NWCC18

NORTH-WEST CREWE PACKAGE, CREWE, CHESHIRE EAST

GEOPHYSICAL SURVEY

commissioned by Jacobs UK Ltd
on behalf of Cheshire East Council

November 2018

HEADLAND ARCHAEOLOGY

REGISTERED ORGANISATION CIfA

NORTH-WEST CREWE PACKAGE, CREWE, CHESHIRE EAST

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This report adheres to the quality standard of ISO 9001:2015

PROJECT INFO:

HA Project Code **NWCC18** / NGR **SJ 6850 5750** / Parish **Crewe** / Local Authority **Cheshire East Council** / OASIS Ref. **headland5-330139** / ADS/DOI Ref. **10.5284/1049654**

PROJECT TEAM:

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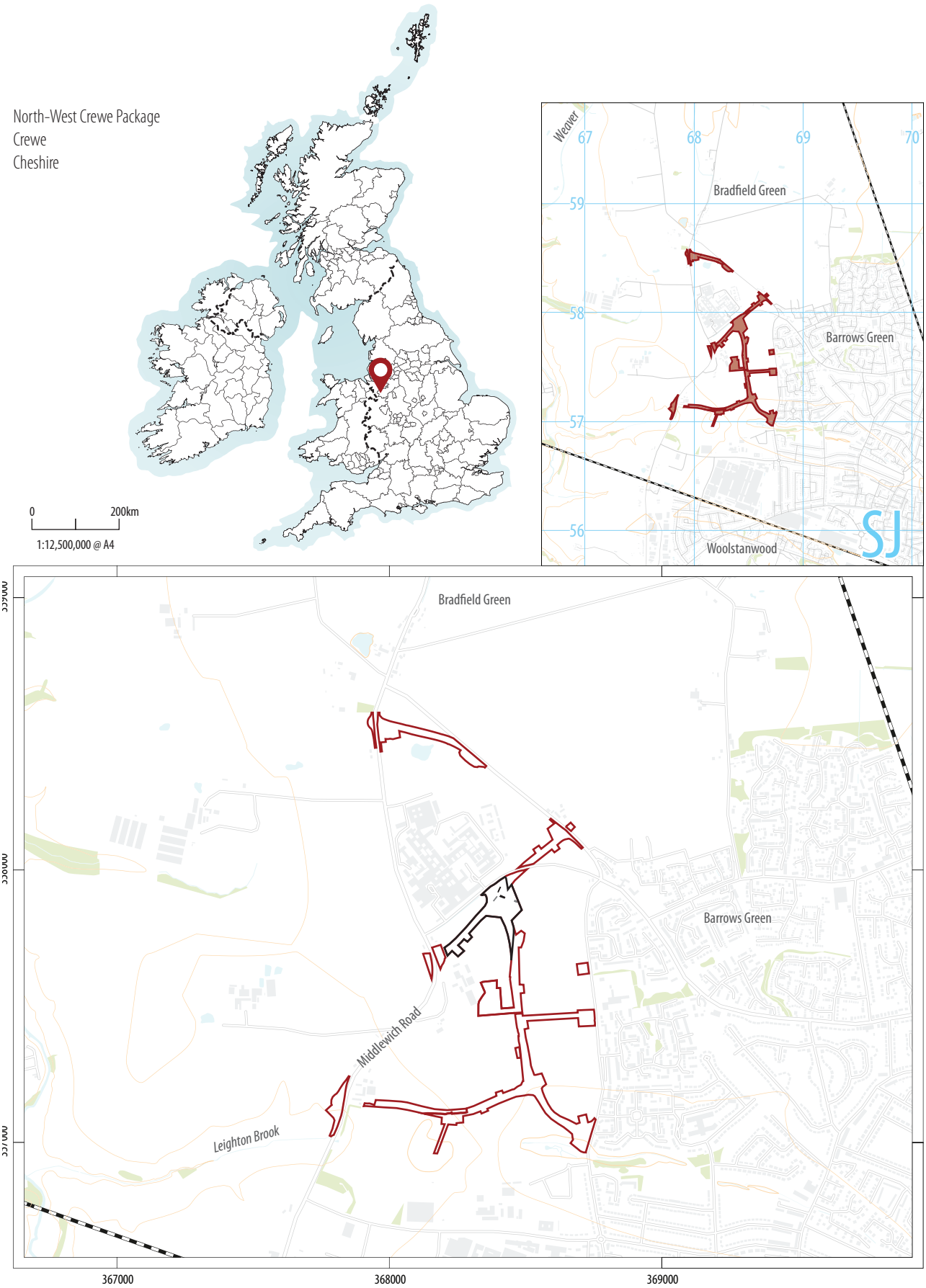
HEADLAND ARCHAEOLOGY

PROJECT SUMMARY

Headland Archaeology (UK) Ltd undertook a geophysical (magnetometer) survey, covering approximately 12 hectares, on the north-western periphery of Crewe, Cheshire East. The survey encompasses the corridor for the construction of 3.3 km of proposed new highways which will extend north and south of Leighton Hospital and also link east and west with A530 Middlewich Road and Minshull New Road. The corridor is located within a landscape of moderate archaeological potential with Roman, post-medieval and modern activity in the immediate vicinity, although there are no known heritage assets within the corridor itself. No anomalies of definite archaeological potential have been identified by the geophysical survey with the majority of the anomalies being of modern, agricultural or geological origin. A line of pit type responses (a possible pit alignment) has been identified immediately south of Leighton Hospital but this interpretation is tentative, and a modern origin is considered equally likely. The relatively narrow width of the survey corridor makes confident interpretation of some of the anomalies difficult but on the basis of the survey the archaeological potential of the road corridor is assessed as low with the exception of in the vicinity of the possible pit alignment where it is assessed as moderate.

CONTENTS

LIST OF ILLUSTRATIONS



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ILLUS 1 Site location

NORTH-WEST CREWE PACKAGE, CREWE, CHESHIRE EAST

GEOPHYSICAL SURVEY

1 INTRODUCTION

Headland Archaeology was commissioned by Jacobs Ltd (The Consultant), on behalf of Cheshire East Council (The Client), to undertake a geophysical (magnetometer) survey along the proposed route of new highways north and south of Leighton Hospital, north-west Crewe (see Illus 1).

The survey was carried out as part of a baseline study which aims to assess the heritage potential of the Study Area (SA).

The work was undertaken in accordance with a Written Scheme of Investigation for Archaeological Geophysical Survey (Jacobs 2018a) and in line with current best practice (CIfA 2016, EAC 2015).

The survey was carried out between 25th of June and 17th of July 2018.

1.1 SITE LOCATION, TOPOGRAPHY AND LAND-USE

The proposed highway will extend in southerly direction from a new roundabout junction at Leighton Hospital (SJ 6850 5750) ending at another roundabout which will connect into the A530 Middlewich Road (SJ 6785 5709) to the west, and Minshull New Road (SJ 6876 5722) to the east. In addition, a new section of road north of Leighton Hospital will connect the A530 Middlewich Road (SJ 6796 5859) to the B5076 Flowers Lane (SJ 6816 5854).

The geophysical survey area (GSA) encompasses the footprint of the new road corridor, including embankments and connecting infrastructure, across 21 Survey Parcels (SP) and varying in width between 30m and 80m; an overall length of 3.3 kilometres. The majority of the SP's comprised grass fields that had been cut for silage fields prior to survey, with the exception of SP2, SP7, SP11 and SP12 which were under a mature cereal crop. SP19 was overgrown and unsuitable for survey while SP25, SP10 and SP1 were under crop and no survey was undertaken.

1.2 GEOLOGY AND SOILS

The bedrock geology comprises sedimentary rock of the Sidmouth Mudstone formation overlain by superficial deposits of Devensian Glacial till (NERC 2018).

The soils are classified in the Soilscape 18 association, slowly permeable, seasonally wet but base-rich loams and clays (Cranfield University 2018).

2 ARCHAEOLOGICAL BACKGROUND

An Environmental Impact Assessment Scoping Report (Jacobs 2018b, Chapter 7) identified Roman, post-medieval and modern activity in the vicinity of the road corridor, but none within the corridor itself. This includes a Roman Road located on the north-west side of the corridor, approximately 150 m away from SP2, a series of post-medieval (AD 1540–1901) sand pits, a number of barrage balloon sites and two crash sites of British aircrafts brought down by collisions with barrage balloon cables (Jacobs 2018, Chapter 7).

Analysis of the Ordnance Survey Maps (OS) covering the extent of the GSA has identified the former location of Totty's Hall Farm, including outbuildings, which was demolished in the 1970s and was located directly north of SP18. Furthermore, the maps indicate numerous changes in the pattern of enclosure since the publication of the first edition maps along the entire road corridor (Old-maps.co.uk 2018), with several boundaries being removed over the last 150 years to increase field size.

ILLUS 2 Survey Parcel 3; looking east **ILLUS 3** Survey Parcel 5; looking north

3 AIMS, METHODOLOGY AND PRESENTATION

The general aim of the geophysical survey was to provide sufficient information to establish the presence/absence, character and extent of any archaeological remains within the road corridor.

The specific archaeological objectives of the geophysical survey were:

- to determine (as far as possible) the presence or absence, character and extent of buried archaeological remains in the GSA; and
- to interpret any geophysical anomalies identified by the survey.

3.1 MAGNETOMETER SURVEY

Magnetic survey methods rely on the ability of a variety of instruments to measure very small magnetic fields associated with buried archaeological remains. A feature such as a ditch, pit or kiln can act like a small magnet, or series of magnets, that produce distortions (anomalies) in the earth's magnetic field. In mapping these slight variations, detailed plans of sites can be obtained as buried features often produce reasonably characteristic anomaly shapes and strengths (Gaffney & Gater 2003). Further information on soil magnetism and the interpretation of magnetic anomalies is provided in Appendix 1.

The survey was undertaken using four Bartington Grad601 sensors mounted at 1m intervals (1m traverse interval) onto a rigid carrying frame. The system was programmed to take readings at a frequency

ILLUS 4 Survey Parcel 8; looking north **ILLUS 5** Survey Parcel 17; looking north

of 10Hz (allowing for a 10–15cm sample interval) on roaming traverses (swaths) 4m apart. These readings were stored on an external weatherproof laptop and later downloaded for processing and interpretation. The system was linked to a Trimble R8s Real Time Kinetic (RTK) differential Global Positioning System (dGPS) outputting in NMEA mode to ensure a high positional accuracy for each data point.

MLGrad601 and MultiGrad601 (Geomar Software Inc.) software was used to collect and export the data. Terrasurveyor V3.0.32.4 (DWConsulting) software was used to process and present the data.

3.2 REPORTING

A general site location plan is shown in Illus 1 at a scale of 1:25,000. Illus 2–5 are site condition photographs. Illus 6 is a 1:5,000 survey location plan showing photo directions. Detailed data plots of the fully processed data, minimally processed data (XY traceplot), with accompanying interpretative plots are produced at 1:5,000, as Illus 7 and Illus 8, and at 1:2,500 as Illus 9 to Illus 17 inclusive.

Technical information on the equipment used, data processing and magnetic survey methodology is given in Appendix 1. Appendix 2 details the survey location information and Appendix 3 describes the composition and location of the site archive. Data processing details are presented in Appendix 4.

The survey methodology, report and any recommendations comply with the Written Scheme of Investigation for Archaeological Geophysical Survey (McNaught 2018), guidelines outlined by Historic England (EAC 2015) and by the Chartered Institute for Archaeologists (CIfA 2016). All illustrations from Ordnance Survey mapping are

reproduced with the permission of the controller of Her Majesty's Stationery Office (© Crown copyright).

The illustrations in this report have been produced following analysis of the data in 'raw' and processed formats and over a range of different display levels. All illustrations are presented to most suitably display and interpret the data from this site based on the experience and knowledge of management and reporting staff.

4 RESULTS AND DISCUSSION

The ground conditions were good throughout and the overall data quality is good. The magnetic background is consistent across the GSA with minor geological anomalies due to the depth and composition of the soils.

Numerous anomalies have been identified against this background and these are discussed below and cross-referenced to specific examples on the interpretive figures, where appropriate.

4.1 FERROUS AND MODERN ANOMALIES

Ferrous anomalies, characterised as individual 'spikes', are typically caused by ferrous (magnetic) material, either on the ground surface or in the plough-soil. Little importance is normally given to such anomalies, unless there is any supporting evidence for an archaeological interpretation, as modern ferrous debris is common on most sites, often being present as a consequence of manuring or tipping/infilling. There is no obvious clustering to these ferrous anomalies which might indicate an archaeological origin. Far more probable is that the 'spike' responses are likely caused by the random distribution of ferrous debris in the upper soil horizons.

An east/west linear anomaly is identified crossing SP5 and SP6 (Illus 15–17) and is interpreted as a buried service pipe (SP1).

Other areas of magnetic disturbance around the perimeter of the fields and along the field edges is due to ferrous material within the field boundaries and along road edges.

In the south of the GSA, a large area of high magnitude magnetic disturbance has been identified in SP20 and SP22 (Q1, Illus 9–11). This area corresponds to an area of post-medieval sand quarrying identified in the Environmental Scoping Report (Jacobs 2018b, Chapter 7). The disturbance is due to the strongly magnetic properties of the material used to backfill the quarry pit/s.

Across the GSA three other areas of magnetic disturbance have been identified in SP15 and SP8 (P1, P2, P3, Illus 9–14). These localised areas correspond to ponds depicted on the first edition OS map which were also likely former quarry pits. Again, the strong magnetic disturbance is due to the magnetic properties of the infill material.

A cluster of positive anomalies (Illus 9–11) have been identified on the north-east side of SP18. These anomalies have been interpreted as of modern origin and are probably due to bricks and/or other fired material in the ploughsoil resulting from the demolition of outbuildings located immediately south of Totty's Hall Farm.

To the eastern side of SP13, a cluster of five irregularly shaped anomalies is identified (Illus 12–14). This cluster is interpreted to be of likely modern origin due to the high magnitude magnetic response and the lack of any archaeological context.

4.2 AGRICULTURAL ANOMALIES

Linear anomalies or linear trends in the data are identified in the majority of the survey parcels. All of these anomalies are due to agricultural activity (boundary removal, ploughing or drainage) over the last 200 years.

Analysis of the historic OS mapping indicates that the pattern of enclosure has changed quite drastically since 1877 with several former boundaries having been removed. These former boundaries manifest in the data as high magnitude linear anomalies (FB1–11). These anomalies are parallel or at right angles to extant boundaries and are caused by the magnetic contrast between the infilled ditch and the surrounding soils.

Other, closely spaced and parallel linear trend anomalies predominantly reflect the alignment of recent ploughing.

Finally, linear anomalies identified in SP7, SP11, SP14 and SP15 (Illus 12–14), which are often oblique to field boundaries and exhibit a 'speckled' appearance, are interpreted as field drains.

4.3 GEOLOGICAL ANOMALIES

Numerous small isolated anomalies (discrete areas of magnetic enhancement) are identified throughout the GSA. These are interpreted as geological in origin and are due to variation in the composition of the superficial deposits and the soils from which they derive.

4.4 ARCHAEOLOGICAL ANOMALIES

No anomalies of definite archaeological potential have been identified by the geophysical survey. However, one area of possible archaeological potential has been identified in SP8 directly south of Leighton Hospital.

An alignment of 13 equally-spaced pit-type anomalies is identified extending 70m on a north-west/south-east orientation (PA?, Illus 12–14). The possible pit alignment does not extend beyond the boundary between SP8 and SP11. However, the possibility that the responses could be due to some type of pipe or drain is considered to be equally plausible.

5 CONCLUSION

The geophysical survey has successfully evaluated the proposed route for new highways in north-west Crewe and has identified no anomalies of definite archaeological origin. However, an alignment of pit type anomalies is interpreted as being of possible archaeological origin although a non-archaeological origin cannot be dismissed.

Elsewhere, the survey has detected anomalies that reflect the historical landscape of the area; former field boundaries, drains, infilled ponds and evidence of quarrying. Therefore, this report confirms the findings of the Environment Scoping Report (Jacobs 2018b, Chapter 7) and assesses the archaeological potential of the road corridor as low, and moderate in the vicinity of the possible pit alignment.

6 REFERENCES

Chartered Institute for Archaeologists (CIfA) 2016 ***Standard and guidance for archaeological geophysical survey*** (Reading) http://www.archaeologists.net/sites/default/files/CIfAS%26GGeophysics_2.pdf accessed 30 August 2018

Cranfield University 2018 ***Cranfield Soil and Agrifood Institute Soilscapes*** http://www.landis.org.uk/soilscapes/ accessed 30 August 2018

Europae Archaeologia Consilium (EAC) 2015 ***EAC Guidelines for the Use of Geophysics in Archaeology: Questions to Ask and Points to Consider*** (Namur, Belgium) https://historicengland.org.uk/images-books/publications/eac-guidelines-for-use-of-geophysics-in-archaeology/ accessed 30 August 2018

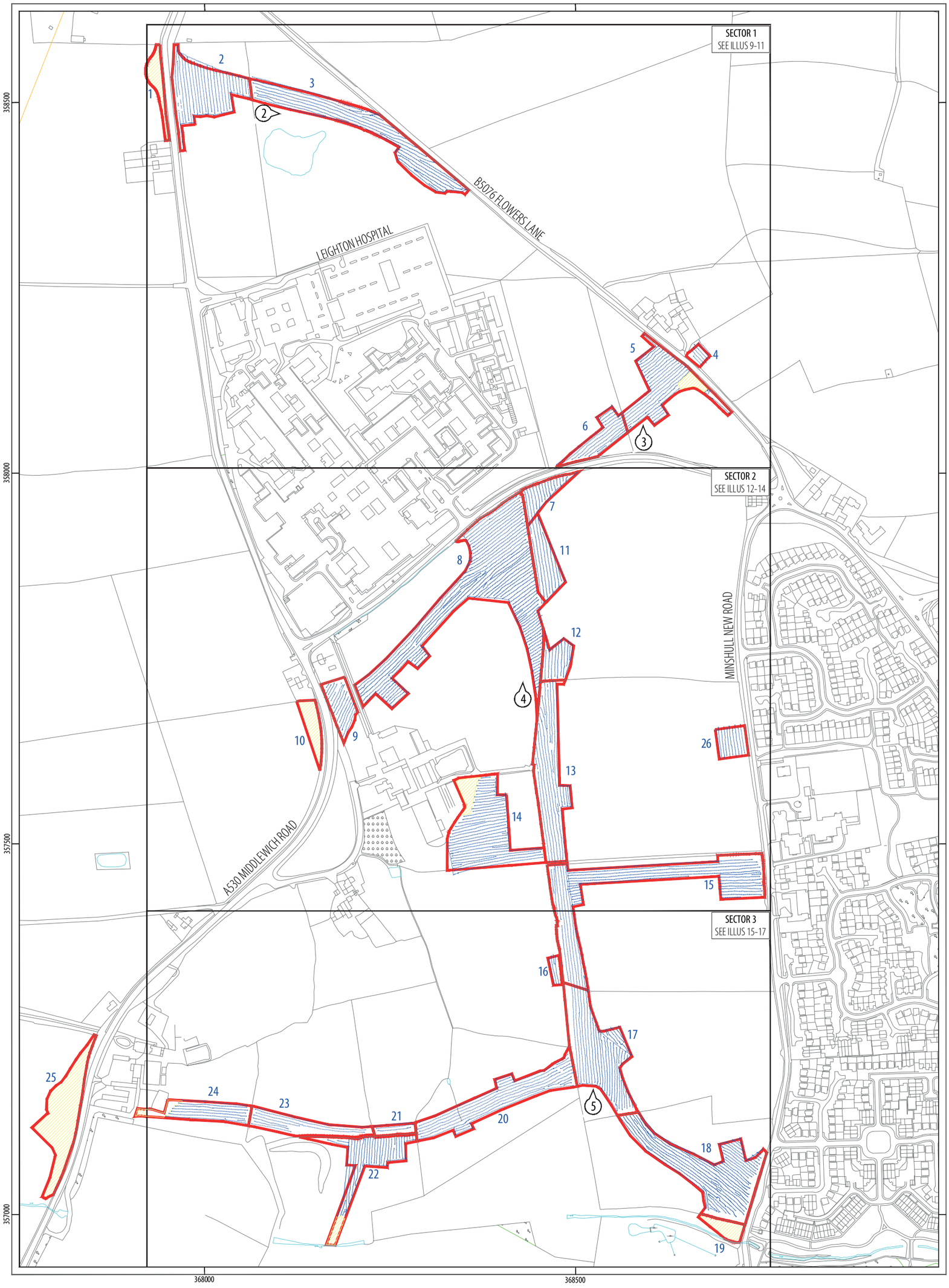
Gaffney C & Gater J (2003) ***Revealing the Buried Past: Geophysics for Archaeologists*** Stroud

Natural Environment Research Council (NERC) 2018 ***British Geological Survey*** http://www.bgs.ac.uk/ accessed 30 August 2018

Jacobs 2018a ***Written Scheme of Investigation for Archaeological Geophysical Survey*** [unpublished client document] ref BRJ10410/SPE/3000/005

Jacobs 2018b ***North-West Crewe Package: Environmental Impact Assessment Scoping Report*** [unpublished client document]

Old-maps.co.uk 2018 ***Old-Maps - the online repository of historic maps*** https://www.old-maps.co.uk/#/Map/368461/357812/12/100093 accessed 30 August 2018



geophysical survey area
area unsuitable for survey
GPS swaths
location and direction of ILLUS 2-5

0 100m
1:5,000 @ A3

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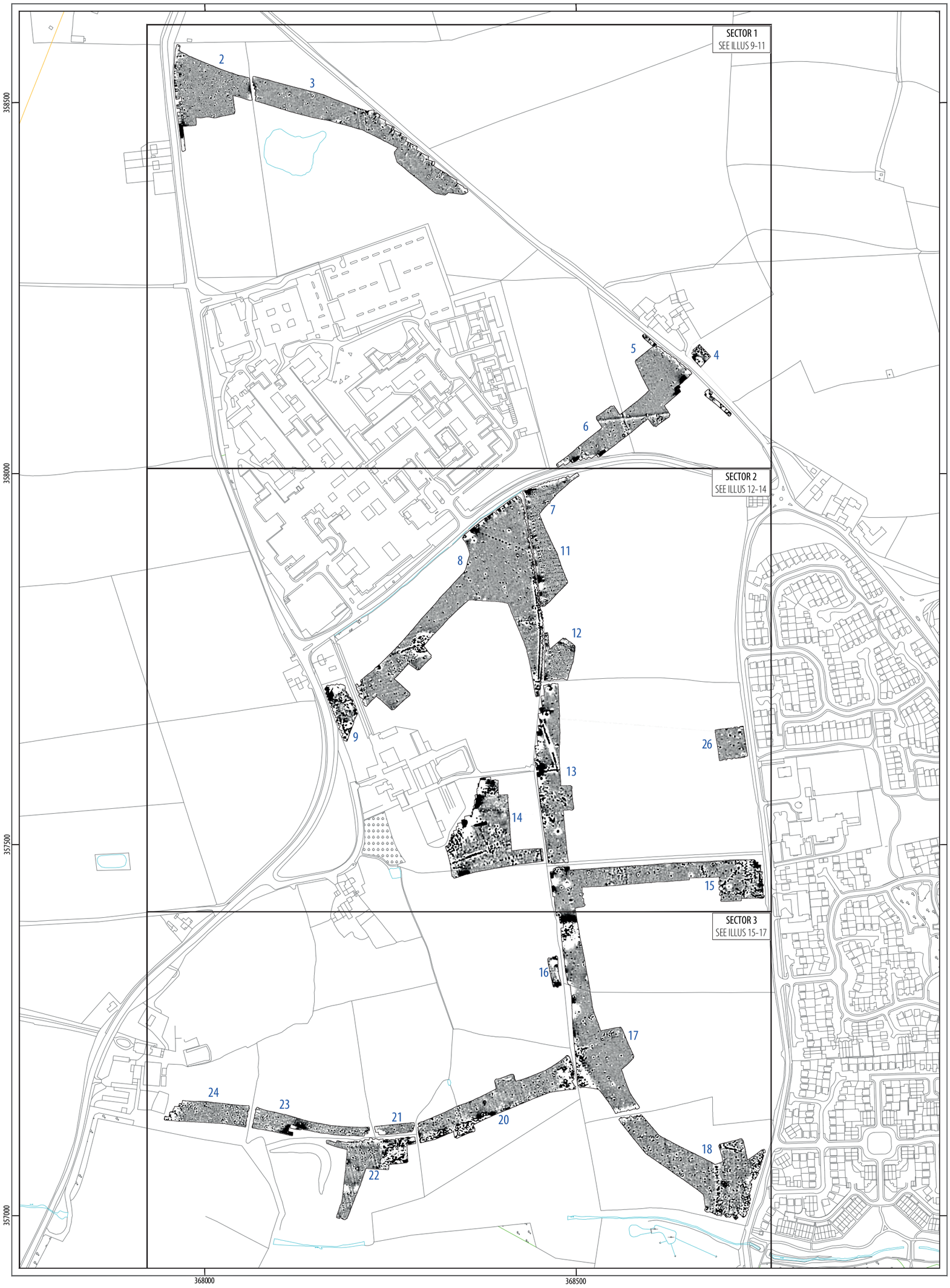
ILLUS 6 Survey location showing GPS swaths and photo locations (1:5,000)



nT
-1.0 2.0

0 100m
1:5,000 @ A3

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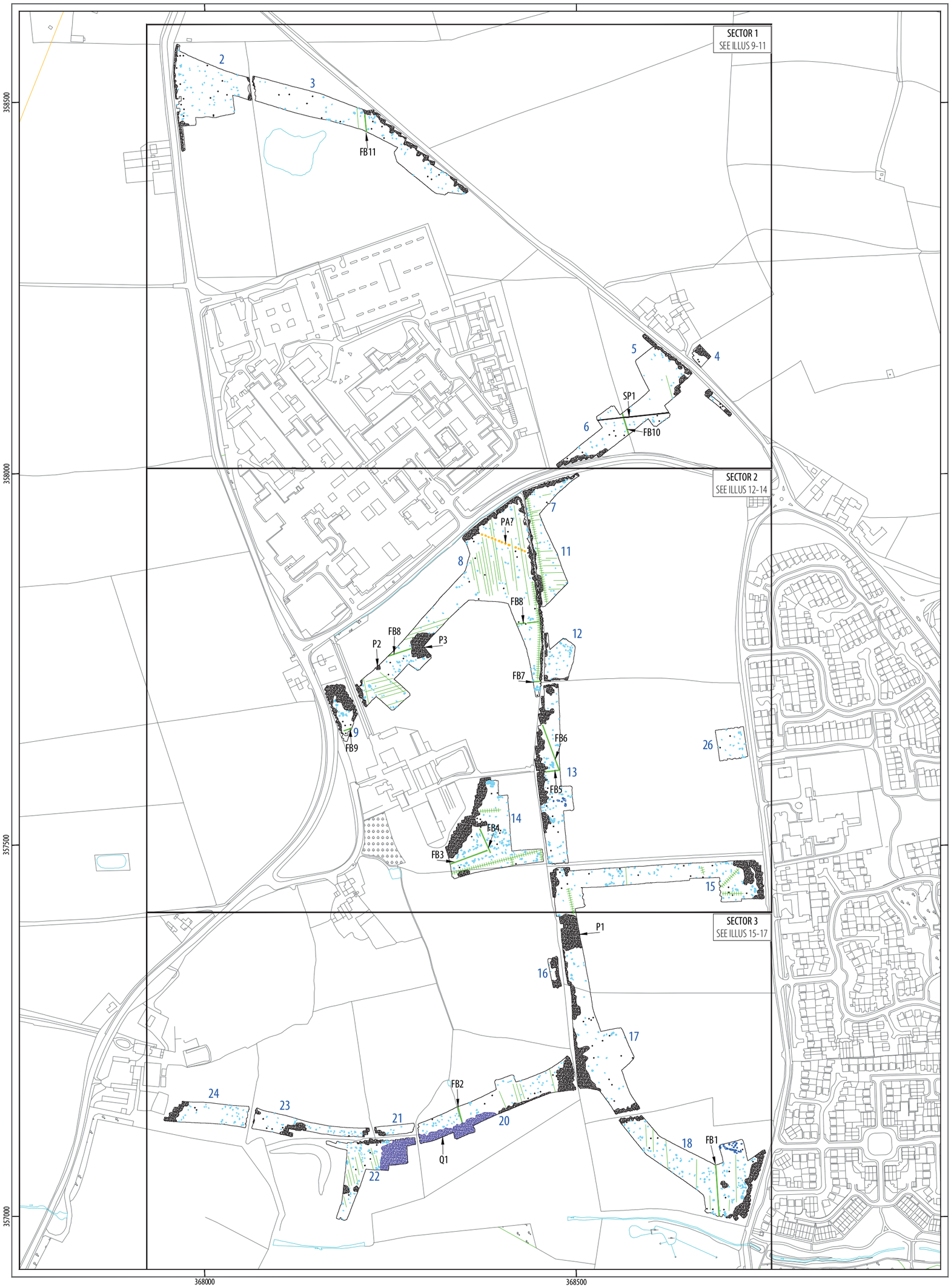
ILLUS 7 Processed greyscale magnetometer data (1:5000)



TYPE OF ANOMALY	INTERPRETATION
dipolar isolated	ferrous material
linear	service pipe
magnetic disturbance	ferrous material
magnetic disturbance	quarry
magnetic disturbance	modern
linear trend	agricultural

TYPE OF ANOMALY	INTERPRETATION
linear trend	field drain
linear	former field boundary
magnetic enhancement	geology
magnetic enhancement	archaeology?

ABBREVIATIONS

- **PA?** pit alignment?
- **FB** former boundary
- **P** pond
- **SP** service pipe
- **Q** quarry

0 100m
1:5,000 @ A3

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ILLUS 8 Interpretation of magnetometer data (1:5000)

nT
-1.0 2.0

0 50m
1:2,500 @ A3

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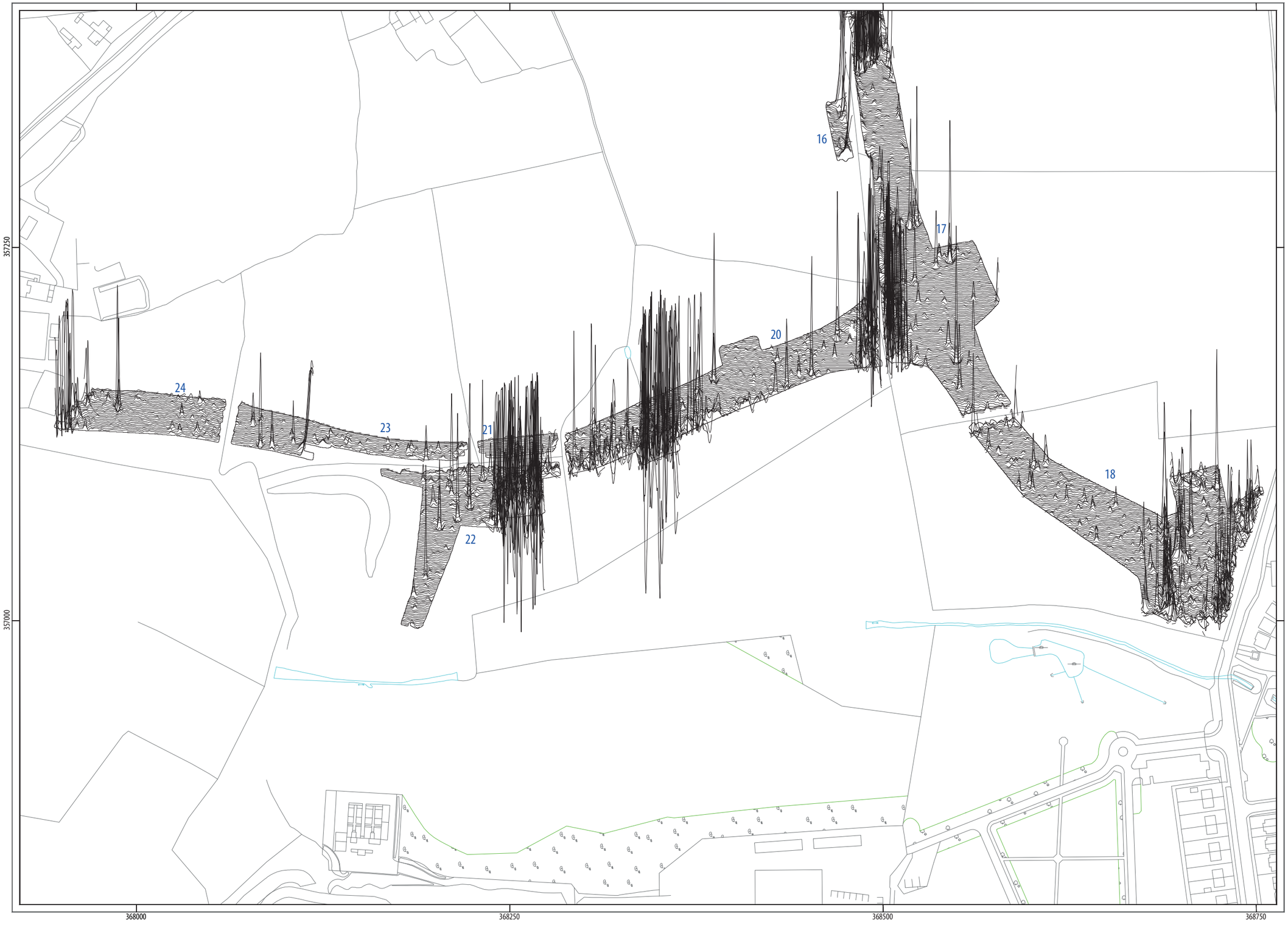
ILLUS 9 Processed greyscale magnetometer data; Sector 1 (1:2,500)



25.0nT/cm

0 50m

1:2,500 @ A3

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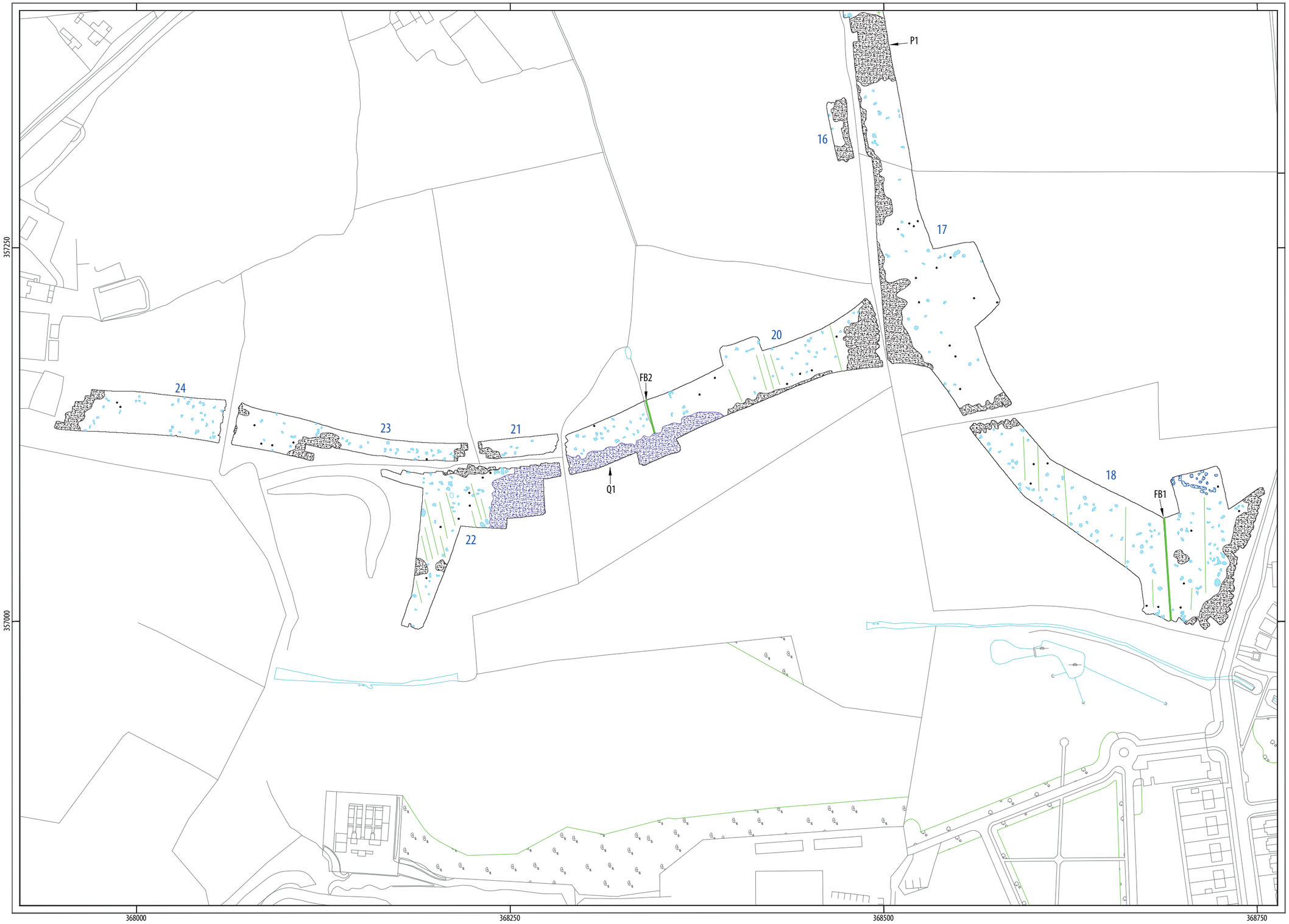
ILLUS 10 XY trace plot of minimally processed magnetometer data; Sector 1 (1:2,500)



TYPE OF ANOMALY / INTERPRETATION

TYPE OF ANOMALY	INTERPRETATION
dipolar isolated	ferrous material
magnetic disturbance	ferrous material
magnetic disturbance	quarry
magnetic disturbance	modern
linear trend	agricultural
linear trend	field drain
linear	former field boundary
magnetic enhancement	geology
magnetic enhancement	archaeology?

ABBREVIATIONS

- **FB** former boundary
- **P** pond
- **Q** quarry

0 50m
1:2,500 @ A3

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ILLUS 11 Interpretation of magnetometer data; Sector 1 (1:2,500)

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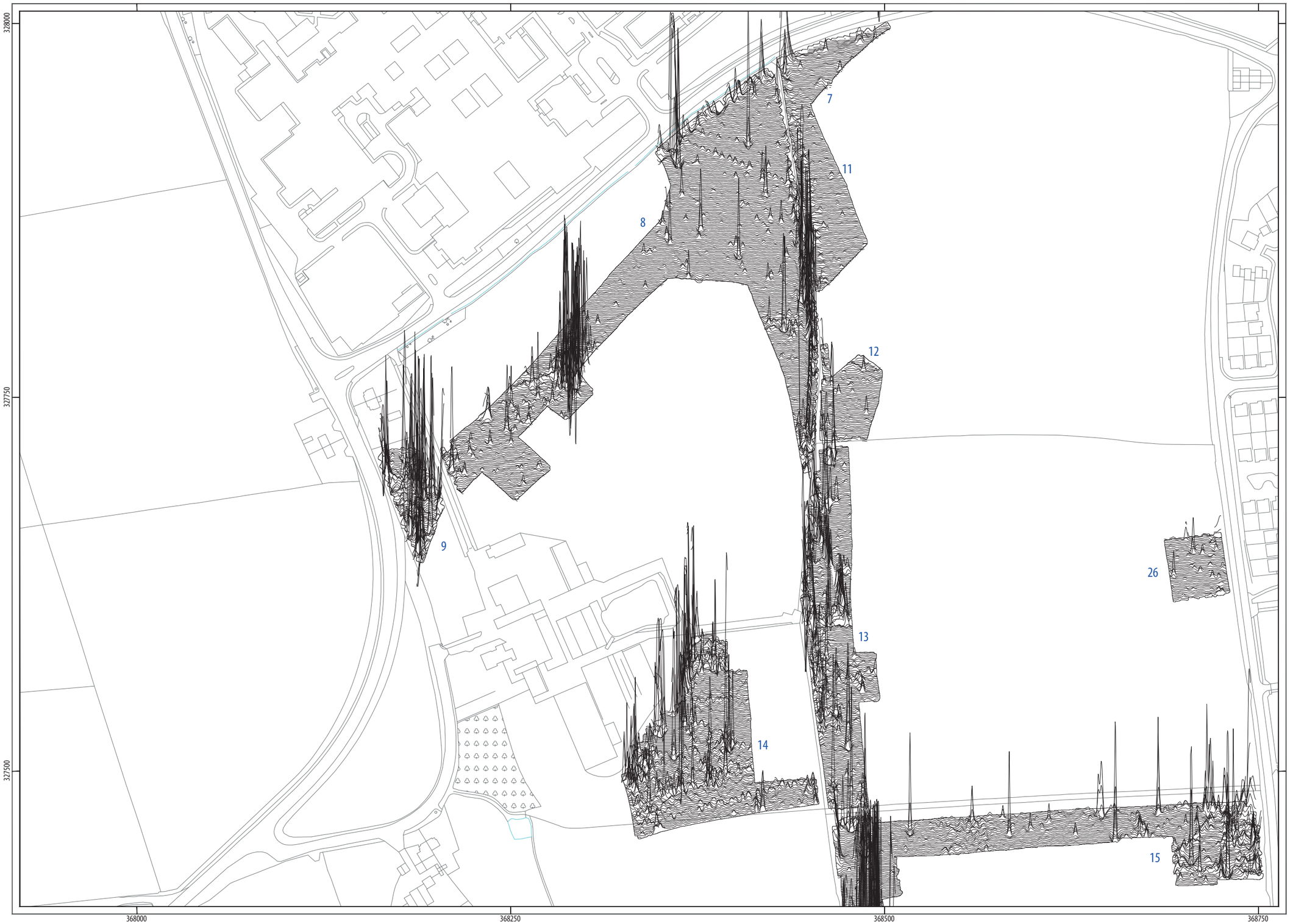
ILLUS 12 Processed greyscale magnetometer data; Sector 2 (1:2,500)



25.0nT/cm

0 50m

1:2,500 @ A3

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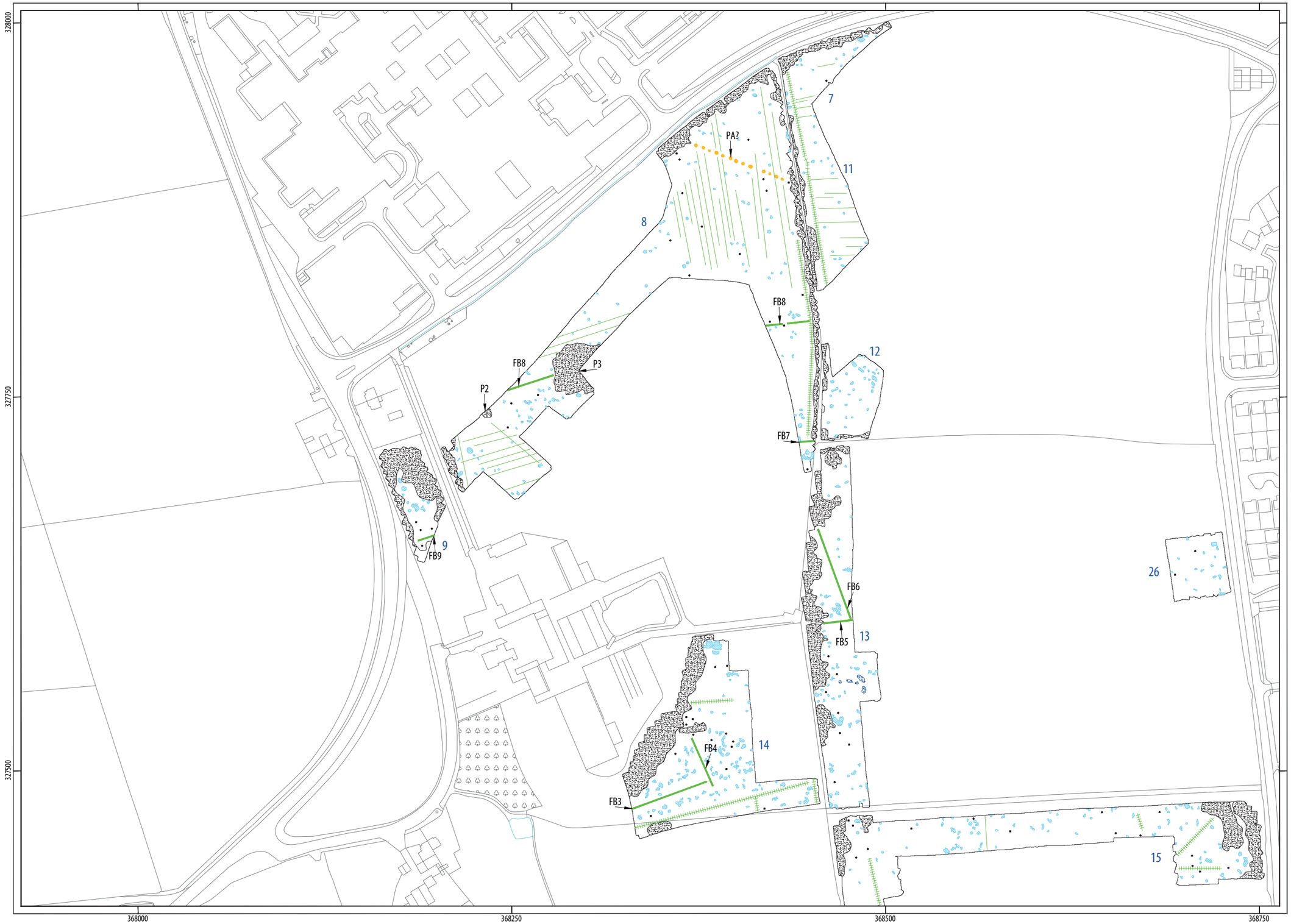
ILLUS 13 XY trace plot of minimally processed magnetometer data; Sector 2 (1:2,500)



TYPE OF ANOMALY	INTERPRETATION
dipolar isolated	ferrous material
magnetic disturbance	ferrous material
magnetic disturbance	modern
linear trend	agricultural
linear trend	field drain
linear	former field boundary
magnetic enhancement	geology
magnetic enhancement	archaeology?

ABBREVIATIONS

PA? pit alignment?

FB former boundary

P pond

0 50m

1:2,500 @ A3

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ILLUS 14 Interpretation of magnetometer data; Sector 2 (1:2,500)

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ILLUS 15 Processed greyscale magnetometer data; Sector 3 (1:2,500)

25.0nT/cm

0 50m

1:2,500 @ A3

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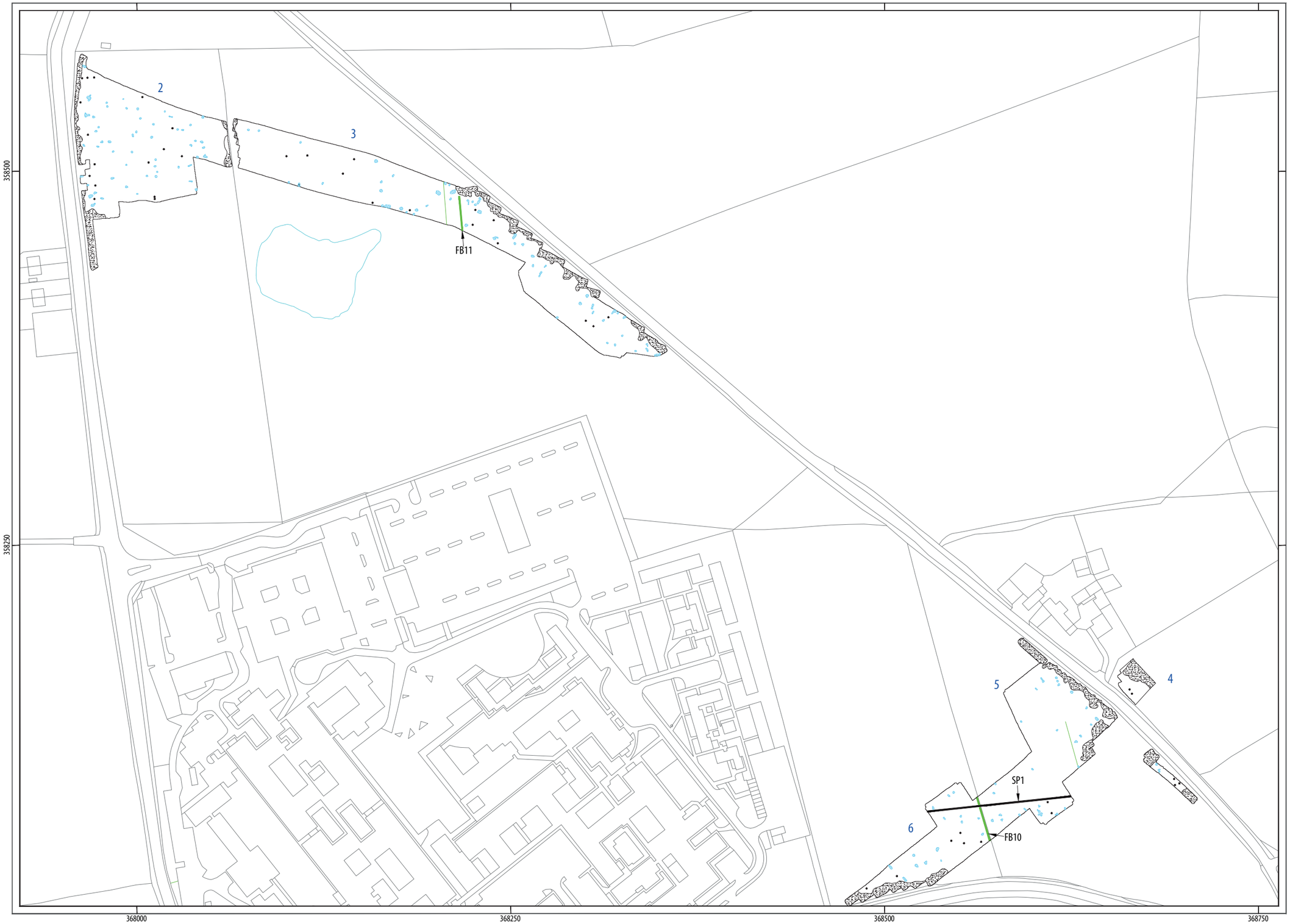
ILLUS 16 XY trace plot of minimally processed magnetometer data; Sector 3 (1:2,500)



TYPE OF ANOMALY	INTERPRETATION
dipolar isolated	ferrous material
magnetic disturbance	ferrous material
linear	service pipe
linear trend	agricultural
linear	former field boundary
magnetic enhancement	geology

ABBREVIATIONS

FB former boundary

SP service pipe

0 50m

1:2,500 @ A3

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ILLUS 17 Interpretation of magnetometer data; Sector 3 (1:2,500)

7 APPENDICES

APPENDIX 1 MAGNETOMETER SURVEY

Magnetic susceptibility and soil magnetism

Iron makes up about 6% of the earth's crust and is mostly present in soils and rocks as minerals such as maghaemite and haematite. These minerals have a weak, measurable magnetic property termed magnetic susceptibility. Human activities can redistribute these minerals and change (enhance) others into more magnetic forms so that by measuring the magnetic susceptibility of the topsoil, areas where human occupation or settlement has occurred can be identified by virtue of the attendant increase (enhancement) in magnetic susceptibility. If the enhanced material subsequently comes to fill features, such as ditches or pits, localised isolated and linear magnetic anomalies can result whose presence can be detected by a magnetometer (fluxgate gradiometer).

In general, it is the contrast between the magnetic susceptibility of deposits filling cut features, such as ditches or pits, and the magnetic susceptibility of topsoils, subsoils and rocks into which these features have been cut, which causes the most recognisable responses. This is primarily because there is a tendency for magnetic ferrous compounds to become concentrated in the topsoil, thereby making it more magnetic than the subsoil or the bedrock. Linear features cut into the subsoil or geology, such as ditches, that have been silted up or have been backfilled with topsoil will therefore usually produce a positive magnetic response relative to the background soil levels. Discrete feature, such as pits, can also be detected.

The magnetic susceptibility of a soil can also be enhanced by the application of heat. This effect can lead to the detection of features such as hearths, kilns or areas of burning.

Types of magnetic anomaly

In the majority of instances anomalies are termed 'positive'. This means that they have a positive magnetic value relative to the magnetic background on any given site. However some features can manifest themselves as 'negative' anomalies that, conversely, means that the response is negative relative to the mean magnetic background.

Where it is not possible to give a probable cause of an observed anomaly a '?' is appended.

It should be noted that anomalies interpreted as modern in origin might be caused by features that are present in the topsoil or upper layers of the subsoil. Removal of soil to an archaeological or natural layer can therefore remove the feature causing the anomaly.

The types of response mentioned above can be divided into five main categories that are used in the graphical interpretation of the magnetic data:

Isolated dipolar anomalies (iron spikes) These responses are typically caused by ferrous material either on the surface or in the topsoil. They cause a rapid variation in the magnetic response giving a characteristic 'spiky' trace. Although ferrous archaeological artefacts could produce this type of response, unless there is supporting evidence for an archaeological interpretation, little emphasis is normally given to such anomalies, as modern ferrous objects are common on rural sites, often being present as a consequence of manuring.

Areas of magnetic disturbance These responses can have several causes often being associated with burnt material, such as slag waste or brick rubble or other strongly magnetised/fired material. Ferrous structures such as pylons, mesh or barbed wire fencing and buried pipes can also cause the same disturbed response. A modern origin is usually assumed unless there is other supporting information.

Linear trend This is usually a weak or broad linear anomaly of unknown cause or date. These anomalies are often caused by agricultural activity, either ploughing or land drains being a common cause.

Areas of magnetic enhancement/positive isolated anomalies Areas of enhanced response are characterised by a general increase in the magnetic background over a localised area whilst discrete anomalies are manifest by an increased response (sometimes only visible on an XY trace plot) on two or three successive traverses. In neither instance is there the intense dipolar response characteristic exhibited by an area of magnetic disturbance or of an 'iron spike' anomaly (see above). These anomalies can be caused by infilled discrete archaeological features such as pits or post-holes or by kilns. They can also be caused by pedological variations or by natural infilled features on certain geologies. Ferrous material in the subsoil can also give a similar response. It can often therefore be very difficult to establish an anthropogenic origin without intrusive investigation or other supporting information.

Linear and curvilinear anomalies Such anomalies have a variety of origins. They may be caused by agricultural practice (recent ploughing trends, earlier ridge and furrow regimes or land drains), natural geomorphological features such as palaeochannels or by infilled archaeological ditches.

APPENDIX 2 SURVEY LOCATION INFORMATION

An initial survey base station was established using a Trimble VRS differential Global Positioning System (dGPS). The magnetometer data was georeferenced using a Trimble RTK differential Global Positioning System (Trimble R8s model).

Temporary sight markers were laid out using a Trimble VRS differential Global Positioning System (Trimble R8s model) to guide the operator and ensure full coverage. The accuracy of this dGPS equipment is better than 0.01m.

The survey data were then super-imposed onto a base map provided by the client to produce the displayed block locations. However, it should be noted that Ordnance Survey positional accuracy for digital map data has an error of 0.5m for urban and floodplain areas, 1.0m for rural areas and 2.5m for mountain and moorland areas. This potential error must be considered if coordinates are measured off hard copies of the mapping rather than using the digital coordinates.

Headland Archaeology cannot accept responsibility for errors of fact or opinion resulting from data supplied by a third party.

APPENDIX 3 GEOPHYSICAL SURVEY ARCHIVE

The geophysical archive comprises an archive disk containing the raw data in XYZ format, a raster image of each greyscale plot with associate world file, and a PDF of the report.

The project will be archived in-house in accordance with recent good practice guidelines (http://guides.archaeologydataservice.ac.uk/g2gp/Geophysics_3). The data will be stored in an indexed archive and migrated to new formats when necessary.

APPENDIX 4 DATA PROCESSING

The gradiometer data has been presented in this report in processed greyscale and minimally processed XY trace plot format.

Data collected using RTK GPS-based methods cannot be produced without minimal processing of the data. The minimally processed data has been interpolated to project the data onto a regular grid and de-striped to correct for slight variations in instrument calibration drift and any other artificial data.

A high pass filter has been applied to the greyscale plots to remove low frequency anomalies (relating to survey tracks and modern agricultural features) in order to maximise the clarity and interpretability of the archaeological anomalies.

The data has also been clipped to remove extreme values and to improve data contrast.

APPENDIX 5 OASIS DATA COLLECTION FORM: ENGLAND

OASIS ID: headland5-330139

PROJECT DETAILS	
Project name	North-West Crewe Package
Short description of the project	Headland Archaeology (UK) Ltd undertook a geophysical (magnetometer) survey, covering approximately 12 hectares, on the north-western periphery of Crewe, Cheshire East. The survey encompasses the corridor for the construction of 3.3 km of proposed new highways which will extend north and south of Leighton Hospital and also link east and west with A530 Middlewich Road and Minshull New Road. The corridor is located within a landscape of moderate archaeological potential with Roman, post-medieval and modern activity in the immediate vicinity, although there are no known heritage assets within the corridor itself. No anomalies of definite archaeological potential have been identified by the geophysical survey with the majority of the anomalies being of modern, agricultural or geological origin. A line of pit type responses (a possible pit alignment) has been identified immediately south of Leighton Hospital but this interpretation is tentative, and a modern origin is considered equally likely. The relatively narrow width of the survey corridor makes confident interpretation of some of the anomalies difficult but on the basis of the survey the archaeological potential of the road corridor is assessed as low with the exception of in the vicinity of the possible pit alignment where it is assessed as moderate.
Project dates	Start: 25-06-2018 End: 17-07-2018
Previous/future work	Not known / Yes
Any associated project reference codes	NWCC18 - Sitecode
Type of project	Field evaluation
Site status	None
Current Land use	Cultivated Land 3 - Operations to a depth more than 0.25m
Monument type	N/A None
Monument type	N/A None
Significant Finds	N/A None
Significant Finds	N/A None
Methods & techniques	"Geophysical Survey"
Development type	Road scheme (new and widening)
Prompt	National Planning Policy Framework - NPPF
Position in the planning process	Not known / Not recorded
Solid geology (other)	Sidmouth Mudstone formation
Drift geology (other)	Devensian Glacial til
Techniques	Magnetometry
PROJECT LOCATION	
Country	England
Site location	CHESHIRE CREWE AND NANTWICH CREWE North-West Crewe Package: Geophysical Survey
Study area	12 Hectares
Site coordinates	SJ 6850 5750 53.113457005535 -2.470657445266 53 06 48 N 002 28 14 W Polygon
PROJECT CREATORS	
Name of Organisation	Headland Archaeology
Project brief originator	Jacobs
Project design originator	Jacobs
Project director/manager	Harrison, S
Project supervisor	Dyulgerski, K.
Type of sponsor/funding body	District Council

PROJECT ARCHIVES	
Physical Archive Exists?	No
Digital Archive recipient	ADS
Digital Contents	"other"
Digital Media available	"GIS","Geophysics","Images vector"
Paper Archive Exists?	No
PROJECT BIBLIOGRAPHY 1	
Publication type	Grey literature (unpublished document/manuscript)
Title	NORTH-WEST CREWE PACKAGE: Geophysical Survey
Author(s)/Editor(s)	Dyulgerski, K.
Other bibliographic details	NWCC18
Date	2018
Issuer or publisher	Headland Archaeology
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Description	A4 Glue Bound report and PDF/A
Entered by	Sam Harrison (sam.harrison@headlandarchaeology.com)
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