WYAS Archaeological Services

Land off Balsall Street East

Balsall Common

Solihull

West Midlands

Geophysical Survey

Report no. 3901
January 2023

Client: RPS Group Ltd

West Yorkshire Joint Services

Land off Balsall Street East, Balsall Common, Solihull, West Midlands

Geophysical Survey

Summary

A geophysical (magnetometer) survey was undertaken on approximately 5.15 hectares of land of which 4.15ha were surveyable, located to the south of Balsall Street East, Balsall Common, Solihull, West Midlands. The survey has detected an area of magnetic disturbance that corresponds to the foundations of a former WWII building. Other magnetic disturbance within the Site can be assigned to metal fencing and boundaries within the modern field systems. Overall, the archaeological potential of the Site is deemed to be low.

WYAS
Archaeological Services

Report Information

Client:	RPS Group Ltd
Report Type:	Geophysical Survey
Location:	Balsall Common
County:	West Midlands
Grid Reference:	SP 23501 76319
Period(s) of activity:	Modern
Report Number:	3901
Project Number:	XI16
Site Code:	BLC22
OASIS ID:	archaeol11-512712
Date of fieldwork:	January 2023
Date of report:	January 2023
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1 Introduction

Archaeological Services ASWYAS has been commissioned by RPS Group to undertake a geophysical survey at land off Balsall Street East, Balsall Common, Solihull, West Midlands. This was undertaken in line with current best practice (CIfA 2020; Schmidt *et al.* 2016). The survey was carried out on the 16th of January 2023 to provide additional information on the archaeological resource of the Site.

Site location, topography and land-use

The Site is located at SP 23501 76319 (approximate centre), comprising *c.* 5.15ha over three fields situated to the south of Balsall Common (see Fig. 1). The westernmost field comprising approximately 1.0ha of this total was not surveyed due to the severity of overgrowth.

The Site is situated to the south of Balsall Street East with land consisting of pasture and overgrown thicket (see Plates 1-4). It is bounded to the south and west by Frog Lane, and to the east by a playing field. The Site lies at 121m aOD (above Ordnance Datum) increasing to 125m at its eastern extent as the terrain rises onto Holly Hill.

Soils and geology

Underlying bedrock geology at the Site comprises Arden Sandstone Formation, a siltstone and sandstone type formed during the Triassic period between 237 and 228.4mya (BGS 2023). Overlying superficial deposits at the Site comprise Arrow soil association- a mixture of two soil types: Glaciofluvial sand and gravel dating to between 860 and 116 thousand years ago during the Quaternary period; and Glaciolacustrine clay and silt deposits of similar date. The Arrow soil association can be described as a deep, permeable, course, loamy, and heavily affected by groundwater (SSEW 1983, BGS 2023).

2 Archaeological Background

The following archaeological background is derived from a search of heritage assets within 1km of the site boundary using Heritage Gateway, supplemented with available resources.

Balsall Common was almost non-existent prior to the early 19th century, at which point it comprised no more than a few hamlets and independent dwellings scattered around the intersection between Station Road and Balsall Street East, which constituted the ‘town centre’ until the current layout developed during the post-war period. OS Six-Inch England and Wales, 1866, records a high concentration of buildings at the intersection, just 190 metres from the survey area (NLS 2022).

The monastery and later hospital of Temple Balsall remained the regional focal point until its dissolution in the mid-18th century. Its remains lie approximately 2km to the west of the survey area.

Two Grade II listed red brick houses lie to the immediate west of the Site: built *c.* 1810. They have been listed due to their age and relative architectural significance. The stables at the property are also included, with the listing as a whole indicative of modern agrarian activity within the site's immediate vicinity. A further eight buildings are depicted on the 1886 map within a few hundred metres of the survey area, in addition to a spring noted in the middle of the three fields (NLS 2022, Heritage Gateway 2022).

The proximity of the survey area to the former centre of the Balsall, as well as its location on Balsall Street East, the route to the historically significant Temple Balsall, indicate that there exists a medium potential for archaeological remains within the survey area.

3 Aims, Methodology and Presentation

The aims and objectives of the programme of geophysical survey were to gather sufficient information to establish the presence/absence, character and extent, of any archaeological remains within the specific area and to inform an assessment of the archaeological potential of the site. To achieve this aim, a magnetometer survey covering all amenable parts of the Site 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 VRS differential Global Positioning System (Trimble R6 model). 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. Bespoke in-house 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 displays processed magnetometer data at a scale of 1:2000.

Processed and minimally processed data, together with 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 the European Archaeological Council (Schmidt *et al*. 2015) and by the Chartered Institute for Archaeologists (CIfA 2020). All figures reproduced from Ordnance Survey mapping are with the permission of the controller of His 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 Figures 3 to 5)

Ferrous anomalies and magnetic disturbance

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.

A larger area of magnetic disturbance within the eastern boundary of the eastern most field corresponds to the location of a former building and most likely represents demolition rubble. The building itself is likely to be a possible communications hub of WWII date as it is present on aerial photography of the area from 1945 with a visible radio tower component (Google Earth 2023) and on OS mapping dating between 1949 and 1972 where it is labelled as 'Wireless Masts' (NLS 2023). The building is no longer present on aerial photography from 1999 onwards, therefore it must have been demolished some time between 1972 and 1999. A streak of similar magnetic disturbance directly south of this is likely to represent the track which led up to the building from Frog Lane to the south.

A former field boundary within the central field is present on OS mapping from 1888 to 1972 (NLS 2023) and on the 1945 aerial photography in the area (Google Earth 2023), however it has not materialised within the survey data which suggests it was unlikely to be a ditched boundary.

Further magnetic disturbance along the limits of each of the fields surveyed are due to metal fencing within the field boundaries and interference from the adjacent housing and roads.

5 Conclusions

The geophysical survey has detected magnetic anomalies associated with a former WWII communication building and the associated track that led up to it.

Magnetic disturbance, immediately either side of Brickyard Lane, relates to demolition rubble associated with housing whilst other areas of disturbance around the periphery of the fields are due to metal fencing within the boundaries.

Overall, the archaeological potential of the Site is deemed to be low.

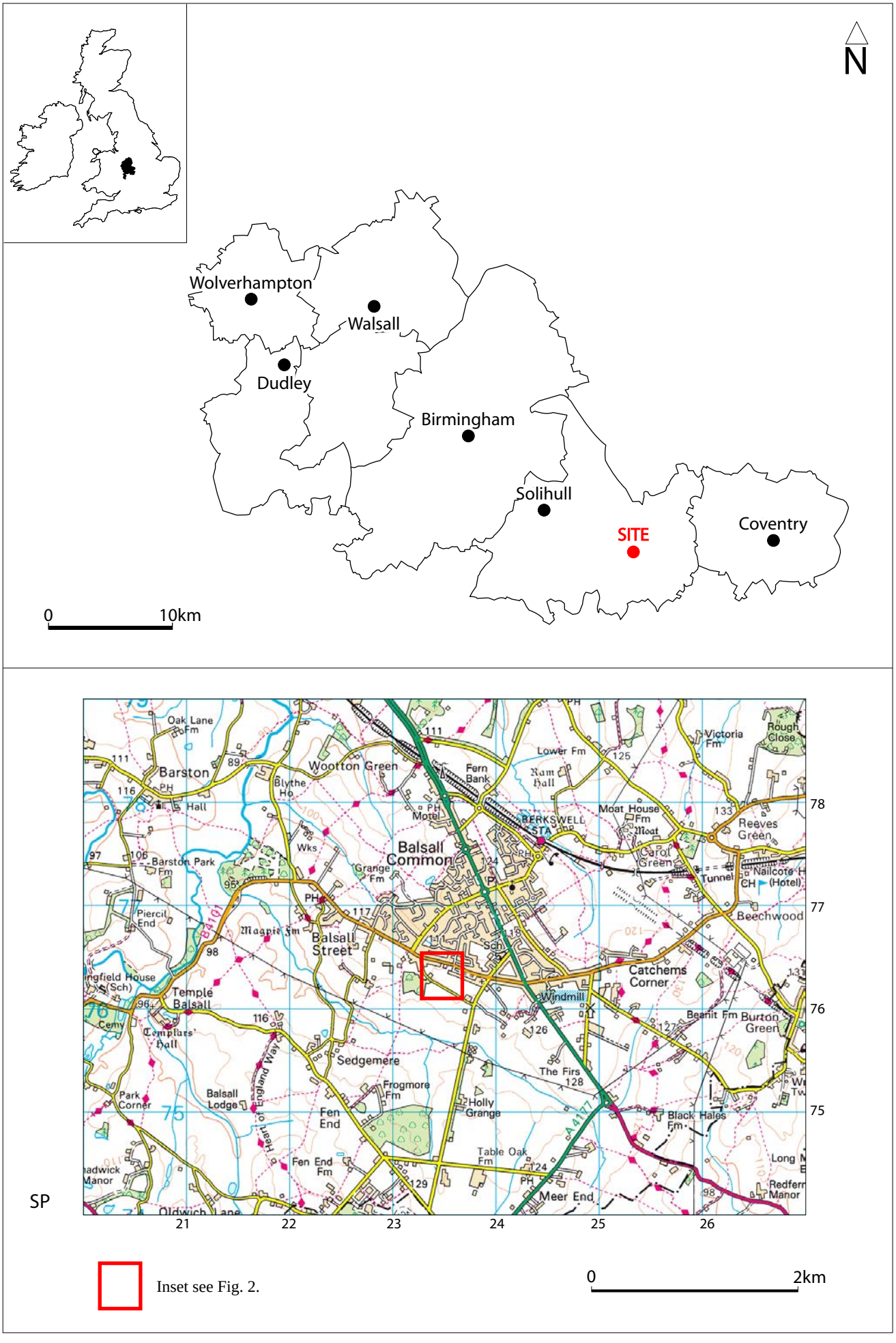
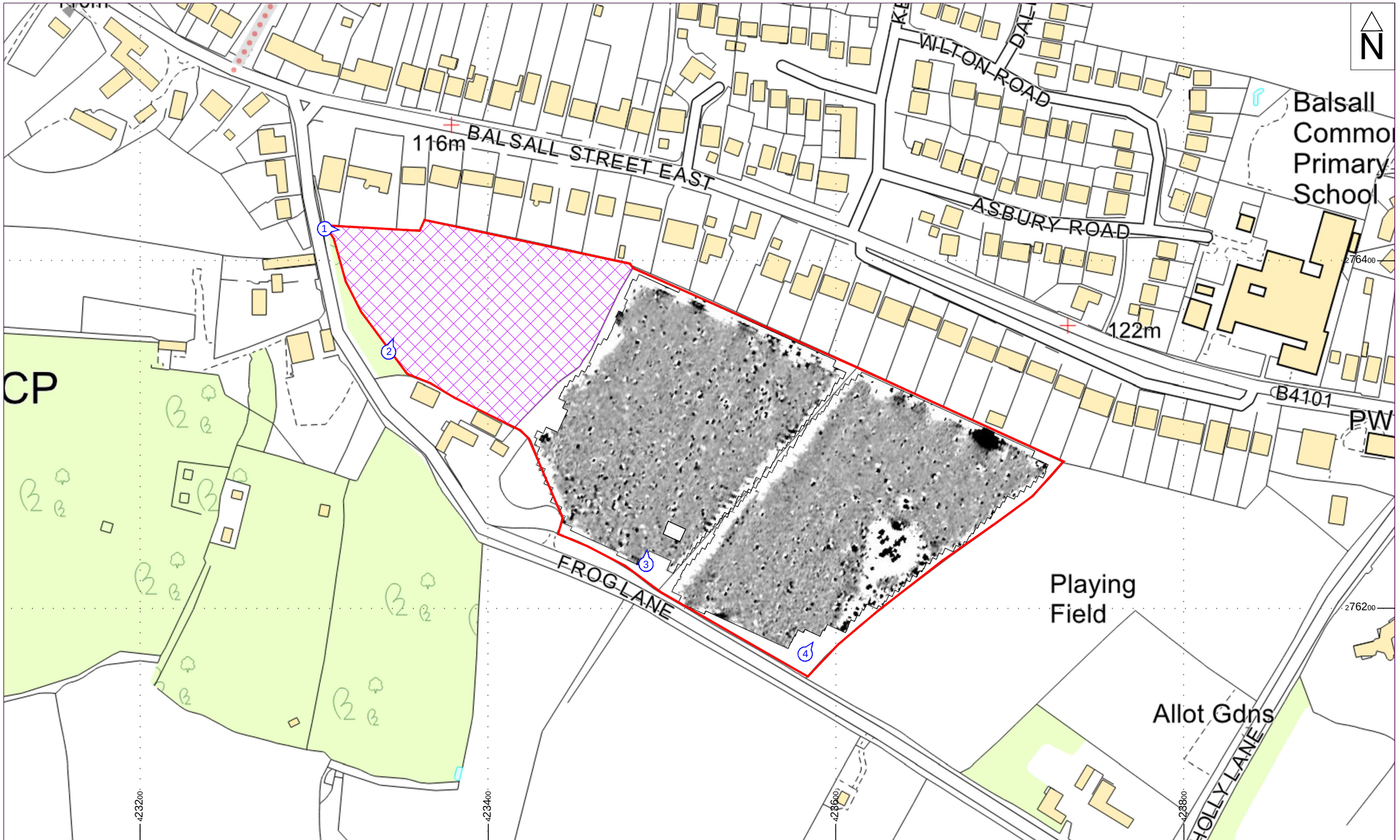


Fig. 1. Site location



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Project ID: XI16_BLC22

Survey location showing processed greyscale magnetometer data

Fig.2

Title

- SURVEY AREA
- UNSUITABLE FOR SURVEY
- 1 PHOTO LOCATIONS

nT -1.0 2.0

0 100m

1:2000 @ A3

N

FROG LANE

Play
Fiel

2762$_{00}$

423$_{400}$

423$_{600}$

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Processed greyscale magnetometer data

Fig.3

Title

UNSUITABLE FOR SURVEY

-1.0 2.0
nT

0 50m

1:1000 @ A3

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Project ID: XI16_BLC22

XY trace plot of minimally processed magnetometer data

Fig.4

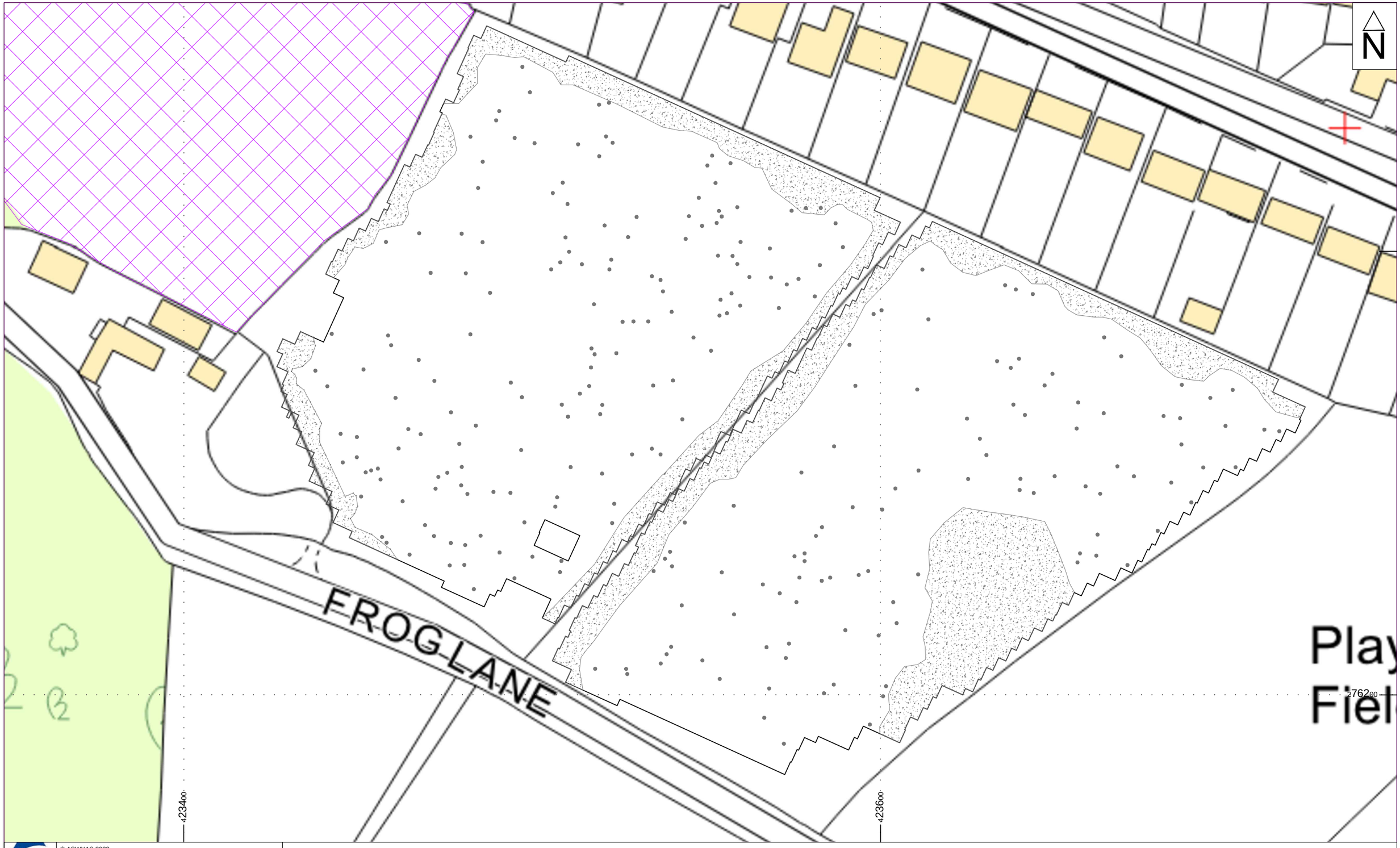
Title

UNSUITABLE FOR SURVEY

15.0 nT/cm

0 50m

1:1000 @ A3



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Interpretation of magnetometer data

Fig.5

Title

UNSUITABLE FOR SURVEY

Interpretation

FERROUS

MAGNETIC DISTURBANCE

0 50m

1:1000 @ A3

Plate 1. Overgrown access for Field 1, facing east

Plate 2. General view of overgrown Field 1, facing north

Plate 3. General view of Field 2, looking northwest

Plate 4. General view of Field 3, looking north

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.

Appendix 2: Survey location information

An initial survey station was established using a Trimble VRS differential Global Positioning System (Trimble R6 model). The data was geo-referenced using the geo-referenced survey station with a Trimble RTK differential Global Positioning System (Trimble R6 model). 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 and metadata

The geophysical archive comprises:-

- an archive disk containing compressed (WinZip 8) files of the raw data, report text (Microsoft Word 2003), and graphics files (Adobe Illustrator CS6 and AutoCAD 2017) 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 Midlands Historic Environment Record).

Appendix 4: Oasis form

Summary for archaeol11-512712

OASIS ID (UID)	archaeol11-512712
Project Name	Geophysical Survey at Land off Balsall Street East
Sitename	Land off Balsall Street East
Activity type	Geophysical Survey, MAGNETOMETRY SURVEY
Project Identifier(s)	
Planning Id	
Reason For Investigation	Planning: Pre application
Organisation Responsible for work	Archaeological Services WYAS
Project Dates	16-Jan-2023 - 16-Jan-2023
Location	Land off Balsall Street East NGR : SP 23501 76319 LL : 52.3844023142241, -1.65614128965235 12 Fig : 423501,276319
Administrative Areas	Country : England County : West Midlands District : Solihull Parish : Balsall
Project Methodology	The site grid was laid out using a Trimble VRS differential Global Positioning System (Trimble R6 model). 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. Bespoke in-house software was used to process and present the data.
Project Results	A geophysical (magnetometer) survey was undertaken on approximately 5.15 hectares of land of which 4.15ha were surveyable, located to the south of Balsall Street East, Balsall Common, Solihull, West Midlands. The survey has detected an area of magnetic disturbance that corresponds to the foundations of a former WWII building. Other magnetic disturbance within the Site can be assigned to metal fencing and boundaries within the modern field systems. Overall, the archaeological potential of the Site is deemed to be low.
Keywords	
Funder	
HER	Solihull HER - unRev - STANDARD
Person Responsible for work	Jake, Freeman
HER Identifiers	
Archives	

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