REPORT

GROUND MAGNETICS SURVEY
ZeroGen-5 Grid, Springsure, QLD
AUSTRALIA

POST-ACTIVITY REPORT

Gap Geophysics Australia Pty Limited

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Prepared For:	ZeroGen Pty Ltd
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Purpose of This Report

This report was commissioned for the purpose of a sub-surface geophysical investigation to map Geology and geological structure.

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GROUND MAGNETICS SURVEYS
POST-OPERATIONS REPORT

ZeroGen-5 Grid, Springsure, QLD

EXECUTIVE SUMMARY

Gap Geophysics Australia Pty Limited (GAP) was commissioned by ZeroGen Pty Ltd to conduct a geophysical survey using GAP's proprietary Ground Magnetics technology over an area near their ZeroGen-5 well, Springsure, QLD, Australia. The survey was carried out during the period 28th September to 1st October 2008.

SCOPE AND OBJECTIVES OF THE SURVEY

The Statement of Work (SOW) specified that GAP was to use its Ground Magnetics technology to survey (in GDA 94 / UTM Zone 55 South co-ordinates) one grid totalling approximately 30 line km.

The deliverables for the project were as follows:

- A brief report on field activities, interpretation techniques and results.
- A digital copy of the Total Magnetic Intensity data in Geosoft GDB and in ASCII XYZ (.XYZ) format.
- A digital copy of the Total Magnetic Intensity data in Geosoft grid (.GRD) format.
- Colour images of the processed data as JPEG images.

PROJECT PERSONNEL

The Client representative who arranged the survey was Peter Spraggon of MBA Petroleum Consultants, acting consultant for ZeroGen Pty Ltd. Lucas Heape led the project for GAP, with field operations carried out by Timothy Vale and Joanna Jago.

SURVEY PROCEDURE AND INSTRUMENTATION

The Ground Magnetics survey procedures and instrumentation are described in detail in Appendix B. A summary of the instrumentation and data processing parameters applied to the surveys is shown in Table 1.

Roving Magnetometer Acquisition System	
Magnetometer	GAP TM-6 Magnetometer Controller - Synchronised with GPS 1PPS pulse
Sensor	Geometrics 822AS Cs Vapour
Sensor Elevation	~2.0 m
Sample Rate	1200 Hz
Sample Resolution	0.01nT
Base Station	
Magnetometer	Geometrics G856 Proton Precession
Sample Rate	0.1 Hz
Sample Resolution	0.1 nT
Navigation & Positioning	
GPS	Trimble GPS Ag-114
Differential Corrections	Fugro OmniStar Real-time
Software	SAMUi – Gap Geophysics Pty Limited
Datum	GDA 94 - UTM Zone 55 S
Sample Rate	1 Hz
Nominal Survey Direction	East/West
Nominal Line Spacing	20 and 40 m
Data Processing Parameters	
TMI Sample Interval	~ 0.2 m
Gridding	Minimum Curvature
Cell Size	5m
TMI Filtering	None unless specified.
Images Produced	TMI_RTP TMI_RTP_UP20

Table 1 Instrumentation and data processing parameters used for the survey.

SURVEY RESULTS

The data were processed as described in Appendix B. Colour images of the data were produced and are provided on the accompanying CD as JPEG images.

Images were produced of the following:

- Survey Layout Map - This map shows the survey line paths, numbers are shown in black.
- Colour Image of Total Magnetic Intensity Reduced to Magnetic Pole (TMI_RTP).
- Colour Image of Total Magnetic Intensity Reduced to Magnetic Pole (TMI_RTP) upward continued 20 metres.

Reduced scale copies of the images have been included in Appendix A for reference.

DIGITAL DATA PRODUCTS

The following files are supplied on the accompanying CD for each of the survey grids:

Files	Description
Grid Name.xyz	TMI and EQMMR in Geosoft XYZ Format
Grid Name.gdb	TMI and EQMMR in Geosoft Database Format
Grid Name TMI.grd	TMI grid file in Geosoft Format
Grid Name TMI_RTP.grd	TMI_RTP grid file in Geosoft Format

Key:

- TMI – Total Magnetic Intensity
- RTP – Reduced To Pole

FINAL REMARKS

- The initial scope for this survey indicated that the area of interest was within a 600m radius of the ZeroGen number 5 well. The proposal submitted by Gap allowed for a 600 x 600m grid centred on the well. The final survey area was changed to suit the restrictions imposed by the local farmers that had advanced wheat crops in several paddocks that were to be surveyed. The final area of the grid is about 800 x 800m and has the centre 600 x600m completed at 20m line spacing and the rest to 40.
- The total area surveyed was slightly larger than the area specified in the Proposal. After looking at the results from the initial 600 x 600m area it was decided that interpretation would be aided by greater coverage to provide background magnetic response. This did not change the cost of the survey as the field crew were able to acquire the extra data in the allotted time.
- There were several fences within the survey area that had no significant impact on the data quality.

INTERPRETIVE COMMENTS

- The response seen from the survey is suggestive of a flat lying layer of magnetic material (basalt suggested). The interpreted depth to surface is 20 to 30m. This depth estimate is largely confirmed from the borehole log of ZeroGen 5 provided by Peter Spraggon of MBA Consultants. The borehole log has a density anomaly from about 12 to 32m below surface and drill chips from 23 to 32m have a magnetic susceptibility consistent with basaltic material.
- The TMI image shows a northeast-southwest trend to the geology of the area with several distinct linear features present.
- The magnetic response also shows characteristics that suggest that there are areas of local thickening and thinning of the basalt layer. MBA consultants also propose that this is the case.
- The TMI data has been upward continued 20m in two of the images shown below. This has the effect of removing the near surface components of the magnetic response and highlighting the response from the thicker magnetic zones.

APPENDIX A – IMAGES

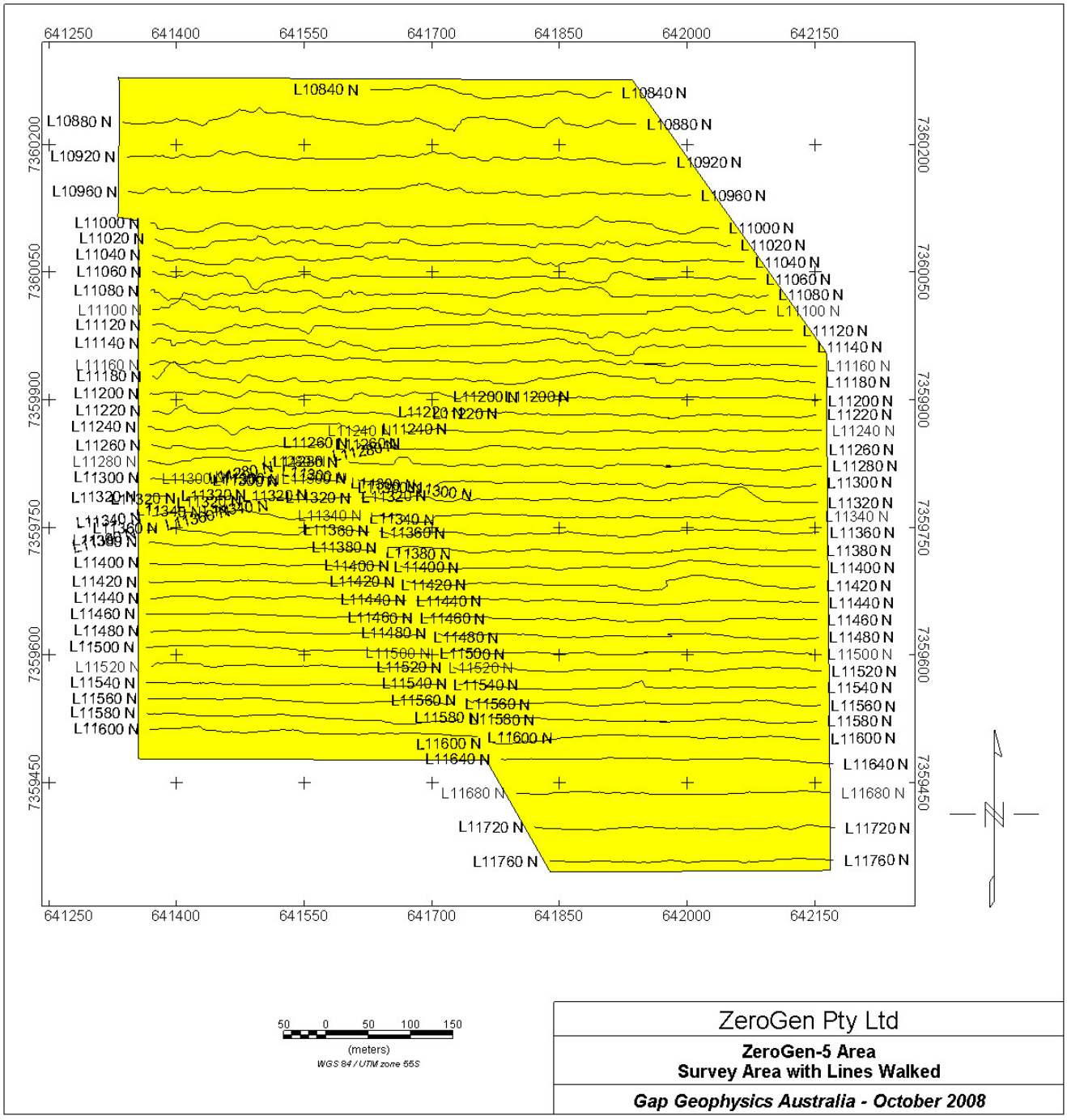

Figure 1 ZeroGen 5 Grid - Survey area, showing survey lines and line numbers.

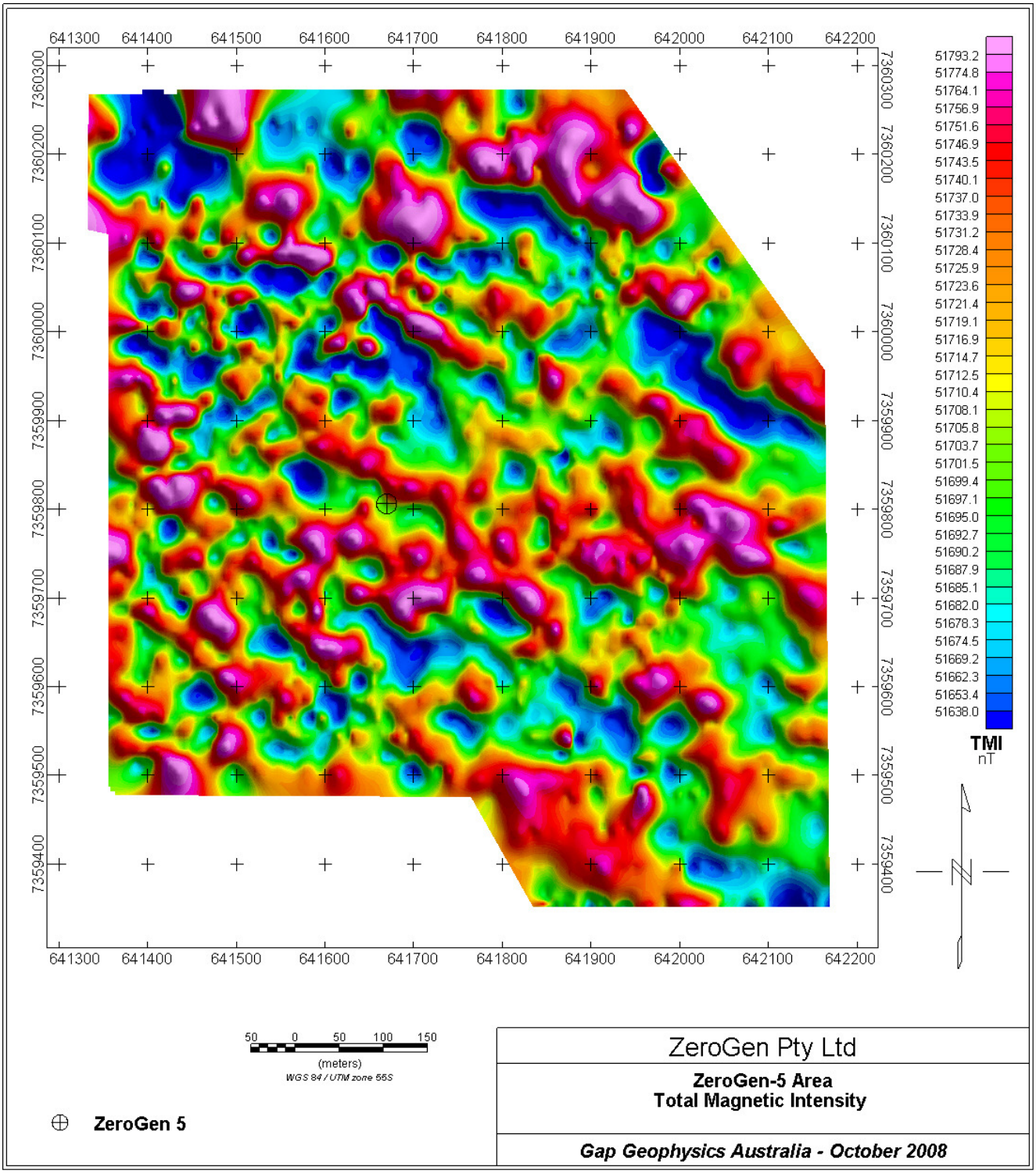

Figure 2 ZeroGen 5 Grid – colour image of Total Magnetic Intensity

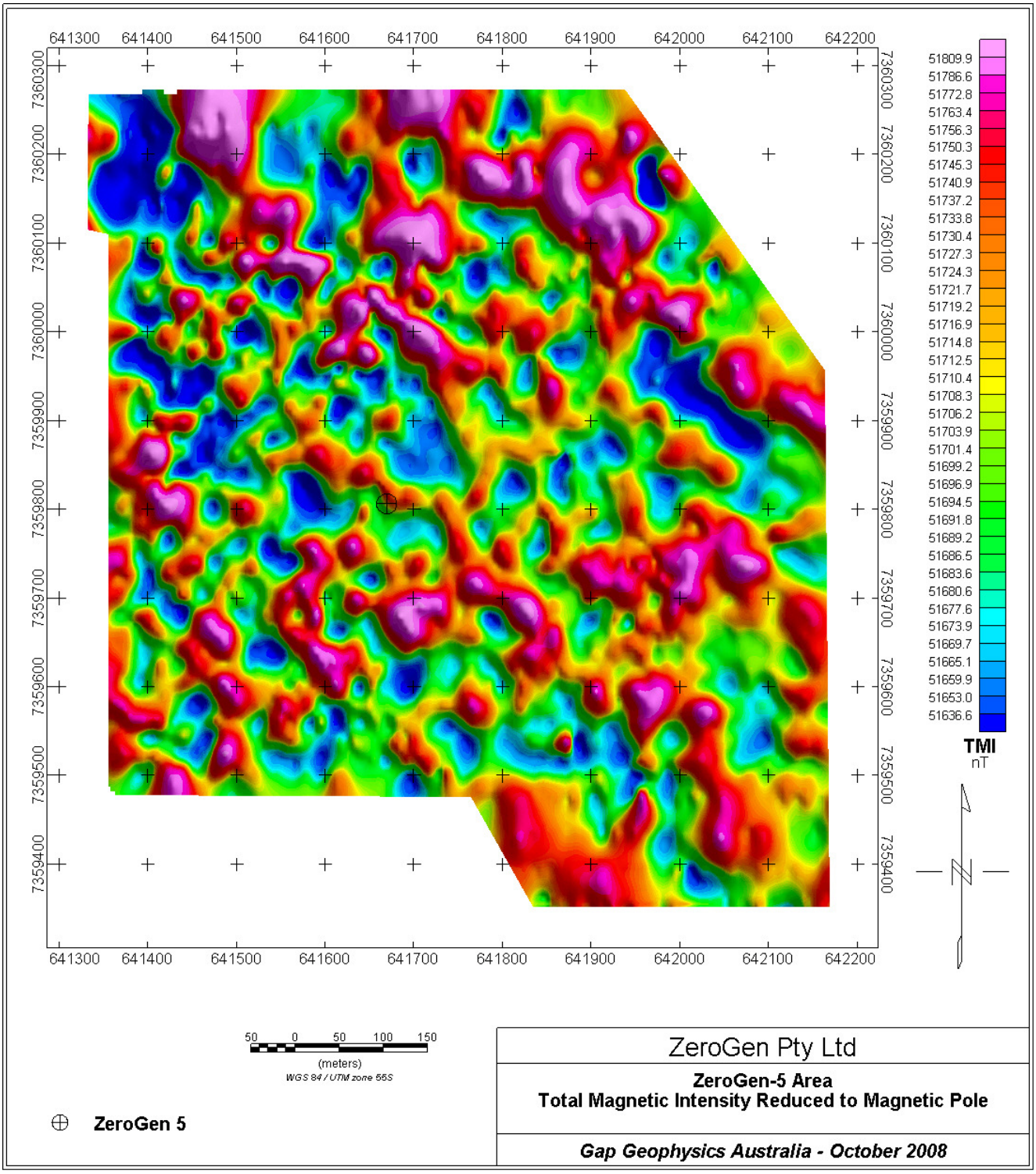

Figure 3 ZeroGen – colour image of Total Magnetic Intensity Reduced to the Pole

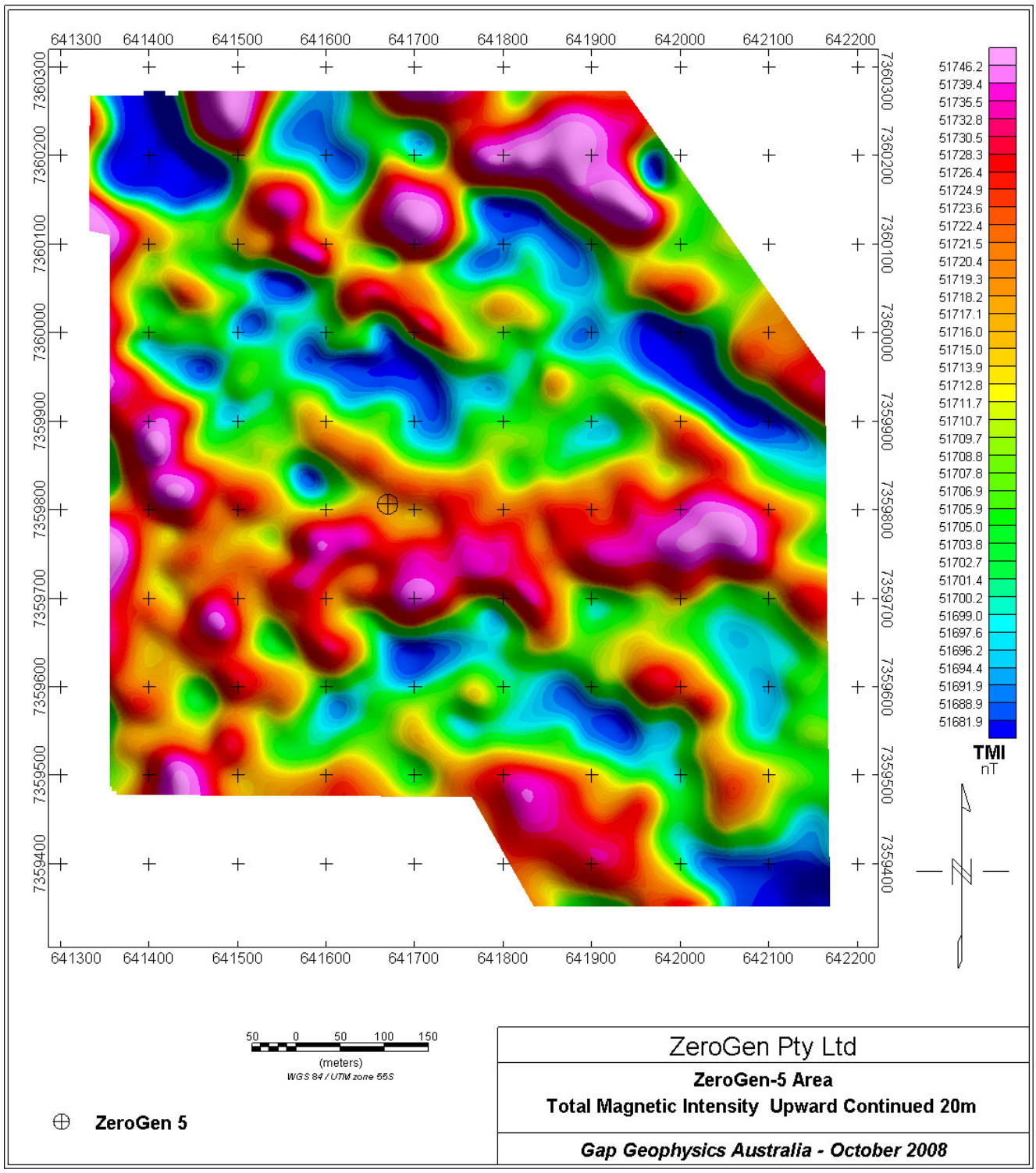

Figure 4 ZeroGen 5 Grid – colour image of Total Magnetic Intensity upward continued 20m

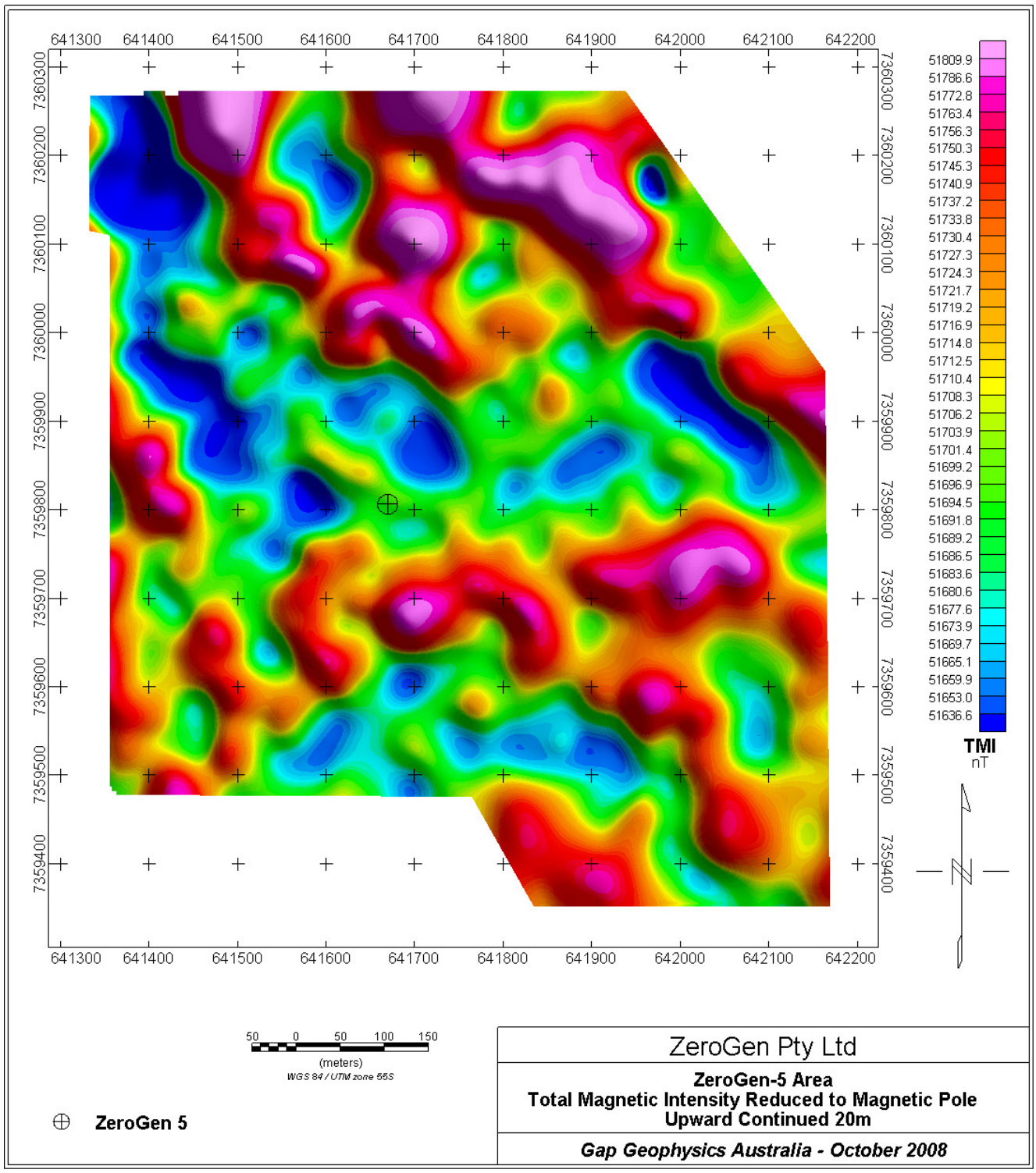

Figure 5 ZeroGen 5 Grid – colour image of Total Magnetic Intensity Reduced to Magnetic Pole. TMI has been upward continued 5m prior to the RTP transformation

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APPENDIX B –INSTRUMENTATION

The TM-6 Magnetometer

A Geophysical Technology Model TM-6 magnetometer controller was used in conjunction with a caesium-vapour magnetometer sensor for this survey. The TM-6 was programmed to record Total Magnetic Intensity (TMI) readings to a resolution of 0.01nT. Measurements were logged to the TM-6 flash memory at a rate of 1200 per second.

In hand-held magnetic survey mode, the TM-6 normally requires two operators, one of whom holds the sensor (see Figure 6). The sensor is connected to the controller by a 5m coaxial cable, which enables the sensor to be separated from the controller by sufficient distance to ensure that the sensor is free from any magnetic interference produced by the control electronics.

GAP utilises differential GPS with the Ground Magnetics acquisition system to assist survey navigation and positioning. This obviates the costly requirement for the client to establish control grids in the survey areas.

The Mag system employs GAP's proprietary "SAMUi" navigation software running on a hand-held computer and coupled with a Trimble AgGPS-114 differential GPS, using Fugro OmniStar real-time differential corrections. The accuracy of the DGPS is described as less than 1m.

The TM-6 and GPS units are mounted in a backpack as shown in Figure 7. Also included in the backpack are batteries to power the units and a warning system should any of the instruments malfunction.

Figure 6 The TM-6 magnetometer system in hand-held configuration. The operators are separated by a distance of up to 5m to minimise magnetic interference from the controller

The Cs vapour magnetometer sensor and GPS antenna are mounted on a second backpack, which enables variable sensor height. A typical sensor configuration is shown in Figure 8.

Accurate timing information technique is provided via the AgGPS-132 receiver which outputs a 1μs "strobe" pulse every second. The strobe pulses are logged by the TM-6 in between Total Magnetic Intensity readings, thus providing the GPS time-reference for magnetic field measurements.

Base-Station

A Geometrics G856 proton precession magnetometer is used to record temporal changes in the Earth's magnetic field. The magnetometer is generally set to record Total Magnetic Intensity readings to a precision of 0.1nT once every 10 seconds.

The base-station magnetometer is located at safe distances from likely sources of cultural magnetic noise during the surveys. Diurnal variation data is calculated as the base-station reading minus the approximate average value at the base-station site(s) used for these surveys.

Figure 7 Backpack showing the TM-6 magnetometer controller, Trimble Ag-132 differential GPS unit and hand held PC's, for navigation and survey controls

Figure 8 Typical sensor configuration showing the Cs vapour sensor on the left at a survey height of 2.5m. The GPS antenna is mounted on the right side of the backpack.

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