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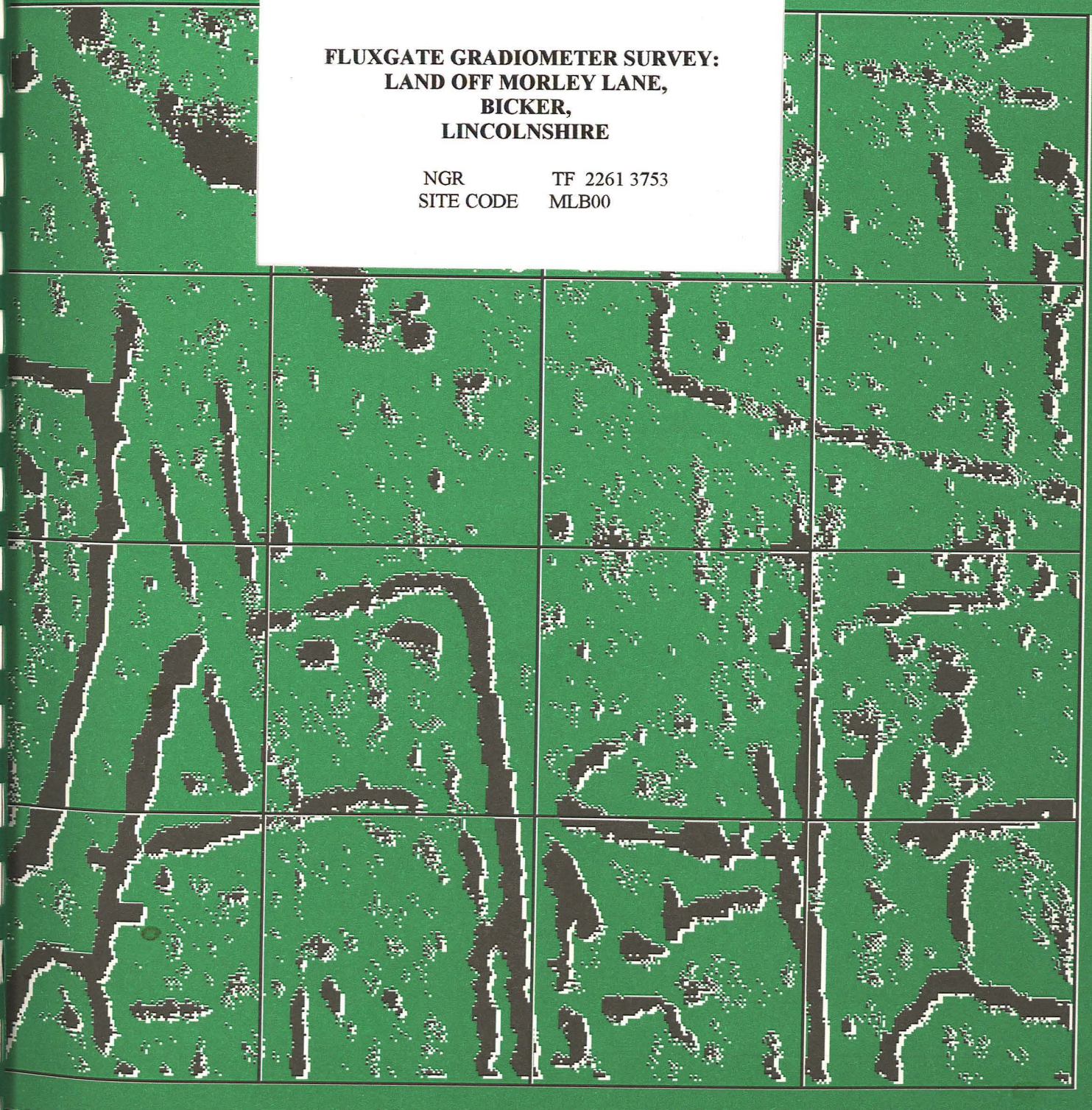
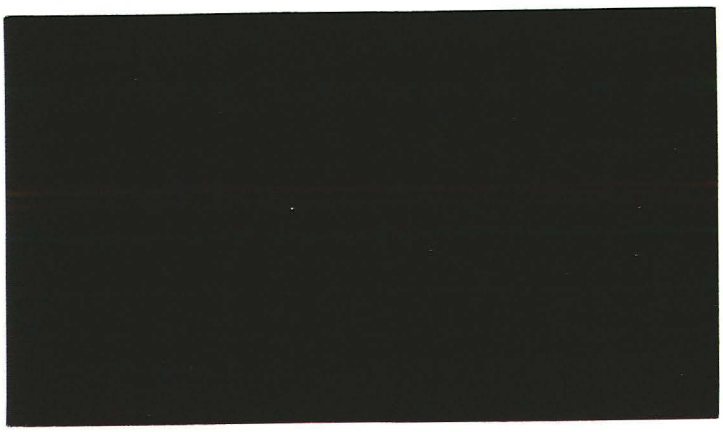
PRE-CONSTRUCT GEOPHYSICS

FLUXGATE GRADIOMETER SURVEY: LAND OFF MORLEY LANE, BICKER, LINCOLNSHIRE

NGR TF 2261 3753
SITE CODE MLB00





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FLUXGATE GRADIOMETER SURVEY: LAND OFF MORLEY LANE, BICKER, LINCOLNSHIRE

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Report prepared for Terry Sykes Design and Build
by Jim Rylatt & David Bunn

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Contents

Illustrations

Summary

- *A fluxgate gradiometer survey was undertaken on 0.3 hectares of land at Bicker, Lincolnshire. The survey identified significant magnetic variation across the site, and this variation can be resolved into a series of magnetic anomalies*

- *Most of these anomalies have been interpreted as representing features of modern origin, as they have a spatial correlation with standing structures and fences containing ferrous metals, or with areas of disturbance*

- *A small number of anomalies possibly reflect the presence of sub-surface archaeological features of greater archaeological significance, although these have proved difficult to resolve due to the masking effects of modern activity*

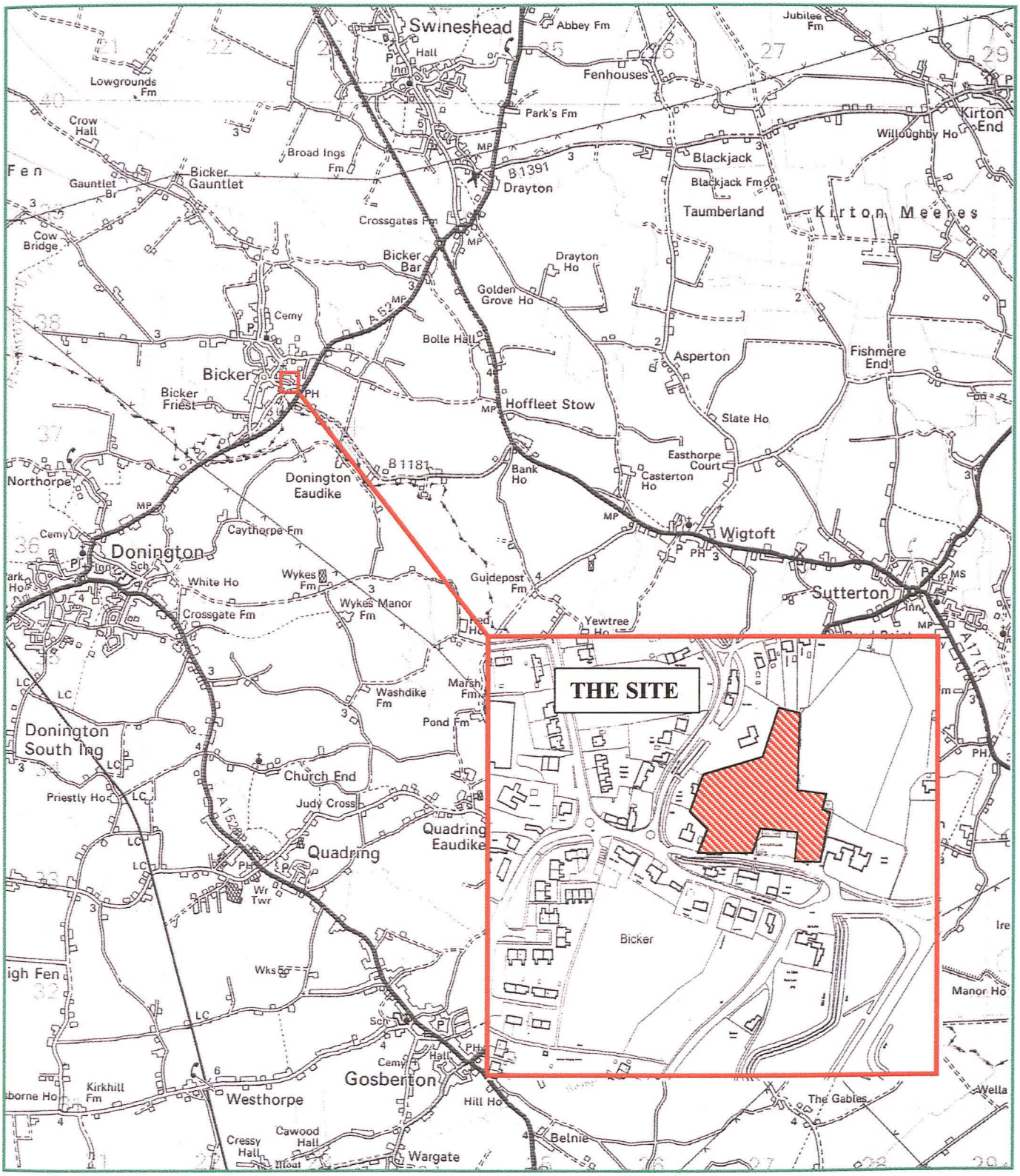

Fig.1: Location of site. **Scale 1:50000 (Inset: 1:2500)**

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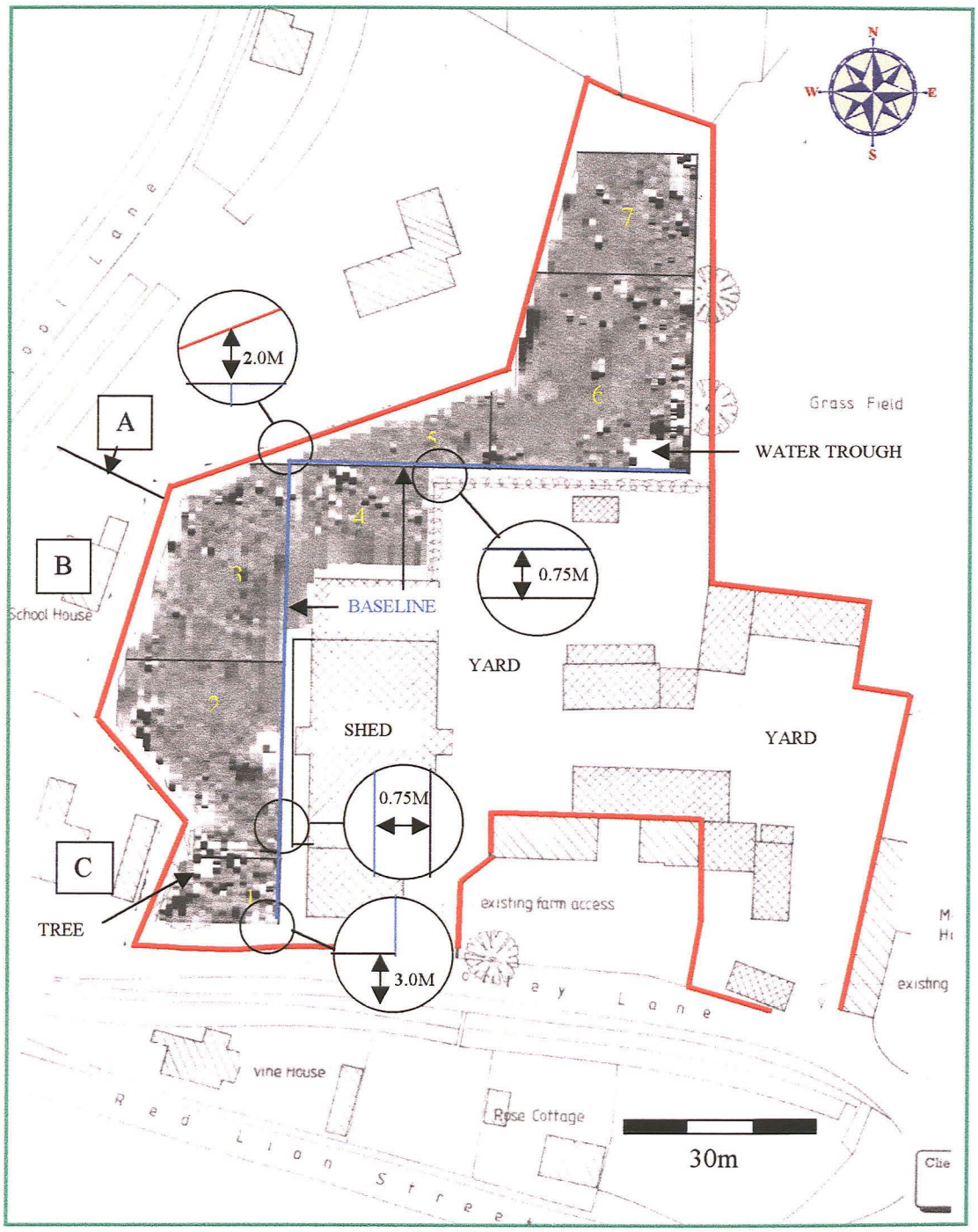

Fig.2: Location of survey. **Scale 1:1000**

1.0 Introduction

Terry Sykes Design and Build commissioned Pre-Construct Archaeology (Lincoln) to undertake an archaeological evaluation of c. 0.8ha of land off Morley Lane, Bicker, Lincolnshire. The initial component of this evaluation was a fluxgate gradiometer survey of an area of c. 0.3ha, which constituted the western and northern edges of the site.

The survey was undertaken by Pre-Construct Geophysics, in accordance with a specification prepared by Pre-Construct Archaeology (Palmer-Brown, 2000).

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

2.0 Location and description

Bicker is situated in the Fens of south Lincolnshire, approximately 11km to the south-west of Boston and 18km to the west of the coast.

The development site is situated on the eastern side of the village, off Morley Lane. It comprises an irregular unit extending to 0.8ha, which is currently occupied by a farmyard (with buildings), and adjoining paddock (Fig. 2). The gradiometer survey was undertaken on the latter area, the remainder of the site being unsuitable for this method of survey.

The survey area is bounded along the south-eastern and north-western sides by wooden fences and hedges. The remainder of the perimeter is defined by a barbed wire fence, and/or metal railings. The western and south-eastern edges of the site adjoin houses and farm buildings, respectively.

The paddock, which is currently used for grazing, is well maintained and free from visible debris, with the exception of a small area of brick rubble observed near the water trough (Fig.2).

The ground surface gently undulates and is noticeably higher than Morley Lane; with the western half of the site looking down upon much of the surrounding area. It is possible that the ground level may have been raised artificially as a precaution against flooding. Any archaeological features created by activities occurring before the importation of such make up deposits, would possibly be situated at too great a depth to be detectable by a fluxgate gradiometer.

The drift geology of the area comprises a series of Quaternary deposits; these are 10-20m in depth and consist of silty clay saltmarsh deposits, which seal the Terrington Beds and younger Marine deposits (Romano-British to present day). These overlie older Marine deposits, of the 3rd- 4th millennia BC. The solid geology consists of a series of Jurassic deposits, with the Ampthill Clay formation overlying the West Walton and Oxford Clay Formations (B.G.S., 1995).

Central National Grid Reference TF 2261 3753.

3.0 Archaeological and historical background

The extent of the prehistoric Fenland is not easy to define, as this low-lying area has been subject to sustained periods of inundation, linked to changes in sea level. At these times, it is likely that much of the region was unsuited to permanent human occupation, a theory supported by the punctuated nature of the archaeological record.

The etymology of the place name suggests that the modern settlement of Bicker can be dated back to the late Saxon period. The components of the name are either of Old Scandinavian origin, meaning 'village marsh', or, of Old English, meaning 'place by the marsh' (Mills, 1993).

The site is located close to the heart of the village, and to the north of Red Lion Street, where late Saxon and early medieval remains have been uncovered (source: project brief issued by Community Archaeologist for Boston).

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 composition of the soil and the introduction of materials such as brick and stone. These features 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 produced features and the natural background level can result from:

- different depth or density of fill, with respect to the depth or density of surrounding soils magnetically similar to the 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
- the magnetic susceptibility of areas of burning, as opposed to unburnt areas
- the magnetic properties of localised, naturally deposited minerals, such as occur in the fill of palaeo-channels, in contrast to those of the surrounding soils.

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 1m 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. Two baselines were established at right angles to each other, along two edges of the farmyard.

The 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 greyscale and trace images.

The area survey was carried out by David Bunn on the 15th of November 2000.

Instrument	Geoscan Research fluxgate gradiometer FM36 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	Cool, overcast
Area surveyed	c. 0.3ha

Table 1: Summary of survey parameters

5.0 Results

The survey detected areas of magnetic variation consistent with distortion produced by the close proximity of modern features. These are presented in *figure* 3 as coloured anomalies.

Anomaly (**1**) represents an area of disturbance at the southern end of the site. It probably results, in part, from the close proximity of metal railings and fencing. However, the relative difference in height between this area of the site and land to the south and west suggests that the ground may have been artificially raised. Consequently, it is possible that ferrous and ceramic debris was imported as components of such dump deposits.

Anomalies (**2**) and (**3**) occur close to a small western extension, and the northern edge respectively, of an agricultural building. They probably result from either the latter's ferrous content, or contamination of the ground during construction.

Anomaly (**4**) possibly indicates the location of an area of burning or a pit filled with ferrous or ceramic debris. Support for the latter is provided by a linear anomaly running eastward from (**4**) to the farmyard. This may be a ceramic drain feeding surface water to a rubble soak-away.

Anomaly (**5**) corresponds to the location of a concrete slab and rubble, while anomaly (**6**) probably results from the proximity of a metal gate, the threshold of which may contain rubble hardcore.

Other areas of strong magnetic disturbance were detected, principally at the edges of the site, near fences containing ferrous materials, or where the site shares boundaries with residential properties.

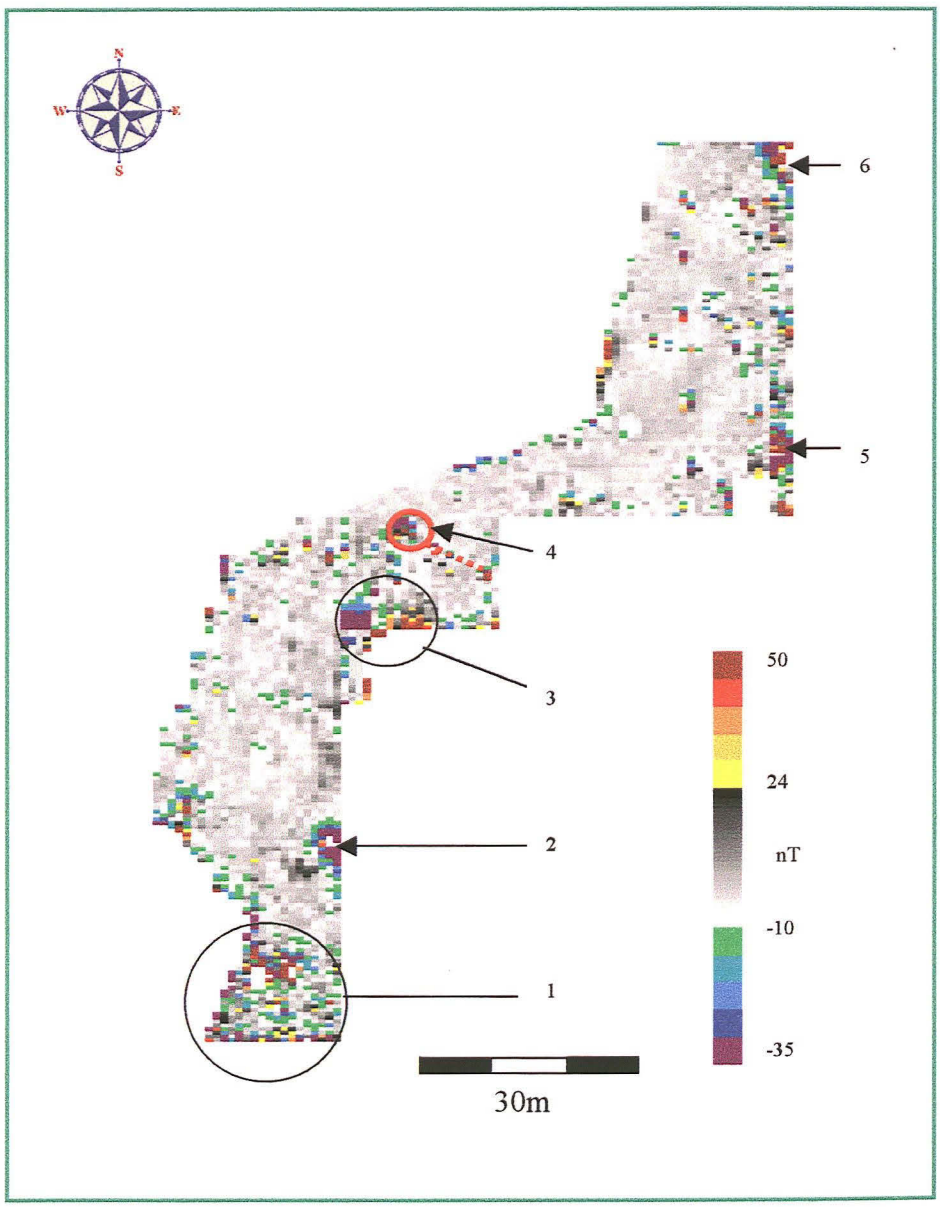

Fig. 3:Greyscale image of raw data with anomalies of definite and probable modern origin shown coloured. Scale 1:1000.

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

Figure 5 shows the weaker magnetic anomalies, which have been enhanced by clipping the data.

Predominant among these are a series of diffuse linear anomalies, situated in the western half of the survey area. Anomaly (**7**) appears to represent a continuation of a boundary (Fig.2: **A**), that forms the northern perimeter of a property to the west of the site (Fig.2: **B**). This suggests that this feature is of relatively recent origin, and the northern and southern parts of the site may have been separate units of land. Anomalies (**8**) and (**9**), which run parallel, and to the south of (**7**), may represent features associated with this phase of activity. It is tentatively suggested that a short linear anomaly on the southern side of (**9**) may indicate the presence of another boundary.

Anomaly (**10**) runs parallel to an existing boundary, which forms the south-western edge of the site, separating the latter from a house and garden (Fig.2: **C**). The age of the house suggests that this delineation is well established. Consequently, anomaly (**10**) may represent an earlier alignment of this property boundary. Anomaly (**11**) abuts, or crosses, (**10**) perpendicularly, while a short linear anomaly, (**12**), which

shares the same alignment as (**11**), and runs across the eastern end of (**10**). It seems likely that all of these anomalies represent components of a single field system.

The survey detected a number of, magnetically weak, irregular anomalies. Anomalies (**13**), (**14**), (**15**), and (**16**) may have been produced by the residues of burning, or the magnetically enhanced fills of pits. Anomaly (**17**) is relatively unusual in that it signifies an area of negative magnetic enhancement; geological processes may be responsible for this magnetic signature, but an archaeological origin should not be discounted. A positively enhanced anomaly (**18**), located in the northern part of the site, appears to represent an 'L'-shaped feature. However, the weak and diffuse nature of the associated magnetic disturbance raises questions as to whether (**18**) possesses any archaeological potential. Anomaly (**19**) shares similar magnetic characteristics, and possibly origins, with those displayed by (**17**).

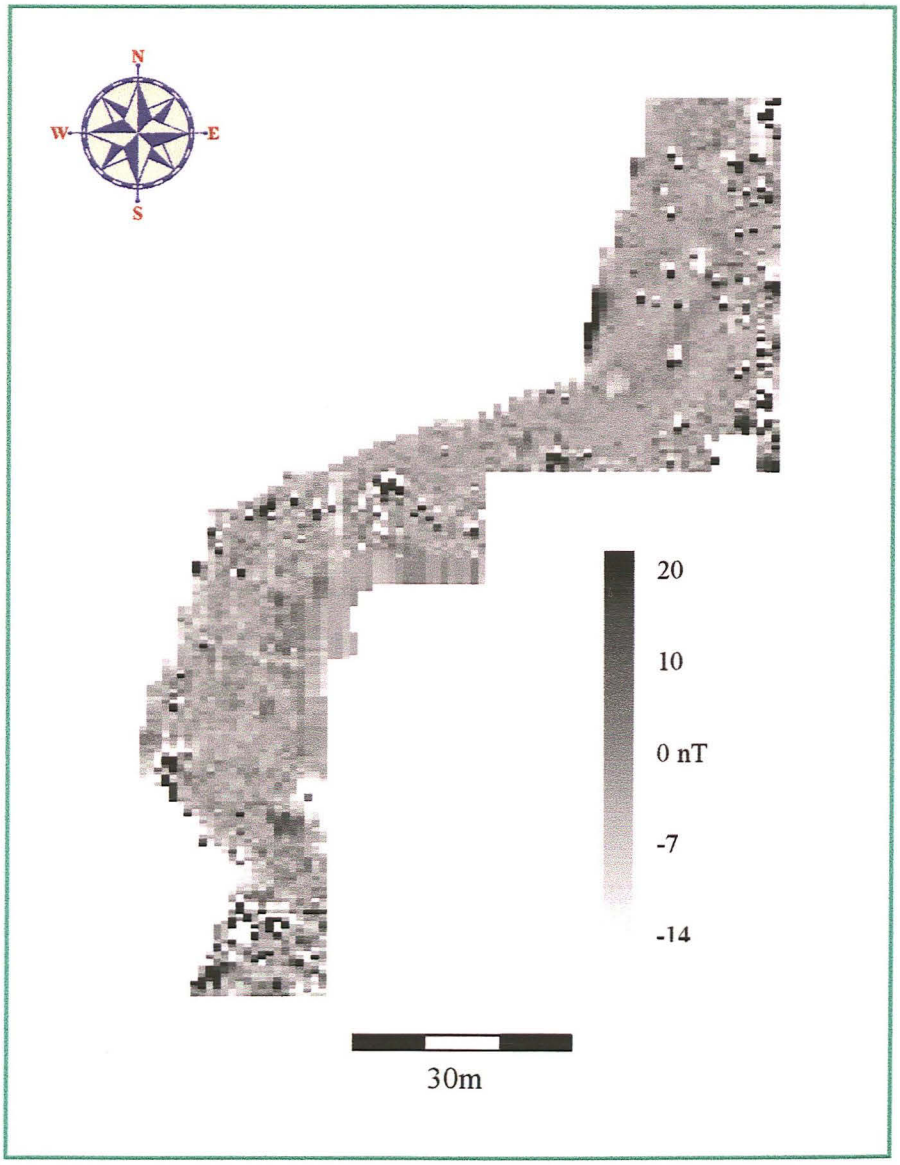

Fig. 5: Clipped greyscale image. Scale 1:1000

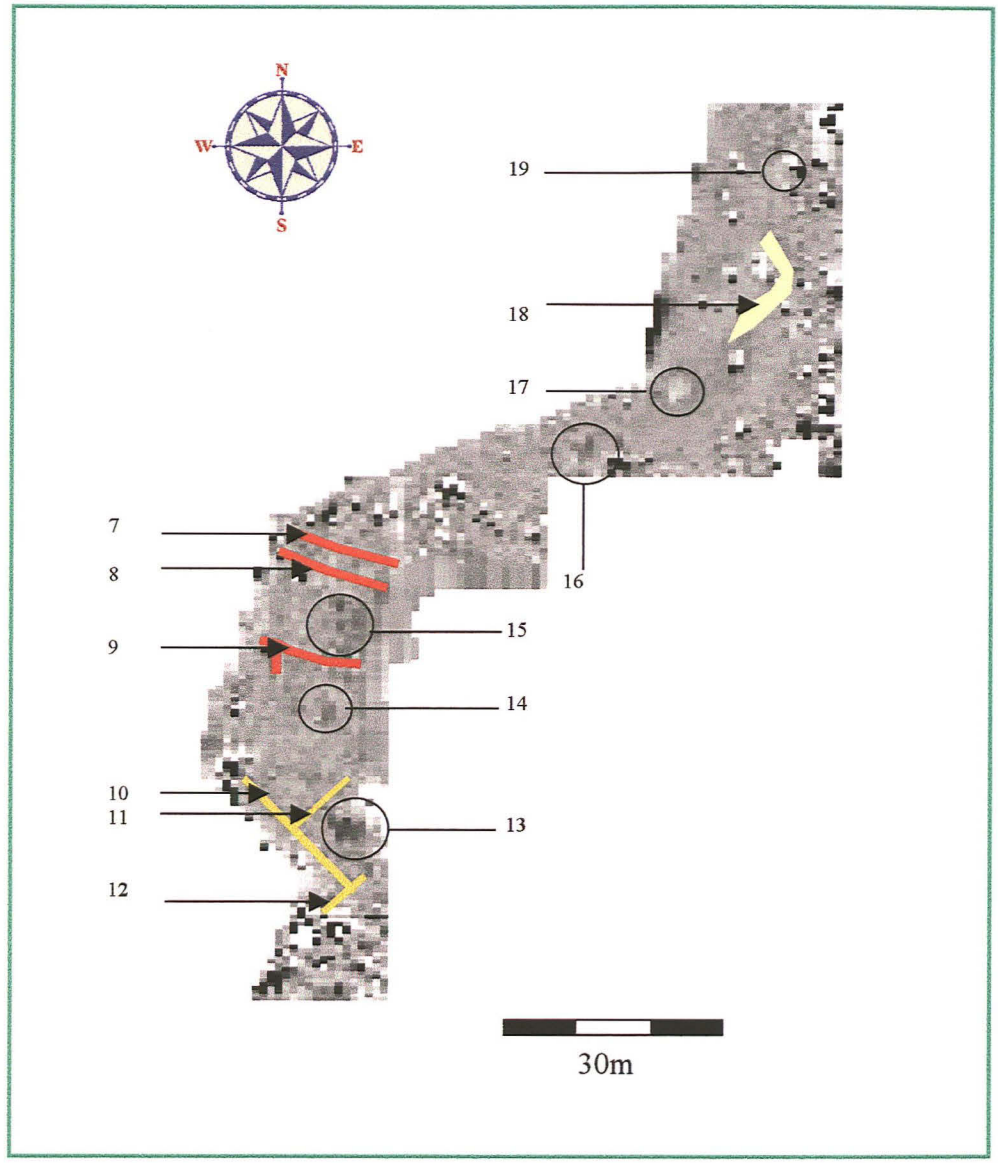

Fig. 6: Interpretive plan showing anomalies of potential archaeological significance. Scale 1:1000

6.0 Conclusions

While the survey detected significant magnetic variation across the site, much of this could be related to modern activity by reference to elements of the surrounding landscape. For example, a few of the anomalies detected appear to represent linear features that have spatial relationships with the properties lying immediately to the west of the site. This would appear to indicate that these are redundant elements of landscape division of relatively recent date.

A small number of irregular anomalies were identified in the northern part of the survey area. Some of these exhibit characteristics consistent with features of natural origin. However, the diversity of ways in which archaeological features are filled, once redundant, indicates that some form of human agency should not be discounted.

7.0 Acknowledgements

Pre-Construct Geophysics would like to extend thanks to Terry Sykes Design and Build for all the help and assistance given during this survey.

8.0 Bibliography

B.G.S. 1995 *Boston, England and Wales Sheet **128**.* Solid and Drift Geology. 1:50,000 Series. Keyworth, British Geological Survey.

Clark, A. J. 1990 *Seeing Beneath the Soil.* London, Batsford.

David, A. 1995 *Geophysical Survey in Archaeological Field Evaluation.* London, English Heritage: Research & Professional Guidelines No.**1**.

Gaffney, C., Gater, J. & Ovendon, S. 1991 *The Use of Geophysical Techniques in Archaeological Field Evaluation.* London, English Heritage: Technical Paper No. **9.**

Mills, A.D. 1993 *English Place Names.* Oxford, Oxford University Press.

Palmer-Brown, C.P.H. 2000 *Land off Morley Lane, Bicker, Lincolnshire: Specification for a Preliminary Field Evaluation in Advance of Residential Development.* Pre-Construct Archaeology (Lincoln) (Unpublished).