Land at Crosland Road

Lindley

West Yorkshire

Geophysical Survey

Report no. 3088
February 2018

Client: Taylor Wimpey Yorkshire

Land at Crosland Road,
Lindley,
Huddersfield,
West Yorkshire

Geophysical Survey

Summary

A geophysical (magnetometer) survey, covering approximately 2.8 hectares, was undertaken on land at Crosland Road, Lindley, Huddersfield, West Yorkshire. This was part of a programme of archaeological works in advance of a proposed housing development. The magnetic survey has detected no anomalies of archaeological potential. Field drains have been detected along with responses of a geological origin and magnetic disturbance.

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Archaeological
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Report Information

Client:	Taylor Wimpey Yorkshire
Address:	Sandpiper House, Peel Avenue, Calder Park, Wakefield, WF2 7UA
Report Type:	Geophysical Survey
Location:	Lindley
County:	West Yorkshire
Grid Reference:	SE 1063 1839
Period(s) of activity:	Modern
Report Number:	3088
Project Number:	6985
Site Code:	LCR18
OASIS ID:	Archaeol11- 310505
Date of fieldwork:	January 2018
Date of report:	February 2018
Project Management:	Emma Brunning BSc MCIfA
Fieldwork:	Emma Brunning
Report:	Emma Brunning
Illustrations:	Emma Brunning
Research:	Emma Brunning

Authorisation for distribution: ---

Nepshaw Lane South, Morley, Leeds LS27 7JQ
Telephone: 0113 383 7500.
Email: admin@aswyas.com

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1 Introduction

Archaeological Services WYAS (ASWYAS) were commissioned by Taylor Wimpey Yorkshire to undertake a geophysical (magnetometer) survey on land at Crosland Road, Lindley, Huddersfield, West Yorkshire. This is in advance of a proposed development. Guidance contained within the National Planning Policy Framework (DCLG 2012) was followed, in line with current best practice (CIfA 2014; David *et al*. 2008). The survey was carried out on the 22nd January 2018.

Site location, topography and land-use

The Site is centred on National Grid Reference SE 1063 1839 and comprises two fields totalling 2.8 ha in size. The Site is bounded by Crosland Road to the east, Hill Grove to the south, new housing development to the north and pasture fields to the west. At the time of survey the ground cover was pasture which was waterlogged in places. It lies at a height above Ordnance Datum between 267m and 254m.

Soils and geology

The geology of the Site consists of Bed Flags – sandstone, a sedimentary bedrock that formed approximately 318 to 319 million years ago in the Carboniferous Period. No superficial deposits have been recorded (BGS 2018). Soils of the area belong to the Rivington 2 (541g) association comprising well drained coarse loamy soils over rock (SSEW 1983).

2 Archaeological Background

The following information has been taken from Land to the South of Lindley Moor Road, Huddersfield, West Yorkshire: Desk Based Archaeological Assessment (OSA 2014).

Approximately 500m to the north of the Site Roman road 712 is located and is visible as a low, linear earthwork (OSA 2014). This road has been subjected to excavations in the past which revealed two phases of metalling.

The name of Lindley itself is likely to be a Saxon place name, and is either derived from the word for meadow or more specifically a “Flax clearing”. Lindley is recorded in the Domesday Survey of 1086, as Lillai(a) and it is likely that this refers to a pre-Conquest site.

To the east of Site a Grade II listed building, Crosland Road Farmhouse (NHL 1290289) is located.

3 Aims, Methodology and Presentation

The main aim of the geophysical survey was to provide additional information on the known archaeology within the area. To achieve this, a magnetometer survey covering all available parts of the PDA was undertaken (see Fig. 2).

The general objectives of the geophysical survey were:

- to provide information about the nature and possible interpretation of any magnetic anomalies identified;
- to therefore determine the presence/absence and extent of any buried archaeological features; and
- to prepare a report summarising the results of the survey.

Magnetometer survey

The site grid was laid out using a Trimble R8s GNSS system. The survey was undertaken using Bartington Grad601 magnetic gradiometers. These were employed taking readings at 0.25m intervals on zig-zag traverses 1.0m apart within 30m by 30m grids, so that 3600 readings were recorded in each grid. These readings were stored in the memory of the instrument and later downloaded to computer for processing and interpretation. Geoplot 3 (Geoscan Research) software was used to process and present the data. Further details are given in Appendix 1.

Reporting

A general site location plan, incorporating the 1:50000 Ordnance Survey (OS) mapping, is shown in Figure 1. Figure 2 shows a more detailed site location plan at a scale of 1:2000. The processed and minimally processed data, together with an interpretation of the survey results are presented in Figures 3 to 5 inclusive at a scale of 1:1000.

Technical information on the equipment used, data processing and survey methodologies are given in Appendix 1. Technical information on locating the survey area is provided in Appendix 2. Appendix 3 describes the composition and location of the archive. A copy of the completed OASIS form is included in Appendix 4.

The survey methodology, report and any recommendations comply with guidelines outlined by English Heritage (David *et al.* 2008) and by the Chartered Institute for Archaeologists (CIfA 2014). All figures reproduced from Ordnance Survey mapping are with the permission of the controller of Her Majesty’s Stationery Office (© Crown copyright).

The figures in this report have been produced following analysis of the data in processed formats and over a range of different display levels. All figures are presented to most

suitably display and interpret the data from this site based on the experience and knowledge of Archaeological Services staff.

4 Results and Discussion (see Figs 2 to 5)

Ferrous anomalies

Ferrous anomalies, as individual 'spikes', or as large discrete areas are typically caused by ferrous (magnetic) material, either on the ground surface or in the plough-soil. Little importance is normally given to such anomalies, unless there is any supporting evidence for an archaeological interpretation, as modern ferrous debris or material is common on rural sites, often being present as a consequence of manuring or tipping/infilling. There is no obvious pattern or clustering to their distribution in this survey to suggest anything other than a random background scatter of ferrous debris in the plough-soil.

Magnetic disturbance along the northern boundary of Area 1 has been caused by the presence of *Heras* fencing and new housing works/compound. Similar responses along the southern boundary of Area 1 and northern boundary of Area 2 are from existing housing.

Geological anomalies

A handful of anomalies in Area 2 have been interpreted as geological/natural and are thought to be caused by variations in the depth and composition of the soils and the superficial deposits from which they derive, this area was also waterlogged which also supports this interpretation.

Agricultural anomalies

Field drains have been recorded in both areas, consisting of a herringbone design.

5 Conclusions

The magnetic survey has detected no anomalies of archaeological interest.

The majority of the responses are of a modern origin including disturbance from adjacent housing and small scale ferrous debris. Field drains have also been recorded along with a handful of responses of a geological origin. Based on this geophysical survey, the archaeological potential for this site, therefore, is deemed to be low.

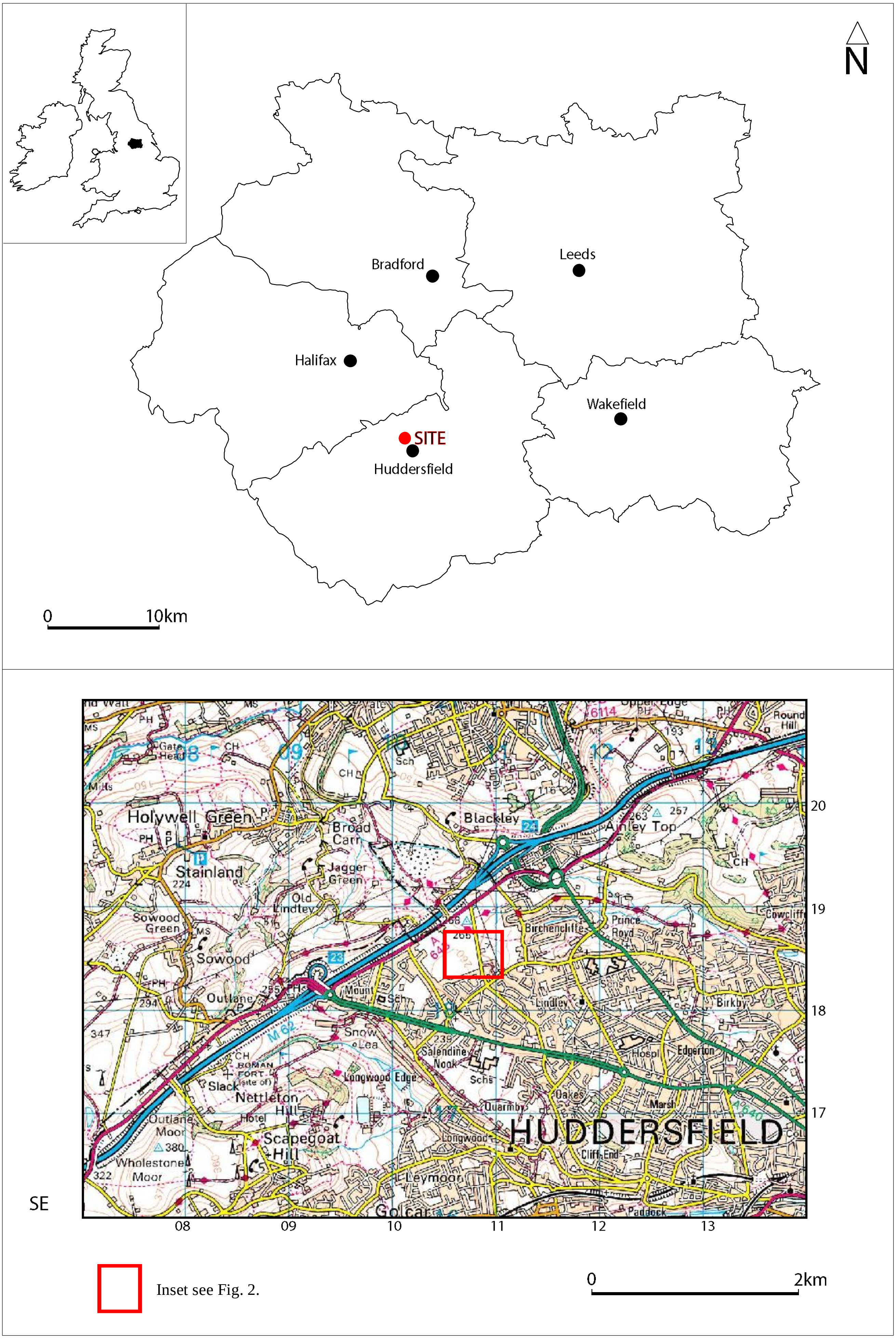

Fig. 1. Site location

Fig. 2. Survey location showing greyscale gradiometer data (1:2000 @ A3)

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Fig. 3. Processed greyscale gradiometer data (1:1000 @ A3)

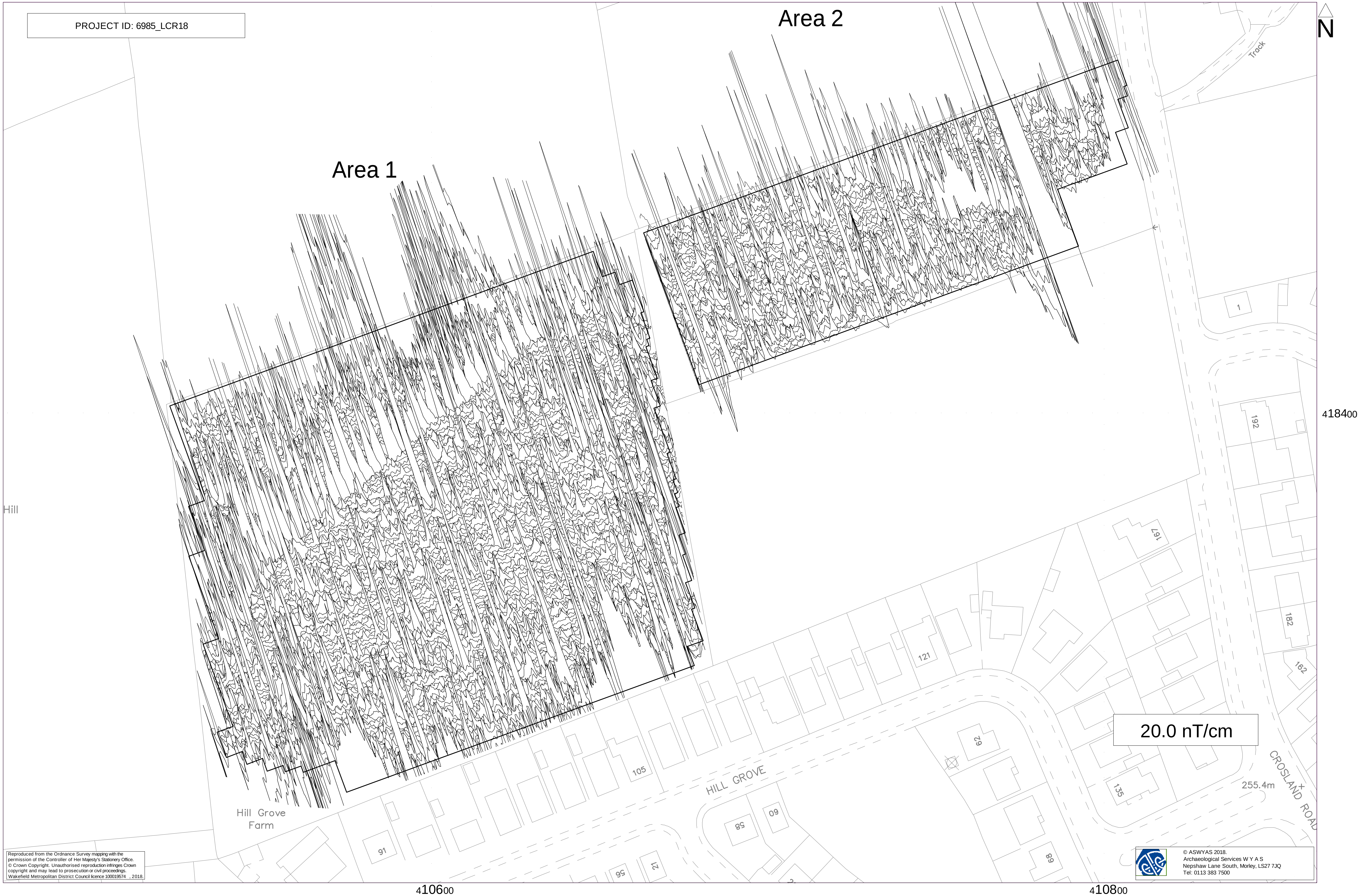

Fig. 4. XY trace plot of minimally processed gradiometer data (1:1000 @ A3)

Fig. 5. Interpretation of gradiometer data (1:1000 @ A3)

Plate 1. General view of Area 1, looning southeast

Plate 2. General view of Area 2, looking west

Appendix 1: Magnetic survey - technical information

Magnetic Susceptibility and Soil Magnetism

Iron makes up about 6% of the Earth's crust and is mostly present in soils and rocks as minerals such as maghaemite and haemetite. These minerals have a weak, measurable magnetic property termed magnetic susceptibility. Human activities can redistribute these minerals and change (enhance) others into more magnetic forms. Areas of human occupation or settlement can then be identified by measuring the magnetic susceptibility of the topsoil because of the attendant increase (enhancement) in magnetic susceptibility. If the enhanced material subsequently comes to fill features, such as ditches or pits, localised isolated and linear magnetic anomalies can result whose presence can be detected by a magnetometer (fluxgate gradiometer).

In general, it is the contrast between the magnetic susceptibility of deposits filling cut features, such as ditches or pits, and the magnetic susceptibility of topsoils, subsoils and rocks into which these features have been cut, which causes the most recognisable responses. This is primarily because there is a tendency for magnetic ferrous compounds to become concentrated in the topsoil, thereby making it more magnetic than the subsoil or the bedrock. Linear features cut into the subsoil or geology, such as ditches, that have been silted up or have been backfilled with topsoil will therefore usually produce a positive magnetic response relative to the background soil levels. Discrete feature, such as pits, can also be detected. The magnetic susceptibility of a soil can also be enhanced by the application of heat and the fermentation and bacterial effects associated with rubbish decomposition. The area of enhancement is usually quite large, mainly due to the tendency of discard areas to extend beyond the limit of the occupation site itself, and spreading by the plough.

Types of Magnetic Anomaly

In the majority of instances anomalies are termed 'positive'. This means that they have a positive magnetic value relative to the magnetic background on any given site. However some features can manifest themselves as 'negative' anomalies that, conversely, means that the response is negative relative to the mean magnetic background.

Where it is not possible to give a probable cause of an observed anomaly a '?' is appended.

It should be noted that anomalies interpreted as modern in origin might be caused by features that are present in the topsoil or upper layers of the subsoil. Removal of soil to an archaeological or natural layer can therefore remove the feature causing the anomaly.

The types of response mentioned above can be divided into five main categories that are used in the graphical interpretation of the magnetic data:

Isolated dipolar anomalies (iron spikes)

These responses are typically caused by ferrous material either on the surface or in the topsoil. They cause a rapid variation in the magnetic response giving a characteristic 'spiky' trace. Although ferrous archaeological artefacts could produce this type of response, unless there is supporting evidence for an archaeological interpretation, little emphasis is normally given to such anomalies, as modern ferrous objects are common on rural sites, often being present as a consequence of manuring.

Areas of magnetic disturbance

These responses can have several causes often being associated with burnt material, such as slag waste or brick rubble or other strongly magnetised/fired material. Ferrous structures such as pylons, mesh or barbed wire fencing and buried pipes can also cause the same disturbed response. A modern origin is usually assumed unless there is other supporting information.

Linear trend

This is usually a weak or broad linear anomaly of unknown cause or date. These anomalies are often caused by agricultural activity, either ploughing or land drains being a common cause.

Areas of magnetic enhancement/positive isolated anomalies

Areas of enhanced response are characterised by a general increase in the magnetic background over a localised area whilst discrete anomalies are manifest by an increased response on two or three successive traverses. In neither instance is there the intense dipolar response characteristic exhibited by an area of magnetic disturbance or of an 'iron spike' anomaly (see above). These anomalies can be caused by infilled discrete archaeological features such as pits or post-holes or by kilns. They can also be caused by pedological variations or by natural infilled features on certain geologies. Ferrous material in the subsoil can also give a similar response. It can often therefore be very difficult to establish an anthropogenic origin without intrusive investigation or other supporting information.

Linear and curvilinear anomalies

Such anomalies have a variety of origins. They may be caused by agricultural practice (recent ploughing trends, earlier ridge and furrow regimes or land drains), natural geomorphological features such as palaeochannels or by infilled archaeological ditches.

Methodology: Gradiometer Survey

The main method of using the fluxgate gradiometer for commercial evaluations is referred to as ***detailed survey*** and requires the surveyor to walk at an even pace carrying the instrument within a grid system. A sample trigger automatically takes readings at predetermined points, typically at 0.25m intervals, on traverses 1m apart. These readings are stored in the memory of the instrument and are later dumped to computer for processing and interpretation.

During this survey a Bartington Grad601 magnetic gradiometer was used taking readings on the 0.1nT range, at 0.25m intervals on zig-zag traverses 0.5m apart within 30m by 30m square grids. The instrument was checked for electronic and mechanical drift at a common point and calibrated as necessary. The drift from zero was not logged.

The gradiometer data have been presented in this report in processed greyscale format. The data in the greyscale images have been interpolated and selectively filtered to remove the effects of drift in instrument calibration and other artificial data constructs and to maximise the clarity and interpretability of the archaeological anomalies.

The results and subsequent interpretation of data from geophysical surveys should not be treated as an absolute representation of the underlying archaeological and non-archaeological remains. Confirmation of the presence or absence of archaeological remains can only be achieved by direct investigation of sub-surface deposits.

Appendix 2: Survey location information

The survey grid was set out using a Trimble R8s GNSS system with its integrated Trimble 360 tracking technology which supports signals from all existing and planned constellations and augmentation systems tracking the full range of satellite systems including GPS, GLONASS, Galileo, BeiDou and QZSS. The accuracy of this equipment is better than 0.01m. The survey grids were then super-imposed onto a base map provided by the client to produce the displayed block locations. However, it should be noted that Ordnance Survey positional accuracy for digital map data has an error of 0.5m for urban and floodplain areas, 1.0m for rural areas and 2.5m for mountain and moorland areas. This potential error must be considered if co-ordinates are measured off hard copies of the mapping rather than using the digital co-ordinates.

Archaeological Services WYAS cannot accept responsibility for errors of fact or opinion resulting from data supplied by a third party.

Appendix 3: Geophysical archive

The geophysical archive comprises:-

- an archive disk containing compressed (WinZip 8) files of the raw data, report text (Microsoft Word 2000), and graphics files (Adobe Illustrator CS6 and AutoCAD 2008) files; and
- a full copy of the report.

At present the archive is held by Archaeological Services WYAS although it is anticipated that it may eventually be lodged with the Archaeology Data Service (ADS). Brief details may also be forwarded for inclusion on the English Heritage Geophysical Survey Database after the contents of the report are deemed to be in the public domain (i.e. available for consultation in the West Yorkshire Historic Environment Record).

Appendix 4: Oasis form

OASIS DATA COLLECTION FORM: England

List of Projects | Manage Projects | Search Projects | New project | Change your details | HER coverage | Change country | Log out

Land at Crosland Road, Lindley, Huddersfield, West Yorkshire - Archaeological Services WYAS

OASIS ID - archaeol11-310505

Versions

View	Version	Completed by	Email	Date
View 1	1	Jamie Ranaldi	Jamie.Ranaldi@aswyas.com	28 February 2018

Completed sections in current version

Details	Location	Creators	Archive	Publications
Yes	Yes	Yes	Yes	1/1

Validated sections in current version

Details	Location	Creators	Archive	Publications
No	No	No	No	0/1

File submission and form progress

Grey literature report submitted?	No	Grey literature report filename/s	
Boundary file submitted?	No	Boundary filename	
HER signed off?		NMR signed off?	

Grey literature | Upload images | Upload boundary file | Request record re-opened | Printable version

Email Peak District National Park Authority about this OASIS record

OASIS:

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