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Engineering Archaeological Services Ltd

E O L O G Y

*Kirton, Willington Road
Geophysical Survey*

Boston Borough

August 2002

EAS Client Report 2002/22

Event L13366
L13368

Conservation
Services

20 SEP 2002

Highways & Planning
Directorate

Sowce L18080

Survey Commissioned Mon L181656
by 13589
Archaeological Project Services

Surveyed
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Kirton Willington Road, Geophysical Survey - Introduction:

NGR

Centred on TF 30413 38814

Location and Topography

The site lies between numbers 31 and 35 Willington Road, Kirton, Lincolnshire. The survey area was "L" shaped, extending behind properties 35 to 41, Willington Road. The eastern edge of the survey area runs along a footpath, adjacent to the "five-a-side" football pitch of the Kirton Leisure Centre. The south west corner of the development area was not available as this was covered with a tarmac drive and wooden buildings. The field had been allowed to grow a sparse vegetation cover since it was last ploughed. The site is basically flat.

Archaeological Background

The survey area lies within the village of Kirton. Work on a development immediately to the north revealed a number of archaeological features. Archaeological conditions were therefore placed on the development by the Lincolnshire Planning Service.

Aims of Survey

To gather sufficient information to establish the location and extent of any archaeological features within the development area and, if possible, to characterise the archaeology located.

SUMMARY OF RESULTS

Only a few anomalies were located within the survey area. The area adjacent to Willington Road was disturbed, particularly near to the standing buildings, however three possible linear anomalies and a large discrete anomaly were defined. This large discrete anomaly may be the result of high temperature feature, such as a kiln.

Areas of modern disturbance were also located.

Kirton Willington Road, Geophysical Survey -Results:

Methods

The survey was undertaken using parts of eight 30 x 30 m grid squares laid out as in Figure 1. Readings were taken at 0.5 m intervals along transects 1 m apart. These transects were walked in a zigzag pattern.

The survey was carried out using a Geoscan FM 36 Fluxgate Gradiometer with a ST 1 sample trigger. Grey Scale and X - Y Plots were produced using Geoscan Research "Geoplot" v. 3.00e.

Survey Results:

Area

A total of eight 30 x 30 m squares, covering approximately 0.6 hectare, were laid out in a single block (Figure 1).

Display

The results are displayed as Grey Scale Image and as X-Y Trace Plots. Figures 2 - 3. A major anomaly in Grids 3 and 6 is also displayed as a filled contour plot (Figure 4)

Results:

Areas of modern, ferromagnetic response were located along the eastern and southern edges of the survey area. These were related to the fence of iron bands along these two sides of the field. A large area of ferromagnetic response was also located near to the upstanding wooden buildings. This area also contained dumps of modern rubbish. A third area of ferromagnetic response was located in Grid 3. This was probably a result of an iron object within the plough soil. These disturbed areas are shown in blue on Figure 5.

Three feint linear anomalies were located. The clearest of these runs approximately ENE - WSW and continues the line of a modern property boundary. It is likely that this represents an old field boundary. The other two linear anomalies

are less clear and do not appear to align with the present field system and may therefore be of archaeological origins. These anomalies are shown in red on Figure 5.

The area adjacent to Willington Road is moderately disturbed, this may be the result of modern rubbish and disturbance associated with its proximity to the road and the sheds in the south west corner of the development area, but may be the result of archaeological activity.

A large discrete anomaly was located at the northern end of the survey area in Grids 3 and 6. It was approximately 10 x 7 m in size and roughly oval in shape. Detailed analysis (Figure 4) shows this anomaly to have a high positive central area with a consistent low on its northern edge. This dipolar response is suggestive of a high temperature feature such as a kiln, furnace or large hearth. The other possibility is that this may be a backfilled pond with a large metal object, or series of objects within its fill.

Kirton Willington Road, Geophysical Survey - Conclusions:

Magnetic Susceptibility

It was possible to take soil samples in order to assess the magnetic susceptibility of the soils. It was not possible to obtain a subsoil sample for comparison.

Sample	Volume susceptibility χ_v	Mass susceptibility χ_m
Grid 1	71	68.3
Grid 3	74	70.5
Grid 5	61	61.0

The susceptibilities as measured are consistent and moderately low suggesting that conditions, whilst acceptable, were not ideal for magnetic survey.

Conclusions

It is a fundamental axiom of archaeological geophysics that the absence of features in the survey data does not mean that there is no archaeology present in the survey area only that the techniques used have not detected it.

Whilst the condition within the survey area were not ideal it was possible to locate and define a few anomalies of possible archaeological origin. The linear anomalies are faint and one of these is probably an old field boundary crossing the site.

Of particular note is the large discrete anomaly in the northern end of the survey area. Its form may suggest that it is the result of a high temperature feature such as a kiln, furnace or hearth. The lack of slags, or suitable magnetic responses would suggest this was not the result of metalworking on the site, although tile, pottery or other ceramic production are possibilities. The AD 1905 Ordnance Survey map of the area, shows a number of ponds within the general area and it is possible that the large anomaly may be a backfilled pond. If so, however, it must contain a significant quantity of magnetically active materials such as metal objects or fired clay (?bricks).

The south west corner of the survey area and along the fence lines were disturbed with modern anomalies.

Kirton Willington Road, Geophysical Survey -Technical Information:

Techniques of Geophysical Survey:

Magnetometry:

This relies on variations in soil magnetic susceptibility and magnetic remanence which often result from past human activities. Using a Fluxgate Gradiometer these variations can be mapped, or a rapid evaluation of archaeological potential can be made by scanning.

Resistivity:

This relies on variations in the electrical conductivity of the soil and subsoil which in general is related to soil moisture levels. As such, results can be seasonally dependant. Slower than Magnetometry this technique is best suited to locating positive features such as buried walls that give rise to high resistance anomalies.

Resistance Tomography

Builds up a vertical profile or pseudosection through deposits by taking resistivity readings along a transect using a range of different probe spacings

Magnetic Susceptibility:

Variations in soil magnetic susceptibility occur naturally but can be greatly enhanced by human activity. Information on the enhancement of magnetic susceptibility can be used to ascertain the suitability of a site for magnetic survey and for targeting areas of potential archaeological activity when extensive sites need to be investigated. Very large areas can be rapidly evaluated and specific areas identified for detailed survey by gradiometer.

Instrumentation:

1. Fluxgate Gradiometer - Geoscan FM36

2. Resistance Meter - Geoscan RM4/DL10

3. Magnetic Susceptibility Meter - Bartington MS2

4. Geopulse Imager 25 - Campus

Methodology:

For Gradiometer and Resistivity Survey 20m x 20m or 30m x 30m grids are laid out over the survey area. Gradiometer readings are logged at either 0.5m or 1m intervals along traverses 1m apart. Resistance meter readings are logged at 1m intervals. Data is down-loaded to a laptop computer in the field for initial configuration and analysis. Final analysis is carried out back at base.

For scanning transects are laid out at 10m intervals. Any anomalies noticed are where possible traced and recorded on the location plan.

For Magnetic Susceptibility survey a large grid is laid out and readings logged at 20m intervals along traverses 20m apart, data is again configured and analysed on a laptop computer.

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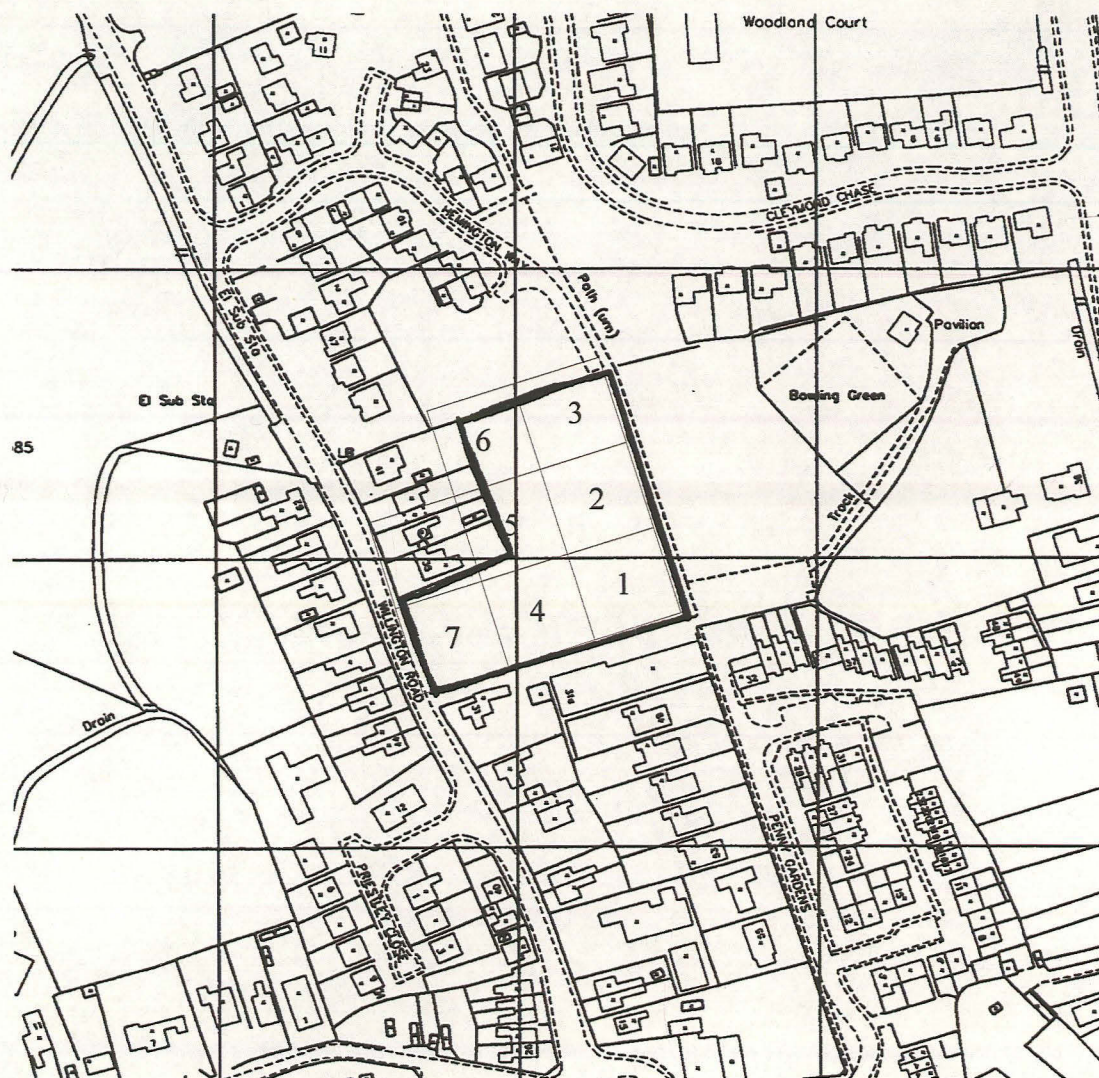


Figure 1: Kirton, Willington Road
Location
Scale 1:2500

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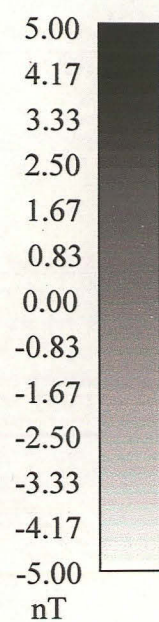
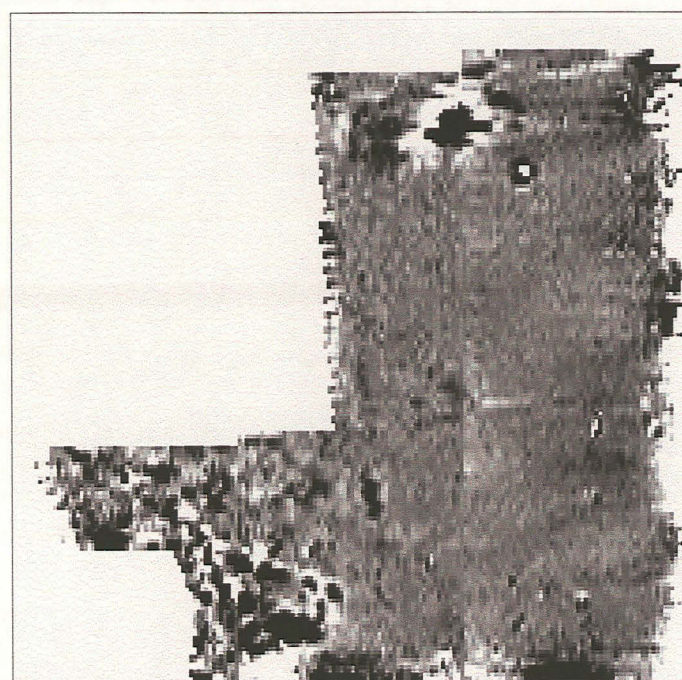


Figure 2: Kirton Willington Road
Grey Scale Plot
Scale 1:1000

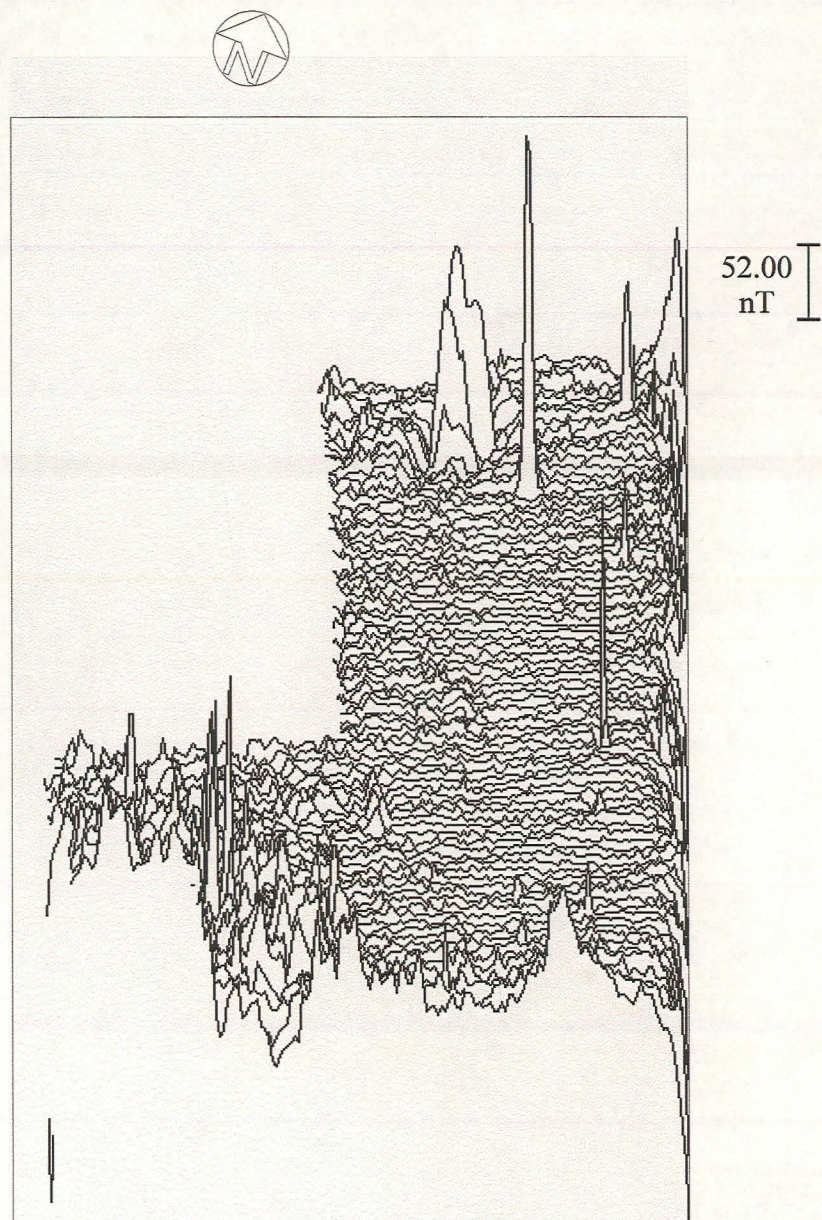


Figure 3: Kirton Willington Road
X - Y Plot
Scale 1:1000

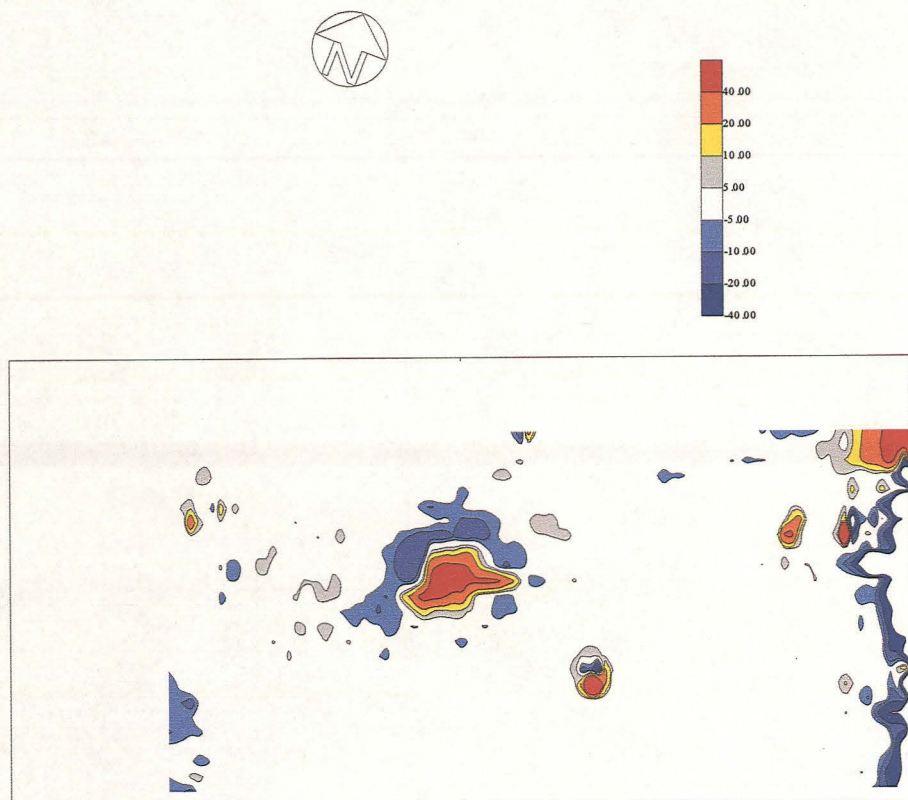
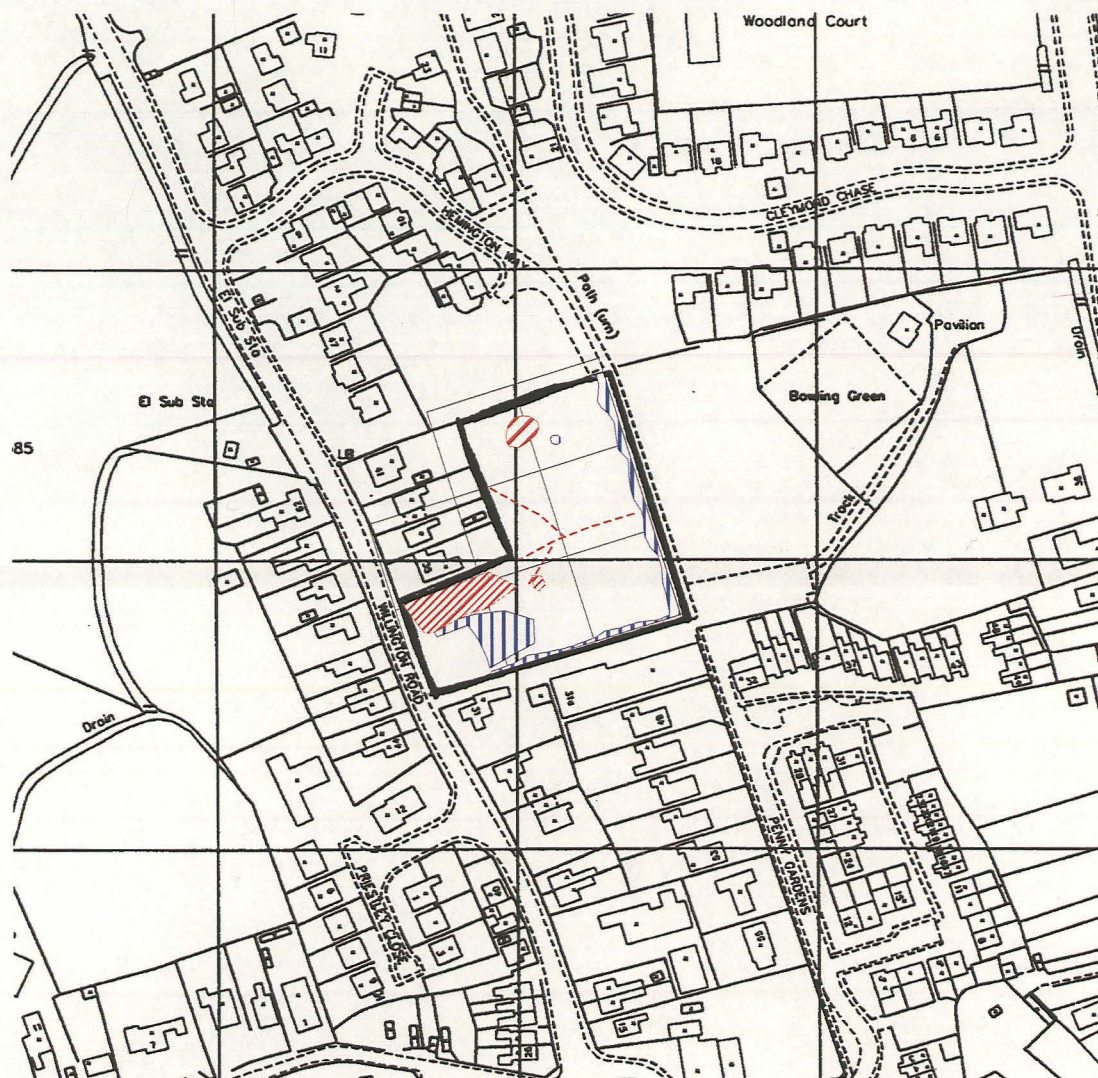


Figure 4: Kirton Willington Road
Filled Contour Plot of Large Anomaly
Scale 1:500



- Possible archaeology
- Probable archaeology
- ▨ Probable discrete archaeological anomaly
- ▨ Areas of mixed response
- ▨ Ferromagnetic responses

Figure 5: Kirton, Willington Road
Interpretation
Scale 1:2500

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