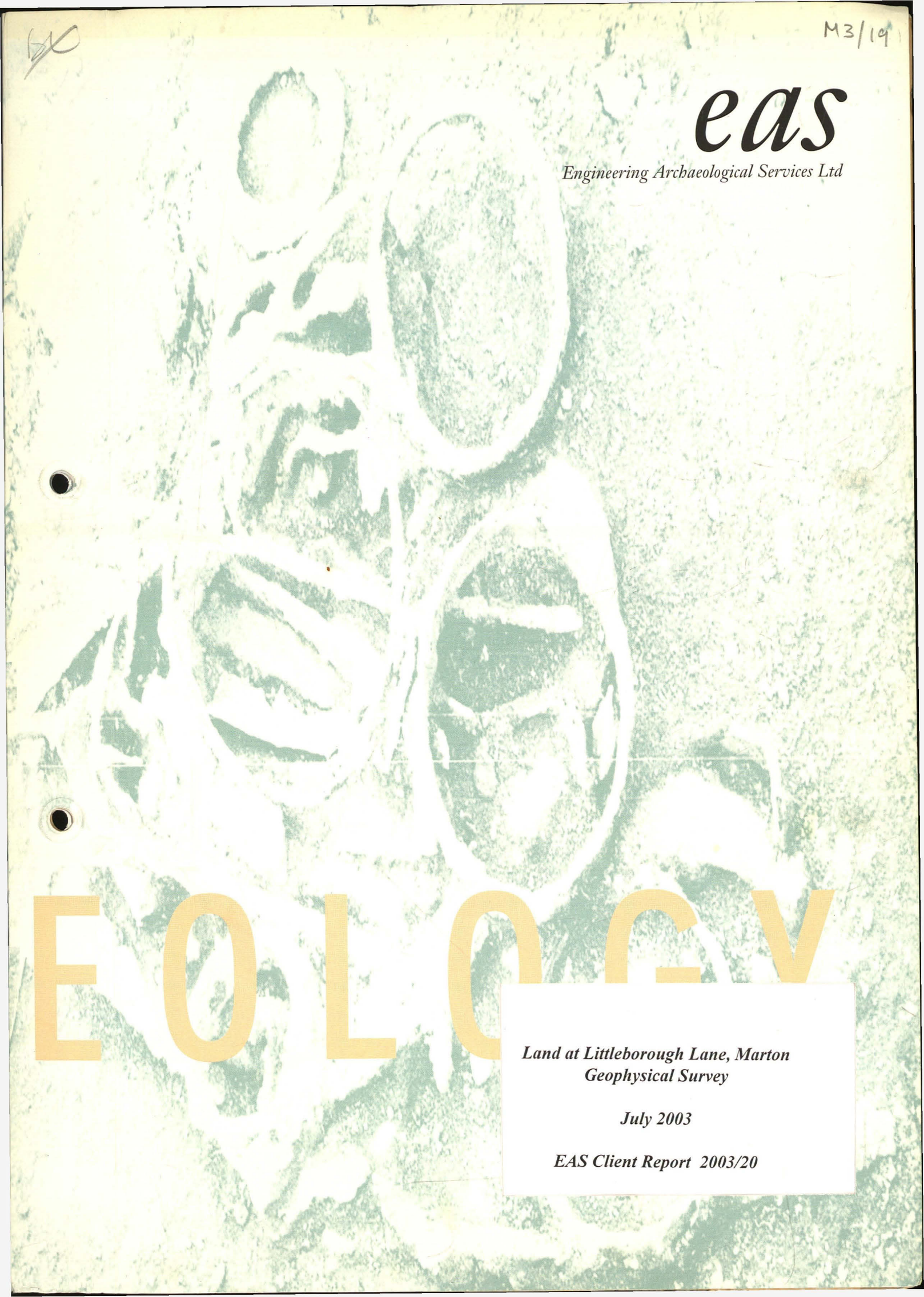
M3/19

eas

Engineering Archaeological Services Ltd



Land at Littleborough Lane, Marton
Geophysical Survey

July 2003

EAS Client Report 2003/20

Survey Commissioned
by
Archaeological Project Services

Surveyed
by
I.P. Brooks
Engineering Archaeological Services Ltd.

registered in England
Nº 2869678

Land at Littleborough Lane, Marton
Geophysical Survey

July 2003

EAS Client Report 2003/20

CONTENTS

List of Illustrations

Littleborough Lane, Marton Geophysical Survey - Introduction:

NGR

Centred on *Area 1: SK 83715 81973*
Area 2: SK 83784 81962

Location and Topography (Figure 1)

The village of Marton is approximately 8 km south east of Gainsborough in the administrative district of West Lindsey, Lincolnshire. The proposed development site consists of parts of three fields within Marton Village, bounded on three sides by properties fronting on to Littleborough Lane, High Street and Trent Port Road. The fourth side is to agricultural land.

The survey site was largely flat in character with only slight undulations . The north western field had been harvested for hay and was therefore under a short grass cover. The north eastern field had been used as an informal storage area. Thistles and matted vegetation had been allowed to grow to a considerable height in amongst various dumps of agricultural and other debris. At the time of survey the majority of this field had been cleared and cut, although a broad band along the eastern boundary remained uncut. Whilst the majority of the debris had been cleared there were various collections of metallic rich objects within the field. This included the remains of a chicken house and lengths of train rails.

Within the southern field very little of the rank vegetation had been cut. Part of this field had already been disturbed and large spoil heaps were dotted within the area.

Thus within a total survey area of approximately 4.0 ha, only approximately 2.4 Ha were available for study.

Archaeological Background

Marton is first mentioned in the Domesday Survey of c. AD 1086. Although the number of archaeological finds within the area would suggest that activity was taking place at a much earlier period.

Marton sits alongside a Roman Road connecting Ermine Street to the Roman town of Segelocvm, (Littleborough). Elements of this are thought to possibly extend into the northern part of the proposed development area. A possible second road or track, seen in aerial photographs may extend into the area. The number of stray finds and sites around Marton may also suggest extensive suburbs associated with Segelocvm.

Sculptural fragments of Saxon date built into the church would suggest a level of activity in the area at this time.

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

Despite the level of modern disturbance and the unavailability of part of the survey area a number of feint linear anomalies have been defined. The magnetic regime in the fields were not ideal for magnetic survey, however along with the linear anomalies four possible sub-circular anomalies have also been defined.

Littleborough Lane, Marton, Geophysical Survey -Results:

Methods

Magnetic Scanning

The available areas within the proposed development site were scanned with a Geoscan FM 36 Fluxgate Gradiometer. Transects were walked at approximately 10 m intervals across the fields and magnetic anomalies ± 2 nT from the background readings were sketch plotted onto a 1:2500 map of the development area. The pattern of transects is shown on Figure 2.

Fluxgate Gradiometer Survey

The Fluxgate Gradiometer survey was undertaken using twelve 30 x 30 m grid squares laid out as in Figure 3 . Readings were taken at 0.25 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:

Magnetic Scanning

Area

The development area covers approximately 4.0 Ha, of which approximately 2.4 Ha were available for study (Figure 2).

Results

A number of high value anomalies were defined within the scanning (Figure 4). None of these would appear to be definitely archaeological in character, indeed most can be directly associated with the modern land use within the survey area.

Anomaly "A" (Figure 4) ran along the northern boundary of the north western field and can be related to the disturbance caused by the new housing development at this point. Anomaly B is the line of the informal farm track crossing this field and associated with this Anomalies C and D mark the areas were cars and pieces of agricultural equipment had sat amongst rank vegetation prior to the survey.

A similar level of modern disturbance can be seen in Anomalies E, F, G and H all of which can be related to areas of modern dumping or storage of materials with a high metallic content. These areas were also associated with growths of rank vegetation around these deposits.

The remaining anomalies were relatively small in size (typically less than 1 m in diameter) and of high values (typically 20 - 80 nT above the background) suggesting that they probably relate to metal fragments within the plough soil.

Fluxgate Gradiometer Survey

Area

Two areas, totalling 1.04 Ha, were investigates each of which were based on blocks of six 30 x 30 m squares (Figure 3). Area 1 was within the north western field and covered an area of 0.54 Ha. Area 2 was 0.5 Ha in size and was located in the north eastern field. The location of these two areas was designed to sample some of the anomalies located in the scanning, whilst avoiding the largest areas of modern magnetic disturbance.

Display

The results are displayed as Grey Scale Image and as X-Y Trace Plots. Figures 5, 6, 7 and 8.

Results

Area 1 (Figure 9)

Except for the ferromagnetic responses the anomalies within this survey area were very slight, often varying from the background field by only 1 or 2 nT. It was possible, however to suggest a number of linear anomalies with this survey. Four sub parallel anomalies were located in the south west corner of this Area (Anomaly 1,

Littleborough Lane, Marton, Geophysical Survey -Results:

Figure 9). These are between 9 and 16 m apart and may represent the modern drainage pattern in the field. Crossing these parallel anomalies Anomaly 2 is obviously on a different alignment, but it would appear to reflect the modern pattern of field boundaries and may relate to a previous land division. In the north east corner of Area 1 two sinuous anomalies were located (Anomalies 3 and 4). These are roughly parallel and of unknown function.

Anomalies 5 and 6 are located in the north west sector of Area 1. These are sub-circular anomalies of low value readings each approximately 4 - 6 m in diameter and of unknown origins.

Two area of ferromagnetic disturbance were also located. Anomaly 7 is an approximately 4 m in diameter. It is believed that a cathodic protection earth for an abandoned oil pipeline is located somewhere within the field and this anomaly may be related to this feature.

Anomaly 8 can be related to the modern fences and disturbance associated with the relatively new houses to the north of the site.

Area 2 (Figure 10)

This area was more disturbed than Area 1, however, it is possible to suggest a number of feint linear anomalies within the survey area. No consistent pattern within the linear anomalies could be determined, but three sub-groups of anomalies can be suggested.

Anomalies 9 and 10 are within the north western corner of Area 2. They run roughly parallel for a approximately 13 m before diverging. They may also be related to Anomaly 11 which is also roughly parallel.

Anomalies 13 and 14 are each right angled in shape and would appear to define a 2 m wide gap, lined by linear anomalies within a general anomaly running NE - SW. This alignment is also followed by Anomaly 12 and it is possible that these anomalies relate to a previous field pattern in the area.

Two sinuous, looping anomalies can be suggested in the south eastern sector of Area 2 (Anomalies 15 and 16). These are of unknown origins and do not appear to relate to either the modern field system or the previously described anomalies. Anomaly 16, however may be related to a short length of linear anomaly (Anomaly 17) which runs approximately NW - SE.

The large area of magnetic disturbance (Anomaly 18) was located in the scanning and related to modern farming practice with the storage and dumping of discarded farm machinery in this area. Anomaly 19, can similarly be related to modern farm practice as it is adjacent to the remains of a chicken shed dumped in this area of the field. The origin of Anomaly 20 is unknown, but it is also probably related to modern activities.

Magnetic Susceptibility

It was possible to take soil samples in order to assess the magnetic susceptibility of the soils. It was also possible to obtain a subsoil sample from the southern field for comparison.

Sample	Volume susceptibility χ_v	Mass susceptibility χ_m
Grid 1	36	28.3
Grid 3	18	18.0
Grid 5	18	18.8
Grid 7	24	22.9
Grid 9	31	32.0
Grid 11	23	19.8
Subsoil	24	20.0

The susceptibilities, as measured, are consistent and low, with little differences between the subsoil and topsoil reading suggesting that the area was not ideal for recording subtle magnetic features.

Littleborough Lane, Marton, Geophysical Survey - Conclusions:

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.

The magnetic susceptibility results suggest that the magnetic regime was not ideal for magnetic survey. To this can be added the level of modern, metallic debris within the field, particularly the north eastern field.

A number of tentative anomalies were located, however, some of which possibly relate to the modern drainage regime. The majority, however, do not appear to conform with the modern field pattern an may relate to previous activity in the area.

Both relatively straight linear anomalies and sinuous anomalies have been suggested. The straight anomalies, probably relate to a previous field pattern, with Anomalies 13 and 14 possibly suggesting a narrow lane between two enclosures. The sinuous anomalies are of unknown origins.

Littleborough Lane, Marton Geophysical Survey - Technical Information:

Techniques of Geophysical Survey:

Magnetometry:

This relies on variations in soil magnetic susceptibility and magnetic remenance 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.

Copyright:

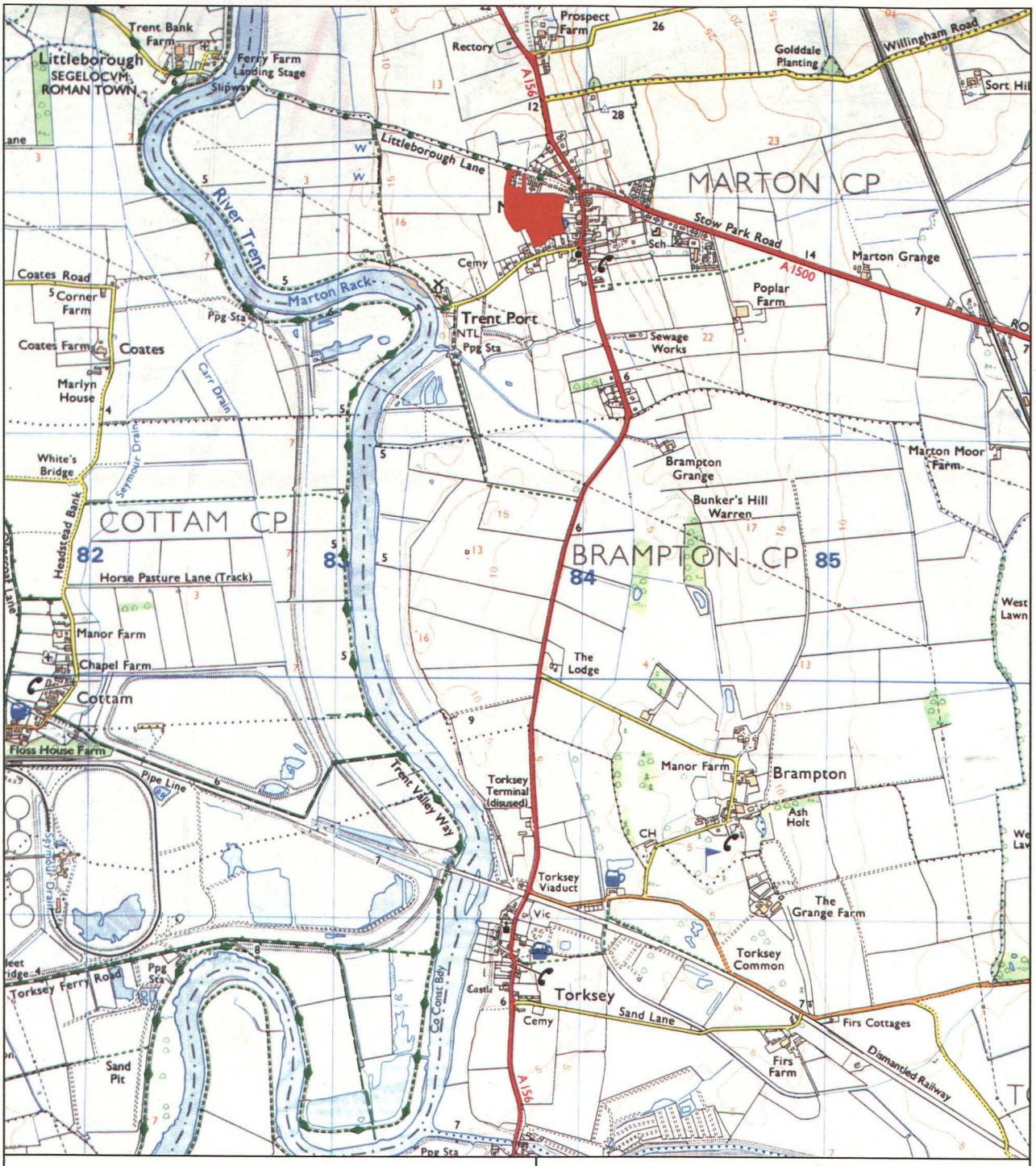


Figure 1: Littleborough Lane, Marton
Location of Survey Area
Scale 1:25,000

Area unavailable or unsuitable

Figure 2: Littleborough Lane, Marton
Location of Magnetic Scanning
Scale 1:2,500

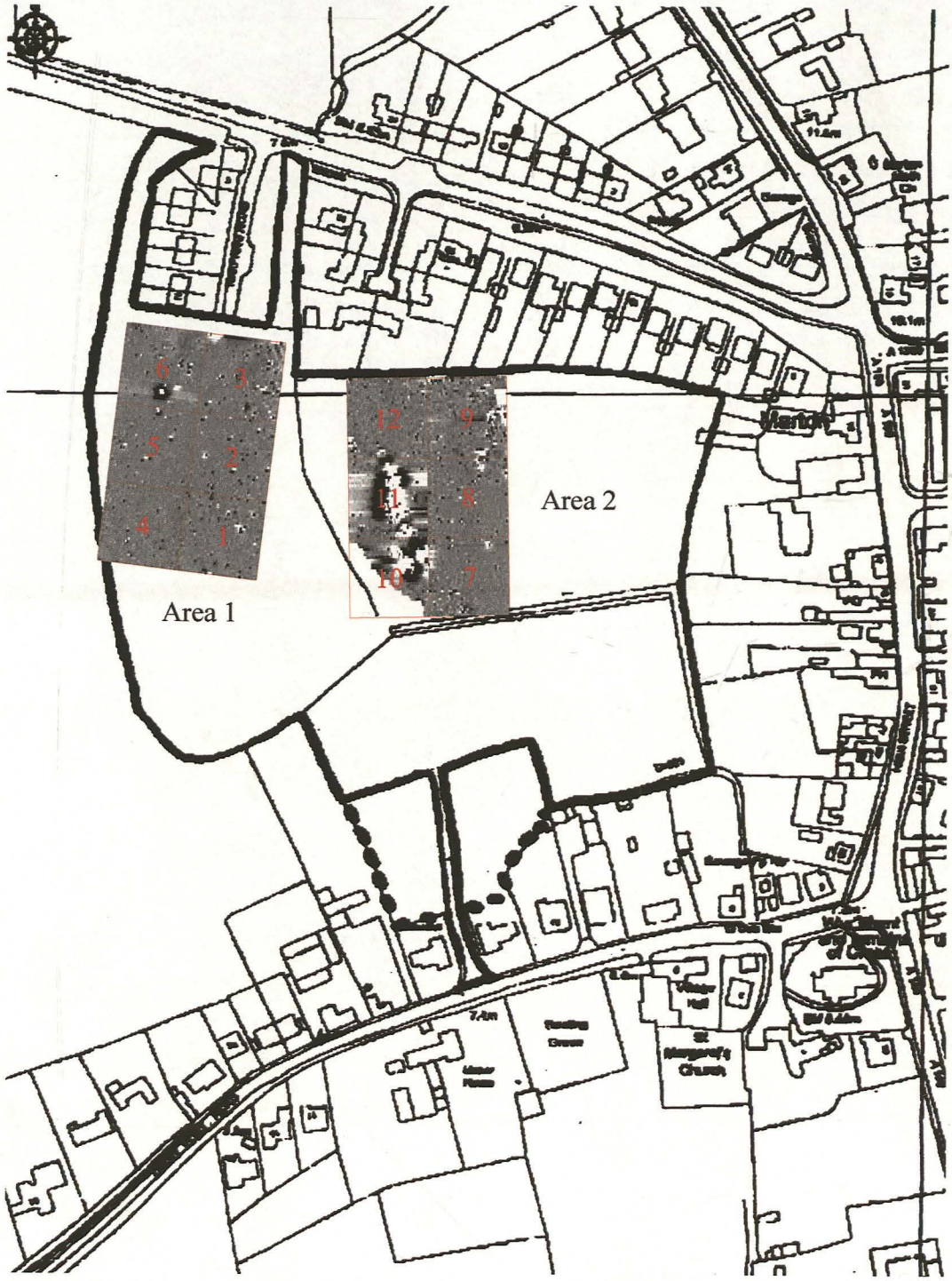
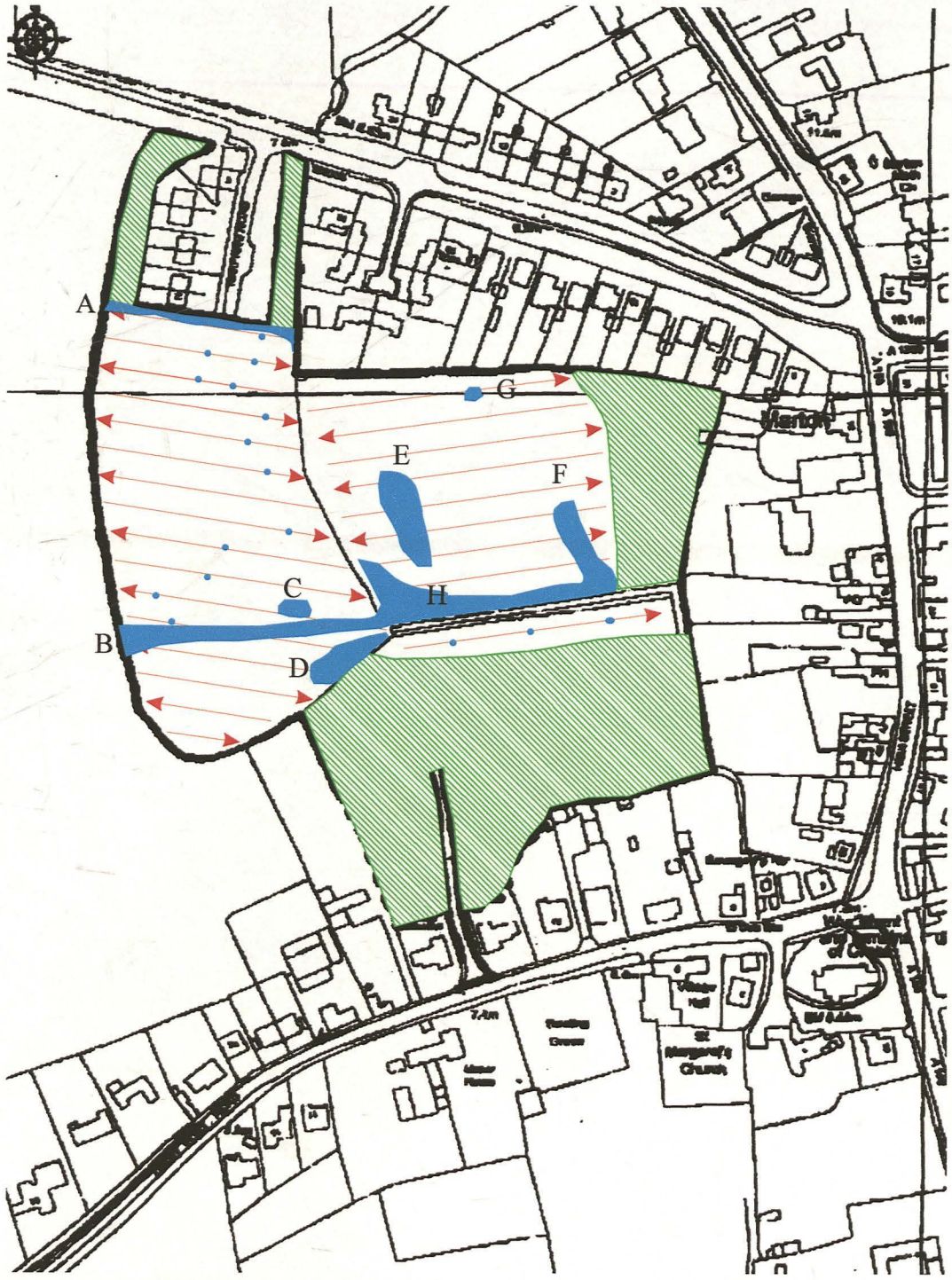


Figure 3: Littleborough Lane, Marton
Location of Fluxgate Gradiometer Survey
Scale 1:2500



Area unavailable or unsuitable

Magnetic Anomalies

Figure 4: Littleborough Lane, Marton
Anomalies Located in Magnetic Scanning
Scale 1:2,500

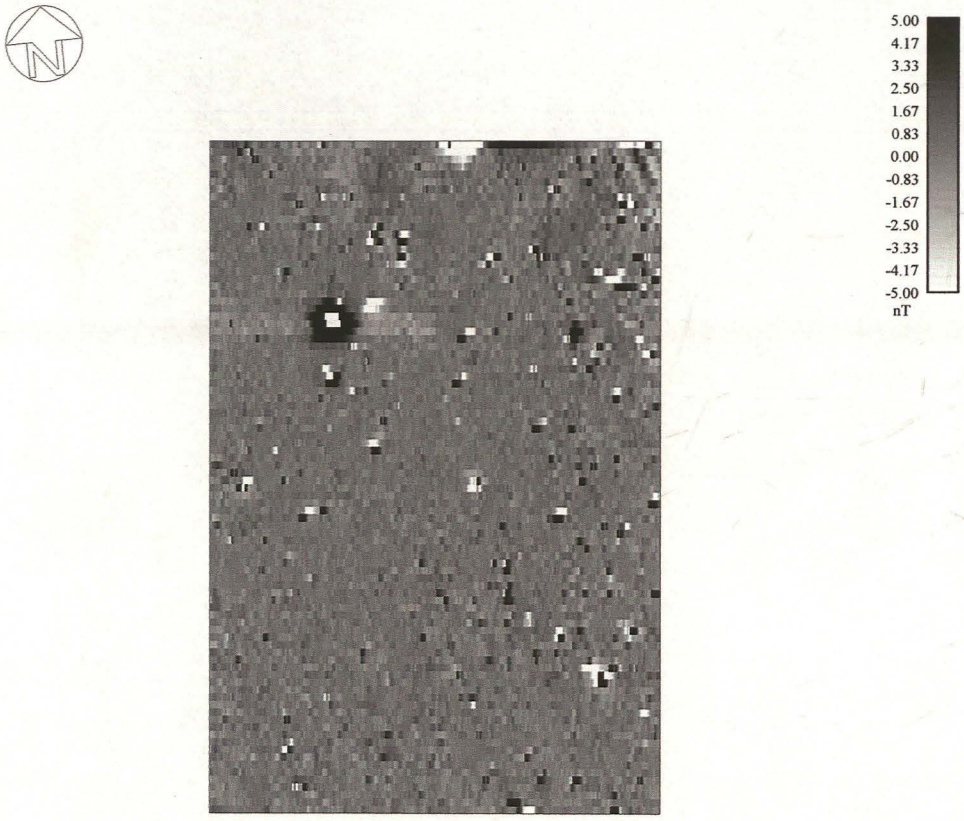


Figure 5: Littleborough Lane, Marton Area 1 Grey Scale Plot	Scale 1:1,000

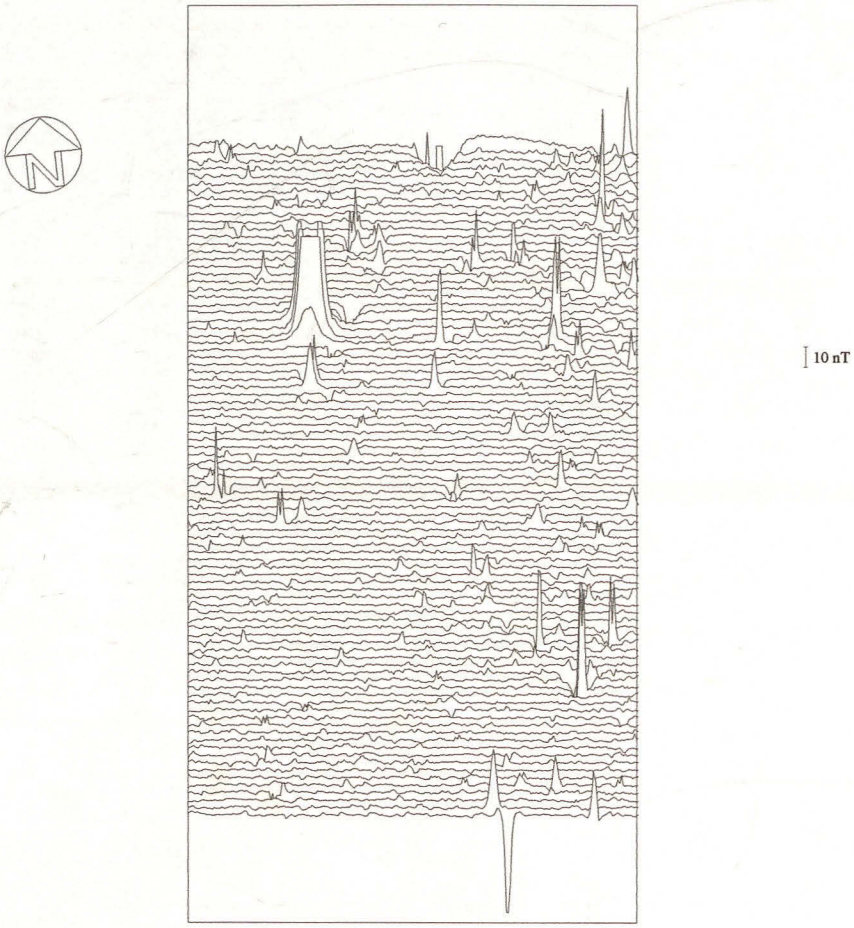


Figure 6: Littleborough Lane, Marton
Area 1, X - Y Plot

Scale 1:1,000

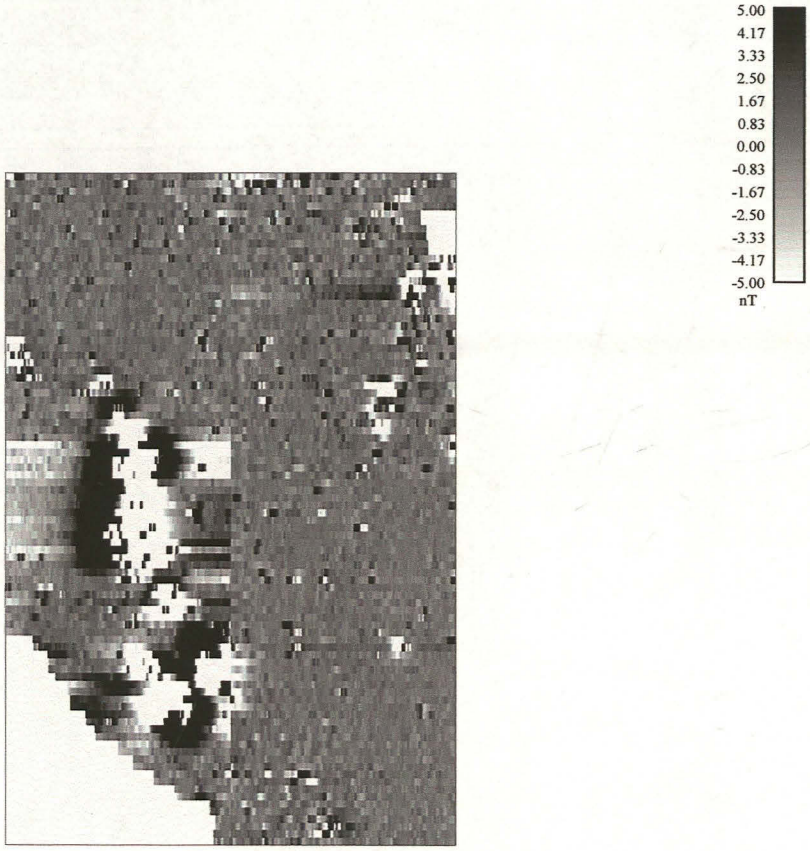


Figure 7: Littleborough Lane, Marton
Area 2' Grey Scale Plot

Scale 1:1000

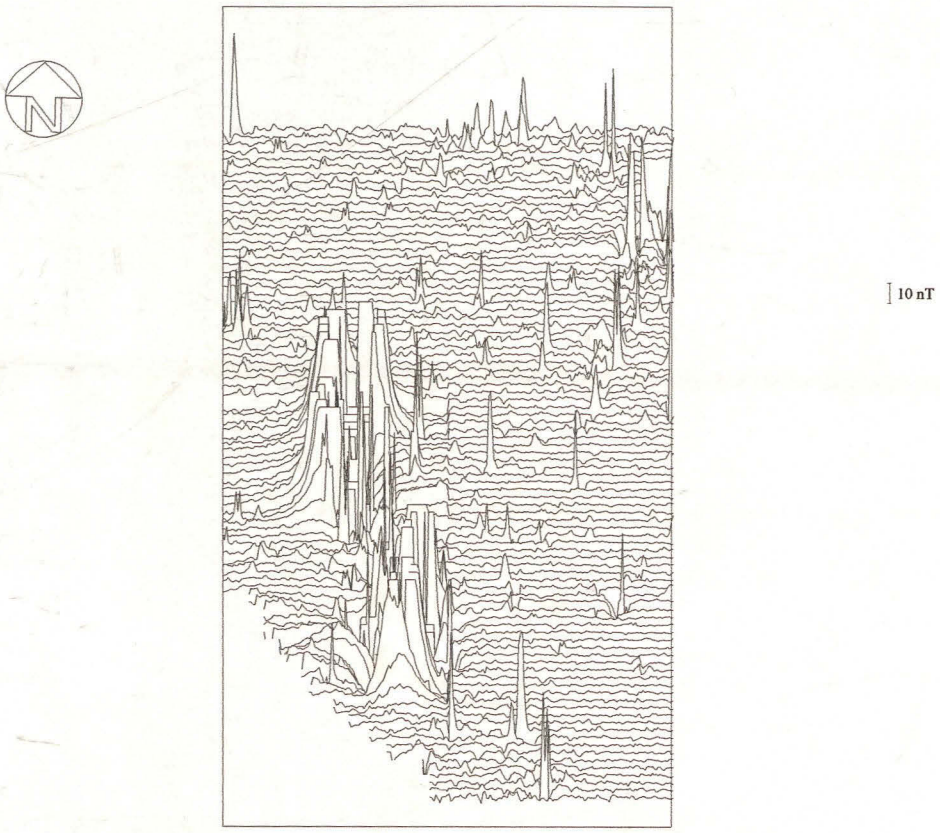
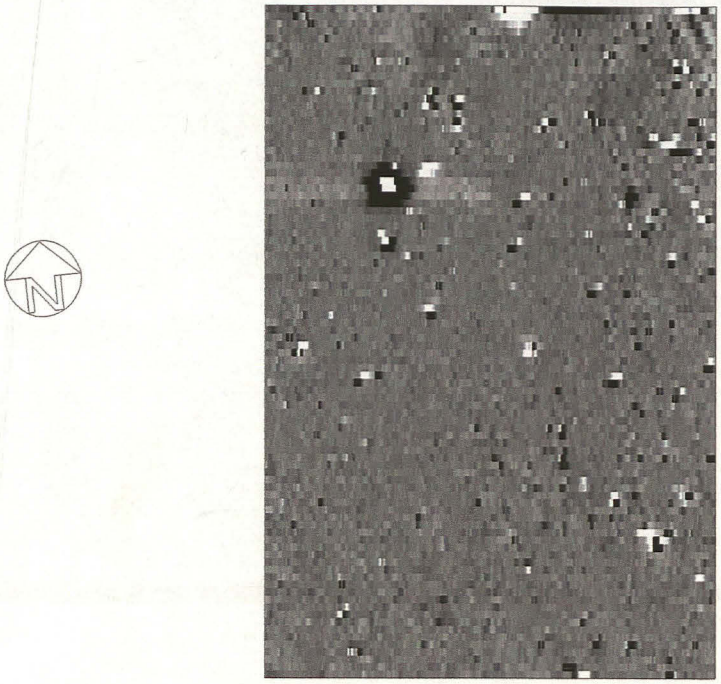
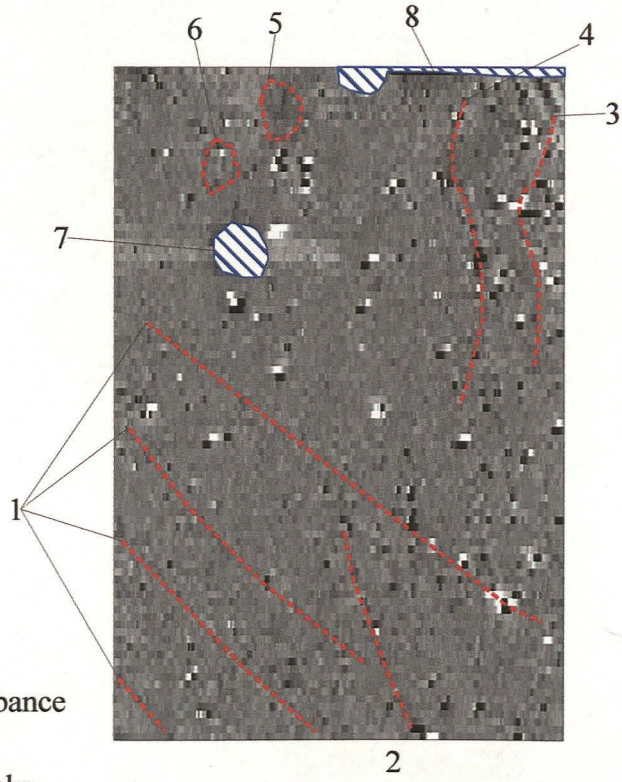


Figure 8: Littleborough Lane, Marton
Area 2, X - Y Plot

Scale 1:1000

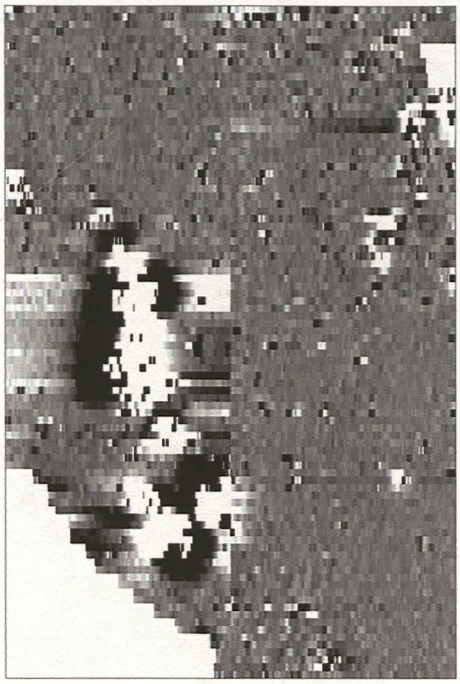




Ferromagnetic disturbance

---- Possible linear anomaly

Figure 9: Littleborough Lane, Marton Area 1: Interpretation	Scale 1:1000

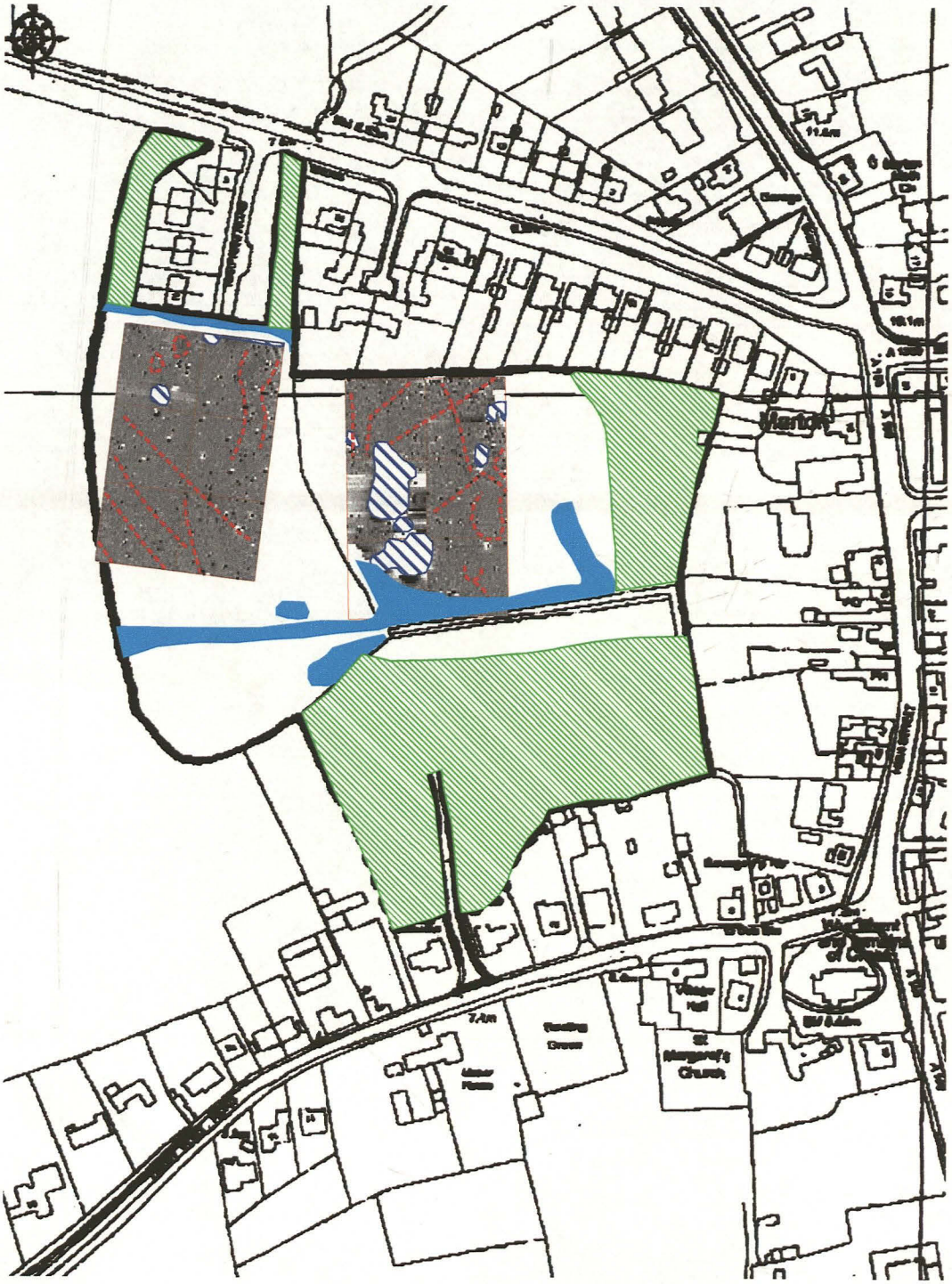


Ferromagnetic disturbance

Possible linear anomaly

Figure 10: Littleborough Lane, Marton
Area 2: Interpretation

Scale 1:1000



Area unavailable or unsuitable
Magnetic Anomalies
Ferromagnetic disturbance
Possible linear anomaly

Figure 11: Littleborough Lane, Marton
Summary
Scale 1:2,500