Appendix 1

The Landscape Research Centre

A fluxgate gradiometer survey report

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DEVELOPMENT MANAGEMENT

carried out at

Thixendale,
North Yorkshire

on behalf of Hazel Colquhoun

March 2011

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Report information

Client	Hazel Colquhoun
Report type	Fluxgate gradiometer survey
Parish	Thixendale
County	North Yorkshire
Central grid reference	SE 8451258 5891521
Report number	LRC 118
Site code	547
Date of Fieldwork	18/03/2011
Date of report	21/03/2011
Fieldwork personnel	James Lyall MA (Hons), MSc
Report by	James Lyall MA (Hons), MSc
Produced by	The Landscape Research Centre Ltd

Summary

The Landscape Research Centre Ltd (LRC) carried out a fluxgate gradiometer survey on behalf of Hazel Colquhoun over an area (designated LRC site 547) of the Wolds Way at the confluence of Worm Dale and Thixendale, North Yorkshire (see Figure 1 for location of survey). The survey was carried out to test for the presence of archaeological features over an area of a proposed archaeologically influenced sculpture by the artist Chris Drury. The magnetic response of the area was reasonable, and detected the remains of four linear features, three of which relate to earlier trackways, and one which is of possible archaeological significance.

Figure 1 The location and extent of the area covered by the geophysical survey (in red) with the villages of Thixendale to the north and Fridaythorpe to the east (background image from Google maps)

Methodology

The survey was conducted using a *Foerster Ferex 4.032 DLG* fluxgate gradiometer 4-probe array. This machine is capable of high resolution data collection, and takes readings every 10cm along the traverse axis and every 50cm along the grid axis (thus achieving 18000 readings per 30m square). The machine collects samples at a 0.2 nT sensitivity range. Because the cart uses a real time kinematic GPS to position itself, each data point of the survey has an inbuilt sub 2cm accuracy.

The area covered over site 547 was a total of 0.9577 Ha. Site 547 is currently under an arable regime, and at the time of the survey the field was low sheep pasture, which did not hamper the data collection. The underlying geology is chalk, which generally gives a reasonable magnetic contrast with cut archaeological features such as ditches and pits.

The data from the magnetometer has been processed and presented using G-Sys (an in-house developed Geographic Database Management program which can also display, process and present digitised plans and images). This report was produced using Microsoft Word 2000 and Adobe Photoshop 7 for further image manipulation. All maps have north pointing to the top of the page.

Known archaeology in the area

A linear boundary, part of the Wold Entrenchments, is located some 250m to the south of the proposed development, but is not visible from the specific sculpture area. The Wold Entrenchments are a series of ditches and banks which divide the landscape of the Wolds up into large tracts of land. They are multi-period in their construction (probably reaching their zenith in the late Iron Age), but many were established as a pit alignment phase, which could be as early as the Neolithic in origin.

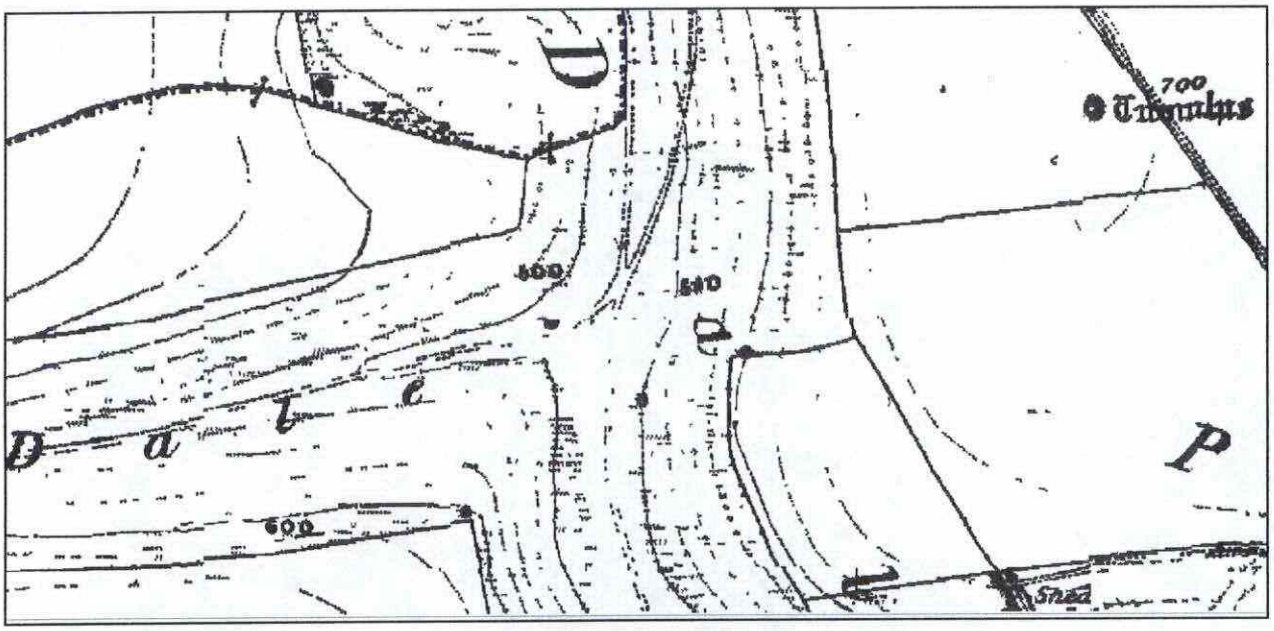

Figure 2 1st Edition Ordnance survey map of the area

A number of tumuli are noted on early maps of the area (many confirmed by cropmark information) and these indicate the location of round barrows (see Figure 2 for the position of the nearest of these). They mark the location of early Bronze Age burial monuments, although many of the barrows marked on the early maps are no longer visible on the ground, as modern farming techniques have allowed them to be ploughed away. All of the visible barrows are positioned on high ground, but this does not mean that as yet undiscovered examples are not located in the lower areas (see Figure 3).

Figure 3 Looking north up Thixendale, across the northern part of the surveyed area

Gradiometer results and interpretation

The results of the survey are displayed both as a greyscale image (see Figure 4) and an interpretative plan (see Figure 6) of potential archaeological features (image (all greyscale plots have a range of +-5nT). Features discovered by magnetic survey techniques are referred to as "anomalies", defined as such because they are different from the background magnetic norm.

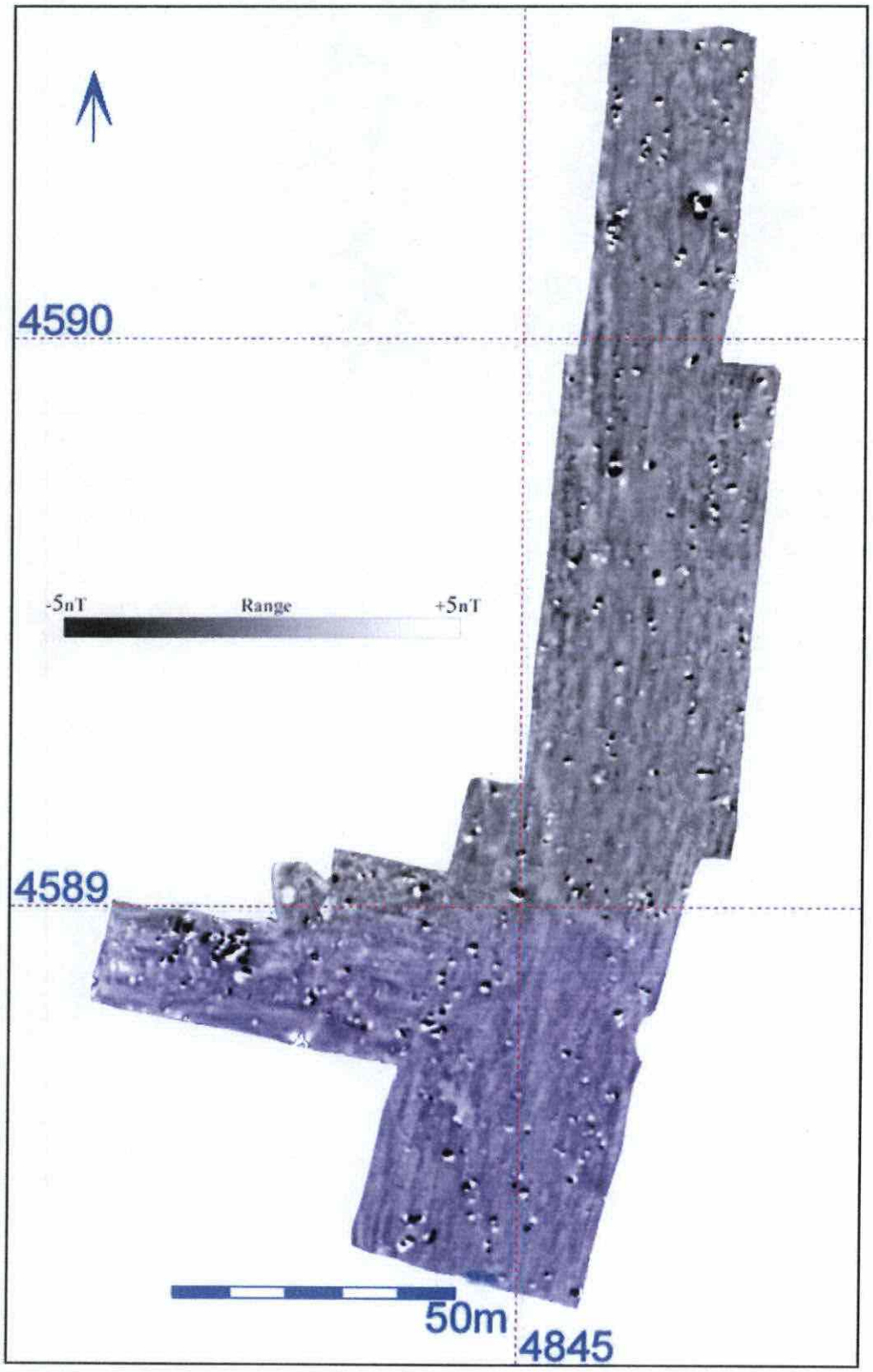

Figure 4 A greyscale plot of the geophysical data

Dipoles

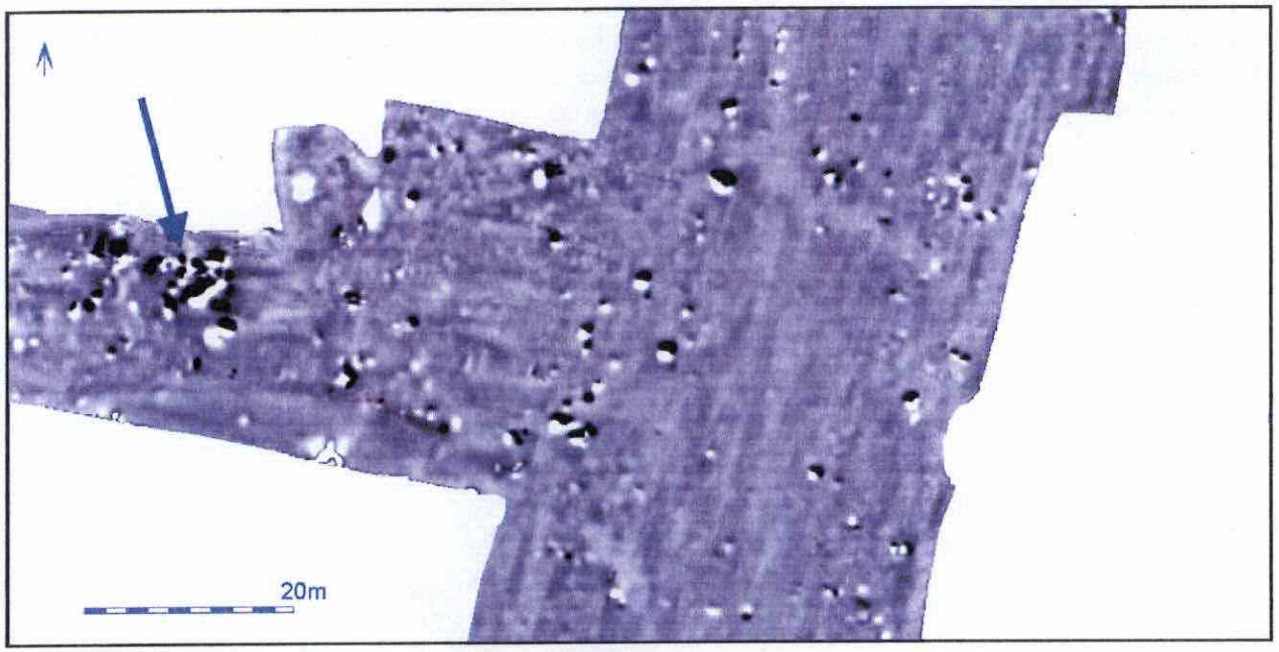

Figure 5 Showing the magnetic response of iron and the location of the dew pond

The small black and white areas in the greyscale images (see Figure 5) are dipoles (iron spikes), which indicate the presence of magnetic (iron or steel) objects. These are generally found in the topsoil, and although they could signify the presence of archaeological objects, it is much more likely that they relate to more modern detritus, such as broken ploughshares, iron horseshoes, shotgun cartridges etc. There is a concentration of larger dipoles where the dew pond is located (arrowed in blue on Figure 5). Local knowledge has it that this was the site of a 2nd World War anti-aircraft installation, and there are certainly a number of concrete blocks in the vicinity of the dewpond. If this is true, it could indicate why there are so many dipoles in the immediate area.

Linear anomalies

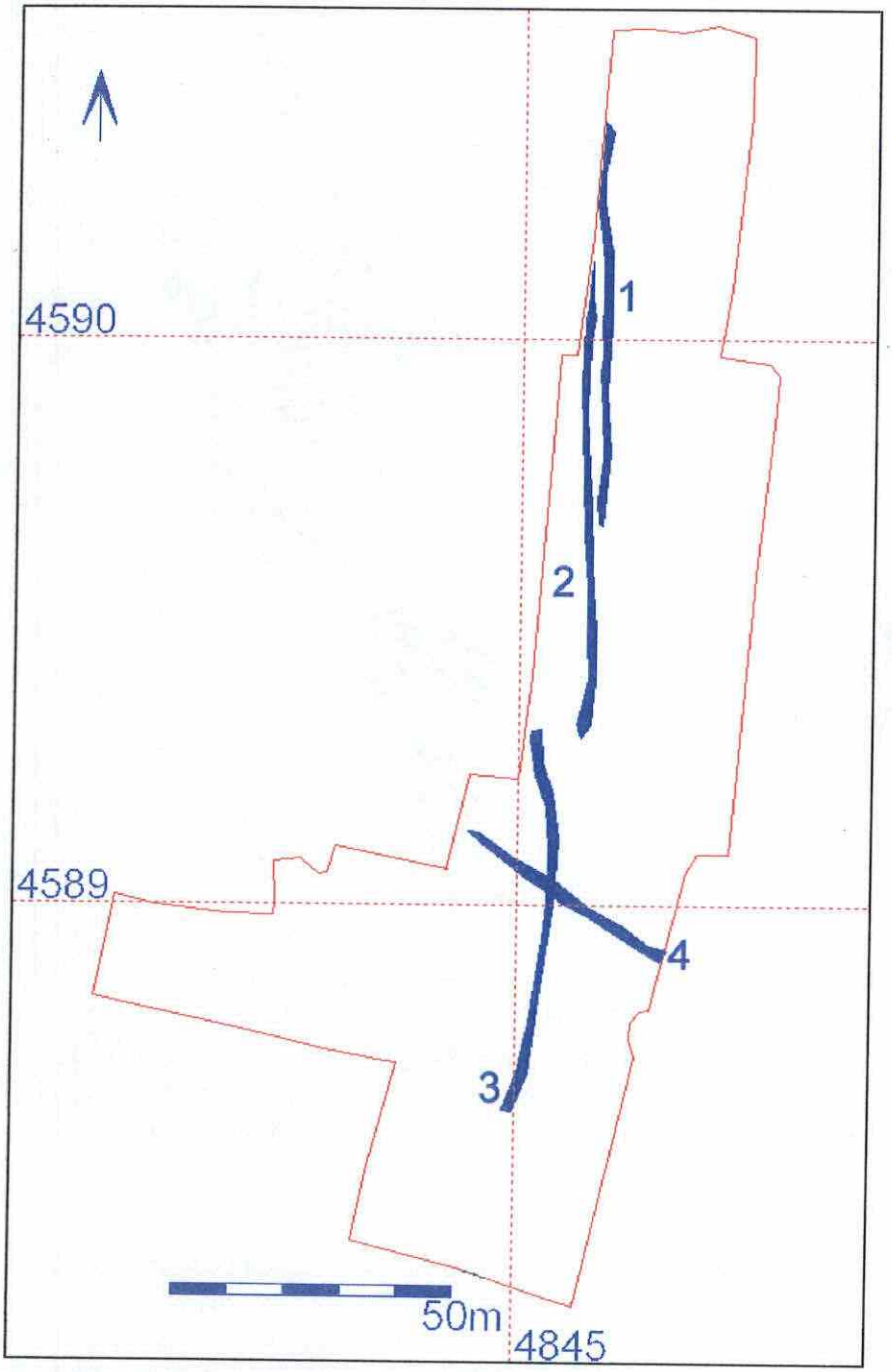

Figure 6 Archaeological features detected by magnetic survey (in blue)

Four linear anomalies were detected during the magnetic survey. It is likely that the anomalies numbered 1, 2 and 3 in Figure 6 are related to the presence of a trackway leading up through Thixendale which is no longer utilised, although it is still present on maps up to around 1980 (see Figure 2 for the 1st edition map showing the trackway). A second trackway is also shown on all maps, leading past the dewpond out of Wormdale and then up the eastern edge of Thixendale to join a chalk track which still exists today (see frontispiece and Figure 3). No evidence for this trackway was detected by the magnetic survey.

Linear anomaly number four is different from the others, if only in that there is no evidence for a feature in this location on any of the early maps. It is still possible that this relates to the presence of an

early trackway, which had gone out of use by the time the first maps were produced. It is also possible that this anomaly indicates the presence of an earlier feature of potential archaeological origin.

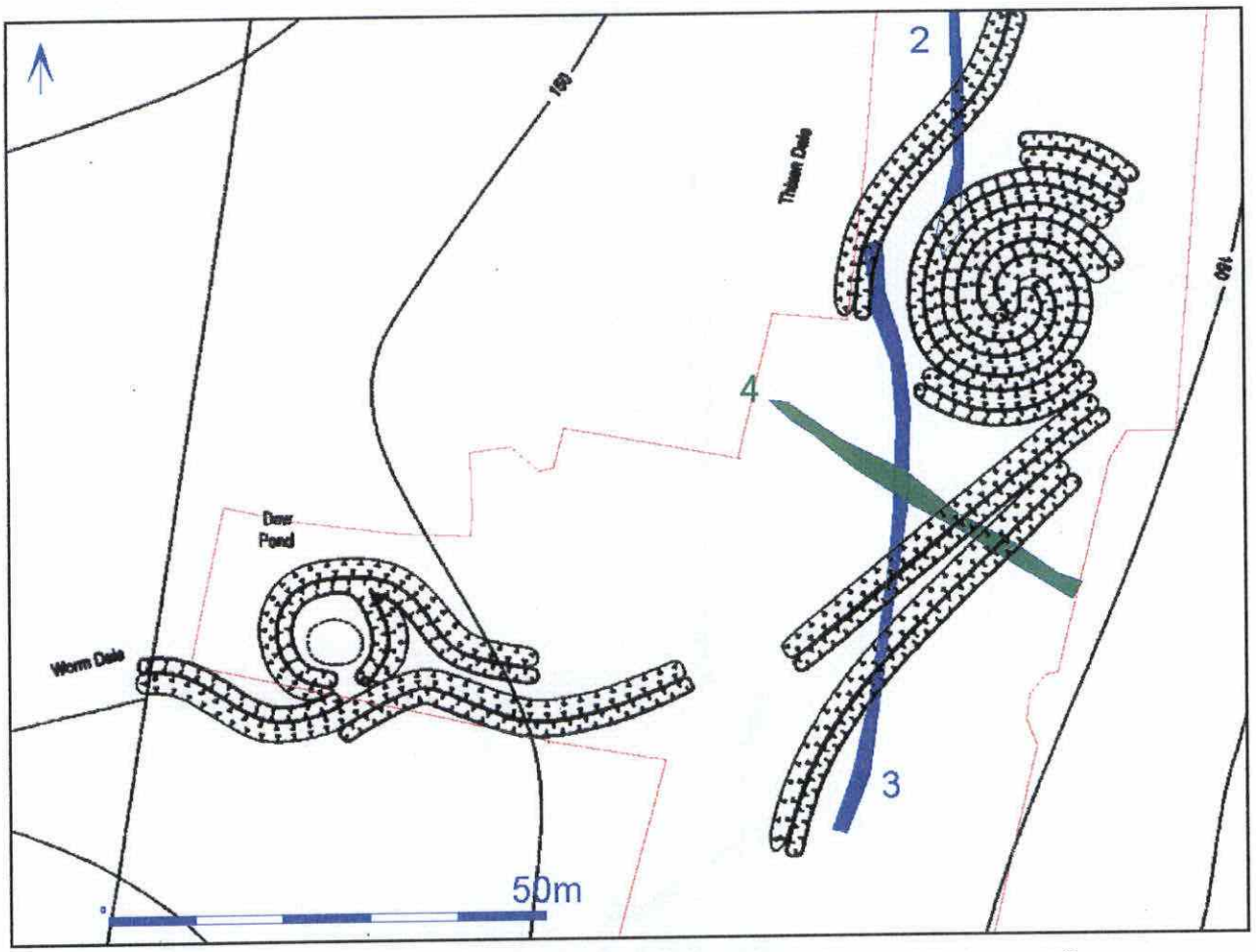

Figure 7 Showing the proposed location of the sculpture in relation to the detected magnetic anomalies

Figure 7 shows where the proposed sculpture will impact on the detected magnetic anomalies. The trackway (numbered 2 and 3, in blue) will be intercepted in four places. The potential archaeological anomaly (numbered 4, in green) will only be intercepted across two linear aspects of the sculpture.

Conclusions

In conclusion, it can be stated that the underlying chalk provided a reasonable magnetic contrast to the in-filled features. Four linear features were detected, although three of these could directly be demonstrated to relate to a trackway which used to run through Thixendale. The fourth is a linear feature which is not represented on early maps, and could potentially be of archaeological significance.

On behalf of the Trustees
The Landscape Research Centre
The Old Bridge Barn
Yedingham
Malton
North Yorkshire
YO17 8SL
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