STRATASCAN

Geophysical Survey Report

North Whiteley, Botley, Hampshire

for

Terence O'Rourke Ltd

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Stratascan Job No: J2452

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REGISTERED IFA ORGANISATION

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1 SUMMARY OF RESULTS

Stratascan were commissioned by Terence O'Rourke Ltd to undertake a geophysical at North Whiteley, Botley where 38.6ha of magnetic susceptibility data and 58.6ha of detailed magnetometry data was collected. The survey located several possible archaeological features of varying certainty. The clearest feature is a series of positive linear anomalies with associated negative response, representing possible former boundary ditches, in Field 23, with other linear and area anomalies appearing over the remainder of the whole area. Discrete positive anomalies, representing pits of possible archaeological interest, can be seen in most fields. Other features which can be seen across the site consist of geological/pedological, modern services magnetic debris and magnetic spikes from ferrous objects.

2 INTRODUCTION

2.1 Background synopsis

Stratascan were commissioned by Terence O'Rourke Ltd to undertake a geophysical survey of an area outlined for development.

2.2 Site location

The site is located at North Whiteley, Botley at OS ref. SU 527 110.

2.3 Description of site

The survey area is 214 ha of generally flat land. The underlying geology is Barton, Bracklesham and Bagshot beds to the north and London clay to the south (British Geological Survey south Sheet, Third Edition Solid, 1979). The survey area has drift geology of Alluvium. (Geological Survey Ten Mile Map, South Sheet, First Edition (Quaternary) 1977 The overlying soils are known as Wickham 3 which are typical Stagnogley soils. These consist of slowly permeable seasonally waterlogged fine loamy over coarse loamy over clayey soils. (Soil Survey of England and Wales, Sheet 6 South West England).

2.4 Site history and archaeological potential

No site history was made available to Stratascan Ltd.

2.5 Survey objectives

The objective of the survey was to locate any features of possible archaeological significance in order that they may be trenched prior to development.

2.6 Survey methods

The reconnaissance technique of magnetic susceptibility was employed over selected area totalling 38.6ha. From this data set three areas of enhancement were targeted with detailed magnetometer survey, and additional area of strong enhancement was selected in the north. A further area of low enhancement to test 'blank' areas was selected. More information regarding these techniques is included in the Methodology section below.

3 METHODOLOGY

3.1 Date of fieldwork

The fieldwork was carried out over 42 days from 3rd March 2008 to 23rd May 2008 when the weather was varied.

3.2 Grid locations

The location of the survey grids is based on the Ordnance Survey National Grid, see Figure 2. The referencing and alignment of grids was achieved using a Leica DGPS System 500.

A DGPS (differential Global Positioning System) can locate a point on the ground to a far greater accuracy than a standard GPS unit. A standard GPS suffers from errors created by satellite orbit errors, clock errors and atmospheric interference, resulting in an accuracy of 5m-10m. Calculations to correct for these errors are performed at an accurately located base station. The base station then transmits the corrections which are received by DGPS consoles giving sub metre accuracy averaging around 0.5m error.

3.3 Description of techniques and equipment configurations

3.3.1 Magnetic Susceptibility

Alteration of iron minerals in topsoil through biological activity and burning can enhance the magnetic susceptibility (MS) of that soil. Measuring the MS of a soil can therefore give a measure of past human activity and can be used to target the more intensive and higher resolution techniques of Magnetometry and Resistivity.

Measurements of MS were carried out using a field coil which provides a rapid scan and has the benefit of allowing "insitu" readings to be taken. The equipment used on this contract was an MS2 Magnetic Susceptibility meter manufactured by Bartington Instruments Ltd. A field coil known as an MS2D was used to take field readings. This assessed the top 200mm or so of topsoil. To overcome the problem of ground contact all readings were taken 4 or 5 times and an average taken. All obvious localised "spikes" were ignored.

3.3.2 Magnetometer

Although the changes in the magnetic field resulting from differing features in the soil are usually weak, changes as small as 0.2 nanoTesla (nT) in an overall field strength of 48,000nT, can be accurately detected using an appropriate instrument.

The mapping of the anomaly in a systematic manner will allow an estimate of the type of material present beneath the surface. Strong magnetic anomalies will be generated by buried iron-based objects or by kilns or hearths. More subtle anomalies such as pits and ditches can be seen if they contain more humic material which is normally rich in magnetic iron oxides when compared with the subsoil.

To illustrate this point, the cutting and subsequent silting or backfilling of a ditch may result in a larger volume of weakly magnetic material being accumulated in the trench compared to the undisturbed subsoil. A weak magnetic anomaly should therefore appear in plan along the line of the ditch.

The magnetic survey was carried out using a dual sensor Grad601-2 Magnetic Gradiometer manufactured by Bartington Instruments Ltd. The instrument consists of two fluxgates very accurately aligned to nullify the effects of the Earth's magnetic field. Readings relate to the difference in localised magnetic anomalies compared with the general magnetic background. The Grad601-2 consists of two high stability fluxgate gradiometers suspended on a single frame. Each gradiometer has a 1m separation between the sensing elements so enhancing the response to weak anomalies.

3.4 Sampling interval, depth of scan, resolution and data capture

3.4.1 Sampling interval

Magnetic susceptibility
The magnetic susceptibility survey was carried out on a 20 m grid with readings being taken at the node points.

Magnetometer
Readings were taken at 0.25m centres along traverses 1m apart. This equates to 3600 sampling points in a full 30m x 30m grid.

3.4.2 Depth of scan and resolution

Magnetic Susceptibility
The MS2D coil assesses the average MS of the soil within a hemisphere of radius 200mm. This equates to a volume of some $0.016m^3$ and maximum depth of 200mm. As readings are only at 20m centres this results in a very coarse resolution but adequate to pick up trends in MS variations.

Magnetometer
The Grad 601 has a typical depth of penetration of 0.5m to 1.0m. This would be increased if strongly magnetic objects have been buried in the site. The collection of

data at 0.5m centres provides an optimum methodology for the task balancing cost and time with resolution.

3.4.3 Data capture

Magnetic susceptibility
The readings are logged manually on site, and then transferred to the office where they are entered into a computer and grey scale plots are produced.

Magnetometer
The readings are logged consecutively into the data logger which in turn is daily down-loaded into a portable computer whilst on site. At the end of each job, data is transferred to the office for processing and presentation.

3.5 Processing, presentation of results and interpretation

3.5.1 Processing

Magnetic susceptibility
No processing of the data has been undertaken. *Surfer* 8 is used to generate a colour plot of the data.

Magnetometer
Processing is performed using specialist software known as *Geoplot 3*. This can emphasise various aspects contained within the data but which are often not easily seen in the raw data. Basic processing of the magnetic data involves 'flattening' the background levels with respect to adjacent traverses and adjacent grids. 'Despiking' is also performed to remove the anomalies resulting from small iron objects often found on agricultural land. Once the basic processing has flattened the background it is then possible to carry out further processing which may include low pass filtering to reduce 'noise' in the data and hence emphasise the archaeological or man-made anomalies.

The following schedule shows the basic processing carried out on all processed magnetometer data used in this report:

1. *Despike* (useful for display and allows further processing functions to be carried out more effectively by removing extreme data values)

   Geoplot parameters:
   X radius = 1, y radius = 1, threshold = 3 std. dev.
   Spike replacement = mean

2. *Zero mean grid* (sets the background mean of each grid to zero and is useful for removing grid edge discontinuities)

   Geoplot parameters:
   Threshold = 0.25 std. dev.

3. *Zero mean traverse* (sets the background mean of each traverse within a grid

to zero and is useful for removing striping effects)

Geoplot parameters:
Least mean square fit = off

3.5.2 Presentation of results and interpretation

Magnetic susceptibility
The presentation of the data for this site involves a colour scale plot of the field measurements overlain onto a site plan (Figure 2).

Magnetometer
The presentation of the data for each site involves a print-out of the raw data both as grey scale (Figures 4-8) and trace plots (Figures 9-11), together with a grey scale plot of the processed data (Figures 12-16). Magnetic anomalies have been identified and plotted onto the 'Abstraction and Interpretation of Anomalies' drawing for the site (Figures 17-21).

4 RESULTS

4.1 Magnetic susceptibility

The magnetic susceptibility survey was carried out over an area of 38.6ha. The survey found the fields in the west of the site to have enhanced magnetic susceptibility. The fields in the centre of the area has a general low response with some higher readings in the east of the area. The fields in the east of the area had low magnetic susceptibility. Field 12 demonstrated generally high readings, probably caused by farming activities within the field as it does not correlate with any changes in the geology in the area.

4.2 Detailed magnetometry

Field 1

Field 1 measures 1.6ha in size and is located in the south of the survey area, with Field 2 to the north east and Whiteley Lane to the south west. Geological/pedological variations can be seen across the majority of the field. Two discrete positive anomalies, representing pits of possible archaeological interest, have been identified in close proximity to each other in the west of the field. Negative linear anomalies, representing possible earthworks, are evident in the south. A modern service crosses in the east of the field and agricultural marks are present throughout.

Field 2

This field is 2.8ha and located to the north east of Field 1. A weak positive linear anomaly of a possible archaeological origin can be seen in the south. Areas of geological / pedological variations can be seen across the field. A modern service crosses in a north - south orientation with an area of magnetic disturbance associated with modern ferrous objects present in the east of the field.

Field 3

Measuring 6ha, Field 3 is located to the north of Field 1, to the east of Field 4 and to the west of Whiteley Lane. A small number of positive area anomalies, perhaps either archaeological or geological /pedological, can be seen in the east of the field. Magnetic disturbance, associated with the field boundaries, can be seen around some of the perimeter. A large amount of magnetic spikes caused by near surface ferrous objects can be seen across the field, with agricultural marks also being present.

Field 4

Field 4 is located to the north of Field 2 and the east of Field 3. An area of 0.8ha was target in this field. The survey area contains a number of magnetic spikes caused by near surface ferrous objects and an area of magnetic disturbance in the south west corner caused by a probable modern service. The results of the magnetic susceptibility survey showed little enhancement. This area was selected to test the 'blank'.

Field 5

Field 5 is located to the south of Bury Farm and to the north west of Field 2 with an area of 0.8ha selected for detailed survey. The data shows two parallel positive features with associated negative response, representing cut features with of possible archaeological interest, running from the south west to the north eastern corners of the field. Separate positive features, of possible archaeological interest, can be seen in the north of the area. An iron manhole cover is present in the north located on a modern service also evident in the data as an area of magnetic disturbance. Two areas of magnetic debris are also present in the north. The magnetic susceptibility survey showed areas of enhancement within this field with possible archaeology present.

Field 6

Field 6 is located to the south of Bury Farm and to the north of Field 5. An area of 0.75ha was selected for detailed survey. Several small positive area anomalies can be seen in the area, these may be of archaeological origin, however no recognisable shapes or features can be seen and further investigation of these features is recommended to determine their true nature. Several discrete positive features, representing pits of possible archaeological interest, can be seen mainly in the south. Agricultural marks can be seen in a south east – north west orientation. Farm machinery was parked to the north of these grids when the survey was taking place and the magnetic disturbance caused can be seen in the north of the area. A general spread of magnetic spikes, caused by near

surface ferrous objects, can be seen throughout. The magnetic susceptibility survey showed areas of enhancement within this field.

Field 7

Field 7 is 6.7ha and is located to the south of Field 9. Several weak positive anomalies, which have been interpreted as cut features of possible archaeological origin, can be observed across the field. The features in the south east of the field seem to respect the current field boundary and may be related. Dipolar linear anomalies, typical of land drains, are identified from the data. An area of strong magnetic disturbance, caused by a modern building in the survey area, is evident in the south. Agricultural marks, geological/pedological variations and magnetic spikes are also visible in the data across the field.

Field 8

Field 8 measures 0.75ha and is located to the north of Ridge Lane and Field 7, to the south of Fields 11 & 12 and to the west of Field 9. Areas of weak positive and negative features are present in the field, which may be of an archaeological origin. However they may be naturally occurring due to the lack of recognisable shapes or features evident within the data. An area of magnetic disturbance can be seen in the east of the field with additional magnetic disturbance related to the field boundary also being seen in the west. The magnetic susceptibility survey showed enhancement within this field with several features identified.

Field 9

Field 9 is 2.9ha and is located to the north of Field 7 and to the south of Fields 10 & 11. Several linear anomalies, which provide weak evidence of archaeological cut features, can be seen across the field. A large area of geological/pedological variation is predominant across the majority of the field. A modern service can be seen entering the field in the north west with the data suggesting it terminates after approximately 30m. A series of linear features, typical of land drains, can be seen adjacent to the west and south boundaries.

Field 10

Field 10 is located to the north of Field 9, to the east of Field 11 and to the south of Meadow Cottage and is 2.8ha in size. The majority of the field shows weak background variations in the magnetic response, probably caused by the geological or pedological variations within the area. Stronger positive and negative area anomalies have been identified, representing possible archaeology, however they may also be natural and further investigation of these features is recommended to determine their true origin. A modern service and associated magnetic disturbance can be seen entering the field in the north east and running towards Field 9 to the south west.

Field 11

Field 11 measures 1.4ha in size and is located to the north of Field 8, to the west of Field 10 and to the east of Field 12. A weak positive linear anomaly, representing a cut feature of possible archaeological interest, can be seen adjacent to the north west boundary. A series of strong positive and negative features, of an unknown origin, can be seen towards the south west of the field. Several areas of weak magnetic variations, possibly caused by geological / pedological variations, can be seen across the field. Areas of magnetic disturbance, debris and spikes can be seen throughout, with a positive and negative linear anomaly, typical of a land drain, visible in the south east.

Field 12

Field 12 is located to the north of Field 8, to the east of Field 13 and to the west of Field 11 and is 3.7ha in size. A general mottled effect, caused by the local geology / pedology, can be seen across the majority of the area. Several positive and negative linear anomalies, typical of land drains, can be seen in the west of the field. A positive linear anomaly and a small weak area anomaly, representing cut feature which may be of either archaeological origin or connected to the series of land drains, can be seen in the western area. Several weak agricultural marks can be seen in the north and east of the field. A modern service is evident along the western edge and a general spread of magnetic spikes are also visible throughout the field.

Field 13

Field 13 is 2.5ha and is located to the west of the survey area with Field 14 to the north and St Barnabas Church and the A3051 to the west. A large positive area anomaly with an area of associated negative, representing a cut feature of possible archaeological origin, can be seen in an approximate east – west direction across the centre of the field. A weak area anomaly, of possible archaeological origin, is present in the south east. Magnetic disturbance from a modern service is evident in the east of the field with magnetic spikes, caused by near surface ferrous objects, are also present throughout.

Field 14

Field 14 measures 3.2ha in size and is located to the south of Bridge Farm, to the east of Meadow Cottage and to the north of Field 13. Areas of variations caused by the pedology in the area can be seen in the north of the site. Area of positive and negative features, of possible geological or archaeological interest, can be seen along the northern perimeter. Negative features, representing a possible former earth work, is evident on the western border. A positive linear anomaly, representing a possible former field boundary, traverses the field in an approximate east – west direction with an apparent break in the centre. Several discrete positive anomalies, representing pits of possible archaeological interest, are present, with the majority in the northern half of the field. Agricultural marks are visible in the data across the site. Two separate directions of agricultural marks are present to the south of the possible former field boundary. A service with associated magnetic disturbance can be seen in the east.

Field 15

Field 15 is located to the west of Field 16, to the east of Field 14 and to the north of Field 12. Positive area anomalies, of either a possible archaeological origin or more likely, due to their size, may be associated with field boundaries, located in the south and east of the field. A positive linear cut feature, of possible archaeological interest can be seen in a south west – north east orientation with several weak linear anomalies to the north of this. Two parallel positive features with an associated negative response, representing a possible ditch and bank formation, can be seen in the north of the field. Agricultural marks and a modern service are also present within this area.

Field 16

Field 16 measures 4.4ha and is located to the south of Field 20 and to the south east of Bridge Farm. Positive linear features, representing possible archaeology are present in the western area, the shape and length of these features suggest that some may be former field boundaries and enclosures. Small positive area anomalies in the north west and south east can be observed in the data representing cut features of possible archaeological interest. Two weak curvilinear features of possible archeologically interest, can be seen by the south west edge. Several discrete positive anomalies, representing pits of possible archaeological interest, can be seen across the field. Other features in the field include agricultural marks, magnetic spikes and modern services.

Field 17

This field is located to the north of Field 10, to the north east of Field 16 and to the south of Fields 19 & 20 and 4.7ha in area. The predominant feature within this field is a weak magnetic variation caused by the pedology or geology. A large number of positive linear anomalies, representing a mixture of both cut features of possible archaeological interest and agricultural marks, can be seen across the field with a concentration of these features in the west. A modern service can be seen in the north and magnetic spikes are also present across the field. An area of positive anomalies with an associated negative response of an unknown origin can be seen in the south of the area.

Field 18

This field is located to the north of Blackmoor Copse and to the east of Fields 10 & 17. An area of 1.4ha was selected for a detailed survey. Weak negative anomalies, representing a possible former earthwork or area of compacted ground, can be seen in a linear formation across the area. A small positive linear, representing a cut feature of possible archaeological origin, can be seen adjacent to the negative features with an positive linear feature in a north east – south west orientation. Agricultural marks can be seen running north west – south east . The magnetic susceptibility survey showed strong enhancement within this field.

Field 19

Field 19 is located to the north west of Barn Farm, to the south east of the railway and to the south east of Field 20 and measures 1.3ha. Weak positive linear features, which have been interpreted as cut features of possible archaeological origin, can be seen in two separate directions in the field. A weak positive area anomaly is evident in the east. Several discrete positive anomalies, representing pits, can be observed in the northern half of the field. Areas of magnetic disturbance associated with field boundaries are evident around most of the perimeter.

Field 20

Field 20 is 4.5ha in size and is located to the south west of the railway, the north of Fields 16 & 17 and the east of Field 21. Positive linear anomalies are present throughout the field in two separate directions. The majority of the anomalies represent agricultural marks with a few representing possible archaeology, the largest of which possibly representing former field boundaries. A small negative linear anomaly, which represents an area of possible former earthworks, is present in the east of the field. Several positive discrete anomalies, representing pits of possible archaeological interest, can be seen in the data across the field. A complex series of positive and negative anomalies, representing either possible archaeology or part of a former field boundary, is observed in the north east. A small area of positive and negative response is evident in the north west of the field relating to possible archaeology or the local geology / pedology. A large area of magnetic debris is evident across the centre of the field and areas of magnetic disturbance can be observed around the perimeter. Also in this field is a scattering of magnetic spikes caused by near surface ferrous objects.

Field 21

This field measures 0.9ha in size and is located to the south of Field 22, to the west of Field 23, to the east of the A3051 and to the north of Woodview Cottages. Positive linear anomalies, representing cut features of possible archaeological origin, can be seen across the field. A negative linear anomaly is evident in the east of the field which represents a former earthwork. A modern service can be seen in a north – south orientation and areas of magnetic disturbance around the perimeter of the field. A positive and negative anomaly, of an unknown origin, is evident in the east.

Field 22

This field is 1.3ha in size and is located to the north of the site with Field 23 to the east and Field 21 to the south. A series of positive and negative features can be seen in the south east of the field, of an unknown origin. Most of these features Are a continuation of those observed in Field 20. Several area and linear anomalies are also present across this field which may be of an archaeological origin. A modern service and associated magnetic disturbance can be seen in an approximate north west – south east orientation. Several small areas of magnetic disturbance, associated with field boundaries, are present around the perimeter.

Field 23

This field is located to the north of the survey area, with the railway track to the east, Fields 21 & 22 to the west and is 5ha. A series of positive and negative linear features, representing possible enclosures, can be seen in the west. An area of magnetic debris can be seen in the west. Areas of geological / pedological variations can be seen across the field. Small areas of magnetic disturbance are evident throughout, possibly representing made ground or burning. A few magnetic spikes and agricultural marks are also present.

5 CONCLUSION

A geophysical survey was carried out at North Whiteley, near Botley. The main features identified in the survey are areas of geological/pedological variations across the majority of the site. Agricultural marks are present throughout which can expected due to the land use. Positive and negative features, of possible archaeological origin, have been identified across the site, some of these may not be archaeology but may be former field boundaries or caused by the local pedology/geology and further investigations are recommended to determine their origins. The strongest evidence for archaeology found within the magnetometer data is in Field 23 where a series of features appear to be former enclosures. Discrete positive features representing pits of possible archaeological origins have been identified across the site. Modern services can be seen across several fields, the associated responses from these may mask any features which may be present within the affected areas.

6 REFERENCES

British Geological Survey, 1979. *Geological Survey Ten Mile Map, South Sheet, Third Edition (Solid)*. British Geological Society.

British Geological Survey, 1977. *Geological Survey Ten Mile Map, South Sheet, First Edition (Quaternary)*. British Geological Society.

Soil Survey of England and Wales, 1983. *Soils of England and Wales, Sheet 6 Southwest*
England.

APPENDIX A – Basic principles of magnetic survey

Detailed magnetic survey can be used to effectively define areas of past human activity by mapping spatial variation and contrast in the magnetic properties of soil, subsoil and bedrock.

Weakly magnetic iron minerals are always present within the soil and areas of enhancement relate to increases in *magnetic susceptibility* and permanently magnetised *thermoremnant* material.

Magnetic susceptibility relates to the induced magnetism of a material when in the presence of a magnetic field. This magnetism can be considered as effectively permanent as it exists within the Earth's magnetic field. Magnetic susceptibility can become enhanced due to burning and complex biological or fermentation processes.

Thermoremnance is a permanent magnetism acquired by iron minerals that, after heating to a specific temperature known as the Curie Point, are effectively demagnetised followed by re-magnetisation by the Earth's magnetic field on cooling. Thermoremnant archaeological features can include hearths and kilns and material such as brick and tile may be magnetised through the same process.

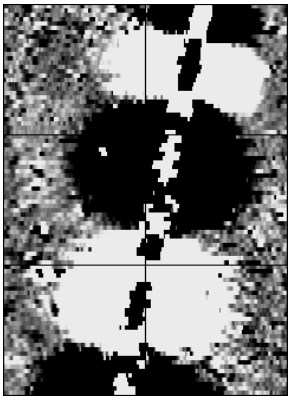
Silting and deliberate infilling of ditches and pits with magnetically enhanced soil creates a relative contrast against the much lower levels of magnetism within the subsoil into which the feature is cut. Systematic mapping of magnetic anomalies will produce linear and discrete areas of enhancement allowing assessment and characterisation of subsurface features. Material such as subsoil and non-magnetic bedrock used to create former earthworks and walls may be mapped as areas of lower enhancement compared to surrounding soils.

Magnetic survey is carried out using a fluxgate gradiometer which is a passive instrument consisting of two sensors mounted vertically either 0.5 or 1m apart. The instrument is carried about 30cm above the ground surface and the top sensor measures the Earth's magnetic field whilst the lower sensor measures the same field but is also more affected by any localised buried field. The difference between the two sensors will relate to the strength of a magnetic field created by a buried feature, if no field is present the difference will be close to zero as the magnetic field measured by both sensors will be the same.

Factors affecting the magnetic survey may include soil type, local geology, previous human activity, disturbance from modern services etc.

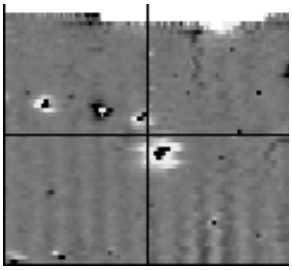
APPENDIX B – Glossary of magnetic anomalies

Bipolar



A bipolar anomaly is one that is composed of both a positive response and a negative response. It can be made up of any number of positive responses and negative responses. For example a pipeline consisting of alternating positive and negative anomalies is said to be bipolar. See also dipolar which has only one area of each polarity. The interpretation of the anomaly will depend on the magnitude of the magnetic field strength. A weak response may be caused by a clay field drain while a strong response will probably be caused by a metallic service.

Dipolar

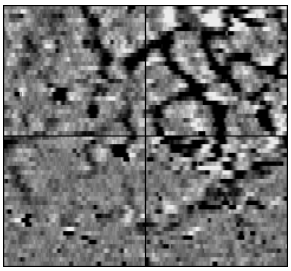


This consists of a single positive anomaly with an associated negative response. There should be no separation between the two polarities of response. These responses will be created by a single feature. The interpretation of the anomaly will depend on the magnitude of the magnetic measurements. A very strong anomaly is likely to be caused by a ferrous object.

Positive anomaly with associated negative response

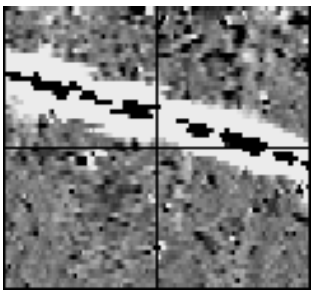
See bipolar and dipolar.

Positive linear



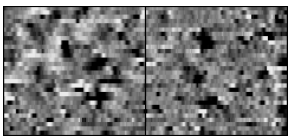
A linear response which is entirely positive in polarity. These are usually related to infilled cut features where the fill material is magnetically enhanced compared to the surrounding matrix. They can be caused by ditches of an archaeological origin, but also former field boundaries, ploughing activity and some may even have a natural origin.

Positive linear anomaly with associated negative response



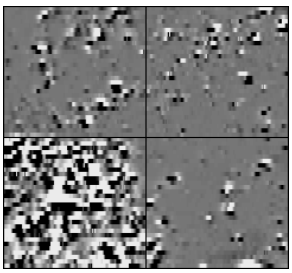
A positive linear anomaly which has a negative anomaly located adjacently. This will be caused by a single feature. In the example shown this is likely to be a single length of wire/cable probably relating to a modern service. Magnetically weaker responses may relate to earthwork style features and field boundaries.

Positive point/area



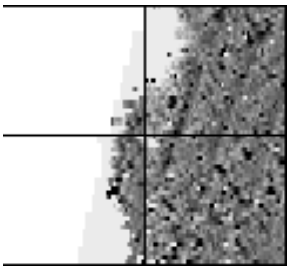
These are generally spatially small responses, perhaps covering just 3 or 4 reading nodes. They are entirely positive in polarity. Similar to positive linear anomalies they are generally caused by infilled cut features. These include pits of an archaeological origin, possible tree bowls or other naturally occurring depressions in the ground.

Magnetic debris



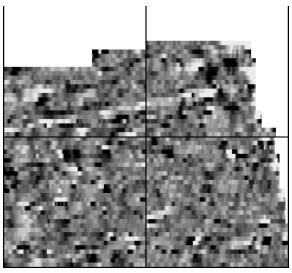
Magnetic debris consists of numerous dipolar responses spread over an area. If the amplitude of response is low (+/-3nT) then the origin is likely to represent general ground disturbance with no clear cause, it may be related to something as simple as an area of dug or mixed earth. A stronger anomaly (+/-250nT) is more indicative of a spread of ferrous debris. Moderately strong anomalies may be the result of a spread of thermoremnant material such as bricks or ash.

Magnetic disturbance



Magnetic disturbance is high amplitude and can be composed of either a bipolar anomaly, or a single polarity response. It is essentially associated with magnetic interference from modern ferrous structures such as fencing, vehicles or buildings, and as a result is commonly found around the perimeter of a site near to boundary fences.

Negative linear

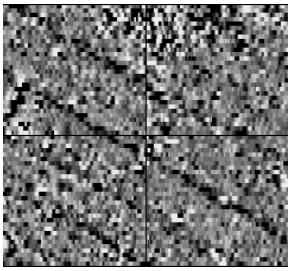


A linear response which is entirely negative in polarity. These are generally caused by earthen banks where material with a lower magnetic magnitude relative the background top soil is built up. See also ploughing activity.

Negative point/area

Opposite to positive point anomalies these responses may be caused by raised areas or earthen banks. These could be of an archaeological origin or may have a natural origin.

Ploughing activity



Ploughing activity can often be visualised by a series of parallel linear anomalies. These can be of either positive polarity or negative polarity depending on site specifics. It can be difficult to distinguish between ancient ploughing and more modern ploughing, clues such as the separation of each linear, straightness, strength of response and cross cutting relationships can be used to aid this, although none of these can be guaranteed to differentiate between different phases of activity.

Polarity

Term used to describe the measurement of the magnetic response. An anomaly can have a positive polarity (values above 0nT) and/or a negative polarity (values below 0nT).

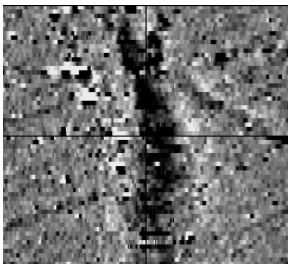
Strength of response

The amplitude of a magnetic response is an important factor in assigning an interpretation to a particular anomaly. For example a positive anomaly covering a $10m^2$ area may have values up to around 3000nT, in which case it is likely to be caused by modern magnetic interference. However, the same size and shaped anomaly but with values up to only 4nT may have a natural origin. Trace plots are used to show the amplitude of response.

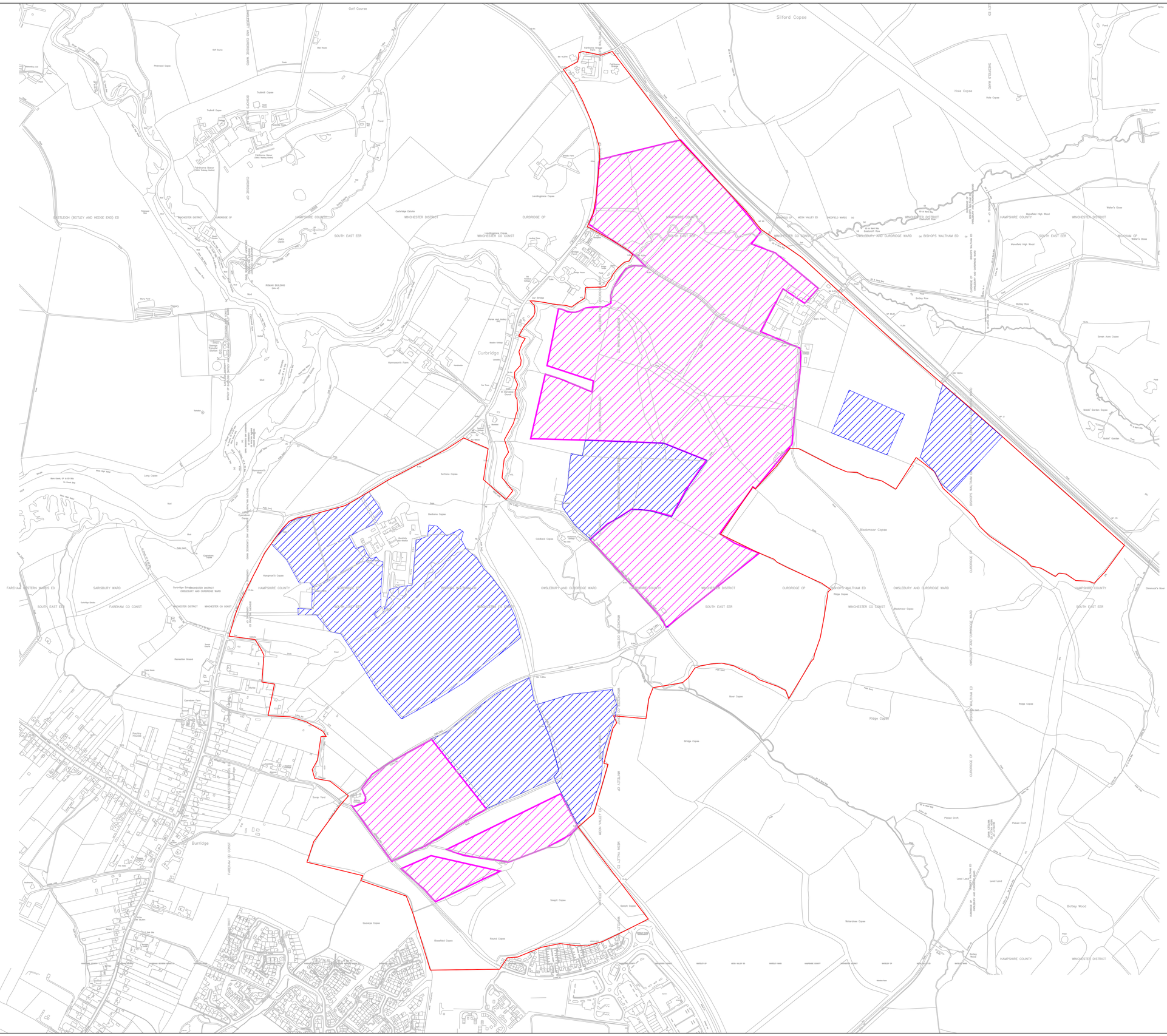
Thermoremnant response

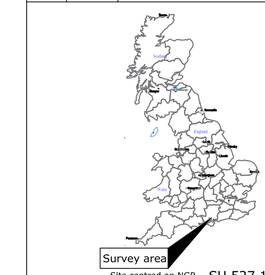
A feature which has been subject to heat may result in it acquiring a magnetic field. This can be anything up to approximately +/-100 nT in value. These features include clay fired drains, brick, bonfires, kilns, hearths and even pottery. If the heat application has occurred insitu (e.g. a kiln) then the response is likely to be bipolar compared to if the heated objects have been disturbed and moved relative to each other, in which case they are more likely to take an irregular form and may display a debris style response (e.g. ash).

Weak background variations

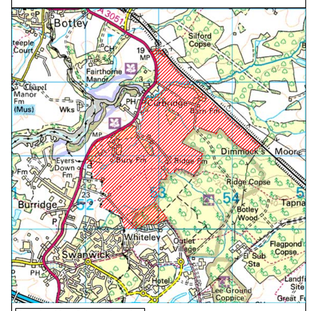


Weakly magnetic wide scale variations within the data can sometimes be seen within sites. These usually have no specific structure but can often appear curvy and sinuous in form. They are likely to be the result of natural features, such as soil creep, dried up (or seasonal) streams. They can also be caused by changes in the underlying geology or soil type which may contain unpredictable distributions of magnetic minerals, and are usually apparent in several locations across a site.





Site centred on NGR SU 527 110



OS 100km square = SU

Amendments

Issue No.	Date	Description
-	-	-
-	-	-

KEY

- Site boundary
- Magnetic susceptibility survey
- Detailed magnetic survey

Job No.	Survey Date
2452	MAR - MAY 08

Client

TERENCE O'ROURKE LTD

Project Title

NORTH WHITELEY, BOTLEY, HAMPSHIRE

Subject

SITE LOCATION AND SURVEY AREA

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Scale 1:5000 (0m 100 200 300m)

Plot	Checked by	Issue No.
A1	PPB	01
Date	Drawn by	Figure No.
MAY 08	SDH	01

N

Amendments

Issue No.	Date	Description
-	-	-
-	-	-

25
20
15
10
5
0

Plotting parameters
Maximum 25 x 10_{-5} SI (red)
Minimum 0 x 10_{-5} SI (blue)

Job No.	Survey Date
2452	MAR - MAY 08

Client

TERENCE O'ROURKE LTD

Project Title

NORTH WHITELEY, BOTLEY, HAMPSHIRE

Subject

RESULTS OF MAGNETIC SUSCEPTIBILITY SURVEY

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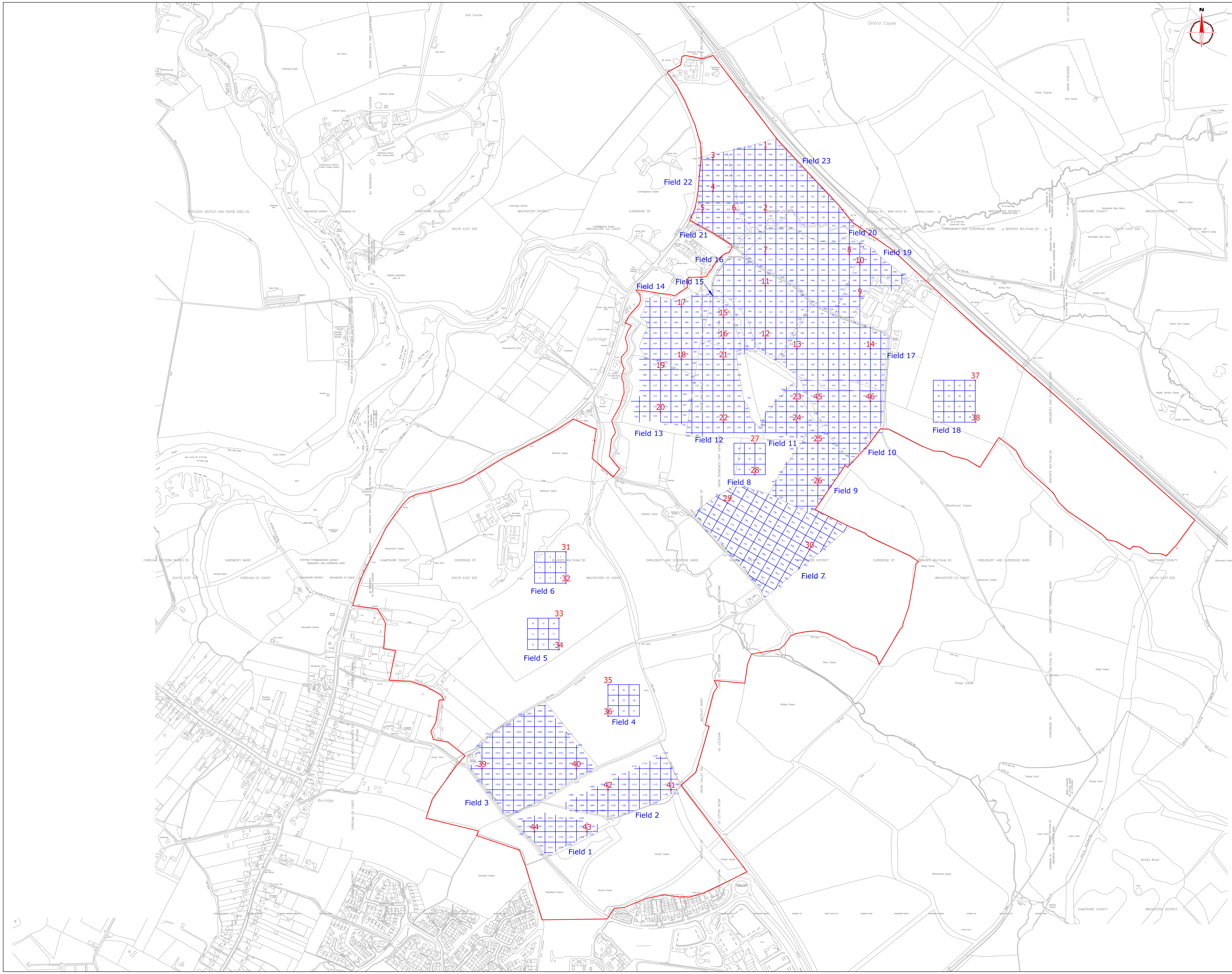
Scale 1:3000 — 0m 30 60 90 120 150 180m

Plot	Checked by	Issue No.
A1	PPB	01
Date	**Drawn by**	**Figure No.**
MAY 08	SDH	02



Amendments

Issue No.	Date	Description
-	-	-
-	-	-

REFERENCING INFORMATION

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3	453010	112170	26	453310	111240
4	453010	112080	27	453130	111360
5	452980	112020	28	453130	111270
6	453070	112020	29	453051.5	111189.4
7	453160	111900	30	453286.3	111056.2
8	453400	111900	31	452590	111050
9	453430	111780	32	452590	110960
10	453430	111870	33	452570	110860
11	453160	111810	34	452570	110770
12	453160	111660	35	452710	110670
13	453250	111630	36	452710	110580
14	453460	111630	37	453760	111540
15	453040	111720	38	453761	111420
16	453040	111660	39	452350	110430
17	452920	111750	40	452620	110430
18	452920	111600	41	452890	110370
19	452860	111570	42	452710	110370
20	452860	111450	43	452650	110250
21	453040	111600	44	452500	110250
22	453040	111420	45	453310	111480
23	453250	111480	46	453460	111480

2 Grid number

Job No. 2452

Survey Date MAR - MAY 08

Client

TERENCE O'ROURKE LTD

Project Title

NORTH WHITELEY, BOTLEY, HAMPSHIRE

Subject

SITE PLAN SHOWING LOCATION OF SURVEY GRIDS AND REFERENCING

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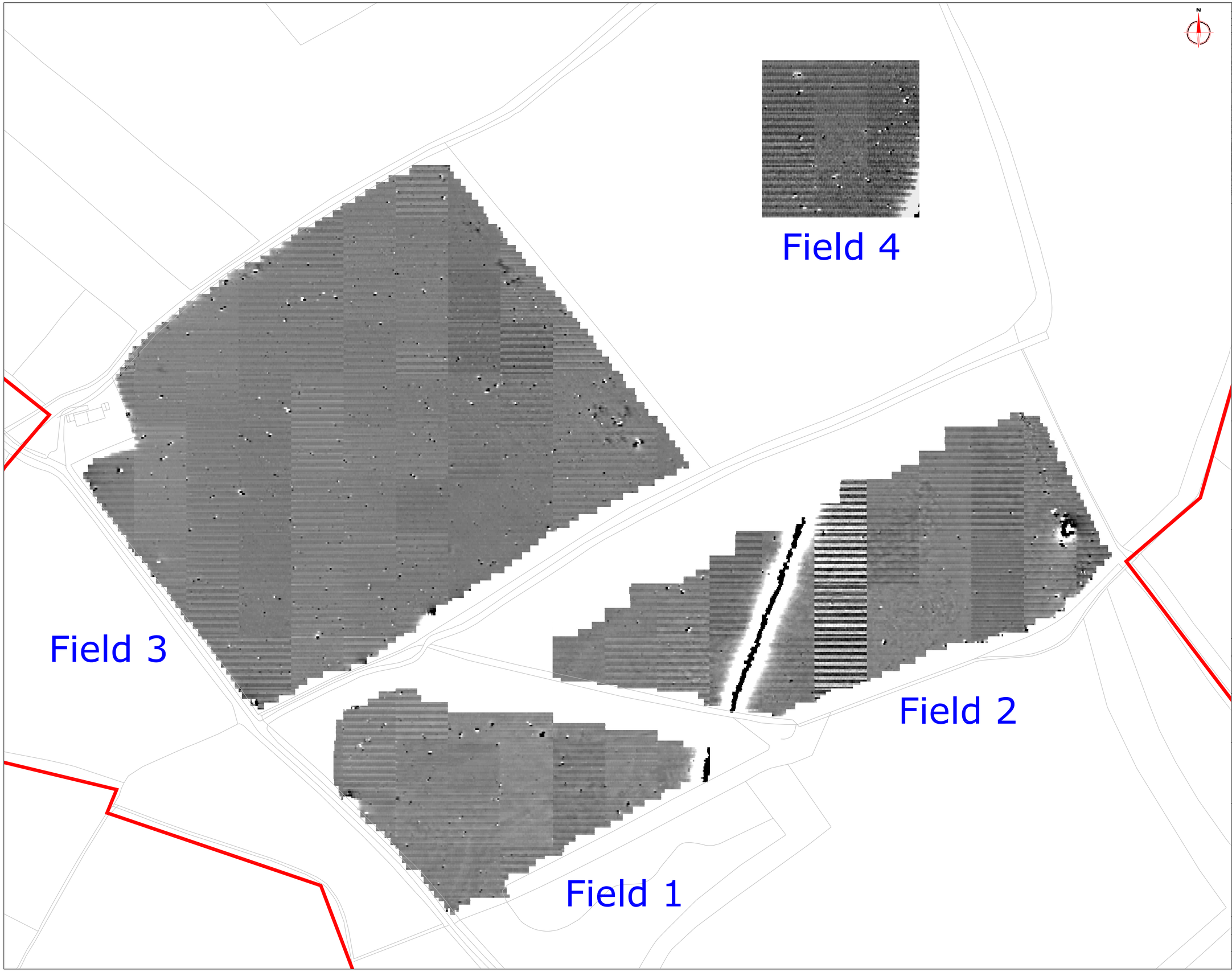
REGISTERED ORGANISATION IFA

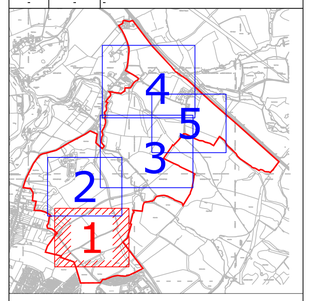
Scale 1:5000 (0m 100 200 300m)

Plot	Checked by	Issue No.
A1	PPB	01
Date	**Drawn by**	**Figure No.**
MAY 08	SDH	03



Amendments

Issue No.	Date	Description
-	-	-
-	-	-



Plotting parameters
Field 1

Maximum +5nT (black)
Minimum -5nT (white)

-3SD +3SD

Plotting parameters
Field 2

Maximum +5nT (black)
Minimum -5nT (white)

-3SD +3SD

Plotting parameters
Field 3

Maximum +5nT (black)
Minimum -5nT (white)

-3SD +3SD

Plotting parameters
Field 4

Maximum +5nT (black)
Minimum -5nT (white)

-3SD +3SD

Plotting parameters
(All fields)

+5nT

-5nT

Job No.	Survey Date
2452	MAR - MAY 08

Client

TERENCE O'ROURKE LTD

Project Title

NORTH WHITELEY, BOTLEY, HAMPSHIRE

Subject

PLOT OF RAW
GRADIOMETER DATA
VIEWPORT 1 FIELDS 1-4

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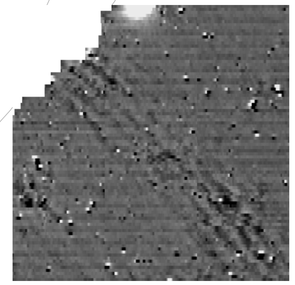
Scale 1:1000 (0m 10 20 30 40 50 60m)

Plot	Checked by	Issue No.
A1	PPB	01
Date	**Drawn by**	**Figure No.**
MAY 08	SDH/RA	04



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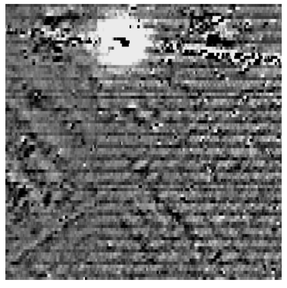
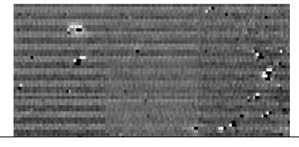
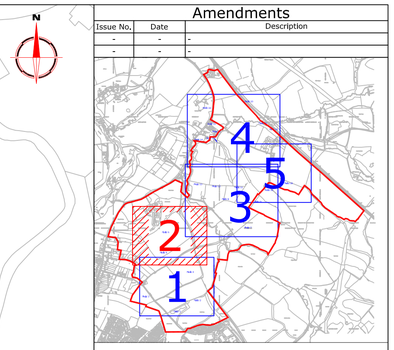


Field 5





Amendments

Issue No.	Date	Description
-	-	-
-	-	-

Plotting parameters
Field 5

Maximum +5nT (black)
Minimum -5nT (white)

-3SD +3SD

Plotting parameters
Field 6

Maximum +5nT (black)
Minimum -5nT (white)

-3SD +3SD

Plotting parameters
(All fields)

+5nT

-5nT

Job No.	Survey Date
2452	MAR - MAY 08

Client

TERENCE O'ROURKE LTD

Project Title

NORTH WHITELEY, BOTLEY, HAMPSHIRE

Subject

PLOT OF RAW
GRADIOMETER DATA
VIEWPORT 2 FIELDS 5&6

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Scale 1:1000 (0m 10 20 30 40 50 60m)

Plot	Checked by	Issue No.
A1	PPB	01
Date	Drawn by	Figure No.
MAY 08	SDH/RA	05