

# Geophysical Survey of land off St Martin's Road, Gobowen, Shropshire



View to the south

**ARS Ltd Report 2015/65**

May 2015

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## EXECUTIVE SUMMARY

*This report presents the results of a geophysical survey undertaken on land off St Martin's Road, Gobowen, Shropshire in advance of a planning application for a proposed housing development. An archaeological desk-based assessment (DBA) compiled in 2015 identified that the Proposed Development Area (PDA) contains part of a scheduled section of Wat's Dyke, an early medieval defensive earthwork of national importance. The assessment also identified the potential for previously unknown remains dating to all periods to survive within the PDA.*

*A geophysical survey was carried out between 15<sup>th</sup> and 17<sup>th</sup> April 2015 using a Bartington 601 dual sensor fluxgate gradiometer. Approximately 6.7ha. was included in the survey. The results have not revealed any definite evidence for any previously unknown significant sub-surface archaeological remains within the survey area although a small number of anomalies with some potential to be of archaeological origin have been identified.*

*The DBA identified the extent of post-medieval coal mining and the sites of former field boundaries constructed at the time or since enclosure and the geophysical survey results have confirmed that below ground remains of many of these features survive at the site. In particular the results have confirmed the findings of the DBA in that the extent of the post-medieval coal mining is more extensive than recorded in the HER and even more extensive than was evident during the walkover survey. However, these features possess a negligible to low historical value and are of local significance only.*

*A number of anomalies can be interpreted with a reasonable amount of certainty from cartographic evidence but the remainder are of unknown origin, although it is likely that these anomalies are also associated with post-medieval coal mining, field division or agricultural practices.*

## **1.0 INTRODUCTION**

### **1.1 Background**

- 1.1.1 Muller Strategic Projects Ltd appointed Archaeological Research Services Ltd (ARS Ltd) to undertake a geophysical survey on land off St Martin's Road, Gobowen, Shropshire. The survey was carried out in advance of a planning application for a proposed housing development.
- 1.1.2 The purpose of the survey was to determine the potential for sub-surface archaeological remains to survive at the site, to provide sufficient information to enable the Local Planning Authority to make an informed decision on the archaeological implications of the proposed development, together with any appropriate mitigation works.
- 1.1.3 The objective was to carry out a non-intrusive survey to identify whether any anomalies of possible archaeological origin could be identified within the survey area which may be affected by the proposed development and which, consequently, may require further evaluation and/or specific mitigation.
- 1.1.4 This report presents the results of the geophysical survey.

### **1.2 Location, Topography and Geology**

- 1.2.1 The geophysical survey area is centred at NGR SJ 30358, 34244. It is bounded to the east by properties on Preeshenlle Lane, Penycae Close, Penycae Avenue and St. Martin's Road; to the south by the River Perry and the rear gardens of properties along School Lane and to the west and north by the boundary with Henlle Park Golf Course. The survey area comprises three fields; a small field at the south contained within the area between School Lane and the River Perry and a very irregular shaped field that wraps around the southern, eastern and northern edges of a more regular field in the west. A sinuous band of vegetation forms a permeable field boundary which follows a sharp break of slope between the two larger fields. In the east, the land rises steeply from the floodplain of the River Perry towards the north of the survey area which is generally flat, although this falls away to the west towards a pond that is within the curtilage of Henlle Golf Club immediately beyond the north-west corner of the survey area. The highest point in the survey area is located at the north-east corner adjacent to Preeshenlle Lane, at c.115m above mean sea level (AMSL), and the lowest is adjacent to where the River Perry exits the survey area at the east at c.101m AMSL.
- 1.2.2 The underlying solid geology of the survey area comprises mudstone, sandstone and conglomerate of the Etruria Formation, a Sedimentary Bedrock formed approximately 307 to 313 million years ago in the Carboniferous Period. The bedrock is overlain by superficial deposits of 'Alluvium' along which the River Perry riverbed is incised; a deposit of Glaciofluvial Sand and Gravel which is roughly coterminous

with the western field; and a till (diamicton) which covers the remainder of the survey area (British Geological Survey 2015).

- 1.2.3 The soils of the survey area are classified as belonging to the WICK 1 Soil Association (541r), which are typical brown earths (SSEW 1983b, 4). These soils form over glaciofluvial or river terrace drift and would have originally formed under broadleaf woodland conditions, and are characterised as 'Deep well drained coarse loamy and sandy soils, locally over gravel. Some similar soils affected by groundwater. Slight risk of water erosion' (SSEW 1983b, 9).

## **2.0 ARCHAEOLOGICAL BACKGROUND**

- 2.1 The site has been the subject of a Desk Based Assessment (DBA) (Brown 2015). This assessment identified that the Proposed Development Area (PDA) contains part of a scheduled section of Wat's Dyke, an early medieval defensive earthwork of national importance. The medieval motte known as Bryn-y-Castell, also a Scheduled Monument, is located c.55m to the south of the PDA. There are four Grade II Listed Buildings within 500m of the PDA, and a Historic Environment Record (HER) entry concerning a post-medieval coal shaft is located within the PDA. The walkover survey undertaken as part of the DBA has identified that the coal workings are more extensive than recorded by the HER, and as well as the coal shaft there are two possible horse gins, a possible building platform and tramway embankment and possible loading platforms. There are a further six archaeological sites recorded within the wider study area beyond the PDA, and the assessment has identified the potential for previously unknown remains dating to all periods to survive within the PDA.

## **3.0 METHODOLOGY**

- 3.1 Magnetometry is a non-intrusive scientific prospecting technique that is the preferred geophysical technique used to determine the presence or absence of buried archaeological features when site and geological conditions are favourable. It is an efficient and effective method for locating anomalies corresponding with archaeological features. The instrument chosen for this survey was a Bartington Grad 601 dual sensor fluxgate gradiometer which can detect weak changes in the Earth's magnetic field caused by buried features.
- 3.2 All fieldwork and reporting was undertaken following Historic England and Chartered Institute for Archaeologists (CIfA) standards and guidance (Gaffney *et al.* 2008; CIfA 2013; CIfA 2014).
- 3.3 The 30m by 30m survey grids were located to cover the entire site which for logistical reasons dictated by the topography was divided into four survey areas; area 1 north, area 1 south, areas 2 and 3 (Figure 2). In total 85 survey grids (including partial grids) were set out on site using a hand-held GPS unit which was accurate to less than +/- 2m. Each grid was then surveyed at 1m traverse intervals with the sampling at 0.250m (4 readings per metre) intervals. The survey was carried out in

'zig-zag' mode with each alternate traverse walked in opposite directions. The range of the instrument was set at 100nT (0.01nT resolution). The direction of the first traverse was north in area 1 south, west in area 1 (north), north-west in area 2 and south-west in area 3 (Figure 2).

- 3.4 The survey was carried out by ARS Ltd between the 15<sup>th</sup> and 17<sup>th</sup> April 2015. Throughout the survey the weather was warm and dry. The ground conditions in the survey area were predominantly firm underfoot and in that respect ideal for geophysical survey. At the time of the survey all fields were under rough grass. The irregular shaped fields, undulating and occasionally steeply sloping topography was challenging to survey. In order to minimise the number of partial grids and prevent excessively staggered data the survey grids were orientated differently in each area to ensure that the traverses were walked along, rather than up and down, the contours. Specific details of the ground conditions and any obstructions are discussed in the results section (section 4.0).
- 3.5 Prior to commencing the survey each day the gradiometer was balanced and calibrated to the local conditions and this was repeated regularly throughout each day. At the end of each day, the data was downloaded into a computer, checked and archived on the ARS Ltd server. The data was downloaded using Bartington Instruments' *Grad 601 Communication Application*.

## **4.0 GEOPHYSICAL SURVEY RESULTS**

### **4.1 Introduction**

- 4.1.1 The data was processed using Geoplot software. The data was "clipped" (clipping parameters selected on the mean and standard deviation data values), random iron spikes were removed by setting the "despike" function to 2.5 and the striping that can often appear in gradiometer data was removed by utilising the "zero mean traverse" function. Some minor staggering in the data, a consequence of the sloping ground conditions, was removed by using the "de-stagger" function and finally the data was interpolated.
- 4.1.2 Occasionally processing the data to compensate for directional sensitivity or to remove iron spikes caused by miscellaneous ferrous objects can also inadvertently disguise anomalies that may be of archaeological origin, particularly long linear features in the direction of the traverses. The data have, therefore, been analysed in a number of different formats and at each stage of processing.
- 4.1.3 The data analysis is presented graphically in figures 3 to 8. A greyscale shade plot of the processed gradiometer data is presented in figure 3 and trace plots of the four survey areas in figures 4 and 7. An interpretative plan is presented in figure 8.
- 4.1.4 Not all anomalies have been included in the results and discussion. The data was characterised by discrete widely dispersed anomalies that are common on most sites and almost certainly relate to bedrock fragments in the topsoil, natural variations in

the soils and geology, agricultural disturbance and miscellaneous ferrous litter on the surface of the field.

## **4.2 Area 1 (south)**

- 4.2.1 The southern part of area 1 (figure 2) comprises an irregular parcel of land within the floodplain of the River Perry. The northern half of the area contains mounds, platforms and banks which have been identified in the DBA (Brown 2015) as being associated with post-medieval coal mining. Patches of ground surrounding the earthworks are overgrown and waterlogged and therefore unsuitable for gradiometer survey.
- 4.2.2 A number of anomalies were recorded that correspond to undesigned archaeological remains located within the proposed development area (DBA section 4.3): anomaly 1 corresponds to AR7 (site of post medieval coal workings/shaft); anomaly 2 corresponds to AR8 (possible gin race); anomaly 3 corresponds to AR9 (three linear mounds interpreted as part of a tramway (AR10) and loading platforms; anomaly 4 corresponds to AR 10 an embanked tramway associated with the coal workings. Undesignated archaeological remains AR5 and AR6 are all contained within overgrown, elevated or waterlogged areas that were unsuitable for geophysical survey and therefore do not appear in the data.
- 4.2.3 Anomaly 4a represents a large area of disturbance of 0.3 hectares that extends from the coal workings in the south to the bottom of a steep slope in the north. It is almost certain that this anomaly corresponds to a spread of colliery or other waste that was either a result of tipping or a deliberate attempt to stabilise and consolidate an otherwise low-lying and waterlogged area which previously formed part of the course of the River Perry (DBA figure 6).
- 4.2.4 To the south of the coal workings a long sinuous negative anomaly (5) was recorded and which is likely to represent a low bank. In this location the most likely interpretation is that the anomaly corresponds to the edge of a well trodden footpath that follows the approximate same route but an archaeological origin cannot be completely discounted. At the western extent a weak parallel positive anomaly (6) was recorded over a length of approximately 30m and just to the east a further positive anomaly (7) is very similar in geophysical response. As with anomaly 5 an archaeological origin cannot be completely discounted for anomalies 6 and 7 but it is far more likely that the anomalies correspond to concentrations of alluvium in the floodplain, evidence of the former course of the River Perry which is known to have changed regularly from Cartographic evidence referred to in the DBA or, most likely, the former field boundaries that were present in this location (Brown 2015, page 8 and figure 6).



### **4.3 Area 1 (north)**

- 4.3.1 The northern part of area 1 (figure 2) comprises a steep bank in the south which then levels off in the north before sloping down to a pond in the north-west corner. At the time of the survey the area was under rough grass.
- 4.3.2 Generally the data is characterised by very weak negative striations on a north-west/south-east and a north-east/south-west alignment (anomaly group 8). This group of anomalies has been interpreted as agricultural in origin, possibly a combination of plough scarring and field drainage. Clustered towards the centre of this part of the survey area, three notable dipolar (positive core with an associated negative halo) anomalies were recorded (9, 10 and 11). The geophysical response is typical of that associated with a ferrous object but may also relate to industrial activity of unknown age. Anomaly 12 represents a modern utility pole the centre of which could not be surveyed and is shown in green on figure 3. Just to the north-west a very weak curvilinear anomaly (12a) appears vaguely in the dataset and an archaeological origin cannot be discounted.
- 4.3.3 Along the eastern boundary and adjacent to the end of Penycae Close a group of anomalies were recorded in an area that has been subject to previous archaeological investigation and at least two episodes of documented modern disturbance (Hanniford 1992). Anomaly 13 is aligned with the utility pole (anomaly 12) and represents a modern service trench which was also observed in one of the evaluation trenches in 1992. Anomaly 14 is of unknown origin but may represent a ferrous object associated with the modern disturbance or utilities. This particular anomaly is unlikely to represent a feature of any archaeological significance as, if so, it would almost certainly have been recorded in the evaluation trenches. Anomalies 15 and 16 represent a strong magnetic response and are likely to represent ferrous materials in the boundary and modern disturbance and are not thought to be archaeologically significant.
- 4.3.4 Further evidence of modern disturbance was recorded in the north-east corner of this part of the survey area as indicated by anomalies 17, 18, 19 and 20. In particular anomaly 20 is probably associated with improvements to the ground or waste materials in front of the gate at the end of Presenelle Lane. Anomalies 21 and 22 are associated with ferrous materials in the boundary.
- 4.3.5 In the south-west of this part of the survey area, a moderately strong linear anomaly was recorded (5a) on a north-west/south-east alignment parallel with the field boundary between areas 1 and 2. This particular anomaly corresponds with the former course of the River Perry (DBA figure 6) and has therefore been interpreted as a silted up former river channel or build up of colluvium in the valley bottom.

#### **4.4 Area 2**

- 4.4.1 Area 2 comprises a domed hill that slopes away steeply on all sides except along most of the north-western boundary. The area is crossed by a number of well used footpaths and at the time of the survey was under rough grass.
- 4.4.2 Recorded centrally and towards the north-west corner of area 2, were a series of weakly positive and low contrast linear anomalies (23 to 26). It can be seen from the cartographic evidence in the DBA (Brown 2015, figures 2, 4 and 6) that former field boundaries and later a significant footpath existed in these approximate locations. The most likely interpretation of this series of anomalies is that they represent the remains of former field boundaries and/or the footpath that once bisected the area. To the south-east of anomaly 25, two further anomalies that have recorded a very similar response (27 and 27a) cannot, however, be directly correlated with former field boundaries. In this case it is not unreasonable to assume that the anomalies are contemporary in some way or at least agricultural in origin but a more significant archaeological origin should not be ruled out.
- 4.4.3 A group of weak negative linear anomalies (28 to 30) on a north-east/south-west alignment respect the alignment of the former central field boundary and are likely to be agricultural in origin, most likely plough scarring. A reasonably large area of what appears to be modern disturbance was recorded just south of the centre of the field (31) although this may also be associated with the coal mining activity in area 1. A number of small discrete anomalies; group (32), a pair (33) and a single (34) were also recorded. Discrete anomalies of this type may represent archaeological pits but without any supporting evidence or definite archaeological features close by they are equally likely to be natural or agricultural in origin.

#### **4.5 Area 3**

- 4.5.1 Area 3 comprises a very tightly constrained irregular shaped area at the southern extent of the survey area. Very little of the area was suitable for geophysical survey being constrained by the River Perry and the southern boundary of area 2 and elsewhere largely overgrown. The small area that was suitable for survey was under short grass close to the north bank of the river.
- 4.5.2 The only anomalies recorded in area 3 were a series of weak, low contrast linear anomalies (35 to 37) that were recorded on an alignment that is approximately parallel to the River Perry. In this location the first interpretation that should be considered is that the anomalies are associated with a former course of the river that, as stated in 4.2.4, has regularly changed position within the floodplain. Also to be considered is that the anomalies represent pockets of alluvium associated with the river and possible flooding events. Given the location, the anomalies are unlikely to be archaeologically significant.

## **5.0 DISCUSSION AND CONCLUSIONS**

- 5.1 The results of the geophysical survey were generally of good quality and the raw data only required minimal processing to produce clear images and plots. The results have not revealed any definite evidence for significant and previously unknown archaeological remains within the survey area.
- 5.2 The DBA identified the extent of post-medieval coal mining and the sites of former field boundaries constructed at the time, or since enclosure, and the geophysical survey results have confirmed that below ground remains relating to these features survive at the site. In particular the results have confirmed the findings of the DBA in that the extent of the post-medieval coal mining is more extensive than recorded in the HER and indeed more extensive than was evident during the walkover survey. However, these features possess a negligible to low historical value and are of local significance only.
- 5.3 A number of anomalies can be interpreted with a reasonable amount of certainty from cartographic evidence but the remainder are of unknown origin, although it is likely that these anomalies are also associated with post-medieval coal mining, field division or agricultural practice. It should be noted that the large area of disturbance associated with the post-medieval coal mining in area 1 (south) may have a masking effect on any possible underlying archaeology in this location.
- 5.8 The results of this geophysical survey should be considered in conjunction with the DBA and Setting Study (Brown 2015).

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- 6.1 Any publicity will be handled by the client.
- 6.2 Archaeological Research Services Ltd will retain the copyright of all documentary and photographic material under the Copyright, Designs and Patent Act (1988).

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- 7.1 All statements and opinions contained within this report arising from the works undertaken are offered in good faith and compiled according to professional standards. No responsibility can be accepted by the author/s of the report for any errors of fact or opinion resulting from data supplied by any third party, or for loss or other consequence arising from decisions or actions made upon the basis of facts or opinions expressed in any such report(s), howsoever such facts and opinions may have been derived.

## **8.0 ACKNOWLEDGEMENTS**

- 8.1 Archaeological Research Services Ltd would like to thank those involved in the project for their help and assistance. In particular we would like to thank Steve Bourne of Muller Strategic Projects Ltd for commissioning the survey and arranging access and Andy Wigley, Shropshire County Council Historic Environment Manager for his advice.

## **9.0 REFERENCES**

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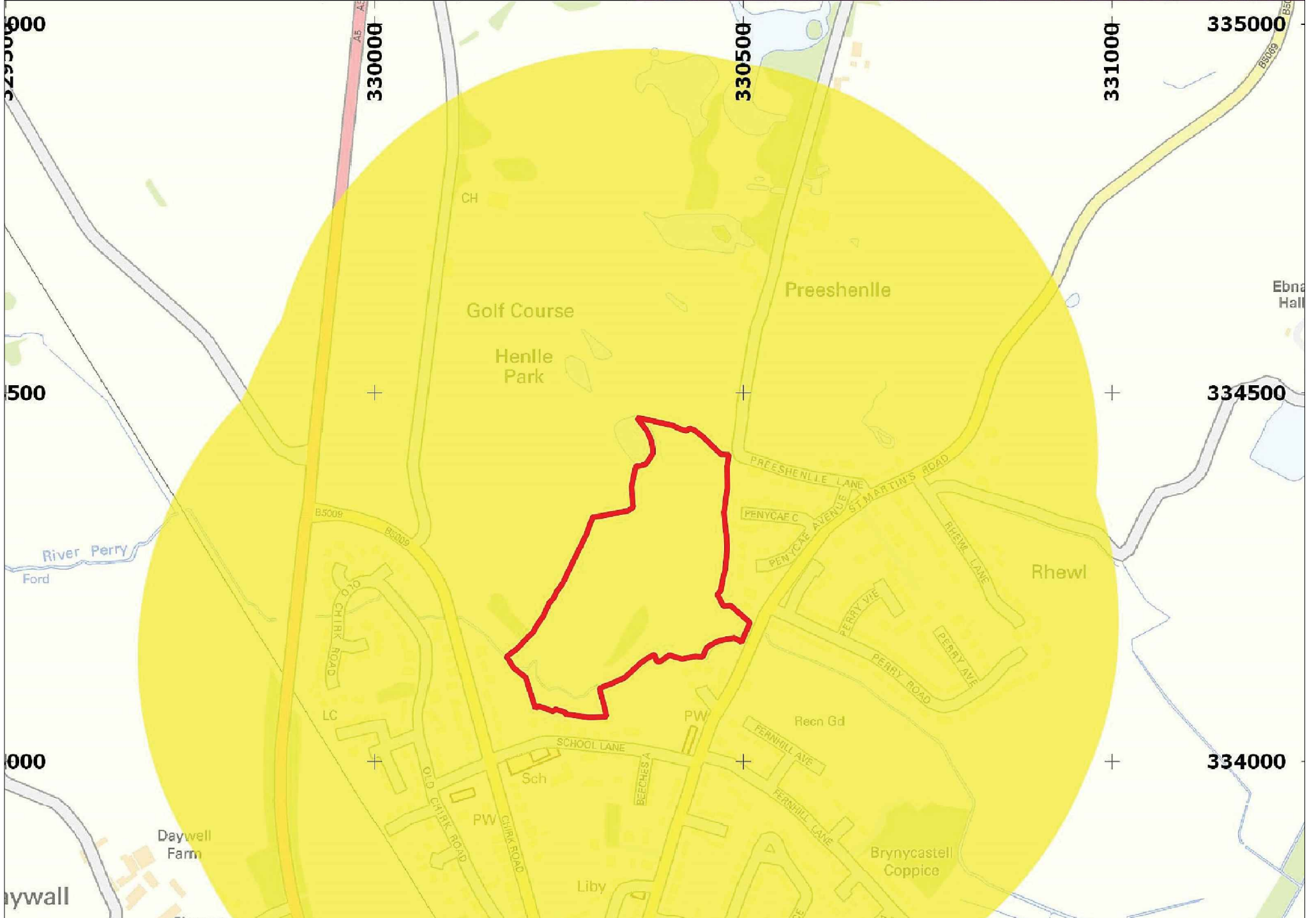
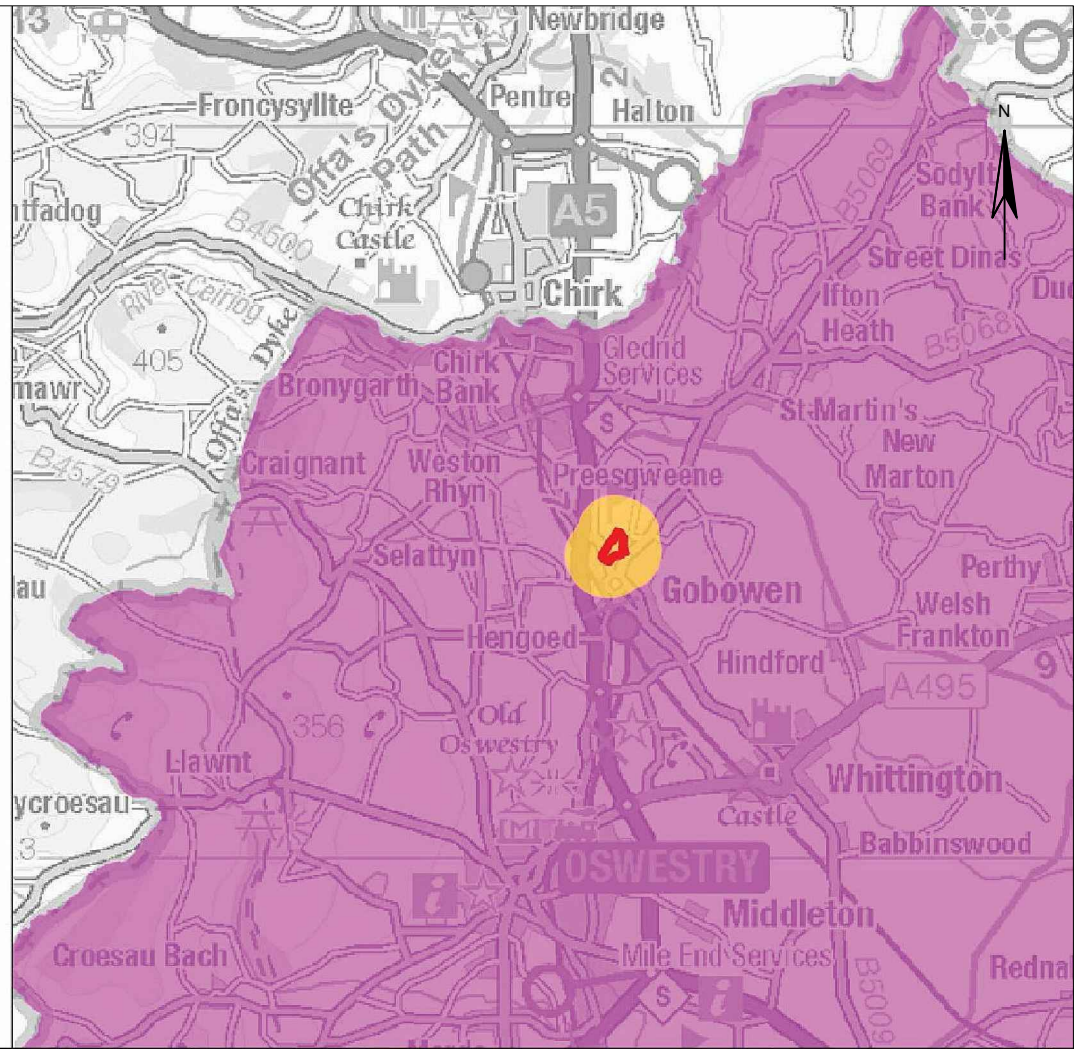
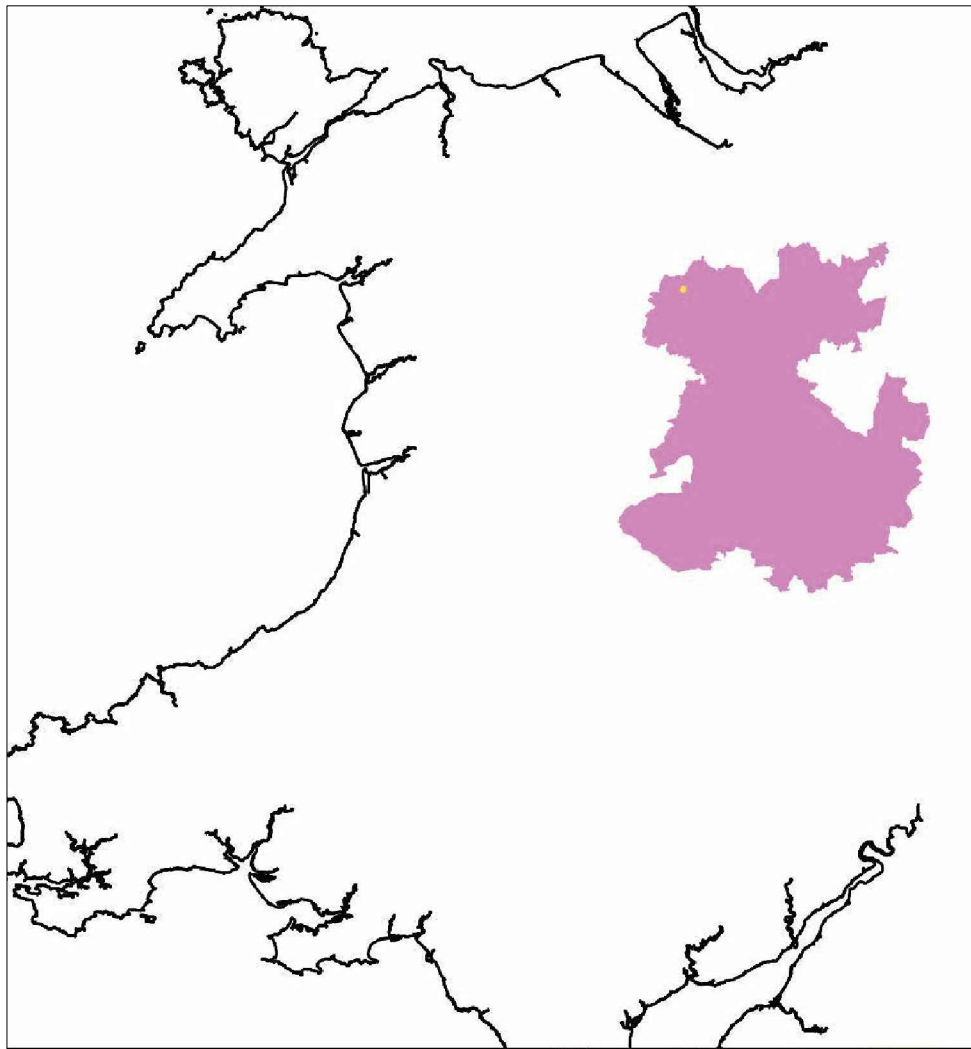
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**Appendix 1: Figures**




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**Figure 1**  
**Site Location**

Key:

 Geophysical survey area

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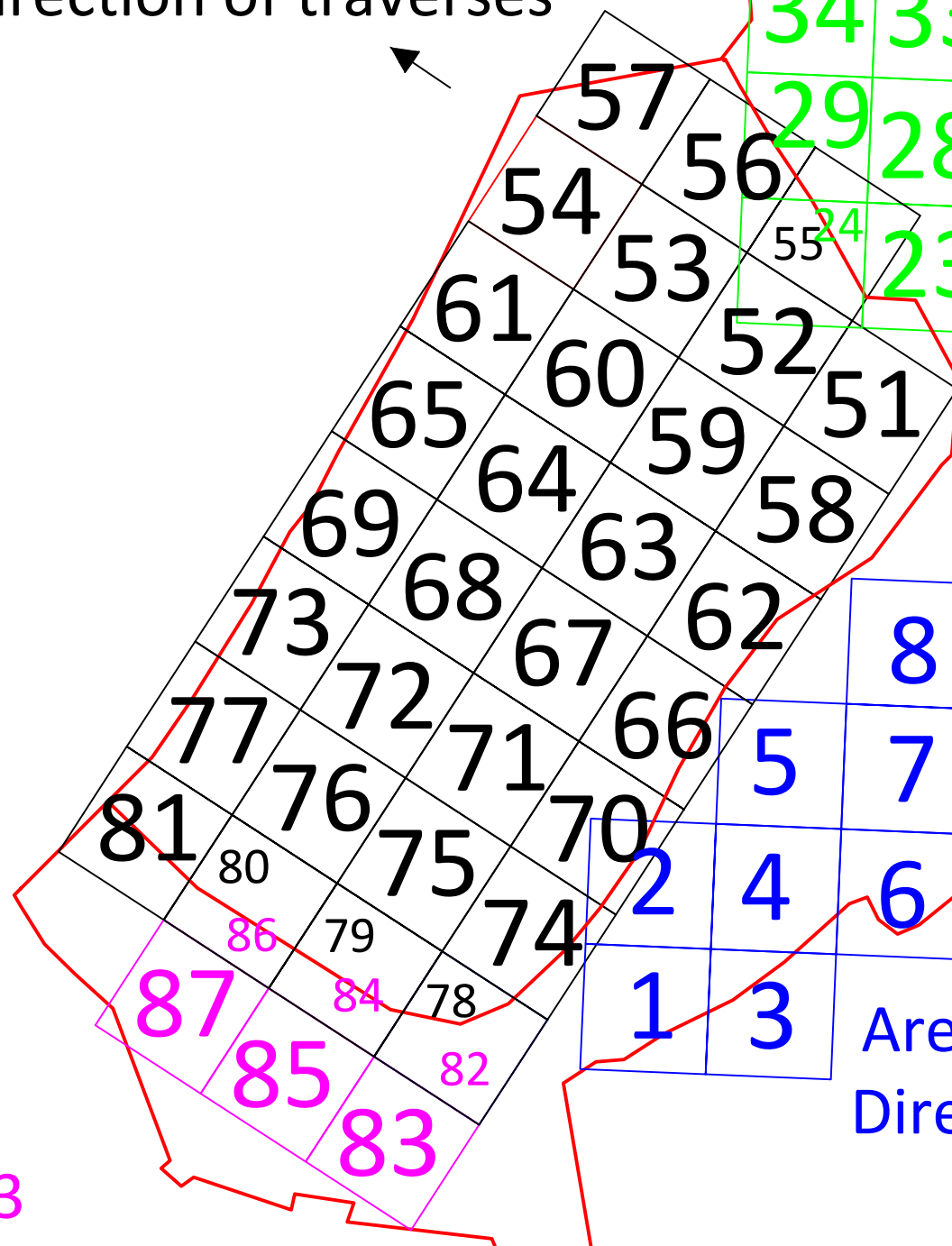
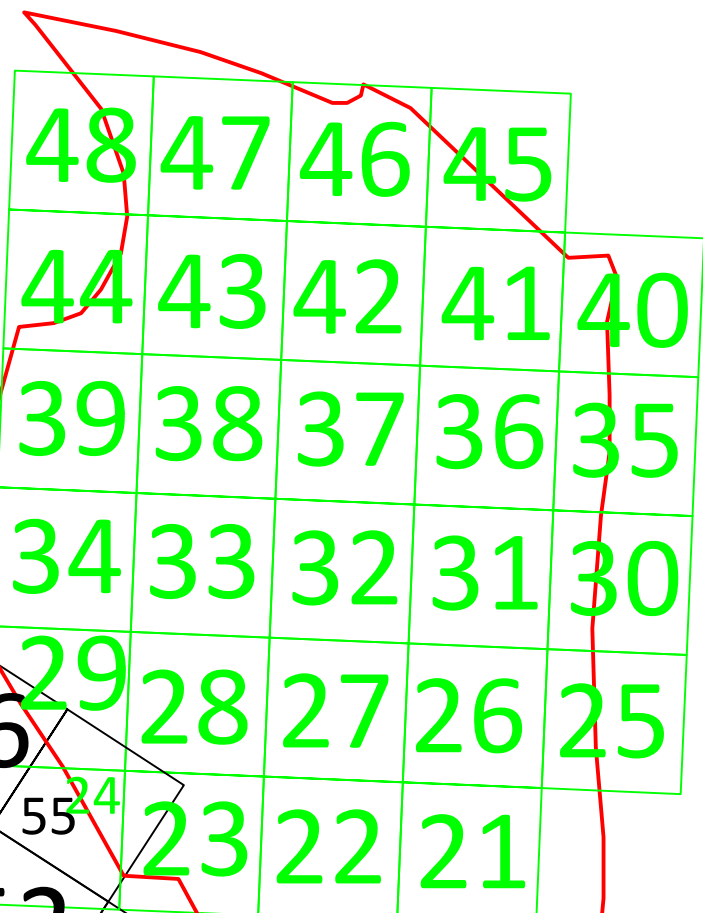
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Area 1 (north)

← Direction of traverses

N

Area 2  
Direction of traverses



Area 1 (south)

↑ Direction of traverses

Area 3

↘ Direction of traverses

Figure 2  
Location of survey grids and areas

Key:



Geophysical survey area

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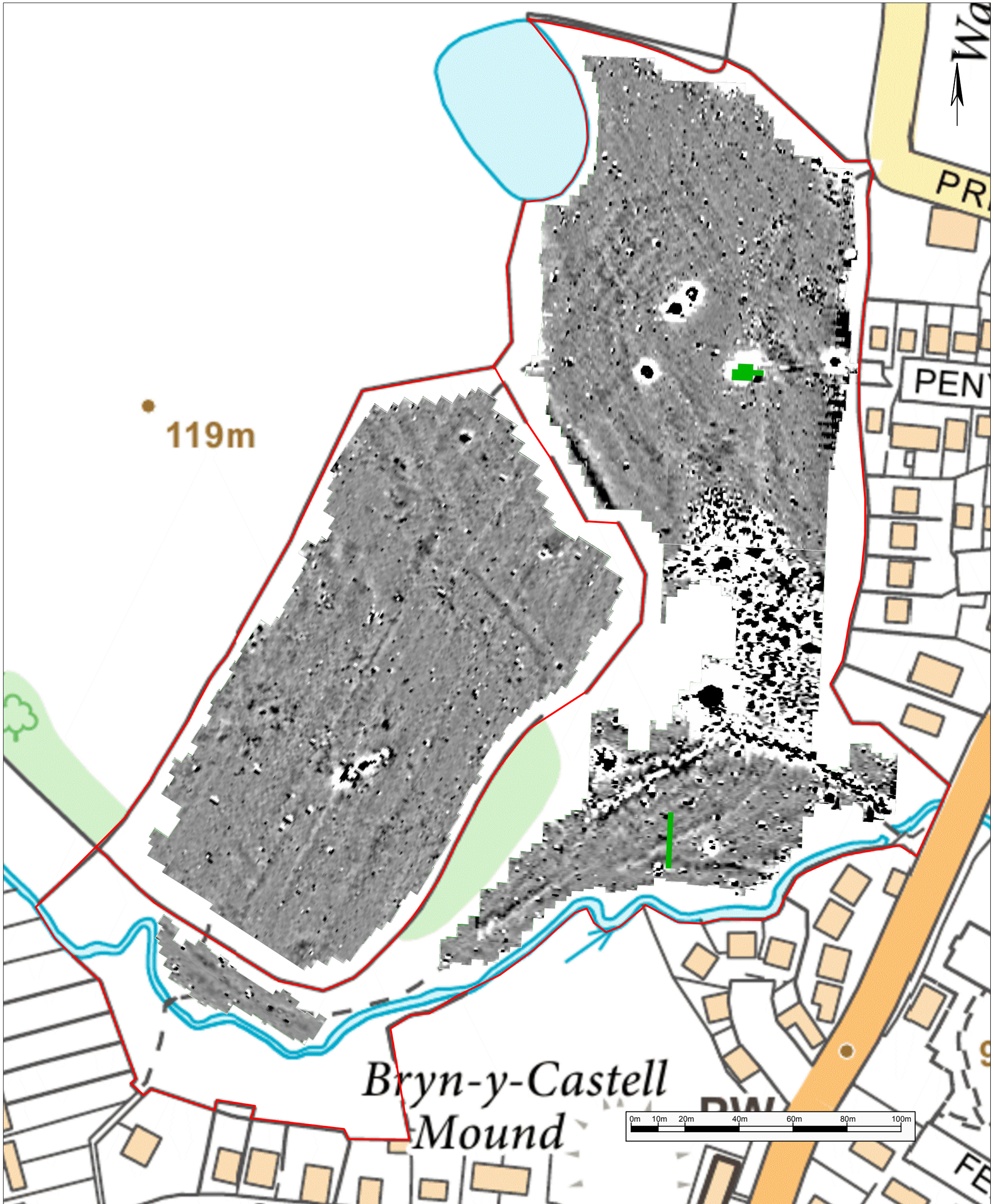


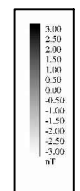


Figure 3  
Greyscale shade plot of processed gradiometer data

Key:

 Geophysical survey area

 Unsuitable for survey



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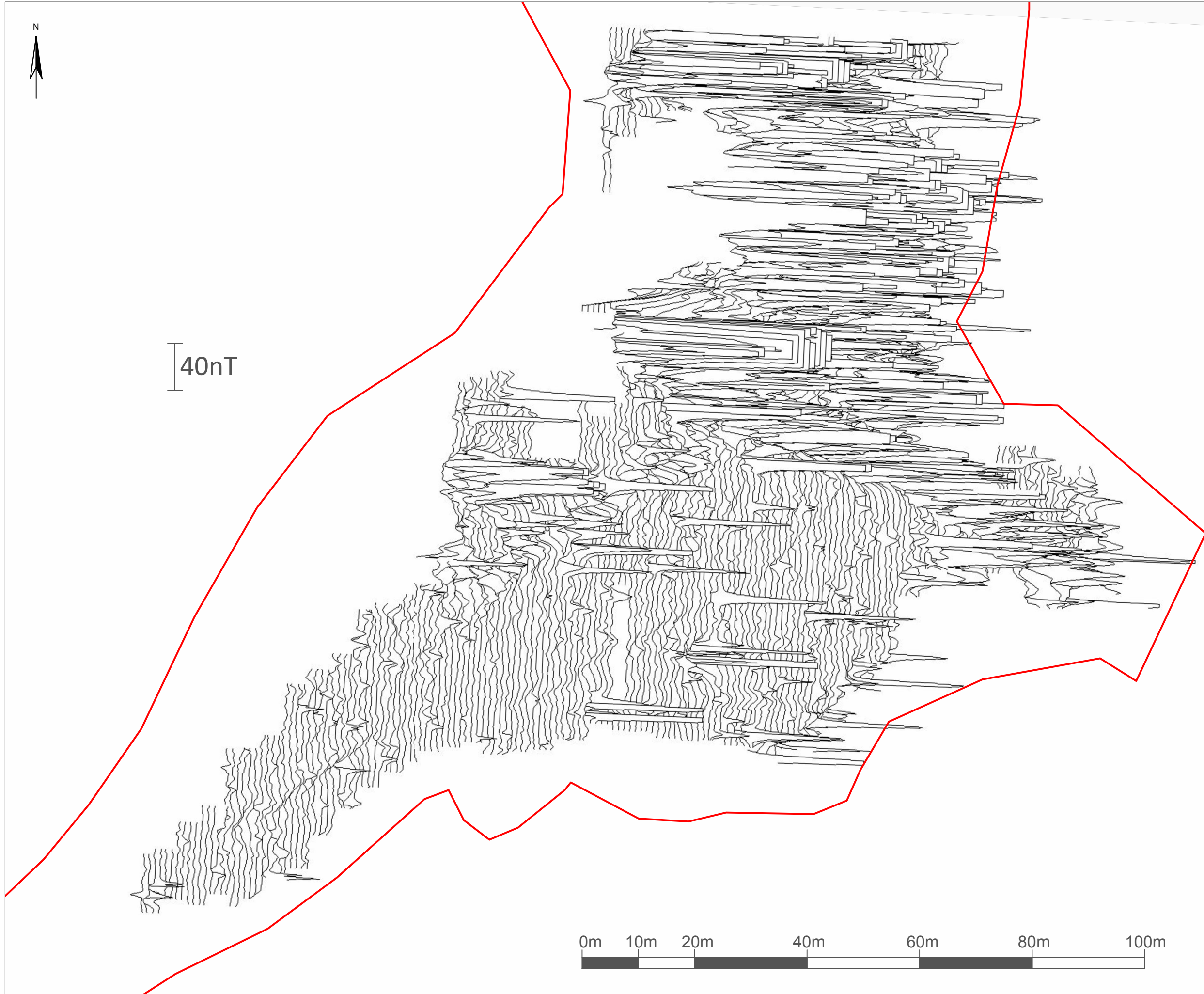
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Figure 4  
Area 1 (south)  
Trace plot

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 Geophysical survey area

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0m 10m 20m 40m 60m 80m 100m



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**Figure 5**  
 Area 1 (north) - Trace plot

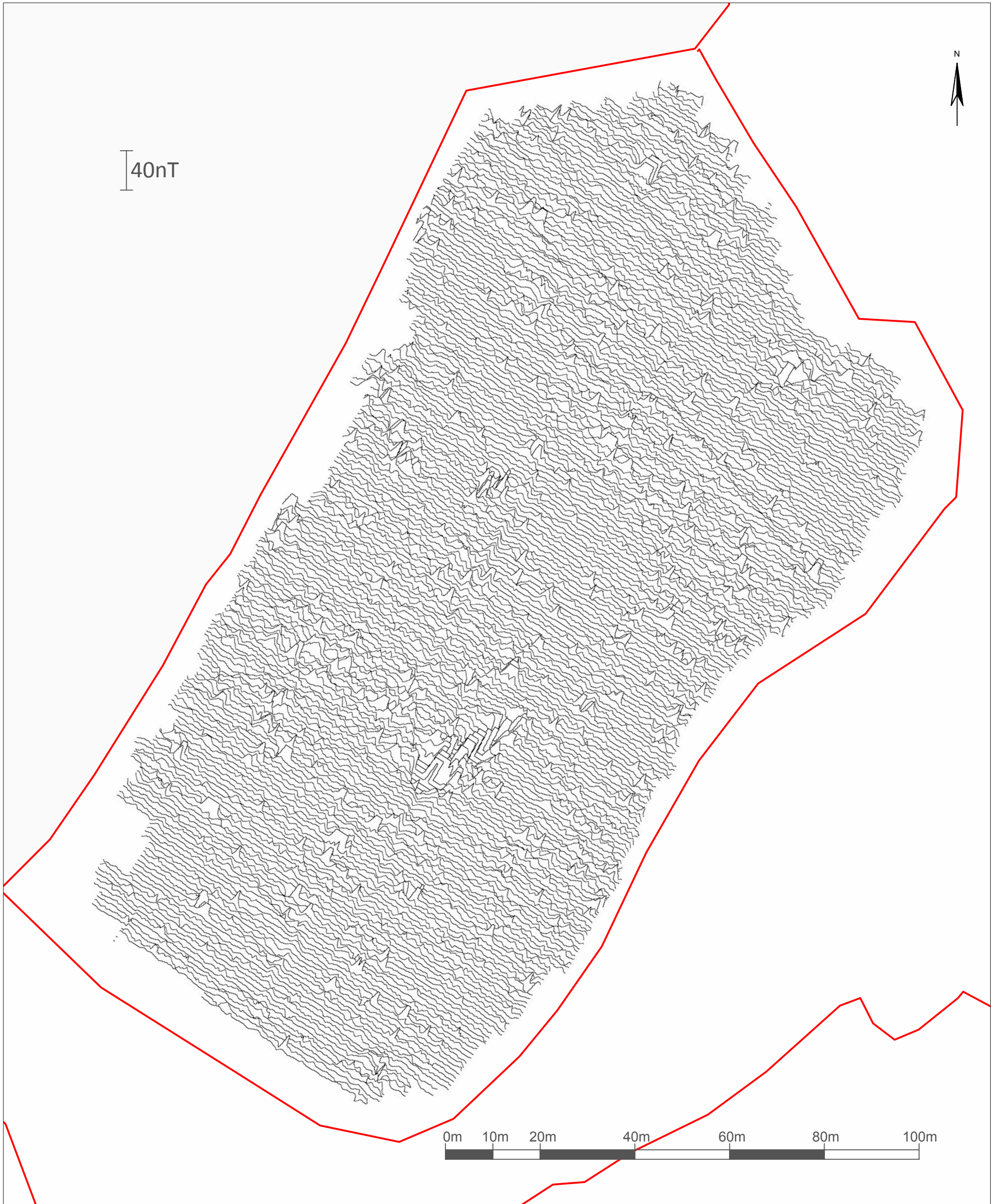
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**Figure 6**  
**Area 2 - Trace plot**

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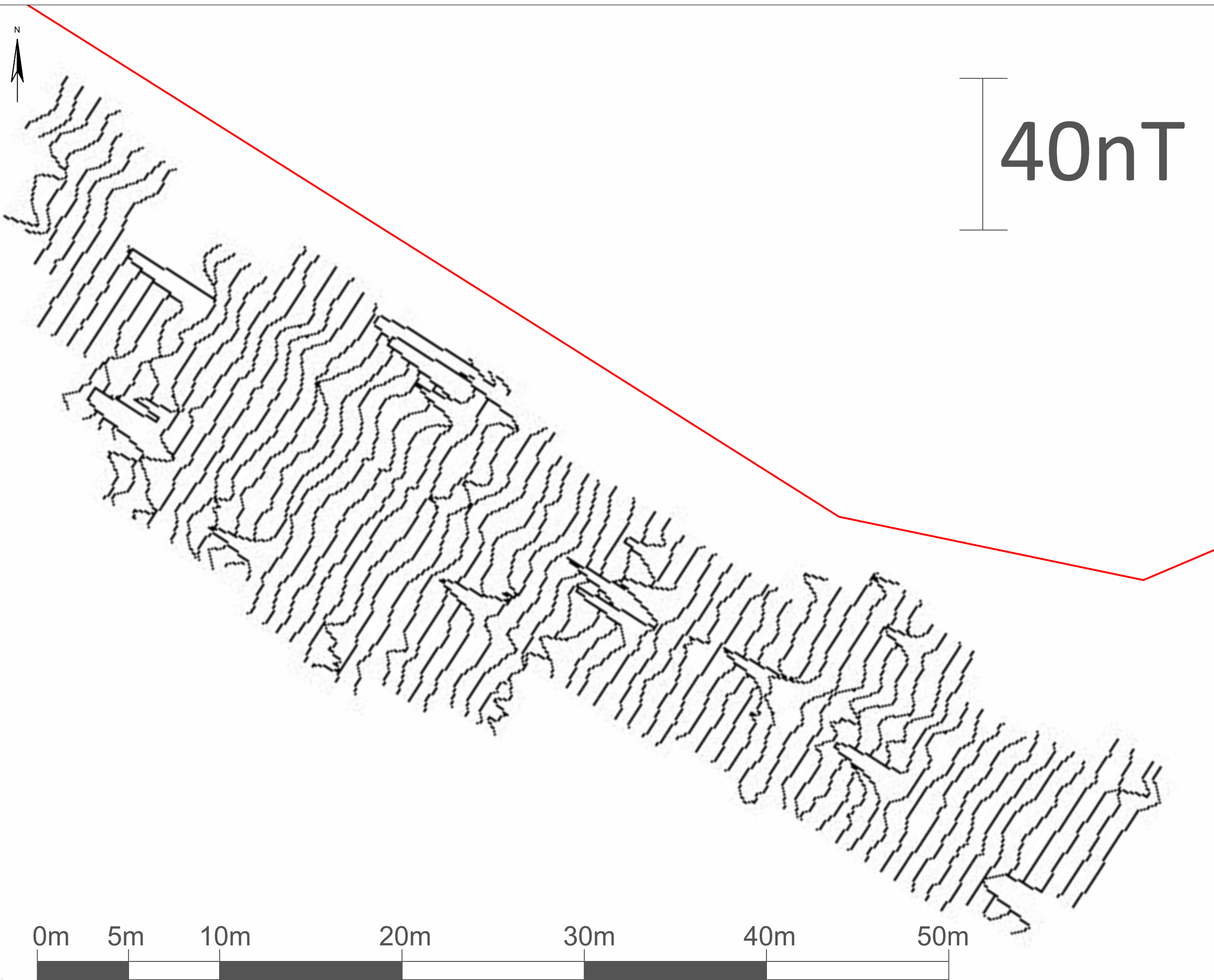


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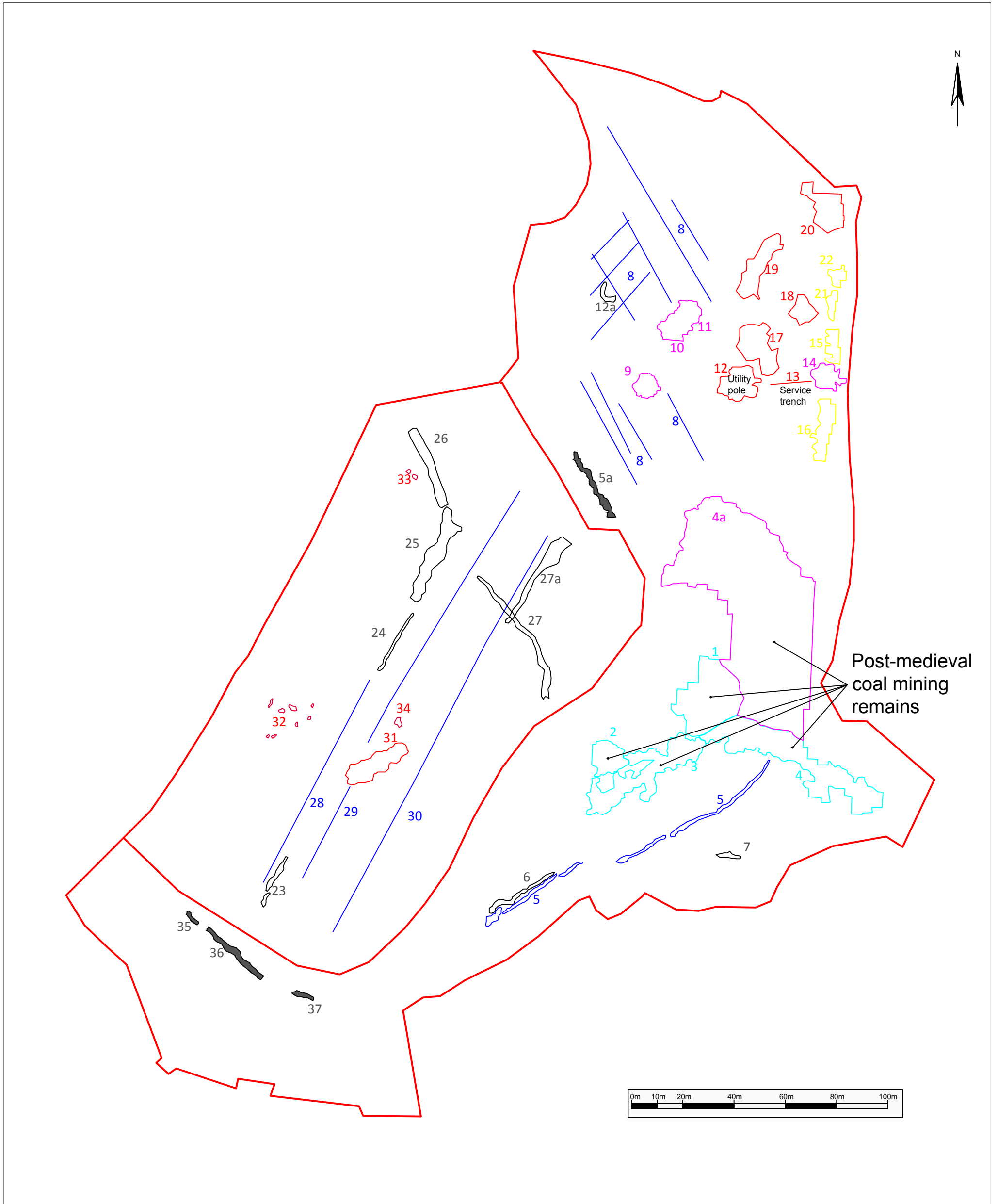
Figure 7  
Area 3 Trace plot

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**Figure 8**  
**Interpretative Plan**

**Key:**

- |                                       |                                |
|---------------------------------------|--------------------------------|
| Field boundary/archaeology(27/27a)    | Disturbance(17-20&31)          |
| River channel/colluvium (5a)          | Boundary ferrous (15/16&21/22) |
| Low bank (5) possible footpath        | Geology/archaeology            |
| Field boundary/archaeology(23-26&6/7) | Ferrous/archaeology(9-11)      |

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**Appendix 2: Written Scheme of Investigation**

## **Land off St Martin's Road, Gobowen, Shropshire**

### **Written Scheme of Investigation for a Geophysical Survey**



**Archaeological Research  
Services Ltd**

## **1 Introduction**

### **1.1 Project Background**

- 1.1.1 This document comprises a Written Scheme of Investigation (WSI) for a geophysical survey of land off St Martin's Road, Gobowen, Shropshire. It outlines the proposed method of investigation to be used by Archaeological Research Services Ltd (ARS Ltd) for surveying the c.6.7 ha site.
- 1.1.2 Muller Strategic Projects Ltd is preparing a planning application to develop the land off St Martin's Road, Gobowen for residential housing. Archaeological Research Services Ltd has been commissioned by Muller Strategic Projects Ltd to produce a heritage assessment and a geophysical (magnetometry) survey to assess the site for potential archaeological remains.

### **1.2 Location and Land-Use**

- 1.2.1 The red line boundary of the proposed development area (hereafter 'PDA') is depicted by a red polygon on Figure 1, and is c.6.7 ha in area, and centred at NGR 330358,334244. It is bounded to the east by properties on Preeshenlle Lane, Penycae Close, Penycae Avenue and St. Martin's Road; to the south by the River Perry and the rear gardens of properties along School Lane, Gobowen, and to the west and north by the boundary with Henlle Park Golf Course. The PDA comprises three fields: one at the south contained within the area between School Lane and the River Perry, and a sinuous band of vegetation divides the rest of the PDA into two. The band of vegetation forms a permeable field boundary which follows a sharp break of slope, with the land rising to the west to the crest of a domed hill. To the east of this, the land towards the north of the PDA is generally flat, although this falls away to the west towards a pond that is within the curtilage of Henlle Golf Club immediately beyond the north-west corner of the PDA. Towards the centre of the PDA, the land falls away sharply to the south down to the floodplain of the River Perry. The highest point in the PDA is located at the north-east corner adjacent to Preeshenlle Lane, at c.115m above mean sea level (AMSL), and the lowest is adjacent to where the River Perry exits the PDA at the east at c.101m AMSL.
- 1.2.1 Most of the PDA is under grass, apart from the band of vegetation which divides the northern area of the site into two, with some areas of invasive species such as nettles in the area to the south of the river.
- 1.2.2 The underlying solid geology of the PDA comprises mudstone, sandstone and conglomerate of the Etruria Formation, a Sedimentary Bedrock formed approximately 307 to 313 million years ago in the Carboniferous Period (British Geological Survey 2015). The bedrock is overlain by superficial deposits of 'Alluvium' (which in reality comprises a combination of clay, silt and gravel) along which the River Perry riverbed is incised; a deposit of

Glaciofluvial Sand and Gravel which is roughly coterminous with the western field of the PDA; and a till (Diamicton) which covers the remainder of the PDA (British Geological Survey 2015). These are land facies typically attractive for past human settlement.

- 1.2.2 The soils of the PDA are classified as belonging to the WICK 1 Soil Association (541r), which are typical brown earths (SSEW 1983b, 4). These soils form over glaciofluvial or river terrace drift, and are characterised as 'Deep well drained coarse loamy and sandy soils, locally over gravel. Some similar soils affected by groundwater. Slight risk of water erosion' (SSEW 1983b, 9).

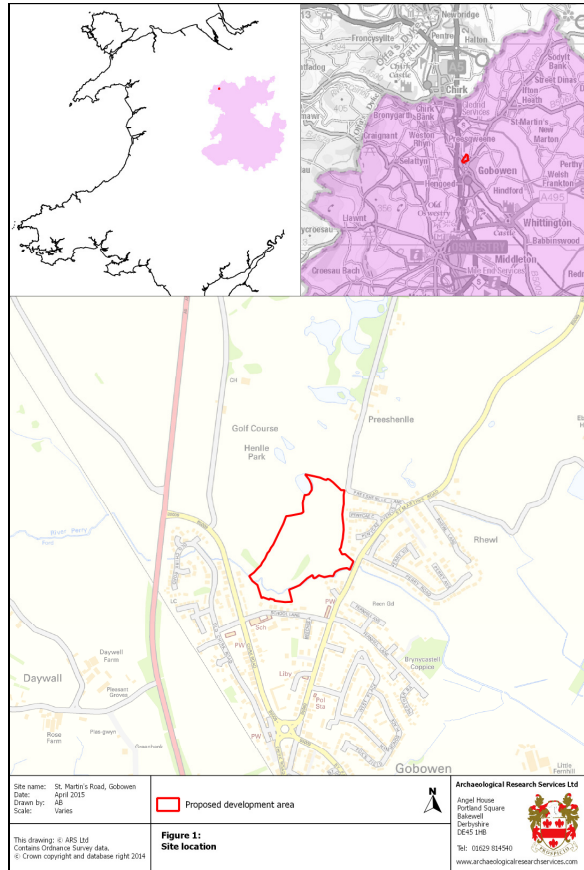


Figure 1. Location of site (highlighted in red)  
(Ordnance Survey © © Crown copyright and database right 2015).

## 2 Archaeological Background

- 2.1 A Desk Based Assessment has been produced for the development, and this identified that the PDA contains part of a scheduled section of Wat's Dyke, an early medieval defensive earthwork of national importance, and the medieval motte known as Bryn-y-Castell, also a Scheduled Monument, is located c.55m to the south of the PDA. There are four Grade II Listed Buildings within 500m of the PDA, and an Historic Environment Record (HER) entry concerning a post-medieval coal shaft is located within the PDA. The walkover survey undertaken as part of the DBA has identified that the coal workings are more extensive than



recorded by the HER, and as well as the coal shaft there are two possible horse gins, a possible building platform and tramway embankment and possible loading platforms. There are a further six archaeological sites recorded within the study area, and the assessment has identified the potential for previously unknown remains dating to all periods to survive within the PDA.

### **3 Objectives**

- 3.1 The objective of the gradiometer survey is to identify anomalies of possible archaeological origin within the survey area (see Figure 1) in order to:
- identify and record the possible presence/absence, location, nature and extent of prehistoric and later historic archaeological deposits that may exist on the proposed development site.
  - gather sufficient evidence to establish, supplement, improve and make available information about the archaeological resource existing within the areas of investigation.
  - assist the formulation of any strategies for the future treatment of archaeological deposits in relation to the development proposals.

### **4 Geophysical Survey**

#### **4.1 Coverage**

- 4.1.1 It is intended to conduct a geophysical (magnetometer) survey over as much of the c.6.7 ha area of the site of the proposed development as it is possible to achieve, as it is noted that some areas of the PDA will be unsuitable for survey due vegetation cover and/or steeply sloping topography.

#### **4.2 Selected technique**

- 4.2.1 The geophysical survey technique selected for the site is magnetometry. Magnetometry using Fluxgate Gradiometer instruments is the preferred geophysical technique utilised for the detection of buried features such as iron-based features and objects, or those subjected to firing such as kilns, hearths and even the buried remains of brick walls. It is also used to locate more subtle features such as boundary or enclosure ditches, pits and post holes which have been gradually in-filled by more humic material. The breakdown of organic matter through microbiotic activity leads to the humic material becoming rich in magnetic iron oxides when compared with the subsoil allowing features to be detected. In addition to this, variations in the magnetic susceptibility between the topsoil, subsoil and bedrock have a localised effect on the Earth's magnetic field enabling the detection of features such as backfilled ditches or pits due to the fact that the topsoil has more magnetic properties than the subsoil or bedrock, resulting in a 'positive' magnetic anomaly. Conversely, earthwork or embankment features can also be identified as 'negative' magnetic anomalies due to the action of placing less magnetic subsoil on top of more magnetic top soil.

#### **4.3 Objectives**

- 4.3.1 The objective of the detailed gradiometer survey is to identify anomalies of possible archaeological origin within the survey area (see Figure 1) in order to inform on the location

and potential significance of buried archaeology on the site.

- 4.3.2 The presentation and interpretation of the results will be carried out in accordance with the *Code of Conduct* of the Chartered Institute for Archaeologists (CIfA 2014a) and will follow the English Heritage guidelines (2008) *Geophysical Survey in Archaeological Field Evaluation* and CIfA *Standard and Guidance for archaeological geophysical survey* (2014b). ARS Ltd is a corporate member of the International Society of Archaeological Prospection (ISAP).

#### 4.4 Methodology

- 4.4.1 A survey grid comprising 30m x 30m individual grids will be set up over the selected survey areas. The survey will use a temporary survey grid accurately positioned using a suitable DGPS system. The temporary grid will be co-registered to the Ordnance Survey National Grid using digital tiles provided by ARS Ltd or suitable digital map tiles provided by the client.

- 4.4.2 These grids will then be surveyed using a Bartington Grad 601-2 gradiometer. The Grad 601-2 has two gradiometer sensors and therefore collects two lines of data during each traverse. Data are collected in a zigzag fashion within the grid starting in the north-west corner, facing east. Readings are taken every 0.25m on traverses 1m apart. This equates to 3600 readings in a complete 30mx30m grid. Sensor balance will be checked and adjusted at regular intervals.

- 4.4.3 At the end of each day the data will be downloaded to a PC or laptop using Geoscan *Geoplot V3*.

- 4.4.4 All staff employed on the geophysical survey will be suitably qualified and experienced for their respective project roles and have practical experience of geophysical survey.

- 4.4.5 All staff will be made aware of the archaeological potential of the area and will be fully briefed on the work required by this WSI.

#### 4.5 Data Processing, Interpretation and Report

- 4.5.1 Data processing will be undertaken by a geophysicist using Geoscan *Geoplot V3*. Anomalies will be digitised and geo-referenced. They will be colour coded using ARS Ltd's standard scheme to provide the most likely interpretation. Anomalies will be numbered and catalogued as systematic groups or individual anomalies as appropriate. The final report will include a graphical and textual account of the techniques undertaken, the data obtained and an archaeological interpretation of that data and conclusions about any likely archaeology. The report will describe the work undertaken and the results obtained. It will (as a minimum) include the following.

- A Non-technical summary
- Introduction
- Geological and topographical setting
- Methodology
- Discussion of archaeological and historical background
- Discussion on the results of the survey
- Conclusions and recommendations
- Sources
- Copy of brief

- Figure showing location of the site
- Figure showing location of survey grids and referencing
- Figure showing processed data
- Figure showing trace plots of processed data
- Figure showing abstraction and interpretation of anomalies.

## 5 Project management

5.1 ARS Ltd is a Registered Organisation with the Chartered Institute for Archaeologists (CIfA). Registered Organisations are continuously assessed to ensure that the highest standards of work are carried out, in line with the *Code of Conduct* of the CIfA (2014a). In addition to our key management staff, who have achieved the highest grade of corporate CIfA membership, many of our field staff also hold corporate grade membership.

5.2 All staff employed on the project will be suitably qualified and experienced for their respective project roles and have practical experience of geophysical surveying and reporting. All staff will be made aware of the archaeological importance of the area surrounding the site and will be fully briefed on the work required by this specification. Each member of staff will be fully conversant with the aims and methodologies and will be given a copy of this WSI to read. All members of staff employed by ARS Ltd are fully qualified and experienced archaeologists, this will ensure that appropriate decisions regarding excavation and sampling will be made in the field.

5.3 *Project Team*

Project management: Chris Scott BA, MLitt, MCIfA (ARS Ltd)

Geophysical surveyors: Richard Durkin BEng (ARS Ltd)

## 6 Access

6.1 ARS Ltd will give the Shropshire Historic Environment Manager at least two weeks (or less if so agreed) notice of the commencement of fieldwork.

6.2 ARS Ltd will liaise with the Shropshire Historic Environment Manager at regular intervals throughout the course of the work to ensure that the project aims and objectives are met.

Dr Andy Wigley  
Historic Environment Manager  
Historic Environment Team  
Shropshire Council  
Shirehall  
Abbey Foregate  
SHREWSBURY  
SY2 6ND

Tel. (01743) 252561  
Mob. 07990 085329

## 7 Report Deposition

7.1 An OASIS online record <http://ads.ahds.ac.uk/project/oasis/> will be initiated and, as the project proceeds, information will be added to this record. Key fields will be completed on

Details, Location and Creators forms. All parts of the OASIS online form will be completed for submission to the HER. This will include an uploaded .pdf version of the entire report (a paper copy will also be included within the archive).

- 7.2 Copies of the final report will be deposited with the Shropshire Historic Environment Record in bound and PDF/A format.
- 7.3 Shropshire Historic Environment Manager will be notified of the final deposition of the report.

## **8 Changes to Methodology or Work Programme**

- 8.1 Changes to the approved methodology or programme of works will only be made with the prior written approval of the Shropshire Historic Environment Manager.

## **9 Health and Safety**

- 9.1 A full health and safety risk assessment will be carried out prior to the survey commencing. All people working on the site will be briefed on the safety requirements whilst working on-site and given access to a copy of the risk assessment and all ARS Ltd staff working on the site will undergo a Health and Safety induction. ARS Ltd maintains a strict health and safety policy, as well as having Contractors Health and Safety Assessment Scheme (CHAS) Accreditation. The appointed Health and Safety Officer for the company is Chris Scott.

## **10 References**

British Geological Survey. 2015. Geology of Britain viewer. Available online at: <http://mapapps.bgs.ac.uk/geologyofbritain/home.html> [Accessed 15th April 2015].

Chartered Institute of Field Archaeologists. 2014a. *Code of Conduct*. Chartered Institute for Archaeologists, Reading.

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English Heritage. 2008. *Geophysical Survey in Archaeological Field Evaluation*. London, English Heritage

Soil Survey of England and Wales. 1983a. Sheet 3: Soils of Central England.

Soil Survey of England and Wales. 1983b. Legend for the 1:250,000 Soil Map of England and Wales.