

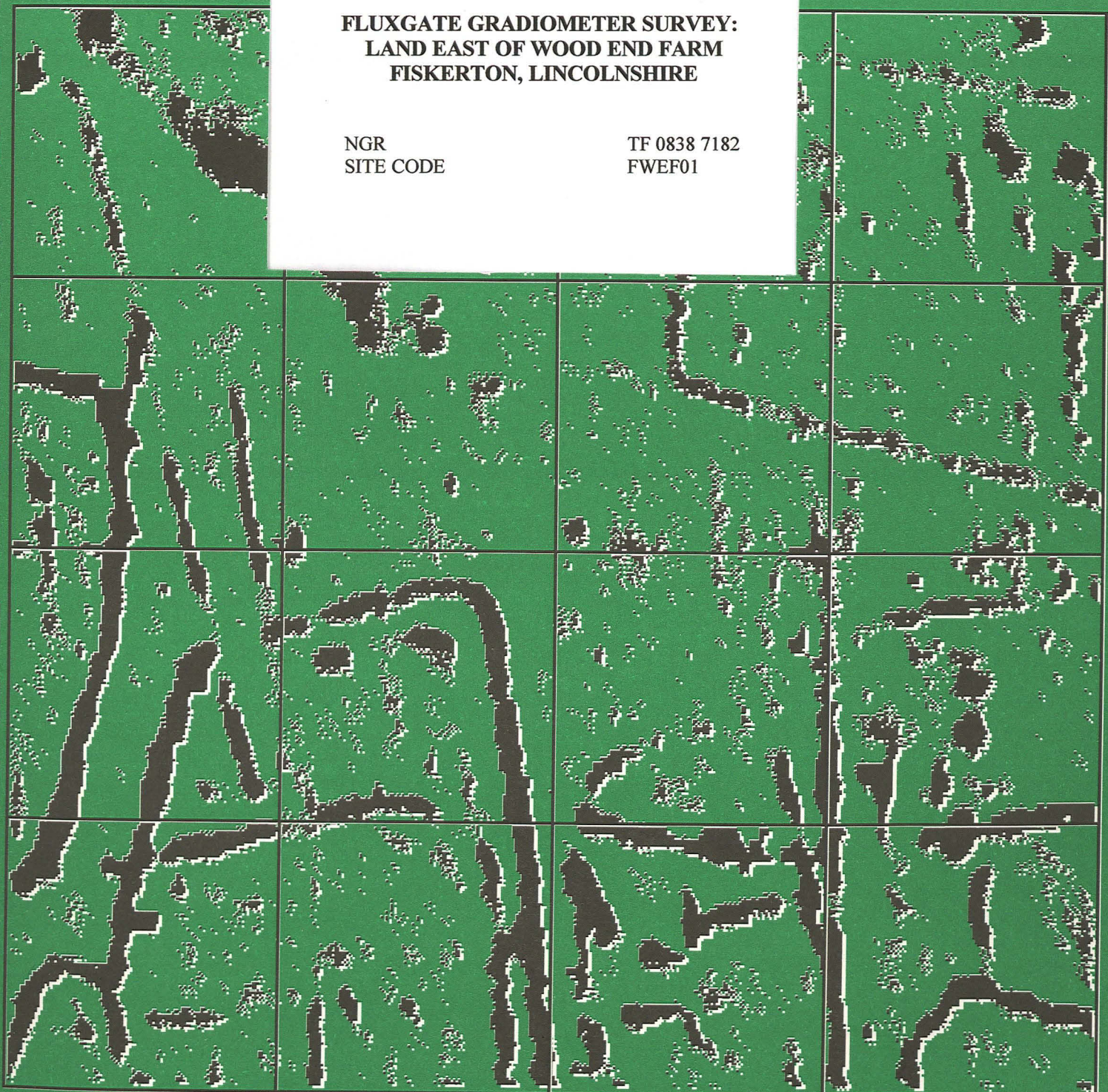
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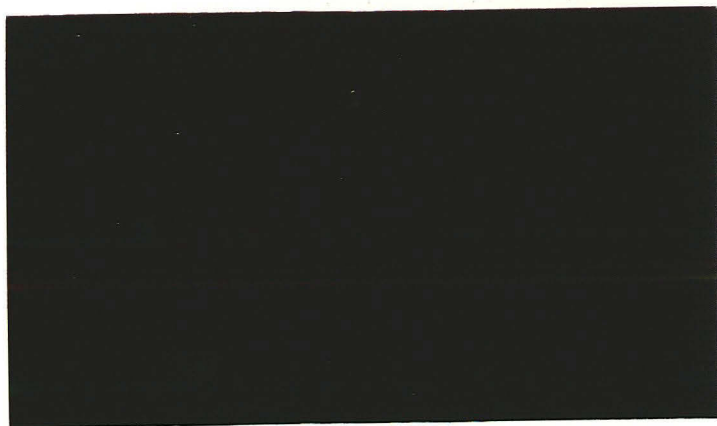
**FLUXGATE GRADIOMETER SURVEY:  
LAND EAST OF WOOD END FARM  
FISKERTON, LINCOLNSHIRE**

NGR  
SITE CODE

TF 0838 7182  
FWEF01







To Nini 11

6133

EVENT L12241  
SOURCE L16937  
54611 L182146 Pmed  
54612 L182147 Pch

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Report prepared for Bullen Consultants Ltd  
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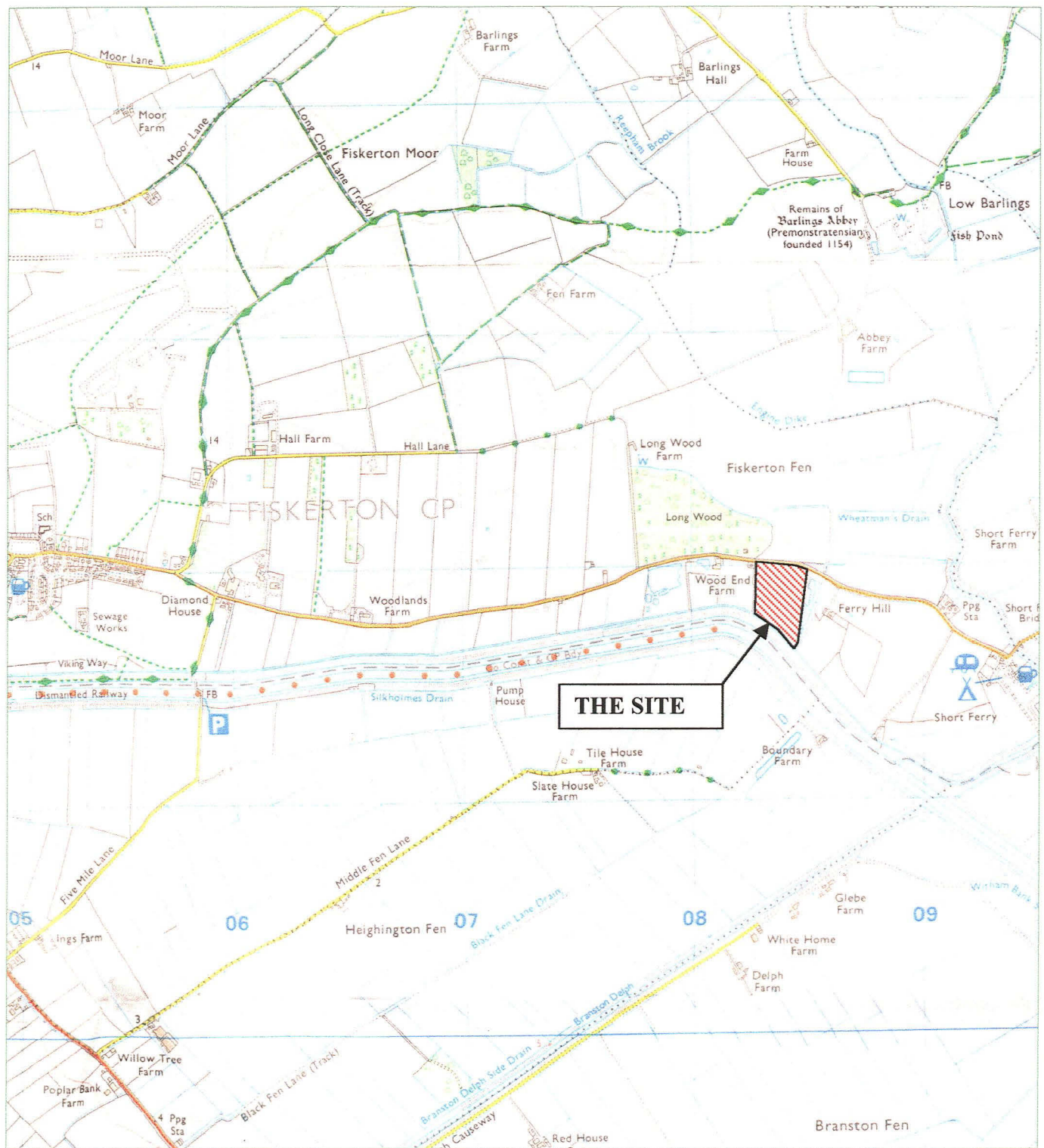
**Fig.7** Clipped and smoothed greyscale image. Scale 1:2000.

**Table 1** Summary of survey parameters.



### *Summary*

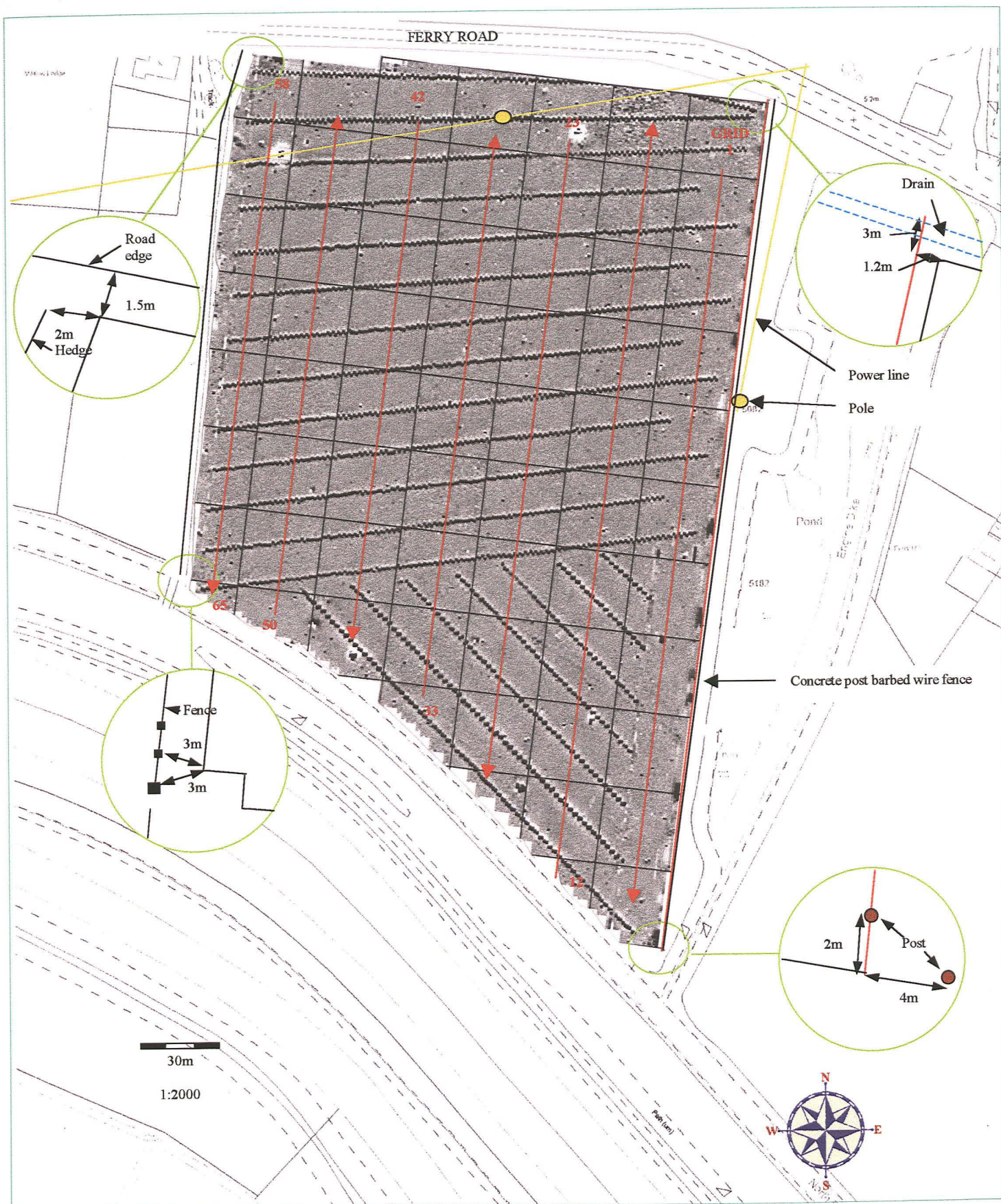
- *A fluxgate gradiometer survey was undertaken on c.5.5ha of land at Fiskerton Fen Lincolnshire*
- *The survey identified significant levels of magnetic variation, and this variability can be resolved into a series of magnetic anomalies*
- *Some of the stronger anomalies are associated with modern activities, such as land drainage*
- *Several magnetically weak linear anomalies possibly represent preceding land divisions*
- *The survey detected a small area of weak magnetic activity in the northern part of the site, and small discrete anomalies distributed across the site suggest the presence of ferrous and ceramic debris in the topsoil*
- *Although the survey has identified a small group of localised anomalies that could reflect pits or areas of burning, the general conclusion, based on the results of this survey, is that the site is probably of limited archaeological potential*



**Fig.1: Location of site**      **Scale 1:25000**

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**Fig.2: Location of survey**

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## 1.0 Introduction

Bullen Consultants Ltd, acting on behalf of The Environment Agency, commissioned Pre-Construct Geophysics to undertake a fluxgate gradiometer survey of land to the east of Wood End Farm, Fiskerton, Lincolnshire. This work was carried out as part of an archaeological evaluation of the site; conducted to satisfy the recommendations of the Lincolnshire County Council Built Environment Team in advance of a planning permission to extract clay for flood defence improvements in the lower Witham area.

The survey methodology was based on the guidelines set out in the English Heritage document '*Geophysical Survey in Archaeological Field Evaluation*' (David, 1995).

## 2.0 Location and description

The site lies c. 2.6km to the east of Fiskerton, on the immediate north side of the River Witham, west of Ferry Hill, and east of Wood End Farm. It comprises a sub-rectangular unit of agricultural land extending to approximately 5.8 hectares, which, at the time of survey, supported a crop of winter wheat (c. 20-30 cm in height). Straw remains of a previous cereal crop were visible on the ground surface.

The site is bounded to the west by mature hedging within a redundant ditch, to the south by the North Delph Drain, beyond which lies The River Witham. The remains of a concrete post and barbed wire fence extend along the eastern boundary, and the northern edge of the site abuts Ferry Road. A power line runs c. 150m from the north-east corner of the site along the eastern boundary to an electricity pole. A similar line, supported by a pole sited within the site itself, extends across the northern part of the survey area (Fig.2).

The topography is characterised by west, south-west and, to a lesser extent, north-west facing slopes, which fall from the slightly higher ground in the mid-eastern part of the site.

Quaternary drift deposits extend across the depression of the Witham Fen basin. A bed of Glacial Till, a clay rich diamicton, lies directly beneath the soil within the boundaries of the site (B.G.S., 1995). The upper strata of the underlying solid geology comprise the Jurassic Kimmeridgian and Oxfordian Clay Formations. An earlier geological survey records these deposits as Oxford Clay Formations overlain by boulder clay (B.G.S., 1968).

Central National Grid Reference TF 0838 7182.



### **3.0 Archaeological and historical background**

The discovery of significant remains within the Witham Fen underlines the archaeological and historical importance of the area, with evidence of human occupation and activity dating from the Neolithic period onwards.

Later prehistoric peat formations have served to preserve archaeological sites and artefacts, and one of the most important discoveries to date is the early Iron Age causeway/jetty, which lies c. 300m to the south of Fiskerton on the north side of the current course of the River Witham (Field, 1986). Associated remains included swords, spearheads, pottery vessels, axes, hammers and files.

Evidence of earlier occupation close to the site includes a Bronze Age axe hoard and two barrows of the same period. The importance of the area probably resulted from the rich flora and fauna associated with the river and fenland environment. The discovery of a number of wooden boats and canoes suggests that the natural resources of the Witham Fen were utilised to full potential.

It is against this background that the current site must be assessed, as it clearly lies within a landscape that is known for its areas of intense archaeological activity.

### **4.0 Methodology**

Detailed area survey using a fluxgate gradiometer is a non-intrusive method of evaluating the archaeological potential of a site. The fluxgate gradiometer detects magnetic anomalies created by areas of high or low magnetic susceptibility. These areas are caused by changes in the composition of the subsoil or the underlying geology. Archaeological features result from man-made changes to the soil and the introduction of intrusive materials such as brick and stone. These features can create detectable magnetic anomalies. In addition, activities that involve heating and burning will create magnetic anomalies, as will the presence of ferrous metal objects.

The anomalies detected by a fluxgate gradiometer survey can often be resolved into entities sharing morphological characteristics with features of known archaeological provenance. This enables the formulation of an informed, but subjective, interpretation.

Magnetic variation between archaeological or naturally occurring features and natural geological strata can result from:

- their relative depth or density of fill
- the magnetic properties of materials introduced as a result of human activity (e.g. rubble, stone, brick/tile, ferrous metal etc.) in contrast to those within surrounding natural deposits
- magnetic enhancement associated with areas of burning

- the magnetic properties of localised, naturally deposited, minerals, such as those occurring in the fills of palaeo-channels.

The area survey was conducted using a *Geoscan Research* fluxgate gradiometer (model FM36) with an electronic sample trigger set to take four readings per metre (a sample interval of 0.25m). The zigzag traverse method of survey was used, with 1 wide traverses across 30m x 30m grids. The sensitivity of the machine was set to detect magnetic variation in the order of 0.1 nanoTesla. A base line was established along the eastern edge of the survey area (Fig.2). Pegs were placed at all grid corners to facilitate relocation of the survey.

Data from the survey was processed using *Geoplot* (v. 3.0). It was desloped (a means of compensating for sensor drift during the survey) and clipped to reduce the distorting effect of extremely high or low readings caused by discrete pieces of ferrous metal. The results are plotted as colour, greyscale and trace images.

The site was surveyed by David Bunn and Alex Osinski on 22nd, 23rd, 24th, 25th and 29th May 2001.

|                     |  |
|---------------------|--|
| Instrument          | Geoscan Research fluxgate gradiometer FM36<br>Sample trigger ST1 |
| Grid size           | 30m x 30m  |
| Sample interval     | 0.25m  |
| Traverse interval   | 1.0m   |
| Traverse method     | Zigzag   |
| Sensitivity         | 0.1nT  |
| Processing software | Geoplot (v. 3.0)   |
| Weather conditions  | Generally warm, sunny with a slight breeze                       |
| Area surveyed       | c. 5.5ha   |

**Table 1: Summary of survey parameters**



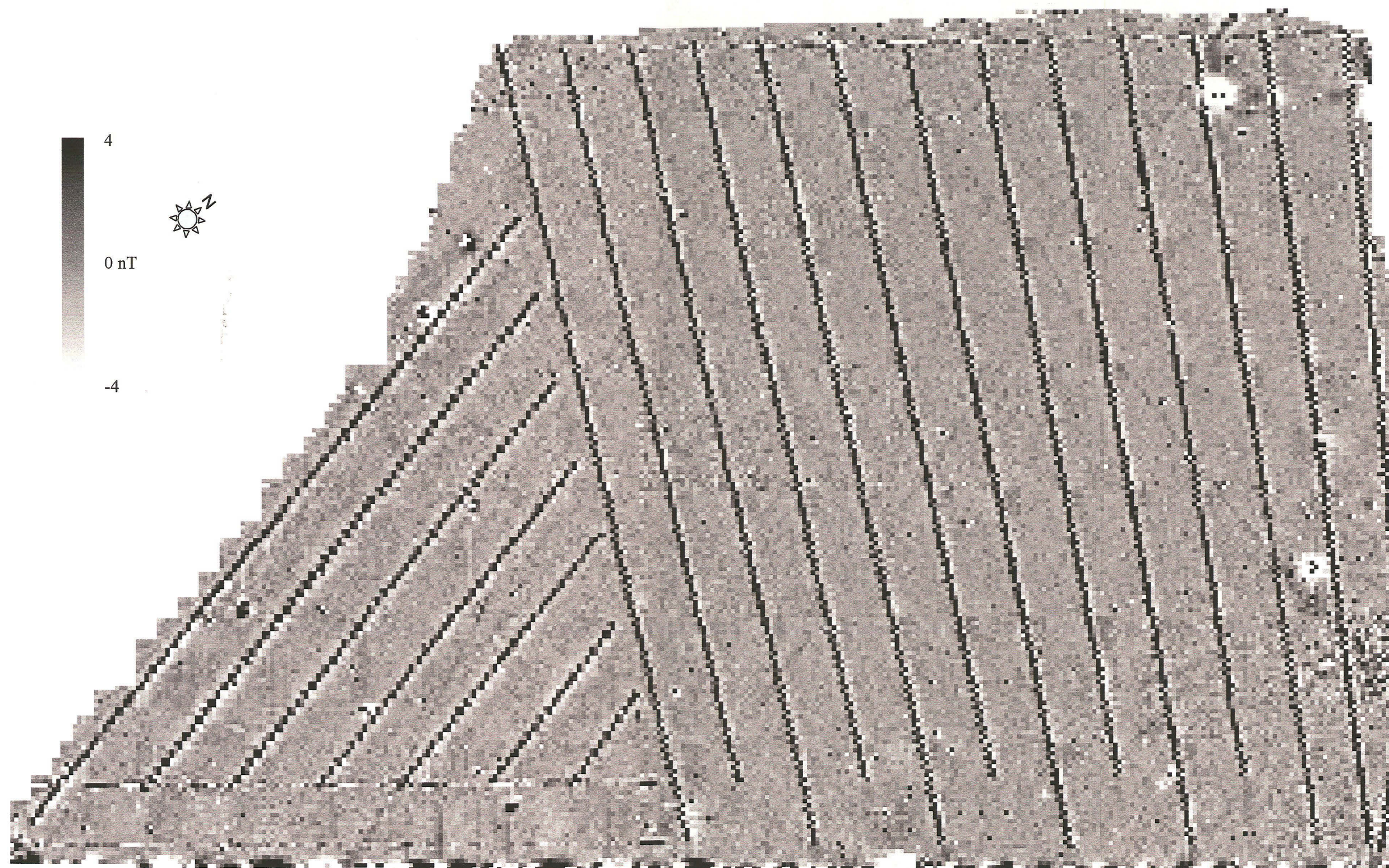


Fig.3: Greyscale image of clipped data    Scale 1:1000



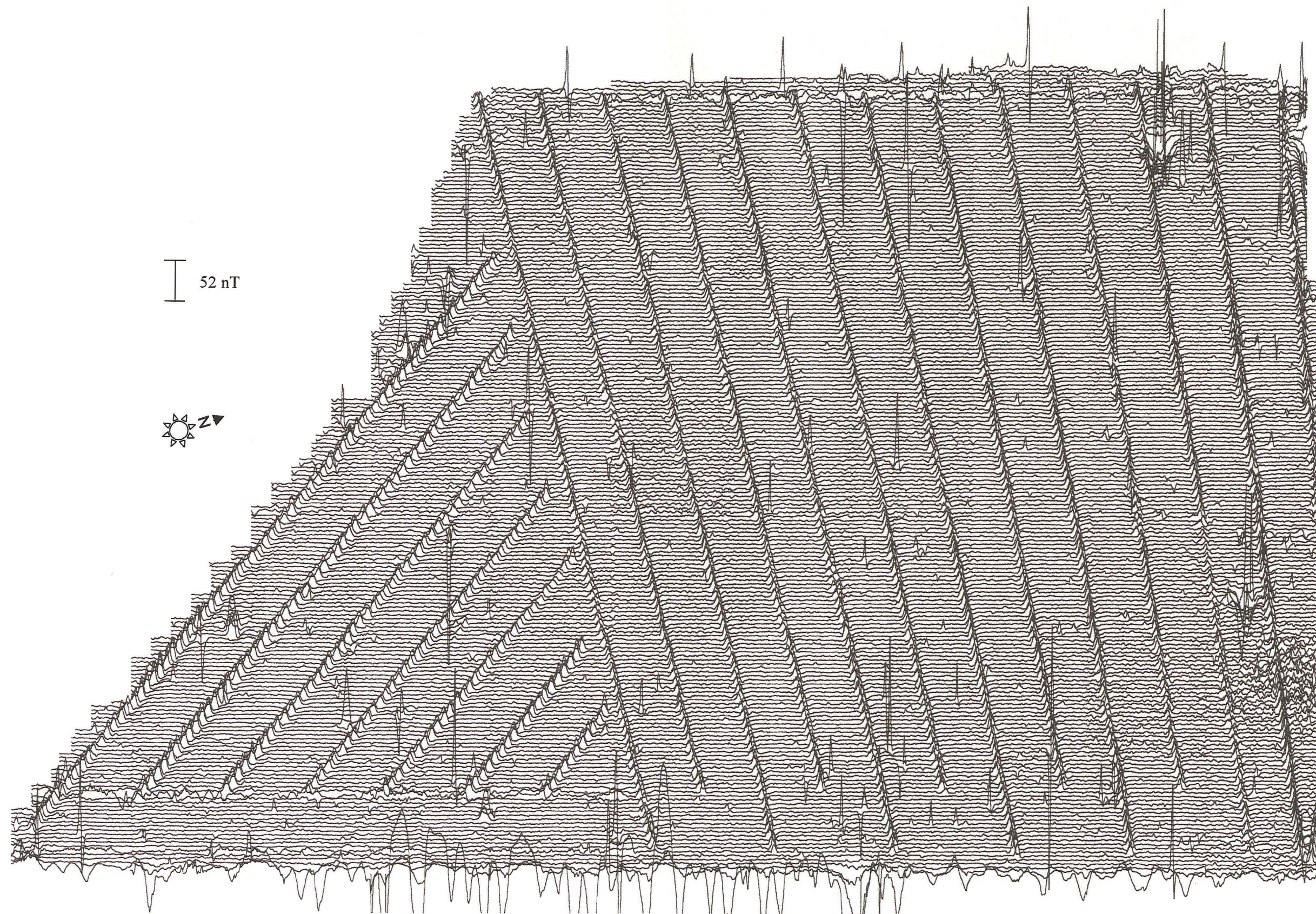


Fig.4: Trace plot of the raw data Scale 1:1000

30m



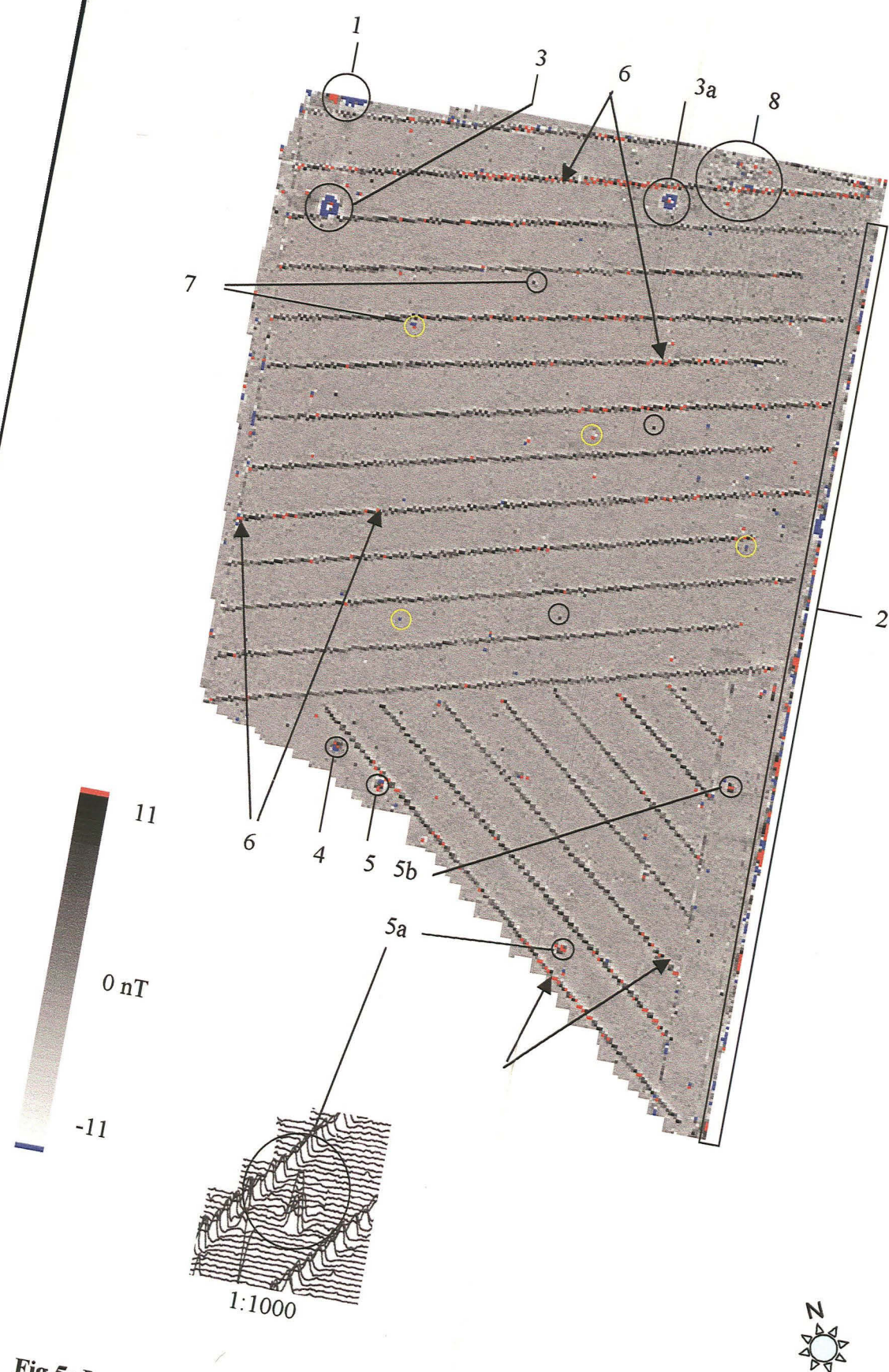
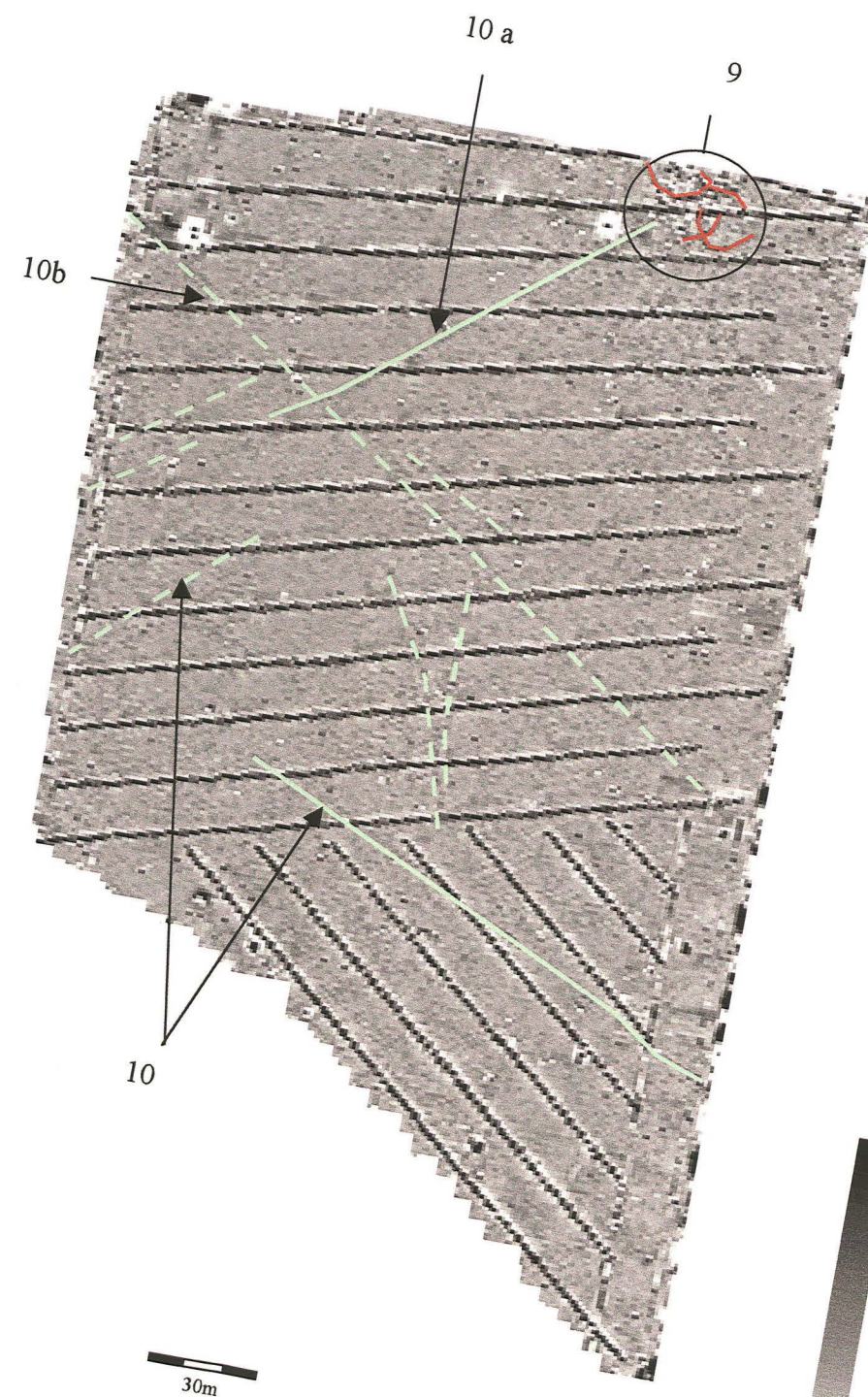


Fig.5: Image of raw data showing strong anomalies (in colour)



Scale 1:2000

Fig.6: Interpretive image of clipped data

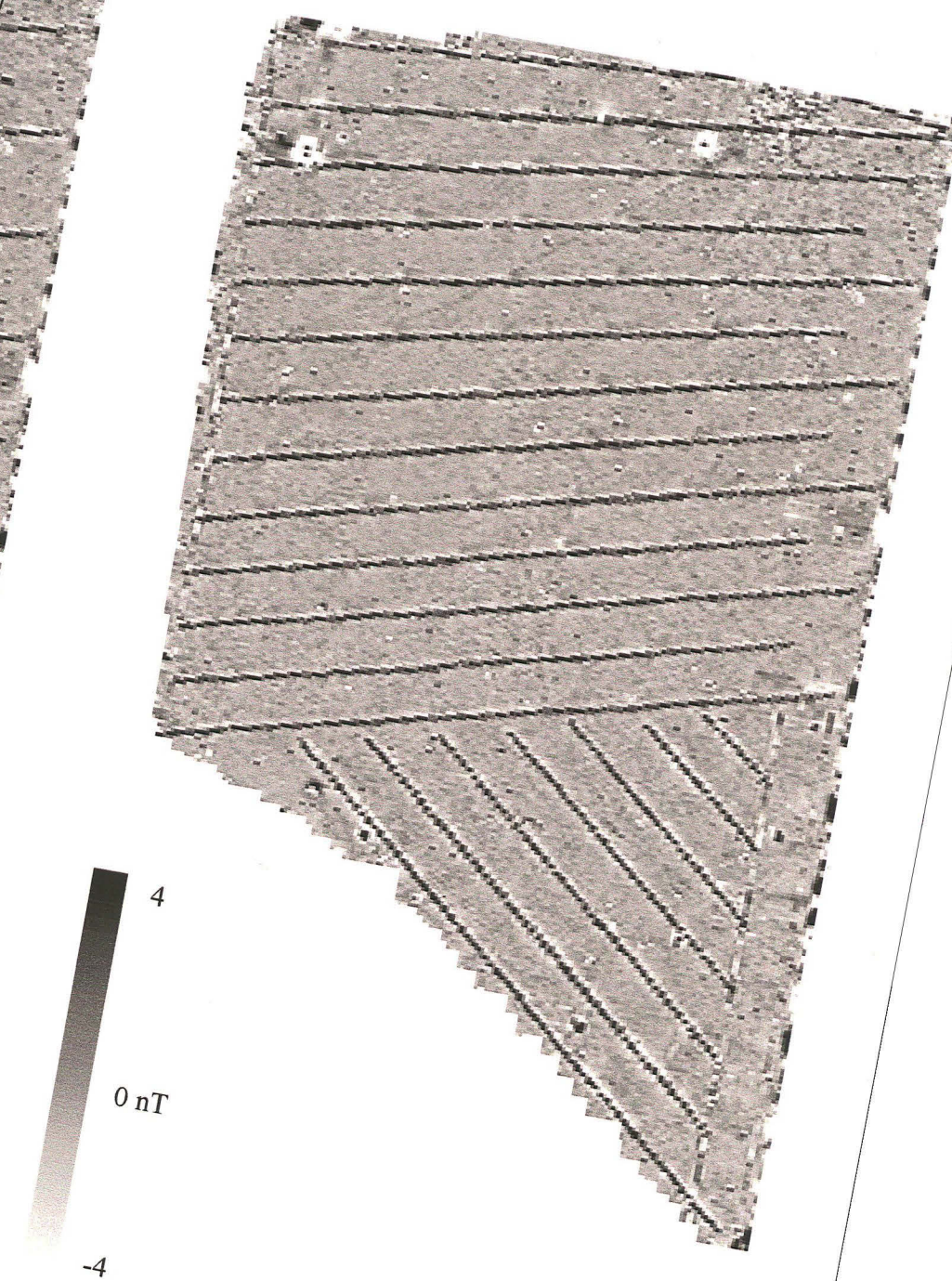


Fig.7: Clipped and smoothed greyscale image



## 5.0 Results

The survey results and their interpretation are represented graphically in the greyscale, colour and trace images (Figs. 3-7).

*Figure 5* represents the raw data, with the strongest anomalies shown in red and blue. *Figure 4* displays the same data as a trace plot.

1: A group of strong dipolar anomalies that probably reflect miscellaneous ceramic and ferrous debris close to Ferry Road and its grass verge.

2: A linear distribution of anomalies displaying magnetic properties similar to 1. These are probably caused by the close proximity of the survey to the eastern edge of the site, which contains a barbed wire fence and the tension cables of an electricity pole. This boundary may also contain hidden debris.

3/3a: Two discrete areas of strong magnetic variation that were detected in the northern part of the site. These may be the result of rubble fill contained within pits. Anomaly 3 lies in a low and potentially wet area of the site and may mark the location of a backfilled pond.

4: Magnetically similar to, though smaller and weaker to 3/3a, and detected in the south-western corner of the site.

5-5b: Three, primarily positive (trace plot, Fig.4), anomalies that were detected on the southern and eastern edges of the survey area. It is possible that they represent areas of burning and/or burnt materials. 5 and 5a lie close to the North Delph Drain and River Witham. Anomaly 5a appears as a slight linear (Fig.5, inset: stacked trace plot). These anomalies may be of archaeological significance.

6: Examples of a modern field drainage system that serves the entire site. The relatively strong (positive) magnetic signature may result from clinker backfill.

7: The random distribution of small, discrete anomalies possibly reflect agricultural activities on the site such as ploughshares, horseshoes, burning, land drainage and midden spreading. Stronger examples are circled in yellow.

8: A dense cluster of small anomalies occurred in the north-western part of the site, to the immediate south of an existing access from Ferry Road. Substantial quantities of slag were noted within this area, and may account for some of the magnetically positive anomalies. A less dense scatter of this material was observed elsewhere, particularly within a 40-50m band along the northern edge of the site. It is possible that this material was used as land drain backfill (see 6) and distributed from this point, which lies adjacent to Ferry Road; and to the immediate south of an access onto the site. A section of drain within this area has produced some of the magnetic variation. However, this interpretation is tempered by the existence of what appears to be a series of short curvilinear features (Fig.6: 9). The latter may be archaeologically significant and related to 8. The clarity and definition of these and other magnetically weaker anomalies has been enhanced by further processing (Figs. 3, 6 and 7).



10: A series of diffuse linear anomalies that appear to extend across the site. Some of these linears may be earlier land divisions or land drains, although the topography of the site suggests that the latter interpretation would preclude at least 10a. The position of linear 10b suggests that it may be related to anomaly groups 8/9 and/or to the access discussed above.

## **6.0 Conclusions**

The survey area appears to contain anomalies that predominantly reflect modern human activity (drains, boundary features, agricultural discard etc).

However, a number of discrete and linear anomalies may of some archaeological significance. The site possibly contains features that have resulted from burning activities, land partitioning and, in the case of anomaly groups 8 and 9, concentrated activity within a relatively small area.

Substantial alluvial deposition may be impairing or masking the magnetic response of some features, although the results of this survey, taken alone, suggest that the site may be one of limited archaeological potential.

## **7.0 Results of field walking assessment**

Following a recommendation of the Senior Built Environment officer of Lincolnshire County Council, an assessment was made regarding the suitability of the site for archaeological field walking in advance of development. It is concluded that the site is not currently suitable for this method of survey, largely due to the extent of vegetation cover (60-90% of the soil surface is obscured by the c.20-30cm high wheat crop). Some observations were noted:

- The site contains some relatively large frost-shattered flint nodules and cobbles, all of which appear to be natural, with no evidence of working.
- There are occasional fragments of horseshoe ceramic land drains on the soil surface, as well as occasional fragments of late post-medieval glazed pottery.
- No medieval or earlier artefacts were observed during the scan.

## **8.0 Acknowledgements**

Pre-Construct Geophysics would like to thank Bullen Consultants Ltd for this commission.

## 9.0 References

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