

52842 } Roman
54247 }
50348 Prehistoric
54248 Medieval

97/15

Source LI 3455
Event LI 2855

LAND AT GREETWELL, LINCOLNSHIRE

MAGNETOMETER (GRADIOMETER) SURVEY

SURVEY REF: 1230897/GRL/BUT

PRODUCED BY OXFORD ARCHAEOTECHNICS

under the direction of

A.E. Johnson *BA (Hons)*

Commissioned by

BUTTERLEY AGGREGATES LIMITED

OCTOBER 1997

OXFORD ARCHAEOTECHNICS

Lincolnshire County Council
Archaeology Section

31 OCT 97

12 Friars Lane
LINCOLN LN2 5AL

Tel: 01522 575292 Fax: 01522 530724

SPECIALIST ARCHAEOLOGICAL FIELD EVALUATION

OXFORD ARCHAEOTECHNICS LIMITED

NOKE

OXFORD OX3 9TX

Tel & Fax: 01865 375536

Mobile: 0831 383295

E-mail: archaeotechnics@dial.pipex.com

CONTENTS

	SUMMARY	1
1.	INTRODUCTION	2
2.	MAGNETIC SURVEY DESIGN	3
3.	MAGNETOMETER (GRADIOMETER) SURVEY RESULTS	4
4.	CONCLUSIONS	6
	REFERENCES	7
	APPENDIX: Magnetic Techniques - General Principles	7
	FIGURES	

SUMMARY

Magnetometer survey was carried out on land at Greetwell, Lincolnshire, close to the eastern outskirts of Lincoln (centred on NGR 500600 372500), in advance of a proposed extension to the neighbouring limestone quarry. The survey was commissioned to determine the extent and geometry of subsurface features detected during previous selective geophysical work carried out in December 1993; the results of the previous work have been integrated into the present report to aid interpretation.

The second phase of survey work has extended the total area investigated by magnetometry to 8.2 ha (55 % of the total application area).

The extended survey has allowed a broader understanding of the dynamics of the topsoil magnetic susceptibility patterns, and has identified a series of features relating to earlier landscape organisation. A length of some 400 m of the previously known triple ditch system (possibly later prehistoric in date) has now been traced. Knowledge of features identified in previous survey work has been extended, although relatively few additional features have been identified.

1. INTRODUCTION

- 1.1 Oxford Archaeotechnics Limited were commissioned by Butterley Aggregates Limited to undertake magnetometer (gradiometer) survey on land at Greetwell, Lincolnshire, in advance of a proposed extension to the neighbouring limestone quarry (Greetwell Quarry). The survey work was carried out in August 1997.
- 1.2 The survey area (centred on NGR 500600 372500) lies upon a prominent limestone rise (c.35 m AOD) on the northern edge of the Witham Valley, close to the eastern outskirts of Lincoln (c.3 km east of Lincoln cathedral) and immediately east of the existing (Butterley Aggregates Limited) quarry. The location is shown on Fig. 1.
- 1.3 The objectives of the survey were to determine the extent and geometry of subsurface features within areas of contrasting topsoil magnetic susceptibility enhancement first detected by Oxford Archaeotechnics in December 1993, at which time the whole of the application area (15 ha) was mapped by topsoil magnetic susceptibility survey and a total of 2.8 ha investigated by detailed magnetometry. The topsoil magnetic susceptibility map had identified three patterns of topsoil enhancement indicative of former anthropogenic activity, one of which within the northwest quadrant of the survey area was shown by gradiometer survey to contain underlying 'cut' features of a fairly substantial complex of enclosures containing possible structural elements, which from their morphology and surface finds may be attributed to a probable Romano-British date; there was also some hand augered evidence for industrial working on the site (although not necessarily contemporary). Further limited gradiometer survey (also in 1993) above the other two foci of magnetic susceptibility enhancement provided more equivocal results, one yielding no obvious evidence for cut features, although the distribution of artefacts and burnt limestone on the field surface at this location hinted at the presence of dispersed archaeological material in the vicinity, the other proximal to the buried foundations of a former electricity pylon and modern ferrous contamination.

- A band of low susceptibility soils running in a c.50 m wide band from northwest - southeast crossing the western part of the field was subsequently shown by gradiometer survey to apparently represent ploughed-down bank material derived from the course of a triple ditch system (three parallel and often sinuous linears) known from aerial photographs, lengths of which have been observed as discontinuous cropmarks both within the survey area and extending to the north and northwest, across the parishes of Greetwell, Nettleham and Grange de Lings, for a distance of at least 4 km (Everson 1983), forming what would have been a major landscape boundary. The origins of this ditch system are uncertain, although a later prehistoric (Iron Age) date has been suggested (Pickering 1978). Limited excavation across the ditches in advance of a pipeline at Riseholme Lane, Nettleham in 1993 yielded a small quantity of Late Iron Age and Romano-British pottery sherds (information supplied by Lindsey Archaeological Services). Previous archaeological investigation (1979) closer to the survey area (c.750 m north) at Nettleham Glebe, on the north side of the A15 confirmed that the ditches were not continuous, and revealed a possible associated cluster of postholes, although no conclusive dating evidence was found (Field 1980).
- 1.4 In addition to the known cropmarks, a desktop archaeological assessment has demonstrated the general archaeological potential of the Greetwell area (Filmer-Sankey 1992): its proximity to the legionary fortress/major Roman town and thriving medieval city of Lincoln; its geology, providing accessible sources of both limestone and ironstone from the medieval period onwards (and possibly earlier; CLAU 1992); and its topographic location above a significant crossing point of the River Witham immediately downstream from Lincoln, which may have held particular importance in either a very early or late Roman military context.
 - 1.5 The present survey comprised detailed gridded magnetometry over the core of the application area and in areas of contrasting topsoil magnetic susceptibility not covered

by the previous investigation. The results from both the current and previous geophysical work have been incorporated into the present report to aid interpretation. The location of the present survey area and its relationship with previous survey results is shown on Fig. 1. An explanation of the techniques used, and the rationale behind their selection, is included in an Appendix to the present report.

- 1.6 The geology comprises Middle Jurassic Lincolnshire Limestone above ironstone of the Northampton Sands. Observation of exposures in the nearby quarry has revealed that the uppermost strata comprise massive blocky to flaggy limestone (Blue and Silver Beds); the bedding intervals are quite variable (in the range c.1.0 - 0.01 m). Overburden is a stony clay loam.
- 1.7 The majority of the application area covers a single modern field originally subdivided by a boundary on a northeast - southwest axis (mapped until recently; OS Field 6455 to the north and 7332 to the south), together with a small triangular-shaped portion of the adjacent field to the south (OS Field 8000). The southwestern angle of the field and the western field (and parish) boundary as mapped by the OS are no longer extant, having been replaced by a wire fence marking the quarry edge (see Fig. 6). The land was under oilseed rape stubble at the time of survey; the western half of the field had been freshly disc-harrowed immediately prior to survey which restricted survey work.

2. MAGNETIC SURVEY DESIGN

- 2.1 Survey control was established to the National Grid by EDM Total Station.
- 2.2 Detailed gridded gradiometer survey was undertaken using a Geoscan Research FM 36 Fluxgate Gradiometer (sampling 4 readings per metre at 1 metre traverse intervals in the 1 nT range). The 1 nT range was selected both to permit integration with previous gradiometer survey results, and to avoid excessive soil 'noise' from the disc-harrowed field surface. The nanotesla (nT) is the standard unit of magnetic flux (expressed as the current density), here used to indicate positive and negative deviations from the Earth's normal magnetic field.
- 2.3 The original 2.8 ha survey area was extended to cover a total area of 8.2 ha. Where appropriate, data from the previous survey was utilised and incorporated, whilst in some cases it was necessary to re-survey part of the original area in order to maximise information and provide a composite local data set. An interpretation of results is shown on Fig. 5 and an overview on Fig. 6. The topsoil magnetic susceptibility data has also been re-processed, with soil contours at 10 SI intervals (Fig. 2), and comparison made between the principal topsoil magnetic susceptibility contours and the gradiometer survey results (Fig. 4).
- 2.4 Field conditions at the time of the present survey dictated a change in magnetometer traverse direction. Whilst having no appreciable effect in the processing and presentation of the grey scale image (Fig. 3), the change in traverse direction has made it impractical to fully integrate the stacked trace plots from both surveys; for this reason the new survey data is shown as a stacked trace plot (raw data) on Fig. 7, and the reader is referred to the earlier report for previous results (Johnson 1994: Figs. 5 & 6).

- 2.5 No significant new 'targets' were identified which warranted hand augering; hand augering results from the principal features within the core activity area were recorded in the previous survey (Johnson 1994: Appendix & Fig.12).

3. MAGNETOMETER (GRADIOMETER) SURVEY RESULTS

- 3.1 A total area of 8.2 ha (55 % of the application area) has now been investigated by detailed gridded gradiometer survey. The location of the survey grids and their relationship to previous gradiometer work is shown on Figs. 1 & 6.
- 3.2 The majority of the anomalies were recorded in the range -2 to +2 nT, with a previously recorded single (burnt) feature ranging up to +10 nT.
- 3.3 The extended gradiometer survey has confirmed that the focus of activity lies within the area defined by the previous survey (Johnson 1994:Area A), comprising: numerous linears; several enclosures, some of which may contain structural elements; a strong anomaly which was demonstrated by hand augering to contain fired clay, burnt material and quantities of hard coal; weaker curvilinear elements; and areas of possible pitting. This focus for the most part lies orthogonal to, and in part apparently overlies, the course of a (probable later prehistoric) triple ditch system. Apart from a series of irregular and extremely tenuous lineations only a relatively small number of features with potential archaeological significance have been added, including a small ring form approximately 10 m in diameter (centred on NGR 500630 372545), perhaps a ploughed-down prehistoric burial mound.
- 3.4 With the exception of the continuation of a previously recorded northeast - southwest linear, and the definition of a 'scar' (perhaps resulting from a former agricultural boundary) no further 'cut' features were detected within an area of magnetically enhanced topsoils within the northeastern part of the field; it is now seen as significant that this linear provides a clear boundary between soils with varying magnetic susceptibility. The topsoil magnetic susceptibility focus at the extreme northeastern

edge of the survey area may be attributable to modern disturbance associated with the modern farm track.

3.5 The southward extension of the survey area revealed a further 200 m stretch of continuous triple ditches within a zone of low magnetic susceptibility topsoils, whilst to the east of the ditch system, within an area of generally magnetically enhanced topsoils the gradiometer revealed sinuous linears, probably former agricultural features. A small focus of magnetically enhanced soils lying immediately north of the former pylon appears to be associated with a pocket of local magnetic disturbance, although it is not clear whether this is of modern origin.

3.6 Multiple striations representing two distinct agricultural patterns are visible over much of the gradiometer plot. One series of linears on a northeast-southwest alignment and spaced 8 - 10 m apart appear to be the furrow bases of former (Medieval or later) ridge and furrow cultivation. A second set of more closely spaced perpendicular linear striations, aligned with the longitudinal axis of the modern field, are of more recent agricultural origin. Some 'containment' of the ridge and furrow-like cultivation pattern is apparent at both the southwest and northern edges of the gradiometer survey area; the boundaries are represented by magnetic 'scars', which on the southwest may mark a former headland (reference to the topsoil magnetic susceptibility plot, Fig. 2, shows dispersal and containment of contrasting magnetic soils within the former cultivation blocks). West of this feature, an area of topsoil magnetic enhancement extends as far as the present western boundary of this field. Within this zone gradiometer survey detected an area of disturbed ground and possible pitting. A ditch, together with what may be a ploughed down bank, running just inside the wire fence which presently defines the eastern extent of the quarry edge is visible along the extreme southwestern edge of the gradiometer plot.

3.7 A previously undetected weak linear infilled with material of relatively low magnetically susceptibility is visible as a continuous linear crossing the whole of the gradiometer survey area from northwest to southeast. This former ditch appears to be unassociated with other linears and alignments detected by gradiometer; there is a slight suggestion of topsoil magnetic susceptibility pattern on a similar trend in this general location.

3.8 An extremely weak magnetic anomaly crossing the centre of the survey area can be traced for a distance of some 200 m running on a SSW-NNE trend before curving WNW and continuing for at least another 100 m. There is a subtle difference in the magnetic identity of the enclosure delineated, with the immediate interior slightly more magnetically 'stable' than the soils outside to the east and north.

3.9 What appears to be a second (smaller) ring form, c.5 m in diameter (centred on NGR 500695 372260) is visible on the line of the triple ditches on the extreme southern boundary of the gradiometer survey area, apparently overlying the easternmost ditch.

4. CONCLUSIONS

- 4.1 Although important additional detail has been added to the previous magnetometer survey, much of the newly surveyed area has been demonstrated to be relatively 'quiet', providing little magnetic evidence for extensive archaeological features beyond the 'core' activity area defined in the original survey.
- 4.2 The triple ditch system has been revealed more distinctly, and can now be traced as a continuous feature with no obvious breaks for a distance of some 400 m. Although its relationship with the area of archaeological potential defined in the original survey work is not absolutely clear, local eradication of the magnetic signal from the ditches suggests that considerable superimposition has taken place, resulting in truncation of earlier archaeological deposits.
- 4.3 Of the two newly discovered ring forms the larger may, on morphological grounds, be earlier prehistoric (Bronze Age) in date, suggesting further (albeit sporadic) activity on the site. The smaller ring appears to overlies part of the triple ditch system, indicating a later date.
- 4.4 The date and function of the enigmatic burnt feature remains uncertain. The survey has shown it to be apparently isolated, with no similar features detected in the vicinity; the presence of coal from a previously hand augered sample suggests that this feature may have been superimposed upon an earlier focus of activity.
- 4.5 The magnetically stable zone defined within two sides of an enclosure with a rounded (northeastern) angle could conceivably be a remnant of an ancient enclosure bank, which on morphological grounds may be compared (tentatively) with Roman military works such as temporary camps. The magnetic evidence gives no indication of an associated ditch, although the possibility of a bank upcast from a shallow ditch

providing a short-lived earthwork cannot be entirely discounted; if proven as such, a temporary Roman camp would be unlikely to retain any obvious internal features.

- 4.6 Gradiometer survey within two areas of topsoil magnetic enhancement which were only selectively investigated during the previous survey (i.e. a c.2 ha block within the centre-east of the survey area, and a zone of enhancement alongside the western boundary associated with a surface scatter of pottery sherds and burnt limestone) show areas of apparently disturbed ground with possible pitting, but few coherent 'cut' features. Local disturbance has been identified associated with a focus of enhanced topsoils lying immediately north of the former electricity pylon base, it is possible that the two are associated. Similarly, local disturbance proximal to the track at the northeastern angle of the field may be modern in origin.
- 4.7 The extended survey work has demonstrated that multiple lineations visible in the previous survey which were difficult to distinguish from the focus of archaeological features sharing a similar alignment represent, in the main, part of the broader ?Medieval agricultural pattern.

REFERENCES

- CLARK, A.J. 1990. *Seeing Beneath the Soil*. B.T. Batsford Ltd: London.
- CLAU 1992. *Lincoln Eastern Bypass: Stage 1. Archaeological and Historical Study*. Report by the City of Lincoln Archaeological Unit to Lincolnshire County Council (October 1992).
- EVERSON, P. 1979. Pre-Roman Linear Boundaries north of Lincoln. *Lincolnshire History and Archaeology* 14:74-5.
- EVERSON, P. 1983. Aerial Photography and Fieldwork in North Lincolnshire. In Maxwell, G. (ed.) *The Impact of Aerial Reconnaissance on Archaeology* CBA Research Report No. 49:London.
- EVERSON, P., TAYLOR, C.C. & DUNN, C. 1991. *Change and Continuity: rural settlement in North-West Lincolnshire* RCHME:London.
- FIELD, N. 1980. Lincoln, Nettleham Glebe. *Lincolnshire History and Archaeology* 15:77-8.
- FILMER-SANKEY, W.P. 1992. *Land at Greetwell, Lincolnshire. Desk-top Archaeological Assessment*. Report by OAA, commissioned by RMC Technical Services Limited (October 1992).
- GALE, S.J. & HOARE, P.G. 1991. *Quaternary Sediments: petrographic methods for the study of unlithified rocks*. Belhaven Press: London (see Section 4.7, pp.201-229, "The magnetic susceptibility of regolith materials").
- JOHNSON, A.E. 1994. *Land at Greetwell, Lincolnshire. Magnetic Susceptibility and Magnetometer Survey*. Survey Ref: 0240293/GRL/BUT. Report commissioned by Butterley Aggregates Limited (March 1994).
- PICKERING, J. 1978. The Jurassic Spine. *Current Archaeology* 64:140-3.
- SCOLLAR, I., TABBAGH, A., HESSE, A. & HERZOG, I. 1990. *Archaeological Prospecting and Remote Sensing*. Cambridge University Press.
- THOMPSON, R. & OLDFIELD, F. 1986. *Environmental Magnetism*. Allen & Unwin: London.
- Gradiometer survey by Oxford Archaeotechnics Limited under the direction of A.E. Johnson BA(Hons), with C. Cole BSc(Hons) and I. Snape BSc (Hons).

APPENDIX 1 - MAGNETIC TECHNIQUES: GENERAL PRINCIPLES

- A1.1 It is possible to define areas of human activity (particularly soils spread from occupation sites and the fills of cut features such as pits or ditches) by means of *magnetic survey* (Clark 1990; Scollar et al. 1990). The results will vary, according to the local geology and soils (Thompson & Oldfield 1986; Gale & Hoare 1991), as modified by past and present agricultural practices. Under favourable conditions, areas of suspected archaeological activity can be accurately located and targeted for further investigative work (if required) without the necessity for extensive random exploratory trenching. Magnetic survey has the added advantages of enabling large areas to be assessed relatively quickly, and is non-destructive.
- A1.2 Topsoil is normally more magnetic than the subsoil or bedrock from which it is derived. Human activity further locally enhances the magnetic properties of soils, and amplifies the contrast with the geological background. The main enhancement effect is the increase of *magnetic susceptibility*, by fire and, to a lesser extent, by the bacterial activity associated with rubbish decomposition; the introduction of materials such as fired clay and ceramics - and, of course, iron and many industrial residues - may also be important in some cases. Other agencies include the addition and redistribution of naturally magnetic rock such as basalt or ironstone, either locally derived or imported.
- A1.3 The tendency of most human activity is to increase soil magnetic susceptibility locally. In some cases, however, features such as traces of former mounds or banks, or imported soil/subsoil or non-magnetic bedrock (such as most limestones), will show as zones of lower susceptibility in comparison with the surrounding topsoil.

- A1.4 Archaeologically magnetically enhanced soils are therefore a response of the parent geological material to a series of events which make up the total domestic, agricultural and industrial history of a site, usually over a prolonged period. Climatic factors may subsequently further modify the susceptibility of soils but, in the absence of strong chemical alteration (e.g. during the process of podzolisation or extreme reduction), magnetic characteristics may persist over millions of years.
- A1.5 Both the magnetic contrast between archaeological features and the subsoil into which they are dug, and the magnetic susceptibility of topsoil spreads associated with occupation horizons, can be measured in the field.
- A1.6 There are several highly sensitive instruments available which can be used to measure these magnetic variations. Some are capable, under favourable conditions, of producing extraordinarily detailed plots of subsurface features. The detection of these features is usually by means of a *magnetometer* (normally a fluxgate gradiometer). These are defined as passive instruments which respond to the magnetic anomalies produced by buried features in the presence of the Earth's magnetic field. The gradiometer uses two sensors mounted vertically, often 50 cm apart. The bottom sensor is carried some 30 cm above the ground, and registers local magnetic anomalies with respect to the top sensor. As both sensors are affected equally by gross magnetic effects these are cancelled out. In order to produce good results, the magnetic susceptibility contrast between features and their surroundings must be reasonably high, thereby creating good local anomalies; a generally raised background, even if due to human occupation within a settlement context, will sometimes preclude meaningful magnetometer results. The sensitive nature of magnetometers makes them suitable for detailed work, logging measurements at a closely spaced (less than 1 metre) sample interval, particularly in areas where an archaeological site is already suspected. Magnetometers may also be used for rapid 'prospecting' ('scanning') of larger areas (where the operator directly monitors the changing magnetic field and pinpoints specific anomalies).

- A1.7 *Magnetic susceptibility measuring systems*, whilst responding to basically the same magnetic component in the soil, are 'active' instruments which subject the sample area being measured (according to the size of the sensor used) to a low intensity alternating magnetic field. Magnetically susceptible material within the influence of this field can be measured by means of changes which are induced in oscillator frequency. For general work, measuring topsoil susceptibility *in situ*, a sensor loop of around 20 cm diameter is convenient, and responds to the concentration of magnetic (especially ferrimagnetic) minerals mostly in the top 10 cm of the soil. Magnetically enhanced horizons which have been reached by the plough, and even those from which material has been transported by soil biological activity, can thus be recognised.
- A1.8 Whilst only rarely encountering anomalies as graphically defined as those detected by magnetometers, magnetic susceptibility systems are ideal for detecting magnetic spreads and thin archaeological horizons not seen by magnetometers. Using a 10 m interval grid, large areas of landscape can be covered relatively quickly. The resulting plot can frequently determine the general pattern of activity and define the nuclei of any occupation or industrial areas. As the intervals between susceptibility readings generally exceed the parameters of most individual archaeological features (but not of the general spread of enhancement around features), the resulting plots should be used as a guide to areas of archaeological potential and to suggest the general form of major activity areas; further refinement is possible using a finer mesh grid or, more usually, by detailing underlying features using a gradiometer.
- A1.9 Magnetic survey is not successful on all geological and pedological substrates. As a rule of thumb, in the lowland zone of Britain, the more sandy/stony a deposit, the less magnetic material is likely to be present, so that a greater magnetic contrast in soil materials will be needed to locate archaeological features; in practice, this means that only stronger magnetic anomalies (e.g. larger accumulations of burnt material) will be

visible, with weaker signals (e.g. from the fillings of simple agricultural ditches) disappearing into the background. Similar problems can arise when the natural background itself is very high or very variable (e.g. in the presence of sediments partially derived from magnetic volcanic rocks).

A1.10 The precise physical and chemical processes of changing soil magnetism are extremely complex and subject to innumerable variations. In general terms, however, there is no doubt that magnetic enhancement of soils by human activity provides valuable archaeological information.

A1.11 As well as locating specific sites, topsoil magnetic susceptibility survey frequently provides information relating to former landuse. Variations in the soils and subsoils, both natural and those enhanced by anthropogenic agencies, when modified by agriculture, give rise to distinctive patterns of topsoil susceptibility. The containment of these spreads by either natural or man-made features (streams, hedgerows, etc.) gives rise to a characteristic chequerboard or strip pattern of varying enhancement, often showing the location of former field systems, which persist even after the physical barriers have been removed. These patterns are often further amplified in fields containing underlying archaeological features within reach of the plough. More subtle landuse boundaries and indications of former cultivation regimes are often suggested by topsoil magnetic susceptibility plots.

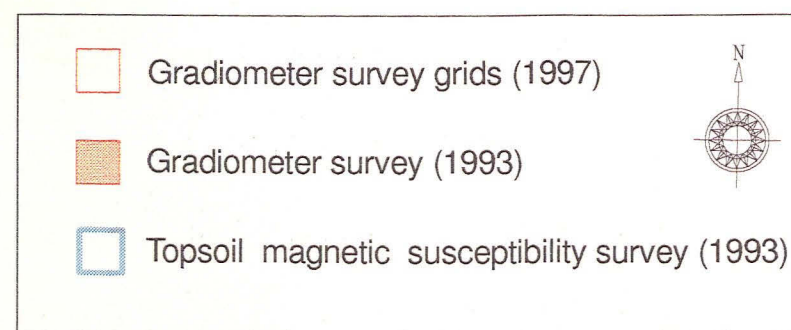
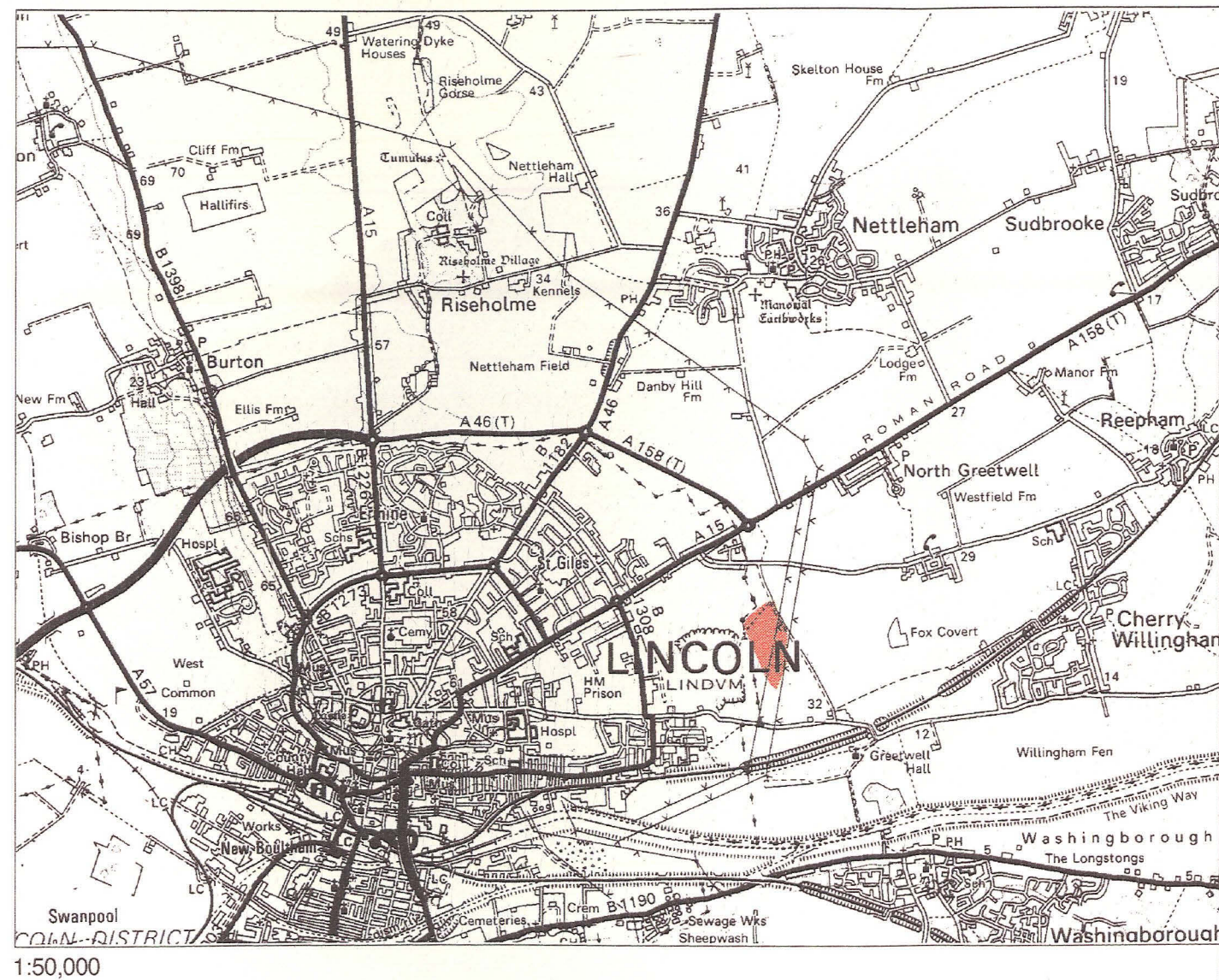
A1.12 Where a general spread of magnetically enhanced soils contained within a long-established boundary becomes admixed over a long period by constant ploughing, it can be diffused to such a point that the original source is masked altogether. Magnetically enhanced material may also be moved or masked by natural agencies such as colluviation or alluviation. Generally, it appears that the longer a parcel of land has been under arable cultivation, the greater is the tendency for topsoil susceptibility to increase; at the same time there is increasing homogeneity of the magnetic signal within

the soils owing to continuous agricultural mixing of the material. Some patterns of soil enhancement derived from underlying archaeological features are, however, apparently capable of resisting agricultural dispersal for thousands of years (Clark 1990).

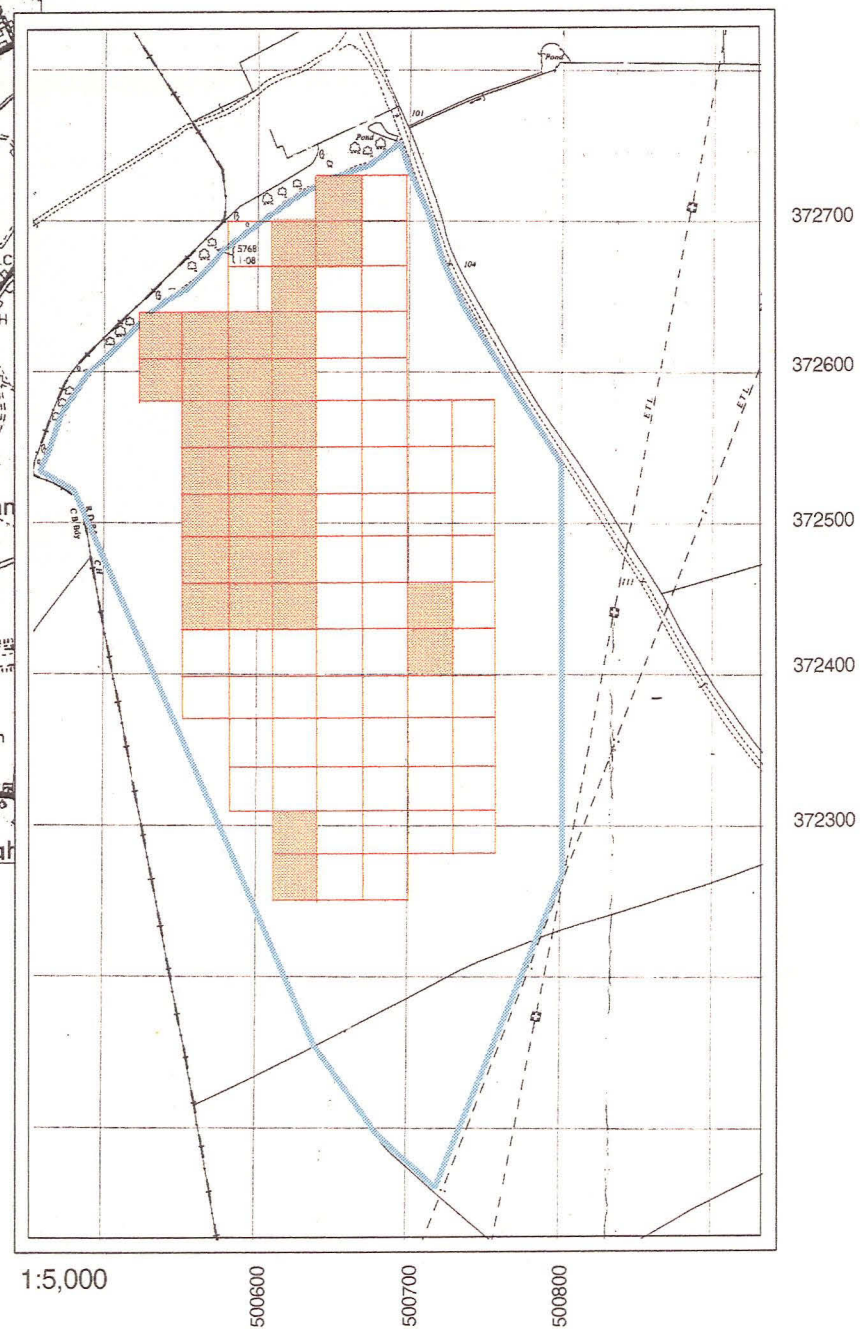
FIGURE CAPTIONS

- Figure 1. Location maps. Scale 1:50,000 and 1:5,000. Based upon OS 1:50,000 Map 121, and OS 1:2500 Sheet TF 0072, reduced to 1:5000 scale.
- Figure 2. Topsoil magnetic susceptibility survey: colour contour plot. Scale 1:2500.
- Figure 3. Magnetometer (gradiometer) survey: grey scale plot (Geoscan Research Geoplot Licence No. GPB 885-6). Scale 1:1250.
- Figure 4. Magnetometer (gradiometer) survey: relationship with topsoil magnetic susceptibility survey (Geoscan Research Geoplot Licence No. GPB 885-6). Scale 1:2500.
- Figure 5. Magnetometer (gradiometer) survey: interpretation (Geoscan Research Geoplot Licence No. GPB 885-6). Scale 1:2500.
- Figure 6. Magnetometer (gradiometer) survey: overview (Geoscan Research Geoplot Licence No. GPB 885-6). Scale 1:5000 and 1:2500.
- Figure 7. Magnetometer (gradiometer) survey: stacked trace plot (raw data) (Geoscan Research Geoplot Licence No. GPB 885-6). Scale 1:1250.

Greetwell Lincolnshire, Magnetometer (gradiometer) Survey

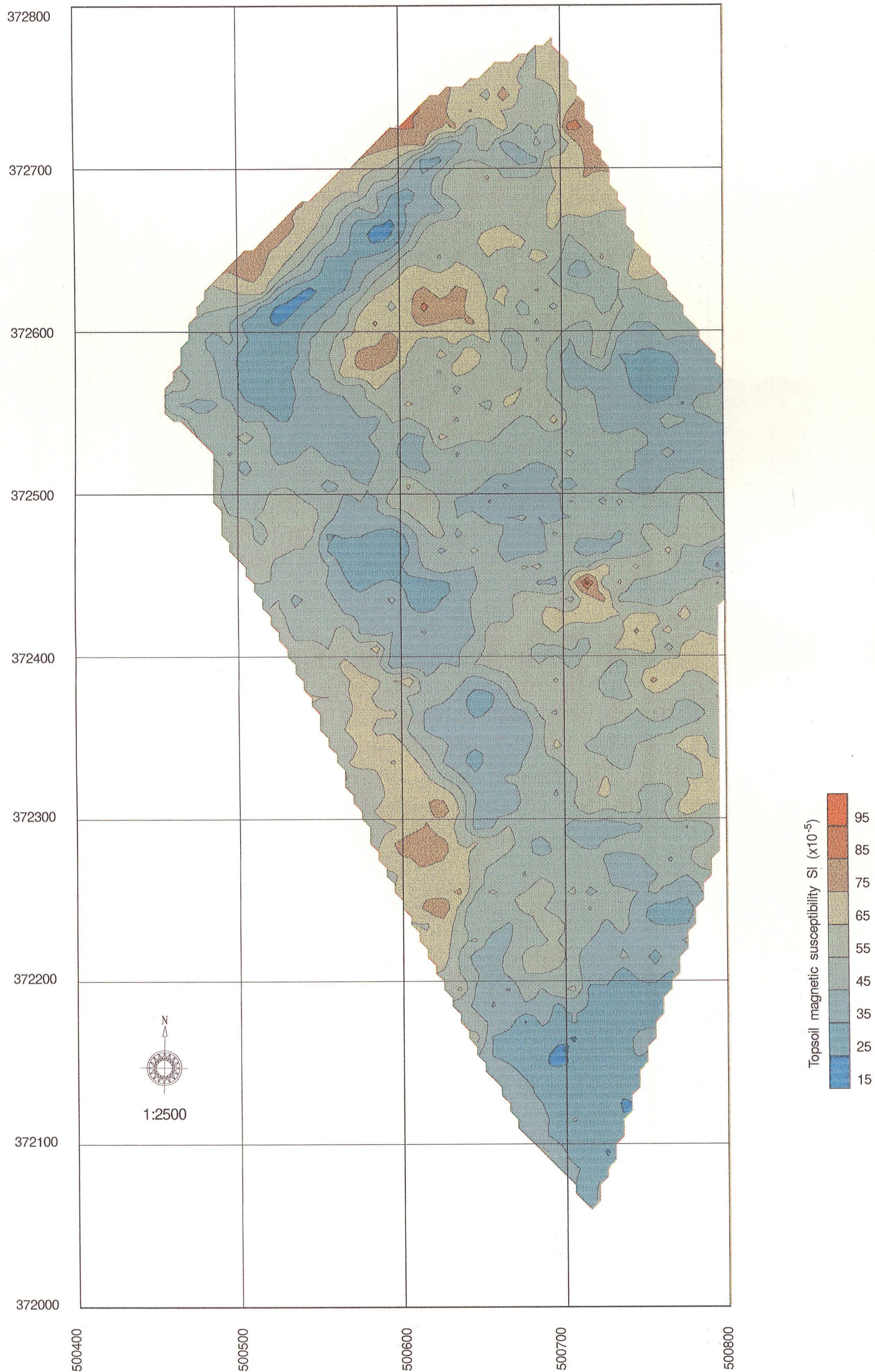


Location



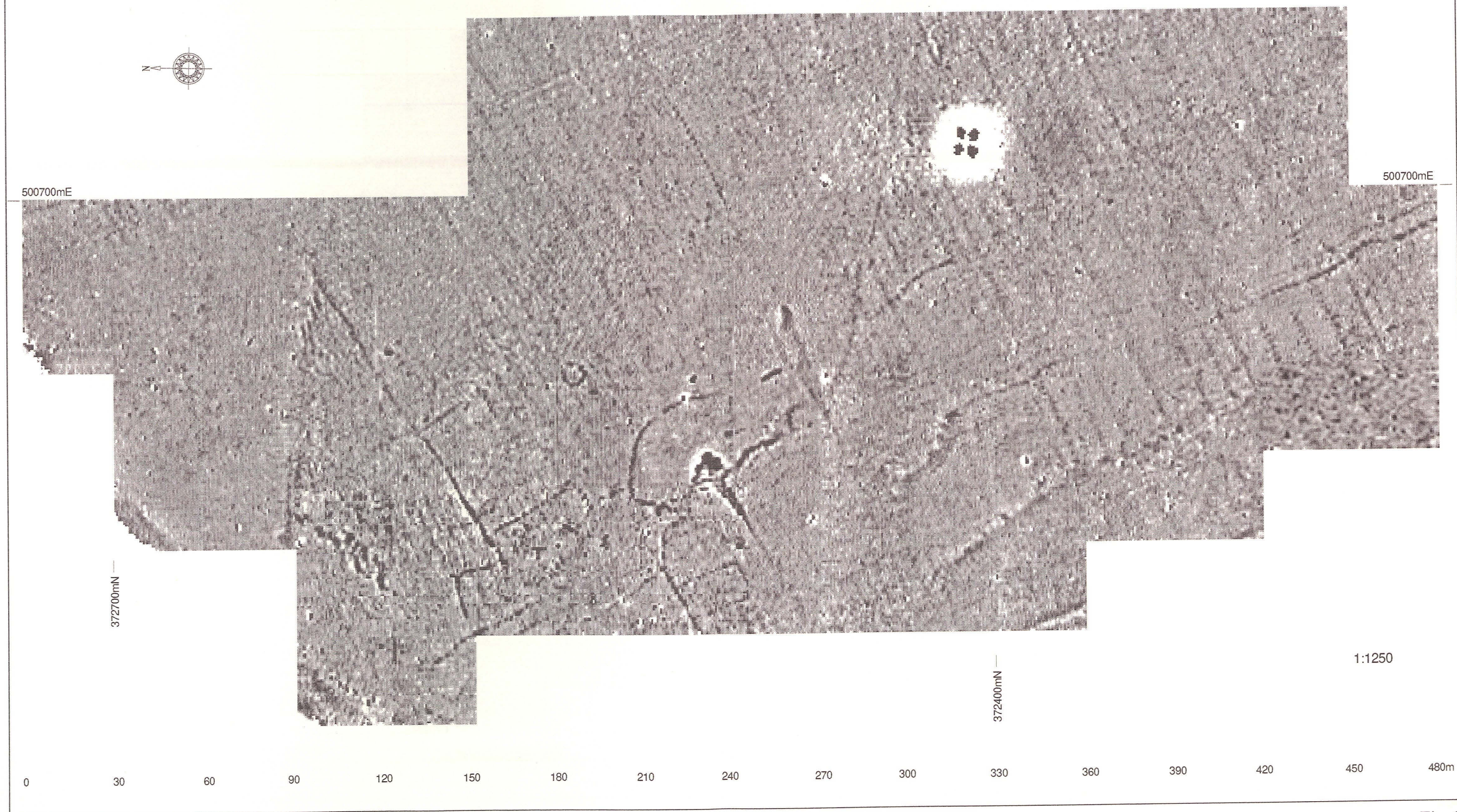
Greetwell Lincolnshire, Topsoil Magnetic Susceptibility Survey

Soil magnetic susceptibility contours



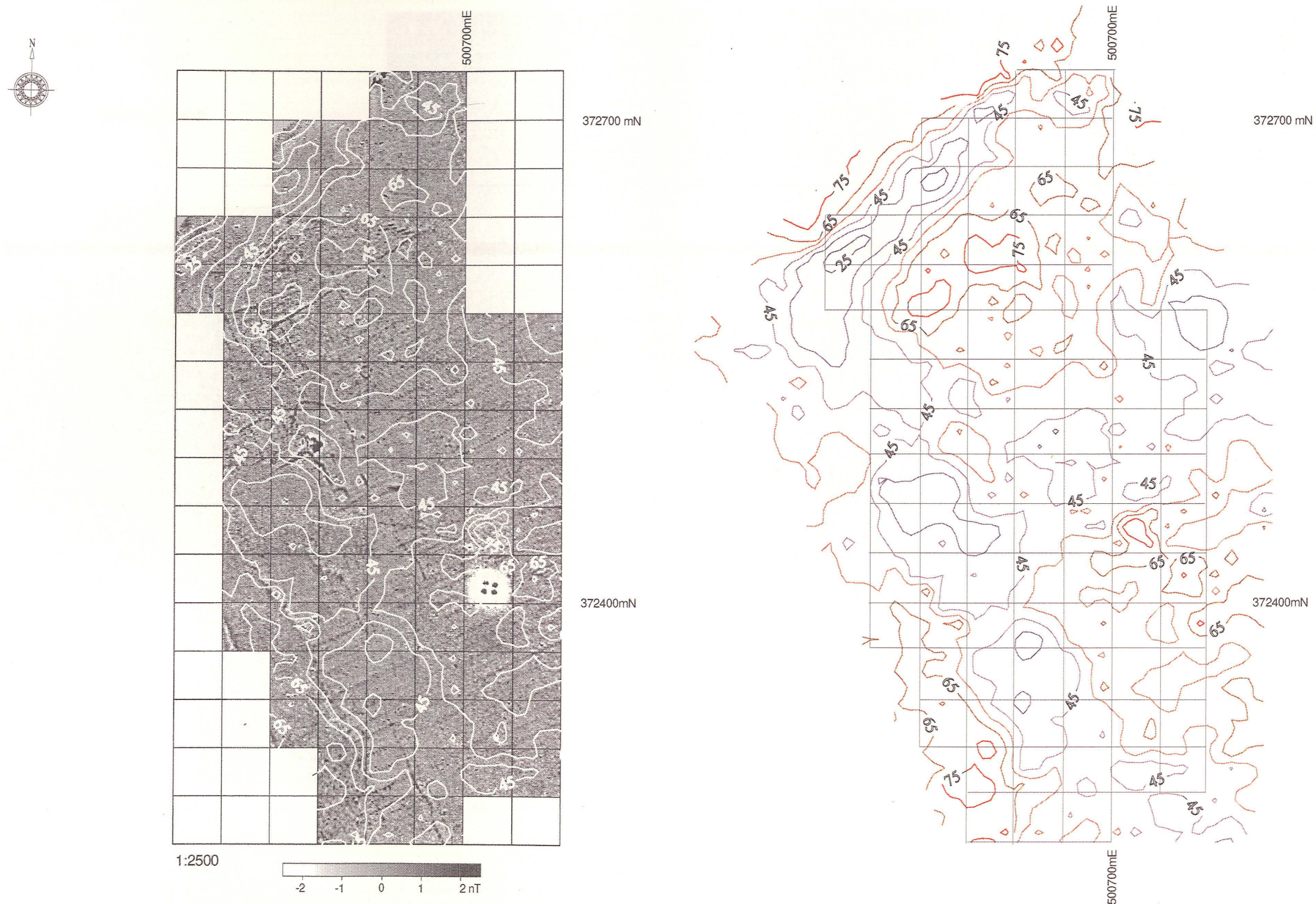
Greetwell Lincolnshire, Magnetometer (gradiometer) Survey

Gradiometer Survey: Grey Scale Plot



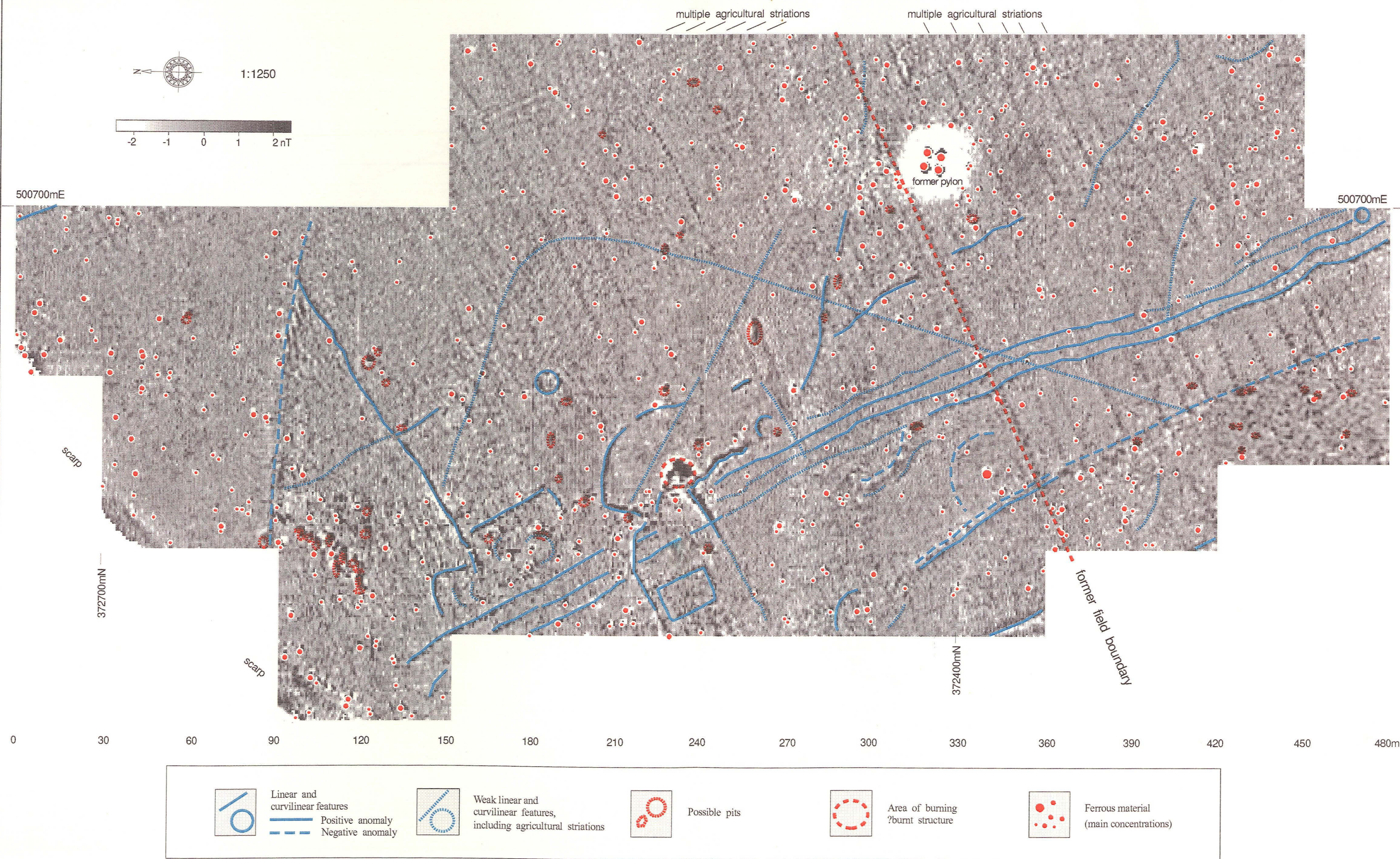
Greetwell Lincolnshire, Magnetometer (gradiometer) Survey

Gradiometer survey: Relationship with topsoil magnetic susceptibility survey



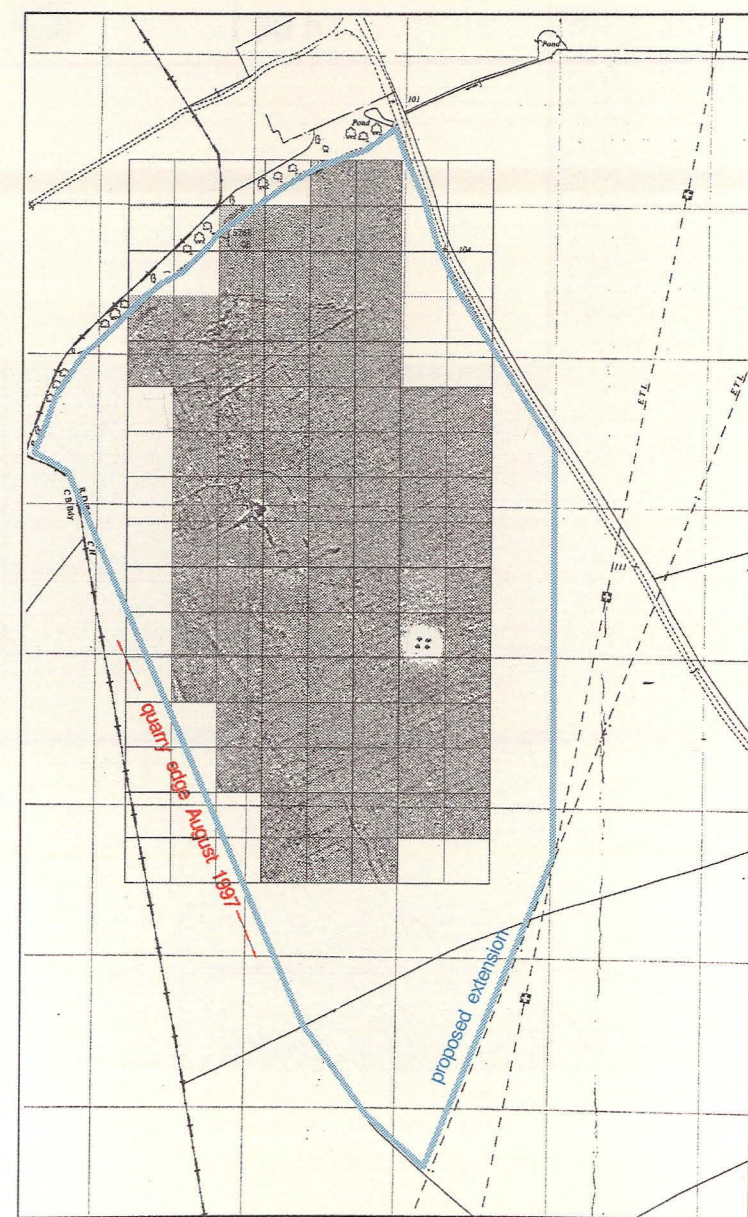
Greetwell Lincolnshire, Magnetometer (gradiometer) Survey

Grey Scale Plot: Interpretation

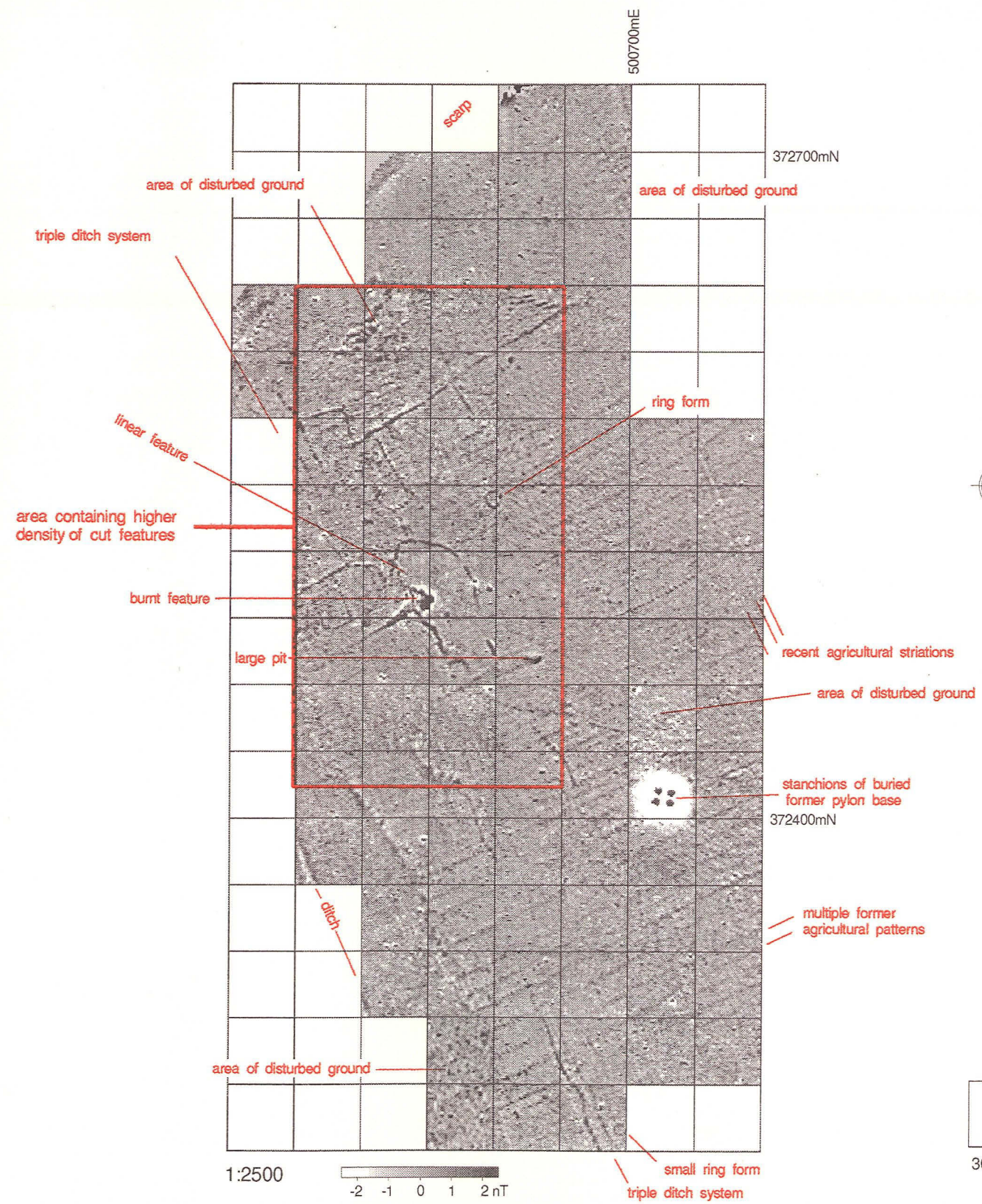


Greetwell Lincolnshire, Magnetometer (gradiometer) Survey

Gradiometer Survey: Overview

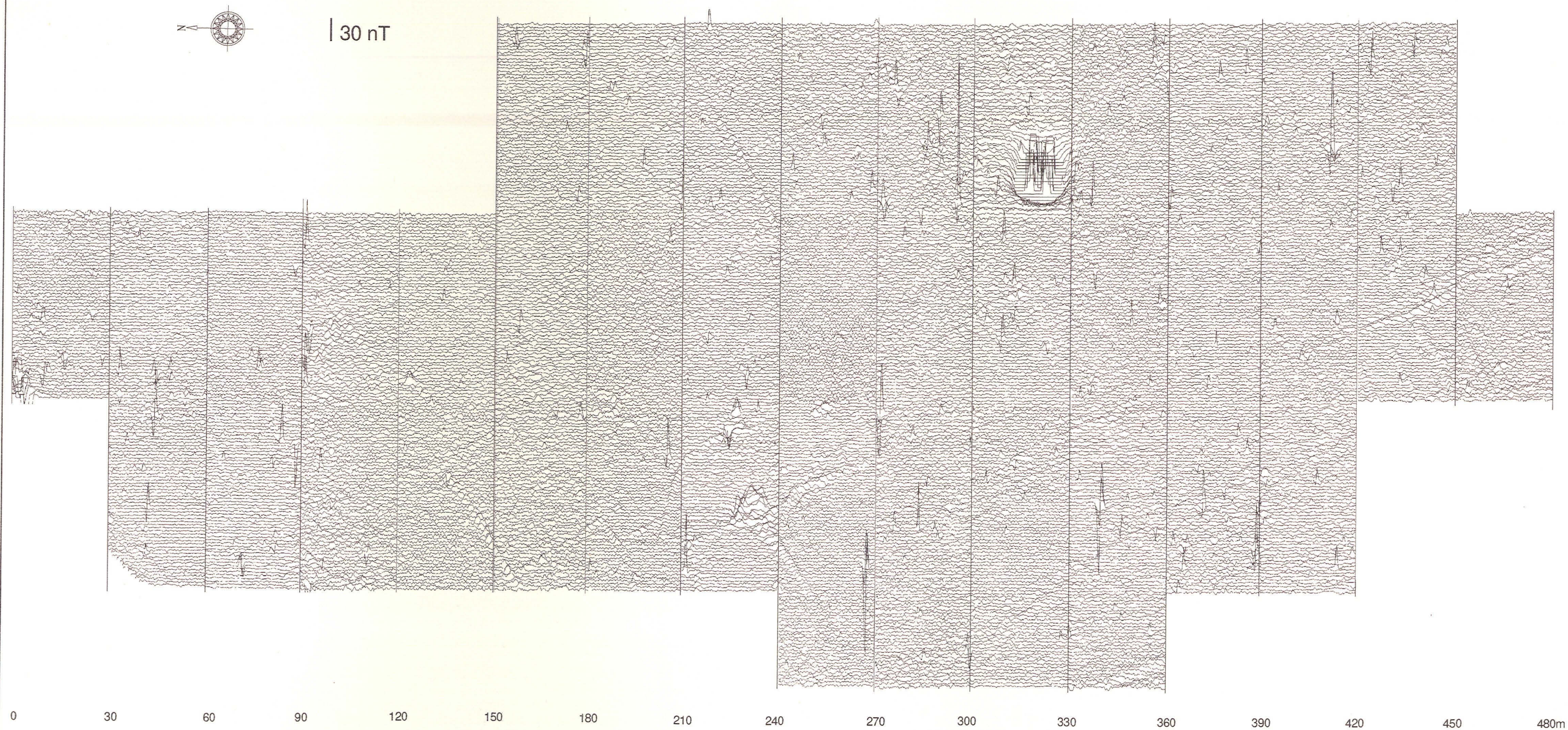


1:5000



Greetwell Lincolnshire, Magnetometer (gradiometer) Survey

Gradiometer Survey: Stacked Trace Plot: Raw Data



1:1250

INTERNAL QUALITY CHECK

Survey Reference	123 0897 / GAL / BUT	
Primary Author	MD	Date 10/10/97
Checked By	APT	Date 10.10.97
Checked By		Date
Further Corrections		Date

OXFORD ARCHAEOTECHNICS

Noke
Oxford OX3 9TX

Tel / Fax 01865 375536
Mobile 0831 383295
Email archaeotechnics@dial.pipex.com