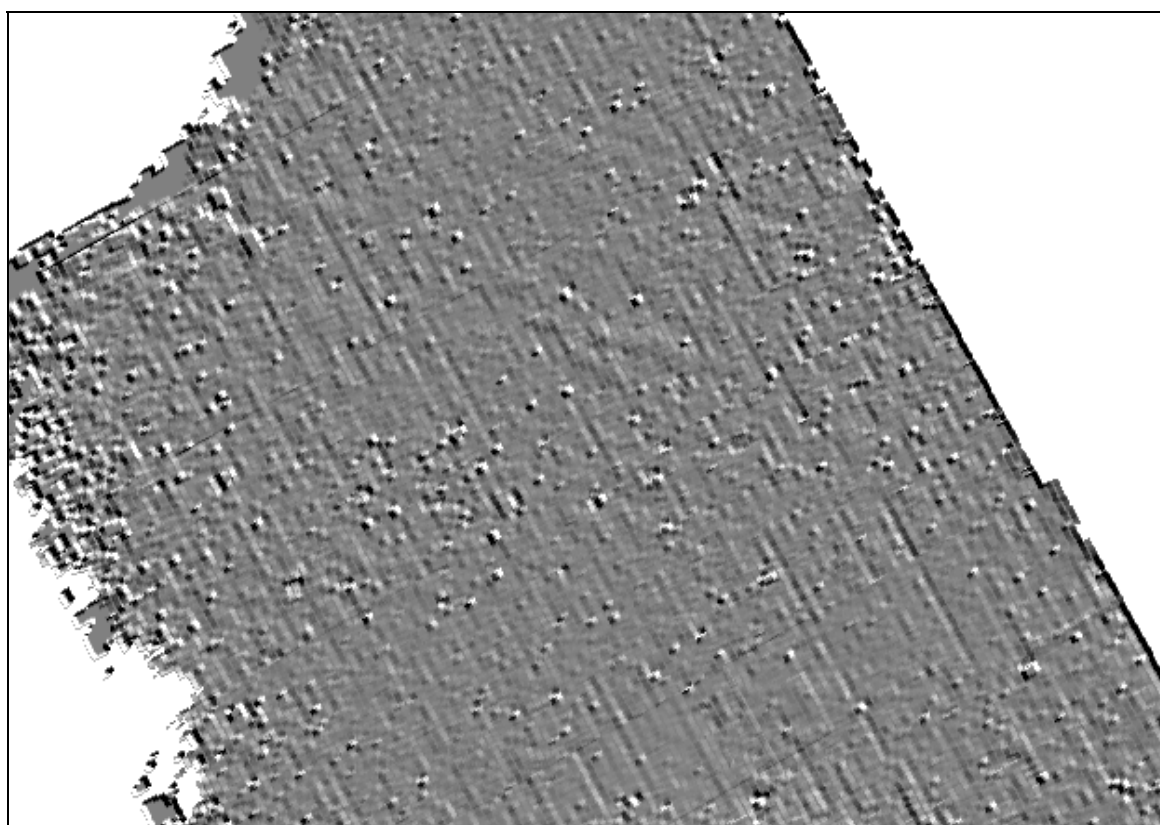


# The Landscape Research Centre

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## Fluxgate Gradiometer Report



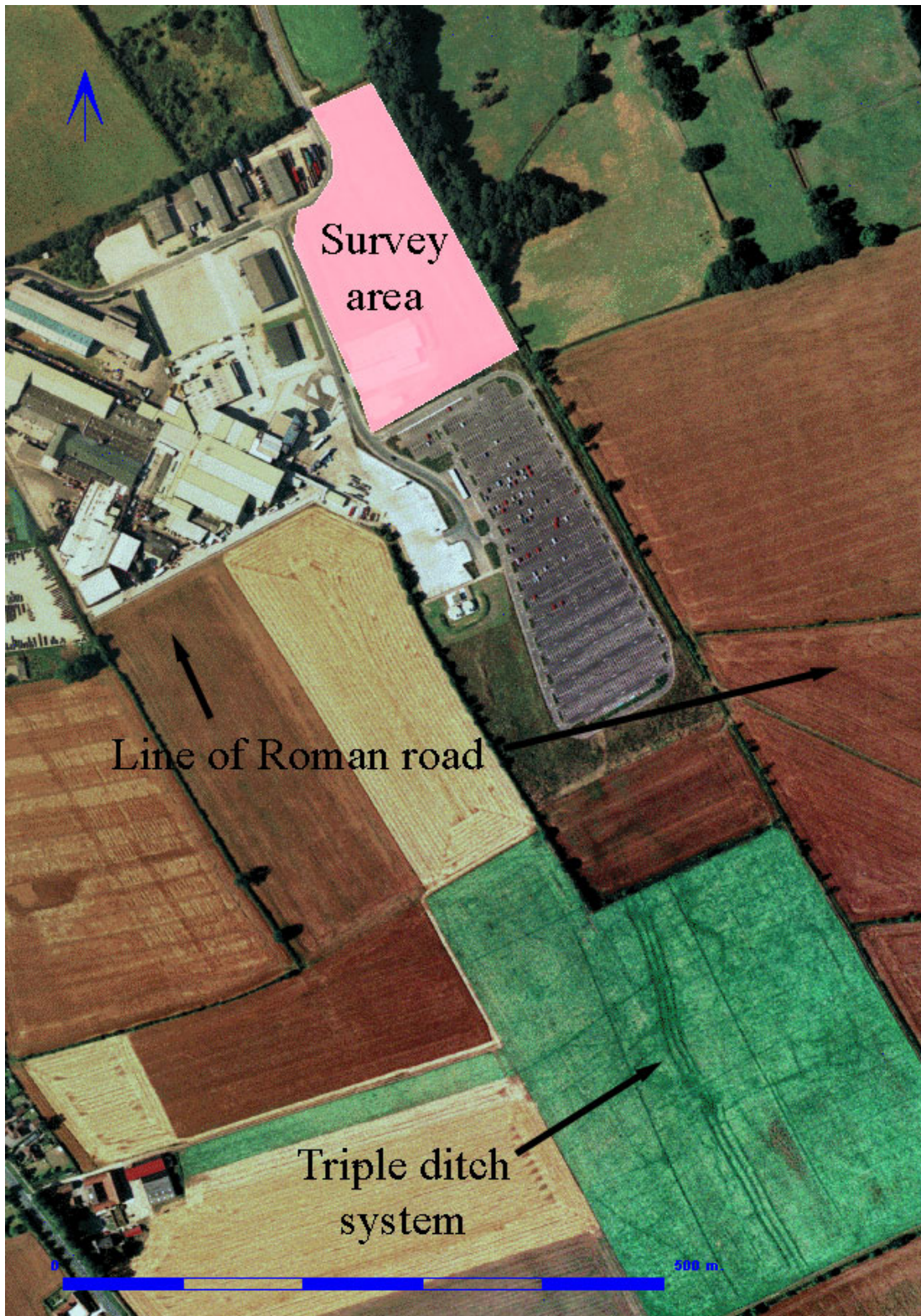
Project Name : Norton, Hugden Way Site 238

Date: 13 November 2006



## Summary

The Landscape Research Centre (LRC) carried out a fluxgate gradiometer survey on behalf of MAP Archaeological Consultants on a site to the east of Hugden Way, Norton, North Yorkshire. The surveyed area is centred around National Grid Reference SE 80524/71580, and is significant because of the presence of a triple ditch system and a Roman road, both located to the south of the site (see Figure 1). The magnetic response of the site was generally low, with only 13 anomalies detected, of which only 3 are of potential archaeological significance.



**Figure 1** Cropmarks of known sites to the south of the survey area (from Getmapping data)



## Methodology

The survey was conducted using a *Bartington Grad 601-2* fluxgate gradiometer. The zigzag traverse method of survey was used. The survey was conducted by taking readings every 25cm along the north-south axis and every metre along the east-west axis (thus 3600 readings for each 30m by 30m grid). The sensitivity of the machine was set to detect magnetic variation in the order of 0.1 nanoTesla. The data has been processed and presented using the programs G-Sys (an in-house developed Geographic Database Management program which can also display, process and present digitised plans and images). This report was produced using Microsoft Word 2000 and Adobe Photoshop 6 for further image manipulation. The background aerial photograph (see Figure 1) is from the Getmapping.com website.

The survey was carried out on the 10<sup>th</sup> and 13<sup>th</sup> of November, 2006. The field was covered in rough, low vegetation, which did not adversely affect data collection. The area surveyed was bounded on the north by Priorpot Beck, to the east by a wooded area (and also a drainage ditch in the south-east), to the south by some trees and a bund, and to the west by Hugden Way.



**Figure 3 Mound of grassed over soil**

Obstacles encountered were an industrial unit located in the south-western quadrant of the site (see Figure 2) and a mound of soil in the north-western corner (see Figure 3).

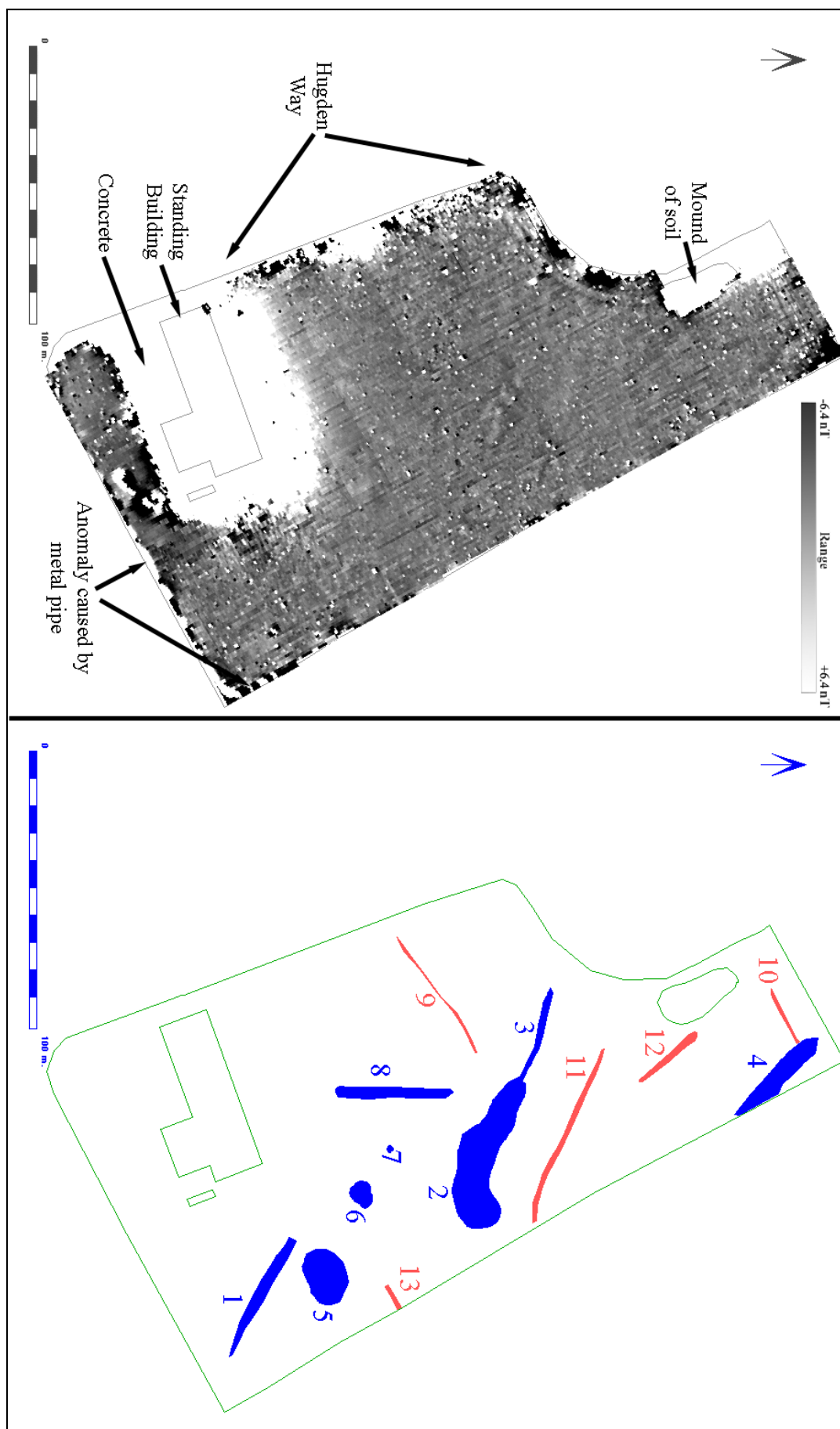


**Figure 2 Industrial unit**

The surveyors were James Lyall and Chris Fern. The total area of the field to be surveyed was 2.9 hectares. Because of the obstacles noted above, the actual area surveyed was 2.4 hectares.

The survey data has been geo-referenced, to allow a correlation of the geophysical anomalies with any archaeological features detected. This was done by tying in the north-west and south-eastern corners of the survey with the nearest field boundaries, using a map provided by the client (Minster Industrial Properties).

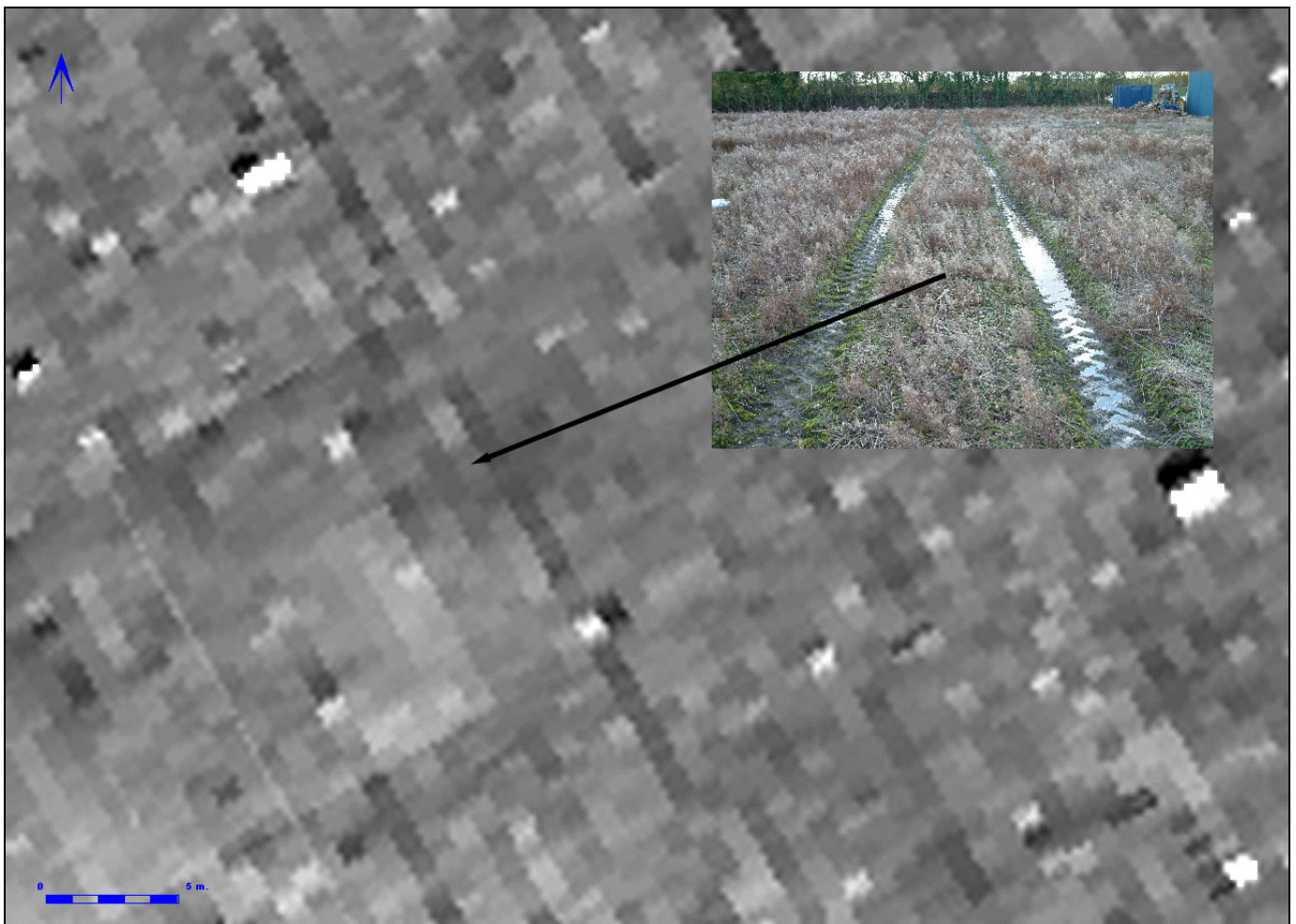
## Gradiometer Results and Interpretation



**Figure 4** A georeferenced greyscale image of the survey data, with interpretation on the left (blue probably geological, and red potentially archaeological, but see discussion below)

The survey results will be discussed using anomaly numbers. The results of the survey are displayed in two ways, both as a greyscale image and as an interpretive plan (see Figure 4). The greyscale image indicates both positive and negative magnetic anomalies, which are displayed as lighter and darker areas in the greyscale image. Also included is an A4 sheet of the survey results (Figure 6) at a scale of 1:1000.

The strongest anomalies (seen as large areas of black and white) have not been included on the interpretation plan, because they are of an obviously modern origin. These include the part of the survey which runs parallel to the existing roads (Hugden Way to the west and Westfield Way to the north) and the strong anomaly which runs along the southern and south-eastern edges of the surveyed area, which is almost certainly an iron water pipe (see Figure 4). The two large anomalies to the south of the standing structure are also caused by modern activity. The scatter of small black and white anomalies (or dipoles) which can be seen across the survey data relate to the presence of small iron or steel objects. Almost invariably these will be of either recent or modern origin: such as broken ploughshares, horse shoe fragments, spent shotgun cartridges and other modern detritus. A number of negative linear anomalies on the same alignment as the eastern field boundary can also be seen in the greyscale image. These are caused by the presence of wheel ruts in the surveyed area (see Figure 5).



**Figure 5** Wheel ruts in the magnetic data

A number of weakly positive anomalies are present (1,2 3 and 4), roughly NW-SE aligned, which are probably of either a geological or alluvial origin. Anomaly 8 is a similar type of feature, though on a different alignment. Anomaly 2 appears to be made up of a series of discrete areas rather than a single event.

Anomalies 5 to 7 are discrete (that is they are not linear), although because their edges are diffuse rather than well-defined it is unlikely that they are archaeological in origin. Anomaly 5 is slightly different in

that it appears to be made up of a number of anomalies rather than a single event, but because of the very weak magnetic response it is not possible to interpret these anomalies with any great degree of certainty.

Anomaly 9 is a weakly positive linear anomaly, extending out from the western edge towards the centre of the surveyed area. The narrow width (between 25 and 50cm) of this anomaly indicates a relatively modern origin.

Anomaly 10 is a negative (darker) anomaly parallel with the northern boundary of the field. This location, together with the magnetic strength, suggest a modern agricultural function.

Anomaly 11 is a negative anomaly on a similar alignment to anomalies 1-4. This could indicate a natural origin, although the size and length of this anomaly indicate that it is of possible archaeological interest.

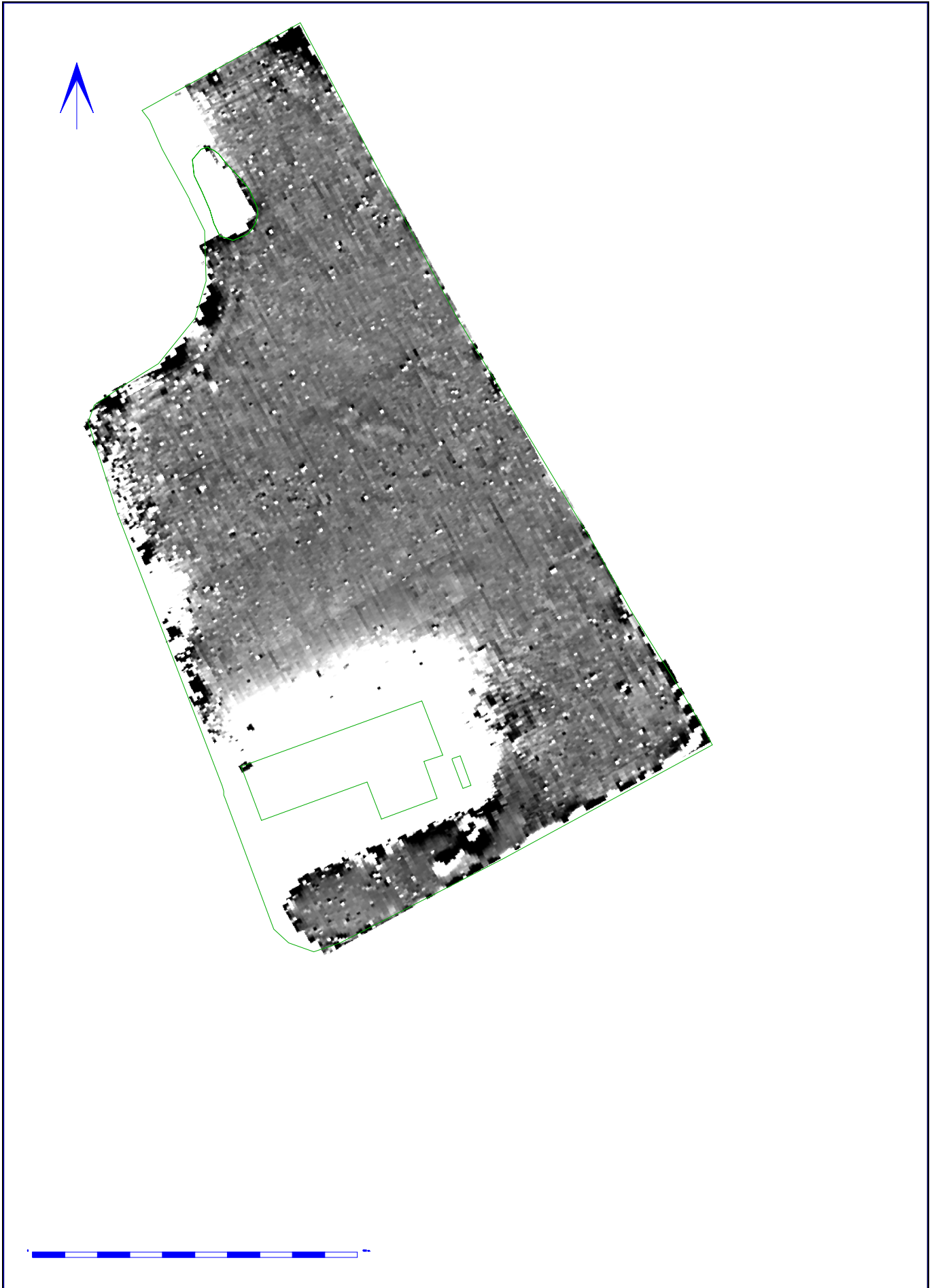
Anomaly 12 is a positive magnetic anomaly on a different alignment to all of the other features detected in the survey. It is thus of potential archaeological significance, possibly a ditch or boundary.

Positive anomaly 13 extends some 10 metres out from the eastern boundary of the site. It may relate to some form of drainage, but it is 16 metres to the north of where the modern drainage ditch is located, and thus could indicate the position of a ditch of archaeological significance.

## **Conclusions**

In conclusion, it can be stated that although the magnetic response of the site was low, a number of anomalies were detected. That being said, the very weak magnetic response of the site makes interpretation difficult, and only three anomalies of potential archaeological significance were identified. No trace of the triple ditch system known to occur 440 metres to the south were detected within the surveyed area. However, the low magnetic susceptibility of the area means that the possibility of archaeological features being present, but remaining undetected by magnetic methods, must be considered, as features have to be filled with material which is magnetically different from the surrounding subsoil in order to be detected.





**Figure 6** The geophysical survey at a scale of 1:1000