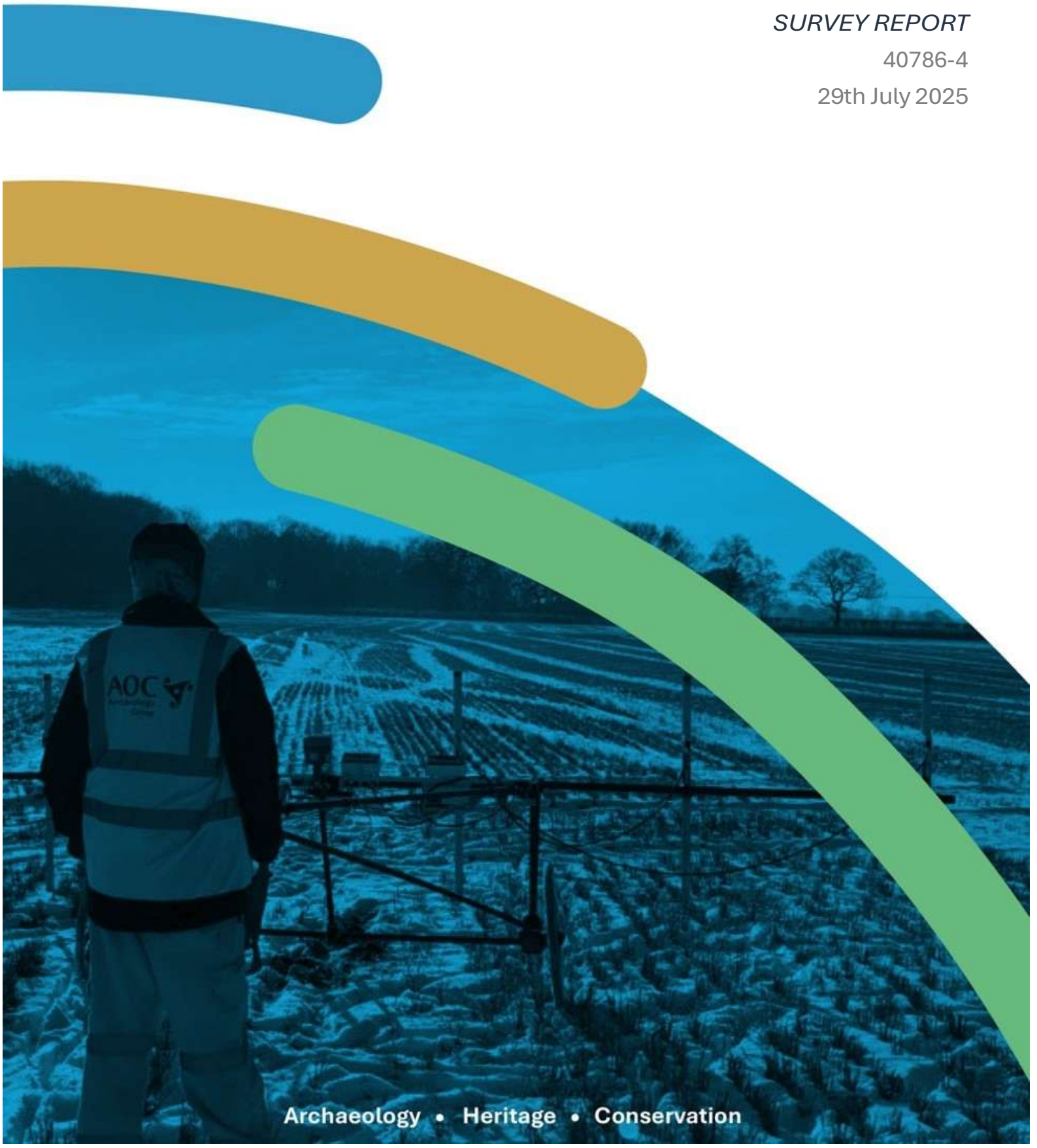
EASTER HAPPREW, PEEBLESSHIRE: UNCOVERING THE TWEED

ARCHAEOLOGICAL GEOPHYSICAL SURVEY REPORT

40786-4

29th July 2025



Archaeology • Heritage • Conservation

On Behalf of: *Destination Tweed*
Old Melrose Dairy Steading
Melrose
TD6 9DF

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Non-Technical Summary

AOC Archaeology was commissioned by Destination Tweed Project to carry out an archaeological geophysical survey using magnetic gradiometry and earth resistance methods to investigate the extent of archaeological remains at Easter Happrew as a part of a research project. The survey was over a known Roman fort at the site, identified through aerial photographs and excavations. The objectives of the survey were to provide information on the layout and development of the site, and current state of preservation of the site following decades of cultivation.

The survey area encompassed c.6ha of land located at NGR NT 19472 40108

Many anomalies from both techniques relate to the ramparts of the fort and features within the fort such a through road. Several features outside the fort such as annexes and a quarry were also identified. Also identified are a potential enclosure and field boundary that appear to relate to linear feature previously identified from aerial photographs.

Several features which could relate to either archaeological, agricultural or natural features were also identified. Anomalies relating to a spring and natural water runoff are also prominent throughout the gradiometer data set. Against this natural background magnetically quiet areas highlighted two possible landforms not affected by water runoff, which could be either natural or archaeological in origins.

Acknowledgements

We are grateful to the landowner of the forts at Lyne and Easter Happrew for their assistance with the survey. AOC would also like to thank all the participants for their effort and assistance during the survey.

The Destination Tweed project is a multi-partner collaboration led by the Tweed Forum. As part of the wider Destination Tweed which has over thirty funders, the Uncovering the Tweed project is funded by National Lottery Heritage Fund Scotland, Historic Environment Scotland, and the Fallago Environment Fund.

1 Introduction

1.1.1 This report of a geophysical survey over land at Lyne has been prepared by AOC Archaeology for Destination Tweed Project for submission to Scottish Border Council.

1.1.2 AOC Archaeology were commissioned to carry out a geophysical survey of approximately 6ha using magnetic gradiometry and earth resistance. The survey took place between the 17th and 21st February 2025 as part of wider archaeological research with the Uncovering the Tweed research project.

1.1.3 This survey was carried out to provide information on the presence, character and extent of potential buried archaeological remains within the survey area. The significance of any such remains can only be determined with reference to further information as such this report may form part of an assessment of significance but cannot stand alone as such.

2 Background to Wider Project and Survey Rationale

2.1.1 The Destination Tweed project is a multi-partner collaboration led by the Tweed Forum. The River Tweed is one of the UK's most important river corridors with a rich natural and cultural heritage. A five-year partnership led investment, will deliver a 113-mile trail running from Moffat, past the source of the River Tweed and on to Berwick Upon Tweed where the river meets the sea.

2.1.2 Uncovering the Tweed (UtT) is a participatory archaeology and community heritage programme and one of the thirteen Destination Tweed projects. The UtT project is maximising the value of LiDAR technology for the investigation of the historic landscape. The UtT is delivering a legacy for future generations by protecting and conserving the landscape, supporting connections between heritage groups and community organisations along the route and building a core of empowered volunteers, confident in identifying, investigating, and conserving the heritage of the project area into the future.

2.1.3 There are several sub projects and themes, and geophysical survey is being carried out at different phases of several sub-projects and themes. These are being conducted by AOC either alone or in conjunction with volunteer participants. Geophysical survey methods being used include magnetometry, earth resistance, and ground-penetrating radar. Participants are learning how to operate these tools and interpret the resulting data to identify potential archaeological features. Geophysical surveys are being undertaken at key sites throughout the Tweed basin, focusing on those sites closest to the proposed trail and those closest to areas typically accessed by walkers, cyclists and other visitors to the area.

2.1.4 The geophysical survey results will feed into the archaeology map compiled by the Mapping the Tweed sub-project. Geophysical surveys will provide a useful comparative to sites identified through LiDAR and will be particularly useful in areas where LiDAR is less successful as in more cultivated land where sites have undergone more ploughing. Survey in the vicinity of known sites will be targeted to enhance our interpretation of these sites. At the same time, it is anticipated that new sites will be revealed as a result of geophysical survey either standalone or in tandem with LiDAR or other desk-based research. The results of the surveys

will feed into the wider Tweed Project and enable better presentation and appreciation of these sites.

2.1.5 Two sites have been selected for initial surveys and fall under the Roman River Frontier theme, which seeks to explore the evidence for Roman activity across the area. Several significant Roman sites are found along the Tweed such as Trimontium Fort and lesser-known Roman sites such as that at Lyne.

2.1.6 The fort at Easter Happrew was first identified through aerial reconnaissance in 1955 and excavated in 1956, although there is no trace of the fort on the ground. APs showed traces of three timber-framed buildings and excavation revealed gravel roads in and around the fort. There is some evidence for annexes, but they are not clearly understood. The survey will provide a better understanding of the layout and survival of the fort. The ditches which have been levelled by cultivation may still be detectable by gradiometer survey. The resistance survey will hopefully map remnants of stone structures, if present, and the layout of roads, while the gradiometer survey may identify postholes associated with wooden structures. As a result these non-invasive surveys will hopefully provide important information on the layout and development of the site, but also on its current state of preservation following decades of cultivation.

2.1.7 The proposed survey area is 6 ha, which was fully surveyed using magnetic gradiometer systems, with 1ha of targeted earth resistance survey to provide complementary a data based on the findings of the magnetic survey.

3 Parcel Location and Description

3.1.1 The survey area is located on land approximately 275m northeast of Easter Happrew Farm, on the western side of the B712 and c. 600m southwest of its junction with the A72, c. 5.6km west of Peebles (NT 19472 40108) (see Figure 1)

3.1.2 The survey area covers approximately 6 ha across two adjacent fields currently in use as rough pasture. The area is situated at around c. 214m above Ordnance Datum (aOD), on an elevated plateau between the Lyne Water and the River Tweed, the ground falls steeply down to the Lyne Water to the northwest of the survey area.

3.1.3 The recorded solid geology underlying the survey area is Shinnel Formation, a wacke sandstone and siltstone turbidite succession. This is overlain by glaciofluvial deposits of gravel, sand and silt (BGS, 2026). The soils within the survey area are recorded as brown earths (Scotland's Soils, 2026).

3.1.4 Magnetic gradiometry can provide variable results over sandstones and siltstones and can show a high degree of local variation over drift deposits, dependent on the magnetic mineralogy of the parent material; however, magnetometer survey can generally be recommended over any sedimentary geology (David et. al. 2008, 15). Earth resistance can be affected by the season and proximal weather conditions, depending on how saturated the ground conditions are and if water pooling has occurred against buried surfaces or foundations. In this instance, the soil and geological environment has not overly hindered the collection and interpretation of gradiometer survey data with a strong magnetic contrast

between anomalies associable with the fort and the magnetic background. Electrical contrast within the earth resistance data is more restricted, possibly reflecting the thin overlying soils on the site, however, both high and low electrical resistance responses are identifiable from the earth resistance data.

4 Archaeological Background

4.1.1 The archaeological background below is a summary of information available from Trove and Pastmap, within 1km of the survey area (Historic Environment Scotland 2025a, 2025b), outlined in the Written Scheme of Investigations (Brown and Ovenden 2024).

4.1.2 The survey area includes much of the scheduled area of a 1st-century Roman fort and annexe (SM1493), known from cropmark evidence and small-scale excavations carried out in the 1950s. The fort is described as rhomboid-shaped with three visible entrances, a road running ENE-WSW through it and a surrounding ditch and rampart. An annexe is located on the southwestern side of the fort, with at least three buildings of possible civilian function outside the northern side of the fort, as well as a quarry speculated to be used for. Part of the garrison commander's house, a timber structure with wattle and daub walls, was revealed by excavation and the lack of any signs of repair or reconstruction was interpreted as indicative of a single phase of occupation. A quarry located just east of the defences of the fort is postulated to the source for gravel used in the construction or roads associated with the fort. the fort may have been abandoned in favour of the site at Lyne (SM1492; c.700m northwest). A Roman temporary camp (SM1492) is also located c. 900m northeast of the survey area, with a Roman road running generally ESE-WNW to the north of the A72.

4.1.3 A 'linear feature' (Trove ID 50057), identified from a cropmark, is recorded along the southern edge of the survey area. Similarly, cropmarks c. 300m east of the survey area (50063) may be archaeological but no further details are recorded.

4.1.4 Prior to Roman occupation, the survey area lay within a well-used prehistoric landscape, with a large number of hillforts situated on surrounding hilltops (e.g. at Kerr's Knowe SM3059; Tor Hill SM3027; Hamildean Hill SM2957; Black Meldon SM2703; White Meldon SM114 and Syke Hill SM3068, all within 3.6km of the survey area). Approximately 350m west of the survey area, the remains of a scooped settlement of probable Iron Age date (166741) have been identified, with burnt mounds (166715) c. 150m southwest of the scooped settlement. In the late 18th-century, a circular enclosure (of unclear, possibly prehistoric, date) (49827) was recorded c. 350m south of the survey area, probably encircling the summit of a knoll, although no surface remains survive now.

4.1.5 To the east of the B712, two standing stones (SM2718) and the remains of a cairn (SM3171) are located c. 550m and 660m east of the survey area respectively. A scatter of prehistoric chert implements (138739) has been recovered through fieldwalking in the area surrounding these monuments, with a small barrow or mortuary enclosure (51596) also identified c. 53m west of the standing stones. On the northern bank of the Lyne Water at Maldon Bridge, c.900m northeast of the survey area, excavations in the 1970s identified a late Neolithic timber enclosure (51564), which is overlain by several Early Bronze Age burials (51565).

5 Aims and Objectives

5.1.1 The primary aim of the archaeological geophysical survey is to identify and record potential geophysical anomalies indicative of archaeological remains through the production and interpretation of geophysical data which will aid in informing the development of subsequent phases of the archaeological evaluation strategy.

5.1.2 The results of the geophysical survey will be assessed and interpreted to gain a clear understanding of potential buried remains within the survey areas.

5.1.3 As a result these non-invasive surveys will hopefully provide important information on the layout and development of the site, but also on its current state of preservation following decades of cultivation.

5.1.4 Specifically, the aims of the gradiometer survey are:

- To locate, record and characterise any potential surviving sub-surface archaeological remains within the survey area.
- Help in determine the next stage of investigations at Easter Happrew by providing evidence that remains of archaeological, possible archaeological, historical and uncertain origins are most likely present on site, which can form targets for further investigation at the site.
- To produce a comprehensive site archive and report.

5.1.5 Additional specific site objectives are to:

- Provide important information on the layout and development of the site.
- Provide important information the current state of preservation of the site following decades of cultivation.

6 Methodology

6.1.1 The geophysical survey was undertaken between 10/02/2025 and 14/02/2025.

6.1.2 All geophysical survey work was carried out in accordance with current good practice specified in the EAC guidelines document (Schmidt et al. 2015), as recommended by Historic England, and in the Chartered Institute for Archaeologists' Standard and Guidance for Archaeological Geophysical Survey (2014, updated 2020).

6.1.3 Digital photographs of every survey parcel were taken before, during and after geophysical survey to show any changes to field conditions following the programme of works. The photos were downloaded and stored off site, and relevant examples are included as Plates 1 to 3 in this report.

6.1.4 The gradiometer survey was carried out using Sensys MAGNETO® MXPDA hand pushed magnetometer cart system and a Bartington Non-Magnetic Cart (see Appendix 2).

6.1.5 Gradiometer data collected using the Sensys cart utilised eleven FGM650/3 fluxgate gradiometer sensors mounted 0.5m apart upon a frame along with data logging equipment and batteries. Data was be collected using zig-zag traverses alongside a constant stream of

GPS data collected through a Carlson BRx7 GPS, enabling the collected data to be spatially georeferenced without the need for a pre-determined grid system. The data and measured tracks were collected through the data acquisition unit MXPDA and visualised through a tablet PC.

6.1.6 Care was also to be taken to attempt to avoid metal obstacles present within the survey area, such as metal objects within and adjacent to the survey area as gradiometer survey is affected by 'above-ground ferrous disturbance' and avoiding them improves the overall data quality and results obtained.

6.1.7 The data was exported in ASCII file before being processed along with the GPS data in TerraSurveyor v3.0.34.10. Data processing, storage and documentation was carried out in accordance with the good practice specifications detailed in the guidelines issued by the Archaeology Data Service (Schmidt and Ernenwein, 2009).

6.1.8 A total of 5.3 ha were surveyed using the Sensys cart system.

6.1.9 The gradiometer survey using a Bartington Non-Magnetic Cart system utilised six Grad-01 fluxgate gradiometer sensors mounted upon a carbon fibre frame, along with data logging equipment and batteries (see Appendix 2). Before each session of use, the cart system was balanced around a single set up point within the Site specifically chosen for being magnetically quiet. Balancing the machine around this point produces a more uniform dataset throughout and allows all data to be plotted with ease on the same palette.

6.1.10 Data was collected using zig-zag traverses alongside a constant stream of GPS data collected through a Trimble R10 GPS, enabling the collected data to be spatially georeferenced without the need for a pre-determined grid system. The data was logged on a laptop mounted to the cart using Geomar MLGrad601 software.

6.1.11 A total of 5.1 ha was surveyed using the Bartington cart.

6.1.12 Care was also taken to attempt to avoid metal obstacles present within the survey area, such as metal objects within and adjacent to the survey area as gradiometer survey is affected by 'above-ground ferrous disturbance' and avoiding these improves the overall data quality and results obtained

6.1.13 The earth resistance survey was carried out using a Geoscan Research RM85 resistance meter. The survey was conducted within a system of grids measuring 30m by 30m each, which were marked out using temporary markers at each grid node.

6.1.14 Grid nodes were set out and recorded using a Trimble R8 / R10 dGPS with an error no greater than +/- 0.05m. The GPS system used the Trimble "VRS Now" service to provide instant access to real-time kinematic (RTK) corrections enabling an accuracy of < 2cm. It was connected via a SIM card run on the Vodafone network with good cellular signal in the survey areas, meaning a repeater will not be required.

6.1.15 Data was collected using zig-zag traverses, with a sample interval of 0.5m and a traverse interval of 0.5m.

6.1.16 The data will be downloaded and processed using Geoscan Geoplot v4.0.

6.1.17 A total of 1.5 ha surveyed by the earth resistance survey, over 17 complete grids.

6.1.18 Interpretations of all the geophysical data were created as shapefile layers in ArcGIS Pro. In the GIS environment all survey data is also compared against historical OS maps of the area (NLS, 2025), LiDAR data from an ongoing assessment as part of the 'Uncovering the Tweed Project' (AOC Archaeology, forthcoming), and aerial photographs of the site.

7 Results and Interpretation

7.1.1 The processed Sensys and Bartington carts gradiometer survey results have been visualised as greyscale plots, with the processed data plotted at -2 to 3nT as seen in Figures 3 and 4 respectively. A combined interpretation of both Sensys and Bartington carts gradiometer data is presented in Figure 5, with interpretation primarily taken from the Sensys cart data when possible due to the higher density of readings. Processed earth resistance data is visualised as a greyscale plot in Figure 6 with data plotted at 70 ohms to 201 ohms, while a high pass filtered plot of the data is visualised in a greyscale plot with data plotted at ±1.25 standard deviations in Figure 7. Interpretation of the processed earth resistance data is presented in Figure 8. Comparative side by side data plots of the processed Senys cart gradiometer and earth resistance data are shown in Figure 9, while comparative sided by side plots of the processed gradiometer and earth resistance data is shown in Figure 10. Combined plots of both the gradiometer and earth resistance data are depicted over LiDAR digital terrain model of slope, and historical OS map data in Figures 11 and 12 respectively. Figures 13 and 14 show minimally processed Sensys and Bartington cart gradiometer data data plotted as XY traces at 50nT/cm at A3 respectively.

7.1.2 Appendix 4 contains a guide to the interpretation categories employed and the logic used to assign anomalies to specific classes, as well as a short discussion of how past human activity results in these anomalies, however some important points are noted below:

7.1.3 The classes have three sub-types (generally); anomalies (typically indicated by a solid colour polygon), spreads (a stippled polygon) and trends (a line with a colour matching the polygon colour). Anomalies refer to distinct changes in the survey data which suggest an abrupt boundary between materials below ground, such as a cut feature with a magnetically contrasting fill. Spreads of enhanced material refer to diffuse areas of altered magnetic contrast which suggest a localised spread of material with a magnetic contrast within the topsoil or ploughzone. Linear trends are less distinct and are typically visible as linear patterning in the overall texture of the data. A common example of these is the striping effect caused by recent ploughing.

7.1.4 Anomalies placed in the 'uncertain' class may have an archaeological origin, but other explanations are equally likely. Where any particular interpretation is more likely than others, the anomaly is assigned to that class.

7.1.5 The definite 'Archaeology' class is only used for anomalies with no other possible explanation, either due to their diagnostic characteristics or because they are corroborated by other sources such as previous interventions within the Parcel. Anomalies with magnetic

characteristics or morphologies that suggest an archaeological origin with generally be assigned to the 'Possible Archaeology' class.

7.1.6 The anomaly type 'ferrous spike' is assigned to strong dipolar anomalies which cover a small spatial area and have a characteristic appearance in the XY traces of the survey data. These are strongly likely to be of recent origin in the form of magnetic or ferrous debris within the topsoil; 'spikes' of other origin will be assigned to their appropriate classification.

7.1.7 A distinction is made between modern disturbance from strongly ferrous materials within or adjacent to the survey area, such as the strong dipolar 'halos' produced by services like gas mains, and spreads of material within the topsoil causing noise which is assumed to have a recent origin. Generally speaking, 'modern disturbance' occurs at a distance from magnetic source, whereas modern magnetic spreads/debris are related to material directly at that location.

7.1.8 Generally, only anomalies (or groups thereof) of a likely archaeological or historical origin have been assigned an anomaly number on the interpretation figures. However, anomalies interpreted as resulting from other processes that are integral to the discussion of the results have also been assigned anomaly numbers.

7.1.9 Magnetic survey data from the survey exhibits a strong background magnetic enhancement, hence the plotting of the survey data between -2 nT a 3nT. The natural background is likely to contribute towards the strength of this magnetic enhancement with several anomalies and areas of magnetic enhancement relating to either a spring or fluvial runoff. Against this background anomalies of archaeological, possible archaeological and uncertain origins have exhibited a strong enhancement or contrast with the magnetic background.

7.1.10 Earth resistance data typically reflects the thin soil environment of the site with earth resistance measurements typically restricted to high readings between 70 and 350 ohms. This is also demonstrated by a large area of high resistance measurements along the northern edges of the earth resistance survey area. Despite this though it has been possible to identify anomalies from the earth resistance data that appear to relate to features associated with the Roman fort as well as other features.

Archaeology

7.1.11 Two to three concentric negative rectilinear anomalies in the fluxgate gradiometer data coincide with extent of the rhomboidal shaped Roman fort demarked in aerial photographs, and appear mostly to be in the location of banks [**m1**]. In the earth resistance data high earth resistance anomalies run alongside some of the negative magnetic anomalies [**r1**], while low resistance anomalies align with the negative magnetic anomalies [**r2**]. This may suggest that the banks of the fort ramparts are earthen in form with weaker magnetic properties than the surroundings (see Section 4.2). Near the north-eastern corner magnetic anomalies associated with the ramparts appear to be positive in signal, suggesting they relate to infilled ditches of the eastern and northern ramparts of the fort (see Section 4.2). Magnetic anomalies along the southern edge appear to suggest a similar break in the ramparts along the southern edge of the fort. To the east of the fort are two linear magnetic anomalies and a low resistance linear anomaly, aligned north-northwest to south-southeast, suggesting the presence of an infilled

ditch just east of the fort [**m3**, **r3**]. Most anomalies relating to the ramparts appear to collocate with a slight platform identifiable in the LiDAR DTM of slope (see Figure 11).

7.1.12 Parallel striations in the fluxgate gradiometer data run west-southwest to east-northeast between the proposed eastern and western entrances [**m4**]. High resistance anomalies are located between these magnetic striations near the eastern and western edges of the fort [**r4**]. These geophysical anomalies appear to correlate with the possible road proposed to run across the fort from excavations and aerial photographs.

Possible Archaeology

7.1.13 Running across the fort area are several repeating striations, which are approximately parallel to the perimeter of the fort [**m5**]. These could relate to remains within the fort, though it is possible cultivation remains has contributed towards at least some of these striations. Several linear and rectilinear high resistance anomalies have also been identified within the fort area, which may relate to stone structures associated with the fort [**r5**].

7.1.14 Discrete magnetic anomalies in fluxgate gradiometer data consistent with the presence of infilled pits within fort area [**m6**]. Two low earth resistance anomalies also appear to coincide with some of these discrete magnetic anomalies [**r6**].

7.1.15 Located just to the northeast of the fort area is a concentration of strong magnetic anomalies in the fluxgate gradiometer data, which co-locates with an area of low resistance measurements [**m7**, **r7**]. These anomalies appear to correspond with the location of a quarry depicted just to the northeast of the fort in an illustration of the site. This quarry is postulated to have been used for obtaining material for surfacing roads in the fort (see Section 4.2).

7.1.16 Along the eastern edge of Roman fort are two concentrations of strong amorphous anomalies within wider areas of increased magnetism [**m8**]. The concentrations could relate to industrial activity associated with the fort; however, the anomalies are similar to those associated with the quarry just northeast of the fort, suggesting they could be related to extraction activity.

7.1.17 Just west of the fort are two negative linear anomalies in an L-shape form, which appear to relate to the possible annex immediately to the west of the Roman fort [**m9**]. Immediately west of this are similar negative anomalies around a mound identifiable in the field and LiDAR data [**m10**].

7.1.18 Near the north-eastern edge of the fluxgate gradiometer survey are curvilinear anomalies in a possible sub-oval shape, with a possible opening along its northern edge [**m11**]. These anomalies have a strong magnetic signal, which may relate to infilled features such as ditches of a small enclosure. Within this possible enclosure are several strong linear, discrete and annular anomalies which may relate to infilled features such as ditches and pits [**m12**]. Overlapping with the eastern edge of the survey area is a linear anomaly consistent with the presence of an infilled ditch [**m13**]. Though the anomaly is not fully defined by the survey data, it seems plausible that the anomaly reflects a former field boundary attached to the possible enclosure. The linear anomaly also appears to relate to the linear cropmark previously noted to be running along the southern edge of the survey area, and also beside a steep slope along the southern edge of the survey areas in LiDAR data (see Section 4.3, Figure 11).

Unclear Anomalies

7.1.19 Overlapping with the possible western entrance of the Roman fort is a magnetically quieter area marked to the west by a curvilinear negative anomaly [**m14**]. The area is magnetically quieter than an area of strong magnetic enhancement, associated with water runoff, immediately to south, and magnetic enhancement within the fort area. The area also correlates with a slight mound identifiable in the LiDAR DTM (see Figure 11). It would seem the magnetically quieter area reflects a landform distinct from the areas of water runoff from the spring (see Sections 7.10.14-16); it is uncertain though whether this formation is natural or archaeological in origins.

7.1.20 On the western edge of the fluxgate gradiometer survey area is another magnetically quieter area, which in this instance surrounds a spring identified on historical OS maps [**m15**] (se Section 7.10.14). Towards the north of this quiet area is a negative linear anomaly, which may relate to a bank or stone wall foundations. As with the area on the eastern side of the Roman fort, it is uncertain whether this quieter area is natural or archaeological in origins.

7.1.21 Two broad linear high resistance anomalies, orientated northwest to southeast, are located near the centre of the fort area [**r8**]. The anomalies are indicative of the presence of material such as stone; however, the anomalies are at a different orientation to the anomalies associated with the fort. A low resistance linear anomaly with a similar orientation is located near the northwest corner of the fort [**r9**], which may relate to an infilled ditch, though again the anomaly is at a different orientation to other anomalies associated with the fort.

7.1.22 Located along the northern edge of the earth resistance survey area are several high resistance anomalies, which are identifiable against the high resistance background in the high pass filtered data [**r10**]. These may relate to masonry within the fort, though they may also relate to near surface geology.

7.1.23 Located in three different locations across the area surveyed using fluxgate gradiometer methods, are clusters of discrete and amorphous anomalies with a strong magnetic signal [**m16**]. These could relate to infilled features such as pits; however, a more natural origin is also possible.

Non archaeological anomalies

7.1.24 Located near the western edge of survey area is a y-shaped anomaly with a strong magnetic signal, which co-locates with a spring noted on historical OS mapping of the area [**m17**] (see Figure 12). This spring is noted above to be surrounded by an area of quieter magnetic variation.

7.1.25 Running northeast and across the Roman fort and towards the north-eastern and eastern edges of the survey area are several curvilinear magnetic anomalies with a strong signal, which appear to relate to two possible palaeo-channels [**m18, m19**]. It would seem likely these channels relate to the runoff of water from the spring, and it is possible there is a deliberate anthropogenic origin to these channels.

7.1.26 Located just to the south of the Roman fort are two areas of enhanced magnetic variation, with strong magnetic striations that are likely to relate to water runoff either from pluvial action or the spring.

7.1.27 Magnetic disturbances along the perimeter of the fluxgate gradiometer survey area relates to the presence of fencing in these areas. Strong dipolar anomalies across the fluxgate gradiometer data also highlight the presence of near surface ferrous objects

8 Conclusions

8.1.1 A magnetic gradiometer survey has been carried out over the Roman Fort and its immediate surroundings at Easter Happrew by AOC Archaeology. From this a targeted earth resistance survey has also been carried out on the basis of the gradiometer survey results. The natural background of the survey area has contributed to a strong magnetic enhancement of the gradiometer data sets. Prominent within the fluxgate gradiometer data are anomalies relating to a spring or fluvial runoff, whilst modern interference is identifiable with magnetic disturbance around fencing and near surface ferrous objects. Earth resistance data typically reflects a thin soil environment with measurements highlighting a high electrical resistance background across the survey area. A large area of increased electrical resistance covers most of the northern edge of the earth resistance survey area; however, despite this it has been possible to identify several anomalies associated with the Roman fort as well as other features.

8.1.2 Several anomalies or probable archaeological origins have been identified from both gradiometer and earth resistance survey data. Most of these anomalies relate to the ramparts of the Roman Fort, highlighting two to three banks with possible entrances in the eastern, western and southern edges of the fort. Other anomalies include magnetic and resistance anomalies that relate to a possible road running between eastern and western entrances of the fort.

8.1.3 Several magnetic striations across the fort area suggest the presence of features within the fort, whilst high resistance anomalies suggest the presence of masonry amongst these features. Other anomalies suggest the presence of infilled features such as pits within the fort. Immediately northeast of the fort both gradiometer and earth resistance data appear to show the presence of quarry that was previously known about. Magnetic anomalies with a similar signal are also identified just inside the eastern ramparts of the fort.

8.1.4 Negative magnetic anomalies just to the west of the fort appear to correlate with a previously identified annex of the fort, whilst further negative anomalies suggest another annex extending westwards around a mound identified in the field and LiDAR data.

8.1.5 Along the southern edge of the gradiometer survey area, magnetic anomalies suggest the presence of a sub-oval shaped enclosure and an adjoining field boundary. Magnetic anomalies suggested the presence of infilled features within the enclosure. The enclosure and field boundary appear to correlate with a linear feature previously identified in aerial photographs of the site.

8.1.6 Anomalies of unclear origins include clusters of discrete and amorphous magnetic anomalies, which could reflect either infilled pits or geological variation, and high and low resistance anomalies within the fort.

8.1.7 Other variations of unclear origins are two magnetically quiet areas Just west of fort and around a spring near the western perimeter of the survey area. These were suggested to reflect landforms, which are distinct from other areas affected by fluvial action. What is uncertain is whether these landforms are natural or anthropogenic in origins.

8.1.8 In addressing the site-specific objective of providing information on the layout and development of the site, the survey has highlighted the outline of the fort along with several possible features within it. Other anomalies appear to relate to the possible construction of the fort, use of the fort and features immediately around it. Archaeology either predating or postdating the fort has also been identified close in vicinity to the fort. Anomalies relating to the spring and possible runoff off it reflect the natural setting of the site, and possible a reason for the setting of the fort.

8.1.9 In addressing the site-specific objective of providing information regarding the current state of preservation of the site following decades of cultivation, the survey has identified a number of anomalies indicative features associated with the fort and possible archaeology surrounding it. The earth resistance data has suggested that the soil overlying the site is thin, though it has also identified possible masonry within the fort.

8.1.10 In assessing the results of the geophysical survey against the specific aims set out in Section 4:

- The survey has succeeded in locating, recording and characterising surviving sub-surface remains within the Site, though more remains may be presposent that are not suitable for detection using magnetic gradiometry.
- The survey will help in determining the next stage of works at Easter Happrew as it has provided evidence that remains of archaeological, possible archaeological, historical and uncertain origin are most likely present on site, and has provided a number of targets for further investigation;
- The survey has resulted in a comprehensive report and archive

8.1.11 Also, in addressing the additional specific site objectives the survey provided:

- important information on the layout and development of the site;
- important information the current state of preservation of the site following decades of cultivation.

Statement of Indemnity

8.1.12 The survey has resulted in a comprehensive report and archive. Although the results and interpretation detailed in this report have been produced as accurately as possible, it should be noted that the conclusions offered are a subjective assessment of collected data sets.

8.1.13 The success of a geophysical survey in identifying archaeological remains can be heavily influenced by several factors, including geology, seasonality, Area conditions and the properties of the features being detected. Therefore, the geophysical interpretation may only provide an indication of the nature and extent of buried archaeological remains and should be

considered in conjunction with other sources of archaeological evidence and, where appropriate, intrusive investigation.

9 Archive Deposition

9.1.1 In accordance with professional standard practice an 'Online Access to the Index of Archaeological Investigations' ('OASIS') record will be completed for submission to the HER and Archaeological Data Service (ADS) (Appendix 2).

9.1.2 One digital and hard copy of the report and data will be submitted to the relevant Historic Environment Record (HER) at the Client's discretion.

9.1.3 A digital copy of the report and data will also be submitted to the ADS at the Client's discretion.

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Plates



Plate 1: Before the survey



Plate 2: During the gradiometry survey



Plate 3: During the earth resistance survey

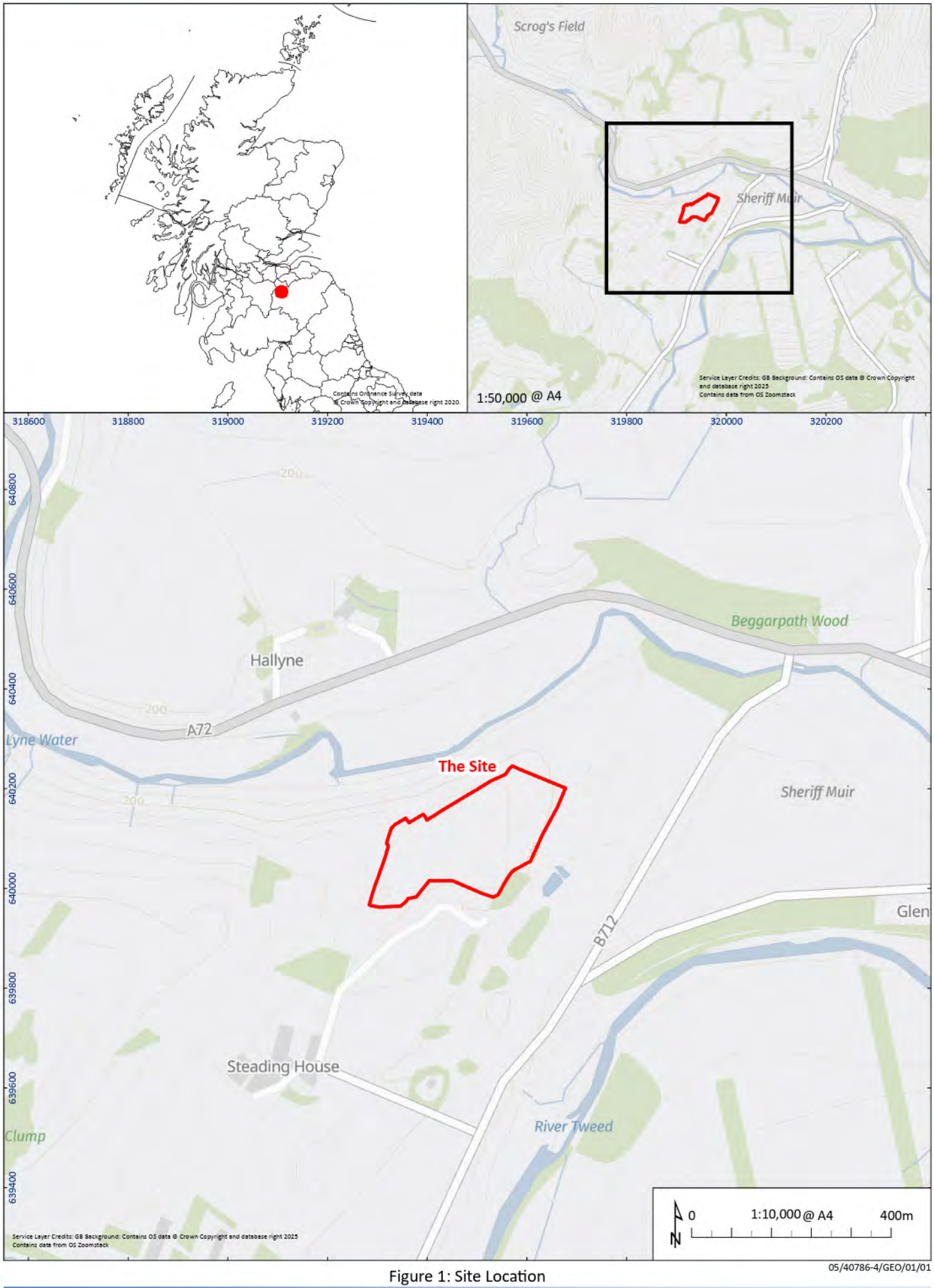
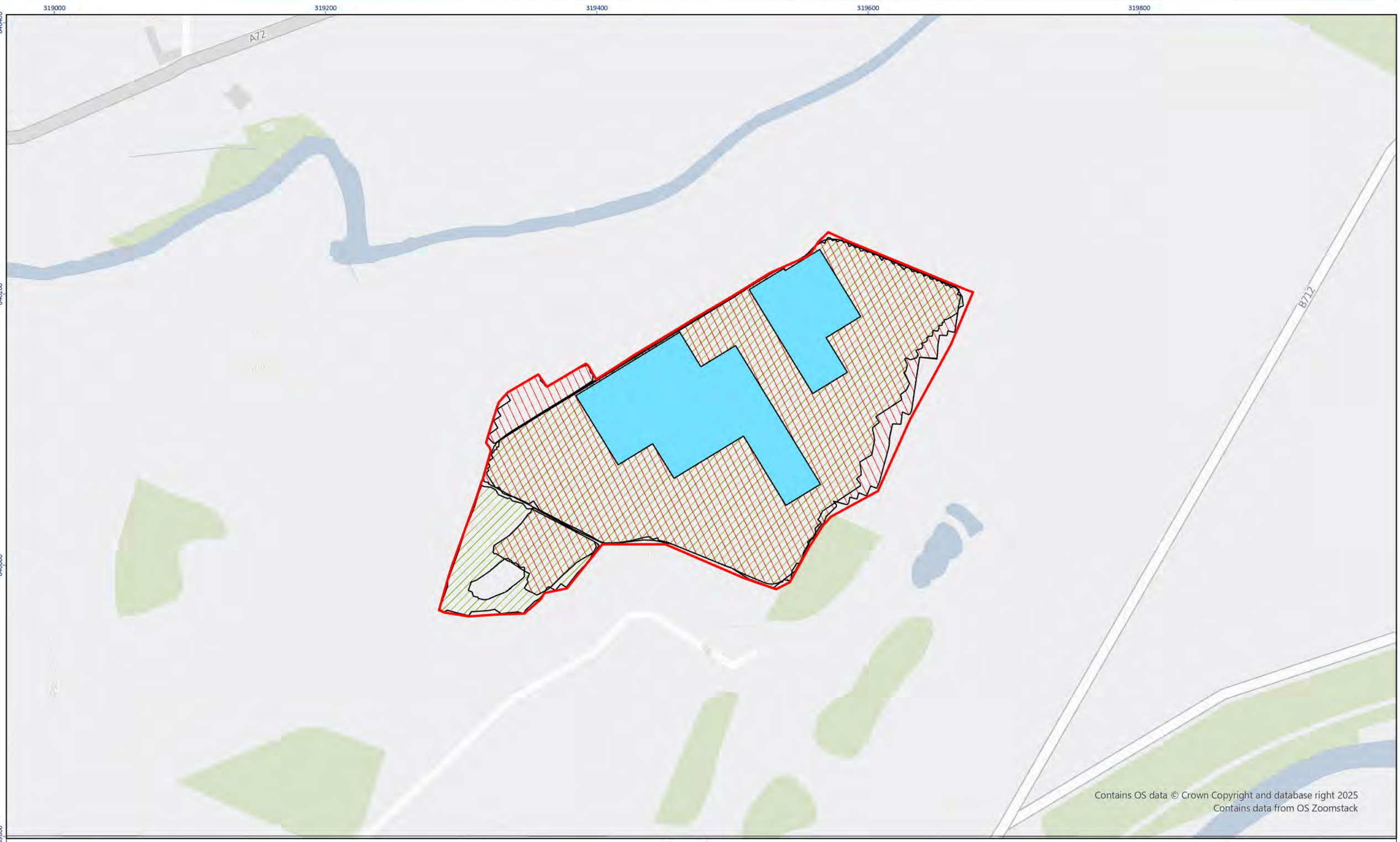


Figure 1: Site Location

05/40786-4/GEO/01/01



Survey Areas

Figure 2

Red Line Boundary
Bartington Cart
Sensys Cart
Earth Resistance

N

0 60m

Scale: 1:2,500 @ A3

Drawing Number: 05/40786-4/GEO/2/01	
Created by: RL	Date: 28/07/2025
Checked by: SO	Date: 28/07/2025
Approved by: SO	Date: 28/07/2025

AOC Archaeology Group

319300 319400 319500 319600 319700

640200

640100

640000



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Ordnance Survey data: Crown Copyright License no:0100031673

Gradiometer Data - Sensys Data (0.25m Traverse Interval)

Figure 3

2nT
-1nT

Red Line Boundary

N

0 30m

Scale: 1:1,250 @ A3

Drawing Number: 05/40786-4/GEO/3	
Created by: RL	Date: 29/07/2025
Checked by: AC	Date: 29/07/2025
Approved by: SO	Date: 29/07/2025

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Gradiometer Data - Bartington Cart (1m Traverse Interval)

Figure 4

3nT
-2nT

Red Line Boundary

N

0 30m

Scale: 1:1,250 @ A3

Drawing Number: 05/40786-4/GEO/4	
Created by: AC	Date: 29/07/2025
Checked by: SO	Date: 29/07/2025
Approved by: So	Date: 29/07/2025

AOC Archaeology Group

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m1 m2 m3 m4 m5 m6 m7 m8 m9 m10 m11 m12 m13 m14 m15 m16 m17 m18 m19

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Interpretation Plot of Processed Gradiometer Data (both Sensys and Bartington Cart Data).

Figure 5

- Anomaly (Probable Archaeology)
- Spread (Probable Archaeology)
- Anomaly (Possible Archaeology)
- Spread (Possible Archaeology)
- Anomaly (Unclear Origin)
- Spread (Unclear Origin)
- Anomaly (Geology/Natural)
- Spread (Geology/Natural)
- Spread (Magnetic Disturbance)
- Anomaly (Ferrous/Iron Spike)
- Spread (Ferrous/Iron Spike)
- Linear Trend (Probable Archaeology)
- Linear Trend (Possible Archaeology)
- Linear Trend (Geology/Natural)

N

0 30m

Scale: 1:1,250 @ A3

Drawing Number: 05/40786-4/GEO/5/01	
Created by: RL	Date: 29/07/2025
Checked by: SO	Date: 29/07/2025
Approved by: SO	Date: 29/07/2025

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Processed Resistance Data - 0.5m Traverse Interval

Figure 6

200Ω
70Ω

N

0 30m

Scale: 1:1,250 @ A3

Drawing Number: 05/40786-4/GEO/6	
Created by: AC	Date: 29/07/2025
Checked by: SO	Date: 29/07/2025
Approved by: SO	Date: 29/07/2025

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640200

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High Pass Filtered Resistance Data - 0.5m Traverse Interval

Figure 7

1.25 SD
-1.25 SD

N

0 30m

Scale: 1:1,250 @ A3

Drawing Number:	05/40786-4/GEO/7
Created by: AC	Date: 29/07/2025
Checked by: SO	Date: 29/07/2025
Approved by: SO	Date: 29/07/2025

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r3
r7
r10
r10
r10
r9
r6
r5
r4
r2
r1
r1
r4
r5
r8
r5
r1
r1

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Interpretation Plot of Processed Earth Resistance Data

Figure 8

- High Resistance (Archaeology)
- High Resistance (Possible Archaeology)
- High Resistance (Unclear origin)
- Low Resistance (Archaeology)
- Low Resistance (Possible Archaeology)
- Low Resistance (Unclear origin)

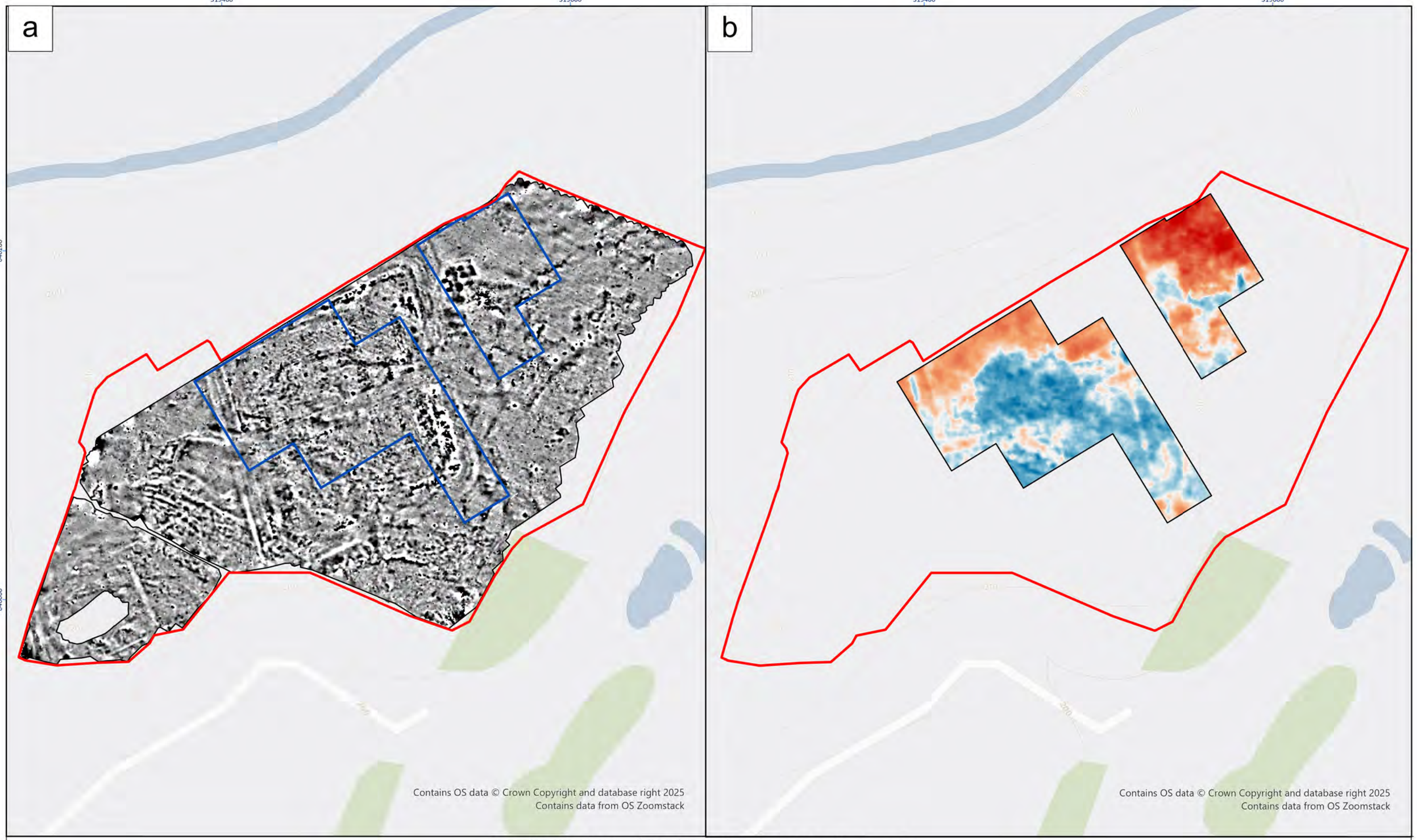
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Scale: 1:1,250 @ A3

Drawing Number: 05/40786-4/GEO/8	
Created by: RL	Date: 29/07/2025
Checked by: SO	Date: 29/07/2025
Approved by: SO	Date: 29/07/2025

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Comparative Plots of Processed a) Gradiometer (Sensys) Data, & b) Earth Resistance Data

Figure 9

a 3 nT -2 nT

b 350Ω 70Ω

N

0 30m

Scale: 1:2,000 @ A3

Drawing Number: 05/40786-4/GEO/9	
Created by: RL	Date: 29/07/2025
Checked by: AC	Date: 29/07/2025
Approved by: SO	Date: 29/07/2025

AOC Archaeology Group



Comparative Interpretation Plots of Processed a) Gradiometer Data, & b) Earth Resistance Data

Figure 10

- Anomaly (Probable Archaeology)
- Spread (Probable Archaeology)
- Anomaly (Possible Archaeology)
- Spread (Possible Archaeology)
- Anomaly (Unclear Origin)
- Spread (Unclear Origin)
- Anomaly (Geology/Natural)
- Spread (Geology/Natural)
- Spread (Magnetic Disturbance)
- Anomaly (Ferrous/Iron Spike)
- Spread (Ferrous/Iron Spike)
- Linear Trend (Probable Archaeology)
- Linear Trend (Possible Archaeology)
- Linear Trend (Geology/Natural)
- High Resistance (Archaeology)
- High Resistance (Possible Archaeology)
- High Resistance (Unclear origin)
- Low Resistance (Archaeology)
- Low Resistance (Possible
- Low Resistance (Unclear origin)

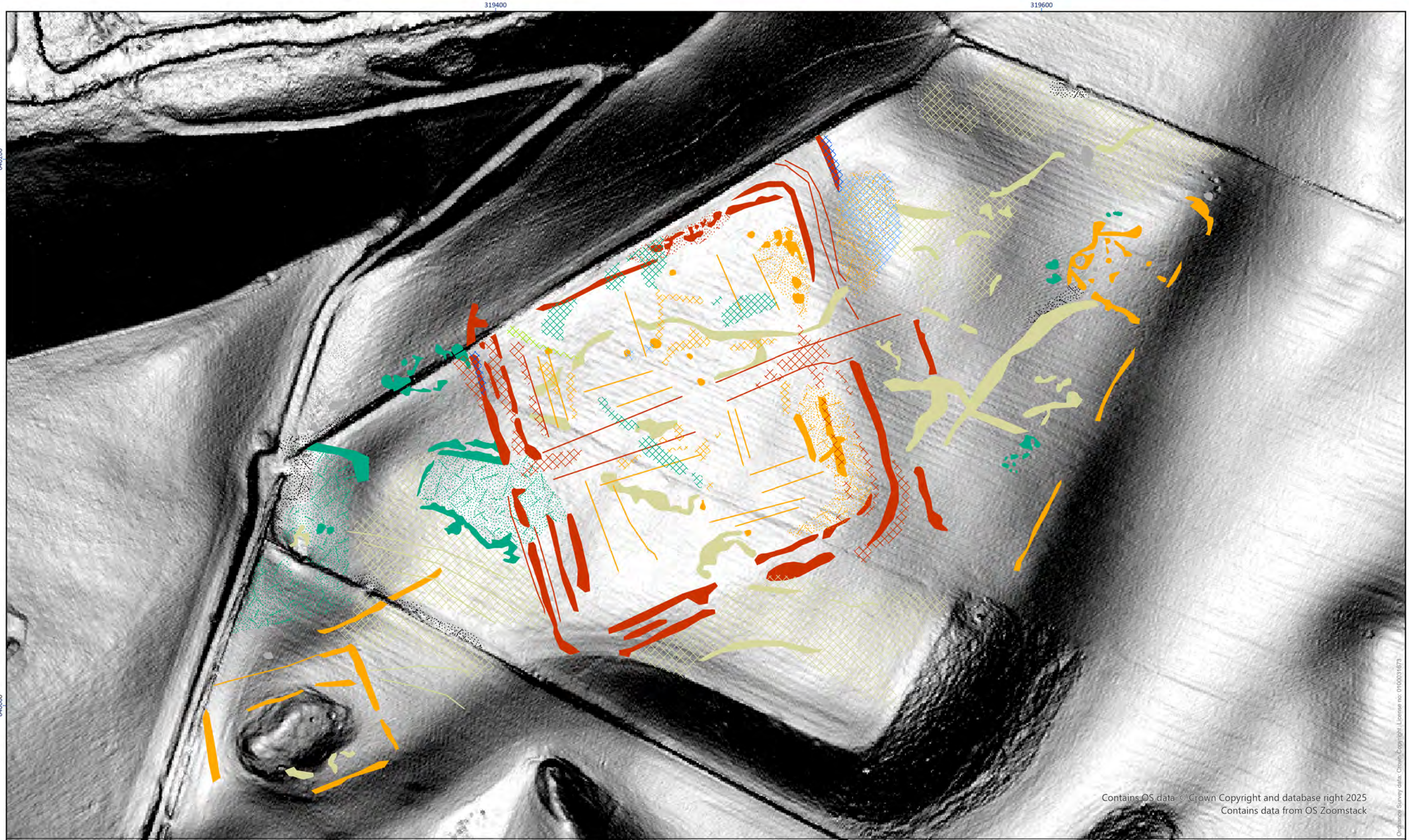
N

0 30m

Scale: 1:2,000 @ A3

Drawing Number: 05/40786-4/GEO/10	
Created by: RL	Date: 29/07/2025
Checked by: SO	Date: 29/07/2025
Approved by: SO	Date: 29/07/2025

AOC Archaeology Group



Interpretation Gradiometer and Resistance Data Displayed Over LiDAR

Figure 11

- Anomaly (Probable Archaeology)
- Spread (Probable Archaeology)
- Anomaly (Possible Archaeology)
- Spread (Possible Archaeology)
- Anomaly (Unclear Origin)
- Spread (Unclear Origin)
- Anomaly (Geology/Natural)
- Spread (Geology/Natural)
- Spread (Magnetic Disturbance)
- Anomaly (Ferrous/Iron Spike)
- Spread (Ferrous/Iron Spike)
- Linear Trend (Probable Archaeology)
- Linear Trend (Possible Archaeology)
- Linear Trend (Geology/Natural)
- High Resistance (Archaeology)
- High Resistance (Possible Archaeology)
- High Resistance (Unclear origin)
- Low Resistance (Archaeology)
- Low Resistance (Possible Archaeology)
- Low Resistance (Unclear origin)

N

0 30m

Scale: 1:1,250 @ A3

Drawing Number: 05/40786-4/GEO/11/01	
Created by: RL	Date: 29/07/2025
Checked by: AC	Date: 29/07/2025
Approved by: SO	Date: 29/07/2025

AOC Archaeology Group

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640000

Ford

Spring

Spring

Combined Interpretation of Gradiometer and Earth Resistance Data over Historical OS Map Data.1888-1913

Figure 12

- Anomaly (Probable Archaeology)
- Spread (Probable Archaeology)
- Anomaly (Possible Archaeology)
- Spread (Possible Archaeology)
- Anomaly (Unclear Origin)
- Spread (Unclear Origin)
- Anomaly (Geology/Natural)
- Spread (Geology/Natural)
- Spread (Magnetic Disturbance)
- Anomaly (Ferrous/Iron Spike)
- Spread (Ferrous/Iron Spike)
- Linear Trend (Probable Archaeology)
- Linear Trend (Possible Archaeology)
- Linear Trend (Geology/Natural)
- High Resistance (Archaeology)
- High Resistance (Possible Archaeology)
- High Resistance (Unclear origin)
- Low Resistance (Archaeology)
- Low Resistance (Possible Archaeology)
- Low Resistance (Unclear origin)

N

0 30m

Scale: 1:1,250 @ A3

Drawing Number: 05/40786-4/GEO/12	
Created by: RL	Date: 29/07/2025
Checked by: SO	Date: 29/07/2025
Approved by: SO	Date: 29/07/2025

AOC Archaeology Group

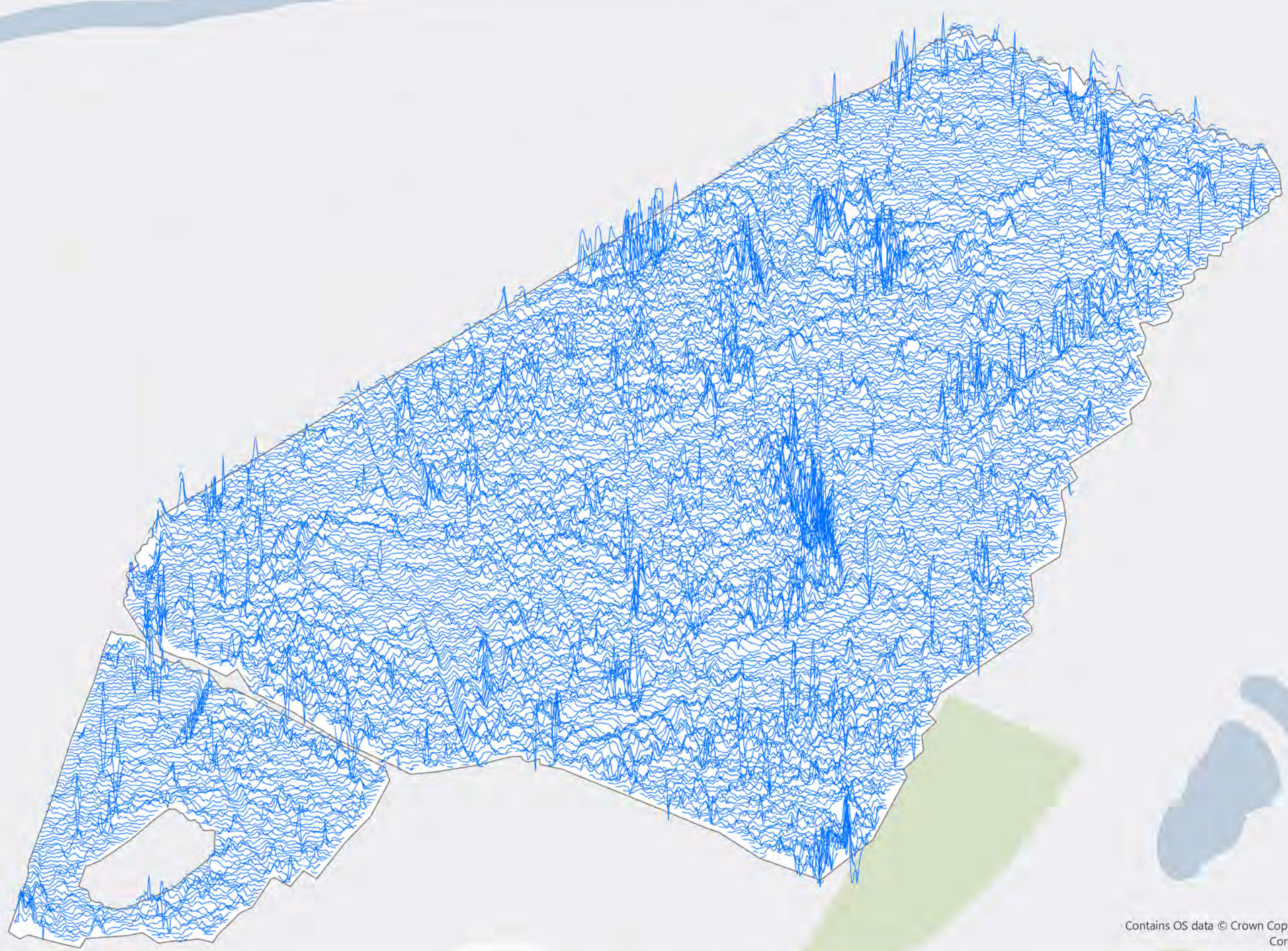
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XY Trace Plot of the Minimally Processed Sensys Cart Gradiometer Data.

Figure 13

50 nT

-50 nT

N

0 30m

Scale: 1:1,250 @ A3

Drawing Number: 05/40786-4/GEO/13	
Created by: RL	Date: 29/07/2025
Checked by: AC	Date: 29/07/2025
Approved by: SO	Date: 29/07/2025

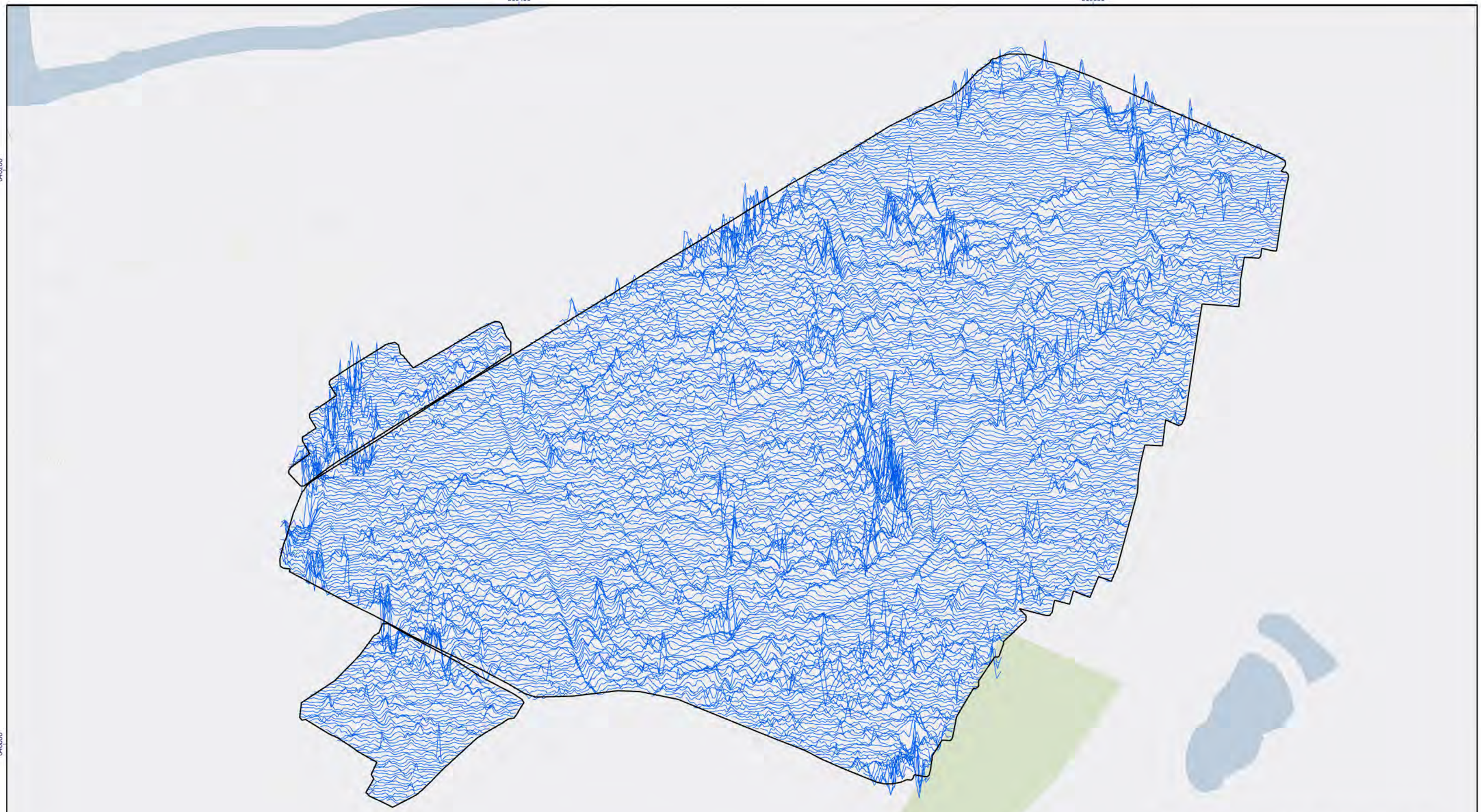
AOC Archaeology Group

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XY Trace Plot of the Minimally Processed Bartington Cart Gradiometer Data.

Figure 14

50 nT

-50 nT

N

0 30m

Scale: 1:1,250 @ A3

Drawing Number:	05/40786-4/GEO/14
Created by: RL	Date: 29/07/2025
Checked by: AC	Date: 29/07/2025
Approved by: SO	Date: 29/07/2025

AOC Archaeology Group

Appendix 1. Survey Metadata

OASIS ID: aocarcha1-

Appendix 1 Table 1 – Survey Metadata

Area	Description
Surveying Company	AOC Archaeology Group
Data collection staff	Chris Sykes, Daniel Shiel
Client	Destination Tweed Project
Site name	Easter Happrew
County	Peebleshire
NGR	NT 19472 40108
Land use/ Area condition	Agricultural
Duration	10th - 14th February 2025
Weather	Rain and clouds
Survey type	Gradiometer and Earth Resistance Survey
Instrumentation	Bartington cart survey: Bartington Non-Magnetic Cart, two Bartington Grad 601-2, Trimble R10 GNSS System Sensys cart survey: Sensys FGM650/3 fluxgate gradiometer sensors Carlson BrX7 Earth Resistance survey: Trimble R8 system, RM85
Area covered	5.9 ha gradiometer, 1.5 ha earth resistance
Download software	MLGrad601 / DLMGPS v4.01-10, Geoserver v1.00-02 / Geoplot v4.0/ MXPDA, Geoserver v1.00-02
Processing software	TerraSurveyor, Geoplot v4.0
Visualisation software	ArcGIS Pro
Geology	Bedrock: Wacke sandstone and siltstone turbidite succession of the Shinnel Formation Superficial: Glaciofluvial deposits of gravel, sand and silt (BGS, 2025).
Soils	Brown earths (Scotland's Soils, 2025).
Scheduled Ancient Monument	Yes
Known archaeology on site	Yes
Historical documentation/ mapping on site	Yes (NLS 2024)
Report title	Easter Happrew, Peebleshire; Uncovering the Tweed: Archaeological Geophysical Survey Report
Project number	40786-4
Report Authors	Robert Legg
Quality Checked by	Susan Ovenden

Appendix 2. Archaeological Prospection Techniques

Instrumentation and Software Used

Gradiometer Survey

Gradiometer surveys measure small changes in the earth's magnetic Area. Archaeological materials and activity can be detected by identifying changes to the magnetic values caused by the presence of weakly magnetised iron oxides in the soil (Aspinall et al., 2008, 23; Sharma, 1997, 105). Human habitation often causes alterations to the magnetic properties of the soils and sediments present in the area (Aspinall et al, 2008, 21). There are two physical transformations that produce a significant contrast between the magnetic properties of archaeological features and the surrounding soil: the enhancement of magnetic susceptibility and thermoremnant magnetization (Aspinall et al., 2008, 21; Heron and Gaffney 1987, 72).

Ditches and pits can be easily detected through gradiometer survey as the topsoil within and around settlements generally has a greater magnetisation than the subsoil; caused by human activity. This enhanced material accumulates in cut features such as ditches and pits. Areas of burning or materials which have been subjected to heat commonly also have high magnetic signatures, such as hearths, kilns, fired clay and mudbricks (Clark 1996, 65; Lowe and Fogel 2010, 24).

It should be noted that negative anomalies can also be useful for characterising archaeological features. If the buried remains are composed of a material with a lower magnetisation compared to the surrounding soil, the feature in question displaying a negative signature. For example, stone- built structures that are composed of sedimentary rocks are frequently non-magnetic and so will appear as negative features within the dataset if the local soils and sediments are at all magnetised.

Ferrous objects – i.e. iron and its alloys - are strongly magnetic and are typically detected as high-value peaks in gradiometer survey data; small (in spatial terms) spikes are generally assumed to derive from ferrous material of recent origin (e.g. stray bits of farm equipment) in the topsoil, though archaeological sources cannot be ruled out. Broader dipolar anomalies and those with diagnostic characteristics of form will be assigned to other classifications based on their character, which might include archaeology, burning, modern ferrous or uncertain.

Although gradiometer surveys have been successfully carried out in all areas of the United Kingdom, the effectiveness of the technique is lessened in areas with complex geology, particularly where igneous and metamorphic bedrock is present or there are layers of alluvium or till between the surface and the layers of interest. All magnetic geophysical surveys must therefore take the effects of background geological and geomorphological conditions into account.

Earth Resistance Survey Instrumentation and Software

AOC Archaeology's Earth Resistance Surveys are conducted using a Geoscan Research RM15 resistance meter, with a set number of probes and remote probes depending on the chosen

survey methodology. Typically, either two or four probes are used, in conjunction with an MPX15 multiplexor attachment if required, to allow more than one measurement to be collected at each measurement point. This might be to allow a greater density of measurements, or to allow measurements using different mobile probe separations, which in theory allows a greater depth of investigation.

Data is typically collected on an east-west alignment using zig-zag traverses, with a set sample interval depending on the degree of resolution required. The gain is set appropriate to ground conditions and the local geology, and the same background readings are maintained when moving the location of the remote probes to ensure consistency between the grids of collected data.

Following completion of the survey, the earth resistance data is downloaded directly from the instrument using Geoscan Geoplot v4.0. The survey grids are then assembled into composites and enhanced using a range of processing techniques using Geoscan Geoplot v4.0 (see Appendix 3 for a summary of the processes used in Geoplot to create final data plots).

Appendix 3. Summary of Data Processing

Appendix 3 Table 1 – Summary of Data Processing

Process	Effect
Clip	Limits data values to within a specified range
Interpolate	Increases the resolution of a survey by interpolating new values between surveyed data points, creating a smoother overall effect.
Low Pass filter	Uses a Gaussian filter to remove high-frequency, small spatial scale variance, typically for smoothing the data.
Periodic Filter	Used to either remove or reduce the appearance of constant and reoccurring features that distort other anomalies, such as recent plough lines.
Remove Turns (TerraSurveyor)	Uses analysis of the direction of travel derived from the GNSS data to break continuous streams of data into individual traverses.
Zero Mean Traverse	Resets the mean value of each traverse to zero, in order to address the effect of striping in the data and counteract edge effects.

Appendix 3 Table 2 – SENSYS Non-Magnetic Cart

Process	Extent
Destripe	Zero Median Traverse – no clipping applied
Clip	-30/30nT
Interpolate	X=0.13 metres, Y = 0.13metres

Appendix 3 Table 3 – Earth Resistance Survey

Process	Extent
Despike	X=1 Y=1 Thr = 3 Repl = Mean
Clip	Min = -5 Max = 5
High Pass filter	HPF x=10 y=10 wt =u
Interpolate	X, Expand – sin x/x Y, Expand – sin x/x
Palette Scale	Grey08 Min= -100.09 ohm Max= 94.64 ohm

Appendix 4. Technical Terminology

Appendix 4 Table 1 – Types of Anomaly

Type of Anomalies	Extent
Anomaly	Usually linear / curvilinear / rectilinear / discrete anomalies characterised by a sharp-edged increase or decrease in values compared to the magnetic background. Some interpretation classes may have more gradual transitions in magnetic character- this is used as part of the classification process.
Spread	Spreads of enhanced material refer to diffuse areas of altered magnetic character, which suggest a localised spread of material with a magnetic contrast within the topsoil or ploughzone or a generalised enhancement of the magnetic properties over a specific area. These anomalies do not have the high dipolar response characteristic of ferrous material anomaly unless specifically classified as a spread of ferrous debris.
Linear Trend	Linear trends are less distinct and are typically visible as linear patterning in the overall texture of the data. A common example of these is the striping effect caused by recent ploughing.

Appendix 4 Table 1 – Classes of Anomaly

Type of Anomalies	Extent
Probable Archaeology	Interpretation is supported by the presence of known archaeological remains or by other forms of evidence such as HER records, LiDAR data or cropmarks identified through aerial photography. OR the data contains diagnostic anomalies in terms of character or morphology which allow a secure interpretation. Anomalies typically have well defined edges with abrupt transitions indicative of cut features with magnetically enhanced fills, such as ditches. Discrete anomalies will be checked on XY traces for their magnetic character; discrete anomalies in this class likely to be cut features such as pits; anomalies indicating high temperature processes will alternatively be classified as 'burned area' - see below. Ferrous material creates distinct 'spikes' and is classified as such.
Possible Archaeology	Anomalies are interpreted as likely to have an archaeological origin, though other explanations are also possible, but less likely. Anomalies typically have well defined edges with abrupt transitions indicative of cut features with magnetically enhanced fills, such as ditches. Discrete anomalies checked on XY traces; discrete anomalies in this class likely to be cut features such as pits; anomalies indicating high temperature processes classified as 'burned area' - see below.
Burned Area	An anomaly with a form on the XY trace plot that is characteristic of high temperature activity such as a kiln or hearth. Should be considered as possible archaeology and should be assigned an anomaly number if a more specific interpretation is possible based on the anomaly characteristics (for example, a clear kiln) so that this can be discussed in text.
Historical Features	Features observed on historical mapping that correspond with anomalies in the data. Linear anomalies caused by removed Area boundaries often exhibit distinct characteristics related to the removal process. Areas of enhanced magnetism in this class could relate to former buildings, trackways, quarries or ponds and their nature should be clarified with the use of anomaly numbers and discussion in the results section.
Unclear Origin	These anomalies are (often) magnetically weak and discontinuous or isolated making their context difficult to ascertain. OR they are indistinct for other reasons such as magnetic disturbance in their vicinity. Anomalies in this category have no more likely explanation than another, so whilst an archaeological origin is possible, an agricultural, geological, or modern origin is also equally likely.
Agricultural	Anomalies associated with agricultural activity, either historical (unless shown on a map, then classed as a historical feature) or modern. Usually, this interpretation is arrived at due to on the ground observations of (for example) ploughing, access tracks and the like, or from observation of recent aerial images of the Parcel. Recent ploughing is shown as a dashed line and Ridge and Furrow ploughing is shown as a solid line.
Ridge and Furrow / Rig and Furrow	A series of regular linear or slightly curvilinear anomalies which are broad and usually have diffuse edges, either composed of an increased or decreased magnetic response compared to background values. Wide regular spacing between the anomalies is consistent with that of a ridge and furrow / rig and furrow ploughing regime, and the regime may also have a degree of sinuosity characteristic of certain types of ridge and furrow cultivation. Often, multiple directions will be present, with distinct headlands in between. The pattern might follow the general landscape organisation, or it may radically differ from it, depending on the local sequence of inclosure. The anomalies often present as a positive 'ridge' anomaly adjacent to a negative 'furrow' anomaly.
Ploughing Trends	A series of regular linear anomalies or changes in the texture of the survey data, either composed of an increased or decreased magnetic response compared to background values. Anomalies seen parallel to Area edges are representative of headlands caused by ploughing.
Drains	A series of magnetic linear anomalies (often with a characteristic alternating positive-negative pattern, which indicates a ceramic drain) of an indeterminate date, usually with a regular dendritic or herringbone patterning which reflects the topography of the Parcel.
Geology / Natural	An area of enhanced magnetism that is composed of irregular (usually) weak increases or decreases in magnetic values, frequently with gradual transitions in character, compared with background readings. These are likely to indicate natural variations in soil composition or reflect variations in the bedrock or superficial geology. In areas where former water courses were present, paleochannels may present as distinct curving and banded or braided linear anomalies.
Service	Strong linear anomalies often composed of contrasting high positive and negative dipolar values, with a halo of magnetic disturbance extending from the causative body. Such anomalies are characteristic of below-ground services.
Magnetic Disturbance	A zone of strong magnetic response (usually alternating between positive and negative with abrupt transitions) that has been caused by modern infrastructure or ferrous material within or adjacent to the Parcel, such as metallic boundary fencing, gateways. The magnetic haloes around services and changes in the background texture of the data resulting from overhead power lines also fall into this class. These haloes are strong enough to obscure other anomalies (including those of possible archaeological interest) in the area they affect.
Ferrous Anomalies / Ferrous (iron spikes) and ferrous or debris spreads	A response caused by ferrous materials on the ground surface or within the subsoil, which causes a strong but localised dipolar response in the data. These generally represent modern material often re-deposited during manuring, rubbish at Area edges and spreads of debris or building material used to surface tracks or left behind following demolition. Distinct from magnetic disturbance, these anomalies relate to material at their spatial location, rather than an effect occurring at a distance from the material responsible.
Free Category for custom use	A category which may be employed to denote specifically identified anomalies related to known past activity within the area, for example those definitely associated with a former Area, or mapped former mineral extraction.

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