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TASMINEX N.L.

EXPLORATION LICENCE 17/78

REPORT COVERING THE PERIOD FROM NOVEMBER 1980 TO MAY 1981

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EXPLORATION LICENCE 17/78SUMMARY OF COMPLETED WORK PROGRAMMEPERIOD 1st NOVEMBER 1980 - 30th APRIL 19811. INTRODUCTION

Exploration Licence 17/78 covers an area of 100 sq. km. in north-eastern Tasmania, and includes the Mathinna, Tower Hill and Mangana goldfields.

In 1979 Tasminex N.L. carried out a general reconnaissance of the area, stream sediment sampling in the Mangana district, and preliminary testing of the Golden Gate Mine tailings dumps at Mathinna.

Early in 1980 it was decided that the alluvial deposits surrounding the township of Mathinna offered good prospects for a gold producing operation. Most of the licence period May- November 1980 was therefore devoted to testing of these alluvials by backhoe sampling. During that period further investigations were made into methods of treating the tailings dumps at Mathinna, and Mining Lease 100M/68 was acquired, which covered part of the tailings dumps.

Results obtained from the alluvial sampling programme were erratic and generally disappointing, and expert advice indicated that backhoe sampling could not give sufficiently reliable information to permit a realistic economic evaluation to be made.

Arrangements were therefore made for selective bulk sampling of some of the more promising locations in the Mathinna and Mangana areas.

A small plant for the treatment and concentration of alluvial bulk samples was erected on the Mining Lease 100M/68 near Mathinna, and nine samples ranging from 10 to 160 cu. metres in size were tested. None of these samples indicated economic viability, and the programme was terminated at the end of December 1980.

During the period covered by this report our geologist supervised the bulk sampling and the collecting and testing of concentrates produced in the treatment plant. Upon completion of the alluvial programme he devoted the rest of the period to an intensive investigation of old gold mines and surface outcrops with the aim of establishing a complete record of all gold-mining activity within the licence area. Wherever possible, samples were taken in the hope of confirming previously recorded information.

This investigation of old mineworkings had three objectives:

- (a) The possibility of discovering an old mine which it might be practical and profitable to re-open.
- (b) The possibility of finding some surface zone containing sufficient small gold-bearing veins to warrant a low grade opencut operation for treatment by the relatively inexpensive heap-leach cyanidation process proposed for the Mathinna tailings dumps.

(c) The hope of identifying possible extensions of sub-surface lodes which might present suitable targets for diamond drilling.

During this six-month period further investigations were made into methods of cyanidation of the tailings at the Golden Gate Mine, Mathinna, and at the end of the period a scheme had been prepared for a small-scale experimental heap-leach operation.

Steps were also taken to extend the mining lease 100M/68 to cover the whole of the area of the tailings.

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SECTION 1E.L. 17/78BULK SAMPLING SURVEY FOR ALLUVIAL GOLDIntroduction

A programme of backhoe trenching had been commenced in February 1980 to locate economic concentrations of alluvial gold in the Mathinna and Mangana districts, within E.L. 17/78. In September 1980 this primary survey was terminated because the results were not encouraging, and because expert advice indicated that the only reliable test of economic viability was the treatment in a pilot plant of much larger samples than had previously been obtained by backhoe.

Using the results of the initial backhoe sampling as a guide, nine locations were selected for bulk sample testing, five of these being at Mathinna and four at Mangana. The size of bulk samples obtained ranged from 10 to 160 m<sup>3</sup>.

Location of Bulk Sample Sites

Locations are shown on accompanying Plans (see page 8).

Summary of Results (from Table 1)

	Sample No.	Volume	Value Au gm/m <sup>3</sup>
Mathinna	B.S.-1	104 m <sup>3</sup>	0.02
	B.S.-2a	94	0.068
	B.S.-2b	61	0.215
	B.S.-3	67	0.206
	B.S.-7	10	0.46
Mangana	B.S.-4a	64	0.075
	B.S.-4b	160	0.266
	B.S.-5	28	0.21
	B.S.-6	17	0.11

Description of Treatment Plant

A small plant for treatment of the alluvial wash was set up on the mining lease 100M/68 held by Tasminex N.L. which covers a part of the old Golden Gate mine tailings dumps.

This plant had been obtained from an alluvial tin mining operation, and comprised a grizzly, a vibrating screen, a sluice box and a series of three jigs, all diesel powered.

Material was excavated from the various sample points by backhoe excavator and carted to the treatment plant by truck.

After erection the treatment plant was tested and various adjustments made to the system by treating an experimental bulk sample (B.S.-1) obtained within the area of the tailings dumps. At this location some 170 m<sup>3</sup> of tailings and alluvial clays were removed as overburden, and 104 m<sup>3</sup> of alluvial gravel carted to the treatment plant.

Deposition of Gold Concentrate in the System

A sluice box about 8 m long and 1 m wide connected the vibrating screen with the first jig, and it was found that most of the gold was deposited in the tail end of this sluice run where two sets of four riffle bars were installed, overlying corduroy material. The jigs were, in fact, superfluous. Any gold which did pass over the riffle bars was recovered in the two main jigs and circulated to a final small jig, where it was collected. Gravel in the tailings race was tested for gold with negative results.

Gravel gold concentrate was initially cradled, and gold removed by hand picking. It was later realised that hand panning the concentrate was more efficient than cradling.

Less than 5% of the gold concentrate was recovered from the small jig (the final stage in the process), this being mainly very fine-grained (flour) gold.

#### Nature of the Gold Recovered

In general the gold particles occurred as flakes, with occasional rounded grains. The alluvial gold from Mangana was typically coarse, with individual grains reaching coarse sand to granule size (1 - 3 mm). Silt size grains (< 0.0625mm) were always present, and small nuggets, up to 10mm were not uncommon.

#### Problems Encountered

Bulk samples from Mangana required screening through a grizzly because of the presence of boulders up to 1 m diameter. Some of the samples had a high clay content which necessitated recycling through the screening system.

In all the bulk samples the concentrate was found to contain ferruginous and lead shot. This caused some problems with samples sent for assay to the Mines Department at Launceston, where damage to pulverising equipment might have resulted. The ferruginous shot was easily removed magnetically, but the lead shot had to be screened.

### Extraction of Samples from Test Holes

All bulk samples were obtained using a small backhoe excavator. Surface soil was first removed and stacked separately, then clays were excavated and stacked at the side of the hole and finally the gravels were excavated and loaded into a truck for transport to the treatment plant site.

In most cases the water table was reached above the bedrock, and a pump was used to dewater the excavation to permit examination of the bottom, and to ensure that the bedrock had been reached. At Mangana, where the test holes were close to a creek, water seepage into two of the holes was greater than could be handled by pumping, and a small suction dredge was used to recover fine material from the bottom. This dredge was operated by a man wearing diving equipment, and in this way a detailed examination was also made of the bottom of the excavation.

At Mangana problems were also encountered with slumping of the sides of the excavations in this waterlogged ground.

### Restoration of Sampling Locations

In the Mathinna area the coarse gravels from screening were returned to the excavations. Because of the long haul distance to Mangana, however, locally available material was used. Clay overburden and topsoil were then replaced and levelled, and after several weeks all bulk sampling sites were checked and re-levelled where subsidence had occurred.

Where necessary the soil was sown with grass seed. In all cases the owners or tenants of the land appeared to be satisfied with the restoration.

#### Results of Bulk Sampling Tests

Detailed results of these tests are given in Table 1.

Bulk sampling was carried out at locations which previous backhoe sampling had suggested might be worthy of further investigation. The bulk samples did, however, only confirm the earlier backhoe results, and indicated no area which might present an economically viable alluvial mining operation.

The best of the samples obtained (B.S.-7) gave a value just over \$2 per tonne of gravel with gold at \$500 per oz., which would be considerably less than the estimated production and treatment cost.

The whole programme of alluvial sampling was terminated at the end of December 1980.

#### Accompanying Plans

Plan No.1 (in folder) shows the location of the bulk samples at Mathinna, in relation to previous backhoe sampling. Plans on pages 9a to 9e show bulk sample locations at Mangana and details of some of the sample excavations.

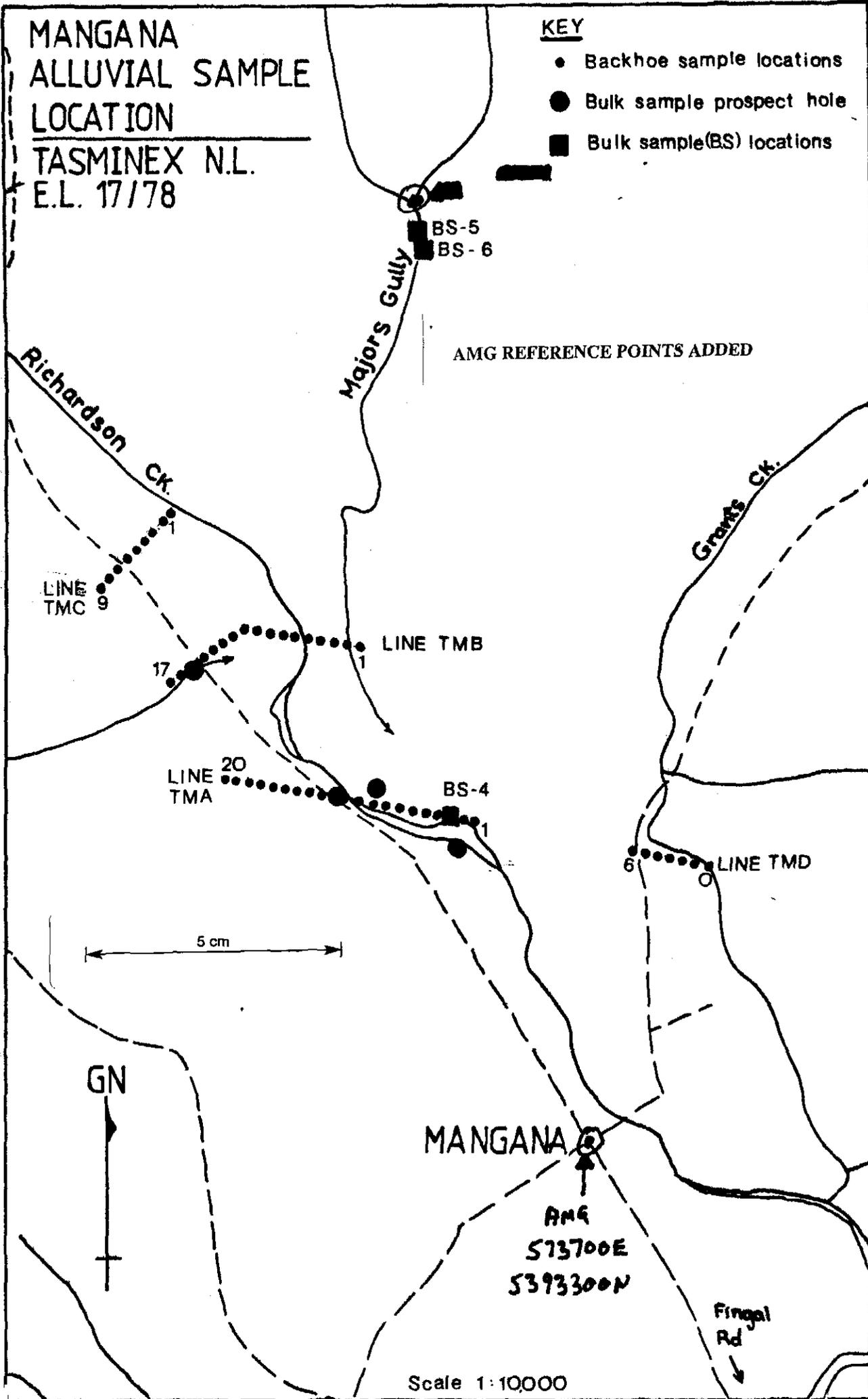
Sample	In-Ground Volume m <sup>3</sup>	Estimated tonnes	Retrievable Gold (gms)	Non-Retrievable Gold (gms) (Assay)	Total Gold (gms)	Au Grade (ppm)	Au Grade (gm/m <sup>3</sup> )	Equivalent Backhoe Samples	
								Hole No.	Au (ppm)
B.S.-1	104	249	1.066	1.0319	2.098	0.0084	0.02	TI 2	0.17
B.S.-2a	94	226	5.45	0.9647	6.415	0.028	0.068	TA 15	0.022
B.S.-2b	61	146	12.55	0.5617	13.112	0.0898	0.215	TA 11	0.035
B.S.-3	67	161	13.56	0.2407	13.801	0.0857	0.206	TK 15	0.32
B.S.-4a	64	154	4.45	0.3418	4.792	0.031	0.075	TMA 4	0.17
B.S.-4b	160	384	41.03	1.5744	42.604	0.111	0.266	TMA 3	0.19
B.S.-5	28	67	7.843	trace	7.843	0.117	0.21	-	-
B.S.-6	17	41	2.606	trace	2.606	0.063	0.11	-	-
B.S.-7	10	24	5.715	trace	5.715	0.238	0.46	-	-

TABLE 1.

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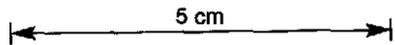
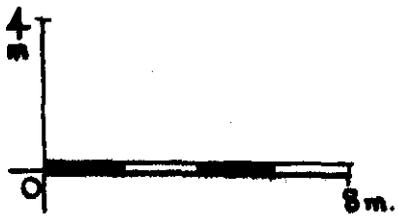
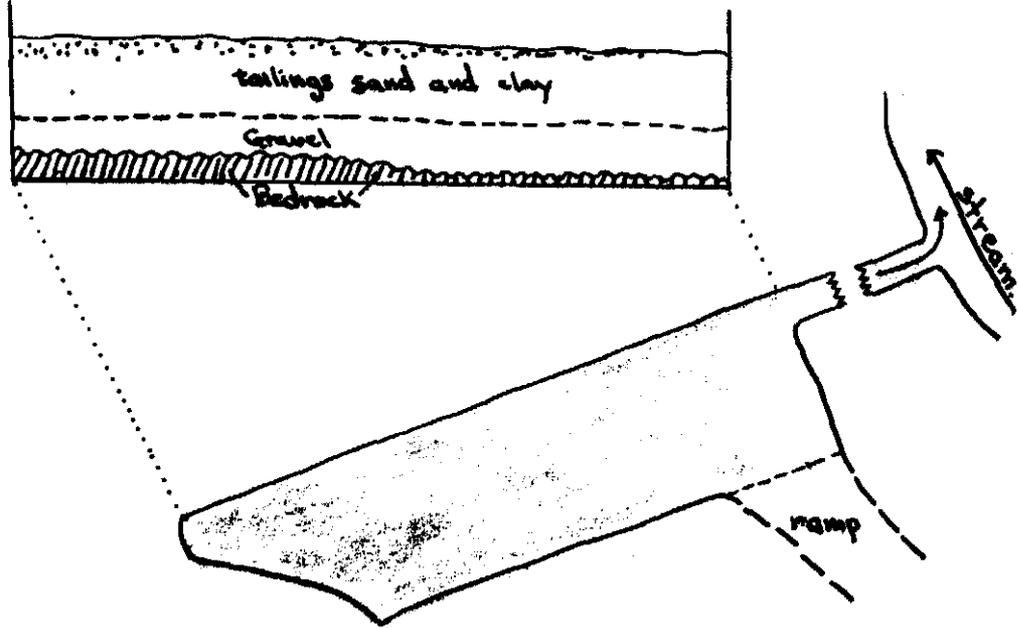
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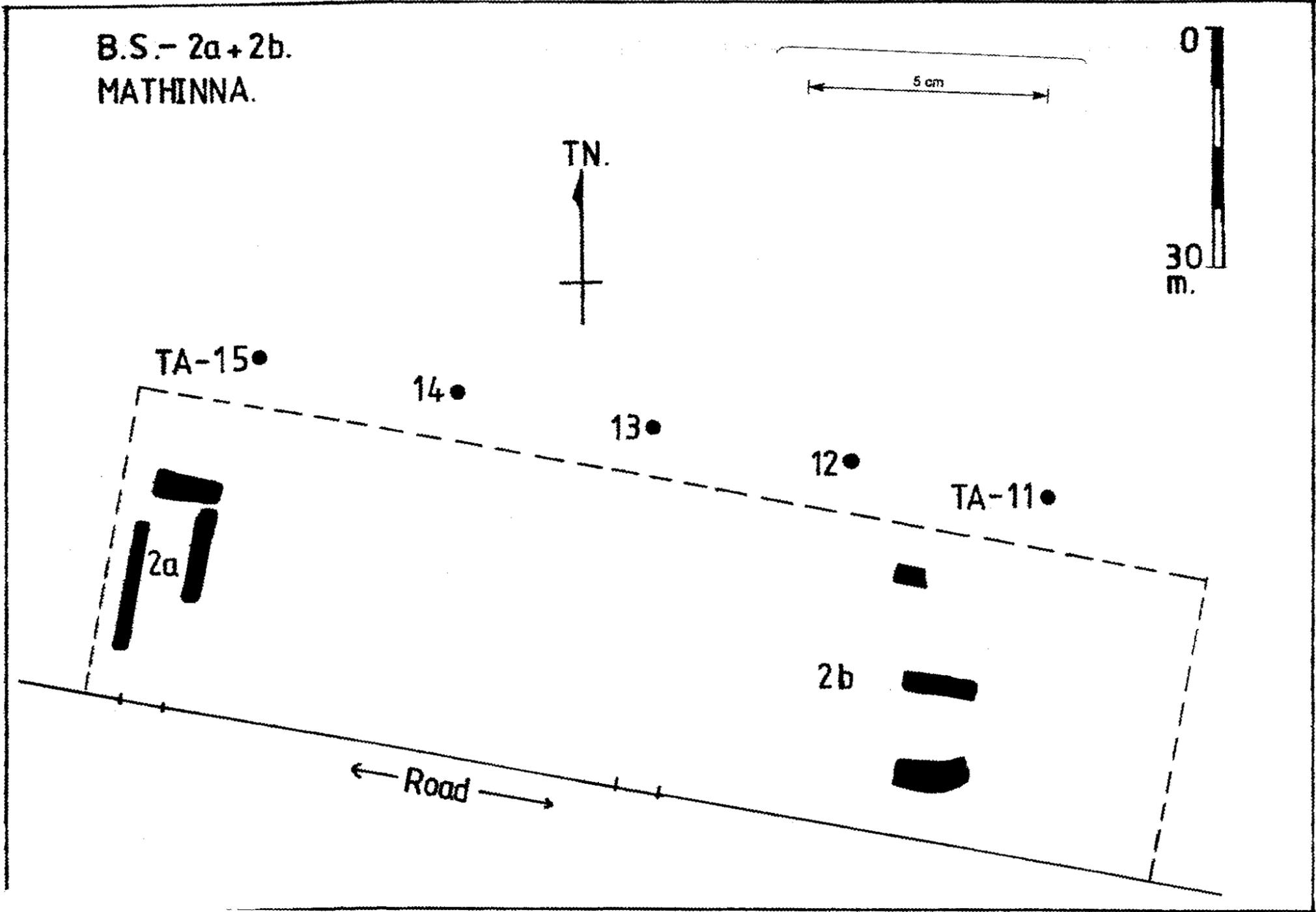
9a.



B.S - 1 (experimental).  
MATHINNA.

Profile.





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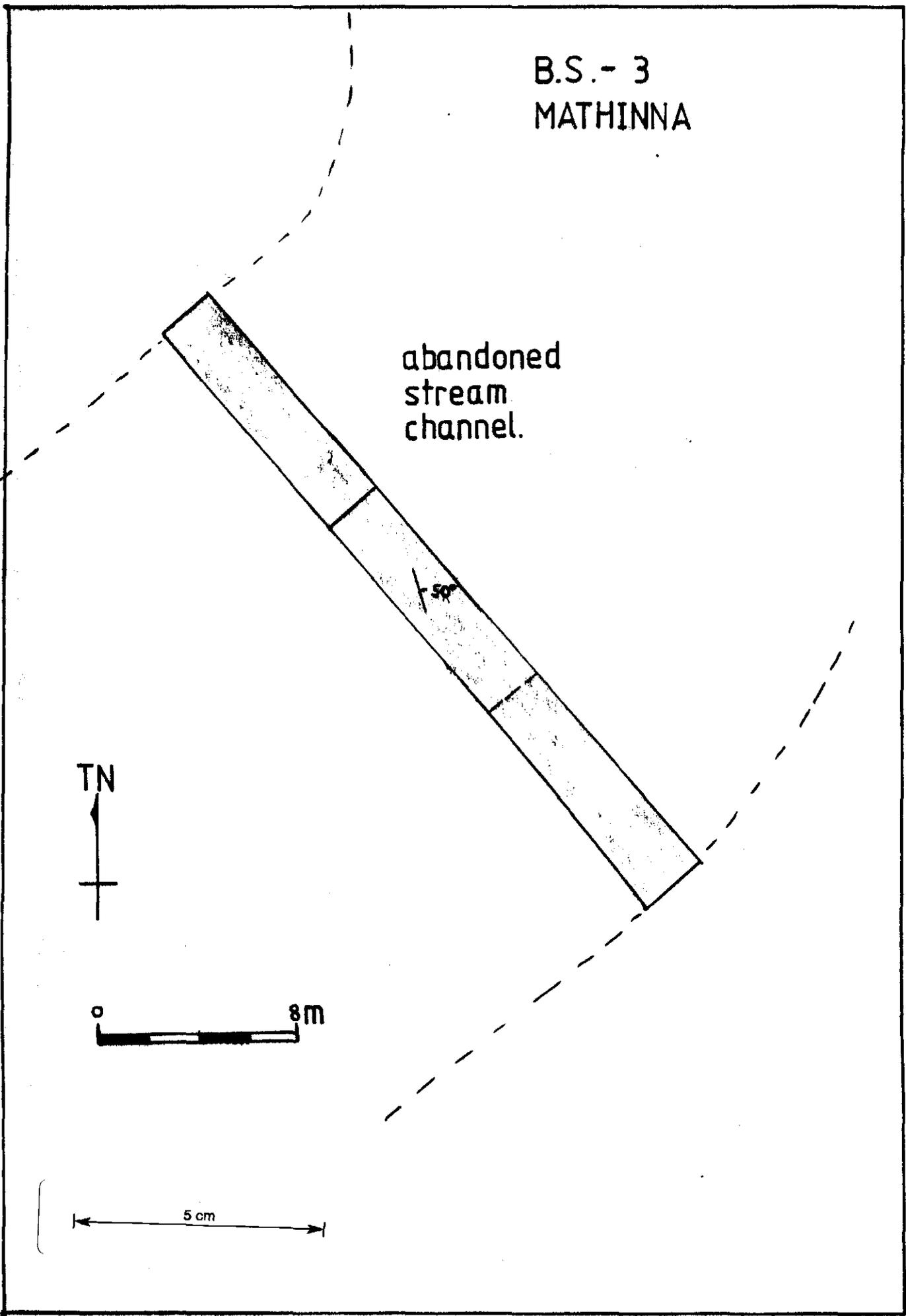
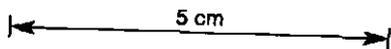
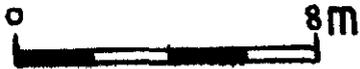
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MATHINNA

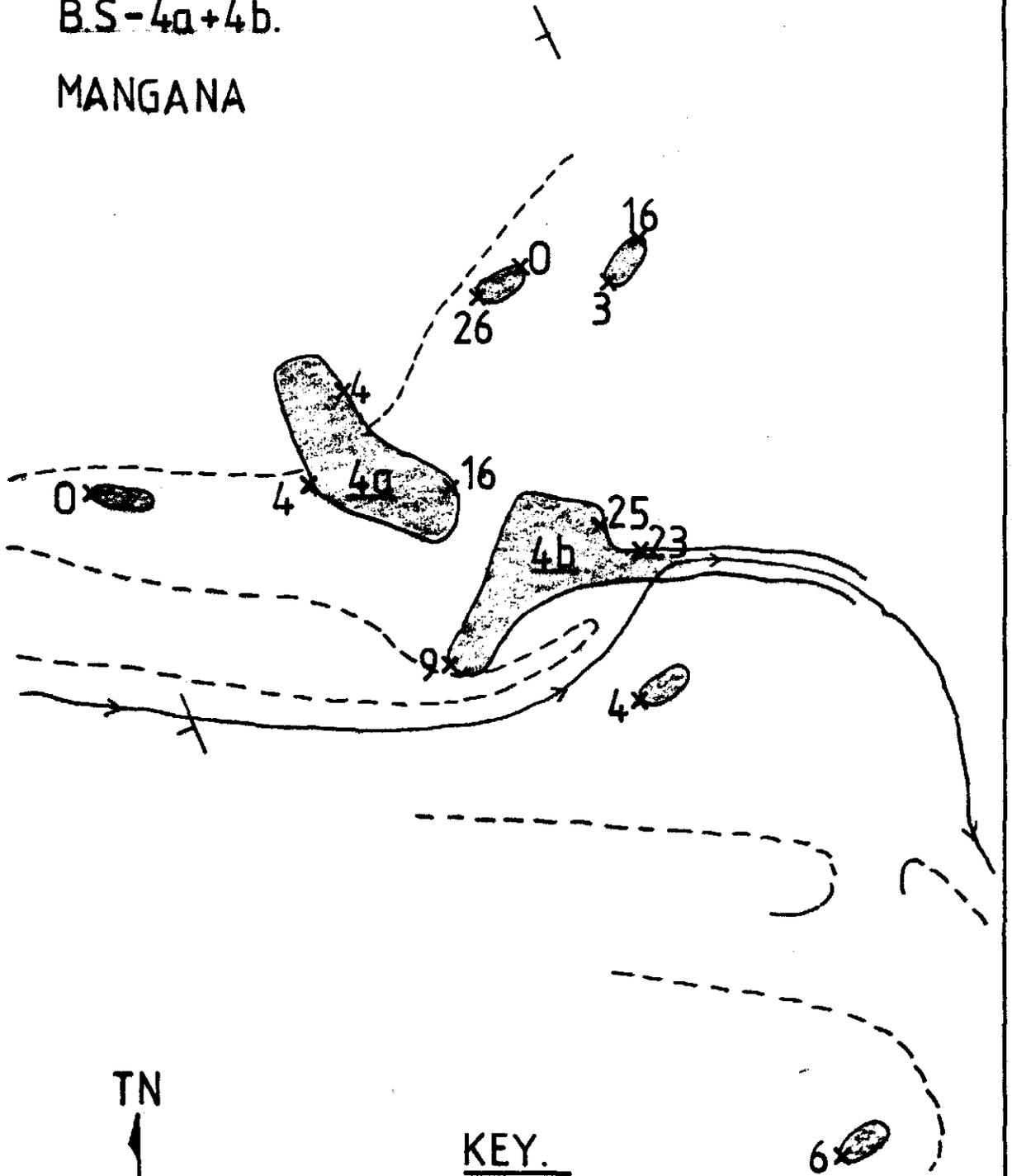
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stream  
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B.S-4a+4b.

MANGANA



TN



0 12m.



5 cm

KEY.



Sample pit.



Stream terraces.



Prospect grain counts.



Stream.



Schistosity.



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SECTION 2

SURVEY AND SAMPLING OF OLD MINES

Records of all of the 47 known gold mines within E.L. 17/78 have been examined, and all accessible parts of these mines have been entered and sampled. A number of unidentified old workings were also sampled and mapped. Samples were also taken from any quartz dumps found adjacent to the mines, especially those mines which were not accessible.

Results of Sampling

From the old mines referred to above, a total of 691 samples were collected, of which 219 were vein samples. It was considered impractical to obtain fire assays of so many samples, so each sample was pulverised and examined by magnifying glass for observable "colours".

Of the 219 vein samples, 55 showed visible gold, with 15 of these visible to the naked eye. Of the 472 quartz dump samples, 85 showed visible gold, with 21 of these visible to the naked eye. The majority of these gold-bearing samples came from the Mangana district.

Twenty selected samples were sent to the Mines Department at Launceston for fire assay analysis. These results were erratic in comparison with the observations.

A comparison of the fire assays with observation of colours in the samples is given in Table 2, page 11.

TABLE 2. Comparison of Fire Assays with Panning Observations

Sample No.	Fire Assay (ppm Au)	Observed Gold
A - V2 1b (Argyle)	< 0.3	3 colours
GE - V2 4a	"	Trace
GE - V.S.3d	"	2 colours
GE - M.1c	"	1 colour
GG - M.5a — Golden Cully Mine	"	Trace
MR - V.A.3b	"	Trace
MR - V.A.3c	"	3 colours
MR - V.A.4b	Mangana Reef 11.0	4 colours
MR - V.B.1a	< 0.3	10 colours
MR - M.18	61.0	7 colours
MD - V.1c	Miners Dream (South Golden Entrance) 8.7	3 colours
S.G.E. - M.2a	< 0.3	5 colours
TF - V.A.4c	"	Trace
TF - V.E.2a	"	Trace
TF - M.B.b	"	8 colours
TF - M.B.j	"	10 colours
TF - M.J.a	"	> 10 colours
U - M.2a	Underlay	4 colours
U - M.3b	"	5 colours
UJ - V.1a	Union Jack	1 colour

Tower Hill  
Freehold

Note:

- V - Vein sample
- M - Quartz dump sample
- Colour - Observable to the naked eye
- Trace - Observable with magnifying glass

It is believed that this inconsistency may be due to the sub-sampling procedure for analysis, where a 30 gramme analytical sample is obtained from a 300 gramme quartz sample, in which case gold particles might be omitted from the sub-sample.

Details of the results of this sampling programme are given in Appendix 1, together with plans of the mines showing sample locations.

### Conclusions

While this sampling programme has revealed nothing of special interest, one or two of the old mines in the Mangana district are considered worth further investigation.

However, a detailed study has been made of all available information on the history and geology of all the old mines within E.L. 17/78. A record of this information has been compiled from numerous references, and as most of the information was obtained from the Mines Department archives it is not included in this report.

The purpose of this detailed study and sampling of the old mines has been to attempt to identify suitable targets for diamond drilling. In accordance with this aim, our geologist has prepared a report entitled "Targets for Exploration" which is given in the following Section. Because of the highly speculative nature of Mr. Daly's suggestions we wish to give them

further careful consideration, and have therefore not committed ourselves to a diamond drilling programme in our work programme for the next six months licence period.

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SECTION 3TARGETS FOR FURTHER EXPLORATION

A detailed study of the geology and history of the mines within E.L 17/78 has suggested that suitable targets for diamond drilling might be found at the following mines:-

Mathinna

1. Extensions to the New Golden Gate and Tasmanian Consols Mines.
2. The Jubilee Mine.
3. The City of Hobart Mine.
4. The Caledonian Mine.
5. The Miners Dream Mine.

Mangana

1. The Golden Entrance Mine.
2. The Mangana Reefs Mine.

It should be noted that at Mathinna the Jubilee, City of Hobart and Miners Dream Mines are actually covered by mining leases not held by Tasminex N.L., but there is a private arrangement with the leaseholders permitting us to carry out exploration on these tenements.

Details of the suggested diamond drilling targets are as follows:-

Possible Diamond Drilling Targets

1. Extensions to the New Golden Gate and Tasmanian Consols Mine

The New Golden Gate Mine was by far the richest and most extensive mine in the area. It reached a total depth of 580m with drives on 18 levels. Eight reefs were worked, the most important being the Loanes, Main, East, and West reefs. A total of 253,907 oz. of gold was recovered from 263,240 tons of ore, the average grade being 29.99 ppm Au.

These mines covered a very limited plan area and exploration beyond their boundaries was almost non-existent. The most promising targets for diamond drilling would therefore seem to be in the vicinity of these mines, where the lodes were larger and richer than elsewhere but had no exposure at the surface.

In the New Golden Gate Mine, between 240m and 580m depth, the East and West reefs were encountered with a combined Au content of 57.4 ppm. These two reefs occur to the north, in the Tasmanian Consols Mine, but in that mine only the West reef was stoped, and the East reef was not explored. In all occurrences the reefing in the New Golden Gate Mine is steeply plunging to the SSW.

A possible target for diamond drilling would be north of the Tasmanian Consols Mine, but south of the Gate

Possible Diamond Drilling Targets (continued)

Extended Mine. This drill hole would also test a possible north west extension of the West reef in the Tasmanian Consols Mine. However, the New Golden Gate line of reefing should not be classified as a hypothetical example of an echelon tension gash reefing associated with a shear zone.

North east of the New Golden Gate Mine, on the east side of Long Gully, are the Caledonian Mine workings, which have proved some rich surface veins. An exploratory diamond drill hole penetrating beneath these workings is suggested; this hole could at the same time test possible extension of the East reef.

In the New Golden Gate Mine, in each drive south on a reef, the reef is fault displaced. South of the fault in some instances are apparently strike slip displaced, and in others become represented by quartz stringers. The ground west of the New Golden Gate Mine is a topographical high, and appears to be a fault zone. Another possible drilling target would be north-west of the New Golden Gate Mine and south of the Golden Hinges adit, to intersect a possible dextral fault displacement of the line of reefing.

It appears that some years ago the Mines Department sank three diamond drill holes looking for structural information in this area, without any significant intersections. Two of these holes were collared near to the South Golden Gate Mine, and the third at the Golden Hinges adit.

Possible Diamond Drilling Targets (continued)

Arthur  
Mr. A. Daly, our geologist, recommends three sites for diamond drilling in the vicinity of the New Golden Gate Mine:

- (a) A north-west inclined bore to intersect the East reef north of the Tasmanian Consols Mine, with a subsequent flattening of the inclination to explore beyond the East reef.
- (b) A west to east inclined bore to explore ground below the Caledonian Mine workings, north of the New Golden Gate/Tas. Consols East reef.
- (c) A north-west to south-east inclined bore to explore faulted extensions of the New Golden Gate belt of reefing west of the New Golden Gate Mine.

2. The Jubilee Mine

In this mine five named reefs were worked. These all appear to represent the limbs, hinge regions of a SSE plunging synformal synclinal fold. The Lyons and Derby reefs (opposite limbs of the same folded reef) were worked to a depth of 79m to the south of the Jubilee Mine.

It is suggested that a north-east to south-west inclined bore be sited to penetrate below this level and to the south of the mine workings.

Possible Diamond Drilling Targets (continued)

3. The City of Hobart Mine

An 0.9m reef (0.4m at depth) was worked in an adit drive and shaft sunk to 201m depth, and assayed about 1 oz. Au per ton. At 176.8m depth this reef is fault-displaced (apparent dextral strike slip).

An east to west inclined bore is suggested to explore the City of Hobart reef north-west of its displacement and below 200m depth.

The Miners Dream Mine at Mathinna, and the Golden Entrance and Mangana Reefs Mines at Mangana may also provide possible diamond drilling targets, but the actual siting of such bores requires further consideration.

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Geophysical Investigations

A preliminary on-site investigation was made by Mr. John Bishop of Mitre Geophysics to assess the possibility of using electrical methods to assist in locating targets for diamond drilling. A number of samples were collected to test for induced polarisation potential and magnetic susceptibility.

However, Mr. Bishop was of the opinion that the only geophysical survey method likely to be effective in the geological conditions in the area was that based on piezoelectric characteristics of the quartz veins, and unfortunately this method was still in an experimental stage of development.

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SECTION 4TAILINGS DUMPS AT MATHINNA - INVESTIGATION OF  
TREATMENT METHODS

During the period covered by this report further detailed discussions were held with Mr. David Wright of Bendigo, who has been retained as our consultant on the subject of cyanidation of tailings. Mr. Wright is a qualified metallurgist who operates his own small cyanidation plant, in which he has tested samples of the Mathinna tailings.

It is believed that the Golden Gate Mine tailings dumps at Mathinna can be profitably treated using the heap-leach method of cyanidation. However, there remain a number of uncertainties which can only be resolved by actually establishing a heap-leach operation on the site. Among these uncertainties are the amenability of the tailings to solution percolation in a large heap, the actual rate of percolation, and the effects of sulphides in the tailings, all of which could materially affect the profitability.

It has therefore been decided to establish a pilot heap-leach operation on the Golden Gate dumps, this plant being the smallest scale which it is estimated might produce a positive cash flow. A scheme has been prepared for submission to the Department of Mines and the Department of the Environment, and a copy of this scheme is attached to this report in Appendix 2.

Extension of Mining Lease

The mining lease 100M/68 held by this Company only covers about one third of the area of the tailings dumps, and it was decided that before embarking upon a pilot operation Tasminex should acquire a larger area - and preferably all - of the dumps.

In April 1981 a new mining lease (now known as 32M/81) was pegged, adjoining 100M/68. Approaches were also made to the holder of a 1 hectare lease 20M/74, which also covers part of the tailings dumps, with the object of acquiring this lease and eventually consolidating all the various leases into a single lease which would cover the whole of the area of the tailings.

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Section 5

Exploration Licence 17/78

Statement of Expenditure for the Period  
1st November 1980 to the 30th April 1981

Services, Rentals	\$23,834.87
Wages, Salaries, Fees	\$32,973.89
Accommodation	\$2,705.00
Transportation	\$9,360.18
Assays	\$1,007.84

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Total Expenditure                      \$69,881.78

PERSONNEL EMPLOYED ON E.L. 17/78

Throughout the period covered by this report our geologist, Mr. Adrian Daly, was fully employed in exploration and research in respect of E.L. 17/78. He was assisted by an average of two field assistants.

During the period up to the end of December 1980 when the alluvial bulk sample testing was in progress the treatment plant was operated by an experienced plant foreman with two, occasionally three assistants.

Excavation and transport of bulk samples, and the restoration of the land at the sample locations was carried out by local contractors.

Apart from Mr. Daly and the plant foreman all labour was recruited locally, from Mathinna or St. Marys. Considerable use was made of local inhabitants in confirming the location and identity of old mines. Information was also obtained from people who recalled, or had actually worked on previous cyanidation of the Golden Gate tailings in the 1930's and 1940's.

The programme of exploration continued to be guided by our geological consultant, Dr. M. Solomon of the University of Tasmania, and directed by Mr. E.N. Charlton of Tasminex N.L.

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SECTION 6.TASMINEX N.L.EXPLORATION LICENCE 17/78PROPOSED PROGRAMME OF EXPLORATION WORK FOR THE NEW  
LICENCE PERIOD COMMENCING 1st MAY 1981

The position has now been reached where it is felt necessary to pause and take stock of the situation resulting from the work we have carried out to date on E.L. 17/78.

The testing of the alluvial deposits at Mathinna and Mangana has proved disappointing, and it is not proposed to investigate the alluvials any further.

All the old mines within the E.L. area have been examined and sampled where accessible, and records of these mines and the general geology of the area have been exhaustively studied in the records held by the Mines Department.

This research has suggested a number of possible targets for diamond drilling in the Mathinna area, but these suggestions only emerged at the end of the licence period and more time is required in which to give them full and careful consideration. It is, however, hoped that this consideration will lead to the employment of a diamond drill in the area in the new licence period.

In the case of possible drilling at the Jubilee and City of Hobart Mines due account will have to be taken of the fact that these mines are within mining leases not held by this Company.

It is proposed to discuss the possible siting of diamond drill holes with Mines Department geologists.

Further research will be necessary to plan more accurately the collar position and inclination of possible drill holes.

Meanwhile, further attention will be given to a number of old mines which we believe warrant further investigation, notably the Mangana Reefs and Golden Entrance Mines at Mangana. There is a possibility that these mines may offer scope for underground development and/or diamond drilling.

Exploration will continue in a search for surface areas where zones of quartz veins occur which might provide bulk low grade material suitable for heap leach cyanidation. If such suitable ore was found, it would be transported from the opencut for heap-leaching at the proposed site at the Golden Gate tailings dumps.

A geologist will be maintained full time in the licence area, with field assistants as required, and the anticipated expenditure during the next six month period is \$40,000. If diamond drilling is commenced this figure will be much higher.

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E.N. Charlton  
Director,  
Tasminex N.L.

APPENDIX 1

Page 1

OLD GOLD MINES - SAMPLING RECORD

In the following record only those samples in which gold was detected are listed. Sample locations are shown on the plans at the end of this appendix, these plans being numbered in accordance with the number allocated to each mine.

Note: V = vein sample, M = quartz dump sample, c = colour visible to the naked eye, Tr = colour visible with magnifying glass.

MANGANA MINES(1) Tower Hill Freehold Mine (TF)

42 vein samples and 48 quartz dump samples taken.

TF - M Ab - Tr	TF - M Bc - 2c
M Bb - 8c	M Bh - Tr
M Ca - Tr	M Bi - Tr
M Ga - Tr	M Bj - 10c (1 large)
M Ha - Tr	M Ca - 1c + Tr
M Ja - +10c	M Cb - 2c
M Jb - Tr	V E 2a - Tr
V A 2b - Tr	V E 2d - Tr
V A 1a - Tr	V E 1 - Tr
V A 4a - Tr	M La - 1c
V A 4c - Tr	M Lb - 1c
V A 4d - Tr	M Lc - Tr
V B 5d - Tr	M Ld - Tr
	M Kb - Tr

Appendix 1Mangana(7) Underlay Mine (U)

No vein samples, 8 quartz dump samples taken.

U - M 2a - 4c	U - M 3b - 5c
M 2d - 3c	M 3c - Tr

(8) Mangana Reefs Mine (MR)

24 vein samples and 21 quartz dump samples taken.

MR - V A 2b - Tr	MR - M 5 - Tr
V A 2c - Tr	M 6 - Tr
V A 3b - Tr	M 7 - 1c + Tr
V A 3c - 3c + Tr	M 8 - Tr
V A 3f - 4c	M 9 - Tr
V A 4a - Tr	M 10 - 2c + Tr
V A 4b - 4c	M 11 - Tr
V B 1a - 10c	M 13 - 3c
V B 1b - Tr	M 18 - 7c
V B 1c - Tr	

(9) Golden Entrance Mine (GE)

32 vein samples and 22 quartz dump samples taken.

GE - A 2a - Tr	GE - A S 2a - Tr
A 2i - Tr	A S 2b - Tr
A 2.1c - Tr	A S 3a - Tr
A 2.2a - Tr	A S 3d - 2c
A 2.4a - Tr	A S 3g - Tr
A 2.4b - Tr	M 1b - Tr
A 2.4c - Tr	M 1c - 1c
A S 1b - Tr	M 2e - Tr

033

Appendix 1

Mangana

(2) Golden Gully Mine (GG)

4 vein samples and 24 quartz dump samples taken.

GG - M 1a - Tr	GG - M 8b - Tr
M 4b - Tr	M 8d - Tr
M 5a - Tr	M 8c - Tr
M 6a - Tr	
M 6b - Tr	

(3) Pingal Mine (F)

No vein samples, 27 quartz dump samples taken.

F - M 1a - Tr	F - M 1f - 3c
M 1b - Tr	M 3a - 6c
M 1c - Tr	M 3d - Tr
M 1e - Tr	M 4b - 1c

(4) Specimen Hill Mine

No samples taken

(5) Pincher Mine (P2)

6 vein samples and 1 quartz dump sample taken.

P2 - V B 1a, V B 1b, V C 2 - Tr Au each.

(6) Union Jack Mine (UJ)

8 vein samples and 7 quartz dump samples taken.

UJ - M 2a - Tr	UJ - V 1a - 1c + Tr
M 2b - Tr	V 1c - 1c + Tr
	V B 5 - Tr

Appendix 1

4.

Mangana(10) Argyle Mine (A)

4 vein samples and 6 quartz dump samples taken.

A - V 2.1a - 2c	A - M 1b - Free Gold
V 2 1b - 3c	seen in sample
V 2.2a - Tr	
V 2.2c - Tr	

(11) South Gold Entrance (SGE)

No vein samples, 10 quartz dump samples taken.

SGE - M 1c - Tr	SGE - M 2a - 5c
M 1f - Tr	M 2d - 2c + Tr

Mathinna - Tower Hill(12) Tower Hill - Sunbeam and Twilight Mines

No samples taken.

(13) Miners Dream (MD)

10 vein samples and 8 quartz dump samples taken.

MD - M 2a - Tr	MD - V 1b - 2c
V 1a - Tr	V 1c - 3c + Tr

(14) South Miners Dream (SMD)

5 vein samples taken.

SMD - V 1a, V 2b - Tr each

(15) South Golden Gate

5 quartz dump samples taken, no vein samples.

Appendix 1

5.

(16) Horseshoe Mine (H)

6 vein samples taken.

H - V 2a, V 2c, V 2e - Tr each.

(17) Caledonian Mine (C)

4 vein samples taken

C - V 1a - 1c + Tr      C - V 2 - Tr

(18) Gladstone Mine (G)

7 vein samples and 13 quartz dump samples taken.

G - V 2a - Tr      G - M 3b - 4c  
M 4b - Tr      M 7b - 3c(19) Jubilee Mine (J)

11 vein samples and 25 quartz dump samples taken.

J - V 2a - Tr      J - M 1e - 5c  
V 3b - 2c      M 1f - Tr  
V 3d - Tr      M 3c - Tr  
M 5b - Tr      M 6b - 2c(20) Victorian Golden Gate Mine

5 vein samples and 5 quartz dump samples taken.

(21) City P.A. Mine

3 quartz dump samples taken.

(22) Mountaineer Mine

5 vein samples and 6 quartz dump samples taken.

Appendix 1

6.

(23) Adits and shafts close to and SW of Jubilee Mine  
3 vein samples and 10 quartz dump samples taken.

Y - V 4a - 2 colours

(24) Golden Hinges Mine (GH)

2 vein samples taken.

GH - V 1 - 5c

(25) New Eldorado Mine

17 vein samples and 22 quartz dump samples taken.

(26) North Eldorado Mine

6 vein samples taken.

(27) Scott & Pickett Mine

No vein samples, 15 quartz dump samples taken.

(28) Pride of the Hills Mine

4 vein and 6 quartz dump samples taken.

(29) Volunteer Mine

No vein samples, 6 quartz dump samples taken.

(30) Volunteer Sons Mine

No vein samples, 15 quartz dump samples taken.

(31) Commercial Mine

No vein samples, 6 quartz dump samples taken.

038

Appendix 1

(32) City of Melbourne Mine

5 vein samples and 5 quartz dump samples taken.

(33) Old Boys' Mine

6 vein samples and 44 quartz dump samples taken.

(34) Yellow Boys' Mine

No vein samples, 7 quartz dump samples taken.

(35) East Golden Gate Mine

No vein samples, 2 quartz dump samples taken.

(36) Tasmanian Consols Mine (TC)

No vein samples, 40 quartz dump samples taken.

TC - M 12 - 4c + Tr	TC - M 24 - 2c + Tr
M 17 - Tr	M 25 - Tr
M 21 - Tr	M 33 - Tr
M 23 - Tr	M 35 - Tr

(37) New Golden Gate Mine (NGG)

3 vein samples and 40 quartz dump samples taken.

NGG - V 1a, 1b, 1c - nil	
NGG - M 9 - 1c	NGG - M 18 - Tr
M 12 - Tr	M 28 - Tr
M 14 - 3c	M 33 - Tr
M 15 - 5c	M 34 - Tr
M 17 - Tr	M 35 - Tr

(38) City of Hobart

No vein samples, 10 quartz dump samples taken.

It was not possible or practical to obtain samples at the following mines in the Mathinna area:-

- (i) O'Brien's Reef (near Scott & Pickett Mine)
- (ii) Golden Stairs Mine
- (iii) Enterprise Mine
- (iv) Golden Spur Mine
- (v) Golden Ladder Mine
- (vi) Gate Extended Mine
- (vii) Star Mathinna Mine



## DEPARTMENT OF MINES—TASMANIA

974041

LAUNCESTON OFFICES  
287 WELLINGTON STREET  
SOUTH LAUNCESTON 7250

## TELEPHONES:

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

1st December 1980

Tasminex N.L.,  
P.O. Box 815,  
Burnie,  
TASMANIA

Samples from E.L. 17/78 Reg. Nos 802697-709

Dear Sirs,

The following samples which were stated by your geologist, Adrian Daly, to be concentrates, have been examined. It was found that except for the last two all contained metallic shot that had to be removed before assay samples could be prepared. The magnetic shot was removed by magnetic separation and to remove the non magnetic shot the samples were screened on a 1 mm screen. This also removed larger rock material as well. It is necessary to remove all metal shot as we have damaged our sample preparation machinery in the past with metal shot in samples from this area. The shot samples can be collected if you wish to examine them.

The results are:-

Reg. No.	Your Mark	Mass in g.			
		M/A	+ 1 N	- 1 N	Au in - 1 N
802697	BS1 - TR	33.2	7.1	42.2	0.89662
698	BS1 - BR	86.6	71.4	137.5	0.1353 } 6.6x
699	BS2A - TR	18.6	25.4	100.6	0.39067
700	BS2A - BR	72.2	103.4	341.6	0.5741 } 1.5
701	BS2D - TBR	20.1	21.2	121.4	0.4417
702	BS3 - TR	18.5	1.5	10.1	0.1239 } 2
703	BS3 - BR	38.3	11.1	187.7	0.1168 } 30
704	BS4 - TR	4.9	9.1	42.6	0.2773 } 4
705	BS4 - BR	19.0	21.6	92.5	0.0645
706	BS4B - TR	25.5	22.0	49.0	0.1727
707	BS4B - BR	80.3	10.0	222.2	0.4844
708	GR - A	-	-	231.0	0.0004
709	GR - B	-	-	20.6	0.0012

Some cassiterite was observed in these samples.

Yours faithfully,

Analyses by *J. K. Wellington*

11 @ \$25.00 = \$275.00

2 @ \$ 5.00 = 10.00

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 \$285.00
 

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

041

M 1588

974042



DEPARTMENT OF MINES—TASMANIA

LAUNCESTON OFFICES  
287 WELLINGTON STREET  
SOUTH LAUNCESTON 7250

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

30th January 1981

Tasminex N.L.,  
P.O. Box 815,  
BURNIE 7320 Tas.

Samples from E.L. 17/78: Mangana - Mathinna Area.

Reg. Nos. 810107-810125

Dear Sirs,

Please find below results of samples submitted to this laboratory on 13th Jan'81 and stated to be from above area.

Group "a" Sample for gold assay.

<u>Reg. No.</u>	<u>Your Mark</u>	<u>Assay g/t Au.</u>
810107	LV - 2a	<0.3
810108	LV - 2b	15
810109	LT - 1b	0.6
810110	LT - 2	1.0

Group "b" Concentrates total mass and mass of contained gold requested. These were all magnetically separated to assist in preparing sample for assay.

<u>Reg. No.</u>	<u>Your Mark</u>	<u>Mass of Products (g)</u>		<u>Mass of Gold. <math>\phi</math> in N. -1mm Fraction (g)</u>	
		<u>M/A</u>	<u>N</u>		
		<u>+ 1mm</u>	<u>-1mm</u>		
810111	1. B.S. - Sd	6.6	7.7*	129.2	4.8
112	2. B.S. - M, R	14.1	13.0	355.0	0.25
113	3. B.S. - M, TR	25.6	60.4+	251.1	0.51
114	4. B.S. - 2d	20.5	58.4	142.8	0.12
115	5. B.S. - 4b	1.6	0.1	6.2	1.09
116	6. TAK - 99	3.7	6.5	32.0	0.055
117	7. LE - 4	-	-	73.7	0.009
118	8. LE - 7	0.1	-	21.9	0.001
119	9. LV - lab	-	-	36.1	0.037
120	10. LT - lac	0.2	-	105.5	0.000

Baldor sampling  
Leura mine  
Beckwith  
Ch. Goldfield

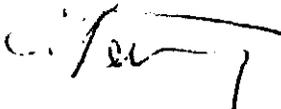
\* Contained several pieces of lead shot, one of which carried 4 or pieces of embedded gold.  
+ One piece 5 X 4 X 1mm, one composite piece 4 X 3 X 2mm.  
M/A is magnetics N non-magnetics.  
 $\phi$  Any gold in other fractions was put in this fraction.

Group "c"

Tin concentrates, total mass, alluvial tin & tantalum requested. Samples have been weighed and assayed for Sn & Ta.

<u>Reg. No.</u>	<u>Your Mark</u>	<u>Mass</u> (g)	<u>Assays (%)</u>	
			<u>% Sn</u>	<u>Ta ppm</u>
819121	1. BR - Ab	155.6	0.09	<10
122	2. BR - Ac	271.7	<0.01	<10
123	3. BR - Cb	279.6	0.10	<10
124	4. BR - Cc	153.1	<0.01	<10
125	5. BR - D	96.5	0.06	<10

Yours faithfully,

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

Analyses by *H. K. Wellington* J. L. 118024

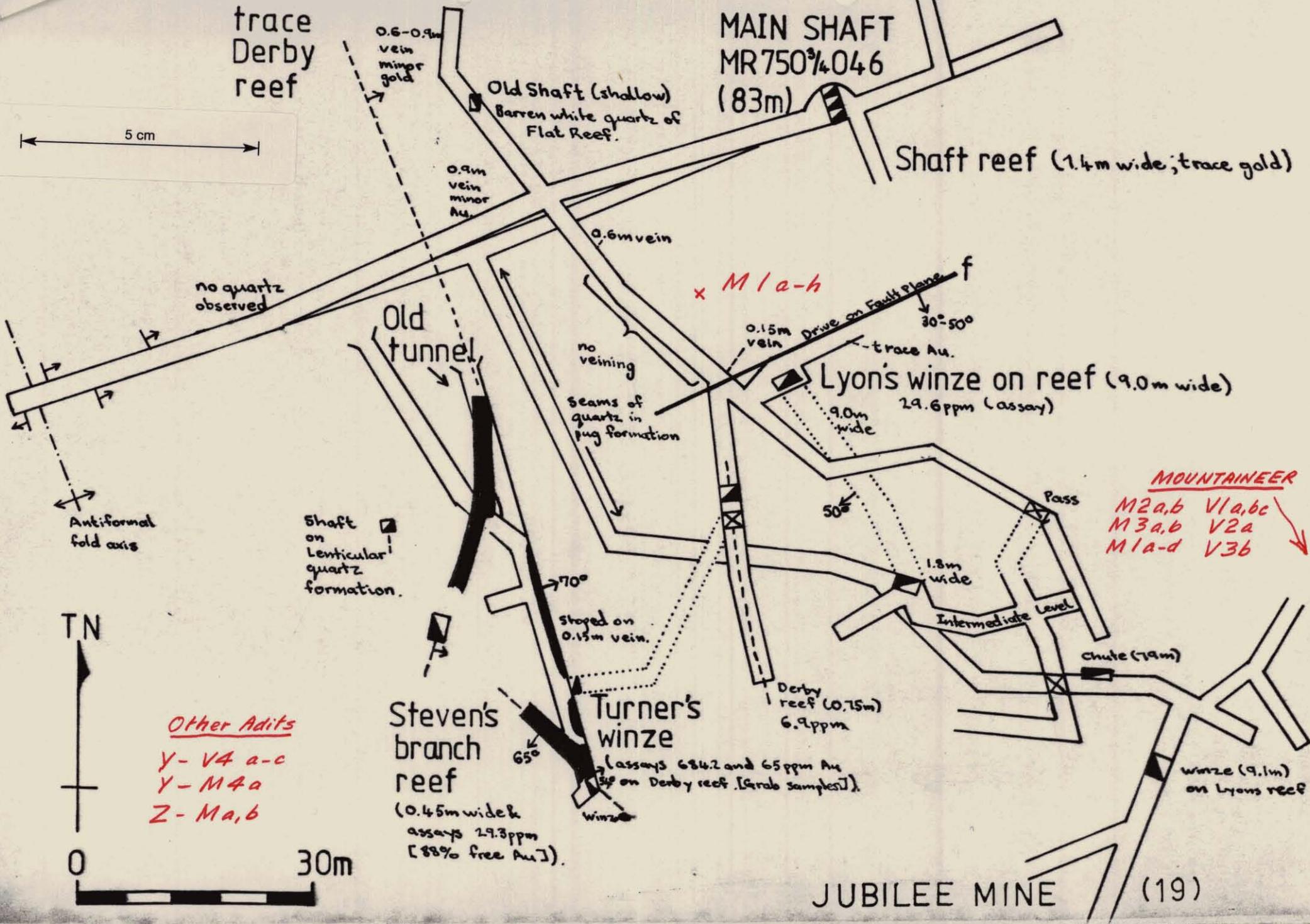
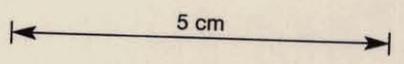
Fee \$220.00

trace Derby reef

MAIN SHAFT MR 750<sup>3</sup>/4046 (83m)

Old Shaft (shallow) Barren white quartz of Flat Reef.

Shaft reef (1.4m wide; trace gold)



no quartz observed

Old tunnel

x M1a-h

0.15m vein Drive on Fault plane f 30°-50°

Lyon's winze on reef (9.0m wide) 29.6ppm (assay)

MOUNTAINEER M2a,b V1a,bc M3a,b V2a M1a-d V3b

Antiformal fold axis

Shaft on Lenticular quartz formation.

seams of quartz in pug formation

stopped on 0.15m vein.

Steven's branch reef (0.45m wide & assays 29.3ppm [88% free Au]). Turner's winze (assays 684.2 and 65 ppm Au [5% on Derby reef. [Grab samples]]).

Derby reef (0.75m) 6.9ppm

Intermediate Level

Chute (79m)

winze (9.1m) on Lyons reef

Other Adits Y-V4 a-c Y-M4a Z-Ma,b

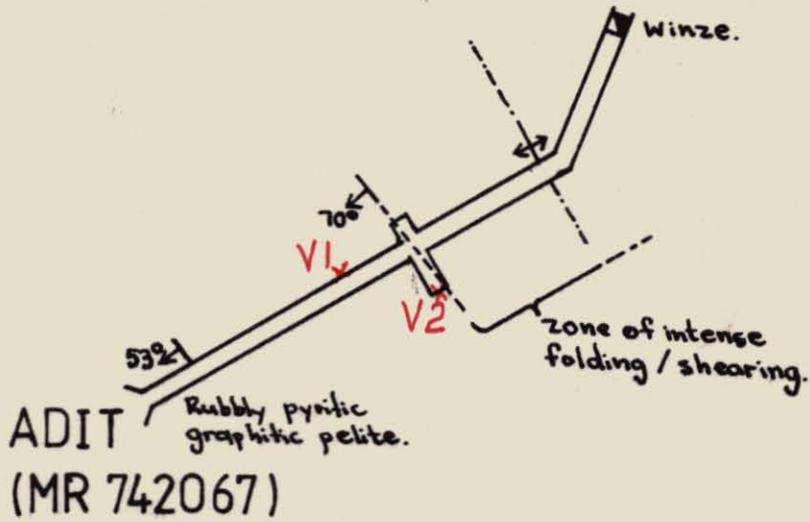


044

GOLDEN HINGES (West golden gate)  
MINE WORKINGS

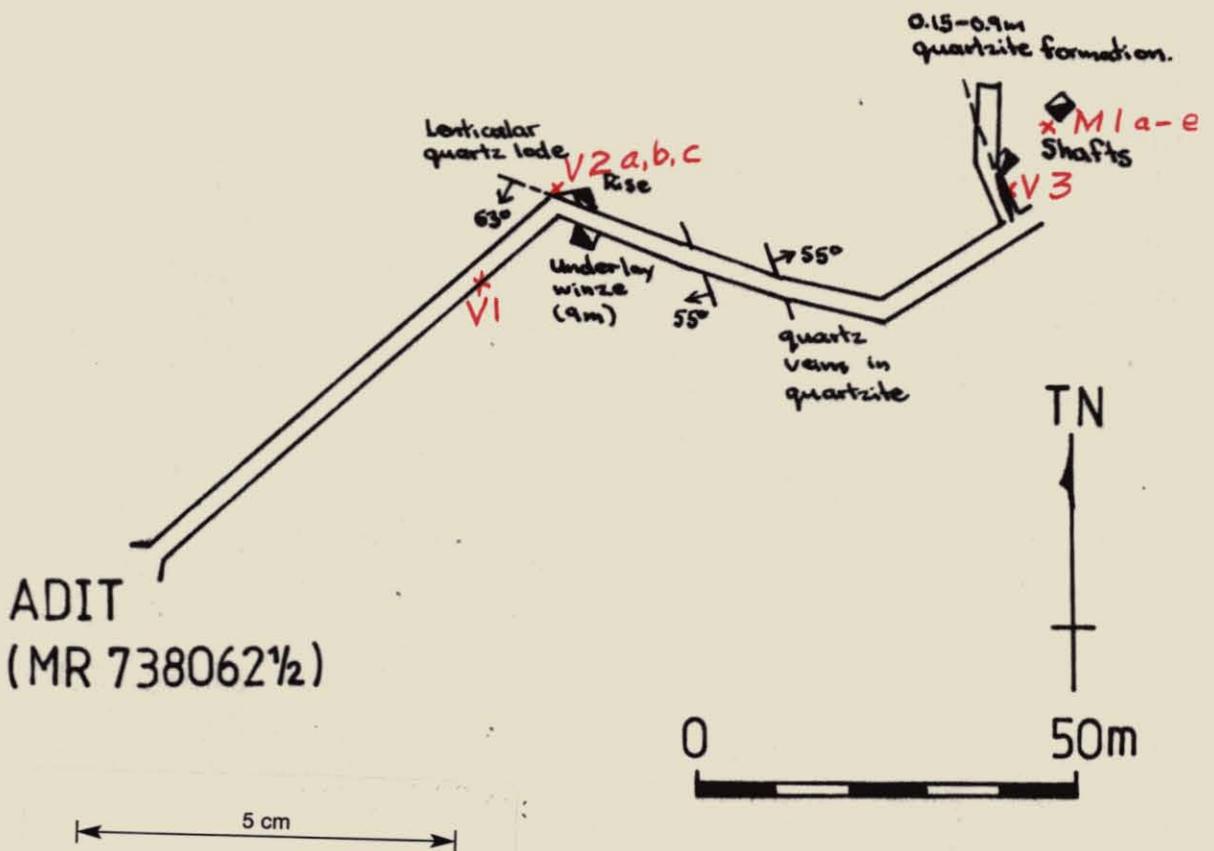
974045

(24)



VICTORIAN GOLDEN GATE

(20)

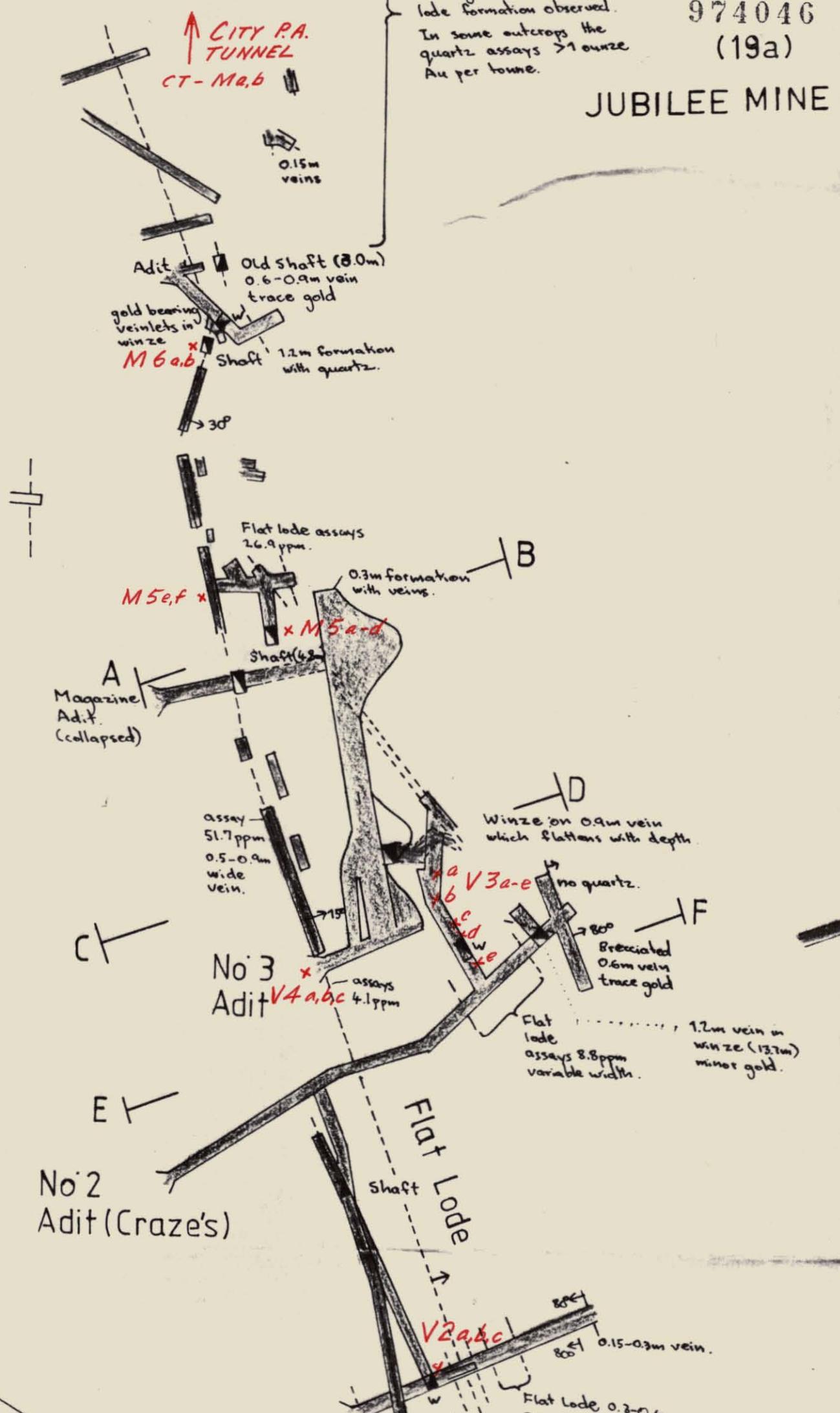


045

no single persistent lode formation observed. In some outcrops the quartz assays > 1 ounce Au per tonne.

974046 (19a)

# JUBILEE MINE

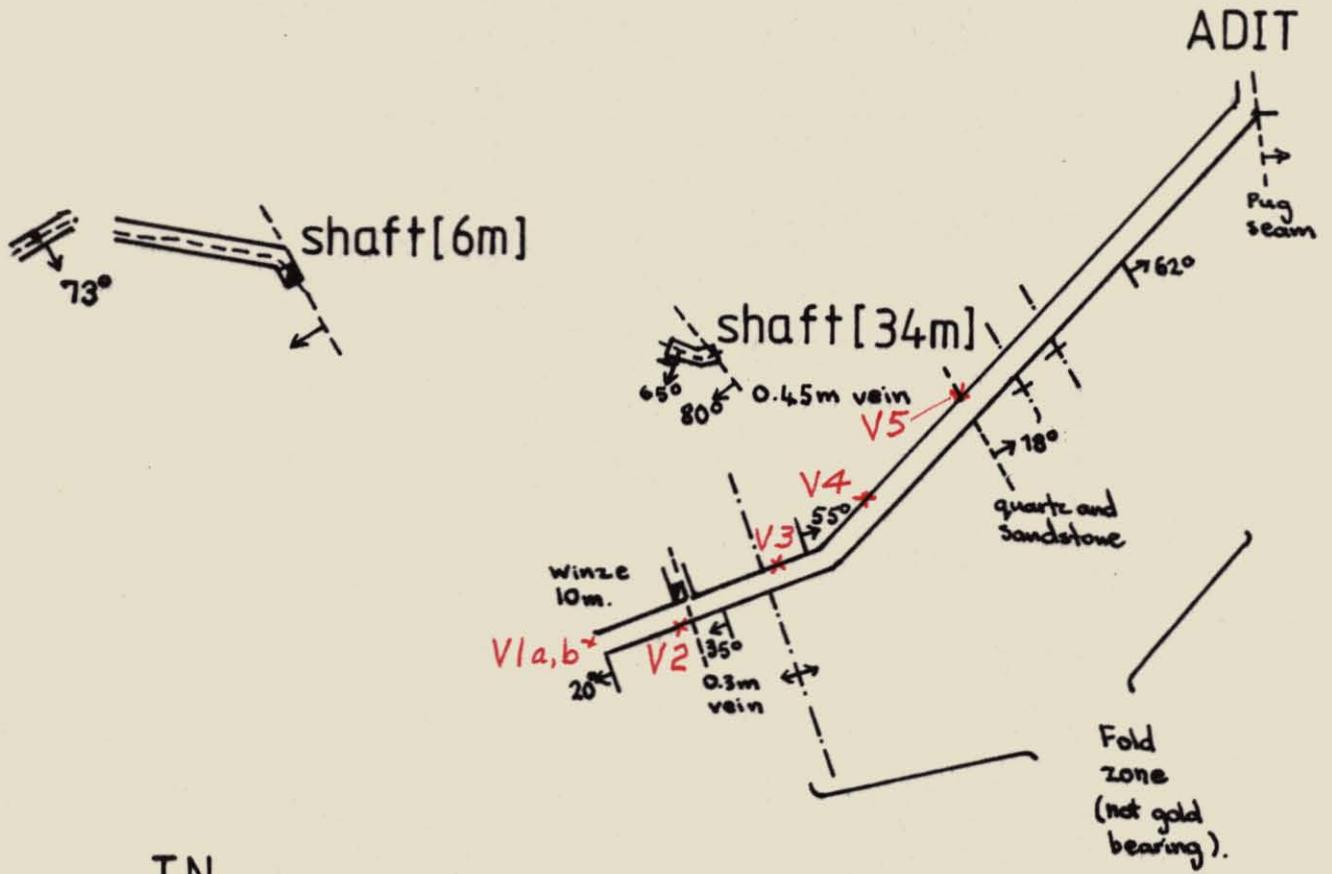


046

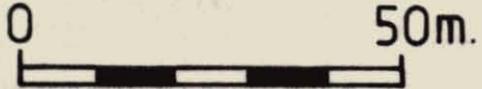
974047

# NORTH ELDORADO MINE WORKINGS (26)

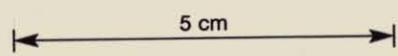
New Main Shaft [37m]



TN

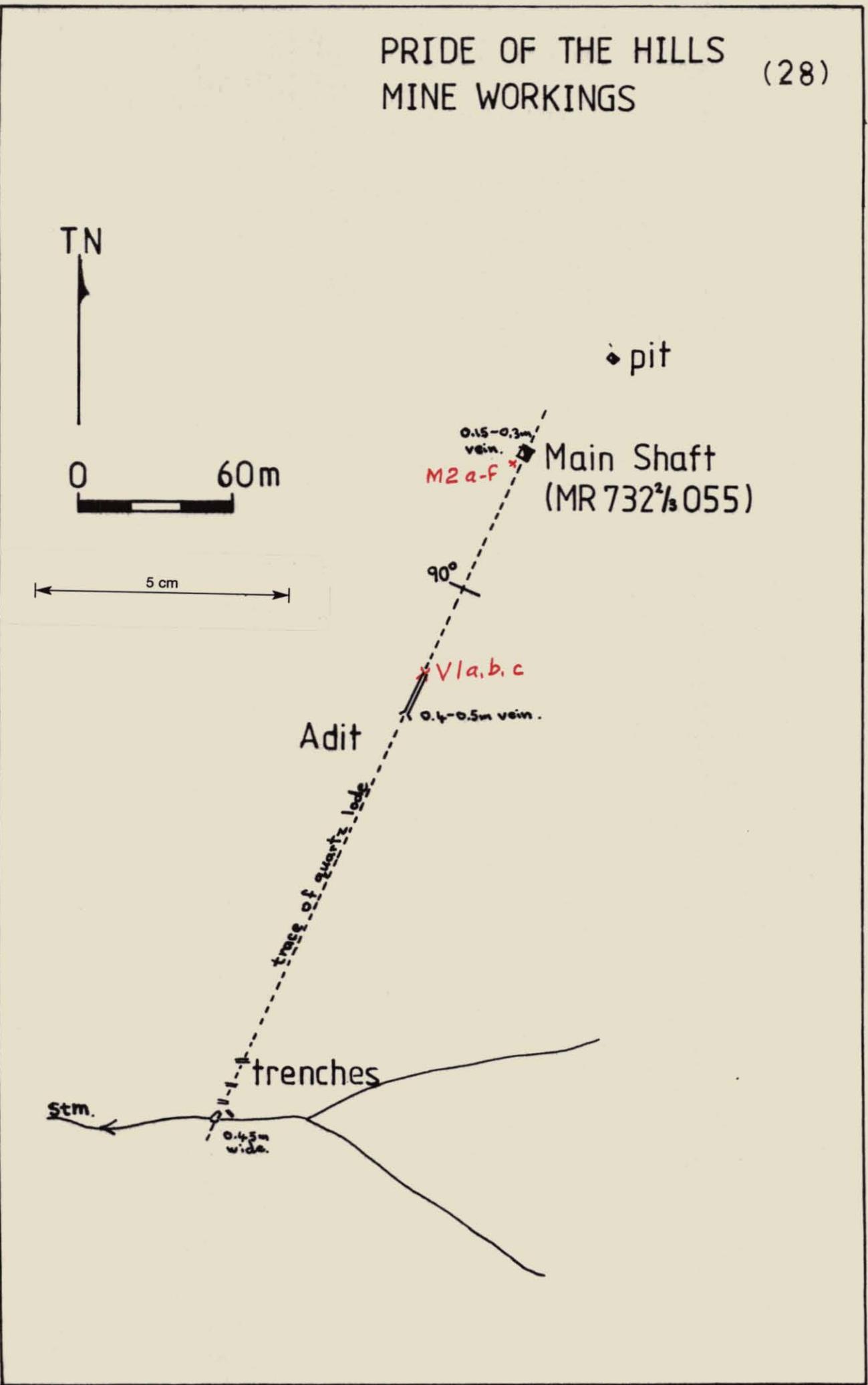


\* ADIT MR 743062 1/2



047

# PRIDE OF THE HILLS MINE WORKINGS (28)

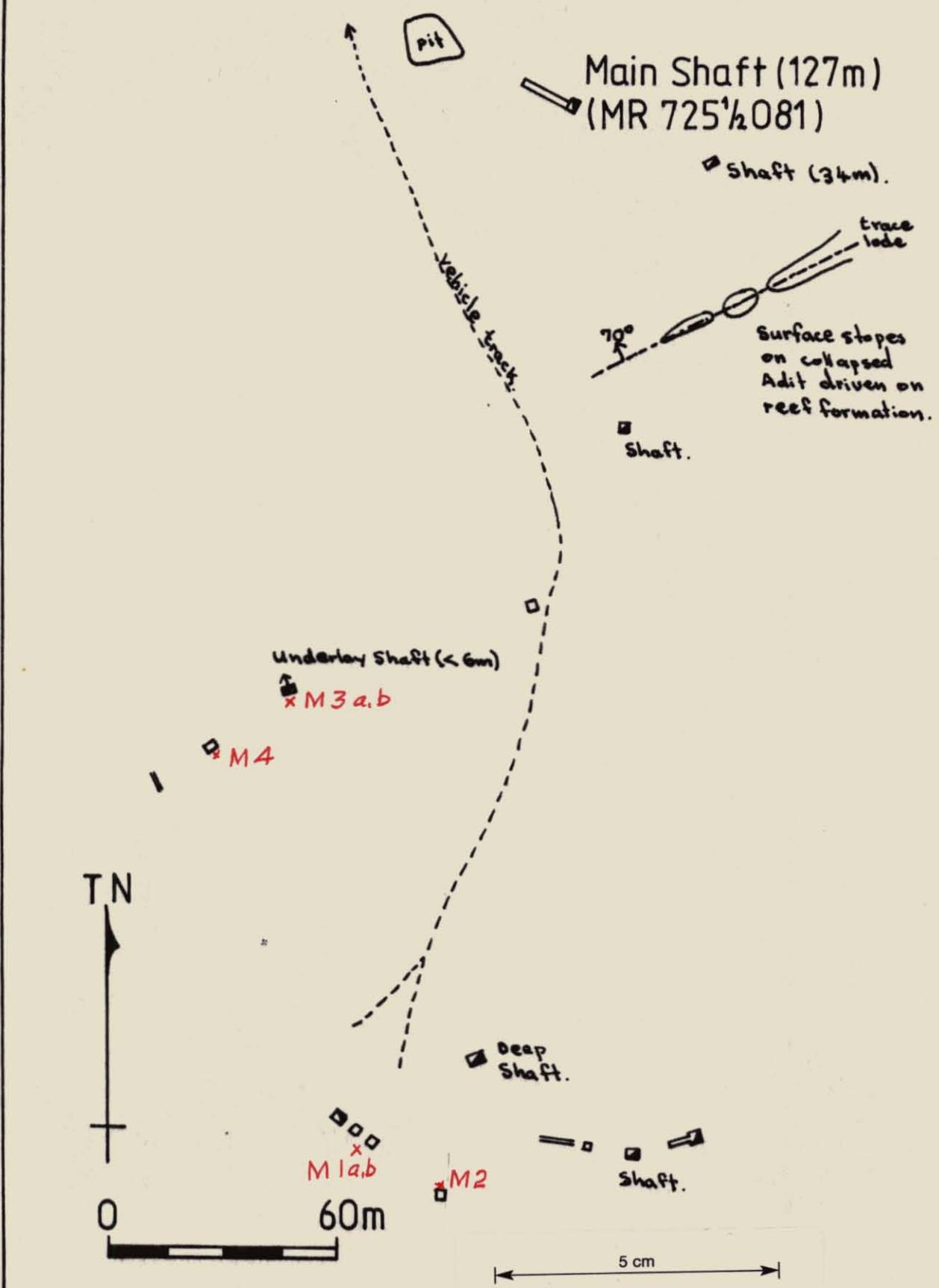


043

974049

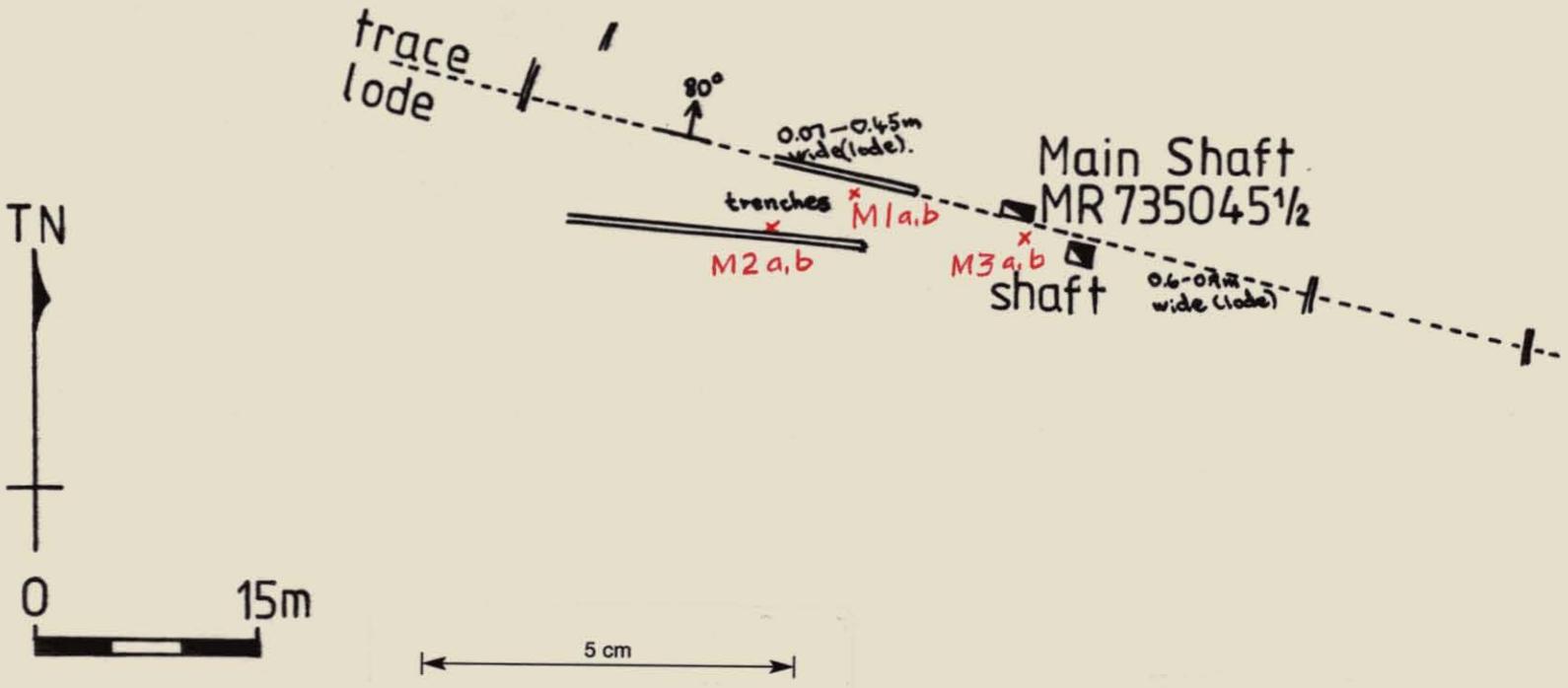
# VOLUNTEER MINE WORKINGS

(29)



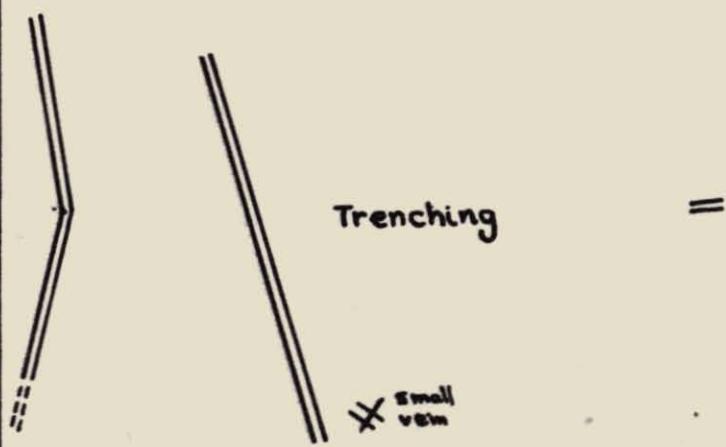
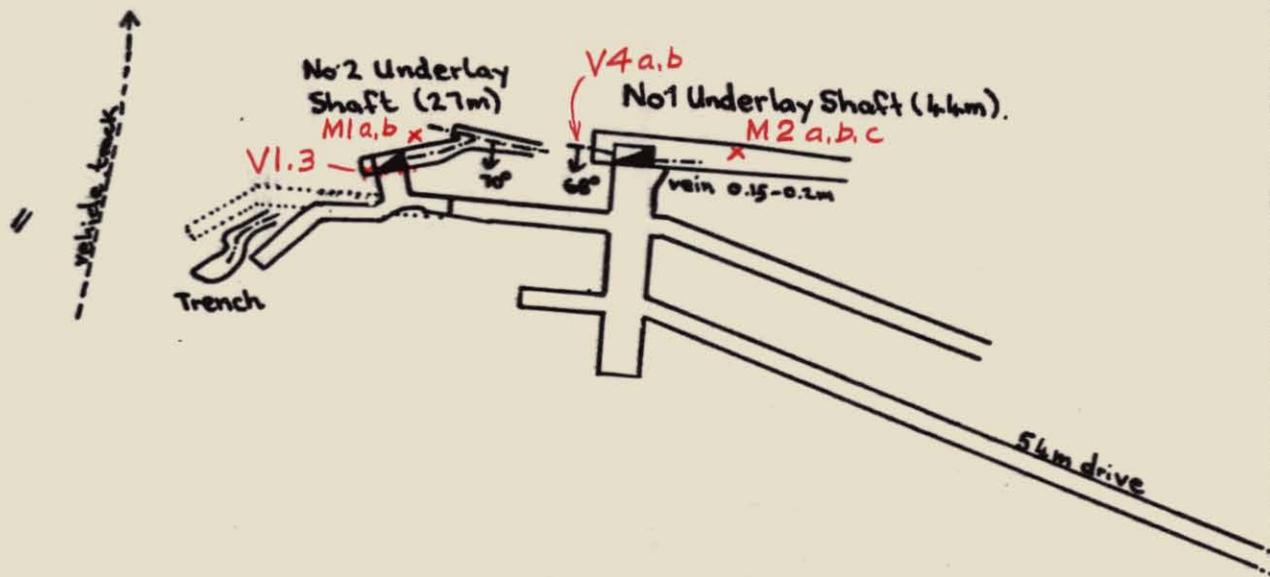
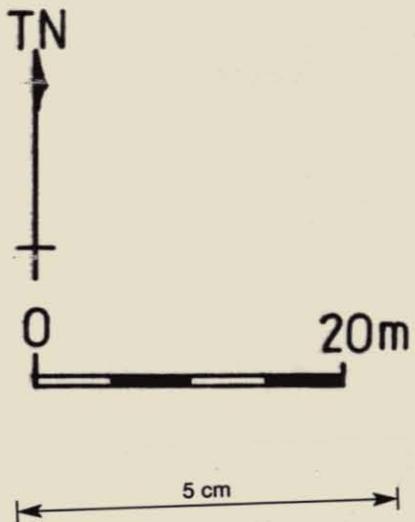
# COMMERCIAL MINE WORKINGS

(31)



# CITY OF MELBOURNE MINE WORKINGS

(32)



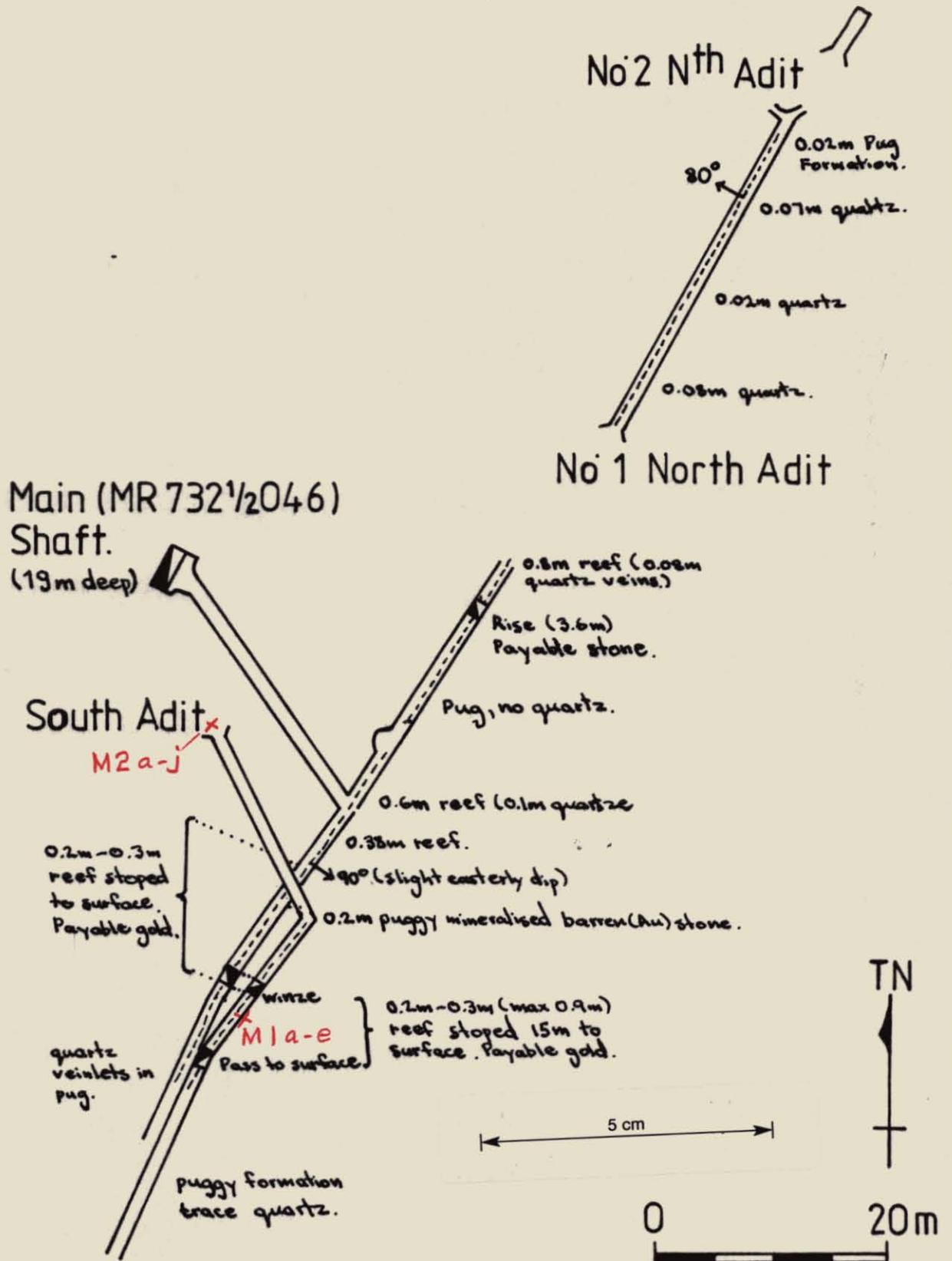
Main Shaft  
(30m)  
MR 728<sup>1</sup>/<sub>2</sub> 099<sup>1</sup>/<sub>2</sub>

\* average trend of lode is 082° / 70°S.

# SCOTT & PICKETT MINE WORKINGS

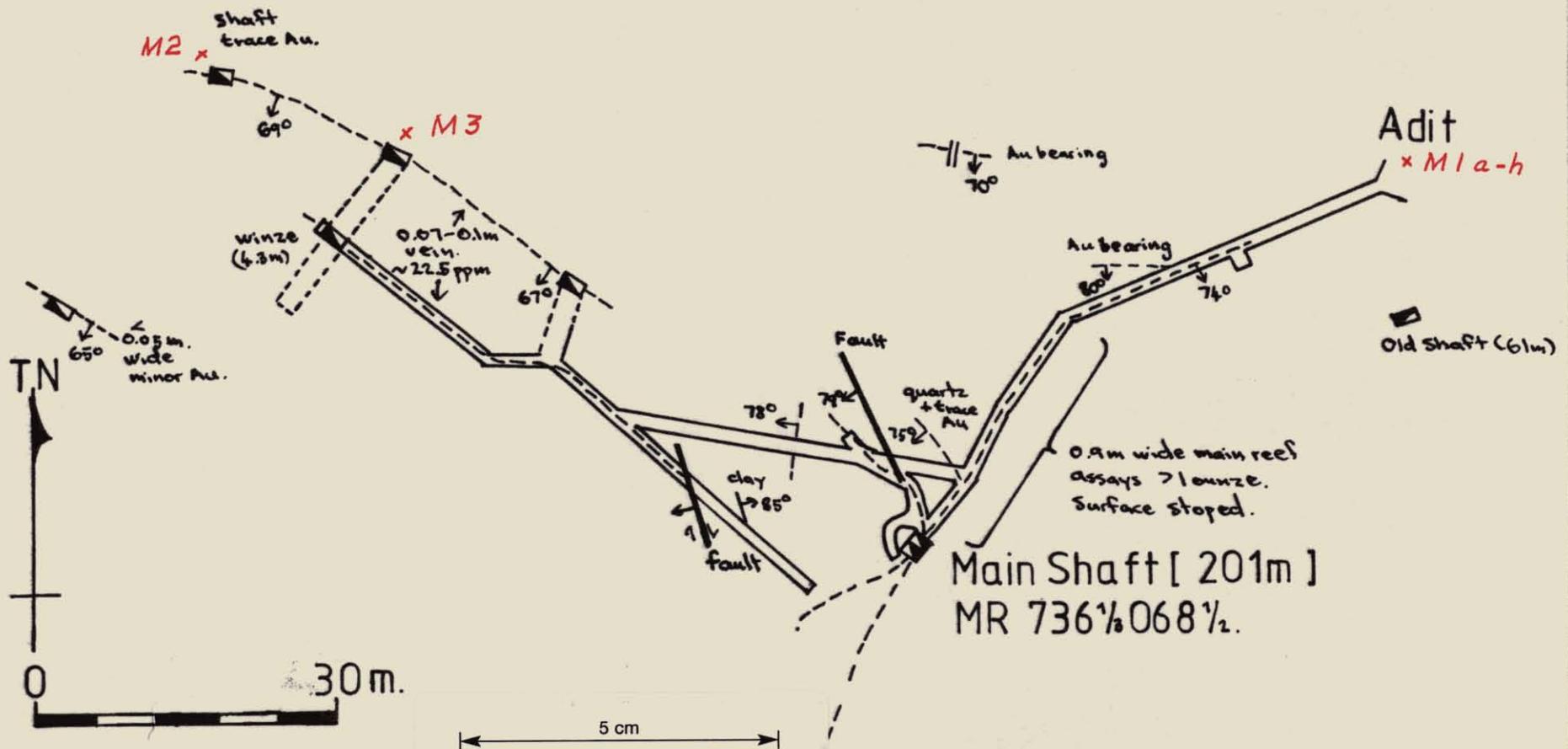
[ after Twelvetrees (1907) ]

(27)



# CITY OF HOBART main MINE WORKINGS

(38)

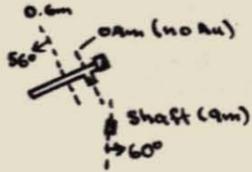


974053

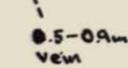
052

974054

Star Mathinna (48m) shaft.



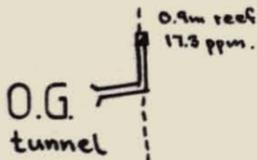
Old Glencoe shaft. (18.3m) O.G.



**MINE WORKINGS**  
on the East side  
of Long Gully,  
opposite the  
New G.G MINE.

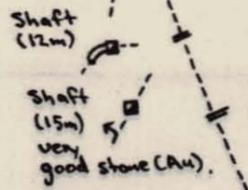
cuddy

East.G.Gate shaft. (~76m) E.G.G.

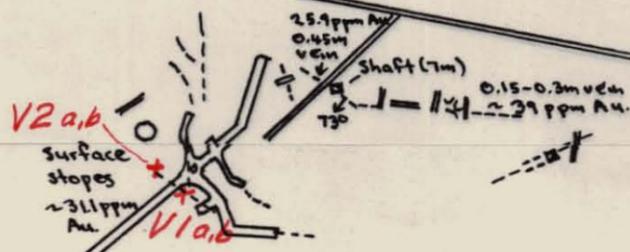


G.Gate Extended shaft (125m) (MR 745 1/2 070)

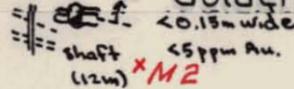
Old Perseverance shaft (36.5m) assay: 31.1 ppm.



E.G.G. Adit (no quartz)



Golden Ladder. (G.L)



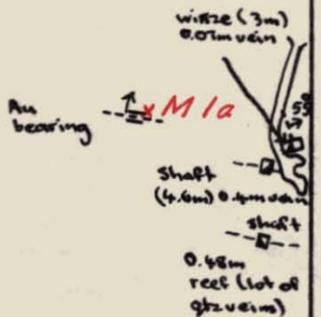
Caledonian Adit (C.) (MR 746 1/2 068 1/2)

4.5m wide reef in pit.



Central Golden Gate shaft. (no quartz).

adit.



TN

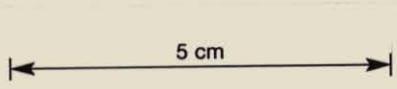
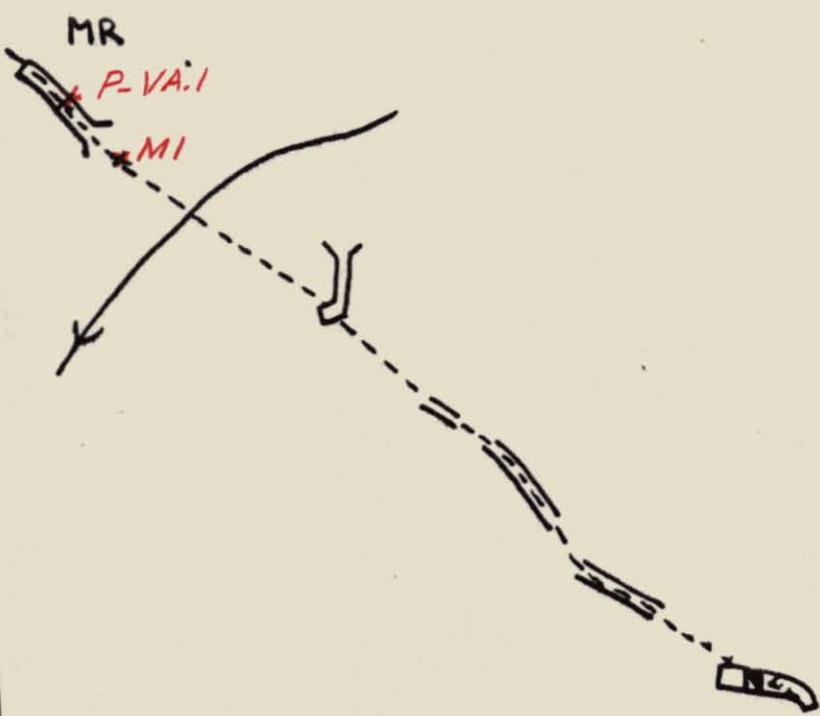
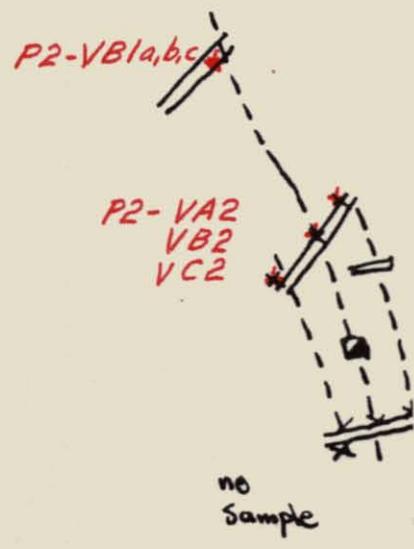


053

054

# PINCHER MINE.

974055  
(5)

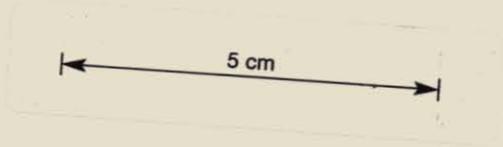
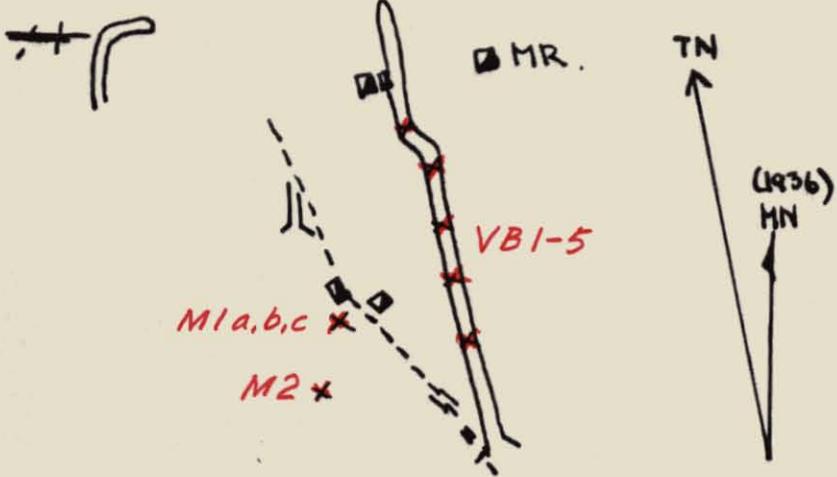
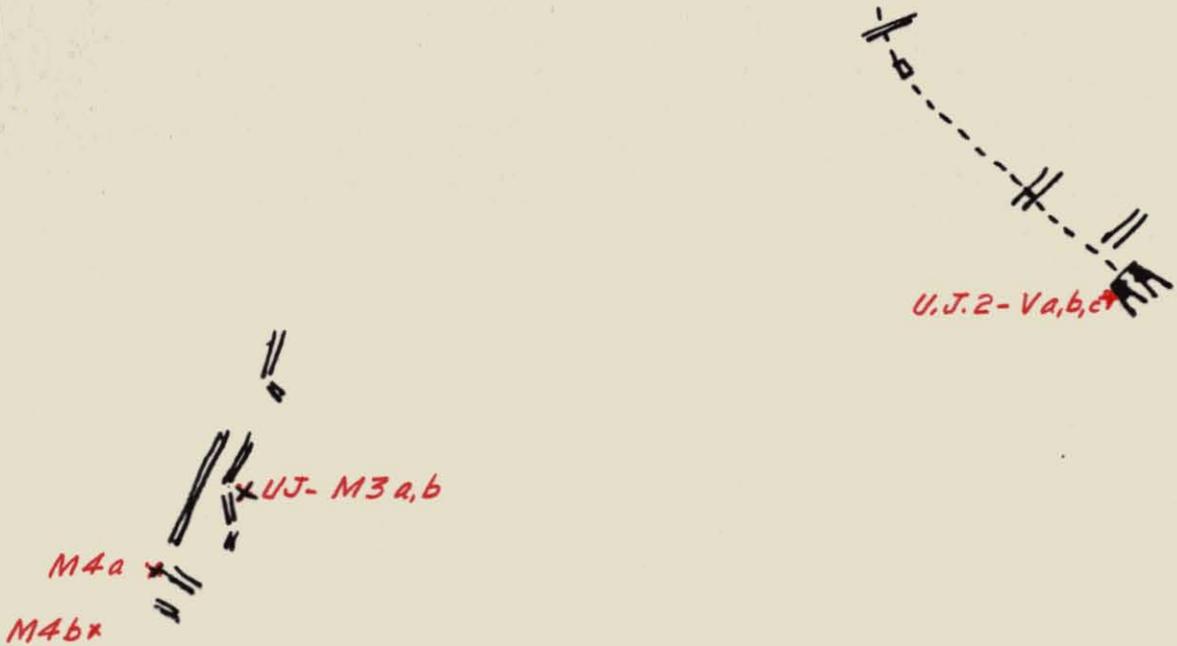


055

974030

# UNION JACK MINE.

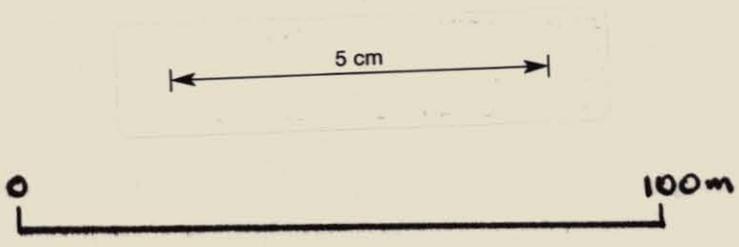
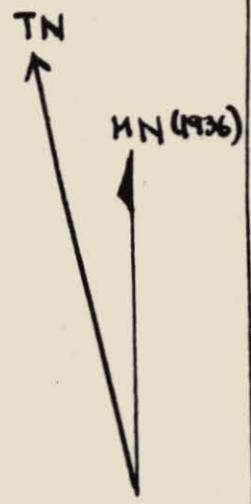
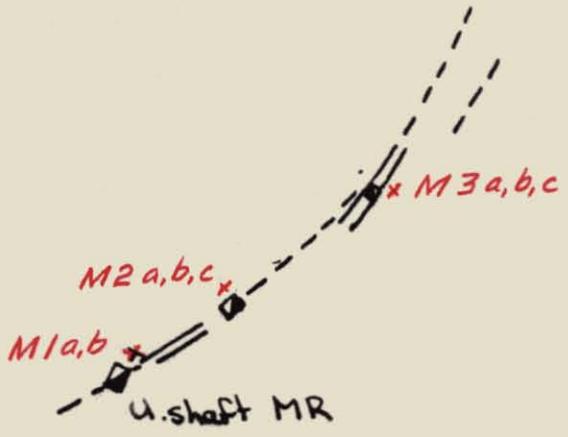
(6)



056

974057

# UNDERLAY REEF (7)

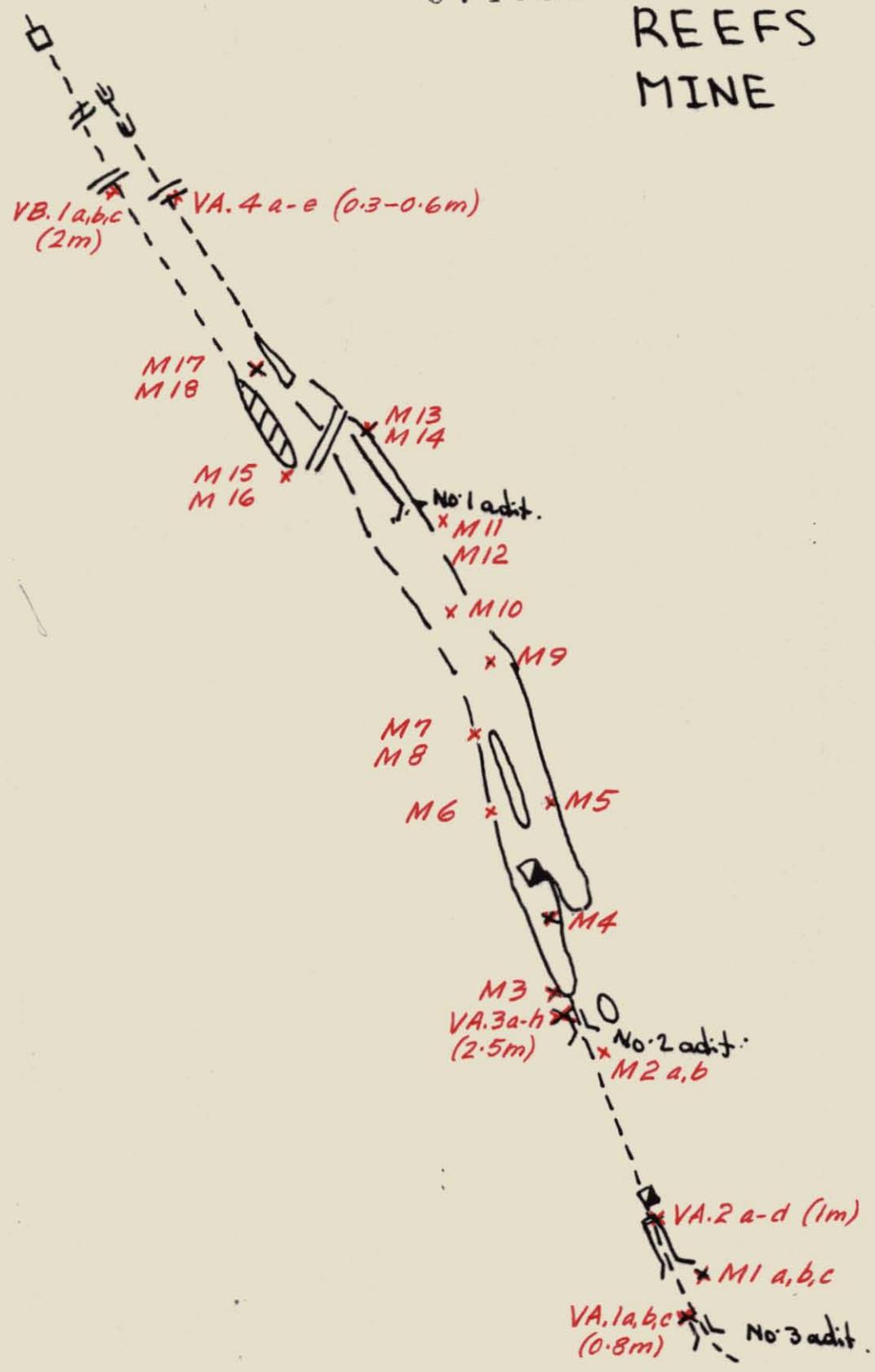


057

974058

# MANGANA REEFS MINE

(8)



5 cm

100m

MR  
Main Shaft.

Adit  
No. 4

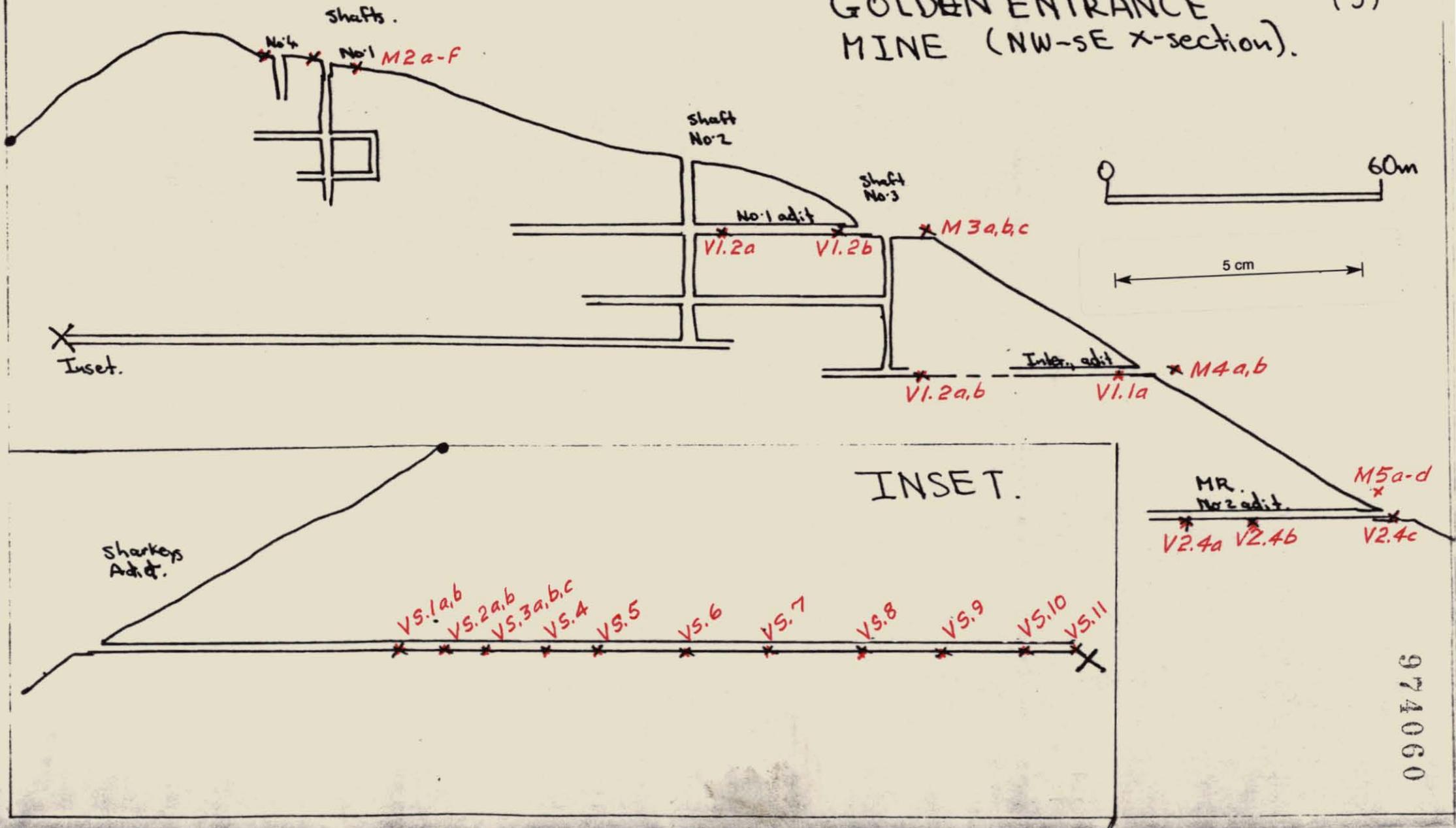
053

974059

# ARGYLE + South (10) GOLDEN ENTRANCE MINES.



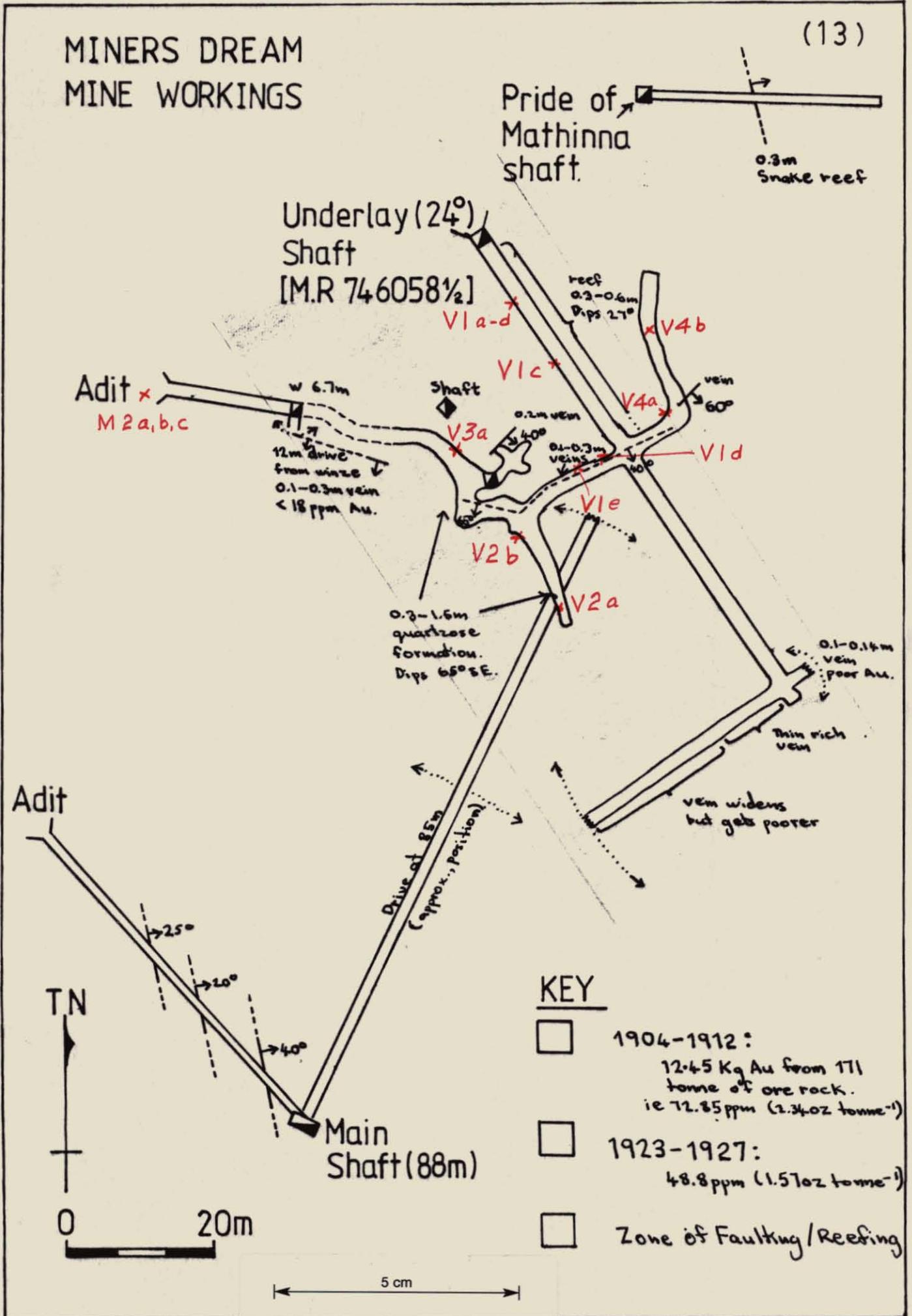
# GOLDEN ENTRANCE MINE (NW-SE X-section). (9)



974060

060

# MINERS DREAM MINE WORKINGS



Pride of Mathinna shaft.

Underlay (24°) Shaft  
[M.R 746058 1/2]

Adit x  
M2a,b,c

12m drive from winze  
0.1-0.3m vein  
< 18 ppm Au.

0.3-1.6m quartzose formation.  
Dips 65° SE.

Adit

Main Shaft (88m)

### KEY

- 1904-1912:  
12.45 Kg Au from 171 tonne of ore rock.  
ie 72.85 ppm (2.34oz tonne<sup>-1</sup>)
- 1923-1927:  
48.8 ppm (1.57oz tonne<sup>-1</sup>)
- Zone of Faulting/Reefing



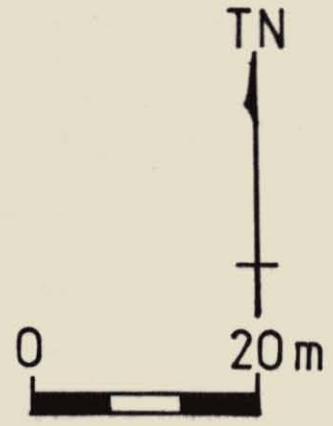
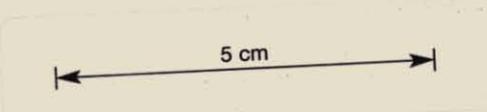
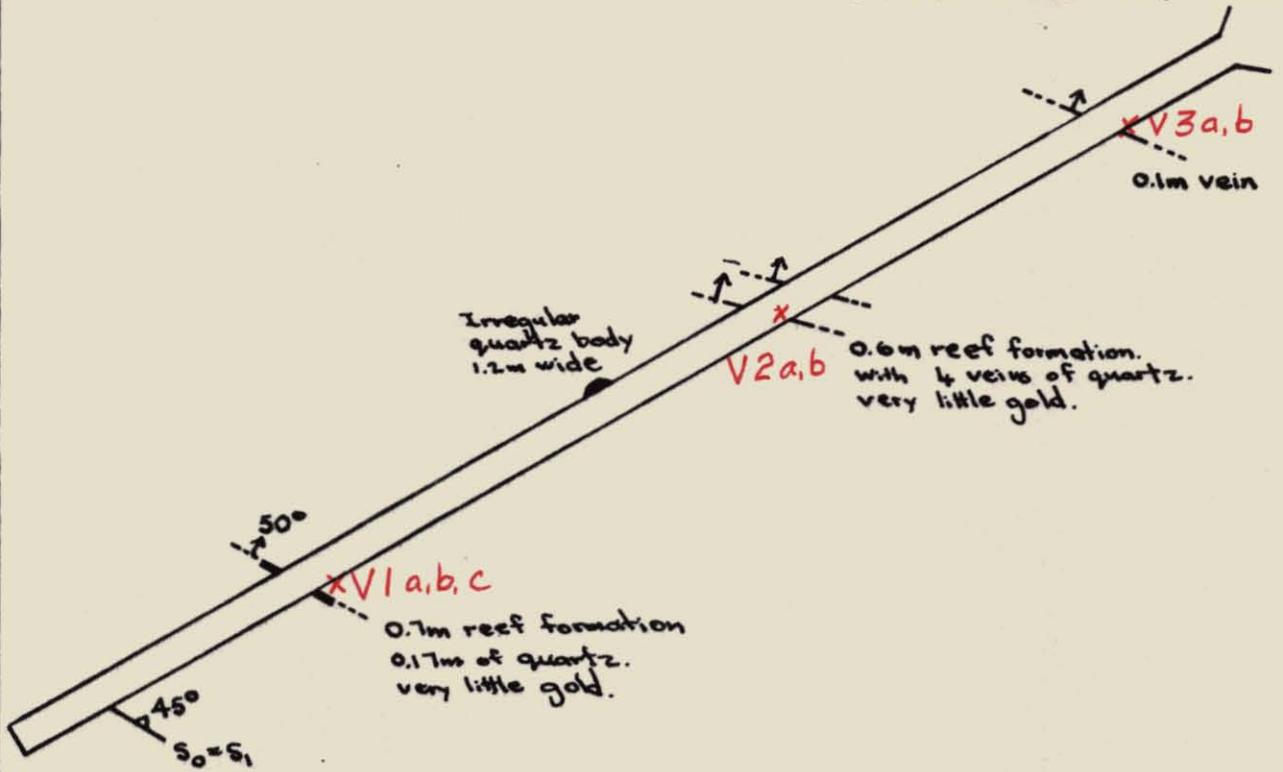
061

974062

# SOUTH MINERS DREAM MINE WORKINGS

(14)

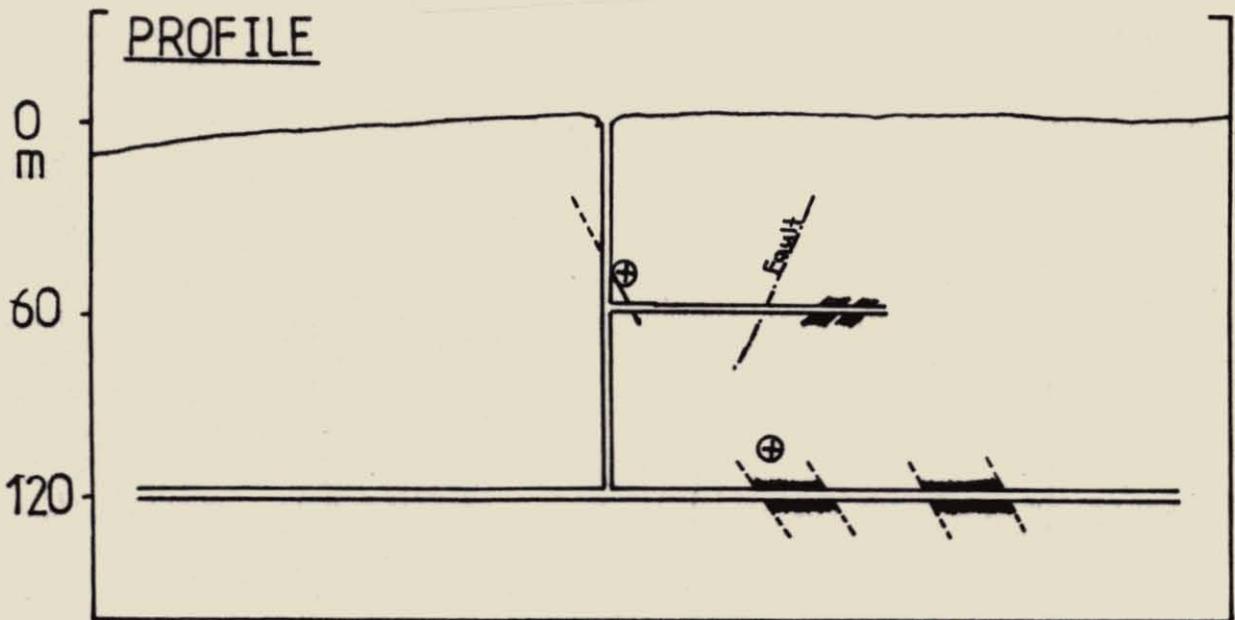
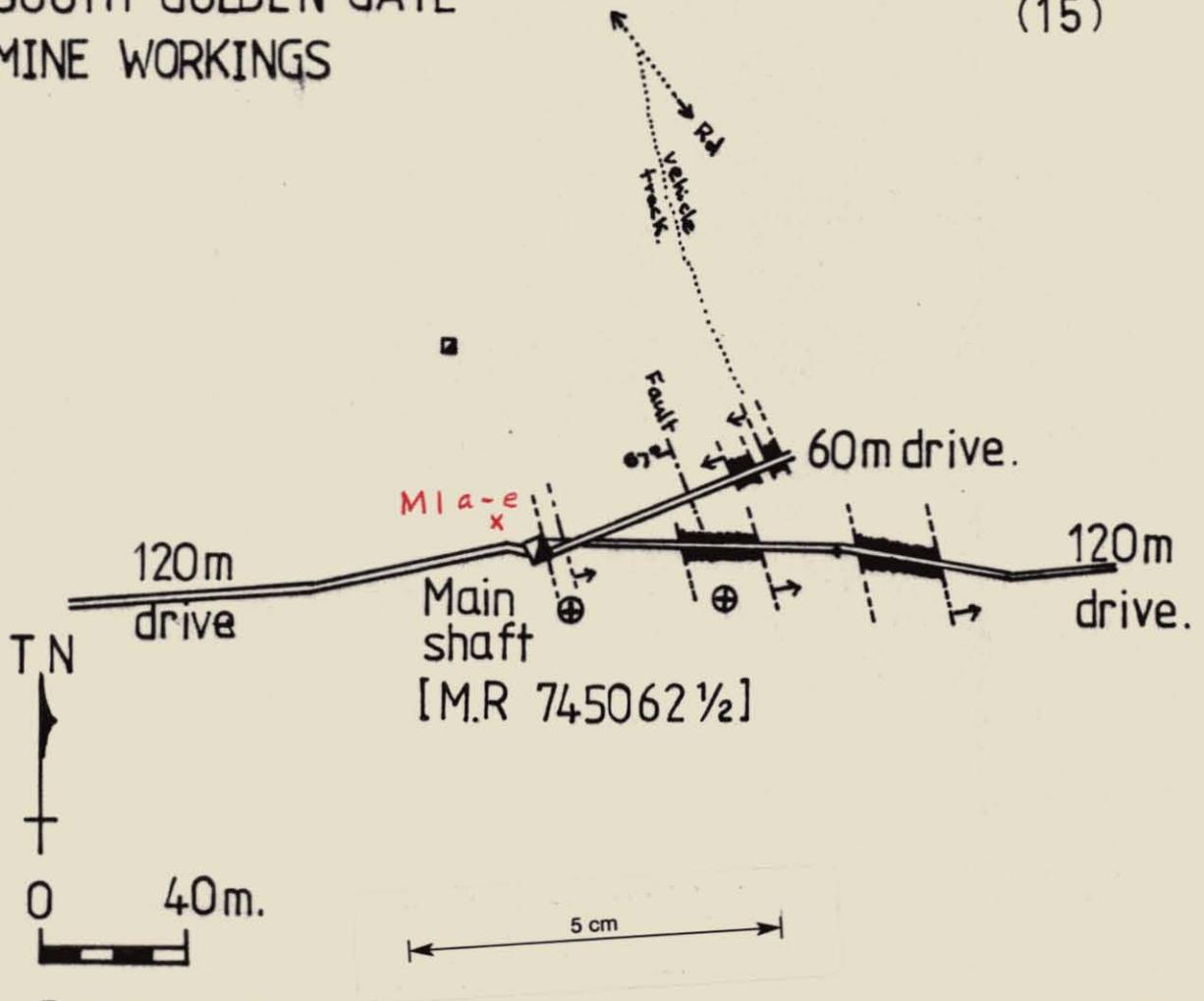
[ M.R 74810574 ] ADIT



062

# SOUTH GOLDEN GATE MINE WORKINGS

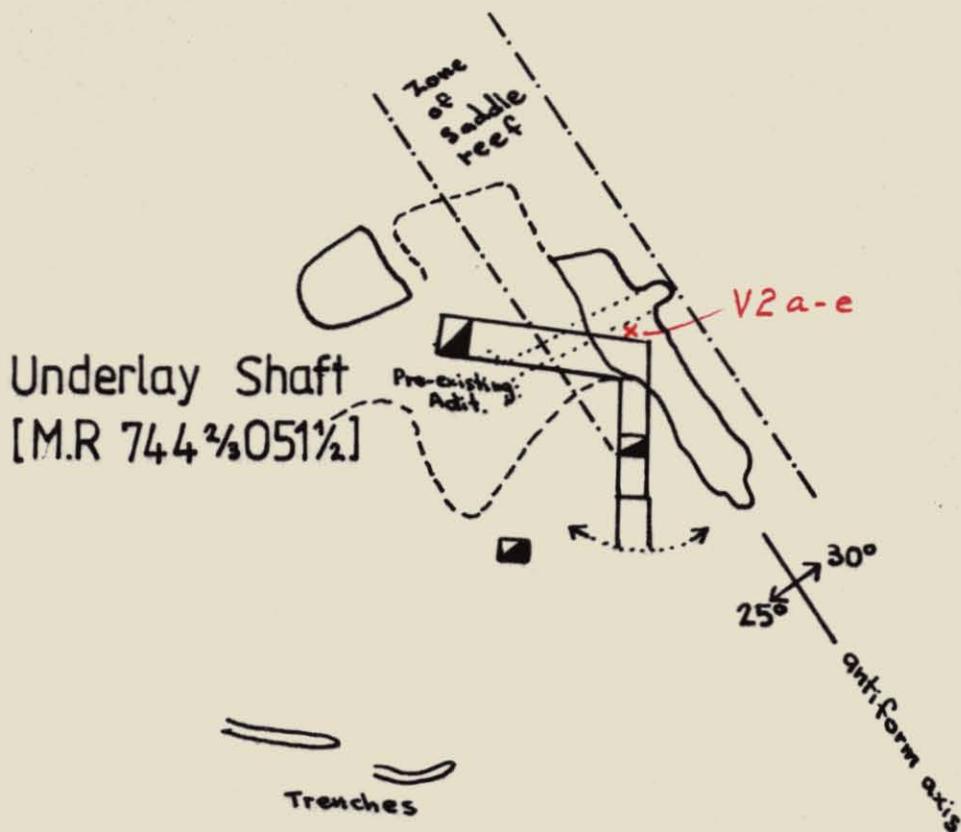
(15)



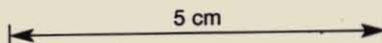
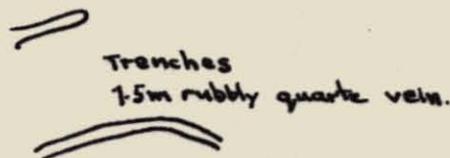
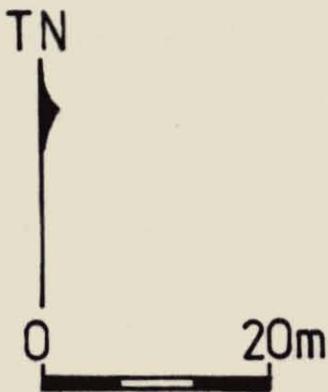
⊕ Snake reef

# HORSESHOE MINE WORKINGS

(16)



- Horseshoe Gold Mining Co. Workings.
- Volunteer Extended Consolidated Co. Workings.



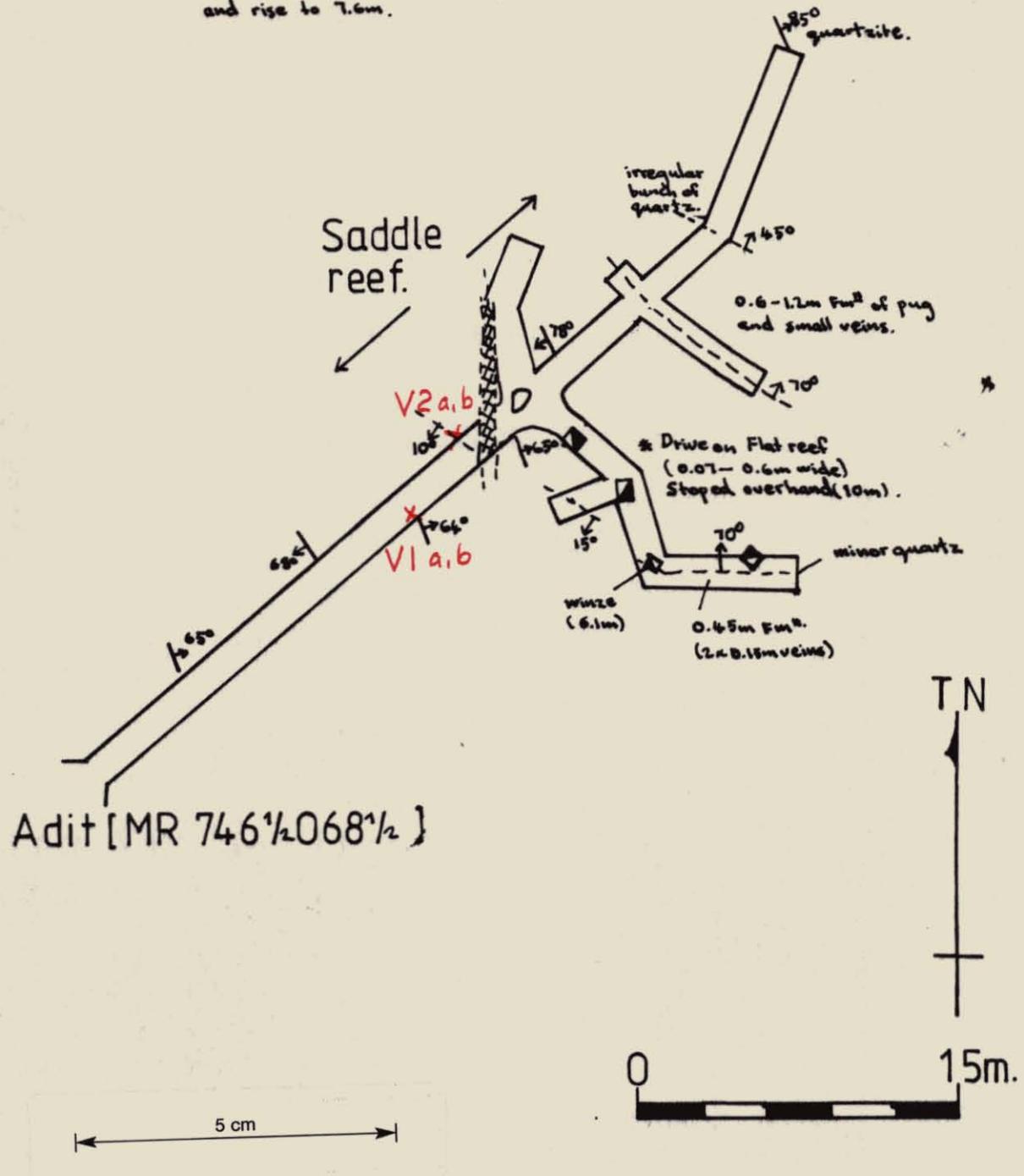
064

974065

# CALEDONIAN ADIT

(17)

Note: Above the tunnel crosscut a reef trending  $N61^{\circ}E/70^{\circ}N$  has been surface stoped for over 15m with  $\sim 0.1m$  veins still evident at either end of the 0.6-3.5m wide stop. Stone from here assayed 31.1 ppm. North of this stop is an 11m stop on a reef trending  $N100^{\circ}E/60^{\circ}N$ . (0.05-0.2m wide reef) which assayed  $\sim 30$  ppm. In the main SE drive from the adit, above drive is an intermediate slope and rise to 7.6m.



065

974066

# GLADSTONE MINE WORKINGS

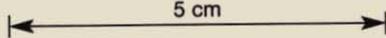
(18)

TN



60m

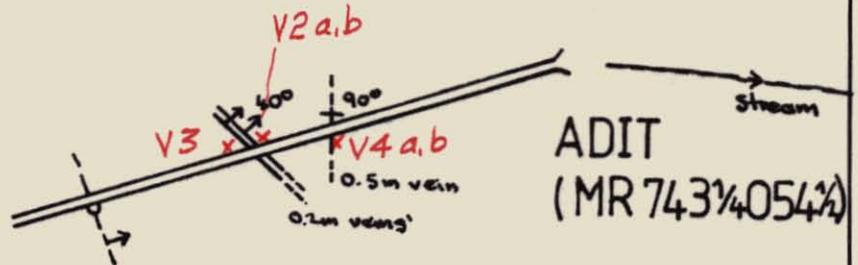
5 cm



shaft (1x1m)  
(shallow, underlay)

x MI

S<sub>0</sub>=S<sub>1</sub>



ADIT  
(MR 743 1/4 054 1/2)

Main Shaft

M3 a,b x  
M2 a,b  
72°  
0.6m vein

x II  
M7 a,b



M6 a,b  
M5 a,b  
M4 a,b  
0.3m vein  
gold payable

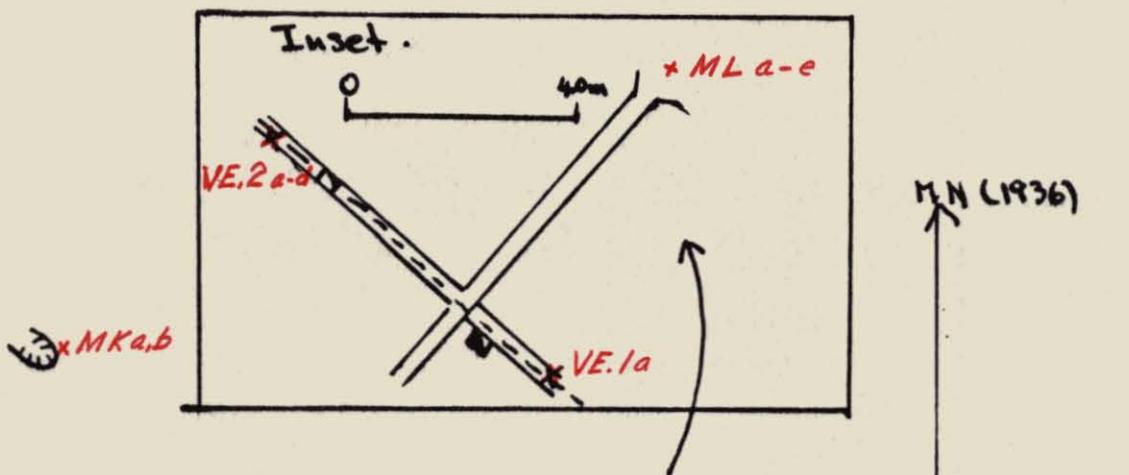


066

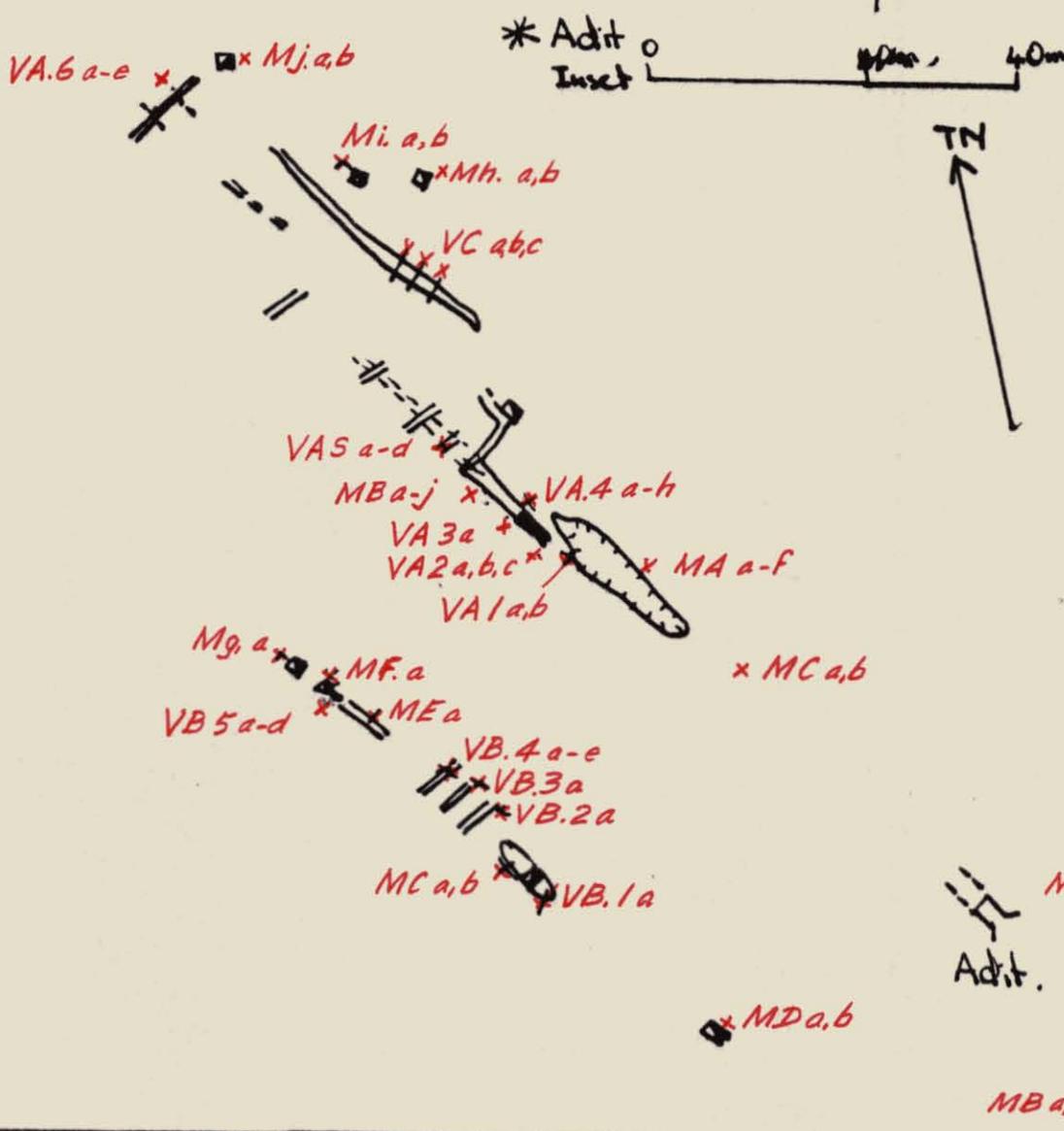
974067

# TOWER FREEHOLD HILL MINE (1)

5 cm



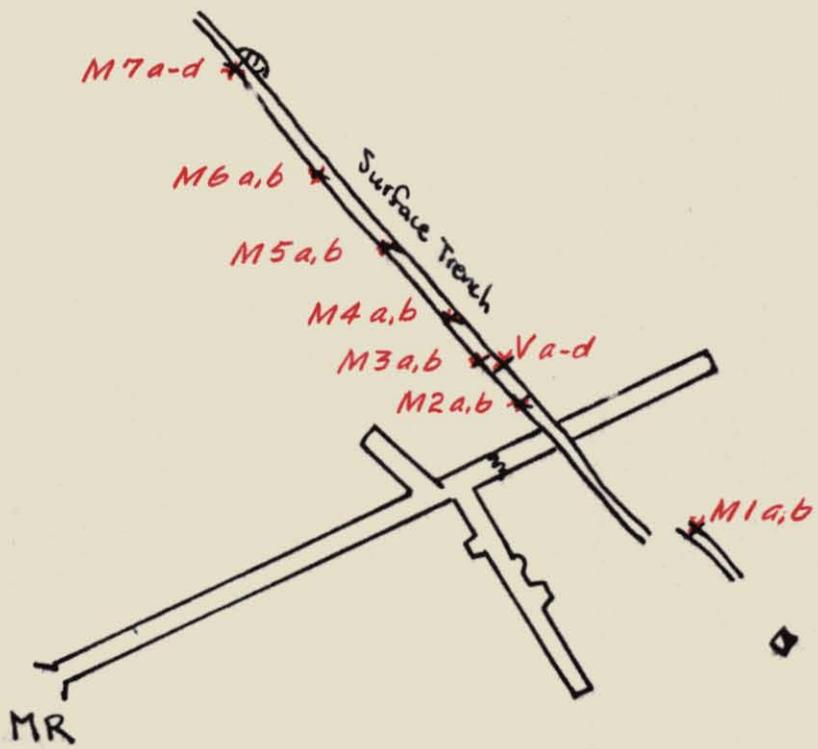
MN (1936)



067

# Golden Gully Mine.

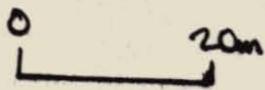
974068  
(2)



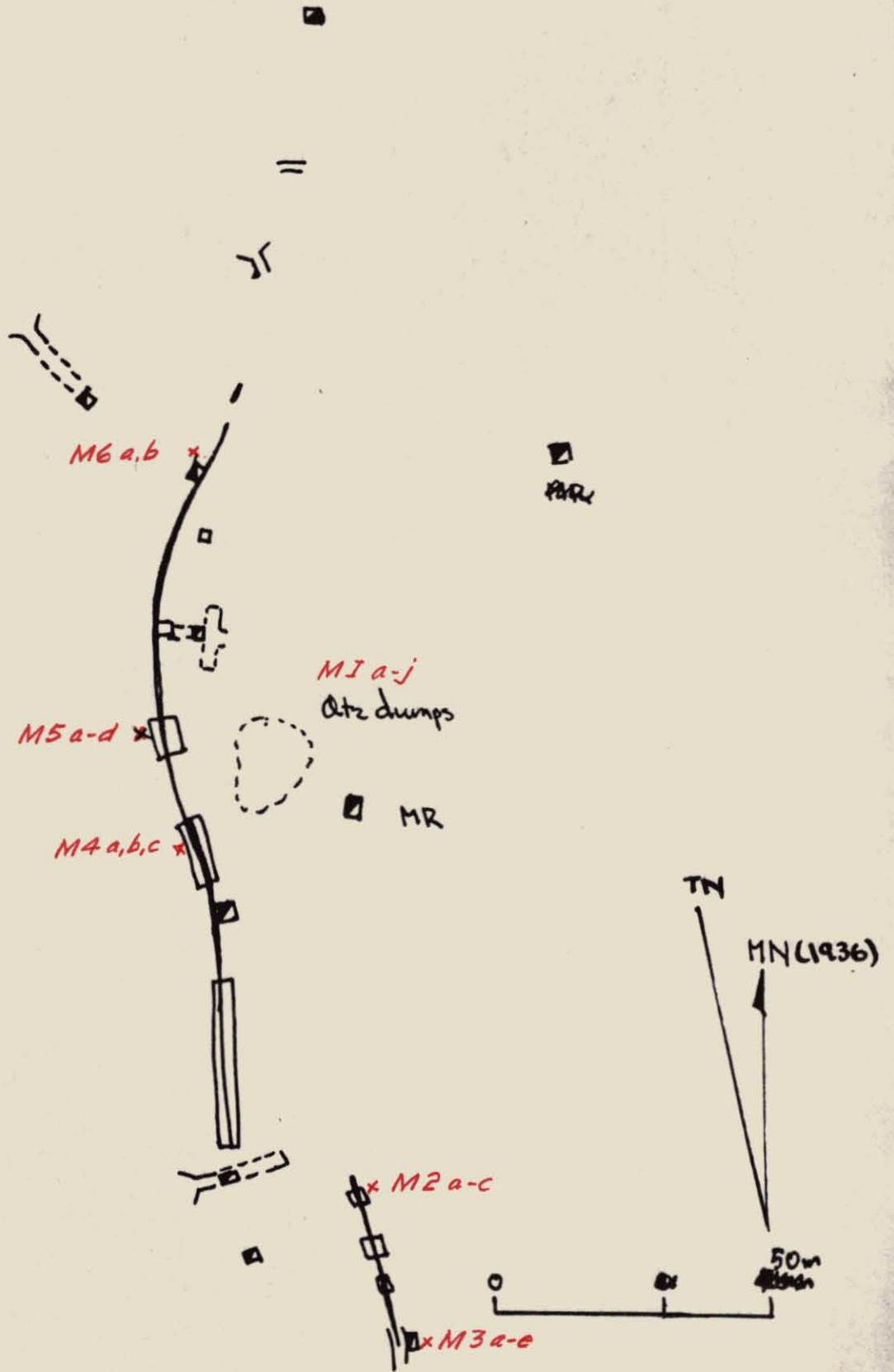
TN

MN (1936)

MR



# FINGAL MINE (3)



U69

974070

APPENDIX 2

TASMINEX N.L.

PROPOSED PILOT PLANT

for

HEAP LEACH CYANIDATION

OF MATHINNA TAILINGS

TASMINEX N.L.

SCHEME FOR HEAP LEACH CYANIDATION OF TAILINGS

Introduction

It is proposed to instal a pilot plant for the heap-leach cyanidation of the old Golden Gate mine tailings dumps at Mathinna.

The tailings cover an area approximately 600 metres by 150 metres at an average depth of about 2.5 metres, equivalent to 225,000 cu. metres (450,000 tonnes).

An 8 hectare Mining Lease 100M/68 is already held by Tasminex, which covers about one third of the tailings dumps. A new 17.6 hectare Mining Lease has been pegged adjoining 100M/68, and the acquisition of another adjoining lease 20M/74 of one hectare is being negotiated. When these arrangements are finalised it is proposed to consolidate the three leases, which will then cover the whole of the area of the tailings dumps. Figure 1 shows these leases in relation to the tailings dumps.

The pilot plant will be established on the mining lease at a point near the edge of the dumps where there is an existing shed owned by Tasminex and to which there is reasonable access by dirt road. The proposed plant location is shown in Figure 1.

Initially one 2,000 tonne heap of tailings will be formed on an impervious base for cyanide leaching, and a similar heap will be under construction while the first is being leached.

071

974072

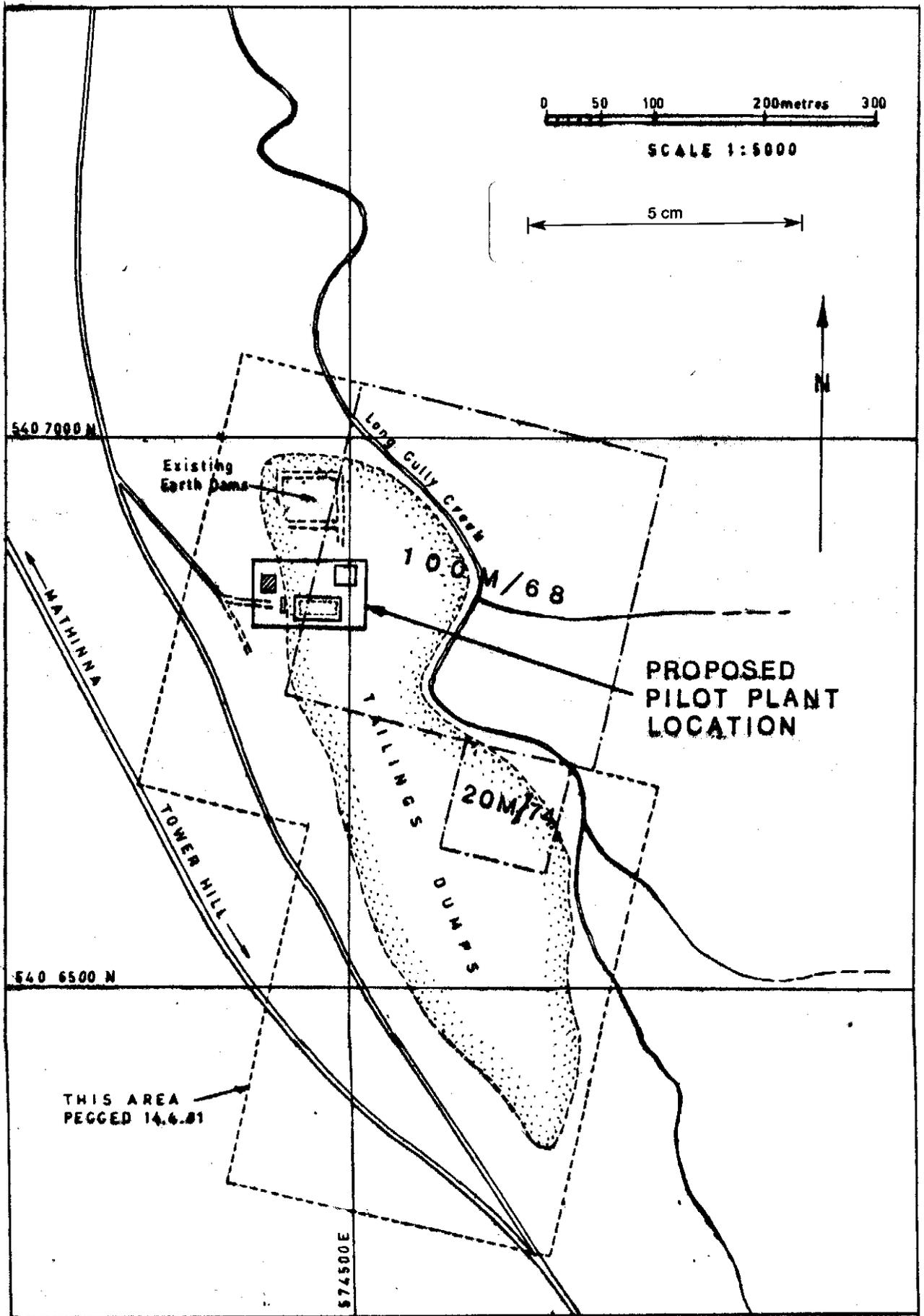


FIG. 1 LOCATION PLAN

Subsequent operations will be determined by results obtained with the pilot plant. It is envisaged that if the first trials are successful the scale of the operation will be considerably increased, with two 6,000 tonne heaps being leached while others are under preparation.

#### General Description of Proposed Heap Leach Process

During the past decade a number of tests of the amenability of the Mathinna tailings to cyanide leaching have given Au recoveries ranging from about 20% to 80%. These wide variations are apparently due to variations in the materials comprising the dumps. While the presence of three distinct materials has been well established (sand, slimes and residues), all of these contain recoverable gold. Varying recoveries from any one of these materials is believed due to the erratic presence of sulphides which may have been influenced by previous treatment of the tailings.

It has been demonstrated that treatment of the sulphides prior to cyanidation can significantly increase gold recoveries, so it proposed to subject the tailings heap to an initial wash of weak sulphuric acid to encourage oxidation of the sulphides.

After a further wash with clean water, sodium cyanide solution will be distributed over the heap, to percolate through to the impervious base. This solution, now carrying dissolved gold and silver, will be collected and pumped through absorption columns containing granular activated carbon which will absorb the precious metals.

073

The barren cyanide solution will be recycled back to the heap, with NaCN added and the pH adjusted as necessary, the process being continuous until monitoring of the pregnant solution indicates that it is uneconomic to continue.

DETAILS OF HEAP LEACH OPERATION

Site Preparation

A 40m x 20m area close to the edge of the tailings dump, where the tailings are less than one metre in thickness, will be levelled and graded at about 3% grade. The whole of this area will be covered with welded plastic sheeting, and a thin layer of rubble will be spread over this impervious base before tailings are heaped over the area by front-end loader to form a flat heap about 35m x 15m x 3m high.

A plastic-lined channel will cross the downhill edge of the heap to collect solutions which have percolated to the impervious inclined base, and direct them into a plastic-lined solution collecting pond from which they will be pumped to the next stage of the operation.

Near to and below the solution collecting pond will be excavated a large solution reservoir having a capacity equal to the total amount of solution in circulation. This reservoir will be lined with welded plastic sheeting, and will be used for preparing solutions prior to distribution on the heap.

Tests have indicated about 35% voids in the heaped tailings, and on this basis the volume of liquid required to saturate a 2,000 tonne ( $900 \text{ m}^3$ ) heap will be about 300,000 litres ( $300 \text{ m}^3$ ). The solution reservoir will therefore have a capacity of  $300 \text{ m}^3$ , and its dimensions may be about 17m x 17m x 1m deep. When the whole of the solution is in circulation this reservoir will be empty, but it will be available to accept any overflow from the smaller solution collecting pond, and would accept the whole of the circulating solution if the process was stopped.

The solution collecting pond will normally be used for handling the relatively small flow of solution from the heap. Its capacity will depend upon the work cycle to be adopted - i.e. whether the process will be operated 24 hours per day or only eight hours per day. On the assumption that the plant will be manned only eight hours per day the collecting pond will have a capacity of some 40,000 litres which would hold the anticipated outflow from the heap during a 12 hour period.

During longer periods, such as weekends, solution outflow beyond the capacity of the collecting pond would overflow into the solution reservoir.

The arrangement of the heap, ponds and solution flow are shown in Figure 3.

075

Solution Distribution

Solutions will be pumped to the tailings heap for sprinkler distribution over the whole surface of the heap (including the inclined sides) via a system of 25mm dia. plastic pipes spaced about 2m apart, with garden sprinklers at suitable intervals. The arrangement of pipes and sprinklers on the heap may be modified with experience.

The rate of solution distribution will need to be roughly the same as the percolation rate, which laboratory tests have indicated to be between 2.4 cm and 6.0 cm per hour. For estimation purposes a figure lower than the mean of these is taken - i.e. 3.0 cm per hour, or one metre bed thickness in 33 hours. It would thus take about 100 hours before the proposed 3m high heap would be saturated and a flow began to exit on the impervious base.

It may be easier preparing solutions in the smaller solution collecting pond on a batch basis, especially if it is decided that working a single 8-hour shift per day can adequately control the operation. However, this will depend upon the actual percolation rate obtained, as the collecting pond could not be used for solution preparation once an outflow of pregnant solution had commenced.

In the initial stages two solution pumps would be available, one to pump fresh solution from the solution reservoir to the heap, and the other to handle pregnant solution when it started to appear.

076

Acid Treatment

The solution reservoir will be used initially for the preparation of a weak sulphuric acid solution to be distributed over the heap through the sprinkler system. After percolation through the heap the acid solution will drain from the impervious plastic base into the solution collecting pond from where it will be recycled on to the heap as necessary.

Upon completion of the acid treatment the acid will be neutralised by pH modification and allowed to run to waste unless another heap happens to be awaiting acid treatment. Fresh water will then be distributed over the heap to wash out any remaining acid.

Cyanidation

A total of 300,000 litres of solution containing between 0.2 and 1.0 g/L NaCN will be required to saturate the heap. As stated above, this solution will be prepared either in the large solution reservoir or in the smaller collecting pond on a batch basis, with lime added to maintain a pH of about 10.

It is anticipated that within about 100 hours from commencement of distribution over the tailings heap a flow of about 3,000 litres per hour will begin to exit from the base of the heap into the solution collecting pond. This outflow will contain dissolved gold and silver, and the pregnant solution will be pumped to the carbon absorption columns.

Most of the NaCN in the solution will be consumed within the heap, and the solution strength will be adjusted to give about 100 ppm NaCN in the exiting solution, which level is considered relatively harmless.

#### Carbon Absorption

The carbon absorption unit will consist of three mild steel columns each 2m high x 0.46m dia. arranged as shown in Figure 2. The pregnant solution will pass upwards through each column in turn, with gold and silver being absorbed from the solution by the granular activated carbon in the columns.

On emerging from the carbon absorption unit the now barren solution will enter a small plastic-lined pond adjacent to the columns where NaCN and lime will be added as necessary to replenish the solution before it is pumped back to the heap via the distribution pipes. The process thus becomes continuous.

The gold content of the pregnant solution will be monitored, and when it drops to a level considered to be uneconomic the process will cease and the solution allowed to drain out into the large solution reservoir. It is anticipated that economic treatment of a 2,000 tonne heap might last up to eight weeks, but it could be as little as two weeks.

The total quantity of carbon required in the three absorption columns is determined by the anticipated amount of recoverable gold.

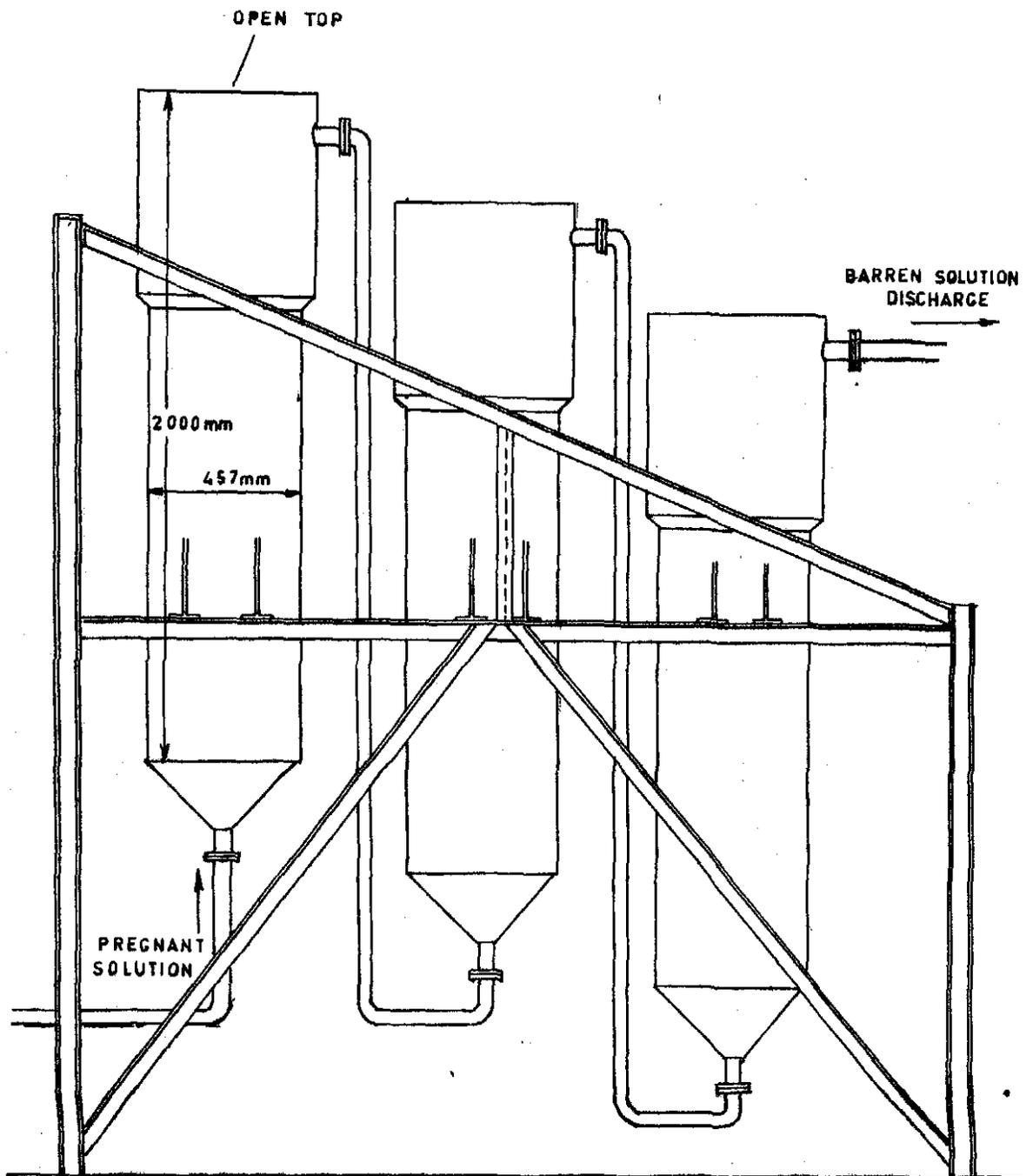
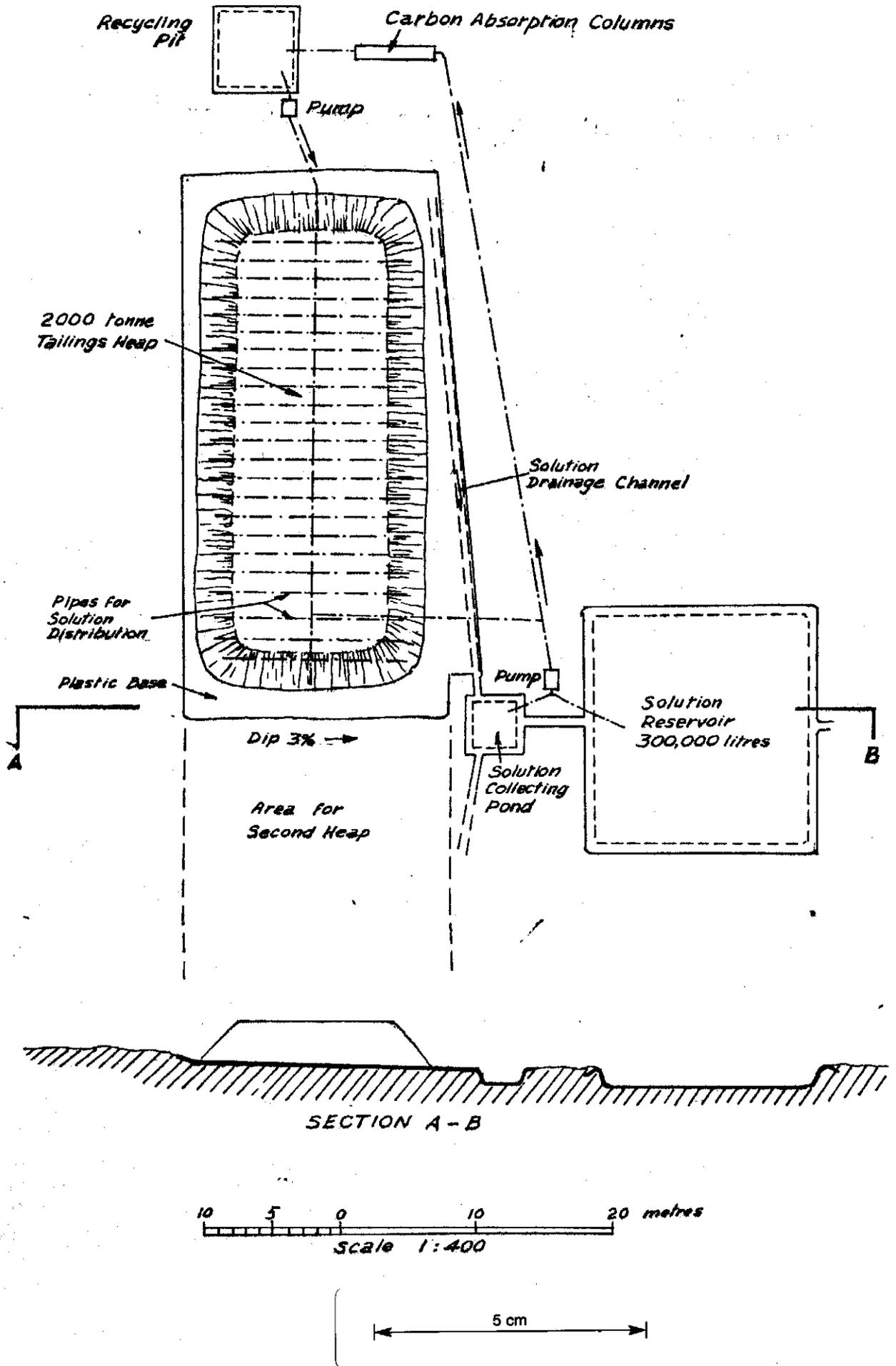


FIG. 2 Carbon Absorption Columns  
(General Arrangement)

079

974080

FIG. 3 Details of Plant Layout



U80

The assumed maximum loading of the carbon is 150 to 200 ounces of gold per tonne of carbon (say 175 ounces). It is estimated that up to 60 oz. gold might be recovered from a 2,000 tonne heap, which would require 350 kg of carbon.

The gold/silver content of the activated carbon in the first absorption column will be tested periodically and when it reaches the required loading it will be removed and replaced with fresh carbon. It is envisaged that in this pilot operation the gold-impregnated carbon will be sold as it is. However, if the scale of the operation was subsequently increased a carbon-stripping circuit would be introduced for recovery of gold on site and re-activating of the carbon.

#### Water Usage

Experience at the Mathinna site with a small alluvial bulk sampling plant has indicated that an adequate water supply will be available even during a dry summer from Long Gully Creek, which runs along the eastern edge of the tailings dumps.

About 70m north from the proposed pilot plant site, and at a lower level, are two old earth dams which were repaired and successfully used for fresh water storage during the alluvial bulk sampling tests during late 1980. One of these dams will be used for fresh water storage, to ensure that the creek is not unduly depleted in dry weather. The other dam will be retained to handle any (unlikely) overflow of solution from the solution reservoir.

081

The anticipated water requirements during an eight-week operation of the pilot plant will be as follows:

- (a) Acid Treatment - One heap volume = 300,000 litres
- (b) Fresh Water Wash - One heap volume = 300,000 litres
- (c) Cyanide Solution - One heap volume = 300,000 litres
- (d) Replenishment of NaCN Solution  
due to evaporation etc. assumed  
10% of heap volume per week = 240,000 litres
- (e) Other General Water Usage = 100,000 litres

---

Total water usage in an 8 week period = 1,240,000 litres  
= 155,000 litres per week

As previously practised with the alluvial sampling plant a water pump will be sited at a deep pool in the creek to maintain the required level of water in the fresh water dam. A pump at the dam will transfer water to the pilot plant as required.

Site Drainage

The site proposed for the pilot plant is well drained and unlikely to be affected by flash flooding. Long Gully Creek, some 100m to the east, drains the valley in which the tailings dumps lie, and is about 6m below the level of the pilot plant site.

In the event of exceptional rainfall causing an overflow of the solution (acid or cyanide) within the tailings heap or generally in circulation, this overflow would first enter the large solution reservoir, which would be empty while the plant was in normal operation. Any overflow from the solution reservoir would be accommodated in one of the two earth dams previously mentioned.

This dam will have a capacity at least equal to that of the solution reservoir, and while it will not be lined with plastic sheeting, experience has shown that it retains its contents well. If it was considered that the much diluted cyanide solution entering this dam might eventually affect the Long Gully Creek, chlorine could be added to it to oxidise the cyanide. However, in the exceptional circumstances which might cause solution to enter this dam it would be expected that dilution would render the solution harmless.

Power Requirements

Apart from mobile equipment such as a front-end loader the only mechanical equipment used will be pumps for supplying fresh water and for circulating the solutions.

The probable arrangement will be one 10 kw pump situated at the creek to supply the fresh water dam via a 50mm dia. pipe as required, one 15 kw pump to supply up to 20 litres/sec from the dam to the solution reservoir, and two 5 kw pumps for distribution and recycling of the solutions.

The main fresh water pumps will be driven by petrol or diesel engines, but consideration will be given to the provision of a small diesel generating set to power the solution pumps and provide lighting.

If the project warranted subsequent expansion an H.E.C. power supply would be arranged.

U83

Management and Personnel

It is envisaged that the plant will be operated by three men, although additional contract labour may be employed in preparation of the tailings heap and solution ponds, and the laying of the plastic sheeting and distribution pipe system.

The operation will be supervised by a plant manager who will be competent to carry out the various tests of solutions and to supervise the handling of sulphuric acid and sodium cyanide. It is envisaged that he will live at the site in caravan accommodation and so be available at fairly short notice.

He will be assisted by one or two locally recruited plant operators, but this number will depend on the number of shifts worked per day.

During some stages of the operation, for example when the heap is being saturated with solution, it will be possible to pump solution for 24 hours per day without continual attendance. However, some warning device might be installed to alert the manager or other personnel in the event of pump malfunction.

Consideration will be given to the erection of a fence round the pilot plant site, but in any case appropriate measures will be taken to prevent unauthorised access and to safeguard the public in respect of the ponds containing potentially dangerous solutions.

084

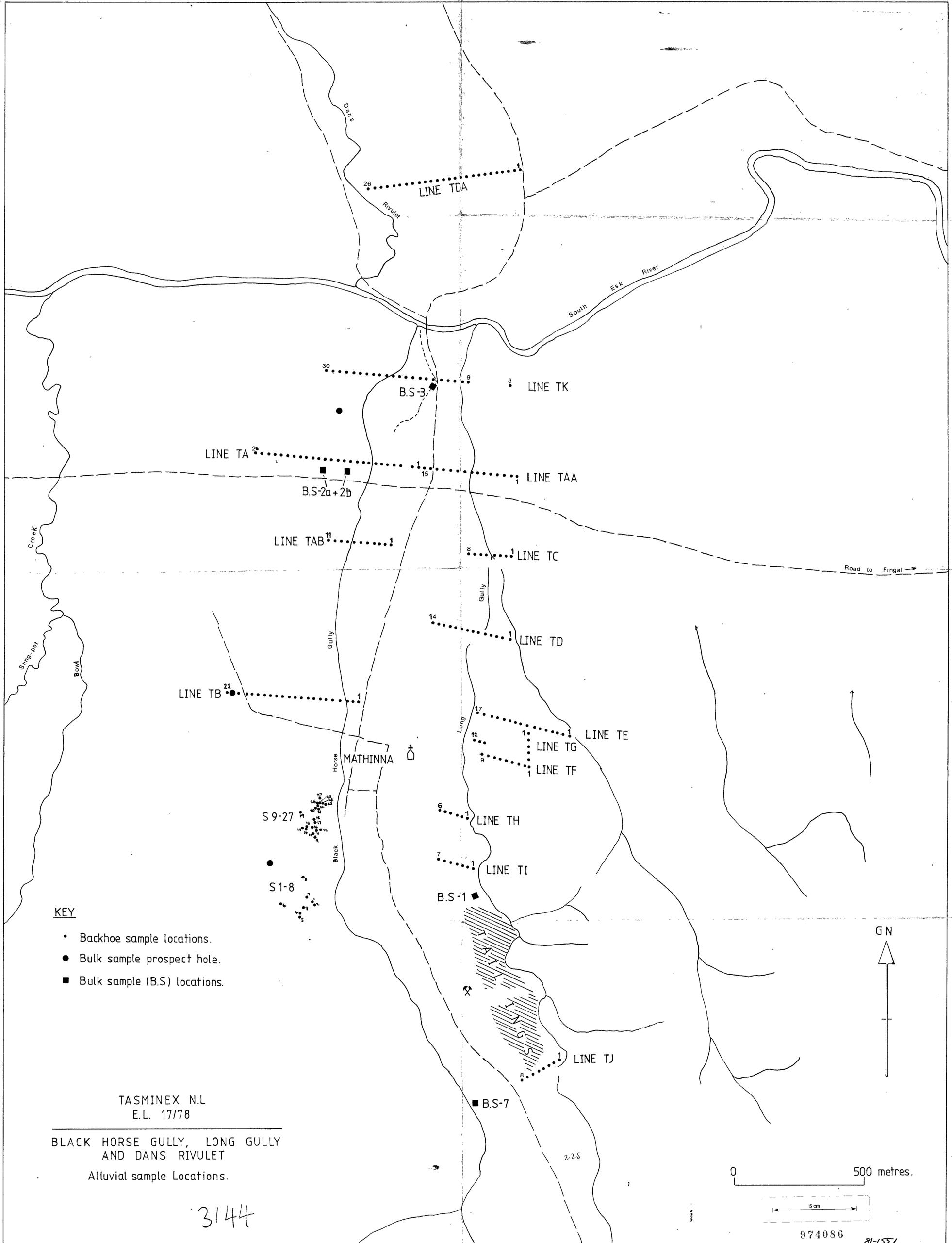
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- 12 -

The proposed pilot plant will be in a secluded valley some 2 kilometres from the township of Mathinna with an intervening hill. It is not anticipated that any inconvenience will be caused to the residents of Mathinna or to the owners or tenants of neighbouring pastoral land.

E.N.Charlton, M.(Aus).I.M.M.

4th May 1981



**KEY**

- Backhoe sample locations.
- Bulk sample prospect hole.
- Bulk sample (B.S.) locations.

TASMINEX N.L.  
E.L. 17/78

BLACK HORSE GULLY, LONG GULLY  
AND DANS RIVULET  
Alluvial sample Locations.

3144

0 500 metres.

5 cm

974086

81-1557