMPANY

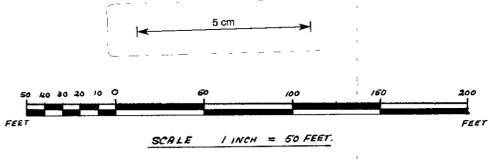
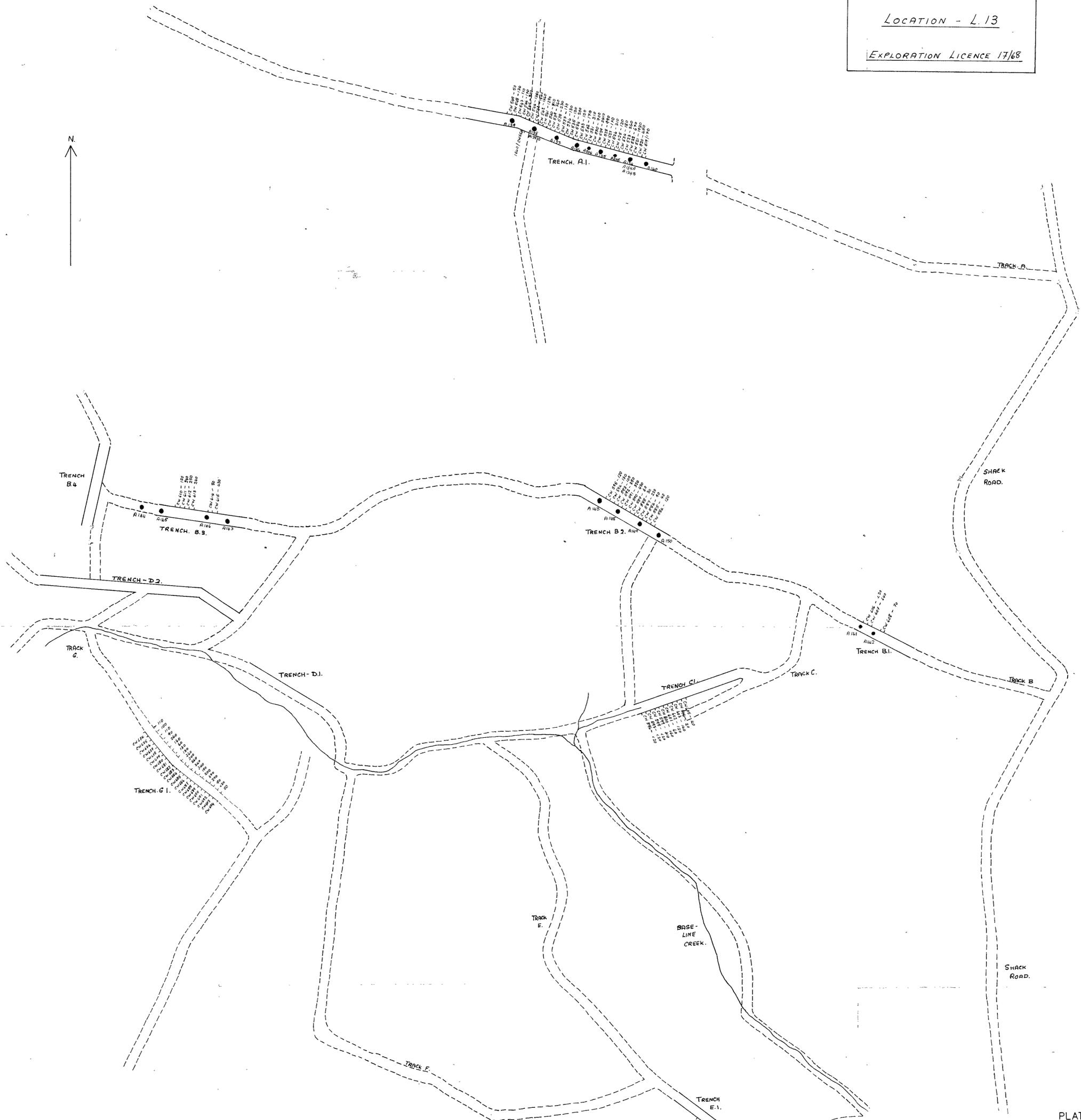
KARA TUNGSTEN PROJECT
575035
LOCATION L.13

GEOLOGY.

74-1035

Prepared by, C.H.W.	Drawn by, C.H.W.
Scale, 1:2400	Date, MAY, 1974.
Drawing N ^o	Proj. N ^o X827-003
Report N ^o	Lib. N ^o

LOCATION - L.13
EXPLORATION LICENCE 17/68



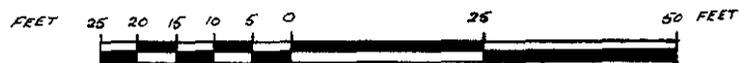
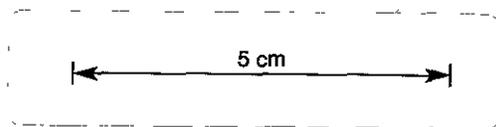
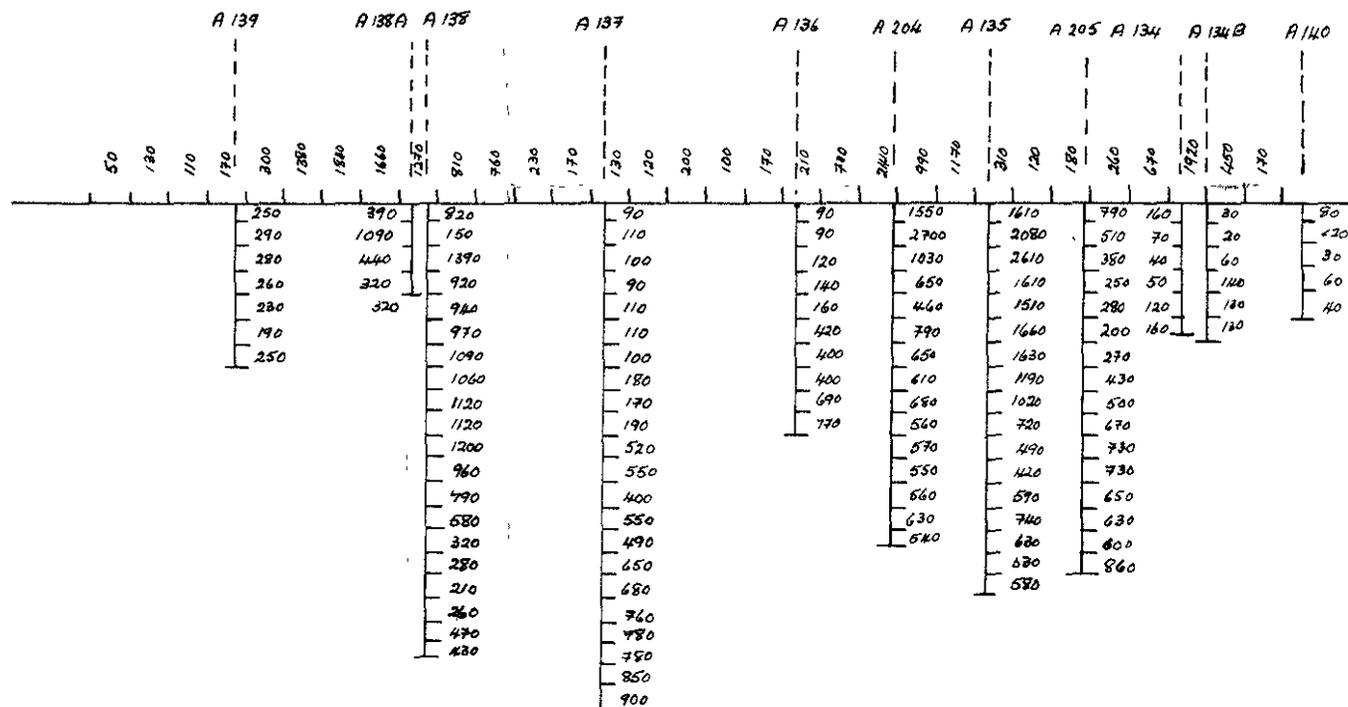
- - - = BULLDOZED TRACK
- - - = BULLDOZED TRENCH
- CW 510 = TRENCH SAMPLE
- 1290 = ASSAY VALUE - ppm W
- = AUGER HOLE

PLATE 8

AUSTRALIA AND NEW ZEALAND
EXPLORATION COMPANY

KARA TUNGSTEN PROJECT
BURNIE, TASMANIA
575036
LOCATION L13
TRENCH SAMPLING AND AUGER HOLES

Prepared by: C.H.W.	Drawn by: C.H.W.
Scale: 1 Inch=50 Feet	Date: 10 June, 1974
Drawing N°	Proj. N° X827-003
Report N°	Lib. N°



HORIZONTAL AND VERTICAL SCALE

1 INCH = 25 FEET

ASSAY VALUES IN PPM W

575037

74-1035

PLATE 9

AUSTRALIA AND NEW ZEALAND
EXPLORATION COMPANY

LOCATION L.13.

AUGER DRILLING + TRENCH SAMPLING.

TRENCH. A.1.

Prepared by, C.H.W.

Drawn by, C.H.W.

Scale, 1"=25'

Date, MAY 1974

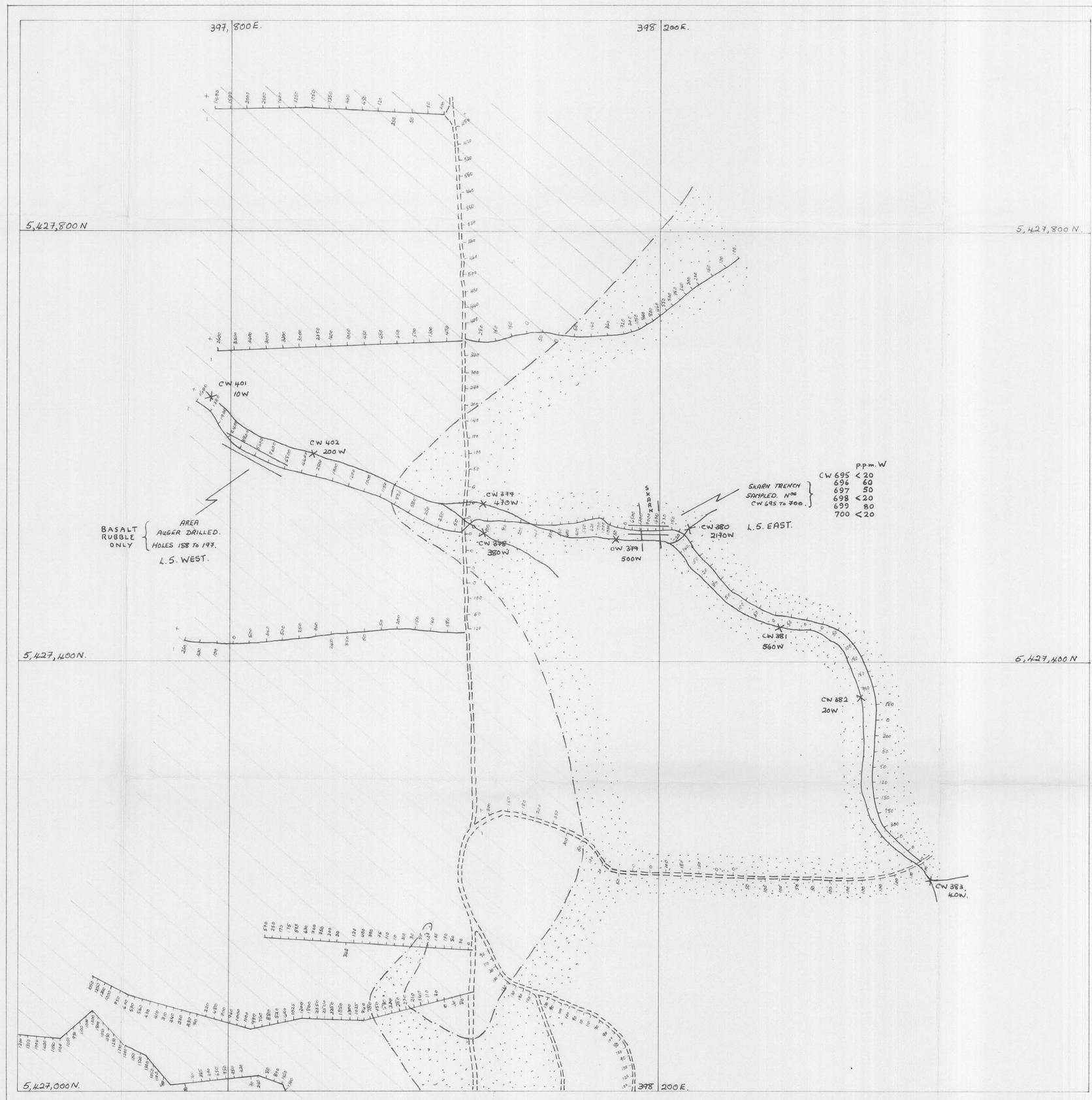
Proj. N^o X827-003

Drawing N^o

Report N^o

Lib. N^o

1660



ppm. W

CW 695	< 20
696	60
697	50
698	< 20
699	80
700	< 20

575038

74-1035 PLATE 10

AUSTRALIA AND NEW ZEALAND
EXPLORATION COMPANY

LOCATION L.5
MAGNETOMETRY AND TRENCHING

5 cm

Prepared by: C.H.W.	Drawn by: C.H.W.	
Scale 1:2400	Date: May 1974	Proj. N° x827-003
Drawing N°	Rept. N°	Lib. N°

TERTIARY BASALT. = [diagonal lines symbol]

SANDSTONES. = [dotted pattern symbol]

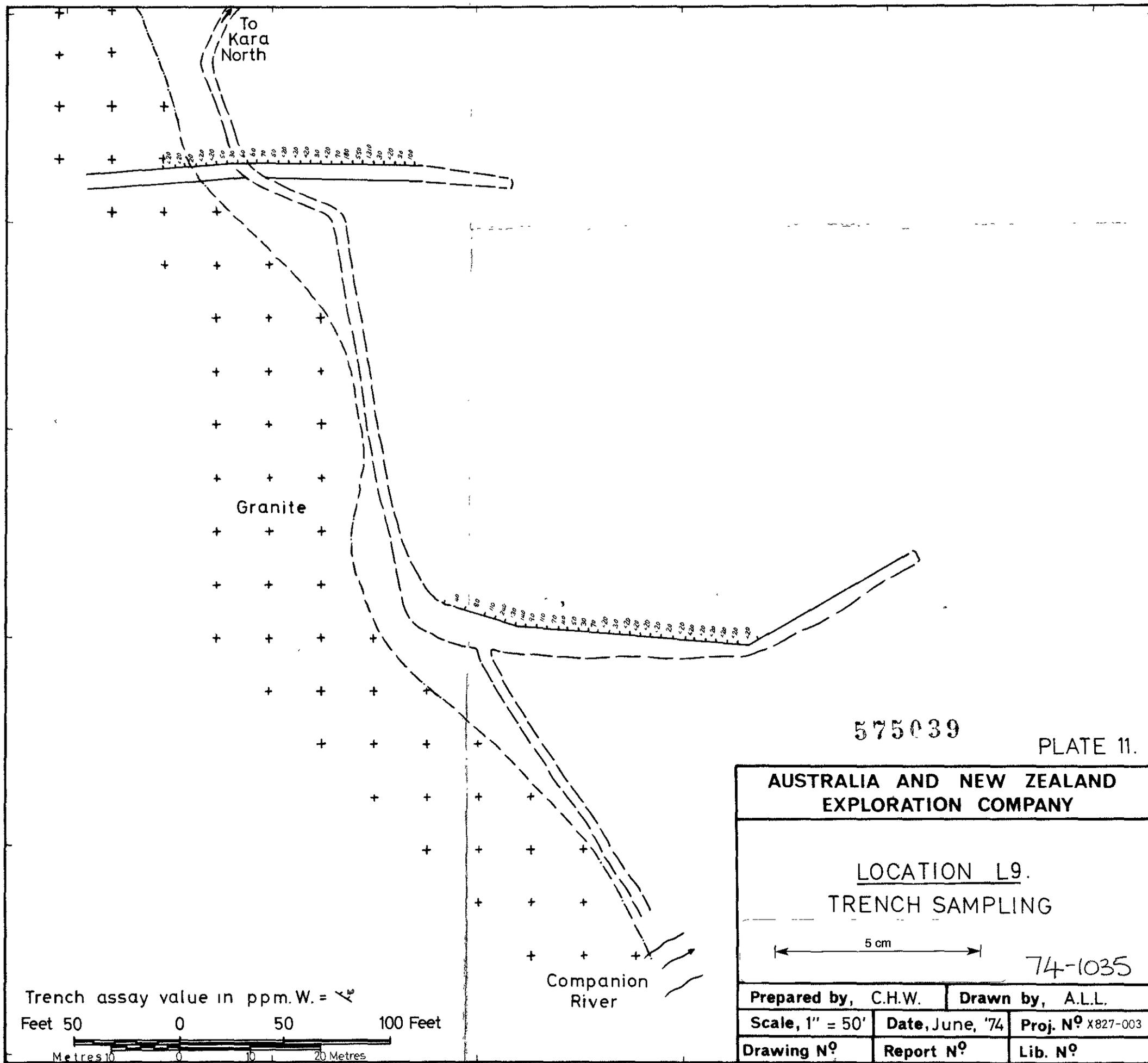
SCALE
1 INCH TO 200 FT

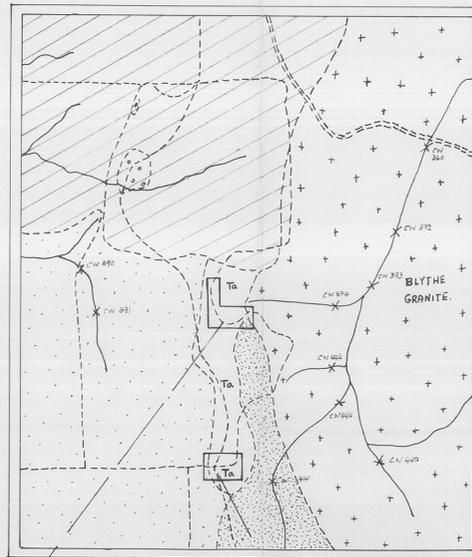
100 50 0 100 200 300 400

X CW 402
200W = STREAM SEDIMENT PANNED CONCENTRATE
ASSAY VALUE - P.P.M. W.

1000
1150
820 = GROUND MAGNETIC SURVEY.

- - - = GEOLOGICAL BOUNDARY.



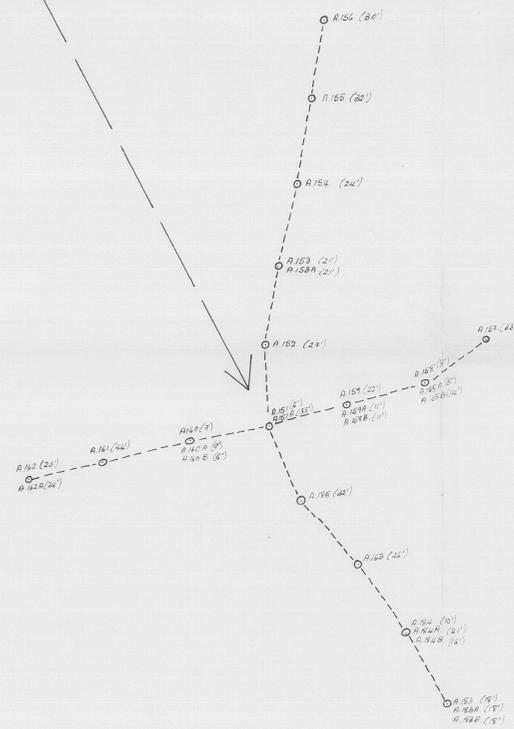


REFERENCE MAP.
SUTTONS SKARN - LOCATION L2.
SCALE 1" = 600 FT.

- = BASALT
- = SUB-BASALT MATERIAL
- = GRANITE
- = TACTITE
- = MOINA SANDSTONE (Ord)
- = TRANSITION SERIES (Ord)
- = PANNED CONCENTRATE SAMPLE
- = PANNED CONCENTRATE SAMPLE



SUTTONS SKARN
SOUTHERN DRILL PATTERN.



SUTTONS SKARN
NORTHERN DRILL PATTERN.

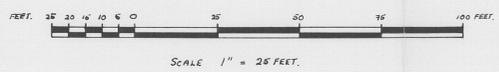
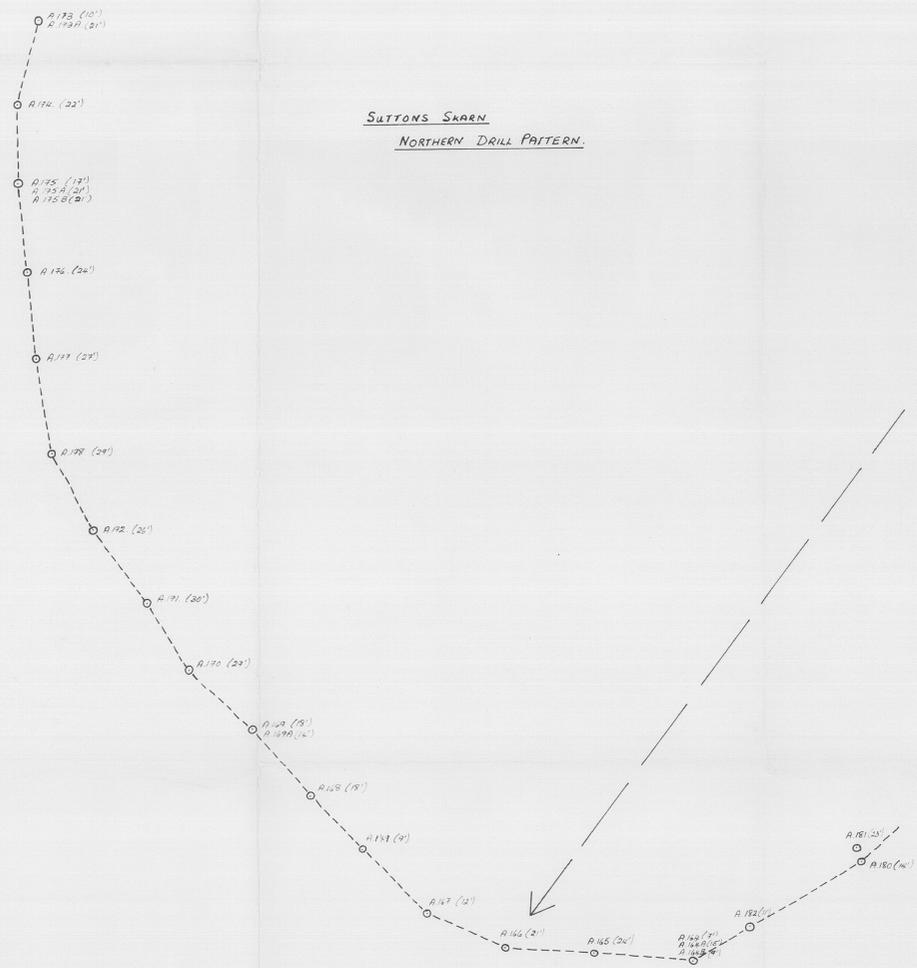


PLATE 12		
AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY		
74-1035		
SUTTONS SKARN - LOCATION L2.		
AUGER DRILLING PATTERN.		
575040		
Prepared by, C.H.W.	Drawn by, C.H.W.	
Scale, 1" = 600 FT 1" = 25 MET	Date, MAY, 1974	Proj. N ^o X827-003
Drawing N ^o	Report N ^o	Lib. N ^o

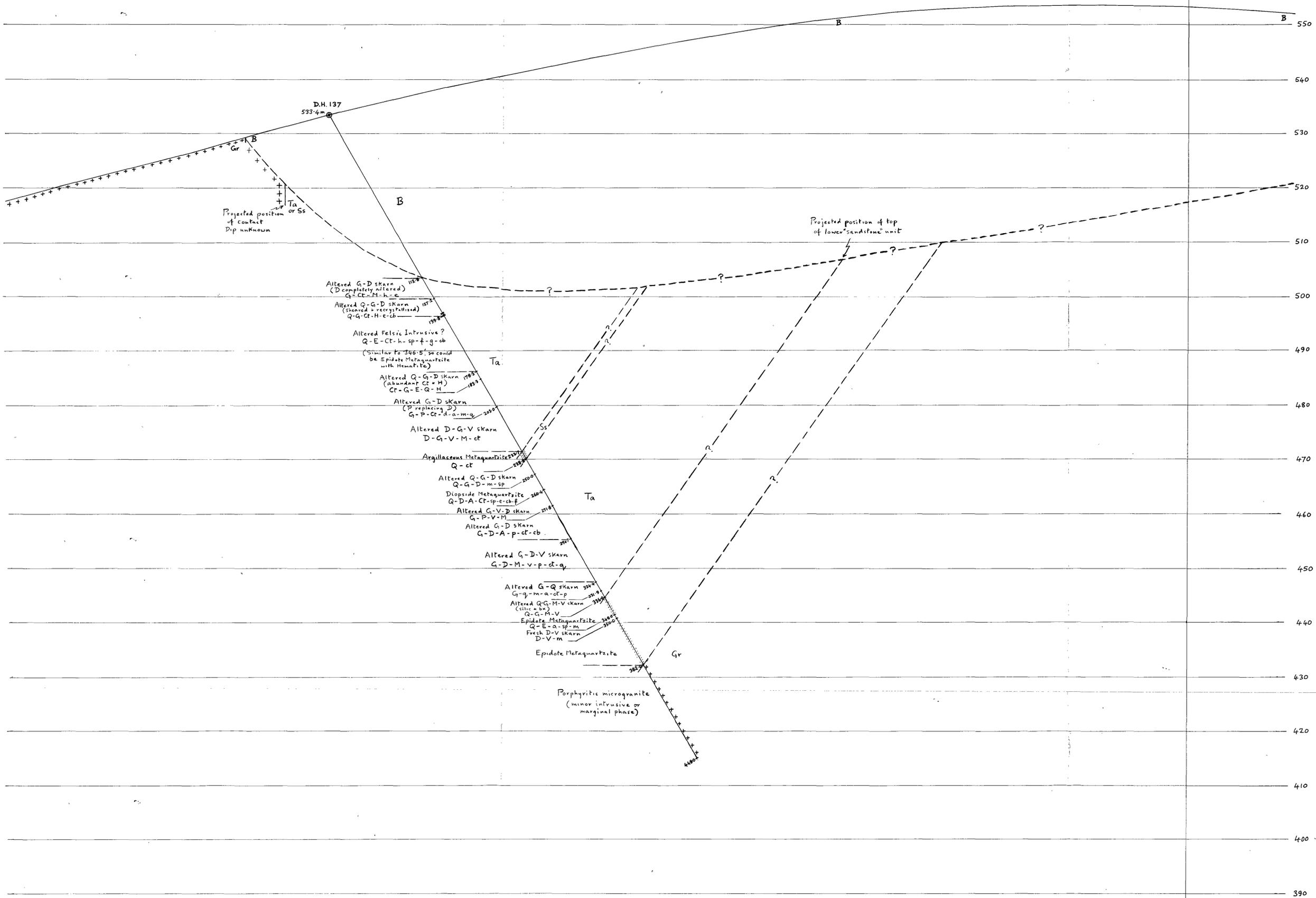
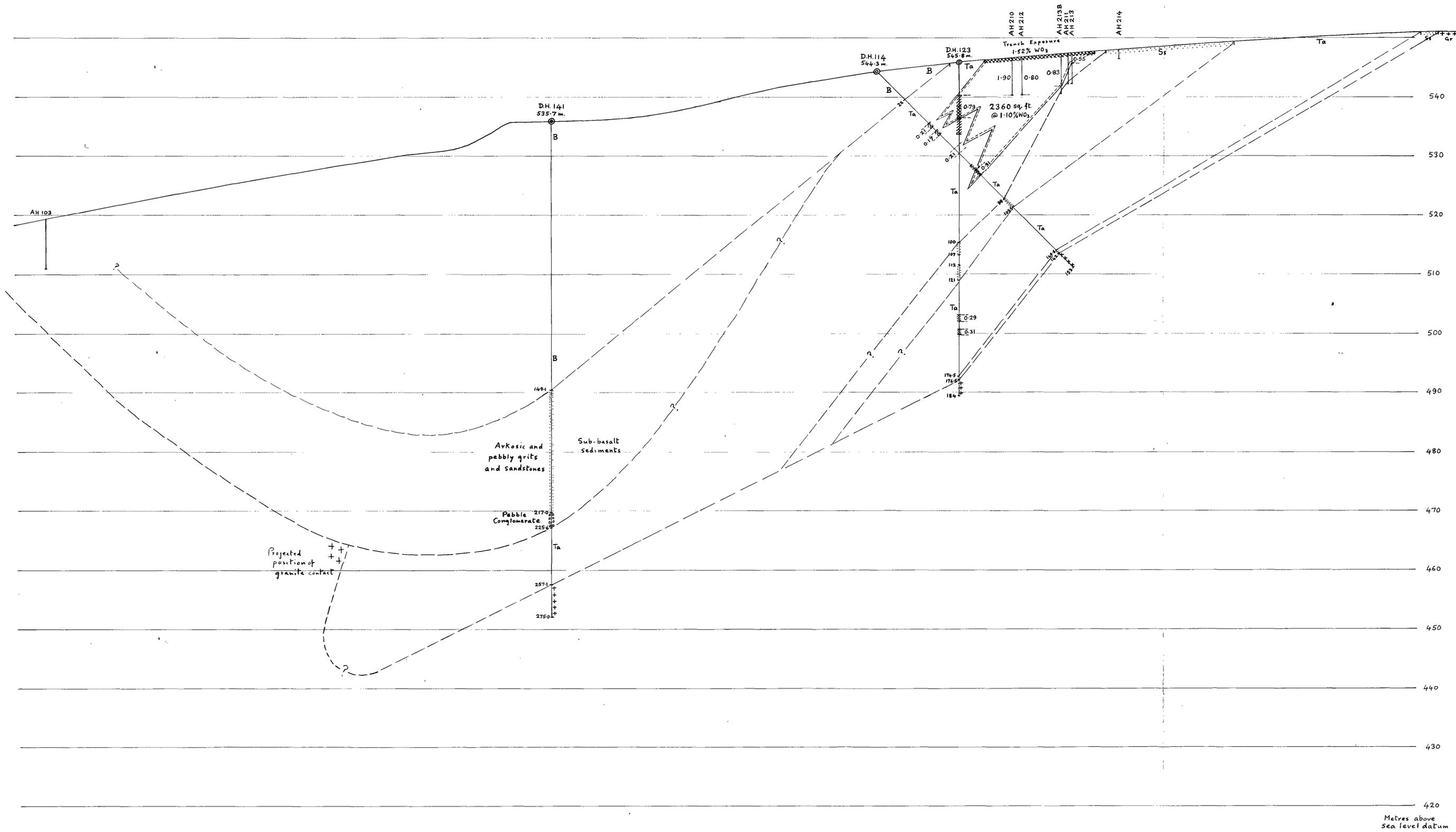


PLATE 13

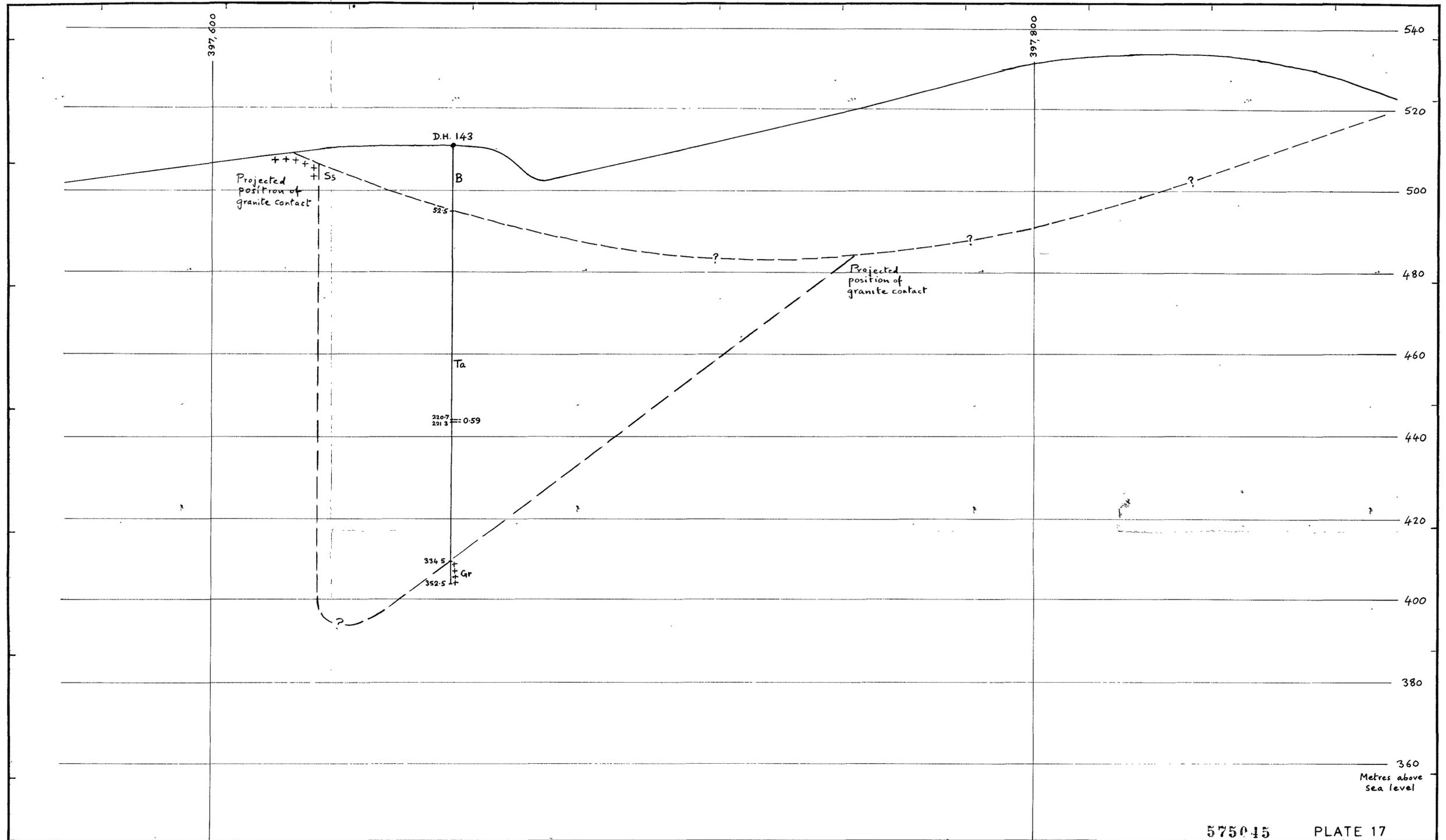
GEOLOGY		REFERENCE		SCALE		AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY	
	Basalt	MINERALS IDENTIFIED IN DRILL CORE SAMPLES		1:300 Metres 10 5 0 5 10 15 20 25 Metres 1 inch to 25 feet 50 40 30 20 10 0 25 50 75 ft.		KARA TUNGSTEN PROJECT BURNIE, TASMANIA 575041 DRILLHOLE SECTION 137 74-1035	
	Granite	MAJOR	MINOR	a	Amphibole (mostly tremolite)	Prepared by: R.T.B.	Drawn by: R.T.B.
	Tactite (skarn)	cb	Carbonates	ct	Chlorite, vermiculite, clay minerals.	Scale: 1 inch = 25 feet	Date: 18 Mar. 1974.
	Sandstone	d	Diopside	e	Epidote (with zoisite and clinozoisite)	Proj. N ^o : X827-003	
	Scheelite moderate	f	Fluorite	g	Garnet	Report N ^o :	Lib. N ^o :
	Scheelite strong	h	Hematite	m	Magnetite		
		p	Phlogopite	q	Quartz		
		r	Quartz	sp	Sphene		
		v	Vesuvianite	v	Vesuvianite		



Metres above sea level datum

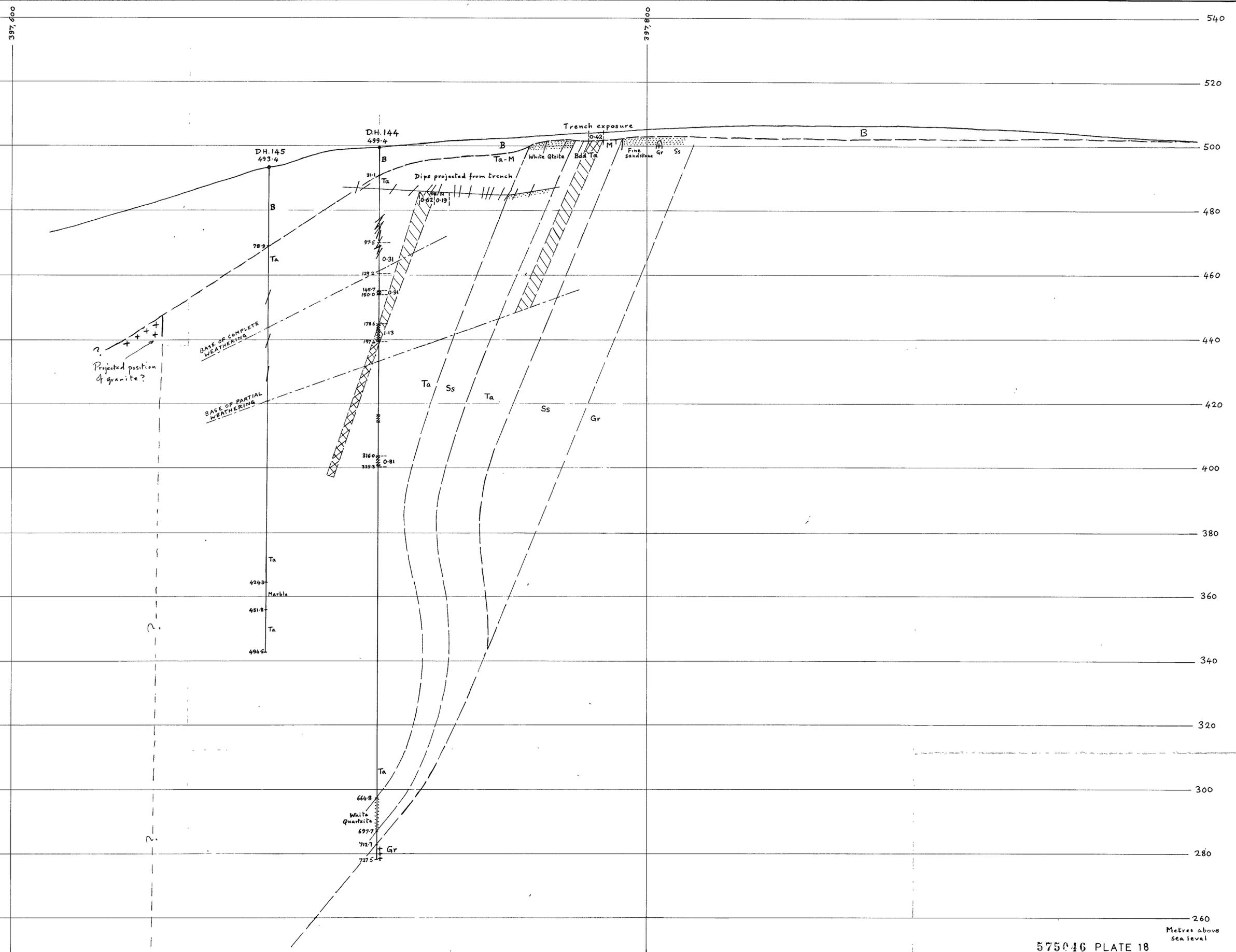
575014 PLATE 16

GEOLOGY		REFERENCE	SCALE	AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY		
B	Basalt (including sub-basalt sediments)	0.40 Drill core assay in % WO ₃	<p>1:300</p> <p>Metres 10 5 0 5 10 15 20 25 Metres</p> <p>1 inch to 25 feet</p> <p>Feet 50 40 30 20 10 0 25 50 75 Feet</p>	<p>KARA TUNGSTEN PROJECT BURNIE, TASMANIA DRILLHOLE SECTION 114</p> <p>74-1035</p>		
Gr	Granite	2340 Drill core assay in ppm WO ₃				
Ta	Tactite (skarn)	DH 114 Diamond Drillhole		Prepared by: RT BRANDT Drawn by: RT BRANDT		
Ss	Sandstone	AH 123 Augur Hole		Scale 1:300	Date 18 th Mar 1974	Proj. N ^o X827-003
▨	Scheelite moderate	▨ Inferred Mineralization, Oxidized, Cut-off 2000 ppm W		Drawing N ^o	Report N ^o	Lib. N ^o
▨	Scheelite strong					



575045 PLATE 17

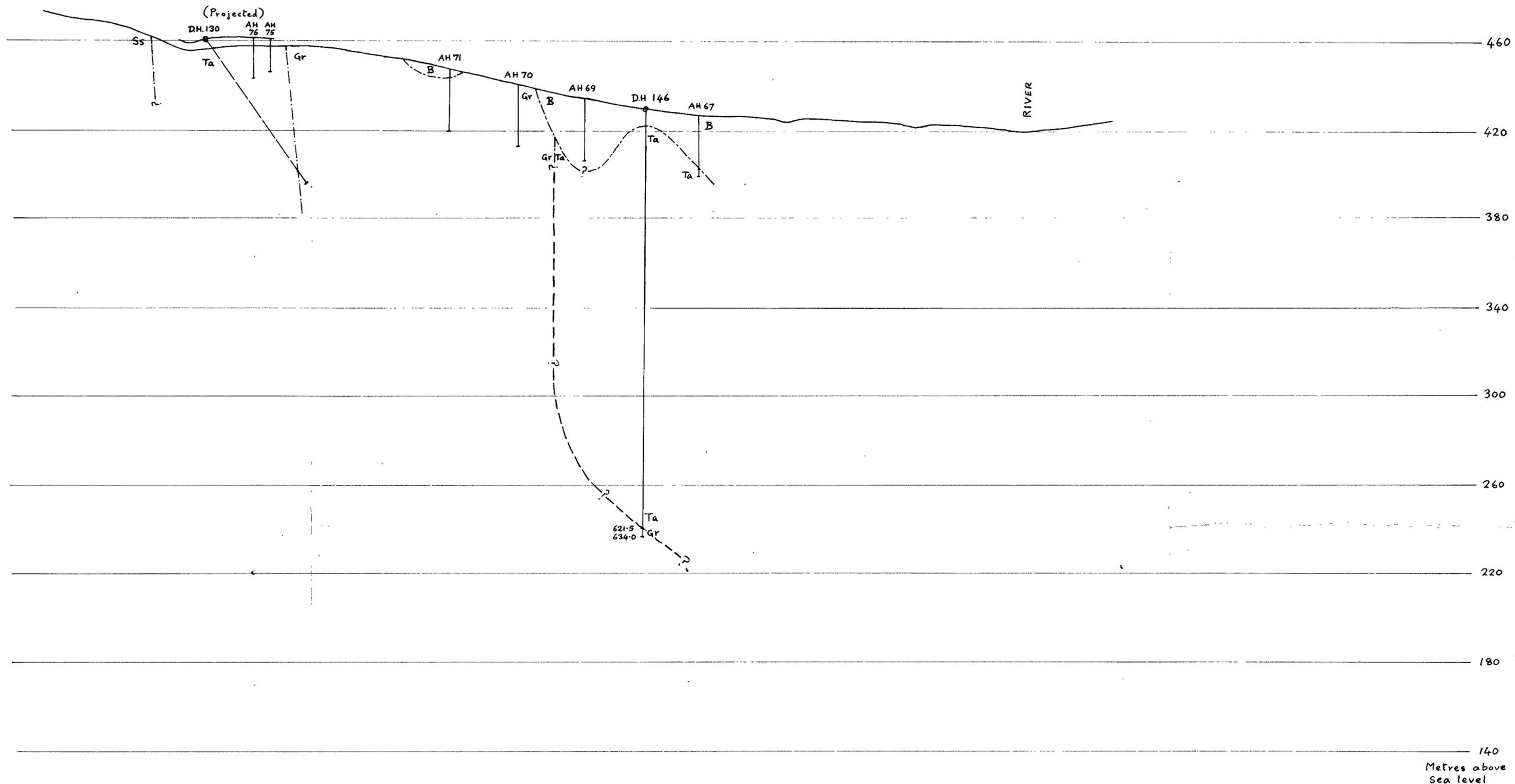
GEOLOGY	REFERENCE	SCALE	AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY											
<p>B Basalt (including sub-basalt sediments)</p> <p>Gr Granite</p> <p>Ta Tactite (skarn)</p> <p>Ss Sandstone</p> <p>▨ Scheelite moderate</p> <p>▩ Scheelite strong</p>	<p>= 0.59 Drill core assay in % WO₃</p>	<p>1:600</p> <p>Metres 10 5 0 10 20 30 40 50 60 Metres</p> <p>1 inch to 50 feet</p> <p>Feet 50 0 50 100 150 200 Feet</p>	<p>KARA TUNGSTEN PROJECT BURNIE, TASMANIA DRILLHOLE SECTION 143</p> <p>5 cm 74-1036</p> <table border="1"> <tr> <td>Prepared by, R.T. BRANDT</td> <td colspan="2">Drawn by, R.T. BRANDT</td> </tr> <tr> <td>Scale, 1:600</td> <td>Date, 18 MAR. 1974</td> <td>Proj. N^o X827-003</td> </tr> <tr> <td>Drawing N^o</td> <td>Report N^o</td> <td>Lib. N^o</td> </tr> </table>			Prepared by, R.T. BRANDT	Drawn by, R.T. BRANDT		Scale, 1:600	Date, 18 MAR. 1974	Proj. N ^o X827-003	Drawing N ^o	Report N ^o	Lib. N ^o
Prepared by, R.T. BRANDT	Drawn by, R.T. BRANDT													
Scale, 1:600	Date, 18 MAR. 1974	Proj. N ^o X827-003												
Drawing N ^o	Report N ^o	Lib. N ^o												



575016 PLATE 18

260
Metres above
sea level

ADDITIONS & NOTES	GEOLOGY	REFERENCE	SCALE	AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY
	<p>B Basalt (including sub-basalt sediments)</p> <p>Gr Granite</p> <p>Ta Tactite (skarn) M = Magnetite</p> <p>Ss Sandstone</p> <p>Scheelite moderate</p> <p>Scheelite strong</p>	<p>0.81 Drill core assay in % WO₃</p> <p>/ Dip of layering</p> <p>INFERRED MINERALIZATION:-</p> <p>Oxidized material</p> <p>Scheelite ore</p>	<p>1:600</p> <p>Metres 10 5 0 10 20 30 40 50 60 Metres</p> <p>1 inch to 50 feet</p> <p>Feet 50 0 50 100 150 200 Feet</p>	<p>KARA TUNGSTEN PROJECT BURNIE, TASMANIA DRILLHOLE SECTION 144</p> <p>74-1035</p> <p>Prepared by: R.T.B. Drawn by: R.T.B.</p> <p>Scale: 1:600 Date: 22 Mar. 1974 Proj. No X827-003</p> <p>Drawing No Report No Lib. No</p>



575017 PLATE 19

AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY

KARA TUNGSTEN PROJECT
BURNIE, TASMANIA

DRILLHOLE SECTION 146

5 cm

74-135

Prepared by, R.T.B.	Drawn by, R.T.B.
Scale, 1:1200 1 inch to 100 ft	Date, 22 Mar. 1974
Drawing N ^o	Proj. N ^o X827-003
Report N ^o	Lib. N ^o

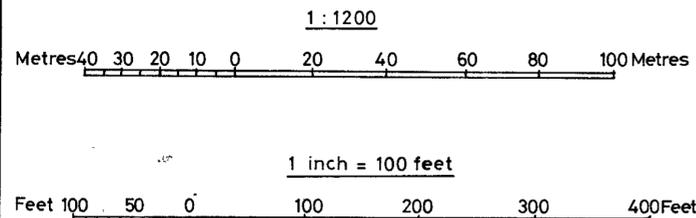
GEOLOGY

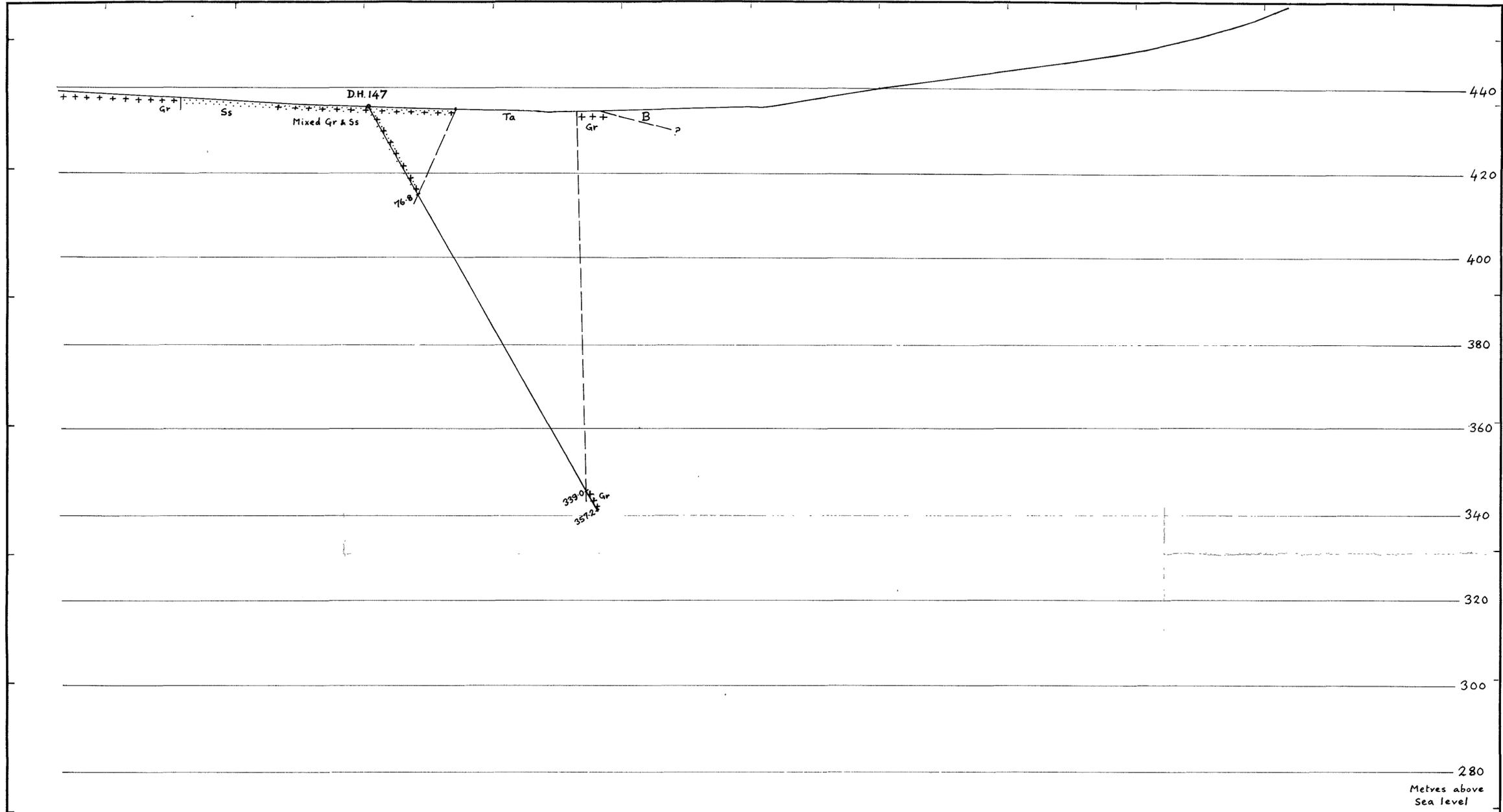
- B Basalt (including sub-basalt sediments)
- Gr Granite
- Ta Tactite (Skarn)
- Ss Sandstone
- Scheelite moderate
- Scheelite strong

REFERENCE

- DH.146 Diamond Drillhole
- A.H.112 Augur Hole
- 3450 Assay value in pp.m. WO₃
- 1.45% Assay value in % WO₃

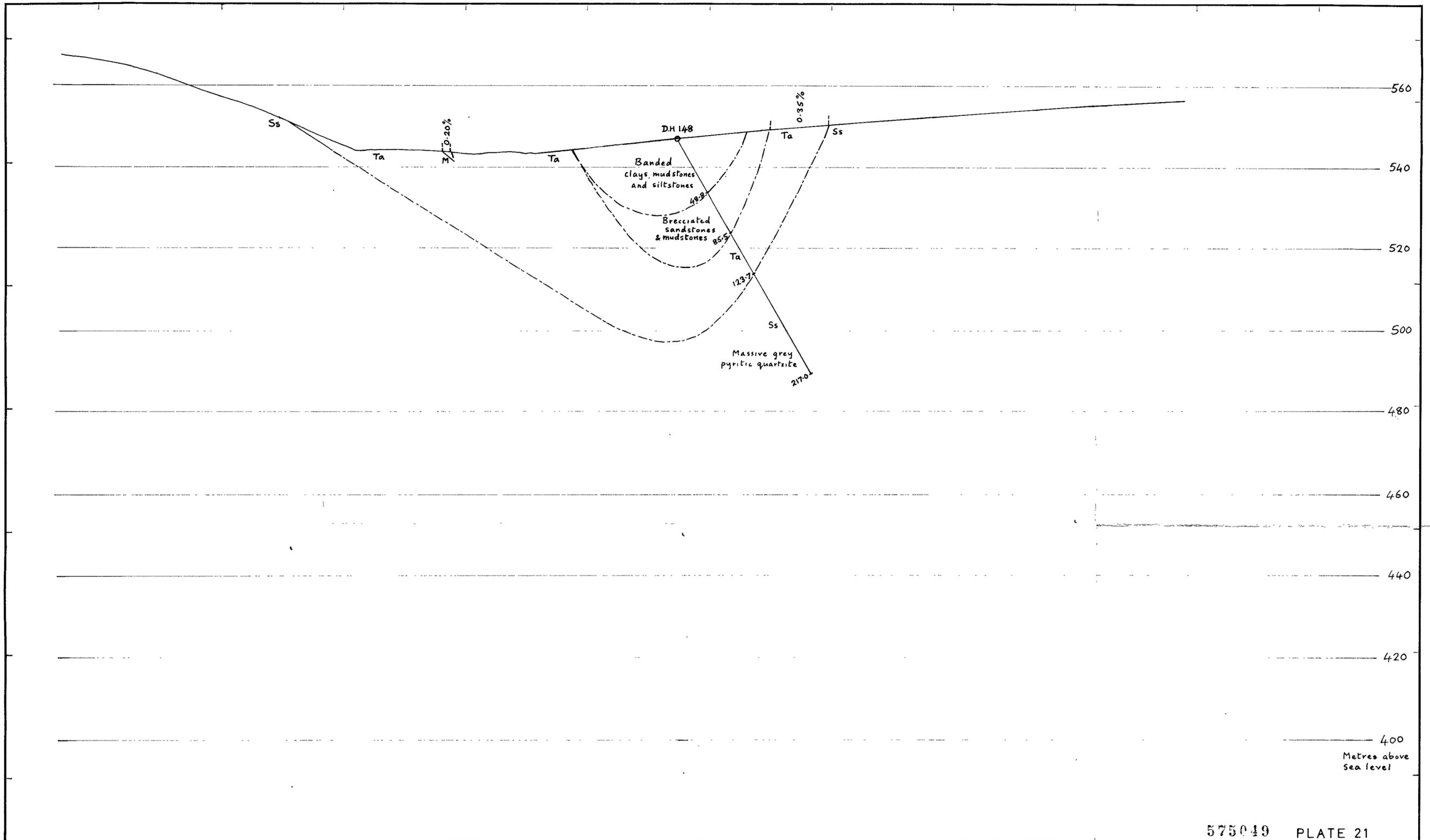
SCALE





575048 PLATE 20

GEOLOGY	REFERENCE	SCALE	AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY											
<p>B Basalt (including sub-basalt sediments)</p> <p>Gr Granite</p> <p>Ta Tactite (Skarn)</p> <p>Ss Sandstone</p> <p>▨▨▨▨ Scheelite moderate</p> <p>▩▩▩▩ Scheelite strong</p>	<p>DH147 Diamond Drillhole</p> <p>AH112 Augur Hole</p> <p>3450 Value in ppm. WO₃</p> <p>1.45% Value in % WO₃</p>	<p>1:600</p> <p>Metres 10 5 0 10 20 30 40 50 60 Metres</p> <p>1 inch = 50 feet</p> <p>Feet 50 0 50 100 150 200 Feet</p>	<p>KARA TUNGSTEN PROJECT BURNIE, TASMANIA</p> <p>DRILLHOLE SECTION 147.</p> <p>5 cm 74-1035</p> <table border="1"> <tr> <td>Prepared by, R.T.B.</td> <td colspan="2">Drawn by, R.T.B.</td> </tr> <tr> <td>Scale, 1:600</td> <td>Date, 27 Mar. '74.</td> <td>Proj. N^o X827-003</td> </tr> <tr> <td>Drawing N^o</td> <td>Report N^o</td> <td>Lib. N^o</td> </tr> </table>			Prepared by, R.T.B.	Drawn by, R.T.B.		Scale, 1:600	Date, 27 Mar. '74.	Proj. N ^o X827-003	Drawing N ^o	Report N ^o	Lib. N ^o
Prepared by, R.T.B.	Drawn by, R.T.B.													
Scale, 1:600	Date, 27 Mar. '74.	Proj. N ^o X827-003												
Drawing N ^o	Report N ^o	Lib. N ^o												

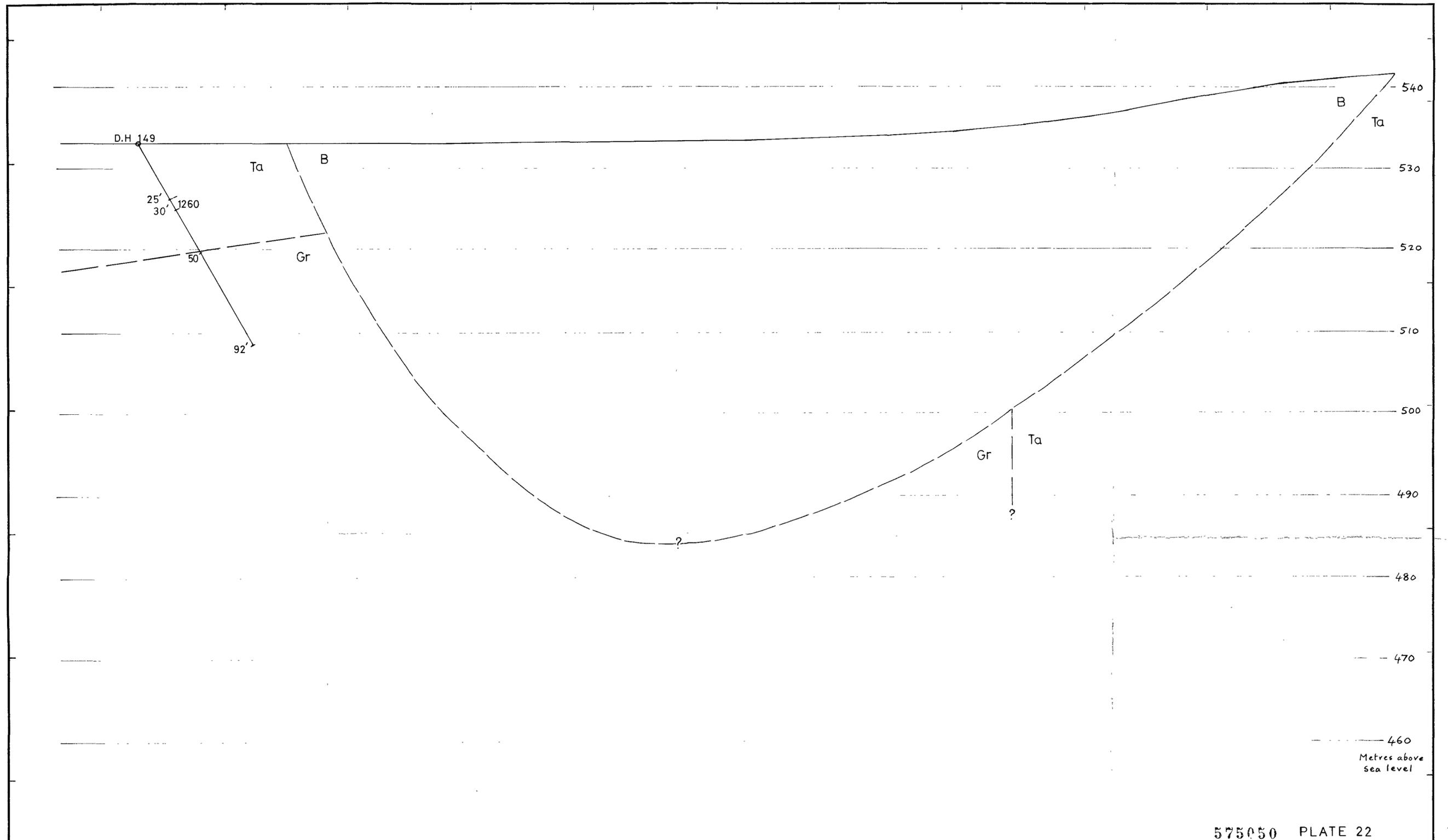


575049 PLATE 21

GEOLOGY	REFERENCE	SCALE	AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY											
<p>B Basalt (including sub-basalt sediments)</p> <p>Gr Granite</p> <p>Ta Tactite (Skarn)</p> <p>Ss Sandstone</p> <p>▨ Scheelite moderate</p> <p>▩ Scheelite strong</p>	<p>DH 148 Diamond Drillhole</p> <p>AH.112 Augur Hole</p> <p>3450 Assay value in p.p.m WO_3</p> <p>1.45% Assay value in % WO_3</p>	<p>1:600</p> <p>Metres 10 5 0 10 20 30 40 50 60 Metres</p> <p>1 inch to 50 feet</p> <p>Feet 50 0 50 100 150 200 Feet</p>	<p>KARA TUNGSTEN PROJECT BURNIE, TASMANIA</p> <p>74-1035</p> <p>DRILLHOLE SECTION 148</p> <table border="1" data-bbox="2116 1965 2764 2074"> <tr> <td>Prepared by, R.T.B</td> <td colspan="2">Drawn by, R.T.B.</td> </tr> <tr> <td>Scale, 1:600</td> <td>Date, 22 Mar. 1974</td> <td>Proj. N^o X827-003</td> </tr> <tr> <td>Drawing N^o</td> <td>Report N^o</td> <td>Lib. N^o</td> </tr> </table>			Prepared by, R.T.B	Drawn by, R.T.B.		Scale, 1:600	Date, 22 Mar. 1974	Proj. N ^o X827-003	Drawing N ^o	Report N ^o	Lib. N ^o
Prepared by, R.T.B	Drawn by, R.T.B.													
Scale, 1:600	Date, 22 Mar. 1974	Proj. N ^o X827-003												
Drawing N ^o	Report N ^o	Lib. N ^o												

400
Metres above
Sea level

5 cm

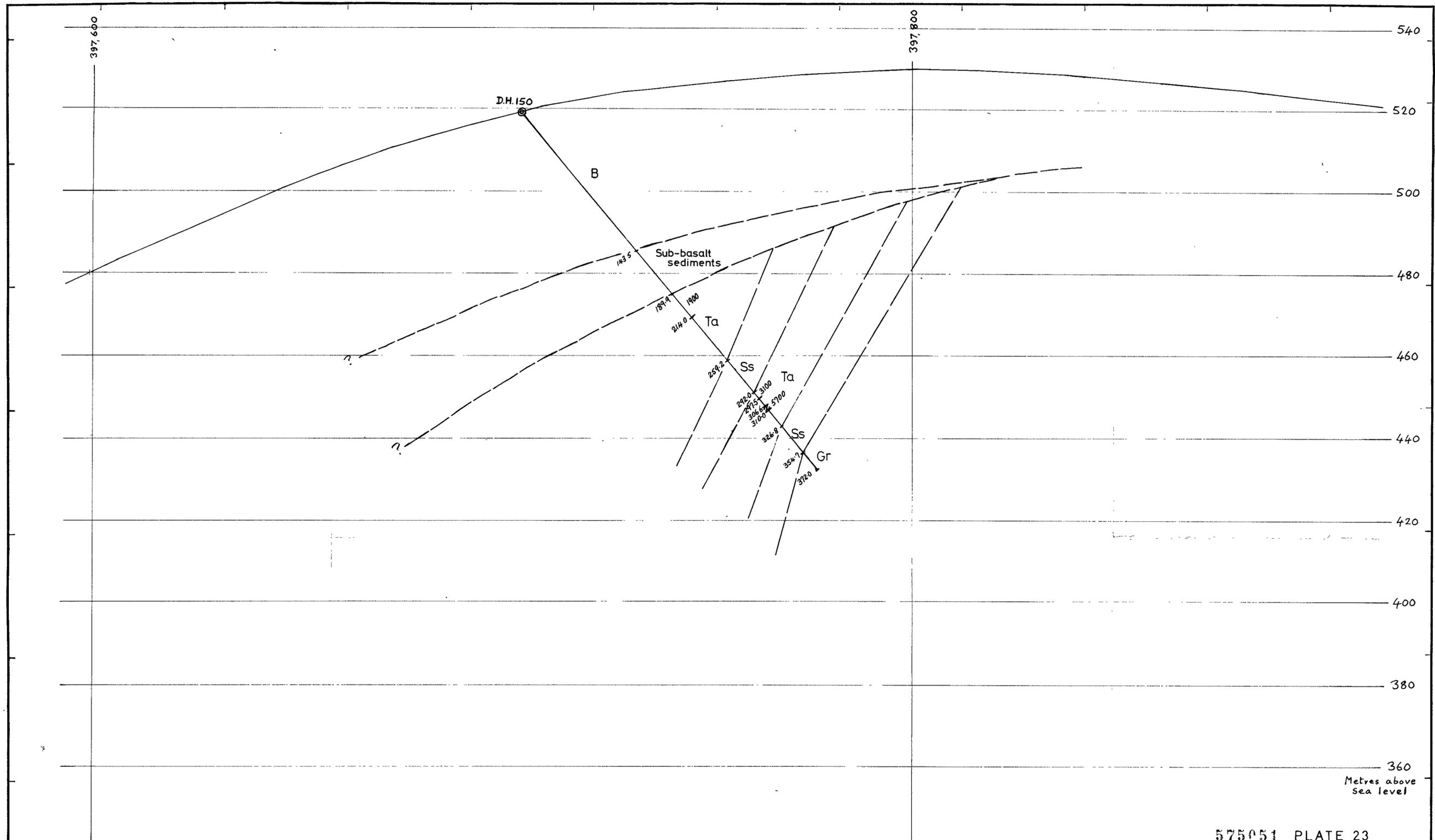


460
Metres above
sea level

575050 PLATE 22

GEOLOGY	REFERENCE	SCALE	AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY		
<p>B Basalt (including sub-basalt sediments)</p> <p>Gr Granite</p> <p>Ta Tactite (Skarn)</p> <p>Ss Sandstone</p> <p> Scheelite moderate</p>	<p>DH.149 Diamond Drillhole</p> <p>A.H.112 Auger Hole</p> <p>3450 Assay value in p.p.m WO₃</p> <p>1.45% Assay value in %WO₃</p>	<p>1 : 300</p> <p>Metres 10 5 0 5 10 15 20 25 Metres</p> <p>1 inch to 25 feet</p> <p>Feet 50 40 30 20 10 0 25 50 75 Feet</p>	<p>KARA TUNGSTEN PROJECT BURNIE, TASMANIA 74-1035</p> <p>DRILLHOLE SECTION 149.</p>		
Prepared by, R.T.B		Drawn by, A.L.L.			
Scale, 1 : 300		Date, 22 Mar. 1974		Proj. N ^o X827-003	
Drawing N ^o		Report N ^o		Lib. N ^o	

5 cm

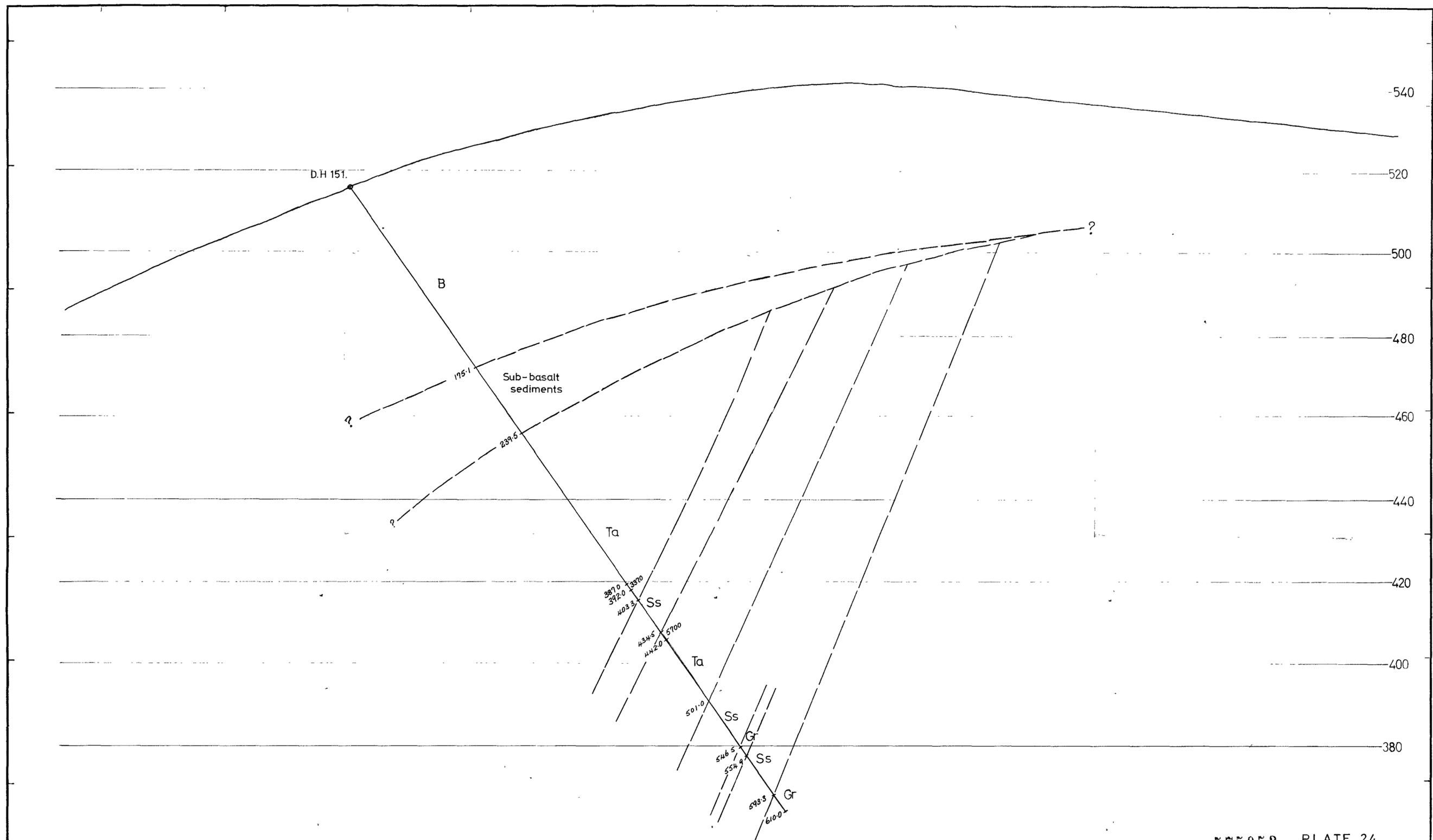


360
Metres above
sea level

575051 PLATE 23

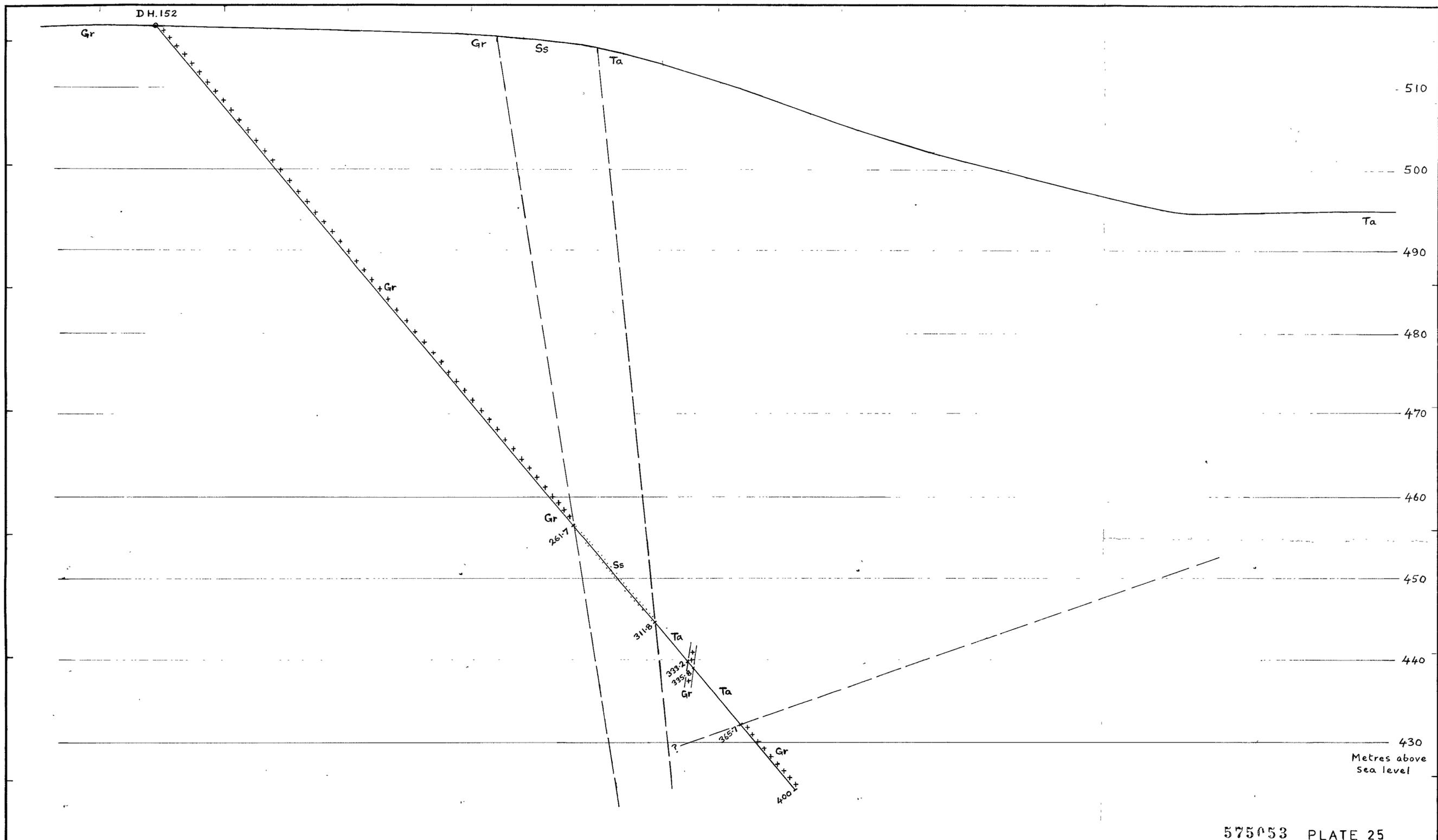
GEOLOGY	REFERENCE	SCALE	AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY											
<p>B Basalt (including sub-basalt sediments)</p> <p>Gr Granite</p> <p>Ta Tactite (Skarn)</p> <p>Ss Sandstone</p> <p> Scheelite moderate</p> <p> Scheelite strong</p>	<p> 0.59 Drill core assay in % WO₃</p> <p>3450 Drill core assay in p.p.m. WO₃</p> <p> D.H.150 Diamond Drillhole</p>	<p>1 : 600</p> <p>Metres 10 5 0 10 20 30 40 50 60 Metres</p> <p>1 inch to 50 feet</p> <p>Feet 50 0 50 100 150 200 Feet</p>	<p>KARA TUNGSTEN PROJECT BURNIE, TASMANIA.</p> <p>DRILLHOLE SECTION 150</p> <p>74-1035</p> <table border="1" data-bbox="2107 1954 2727 2057"> <tr> <td>Prepared by, R.T.B.</td> <td colspan="2">Drawn by, A.L.L.</td> </tr> <tr> <td>Scale, 1 : 600</td> <td>Date, 22 Mar. 1974</td> <td>Proj. N^o X827-003</td> </tr> <tr> <td>Drawing N^o</td> <td>Report N^o</td> <td>Lib. N^o</td> </tr> </table>			Prepared by, R.T.B.	Drawn by, A.L.L.		Scale, 1 : 600	Date, 22 Mar. 1974	Proj. N ^o X827-003	Drawing N ^o	Report N ^o	Lib. N ^o
Prepared by, R.T.B.	Drawn by, A.L.L.													
Scale, 1 : 600	Date, 22 Mar. 1974	Proj. N ^o X827-003												
Drawing N ^o	Report N ^o	Lib. N ^o												

5 cm



575052 PLATE 24

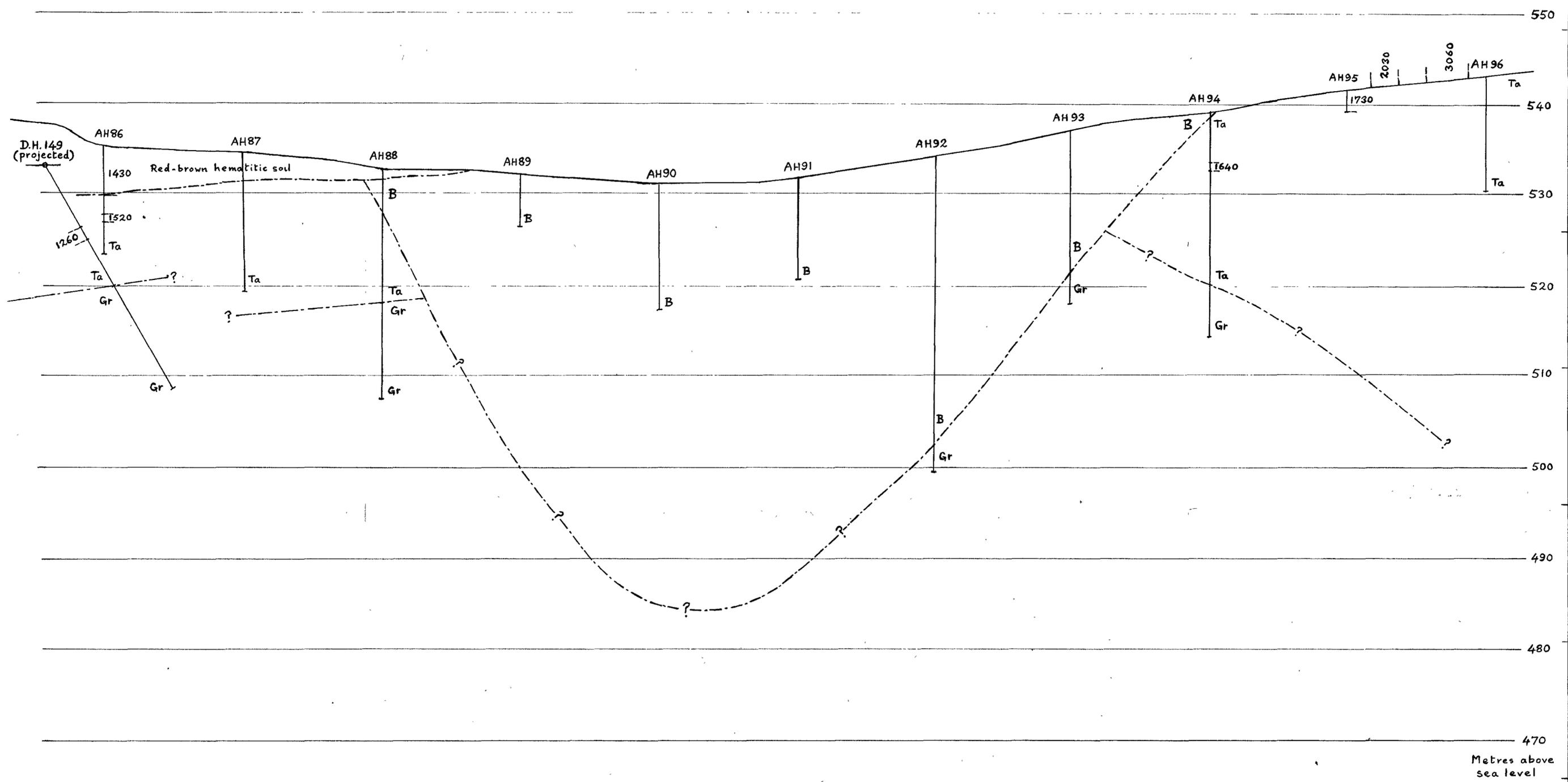
GEOLOGY	REFERENCE	SCALE	AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY
<p>B Basalt (including sub-basalt sediments)</p> <p>Gr Granite</p> <p>Ta Tactite (Skarn)</p> <p>Ss Sandstone or quartz-epidote contact rock</p>	<p>DH151 Diamond Drillhole</p> <p>5700 Drill core assay in p.p.m. WO₃</p>	<p>1:600</p> <p>Metres 10 5 0 10 20 30 40 50 60 Metres</p> <p>1 inch to 50 feet</p> <p>Feet 50 0 50 100 150 200 Feet</p>	<p>KARA TUNGSTEN PROJECT BURNIE, TASMANIA</p> <p>DRILLHOLE SECTION 151.</p> <p>5 cm</p> <p>74-1035</p> <p>Prepared by, R.T.B. Drawn by, A.L.L.</p> <p>Scale, 1:600 Date, 30 Apr 1974 Proj. N^o X827-003</p> <p>Drawing N^o Report N^o Lib. N^o</p>



Metres above sea level

575053 PLATE 25

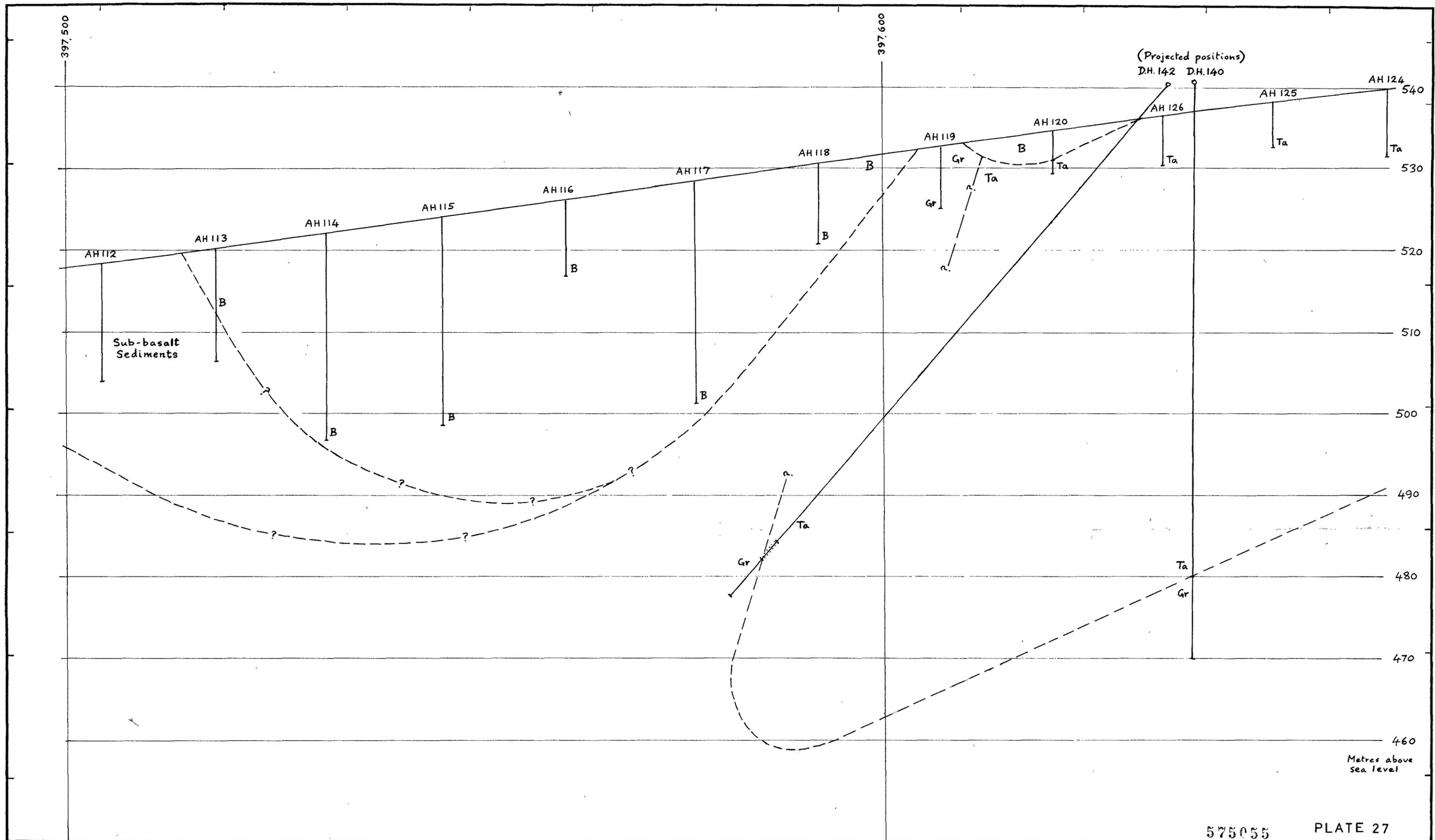
GEOLOGY	REFERENCE	SCALE	AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY
<p>B Basalt (including sub-basalt sediments)</p> <p>Gr Granite</p> <p>Ta Tactite (Skarn)</p> <p>Ss Sandstone or quartz-epidote contact rock</p>	<p>——— Inferred geological boundary</p>	<p>1:300</p> <p>Metres 10 5 0 5 10 15 20 25 Metres</p> <p>1 inch to 25 feet</p> <p>Feet 50 40 30 20 10 0 25 50 75 Feet</p>	<p>KARA TUNGSTEN PROJECT BURNIE, TASMANIA</p> <p>DRILLHOLE SECTION 152</p> <p>5 cm</p> <p>74-1035</p> <p>Prepared by, RT.B. Drawn by, RT.B.</p> <p>Scale, 1:300 Date, June 1974 Proj. N^o X827-003</p> <p>Drawing N^o Report N^o Lib. N^o</p>



470
Metres above
sea level

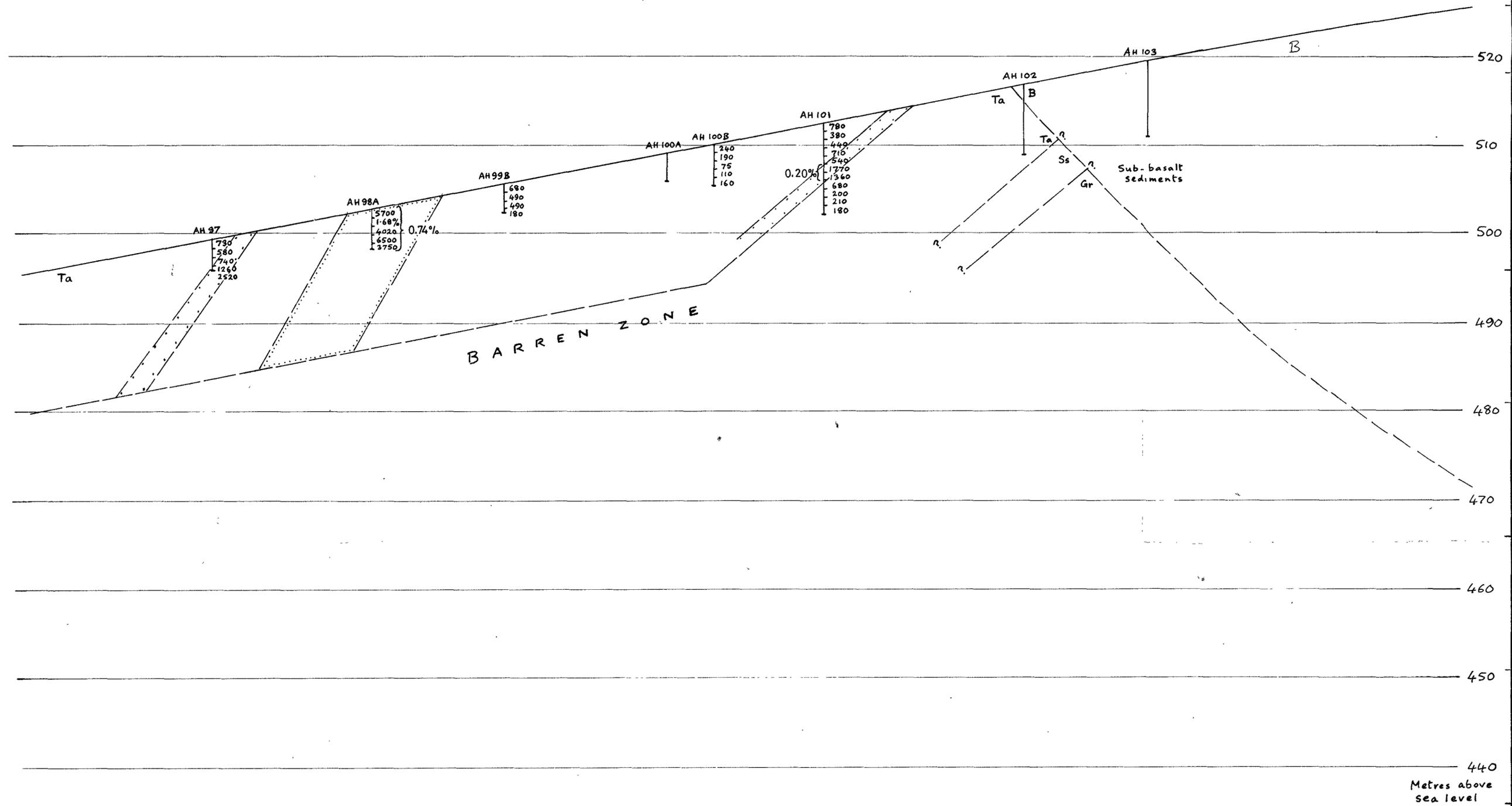
575054 PLATE 26

GEOLOGY	REFERENCE	SCALE	AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY											
<p>B Basalt (including sub-basalt sediments)</p> <p>Gr Granite</p> <p>Ta Tactite (Skarn)</p> <p>Ss Sandstone or quartz-epidote contact rock</p>	<p>D.H. 149 Diamond drillhole</p> <p>AH 86 Augur hole</p> <p>1430 Value in ppm. WO₃</p> <p>Geological boundary</p>	<p>1 : 300</p> <p>Metres 10 5 0 5 10 15 20 25 Metres</p> <p>1 inch to 25 feet</p> <p>Feet 50 40 30 20 10 0 25 50 75 Feet</p>	<p>KARA TUNGSTEN PROJECT BURNIE, TASMANIA</p> <p>KARA N^o.1 EAST LIMB SECTION THROUGH AUGUR HOLES 86 - 96</p> <p>5 cm</p> <p>74-1035</p> <table border="1"> <tr> <td>Prepared by, R.T.B.</td> <td colspan="2">Drawn by, R.T.B.</td> </tr> <tr> <td>Scale, 1 : 300</td> <td>Date, June 1974</td> <td>Proj. N^o X827-003</td> </tr> <tr> <td>Drawing N^o</td> <td>Report N^o</td> <td>Lib. N^o</td> </tr> </table>			Prepared by, R.T.B.	Drawn by, R.T.B.		Scale, 1 : 300	Date, June 1974	Proj. N ^o X827-003	Drawing N ^o	Report N ^o	Lib. N ^o
Prepared by, R.T.B.	Drawn by, R.T.B.													
Scale, 1 : 300	Date, June 1974	Proj. N ^o X827-003												
Drawing N ^o	Report N ^o	Lib. N ^o												

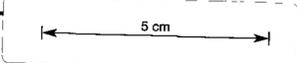


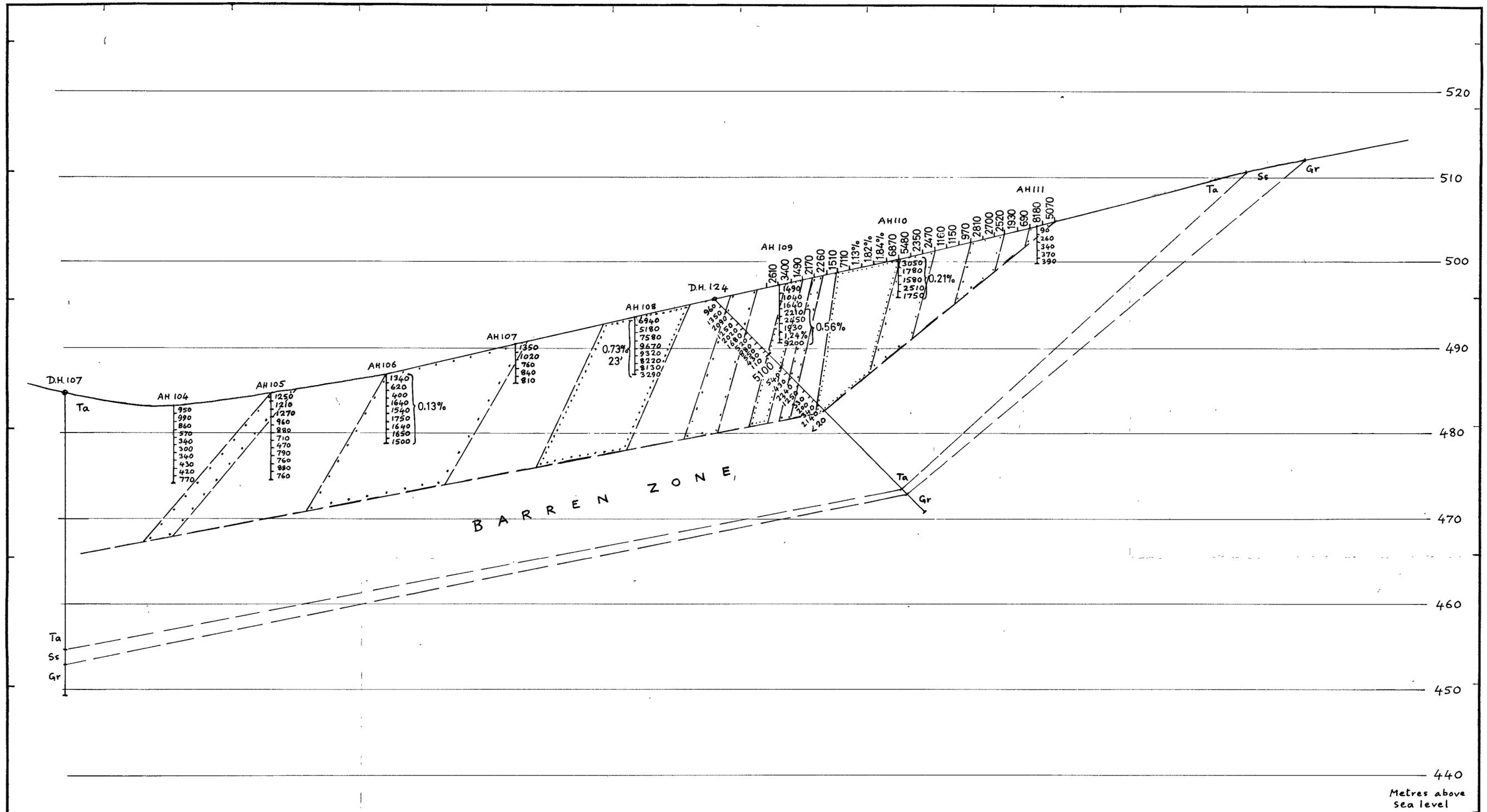
575055 PLATE 27

GEOLOGY	REFERENCE	SCALE	AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY
<p>B Basalt (including sub-basalt sediments)</p> <p>Gr Granite</p> <p>Ta Tactite (Skarn)</p> <p>Ss Sandstone</p>	<p>D.H.142 Diamond Drillhole</p> <p>A.H.112 Augur Hole</p> <p>3450 Assay value in p.p.m. WO₃</p> <p>1.45% Assay value in %WO₃</p>	<p>1:300</p> <p>Metres 10 5 0 5 10 15 20 25 Metres</p> <p>1 inch to 25 feet</p> <p>Feet 50 40 30 20 10 0 25 50 75 Feet</p> <p>5 cm</p>	<p>KARA TUNGSTEN PROJECT BURNIE, TASMANIA</p> <p>KARA N^o.1 EAST LIMB SECTION THROUGH AUGUR HOLES 112-124</p> <p>74-1035</p> <p>Prepared by, R.T BRANDT Drawn by, R.T.BRANDT</p> <p>Scale, 1:300 Date, 21 Mar. 1974 Proj. N^o X827-003</p> <p>Drawing N^o Report N^o Lib. N^o</p>



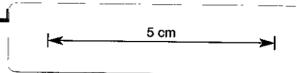
575056 PLATE 28

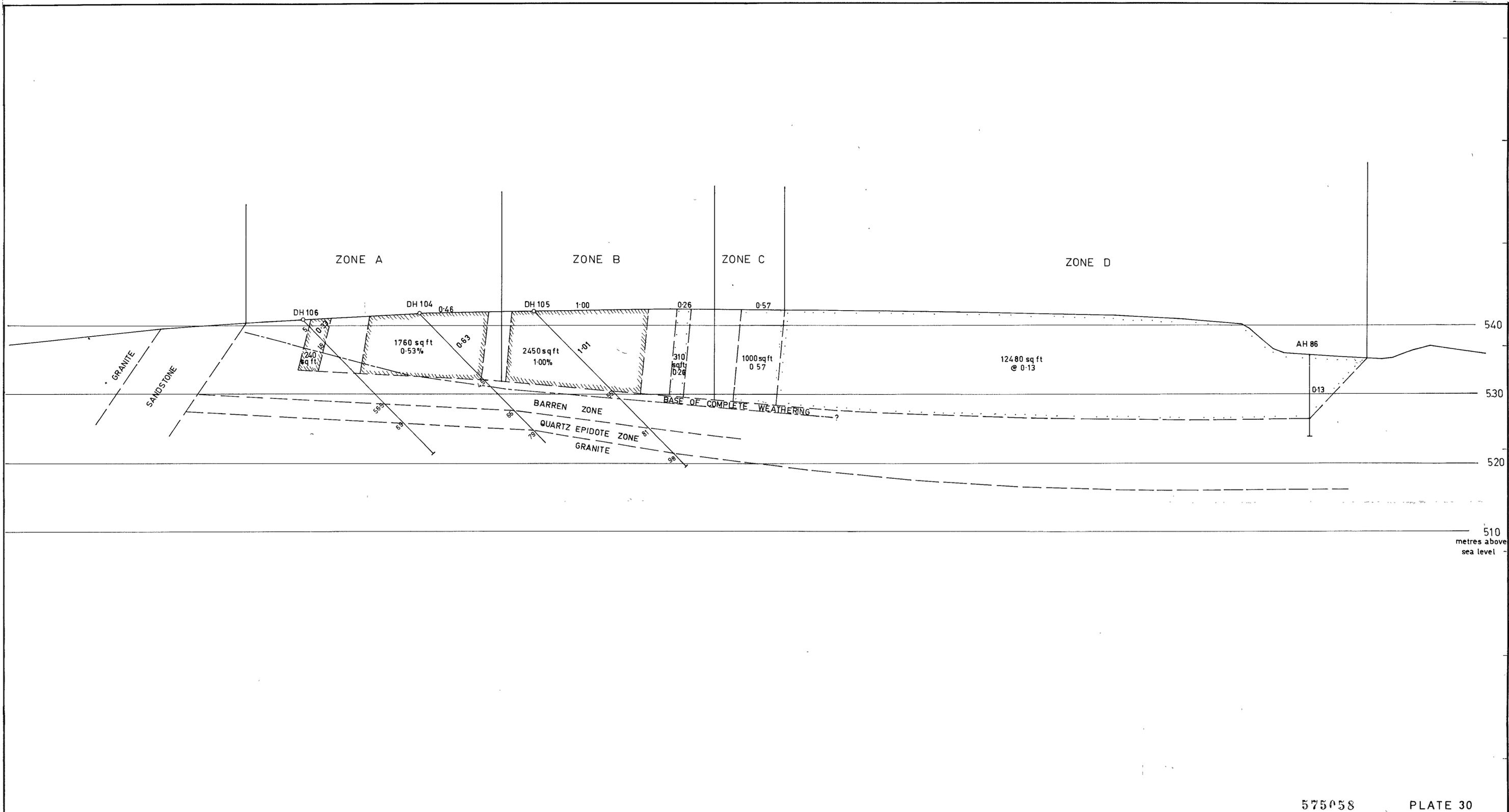
GEOLOGY	REFERENCE	SCALE	AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY
<p>B Basalt (including sub-basalt sediments)</p> <p>Gr Granite</p> <p>Ta Tactite (skarn)</p> <p>Ss Sandstone</p>	<p>AH 97 Augur Hole</p> <p>1150 Assay value in ppm WO₃</p> <p>145% Assay value in % WO₃</p> <p>INFERRED MINERALIZATION:-</p> <p> Cut-off 2000 ppm.</p> <p> Cut-off 1000 ppm.</p>	<p>1:300</p> <p>Metres 10 5 0 5 10 15 20 25 Metres</p> <p>1 inch to 25 feet</p> <p>Feet 50 40 30 20 10 0 25 50 75 Feet</p> <p></p>	<p>KARA TUNGSTEN PROJECT BURNIE, TASMANIA KARA NO.1 EAST LIMB SECTION THROUGH AUGUR HOLES 97-103 74-1035</p> <p>Prepared by, R.T. BRANDT Drawn by, R.T. BRANDT</p> <p>Scale, 1:300 Date, 15 Mar. 1974 Proj. N^o X827-003</p> <p>Drawing N^o Report N^o Lib. N^o</p>



575057 PLATE 29

GEOLOGY	REFERENCE	SCALE	AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY
<p>B Basalt (including sub-basalt sediments)</p> <p>Gr Granite</p> <p>Ta Tactite (skarn)</p> <p>Ss Sandstone</p>	<p>DH.124 Diamond Drillhole</p> <p>AH106 Augur Hole</p> <p>3450 Assay value in ppm WO₃</p> <p>1.44% Assay value in % WO₃</p> <p>INFERRED MINERALIZATION:-</p> <p>⋯ Cut-off 2000 ppm.</p> <p>- - - Cut-off 1000 ppm.</p>	<p>1 : 300</p> <p>Metres 10 5 0 5 10 15 20 25 Metres</p> <p>1 inch to 25 feet</p> <p>Feet 50 40 30 20 10 0 25 50 75 Feet</p>	<p>KARA TUNGSTEN PROJECT</p> <p>BURNIE, TASMANIA</p> <p>KARA NO.1 EAST LIMB</p> <p>SECTION THROUGH AUGUR HOLES 104-111</p> <p>74-1035</p> <p>Prepared by, R.T. BRANDT Drawn by, R.T. BRANDT</p> <p>Scale, 1 : 300 Date, 8 Mar. 1974 Proj. N^o X827-003</p> <p>Drawing N^o Report N^o Lib. N^o</p>

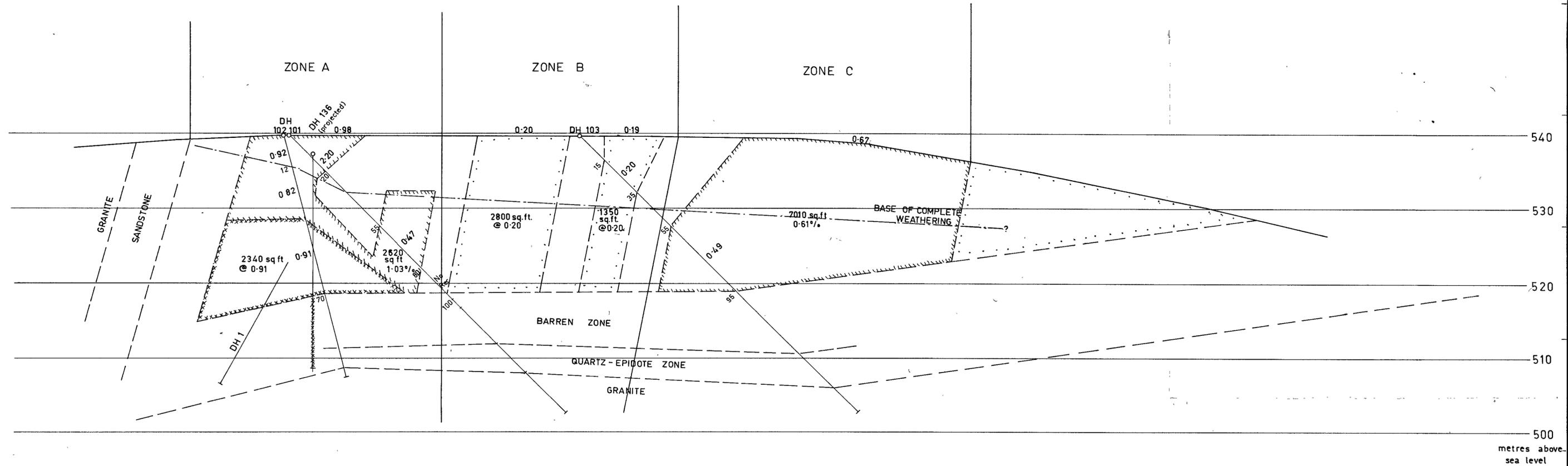




510 metres above sea level

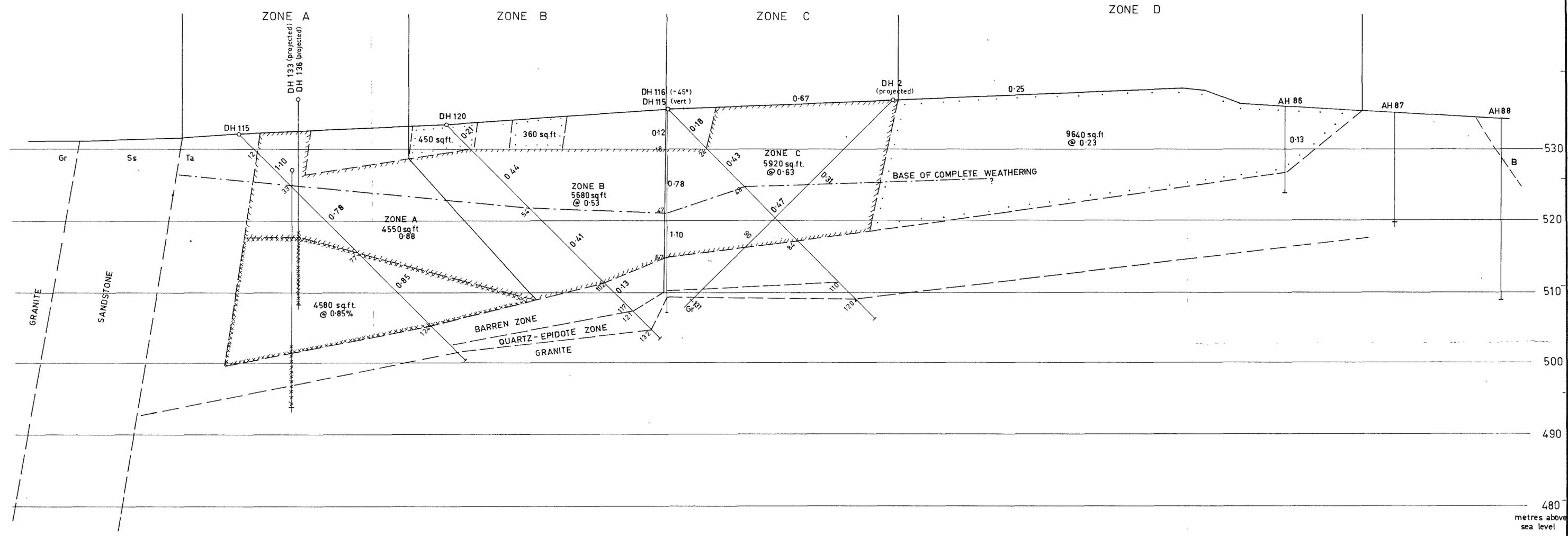
575058 PLATE 30

GEOLOGY		REFERENCE		SCALE		AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY		
B	Basalt (including sub-basalt sediment)	INDICATED	Scheelite Ore	Cut-off ppm W	2000	1 : 300		KARA TUNGSTEN PROJECT BURNIE, TASMANIA ORE RESERVE DRILLHOLE SECTION 104 5 cm
Gr	Granite	INDICATED	Oxidized Material	2000	Metres 10 5 0 5 10 15 20 25 Metres			
Ta	Tactite (Skarn)	INFERRED	Oxidized Material	2000	1 inch to 25 feet		74-1035	
Ss	Sandstone or quartz-epidote contact rock	INFERRED	Oxidized Material	1000	Feet 50 40 30 20 10 0 25 50 75 Feet			
						Prepared by, R.T. BRANDT Drawn by,		
						Scale, 1 300 Date, 29 Apr 1974 Proj. N ^o X 827-003		
						Drawing N ^o Report N ^o Lib. N ^o		



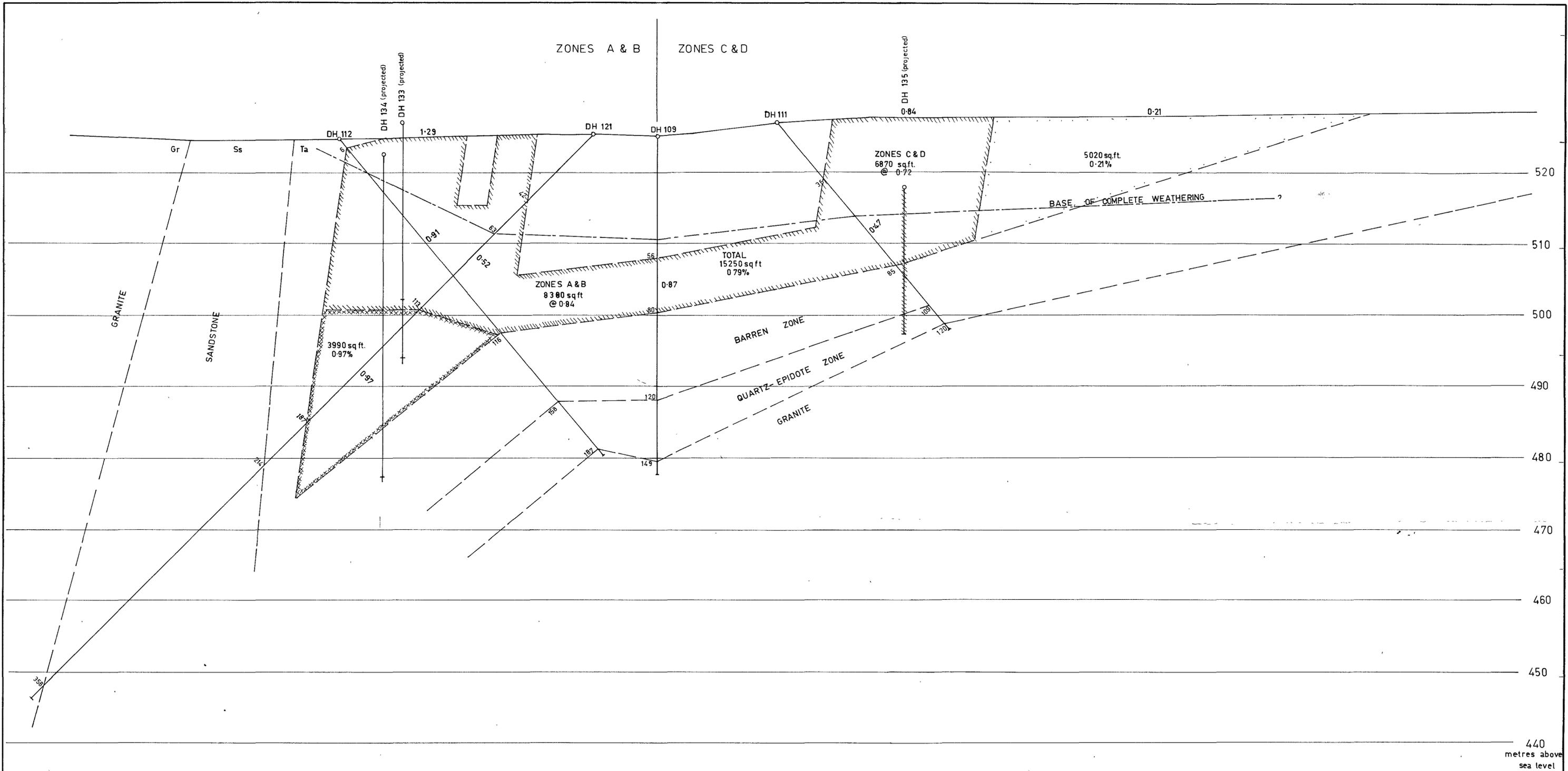
575059 PLATE 31

GEOLOGY		REFERENCE		SCALE		AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY		
B	Basalt (including sub-basalt sediments)	INDICATED	[Symbol]	Scheelite Ore	2000	1 : 300		KARA TUNGSTEN PROJECT BURNIE, TASMANIA
Gr	Granite		[Symbol]	Oxidized Material	2000	Metres 10 5 0 5 10 15 20 25 Metres		ORE RESERVE
Ta	Tactite (Skarn)	INFERRED	[Symbol]	Oxidized Material	2000	1 inch to 25 feet		DRILLHOLE SECTION 101
Ss	Sandstone or quartz-epidote contact rock		[Symbol]	Oxidized Material	1000	Feet 50 40 30 20 10 0 25 50 75 Feet		5 cm
								74-1035
								Prepared by, R. T. BRANDT
								Drawn by,
								Scale, 1 : 300
								Date, 29 Apr 1974
								Proj. N ^o X827-003
								Report N ^o
								Lib. N ^o



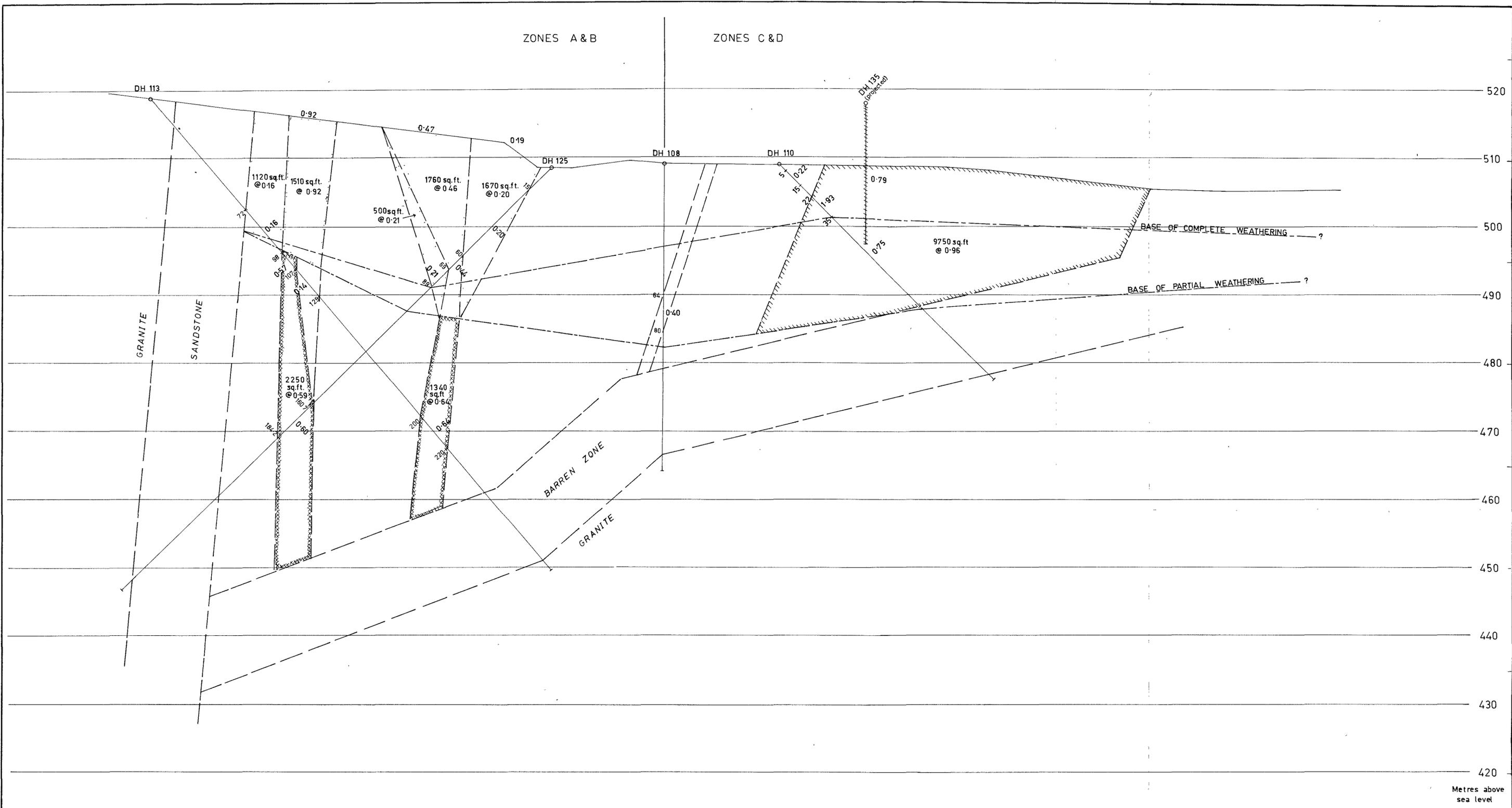
575060 PLATE 32

GEOLOGY		REFERENCE		SCALE		AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY KARA TUNGSTEN PROJECT BURNIE, TASMANIA ORE RESERVE DRILLHOLE SECTION 115 74-1035			
B	Basalt (including sub-basalt sediments)	INDICATED	 Scheelite Ore  Oxidized Material	2000	2000	1 : 300 Metres 10 5 0 5 10 15 20 25 Metres Feet 50 40 30 20 10 0 25 50 75 Feet		Prepared by, R. T. BRANDT	Drawn by,
Gr	Granite	INFERRED	 Oxidized Material  Oxidized Material	2000	1000				
Ta	Tactite (Skarn)								
Ss	Sandstone or quartz-epidote contact rock								
						Scale, 1 : 300 Date, 29 Apr 1974 Proj. N ^o X827-003 Drawing N ^o Report N ^o Lib. N ^o			



575061 PLATE 33

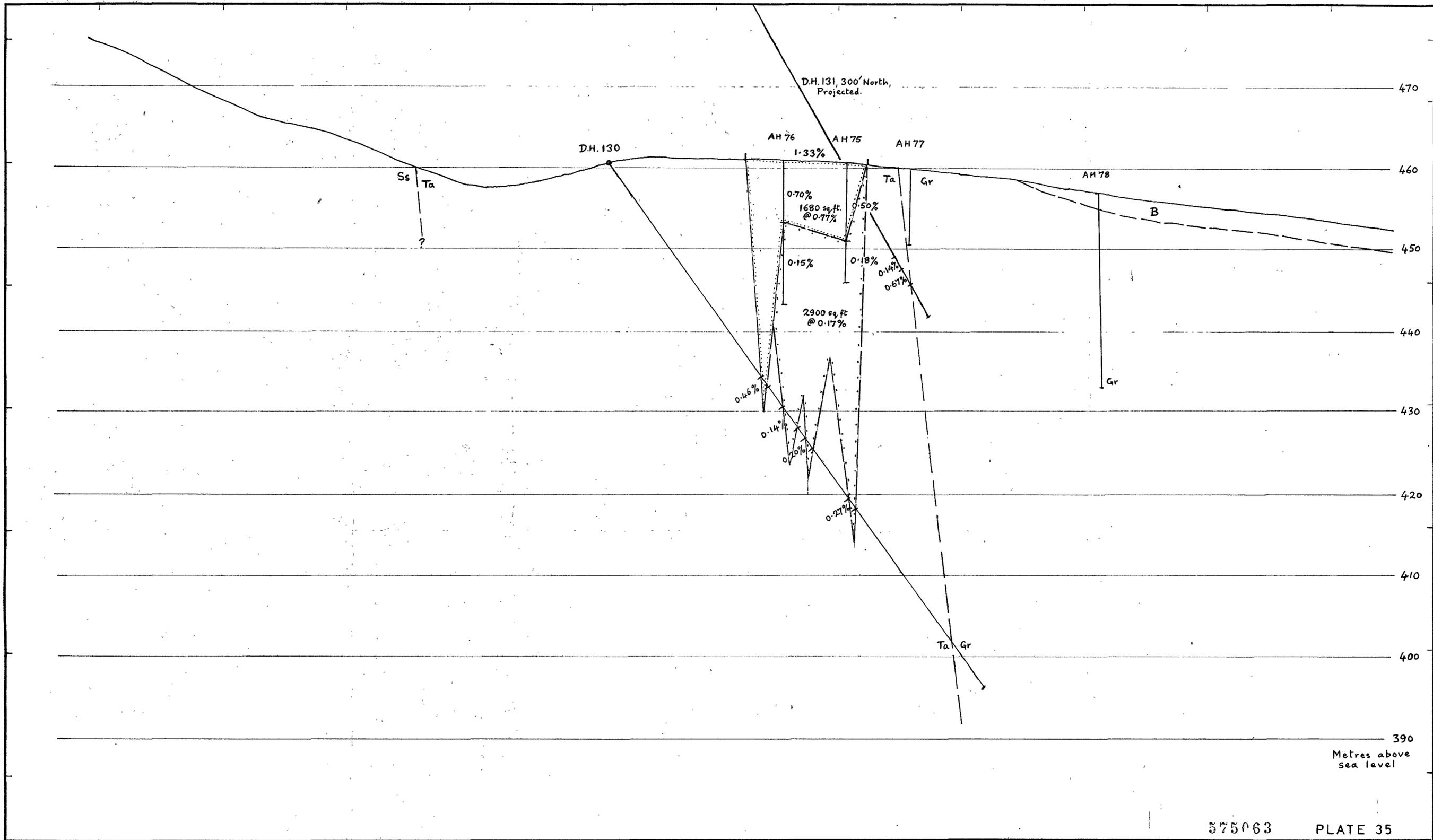
GEOLOGY		REFERENCE		SCALE		AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY			
B	Basalt (including sub-basalt sediments)	INDICATED	Scheelite Ore	Cut-off ppm W	1:300		KARA TUNGSTEN PROJECT		
Gr	Granite	INFERRED	Oxidized Material	2000	Metres 10 5 0 5 10 15 20 25 Metres		BURNIE, TASMANIA		
Ta	Tactite (Skarn)		Oxidized Material	2000	1 inch to 25 feet		ORE RESERVE		
Ss	Sandstone or quartz-epidote contact rock		Oxidized Material	1000	Feet 50 40 30 20 10 0 25 50 75 Feet		DRILLHOLE SECTION 109		
					5 cm		74-1035		
							Prepared by, R.T. BRANDT	Drawn by,	
							Scale, 1:300	Date, 29 Apr 1974	Proj. N ^o X827-003
							Drawing N ^o	Report N ^o	Lib. N ^o



Metres above sea level

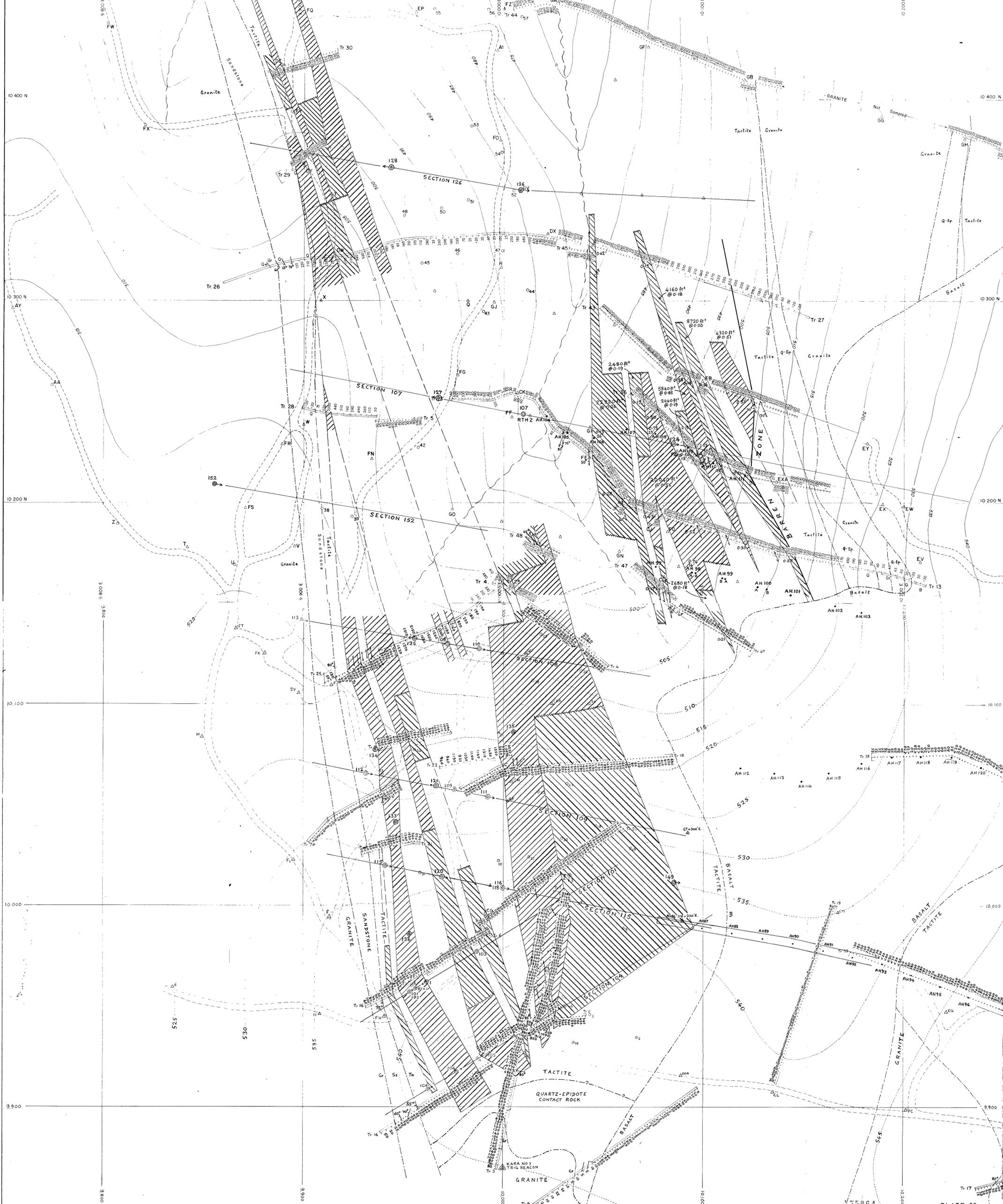
575062 PLATE 34

GEOLOGY		REFERENCE		SCALE		AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY	
B	Basalt (including sub-basalt sediments)	INDICATED	Oxidized Material	2000	<p style="text-align: center;">1:300</p> <p style="text-align: center;">Metres 10 5 0 5 10 15 20 25 Metres</p> <p style="text-align: center;">1 inch to 25 feet</p> <p style="text-align: center;">Feet 50 40 30 20 10 0 25 50 75 Feet</p>	KARA TUNGSTEN PROJECT BURNIE, TASMANIA	
Gr	Granite	INFERRED	Scheelite Ore	2000		ORE RESERVE DRILLHOLE SECTION 108	
Ta	Tactite (Skarn)		Oxidized Material	2000		74-1035	
Ss	Sandstone or quartz epidote contact rock		Oxidized Material	1000		Prepared by, R. T. BRANDT Drawn by,	
						Scale, 1:300 Date, 29 Apr 1974 Proj. N ^o X827-003	
						Drawing N ^o Report N ^o Lib. N ^o	



575063 PLATE 35

GEOLOGY	REFERENCE	SCALE	AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY
<p>B Basalt (including sub-basalt sediments)</p> <p>Gr Granite</p> <p>Ta Tactite (Skarn)</p> <p>Ss Sandstone or quartz-epidote contact rock</p>	<p>D.H. 130 Diamond drillhole</p> <p>AH 75 Auger hole</p> <p>0.46% Value in % WO₃</p> <p>INFERRED MINERALIZATION :-</p> <p> Cut-off 2000 p.p.m.</p> <p> Cut-off 1000 p.p.m.</p>	<p>1 : 300</p> <p>Metres 10 5 0 5 10 15 20 25 Metres</p> <p>1 inch to 25 feet</p> <p>Feet 50 40 30 20 10 0 25 50 75 Feet</p>	<p>KARA TUNGSTEN PROJECT BURNIE, TASMANIA ORE RESERVE DRILLHOLE SECTION 130</p> <p style="text-align: right;">74-1035</p> <p>Prepared by, R.T.B. Drawn by, RTB</p> <p>Scale, 1 : 300 Date, 29 Apr. 1974 Proj. N^o X827-003</p> <p>Drawing N^o Report N^o Lib. N^o</p>



ADDITIONS & NOTES

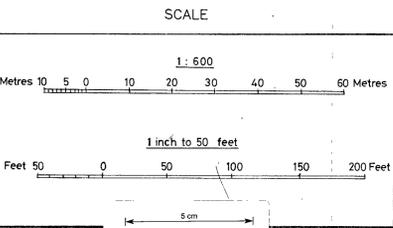
DETAILS OF KARA NO 1 TRIG BEACON
 Coordinates on State Yard Grid -
 912 068 49 yds North
 379 363 46 yds East
 Grid Bearing from St Valentine's Trig Point -
 18° 42' 33"
 Altitude above Sea Level Datum -
 539.86 metres (1771.2 feet)
 Coordinates on local Company Metric Grid -
 9870 metres North
 10,000 metres East

REFERENCE

0.63 Trench sample values in ppm W
 0.73 Average value of trench intersection in % WO₃
 23' Auger hole intersection, average value in % WO₃ and depth in feet

TUNGSTEN MINERALIZATION AT SURFACE

Area of tungsten mineralization at surface in square feet and average value in % WO₃



75064 PLATE 36

AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY

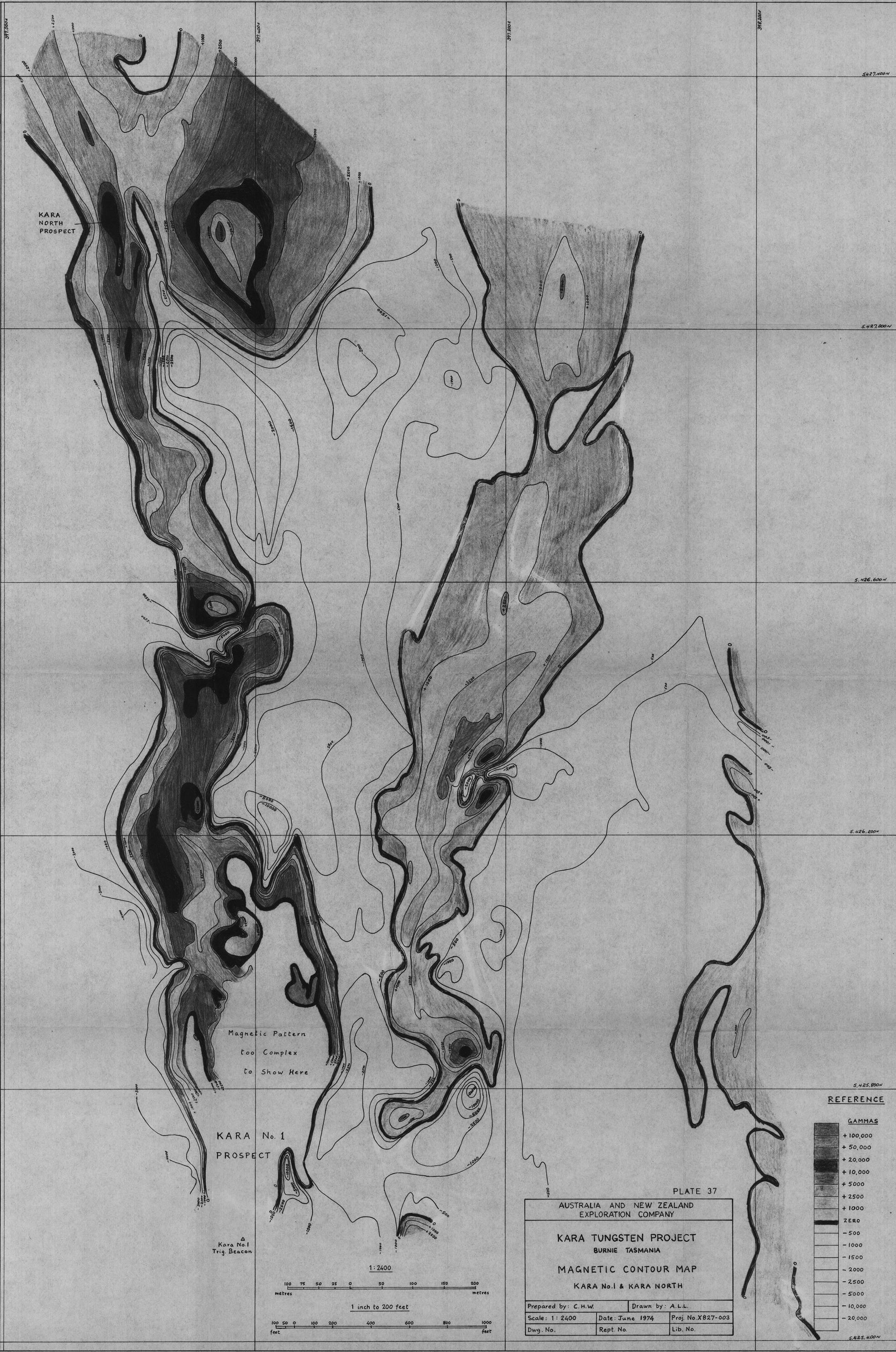
74-1035

KARA TUNGSTEN PROJECT
 BURNIE, TASMANIA

KARA No 1

TRENCH ASSAY PLAN

Prepared by, R.T.B. Drawn by, R.T.B. & A.L.L.
 Scale, 1:600 Date, 30 April, 1974. Proj. No, X827-003
 Drawing No Report No Lib. No



REFERENCE

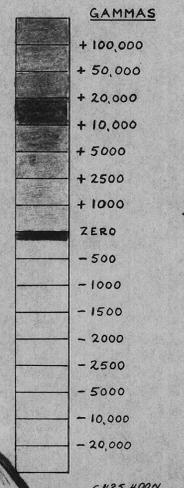


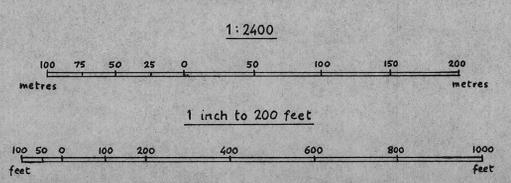
PLATE 37

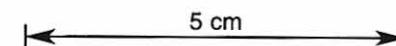
AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY

KARA TUNGSTEN PROJECT
BURNIE TASMANIA

MAGNETIC CONTOUR MAP
KARA No.1 & KARA NORTH

Prepared by: C.H.W.	Drawn by: A.L.L.
Scale: 1:2400	Date: June 1974
Dwg. No.	Proj. No. X827-003
Rept. No.	Lib. No.





DRILL HOLE NO. 150

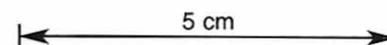
SHEET NO. 3 OF 6

FOOTAGE				DESCRIPTION	GRAPHIC LOG	CORE RECOVERY	A S S A Y S																	
From	To	Interval	Recovery				FOOTAGE																	
							From	To	Interval															
185.5	189.5	4.0	3.8	<p>From 183.9-184.9', a rather pink incompletely consolidated conglomeratic grit occurs, probably after a phase of weathering and transport dominantly from granite.</p> <p>A few banded siltstone interbeds occur, for example at 147', thinly bedded at 50-55° intersected; the lowermost bed of this narrow group over an inch or so, truncates some narrow wispy interbedding over another inch or so which is lying almost parallel to the core axis. At 187', there is also some thin bedding within a rather clayey zone, intersected at 60°.</p> <p>143.0-143.8': Basalt/sub-basaltic breccia contact zone, principally clay and broken basalt fragments.</p> <p>133.5': A few sandstone pebbles seem to "contain" minor magnetite/goethite as well as having small fragments of magnetite around their margins, which is a trifle puzzling. The black material in the pebbles is, however, elongate and appears to join up with the marginal magnetite fragments. Probably it is a weathering effect, goethite derived from the magnetite penetrating along fine fractures in the pebbles and to some extent spreading out from such.</p> <p>189.9-259.2': "Upper" or Westsly Skarn Unit:</p> <p>189.9-239.8': Virtually Completely Weathered:</p> <p>189.9-214.8': Originally High Magnetite rocks?:</p> <p>189.9-201.4': The highly weathered rock is dominantly black earthy goethite with some medium yellow-brown limonitic clay and is thought to represent an original high magnetite rock, possibly around 65-70% magnetite. Some relict banding</p>																				
189.5	194.5	5.0	5.0																					
194.5	199.2	4.7	4.7																					
199.2	204.2	5.0	4.8																					
204.2	209.2	5.0	5.2																					
209.2	214.0	4.8	4.8																					
214.0	219.1	5.1	5.3																					
219.1	222.0	2.9	2.6																					
222.0	227.1	5.1	5.2																					
227.1	231.7	4.6	4.3																					
231.7	236.0	4.3	4.1																					
236.0	239.7	3.7	3.4																					
239.7	242.0	2.3	2.5																					
242.0	247.0	5.0	5.0																					
247.0	252.0	5.0	5.1																					
252.0	254.0	2.0	1.5																					
254.0	259.0	5.0	5.2																					
259.0	262.0	3.0	2.7																					
262.0	264.0	2.0	0.8																					
264.0	267.0	3.0	1.4																					
267.0	268.2	1.2	1.2																					
268.2	270.0	1.8	1.4																					
270.0	272.8	2.8	2.5																					
272.8	276.8	4.0	2.3																					
276.8	278.0	1.2	0.2																					
278.0	280.5	2.5	0.3																					
280.5	282.0	1.5	0.3																					
282.0	283.8	1.8	1.4																					
283.8	286.8	3.0	3.0																					

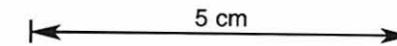
Geochemical Core-chip Samples:

ppm	W ₃ Portable	W McPhar
	CSI Minilab Analyzer	
150/1	190.0	194.5
2	194.5	199.3
3	199.3	204.3
4	204.3	209.3
5	209.3	214.0
6	214.0	219.2
	2,100	1,930
	1,500	1,720
	750	1,060
	750	1,110
	1,200	1,800
	500	640

Strong goethite which was thought to be after orig magnetite ska

DRILL HOLE NO. 151SHEET NO. 3 OF 12

FOOTAGE				DESCRIPTION	GRAPHIC LOG	CORE RECOVERY	A S S A Y S							
From	To	Interval	Recovery				FOOTAGE							
							From	To	Interval					
136.0	137.2	1.2	1.2	<p><u>184.9 - 191.0'</u>: Well and thinly bedded white and yellowish-brown silty sandstone and siltstone, bedding at 65° intersected. Some cross-bedding at 40° int. at 188.4'.</p> <p><u>191.0 - 201.0'</u>: A somewhat indeterminate type of conglomerate/breccia with zones of light yellow-brown sandy siltstone with bedding again at 60-65° intersected. Zones of a peculiar very soft waxy greyish-black substance with some admixed greenish material occur, the exact nature of which is not known.</p> <p><u>201.0 - 207.0'</u>: Extremely well and thinly bedded white and yellowish-brown fine-grained silty sandstone, some medium yellow-brown mudstone and some grit. Bedding intersected at 60°, suggesting that they may be nearly flat-lying.</p> <p><u>207.0 - 217.3'</u>: Conglomerate/breccia with zones of well and thinly bedded light and medium yellow-brown and pinkish mudstone, and finely sandy siltstone. Bedding intersected at 60°. "Matrix" of conglomerate/breccia seems to be more a clayey arkosic grit in which the feldspars are virtually completely decayed to white kaolin. 215.4-217.3': Coarse pink and white arkosic grit. "Fragments" and zones of soft waxy blackish material also occur from 207.0-215.4', thought from similarity to some material in weathered tectites to be skarn derived, probably admixed chlorite-montmorillonite.</p> <p><u>209.5'</u>: Small truncated "orbicular" structure in</p>										
137.2	137.5	0.3	0.3											
137.5	138.2	0.7	0.7											
138.2	140.0	1.8	1.5											
140.0	142.7	2.7	2.6											
142.7	147.0	4.3	3.8											
147.0	151.5	4.5	4.6											
151.5	155.0	3.5	3.5											
155.0	160.2	5.2	5.2											
160.2	164.3	4.1	3.8											
164.3	166.0	1.7	1.5											
166.0	171.0	5.0	4.5											
171.0	172.3	1.3	1.0											
172.3	175.0	2.7	2.3											
175.0	180.0	5.0	4.5											
180.0	184.2?	4.2	4.8											
184.2	189.2	5.0	4.8											
189.2	192.0	2.8	2.7											
192.0	196.3	4.3	4.3											
196.3	201.2	4.9	3.7											
201.2	202.8	1.6	1.5											
202.8	207.8	5.0	4.8											
207.8	212.0	4.2	3.6											
212.0	217.2	5.2	5.0											
217.2	222.0	4.8	4.8											
222.0	227.2	5.2	5.2											
227.2	232.0	4.8	4.6											
232.0	237.0	5.0	5.0											
237.0	242.0	5.0	4.9											



DRILL HOLE NO. 151

SHEET NO. 9 OF 12

FOOTAGE			DESCRIPTION	GRAPHIC LOG	CORE RECOVERY	A S S A Y S							
From	To	Interval				FOOTAGE			Recovery	ppm W			
						From	To	Interval					
			<p>with which limonitic material is also associated. Much of the core over this stretch is very broken but there is also some good banding displayed from 460.3 - 461.3' at 45° intersected. Magnetite is very minor.</p> <p>The weathered rock from 454.7 - 456.5' contains a little remnant garnet but, apart from more "gritty" light orange-brown limonitic material (probably also after garnet), there is also light green soapy or waxy clay or talc-like material, perhaps after diopside.</p> <p>The completely weathered brown and yellow-brown limonitic clays, with minor goethite, but also some green "talc" from 463 - 467.6' also display good banding in part, at 50° intersected. In view of the following interval and the nature of the weathering products, this zone was probably originally garnet-diopside skarn with quite minor magnetite.</p> <p>467.6 - 469.2': Zone is partially weathered but is very similar to the diopside-chlorite-garnet rock following. Some shearing and slickensiding, and carbonate veining at 468.4'.</p> <p>469.2 - 473.7': Diopside-garnet-chlorite-magnetite rock: Magnetite content fairly minor, rock fairly, though irregularly, fractured. The diopside-chlorite is quite massive and fine-grained. Some banding at 30° & 45° intersected. Some narrow carbonate veining.</p> <p>473.7 - 501.0': High Magnetite Rocks:</p> <p>473.7 - 492.0': Magnetite-diopside-tremolite/actinolite skarn: Magnetite content about 65%, minor carbonate. Banding at 65° at beginning of zone from 473.7' to about 487'. From 487 - 492', however, at 50-55°, indeed at 491.4' closer to 45°.</p> <p>492.0 - 499.3': Dominantly Magnetite & Haematite: Magnetite/haematite content about 75% with only very minor</p>										
					151/50	468.0	469.2	1.2	1.2	<20			
					51	469.2	474.0	4.8	4.2	200			
					52	474.0	477.0	3.0	3.0	170			
					53	477.0	479.8	2.8	2.7	120			
					54	479.8	484.0	4.2	4.2	740			
					55	484.0	487.0	3.0	2.8	660			
					56	487.0	489.6	2.6	2.6	700			
					57	489.6	495.1	5.5	5.5	270			
					58	495.1	495.9	0.8	0.8	5,600			
					59	495.9	499.0	3.1	3.1	540			

