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**LAND AT  
BUNTINGS LANE  
STANGROUND  
PETERBOROUGH  
(SGBL13)**

**GEOPHYSICAL SURVEY**

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**Work undertaken for  
John Martin and Associates,  
on behalf of  
Persimmon Homes East Midlands**

**JUNE 2013**

**Report produced by  
Andrew S. Failes BA (Hons) MA**

**OASIS Ref: archaeo11-154842  
National Grid Reference: TL 2008 9595**



APS Report No: **65/13**

**ARCHAEOLOGICAL  
PROJECT  
SERVICES**



**Quality Control  
Stanground,  
Buntings Lane, Peterborough  
(SGBL 13)**

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## 1. SUMMARY

*Detailed magnetic gradiometer survey was undertaken for Persimmon Homes East Midlands on land south of Buntings Lane, Stanground, Peterborough, in advance of proposed residential development of the area. Four adjacent blocks of land were surveyed which encompassed an area of c. 1.27ha.*

*Magnetometer survey identified three east-west oriented, parallel linear positive anomalies occurring equidistantly from each other. These probably represent cut features in the form of ditches and possibly relate to demarcation of the land during its former use as an allotment garden. A possible curvilinear negative anomaly was identified in Area 1 and may represent a cut feature, however based on form and the variability of response, the interpretation of this anomaly remains uncertain.*

*Magnetic disturbance is present around the eastern and western edges of Area 1 and in the northern part of Area 4. The disturbance at the western edge of Area 1 relates to recent ground disturbance, while fencing was responsible for the readings at the eastern edge. The disturbance in Area 4 was caused by a metal shed and various bits of metal equipment and machinery being stored in this part of the survey site. However, with the exception of occasional metal items in the topsoil there is little indication of modern disturbance across the field as a whole.*

## 2. INTRODUCTION

### 2.1 Definition of an Evaluation

Geophysical survey is a non-intrusive method of archaeological evaluation. Evaluation is defined as 'a limited

*programme of non-intrusive and/or intrusive fieldwork which determines the presence or absence of archaeological features, structures, deposits, artefacts or ecofacts within a specified area or site. If such archaeological remains are present Field Evaluation defines their character and extent, quality and preservation, and it enables an assessment of their worth in a local, regional, national or international context as appropriate' (IFA 2008).*

### 2.2 Background

Archaeological Project Services was commissioned by John Martin and Associates on behalf of Persimmon Homes East Midlands to undertake detailed magnetometer survey on land south of Buntings Lane, Stanground, Peterborough. This was in advance of proposed residential development of the area. The survey was carried out on the 10<sup>th</sup> of June 2013.

### 2.3 Topography and Geology

Stanground is located 1.3km southeast of Peterborough, close to the county boundary with Cambridgeshire (Fig. 1).

The site is located a further 1.7km south of the centre of Stanground as defined by the parish church of St John the Baptist at National Grid Reference TL 2008 9595 (Fig. 2). The site lies to the south of Buntings Lane and west of Farcet Road and encompasses some 1.27 hectares. The survey area is on a slight west facing slope down to the minor watercourse, the Stanground Lode and lies at a height of c. 10.5m OD.

Local soils are of the Hanslope Association, typically calcareous pelosols (Hodge *et al.* 1984, 209). These soils are developed on a drift geology of glacially derived till and glacio-lacustrine sands and

gravels which in turn seals a solid geology of Jurassic Oxford Clay (BGS 1995).

### 3. GEOPHYSICAL SURVEY

#### 3.1 Methods

Location and layout of the survey area is shown in Figure 3. The area comprised four adjacent blocks of land, necessitated by the current layout of small paddocks (Areas 1-4), to the south of Buntings Lane and west of Farcet Road. The survey area encompasses some 1.27 hectares (Fig 3). The land consisted of pasture used to keep horses and was covered in short grass and in good condition for survey.

Survey was undertaken in accordance with English Heritage (2008) and IfA (2011) guidelines and codes of conduct. The survey grid was laid out using differential GPS equipment using Ordnance Survey correction data to allowing accurate positioning and relocation where necessary.

The magnetic survey was carried out using a dual sensor Grad601-2 Magnetic Gradiometer manufactured by Bartington Instruments Ltd. This records subtle changes in the magnetic field resulting from differing features in the soil. Changes as small as 0.2 nanoTesla (nT) in an overall field strength of c. 49,000nT can be accurately detected using this instrumentation, although in practice instrument interference and soil noise can limit sensitivity.

The mapping of anomalies in a systematic manner allows interpretation of the type of material present beneath the surface. Strong magnetic anomalies are generated by buried iron-based objects or by kilns or hearths, usually resulting in a bipolar (positive/negative) response. More subtle

positive anomalies representing pits and ditches can be seen where these contain more topsoil which is normally richer in magnetic iron oxides and provides a contrast with the natural subsoil (but this can vary depending on the nature of the underlying deposits). A negative anomaly may result from upcast bank material. Wall foundations can also show as negative anomalies where the stone is less magnetic than the surrounding soil, or as stronger positive and negative anomalies if of brick, but are not always responsive to the technique. It should be noted that not all features will be responsive and absence of anomalies does not necessarily indicate absence of archaeological features.

Magnetometers measure changes in the Earth's magnetic field. With two sensors configured as a gradiometer the recorded values indicate the difference between two magnetic measurements separated by a fixed distance. The Grad601-2 consists of two high stability fluxgate gradiometers suspended on a single frame with a 1m separation between the sensing elements giving a strong response to deep anomalies.

#### *Sampling interval and data capture*

Readings were taken at 0.25m centres along traverses 1m apart. This equates to 3600 sampling points in a full 30m x 30m grid. The Grad 601 has a typical depth of penetration of 0.5m to 1.0m although a greater range is possible where strongly magnetic objects have been buried in the site.

Readings are logged consecutively into the data logger which is downloaded daily either into a portable computer whilst on site or directly to the office computer. At the end of each job, data is transferred to the office for processing and presentation.

*Processing and presentation of results*

Processing is performed using specialist ArcheoSurveyor software. 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 (Destripe or zero mean traverse). Despiking is also performed to reduce the effect of the anomalies resulting from small iron objects often found on agricultural land. Further processing can then be carried out which may include low pass filtering to reduce 'noise' in the data and hence emphasise the archaeological or man-made anomalies.

The following are the processing techniques carried out on the processed gradiometer data used in this report:

1. DeStripe (sets the background mean of each traverse within a grid to zero and is useful for removing striping effects)
2. Despike (useful for display and allows further processing functions to be carried out more effectively by removing extreme data values)  
Parameters: X radius = 1; Y radius = 1; Threshold = 3SD; Spike replacement = mean
3. Clip (excludes extreme values allowing better representation of detail in the mid range): -3 to 3nT.

**3.2 Results**

The presentation of the data for the site involves a print-out of the raw or minimally processed data as greyscale and trace plots (Figs 4 & 5; clipped for display but otherwise unprocessed), together with greyscale plots of the processed data (Figs 6 & 7). Magnetic anomalies have been

identified and plotted onto an interpretative drawing (Fig. 8) and are described below.

*Linear positive anomalies*

Three faint parallel linear positive anomalies were identified in Areas 1, 2 and 3 (Fig 8) and possibly represent cut features. Although somewhat faint, the parallel alignment and the regular distance between the anomalies suggests these are not the result of natural geology and probably represent ditches, possibly related to the land's former use as an allotment garden. A short curvilinear negative anomaly was also recorded in Area 1 and may represent a cut feature. Although, on the basis of form and the variable nature of the response it is difficult to say with certainty if this is the case.

*Modern/magnetic disturbance*

Strong bipolar responses occur along the eastern, western and northern edges of Area 1 and in the northern end of Area 4 (Fig 8). The strong response on the western edge of Area 1 coincides with a large bank and area of modern ground disturbance. The response along the eastern and northern edge of Area 1 represents fencing (containing a metal component) that occurs along the western side and northern edge of the paddock. The strong response in Area 4 was the result of a metal shed, and various bits of stored metal machinery in the survey area.

*Iron spikes (discrete bipolar anomalies)*

Iron items within the topsoil give a distinctive localised bipolar (strong positive with associated strong negative) response. Such items usually derive from relatively recent management or agricultural use of the land – broken or discarded pieces of agricultural machinery or other modern debris. These are sparsely and scattered across the site (Fig 8).

#### 4. DISCUSSION

Magnetometer survey identified few anomalies of potential archaeological origin. Three parallel linear positive anomalies identified in Areas 1, 2 and 3 and occurring equidistantly from each other probably represent cut features, possibly ditches relating to the land's former use as an allotment garden. A possible curvilinear feature was also identified in Area 1, however the interpretation of this anomaly remains uncertain.

Magnetic disturbance is present around the western, northern and eastern edges of Area 1, indicating the proximity of fencing at the eastern and northern edge of the area and an area of recently disturbed ground at the western edge. A third area of magnetic disturbance in Area 4 represents a metal shed and various bits of stored metal machinery in the survey area. With the exception of occasional metal items in the topsoil there is little indication of modern disturbance across the field as a whole.

#### 5. ACKNOWLEDGEMENTS

Archaeological Project Services wishes to acknowledge the assistance of John Martin and Associates who commissioned the project on behalf of Persimmon Homes East Midlands. Steve Malone (APS) edited the report along with Tom Lane (APS).

#### 6. PERSONNEL

Project coordinator: Steve Malone  
Geophysical Survey: Andrew Failes  
Survey processing and reporting: Andrew Failes

#### 7. BIBLIOGRAPHY

English Heritage, 2008 *Geophysical Survey in Archaeological Field Evaluation*.

Hodge, CAH, Burton, RGO, Corbett, WM, Evans, R and Seale, RS, 1984 *Soils and their use in Eastern England*, Soil Survey of England and Wales **13**

IfA, 2008 *Standard and Guidance for Field Evaluation*.

IfA, 2011 *Standard and Guidance for Geophysical Survey*.

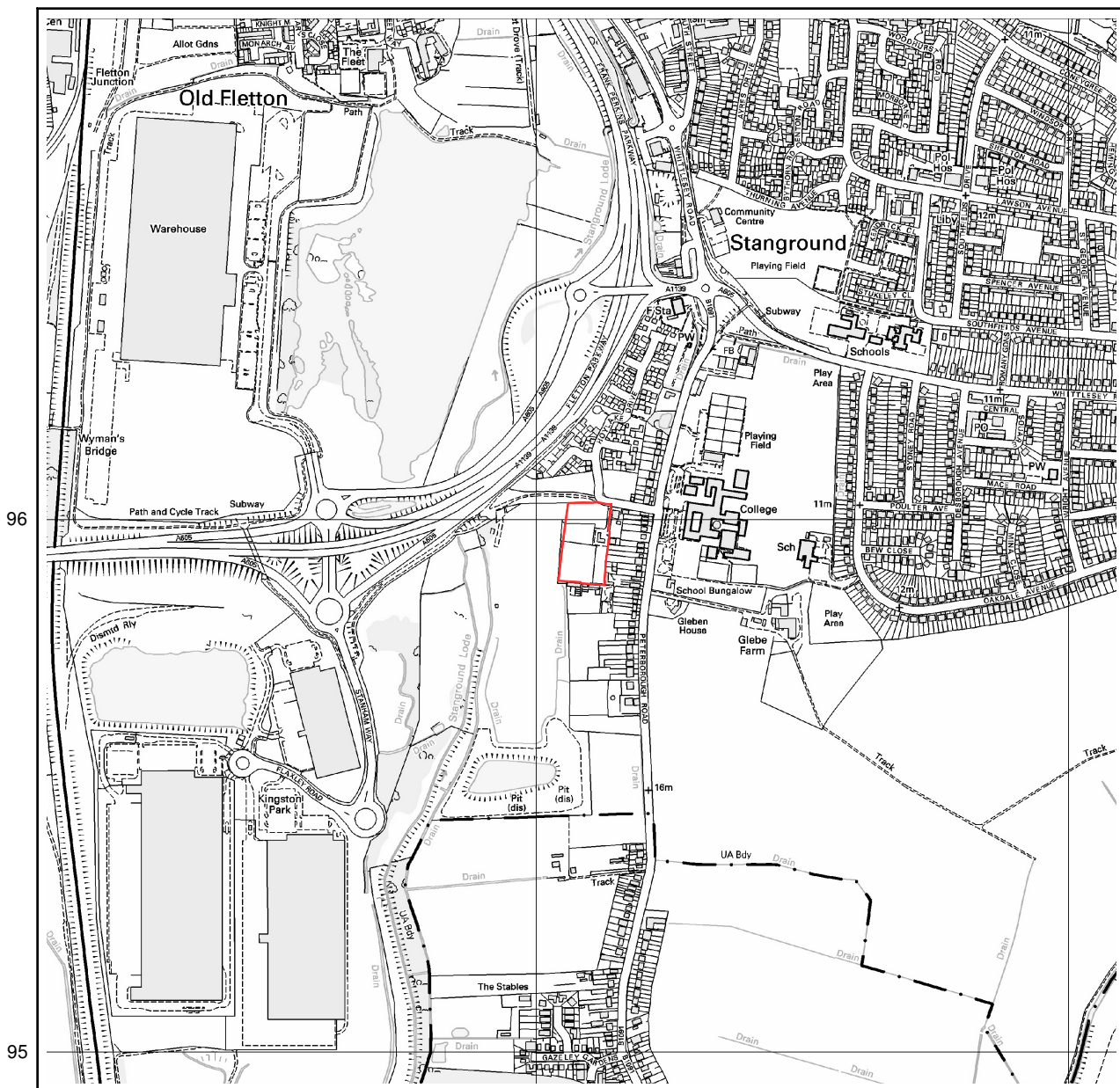
#### 8. ABBREVIATIONS

APS	Archaeological Project Services
BGS	British Geological Survey
IfA	Institute for Archaeologists



Figure 1 General location map






TL

20

21



 Proposed development site

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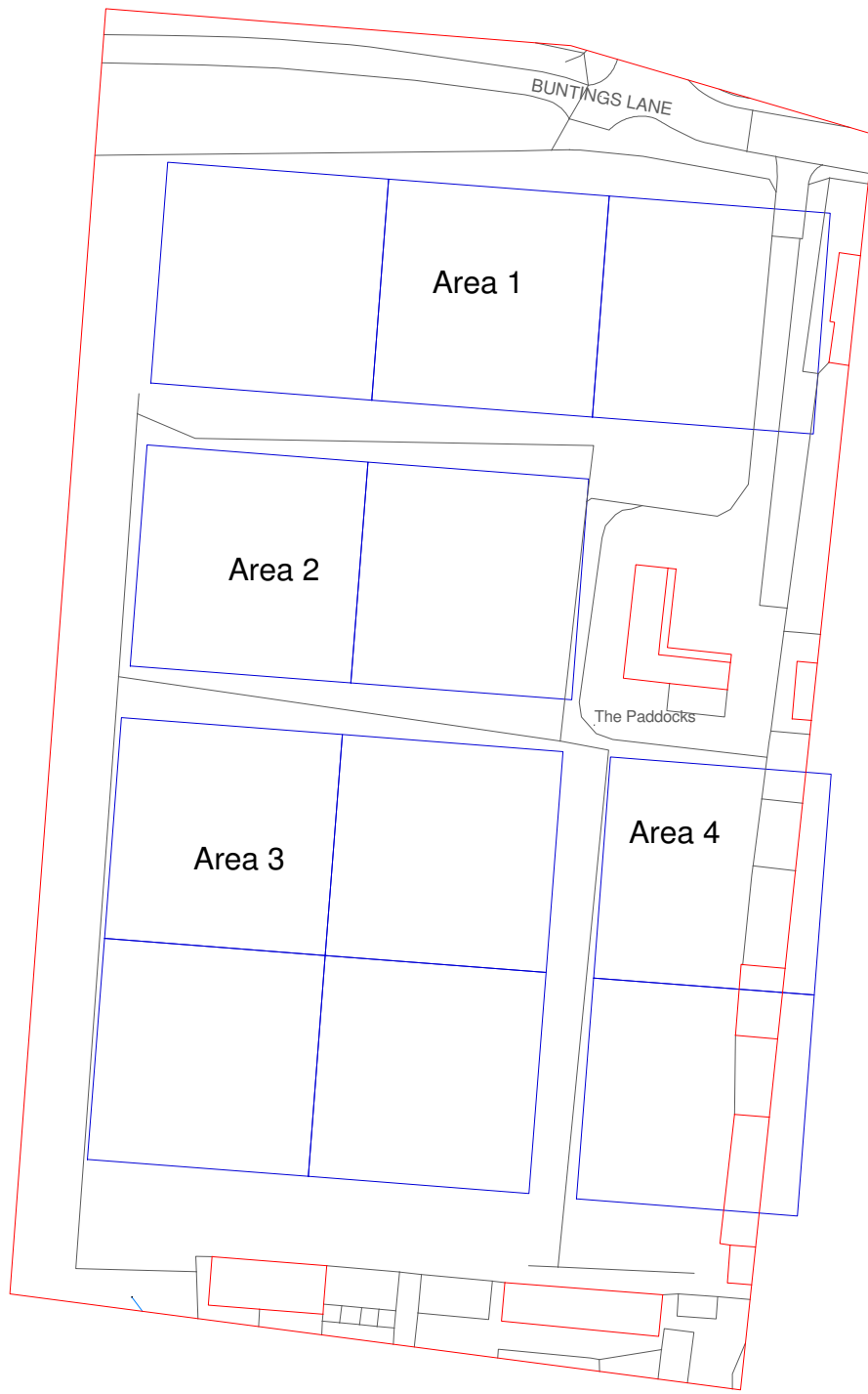
 <b>Archaeological Project Services</b>		
Project Name: Stanground Buntings Lane (SGBL13)		
Scale 1:12500	Drawn by: AF	Report No: 65/13

Figure 2 - Site location map




	Archaeological Project Services		
Project Name: Stanground Buntings Lane (SGBL13)			
Scale 1:1000	Drawn by: AF	Report No: 65/13	

Figure 3 - Location and layout of survey areas

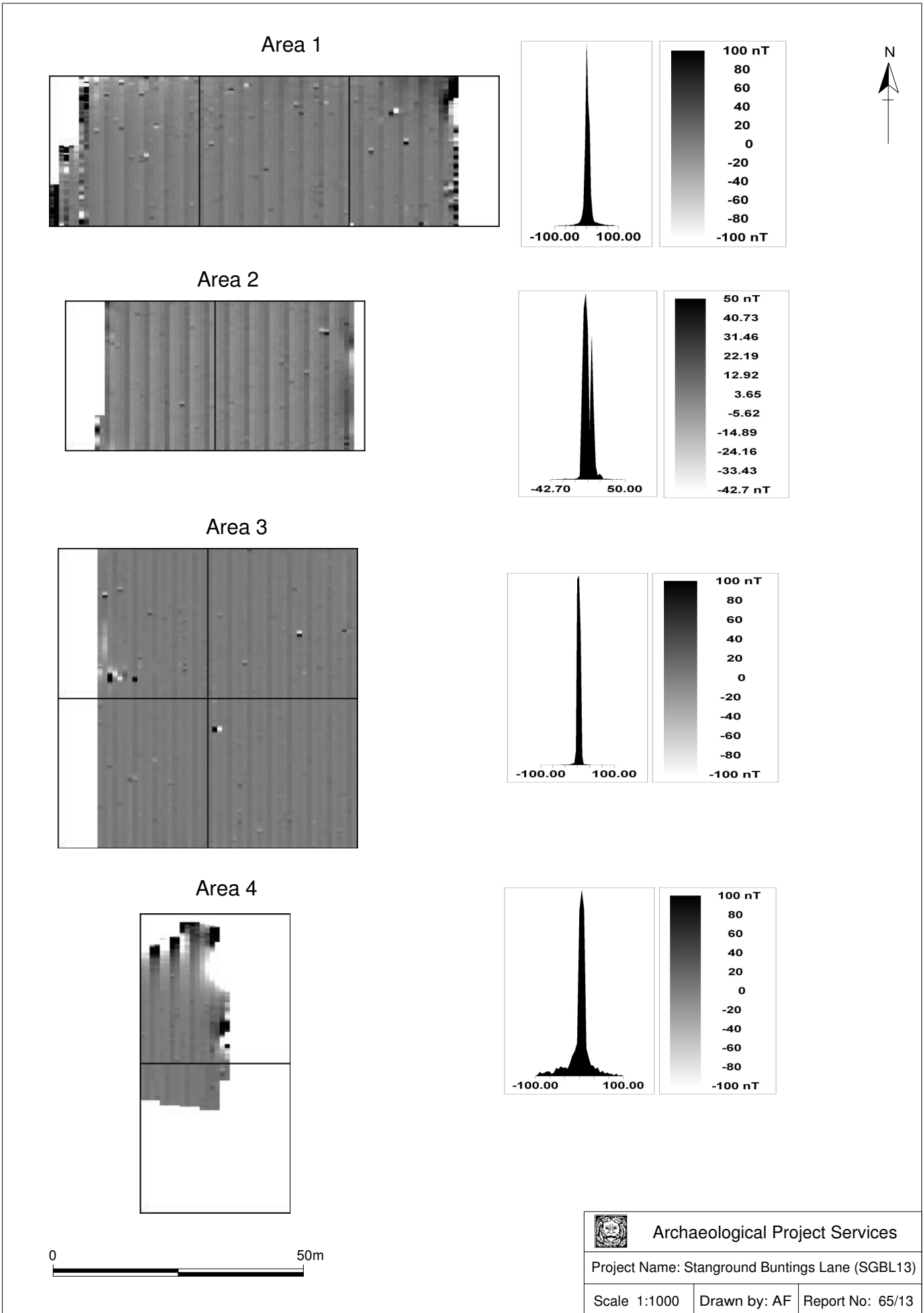


Figure 4 - Minimally processed data grey scale plots of Areas 1-4

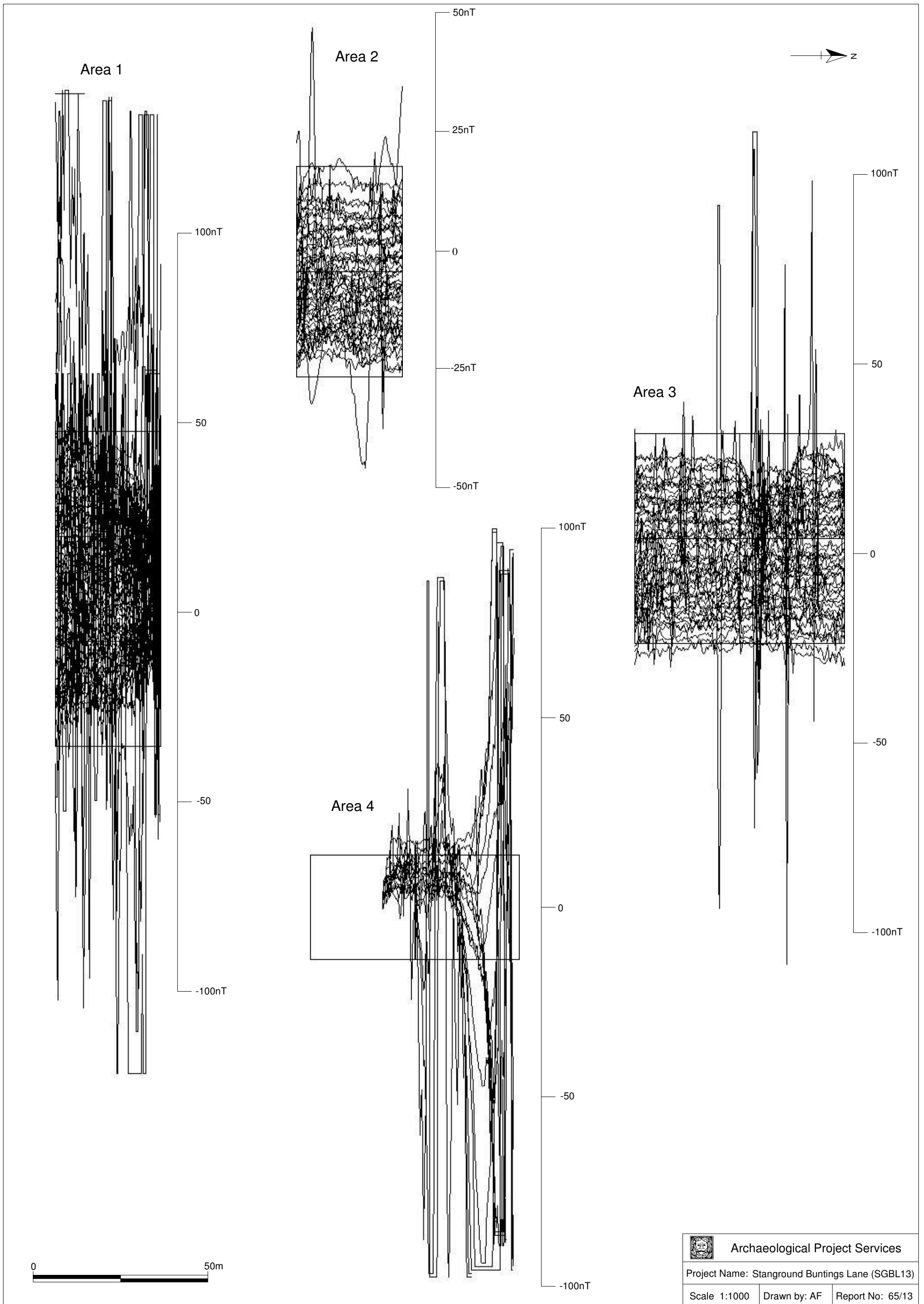


Figure 5 - Minimally processed data trace plots: Areas 1-4

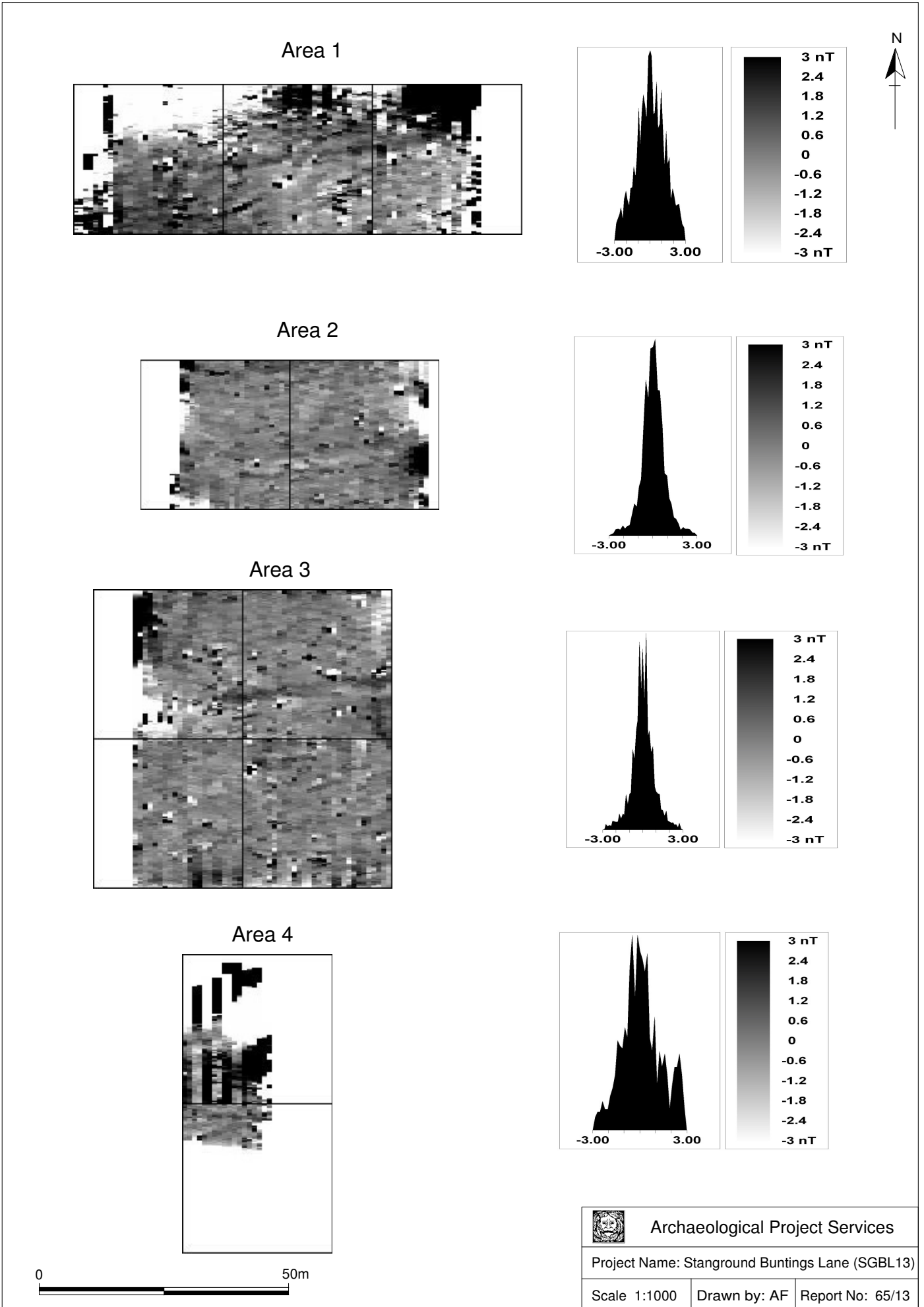


Figure 6 - Processed data greyscale plots: Areas 1-4

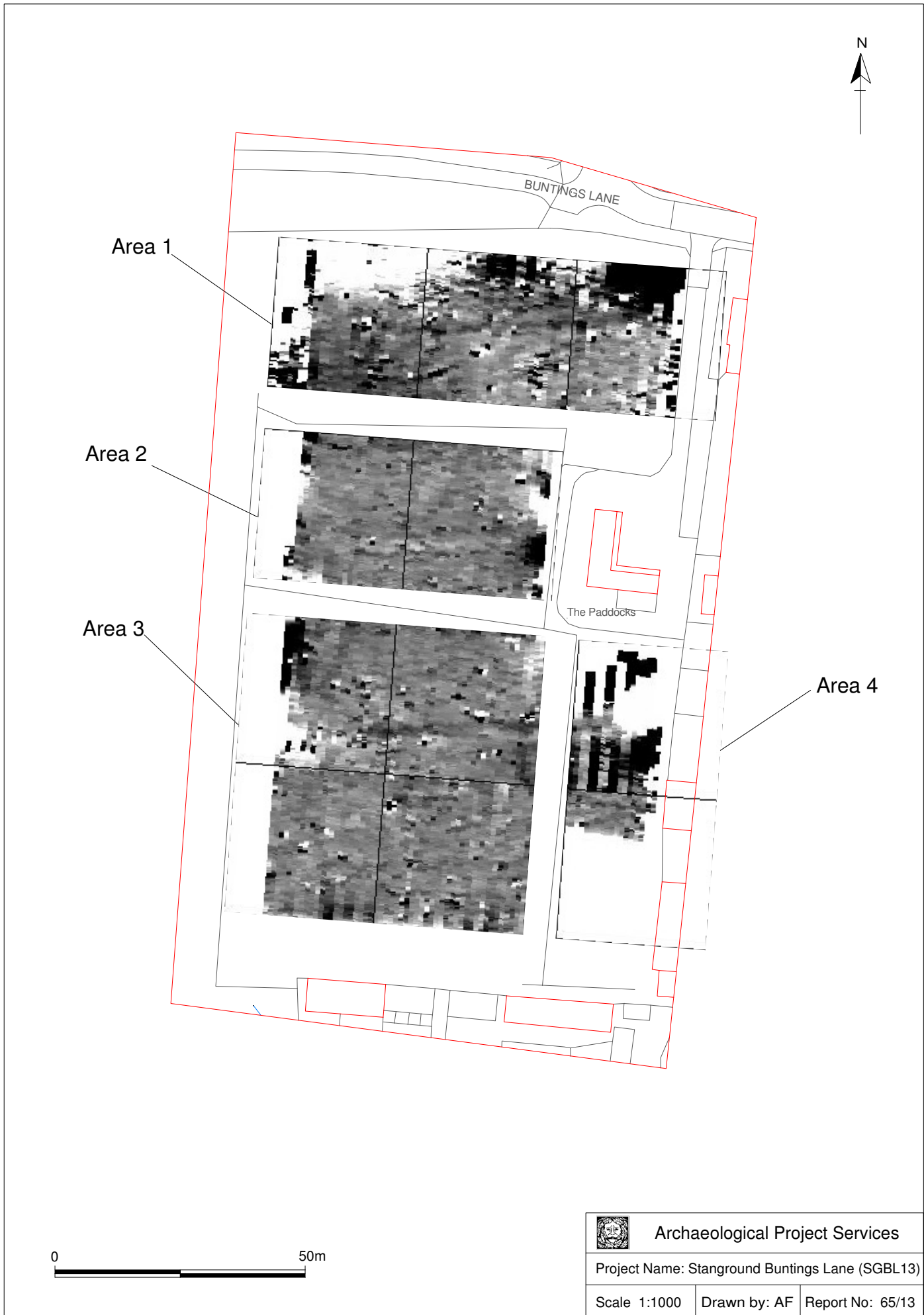
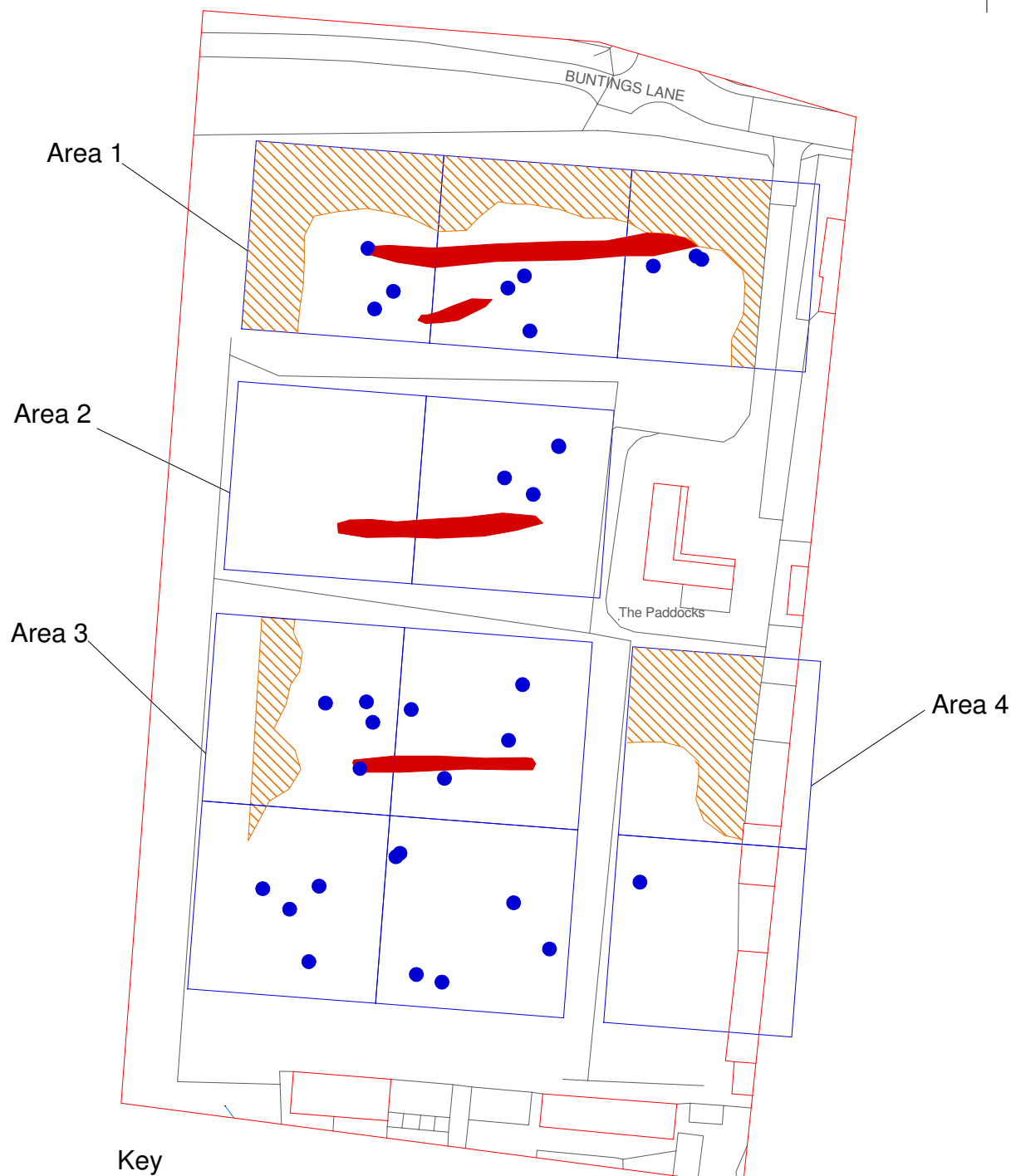


Figure 7 - Processed data greyscale plot overlain on base map: Areas 1-4



Key



- magnetic disturbance



- positive anomaly



- ferrous response

0 50m



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Scale 1:1000

Drawn by: AF

Report No: 65/13

Figure 8 - Interpretative plot: Areas 1-4

# Appendix 1

## THE ARCHIVE

The archive consists of:

- 1 Daily record sheets
- 1 Report text and illustrations
- Digital data

File names	Sgbl13-01.xgd Sgbl13-02.xgd Sgbl13-03.xgd Sgbl13-04.xgd Sgbl13-05.xgd	Sgbl13-06.xgd Sgbl13-07.xgd Sgbl13-08.xgd Sgbl13-09.xgd Sgbl13-10.xgd Sgbl13-11.xgd	Sgbl13c1.xcp Sgbl13c2.xcp Sgbl13c3.xcp Sgbl13c4.xcp
Explanation of codes used in file names	Xgd files are magnetometer grids, named with site code and number in the order surveyed. xcp files are composites containing record of all the data and processes used to produce the end product		
Description of file formats	All files are in plain text xml format with header data defining survey and processing parameters		
List of codes used in files	D indicates a "dummy" value within the composite data		
Hardware, software and operating systems	ArcheoSurveyor 2.5.15 running under Windows 7		
Date of last modification	10/06/13		
Indications of known areas of weakness in data			

All primary records are currently kept at:

Archaeological Project Services, The Old School, Cameron Street, Heckington, Sleaford, Lincolnshire  
NG34 9RW

The ultimate destination of the project archive is:

Peterborough Museum and Art Gallery  
Priestgate  
Peterborough  
PE1 1LF

Site Code:

SGBL13

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