Clawdd Coch Geophysical Survey
March 2016

EAS Client Report 2016/01

Survey Commissioned
by
Trysor

Surveyed
by
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NGR

Centred on: SJ 24798 20263

Location and Topography (Figure 1)

The survey was located approximately 1.5km to the west-southwest of Llanymynech village, on the Powys/Shropshire border, to the east of the River Vyrnwy. Approximately 250m WSW of the farmyard of Clawdd Cloch the survey area is bounded to the north by a farm track which runs in a marked hollow way. The survey area was a relatively flat area within a ploughed field with a slight rise along the northern edge which runs parallel to the farm track. A few mature trees within the field suggests there was previously a field boundary which ran to the south west of the survey area.

It is intended to construct a free range egg production unit on the site (planning application, reference number P/2016/0154).

Archaeological Background

The site is traditionally thought to be the site of a Roman fort (HER PRN 21, NPRN 140020) with the initial association of the site to a possible Roman fort dating to 1816 when Sir Richard Colt Hoare equated the site with the fort of Mediolanum. This view was challenged in 1911 when a field inspection by the Royal Commission on Ancient Monuments suggested there were no physical traces of a fort. However work by G.D.B. Jones in 1991 located a number of small features he interpreted as a “V” shaped ditch and a possible field oven

Aims of Survey

1. It investigate the site of the proposed new free range egg production unit and to evaluate the archaeological potential of the site.

SUMMARY OF RESULTS

No anomalies of archaeological origins were located in the survey and the magnetic susceptibility samples suggest that there are no concentrations of increased human activity within the survey area.

Methods

The Fluxgate Gradiometer survey took place on 15th March 2016. At the time of the survey the field had been plough and left to weather, however the field surface was still rough and uneven. The site of the proposed free range egg production unit had been previously marked out by the land owner and the survey was laid out based on these pegs.

The Fluxgate Gradiometer Survey was undertaken using twelve 20 x 20 m square laid out as in Figure 2. Readings were taken at 0.5 m intervals along transects 1.0 m apart. These transects were walked in a zig zag pattern. Readings were taken with the aid of a ST1 sample trigger.

The survey was carried out using a Geoscan FM 36 Fluxgate Gradiometer. Grey Scale Plots were produced using Geoscan Research "Geoplot" v.3.00x and X - Y Plots using Golden Software "Surfer" v. 5.01.

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. Soil samples were taken from all the grid squares within the survey area. These were dried in a heated cabinet, sieved through a 2 mm sieve and placed into 10 ml plastic pots for analysis with a Bartington MS 2 Magnetic Susceptibility Meter using the MS2B bench sensor

Results:

Area

The Fluxgate Gradiometer surveys covered a total area of 0.48 Ha.

Display

The results of the Fluxgate Gradiometer Survey is displayed as a Grey Scale Image (Figures 3) and as an X-Y Trace Plots. (Figures 4) and the results are summarized in Figure 7.

Fluxgate Gradiometer Survey

This survey technique records slight changes in the earths' magnetic field, which may be the results of human activity. The interpretation of the Fluxgate Gradiometer Surveys is shown as Figure 5 and is summarized in Figure 7.

No anomalies of potential archaeological origins were located within the survey. Indeed, the whole survey has a standard deviation, on the reading, of only 1.16 nT suggesting the area is remarkably, magnetically, quiet. A few anomalies were located, however. The anomalies marked in blue on Figure 5 are high value ferromagnetic responses typical of those from fragments of agricultural iron. The feint, parallel, anomalies at the south west end of the survey area (shown in green) follow the line of the ploughing of the field and therefore probably reflect the modern land use.

Magnetic Susceptibility

Soil samples were taken from the area of the survey in order to assess the magnetic susceptibility of the soils. It was possible to obtain a subsoil sample for comparison. The location of the samples is shown on Figure 6.

Sample	Volume susceptibility χ_v	Mass susceptibility χ_m
Grid 1	87	82.9
Grid 2	80	80.0
Grid 3	89	83.2
Grid 4	90	82.6
Grid 5	79	79.0
Grid 6	48	42.5
Grid 7	83	75.5
Grid 8	79	77.5
Grid 9	73	75.3
Grid 10	81	72.3
Grid 11	78	72.2
Grid 12	55	51.9
Sub-soil	64	68.8

The values, as measured are of moderate values suggesting that the area was suitable for magnetic survey. There is also a difference between the sub soil sample and the majority of the topsoil samples confirming the suitability for magnetic survey. It is noticeable that the values for the two northern grids are lower than those in the rest of the survey. These grid squares correspond with the slight rise at the northern end of the survey and a band of slightly darker soil, thus it is likely that these

readings reflect a change in the underlying geology.

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.

Neither the Fluxgate Gradiometer survey nor the Magnetic Susceptibility samples suggest that there is any significant archaeological activity within the survey area.

Acknowledgements

The survey was commissioned by Jenny Hall and Paul Sambrook of Trysor. Thanks are also due to the land owner, Glyn Jones, for allowing access and discussing the previous work on the site.

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 RM15

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:

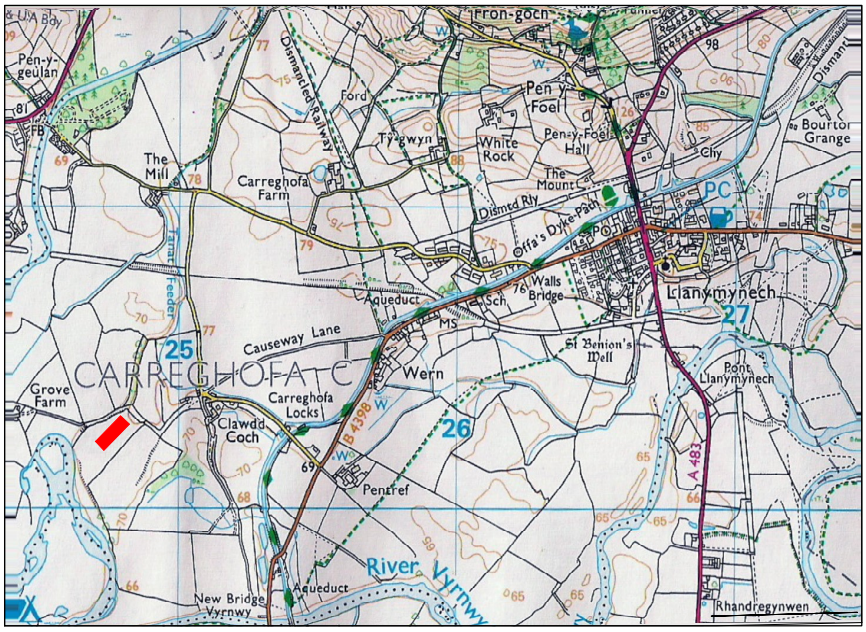


Figure 1: Location
Scale 1:25,000

Figure 2: Location of the Survey Area
Scale 1:2000

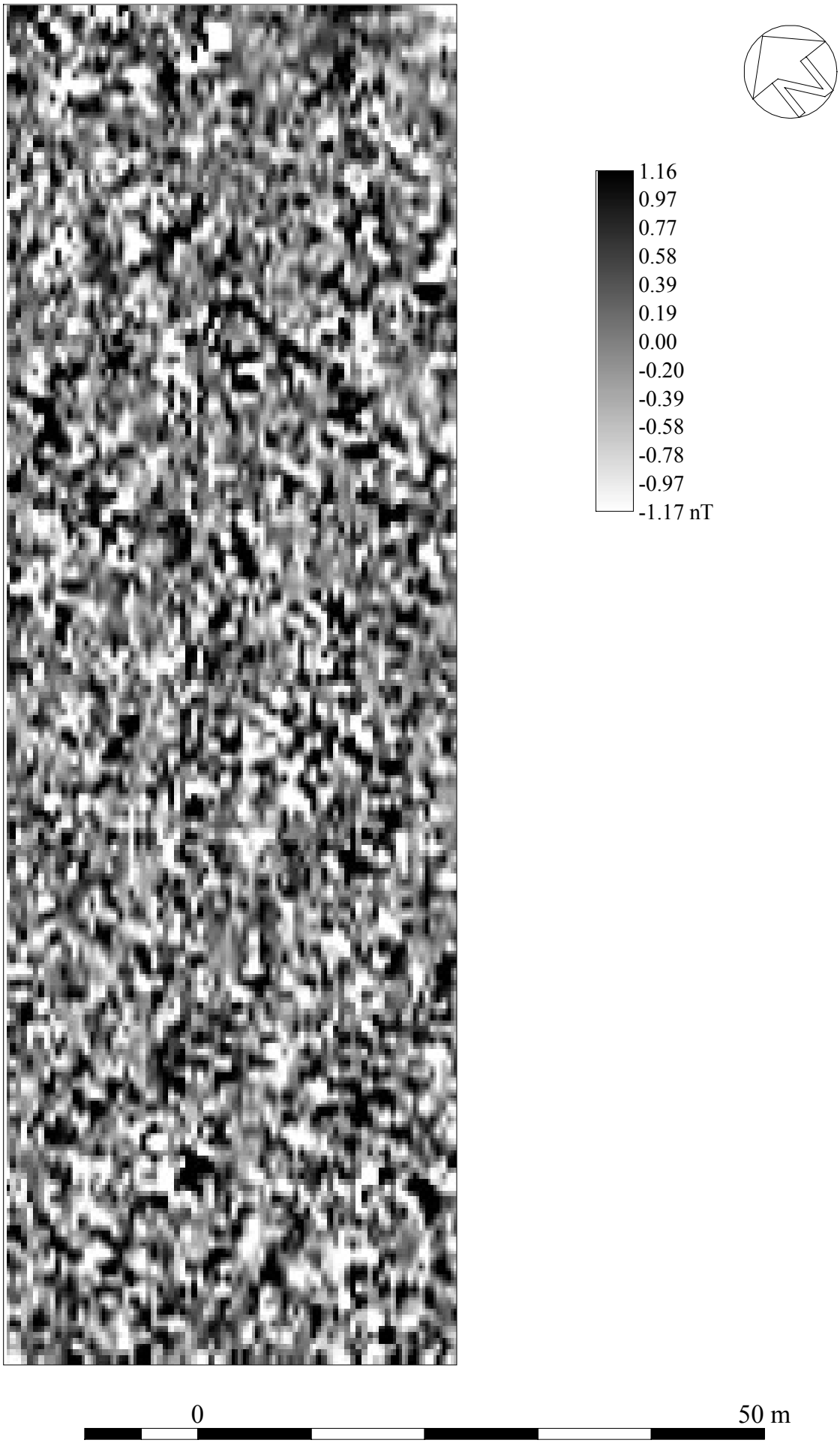


Figure 3: Grey Scale Plot
Scale 1:500

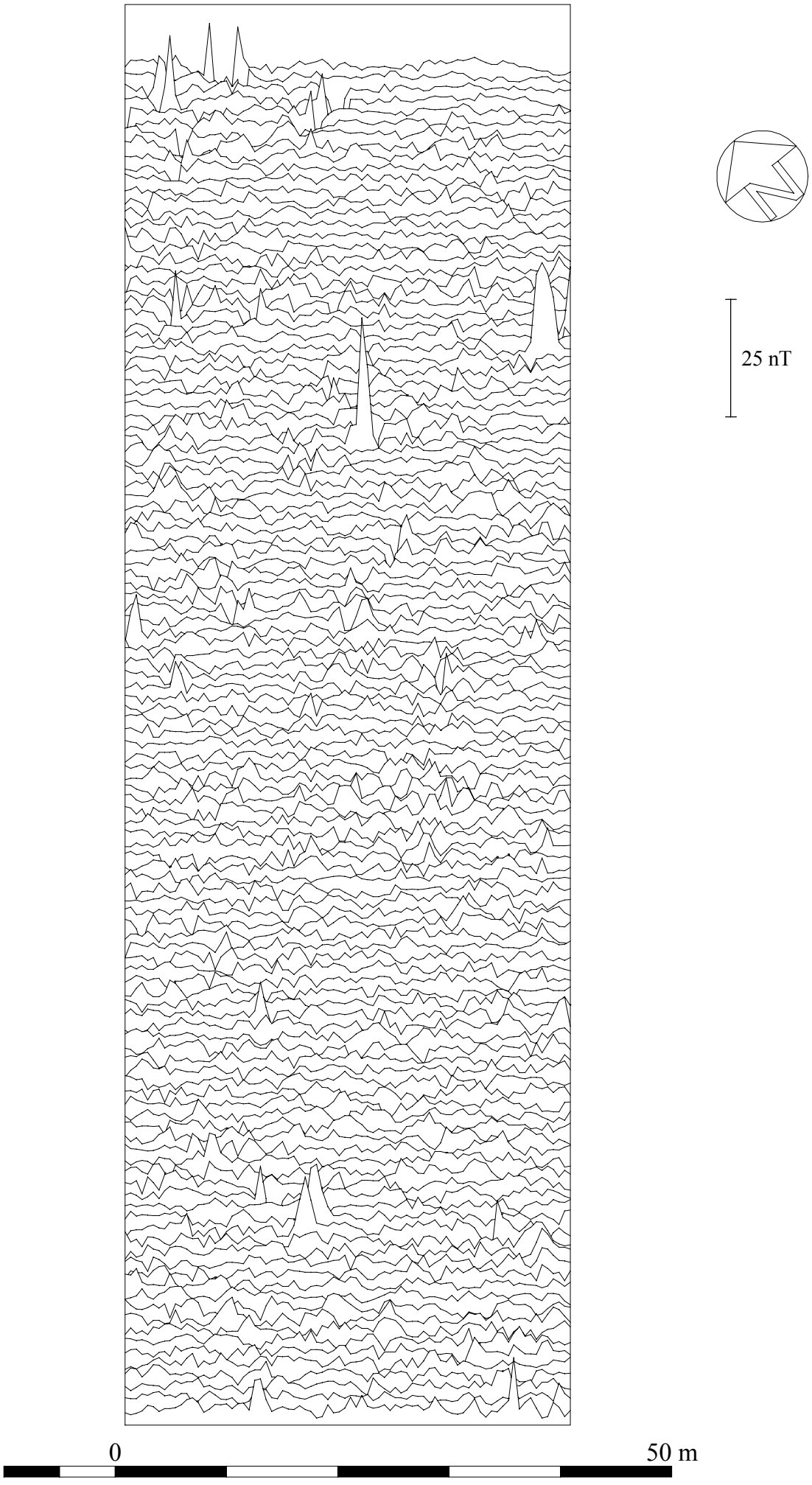
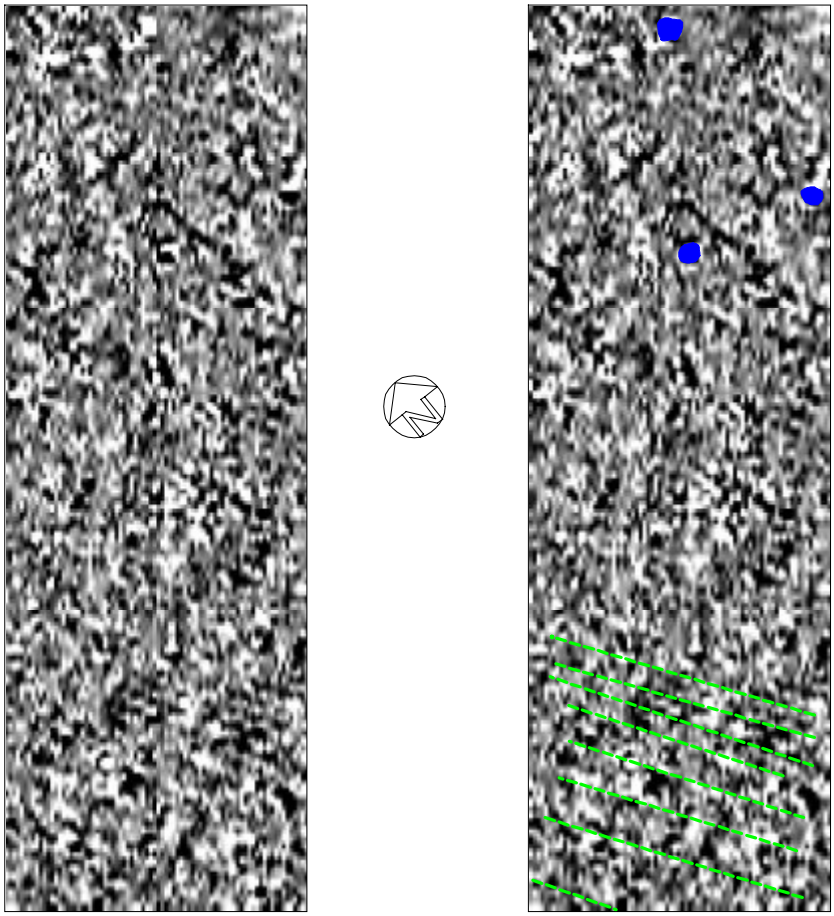


Figure 4: X-Y Plot
Scale 1:500



Feint linear anomaly (probably agricultural)

Ferromagnetic anomaly

Figure 5: Interpretation
Scale 1:1000

Figure 6: Magnetic Susceptibility Results
Scale 1:2000

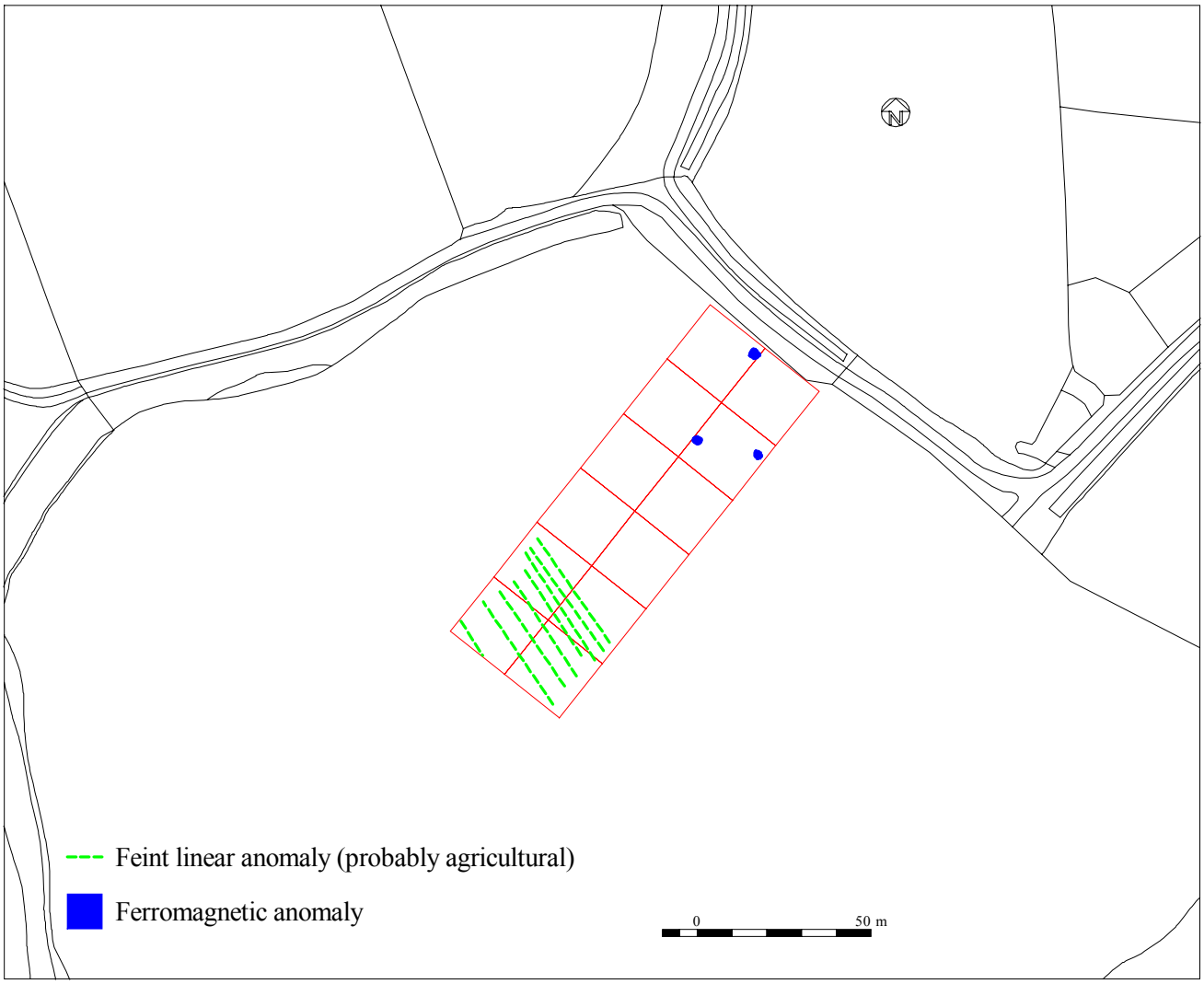


Figure 7: Summary
Scale 1:2000