Ratcliffe on Soar Power Station
Nottinghamshire

Detailed Gradiometer Survey Report

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Fieldwork directed by	Rok Plesnicar
Project management by	Tom Richardson
Document compiled by	Brett Howard
Graphics by	Brett Howard

Quality Assurance

Issue	Date	Author	Approved by
1	24/02/2022	BH	 AJS

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Summary

A detailed gradiometer survey was conducted over land surrounding Ratcliffe on Soar Power Station, Nottinghamshire (centred on NGR 450697 329661). The project was commissioned by Arup Ltd, with the aim of establishing the presence, or otherwise, and nature of detectable archaeological features in support of the development of the site as a low-carbon energy power station, expanding from the existing building complex.

The site comprises nine arable fields, covering an area of 66 ha. The geophysical survey was undertaken between 24 January and 2 February 2022 and has identified magnetic anomalies across the site, of which several areas of strong anomalies have been interpreted as evidence of archaeological settlement activity in the north and south-west of the site. Further, anomalies have been identified that are suggestive of anthropogenic activity in the form of ridge and furrow ploughing and areas of increased magnetic response potentially associated with more recent land management.

In the south-west of the site a series of rectilinear and curvilinear enclosures have been identified radiating east and west from a central throughway. Aerial photography and LiDAR data suggests this activity continues to the west, outside of the survey boundary. It is possible that these features relate to a wider settlement, associated with a potential manorial complex. It is likely that these features date to the medieval/post-medieval period, as early ridge and furrow intersects the features with no discernible contemporaneous association.

Further archaeological activity is evident towards the north of the site, in the form of enclosures and boundary features. Although there is evidence for Romano-British activity to the west of the wider site, and medieval/post-medieval within the wider site, there is not enough evidence to confidently associate a date with these features.

Ridge and furrow ploughing is evident in several areas of the site. Due to the curved form and wider spacing of the lines, it is likely that these are associated with pre-steam plough methods of agricultural land management.

Evidence of modern land management is present towards the centre of the site, where a rectangular area of increased magnetic response, coupled with cropmarks from aerial photography, is potentially associated with previous ash field management.

Numerous further areas of increased magnetic responses, related to power lines, and a former field boundary with intersecting path, as seen on 1888 – 1913 mapping, have been noted.

Acknowledgements

Wessex Archaeology would like to thank Arup Group Limited for commissioning the geophysical survey. The assistance of Ruth Humphreys and Neil Tomlinson is gratefully acknowledged in this regard.

The fieldwork was undertaken by Rok Plesnicar and Joanne Instone-Brewer. The geophysical data was processed, interpreted, reported on, and illustrated by Brett Howard. The geophysical work was quality controlled and managed on behalf of Wessex Archaeology by Tom Richardson.

Ratcliffe on Soar Power Station, Nottinghamshire

Detailed Gradiometer Survey Report

1 INTRODUCTION

1.1 Project background

1.1.1 Wessex Archaeology was commissioned by Arup Ltd to carry out a geophysical survey on land near Ratcliffe on Soar Power Station, Remembrance Way, Ratcliffe, Nottinghamshire (centred on NGR 450697 329661) (**Figure 1**). The survey forms part of an ongoing programme of archaeological works being undertaken in support of a planning application for the development of the site as a low-carbon energy power station, expanding from the existing building complex.

1.2 Scope of document

1.2.1 This report presents a brief description of the methodology followed by the detailed survey results and the archaeological interpretation of the geophysical data.

1.3 The site

1.3.1 The geophysical survey area is located 2.8 km west of the village of Gotham, and 10 km south-west of central Nottingham, in the county of Nottinghamshire.

1.3.2 The survey comprises 66 ha of land, currently utilised for agriculture and scrub land. The site is bisected by the A453 (Remembrance Way) producing northern and southern portions. The northern portion of the site is bounded by scrub land to the north, the A453 to the south, agricultural land to the east, with further scrub and the extant power station to the west. The southern portion of the site is bounded by the A453 to the north, agricultural land to the south and east, and the village of Ratcliffe-on-Soar to the west.

1.3.3 The northern portion of the site is on a slight incline sloping from 58 m above Ordnance Datum (aOD) at the eastern edge to 66 m aOD at the north-western edge. The southern portion of the site is also on a slight incline sloping from 31 m aOD in the west to 41 m aOD at the eastern edge.

1.3.4 The solid geology comprises Mudstone of the Branscombe Formation with areas of overlying superficial deposits of Hemington Member (silt and gravels), and Head (clay, silt, sand, and gravel) (BGS 2022).

1.3.5 The soils underlying the site are likely to consist of interchanging areas of typical argillic pelosols of the 431 (Worcester) association; pelo-alluvial gley soils of the 813c (Fladbury 2) association; and stagnogleyic paleo-argillic brown earths of the 572g (Dunnington Heath) association (SSEW Midlands Sheet 3 1983). Soils derived from such geological parent material(s) have been shown to produce magnetic contrasts acceptable for the detection of archaeological remains through magnetometer survey.

2 ARCHAEOLOGICAL BACKGROUND

2.1 Introduction

2.1.1 A Written Scheme of Investigation (WSI) was prepared by Wessex Archaeology (2021). The following background is not exhaustive but is summarised from aspects of the WSI as well as publicly available online resources, that are considered relevant to the interpretation of the geophysical survey data. Due to the size of the area, a search radius of 1 km from the approximate centre of the site was used.

2.2 Summary of the archaeological resource

2.2.1 There are limited records pertaining to prehistoric activity within the immediate vicinity of the site, with the majority of evidence relating to Romano-British activity. The 'Roman site on Red Hill' is a Scheduled Monument and is situated directly adjacent to the north-western boundary of the northern portion of the site (NHLE 1003667). There is also the presence of further Roman activity 1.3 km west of the site, in the form of a Scheduled Monument containing a Roman Villa with enclosures (NHLE 1003567).

2.2.2 A scatter of Romano-British pottery was identified by the corner of a road leading to Drypot Barn. This is immediately adjacent to the western boundary of the northern portion of the survey area. Drypot Barn is recorded on late 19th and early 20th century mapping and falls within the grounds of the modern-day power station and is no longer extant.

2.2.3 Further to the north-west of the site there have been a series archaeological investigations carried out associated with the construction of the Ratcliffe-on-Soar power station. This has revealed a variety of Romano-British features, as well as some more limited Neolithic/Bronze age and medieval activity (Greenfield 1964).

2.2.4 Undated cropmarks are noted within the northern portion of the survey area but the pattern of land division visible on available historical mapping has changed significantly in both the northern and southern portion of the survey area. No notable former buildings or other features are noted within the survey area on the same mapping. The words 'Old Shafts' are noted within the northern portion, although no clear features are recorded.

2.2.5 There are two Grade I listed buildings within the search radius of the site. These are Thrumpton Hall 500 m to the north-east of the site (NHLE 1242464), and Church of the Holy Trinity 250 m west of the south-western extent of the site (NHLE 1242163).

2.2.6 There is a single Grade II* listed building 500 m to the north-east of the site, which is the Church of All Saints in Thrumpton (NHLE 1242423). A further 27 Grade II listed buildings are noted within the search area. The majority of which, are situated in Thrumpton, 500 m to the north-east of the site.

3 METHODOLOGY

3.1 Introduction

3.1.1 The geophysical survey was undertaken by Wessex Archaeology's in-house geophysics team between 24 January and 2 February 2022. Field conditions for the duration of the survey were adequate. An overall coverage of 56 ha was achieved, with reductions attributable to overhead powerline interference preventing survey.

3.1.2 The methods and standards employed throughout the geophysical survey conform to that set out in the Written Scheme of Investigation (WSI) (Wessex archaeology 2021), as well as to current best practice, and guidance outlined by the Chartered Institute for Archaeologists' (CIfA 2014) and European Archaeologiae Consilium (Schmidt *et al.* 2015).

3.2 Aims and objectives

3.2.1 The aims of the survey comprise the following:

- To determine, as far as is reasonably possible, the nature of the detectable archaeological resource within a specified area using appropriate methods and practices; and
- To inform either the scope and nature of any further archaeological work that may be required; or the formation of a mitigation strategy (to offset the impact of the development on the archaeological resource); or a management strategy.

3.2.2 In order to achieve the above aims, the objectives of the geophysical survey are:

- To conduct a geophysical survey covering as much of the specified area as possible, allowing for on-site obstructions.
- To clarify the presence/absence of anomalies of archaeological potential; and
- Where possible, to determine the general nature of any anomalies of archaeological potential.

3.3 Fieldwork methodology

3.3.1 The cart-based gradiometer system used a Leica Captivate RTK GNSS instrument, which receives corrections from a network of reference stations operated by the Ordnance Survey (OS) and Leica Geosystems. Such instruments allow positions to be determined with a precision of 0.02 m in real-time and therefore exceeds European Archaeologiae Consilium recommendations (Schmidt *et al.* 2015).

3.3.2 The detailed gradiometer survey was conducted using four SenSys FGM650/3 gradiometers, with an effective sensitivity of 0.03 nT, mounted at 1 m intervals on a non-magnetic cart frame towed by an All-Terrain Vehicle (ATV).

3.4 Data processing

3.4.1 Data from the survey were subjected to minimal correction processes. These comprise a 'Destripe' function (±5 nT thresholds), applied to correct for any variation between the sensors, and an interpolation used to grid the data and discard overlaps where transects have been collected too close together.

3.4.2 Further details of the geophysical and survey equipment, methods and processing are described in **Appendix 1**.

4 GEOPHYSICAL SURVEY RESULTS AND INTERPRETATION

4.1 Introduction

4.1.1 Results are presented as a series of greyscale plots and archaeological interpretations at a scale of 1:10,000 (**Figures 2, 3** and **4**) and 1:2,000 (**Figures 5** to **18**). The data are displayed at -6 nT (white) to +9 nT (black) for the greyscale images. However, a further greyscale image displays the data at -2 nT (white) to +3 nT (black) (**Figure 2**). **Figure 2** is presented at the standard data range parameters, however due to a strong magnetic background across the site, a range of –6 nT to +9 nT better displays the identified features.

4.1.2 The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous responses, burnt or fired objects, and magnetic trends (**Figures 2** to **18**). Full definitions of the interpretation terms used in this report are provided in **Appendix 2**.

4.1.3 Numerous ferrous anomalies are visible throughout the dataset. These are presumed to be modern in provenance and are not referred to, unless considered relevant to the archaeological interpretation.

4.1.4 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 present than have been identified through geophysical survey.

4.1.5 A 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.

4.2 Gradiometer survey results and interpretation

4.2.1 The gradiometer survey has identified areas of strong magnetic anomalies indicating archaeological potential, in the south-western portion and north-eastern portions of the site.

4.2.2 The most complex of these areas is in the south-west (LP_9) and has produced an alignment of strong, positive linear, rectilinear, and curvilinear magnetic anomalies. These anomalies cover an area of 480 m north – south by 150 m east – west, before reaching the western site boundary, adjacent to the extant rail line (**4000** – **4007**; **Figures 16** and **18**).

4.2.3 The data suggests the presence of a central through-way at **4000**, characterised by a linear stretch, clear of anomalies, 200 m in length and 16 m in width, south-east to north-west, bisecting two parallel areas of strong, positive rectilinear activity either side (**4001** and **4002**).

4.2.4 The area to the west of the throughway is a complex arrangement of rectilinear and curvilinear anomalies at **4001**. They cover an area of 300 m south-east to north-west by 60 m north-east to south-west, with individual anomaly widths of 1 – 2 m. Similarly, **4002** is a continuation of the rectilinear anomalies to the east of the throughway. The area covered by **4002** is 210 m south-east to north-west by 55 m north-east to south-west. Some anomalies within **4001** present as irregular circles, as opposed to the rectilinear form noted throughout. The larger of these is at **4003**, which presents as 25 m east – west by 28 m north – south. Whereas at **4004** a regular circular anomaly has been identified with an 8 m diameter.

4.2.5 Further at **4005**, two right-angled linear anomalies are present to the east of the main throughway of **4000**. At 18 m east – west, 10 m north – south, and 2 m in width, these anomalies suggest a continuation of the anomalies along the throughway. However, due to the different orientation, these anomalies may indicate a different phase of activity. Similarly, at the southern-most extremity of these anomalies, a set of weaker positive linear anomalies are present at **4006**. At between 45 m and 55 m long, these linear anomalies suggest a further continuation south of the anomalies discussed.

4.2.6 To the north of the collection of strong anomalies are weaker, positive linear and curvilinear anomalies at **4007**. These anomalies cover an area of 44 m south-east to north-west and 26 m south-west to north-east. Due to the proximity and alignment of these anomalies, it is likely they are a continuation of the stronger anomalies to the south.

4.2.7 The extensive anomalies at **4000** – **4007** (**Figures 16** and **18**), suggests an area of archaeological activity. This most likely relates to a manorial complex settlement either side

of a central throughway at **4000**. The anomalies appear to represent an array of ditch features, with smaller enclosure ditches identified at **4003** and **4004**.

4.2.8 In the centre of LP_7, is a ring-shaped anomaly at **4008** measuring 11 m in diameter. This is situated between two linear anomalies, and a curvilinear anomaly further to the north-east at **4009,** which measures 26 m in length and 2 m in width (**Figure 14**). The ring-shaped anomaly could represent a roundhouse, or funerary monument, with potential enclosure ditches signified by the linear anomalies. However, these could equally be a by-product of agricultural activity in this area.

4.2.9 In the south of LP_7 (**Figure 14**), is a strong positive linear anomaly at **4010**. This is 21 m in length and 2 m in width on a south-east to north-west orientation. The anomaly presents as a ditch feature but due to the lack of further contextual evidence, a more detailed interpretation is not possible.

4.2.10 In the west of LP_3 (**Figure 10**), is a weak positive linear anomaly at **4011**. This is 39 m long and 2 m wide on a broadly north – south orientation. This anomaly is adjacent to an area of superficial geology so may indicate a ditch feature bordering alluvial activity in the immediate vicinity. However, due to the weak nature and lack of further evidence, it is equally likely this is a product of agricultural activity.

4.2.11 In the centre of LP_5 (**Figure 12**), is a weak positive amorphous anomaly at **4012** covering an area 13 m by 7 m. This anomaly may indicate archaeological activity in the form of a ditch, but it could equally be attributed to either agricultural activity, superficial geology, or ground disturbance related to the installation of the adjacent modern service at **4029**.

4.2.12 In the north-eastern portion of the survey area (LP_1 and LP_2), are strong positive linear anomalies at **4013** and **4014** (**Figures 6** and **8**). The area covered by **4013** is 266 m east-west by 120 m north-south, while **4014** covers an area of 150 m by 150 m. The anomaly widths are all approximately 2 m. These anomalies indicate enclosure ditches or boundary features and are thought to be archaeological in origin. It is possible that these anomalies are continuations of each other, indicating a wider management of the landscape. Due to the presence of Romano-British, medieval, and post-medieval, activity in the wider area, there is not enough contextual evidence associated with these anomalies to provide an accurate date.

4.2.13 Towards the centre of LP_1, is a weak positive curvilinear anomaly with small linear features immediately north-west at **4019** (**Figure 6**). The curvilinear anomaly presents as semi-circular and is 39 m in diameter. Similar anomalies are present to the south-east of **4019** in LP_2 at **4015** – **4018** (**Figure 8**). A weak rectilinear anomaly (**4015**), 22 m by 22 m in area, is present 24 m north-east of a weaker broken, circular anomaly at **4017**, which is 18 m in diameter. Bisecting **4015** and **4017**, is a weak positive linear anomaly 146 m in length on a broad east-west alignment. A stronger linear anomaly is present at **4018**, and is 39 m long on a south-east to north-west orientation. These anomalies indicate ditch features that may be associated with enclosures and/or prehistoric settlement activity in the wider survey area. However, due to their weak and sporadic nature, these features could be a product of agricultural activity on the site.

4.2.14 Across the site are multiple areas of weak, positive, parallel, linear anomalies (**4020** – **4023**; **Figures 6**, **8**, **14**, **16**, and **18**). The average distance between lines is 8 m, and they are often of a curved form. These anomalies have been interpreted as areas of ridge and furrow ploughing and are thought to be medieval due to their curved form and spacing. These features are evident across the landscape in both aerial photography and LiDAR.

4.2.15 In the north of the site (LP_2), a cross-shaped area of increased magnetic response has been identified at **4024** and **4025** (**Figure 8**). North – south (**4025**) is 270 m , and east –

west is 135 m (**4024**). The anomaly at **4024** is interpreted as a former field boundary, intersected by a path at **4025**, and is evident on 1888 – 1913 OS mapping.

4.2.16 In LP_6, a strong linear anomaly is present at **4026** (**Figure 14**). This anomaly is 288 m long on a north-east to south-west orientation. Due to the shape and form of this anomaly, it has been interpreted as a former field boundary, directly associated with the ridge and furrow ploughing in that portion of the site.

4.2.17 Several areas of increased magnetic response have been identified across the site (**Figures 14, 16,** and **18**). The most regular of these is in LP_6 at **4027** (**Figure 14**) where a rectangular area 84 m in length east -west by 30 m in width north-south, is present. Aerial photography and LiDAR evidence cropmarks within this area. Further extension of the increased magnetic response continues north and south from this anomaly along the field edges. Additionally, 55 m to the south of **4027** is another area of strong increased magnetic response at **4028**, which is broadly 40 m east – west by 33 m north – south. These anomalies suggest modern activity, possibly related to the ash field management in the area. Other areas of increased magnetic response have been indicated on the drawing, with large areas present along extant power lines.

4.2.18 Toward the centre of the site, in LP_5, two strong dipolar linear anomalies are present at **4029** and **4030** (**Figure 12**). The anomaly at **4029** is 276 m long east – west by 6 m wide, whereas the curvilinear anomaly at **4030** is 273 m long east – west and 6 m wide. Further, smaller dipolar linear anomalies are evident at **4031** in LP_3, and **4032** immediately south of **4027** in LP_6. These anomalies are all indicative of modern services, such as pipes or cables.

4.2.19 A swath of superficial geology is evident in the northern portion of the survey (LP_1 and LP_2) at **4033** and **4034** (**Figure 6** and **8**). This geology presents as amorphous groups of positive magnetic responses. It is possible that these features may contain pits associated with archaeological extraction activity. However, it is not possible to differentiate between natural and archaeological pits from the geophysical data alone.

4.2.20 Numerous linear and curvilinear trends have been identified across the site. The anomalies are too weak to confidently interpret. While an archaeological origin cannot be ruled out for these trends, a modern agricultural origin is more likely.

5 DISCUSSION

5.1.1 The gradiometer survey has identified evidence of archaeological settlement activity in the north and south-west of the site. In the south-west of the site a series of rectilinear and curvilinear enclosures have been identified radiating east and west from a central throughway. Aerial photography and LiDAR data suggests this activity continues to the west, outside of the survey boundary. It is possible that these features are indicative of a wider settlement, associated with a potential manorial complex to the west of the site. It is likely that these features date to the medieval/post-medieval period, as early ridge and furrow intersects the features with no discernible contemporaneous association. Further, the settlement is not evident on available historical mapping dating to the 19th century.

5.1.2 Further archaeological activity is evident towards the north of the site, in the form of enclosures and boundary features. Although there is evidence for Romano-British activity to the west of the wider site, and medieval/post-medieval within the wider site, there is not enough evidence to confidently associate a date with these features.

5.1.3 Other areas of weaker magnetic responses indicate activity across the wider site, including circular and linear features. These may indicate archaeological activity but may equally be associated with agricultural use of the site.

5.1.4 Ridge and furrow ploughing is evident in several areas of the site. Due to the curved form and wider spacing of the lines, it is likely that these are associated early medieval or medieval methods of agricultural land management.

5.1.5 Evidence of modern land management is present towards the centre of the site, where a rectangular area of increased magnetic response, coupled with cropmarks from aerial photography, is potentially associated with previous ash field management.

5.1.6 Numerous further areas of increased magnetic responses, related to power lines, and a former field boundary with intersecting path, as seen on mapping from 1888 – 1913, have been noted.

5.1.7 A swath of superficial geology to the north is evident in the data and is most likely related to a Diamicton sedimentary deposit.

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Schmidt, A, Linford, P, Linford, N, David, A, Gaffney, C, Sarris, A and Fassbinder, J. 2015 *Guidelines for the use of geophysics in archaeology: questions to ask and points to consider.* EAC Guidelines 2, Belgium: European Archaeological Council.

Wessex Archaeology, 2022 *Written Scheme of Investigation for Geophysical Survey for Ratcliffe on Soar, Nottinghamshire.* Ref:258650.02

Cartographic and documentary sources

Ordnance Survey 1983 *Soil Survey of England and Wales Sheet 3, Soils of Midland and Western England.* Southampton.

Online resources

British Geological Survey Geology of Britain Viewer (accessed February 2022) http://mapapps.bgs.ac.uk/geologyofbritain/home.html

Historic England (HE) website http://historicengland.org.uk (accessed February 2022)

National Library of Scotland (NLS): http://www.maps.nls.co.uk

Old Maps (accessed February 2022) https://www.old-maps.co.uk

APPENDICES

Appendix 1: Survey Equipment and Data Processing

Survey methods and equipment

The magnetic data for this project were acquired using a non-magnetic cart fitted with four SenSys FGM650/3 magnetic gradiometers. The instrument has four sensor assemblies fixed horizontally 1 m apart allowing four 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 0.03 nT over a ±100 nT range, and measurements from each sensor are logged at intervals of 0.25 m. All of the data are then relayed to a Leica Viva CS35 tablet, running the MLgrad601 program, which is used to record the survey data from the array of Grad601 probes at a rate of 10 Hz. The program also receives measurements from a GPS system, which is fixed to the cart at a measured distance from the sensors, providing real time locational data for each data point.

The cart-based system relies upon accurate GPS location data which is collected using a Leica Viva system with rover and base station. This 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 European Archaeologiae Consilium recommendations (Schmidt *et al.* 2015) for geophysical surveys.

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 0.125 m intervals along traverses spaced up to 0.25m apart.

Post-processing

The magnetic data collected during the detail survey are downloaded from the SenSys cart 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.

The cart-based system generally requires a lesser amount of post-processing than the handheld Bartington Grad 601-2 fluxgate gradiometer instrument. This is largely because mounting the gradiometers on the cart reduces the occurrence of operator error; caused by inconsistent walking speeds and deviation in traverse position due to varying ground cover and topography.

Typical data and image processing steps may include:

- GPS DeStripe – Determines the median of each transect and then subtracts that value from each datapoint in the transect. May be used to remove the striping effect seen within a survey caused by directional effects, drift, etc.

- GPS Base Interpolation – Sets the X & Y interval of the interpolated data and the track radius (area around each datapoint that is included in the interpolated result).

- Discard Overlaps - Intended to eliminate a track(s) that have been collected too close to one another. Without this, the results of the interpolation process can be distorted as it tries to accommodate very close points with potentially differing values.

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 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 four main categories: archaeological, modern, agricultural, and uncertain origin/geological.

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.
- Possible archaeology – used for features which give a response, but which form no discernible pattern or trend.

The modern category is used for anomalies that are presumed to be relatively modern in date:

- Ferrous – used for responses caused by ferrous material. These anomalies are likely to be of modern origin.
- Modern service – used for responses considered relating to cables and pipes; most are composed of ferrous/ceramic material although services made from non-magnetic material can sometimes be observed.

The agricultural category is used for the following:

- Former field boundaries – used for ditch sections that correspond to the position of boundaries marked on earlier mapping.
- Ridge and furrow – used for broad and diffuse linear anomalies that are considered to indicate areas of former ridge and furrow.
- Ploughing – used for well-defined narrow linear responses, usually aligned parallel to existing field boundaries.
- Drainage – used to define the course of ceramic field drains that are visible in the data as a series of repeating bipolar (black and white) responses.

The uncertain origin/geological 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.
- Superficial geology – used for diffuse edged spreads considered to relate to shallow geological deposits. They can be distinguished as areas of positive, negative, or broad bipolar (positive and negative) anomalies.

Appendix 3: OASIS form

Project Details:

Project name		Ratcliffe on Soar Power Station, Nottinghamshire			
Type of project		Detailed gradiometer survey (Field evaluation)			
Project description		The south-west of the site has provided evidence for extensive archaeological settlement activity. This activity presents as a series of rectilinear, and/or curvilinear, enclosures radiating north and south from a central throughway. The data suggests this activity continues to the west, outside of the survey boundary, and is evident from aerial photography and LiDAR. It is possible that these features are indicative of a ladder settlement associated with a manorial complex to the west of the site. Further anthropogenic activity is evident towards the north of the site, in the form of linear enclosure ditch features. Other areas of weaker magnetic response indicate activity across the wider landscape, including circular features and ridge and furrow ploughing. Evidence of modern land management is present towards the centre of the site, where a rectangular area of increased magnetic response, coupled with cropmarks from aerial photography, is potentially associated with previous ash field management. Numerous further areas of increased magnetic response related to the power lines and a former field boundary, as seen on historic mapping from 1888-1913, have been noted. A swath of superficial geology to the north is evident in the data and is most likely related to a Diamicton sedimentary deposit.			
Project dates		**Start:** 24 January 2022		**End:** 2 February 2022	
Previous work		Not Known			
Future work		Not Known			
Project Code:	258650	**HER event no.**	If relevant	**OASIS form ID:**	wessexar1-504453
		NMR no.	N/A		
		SM no.	N/A		
Planning Application Ref.					
Site Status		None			
Land use		Agricultural			
Monument type		Ladder settlement	**Period**	medieval	

Project Location:

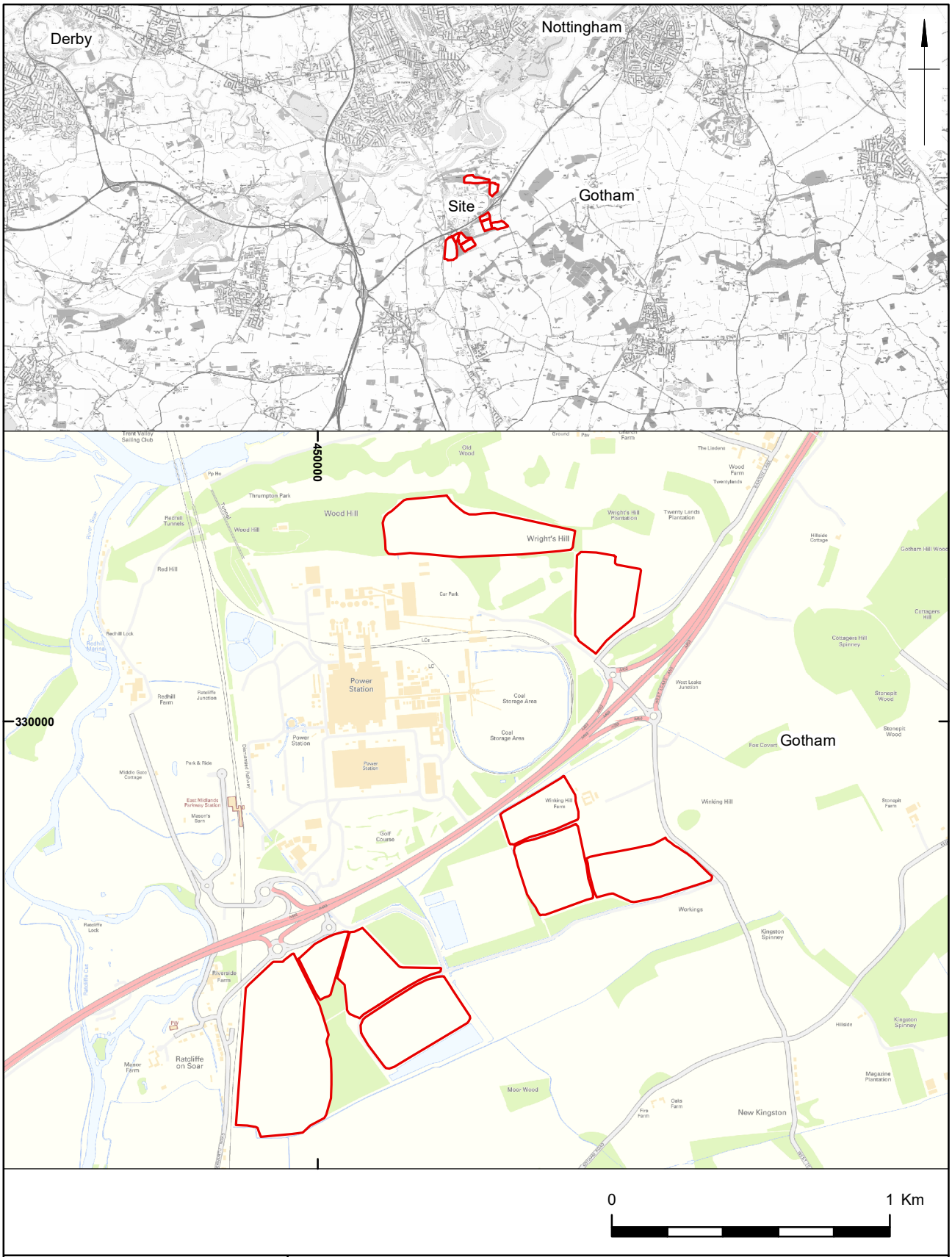
Site Address	Ratcliffe on Soar Power Station, Nottingham,			**Postcode**	NG11 0EE
County	Nottinghamshire	**District**	Rushcliffe	**Parish**	Ratcliffe on Soar
Study Area	58 ha	**Height OD**	20 – 25 m aOD	**NGR**	450697 329661

Project Creators:

Name of Organisation	Wessex Archaeology		
Project brief originator	Arup	**Project design originator**	Arup
Project Manager	Tom Richardson	**Project Supervisor**	Rok Plesnicar
Sponsor or funding body	Arup	**Type of Sponsor**	

Project Archive and Bibliography:

Physical archive	N/A	**Digital Archive**	Geophysical survey and report	**Paper Archive**	N/A
Report title	Ratcliffe on Soar Power Station, Nottinghamshire			**Date**	2022
Author	Wessex Archaeology	**Description**	Unpublished report	**Report ref.**	258650.03



Site Boundary

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Site location and survey extent

Figure 1

Site Boundary

Detailed Survey Extents

-2 nT 3 nT

0 500 m

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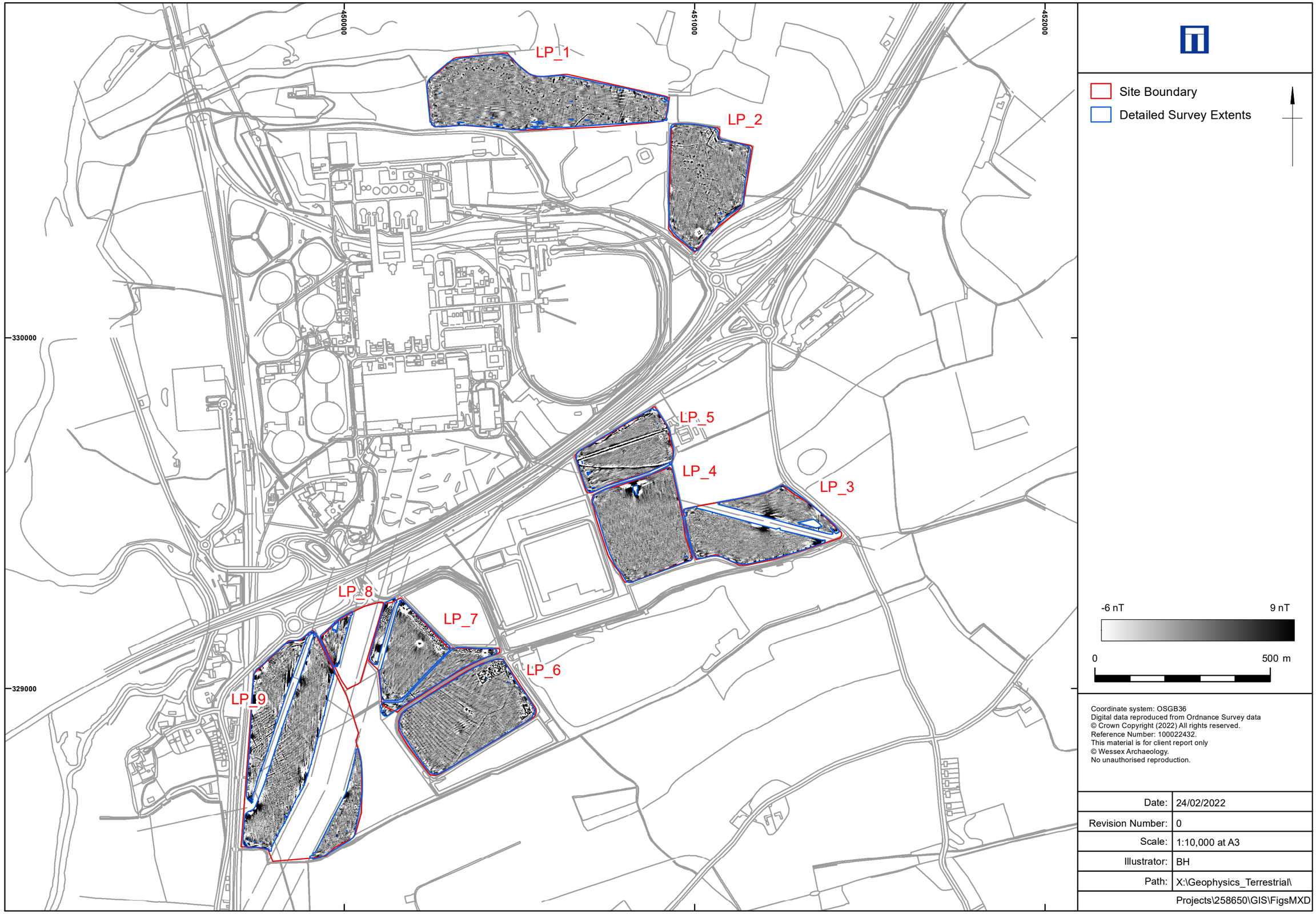
Detailed gradiometer survey results:greyscale overview -2 nT to 3 nT

Figure 2



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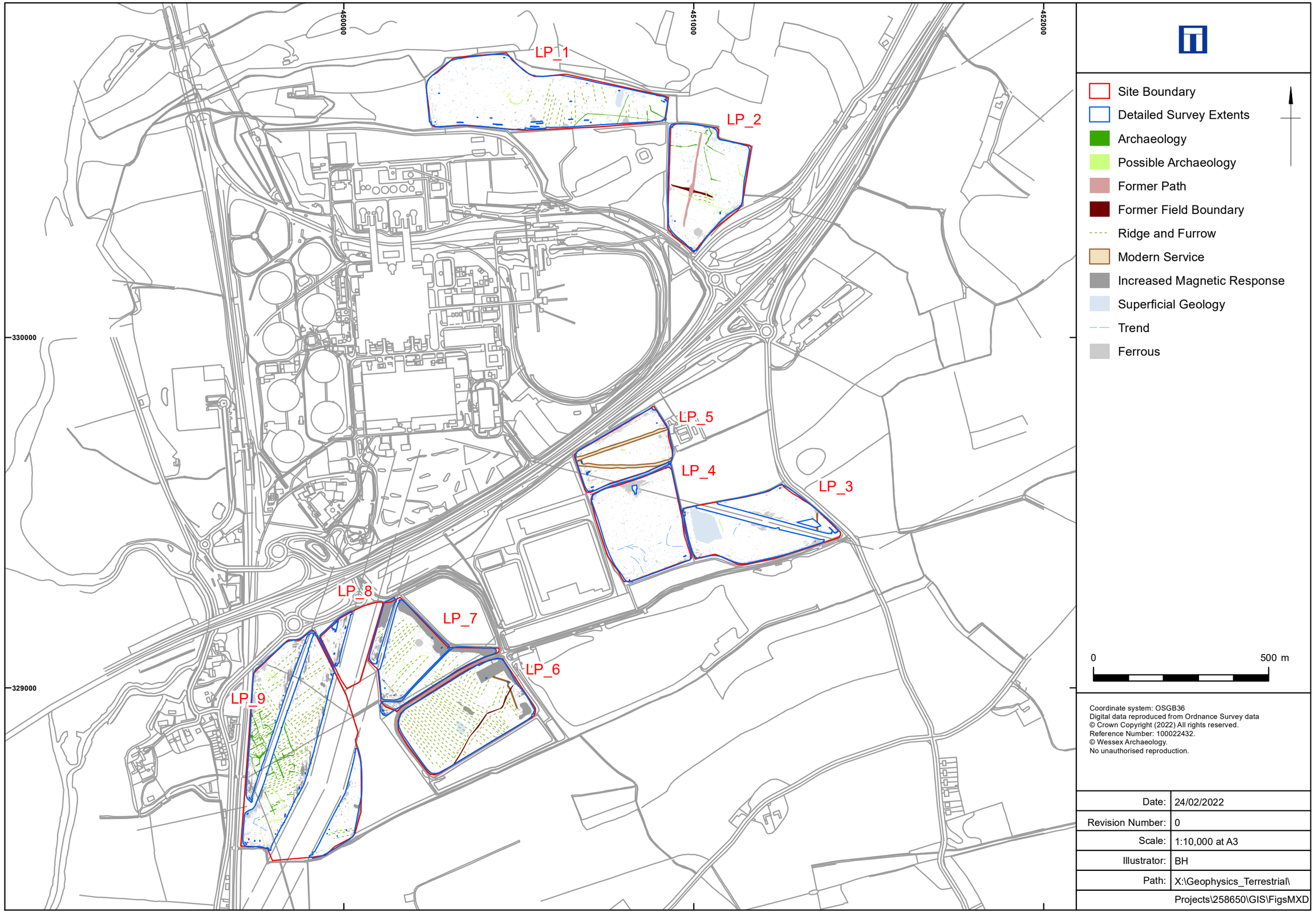
Detailed gradiometer survey results:greyscale overview -6 nT to +9 nT

Figure 3



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Detailed gradiometer survey results: interpretation overview

Figure 4

450300

450600

330900

330600

LP_1

Site Boundary

Detailed Survey Extents

-6 nT

9 nT

0

100 m

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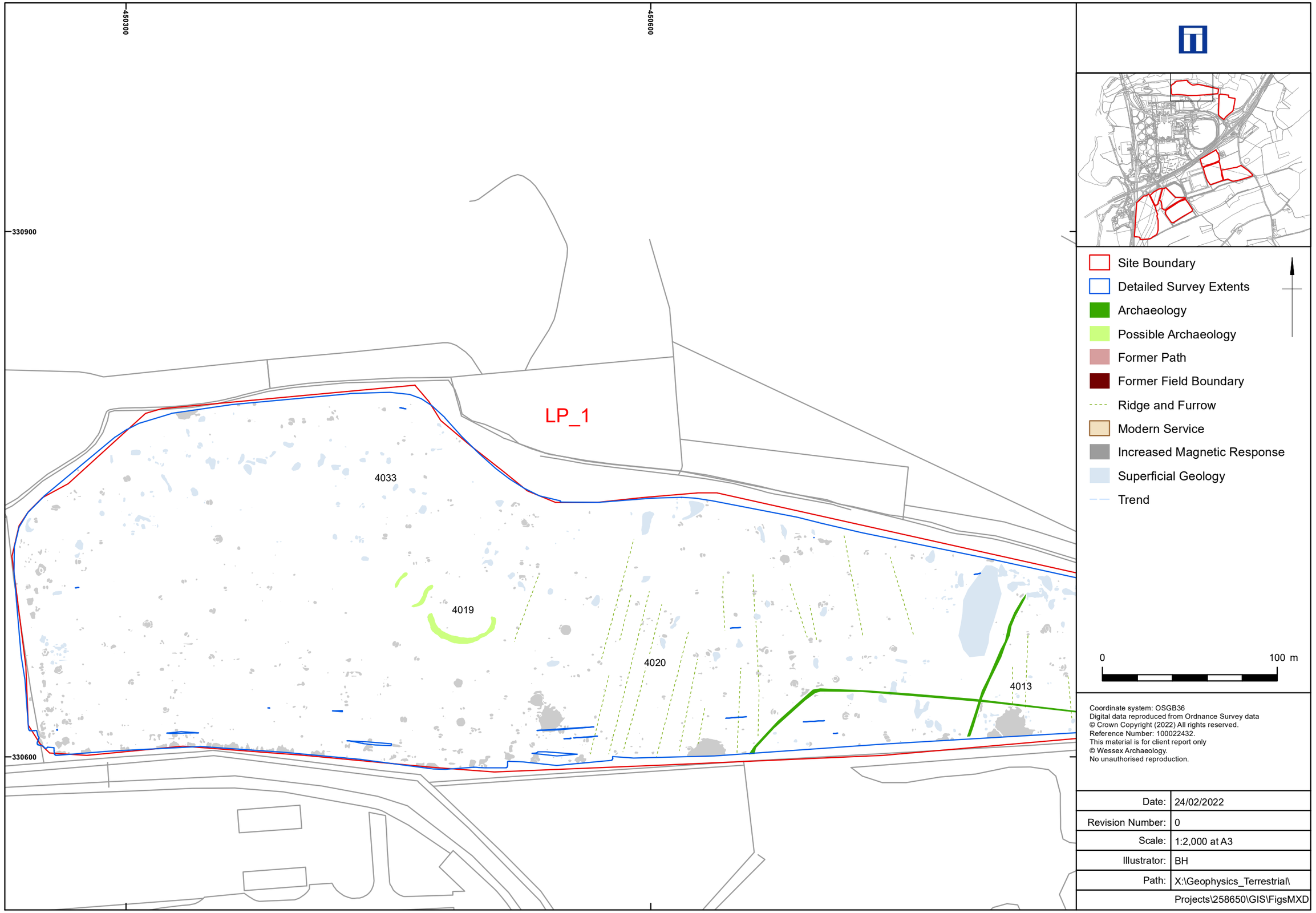
Detailed gradiometer survey results: greyscale plot north

Figure 5



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Detailed gradiometer survey results: interpretation north

Figure 6

Site Boundary

Detailed Survey Extents

-6 nT

9 nT

0

100 m

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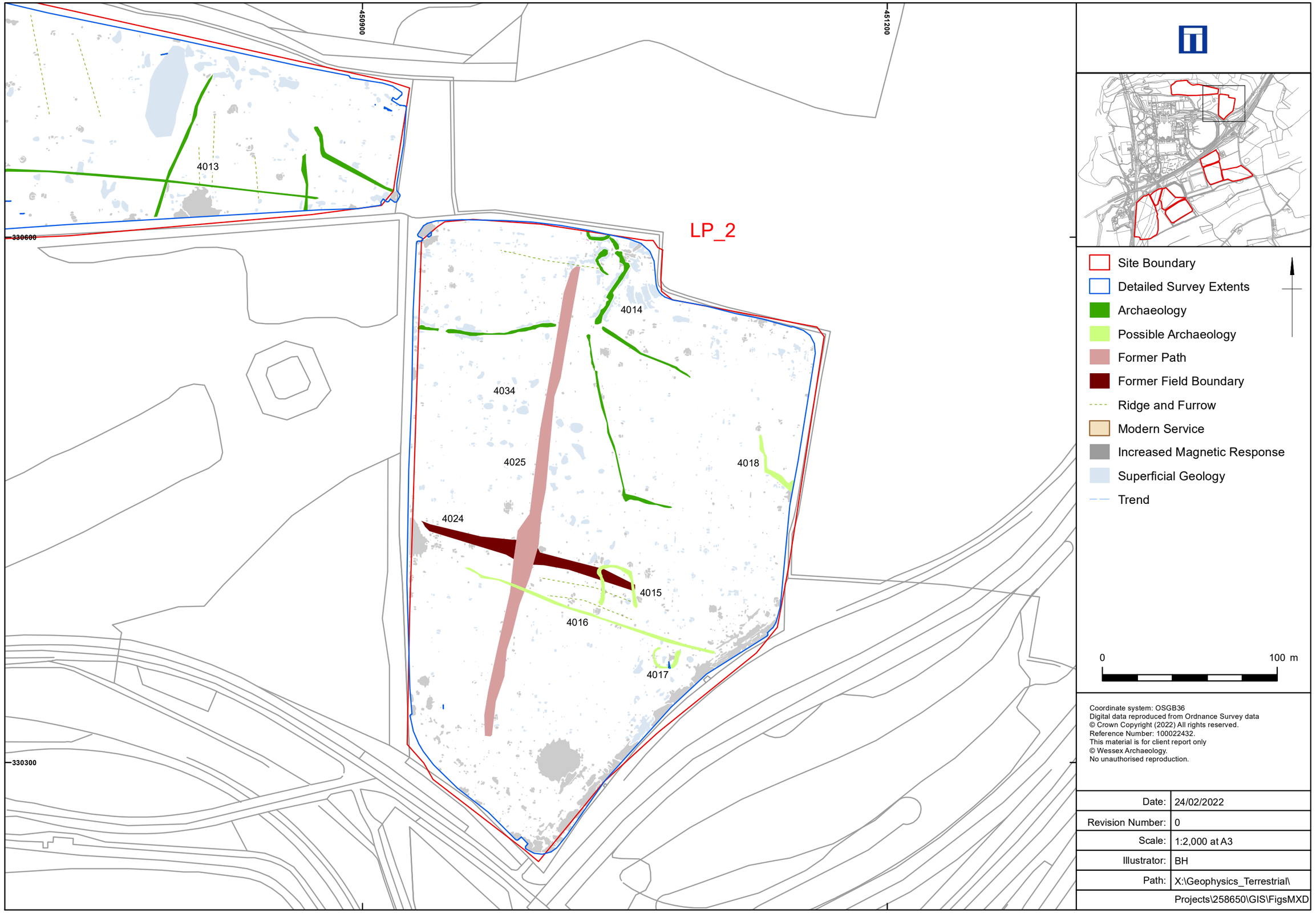
Detailed gradiometer survey results: greyscale plot north-east

Figure 7



Site Boundary
Detailed Survey Extents
Archaeology
Possible Archaeology
Former Path
Former Field Boundary
Ridge and Furrow
Modern Service
Increased Magnetic Response
Superficial Geology
Trend

0 100 m

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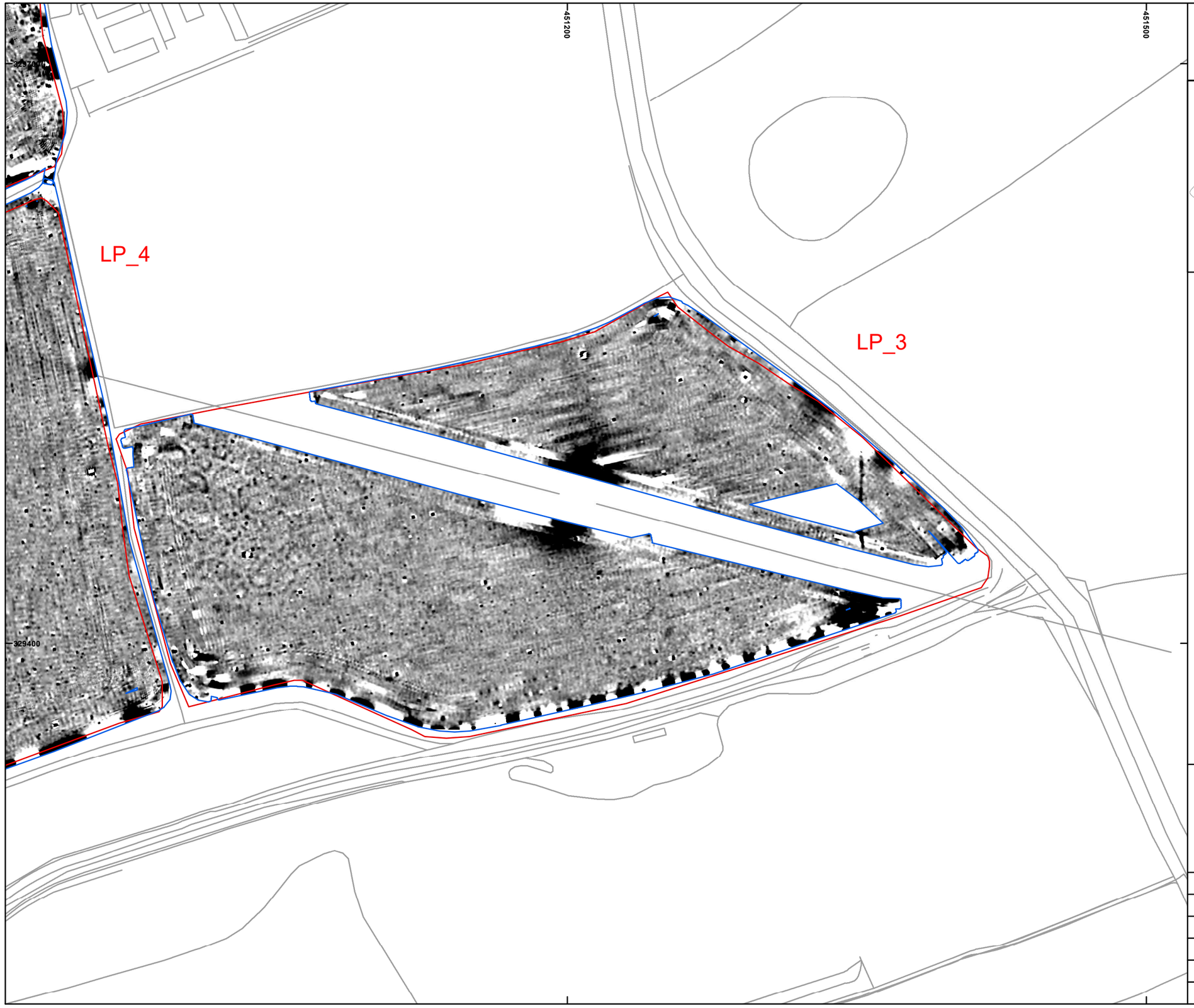
Detailed gradiometer survey results: interpretation north-east

Figure 8



Site Boundary
Detailed Survey Extents

-6 nT
9 nT

0
100 m

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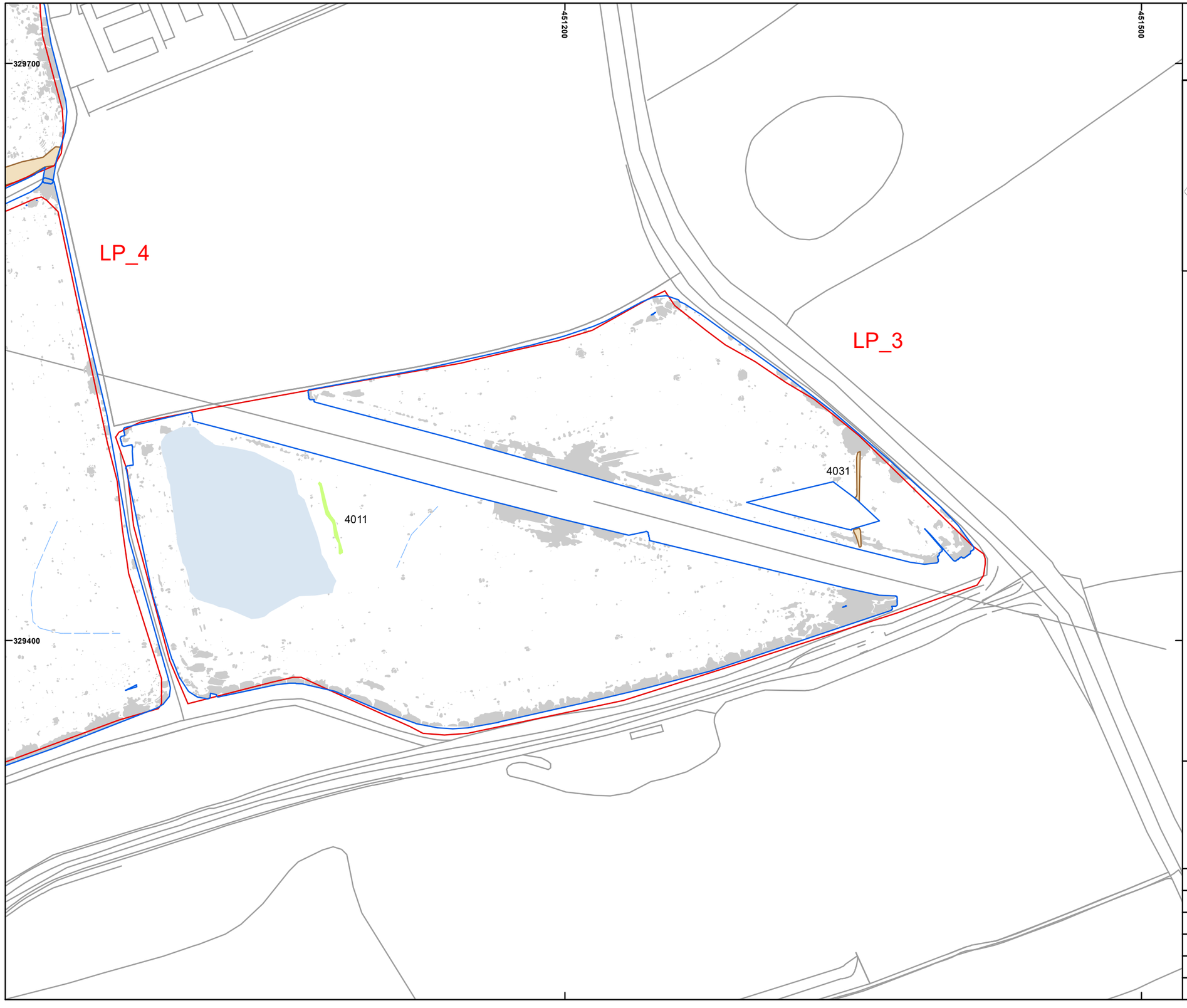
Detailed gradiometer survey results: greyscale plot east

Figure 9



Site Boundary
Detailed Survey Extents
Archaeology
Possible Archaeology
Former Path
Former Field Boundary
Ridge and Furrow
Modern Service
Increased Magnetic Response
Superficial Geology
Trend

0 100 m

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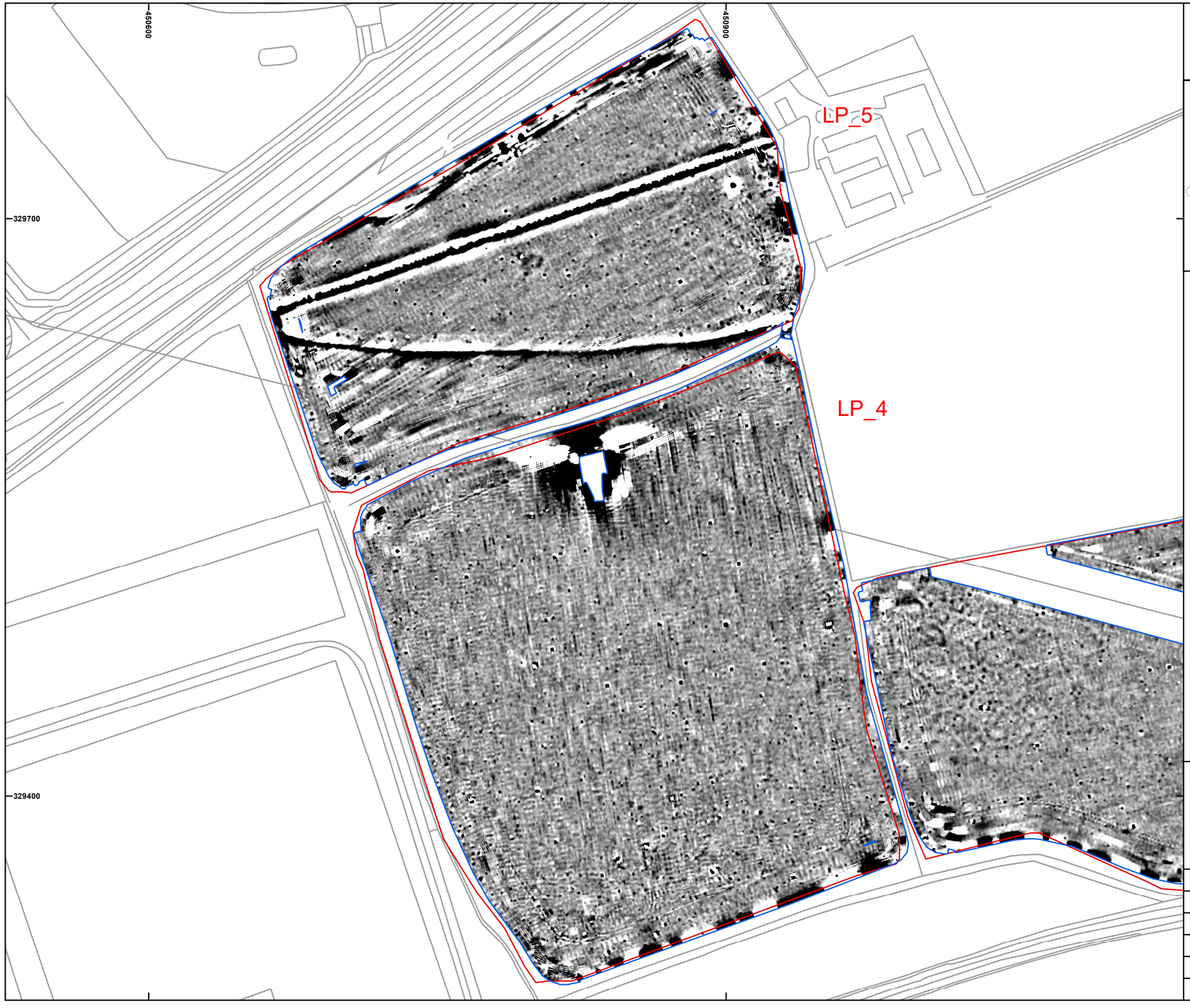
Detailed gradiometer survey results: interpretation east

Figure 10



Site Boundary

Detailed Survey Extents

-6 nT

9 nT

0

100 m

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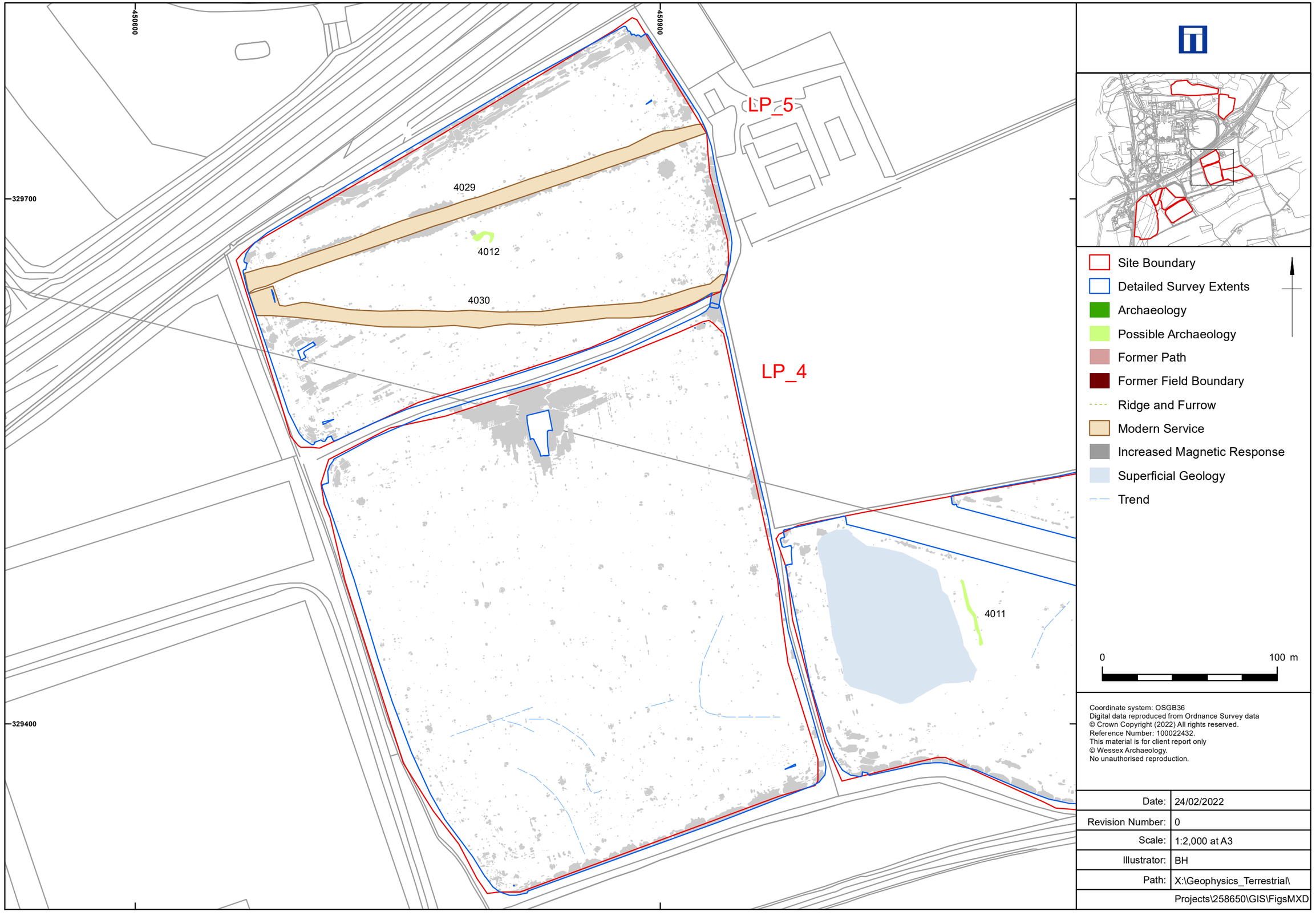
Detailed gradiometer survey results: greyscale plot centre

Figure 11



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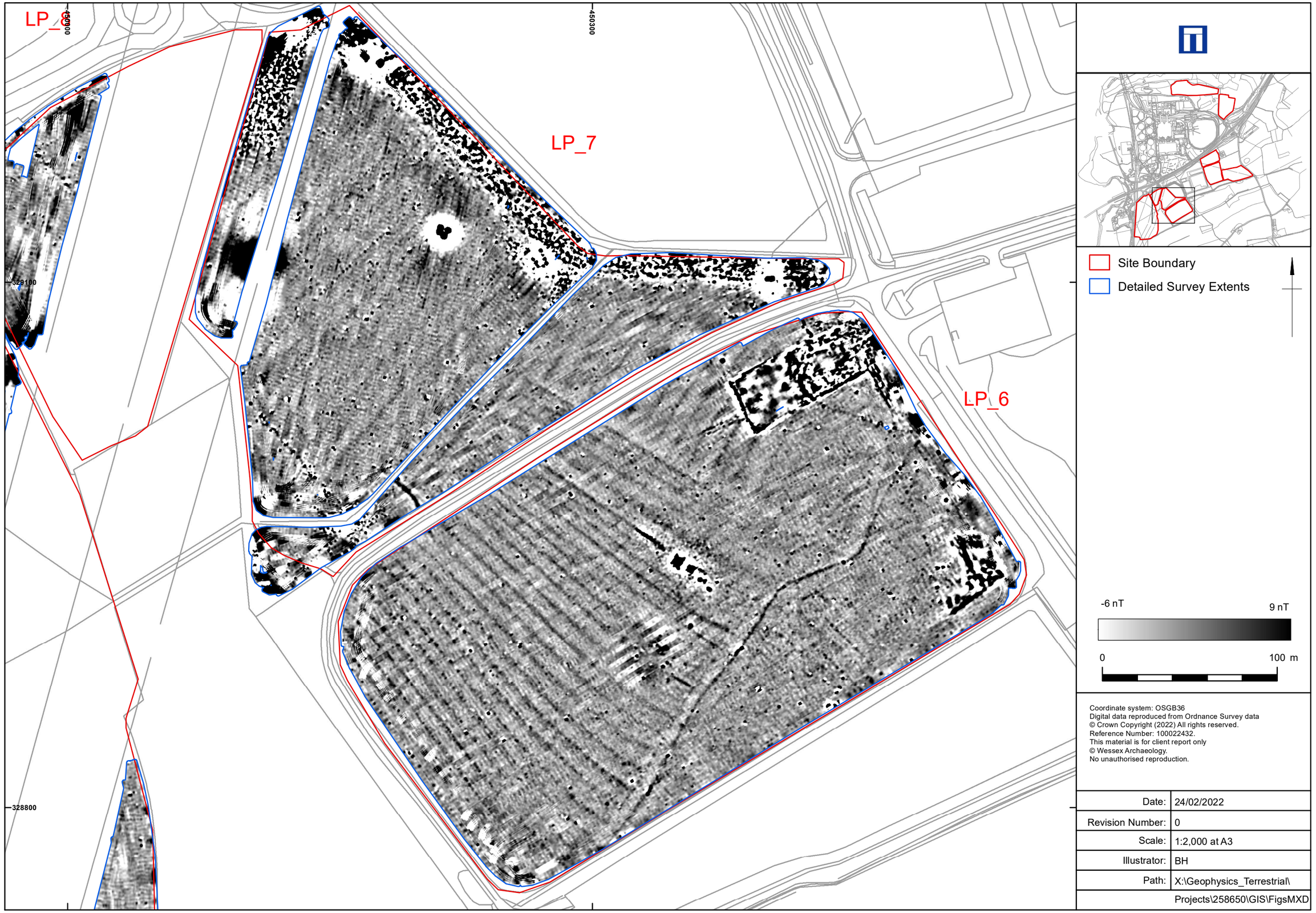
Detailed gradiometer survey results: interpretation centre

Figure 12



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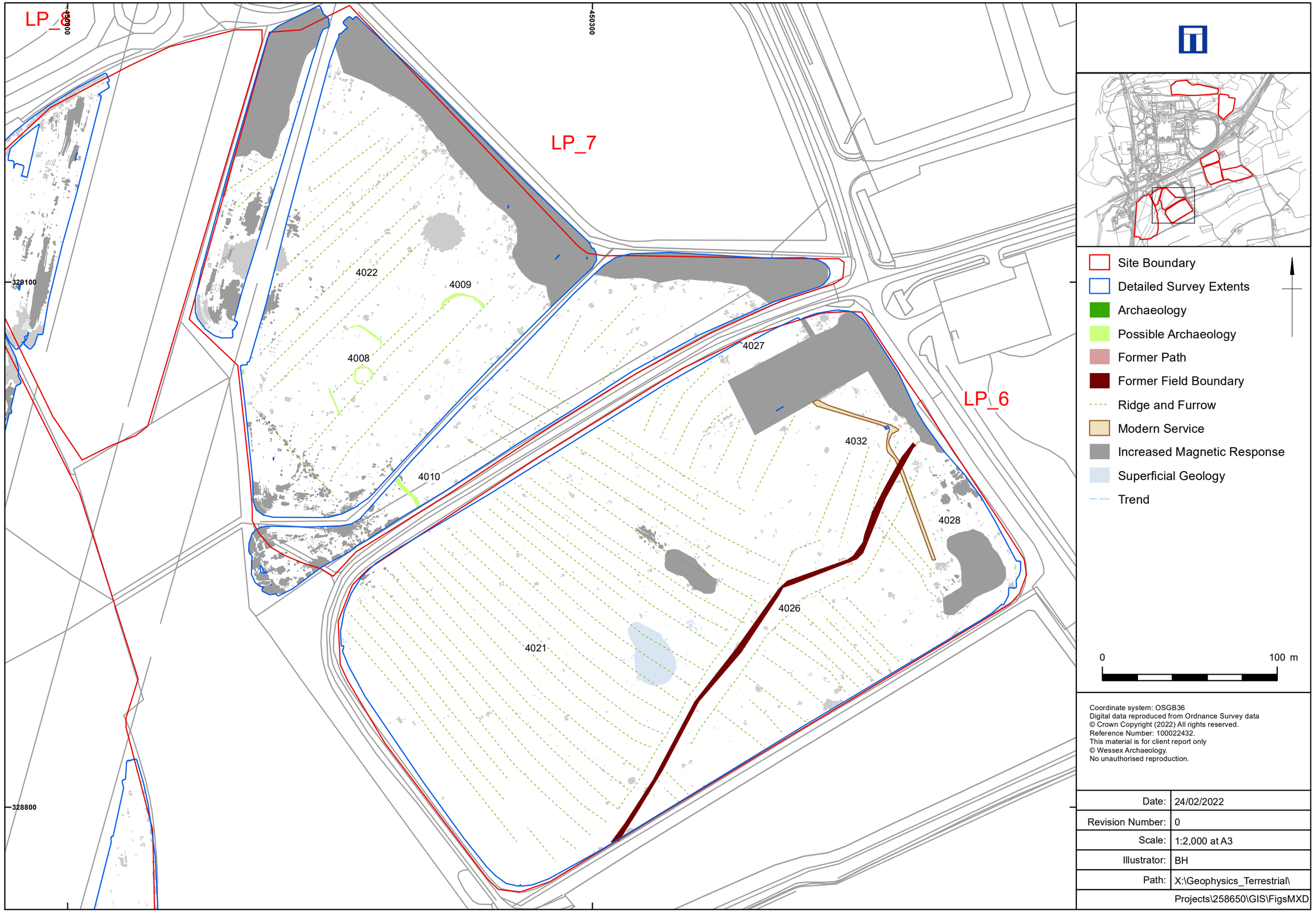
Detailed gradiometer survey results: greyscale plot mid-west

Figure 13



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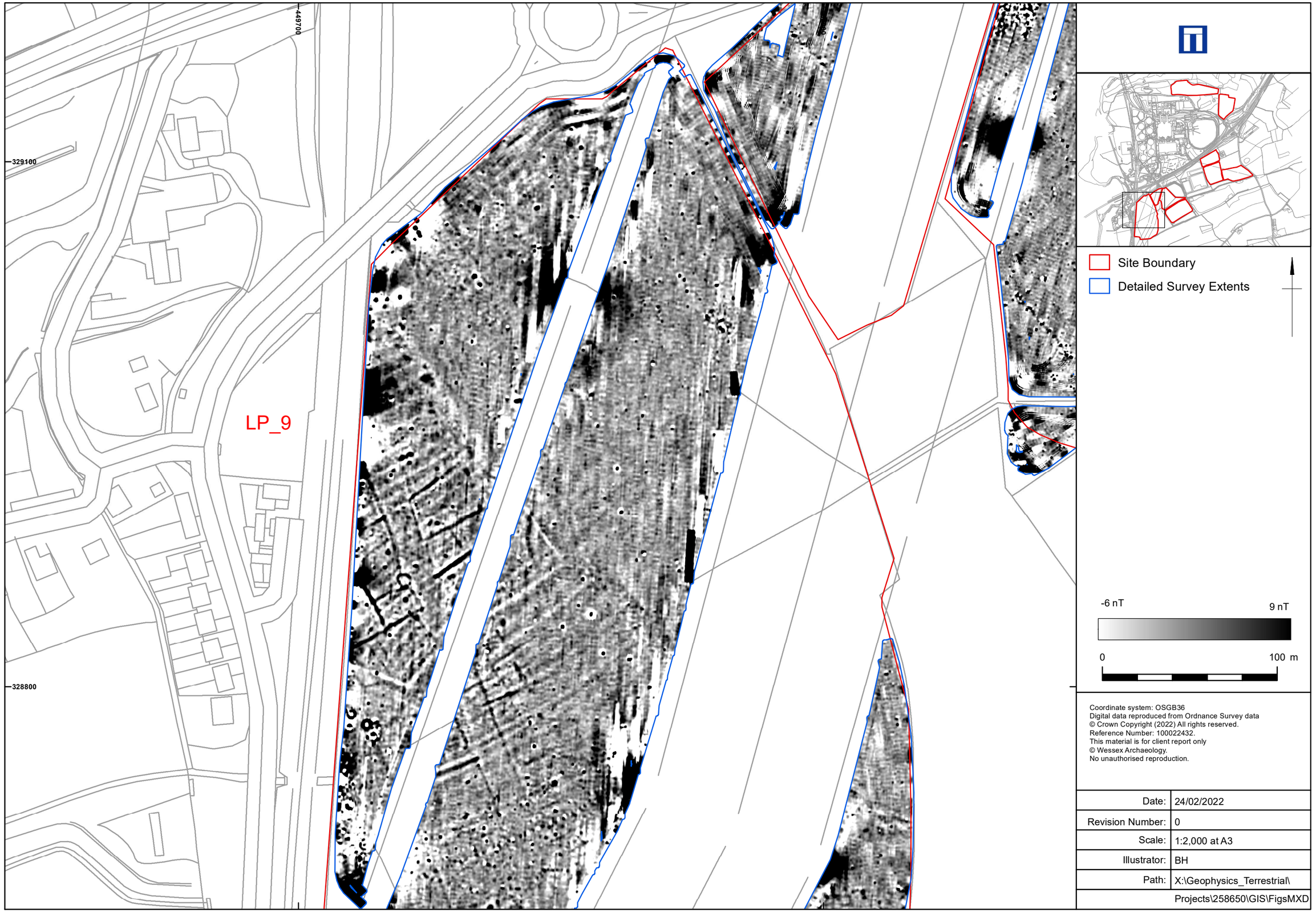
Detailed gradiometer survey results: interpretation mid-west

Figure 14



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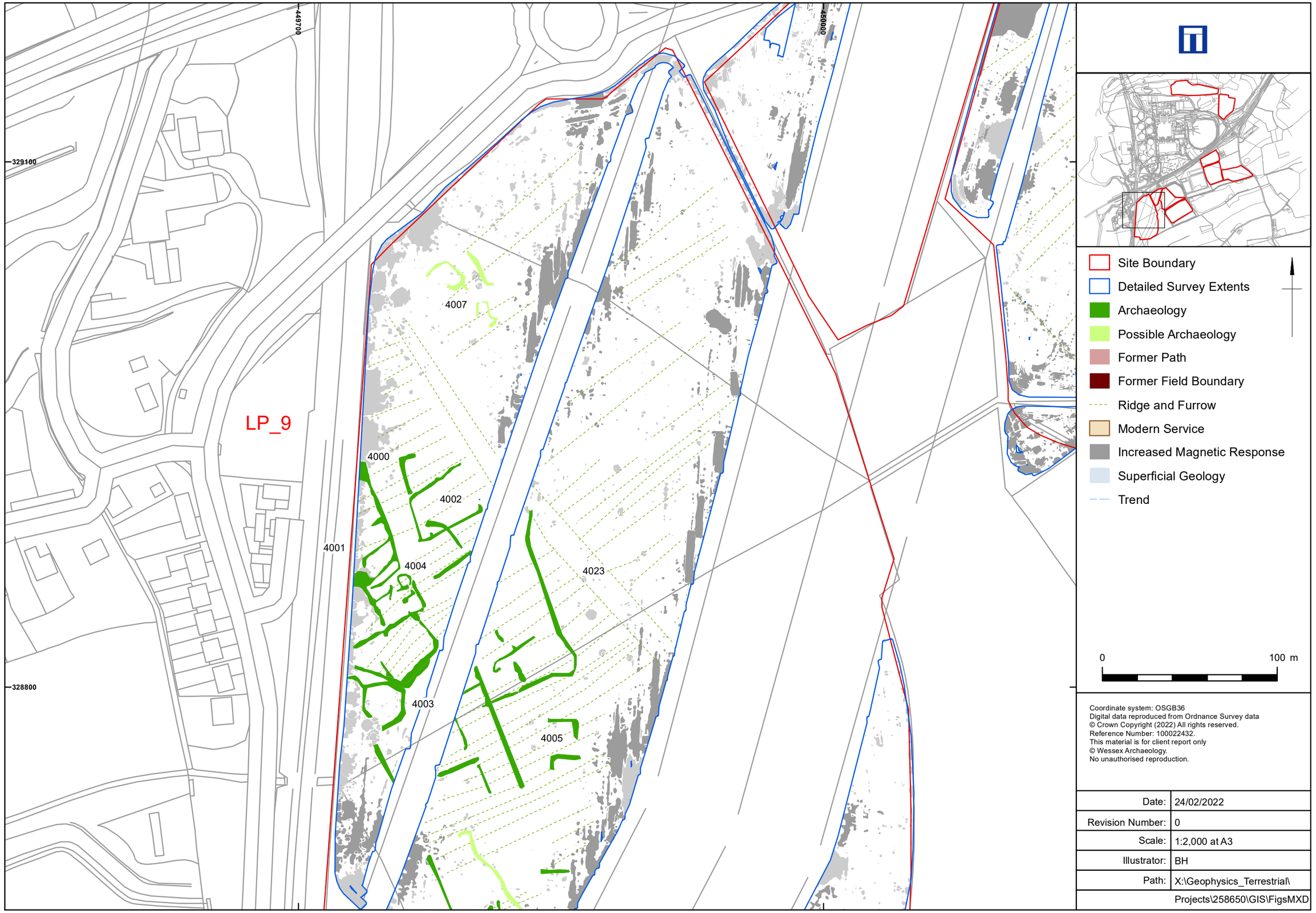
Detailed gradiometer survey results: greyscale plot west

Figure 15



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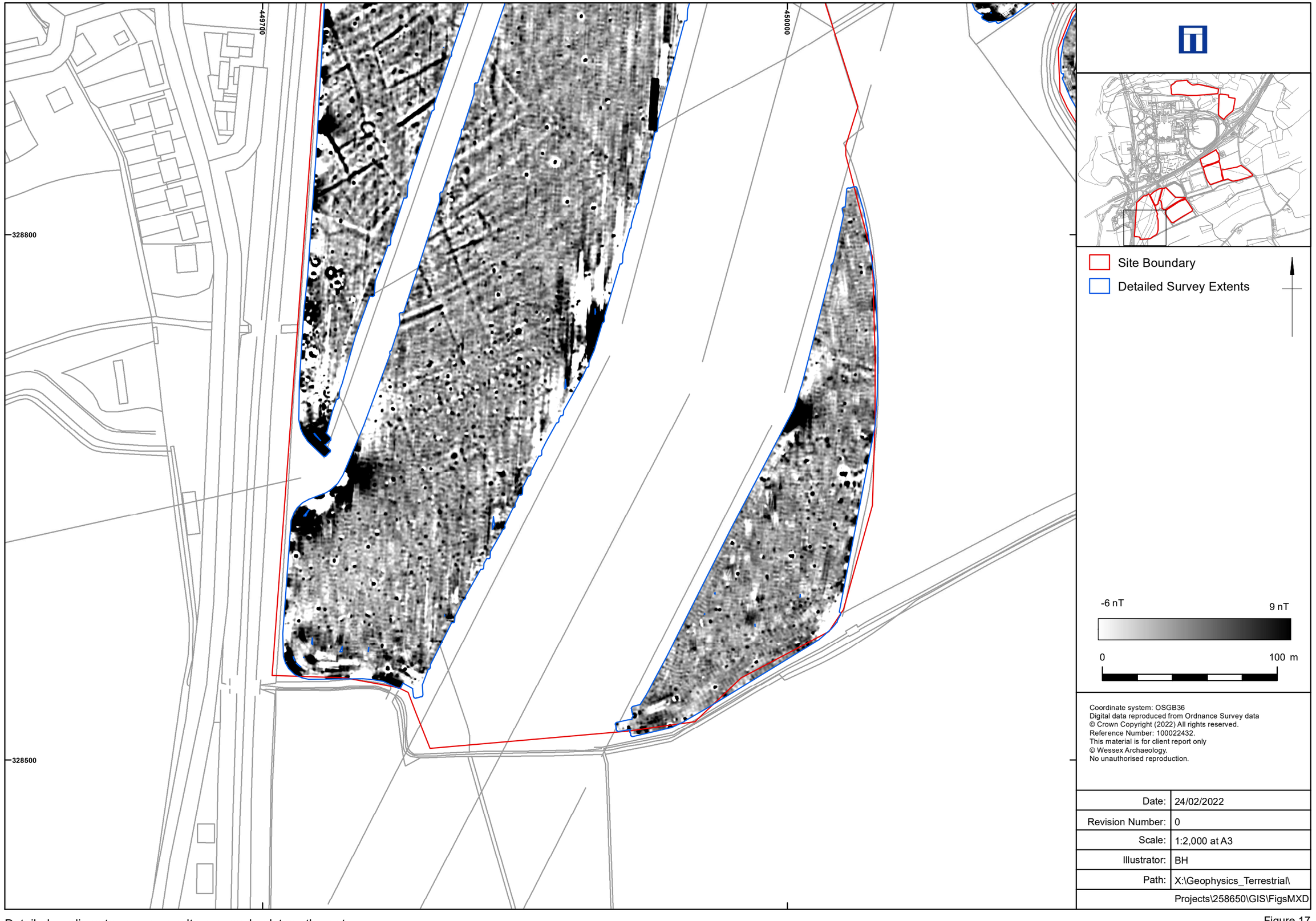
Detailed gradiometer survey results: interpretation west

Figure 16



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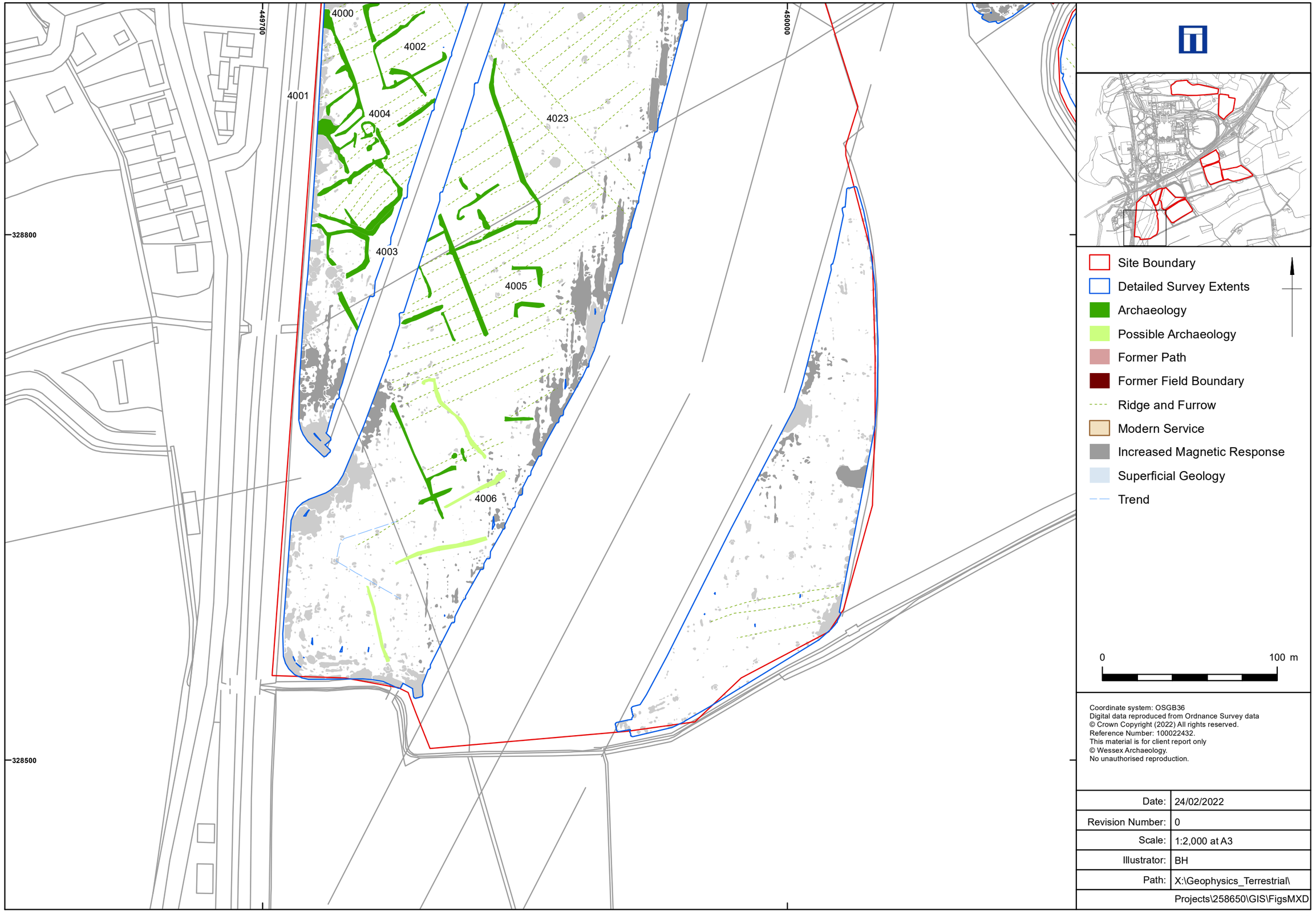
Detailed gradiometer survey results: greyscale plot south-west

Figure 17



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Detailed gradiometer survey results: interpretation south-west

Figure 18

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