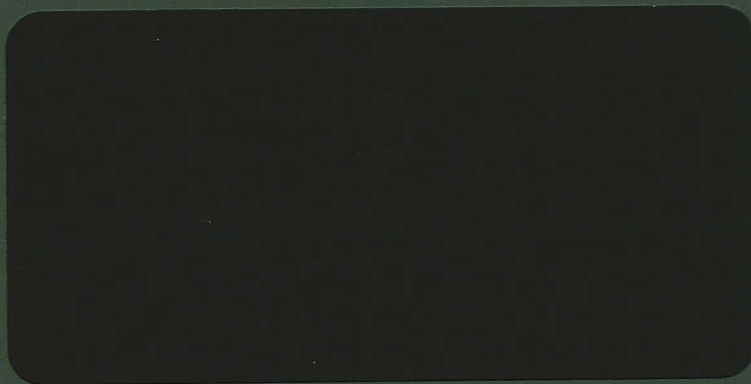


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**FLUXGATE GRADIOMETER SURVEY
LAND AT THE GREEN, ORBY
LINCOLNSHIRE**



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**FLUXGATE GRADIOMETER SURVEY
LAND AT THE GREEN, ORBY
LINCOLNSHIRE**

Report prepared for Mr P Sharp
by David Bunn BSc & Andrew Hardwick BSc
January 2000

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Summary

- *A fluxgate gradiometer survey was undertaken to evaluate the archaeological potential of land at Orby in Lincolnshire*
- *The survey detected a significant number of linear, curvilinear and localised anomalies of potential archaeological significance, which may represent several phases of activity*
- *As the site lies within the heart of the traditional settlement, it would seem logical that most of the anomalies should translate to medieval settlement remains, although this cannot be proved on the basis of morphology alone, and other interpretations are plausible*

1.0 Introduction

A fluxgate gradiometer survey was commissioned by Mr P Sharp to evaluate the archaeological potential of land at the Green, Orby, near Skegness, Lincolnshire. This work was undertaken as part of an application for outline planning permission for residential development.

This survey was carried out in accordance with an archaeological project brief issued by the Assistant County Archaeologist, and a specification prepared by Pre-Construct Archaeology (December 1999). It also followed the guidelines set out in the English Heritage document '*Geophysical Survey in Archaeological Field Evaluation*', 1995. Consideration was taken of the recommendations set out in the Lincolnshire County Council Archaeology Section publication '*Lincolnshire Archaeological Handbook; A Manual of Archaeological Practice*', 1998.

2.0 Location and description

Orby is in the administrative district of East Lindsey approximately 7km east of Skegness. The proposed development site, an irregular unit of 0.95 hectares, is in the centre of the village and centres on NGR TF 4911 6728.

Permanent pasture covers the site, which is mainly level and subtly undulated. Drains and hedging bound the site to the west and north: a drain to the south and hedging to the east.

The site is very close to a Scheduled medieval moated (SM30211) site and is situated in the heart of a former medieval settlement. Hand bricks, associated with salt manufacture, have been located within the parish.

3.0 Methodology

Detailed area survey using a fluxgate gradiometer is a non-intrusive means of evaluating the archaeological potential of a site. The fluxgate gradiometer detects magnetic anomalies caused 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 are the result of man-made changes to the composition of the soil and the introduction of intrusive materials such as brick and stone. These features will create detectable magnetic anomalies. In addition, activities which involve heating and burning will create magnetic anomalies as will the presence of ferrous metal objects. By examining the anomalies detected by a fluxgate gradiometer survey, geophysicists can often translate the data into archaeological interpretation.

The area survey was conducted using a *Geoscan Research* fluxgate gradiometer (model FM36) with an electronic sample trigger set to take 4 readings per metre (a sample interval of 0.25m). The zigzag traverse method of survey was used, with 1m wide traverses across 30m x 30m grids. The base line was established by measuring out from the southern and western field boundaries: 4m east, 4m north from the south-west corner (midpoint of drain) and 8 north from the house in the south-east corner.

Pegs were left along the base line and elsewhere to facilitate grid relocation. The sensitivity of the machine was set to detect magnetic variation in the order of 0.1 nanoTesla.

The data from the survey was processed using *Geoplot* version 3.0. The data was desloped (a means of compensating for sensor drift during the survey by subjecting the data to a mathematical bias sloping in the opposite direction of the bias created by sensor drift). The data was clipped to reduce the distorting effect of extremely high or low readings caused by ferrous metals on the site, and the result was plotted as a number of greyscale images.

The survey was carried out by David Bunn and Andrew Hardwick on the 10th January 2000. The weather was cold and sunny. The area surveyed measured approximately 0.8 hectares.

4.0 Results

The survey revealed anomalies of potential archaeological significance, particularly to the north, east and west of the site (Figs.3, 4, 5, 6 and 7). The southern area was magnetically quieter, although more diffuse anomalies are apparent, probably indicating some form of masking.

A complex network of positive linear/curvilinear anomalies dominate the site (Fig.5, red). Anomaly 1, extending east-west, represents a feature that possibly traverses the site completely, abutting and sometimes bisecting a number of shorter linears on the north/south axis (Fig.5, 2). Some of the latter possibly extend further north, 2a, for example curving east and becoming stronger along the northern edge. The shorter linears further east appear to have association with anomaly 1, as does anomaly 3.

Distinct linear/curvilinear anomalies form a series of features on the northern edge (Fig.5, 4), some of which appear to radiate southwards from the modern road, with linear 2a possibly extending east and continuing south-eastwards to meet linear 5. A more diffuse linear (Fig.5, 6) runs roughly parallel to the latter. Both of these may associate with anomalies 7 and 8 respectively.

Anomaly 9 comprises a dense cluster of positive/negative readings and may be the easterly traces of anomaly 1 and/or linear 10. This scenario suggests that linear 5 may be a later feature. This area produced strong magnetic signals indicative of human activity, which were somewhat masked by the presence of barbed wire in the hedge (Fig.7).

Immediately west, the survey detected faint amorphous anomalies bearing no clear association with the other visible features (Fig.5, 11).

The southernmost area of the survey produced the least magnetic variation. The data was processed without removing slight data collection errors in the traverse direction, enabling any faint linear anomalies on the north/south axis to be more visible. This results in some striping, although on this survey the effect is minimal. With this in mind, it is possible to discern faint north/south linear anomalies in this area (Fig.5, 12, 13). Anomaly 12 compliments 2a, although it is broader and possibly comprises two

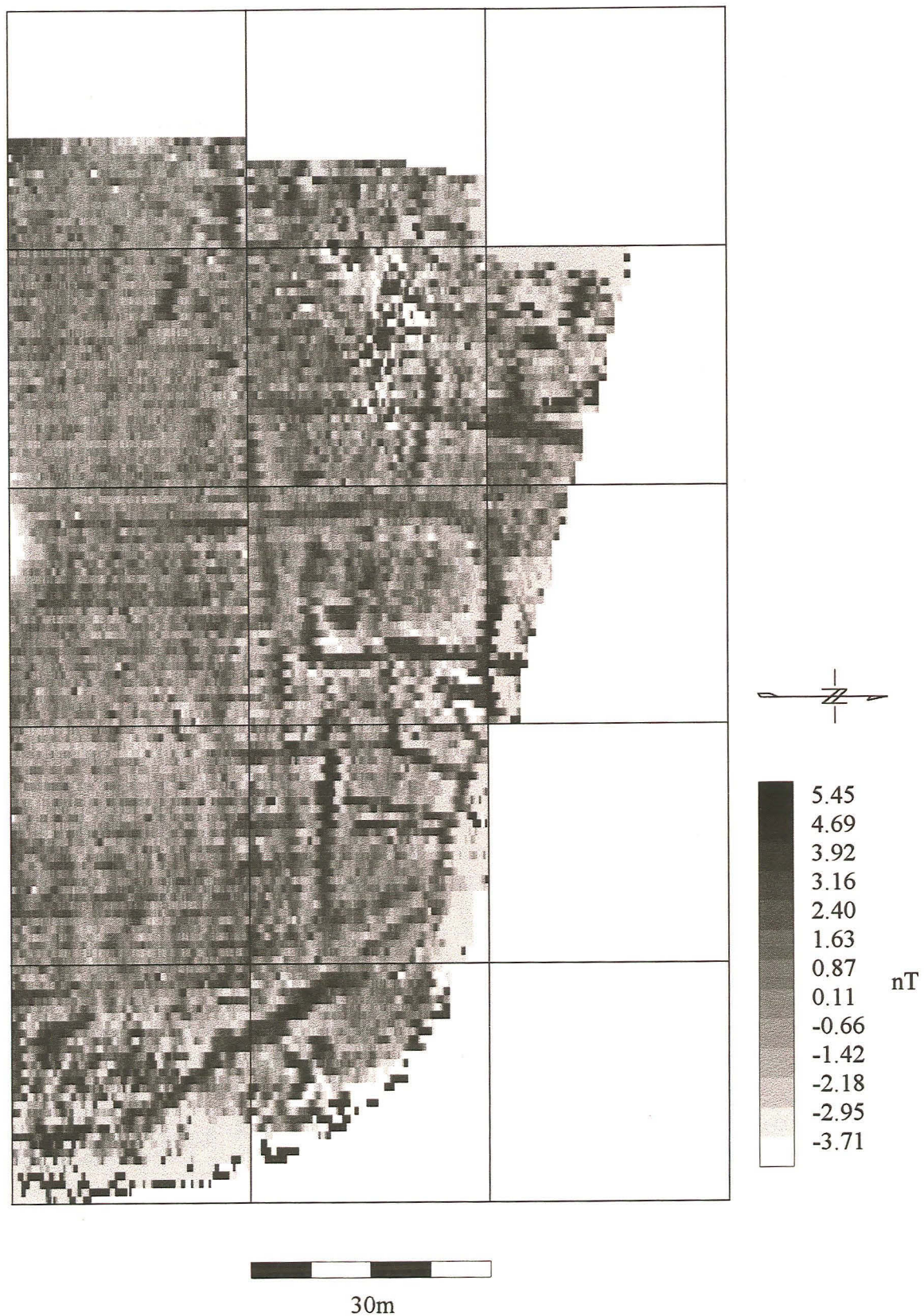
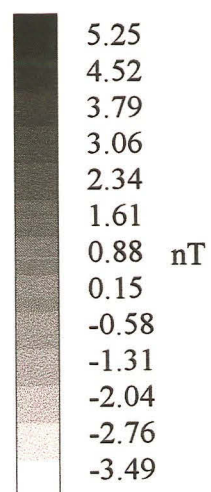
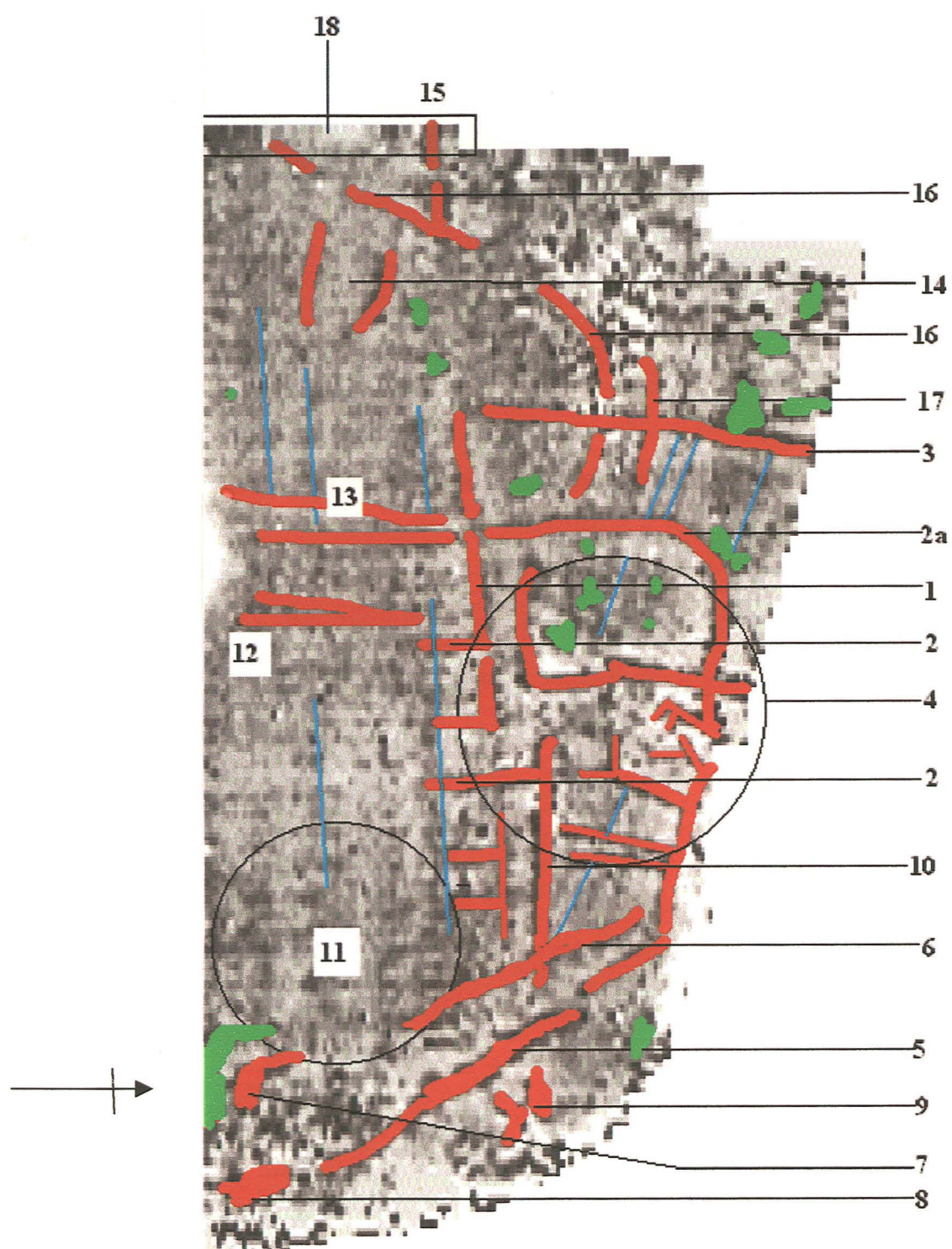


Fig.3 Greyscale image



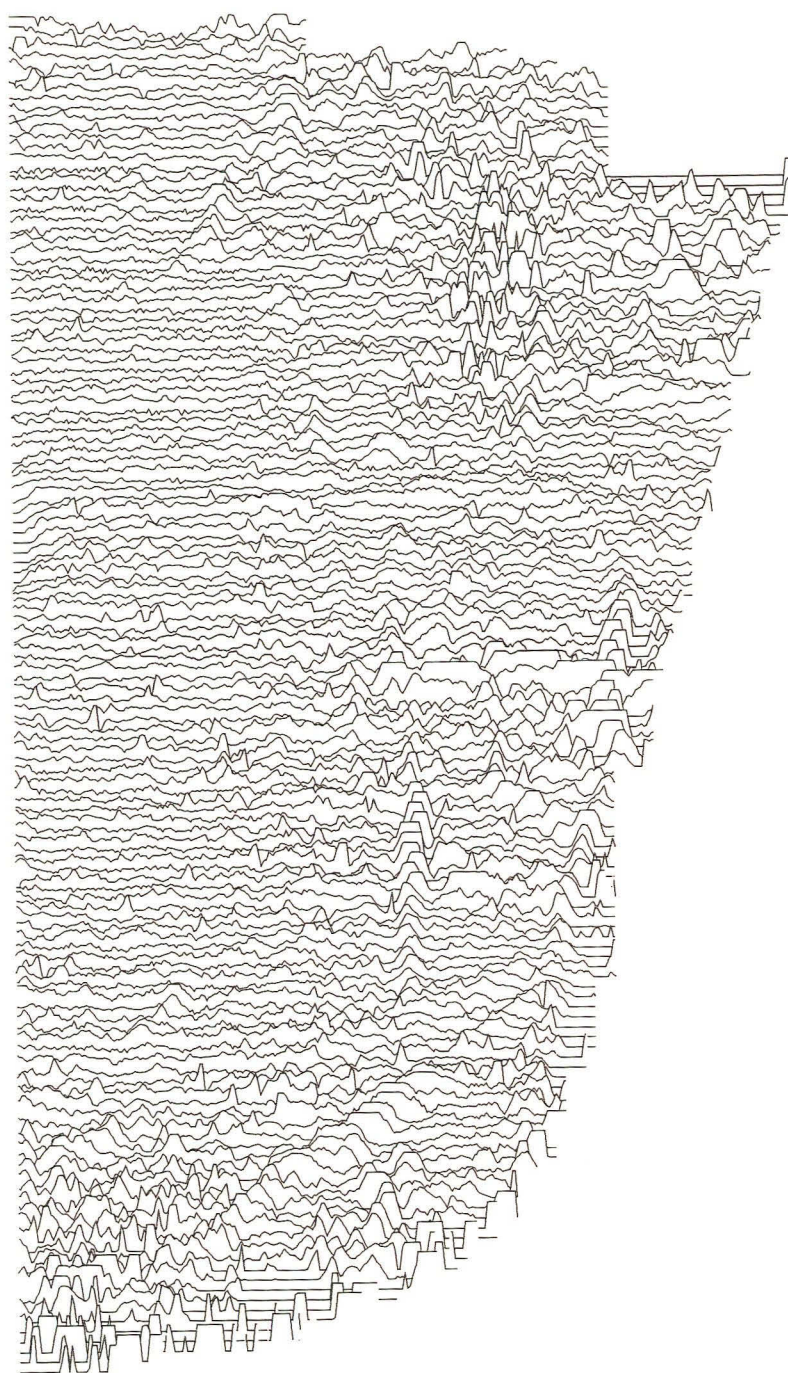
30m

Fig.4 Smoothed greyscale image



Scale 1:750

Fig.5 Interpretive plan



30m

22.47nT/cm

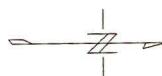


Fig.6 Trace plot

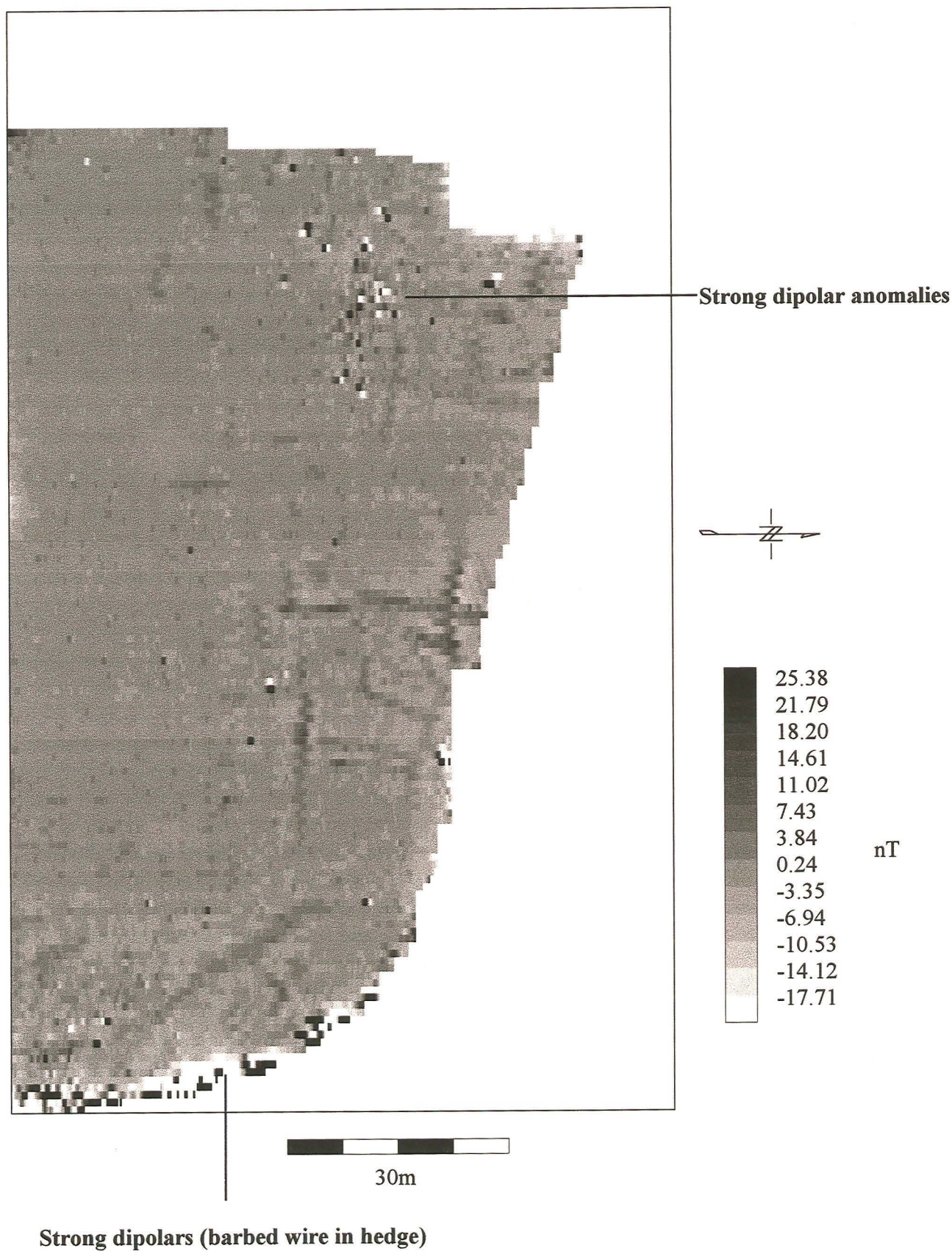


Fig.7 Greyscale image of raw data

closely neighbouring features. Anomaly 13 is a faint negative linear, not quite parallel with the traverse direction and may have archaeological significance.

Two, short positive anomalies (Fig.5,14) in the south-west corner mark the edge of another busy area, especially to the north. Anomaly 15 may represent the westernmost portion of anomaly 1. Very faint traces of a linear anomaly (16) is discernable extending south-west to north-east, resolving into a curvilinear .

This area produced a number of dipolar signals (Fig.7) which may be masking magnetically weaker features. Linear anomaly 17 extends eastwards from these, possibly bisecting 2a, and into feature 4. Slightly curved in character it is tentatively suggested that anomalies 17 and 10 may represent the same feature.

A group of strong positive anomalies in the north-west corner (Fig.5, green) may have associations with anomalies 3, the east part of 2a, or areas of burnt material. Similar features occur elsewhere across the site.

A narrow strip of positive and negative anomalies extending close to the drain to the west (Fig.5, 18) may have archaeological potential, similarly a positive anomaly to the south of anomalies 13 and 14.

Closely spaced linears (Fig.5, blue) parallel to the north edge may be plough marks: those parallel to the southern boundary, broader and more widely spaced evidence of rig and furrow. One of the latter mirrors anomaly 1 and butts up to the shorter north-south linears (Fig.5, 2). This results in several box-like features, which could be interpreted as some form of complex.

The site possessed few of the dipolar scatters common to this survey method (Fig.7). This may be due to the absence of modern cultivation. The dipolar anomalies in the north-west corner may be modern: their localised nature the result of non random discard

Interpretation of the results takes into account the possibility of more than one phase of development. This may be the case in areas where the linear features appear to overlap others, for example around anomaly 1. This feature may have close associations with anomalies 2 and 3, less so with linear 10 and 17.

Anomalies 5 and 6 possibly represent earlier boundaries that ran parallel to the current site boundary with the road, although it seems probable that the features along the northern edge originally continued further north.

5.0 Conclusions

Overall, the anomalies indicate a potentially rich archaeological landscape. Whilst this landscape could incorporate enclosures for stock control and agriculture, the location of the site in the core of the medieval settlement suggests that some of the anomalies at least may relate to direct human settlement, and the possibility that building and similar remains are present should not be ruled out.

Detailed survey by fluxgate magnetometer is only capable of detecting features that alter the magnetic susceptibility of soils or are magnetically different to the soils or features around them. It remains a possibility that there are archaeological features within the survey area that are not detectable.

Acknowledgements

Pre-Construct Geophysics would like to thank Mr P Sharp for this commission.

7.0 Appendices

7.1 References

- | | |
|-----------------------------------|--|
| Clark, A J | 1990 'Seeing beneath the soil.' |
| David, A | 1995 <i>Research & Professional Services Guidelines No 1; 'Geophysical Survey in Archaeological Field Evaluation.'</i> |
| Gaffney, C, Gater, J & Ovenden, S | 1991 <i>IFA Technical Paper No 9; 'The use of Geophysical techniques in archaeological evaluations.'</i> |
| Palmer-Brown, C P H | 1999 <i>Land at the Green, Orby, Lincolnshire: Preliminary Field Evaluation in Advance of Residential Development.</i> |

7.2 Summary of survey parameters

Instrument:	Geoscan Research Fluxgate Gradiometer FM 36 with Sample Trigger ST1.
Resolution:	0.1 nT
Grid size:	30m x 30m
Sample interval:	0.25m
Traverse interval:	1m
Traverse method:	Zigzag