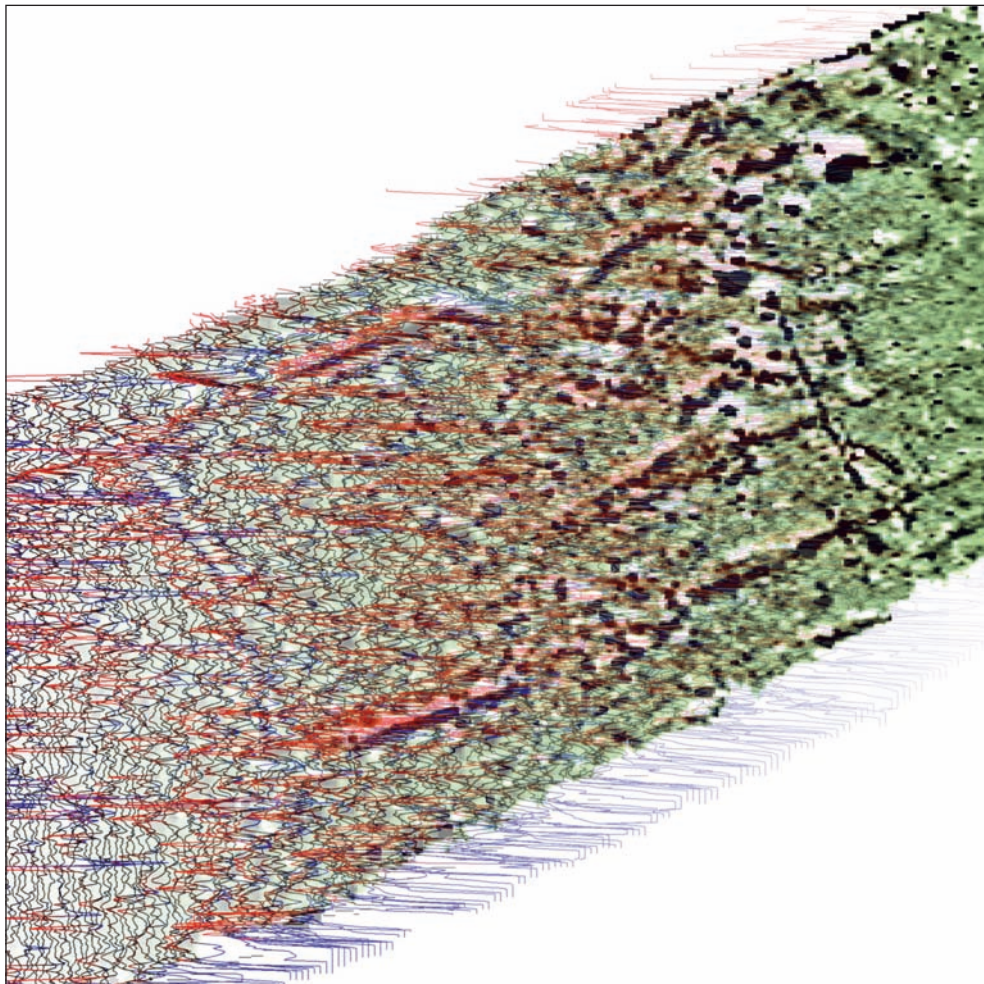




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# Little Sharpshaw Farm Frome, Somerset

Detailed Gradiometer Survey Report



Ref: 89040.02  
May 2013



**Little Sharpshaw Farm  
Frome, Somerset**

**Detailed Gradiometer Survey Report**

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# Little Sharpshaw Farm Frome, Somerset

## Detailed Gradiometer Survey Report

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# **Little Sharpshaw Farm Frome, Somerset**

## **Detailed Gradiometer Survey Report**

### **Summary**

A detailed gradiometer survey was conducted over land off Marston Road at Little Sharpshaw Farm, near Frome, Somerset. The project was commissioned by AEE Renewables Plc. with the aim of establishing the presence, or otherwise, and nature of detectable archaeological features on the site ahead of a proposed solar farm development.

The site comprises five arable fields to the northeast of Marston Road, approximately 3km southwest of Frome. The site occupies a ridge with streams downslope on both sides. The gradiometer survey covered 13.4 ha and has demonstrated the presence of anomalies of definite, probable and possible archaeological interest within the survey area, along with regions of increased magnetic response and a modern service.

The main concentration of archaeological features lies at the centre of the site with enclosures and possible former field boundaries detected in addition to pits and more ephemeral features such as possible timber post built structures. It seems likely that other more fragmentary features have been impacted upon by more recent ploughing.

Further clusters of enclosures can be seen towards the southwestern extent of the survey area, the majority of which extend approximately NE-SW. In places ditch-like anomalies are distributed more densely, perhaps suggesting settlement activity.

Towards the northeastern extent of the survey area, numerous ditch segments and other linear anomalies appear on approximate NE-SW orientations and are considered to form parts of enclosures or droveways.

Extensive magnetic disturbance associated with the services and numerous small-scale ferrous responses were seen throughout the dataset.



# **Little Sharpshaw Farm Frome, Somerset**

## **Detailed Gradiometer Survey Report**

### **Acknowledgements**

The detailed gradiometer survey was commissioned by AEE Renewables UK 30 Limited. The assistance of Rolland Billington is gratefully acknowledged in this regard.

The fieldwork was directed by Rachel Chester and assisted by Laura Andrews and Clara Dickinson. Ross Lefort processed and interpreted the geophysical data in addition to writing this report. The geophysical work was quality controlled by Dr. Paul Baggaley. Illustrations were prepared by Kenneth Lymer. The project was managed on behalf of Wessex Archaeology by Damian De Rosa.



# Little Sharpshaw Farm Frome, Somerset

## Detailed Gradiometer Survey Report

### 1 INTRODUCTION

#### 1.1 Project background

- 1.1.1 Wessex Archaeology was commissioned by AEE Renewables Plc. to carry out a geophysical survey of land off Marston Road (A361), Little Sharpshaw Farm, Frome, Somerset (**Figure 1**), hereafter “the Site” (centred on NGR 375650, 145475). The survey forms part of an ongoing programme of archaeological works being undertaken ahead of proposed development at the Site.
- 1.1.2 This report along with a previously submitted desk-based assessment (WA 2013) will support a planning application for the development of the Site as a solar farm, to be submitted to Mendip District Council.
- 1.1.3 The aim of the geophysical survey was to establish the presence/absence, extent and character of detectable archaeological remains within the survey area.
- 1.1.4 This report presents a brief description of the methodology followed by the detailed survey results and the archaeological interpretation of the geophysical data.

#### 1.2 The Site

- 1.2.1 The survey area comprises five arable fields located along Marston Road, some 3km southwest of the centre of Frome (**Figure 1**). Detailed gradiometer survey was undertaken over all accessible parts of the Site, a total of 13.4 ha.
- 1.2.2 The Site occupies a ridge aligned ENE-WSW; much of the Site lies at a height of 135m above Ordnance Datum (aOD) with the highest area at the western end at 139m aOD. The land drops steeply at the eastern end with the lowest area at a height less than 125m aOD. Two streams, both tributaries of the River Frome, are aligned roughly with the ridge lie at the base of the slope; an unnamed watercourse lies to the north and Marston Brook to the south. The survey area is defined by field boundaries in four of the fields with its westernmost extents partly defined by the limit of the proposed development area.
- 1.2.3 The solid geology on site is recorded as Forest Marble (Jurassic) for most of the site which consists of clay, shelly limestone and sandstone. Fairly large chunks of sandstone were observed on the surface during the survey. Fuller’s Earth (clays) is recorded further to the northwest with superficial head deposits recorded further downslope (Ordnance Survey 1965). The soils underlying most of the Site are likely to be typical calcareous pelosols of the 411a (Evesham 1) association with typical stagnogley soils of the 711g (Wickham 3) association along the north-western edge of the site. Brown rendzinas of the 343d (Sherborne) association are located to the north of the survey area (SSEW 1983). Soils derived from such geological parent material have been shown to produce magnetic



contrasts acceptable for the detection of archaeological remains through magnetometer survey.

- 1.2.4 An archaeological Desk-Based Assessment (DBA) was carried out by Wessex Archaeology (2013). The results of this will be referred to when discussing the detailed gradiometer survey results.

## **2 METHODOLOGY**

### **2.1 Introduction**

- 2.1.1 The detailed magnetometer survey was conducted using a Bartington Grad601-2 dual fluxgate gradiometer system. The survey was conducted in accordance with English Heritage guidelines (2008).
- 2.1.2 The geophysical survey was undertaken by Wessex Archaeology's in-house geophysics team on 2<sup>nd</sup> to 5<sup>th</sup> April 2013. Field conditions at the time of the survey were variable, with strong winds and steep slopes in places making survey more difficult. This has resulted in greater stepping errors but these errors fell within the acceptable limit for good data quality.

### **2.2 Method**

- 2.2.1 Individual survey grid nodes were established at 30m x 30m intervals using a Leica Viva RTK GNSS instrument, which is precise to approximately 0.02m and therefore exceeds English Heritage recommendations (2008).
- 2.2.2 The magnetometer survey was conducted using a Bartington Grad601-2 fluxgate gradiometer instrument, which has a vertical separation of 1m between sensors. Data were collected at 0.25m intervals along transects spaced 1m apart with an effective sensitivity of 0.03nT, in accordance with EH guidelines (2008). Data were collected in the zigzag method.
- 2.2.3 Data from the survey was subject to minimal data correction processes. These comprise a zero mean traverse function ( $\pm 10$ nT thresholds) applied to correct for any variation between the two Bartington sensors used, and a de-step function to account for variations in traverse position due to varying ground cover and topography. These two steps were applied to all survey areas, with no interpolation applied.
- 2.2.4 Further details of the geophysical and survey equipment, methods and processing are described in **Appendix 1**.





### 3 GEOPHYSICAL SURVEY RESULTS AND INTERPRETATION

#### 3.1 Introduction

- 3.1.1 The gradiometer survey has been successful in identifying anomalies of definite, probable and possible archaeological interest across the Site, along with a modern service. Results are presented as a series of greyscale and XY plots, and archaeological interpretations, at a scale of 1:1500 (**Figures 2 to 12**). The data are displayed at -2nT (white) to +3nT (black) for the greyscale image and  $\pm 25$ nT at 50nT per cm for the XY trace plots. An additional greyscale image has been produced at a wider display range (**Figure 6**) of -4nT to +6nT for the region around anomalies **4013** to **4040**. This is due to the use of this wider display range during the interpretation process to identify the strongest magnetic anomalies in this complicated area.
- 3.1.2 The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous/burnt or fired objects, and magnetic trends (**Figures 4, 8, 11 and 12**). Full definitions of the interpretation terms used in this report are provided in **Appendix 2**.
- 3.1.3 Numerous ferrous anomalies are visible throughout the detailed survey dataset. These are presumed to be modern in provenance and are not referred to, unless considered relevant to the archaeological interpretation.

#### 3.2 Gradiometer Survey Results and Interpretation

- 3.2.1 The westernmost field (**Figures 2 to 4 and 12**) contains several anomalies of definite and probable archaeological interest. The main area of interest is a pair of linear positive anomalies aligned roughly ENE-WSW at **4000**; these features are spaced 24.5m apart and run for a length of 24.5m. They are considered to be cut features such as ditches and may form part of a partially visible enclosure. The ditch responses fade out gradually and it is possible that they extend further. A similarly aligned pair of ditches is present further to the east at **4001**, the largest of which measures around 10m in length. These ditches may be related to the same complex as those at **4000** and they may form a small field enclosure. The interrupted form of these ditch sections may either be a product of partial preservation of the buried remains or could indicate a loss of measurable contrast. These ditches are suspected as having an agricultural function.
- 3.2.2 There are two parallel ditches running roughly northwest to southeast at **4002**; they have varying magnetic amplitudes along their length and are spaced roughly 15m apart. This feature runs for more than 100m from a group of ditches (aligned northeast to southwest) to the west of **4000** to Marston Road in the southeast. The alignment of these ditches differs from those at **4000** and **4001** but they seem to respect each other so may be related. This feature is perhaps too narrow to form a field but may represent a driveway. Another linear is present at **4003** that runs perpendicular to the pair at **4002**, extending for at least 43m; it is consistent with a former field boundary.
- 3.2.3 A small rectangular feature, defined by trends, is present at **4004**, measuring 6.2m x 3.3m. This feature is surrounded by other trends that form a wider enclosure measuring 11.9m x 8.9m. It is unclear what this feature could represent but its regular form suggests it is more likely to be archaeological than other trends identified in the geophysical data.
- 3.2.4 There are isolated sections of ditch at **4005**, the largest of which measures 9.5m in length. There are other examples of linear features in this field at **4007** along with some sub-oval positive anomalies at **4006** with similar magnetic values. These features are considered to be pits and sections of ditch that appear to form no overall pattern; these features may be part of more extensive complexes but only small parts have been detected.



- 3.2.5 The remaining anomalies in this field are faint ploughing trends, trends of possible archaeological interest, small sub-circular positive anomalies or larger weak positive anomalies. Some of the small positive anomalies may prove to be archaeological but as there is no significant patterning in their distribution they are regarded as possible archaeology.
- 3.2.6 There is a complex made up of several sections of ditch in the next field at **4008**; the four longest sections are set parallel to one another and are aligned roughly northeast to southwest. Some of these ditches have closed ends formed by shorter sections of ditch that appear to form narrow enclosures. The clearest enclosure is at the centre of the complex and measures 38.9m x 7.3m with a smaller enclosure to the northwest measuring 9.7m x 7.3m. There is the potential for a larger third enclosure to the southeast of the central example that measures 43.5m x 6.3m but this is not as clearly defined as the other two. The ditches have varying magnetic values along their length and appear to be sub-divided in places by weak magnetic trends. The function of these enclosures is not clear from the geophysical data alone; they are not considered as fields given their narrow width but may have served some agricultural function. This complex is considered to be archaeological with some weaker anomalies classed as probable archaeology.
- 3.2.7 Immediately to the west of this complex are another group of clearly-defined ditch sections that form an L-shape at **4009**; they are set at a slightly different alignment to **4008**. There is a possible section of ditch to the southeast that appears to join up with the L-shaped section at **4009**; this may form a four sided enclosure with an open side along the southwest edge. This enclosure measures 19.9m x 18.5m and there are small positive anomalies within that may represent pits and postholes. This enclosure may represent part of a larger complex which may include the enclosures at **4008**; although they are set at slightly different alignments there are no visible areas where ditches cross each other which might indicate multiple phases. This enclosure is considered to be archaeological with the weaker magnetic anomalies classed as probable archaeology.
- 3.2.8 A linear anomaly with varying magnetic values across its length is present at **4010**. It is aligned ENE-WSW, similar to the modern field boundary to the north, and runs for a length greater than 115m. This feature is interpreted as a ditch and may form part of an earlier field boundary or part of the nearby enclosure complex at **4008** and **4009**. Due to this uncertainty in interpretation and the lack of map evidence to support a recent field boundary here the feature is regarded as archaeological. The strongest regions are classed as definite archaeology and weaker regions are classed as probable or possible archaeology.
- 3.2.9 There are numerous small positive anomalies in the geophysical data, most form no significant patterns but examples such as **4011** and **4012** appear to do so. The most convincing example is at **4011** where several small sub-circular to sub-oval shaped anomalies appear to define a rectangular feature. This feature measures 19.7m x 8.5m; the small positive anomalies are interpreted as postholes and they possibly form a timber built building or a small enclosure formed by upright timber posts. There are two other examples at **4012** but these are not as well defined as **4011**. These features are considered to be archaeological but the interpretation is given tentatively given how faint the anomalies are. The probable postholes are classed as probable archaeology with trends used to define the shape of the structures they are thought to represent.
- 3.2.10 A curvilinear ditch is visible running through the data at **4013** that is interrupted by a modern service running through it at **4015**. The ditch has varying magnetic values along its length and runs for more than 113m. This feature is considered to represent part of an



agricultural boundary; it has been classed as archaeology with weaker sections classed as probable archaeology.

- 3.2.11 There are short sections of ditch at **4014** that are located to the southwest of **4011** on a similar alignment. There are other similar features at **4016** that may represent the fragmentary remains of a larger feature. It is not clear what archaeological features relate to but are considered significant due to the common alignment they share with other features in this field.
- 3.2.12 The greatest concentration of archaeological features can be found in the eastern half of this field. The main feature of interest is a roughly rectangular enclosure aligned roughly northeast to southwest, on a similar alignment to the road to the south. This feature has numerous sub-enclosures concentrated towards its eastern end and has some complex entrances. Three corners of this enclosure are clearly visible with the western corner at **4017**, the southern corner at **4018** and the eastern corner is visible around **4026** and **4027**. The northern corner is difficult to distinguish and this is perhaps due to the greater concentration of cut features in that area (between **4028** and **4029**). The enclosure is considered to be defined by a ditch. The enclosure measures approximately 102m x 59m and is strongly magnetised in places.
- 3.2.13 There are numerous breaks and weaker responses along the course of the enclosure ditch. One such break is present at **4017** and is associated with some additional ditches; this could represent an entrance with ditches forming a funnelled passageway or could be a section of the enclosure ditch obscured by the negative shadow of a separate ditch.
- 3.2.14 There is a more convincing candidate for an entrance at **4018**. The ditch section running south from **4017** divides into two sections at a fork which both quickly terminate forming a gap 2.8m wide before both offshoots continue again. The western offshoot continues south as an L-shaped section of ditch and this feature terminates shortly after it makes a right angled turn forming a much wider gap measuring 9.5m before the enclosure ditch continues again. The eastern offshoot continues on the same alignment as the ditch as a series of separate positive anomalies. This line of positive responses turns at a right-angle and runs inside the enclosure parallel to the section of enclosure ditch that continues from the western offshoot. This line of positive responses is considered to represent either a segmented ditch or is a line of pits; the largest of these anomalies measures 3.3m in length. There is another line of pits or segmented ditch at **4019**; these positive anomalies are aligned NNE-SSW and are more regularly spaced than those at **4020** with gaps measuring 3m to 4m wide. All of these features, if contemporary, may form a complex double enclosure with segmented ditches used to restrict access to the enclosure. It is not clear whether these entrances served as access to people or were devised to control the movement of animals.
- 3.2.15 There are short sections of segmented ditch or pits at **4021**; like those at **4020** they run inside and parallel to the main enclosure ditch creating a gap around 2m wide. It doesn't appear to form a full secondary enclosure running around the inside of the ditch and the purpose of these alignments and the corridors they create is unclear.
- 3.2.16 The western half of the rectangular enclosure is relatively open and clear of sub-divisions. The majority of the features present are numerous sub-oval shaped positive anomalies that are interpreted as cut features such as pits and postholes. They are classed as either possible archaeology, probable archaeology or definite archaeology depending on size and magnetic values. The only features that may represent sections of ditches are present at **4022** and these features are on a similar line and alignment (WNW-ESE) to other



ditches at **4017**. It is not clear whether these ditches form a larger sub-division of the enclosure or date to a different phase.

- 3.2.17 The eastern half of the enclosure (**Figures 5 to 8 and 12**) contrasts with the western half due to the greater concentration of positive anomalies, many of which form sub-rectangular enclosures that sub-divide the enclosure. There are examples of these enclosures at **4023** and they seem to obscure the enclosure ditch between **4018** and **4026**. This interruption of the ditch could indicate the presence of an entrance here surrounded by a group of small enclosures; the largest and most clearly defined of these enclosures measures 8.5m x 6m and is strongly magnetised. These enclosures are defined by ditches and are considered to be archaeological.
- 3.2.18 There are more sub-divisions further to the north at **4025** which is associated with an additional probable entrance at **4024**. The enclosure is defined by the ends of the enclosure ditch curving slightly into the enclosure ditch before they terminate to leave a gap measuring approximately 11.5m wide. The sub-division ditches inside the entrance are considered to represent part of this entrance which appears to be similar in complexity to the probable entrance at **4018**. The exact purpose and function of these complex entrances is unclear from the geophysical data alone but this is considered to be definite archaeology.
- 3.2.19 At least three more small enclosures are visible inside and out of the eastern corner of the main enclosure ditch at **4027**. The largest of these three enclosures measures 16.3m x 13.5m with a variable magnetic response. The smallest measures 11.5m x 8.3m and has similar magnetic values as the others. Within this enclosure is a smaller anomaly at **4028**; it has a fairly regular form with a sub-rectangular centre with linear sections extending from it. This feature may be a group of closely spaced anomalies such as a large pit and sub-dividing ditches and they are considered to be archaeological.
- 3.2.20 To the north of the northern corner of the main enclosure ditch at **4029** are a series of ditch sections that are set at a different alignment to the enclosure. Some of these sections appear to form small enclosures but the dense concentration of archaeological features in this area makes interpretation difficult. These features form a part of a wider complex and clearly extend beyond the limits of the survey area further north. These features are considered to be archaeological although their relationship with the rectangular enclosure is unclear.
- 3.2.21 There is an unusual area at **4030** that is notable as it is relatively clear of archaeological features compared to neighbouring areas. This clear area is defined by ditch sections that form an interrupted curving enclosure. The only features present are small positive anomalies interpreted as possible archaeology, trends and ferrous responses. The reasons for this apparent absence of archaeological features perhaps relates to different patterns of land use; this may represent a field that is close to a settlement area that is defined by a boundary ditch.
- 3.2.22 This settlement complex continues into the next field with a probable enclosure at **4031**; three sides are visible on the western side but the eastern side is indistinguishable from the background. There are several more sections of ditch at **4032** and **4033** with no clear overall form. This partial visibility of remains could result from either a loss of magnetic contrast in places or may have been damaged by more recent ploughing activity. All of these anomalies are considered to be archaeological in origin.
- 3.2.23 Two fairly well-defined sub-rectangular enclosures are present at **4034** and **4035**; they are aligned roughly northeast to southwest and are arranged end to end. The enclosures both



measure approximately 20m x 8m. The function of these enclosures is unclear but they seem to be part of a wider complex as fragmentary sections of ditch and large pits are present nearby such as at **4036**, **4037**, **4038** and **4039**.

- 3.2.24 There is a section of ditch at **4040** that has a perpendicular alignment of small positive anomalies defined by a trend and a broad and weak L-shaped anomaly defined by another trend to form a sub-rectangular feature. This could be a coincidental arrangement of unrelated features but its regularity seemed worthy of note.
- 3.2.25 A very small enclosure and a possible second are present at **4041**; the better defined enclosure measures 7m x 5.5m and has magnetic values varying in magnitude. The function of these features is unclear but they appear to be further removed from the dense concentration of features further to the southwest. These features are classed as archaeology or probable archaeology depending on the strength of their magnetic values.
- 3.2.26 The next field to the northeast (**Figures 9 to 12**) is the smallest and contains numerous fragmentary sections of ditch such as at **4042**, **4045**, **4046** and **4047**. These sections range in form from straight linear features (**4042**) to L-shaped ditch sections (**4045**). These features may relate to fragmented enclosures, former field boundaries or even ridge and furrow.
- 3.2.27 A partial sub-rectangular enclosure is present at **4043**; it is formed by two L-shaped sections of ditch and measures at least 11.2m x 11m. This enclosure is well-defined on its eastern side but the western side is indistinguishable from the magnetic background. A curvilinear negative anomaly runs into the middle of this enclosure at **4044**. It is unclear what feature this anomaly could represent and it is not clear whether it relates to the enclosure. The enclosure ditches have been classed as definite archaeology and the negative anomaly has been classed as possible archaeology as a reflection of the uncertainty over its interpretation.
- 3.2.28 A much larger enclosure aligned northeast to southwest spans the field boundary at **4048**; it measures at least 63.5m x 44.7m. The southwest extent of the enclosure is difficult to discern and a region of magnetic disturbance obscures part of the northeast end along with much of the interior. There is a diffuse and broader linear anomaly at **4049** that joins up with the probable enclosure ditch. It curves off from the line of the enclosure and may represent a separate feature. It has been classed as possible archaeology due to its weaker magnetic values and diffuse form in plan.
- 3.2.29 There are two negative linear anomalies in the next field at **4050** and, like the other negative linear at **4044**, their function and identity is unclear and have been classed as possible archaeology as a result. A positive linear is observed at **4051** running parallel to one of the negative linear anomalies and the field boundary and is considered to represent a ditch. It has been classed as archaeology due to its high magnetic values but could be part of a field boundary or could form part of a system of ridge and furrow along with some of the negative anomalies observed at a common alignment in this field.
- 3.2.30 A concentrated group of sub-oval shaped positive anomalies is present at **4052** exhibits varying magnetic values and the strongest anomaly measures 3.6m in length. These features are considered to be a cluster of pits and have been classed as definite archaeology given their strong values and regular forms.
- 3.2.31 There are many sections of ditch visible in the data at **4053**, **4057**, **4060**, **4061**, **4062**, **4064** and **4065**. Some sections such as **4064** are linear and others are L-shaped such as **4053**. These ditches may form part of larger extended complexes and field systems that



have been impacted by more recent ploughing. These ditch sections are classed as either definite or probable archaeology depending on their measured magnetic values.

- 3.2.32 There are numerous small positive anomalies scattered throughout the geophysical data. Many of these are very small and form no significant patterns in their spatial distribution but others are larger and are thought to be significant. There are larger sub-circular examples such as those at **4058**, which measure around 3m in diameter. There are also sub-rectangular examples such as those at **4059** and **4063**; the largest and most regular in shape measures 4.9m x 3m. These features are considered to be archaeological in origin and represent either pits or fragmentary sections of ditch and may relate to either domestic or agricultural activity.
- 3.2.33 The remaining anomalies in the geophysical data are either trends or small positive anomalies. The trends are either considered to be ploughing trends or may prove to be weakly contrasting archaeological features. The small positive anomalies are considered to possibly represent small cut features such as small pits or postholes; since they form no significant patterning in their spatial distribution they have been classed as possible archaeology. The broad spreads of increased magnetic response are coincident with archaeological features and are more likely to be related to concentrated domestic, agricultural or industrial activity than any geological processes.

### **3.3 Gradiometer Survey Results and Interpretation: Modern Services**

- 3.3.1 There is one service present at **4015** that appears to be a pipe made up of sections made from ferrous material. It passes straight through the survey area and is aligned roughly northwest to southeast.
- 3.3.2 It is not clear from the geophysical data whether the service identified is in active use, and it should be noted that gradiometer survey may not detect all services present on site. This report and accompanying illustrations should not be used as the sole source for service locations and appropriate equipment (e.g. CAT and Genny) should be used to confirm the location of buried services before any trenches are opened on site.



## 4 CONCLUSION

- 4.1.1 The detailed gradiometer survey has been successful in detecting anomalies of definite, probable and possible archaeological interest within the Site, in addition to regions of increased magnetic response and one modern service.
- 4.1.2 A great concentration of archaeological features has been detected in the geophysical data that suggest this ridge was at one time quite densely populated. The origin of the numerous ditches and enclosures is unclear but some may be associated with Marston House to the south. Another group of identified features may relate to an early pre-medieval field system to the northwest (WA 2013). The enclosures and ditches detected may form an extension to this system and therefore represent the site of an associated settlement.
- 4.1.3 It is considered highly likely that the archaeology detected through this geophysical survey continues in nearly all directions with the densely populated central region of the survey area extending further to both the north and south of the survey area.
- 4.1.4 The complex arrangement of enclosures and their entrances along with internal subdivisions suggests that areas of this ridge were carefully divided into areas of specialised activity. Whilst geophysical survey cannot determine conclusively what functions were carried out on site, the strong magnetic values obtained from enclosure ditches suggest activity was intense in the central area of the survey area and to a lesser degree towards the northeast. A series of shallow depressions and low mounds to the east of the farm track are likely to be associated with the geophysical anomalies there.
- 4.1.5 The remaining features detected relate to more recent use of this area with ploughing trends, spreads of magnetic debris and one modern service detected. The regions of increased magnetic response may be associated with archaeological deposits that have been disturbed through ploughing, although it is conceivable that these magnetic enhancements are the result of changes in the near-surface geology; this is particularly the case towards the northeastern extent of the survey.
- 4.1.6 The relative dimensions of the modern services identified by the gradiometer survey are indicative of the strength of their magnetic response, which is dependent upon the materials used in their construction and the backfill of the service trenches. The physical dimensions of the services indicated may therefore differ from their magnetic extents in plan; it is assumed that the centreline of services is coincident with the centreline of their anomalies, however. Similarly, it is difficult to estimate the depth of burial of the services through gradiometer survey.
- 4.1.7 It should be noted that small, weakly magnetised features may produce responses that are below the detection threshold of magnetometers. It may therefore be the case that more archaeological features may be encountered than have been identified through geophysical survey.



## 5 REFERENCES

English Heritage, 2008. *Geophysical Survey in Archaeological Field Evaluation*. Research and Professional Service Guideline No 1, 2nd edition.

Geological Survey of Great Britain (England and Wales), 1965. *Sheet 281, Frome (Solid and Drift)*. Ordnance Survey, Chessington.

Soil Survey of England and Wales, 1983. *Sheet 5, South West England*. Ordnance Survey, Southampton.

Wessex Archaeology, 2013. *Little Sharpshaw Farm, Frome, Somerset: Archaeological Desk-Based Assessment*. Report reference: 89040.01





## APPENDIX 1: SURVEY EQUIPMENT AND DATA PROCESSING

### *Survey Methods and Equipment*

The magnetic data for this project was acquired using a Bartington 601-2 dual magnetic gradiometer system. This instrument has two sensor assemblies fixed horizontally 1m apart allowing two traverses to be recorded simultaneously. Each sensor contains two fluxgate magnetometers arranged vertically with a 1m separation, and measures the difference between the vertical components of the total magnetic field within each sensor array. This arrangement of magnetometers suppresses any diurnal or low frequency effects.

The gradiometers have an effective resolution of 0.03nT over a  $\pm 100$ nT range, and measurements from each sensor are logged at intervals of 0.25m. All of the data are stored on an integrated data logger for subsequent post-processing and analysis.

Wessex Archaeology undertakes two types of magnetic surveys: scanning and detail. Both types depend upon the establishment of an accurate 20m or 30m site grid, which is achieved using a Leica Viva RTK GNSS instrument and then extended using tapes. The Leica Viva system receives corrections from a network of reference stations operated by the Ordnance Survey and Leica Geosystems, allowing positions to be determined with a precision of 0.02m in real-time and therefore exceed the level of accuracy recommended by English Heritage (2008) for geophysical surveys.

Scanning surveys consist of recording data at 0.25m intervals along transects spaced 10m apart, acquiring a minimum of 80 data points per transect. Due to the relatively coarse transect interval, scanning surveys should only be expected to detect extended regions of archaeological anomalies, when there is a greater likelihood of distinguishing such responses from the background magnetic field.

The detailed surveys consist of 20m x 20m or 30m x 30m grids, and data are collected at 0.25m intervals along traverses spaced 1m apart. These strategies give 1600 or 3600 measurements per 20m or 30m grid respectively, and are the recommended methodologies for archaeological surveys of this type (EH, 2008).

Data may be collected with a higher sample density where complex archaeological anomalies are encountered, to aid the detection and characterisation of small and ephemeral features. Data may be collected at up to 0.125m intervals along traverses spaced up to 0.25m apart, resulting in a maximum of 28800 readings per 30m grid, exceeding that recommended by English Heritage (2008) for characterisation surveys.



## Post-Processing

The magnetic data collected during the detail survey are downloaded from the Bartington system for processing and analysis using both commercial and in-house software. This software allows for both the data and the images to be processed in order to enhance the results for analysis; however, it should be noted that minimal data processing is conducted so as not to distort the anomalies.

As the scanning data are not as closely distributed as with detailed survey, they are georeferenced using the GPS information and interpolated to highlight similar anomalies in adjacent transects. Directional trends may be removed before interpolation to produce more easily understood images.

Typical data and image processing steps may include:

- Destripe – Applying a zero mean traverse in order to remove differences caused by directional effects inherent in the magnetometer;
- Destagger – Shifting each traverse longitudinally by a number of readings. This corrects for operator errors and is used to enhance linear features;
- Despike – Filtering isolated data points that exceed the mean by a specified amount to reduce the appearance of dominant anomalous readings (generally only used for earth resistance data)

Typical displays of the data used during processing and analysis:

- XY Plot – Presents the data as a trace or graph line for each traverse. Each traverse is displaced down the image to produce a stacked profile effect. This type of image is useful as it shows the full range of individual anomalies.
- Greyscale – Presents the data in plan view using a greyscale to indicate the relative strength of the signal at each measurement point. These plots can be produced in colour to highlight certain features but generally greyscale plots are used during analysis of the data.



## **APPENDIX 2: GEOPHYSICAL INTERPRETATION**

The interpretation methodology used by Wessex Archaeology separates the anomalies into two main categories: archaeological and unidentified responses.

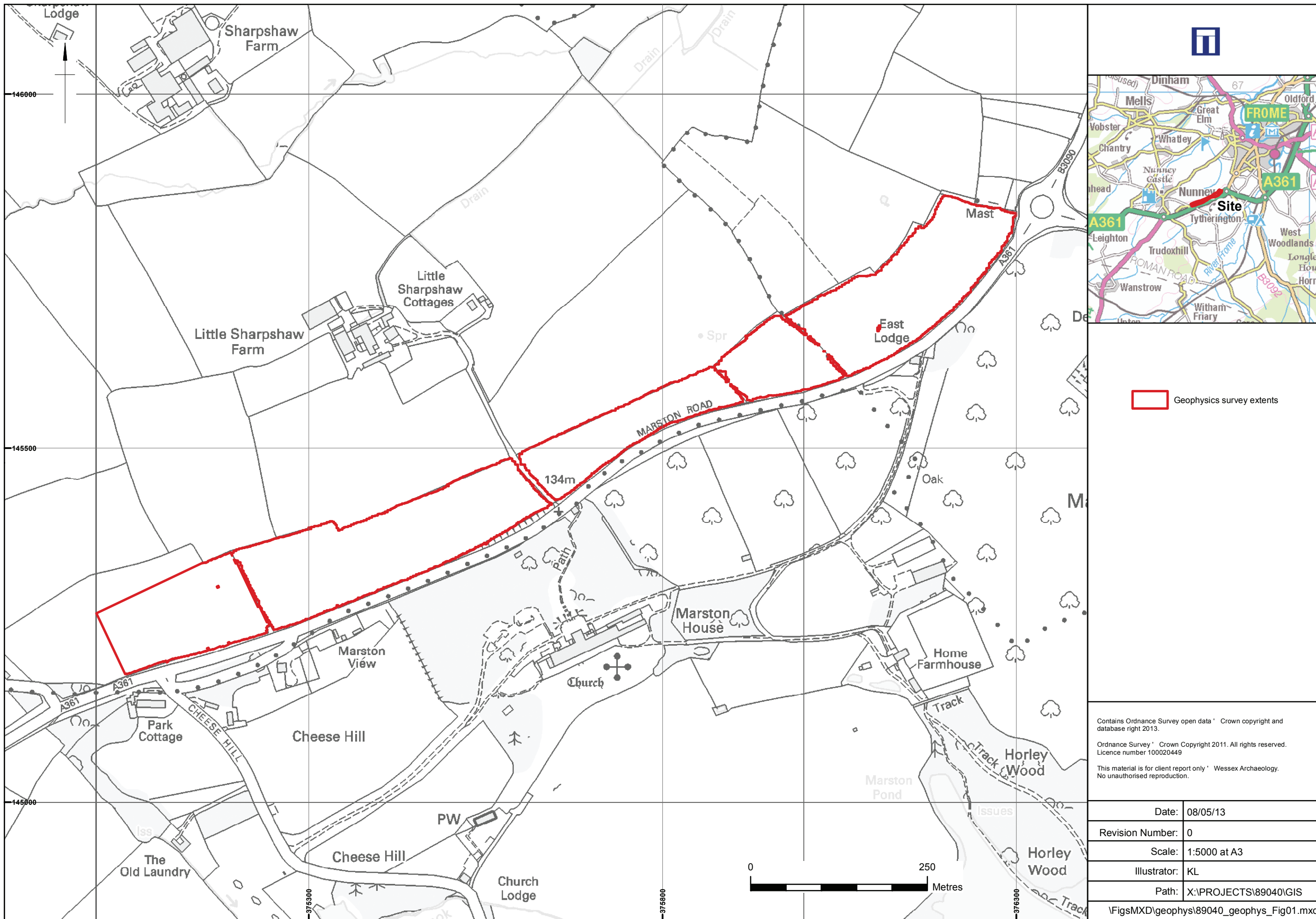
The archaeological category is used for features when the form, nature and pattern of the anomaly are indicative of archaeological material. Further sources of information such as aerial photographs may also have been incorporated in providing the final interpretation. This category is further sub-divided into three groups, implying a decreasing level of confidence:

- Archaeology – used when there is a clear geophysical response and anthropogenic pattern.
- Probable archaeology – used for features which give a clear response but which form incomplete patterns.
- Possible archaeology – used for features which give a response but which form no discernible pattern or trend.

The unidentified category is used for features when the form, nature and pattern of the anomaly are not sufficient to warrant a classification as an archaeological feature. This category is further sub-divided into:

- Increased magnetic response – used for areas dominated by indistinct anomalies which may have some archaeological potential.
- Trend – used for low amplitude or indistinct linear anomalies.
- Ferrous – used for responses caused by ferrous material. These anomalies are likely to be of modern origin.

Finally, services such as water pipes are marked where they have been identified.

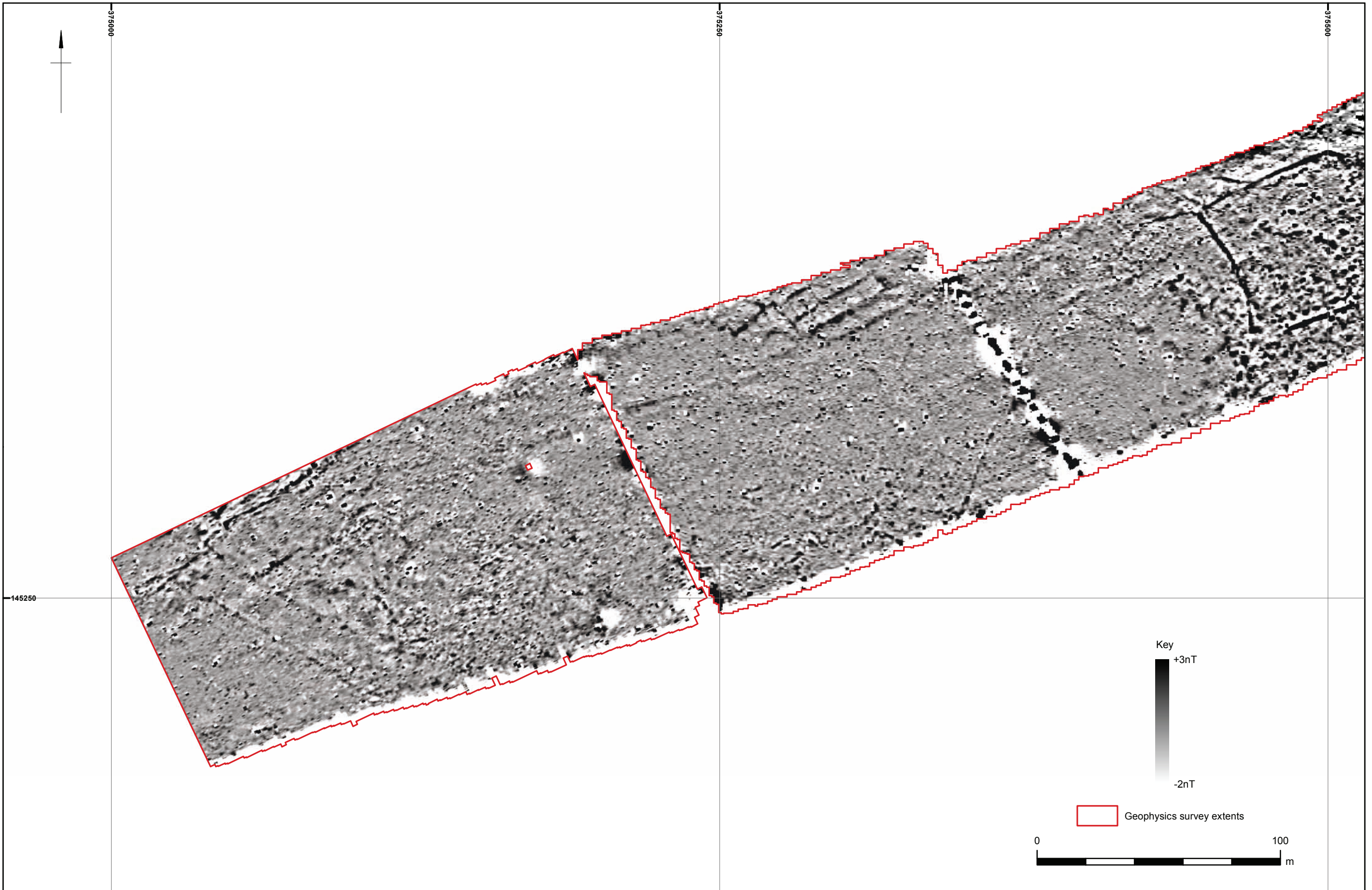



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Site location and survey extents

Figure 1

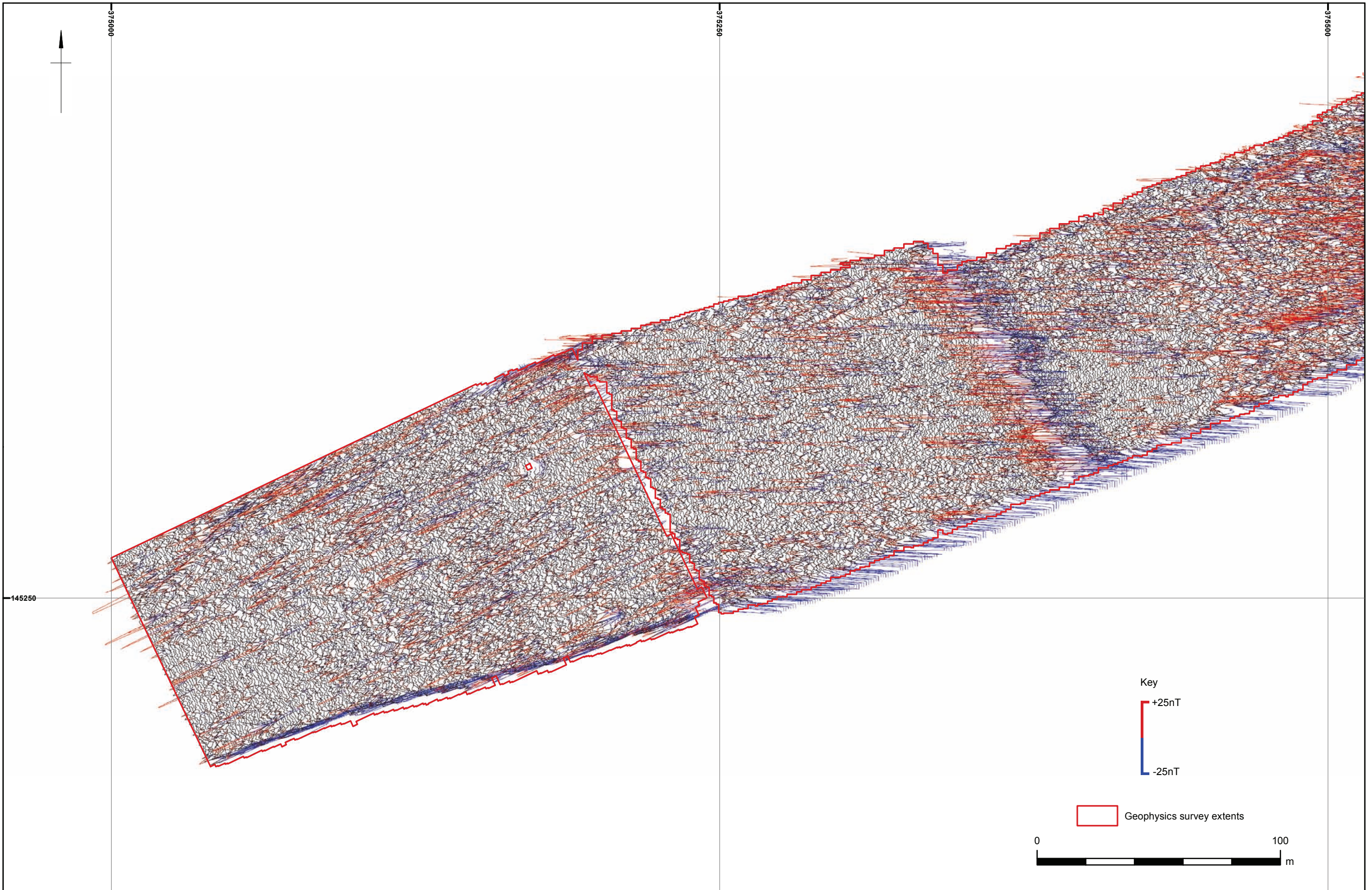



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South-west greyscale (-2nT to +3nT)

Figure 2




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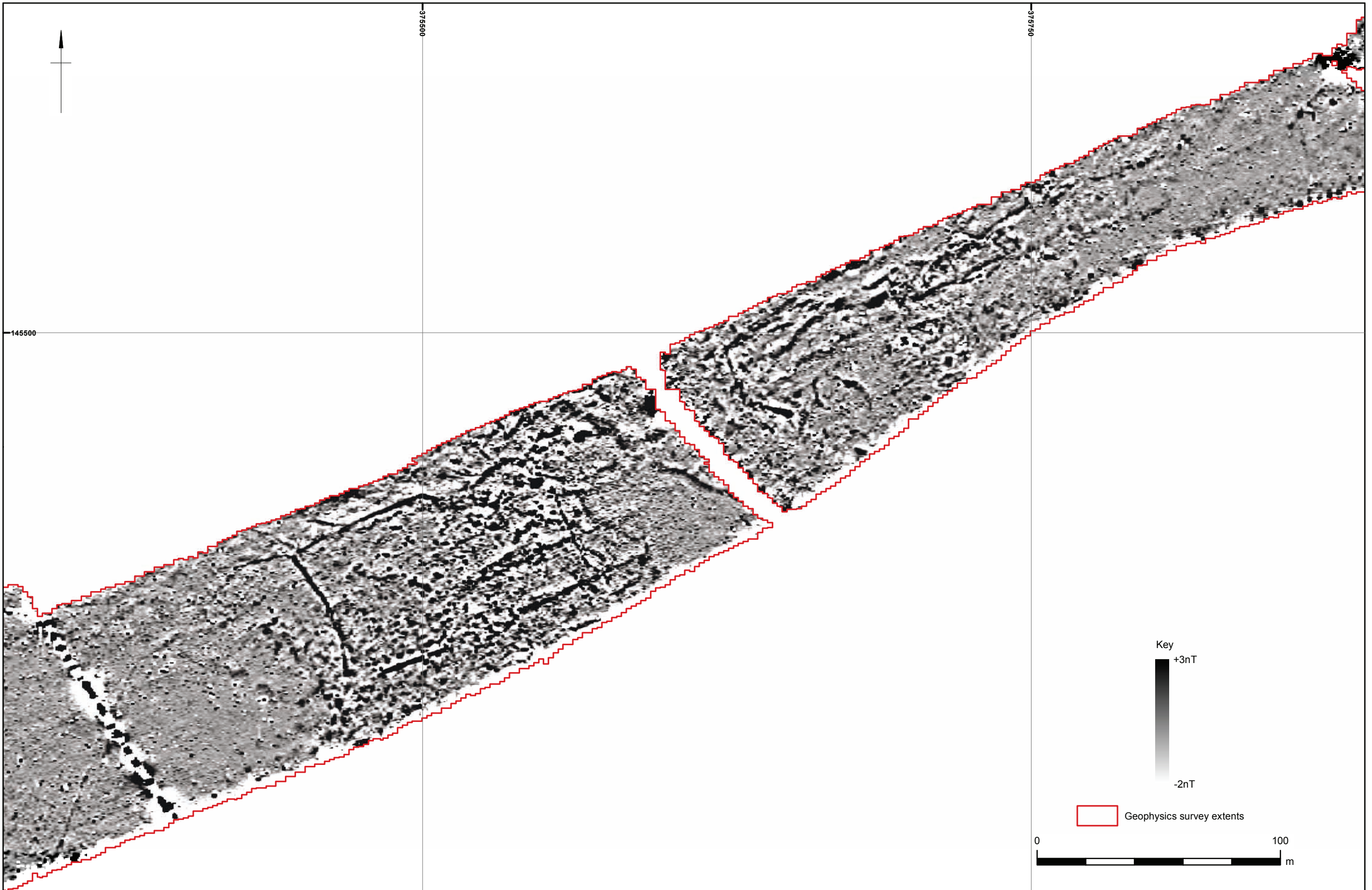
South-west XY trace

Figure 3



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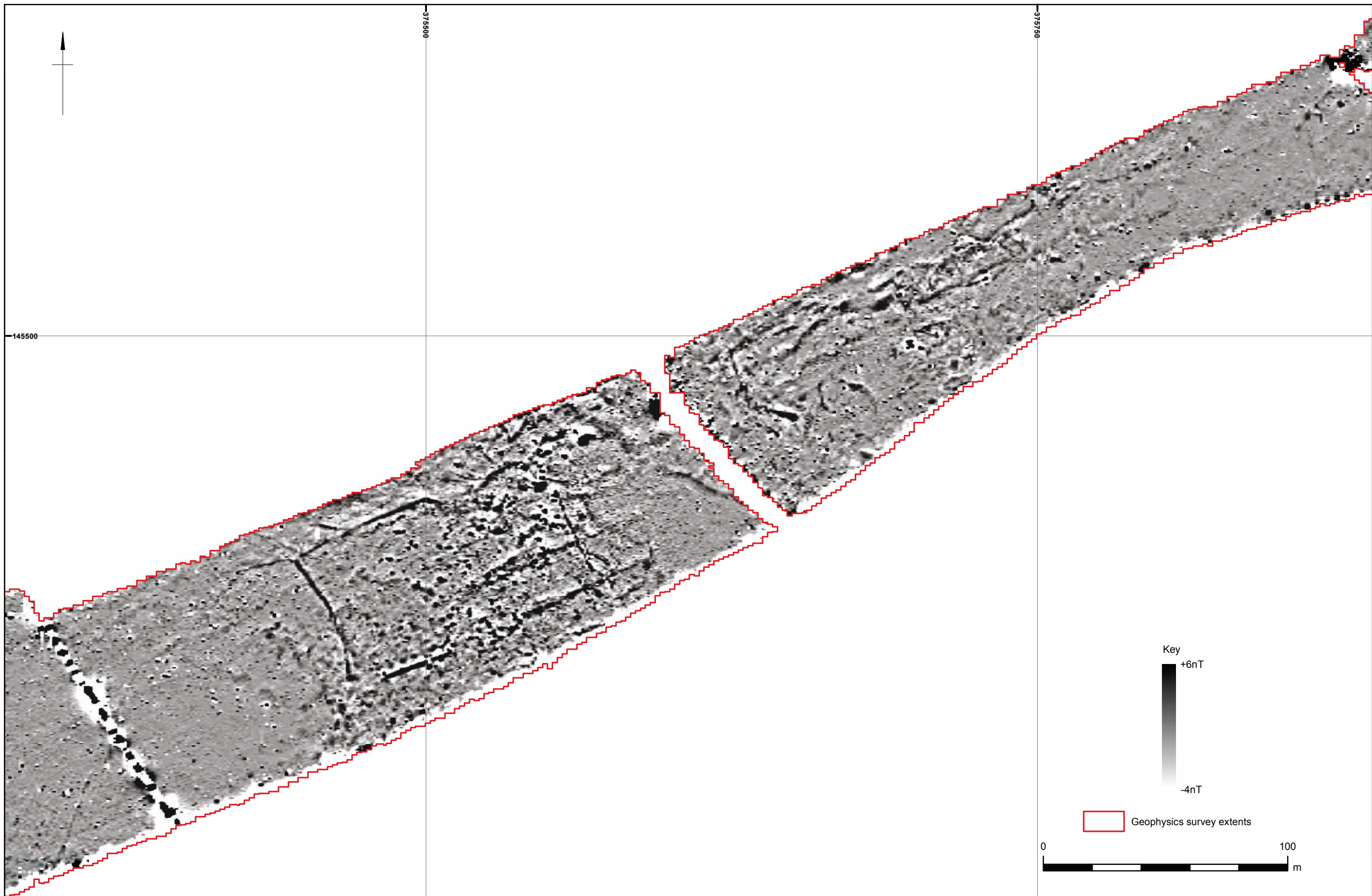
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Centre greyscale (-2nT to +3nT)

Figure 5



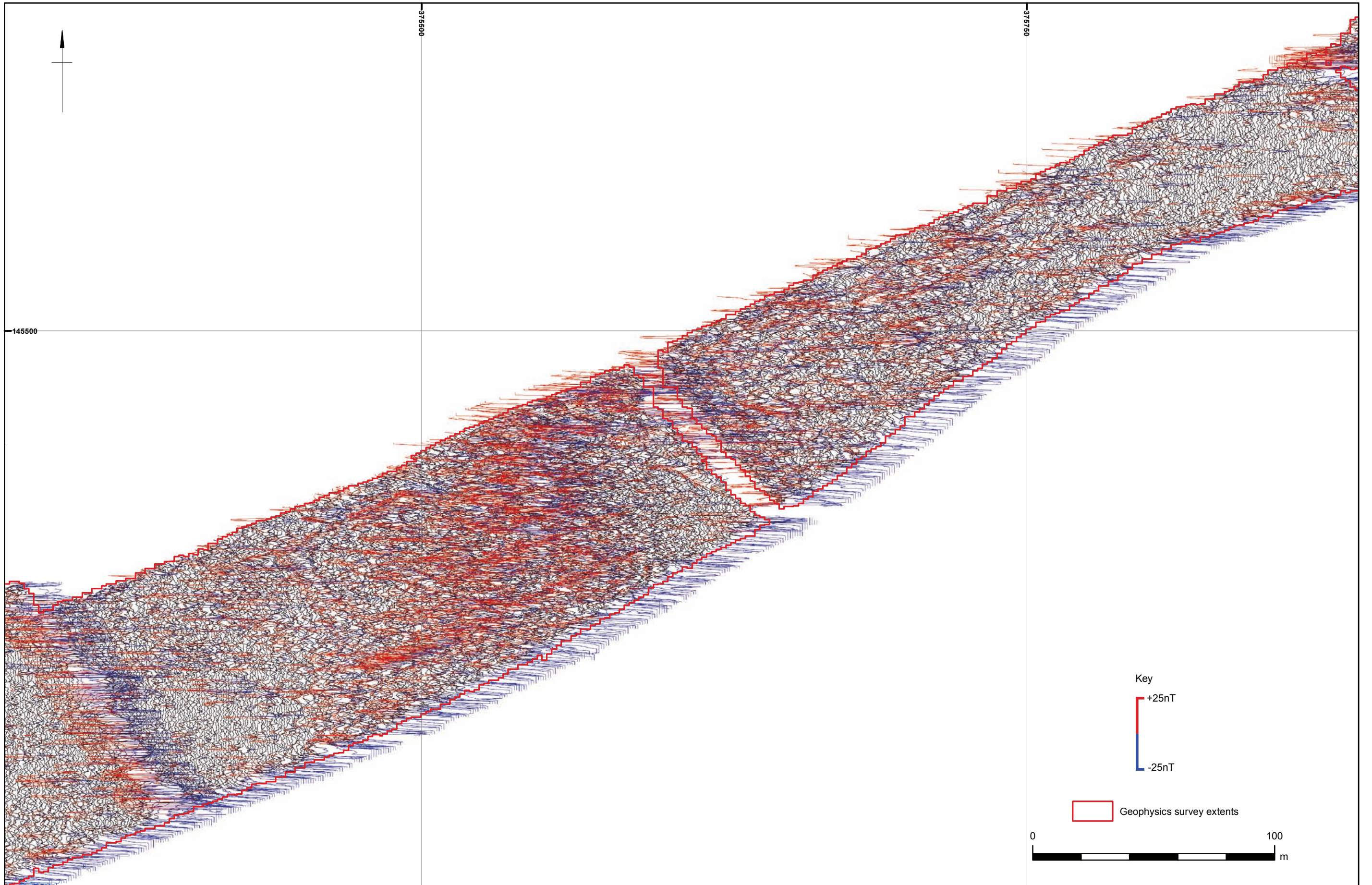


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Centre greyscale (-4nT to +6nT)

Figure 6

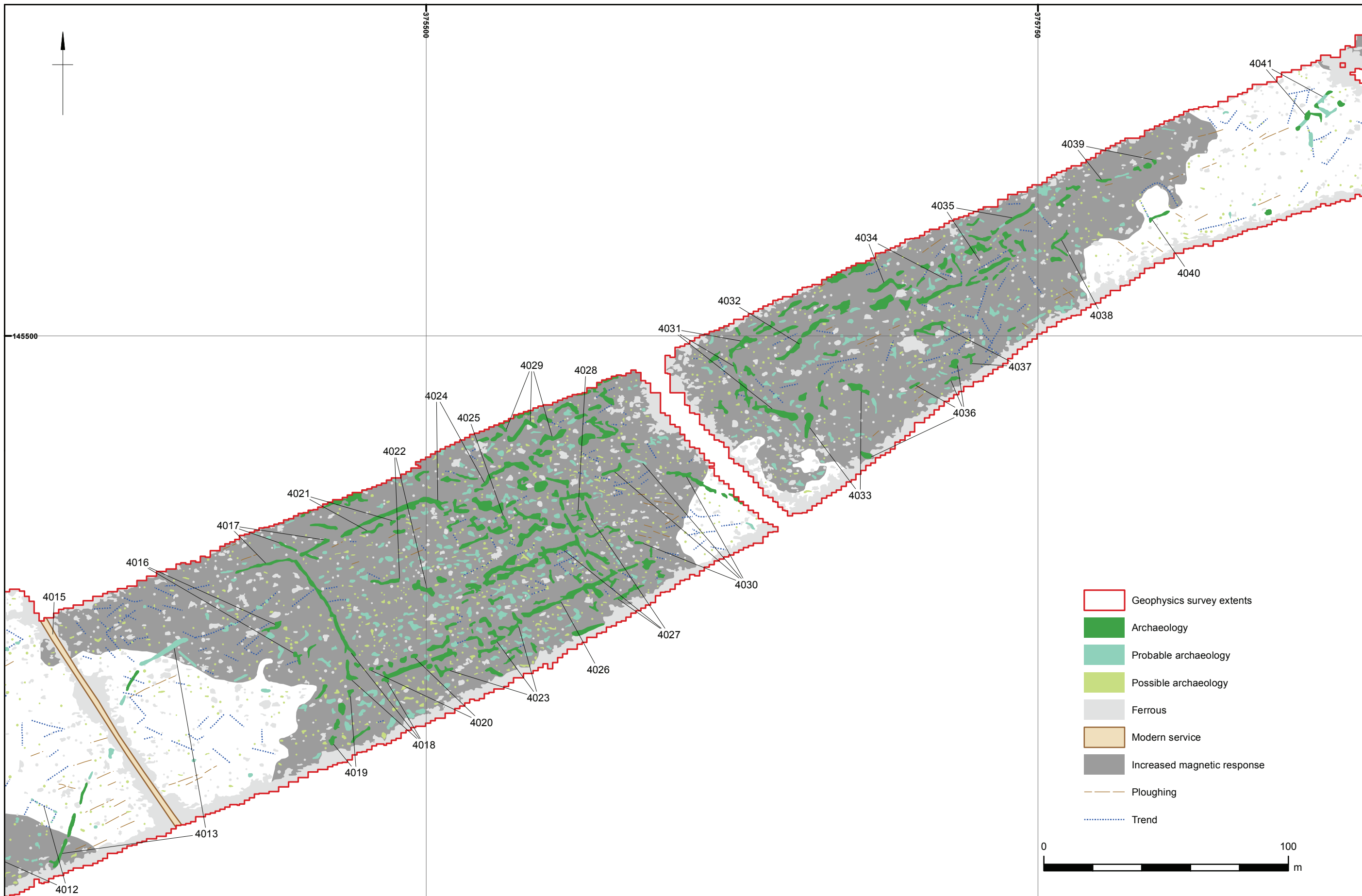


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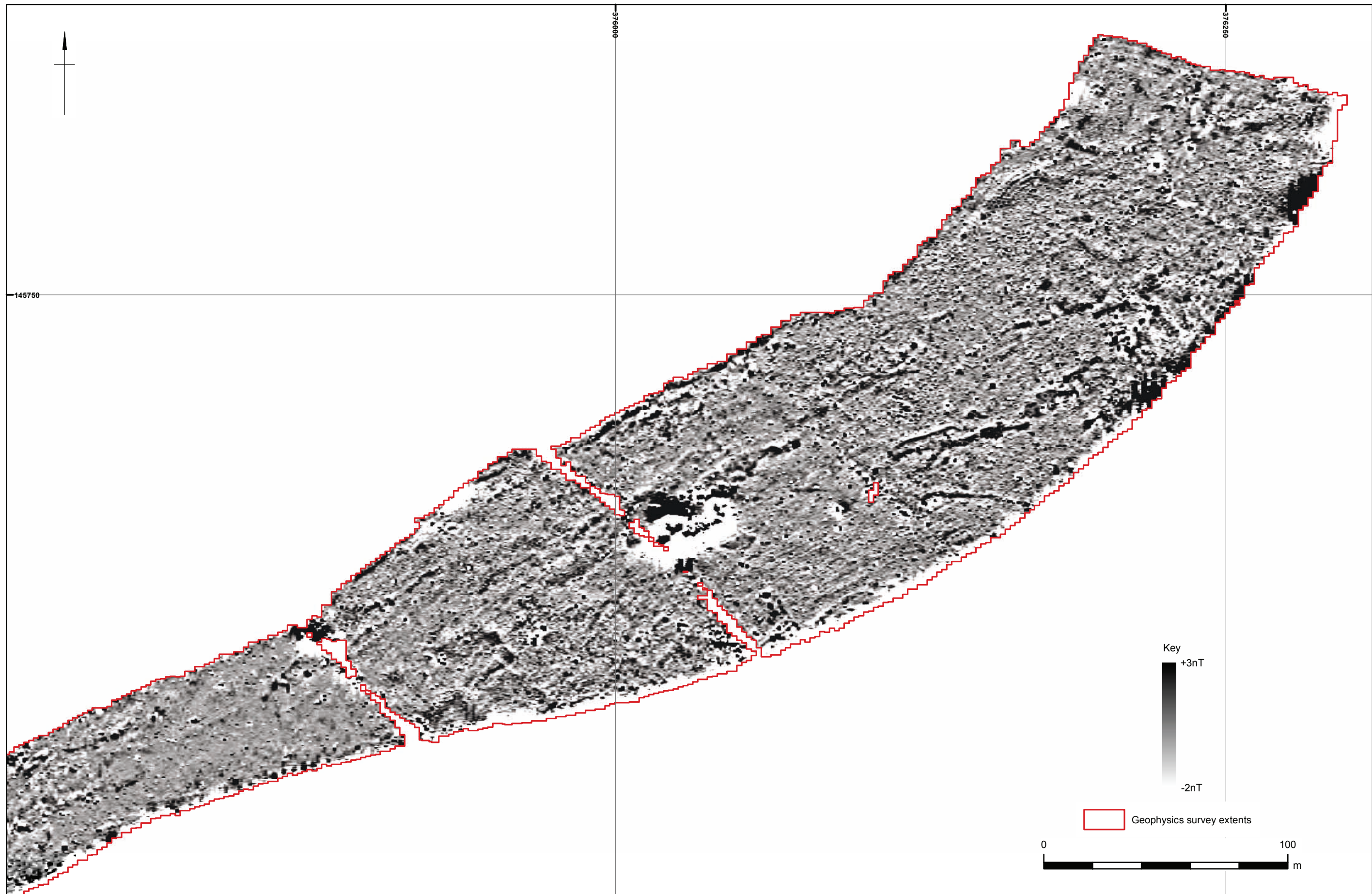
Centre XY plot

Figure 7



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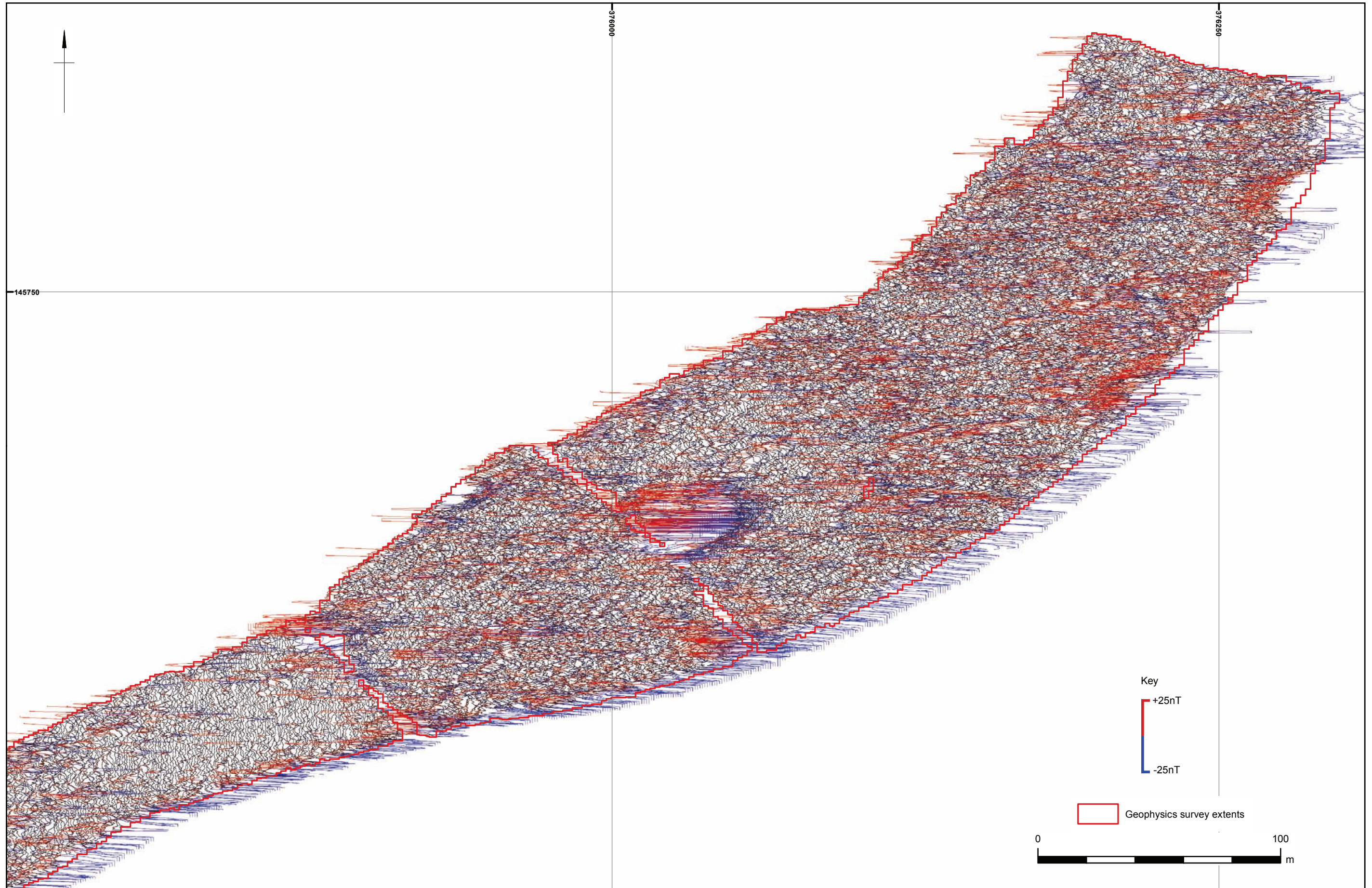


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North-east greyscale (-2nT to +3nT)

Figure 9



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North-east XY plot

Figure 10

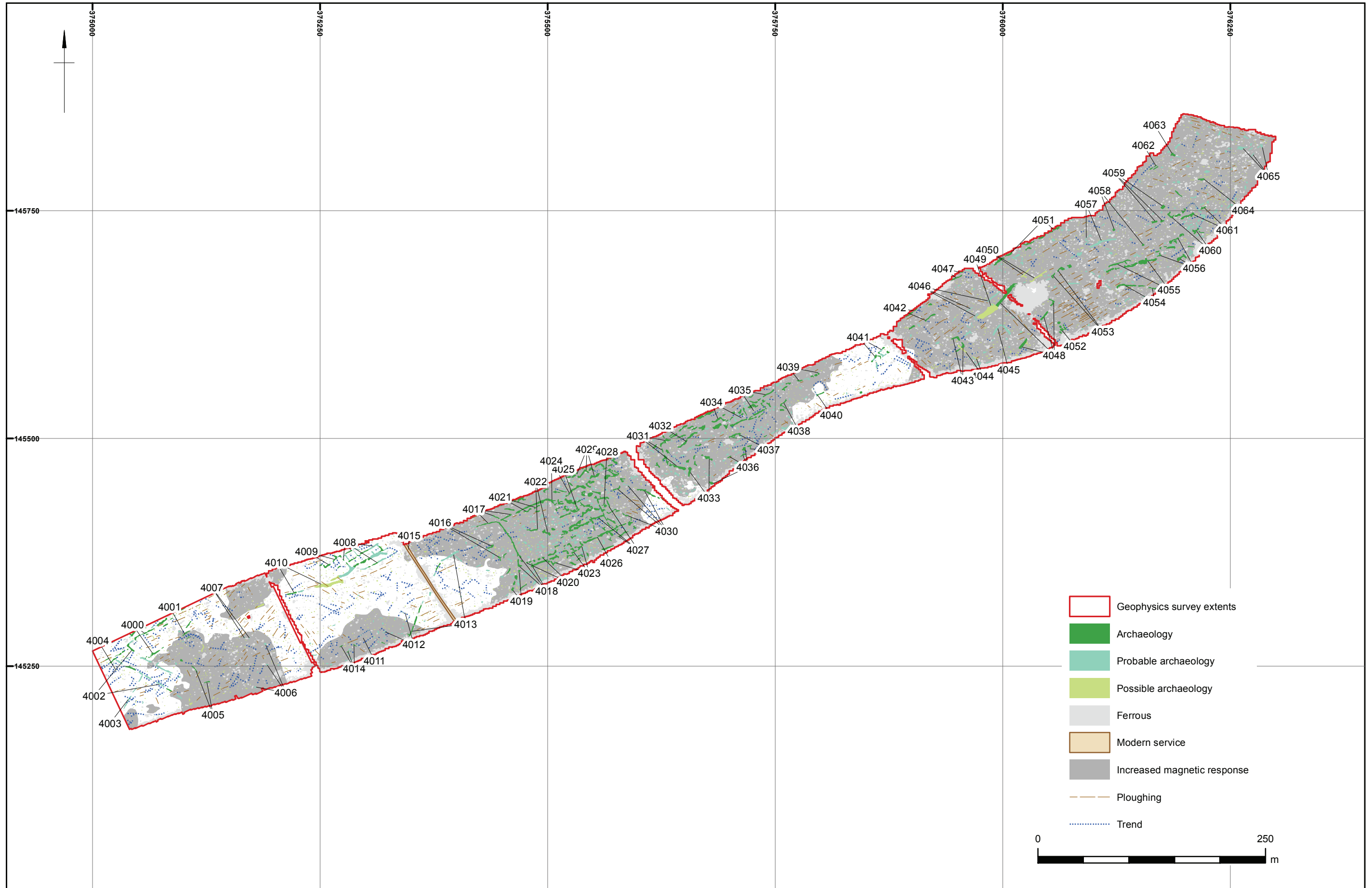


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North-east interpretation

Figure 11



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The logo for Wessex Archaeology features a stylized 'W' icon composed of three vertical bars of increasing height, followed by the text 'wessex' in a bold, blue, sans-serif font, and 'archaeology' in a smaller, blue, sans-serif font below it.

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