TANAMI JOINT VENTURE

ZAPOPAN N.L.
KUMAGAI GUMI CO. LTD.
KINTARO METALS PTY. LTD.

EXPLORATION LICENCE 6447

TANAMI DOWNS
GRANITES-TANAMI AREA
NORTHERN TERRITORY

FINAL REPORT

THE GRANITES 1:250,000 SHEET

APRIL 1990

C O N T E N T S

APPENDICES

Figures

1. SUMMARY

EL6447 was granted to the Tanami Joint Venture on 16 May 1989 after the area was relinquished by North Flinders Mines Ltd from EL2368.

Work carried out comprised literature searches, acquisition of open-file airborne magnetic data, image processing of airborne magnetic and radiometric data, acquisition of colour aerial photography, geological reconnaissance, and rock-chip sampling.

The data show that the licence area is prospective for shallow open-pittable gold mineralization and hence the licence is being surrendered.

2. INTRODUCTION

Exploration Licence 6447 is located on Tanami Downs Station, approximately 50km south of the Tanami mine (figure 1). It covers an area of 57 sq km (19 blocks) and was granted to Zapopan N.L., Kumagai Gumi Co. Ltd., and Kintaro Metals Pty. Ltd. ("Tanami Joint Venture") on the 16 May 1989.

EL6447 covers a portion of the area relinquished from EL2368 by North Flinders Mines Ltd. in 1988.

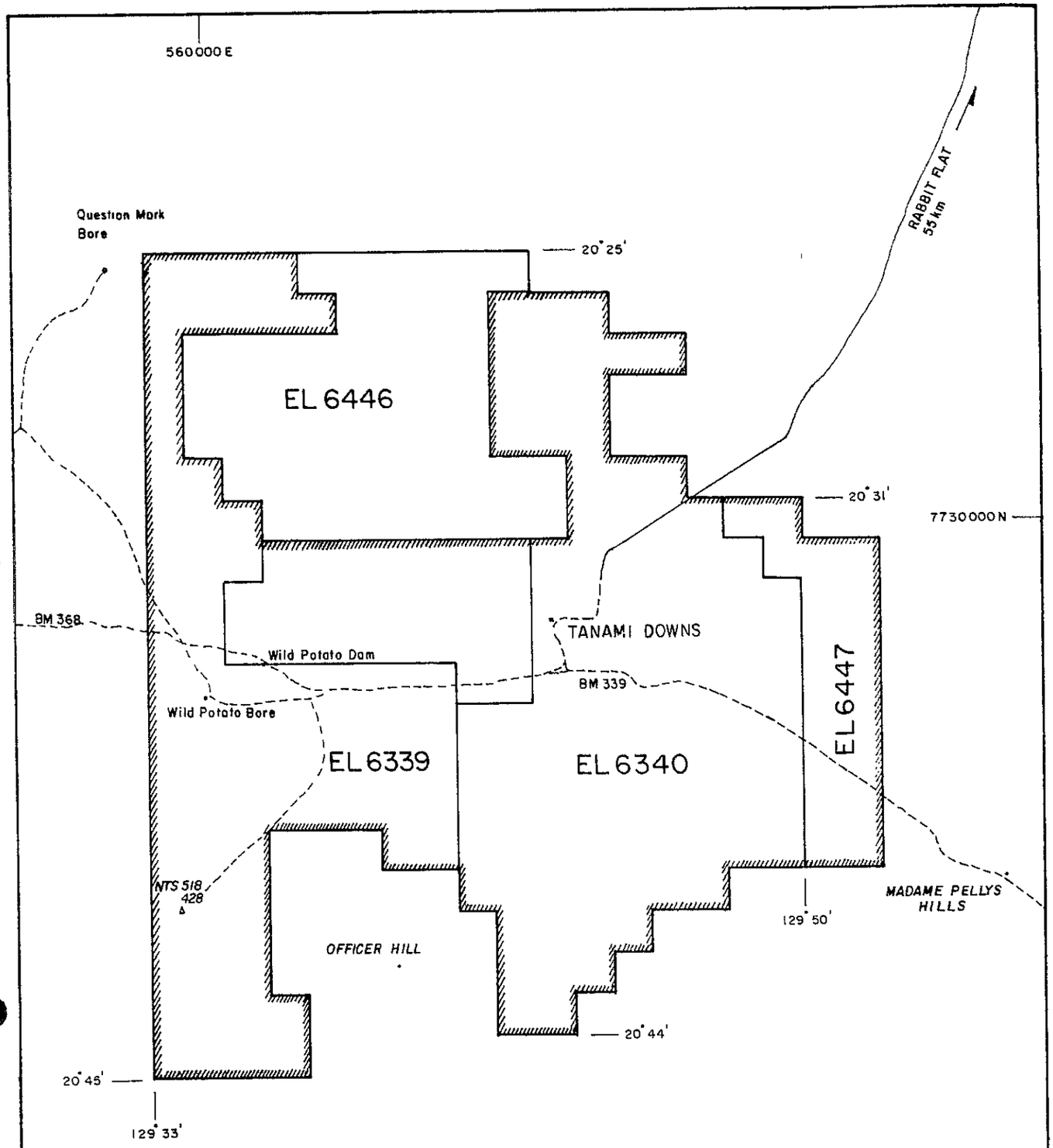

Fig. 1.

TANAMI JOINT VENTURE	
SCALE: 1:250000	COMPILED:
	DRAWN: DATE:

TANAMI DOWNS
EL 6339, 6340, 6446, 6447

3. PREVIOUS WORK

Previous geological work carried out in the area is summarized as follows:-

1962 BMR carried out an airborne magnetic and radiometric survey of Tanami and The Granites Sheet area (Spence, 1964; BMR, 1965a, 1965b).

1967 BMR carried out a reconnaissance gravity survey of The Granites Sheet area (Whitworth, 1970).

1972 BMR geologically mapped the area as part of a larger mapping programme covering the Granites - Tanami block. (Blake et al, 1973; Hodgson, 1976; Blake et al 1979). At the same time as the geological mapping, a programme of shallow stratigraphic drilling was carried out by BMR drilling crews (Blake, 1974).

1985 - 1989 North Flinders Mines Limited explored EL2368. This work consisted of base map preparation, aerial photography, an airborne geophysical survey, interpretation and reconnaissance follow-up, percussion and diamond drilling. (Chadwick 1987 and 1988)

4. GEOLOGY

The following geological units have been recognized in the licence area and immediate environs:

Lower Proterozoic Tanami Complex

This unit consists of folded and cleaved rocks of greenschist and amphibolite metamorphic facies. Lithologies include banded chert, silicified siltstone, quartzite, phyllitic sandstone, schistose greywacke, amphibolite, jaspilite, gossanous ironstone and acid porphyry.

The Tanami Complex is of economic interest, as it is host for known gold deposits at Tanami, The Granites and Dead Bullock Soak.

No sequence has been established in the Tanami Complex because of tight folding, probable complex faulting and relatively poor exposures.

Granite is interpreted to underlie EL6447.

Upper Proterozoic (Adelaidian)

Shallow-dipping (3^{o}-45^{o}) arenites of the Muriel Range Sandstone (Redcliff Pound Group) crop out to the south of the licence area at the Murdoch Cliffs.

Cainozoic

Aeolian sand of Quaternary to Recent age forms extensive sand plains across the EL. Laterite surficial lag is found in places on the sand. It is not known to what extent laterite is developed beneath the sand. It is likely that the sand for the most part rests directly on weathered granite or Tertiary lacustrine clays related to palaeochannels.

5. EXPLORATION COMPLETED

5.1 Literature search

Research was completed to locate all previous geological work in the licence area. Data from BMR reports, open file company reports in the NT Department of Mines and Energy, and water bore logs from the NT Water Resources Division were collated.

5.2 Geophysics

The open-file airborne magnetic data for the 1:100,000 scale Inningarra and Frankenia sheets were purchased and interpreted as part of a regional study. The specifications for that survey are as follows:

COMPANY	GEOTERREX PTY LTD 1988
AIRCRAFT	ROCKWELL SHRIKE COMMANDER
MAGNETOMETER	GESIUM VAPOUR OPTICAL ABSORPTION
	RESOLUTION 0.01 nanoTesla
	CYCLE RATE 0.5 second
	SAMPLE INTERVAL 30 metres
SPECTROMETER	NUCLEAR DATA 256 CHANNEL ADC
	TOTAL COUNT 0.40 - 3.00 MeV
	K40 1.36 - 1.56 MeV
	Bi^{214} 1.66 - 1.86 MeV
	Tl^{208} 2.42 - 2.82 MeV
	VOLUME 33.5 litres
	CYCLE RATE 1.0 second
	SAMPLE INTERVAL 60 metres
DATA ACQUISITION	GEOTERREX MADACS ACQUISITION SYSTEM
	DIGITAL TO MAGNETIC TAPE
FLIGHT LINE SPACING	TRAVERSE LINES 500 metres
	TIE LINES 5000 metres
FLIGHT LINE DIRECTION	TRAVERSE LINES 180-360 degrees
	TIE LINES 090-270 degrees
SURVEY HEIGHT	90 metres MEAN TERRAIN CLEARANCE
FLIGHT PATH NAVIGATION	SYLEDIS STR4 RADIO NAVIGATION SYSTEM
FLIGHT PATH RECORD	REAL TIME CALCULATION OF AMG COORDINATES
	FROM THE SYLEDIS STR4 NAVIGATION SYSTEM

Tanami Joint Venture's airborne magnetic data and the N.T.D.M.E. open-file data were image processed by Geoimage Pty Ltd. The report is appended (Appendix I).

An interpretation of the magnetic data shows that beneath the aeolian sand and laterite, EL6447 is underlain by granite. Two prominent quartz blows are interpreted to occupy a major NW-trending fault zone.

A 1:100,000 scale copy of the airborne magnetic data for EL6447 is attached (Figure 2).

5.3 Aerial Photography

Colour aerial photography at 1:50,000 scale was flown by Airesearch Mapping Pty Ltd, over the Tanami Downs Station area, on the 18 August 1989. An interpretation onto transparent overlays was completed over the area.

5.4 Rock-chip sampling

A total of 13 rock-chip samples were collected across the two prominent quartz ridges in the northern part of the EL (see figure 3). The results are appended (Appendix II).

REFERENCES:

Blake, D.H., 1974.
Shallow Stratigraphic Drilling in the Granites-Tanami Region, Northern Territory and Western Australia 1971-73
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Blake, D.H., Hodgson, I.M. and Muhling, P.C., 1973.
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Blake, D.H., Hodgson, I.M., and Muhling, P.C. 1979.
Geology of The Granites-Tanami Region,
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BMR, Australia
E52/B1-5 to 8

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The Granites-Total magnetic intensity and radioactivity map,
1:126720, 4 sheets
BMR, Australia
F52/B1-5 to 8

Chadwick, R.C., 1987
First Relinquishment Report Exploration Licence 2368, Tanami Downs, The Granites 1:250,000 Sheet SF52-3
unpublished North Flinders Mines report

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Tanami Downs, The Granites 1:250,000 sheet SF52-3.
(unpublished North Flinders Mines report)

Spence, A.G., 1964
Tanami/The Granites airborne magnetic and radiometric survey, Northern Territory, 1962.
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Whitworth, R.I., 1970.
Reconnaissance gravity survey of parts of Northern Territory and Western Australia, 1967.
BMR, Australia,
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A P P E N D I X I

Processing of Airborne Geophysics

of the

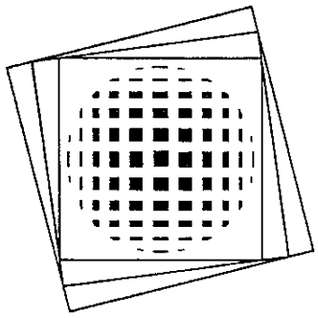
Granites - Tanami area

for the

Tanami Joint Venture

by

GEOIMAGE PTY LTD



GEOIMAGE
SPECIALISTS IN IMAGE PROCESSING AND REMOTE SENSING APPLICATIONS

PROCESSING

of

AIRBORNE GEOPHYSICS

of the

GRANITES-TANAMI AREA

for the

TANAMI JOINT VENTURE

R.N. Walker
SEPTEMBER 1989

GEOIMAGE PTY LTD
19 Carnaby Street, MacGregor, Qld. 4109 Australia, P.O. Box 395 Upper Mt Gravatt, Qld. 4122
Telephone: (07) 343 2194 Fax: (07) 343 7974

INTRODUCTION

Under instructions from Mr P. Nicholson of Eupene Exploration Enterprises, airborne geophysical surveys over the Granites-Tanami area covering exploration areas held by the Tanami Joint Venture have been processed. The work involved-

- reading data off a number of located data tapes
- gridding the data at 20 metres cell size over the Tanami mine area and 50 metres cell size over the full area for the following parameters
  - magnetics
  - vertical derivative
  - vertical derivative with automatic gain (mine area only)
  - radiometrics
- processing and photography of the above files

PROCESSING (ctd)

Tanami Regional Data

Flight line data from several surveys flown for various companies including the NT Geological Survey, BHP, North Flinders and the Tanami JV, were processed. Other than a constant flight line spacing of 500 metres, the specifications for these surveys varied. The North Flinders surveys on the Frankenia and Ptilotus 1:100 000 sheets were flown E-W whereas the remaining areas were flown N-S.

Two major problems were encountered with the gridding-

1. Individual surveys had completely different radiometric responses and this problem was overcome as much as possible by gridding the individual surveys and matching the statistics either over the overlap areas or over the full area.

2. In the case of the vertical derivative (VD), problems were encountered because the original flight lines were separated into individual 1:100 000 sheets. Because of the technique used to calculate VD's, the responses at the end of the lines differed and resulted in apparent E-W discontinuities where survey or line segments met.

The final grids for the area were

BLHC	498 000 E, 7 691 800 N
Samples	5492
Lines	3140
Sample size	50 metres

for magnetics, vertical derivative (VD) and radiometrics. The VD image file was then used to derive shade images at various sun azimuth angles.

PROCESSING (ctd)

Appendix 1 contains output from runs converting the real grid files to byte files.

The magnetics, VD and VDG data were gridded using a minimum curvature algorithm, whereas the radiometrics were gridded using a bicubic spline algorithm.

The VD and VDG were processed on the flight line data using an along line 31 point FFT derived filter. A description of the methodology is attached as Appendix 2.

LIST OF SLIDES

TANAMI REGIONAL DATA - FULL AREA

1. Greyscale magnetics.

2. Rainbow pseudocoloured magnetics multiplied by a vertical illumination.

3. Greyscale vertical derivative.

4. Rainbow pseudocoloured vertical derivative multiplied by a vertical illumination on the vertical derivative.

5. Greyscale 00 azimuth 26 degree altitude shade illumination on the magnetics.

6. Rainbow pseudocoloured magnetics multiplied by a 00 azimuth 26 degree altitude shade illumination on the vertical derivative.

7. Greyscale 45 azimuth 26 degree altitude shade illumination on the magnetics.

8. Rainbow pseudocoloured magnetics multiplied by a 45 azimuth 26 degree altitude shade illumination on the vertical derivative.

9. Greyscale 90 azimuth 26 degree altitude shade illumination on the magnetics.

10. Rainbow pseudocoloured magnetics multiplied by a 90 azimuth 26 degree altitude shade illumination on the vertical derivative.

11. Greyscale 135 azimuth 26 degree altitude shade illumination on the magnetics.

12. Rainbow pseudocoloured magnetics multiplied by a 135 azimuth 26 degree altitude shade illumination on the vertical derivative.

13. Radiometric colour composite.
Potassium in red, thorium in green, uranium in blue.

14. Greyscale potassium / thorium ratio.

LIST OF SLIDES

TANAMI REGIONAL DATA - SW CORNER

TSW1. Greyscale magnetics.

TSW2. Rainbow pseudocoloured magnetics multiplied by a vertical illumination.

TSW3. Greyscale vertical derivative.

TSW4. Rainbow pseudocoloured vertical derivative multiplied by a vertical illumination on the vertical derivative.

TSW5. Greyscale 00 azimuth 26 degree altitude shade illumination on the magnetics.

TSW6. Rainbow pseudocoloured magnetics multiplied by a 00 azimuth 26 degree altitude shade illumination on the vertical derivative.

TSW7. Greyscale 45 azimuth 26 degree altitude shade illumination on the magnetics.

TSW8. Rainbow pseudocoloured magnetics multiplied by a 45 azimuth 26 degree altitude shade illumination on the vertical derivative.

TSW9. Greyscale 90 azimuth 26 degree altitude shade illumination on the magnetics.

TSW10. Rainbow pseudocoloured magnetics multiplied by a 90 azimuth 26 degree altitude shade illumination on the vertical derivative.

TSW11. Greyscale 135 azimuth 26 degree altitude shade illumination on the magnetics.

TSW12. Rainbow pseudocoloured magnetics multiplied by a 135 azimuth 26 degree altitude shade illumination on the vertical derivative.

TSW13. Radiometric colour composite.
Potassium in red, thorium in green, uranium in blue.

TSW14. Greyscale potassium / thorium ratio.

TSW15. Radiometric colour composite with gradient defined by 0 azimuth 26 altitude shade on the magnetics.

APPENDIX 1 - REAL TO BYTE CONVERSION RUNS (ctd)

Tanami Regional Data - Full Area
Magnetics

BYTE VALUE	REAL VALUES
1	723.69
16	1203.37
32	1357.29
48	1419.76
64	1457.71
80	1488.85
96	1523.53
112	1571.46
128	1625.21
144	1681.62
160	1743.96
176	1818.22
192	1915.36
208	2044.61
224	2261.82
240	2492.07
256	4183.97

Tanami Regional Data - Full Area
Radiometrics (TC, K, U, Th)

BYTE VALUE	REAL VALUES			
1	-19.26	-0.37	-0.51	12.57
16	217.55	12.78	7.21	22.08
32	352.87	19.68	10.77	26.89
48	445.75	25.70	13.56	31.03
64	513.73	31.54	16.27	35.04
80	597.03	37.07	18.85	39.05
96	763.31	42.78	21.41	43.06
112	1018.64	48.73	23.95	47.51
128	1175.35	55.19	26.55	52.74
144	1299.50	62.51	29.20	58.91
160	1454.61	70.96	32.03	66.71
176	1654.08	81.09	35.09	76.92
192	1891.86	93.20	38.40	90.29
208	2154.84	107.02	41.90	105.55
224	2426.77	122.12	45.55	122.86
240	2688.36	139.49	48.96	139.12
256	5795.80	229.87	75.86	302.07

APPENDIX 1 - REAL TO BYTE CONVERSION RUNS (ctd)

Tanami Regional Data - Full Area
Potassium / Thorium Ratio

BYTE VALUE	REAL VALUES
1	-0.13
16	1.43
32	3.09
48	4.75
64	6.41
80	8.08
96	9.74
112	11.40
128	13.06
144	14.73
160	16.39
176	18.05
192	19.71
208	21.38
224	23.04
240	31.66
256	1610.00

APPENDIX 2 - VERTICAL DERIVATIVES

Vertical derivatives are used to improve the resolution of small scale anomalies caused by near surface magnetic sources, and to suppress the longer wavelength anomalies resulting from deeper sources. Derivatives can be calculated using a one dimensional operator and this is usually done on the original flight line data prior to gridding, or using a two dimensional operator on the grid file.

One dimensional operators tend to suppress local anomaly trends which parallel or near-parallel the flight line direction. This however can also be an advantage of the one-dimensional operator in that on poorly levelled data it will suppress or even remove artefacts caused by poor levelling.

In image products produced from vertical derivative grids, the usual distribution of data is such that the major anomalies will be very obvious however the weaker trends in the less magnetic units will tend to fall around a greyscale value of 127 and be difficult to see. This can be overcome using the technique of "Automatic Gain Control" (AGC) as suggested by S. Rajagoplan (Conference Volume, 5th ASEG Conference, 1987). In this technique, the vertical derivative is calculated along the flight line and the relative amplitude of each data point is adjusted by dividing by the gain in a window around the data point. The gain is defined as the inverse of the root mean square of the original data values in the window.

The result of the vertical derivative with AGC is to emphasise small anomalies in low gradient areas while suppressing high amplitude anomalies in high gradient areas.

Geoimage routinely carries out vertical derivative and vertical derivative with AGC operations on the original flight line data prior to gridding.

A P P E N D I X I I

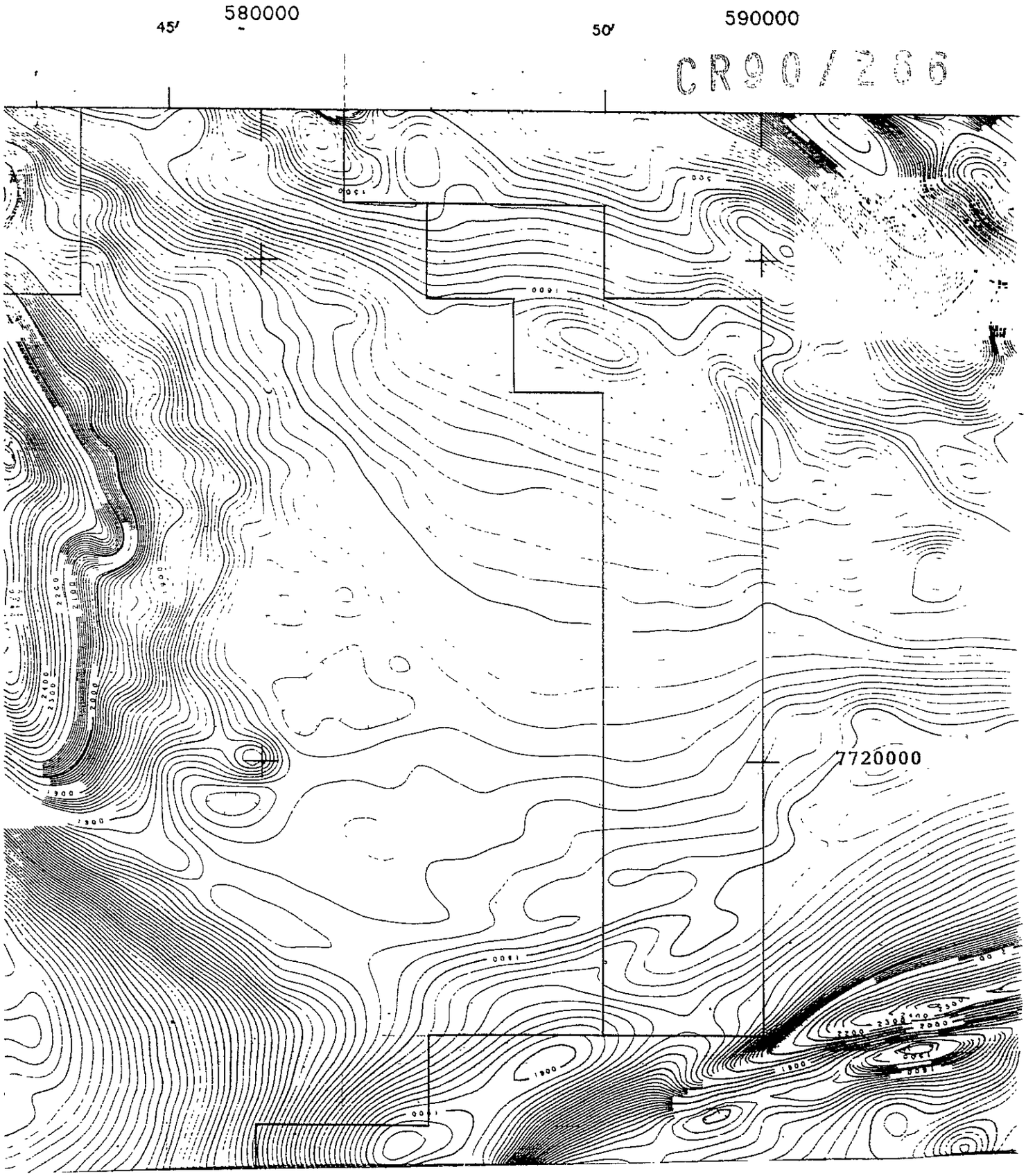
Rock-chip Sampling

EL6447

ROCK CHIP SAMPLING - EL6447

SAMPLE NUMBER	Au (ppm)
54072	0.002
54073	0.004
54074	0.001
54075	0.001
54076	0.016
54077	0.004
54078	0.014
54079	0.005
54080	0.005
54081	0.005
54082	0.005
54090	0.001
54091	0.001

Method	:	FA50/D610
Accuracy	:	± 15%
Det. Limit	:	0.001 ppm
Laboratory	:	Australian Assay Laboratories, Townsville.



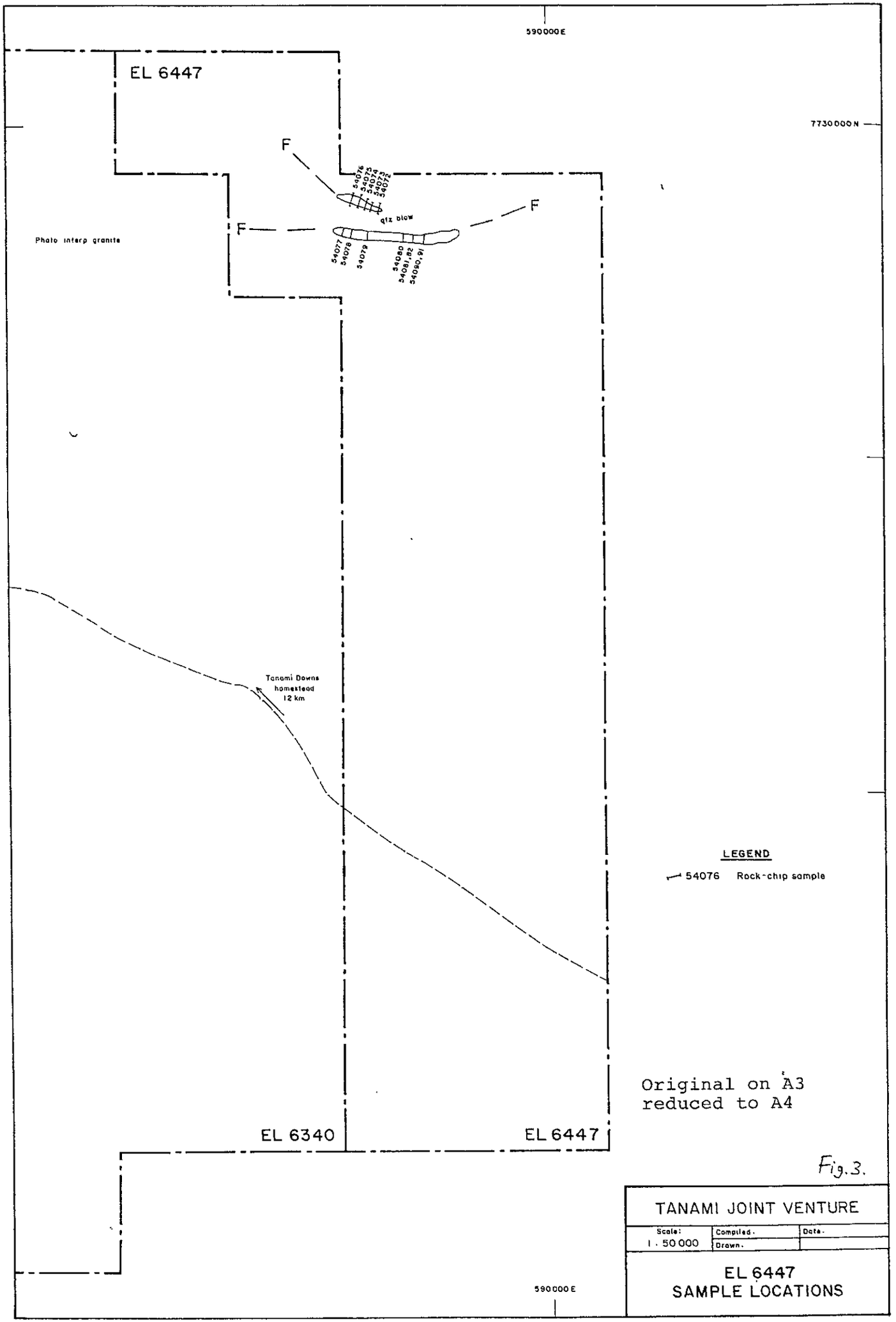
TANAMI JOINT VENTURE

EXPLORATION LICENCE 6447

Airborne Magnetic Data

1:100,000 scale

Fig. 2.



Original on A3
reduced to A4

Fig.3.

TANAMI JOINT VENTURE

Scale:	Compiled.	Date.
1 . 50 000	Drawn.	

EL 6447
SAMPLE LOCATIONS