

REPORTS ON EXPLORATION OF  
SPL'S 75, 76, 78 AND EL 12/70

**MICROFILMED**

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Original.

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*Raylen Range - Mt. Arrowsmith*

REPORT ON EXPLORATION OF

S.P.L.'s 75, 76, 78 and EL 12/70

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**MICROFILM**

A geological compilation ~~is currently being prepared~~ following the completion of a literature search. The only field mapping in the area is that shown in Spry and Gee (1964), Reid (1964) and McIntyre (1964) and also in a compilation of West Coast geology by M. Solomon.

Little literature is available on the areas and most comments are restricted to indications of gold or pyrite obtained by panning in some streams. Preliminary exploration has consisted of reconnaissance ground traverses seeking any evidence of mineralisation. The location of the ground traverses and location of samples collected is presently being mapped. Mineralisation was located in a number of areas and the three areas of immediate interest are:

- (a) Bubs Hill
- (b) Franklin River
- (c) Mt. Arrowsmith

and these are discussed. The rock samples collected are being examined and results are not yet available.

(a) Bubs Hill

Mineralisation had been previously reported from Bubs Hill in the Gordon Limestone. In one of the more recent reports (Reid, 1964) described the limestone as variable in composition with interbedded calcareous siltstones, fine sandstones and dolomites. Reid indicated the presence of pyrite, sphalerite and galena with mineralised horizons at 1820, 1890 and from 2110 to 2190 feet, the main mineralisation in these horizons being sphalerite, galena and sphalerite with galena respectively. The limestone is at least 1000 feet thick in the Bubs Hill area. Following the discovery that the

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mineralisation was more extensive than was previously thought the licence holders sought geological assistance from the Mines Department in January, 1970. Dr. D.I. Groves inspected the prospect and supplied a brief report which indicated that geochemical soil sampling should be used to determine the real extent of the mineralisation. Dr. Groves' report which is attached, was immediately acted upon and soil samples for geochemical analysis were obtained.

Traverse lines have been cut and pegged on all slopes of Bubs Hill and soil samples obtained using a hand auger. All sample locations were pegged and the samples analysed for lead and zinc by the Mines Department Laboratories, Launceston. An appraisal of the prospect was made by Dr. M. Solomon (report attached) who identified barite along with the known mineral assemblage of galena and sphalerite with calcite and some pyrite. It was suggested that the deposit may be a Mississippi Valley type Pb-Zn deposit.

Drs. Solomon and Groves are currently carrying out an academic research project involving temperature determinations using fluid inclusions in the calcite, barite and sphalerite in an attempt to determine the genesis of the ore deposit.

At this stage the Pb-Zn determinations of the soil samples have outlined two anomalous zones. These are shown on the attached map. A further 43 soil samples are currently in Launceston awaiting analysis. Twenty-one rock samples were analysed for lead, zinc and silver and these results are attached. The results are not very meaningful as the samples were not representative samples but represent a minimum mineral content due to hand picking of barren rock rather than the collection of a representative bulk sample. Proper rock sampling methods are now being used and samples (more than 100 lb. each) have been collected and are currently in Launceston for analysis. Channel samples were not considered practical in this prospect.

The location of further geochemical traverses has been decided on and these are currently being cut, pegged and sampled. Eight further bulk rock samples have been obtained and these will be analysed for lead, zinc, barium and silver. All samples will also be analysed for barium.

(b) Franklin River.

At the prospect on the west bank of the Franklin River, about 1½ miles north of the Lyell Highway quartz veins in schists carry some chalcopyrite. At present a track has been cut to this area and access is also possible by crossing the Franklin River on a flying fox which has been recently installed. It is intended to carry out a geological reconnaissance and determine the location for geochemical traverses in this area. At present the existing pit is being drained by blasting a channel to the river.

(c) Mt. Arrowsmith.

This area was also inspected by Dr. Solomon who indicated that the small amounts of chalcopyrite in the amphibol/<sup>ite</sup> were not of immediate interest but further prospecting is warranted.

References

McIntyre, E.B., 1964: The Structure and petrology of the Collingwood area.

*Honours Thesis*, University of Tasmania, Geology Dept.

Reid, K.O., 1964: The geology of the Princess River area. *Honours Thesis*,

University of Tasmania, Geology Dept.

Spry, A.H., and Gee, D., 1964: Some effects of Palaeozoic folding on the Precambrian rocks of the Frenchman's Cap area, Tasmania. *Geol. Mag.*, 101, 385-396.

EXPLORATION PROGRAMS.P.L.'s 75, 76, 78 and EL 12/70.

The exploration program outlined below was commenced in March 1970 after my involvement on behalf of Mr. T.J. Greene in the above leases.

- (a) Literature search.
- (b) Compilation of available mapping.
- (c) Compilation of completed reconnaissance traverses and rock sample localities together with sample descriptions and analysis where appropriate.
- (d) Continuation of soil sampling and geochemical analysis, which was initially recommended by the Mines Department, to delimit the anomalous Pb-Zn anomalies located at Bubs Hill. Samples are being analysed for Pb, Zn, and Ba.
- (e) Rock sampling of outcrop at Bubs Hill for elemental analysis. Rock samples are being analysed for Pb, Zn, Ba and Ag.
- (f) Investigation of the Franklin River copper prospect followed by an exploration program which will be determined after the detailed geological investigation. It is anticipated that this will commence with a geochemical survey.
- (g) Reconnaissance investigation and sampling to locate further prospects within this area of the licences.
- (h) Investigation of reconnaissance rocks samples (thin section or analysis) on a continuing basis.

At present (a) has been completed and (b) has been finalised and the final drafting is nearing completion. The sample locality map, (c) has been prepared and is being drafted. These maps will be forwarded as soon as they are complete. Soil sampling (d) is still continuing and 43 samples are currently being analysed for Pb, Zn, and Ba by the Mines Department, Launceston and these results will

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determine further work in the Bubs Hill area. Three bulk rock samples have been forwarded to Launceston for analysis for Pb, Zn, Ba and Ag. Results are not yet available. A further eight bulk samples have been obtained and are currently in transit to Launceston.

The Franklin River copper prospect is currently inaccessible due to weather, but the investigation will proceed as soon as possible. A reconnaissance investigation and sampling program is being carried out by a three man party, currently in the Princess River area. Results will be forwarded as soon as they are available.

All field activities are of course dependant on suitable weather conditions.

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The Bubs Hill prospect is situated on the northern flank of Bubs Hill. The sulphides occur in the Gordon Limestone which locally consists of interbedded limestones and dolomitic limestones containing chert fragments. The limestone is gently folded and is generally flat lying (see plan). It extends over a vertical distance of over 600' at Bubs Hill.

The sulphides are predominantly galena and sphalerite which occur in irregular veins and patches in association with coarsely crystalline calcite and quartz. The veins, which are generally less than 4" in width, either trend approximately W to NW or are subhorizontal and are possibly parallel to bedding of the limestone. The distribution of these veins is erratic and the content of galena and sphalerite is variable. Reid (1964) recorded four separate occurrences of mineralization at elevations of 1820' (sphalerite-rich), 1890' (galena-rich), 2110' (sphalerite-rich) and 2190' (galena-rich). It is possible that the deposits are restricted to particular horizons within the limestone.

It is evident that the sulphide veins are too small and erratic to be mined individually and the prospect should be investigated to determine the possibility of a large relatively low grade deposit that could be open cut.

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Systematic sampling of the mineralized limestones, preferably at right angles to the direction of the veins, should be carried out in the area of known mineralization to indicate the possible metallic content of the exposed deposits.

There are several possible methods for investigation of the deposits but the least expensive is probably to conduct a geochemical soil survey over the northern flank of the hill on a grid pattern (grid spacing approximately 100') to determine the extent of the mineralization. For a detailed survey the traverses should trend approximately N-S, but a preliminary E-W traverse along the lower slopes of the hill may indicate the extension of mineralization to the west of the exposed area of mineralization. Soil samples should preferably be taken just above bedrock but must be at least 1' below the surface. An alternative approach, or a follow-up if the soil survey indicates an extensive anomaly, would be to make bulldozer cuts at right angles to the long axis of the mineralization (or the anomolous zone) to enable systematic sampling of the limestone.

D. J. Jones  
16/1/70



Department of Mines,  
Tasmania

## TELEPHONES

METALLURGICAL RESEARCH.....  
LABORATORY..... } 42451-2  
MINES INSPECTION..... } 2 LINES  
EXPLOSIVES AND INFLAMMABLE LIQUIDS.....  
REGISTRAR OF MINES..... 22457

LAUNCESTON OFFICES,

287 WELLINGTON STREET,

SOUTH LAUNCESTON 9th February,  
1970.

Mr. B.J. Britton,  
P.O. Box 47,  
Sorell, Tas. 7172.

Dear Sir,

Herewith results of analyses on soil samples received from you on 28th January, 1970 and stated to have been obtained from Bubbs Hill.

Reg. No.	Sample No.	Parts Per Million	
		Pb	Zn
700063	<u>N/S</u> 1.	Nil	20
700064	2.	30	20
700065	3.	120	100
700066	4.	9000	1800
700067	5.	670	4600
700068	6.	520	2070
700069	7.	610	800
700070	<u>E/W</u> 1.	230	130
700071	2.	14,700	5,330
700072	3.	270	250
700073	4.	120	150
700074	5.	50	50
700075	<u>A.</u> 1.	30	50
700076	2.	Nil	30
700077	3.	Nil	30
700078	4.	50	90
700079	5.	1,630	4,300
700080	6.	5,170	3,700
700081	7.	470	930
700082	8.	30	70

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Sheet No. 2.

FROM Department of Mines Laboratory,  
Launceston, Tasmania.

TO Mr. B.J. Britton, Sorell, Tas.

Reg. No.	Sample No.	Parts Per Million	
		Pb	Zn
700083	DS 1.	30	60
700084	B 1.	Nil	60
700085	2.	30	30
700086	3.	70	100
700087	4.	1,110	1,400
700088	5.	610	930
700089	6.	610	580
700090	7.	300	430
700091	8.	130	20
700092	9.	130	20

Rock Analyses to follow.

Analyses by.....*[Signature]*.....

Yours faithfully,

*[Signature]*

(H.K. Wellington),  
Chief Chemist & Metallurgist.

Fees: \$60.00

Pb = lead.  
Zn = zinc.

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Department of Mines,  
Tasmania

## TELEPHONES

METALLURGICAL RESEARCH.....  
LABORATORY.....  
MINES INSPECTION.....  
EXPLOSIVES AND INFLAMMABLE LIQUIDS...  
REGISTRAR OF MINES.....

42431-2

2 LINES

22457

## LAUNCESTON OFFICES,

287 WELLINGTON STREET,

SOUTH LAUNCESTON 24th February,  
1970.

Mr. B.J. Britton,  
P.O. Box 47,  
Sorell, Tas. 7172.

Dear Sir,

Herewith results of analyses on rock samples received from you on 28th January, 1970 and stated to have been obtained from Bubbs Hill. Previous results forwarded 9th February, 1970.

Reg. No.	Sample No.	Parts Per Million		Oz./ton
		Pb	Zn	Ag
700093	R. 1	300	300	0.3
700094	2	Nil	100	0.3
700095	3	100	100	Nil
700096	4	3,000	400	0.5
700097	5	54,000	10,600	1.6
700098	6	160	11,200	Nil
700099	7	280	43,000	Nil
700100	RS. 1	100	200	0.5
700101	2	100	200	Nil
700102	3	100	13,000	Nil
700103	4	160	300	Nil
700104	5	40	220	Nil
700105	6	1,200	760	Nil
700106	7	160	160	Nil
700107	8	Nil	200	0.7
700108	9	Nil	200	0.3
700109	10	Nil	90	0.9
700110	11	Nil	70	0.2
700111	12	Nil	120	Nil
700112	13	Nil	80	0.2
700113	Unlabelled	Nil	70	Nil

Analyses by *Spullon*

Yours faithfully,

*W.K. Allen*  
Chief Chemist & Metallurgist.

Fees: \$63.00

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# Tasmania

Department of Mines,  
Tasmanian Offices,

287 Wellington Street,

South Tasmanian 7th April, 1970.

**TELEPHONES:**

Metallurgical Research	.....	42481-2
Laboratory	.....	2 Lines.
Mines Inspection	.....	
Explosives and Inflammable Liquids	.....	
Registrar of Mines	.....	22467

Mr. B.J. Britton,  
P.O. Box 47,  
Sorell, Tas. 7172.

Dear Sir,

Herewith results of analyses on soil samples received from you on 13th March, 1970 and stated to have been obtained from Bubbs Hill.

Reg. No.	Sample No.	Parts Per Million	
		Pb	Zn
700509	1.	40	230
700510	2.	12,000	13,300
700511	3.	40	48
700512	4.	Nil	32
700513	5.	Nil	40
700514	6.	200	164
700515	7.	100	142
700516	8.	260	800
700517	9.	Nil	26
700518	10.	Nil	42
700519	11.	Nil	250
700520	12.	Nil	13
700521	13.	Nil	28
700522	14.	Nil	28
700523	15.	40	60
700524	16.	340	876
700525	17.	100	220
700526	18.	200	94
700527	19.	40	238
700528	20.	140	464
700529	21.	340	166
700530	22.	340	156

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Sheet No. 2.

FROM Department of Mines Laboratory,  
Launceston, Tasmania.

TO Mr. B.J. Britton, Sorell

Reg. No.	Sample No.	Per Cent	
		Pb	Zn
700531	H.1	4.5	1.5
700532	H.2	5.0	1.7
700533	H.3	6.1	1.6
700534	H.4	1.0	0.78
700535	H.5	2.6	2.5
700536	H.6	3.3	2.3

Note Barium results to follow.

Analyses by *M. Walsley*

Yours faithfully,

*H.K. Wellington*

(H.K. Wellington)  
Chief Chemist & Metallurgist.

Fees: \$56.00

Report on prospects in the  
Central Highlands, held by  
John Shirley and Partners.

INTRODUCTION

A visit was paid on 22nd March to three prospects covered by S.P.L. 75, S.P.L. 76, S.P.L. 78 and Exploration Licence 12/70, all held by partnership members. The writer was accompanied by several members of the partnership. This report does not represent a complete geological study of the prospects but contains suggestions as to future work.

BUBBS HILL PROSPECT

Ordovician limestone is faulted between ranges of Precambrian schists and quartzites. The limestone is more or less horizontal and is capped by Silurian sandstone. On Bubbs Hill proper the lower two hundred to three hundred feet of the limestone on the eastern side of the hill is locally mineralized and Pb and Zn assays from soil samples have partially outlined two anomalous zones of mineralization. The mineralization is in the form of veinlets (up to two inches thick) of calcite, barite, quartz, sphalerite, and galena. The veins are generally parallel or steeply inclined to bedding and vary widely in thickness and intensity. In places they are anastomosing, forming a mineralized breccia with limestone fragments. In one area a particularly fine grained limestone carries disseminated galena and sphalerite in certain horizons (the "spotted ore"), together with beds of barite, two or three inches thick, and also patchy barite irregularly replacing the

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limestone. The mineralized rocks have been exposed in several places by pitting and clearly the grade is extremely variable, but no systematic sampling has been carried out. The anomalous zones discovered by soil sampling and pitting indicate the mineralization covers at least 3,000 sq. yds. and further results from a recent soil sampling programme may increase this figure.

The mineralization is almost certainly of Mississippi Valley type and may be expected to show the following features:

- It will be largely confined to the limestone, possibly to a particular part of the limestone succession.
- It will consist largely of barite, galena and sphalerite but could carry fluorite and mercury (in the sphalerite).
- It may be fairly extensive.
- It may be irregular or in veins.
- It will probably be high grade in some places and low grade in others.
- No particular source of the mineralization will be found.

Recommendations:

The area is of interest and should be further prospected. It is recommended:-

- (a) That soil sampling as previously carried out be extended until the anomalous zones have been closed off.
- (b) That soil sampling on a larger grid be carried out around the perimeter of the hill and on the eastern slopes where the limestone has been repeated by faulting.

- (c) The soil samples should be assayed for barium as well as Pb and Zn and field inspections should include the search for substantial showings of barite.
- (d) That further pitting or costeaning be carried out in the areas showing the highest Pb and Zn values in the soils.
- (e) That ten or so channel samples be taken across the best ore, the channels preferably being say, four or five feet in length and aligned perpendicular to the majority of the veins.

MT. GELD COPPER PROSPECT

Attempts to cross the Franklin River were thwarted by an abundance of water.

MT. ARROWSMITH HEMATITE PROSPECT

Veins of quartz and specular hematite with a little pyrite and chalcopryrite up to about six inches in thickness occur in amphibolite on a valley slope above the Franklin River. The veins are lenticular and not abundant, and though there are small amounts of chalcopryrite showing, this prospect is not considered of much importance. However, further prospecting from time to time may yield areas richer in copper and other metals.

*M. Solomon*

M. Solomon.

26/3/70



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REPORT ON EXPLORATION E.L. 12/70

The operator for the exploration in this permit has been Australian Hanna Limited under the agreement filed with your Department. Unseasonal wet weather in the summer months has substantially delayed the program. Exploration to date has been as originally detailed and has consisted of

- a) detailed geology in Bub's Hill area
- b) geochemical soil samples on a surveyed grid, analyses for Pb, Zn
- c) VHEM

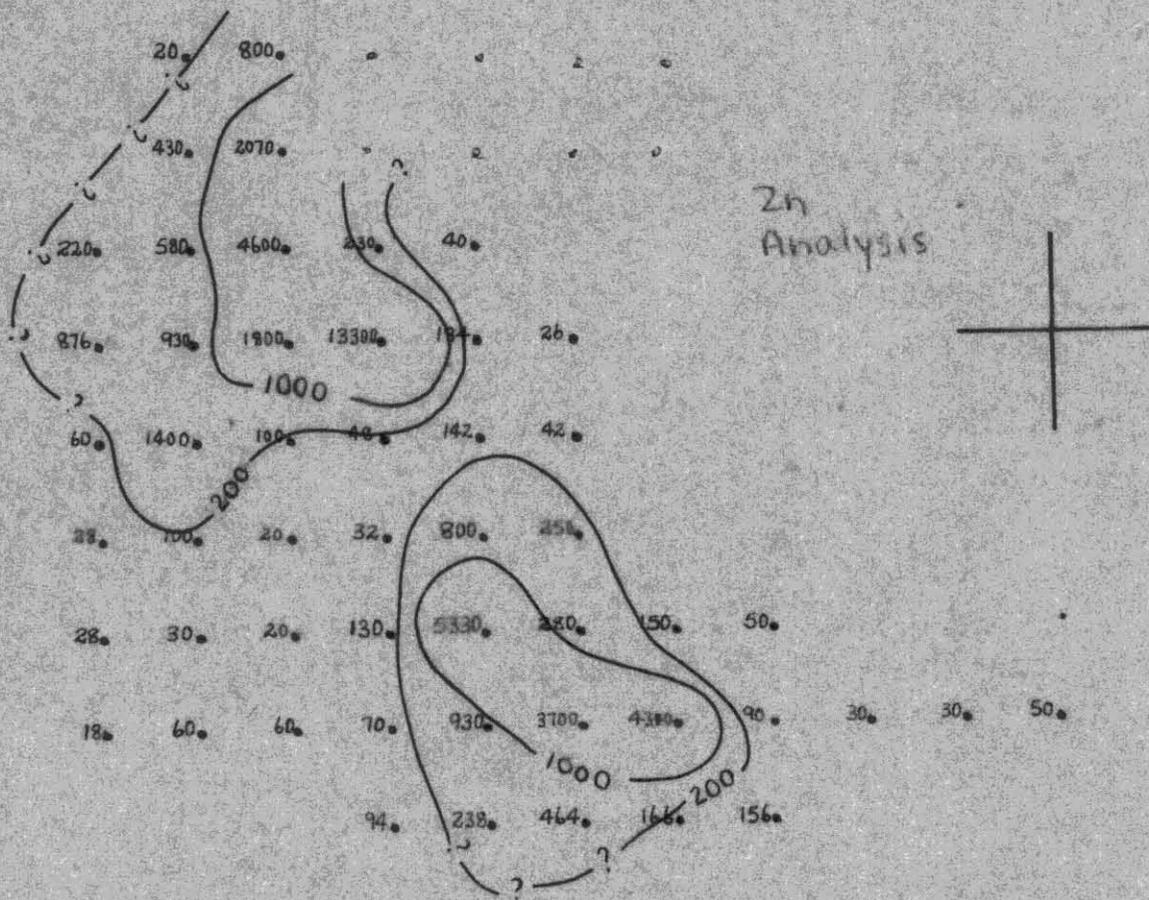
The results from a, b are presented on the attached maps - Plates 1-4. The VHEM survey was not successful.

The reconnaissance geology in the south-western part of the Exploration Licence is continuing and results will be presented as soon as the field mapping is completed and compiled.

5 cm

Zn Analyses  
1" = 200 ft    ↓ N

△ SUBS HILL



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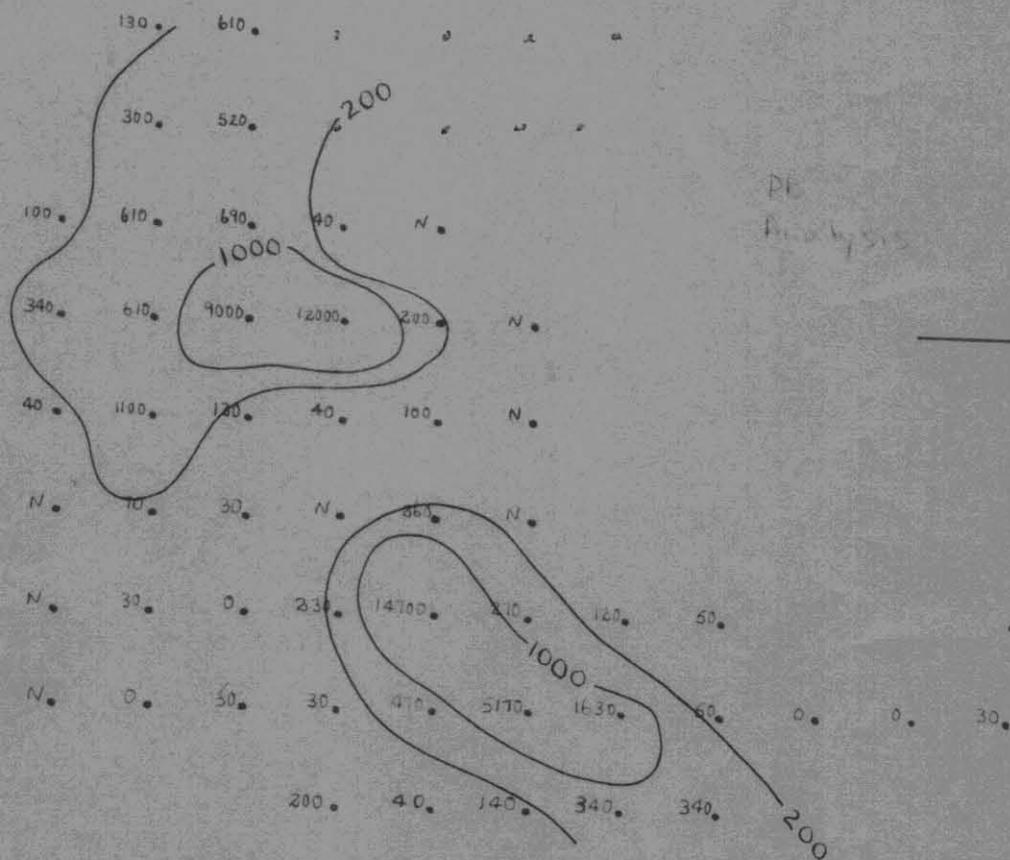
5 cm

Pb Analyses

1" = 200 ft

↓ N

△ BUBS HILL



TELEPHONES:

Research .....  
Section .....  
and Inflammable Liquids .....  
of Mines ..... 22487

Dunneceon Offices,

287 Wellington Street,

South Dunneceon 6th May, 1970.

Mr. B.J. Britton,  
P.O. Box 47,  
Sorell, Tas. 7172.

The following 5 sheets were taken  
one copies of sheets on the file for  
61270 held by archives No. 10410  
were given for the samples, but presumably  
AS 1-3 refer to 100lb bulk samples 1/25/72

Dear Sir,

Herewith results on the following samples received  
from you on 7th April, 1970, and stated to have been  
obtained from Bubbs Hill.

<u>Reg. No.</u>	<u>Sample No.</u>	<u>Zn (ppm.)</u>	<u>Pb (ppm.)</u>
700688	1.	80	Nil
700689	2.	250	Nil
700690	3.	190	Nil
700691	4.	190	Nil
700692	5.	240	Nil
700693	6.	310	Nil
700694	7.	170	Nil
700695	8.	130	Nil
700696	9.	80	Nil
700697	10.	130	Nil

Note: Ba results to follow.

Analyses by *M. Wadley*.....

Yours faithfully,

(H.K. Wellington),  
Chief Chemist & Metallurgist.

Fees: \$20.00

DEPARTMENT OF MINES—TASMANIA

796022

MINES:  
 Metallurgical Research .. .. }  
 Laboratory .. .. } 44 2431-2  
 Mines Inspection .. .. } (2 lines)  
 Explosives & Inflammable Liquids

LAUNCESTON OFFICES  
 287 WELLINGTON STREET  
 SOUTH LAUNCESTON 7250

21st May, 1970.

Your Ref: JES/GFK

Mr. J.E. Shirley,  
 Geology Department,  
 University of Tasmania,  
Hobart.

Dear Sir,

Further to yours of 17th April, 1970, herewith results on the following samples which were received on 20th April, and stated to have been obtained from Bubbs Hill.

<u>Reg. No.</u>	<u>Sample No.</u>	<u>% Pb</u>	<u>% Zn</u>	<u>% Ba</u>	<u>Ag Ozs/ton</u>
700886	BS/1	1.5	2.3	0.1	0.9
700887	BS/2	8.0	2.6	0.1	3.2
700888	BS/3	8.4	4.0	Nil	4.1

Analyses by *M. Wadley*.....

Yours faithfully,

*H.K. Wellington*  
 (H.K. Wellington),  
Chief Chemist & Metallurgist.

Fee: \$12.00

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TASMANIA

TELEPHONES

LABORATORY RESEARCH..... } 42431-2  
 INSPECTION..... } 2 LINES  
 EXPLOSIVES AND INFLAMMABLE LIQUIDS..... }  
 DEPARTMENT OF MINES..... 22487

LAUNCESTON OFFICES, 796023

287 WELLINGTON STREET,

SOUTH LAUNCESTON 21st May, 1970.

Mr B.J. Britton,  
 P.O. Box 47,  
 Sorell, TAS. 7172.

320 am  
 16  
 16  
 16

Dear Sir

Herewith results on the following received from you on 20th April, 1970, and stated to have been obtained from Bubbs Hill.

<u>Reg. No.</u>	<u>Sample No.</u>	<u>Zn (ppm.)</u>	<u>Pb (ppm.)</u>
700889	1	30	65
700890	2	20	35
700891	3	22	35
700892	4	58	295
700893	5	260	155
700894	6	28	35
700895	7	40	35
700896	8	22	45
700897	9	38	70
700898	10	64	105
700899	11	60	55
700900	12	38	70
700901	13	64	80
700902	14	68	115
700903	15	44	130
700904	16	38	45
700905	17	68	35
700906	18	52	155

Note: Ba results to follow.

Yours faithfully, *Britton*

Yours faithfully,

*K. K. K.*

Enc: 36.00

796024.017

LAUNCESTON OFFICES,

287 WELLINGTON STREET,

SOUTH LAUNCESTON.....21st May.....  
1970.

TELEPHONES

RESEARCH.....	} 42431-2 2 LINES
AND INFLAMMABLE LIQUIDS.....	
MINES.....	22467

Mr B.J. Britton,  
P.O. Box 47,  
Sorell, TAS. 7172.

Dear Sir,

Herewith results on the following received from you on 22nd April, 1970, and stated to have been obtained from Bubbs Hill.

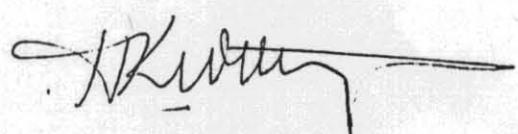
<u>Reg. No.</u>	<u>Sample No.</u>	<u>Pb (ppm.)</u>	<u>Zn (ppm.)</u>
700933	1	420	710
700934	2	110	72
700935	3	120	50
700936	4	70	22
700937	5	50	20
700938	6	70	20
700939	7	65	18
700940	8	65	24

Note: Ba results to follow.

Analyses by... *Gauston*

Fees: £ 16.00

Yours faithfully,



H.K. Wellington.

Chief Chemist & Metallurgist.

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Department of Mines,  
Tasmania 796025

TELEPHONES  
METALLURGICAL RESEARCH..... }  
LABORATORY..... } 42431-2  
INSPECTION..... } 2 LINES  
HAZARDOUS AND INFLAMMABLE LIQUIDS..... }  
DEPARTMENT OF MINES..... 22457

LAUNCESTON OFFICES,  
287 WELLINGTON STREET,  
SOUTH LAUNCESTON 5th June 1970.

Mr. J. E. Shirley,  
11 Tarcoona Crescent,  
Tarcoona, Tas. 7006.

Dear Sir,

Herewith results of analyses on the following samples which were received from you on 7th May 1970 and stated to have been obtained from Bubbs Hill.

Res. No.	Sample No.	JCS No	Pb ppm.	Zn ppm.	Ag ppm.	
701110	1	4	30,000	0979,400	55	1 1/2 oz/ton.
701111	3	5	800	1,260	3	
s/s 701112	4	6	100	50	3	
701113	7	7	1,200	590	4	
701114	8	8	220	240	5	
701115	9	9	3,700	560	3	
s/s - 701116	10	10	50	50	2	
s/s - 701117	11	11	60	55	3	

Analyses by... *[Signature]*

Fee: 24.00

Yours faithfully,

*[Signature]*  
H.K. Wellington,  
Chief Chemist & Metallurgist.

BUBB'S HILL LEAD-ZINC PROSPECT, TASMANIA:

PROPOSED EXPLORATION PROGRAMME, PHASE 1.

M. D. Watts

July, 1970.

SUMMARY.

Lead-zinc mineralisation at Bub's Hill, Tasmania, occurs as disseminated ore within a flat-lying Ordovician limestone sequence. The ore appears to have been deposited primarily in solution-collapse breccias, and to a lesser extent in dolomitised reef limestone. The limited evidence at present available suggests that the mineralised zone is at least 100 feet thick; however, the lateral extent is uncertain: the mineralised breccia observed could represent either vertical pipes or laterally-extensive sheets.

A geochemical survey of the area around Bub's Hill is planned in order to delimit the mineralised zone; this will take approximately two weeks to carry out, and will involve the collection and analysis of about 400 soil samples.

This will be followed by a drilling programme in which the main geochemical anomalies will be tested to depths of about 200 feet. A crawler-mounted rotary-percussion drill, providing dust samples, will be used; the cost of this is estimated at about \$3 per foot for 1000 feet of drilling.

Whilst the drilling operation is taking place, detailed geological mapping of the area will be carried out.

Total cost of this programme is estimated at \$10,000.

## 1. GENERAL

Bub's Hill is a steep-sided, conical-shaped hill which lies immediately south of the bitumen Lyell Highway in western Tasmania. It is partly covered with scattered gum tree growth, but in depressions and creeks very dense ti-tree growth occurs. In the adjacent flats, button-grass predominates, ti-trees again marking creeks.

An average of about 10" rain falls each month, with a slightly drier period between December and March. Thus the logistical support needed for an operation in this locality is much greater than elsewhere in Australia. In addition, much time may be lost due to extended periods of rain.

Most supplies are obtainable from Queenstown (pop. 4600) , which lies 17 miles further west along the Lyell Highway. A thrice-weekly air-service connects Queenstown with Hobart, which is 150 miles by road from Bub's Hill.

## 2. GEOLOGY

An east-trending block of Ordovician limestone is bounded by faults to the north and south, these occurring at the edges of ranges of Precambrian schists and quartzites. At Bub's Hill the limestone succession, which is at least 1000 feet thick, is unconformably overlain by the Silurian Crotty Quartzite. Both limestone and quartzite are nearly flat-lying, a very gentle fold being noticed at one locality.

The Ordovician Gordon Limestone was deposited in relatively shallow warm water in a slowly sinking shelf area (Reid, 1964). The sediment was derived from a source area of low relief to the north-west - possibly the worn-down Mt. Read Volcanic Arc - and ripple marks show that there was at least light current activity. The presence of widespread currents is also suggested by the presence within the limestone sequence of coarse sandy limestone beds and minor siltstone horizons. That the currents were of low velocity is suggested by the fact that many of the corals are in situ. No volcanic or igneous activity is associated with the Gordon Limestone.

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Immediately overlying the Gordon Limestone on Bub's Hill, the Crotty Quartzite consists of about 100 feet of massive, hard, grey-brown, sparsely fossiliferous quartzite.

Mineralisation was recorded at three levels within the Gordon Limestone by Reid: 2200-2100 feet (galena-sphalerite), 1890 feet (mainly galena), and 1820 feet (mainly sphalerite). Minor galena mineralisation has also been observed at several localities in the adjacent Precambrian rocks. The ore occurs in three forms:

1. as veins in limestone breccia
2. as laterally-extensive veins parallel to bedding
3. as disseminated ore in fine-grained limestone.

I suggest that the ore resulted from two types of deposition: ore types 2 and 3 may be genuinely syngenetic, resulting from deposition at the same time as the limestone. The breccia, however, possibly resulted from the remobilisation of lead and zinc which was redeposited as open-space filling in a solution-collapse breccia formed during the time interval separating the Gordon Limestone and the overlying Crotty Quartzite. Thus the breccia may well be in the form of vertical pipes, rather than the more favourable flat-lying sheets. Although the distribution of geochemical anomalies tends to favour the latter, the scattered outcrops at this level did not appear to show a continuous breccia sheet. Thus, the most important requirement of this initial investigation is to determine the actual form of the mineralised zone.

### 3. PROPOSED PHASE 1 EXPLORATION PROGRAMME

In order to determine the approximate lateral extent of mineralisation, a geochemical survey will be carried out on the somewhat irregular grid shown on the attached map. The most densely gridded areas correspond to the outcrop position of a flat-lying mineralised sheet. About 400 soil-samples will be collected from the base of the soil profile, at a depth of about 18"; in the swamp area a Cobra drill with a geochemical sampling device may be necessary to achieve this. Samples will be sent to McPhar Geophysics in Adelaide for analysis, at a cost of \$1/sample for preparation and AAS analysis for Pb and Zn. Although cxTHM (dithizone extraction)

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analysis is very cheap (2.25¢/sample), the lack of staff precludes its use.

The basic survey grid will be located using compass and tape measurements from an accurately surveyed base line. Slope corrections will be necessary because of the rugged topography. Fairly extensive line-cutting will be required, thus increasing considerably the survey time. A total of 72,000 feet of line will require surveying; with two field-hands, I believe that this will take from one to two weeks of full time work; however, much of the soil-sampling will be carried out concurrently with this.

Following the sampling programme, detailed geological mapping of Bub's Hill will take place. Location will be primarily by reference to survey pegs, but also by use of enlarged aerial photography. If the available photography is unsuitable for this purpose, low-level photography will be flown by Tasmanian Aerial Services at a cost of about \$300. To produce a detailed photogrammetric map from this would cost about \$500 more, but this will not be required until Phase 2 of the project.

Upon receipt of the geochemical data from McPhar Geophysics - probably about one week after dispatching the samples - a review of the data will be made. Drill sites will then be selected. It is envisaged that a rotary-percussion crawler-mounted drill will be used, providing dust samples only. Most holes will be 100 to 200 feet deep, and will generally be vertical; however, the drill selected will be capable of horizontal drilling also, a factor which could be useful in determining the lateral extent of mineralisation. The cost of this will be \$3/ft for the first 1000 feet, and about \$2/ft thereafter. The sample interval used will probably be 5 ft, the minimum suitable for this type of drilling. Assays will be again carried out by McPhar, at a cost of about \$3/sample. Thus, drilling and assaying 1000 feet of rock will cost about \$3600.

There is a possibility that useful data may be obtained using the VLF-EM system; however, sphalerite is a non-conductor, whilst 5% of lead is unlikely to produce a significant EM anomaly. Thus, the technique will be tested because of its

cheapness and ease of use, rather than any high probability of its being a successful geophysical technique.

4. Reference

Reid, K.O. 1964: The geology of the Princess River area.  
Honours thesis, University of Tasmania.



LOCALITY MAP

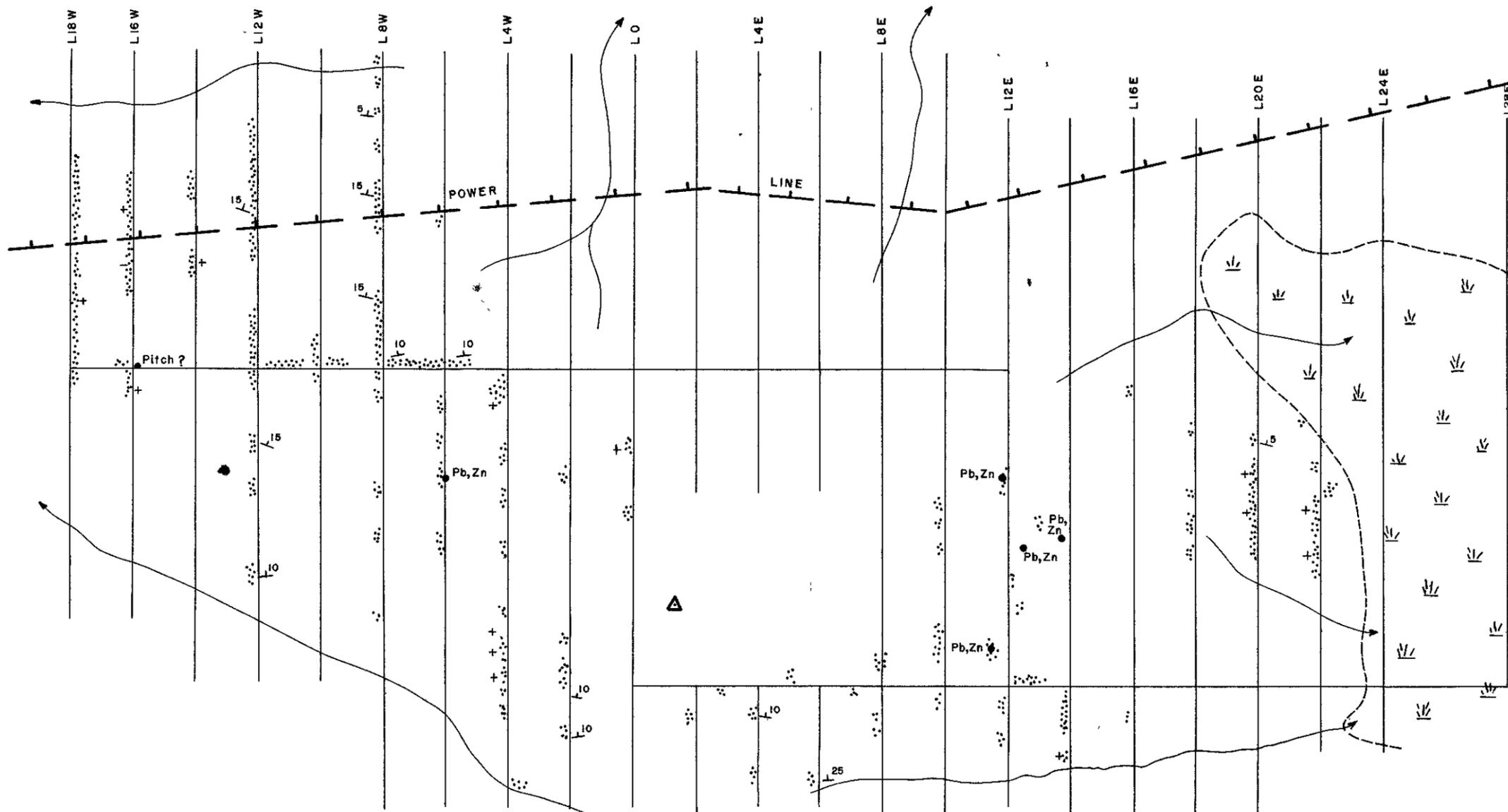
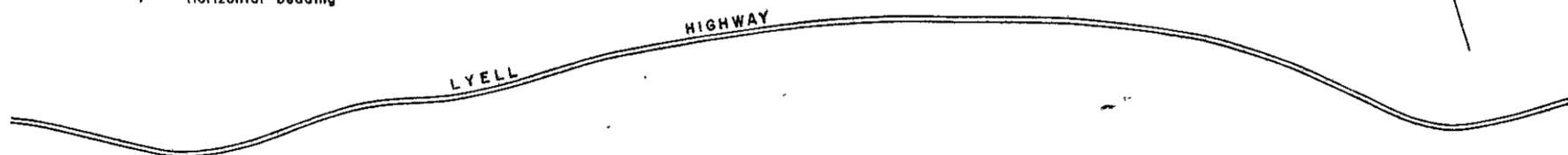
- Gordon Limestone outcrops
- Mineralisation
- ┆ Attitude of bedding
- + Horizontal bedding

# BUB'S HILL TASMANIA OUTCROP PLAN

SCALE 400 feet to 1 Inch

400 ft

5 cm



# BUB'S HILL TASMANIA INTERPRETED GEOLOGY

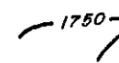
-  swamp, overlying quartzite gravel
-  area of landslipped gravel
-  mainly Sc - quartzite scree and gravel
-  mainly pcf - scree
-  Silurian: Crotty quartzite
-  minor quartzite outcrops; probably within Gordon Lst.
-  Ordovician: Gordon Limestone
-  Pre-Cambrian: Franklin Group

- GEOCHEMICAL RESULTS
-  Zn 200 ppm
  -  Pb 200 ppm

SCALE 400 feet to 1 inch

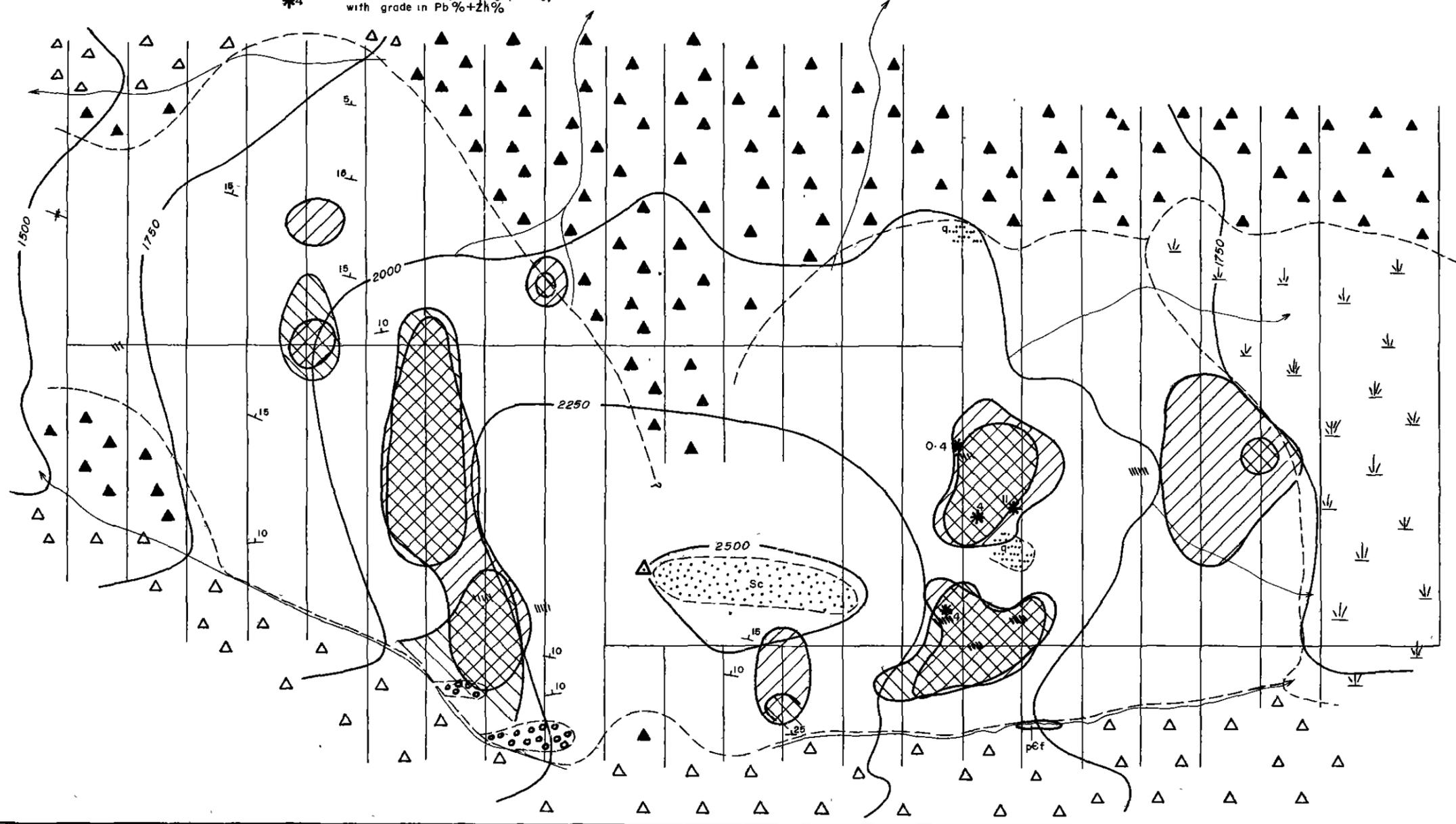
400 ft

5 cm

 1750 topographic contour in feet above sea level contour interval = 250 ft

 breccia zone (not to scale)

 \*4 mineralisation exposed by pitting, with grade in Pb%+Zn%



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Plate 2

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