

# Geophiz.biz

**Report on a fluxgate gradiometer survey  
carried out over land to the west of Wolsey Avenue,  
Cawood, North Yorkshire**



**on behalf of PastSearch Archaeology**

**March 2015**

## ***Table of Contents***

Table of Contents .....	2
1 Table of figures.....	2
2 Report information .....	3
3 Summary .....	3
4 Methodology.....	3
4.1 Technique .....	3
4.2 Area surveyed.....	4
5 Geology .....	4
6 Gradiometer results and interpretation .....	5
6.1 Magnetic anomalies .....	5
6.2 Interpretation and discussion of anomalies .....	5
6.3 Linear anomalies.....	5
7 Conclusions .....	7
8 Bibliography .....	7
9 Appendix One - A3 geophysical survey plot .....	8

### ***1 Table of figures***

Figure 1 Area surveyed (in red) on 1 <sup>st</sup> Edition Ordnance survey map.....	4
Figure 2 Dipolar anomalies in magnetic data .....	5
Figure 3 Greyscale data plotted on 1 <sup>st</sup> Edition map using OS coordinate system .....	6
Figure 4 All interpreted anomalies .....	7
Figure 5 Geophysical survey data on 1 <sup>st</sup> Edition Ordnance survey map .....	8

## 2 Report information

Client	PastSearch Archaeology
Report type	Fluxgate gradiometer survey
Town	Cawood
County	North Yorkshire
Central grid reference	SE 56838 37533
Report number	GB 025
Site code	Site 614
Date of fieldwork	10-11/03/2015
Date of report	15/03/2015
Fieldwork personnel	James Lyall MA (Hons), MSc
Report by	James Lyall MA (Hons), MSc
Produced by	Geophiz.biz

## 3 Summary

3.1.1 James Lyall (of Geophiz.biz) was engaged by Karen Adams of PastSearch Archaeology, on behalf of Brian Scott Designs acting for Mr D. Pulleyn, to undertake a fluxgate gradiometer survey over land to the west of Wolsey Avenue, Cawood, North Yorkshire.

3.1.2 The work has been undertaken to inform a planning application for erection of residential development, creation of access road and associated public open space, in accordance with guidance contained within the National Planning Policy Framework (NPPF; 2012) and the written scheme of investigation (Lyall 2015).

3.1.3 The survey detected 4 linear anomalies, one of which could be directly related to an old field boundary. The remainder of the anomalies are most likely to be drainage features.

## 4 Methodology

### 4.1 Technique

4.1.1 The survey was conducted using a *Foerster Ferex 4.032 DLG* fluxgate gradiometer 4-probe array. This machine is capable of high resolution data collection, and takes readings every 10cm along the traverse axis and every 50cm along the grid axis (thus achieving 18000 readings per 30m square). The machine collects data within a 0.2 nT (nanoTesla) sensitivity range. Because the cart uses a real time kinematic GPS to position itself, each data point of the survey has an inbuilt sub 2cm accuracy.

4.1.2 Survey in the field, report production and archiving were conducted and prepared using the most up to date guidelines, as laid out in David et al (2008) and Schmidt (2013).

4.1.3 The data from the magnetometer has been processed and presented using G-Sys (a proprietary Geographic Database Management program which can also display, process and present digitised plans and images). This report was produced using Microsoft Word 2010 and Adobe Photoshop 7 for further image manipulation. All maps have north pointing to the top of the page, and Google Earth images are used for background map location for some of the figures.

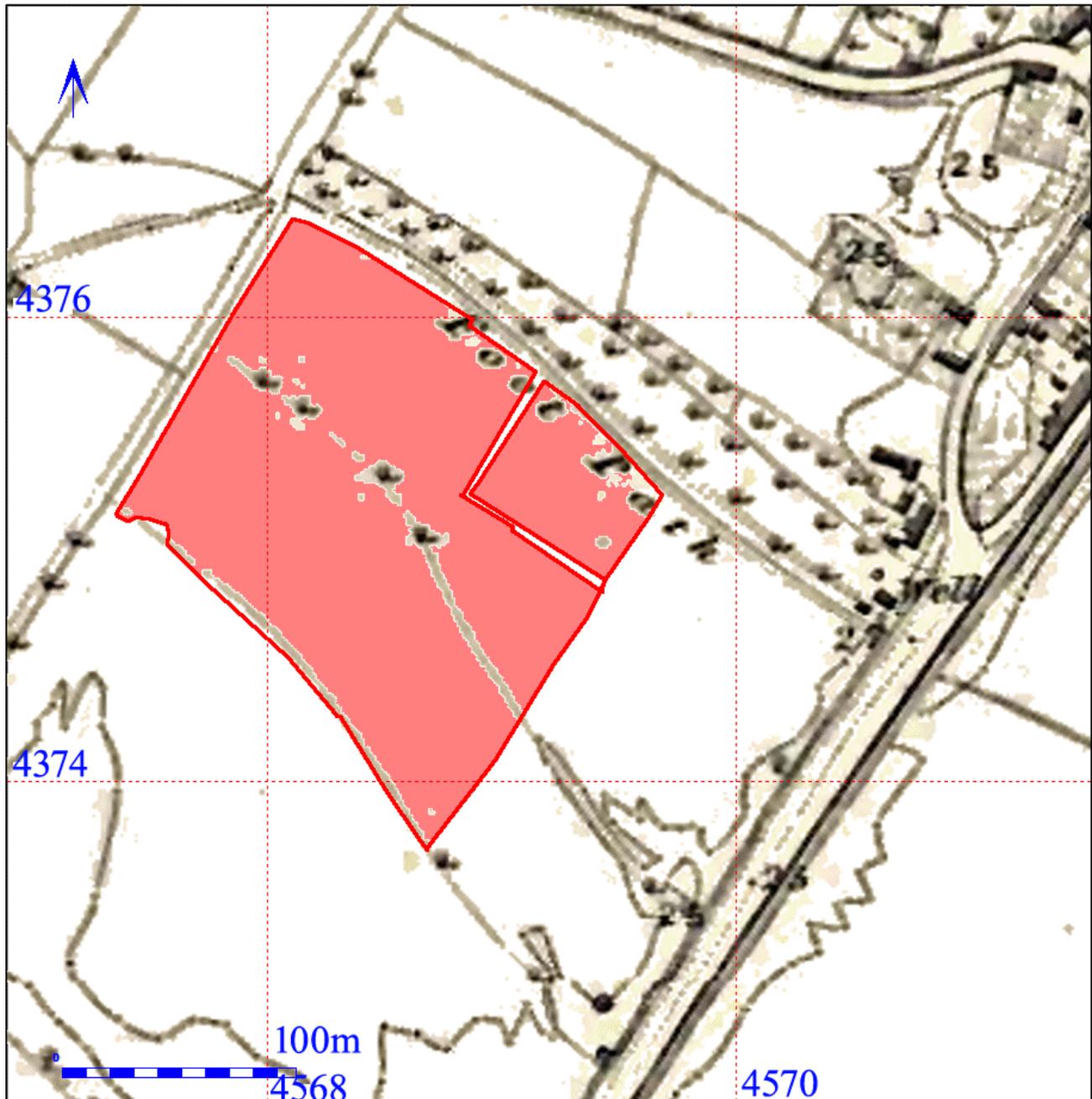
### 4.2 Archaeological background

4.2.1 In a letter from the NYCC (reference number 8035 MP CNY13248), it is stated that "The proposed development lies in an area of archaeological interest. Crop marks of ditched enclosures of probable Roman date have been recorded by English Heritage National Mapping Programme for the Vale of York and on PastScape (UID numbers 1324830, 1324940, 1322801 and 13245047). These features lie within a distance of

between 700m to 1km to the north-west and south of the application area. In addition, during excavations in 1933/4 at the former brick and tile works approximately 600m to the north, Roman remains were found comprising ditches containing Roman roof tile and a pottery assemblage from the 3<sup>rd</sup> to the 4<sup>th</sup> century. The finds indicate the site of a Roman settlement or a possible villa (Pastscape UID No 56251). Therefore the proposed development sits within a landscape of Roman activity. Metal detecting finds of Roman and Medieval date have been recorded within the application area, and in the adjacent fields, indicating the potential for further activity dating from the Roman period or later in the vicinity.

### 4.3 Area surveyed

4.3.1 The area surveyed was a modern field, with the north-eastern part of the field now fenced off as a paddock (see Figure 1).



4.3.2

Figure 1 Area surveyed (in red) on 1<sup>st</sup> Edition Ordnance survey map

## 5 Geology

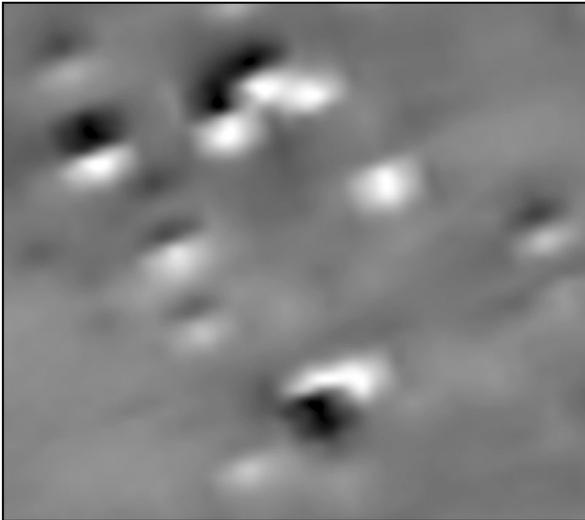
5.1.1 The underlying solid geology is part of the Sherwood Sandstone group, comprising sedimentary bedrock (sandstone) formed approximately 229-271 million years ago in the Triassic and Permian periods.

5.1.2 The superficial deposits are part of the Brighton Sand Formation, formed up to 2 million years ago in the Quaternary Period, in a local environment previously dominated by ice age conditions. (source <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>).

## **6 Gradiometer results and interpretation**

### **6.1 Magnetic anomalies**

6.1.1 Features discovered by magnetic survey techniques are referred to as "anomalies", defined as such because they are different from the background magnetic norm. All magnetic survey plots relating to the current survey are plotted with a scale of  $\pm 5$  nanoTesla (nT).



6.1.2 The large and small black and white areas in the greyscale images (see Figure 2) are dipoles (iron spikes), which indicate the presence of iron or steel objects. These are generally found in the topsoil, and although they could signify the presence of archaeological objects, it is much more likely that they relate to more modern detritus, such as broken ploughshares, iron horseshoes, shotgun cartridges etc.

**Figure 2 Dipolar anomalies in magnetic data**

### **6.2 Interpretation and discussion of anomalies**

6.2.1 The survey data is plotted as a greyscale image on Figure 3 and as a digitised interpretation of anomalies on Figure 4, where a small number of linear anomalies are identified.

### **6.3 Linear anomalies**

6.3.1 All of the anomalies in area 1 were linear, although they were two different characters.

6.3.2 Anomaly 1 is a positive, slightly curving anomaly, which appears to stop in the central part of the field. A quick perusal of the 1<sup>st</sup> Edition Ordnance Survey map (published 1852) shows that the anomaly is caused by the remains of a now removed field boundary (see Figure 1 and Figure 4). The western part of anomaly 2 seems to follow this field boundary, although in the east anomaly 2 is located to the north of the old field edge.

6.3.3 Anomalies 2, 3 and 4 are all similar in magnetic character, all being very weakly positive. Anomaly 4 is slightly different, and exhibits some of the characteristics of a clay field drain, although not along its entire length. It seems most likely that all three of these anomalies relate to the presence of some form of drainage.

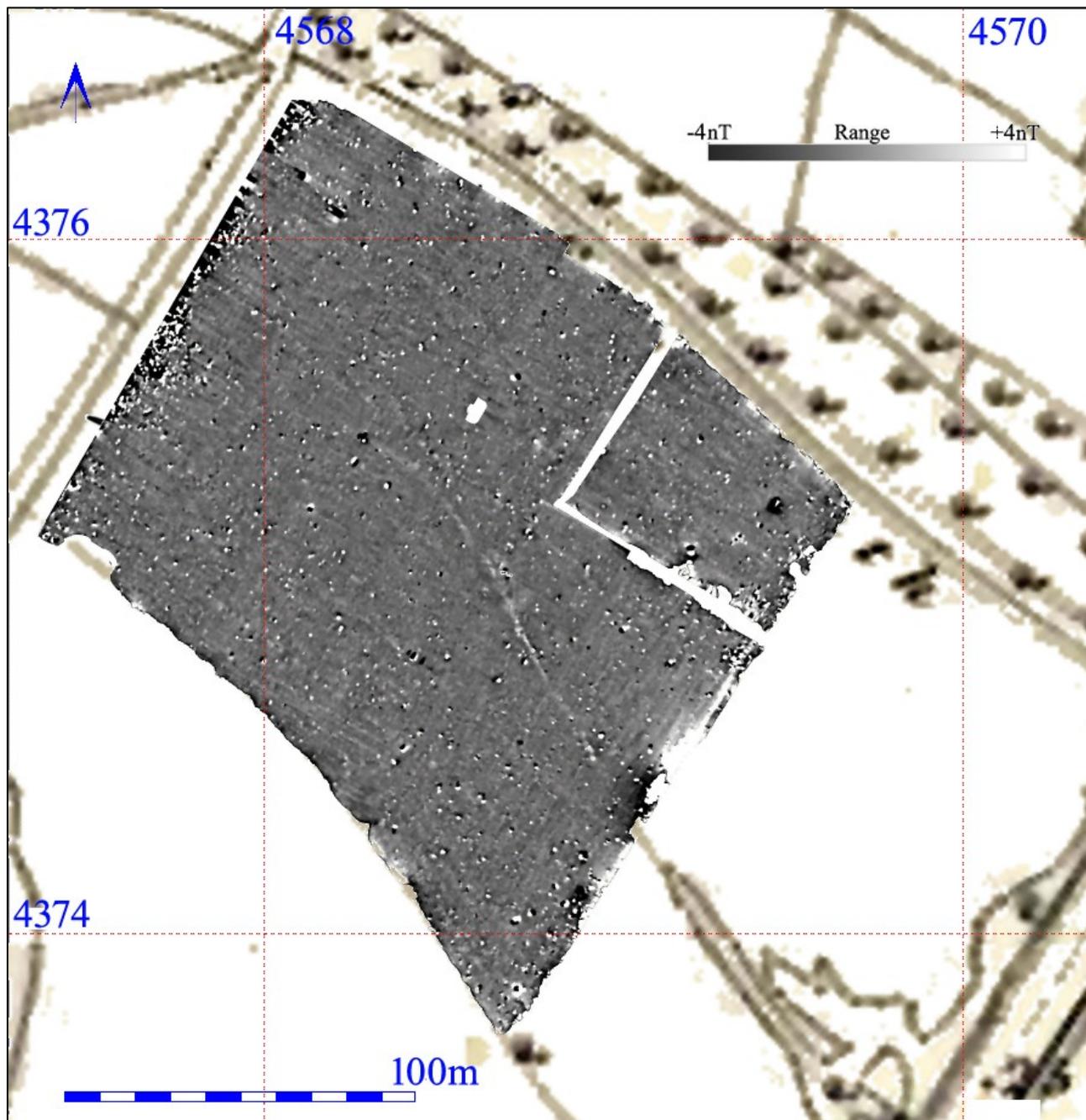


Figure 3 Greyscale data plotted on 1<sup>st</sup> Edition map using OS coordinate system

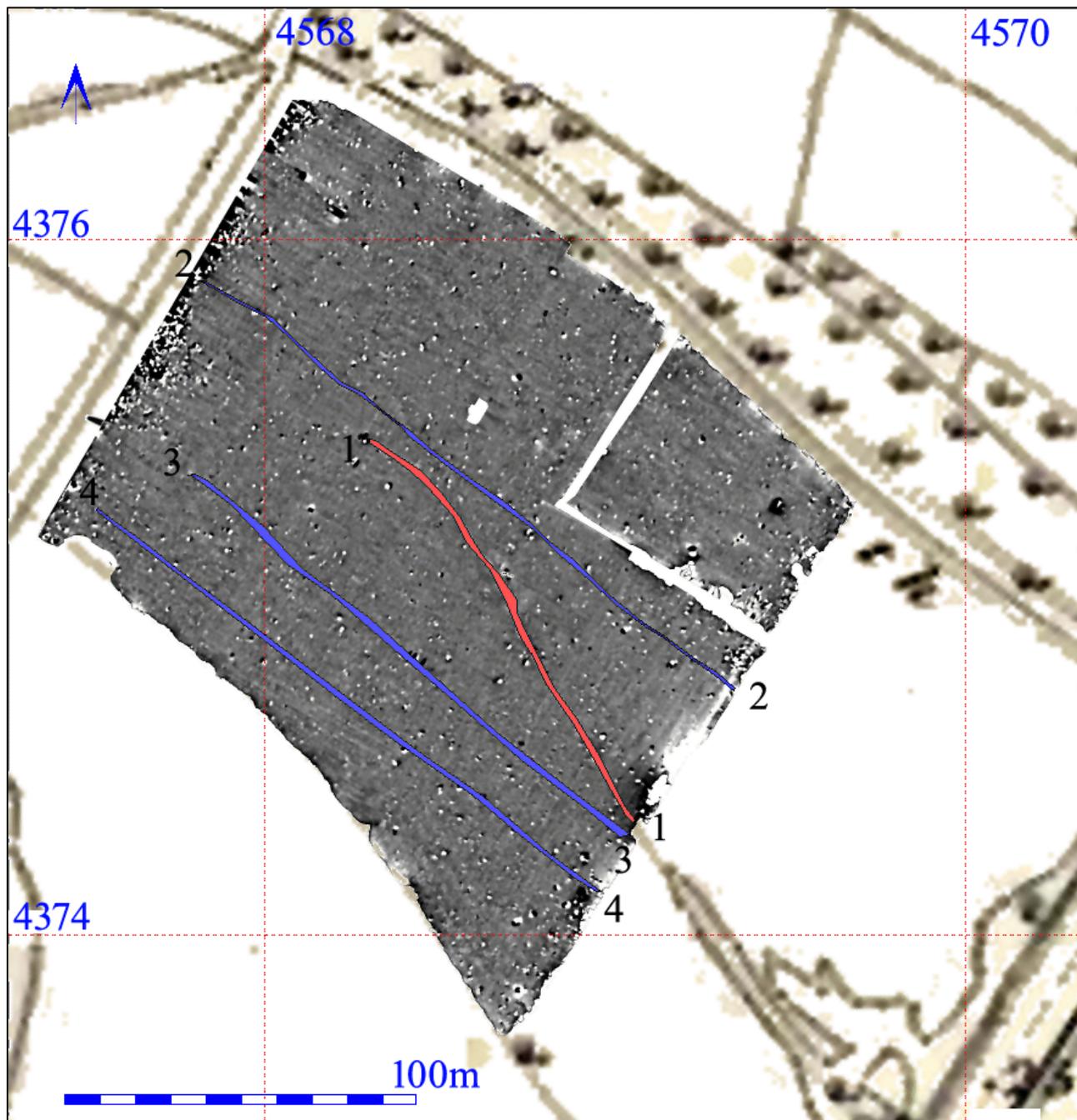


Figure 4 All interpreted anomalies

## 7 Conclusions

7.1.1 In conclusion, it can be stated that the geophysical survey was successful in identifying four anomalies, all of which were linear in character.

7.1.2 One of the anomalies relates to the presence of an old field boundary, while the remaining three appear most likely to be drainage features.

## 8 Bibliography

David, A. et al, 2008. Geophysical Survey in Archaeological Field Evaluation (2<sup>nd</sup> edition). English Heritage Publishing.

Lyll, J. 2015. Written Scheme of Investigation for a magnetic geophysical survey to be carried out over land to the west of Wolsey Avenue, Cawood, North Yorkshire. (Unpublished written scheme of investigation, Geophiz.biz)

Schmidt, A. 2013. Geophysical Data in Archaeology: A Guide to Good Practice (2<sup>nd</sup> edition).

9 Appendix One - A3 geophysical survey plot

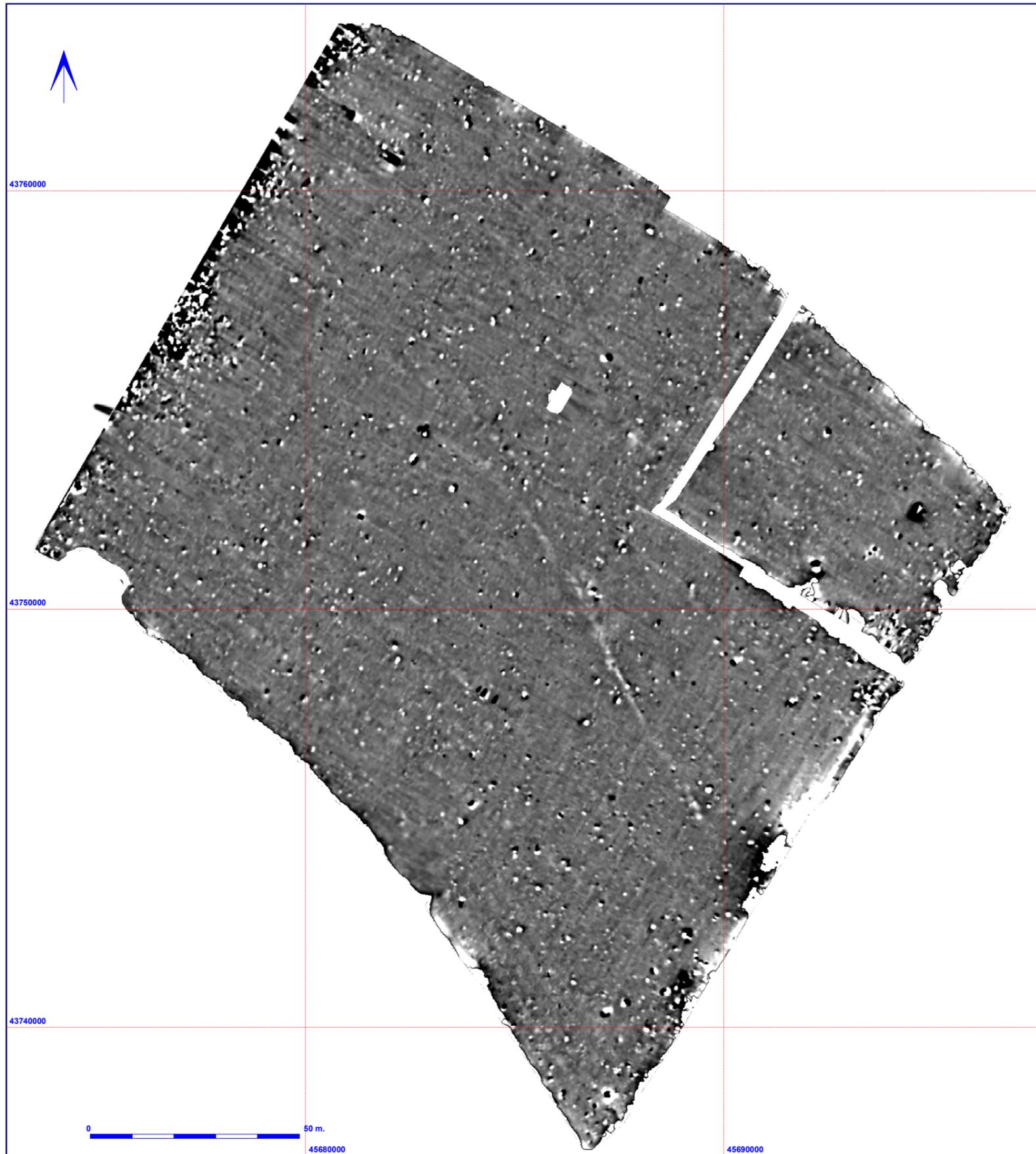


Figure 5 Geophysical survey data on 1<sup>st</sup> Edition Ordnance survey map