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# The Landscape Research Centre

Fluxgate gradiometer survey



carried out  
to the east of 54 St Hilda's Street, Sherburn,  
North Yorkshire

Commissioned by [mcbeathproperty.co.uk](http://mcbeathproperty.co.uk)

15<sup>th</sup> October 2008

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## Report information

<b>Client</b>	mcbeathproperty.co.uk
<b>Report type</b>	Fluxgate gradiometer survey
<b>Parish</b>	Sherburn
<b>County</b>	North Yorkshire
<b>Central grid reference</b>	SE 9605779 7728370
<b>Report number</b>	LRC 105
<b>Site code</b>	469
<b>Date of Fieldwork</b>	15/10/2008
<b>Date of report</b>	22/10/2008
<b>Fieldwork personnel</b>	James Lyall MA (Hons), MSc
<b>Report by</b>	James Lyall MA (Hons), MSc
<b>Produced by</b>	The Landscape Research Centre Ltd



## Summary

A fluxgate gradiometer survey carried out by the Landscape Research Centre Ltd (LRC) in 2006 in the field immediately to the east of the projected development had demonstrated that the area is a region of intense archaeological activity. Therefore, in order to assist and inform the design of an archaeological evaluation strategy, a fluxgate gradiometer survey was conducted by the LRC on behalf of mcbeathproperty.co.uk over the area of proposed housing development to the east of 54 St Hilda's Street, Sherburn, North Yorkshire (see Figure 1 for location). The magnetic response of the site was good, with 33 features of potential archaeological origin detected.



**Figure 1** The extent of the area covered by the geophysical survey (in red) with St Hilda's Street to the west (background image source [www.maps.live.com](http://www.maps.live.com))

## Methodology

The survey was conducted using a *Foerster Ferex 4.032 DLG* fluxgate gradiometer 4 probe array. This machine allows for high resolution data collection, and takes readings every 10cm along the traverse axis and every 50cm along the grid axis (thus taking 18000 readings in a 30m grid). This machine collects samples at a 0.2 nT sensitivity. 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 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 6 for further image manipulation. All maps have north pointing to the top of the page.

The field is currently a small open grass area, and has been given a site number of 469 in the LRC numbering system. The longish grass of the field presented an obstacle to the low axle of the magnetometer cart, although the data collection was not compromised. A number of trees were present in the south-western part of the site and long undergrowth along the southern boundary precluded survey of these two areas (see Figure 2 for areas unavailable for survey). However, an electricity pole is present in the south-eastern corner, and an underground electric



cable leads from this pole to the houses to the south-west, which would have dominated any magnetic survey of the south-eastern boundary area. The surveyor was James Lyall. The area surveyed was 0.2654 Ha.

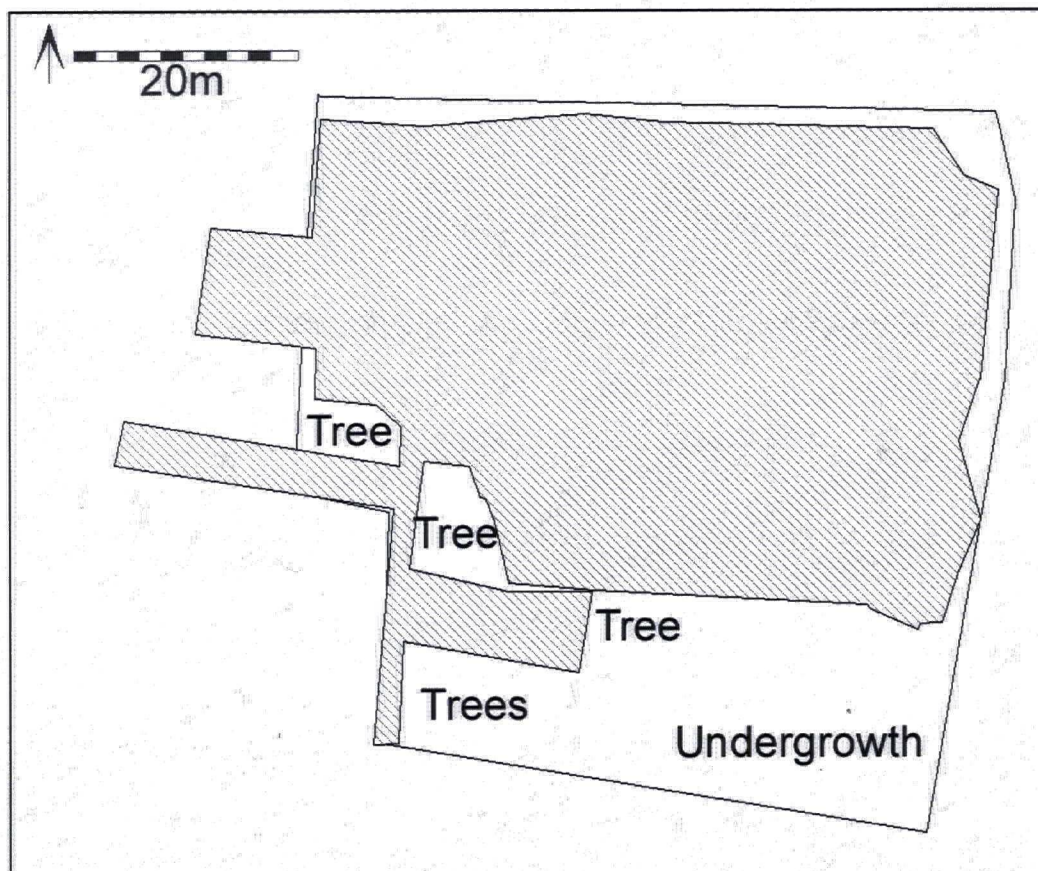


Figure 2 Area surveyed (red) showing location of obstacles within requested area (black)

### Gradiometer results and interpretation

The results of the survey are displayed as a greyscale image (see Figure 3) and as interpretative plans (see Figure 4 and Figure 5). Features discovered by magnetic survey techniques are referred to as "anomalies", defined as such because they are different from the background norm. When using a gradiometer, these anomalies can be either positive (greater) or negative (less) than the background norm. Figure 3 indicates both positive and negative magnetic anomalies (lighter and darker areas in the greyscale image).

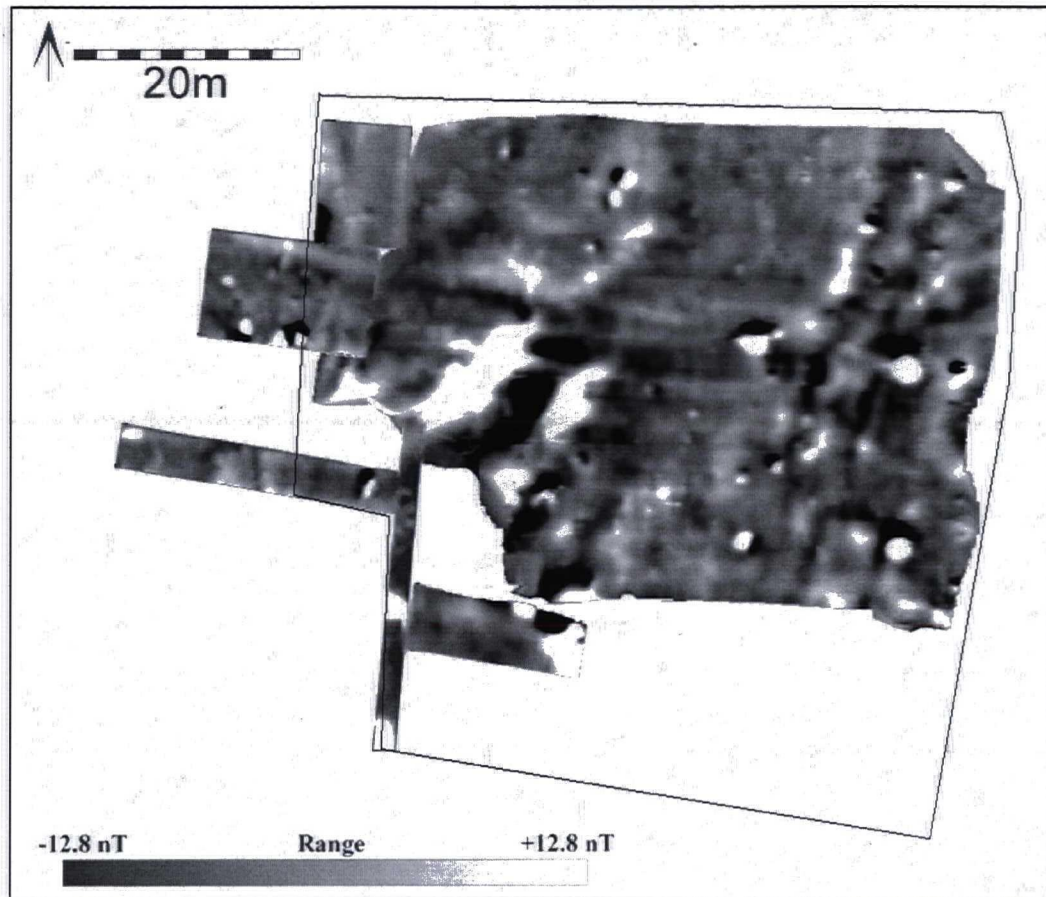
The small black and white areas in the greyscale image are dipoles (iron spikes), which indicate the presence of iron objects. These are generally found in the topsoil, and although they could indicate the presence of archaeological objects, it is much more likely that they relate to more modern detritus, such as broken ploughshares, iron horseshoes, shotgun cartridges etc.

A total of 33 anomalies were discovered, of which 15 were linear anomalies and 18 were localised or discrete anomalies.

The most obvious anomalies are the strong linears running SSW-NNE through the centre of the surveyed area, and these can be related to an area of stream

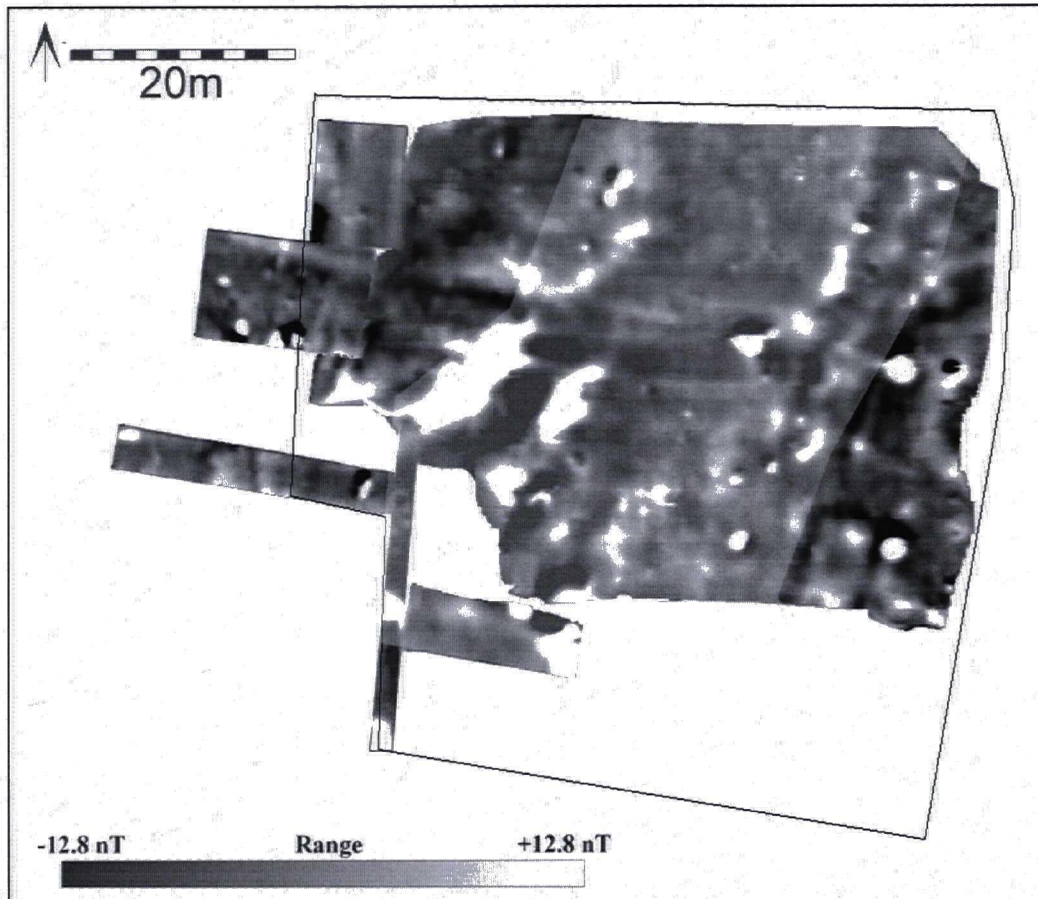


channel influence (see Figure 4). The previous magnetic surveys in the field to the east (see Figure 6) had indicated that the old line of the East Beck ran through the area, which has now been confirmed by the current survey.



**Figure 3** A greyscale image of the magnetic data from the Foerster survey

It should be made clear that the stream channel itself would not have been significantly different in size or flow than the current East Beck. The reason that so wide an area is influenced by these deposits is that the channel would have moved around over time, through both natural processes and human influence. Stream channels are of significant potential archaeological interest, as the deposits can preserve organic material which would otherwise be dissolved in the acidic sands of the area. As well as this, the natural resource would have attracted human activity from the earliest times (i.e. the excavations at West Heslerton revealed activity along the stream channel from the Mesolithic to the Medieval periods), so the potential of discovering human activity along the banks of the stream is enhanced.



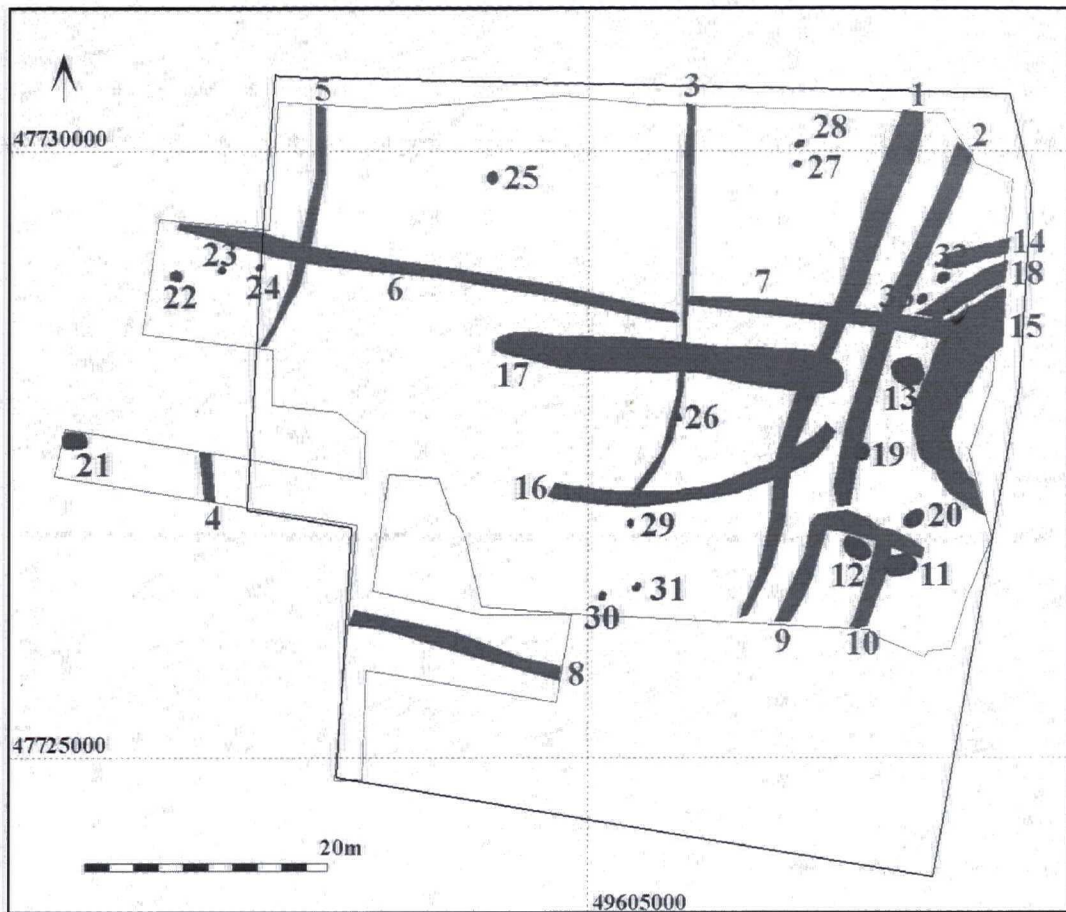
**Figure 4 Showing area influenced by stream channel activity (coloured lilac), both natural and human influence**

### Linear anomalies

There are also a number of linear anomalies associated with the line of the channel. These are almost certainly archaeological in origin, and are likely to be associated with stream channel management. In particular, anomalies 1, 2 (strongly negative along the eastern edge) and 3 (weakly positive, central) all follow the line of the channel, but are confined and thus hint that there were at least 3 different phases of stream channel management.

Anomaly 17 is a large negative anomaly extending across the line of the stream channel. It is unclear whether this relates to a stream diversion ditch or has some other function. Linear anomaly 16 is a weak magnetic feature which could relate to the (natural?) course of an old stream channel. Only a small part of anomalies 14, 15 and 18 were covered by the survey, so interpretation of these features is difficult. They could be part of the main stream channel management, or they could have an alternative function.





**Figure 5 Interpretative plot of anomalies (without stream channel activity)**

A number of other linear anomalies unassociated with stream channel management were also detected.

Weakly positive linear anomaly 5 is on the same alignment as 3, but is of a different magnetic character, possibly indicating that this is an enclosure ditch. Anomaly 7 is a positive east-west aligned feature, on the same alignment as anomaly 6, although there is a slight offset between the two in the centre of the surveyed area. If they are related, this could be an entrance, indicating that these two features are also enclosure ditches. Anomaly 8 is another east-west aligned feature, with its positive fill indicating that this is another enclosure ditch.

The most intriguing of the linear anomalies is an apparently rectangular arrangement (anomalies 9 and 10) located in the south-eastern part of the survey area. They appear to have been cut through by at least one of the Grubenhäuser (11, see Localised anomalies below for discussion). Because we only have the northern part of the feature, any interpretation will need to be tested. The negative nature of the anomalies could lead to the suggestion that a structure of some form is present here, but because of the presence of the stream channel this interpretation cannot be taken for granted, as they could also relate to further enclosure ditches.

Linear anomaly 4 is outside of the proposed development area.

### **Localised anomalies**

There are at least three large (11, 12 and 13) and two smaller (19 and 20) localised anomalies in the eastern part of the surveyed area which have been interpreted as Grubenhäuser. These are a specific form of Anglo-Saxon structure which involved the initial excavation of a large hole in the ground which was subsequently covered by a timber framed superstructure. When the building went out of use, the hole was generally used as a convenient rubbish dump, thus providing the enhanced magnetic signal common for these structures. Two further potential Grubenhäuser (21 and 22) are located outside of the proposed development area.

In addition, the survey discovered at least 11 smaller localised anomalies (numbers 23-33), which may indicate the location of pits. Pits in the past were used for a number of different functions, but tend to show up in magnetic surveys if they are filled with magnetically enhanced material (anything that has been burnt), so the pits that were detected are likely to be rubbish pits. There is no obvious concentration of this feature type within the surveyed area. Anomalies 23 and 24 were outside of the proposed development area.

### **Conclusions**

In conclusion, it can be stated that the area was particularly conducive to magnetic survey techniques, and 33 anomalies of potential archaeological significance were detected. The presence of stream channel activity through the centre of the surveyed area means that the natural deposits may be masking the more subtle underlying archaeological features.

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On behalf of the Trustees  
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20<sup>th</sup> May 2008



## Appendix One

It is worth noting that the LRC has previously conducted surveys of the fields to the east of Sherburn village, and these surveys demonstrate that the Sherburn is surrounded by intense settlement activity, particularly of the Iron Age, Romano-British, Anglo-Saxon and Middle Saxon phases.

The entire field to the east of site 469 was surveyed in 2006, and indicated intense archaeological activity in the immediate vicinity (see Figure 6). In particular, it was assumed that the old line of the stream channel (currently diverted around site 469 to the south and east) used to pass through the surveyed area, which was confirmed by the current geophysical survey.

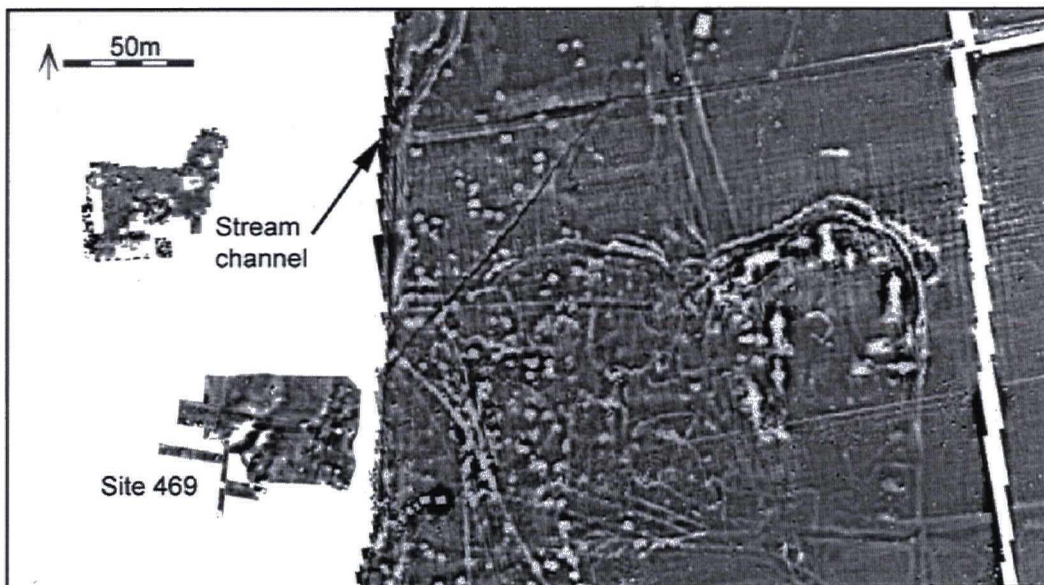


Figure 6 Line of stream channel previously detected by LRC surveys