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**FLUXGATE GRADIOMETER SURVEY:
WILSFORD TO RAUCEBY MAINS
REINFORCEMENT SCHEME,
LINCOLNSHIRE**

REPORT PREPARED FOR LINDSEY ARCHAEOLOGICAL SERVICES

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Summary

- A fluxgate gradiometer survey was undertaken along sections of the proposed Wilsford to Rauceby reinforcement water main.
- The survey detected a number of ditches and pits/zones of burning in Field B and ditches at the western end of Field C. Subsequent excavation by Lindsey Archaeological Services has exposed traces of Romano-British settlement.
- For the most part, the remaining survey areas appear to be clear of significant anomalies, although linear examples in Field K may reflect buried ditches.

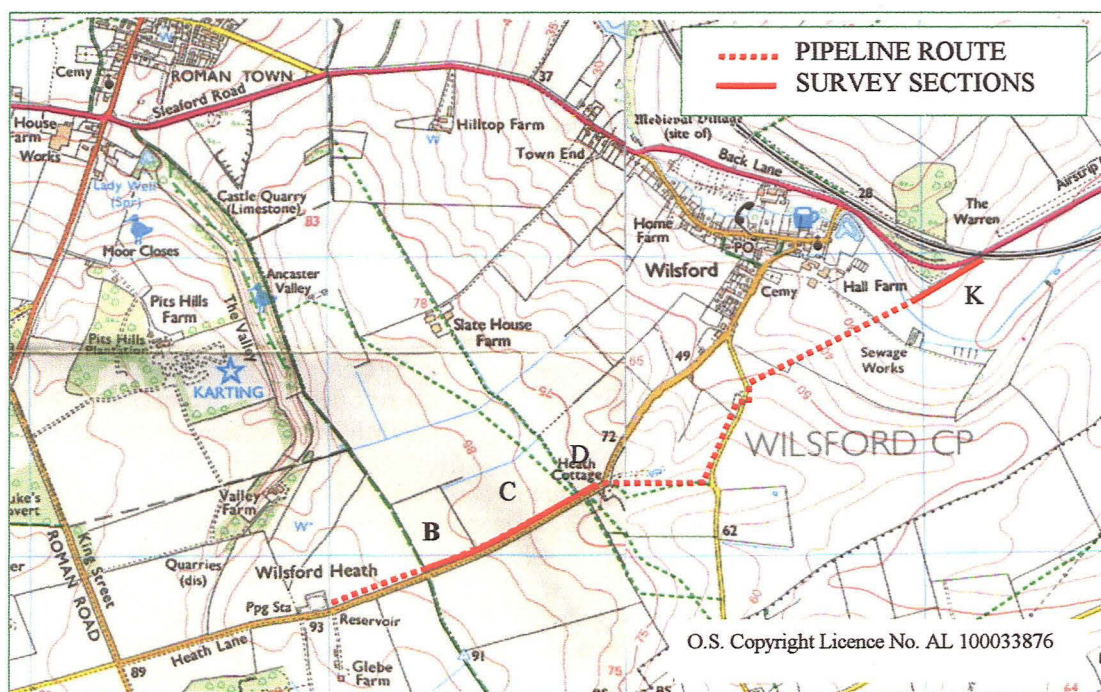


Fig.1: Location of site 1:25,000

1.0 Introduction

Lindsey Archaeological Services (LAS), acting on behalf of Anglian Water Services Ltd., commissioned Pre-Construct Geophysics to undertake a fluxgate gradiometer survey along sections of the proposed Wilsford to Rauceby mains reinforcement scheme, Lincolnshire.

Based upon the findings of previous fieldwork, four fields (designated by LAS as fields B, C, D and K) were surveyed as part of an archaeological assessment.

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 (Figs 1-2)

Sections 2 and 3 include information contained within an archaeological desk-based assessment of the proposed route (Rowlandson 2006).

The mains replacement scheme is situated between the existing Wilsford Reservoir compound on Heath Lane, and the junction of Back Lane and the railway line at the south-eastern tip of Wilsford village.

The route traverses farmland, along roadside hedges and across fields. Fields B, C and D are presently under arable cultivation whilst Field K is set-a-side. Land along the route undulates across two valleys, ranging from 93m OD at the western end, to below 30m OD at The Beck.

The solid geology of the area is comprised of Boulder Clay in Fields B and C, Great Oolitic Limestone in the eastern half C and also D, whilst Field K comprises Old River Sand and Gravel underlain with undivided Lincolnshire Limestone (BGS 1972).

3.0 Archaeological and historical background

A desktop assessment concluded that the general area has a relatively high archaeological potential, identifying the two most relevant sites as:

- Romano-British pottery and stone scatter straddling the boundary between fields B and C. (Identified in the desktop assessment as SMR 60457 on the map and SMR 60637 in the text), and
- A Bronze Age findspot in field K, including an accessory vessel that is often associated with burial practices. Other finds in this area suggest a human influence since Neolithic times on a more or less continuous scale.

4.0 Methodology

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

The use of gradiometry is used to establish the presence/absence of buried magnetic anomalies, which may reflect sub-surface archaeological features.

The area survey was conducted using a Bartington Grad 601 dual fluxgate gradiometer with 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 40m x 20m grids. The sensitivity of the machine was set to detect magnetic variation in the order of 0.1 nanoTesla.

The data was processed using *ArcheoSurveyor 1.3.2.7*. It was clipped to reduce the distorting effect of extremely high or low readings caused by discrete pieces of ferrous metal on the site. The results are plotted as greyscale and trace images.

Instrument	Bartington Grad-601
Grid size	40m x 20m
Sample interval	0.25
Traverse interval	1.0m
Traverse method	Zigzag
Sensitivity	0.1nT
Processing software	ArcheoSurveyor 1.3.2.7
Weather conditions	Sun
Area surveyed	c. 1km
Date of survey	28 June
Survey personnel	Peter Masters and Peter Heykoop
National Grid Reference	SK 9906 4185 – TF 0112 4293

Table 1: Summary of survey parameters

5.0 Results (Figs. 2-3)

Field B

The results indicate a dense network of ditches that extend across most parts of the survey area (Fig. 3: red lines). Two parallel ditches at the western end of the survey could define the edges of a trackway (1–2). The survey also recorded a number of potential pits and/or sites of burning (Fig. 3: circled in red).

At the time of writing, a number of evaluation trenches had exposed Roman-British settlement remains in the field (N. Fields, *pers. comm.*), including a stone spread and section of wall in the mid-eastern part of the survey (Fig. 3: 3, circled in red). However, the magnetic survey itself has not produced definitive evidence of structural remains.

Field C

Weakly magnetic linear features, probably ditches, were detected at the eastern end of the field. These appear to mark the easternmost extent of intensive occupation.

Other anomalies reflect ferrous materials, along/within the southern boundary of the field and probable ferrous litter, such as ploughshares, brick and tile fragments (Fig. 3: highlighted in pink).

Field D

The magnetic anomalies indicate modern activity, including a service (possibly two) at the eastern end of the survey (Fig. 3: blue lines).

Field K

Dense vegetation and a manure heap impaired the survey. Magnetic variation predominantly reflects recent activity; including a probable service (Fig. 3: blue line) and miscellaneous ferrous debris (Fig. 3: circled/boxed in pink).

A number of linear anomalies have been tentatively flagged as potential ditches (Fig. 3: red lines).

6.0 Conclusions

The survey has recorded what appear to be significant anomalies in Field B and western end of Field C. Collectively these features resolve as a relatively dense arrangement of ditches, indicative of settlement. Partial excavation of this area has exposed Romano-British settlement remains.

It is possible that linear anomalies recorded in Field K signify further ditches. Elsewhere, however, magnetic variation appears to reflect modern activity and features, including services in Fields D and K, as well as miscellaneous ferrous materials in Field K.

7.0 Acknowledgements

Pre-Construct Geophysics would like to thank Lindsey Archaeological Services for this commission.

8.0 References

BGS 1972 *Sheet 127*, Grantham Solid and Drift edition 1:50,000 series.

Clark, A. J. 1990 *Seeing beneath the soil*. London, Batsford.

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

Rowlandson, I.M. 2006 *Wilsford – Rauceby Reinforcement Main Scheme Archaeological Desk-Based Appraisal*, Lindsey Archaeological Services Report No. 906 (Unpublished).

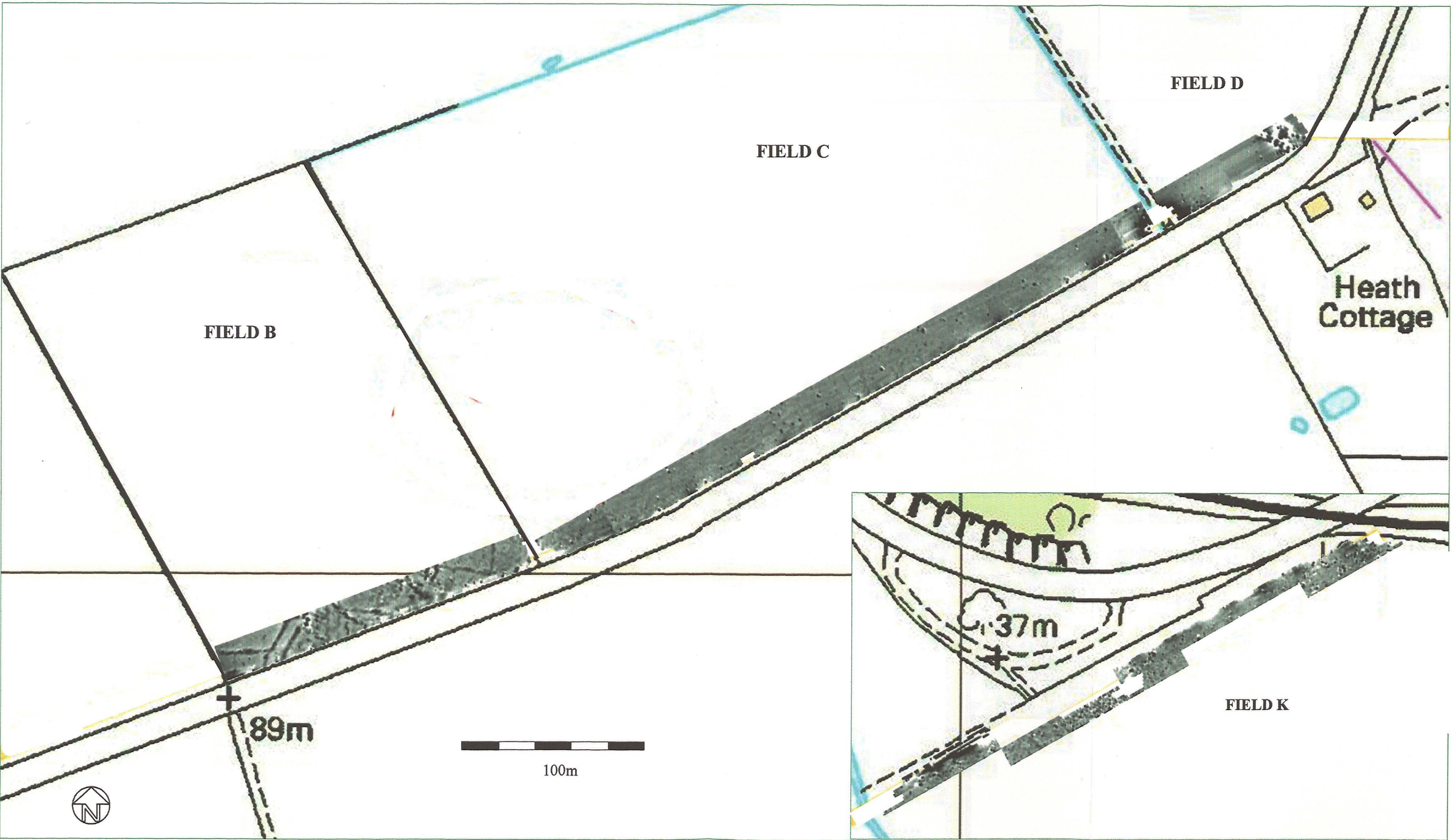
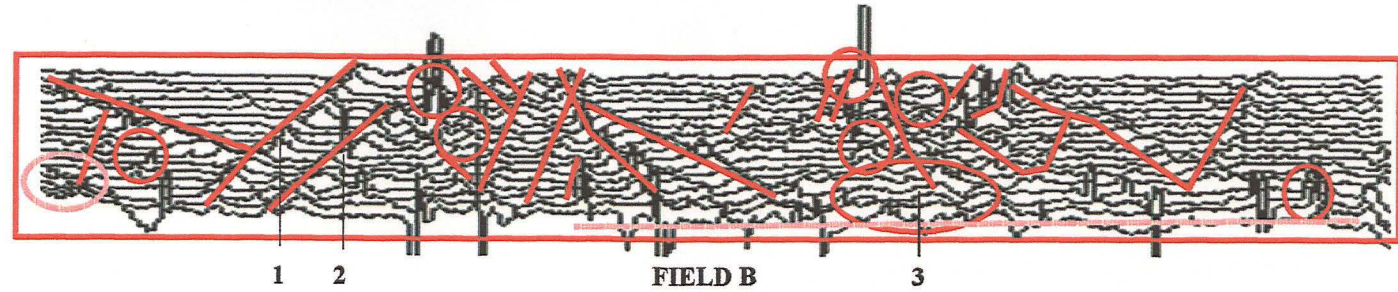


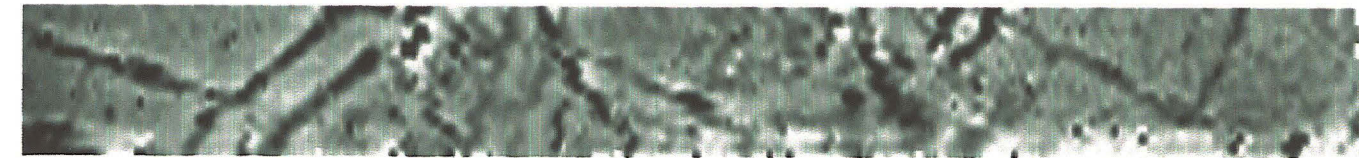
Fig. 2: Location of survey

1:2000

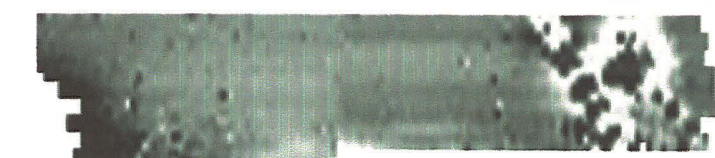
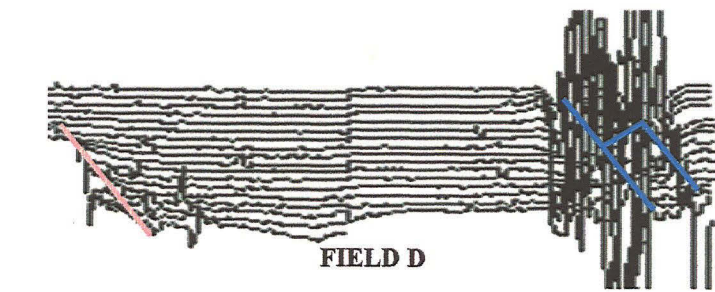
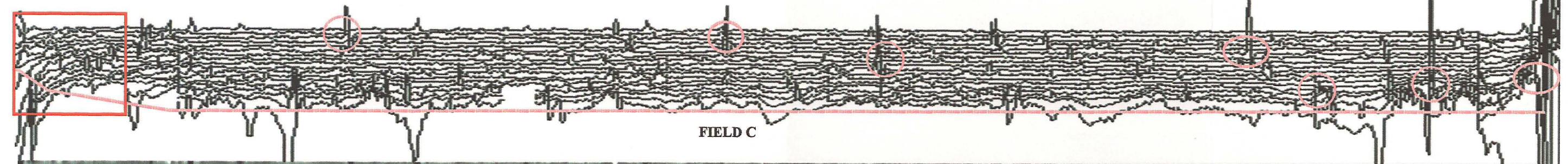
← WILSFORD HEATH



25nT
TRACE PLOT OF RAW DATA



GREYSCALE IMAGE
- 5 nT 5



50m

- Former boundary
- Possible ditch
- Service
- Boundary ferrous
- Cultivation,
- Probable land drain
- ▭ Zone displaying archaeological potential
- ▭ ?Natural
- ▭ Zone containing probable modern ferrous
- Discrete ferrous (examples)

FARM WASTE

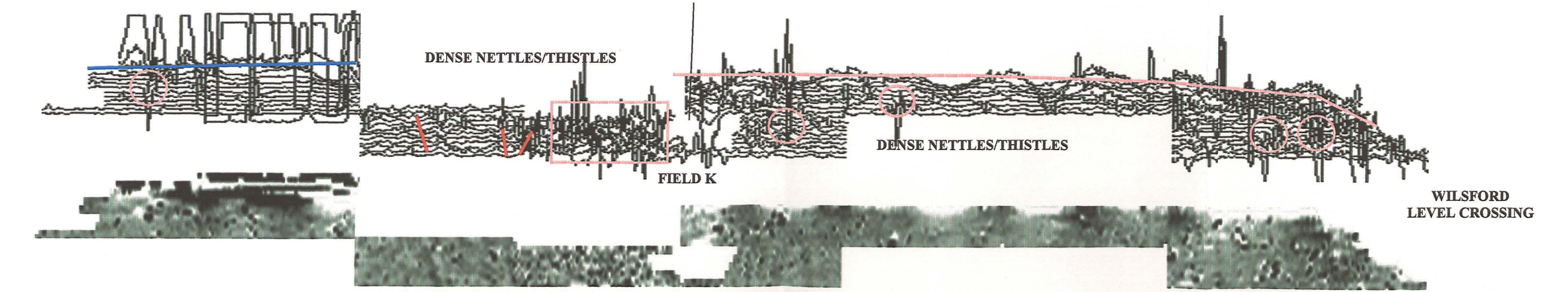


Fig. 3: Greyscale and trace plot images (with interpretation) 1:1000