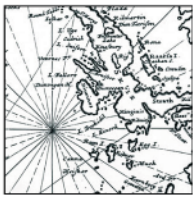
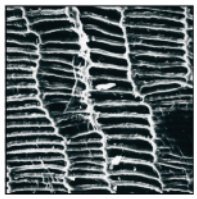
LRPR/01






LAND OFF LONGWICK ROAD AND MILL LANE PRINCES RISBOROUGH, BUCKINGHAMSHIRE

GEOPHYSICAL SURVEY

commissioned by BLOOR HOMES

January 2016

HEADLAND ARCHAEOLOGY

REGISTERED ORGANISATION CIfA

LAND OFF LONGWICK ROAD AND MILL LANE PRINCES RISBOROUGH, BUCKINGHAMSHIRE

GEOPHYSICAL SURVEY

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January 2016

project info

HA JOB NO.	LRPR/01
NGR	SP 80154 04816
PARISH	Princes Risborough, Longwick-cum-Ilmer
LOCAL AUTHORITY	Buckinghamshire
OASIS REF.	headland5-238666

project team

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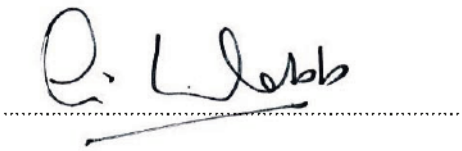
APPROVED BY	Alistair Webb – Project Manager



HEADLAND ARCHAEOLOGY

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PROJECT SUMMARY

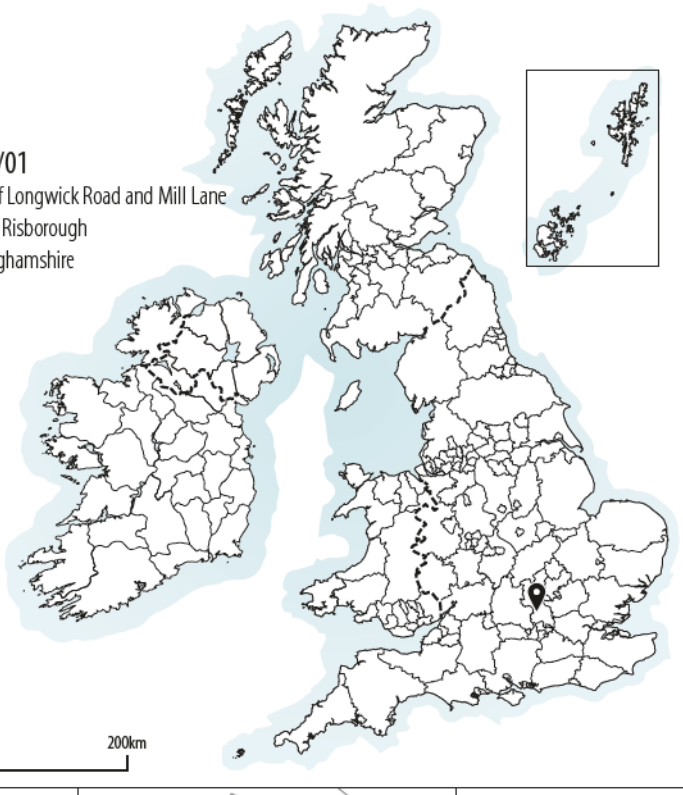
Headland Archaeology (UK) Ltd undertook a geophysical (magnetometer) survey covering 55 hectares on land to the north of Princes Risborough, to provide information about the archaeological potential of the site in advance of proposed development. The survey has identified three areas of definite archaeological potential. Within the north-west of the site, parallel with Lower Ickneild Way, linear ditches have been identified corresponding to the projected route of a possible prehistoric trackway, subsequently a Roman road (Buckinghamshire HER MBC11085). Further south a D-shaped enclosure and a sub-rectangular enclosure have been identified on slightly elevated ground either side of Mill Brook. Numerous discrete anomalies within the interior of the enclosures are ascribed a possible archaeological origin, perhaps being due to soil-filled pits. Elsewhere, faint linear anomalies within the north of the survey area correspond closely to the site of a possible windmill (Buckinghamshire HER MBC6693) and may be of archaeological interest, whilst magnetic disturbance on the southern bank of Mill Brook may be due to buried structural remains, perhaps a mill. Anomalies indicative of medieval or post-medieval ridge and furrow cultivation are visible across most of the site.

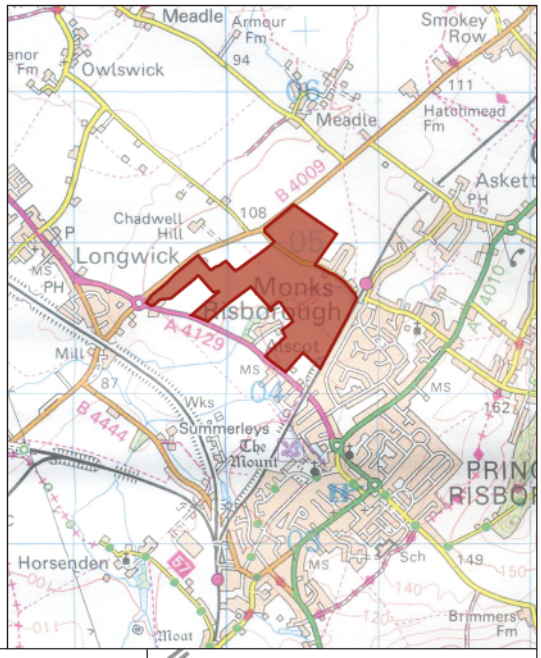
There is no indication from any other source to suggest that the magnetic data provides anything other than an accurate representation of the sub-surface conditions within the survey area. Therefore, based solely on the results and interpretation of the data, the archaeological potential of the site is considered to be low to moderate, and locally high.

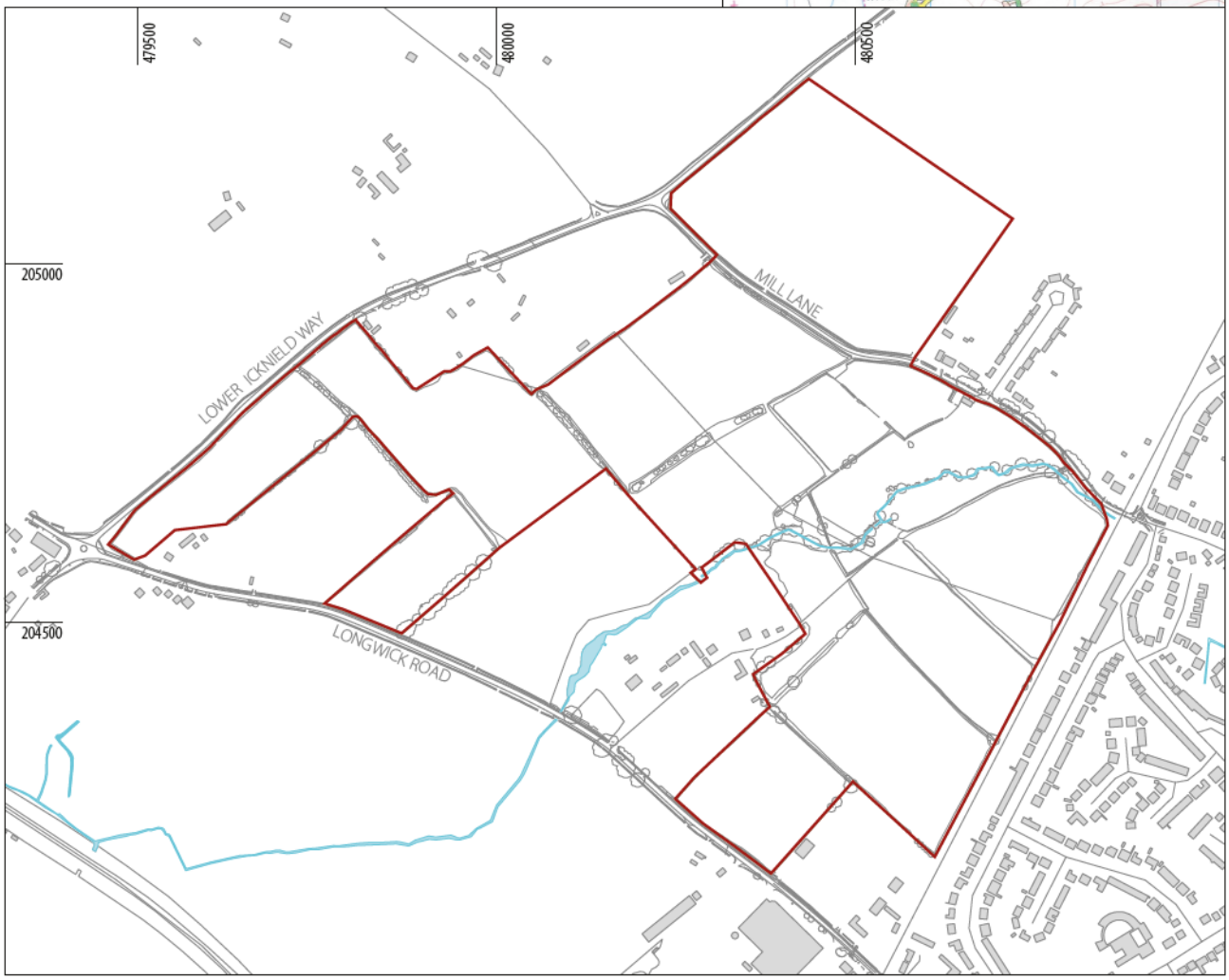
CONTENTS

LIST OF ILLUSTRATIONS

LRPR/01
land off Longwick Road and Mill Lane
Princes Risborough
Buckinghamshire







KEY
geophysical survey area

N
0
500m
scale 1:10,000 @ A4

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ILLUS 1 Site location

LAND OFF LONGWICK ROAD AND MILL LANE PRINCES RISBOROUGH, BUCKINGHAMSHIRE

GEOPHYSICAL SURVEY

1 INTRODUCTION

Headland Archaeology (UK) Ltd was commissioned by The Environmental Dimension Partnership (The Consultant) on behalf of Bloor Homes (The Client) to undertake a geophysical (magnetometer) survey on land which is proposed for development on the northern periphery of Princes Risborough, Buckinghamshire.

The work was undertaken in accordance with a Written Scheme of Investigation (Headland Archaeology 2015), guidance within the National Planning Policy Framework (DCLG 2012) and in line with current best practice (David et al 2008). The survey was carried out between the 2nd and the 15th of December 2015 in order to provide additional information on the archaeological potential of the site.

1.1 SITE LOCATION, TOPOGRAPHY AND LAND-USE

The proposed development area (PDA) comprises of seventeen fields (F1 – F17) within an irregularly-shaped parcel of land on the northern periphery of Princes Risborough, centred at NGR 480154, 204816 (see **ILLUS 1**). The PDA is roughly bound to the north by the B4009 Lower Ickneild Way, to the west by the A4129 Longwick Road, to the south by the Princes Risborough to Aylesbury railway and, with the exception of one field, by Mill Lane to the north-east (see **ILLUS 10**).

The PDA lies within a gently undulating landscape between 100m above Ordnance Datum (aOD) and 110m aOD. Locally, the topography slopes towards Mill Brook, which traverses the PDA from east to west (see **ILLUS 12**).

At the time of the survey the fields within the PDA contained a mixture of short pasture and short cereal crops (see **ILLUS 2** – **ILLUS 9**). A small field, F10, to the immediate north of Mill Brook was overgrown and unsuitable for survey (see **ILLUS 6**).

1.2 GEOLOGY AND SOILS

The underlying bedrock consists of Upper Greensand Formation - siltstone and sandstone, Glauconitic Marl Member – sandstone, and West Melbury Marly Chalk Formation – Chalk (see **ILLUS 11**). The only superficial deposits within the PDA consist of alluvial deposits and small pockets of river terrace sands and gravels along the course of Mill Brook (British Geological Survey 2016).

The soils in the north of the PDA are classified in the Soilscape 8 association, characterised as slightly acid loams and clays with impeded drainage and in the south, as freely draining lime-rich loams (Soilscape 5 Association; LandIS 2016).

2 ARCHAEOLOGICAL BACKGROUND

Several heritage assets are recorded within the landscape surrounding the PDA (see **ILLUS 12**) and four assets are known within the PDA itself. The Lower Ickneild Way follows the route of a possible prehistoric trackway which was later used as a Roman road (MBC11085). The Buckinghamshire Historic Environment Record (HER) records the route of this section of the road as running through the north of the PDA on a north-east/south-west trajectory rather than following the current route of the B4009 Ickneild Way.

The HER also records the possible route of a Late Saxon Estate Boundary (MBC7552) on an approximate north-west/south-east orientation within the west of the PDA.

Within the northernmost field (F5) the site of a possible windmill is recorded (MBC6693). The field is marked as 'Windmill Field' on the 1839 Enclosure Map and the HER describes the presence of a mound, albeit 'very ploughed out'.

The fourth asset from within the PDA comprises of a findspot of early Saxon metalwork (MBC13625) from within the south-eastern field (F17).

ILLUS 2 General view of Field 1, looking north-east **ILLUS 3** General view of Field 4, looking south-west **ILLUS 4** General view of Field 5, looking north-east
ILLUS 5 General view of Field 7, looking north-west

3 AIMS, METHODOLOGY AND PRESENTATION

The main aim of the geophysical survey was to provide sufficient information to enable an assessment to be made of the impact of any proposed development on any potential sub-surface archaeological remains and for further evaluation or mitigation proposals, if appropriate, to be recommended.

The general archaeological objectives of the geophysical survey were:

- to provide information about the nature and possible interpretation of any magnetic anomalies identified;
- to therefore model the presence/absence and extent of any buried archaeological features; and
- to prepare a report summarising the results of 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. Features 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 and 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 is programmed to take readings at a frequency of 10Hz (allowing for a 10–15cm sample interval) on roaming traverses 4m apart. These readings are stored on an external weatherproof laptop and later downloaded for processing and interpretation. The system is 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 has been used to collect and export the data. Terrasurveyor V3.0.27.1 (DWConsulting) software has been used to process and present the data.

ILLUS 6 General view of Field 10, looking south **ILLUS 7** General view of Field 13, looking west **ILLUS 8** General view of Field 16, looking south-east
ILLUS 9 General view of Field 14, looking south

3.2 REPORTING

A general site location plan is shown in **ILLUS 1** at a scale of 1:10,000. **ILLUS 2** to **ILLUS 9** are general site condition photographs, the location and facing-direction of which are shown on **ILLUS 12**. A large scale (1:5,000) survey location plan showing the processed greyscale magnetometer data is presented in **ILLUS 10**. The geology detail (after BGS 2016) is shown at the same scale in **ILLUS 11**. **ILLUS 12** shows the contour data and Buckinghamshire HER data and **ILLUS 13** presents an overall interpretation of the geophysical data, both being displayed at 1:5,000. Detailed data plots (greyscale and XY trace) and interpretative illustrations are presented at a scale of 1:1,250 in **ILLUS 14** to **ILLUS 40** 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. A copy of the OASIS entry (Online Access to the Index of Archaeological Investigations) is reproduced in Appendix 4.

The survey methodology, report and any recommendations comply with the Written Scheme of Investigation (Headland Archaeology 2015) and guidelines outlined by English Heritage (David et al. 2008) and by the Chartered Institute for Archaeologists (CIfA 2014). All illustrations reproduced from Ordnance Survey mapping are 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

Generally, the survey has detected a low level of magnetic background variation throughout the PDA. Within this background, numerous areas of magnetic enhancement have been identified. These are discussed below and cross-referenced to specific examples on the interpretive figures, where appropriate.

4.1 FERROUS 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 or material is common on most sites, often being present as a consequence of manuring or tipping/infilling.

Three dipolar linear anomalies have been detected by the survey which locate buried service pipes. The first of these, A, can be seen within the centre of F1 on a north/south alignment (see **ILLUS 14**, **ILLUS 15** and **ILLUS 16**). A second service pipe, B, is identified on a north-east/south-west orientation passing through F4 and F6 (see **ILLUS 20**, **ILLUS 21** and **ILLUS 22** and **ILLUS 26** to **ILLUS 31** inclusive). The final service pipe, C, can be seen within F15 and F16, also on a north-east/south-west alignment (see **ILLUS 32** to **ILLUS 33** and **ILLUS 38** to **ILLUS 40** inclusive). The broad high magnitude band, D, on the southern side of the pipe is probably caused by upcast from the pipe trench or from material used/deposited within the pipeline construction corridor. The apparent termination of the linear anomaly, D, within the west of F17 is worthy of note. The pipeline is visible as a linear cropmark on aerial photographs (Google Earth 2016) and the absence of a magnetic anomaly is not necessarily thought to indicate the absence of the pipeline. It is possible that there is a lack of magnetic contrast between the sandstone bedrock and alluvial/river terrace superficial deposits for the pipeline to manifest with clarity as a magnetic anomaly. A large ferrous spike, E, within the centre of F17 appears along the projected extension of the pipe and may be caused by part of the pipeline or a ferrous object within the pipe trench (see **ILLUS 32**, **ILLUS 33** and **ILLUS 34**).

Two modern tracks have been identified in the data as linear bands of magnetic disturbance. The first, F, is visible along the north-eastern boundary in F3 (see **ILLUS 17**, **ILLUS 18** and **ILLUS 19**) and the second, G, can be seen in F9 running from Alscot Lane on a north-east/south-west alignment to a broad area of magnetic disturbance, H, within the west of F13 (see **ILLUS 29** to **ILLUS 34** inclusive). No obvious pattern can be discerned from this magnetic disturbance and it may be due to an area of modern tipping/dumping but it is also possible that it is caused by demolition material and possibly in situ structural remains. The disturbance is located adjacent to Mill Brook and a short distance downstream from a rectangular pond (see **ILLUS 10**) and it is possible that it relates to a building, perhaps a mill.

Ferrous spikes, I, along the route of overhead wires within F4, F6 and F17 are caused by telegraph poles in these locations.

Elsewhere, magnetic disturbance at the perimeter of the fields is caused by ferrous material within, or close to, the adjacent field boundaries.

4.2 AGRICULTURAL ANOMALIES

Analysis of historical mapping indicates that the division of land within the PDA has remained largely unchanged since the publication of the first edition Ordnance Survey (OS) map in 1877, albeit with the removal of two field boundaries from within F12. The first of these boundaries manifests in the data as a band of magnetic disturbance, J, between Mill Lane and Mill Brook and corresponds to a boundary which is depicted on the 1898 edition OS map (see **ILLUS 26**, **ILLUS 27** and **ILLUS 28**). The second former boundary is depicted on the first edition map as a curving tree-lined feature but does not manifest in the data as a magnetic anomaly. The reason for this is not clear but may be due to the boundary being defined by a line of trees rather than a ditch.

Broad, parallel and slightly sinuous linear trends are identified across most of the PDA with the exception of F1, F8-F13, F16 and F17. The anomalies are characteristic of the medieval and post-medieval practice of ridge and furrow cultivation with the stripy appearance being caused by the contrast between former ridges and the soil-filled furrows. Within the centre of F5, on a north-west/south-east alignment, a possible former field boundary has been identified as a linear alignment of ferrous spikes, K (see **ILLUS 23**, **ILLUS 24** and **ILLUS 25**). The anomaly runs parallel to the surrounding ridge and furrow anomalies and may be due to a boundary removed before the publication of the first edition map.

A series of field drains are identified within F3 as widely-spaced parallel linear trends, the 'speckled' appearance to the trends is thought to be due to the material used in the drain-fill.

4.3 GEOLOGICAL ANOMALIES

Throughout the PDA numerous discrete, low magnitude, anomalies have been identified. The number of these anomalies and their random distribution suggests that they are almost certainly caused by variations in the composition of the soils.

4.4 ARCHAEOLOGICAL AND POSSIBLE ARCHAEOLOGICAL ANOMALIES

Within the north of F5 two clear linear anomalies, L and M, are identified on a north-east/south-west orientation parallel with the B4009 Lower Ickneild Way (see **ILLUS 20** to **ILLUS 25** inclusive). The northernmost anomaly, L, corresponds closely to the route of a possible prehistoric trackway and Roman road (MBC11085) and is thought to be caused by a soil-filled ditch flanking the southern edge of the road. No anomalies have been identified which can confidently be interpreted as locating the road surface, although, rather than indicating an absence of archaeology, this is likely to be due a lack of magnetic contrast between the sand, clay and gravel used in the construction of the road and the prevailing soils. Nevertheless, occasional discrete anomalies have been ascribed a possible archaeological origin and may locate spreads of material and/or pits. Anomaly M is similar in magnitude to the probable roadside ditch L and appears on the same north-east/south-west alignment. It is likely to be caused by a ditch although no obvious archaeological pattern is discernible.

The Roman road also manifests in the north of F3 as north-east/south-west aligned parallel linear anomalies N and O, which are caused by soil-filled ditches (see **ILLUS 17, ILLUS 18** and **ILLUS 19**). The ditches are spaced 17.5m apart with the southernmost, O, corresponding to the projected extension of anomaly L in F5. Again, no anomalies have been identified to locate the road surface, if present, although discrete anomalies are ascribed a possible archaeological origin and may be due to spreads of enhanced material. The anomalies, N and O, do not extend to the western field boundary and it is unclear whether there is insufficient magnetic contrast within this part of the

field for the ditches to manifest as magnetic anomalies, or whether the archaeological deposits have been completely removed by subsequent cultivation. Faint curvilinear anomalies P and Q, appear to be appended to the roadside ditches within this part of F3 and may be due to soil-filled ditches, perhaps forming part of roadside enclosures.

Two clear enclosures have been identified by the survey. The first is located in an elevated position within the centre of F4 (centred at NGR 480248 204872) and appears as fragmented linear and curvilinear anomalies, R, forming a clear D-shaped enclosure and measuring 85m from north to south and 50m from east to west (see **ILLUS 20**, **ILLUS 21** and **ILLUS 22**). The anomalies become weaker towards the south and east, perhaps at the geological boundary between the chalk bedrock and the prevailing, and usually less-responsive, sandstone bedrock (see **ILLUS 11**). Nevertheless, faint linear and rectilinear anomalies, S, T and U have been identified which may be caused by ditches. No obvious archaeological anomalies have been identified within the interior of the D-shaped enclosure although several discrete areas of magnetic enhancement within and close to enclosure are ascribed a possible archaeological origin and may be due to pits. The second enclosure is also identified in a slightly elevated location close to the southern boundary of the PDA in F15 and F16, centred at NGR 480621 204417 (see **ILLUS 32** to **ILLUS 34** and **ILLUS 38** to **ILLUS 40**). The appearance of the enclosure, V, is hampered by the extant boundary between F15 and F16 and by the modern service pipe C/D which truncates the enclosure from north-east to south-west, but appears to be sub-rectangular in form and measuring 69m from north-west to south-east and 50m from north-east to south-west. Again, no obvious archaeological anomalies can be seen in the interior of the enclosure, but discrete anomalies are ascribed a possible archaeological interpretation given the local context. A broad, high-magnitude, pit-type anomaly, W, immediately east of V may also be of archaeological interest.

No anomalies of definite archaeological potential have been identified which correspond to the site of a possible windmill (MBC6693) towards the centre of F5 (see **ILLUS 23**, **ILLUS 24** and **ILLUS 25**). However, two faint linear anomalies, X and Y, have been identified which are oblique to the ridge and furrow anomalies and to the historical and existing pattern of land division. The anomalies are thought to be due to soil-filled ditches and, whilst an agricultural origin cannot be dismissed, are interpreted as potentially archaeological in origin.

An isolated faint curvilinear anomaly, Z, at the south-western boundary of F15 is also ascribed a possible archaeological origin on account of there being no obvious modern, agricultural or geological explanation (see **ILLUS 35** to **ILLUS 40** inclusive). The anomaly may be caused by a soil-filled ditch although no clear pattern is visible.

5 CONCLUSION

The geophysical survey has identified three areas of definite archaeological potential comprising the route of a Roman road and two enclosures. The Roman Road runs parallel with the B4009 Lower Ickneild Way and whilst the road surface, or agger, does not manifest with clarity in the data, its route is thought to be defined by parallel linear anomalies, roadside ditches, spaced 17.5m apart. South of the Roman road, a D-shaped enclosure has been identified in an elevated position on the northern side of Mill Brook, whilst a sub-rectangular enclosure has been identified south of the brook. No anomalies of obvious archaeological potential have been identified within the interior of the enclosures, but numerous discrete anomalies may be due to pits.

On the southern bank of Mill Brook a broad area of magnetic disturbance may be due to buried rubble, perhaps indicating the site of a mill, although a modern origin, such as dumping, is equally plausible. In the north of the PDA, at the site of a possible windmill, no obvious archaeological anomalies have been identified, although linear anomalies, oblique to the existing and historical pattern of land division, may be of interest. Elsewhere, anomalies have been identified which reflect the former agricultural landscape in the form of ridge and furrow cultivation.

There is no indication from any other source to suggest that the magnetic data provides anything other than an accurate representation of the sub-surface conditions within the survey area. Therefore, based solely on the results and interpretation of the geophysical data, the archaeological potential within the south of the site is assessed to be low to moderate and locally high.

6 REFERENCES

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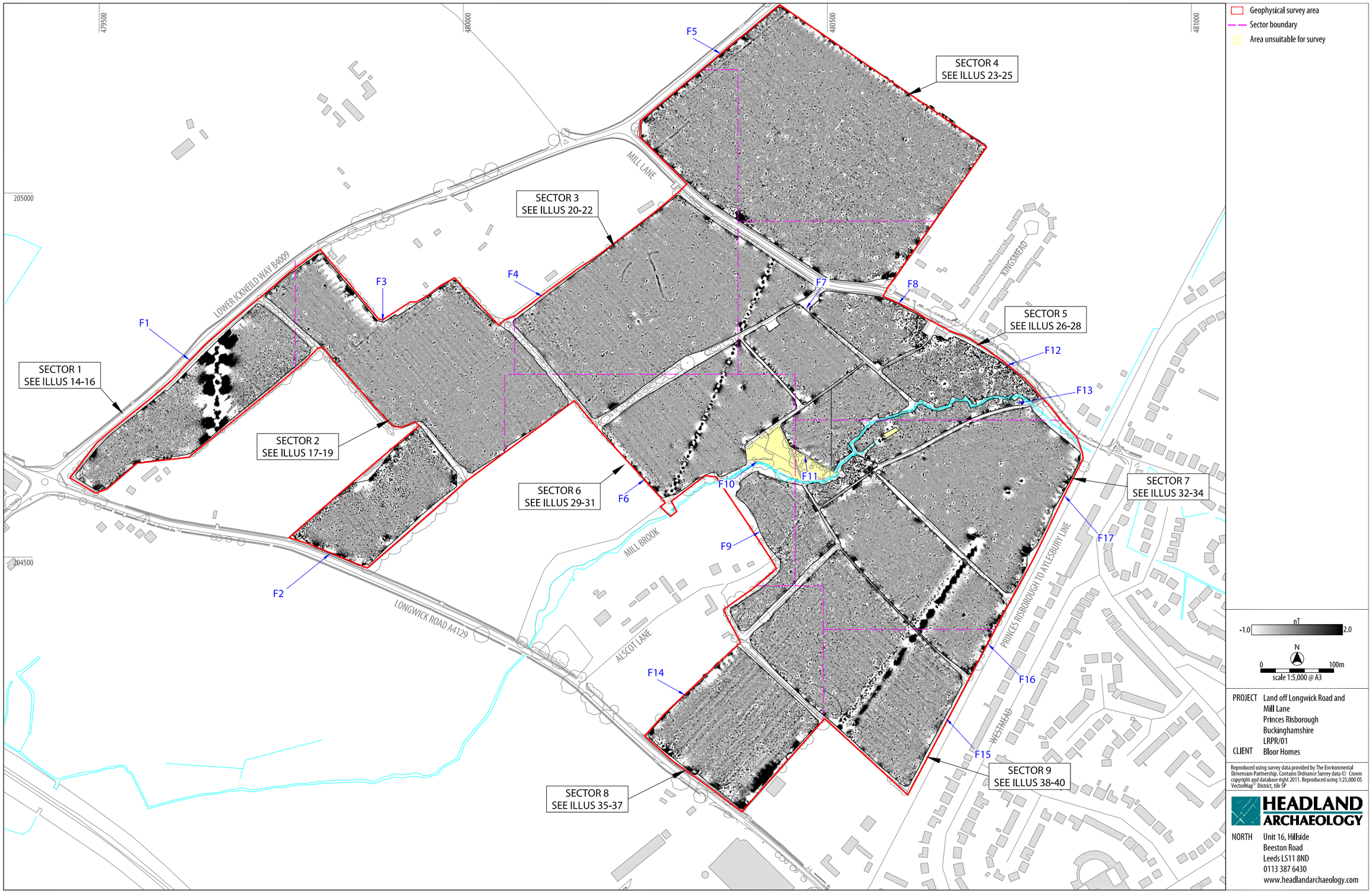
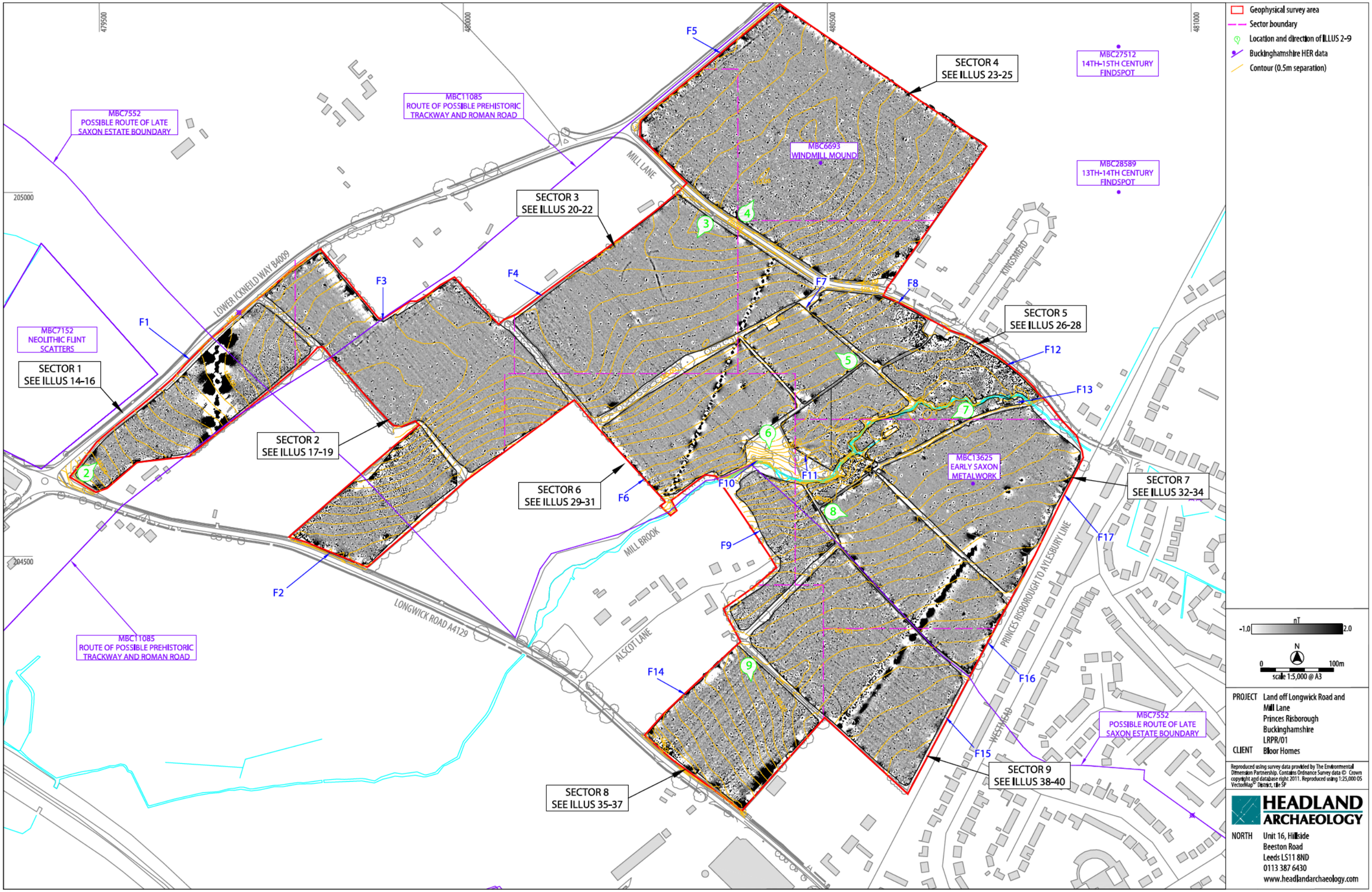
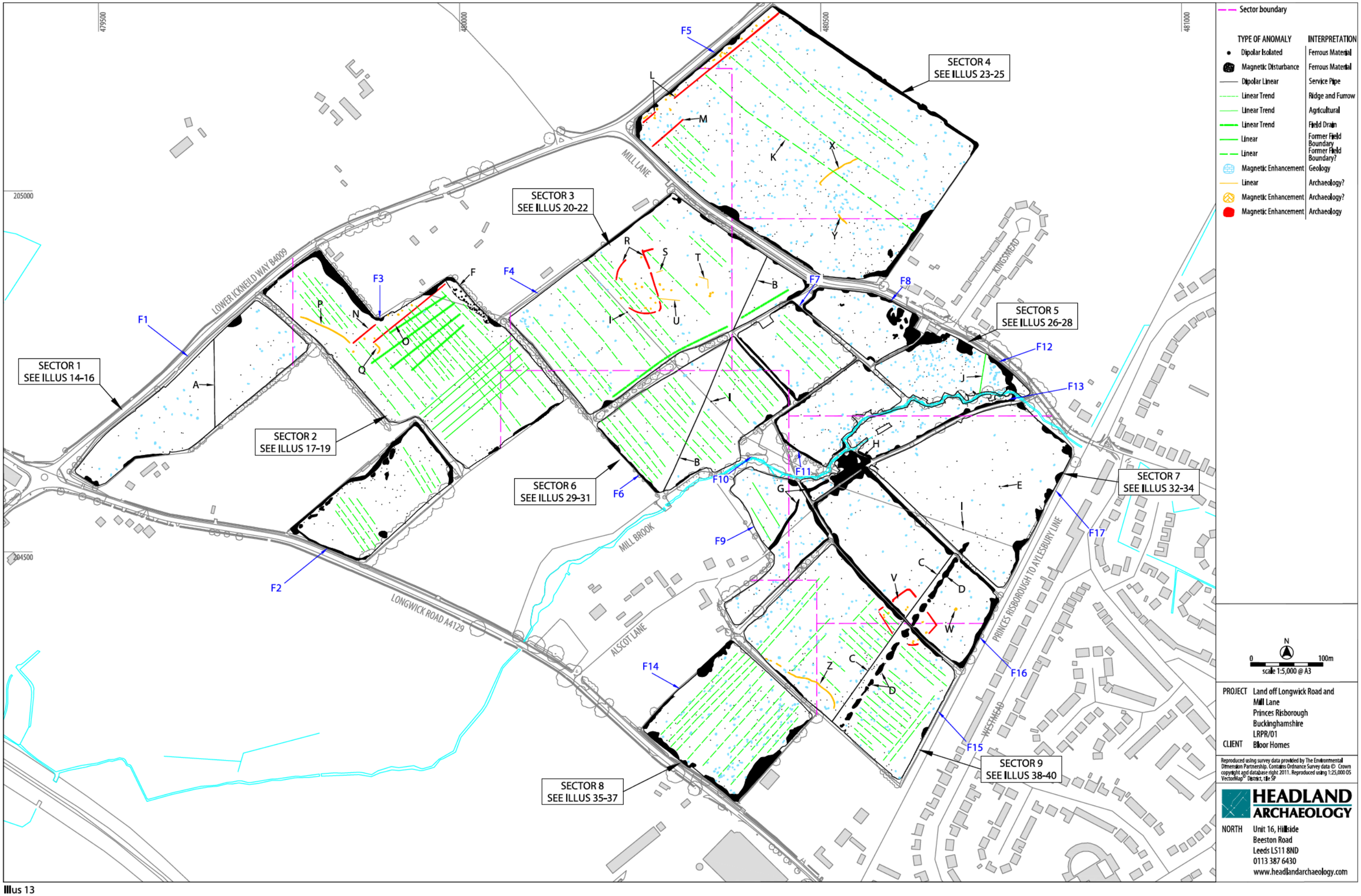


Illus 10
Survey location showing processed greyscale magnetometer data

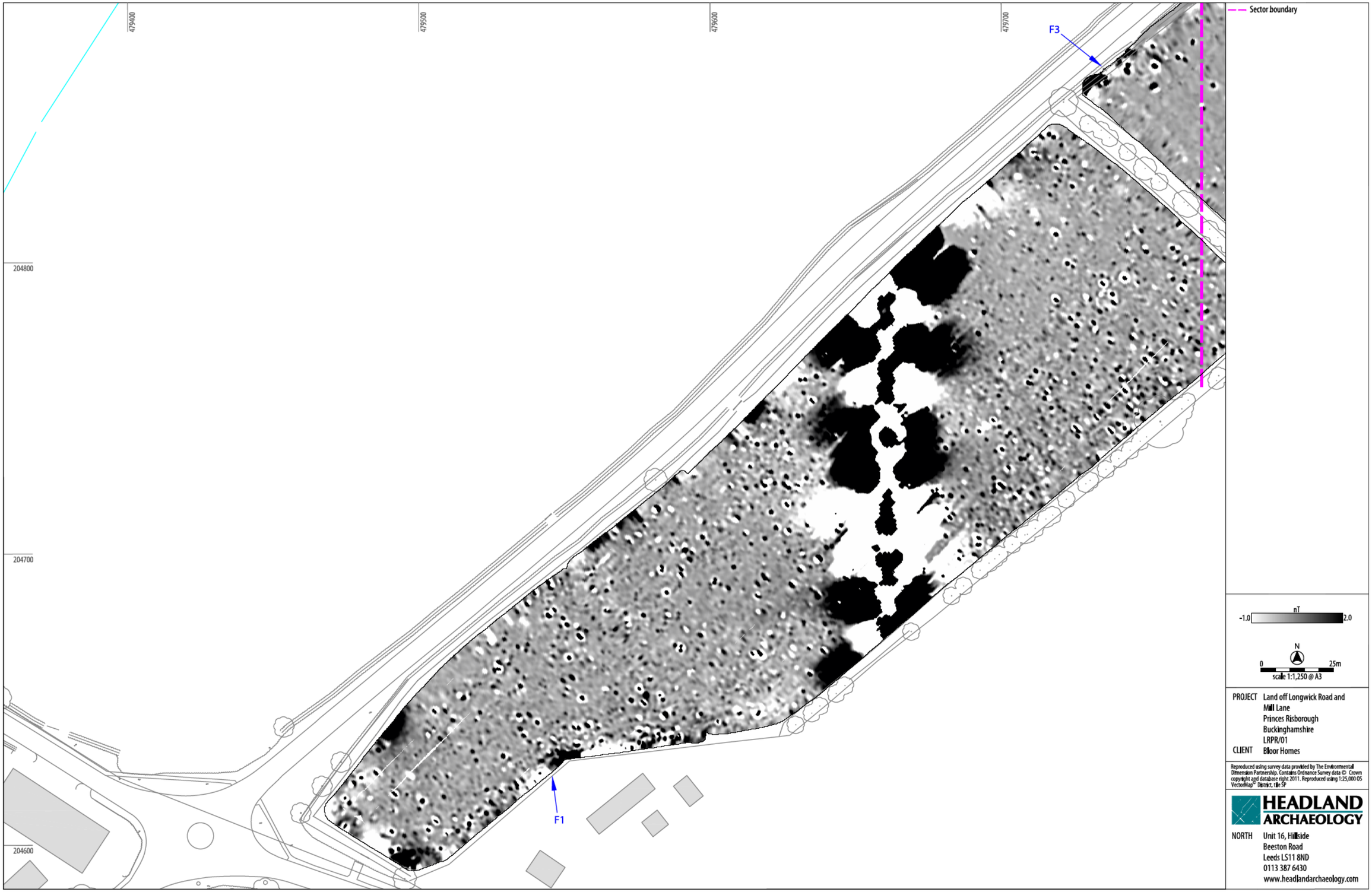
Illus 11
Processed greyscale magnetometer data overlain by geology detail (after BGS 2016)



Illus 12
Processed greyscale magnetometer data showing contour detail and Buckinghamshire HER data



Illus 13
Overall interpretation of magnetometer data



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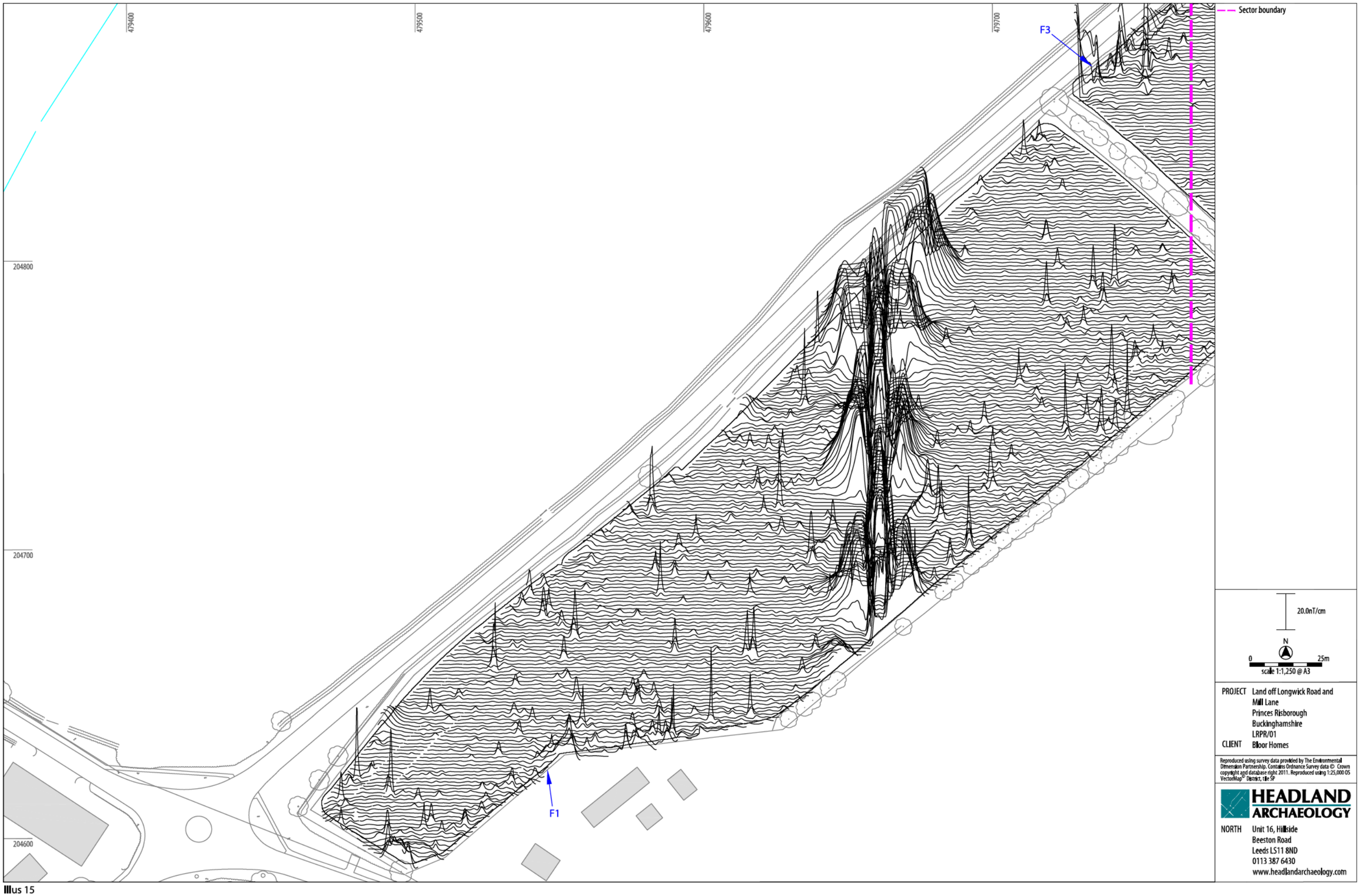
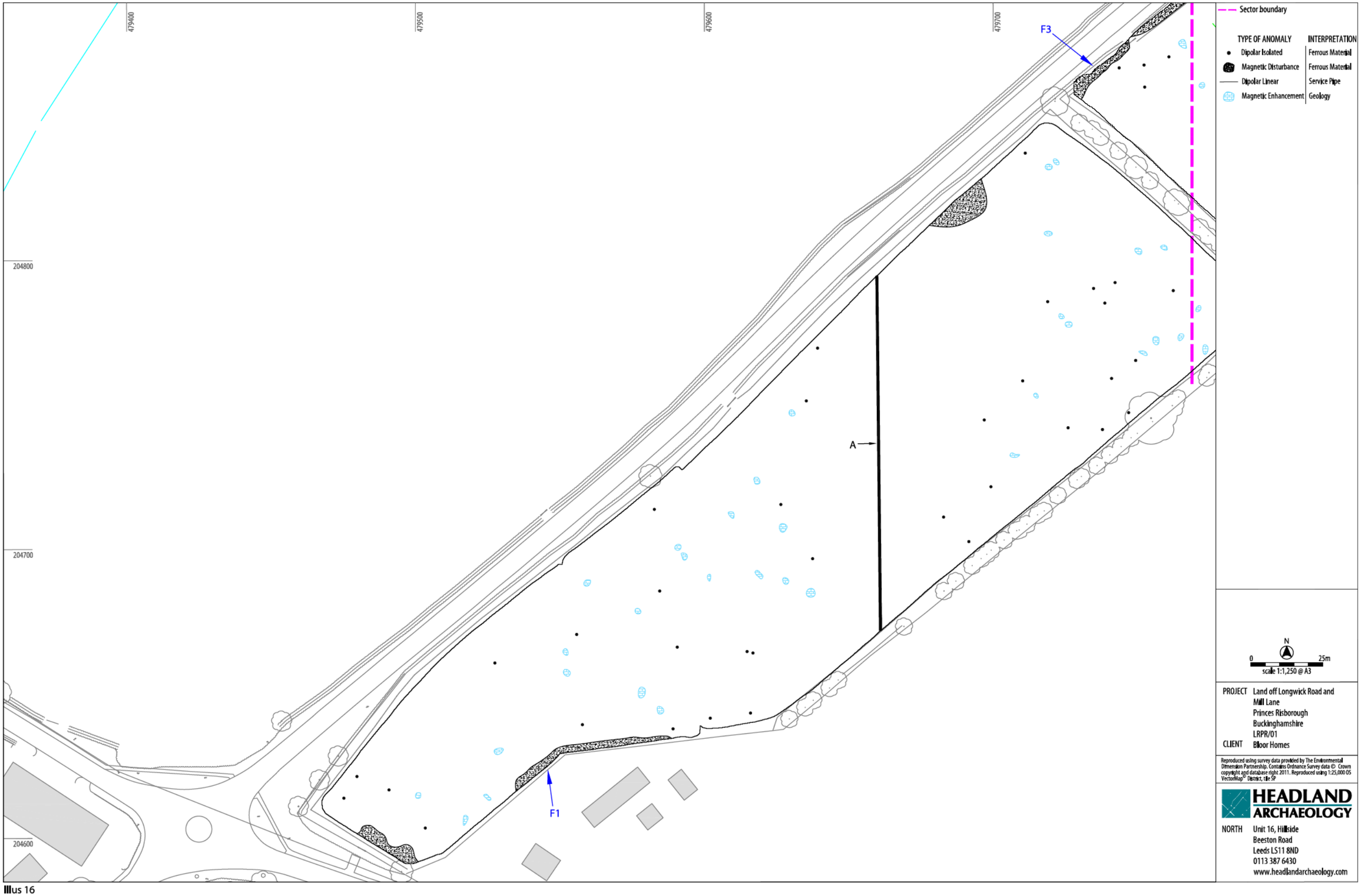
Processed greyscale magnetometer data; Sector 1



Illus 15
XY trace plot of magnetometer data; Sector 1



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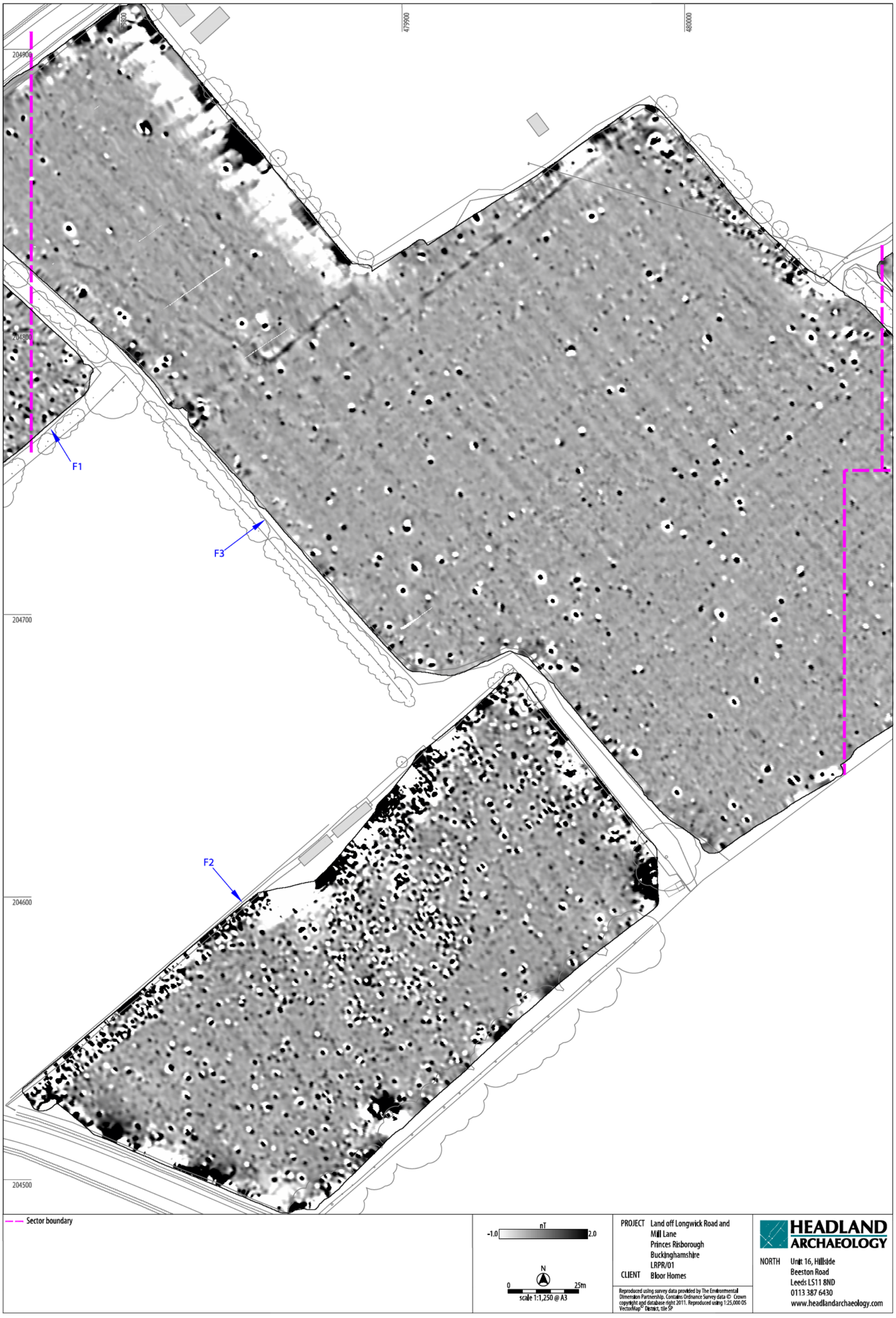
Interpretation of magnetometer data; Sector 1



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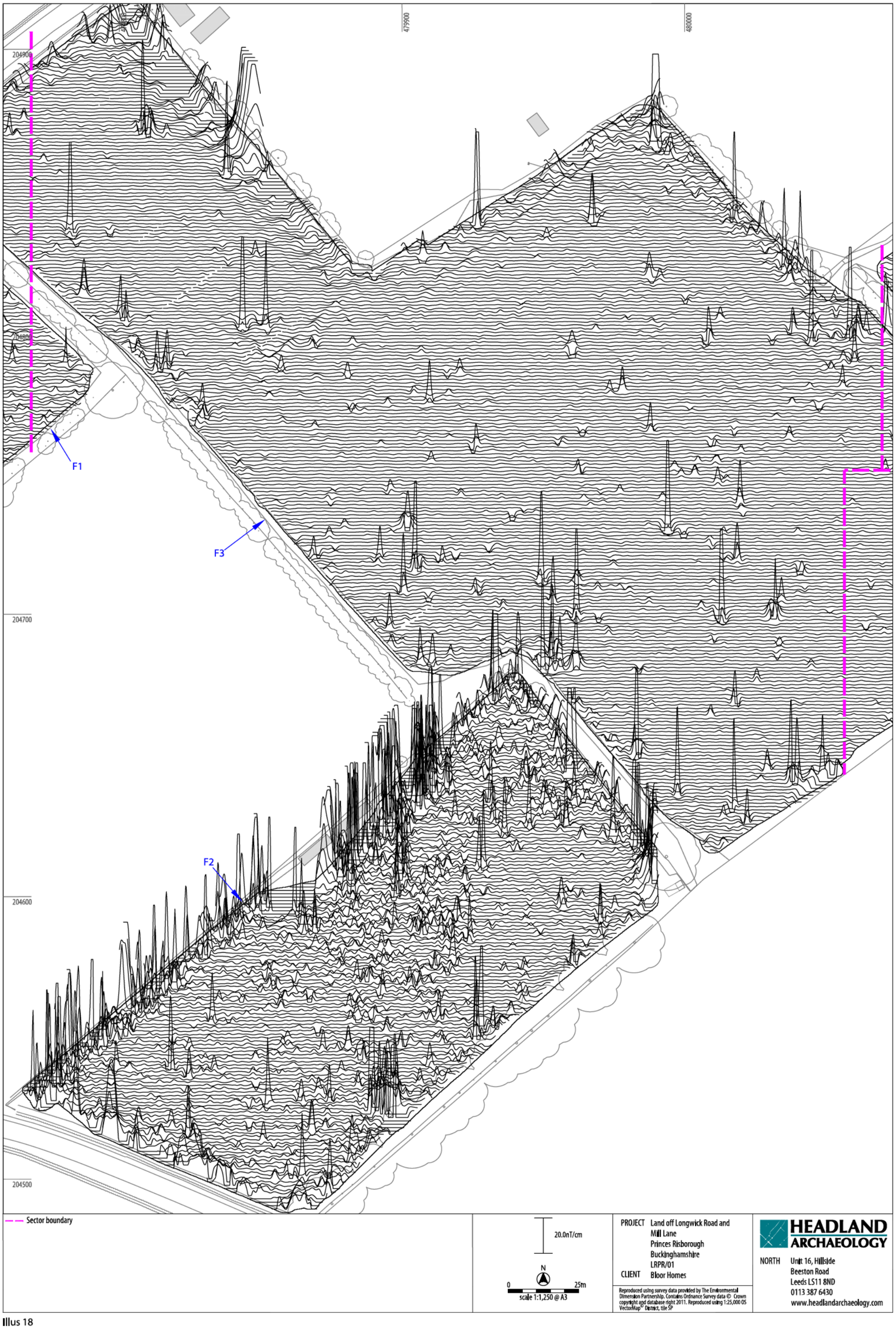

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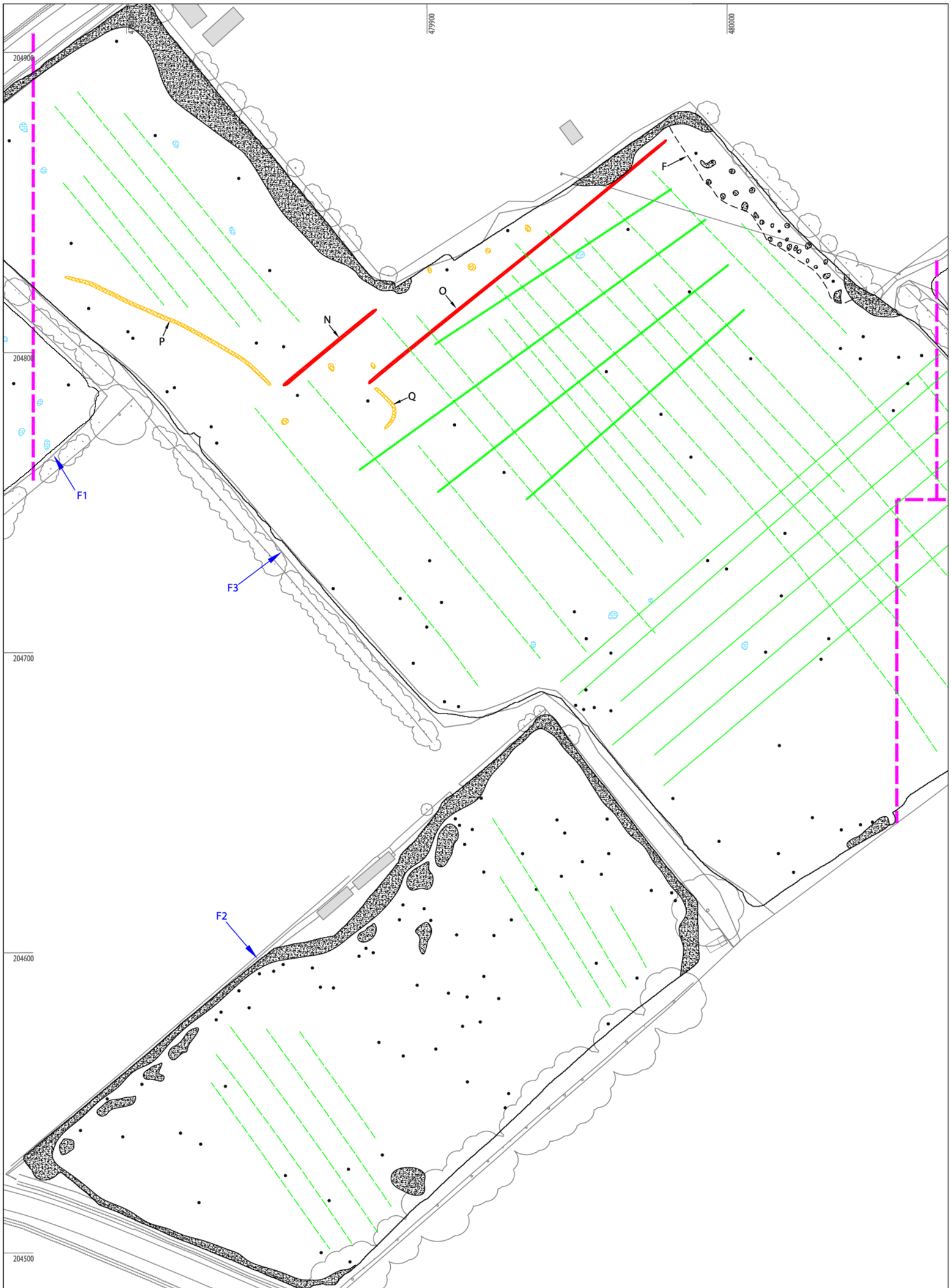
XY trace plot of magnetometer data; Sector 2



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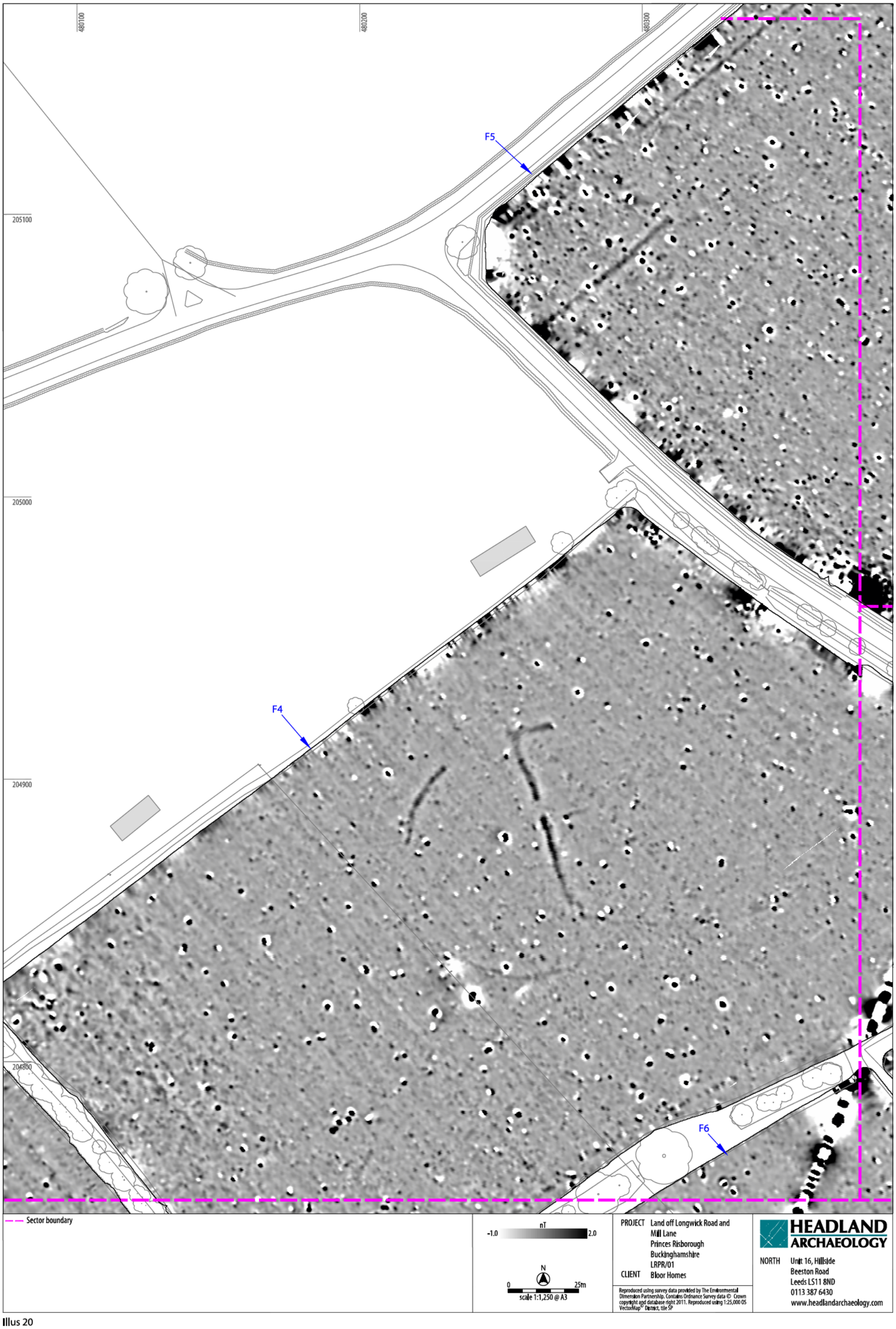
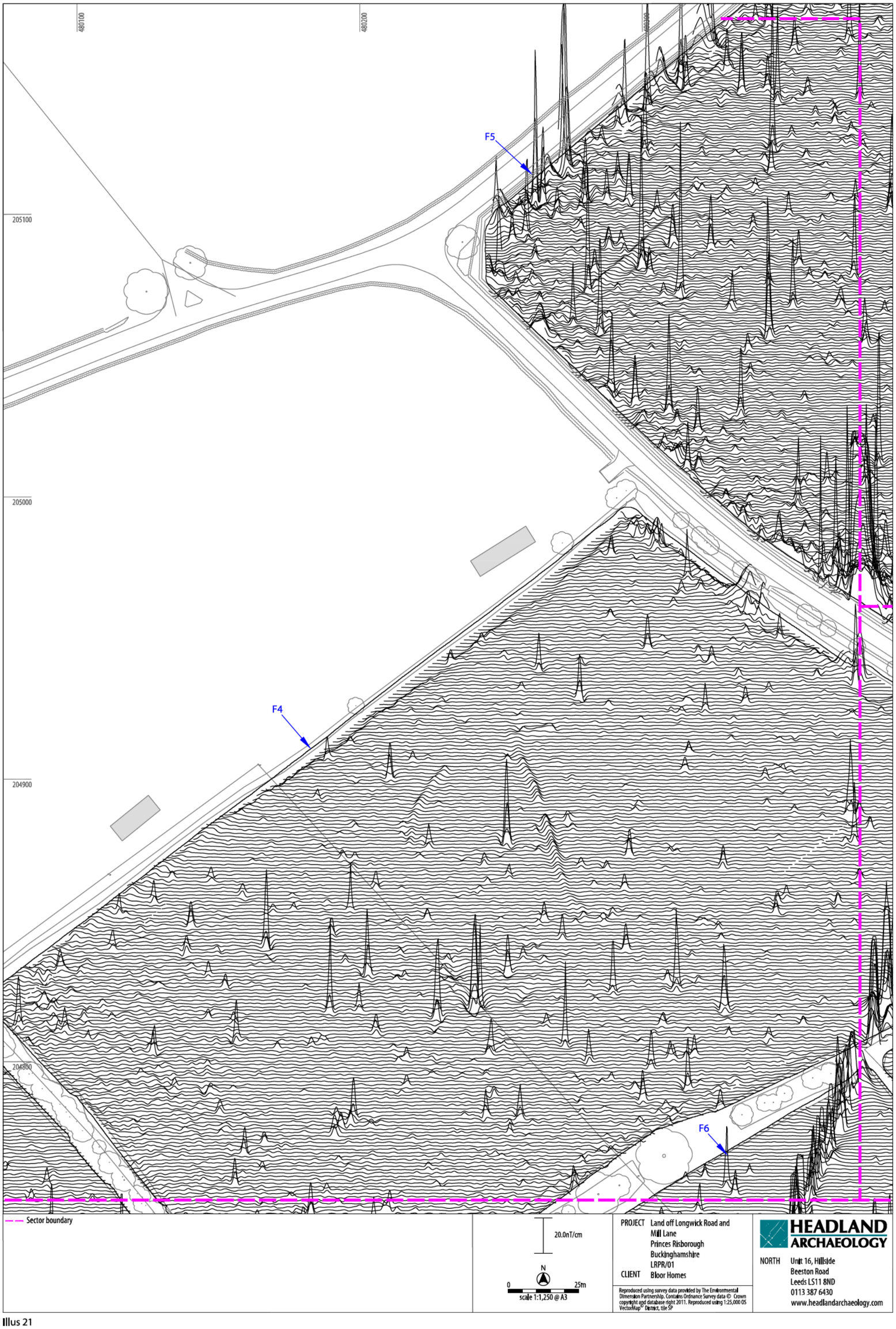


Illus 20
Processed greyscale magnetometer data; Sector 3



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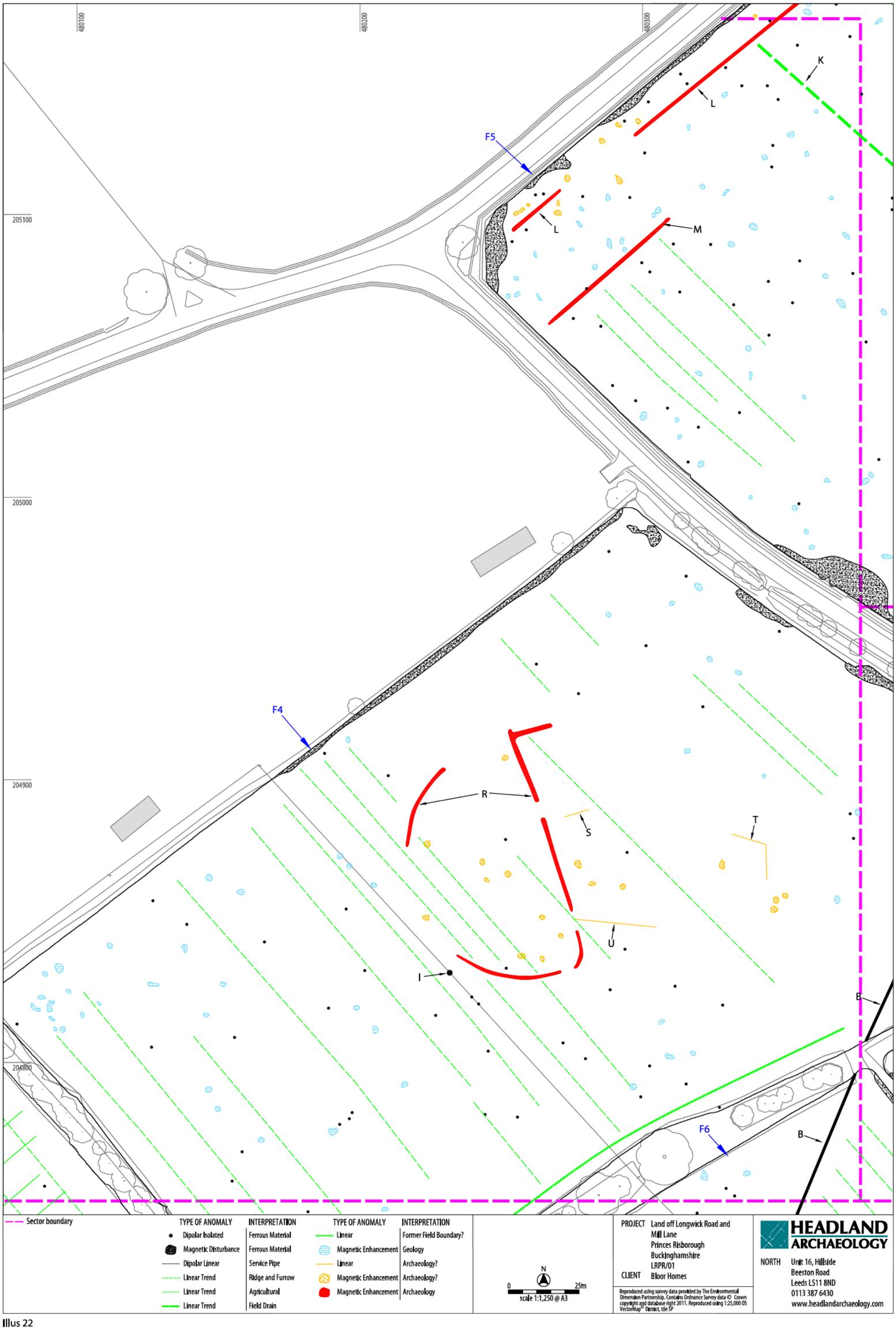
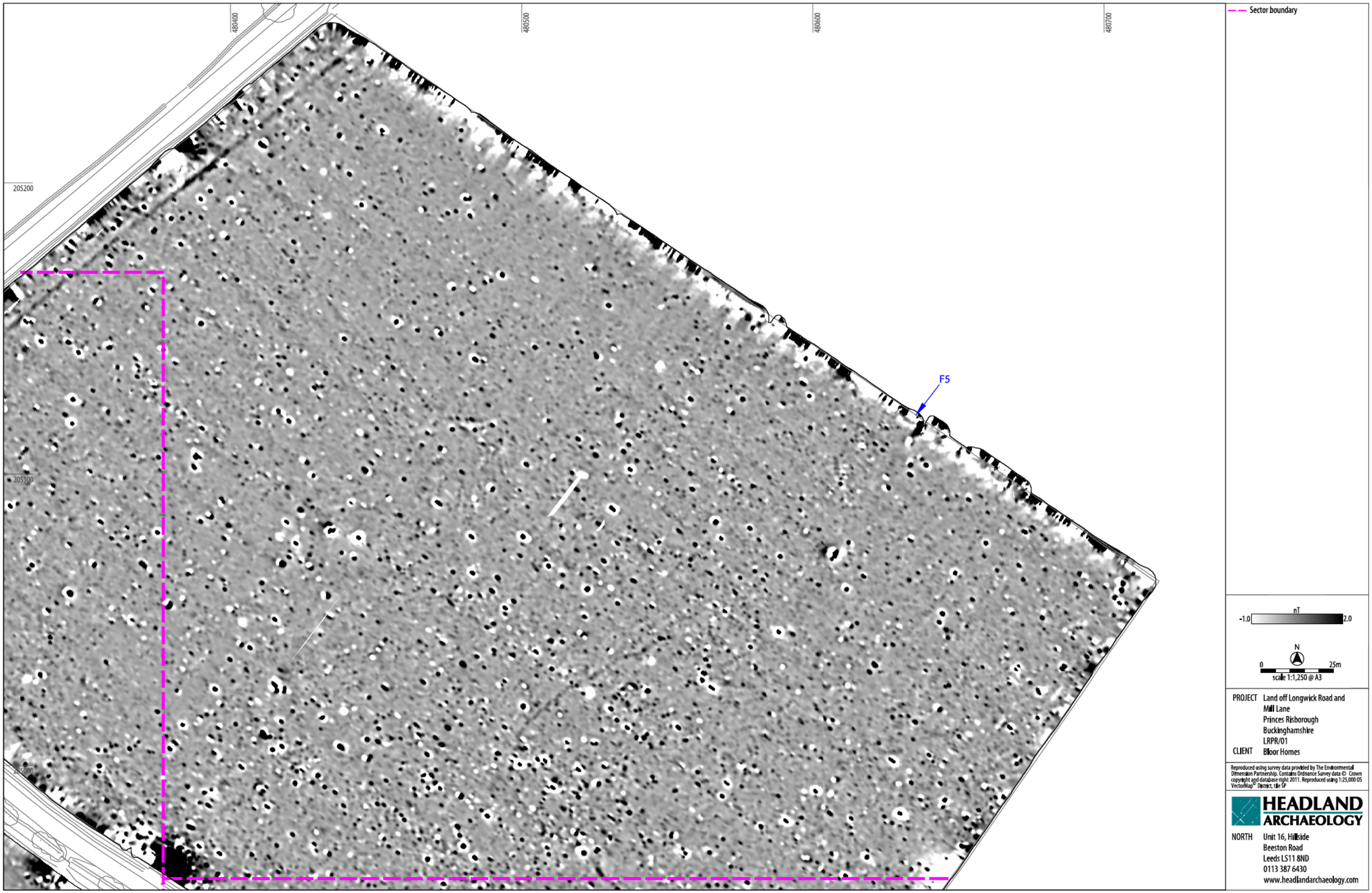
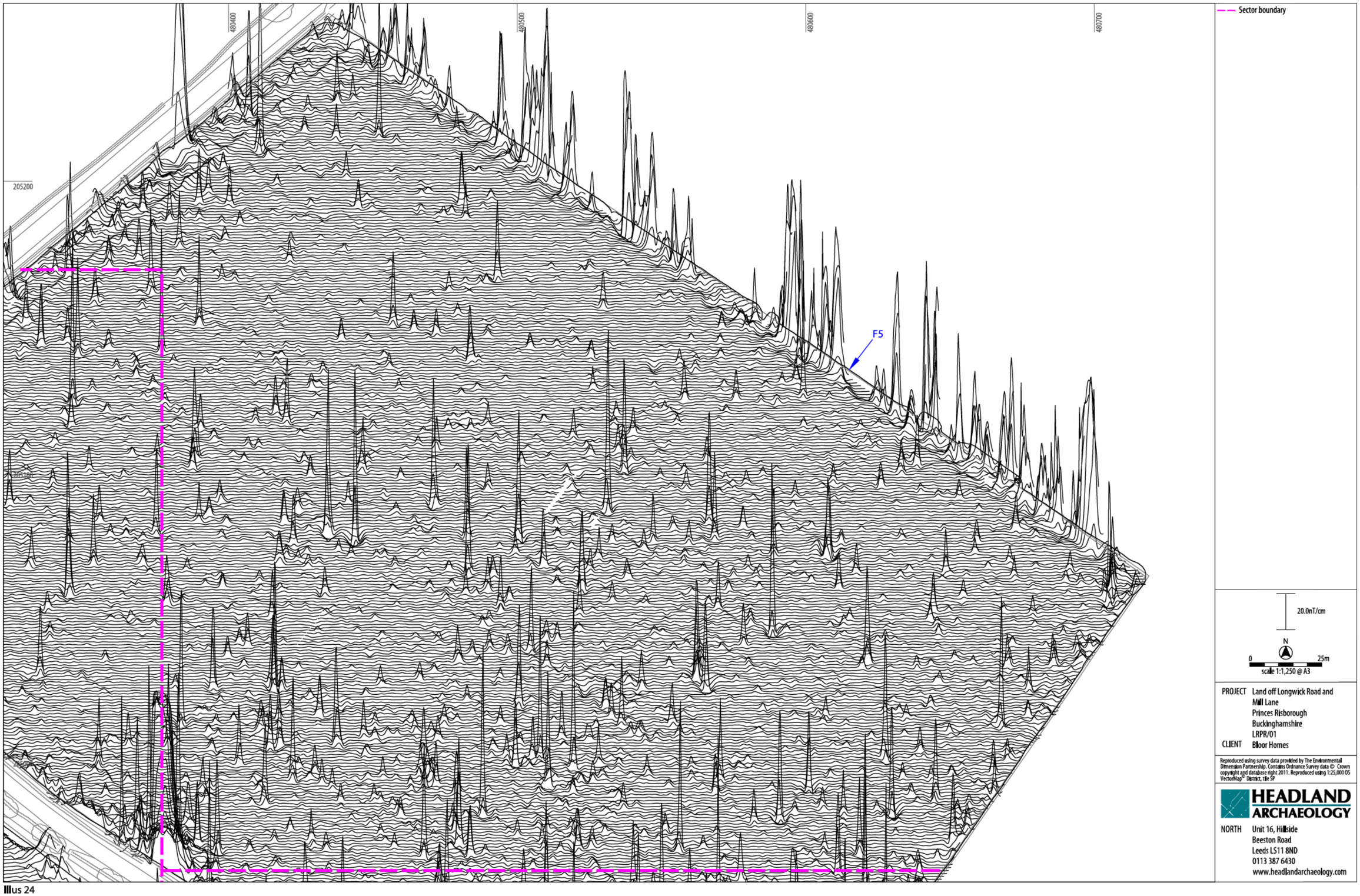
XY trace plot of magnetometer data; Sector 3



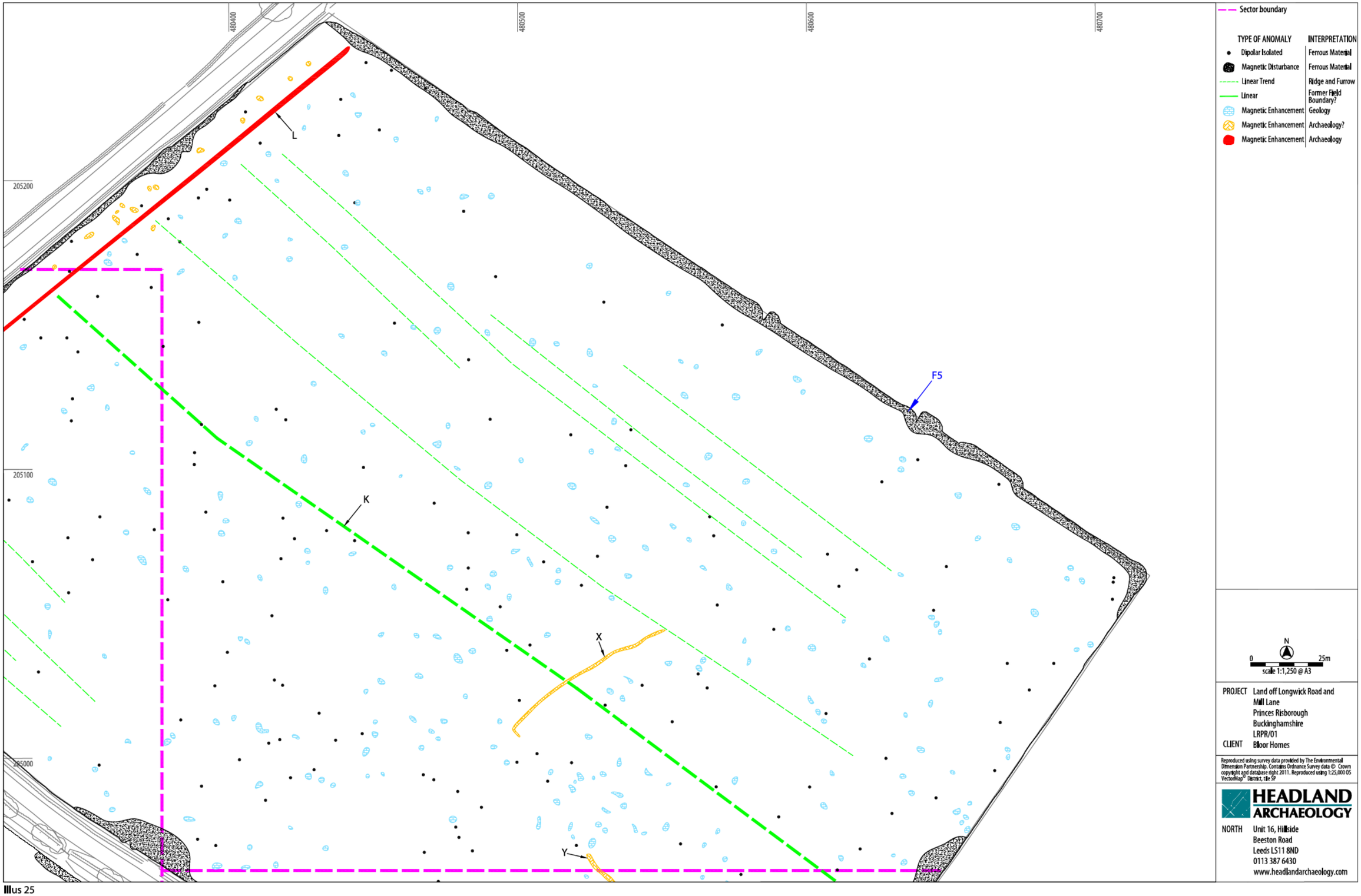
Illus 22
Interpretation of magnetometer data; Sector 3



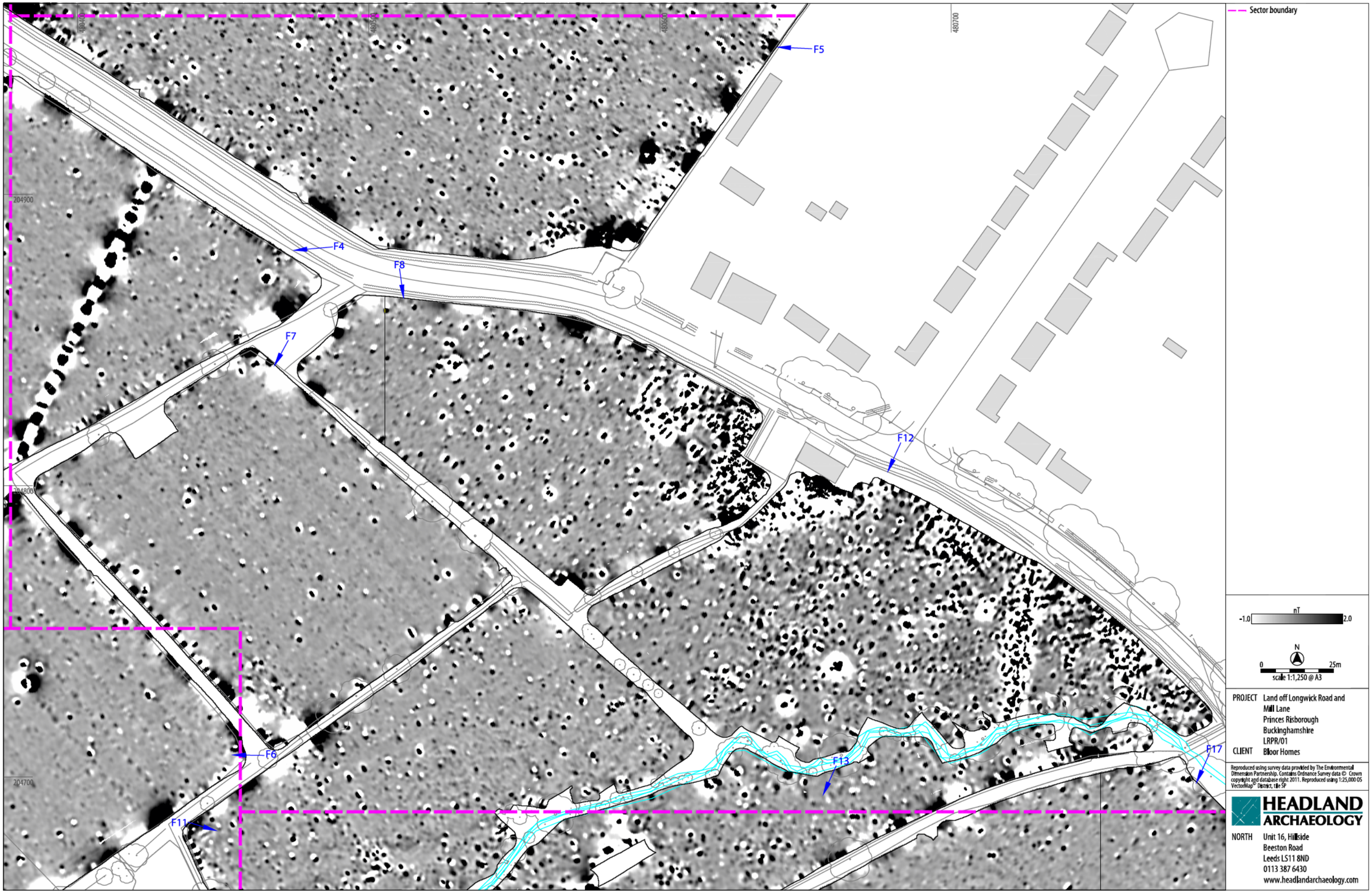
Illus 23
Processed greyscale magnetometer data; Sector 4



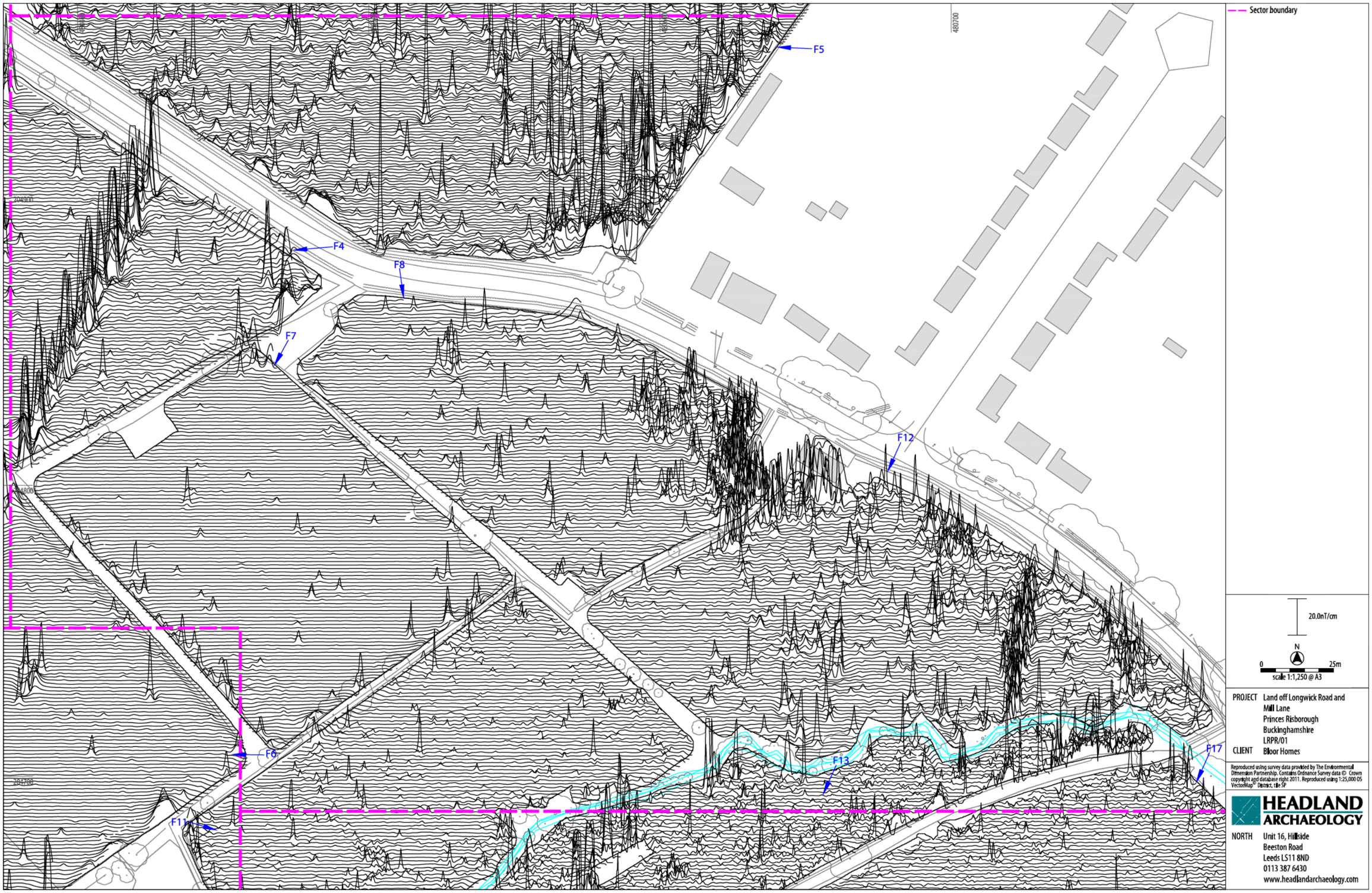
Illus 24
XY trace plot of magnetometer data; Sector 4



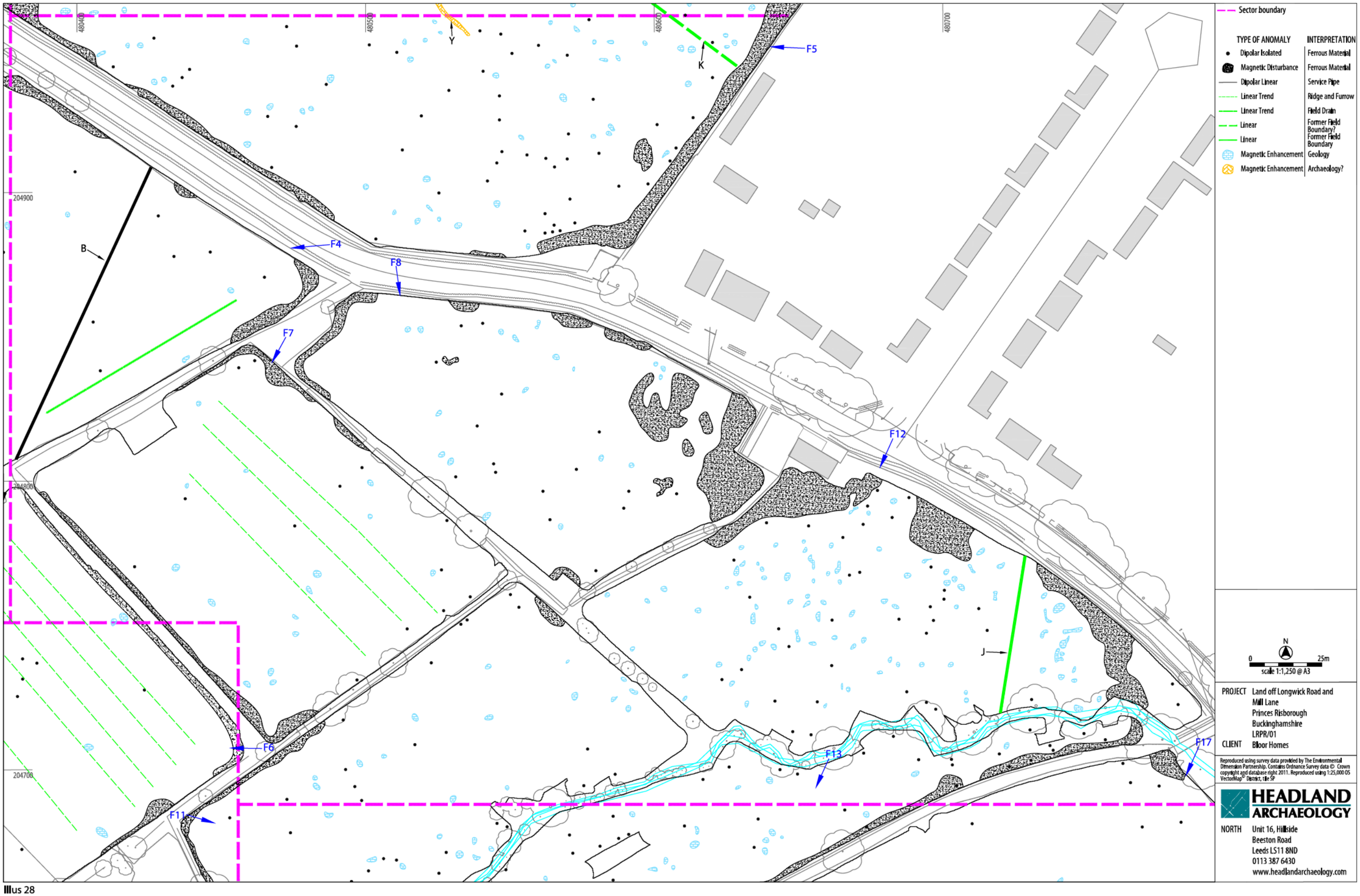
Illus 25
Interpretation of magnetometer data; Sector 4



Illus 26
Processed greyscale magnetometer data; Sector 5

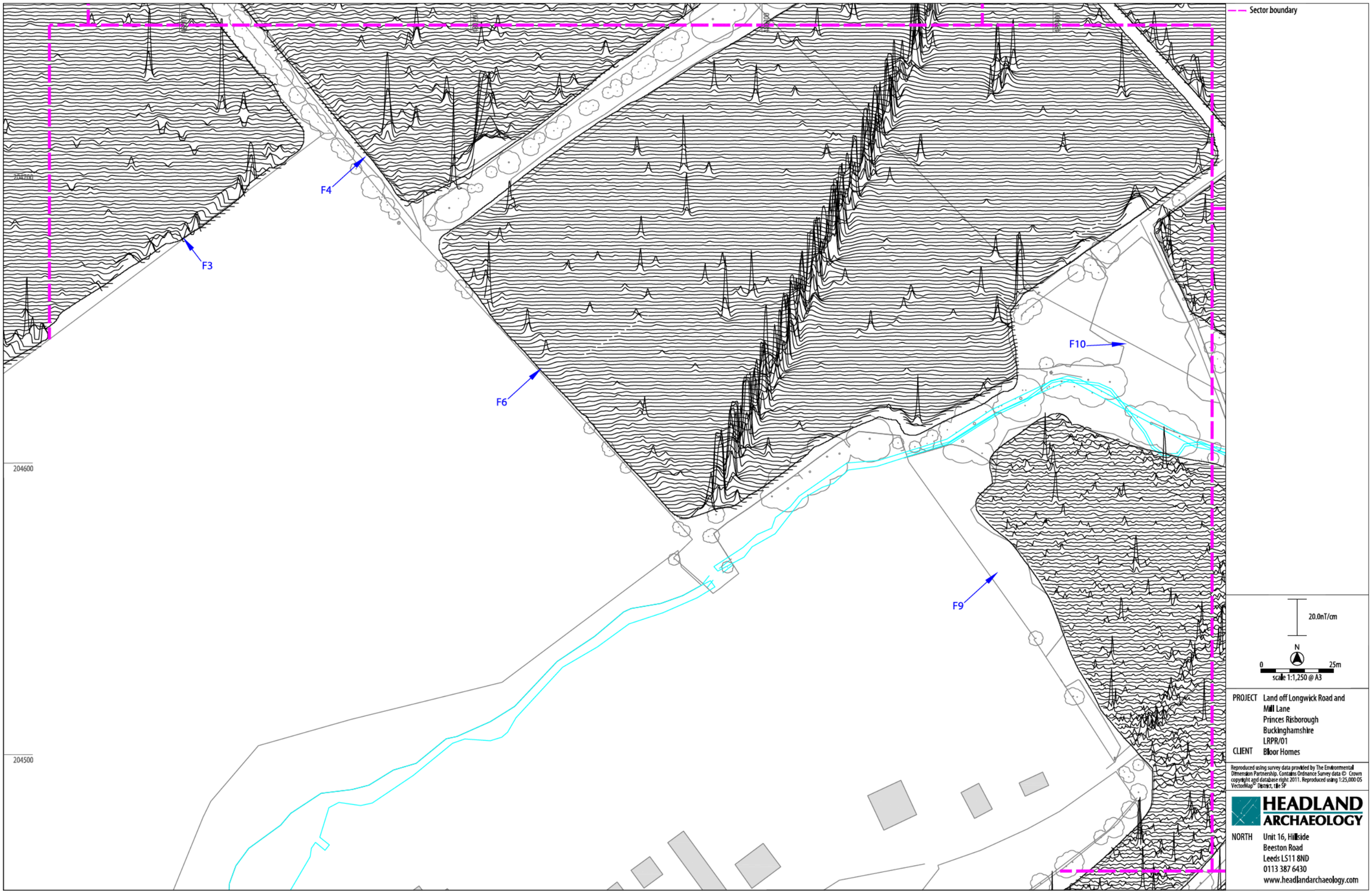


Illus 27
XY trace plot of magnetometer data; Sector 5

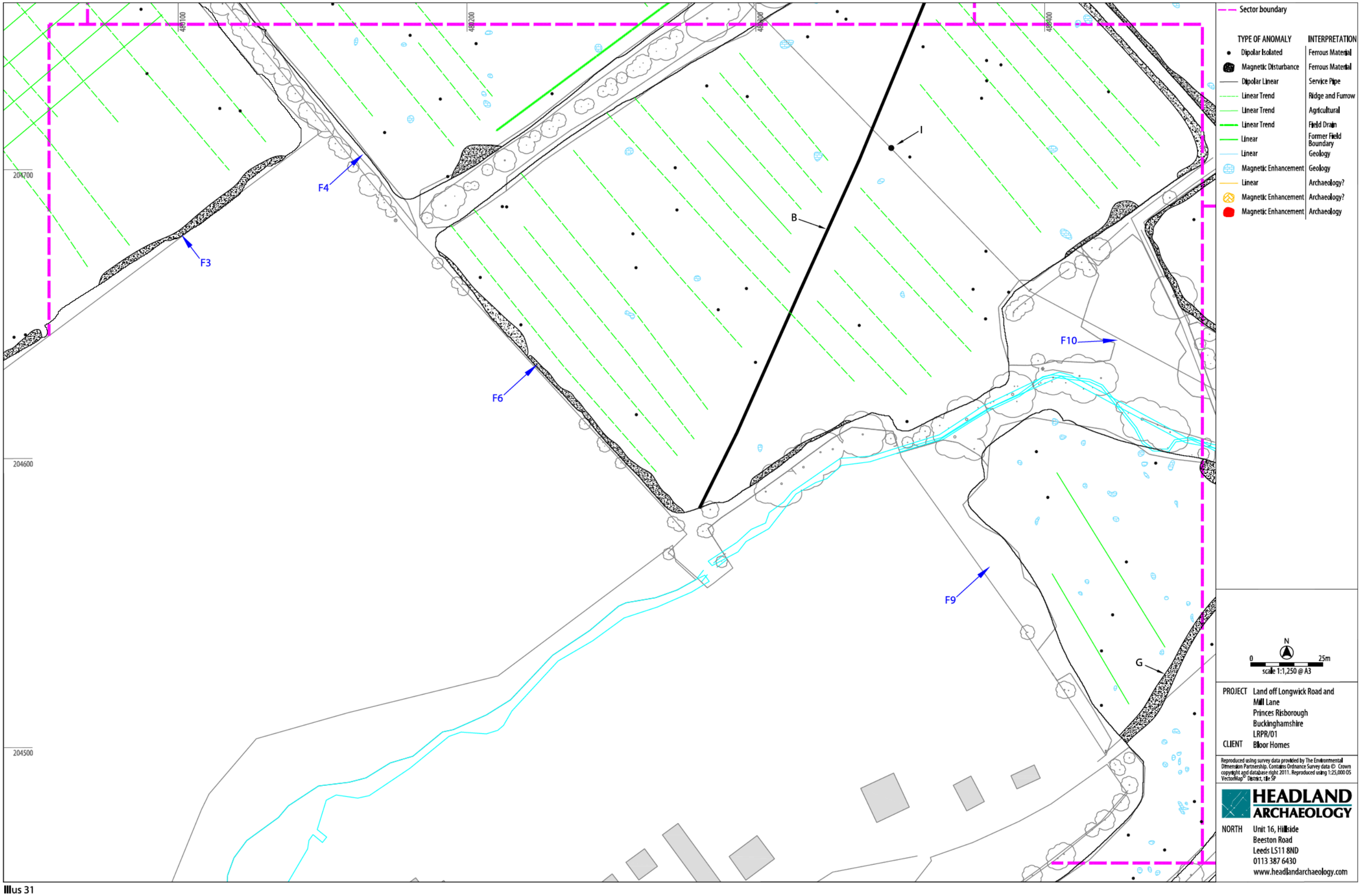


Illus 28
Interpretation of magnetometer data; Sector 5

Illus 29
Processed greyscale magnetometer data; Sector 6



Illus 30
XY trace plot of magnetometer data; Sector 6



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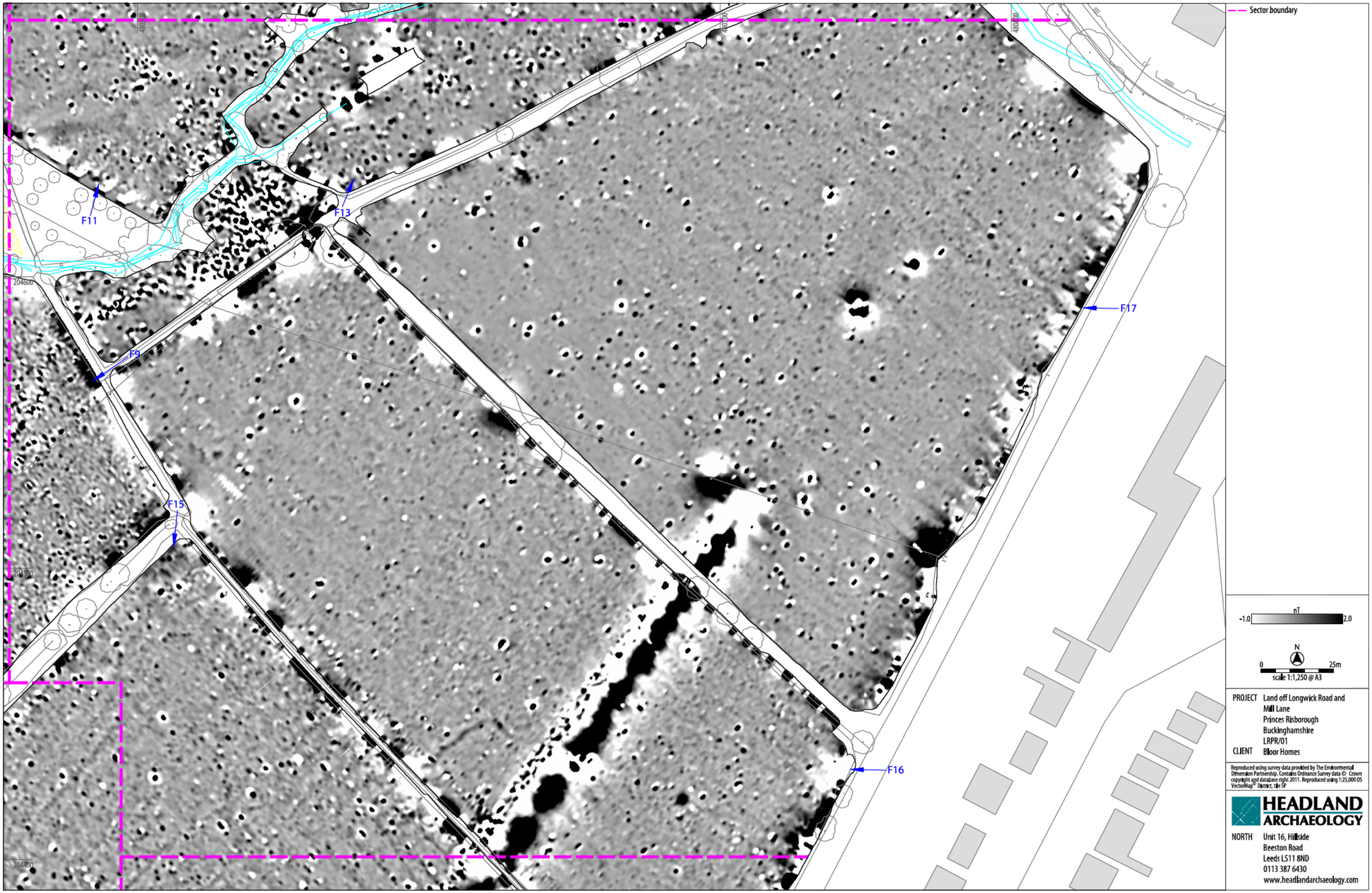
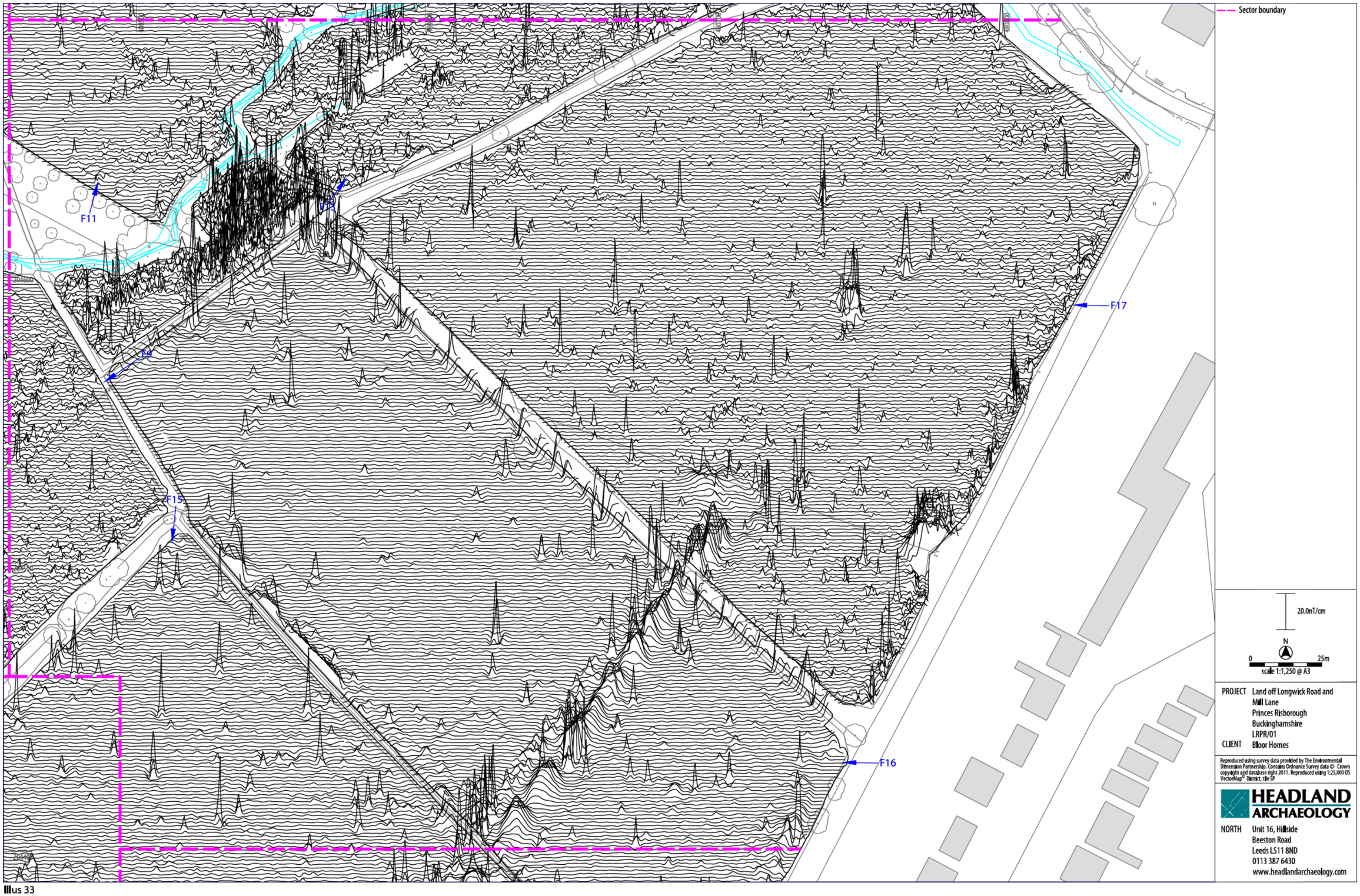
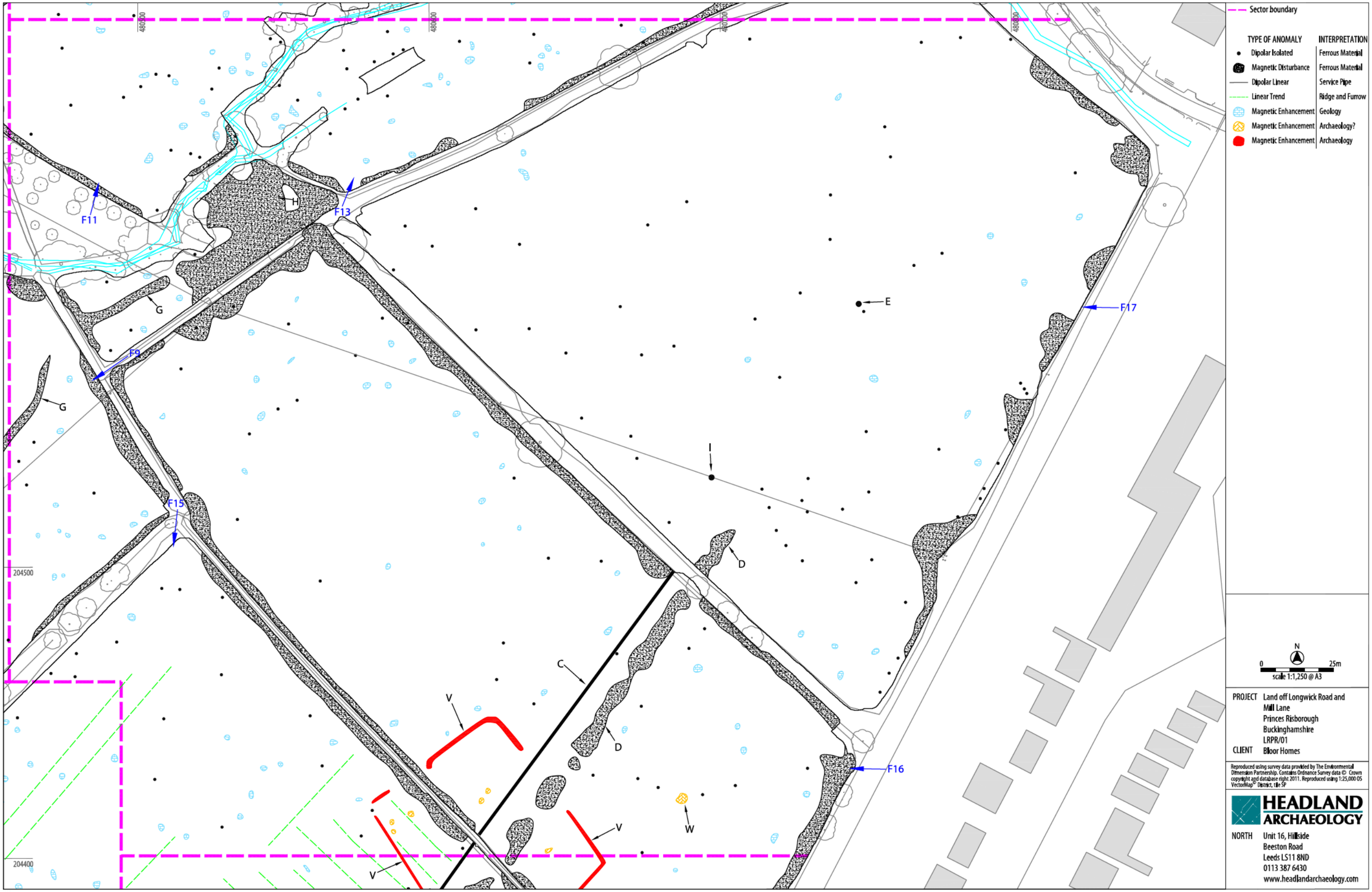
Interpretation of magnetometer data; Sector 6



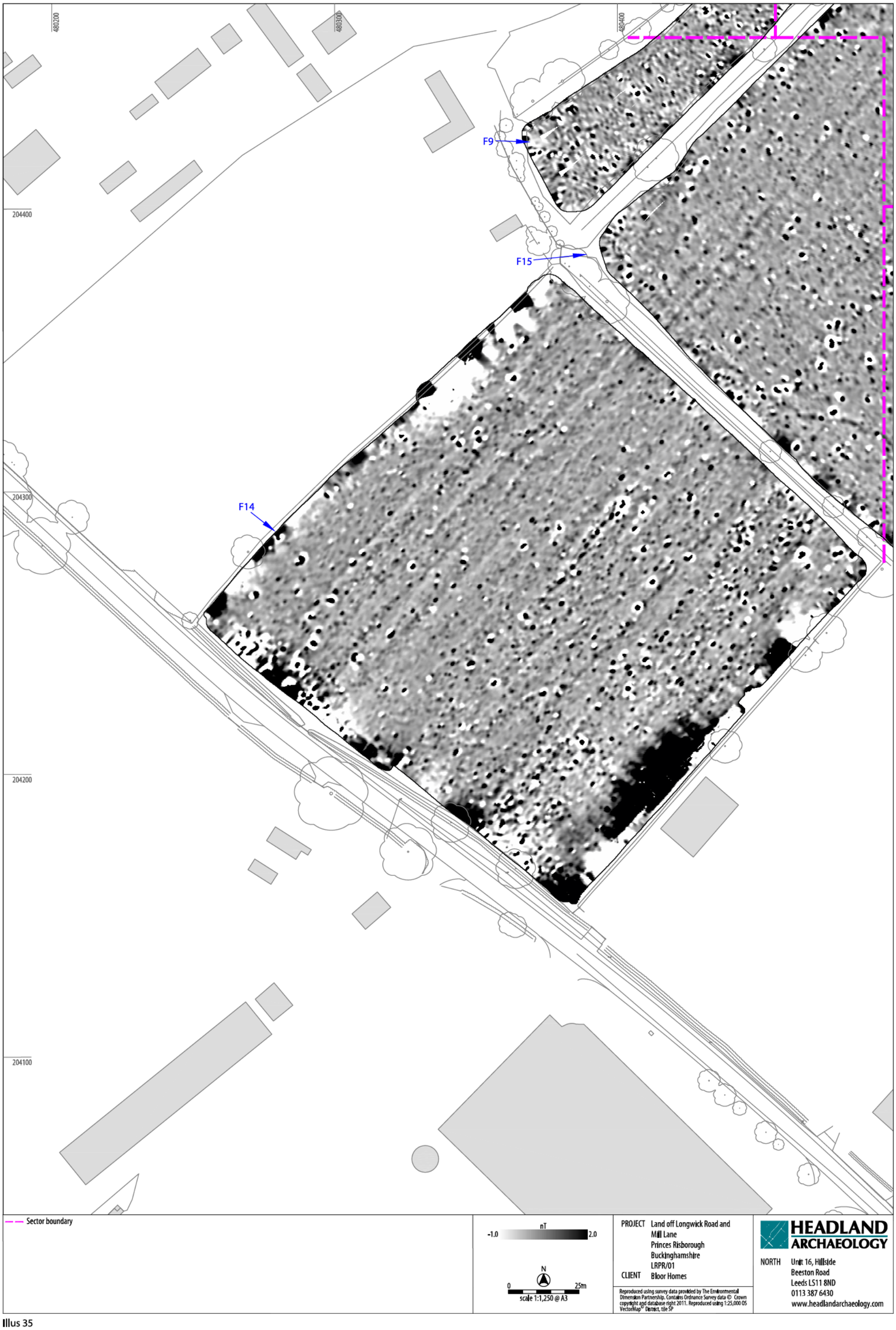
Illus 32
Processed greyscale magnetometer data; Sector 7



Illus 33
XY trace plot of magnetometer data; Sector 7

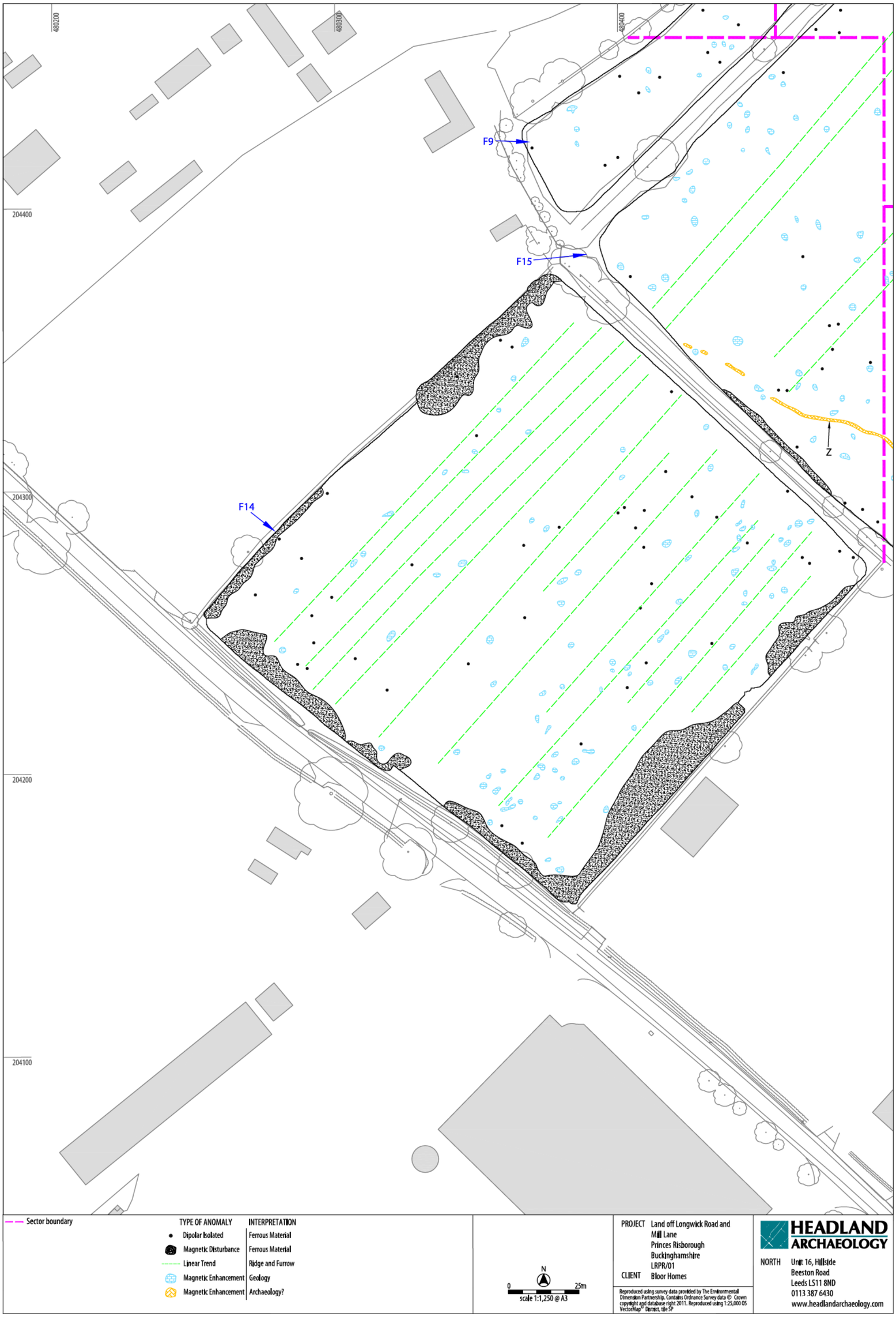


Illus 34
Interpretation of magnetometer data; Sector 7



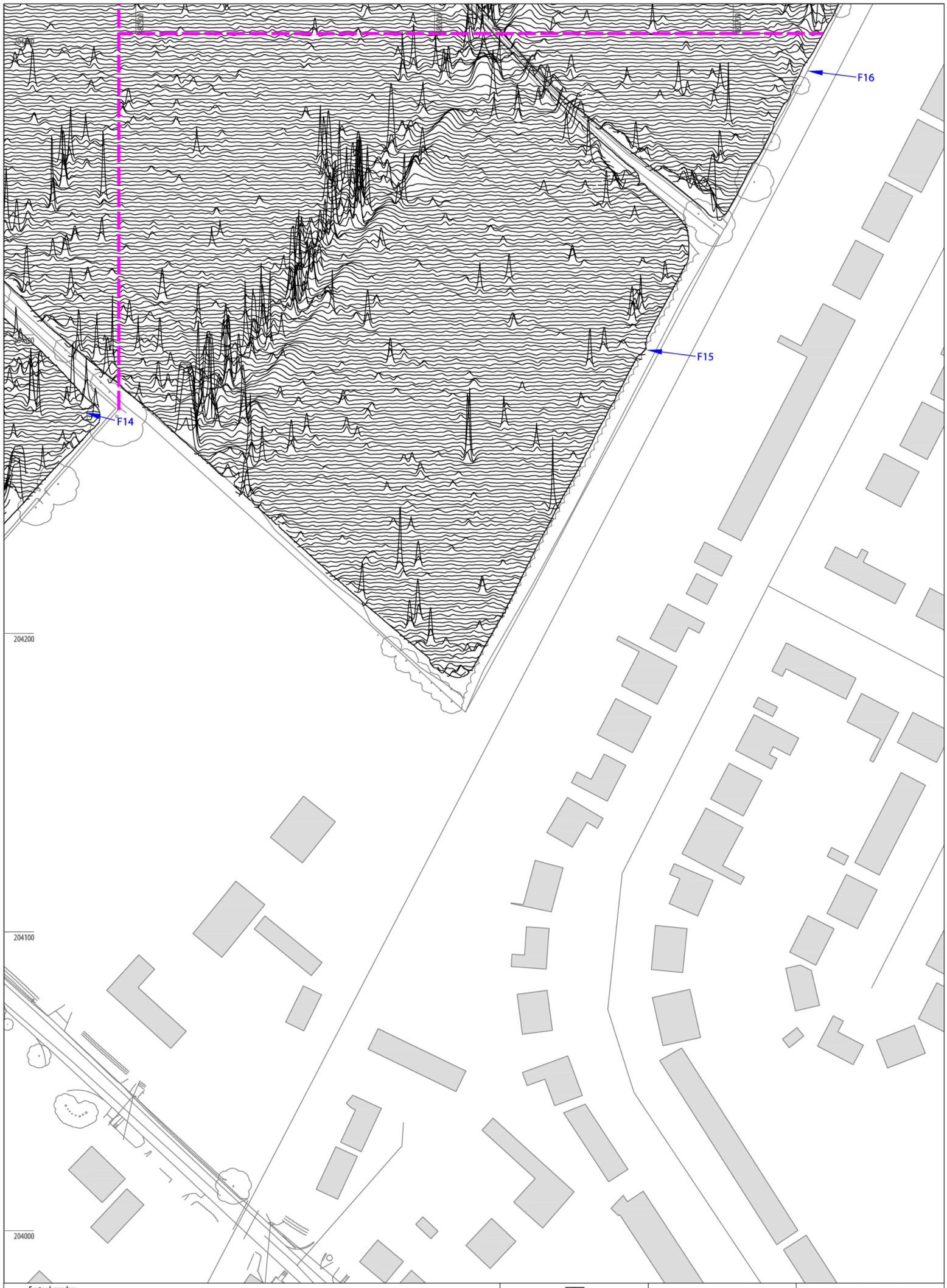
Illus 35
Processed greyscale magnetometer data; Sector 8

Illus 36
XY trace plot of magnetometer data; Sector 8

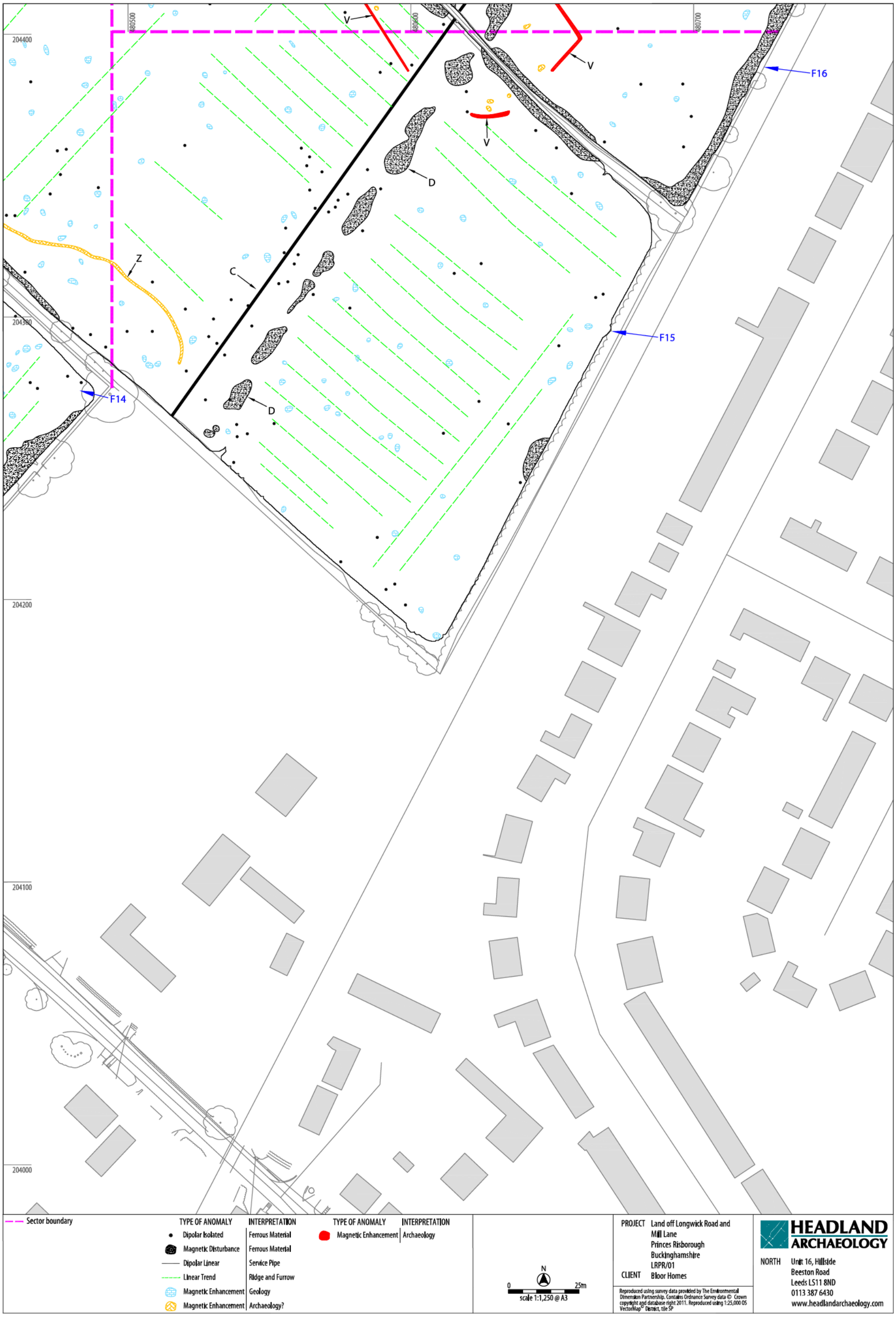


Illus 37
Interpretation of magnetometer data; Sector 8

Illus 38
Processed greyscale magnetometer data; Sector 9



Illus 39
XY trace plot of magnetometer data; Sector 9



Illus 40
Interpretation of magnetometer data; Sector 9

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 OASIS DATA COLLECTION FORM: ENGLAND

OASIS ID: headland5-238666

Project details	
Project name	Land off Longwick Road and Mill Lane, Princes Risborough
Short description of the project	Headland Archaeology (UK) Ltd undertook a geophysical (magnetometer) survey covering 55 hectares on land to the north of Princes Risborough, to provide information about the archaeological potential of the site in advance of proposed development. The survey has identified three areas of definite archaeological potential. Within the north-west of the site, parallel with Lower Ickneild Way, linear ditches have been identified corresponding to the projected route of a possible prehistoric trackway, subsequently a Roman road (Buckinghamshire HER MBC11085). Further south a D-shaped enclosure and a sub-rectangular enclosure have been identified on slightly elevated ground either side of Mill Brook. Numerous discrete anomalies within the interior of the enclosures are ascribed a possible archaeological origin, perhaps being due to soil-filled pits. Elsewhere, faint linear anomalies within the north of the survey area correspond closely to the site of a possible windmill (Buckinghamshire HER MBC6693) and may be of archaeological interest, whilst magnetic disturbance on the southern bank of Mill Brook may be due to buried structural remains, perhaps a mill. Anomalies indicative of medieval or post-medieval ridge and furrow cultivation are visible across most of the site. There is no indication from any other source to suggest that the magnetic data provides anything other than an accurate representation of the sub-surface conditions within the survey area. Therefore, based solely on the results and interpretation of the data, the archaeological potential of the site is considered to be low to moderate, and locally high.
Project dates	Start: 02-12-2015 End: 15-12-2015
Previous/future work	Not known / Not known
Any associated project reference codes	LRPR - Contracting Unit No.
Type of project	Field evaluation
Site status	None
Current Land use	Cultivated Land 4 - Character Undetermined
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	Housing estate
Prompt	National Planning Policy Framework - NPPF
Position in the planning process	Pre-application
Solid geology (other)	Upper Greensand Formation - siltstone and sandstone, Glauconitic Marl Member – sandstone, and West Melbury Marly Chalk Formation – Chalk
Drift geology (other)	alluvial deposits and small pockets of river terrace sands and gravels along the course of Mill Brook
Techniques	Magnetometry

Project location	
Country	England
Site location	BUCKINGHAMSHIRE WYCOMBE PRINCES RISBOROUGH Land off Longwick Road and Mill Lane, Princes Risborough
Study area	55 Hectares
Site coordinates	SP 80154 04816 51.735856571822 -0.839123854505 51 44 09 N 000 50 20 W Point

Project creators	
Name of Organisation	Headland Archaeology
Project brief originator	Consultant

Project design originator	Headland Archaeology
Project director/manager	Harrison, S
Project supervisor	Schmidt, A
Type of sponsor/funding body	Developer

Project archives	
Physical Archive Exists?	No
Digital Archive recipient	In house
Digital Contents	"other"
Digital Media available	"Geophysics"
Paper Archive Exists?	No

Project bibliography 1	
Publication type	Grey literature (unpublished document/manuscript)
Title	Land off Longwick Road and Mill Lane, Princes Risborough, Buckinghamshire: Geophysical Survey
Author(s)/Editor(s)	Harrison, D
Other bibliographic details	Report for LRPR/01
Date	2016
Issuer or publisher	Headland Archaeology
Place of issue or publication	Edinburgh
Description	A4 glue comb bound report

Entered by	Sam Harrison (sam.harrison@headlandarchaeology.com)
Entered on	15 January 2016

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