

**FLUXGATE GRADIOMETER AND FIELD WALK OVER SURVEYS:
LAND AT FAIRFIELDS INDUSTRIAL ESTATE, LOUTH**

CNGR: 532900,389200

REPORT PREPARED FOR PRE-CONSTRUCT ARCHAEOLOGY

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Table 1: Summary of survey parameters

Summary

- Fluxgate gradiometer and walk over surveys were undertaken on the site of a proposed waste transfer station at Fairfield Industrial Estate, Louth, Lincolnshire.
- The surveys have produced no clear evidence relating to any archaeological activity, where, for the most part, magnetic variation can be identified as reflecting either natural processes or buried ferrous materials.
- Tentative pit-like and ditch-like anomalies were identified in restricted areas but these cannot confidently be interpreted as archaeological remains.

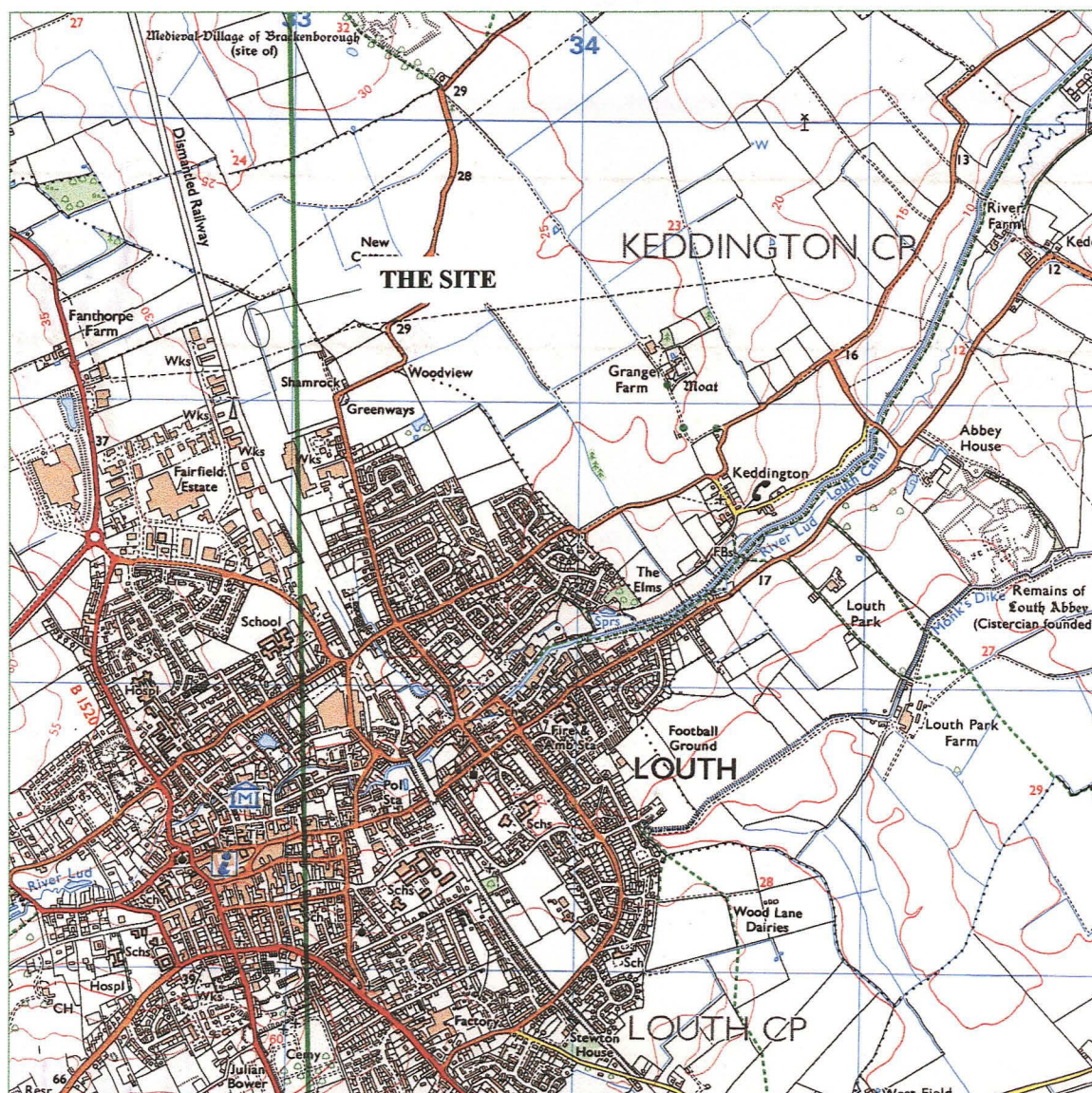


Fig.1: General site location 1:25000

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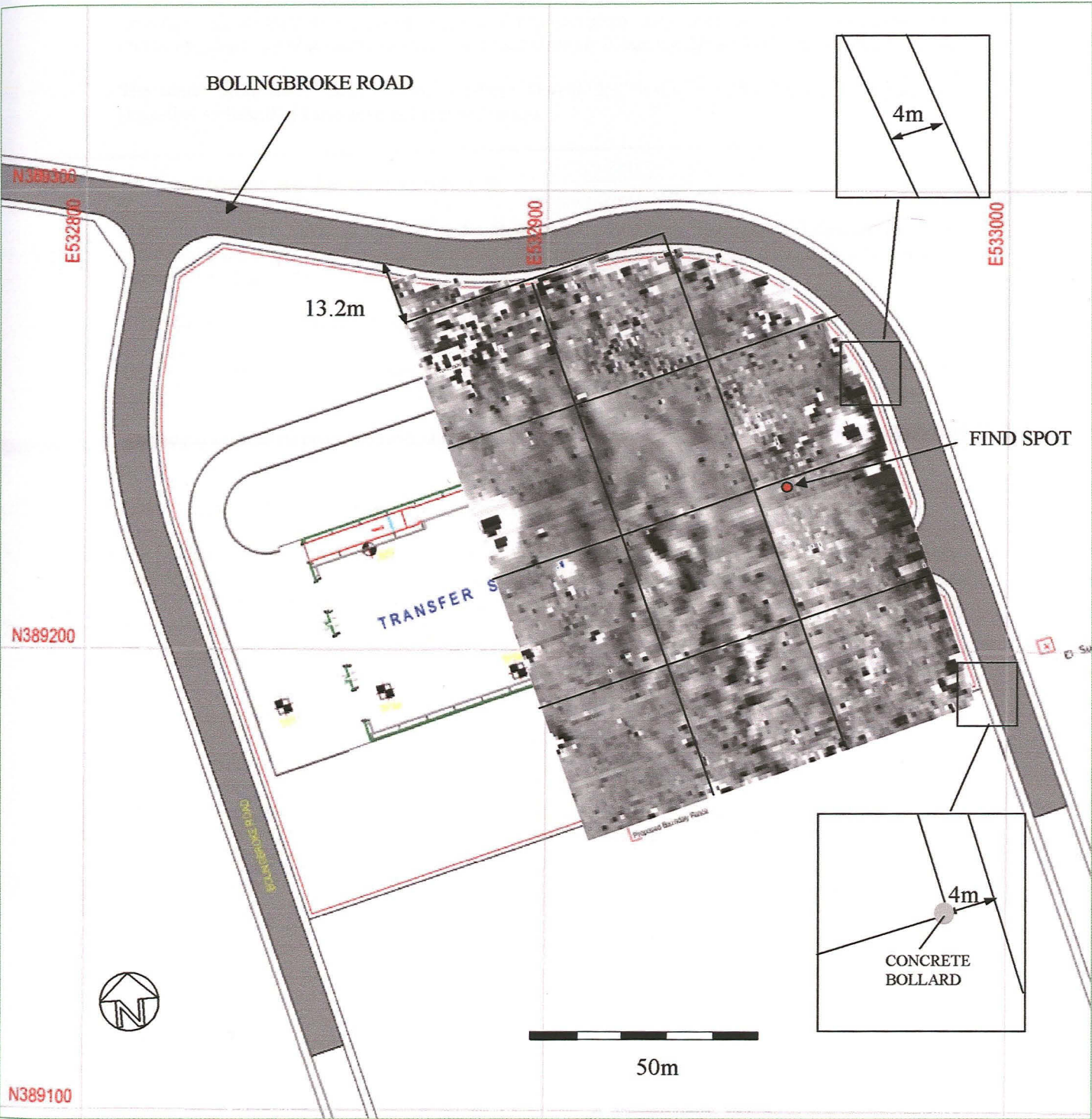


Fig.2: Location of survey

1:1250

1.0 Introduction

This report documents the results of a combined fluxgate gradiometer and walkover survey, undertaken on the proposed site of a waste transfer station at Fairfields Industrial Estate, Bolingbroke Road, Louth.

The works were undertaken by Pre-Construct Geophysics, acting for Pre-Construct Archaeology (Lincoln) on behalf of Lincolnshire County Council.

2.0 Location and description (Figs. 1-2)

Fairfields Industrial Estate is situated at the northern edge of Louth. The proposed development area comprises the northernmost element (c.1.8ha) of an oval-shaped unit of grassland that is bounded by Bolingbroke Road.

A 1ha survey was carried out in the eastern part of the site.

The drift geology of the area comprises glaciofluvial sand and gravel. This overlies solid deposits of Upper Cretaceous chalk (BGS, 1999). Magnetic survey over this type of geology is, at best, average.

The site is centred on NGR: 532955, 389237.

3.0 Archaeological and historical background

The proposed development area falls outside of the modelled archaeological landscape and is generally considered to have a low archaeological potential. However, during pre-development geotechnical works, a relatively large and un-abraded Iron Age pottery sherd was identified. A find such as this (in fresh condition) is unusual and consequently a recommendation was made to further investigate the area by non-intrusive evaluation

4.0 Methodology

4.1 Gradiometer survey

The survey and reporting methodology is based on current best practice, as defined in the English Heritage document *Geophysical Survey in Archaeological Field Evaluation, Research and Professional Services Guideline No.1* (David 1995).

Gradiometry is a non-intrusive scientific prospecting technique; used to establish the presence/absence of some classes of sub-surface archaeological remains (eg pits, ditches, kilns). By scanning the soil surface, geophysicists identify areas of varying magnetic susceptibility and interpret such variation by presenting data in various graphical formats and identifying images that share morphological affinities with diagnostic archaeological remains.

The area survey was conducted using a Bartington Grad – 01 – 1000 dual fluxgate gradiometer with a DL601 data logger 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 sensitivity of the machine was set to detect magnetic variation in the order of 0.1 nanoTesla. The grid was established by manual measurement from permanent features.

Data from the survey has been processed using Archeosurveyor 1.3.1.1; clipped to reduce the distorting effects of extremely high or low readings (caused by discrete pieces of ferrous metal), and processed using zero mean functions to correct the unevenness of the plots in order to give a smoother graphical appearance. It was also processed using an algorithm to remove magnetic spikes, thereby minimising the effect of extreme readings caused by ferrous debris, and spurious effects resulting from the inherent magnetism of some soils.

The results are plotted as colour/greyscale, trace and interpretive images (Figs. 2-6).

| | |
|-------------------------|---|
| Instruments | Bartington Grad – 01 – 1000 dual fluxgate gradiometer, with DL601 data logger |
| Grid size | 30m x 30m |
| Sample interval | 0.25m |
| Traverse interval | 1.0m |
| Traverse method | Zigzag |
| Sensitivity | 0.1nT |
| Processing Software | Archeosurveyor 1.3.1.1 |
| Area Surveyed | 1ha |
| Date of survey | 25/09/06 |
| Survey personnel | Peter Heykoop |
| National Grid Reference | Centred on 532900,389200 |

Table 1: Summary of survey parameters

4.2 Walkover survey

The walkover survey was undertaken at 2m traverse intervals across the target area. Notes on the topography of the site and ground cover were made, and the location of any archaeological artefacts plotted to $\pm 0.5\text{m}$.

5.0 Results

5.1 Gradiometer survey (Figs 2-6)

Results throughout the central part of the survey are characterised by an amorphous zone of magnetic variation (Fig. 6: boxed in green). For the most part, this variation almost certainly is a reflection of natural features/processes, probably indicating that there are alluvial deposits over wide areas.

Readings indicative of ferrous objects/zones of varying amplitude were encountered elsewhere: as discrete anomalies (circled in pink), along the northern and eastern boundary (pink line) and as groups of anomalies in the northern part of the survey (boxed in pink). It is likely that the latter reflects sub-surface deposits of rubble and/or iron.

Just a few pit/ditch-like anomalies were recorded towards the south-eastern corner of the survey (highlighted in red). The interpretation that these features may be of archaeological interest is offered cautiously, given their limited resolution and an apparent absence of archaeological anomalies elsewhere.

5.2 Walkover survey

The presence of dense vegetation prevented an effective visual assessment of the surface. As such, no finds or features of potential archaeological significance were recorded. Slight topographic variation was noted across the site, but this appeared to be the result of recent landscaping rather than reflecting the presence of any earthwork features of greater significance.

6.0 Conclusions

It is concluded that the majority of magnetic anomalies recorded reflect natural variations within the subsoil, or deposits containing modern ferrous materials. A very low number of anomalies exhibit limited potential as buried pits and a ditch, although these features, which have magnetic signatures that are not at variance with those associated with archaeological activity, may also be of natural origin (there is no patterning present upon which to hang an archaeological interpretation).

With reference to the geophysical evidence, it is concluded that the site in general has low archaeological potential. The usefulness of the walk over survey was virtually nullified by dense ground cover. It is noted, however, that Iron Age pottery has been recovered from this site, but that a context for this find has not been forthcoming in the geophysics data

7.0 Acknowledgements

Pre-Construct Geophysics would like to thank Lincolnshire County Council for this commission.

8.0 Bibliography

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- Clark, A. J. 1990 *Seeing Beneath the Soil*. London, Batsford.
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- Gaffney, C., Gater, J. & Ovendon, S. 1991 *The Use of Geophysical Techniques in Archaeological Field Evaluation*. London, English Heritage: Technical Paper No. 9.

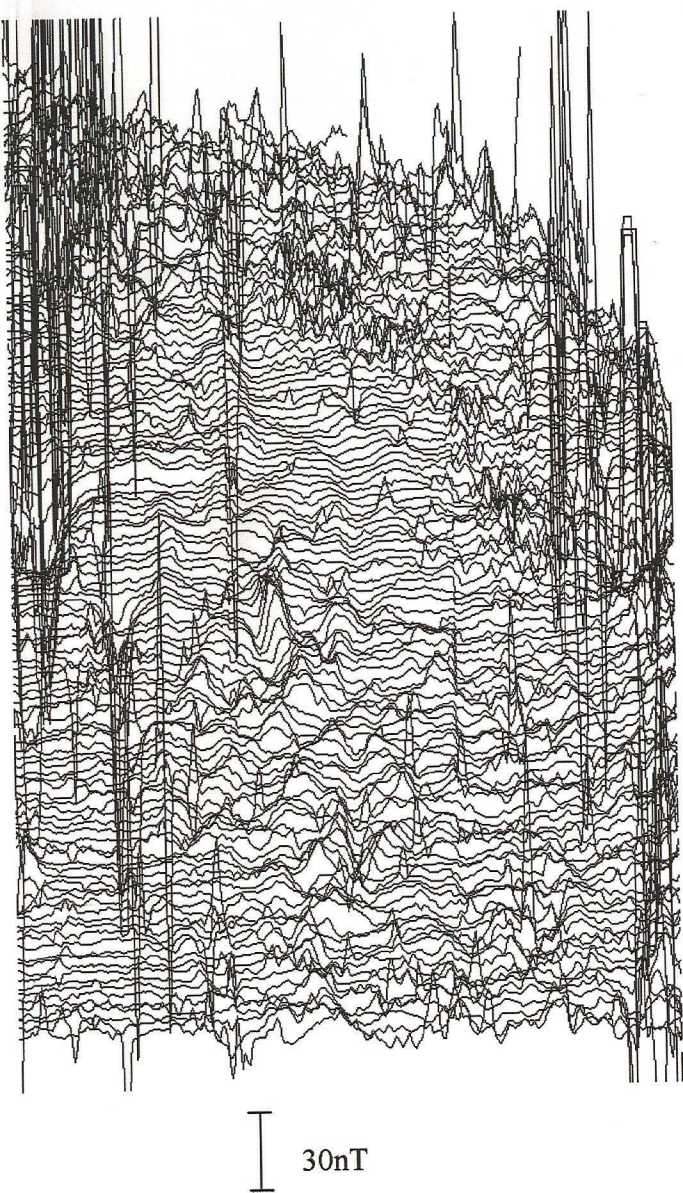


Fig.3: Trace plot
(data clipped to +/-100nT)

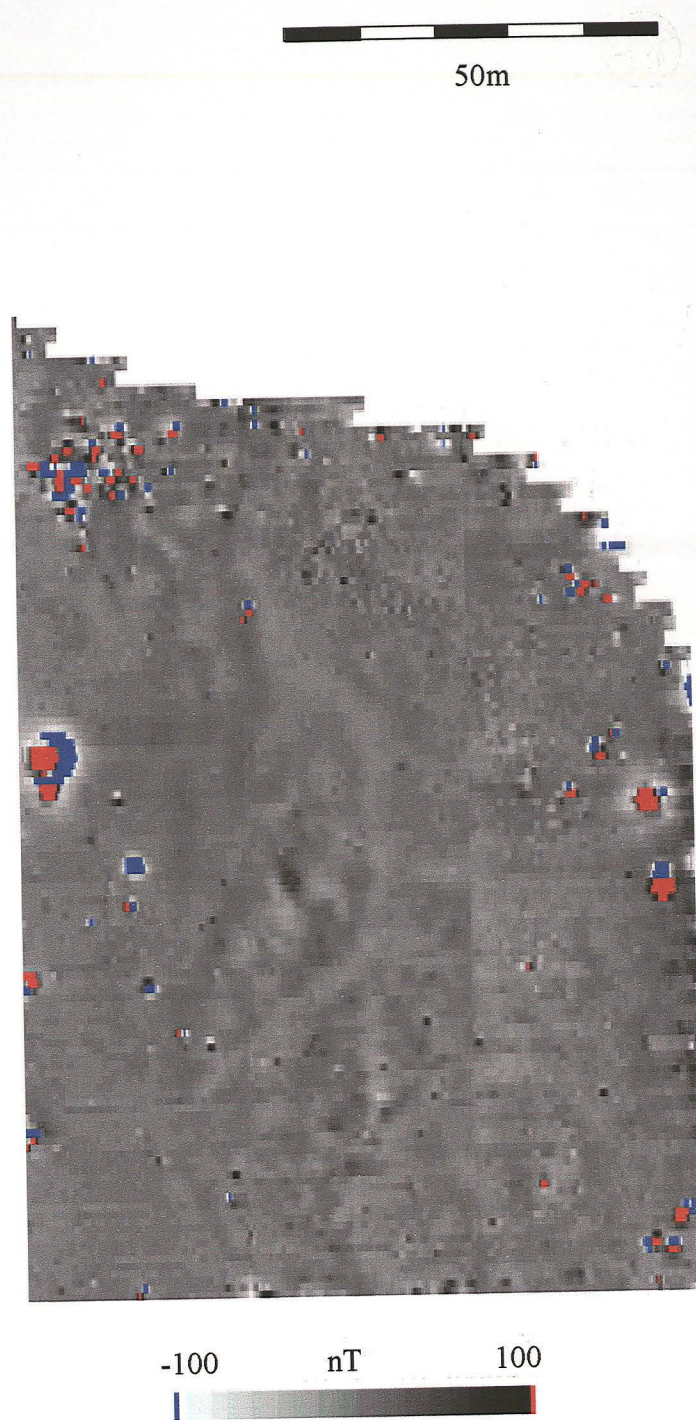


Fig.4: Colourscale image
(data clipped to +/-100nT)

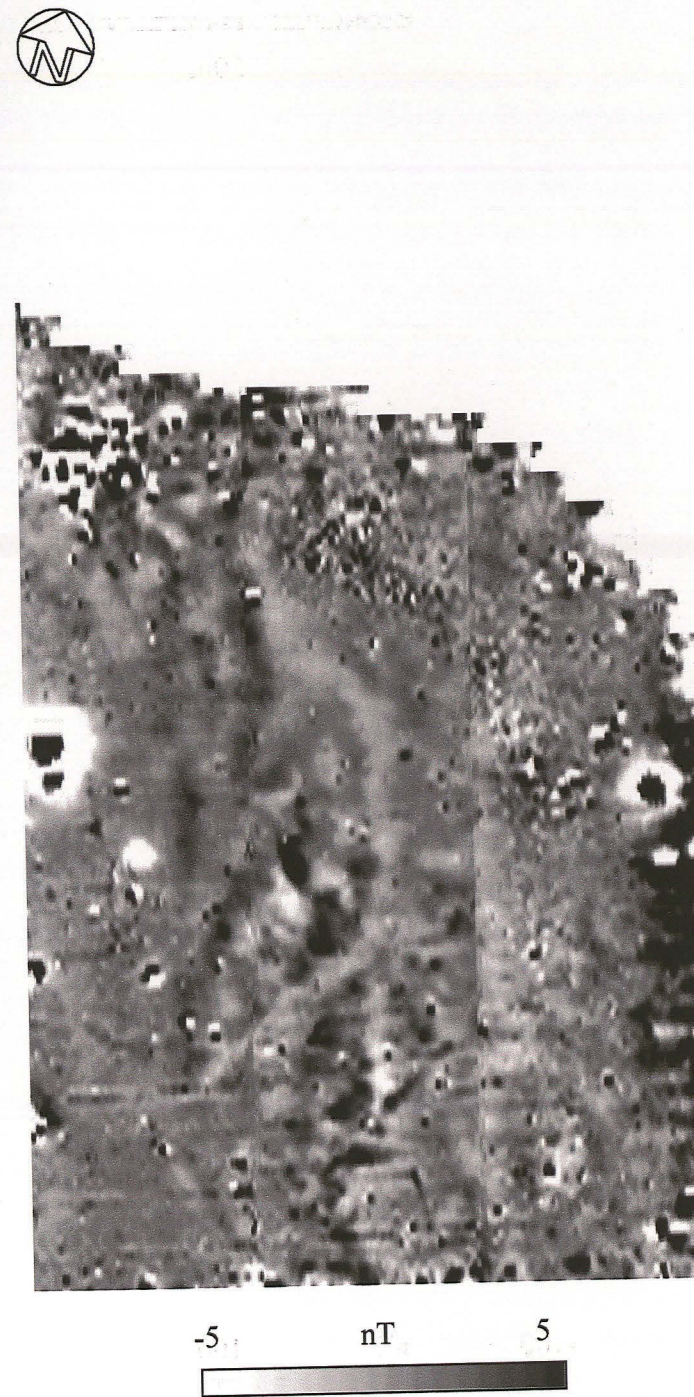


Fig.5: Greyscale image
(data clipped to +/-5nT)

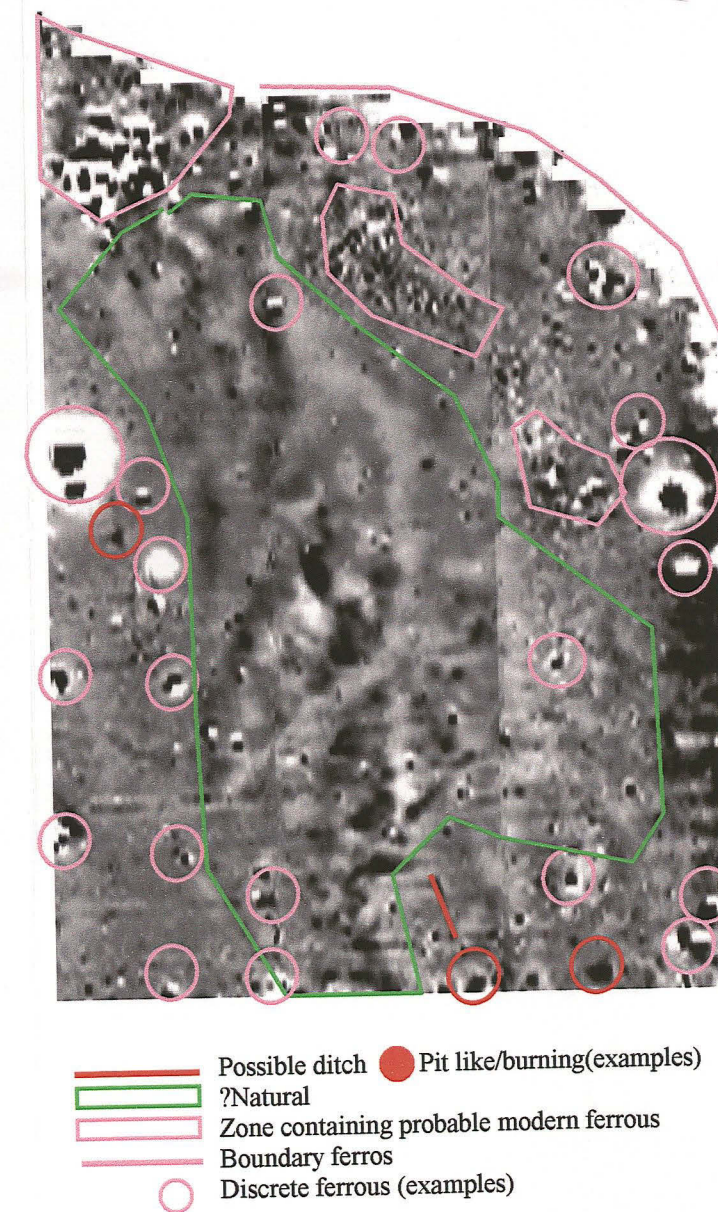


Fig.6: interpretive image