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REPORT A12

INTERPRETATION OF ARTHUR RIVER AREA - DIGHEM SURVEY

By: D B Trussell
December 1983

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REPORT A12

INTERPRETATION OF ARTHUR RIVER AREA

DIGHEM SURVEY

1. INTRODUCTION

In April 1983 DIGHEM carried out an airborne EM survey in the Arthur River area. The flight line direction was north west-south east. The line spacing was 200m. The EM bird height was 35m. The magnetometer altitude was 50m. The DIGHEM EM system consisted of 3 coil pairs - one operating at 900Hz, with the axis in the direction of flight and the other two operating at 900Hz and 385Hz with vertical axis. The coil separation was 9m. The EM data were recorded with a sensitivity of .25 ppm. The magnetic data were recorded with a sensitivity of 1nT.

The contractor has prepared a report on the DIGHEM work. All significant anomalies were selected using objective criteria. The depth and conductivity width of horizontal and vertical sources which would generate the observed anomalies are presented in tabular form in the DIGHEM report. In addition the contractor has given descriptive comments on those anomalies believed to be due to genuine bedrock conductors. Accompanying the DIGHEM report are five 1:10 000 scale plans - Electromagnetic anomalies, probable bedrock conductors, resistivity, and two magnetic plans. All except one of the magnetic plans are plotted showing both the flight lines and the topgraphic base.

2. WORK DONE

Other than the data collected by the DIGHEM survey the only geophysical information available over the area is the 1:50 000 Tasmanian Mines Department aeromagnetic plan and an aeromagnetic survey carried out by Geoex. The Geoex survey was rendered obsolete by the DIGHEM work.

The DIGHEM plan maps and the profiles were examined in detail for anomalies which appear to merit further investigation.

3. DISCUSSION

A. Geology Interpreted From Geophysical Information

Tertiary basalts have a distinctively low resistivity and are clearly mapped by the resistivity plan. Values as low as 80 ohm metres are common. The magnetic susceptibility of the basalts is usually quite high. They typically give rise to a highly contorted magnetic contour pattern having an average peak to peak amplitude of 300nT. Areas similar in magnetic character to the Tertiary basalts but without any anomalous resistivity response have been labelled as metamorphosed sediments on the geological interpretation plan.

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Precambrian sediments of the Mt Bischoff series are characterised by very low magnetic susceptibility. Other areas similar in nature have thus been interpreted to have the same geology. Three areas of Precambrian sediment not shown on government maps have been identified in this way.

The magnetic contour maps and to a lesser extent the resistivity plan have been useful in identifying numerous faults in the area.

A major magnetic anomaly (1km x 1½km) is located in the extreme southeast part of the survey area. It is located in an area mapped as Tertiary basalt. A basic intrusion is a more likely rock type.

The gabbros on the west side of the Magnet River can be readily discerned on the resistivity plan because of their very low resistivity (less than 100 ohm metres). Other gabbro bodies shown on the regional mapping have no resistivity response. They must be either quite thin or else significantly different in composition.

The magnetic data is useful in establishing the geometry of the granite body in the very southern part of the survey area. However it would not have been identified, as a granite, by the use of the magnetics alone.

B. Geophysical Targets

Other EM conductors which are sufficiently attractive to warrant ground follow up include:-

2190B
2200B

2280B
2290C

2400AB

All these responses have been marked on the geological interpretation plan.

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5 425 000 m N

ARTHUR RIVER

600
500
400
300

2280 B

375 000 m E

367 000 m E

5 420 000 m N

Anomaly (M = Magnetic)

Tertiary Basalt

Thin Basalt

M — Magnetic Sediments

Metamorphosed Sediments

Gabbro

Granite

M M — Magnetic Intrusive

Pre-Cambrian Sediments

5 cm

TAS/2/3740	TAS/2/3741
TAS/2/3742	TAS/2/3743
TAS/2/3744	TAS/2/3745
TAS/2/3746	TAS/2/3747

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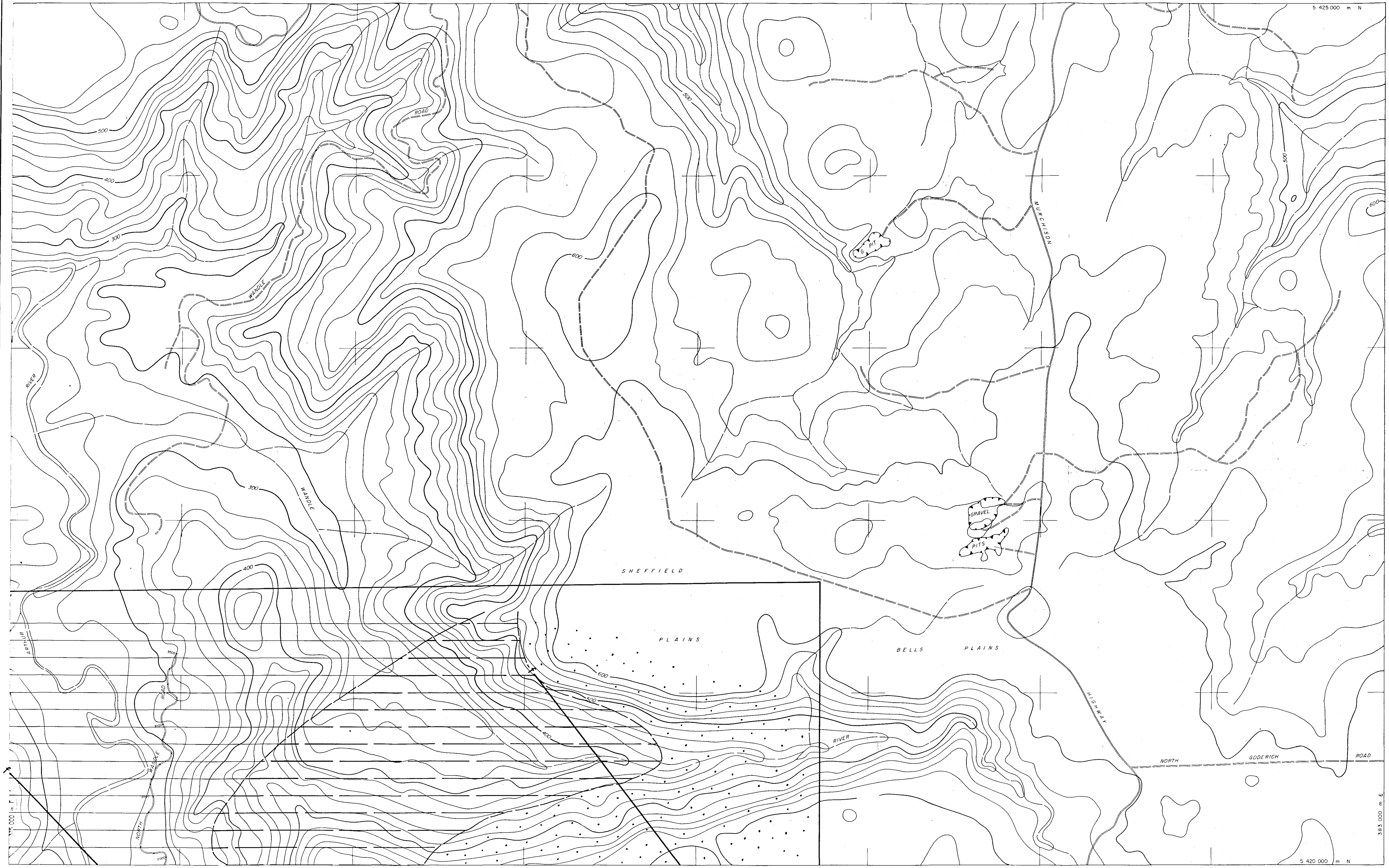
EL 5/63 AREA 1 007
ARTHUR RIVER / MAGNET
GEOLOGICAL INTERPRETATION
OF DIGHEM SURVEY

COMPILED: D B TRUSSELL
DRAWN: DATE 11/83
AMENDED:
SCALE 1 : 10 000
PLAN No TAS/2/3740



Anomaly (M = Magnetic)	Magnetic Sediments
Tertiary Basalt	Metamorphosed Sediments
Thin Basalt	Gabbro
Granite	Magnetic Intrusive
Pre-Cambrian Sediments	

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85-2413

TAS/2/3740	TAS/2/3741
TAS/2/3742	TAS/2/3743
TAS/2/3744	TAS/2/3745
TAS/2/3746	TAS/2/3747

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ARTHUR RIVER / MAGNET
GEOLOGICAL INTERPRETATION
OF DIGHEM SURVEY

006

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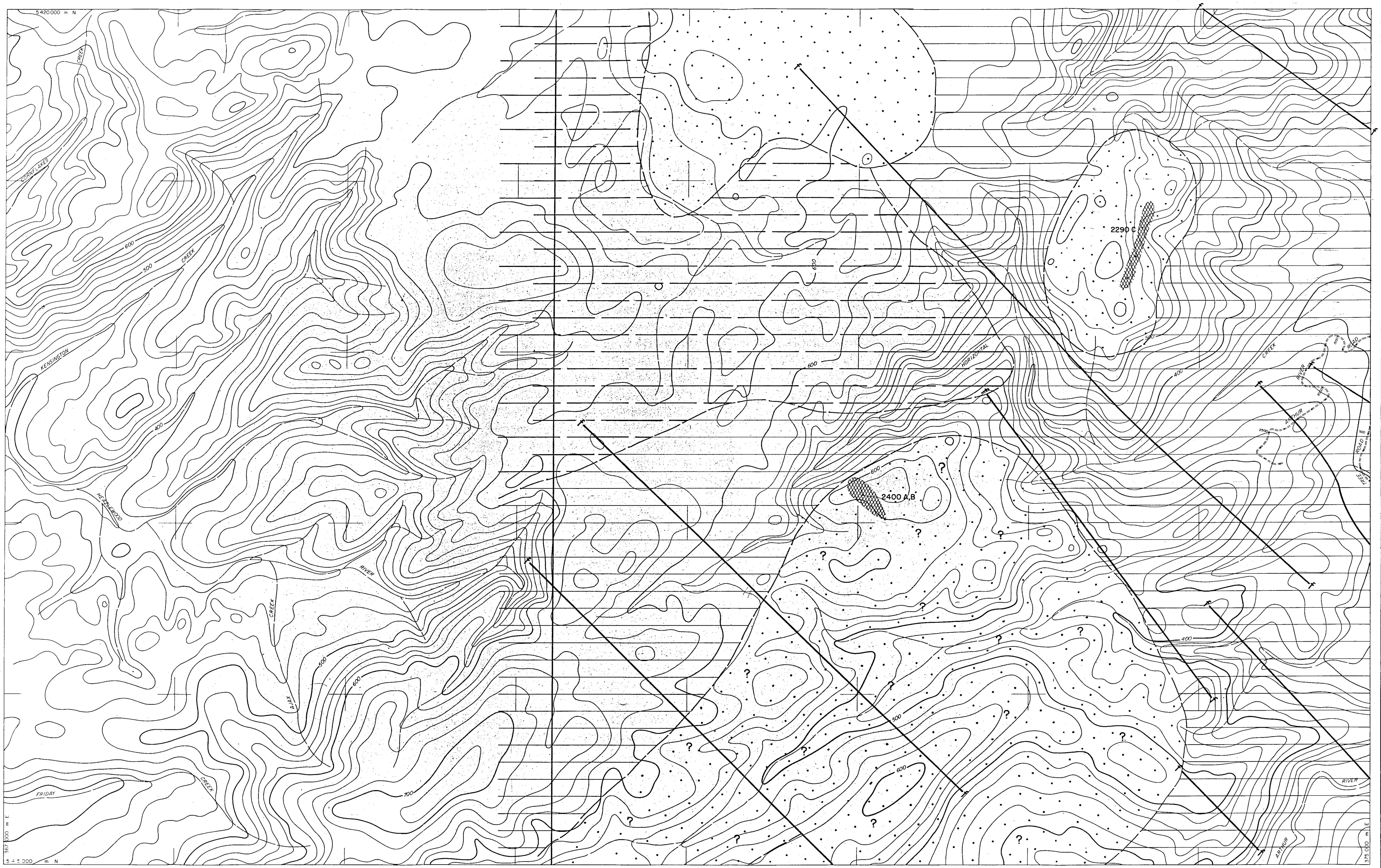
DATE 11/83
AMENDED
SCALE 1 : 10 000
PLAN No TAS/2/3741



Symbol	Legend
(cross-hatched)	Anomaly (M = Magnetic)
(dots)	Tertiary Basalt
(sparse dots)	Thin Basalt
M	Magnetic Sediments
(ruled lines)	Metamorphosed Sediments
^ ^	Gabbro
(dashes)	Granite
M M	Magnetic Intrusive
(dashed lines)	Pre-Cambrian Sediments

5 cm

154007 85-2413

TAS/2/3740	TAS/2/3741
TAS/2/3742	TAS/2/3743
TAS/2/3744	TAS/2/3745
TAS/2/3746	TAS/2/3747

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GEOLOGICAL INTERPRETATION OF DIGHEM SURVEY

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SCALE 1 : 10 000

PLAN No TAS /2 /3742

Anomaly (M = Magnetic)

Tertiary Basalt

Thin Basalt

Magnetic Sediments

Metamorphosed Sediments

Gabbro

Granite

Magnetic Intrusive

Pre-Cambrian Sediments

TAS/2/3740	TAS/2/3741
TAS/2/3742	TAS/2/3743
TAS/2/3744	TAS/2/3745
TAS/2/3746	TAS/2/3747

TN

5 cm

154008

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EL 5/63 AREA I 004

ARTHUR RIVER/MAGNET

GEOLOGICAL INTERPRETATION OF DIGHEM SURVEY

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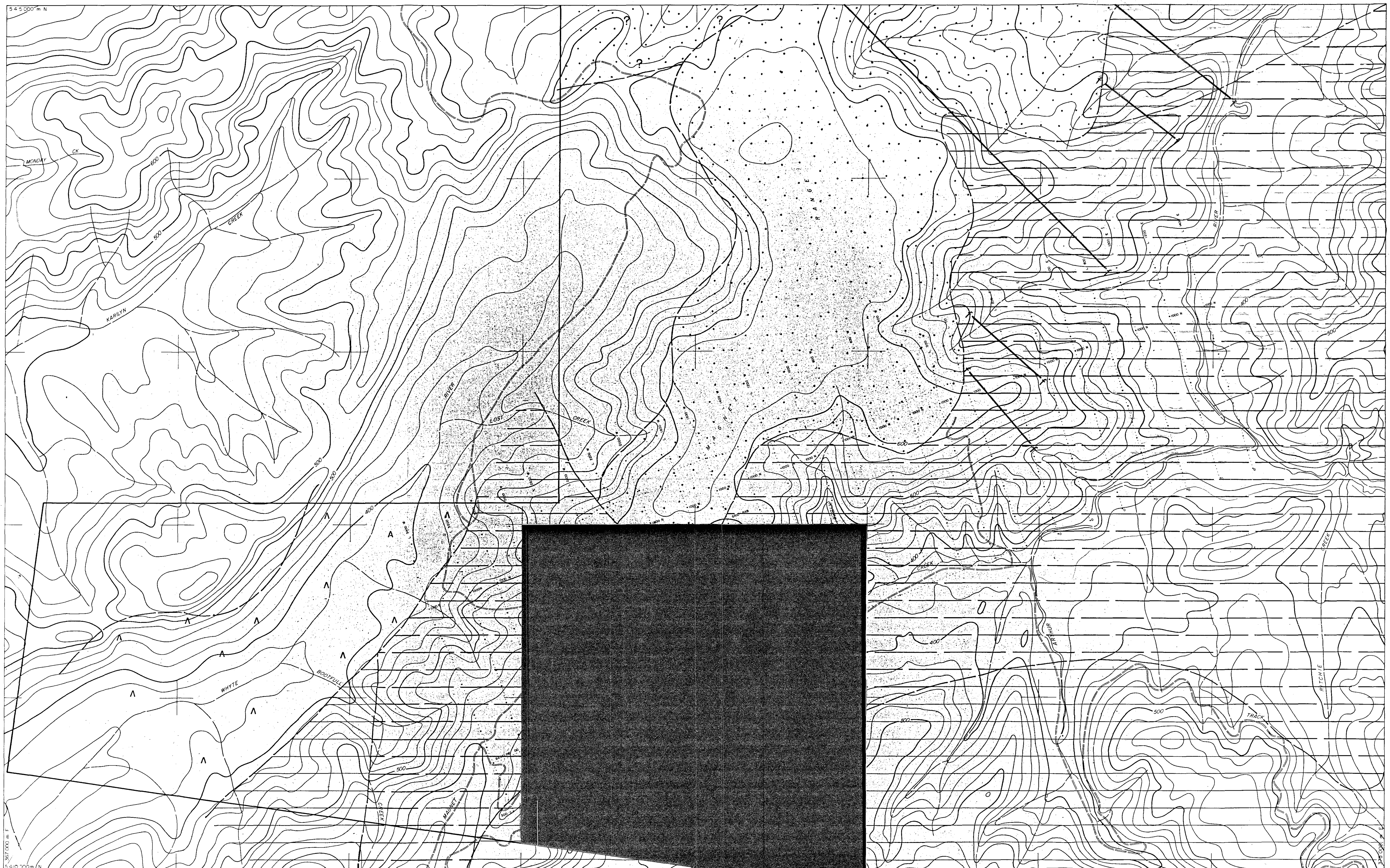
AMENDED:

SCALE: 1 : 10 000

PLAN No. TAS/2/3743



Anomaly (M = Magnetic)	Magnetic Sediments
Tertiary Basalt	Metamorphosed Sediments
Thin Basalt	Gabbro
Granite	Magnetic Intrusive
Pre-Cambrian Sediments	

5 cm

154009 85-2413

TAS/2/3740	TAS/2/3741
TAS/2/3742	TAS/2/3743
TAS/2/3744	TAS/2/3745
TAS/2/3746	TAS/2/3747

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ARTHUR RIVER / MAGNET

GEOLOGICAL INTERPRETATION OF DIGHEM SURVEY

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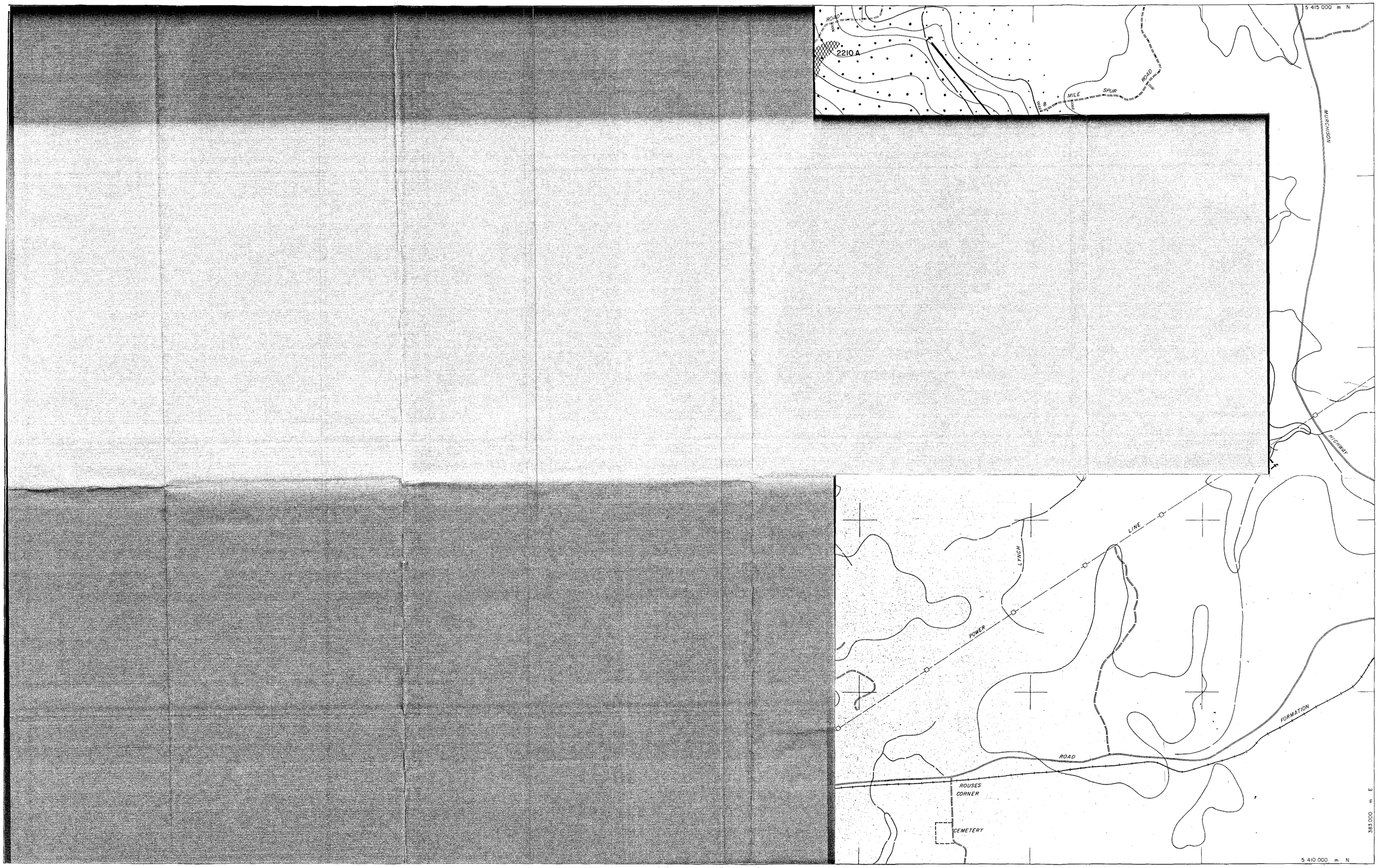
DATE 11/83

AMENDED

SCALE 1 : 10 000

PLAN No TAS/2/3744



Anomaly (M = Magnetic)

Tertiary Basalt

Thin Basalt

Magnetic Sediments

Metamorphosed Sediments

Gabbro

Granite

Magnetic Intrusive

Pre-Cambrian Sediments

5 cm

TAS/2/3740	TAS/2/3741
TAS/2/3742	TAS/2/3743
TAS/2/3744	TAS/2/3745
TAS/2/3746	TAS/2/3747

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EL 5/63 AREA I 009

ARTHUR RIVER / MAGNET

GEOLOGICAL INTERPRETATION

OF DIGHEM SURVEY

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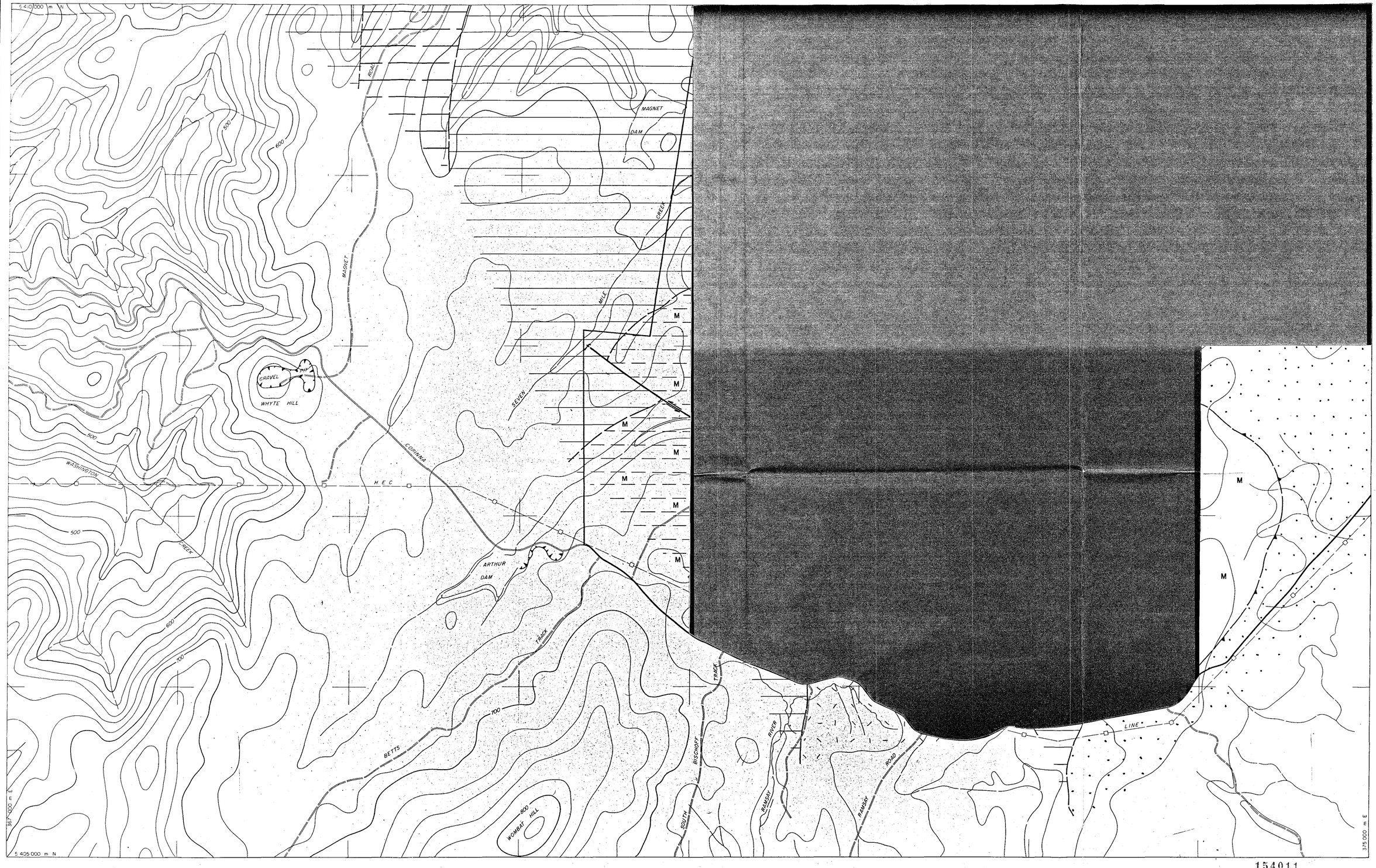
SCALE	1 : 10 000
PLAN No	TAS/2/3745



Anomaly (M = Magnetic)

Tertiary Basalt

Thin Basalt

M — Magnetic Sediments

Metamorphosed Sediments

Gabbro

Granite

M M — Magnetic Intrusive

Pre-Cambrian Sediments

5 cm

154011

85-2413

TAS/2/3740	TAS/2/3741
TAS/2/3742	TAS/2/3743
TAS/2/3744	TAS/2/3745
TAS/2/3746	TAS/2/3747

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EL 5/63 AREA 1
ARTHUR RIVER / MAGNET
GEOLOGICAL INTERPRETATION
OF DIGHEM SURVEY

010

COMPILED: D.B. TRUSSELL
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AMENDED:
SCALE: 1" : 10 000
PLAN No. TAS/2/3746

5 410 000 m N

RESERVOIR

LINE

ROAD

POWER

TRACKHAM

CREEK

TRAMWAY

CREEK

WARATAH

RESERVOIR

H.E.C.

CORINNA

375 000 m E

383 000 m E

5 405 000 m N

154012

5 cm

85-2413

Anomaly (M = Magnetic)

Tertiary Basalt

Thin Basalt

M — Magnetic Sediments

Metamorphosed Sediments

Gabbro

Granite

M M — Magnetic Intrusive

Pre-Cambrian Sediments

TAS/2/3740	TAS/2/3741
TAS/2/3742	TAS/2/3743
TAS/2/3744	TAS/2/3745
TAS/2/3746	TAS/2/3747

TN

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EL 5/63 AREA I
ARTHUR RIVER / MAGNET
GEOLOGICAL INTERPRETATION
OF DIGHEM SURVEY

011

COMPILED: D.B TRUSSELL
DRAWN
DATE: 11/83
AMENDED:
SCALE: 1 : 10000
PLAN NO: TAS/2/3747