



# Candwr Solar Farm

Pre Application Consultation

Geophysical Survey Report

2 July 2026



# CANDWR SOLAR FARM, NEWPORT, WALES

## GEOPHYSICAL SURVEY

PLANNING REF. DNS CAS-02366-F2C3K8

commissioned by Pegasus Group  
on behalf of Candwr Solar Farm Ltd

May 2026

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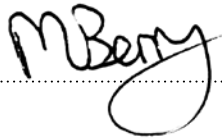
### PROJECT INFO:

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Fieldwork Date **12-29.05.2025, 21-23.07.2025 & 22-23.04.26** /

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## PROJECT SUMMARY

Headland Archaeology (UK) Ltd was commissioned by Pegasus Group (the Consultant) on behalf of Candwr Solar Farm Limited (the Client) to undertake a geophysical (magnetometer) survey on land north of Ponthir, Newport, Wales proposed for Candwr Solar Farm. Initial survey in 2025 covered a total area of approximately 102 hectares out of an overall site boundary of 120 hectares, the remainder either being unsuitable for survey or not proposed for built development. Two adjacent land parcels relating to a proposed substation and access haul road, totalling 5 hectares, were subsequently surveyed in 2026. This report details the results of all magnetometer survey pertaining to the proposed Solar Farm, and will be submitted in support of the development of the land and the results may also inform future archaeological strategy, if required.

Collectively the surveys have mostly recorded anomalies indicative of post-medieval and modern agricultural activity relating to boundary removal, ploughing and drainage. In addition, anomalies of modern and natural origin have also been identified. Several ephemeral linear/curvilinear and/or discrete anomalies with distinct magnetic signatures have been interpreted as of uncertain origin although most are not considered to have any archaeological potential, being far more likely to be indicative of an increased natural variation in the magnetic background or agricultural activity. A possible enclosure located towards the centre of the site, has been tentatively interpreted as of possible archaeological origin. No anomalies of probable archaeological origin have been recorded by the survey.

The detection of a range of magnetic anomalies allied with the lack of any superficial deposits across most of the site suggests that there was likely sufficient magnetic contrast for the detection of sub-surface archaeological features, if present, notwithstanding the limitations of magnetometer survey to identify certain types, sizes and periods of archaeological features. It is therefore considered that the results of the survey give a reasonably good indication of the archaeological potential of the site which is therefore assessed as low. The results of the survey are in keeping with the findings of the desk-based assessment of the site which identified no heritage assets within the site boundary.

## CRYNODEB O'R PROSIECT

Comisiynodd Pegasus Group (yr Ymgynghorydd) Headland Archaeology (UK) Ltd ar ran Candwr Solar Farm Limited (y Cleient) i ymgymryd arolwg geoffisegol (magnetomedr) ar tir i'r gogledd o Penthir, Casnewydd, Cymru sydd yn gael ei gynnig ar gyfer Fferm Solar Candwr. Gorchuddiodd yr arolwg blaenorol ardal o tua 102 hectarau allan o gyfanswm o 120 hectarau oddi fewn i ffin y safle, roedd y gweddillion naill ai yn anaddas ar gyfer arolwg neu nad oedd yn arfaethedig ar gyfer datblygiad adeiledig. Cafodd dau barseli tir cyfagos, cyfanswm o 5 hectar, yn ymwneud ag is-orsaf a ffordd gludo mynediad eu arolygu yn 2026. Mae'r adroddiad hyn yn manylu ar ganlydiadau yr holl arolygion magnetomedr sydd yn ymwneud â'r fferm solar arfaethedig a fydd yn cael ei gyflwyno i gefnogi cais cynllunio ar gyfer datblygiad y tir a strategaeth archaeolegol yn y dyfodol, os oes angen.

Yn bennaf, cofnododd yr arolwg anomaleddau sydd yn ddangosol o gweithgaredd amaethyddol ôl-ganoloesol a fodern yn gysylltiedig â dileu ffiniau, aradr, a draeniad. Yn ogystal, nodwyd anomeleddau o darddiad modern a naturiol. Dehonglwyd sawl anomaleddau darfodedig llinol/cromlinog ac/neu arwanhol gyda llofnodau magnetig pendodol fel anomaleddau o darddiad ansicr, er ni ystyrwyd bod gan rhan fwyaf ohonynt unrhyw botensial archaeolegol, ac yn fwy tebygol i fod yn ddangosol o gynnydd gwanhaniaeth naturiol yn y cefndir magnetig neu yn canlyniad o weithgaredd amaethyddol. Dehonglwyd yn betrus fod amgaead posib tua canolbwynt y safle o darddiad archaeolegol posib. Ni chofnododd yr arolwg anomaleddau sydd yn debygol i fod o darddiad archaeolegol.

Awgrymodd y dategliad o amrywiaeth o anomaleddau magnetic, gyda diffyg gwaddoddion arwynebol dros rhan fwyaf o'r safle, bod tebyg digon o gyferbyniad magnetig ar gyfer ddatgelu nodweddion archeolegol isarwyeb, os oedd yn bresennol, er gwaethaf cyfyngiadau arolygion magnetomedr i ganfod rhai fathau, meintiau, a cyfnodau o nodweddion archaeolegol. Ystyrwyd bod canlyniadau yr arolwg yn rhoi syniad rhesymol o dda o botensial archaeolegol y safle, a felly aseswyd bod y potensial yn isel. Mae canlyniadau yr arolwg yn unol â chanfyddiadau asesiad desg cynharach o'r safle nad oedd yn nodi unrhyw asedau treftadaeth oddi fewn i ffin y safle.



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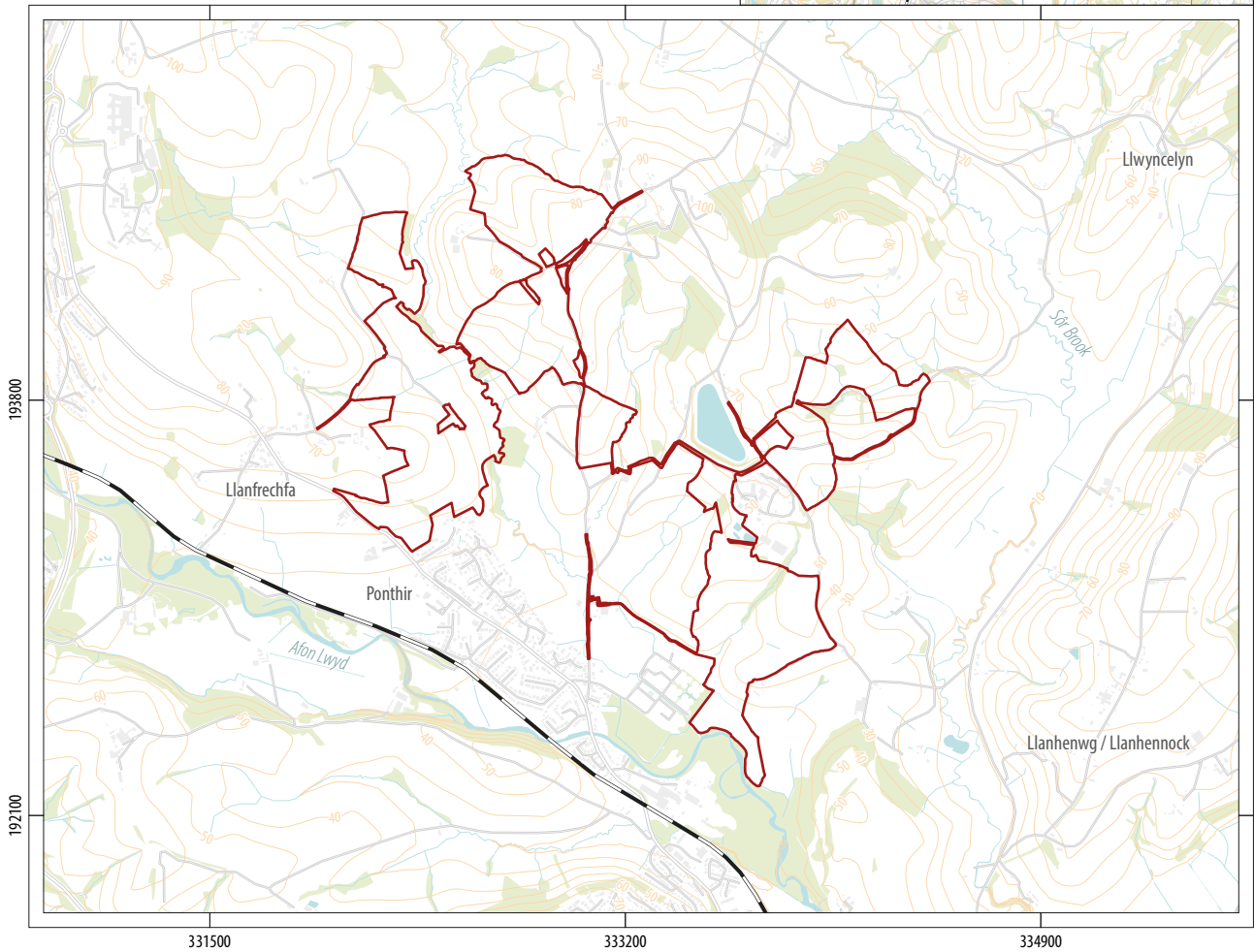
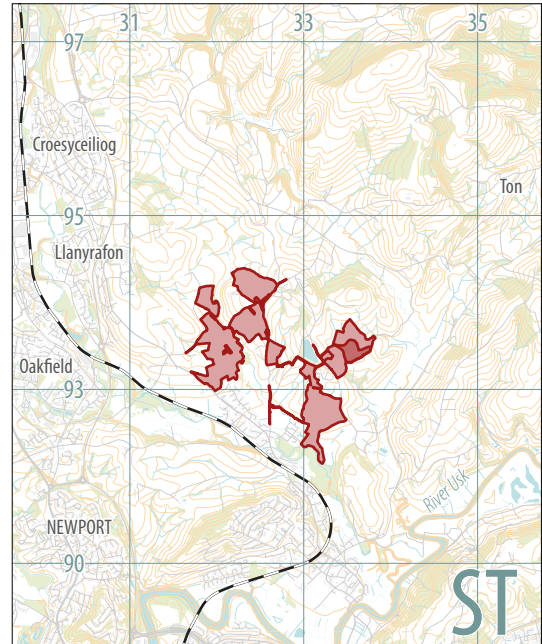
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Candwr Solar Farm  
Newport  
Wales

0 200km  
1:12,500,000 @ A4



0 500m  
1:30,000 @ A4

application site boundary

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# CANDWR SOLAR FARM, NEWPORT, WALES

## GEOPHYSICAL SURVEY

### 1 INTRODUCTION

Headland Archaeology (UK) Ltd was commissioned by Pegasus Group (the Consultant) on behalf of Candwr Solar Farm Ltd (the Client), to undertake a geophysical (magnetometer) survey on land north of Ponthir, Newport, Wales proposed as part of Candwr Solar Farm (Illus 1). This geophysical survey report will be submitted in support of the solar farm development and the results may also inform future archaeological strategy, if required.

The scheme of work was undertaken in accordance with the requirements of Planning Policy Wales 2024 (Edition 12, Ch.6 The Historic Environment), and with the Written Scheme of Investigation for Geophysical Survey (WSI) (Headland Archaeology 2025) which was submitted to Heneb prior to survey on May 8th 2025 with comments received back on May 9th.

The WSI was produced to the standards laid down in the European Archaeological Council's guideline publication, EAC Guidelines for the Use of Geophysics in Archaeology (Europae Archaeologia Consilium 2016) and the Chartered Institute for Archaeologists' (CIfA) Standard and Guidance for Archaeological Geophysical Survey (CIfA 2020). The survey was also carried out in line with the same best practice guidelines.

Initial survey was carried out in two phases between May 12th and May 29th and July 21st and July 23rd, 2025. An additional phase of survey pertaining to the proposed sites of a substation (F15) and access haul road (F16) was carried out between April 22 and April 23rd, 2026.

### 1.1 SITE LOCATION, TOPOGRAPHY AND LAND-USE

The Geophysical Survey Area (GSA) comprises five irregularly-shaped parcels of land with connecting corridors roughly centred at NGR ST 33072 93632 to the north and east of the villages of Ponthir and Llanfrehfa respectively (Illus 1). The GSA is sub-divided into twelve parcels from which the field numbering for the report is derived, measures approximately 125 hectares and lies within three different local planning authority areas: Monmouthshire, Torfaen, and Casnewydd. The Geophysical Survey Area matches the Application Site Boundary (ASB) with the exception of F16 (where additional land beyond the ASB was surveyed), a field to the north of F8a and various field margins (where ground conditions were unsuitable for survey), and F12 (which was excluded from the survey scope as no built infrastructure is proposed here).

The land within the GSA is topographically varied, particularly to the north (parcel 3) and across central areas of the GSA (parcels 4 and 5) where it slopes and undulates. Land within the western (parcels 9 and 13) and southern (parcels 8 and 12) parts of the GSA generally slopes more gradually up to the south and north respectively. Fields within the GSA are currently under a mixture of pasture and arable cultivation. Further agricultural land surrounds the GSA in all directions.

At the time of the initial survey parcels 3, 4, 5 and 10 contained an oil seed rape crop with varying levels of growth (Illus 2, Illus 3 and Illus 6). Only the crop within parcel 5 was sufficiently dense as to preclude survey. This was subsequently surveyed along with larger gaps in the original data set caused by crops, during a second mobilisation post-harvest in late July. Land immediately north of parcel 8a remained overgrown and unsuitable for survey. The land most recently surveyed in 2026 (F15 and F16) for the proposed substation and access haul road were under pasture.





**ILLUS 2** Field 3c, looking north

## 1.2 GEOLOGY AND SOILS

The underlying geology across of the site, including the areas being considered for the substation and access haul road, comprises interbedded mudstone and sandstone of the Raglan Mudstone Formation, a sedimentary bedrock formed between 423.6 and 419.2 million years ago during the Silurian period. Small areas of calcareous mudstone of the Upper Llanbadoc Beds and Llangibby Beds and sandstone of the Downton Castle Sandstone Formation (sedimentary bedrocks formed during the Silurian period, between 425.6 and 423.6 million years ago and between 423.6 and 419.2 million years ago respectively) extend into the westernmost parcel.

No superficial deposits are mapped across a large part of the GSA. A band of alluvium (clay, silt, sand and gravel) formed between 11.8 thousand years ago and the present during the Quaternary period extends across part of the westernmost parcel adjacent Candwr Brook (F9b-d) and a spread of sand and gravel glaciofluvial deposit overlies the eastern two thirds of F16 adjacent Carleon Road (BGS 2026).

The soils across most of the GSA are classified in the Soilscape 6 Association as freely draining slightly acid loamy soils, except for an area adjacent to the Candwr Brook, which is classified under Soilscape 12 Association as having freely draining floodplain soils (Cranfield University 2026).

## 2 ARCHAEOLOGICAL BACKGROUND

The following background information is abstracted from a Heritage Desk Based Assessment (Pegasus Group Forthcoming) and Note for Environmental Impact Assessment Screening (Pegasus Group 2025) for the proposed site. These documents were informed by a review of Cadw records of designated historic assets within a 3km radius of the site and Heneb (Glamorgan Gwent Archaeological Trust) Historic Environment Records of non-designated historic assets within a 1km radius of the site.

One HER monument coincides with the redline boundary of the site: the postulated route of a Roman road, which is today traced by Candwr Road (RR GGAT 003-02, RR GGAT 0003-03). Sections of the road are included within the redline at the south-eastern boundary of Parcel 3, between Parcels 4 and 13, at the western boundary of Parcel 10, and for the proposed access to Parcel 8.

The HER did not supply any text for the monument records, only GIS data, and so it is unclear whether there is any archaeological evidence of the sections through the site or whether these alignments have been extrapolated from other sections for which there is data. There is considered to be potential for Roman metallurgy (successive layers of stone and gravel) below the modern road surface, as well as infilled ditches on either side of the road agger (embankment). The metallurgy and ditches could contain waterlogged paleoenvironmental deposits and/or artefactual material.

Parcel 10 of the GSA lies directly north of the Scheduled Iron Age hillfort of Candwr (or Caerau) Camp (GGAT00645g, MM135). Apart





ILLUS 3 Field 10c, looking west

from a findspot of an earlier Bronze Age axe near/in Parcel 10, no other evidence of later prehistoric activity is recorded in the immediate vicinity. No earthworks (which could be associated with the hillfort) have been identified through the analysis of LiDAR imagery or from the site walkover survey undertaken for this assessment, and no cropmarks have been mapped by aerial reconnaissance undertaken by the Royal Commission.

Given the proximity of Candwr Camp, and the existence of other Iron Age defended sites in the surrounding landscape, there is considered to be potential for evidence of Iron Age activity within Parcel 10. Most likely would be the infilled ditches of livestock enclosures or field systems and perhaps trackways.

There is nothing to suggest Roman settlement or military activity within the GSA, despite evidence of such being recorded within the wider landscape. It is possible, however, that the site was part of the agricultural hinterland of Caerleon, supporting the legionary fortress and civilian settlement. There is potential for the infilled ditches of livestock enclosures or field systems and perhaps trackways.

There is nothing to suggest that the medieval settlement of Llanfrechfa extended into Parcels 9 or 13 of the GSA, or that the site was part of the medieval monastic estate of Llantarnam Abbey or the medieval deer park of Llanvihangel Park.

The land within the GSA has been in agricultural use from at least the early 19th-century, and in all likelihood, from the medieval period.

Archaeological remains of historic agricultural activity could include the infilled ditches of former field boundaries and plough furrows and the buried surfacing of former farm tracks.

## 3 AIMS, METHODOLOGY & PRESENTATION

### 3.1 AIMS AND OBJECTIVES

The principal objectives of the geophysical survey were to gather information to establish the presence/absence, character, and extent of any archaeological remains within the GSA, and thereby support any forthcoming planning application and inform any further investigation strategies.

The aims of the survey were:

- › to provide information about the nature and possible interpretation of any magnetic anomalies identified;
- › to therefore determine the likely presence/absence and extent of any buried archaeological features, or other geophysical anomalies, and provide an interpretation; and
- › to produce a comprehensive site archive and report.



**ILLUS 4** Field 2a, looking south-west

### 3.2 METHODOLOGY

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.

Magnetometry is the most widely used geophysical survey technique in archaeology as it can quickly evaluate large areas and, under favourable conditions, identify a wide range of archaeological features including infilled cut features such as large pits, gullies and ditches, hearths, and areas of burning, and kilns and brick structures. It is therefore good at locating settlements of all periods, prehistoric field systems and enclosures, and areas of industrial or modern activity, amongst others. It is less successful in identifying smaller features such as post-holes and small pits (except when using a non-standard sampling interval), unenclosed (prehistoric) settlement sites and graves or burial grounds. However, magnetometry is by far the single most useful technique and was assessed as the best non-intrusive evaluation methodology for this site.

The survey was walked utilising five Sensys FGM650/3 sensors mounted at 1m intervals onto a rigid carrying frame. The system was programmed to take readings at a frequency of 100Hz on roaming

traverses (swaths) 5m apart. These readings were stored on an external weatherproof laptop and later downloaded for processing and interpretation. The system was linked to a Juniper Geode Real Time Kinetic (RTK) differential Global Positioning System (dGPS) outputting in NMEA mode to ensure a high positional accuracy for each data point.

MonMX (Sensys GmbH) software was used to collect and export the data. Anomaly GeoSurvey v1.12.3 (Lichenstone Geoscience) and QGIS v3.34.6 software was used to process and present the data respectively.

### 3.3 DATA PRESENTATION AND TECHNICAL DETAIL

A general site location plan is shown in Illus 1 at a scale of 1:30,000. Illus 2 to Illus 6 inclusive are site condition photographs. Illus 7 shows the location and direction of the site condition photographs at a scale of 1:10,000: the unsurveyed and descoped areas are also displayed. Illus 8 and Illus 9 present overviews of the processed greyscale data and interpretation of the data, also at 1:10,000. Illus 10 to Illus 33 inclusive show the fully processed (greyscale) data, minimally processed (XY trace plot) data and interpretative plans, by Sector, at a scale of 1:2,500.

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



**ILLUS 5** Field 8a, looking west

details are presented in Appendix 4. A copy of the OASIS entry (Online Access to the Index of Archaeological Investigations) is reproduced in Appendix 5.

The survey methodology, report and any recommendations comply with the Written Scheme of Investigation (Headland Archaeology 2025), and guidelines outlined by Europae Archaeologia Consilium (EAC 2016) and by the Chartered Institute for Archaeologists (CIfA 2020).

All illustrations using Ordnance Survey (OS) base mapping are reproduced with the permission of the controller of His Majesty's Stationery Office (© Crown copyright).

The illustrations in this report have been produced following analysis of the data in 'raw' (minimally processed) and processed formats and over a range of different display levels. All illustrations are presented to display and interpret the data to best effect. The interpretations are based on the experience and knowledge of Headland Archaeology management and reporting staff.

## 4 RESULTS & DISCUSSION

### 4.1 SITE CONDITIONS

Magnetometer survey is generally recommended over any sedimentary geology, but results can be variable over mudstone

and sandstone bedrock geologies. Responses may also be average to poor over alluvium, as present across small parts of F7b, F9b, F9c and F9d adjacent to Candwr Brook (English Heritage 2008; Table 4).

The magnetic background changes across the GSA and is generally quite varied except for across parcels 4, 8, 9 and 12 which exhibit a more uniform magnetic background. Variation in the magnetic background is likely derived from topographic effects prominent across the site and natural changes in the upper soil horizons derived from the sedimentary bedrock.

Against this magnetic background, anomalies of predominantly agricultural, modern, and geological origin have been recorded although a single anomaly of possible archaeological origin and several ephemeral linear and discrete anomalies of uncertain origin have also been identified.

The range and magnitude of the recorded anomalies allied with the lack of any superficial deposits across most of the site indicates that there was likely sufficient magnetic contrast for the detection of sub-surface archaeological features, if present, notwithstanding the limitations of magnetometer survey to identify the types, sizes and period of archaeological features as described in Section 3.2. It is therefore considered that the results of the survey provide a reasonably good indication of the archaeological potential of the site.

The ground conditions across all pasture fields were good (illus 4 and Illus 5) except in the steepest parts of the site.





**ILLUS 6** Field 5a, unsuitable for survey, looking north-east

No problems were encountered during the survey except for areas of uneven ground and steep topography. The magnetic anomalies recorded by the survey are discussed below according to their interpreted origin.

Small, discrete patches of magnetic disturbance in several fields are indicative of areas of tipping or infilling and are also interpreted as of modern origin, likely identifying attempts to improve drainage/access between fields.

## 4.2 ANOMALIES OF FERROUS AND MODERN ORIGIN

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 introduced into the topsoil during manuring or tipping/infilling. There is no obvious clustering of the 'spike' responses, so these anomalies are likely to be indicative of a random distribution of modern ferrous debris in the plough-soil.

Twenty-seven very high magnitude linear dipolar anomalies (Illus 9 – SP1 to SP27) record the location of buried service pipes (or drains) across the GSA.

Bands or small areas of magnetic disturbance recorded along the field edges are likely to be due to the accumulation of ferrous debris around the field margins or to ferrous material in the boundary itself.

## 4.3 ANOMALIES OF AGRICULTURAL ORIGIN

Faint parallel linear and curvilinear anomalies are abundant across the GSA and are of agricultural origin, identifying patterns resulting from post-medieval and modern cultivation and/or attempts to drain the land.

Twelve linear anomalies (Illus 9 – FB1 to FB12) of varying strengths record the locations of former field boundaries detailed on historic maps.

## 4.4 ANOMALIES OF GEOLOGICAL ORIGIN

Several low magnitude linear anomalies have been interpreted as of natural (geological) origin. In many cases these align with the contours of the undulating landscape and likely reflect the accumulation of material along breaks of slope. Elsewhere, increased variability in the natural magnetic background may reflect small, localised changes in superficial geology and/or upper soil horizons.

## 4.5 ANOMALIES OF POSSIBLE OR PROBABLE ARCHAEOLOGICAL ORIGIN

A single very low magnitude rectilinear anomaly of possible archaeological origin is recorded in the south of F4b (Illus 24 – E?1). Broadly aligned north-west to south-east this possible enclosure measures approximately 17m by 12m and contains two small, discrete pit-like responses which could equally arise from changes in the natural magnetic background. The response lies approximately 60m west of a suspected Roman road that extends north from Caerleon Road at Ponthir (RR GGAT 0003-03), 75m north of a findspot of a Middle Bronze Age palstave axe (GGAT 04388g) and 425m from the Scheduled Monument of Caerau Hillfort (GGAT00645g), though no direct association to any of these heritage assets, all of which are located outside the GSA, is inferred. The response from E?1 is so faint as to preclude a more confident interpretation however is sufficiently coherent as to indicate a possible anthropogenic cause.

No anomalies of probable or clear archaeological potential have been recorded by the survey.

## 4.6 ANOMALIES OF UNCERTAIN ORIGIN

Several anomalies, described below, both linear and discrete, have been interpreted as of uncertain origin on the basis that they cannot be confidently interpreted in any of the other categories. Where possible the most likely cause is stated.

Roughly 15m north-west of E?1 are two similarly faint linear responses that possibly form a right angle (Illus 9 – L2). The anomalies are of such low strength that an agricultural or natural cause is considered most likely.

A group of very faint curvilinear and linear anomalies in F10c (Illus 24 – L4 and U2) that correlate with an area of increased natural background magnetic variation are tentatively identified. The anomalies are most likely a coincidental arrangement of natural responses. However their proximity approximately 50m from a postulated Roman road (RR GGAT 0003-03) and 100m from the Scheduled Monument of Caerau Hillfort (GGAT00645g) is noted.

Linear and curvilinear ditch-like anomalies located at the northern boundary of F4a (Illus 21 – L1), in the north of F8a and in F13k (Illus 18 – L3) are also all interpreted as of uncertain origin. All these anomalies are considered most likely to represent agricultural trends/features resulting from ploughing and/or drainage or are of natural origin. However, their form and magnetic signature merits their identification as distinct from these classifications.

Singular, isolated discrete anomalies with distinct magnetic signatures and levels of magnetic enhancement above the natural background located in F3d, F4b, F11a, F12c, and F13k are also all classed as uncertain (Illus 8 – ME1 to ME8). In all cases the character of these anomalies is suggestive of an anthropogenic cause but with little context and in isolation a more confident interpretation is not possible.

The same reasoning applies to a cluster of small, pit-like anomalies in the south of F4a (Illus 21 – P?1). These anomalies have an amplitude elevated above the general magnetic background but could also be indicative of modern disturbance around the field boundary.

## 5 CONCLUSION

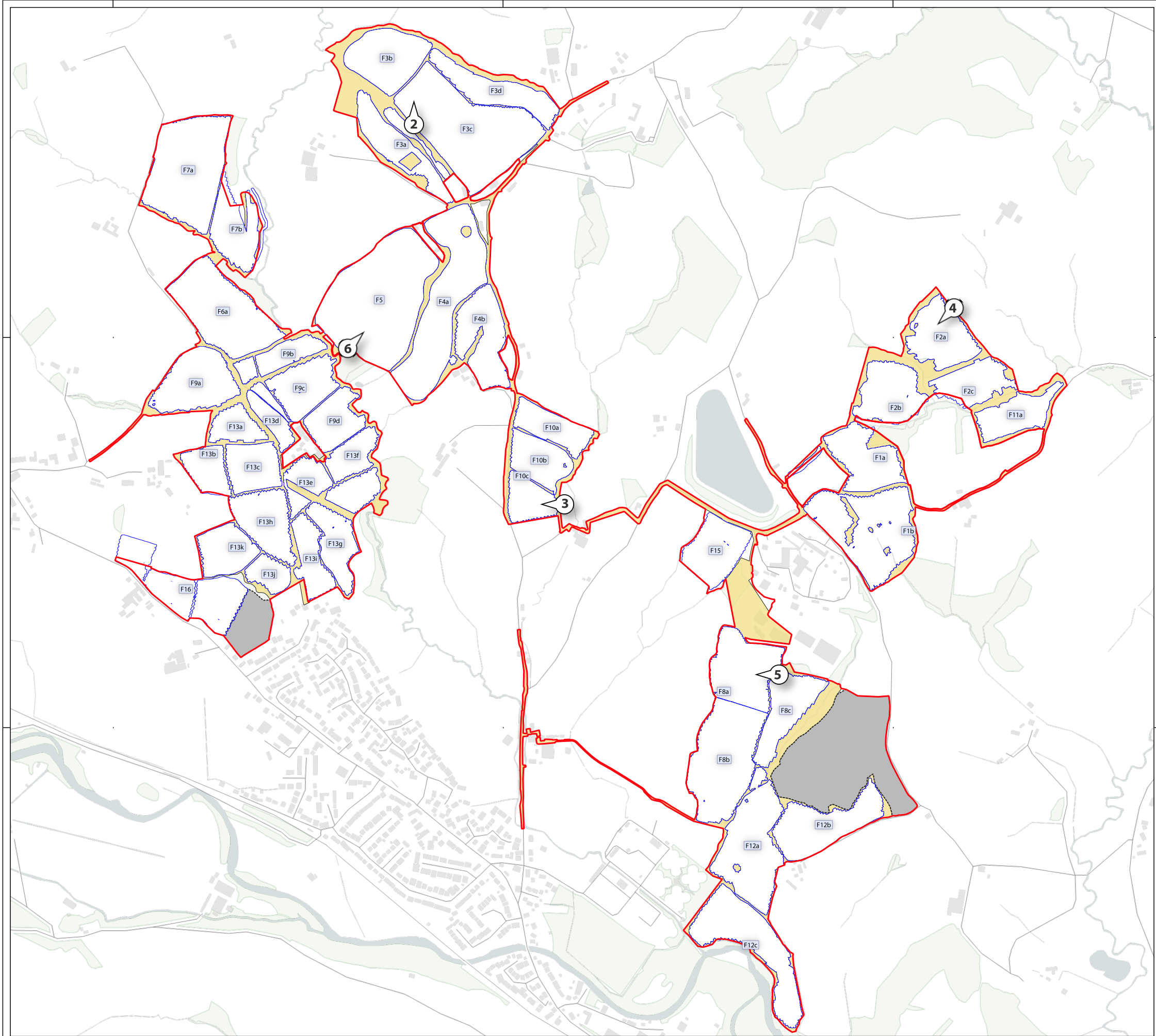
The survey has mostly recorded anomalies indicative of post-medieval and modern agricultural activity relating to boundary removal, ploughing and drainage. In addition, anomalies of modern and natural origin have also been identified. Several ephemeral linear/curvilinear and/or discrete anomalies with distinct magnetic signatures have been interpreted as of uncertain origin although most are not considered to have any archaeological potential being far more likely to be indicative of an increased natural variation in the magnetic background or agricultural activity. Only a single anomaly, a possible enclosure located towards the centre of the site, has been tentatively interpreted as of possible archaeological origin. No anomalies of probable archaeological origin have been recorded by the survey.

The detection of a range of magnetic anomalies allied with the lack of any superficial deposits across most of the site suggests that there was likely sufficient magnetic contrast for the detection of sub-surface archaeological features, if present, notwithstanding the limitations of magnetometer survey to identify certain types, sizes and periods of archaeological features. It is therefore considered that the results of the survey give a reasonably good indication of the archaeological potential of the site which is therefore assessed as low. The results of the survey are in keeping with the findings of the desk-based assessment of the site which identified no heritage assets within the site boundary.

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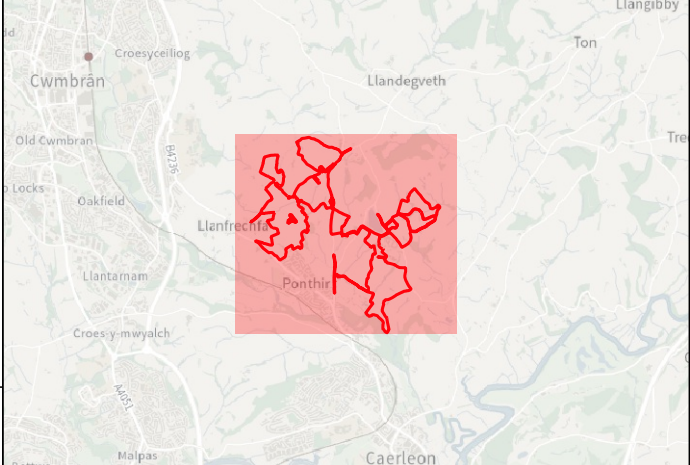






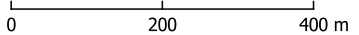


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**Key**

-  Application Site Boundary
-  Geophysical Survey Area
-  Excluded from Survey
-  Location and Direction for Illus 02 to 06
-  Unsuitable Survey Area



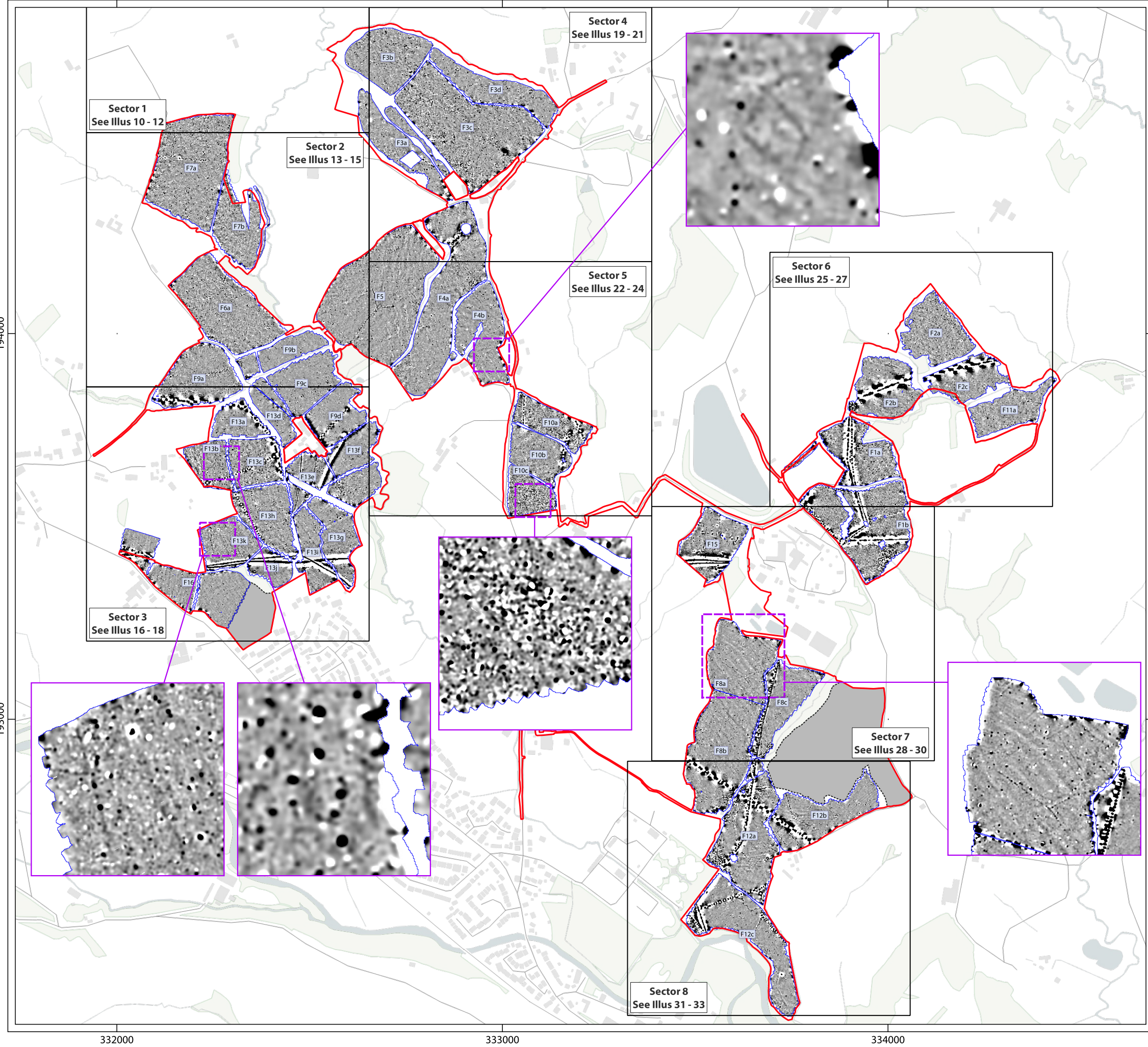
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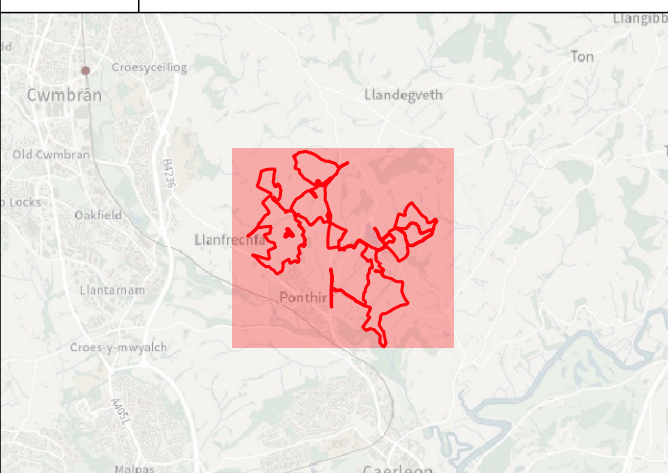
Illus 07 - Survey location and photograph locations







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**Key**

-  Application Site Boundary
-  Geophysical Survey Area
-  Area for Illus 10 to 33
-  Inset Detail Location
-  Excluded from Survey



0 200 400 m

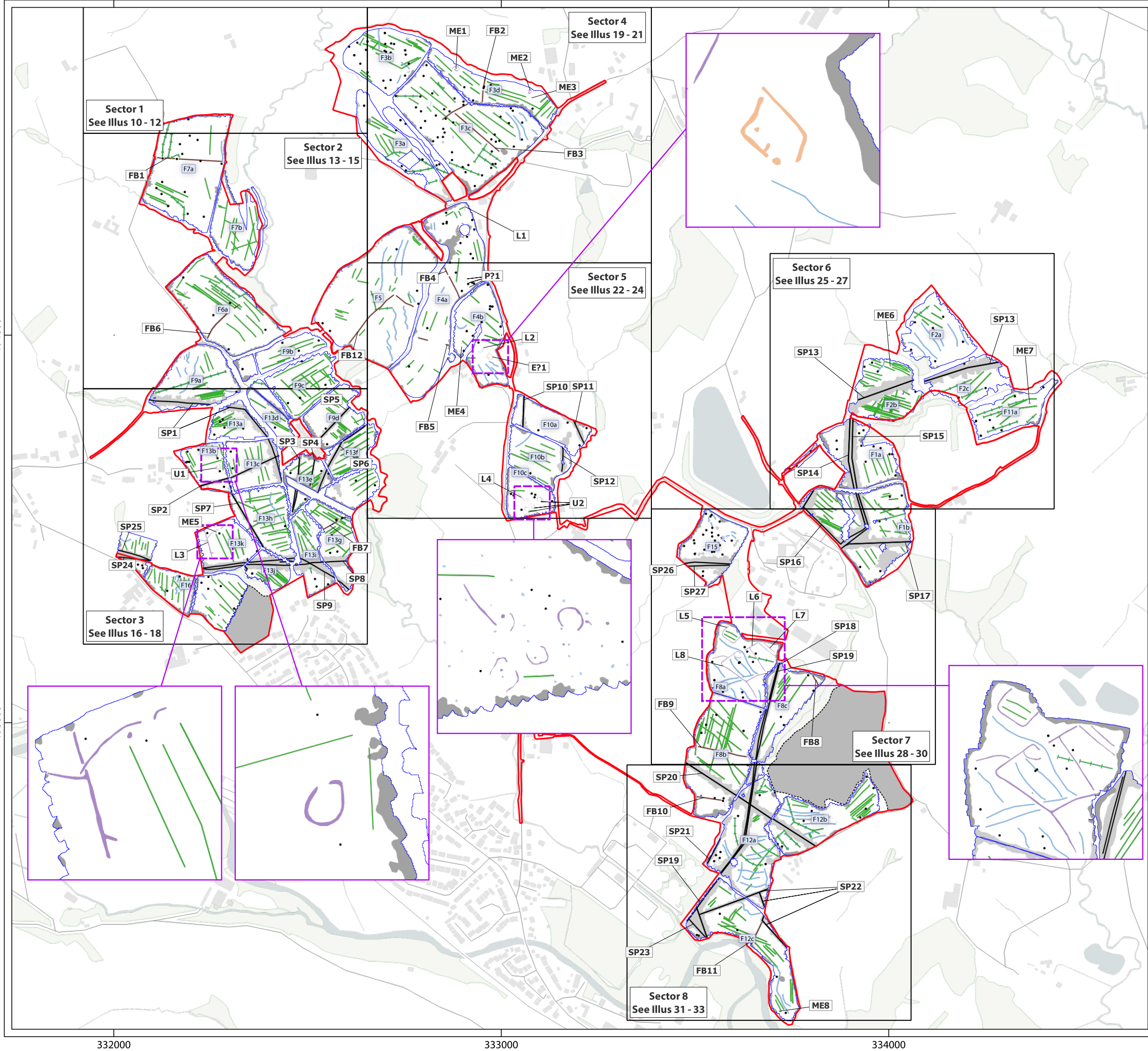
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Illus 08 - Overall greyscale plot of processed magnetometer data





**Key**

- Application Site Boundary
- Geophysical Survey Area
- Area for Illus 10 to 33
- Inset Detail Location
- Excluded from Survey
- Ferrous Objects
- Agriculture
- Field Boundary
- Field Drain
- Natural
- Service
- Magnetic Disturbance (Above Ground)
- Magnetic Disturbance (Below Ground)
- Natural
- Possible Archaeology
- Uncertain

**Abbreviation**

|    |                       |
|----|-----------------------|
| E? | Enclosure?            |
| FB | Former Field Boundary |
| L  | Linear                |
| ME | Magnetic Enhancement  |
| P? | Pit?                  |
| SP | Service Pipe          |
| U  | Uncertain             |

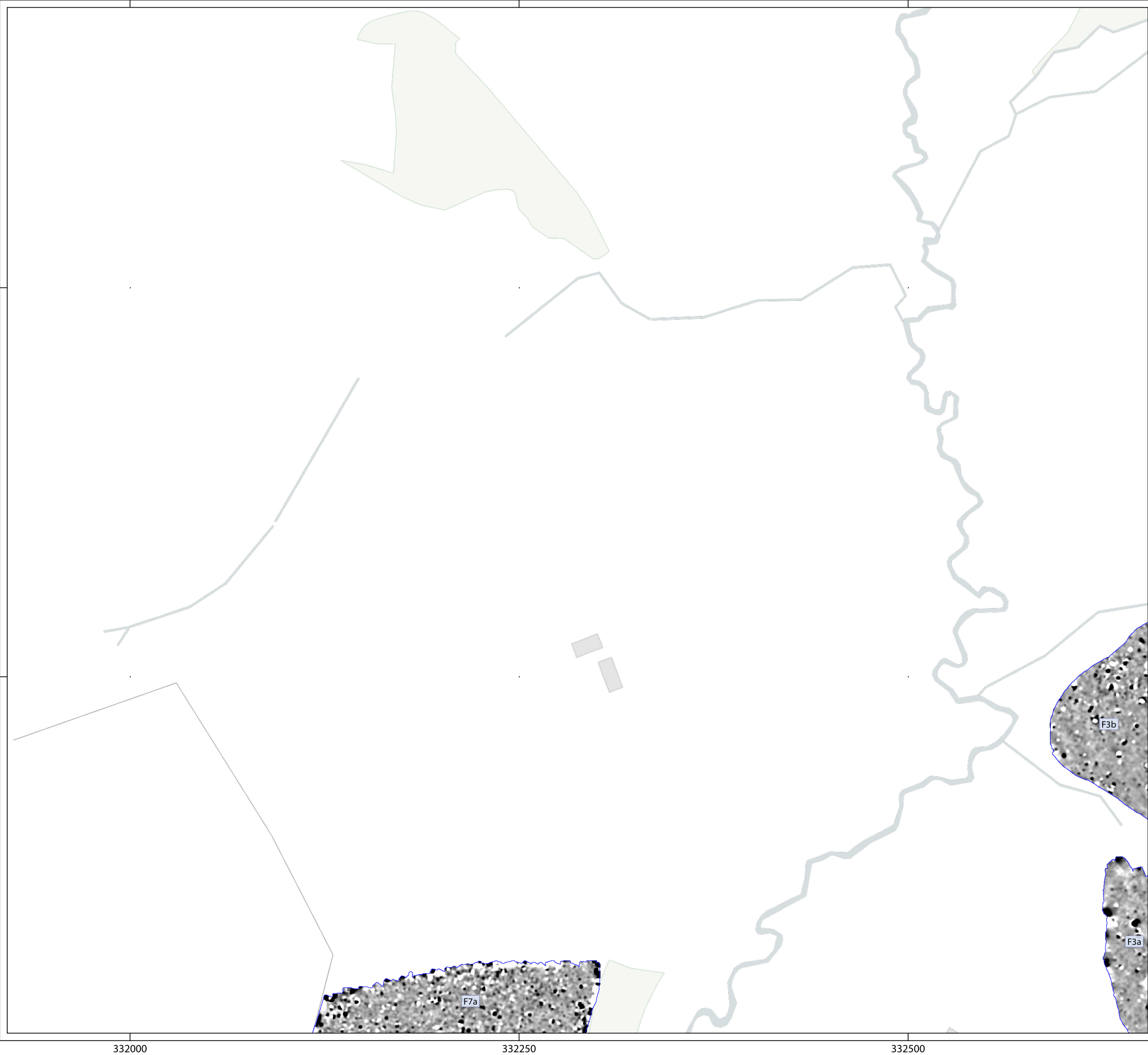
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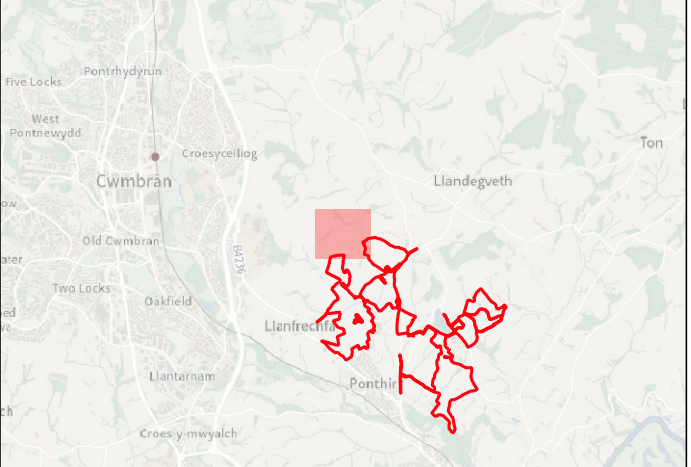
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Illus 09 - Overall interpretation of magnetometer data









**Key**

 Geophysical Survey Area

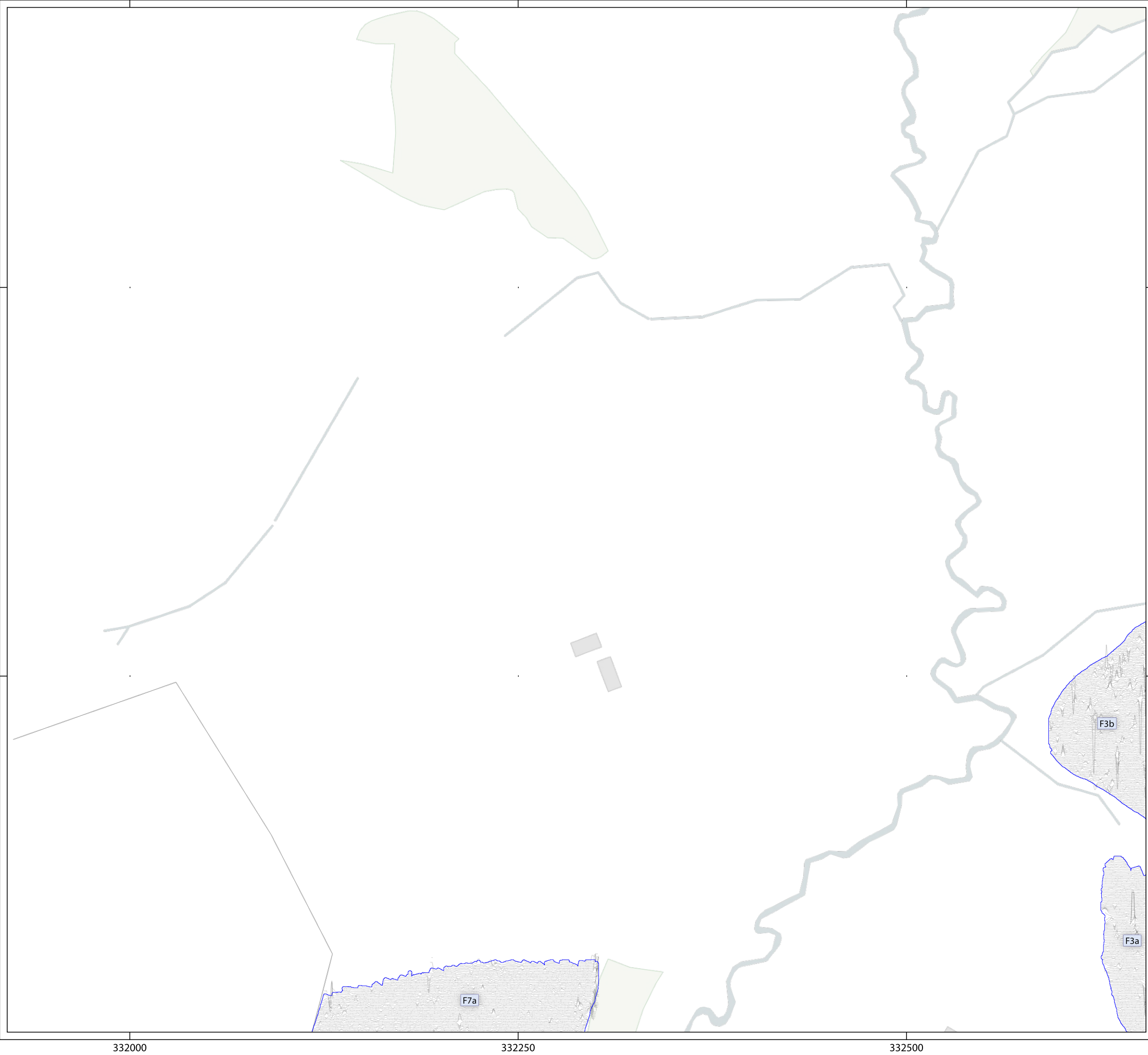


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**Key**

Geophysical Survey Area

XY Trace (25nT/cm)

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100 m

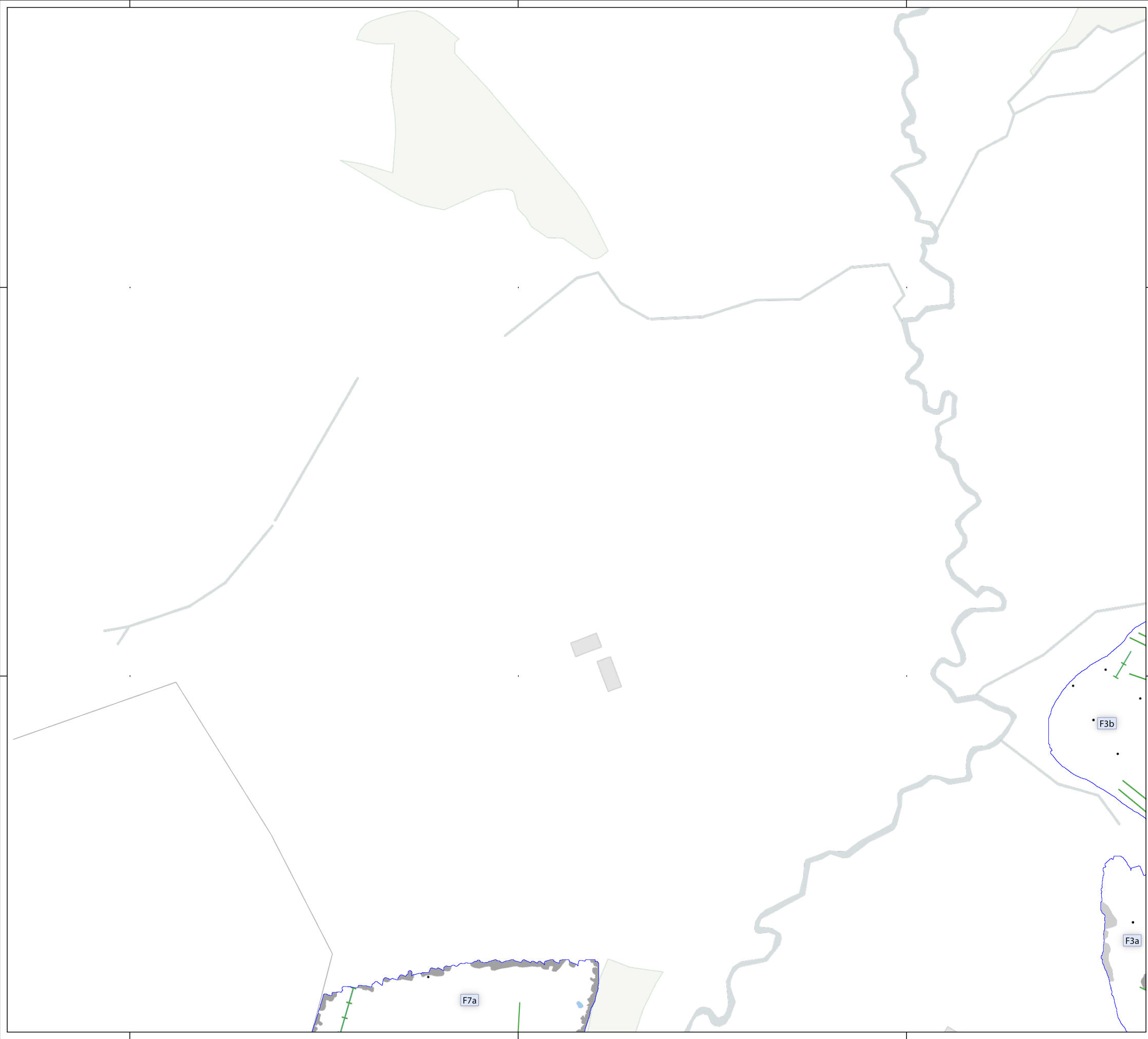
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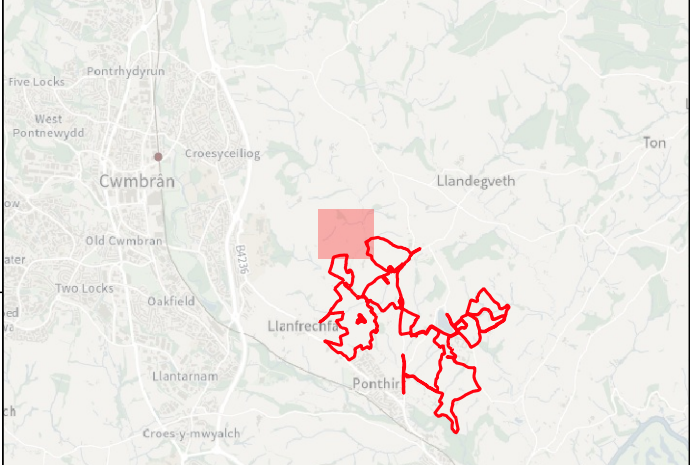
Illus - 11 XY trace plot of minimally processed magnetometer data; Sector 1





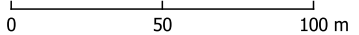


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**Key**

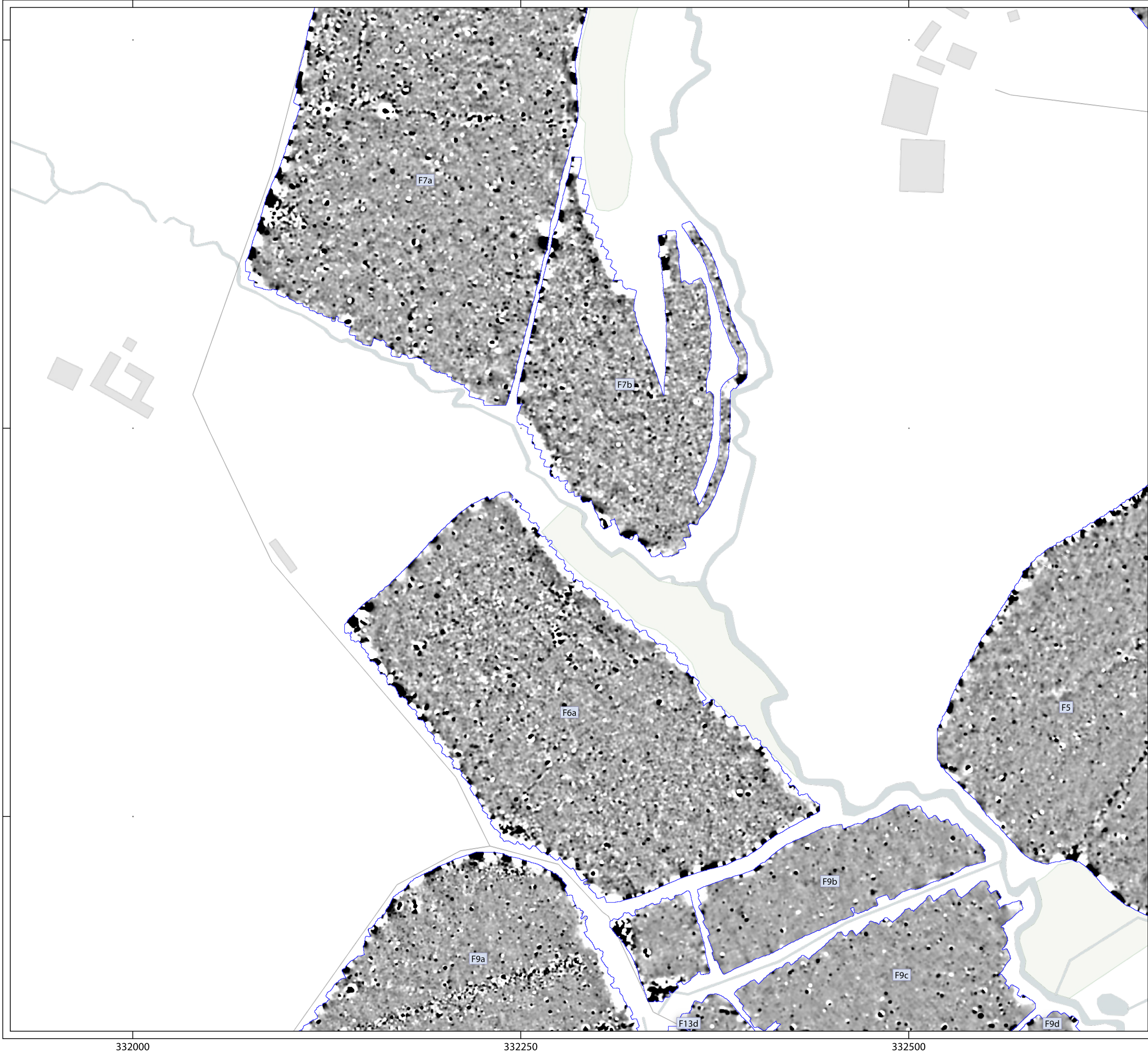
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-  Ferrous Objects
-  Agriculture
-  Field Drain
-  Magnetic Disturbance (Above Ground)
-  Magnetic Disturbance (Below Ground)
-  Natural



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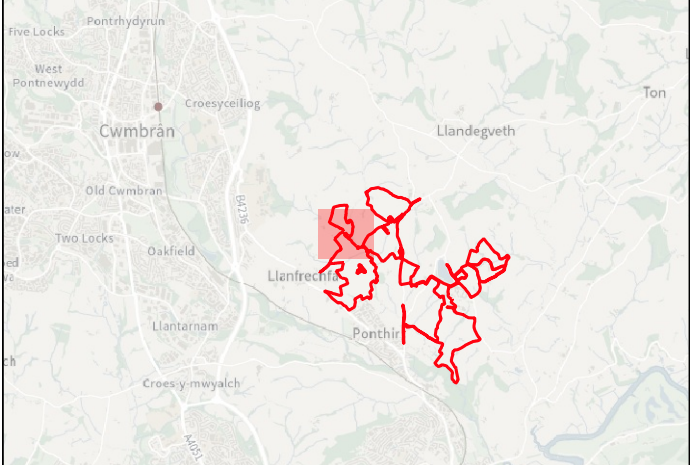
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**Key**

 Geophysical Survey Area



+2nT  
-1nT

0 50 100 m

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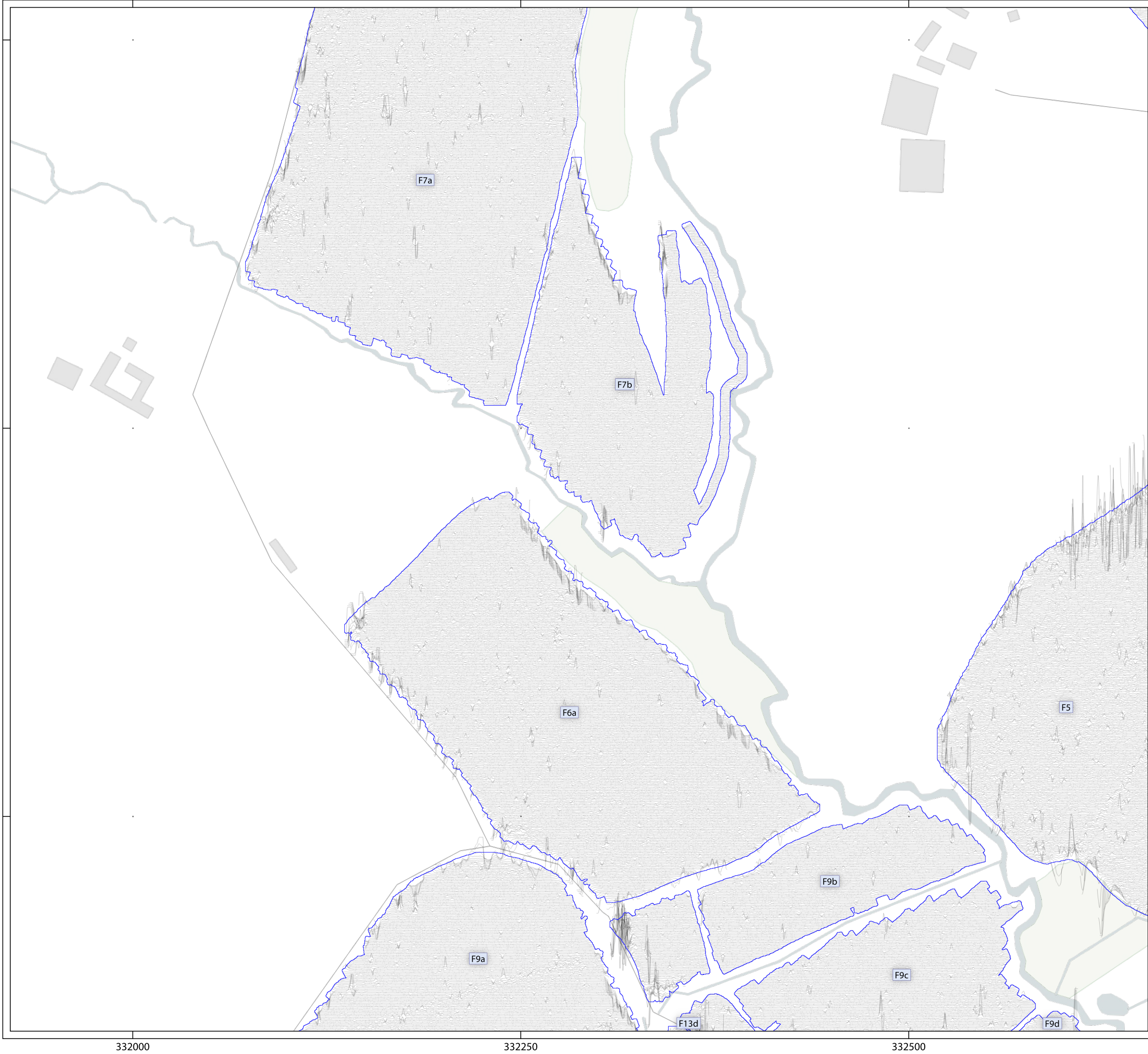
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**Key**

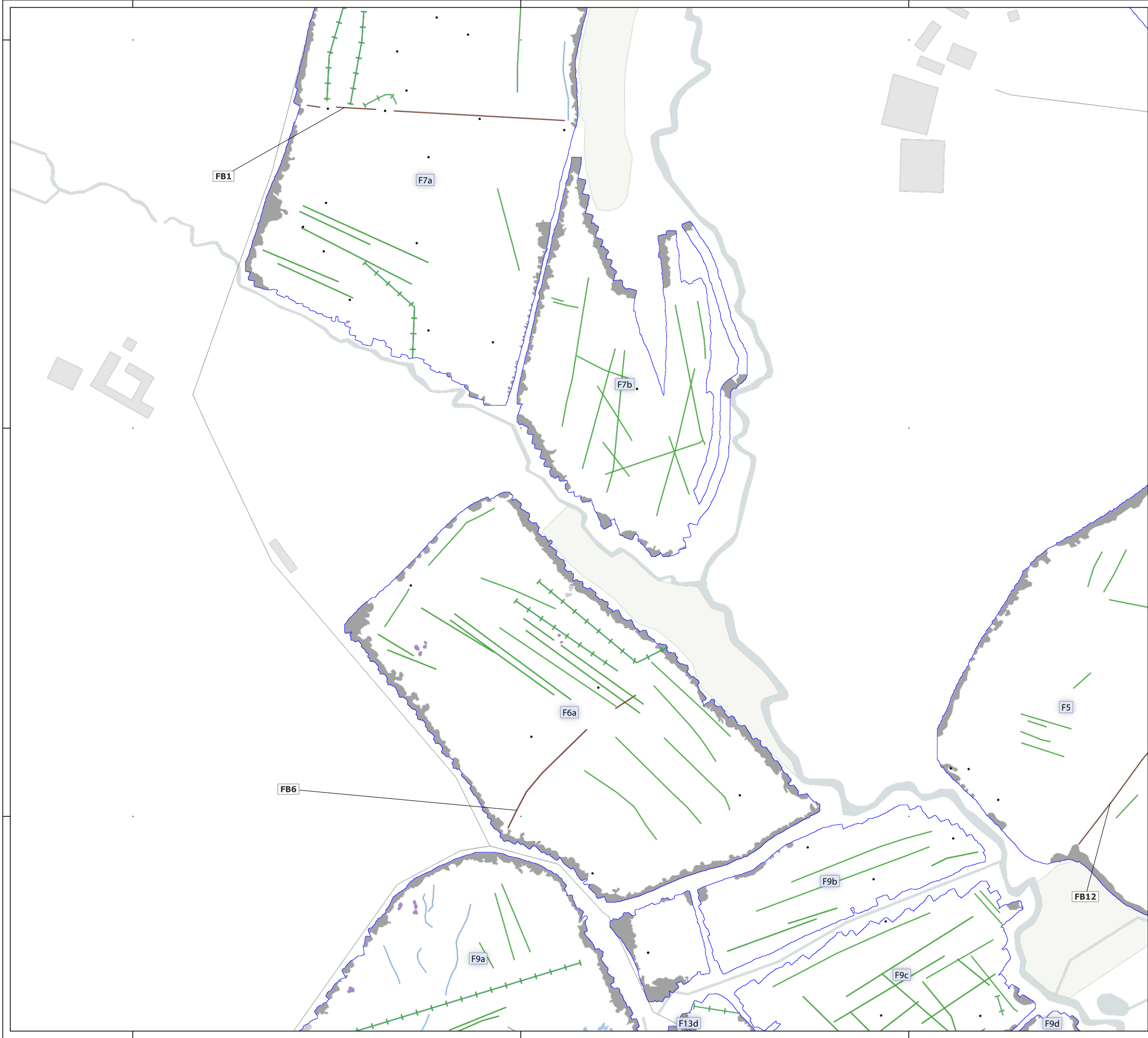
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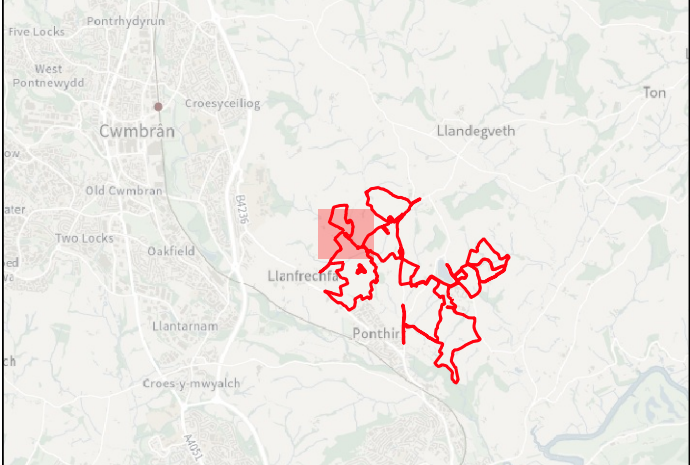








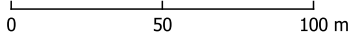
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**Key**

-  Geophysical Survey Area
-  Ferrous Objects
-  Agriculture
-  Field Boundary
-  Field Drain
-  Natural
-  Magnetic Disturbance (Above Ground)
-  Magnetic Disturbance (Below Ground)
-  Natural
-  Uncertain

| Abbreviation |                       |
|--------------|-----------------------|
| FB           | Former Field Boundary |



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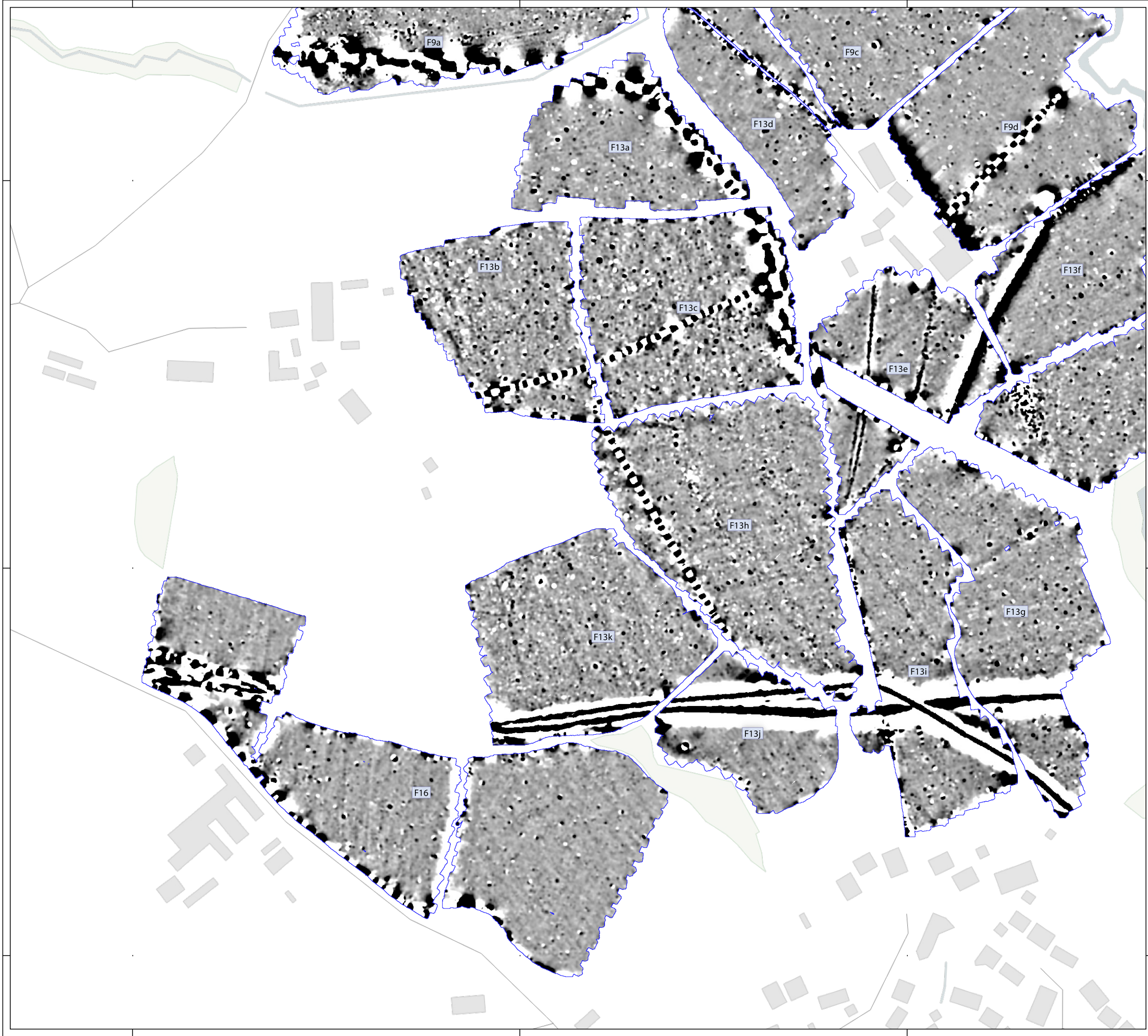
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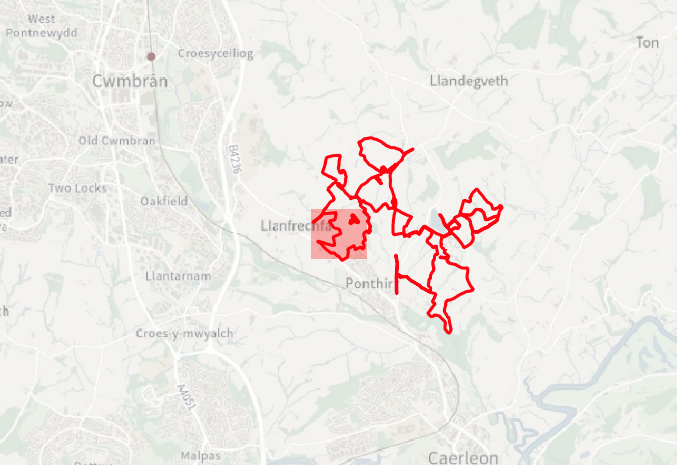
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Illus - 15 Interpretation of magnetometer data; Sector 2









**Key**

 Geophysical Survey Area



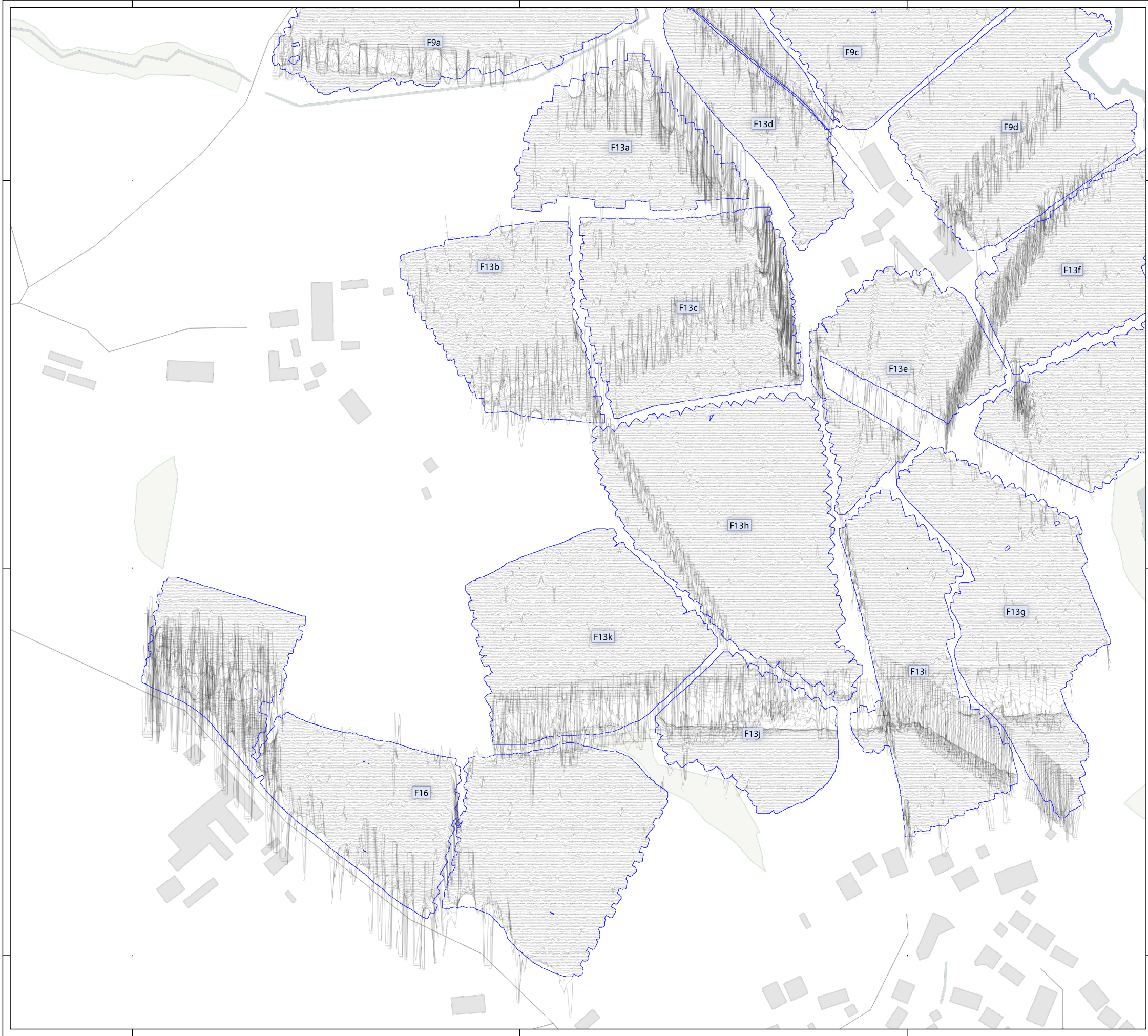
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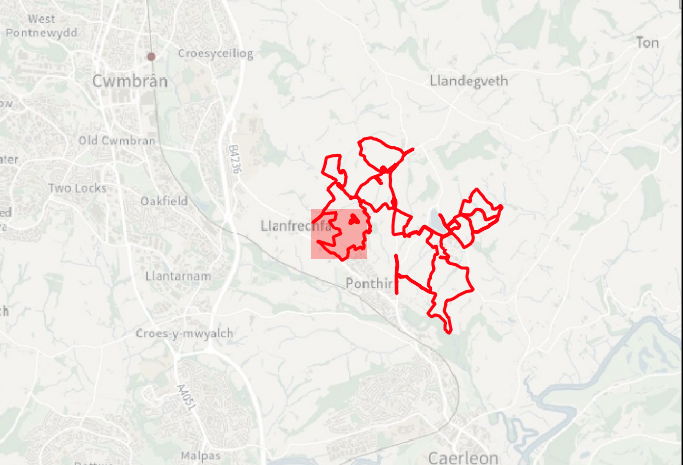
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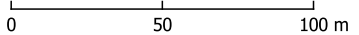






**Key**

-  Geophysical Survey Area
-  XY Trace (25nT/cm)

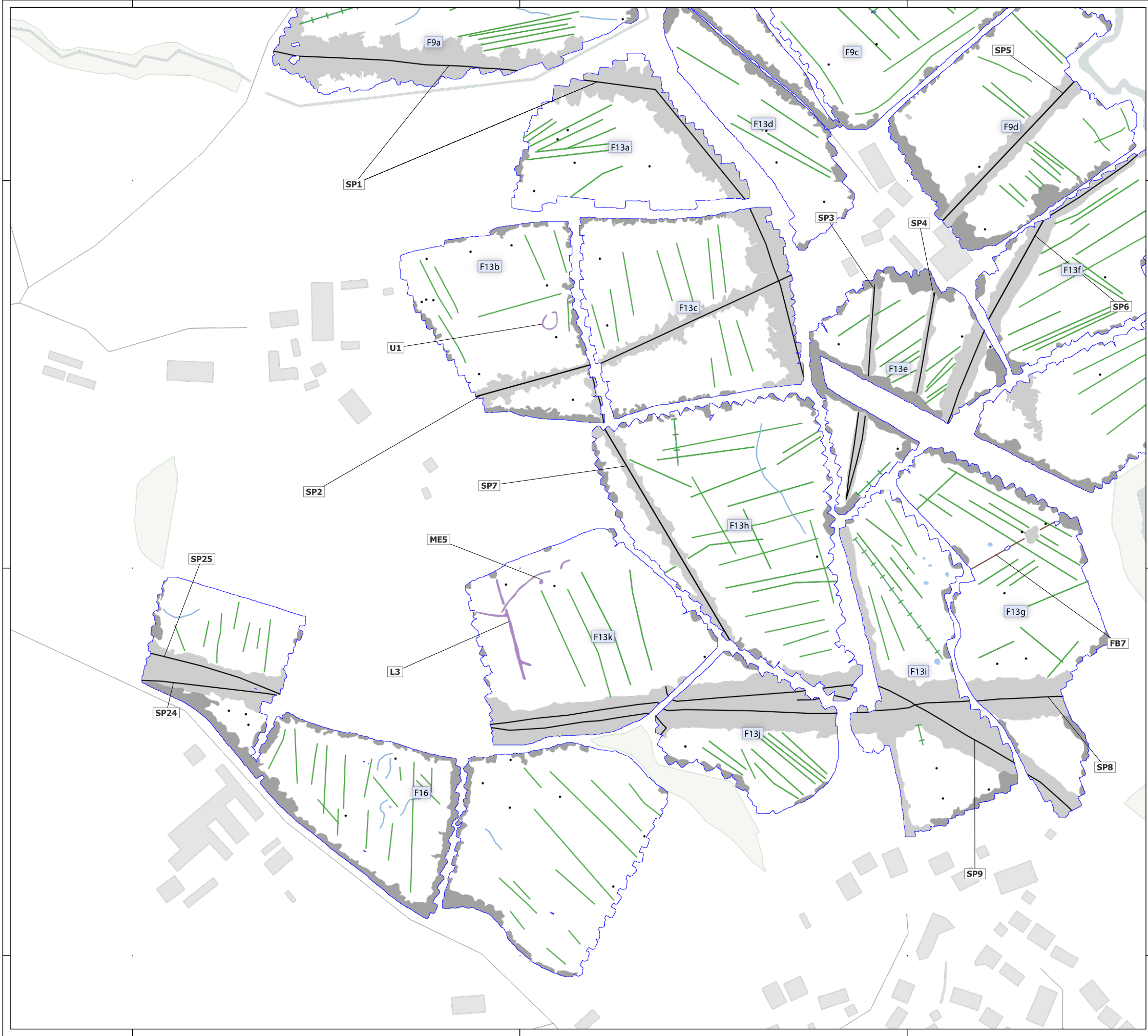


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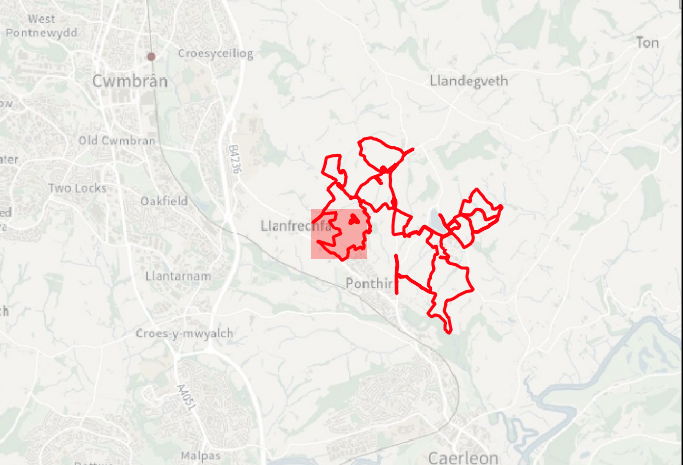








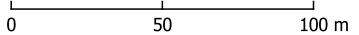
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**Key**

-  Geophysical Survey Area
-  Ferrous Objects
-  Agriculture
-  Field Boundary
-  Field Drain
-  Natural
-  Service
-  Magnetic Disturbance (Above Ground)
-  Magnetic Disturbance (Below Ground)
-  Natural
-  Uncertain

| Abbreviation |                       |
|--------------|-----------------------|
| FB           | Former Field Boundary |
| L            | Linear                |
| ME           | Magnetic Enhancement  |
| SP           | Service Pipe          |
| U            | Uncertain             |



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Illus - 18 Interpretation of magnetometer data; Sector 3

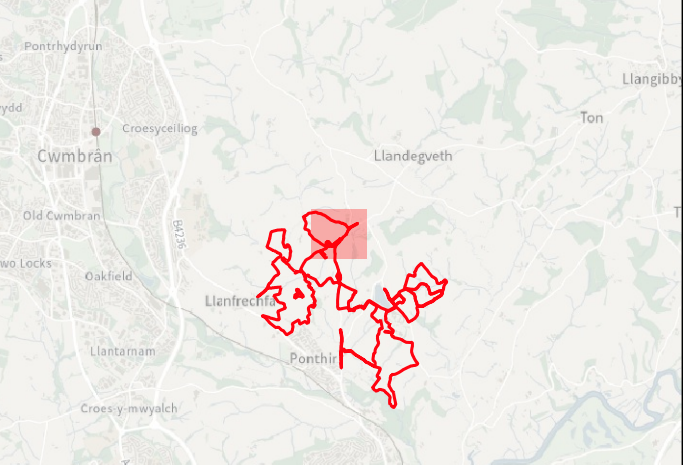








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**Key**

 Geophysical Survey Area



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-1nT

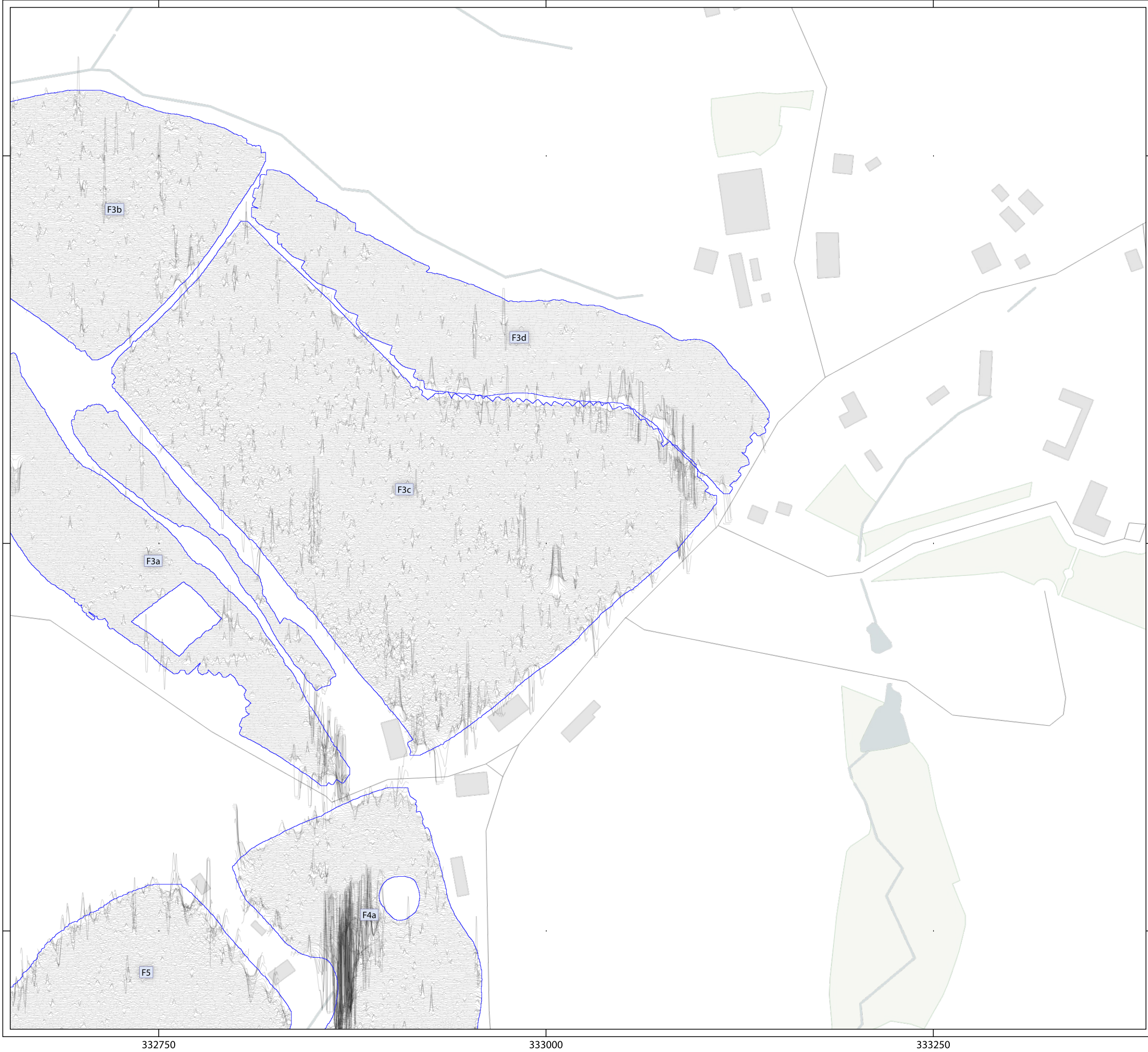
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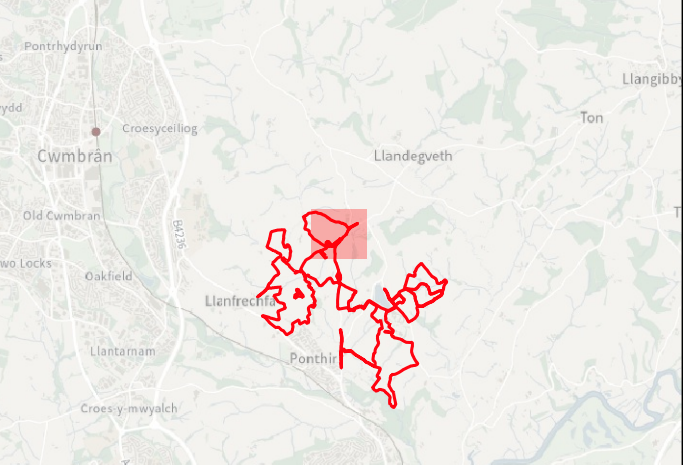
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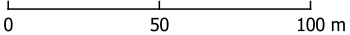






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-  XY Trace (25nT/cm)



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Key

Geophysical Survey Area

•

Ferrous Objects

Agriculture

Field Boundary

Field Drain

Natural

Magnetic Disturbance (Above Ground)

Magnetic Disturbance (Below Ground)

Natural

Uncertain

Abbreviation

FB

Former Field Boundary

L

Linear

ME

Magnetic Enhancement

0

50

100 m

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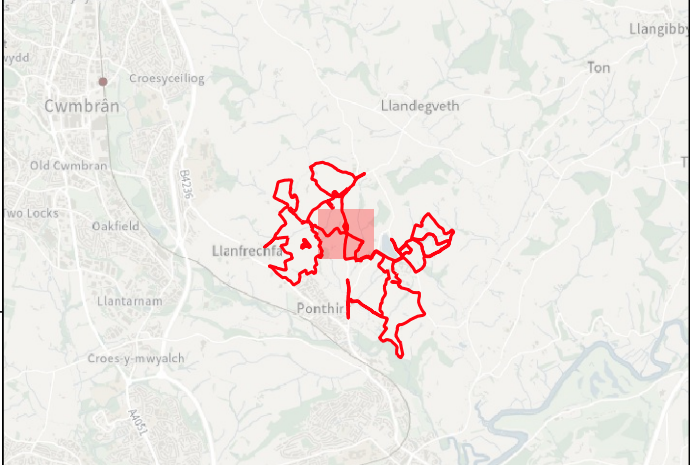
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Illus - 21 Interpretation of magnetometer data; Sector 4





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**Key**  
 Geophysical Survey Area



+2nT  
-1nT

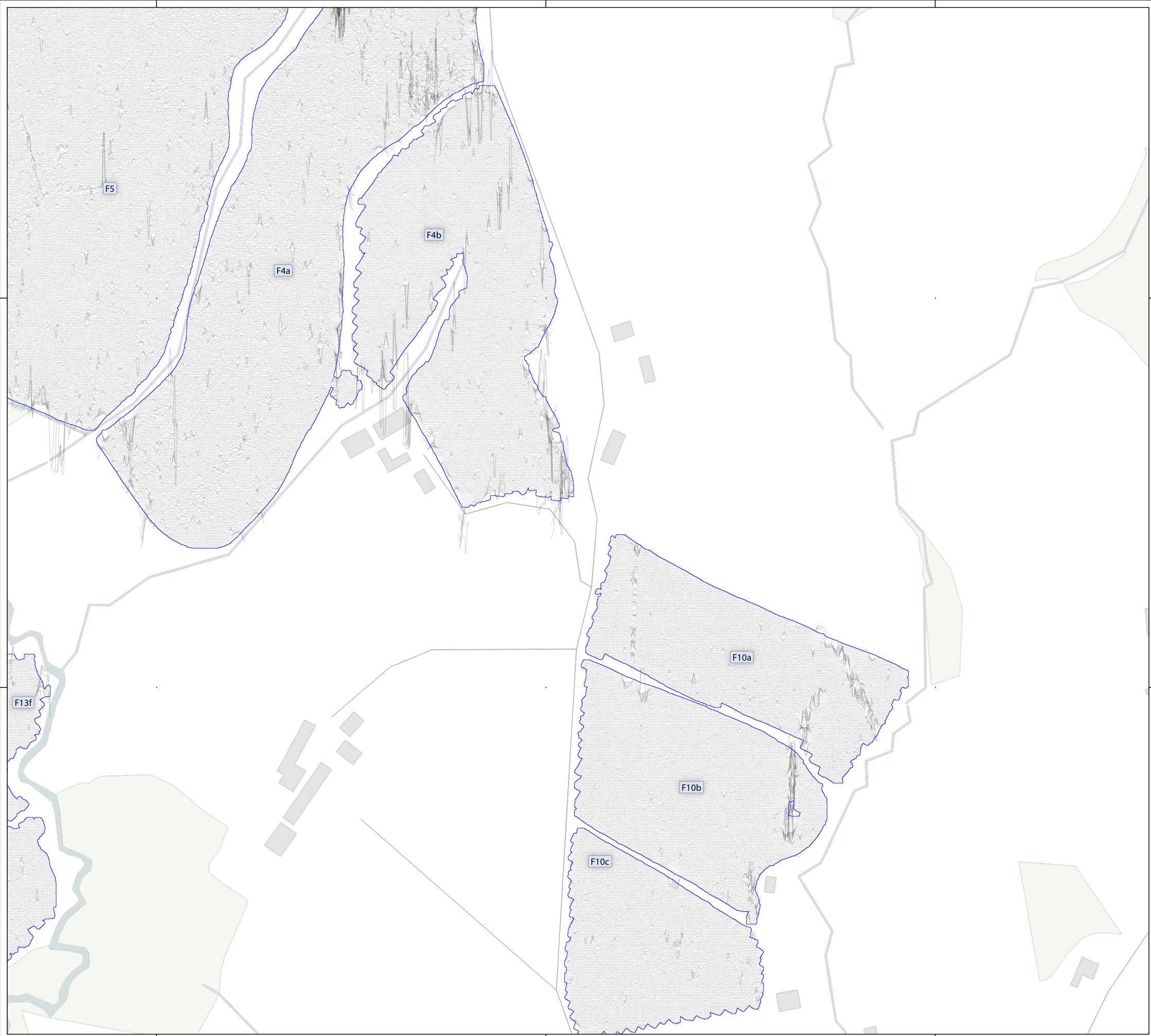
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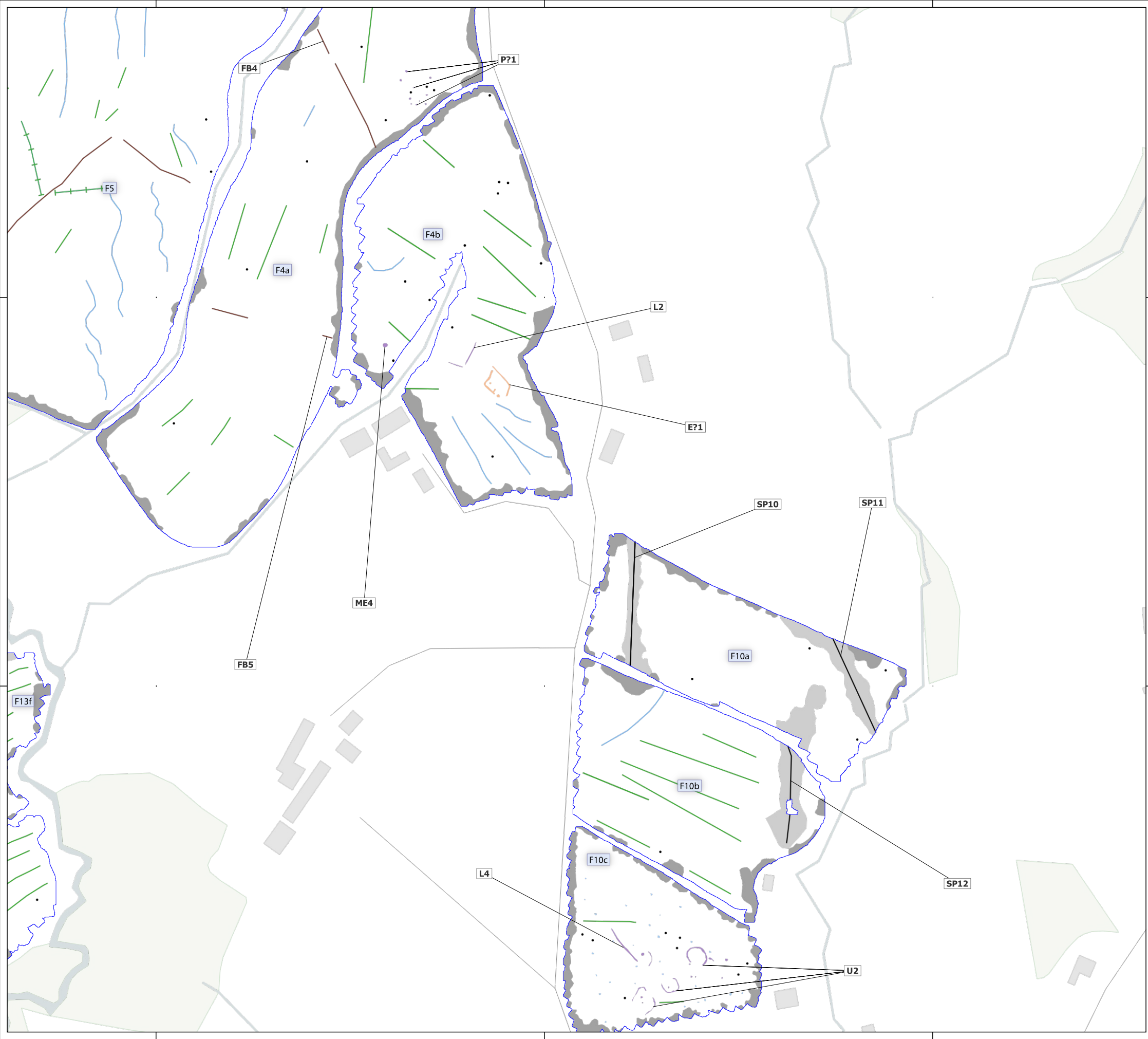
**Key**

- Geophysical Survey Area
- XY Trace (25nT/cm)

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333250

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**Key**

- Geophysical Survey Area
- Ferrous Objects
- Agriculture
- Field Boundary
- Field Drain
- Natural
- Service
- Magnetic Disturbance (Above Ground)
- Magnetic Disturbance (Below Ground)
- Natural
- Possible Archaeology
- Uncertain

| Abbreviation |                       |
|--------------|-----------------------|
| E?           | Enclosure?            |
| FB           | Former Field Boundary |
| L            | Linear                |
| ME           | Magnetic Enhancement  |
| P?           | Pit?                  |
| SP           | Service Pipe          |
| U            | Uncertain             |

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| Version:    | v6.0         |
| Date:       | 22/06/2026   |
| Scale:      | 1:2,500 @ A3 |





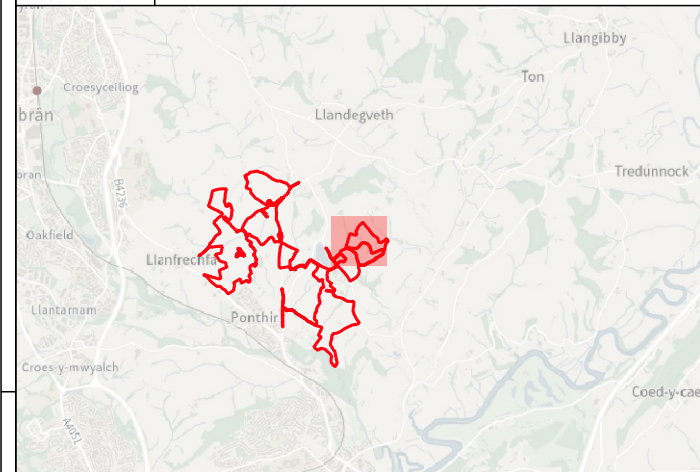
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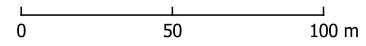
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334250



Key

 Geophysical Survey Area



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| Scale:      | 1:2,500 @ A3 |  |





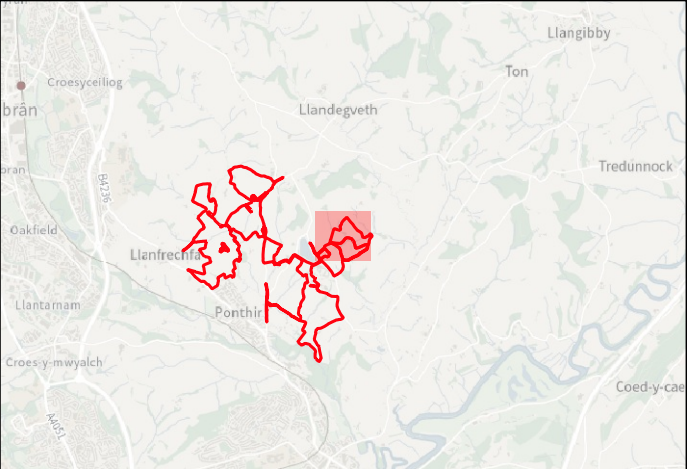
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193750

333750

334000

334250



**Key**

- Geophysical Survey Area
- XY Trace (25nT/cm)

0 50 100 m

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|             |            |      |
|-------------|------------|------|
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| Checked by: | AW         |      |
| Version:    | v6.0       |      |
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| Scale:      | 1:2,500    | @ A3 |





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**Key**

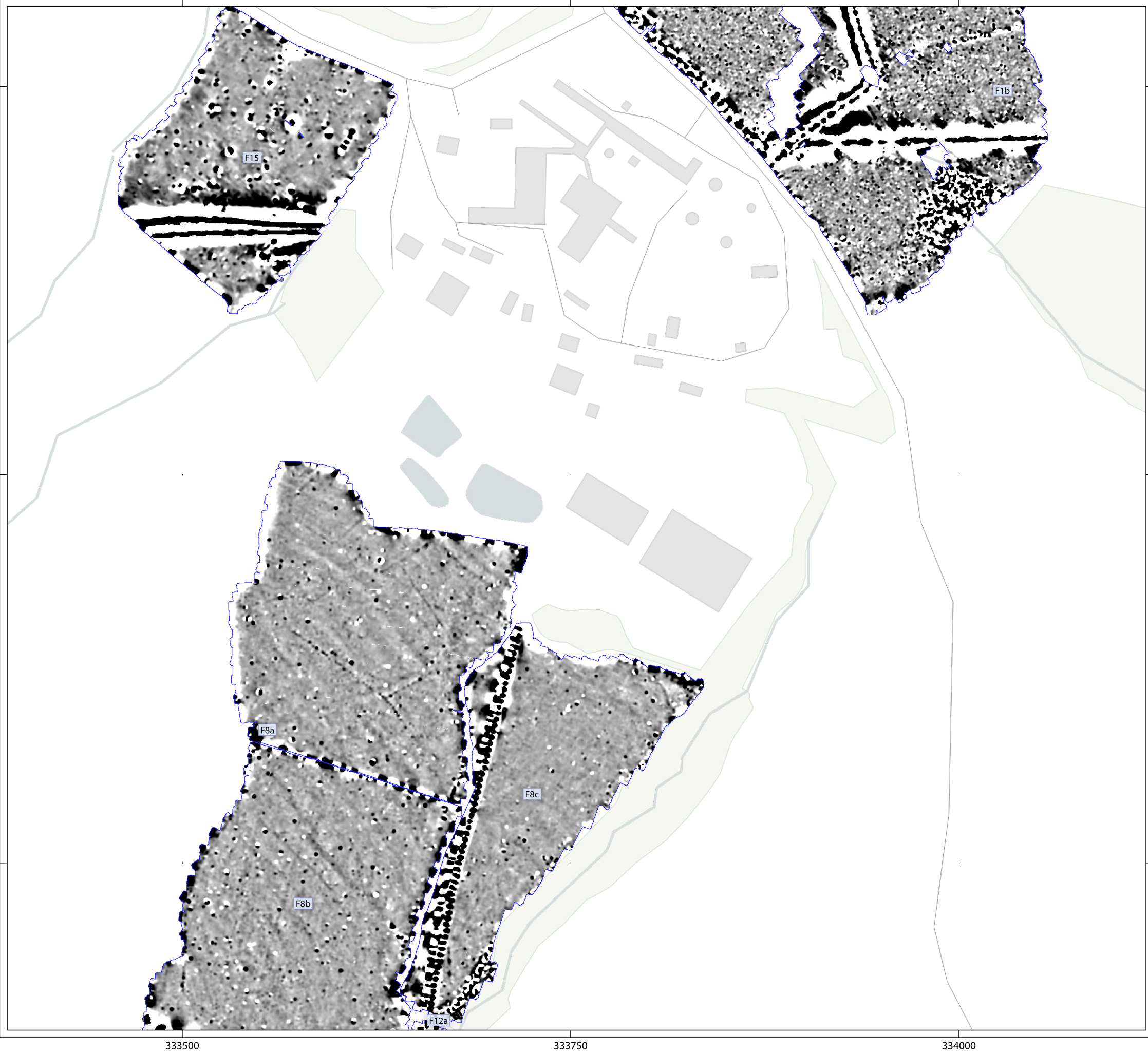
- Geophysical Survey Area
- Ferrous Objects
- Agriculture
- Field Drain
- Natural
- Service
- Magnetic Disturbance (Above Ground)
- Magnetic Disturbance (Below Ground)
- Uncertain

| Abbreviation |                      |
|--------------|----------------------|
| ME           | Magnetic Enhancement |
| SP           | Service Pipe         |

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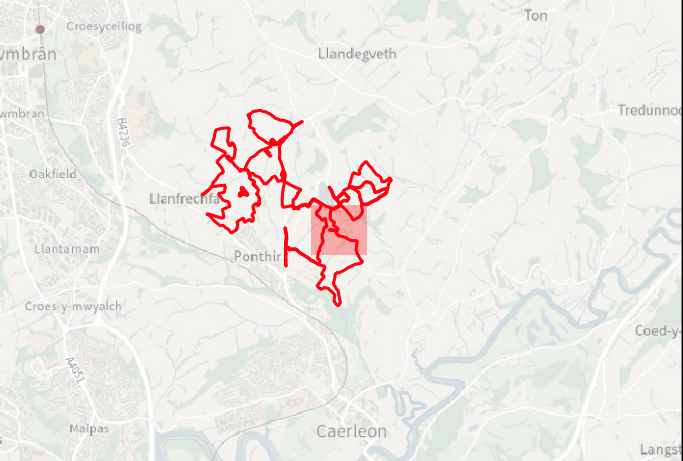
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| Date:       | 22/06/2026   |
| Scale:      | 1:2,500 @ A3 |







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**Key**  
 Geophysical Survey Area



+2nT  
-1nT

050100 m

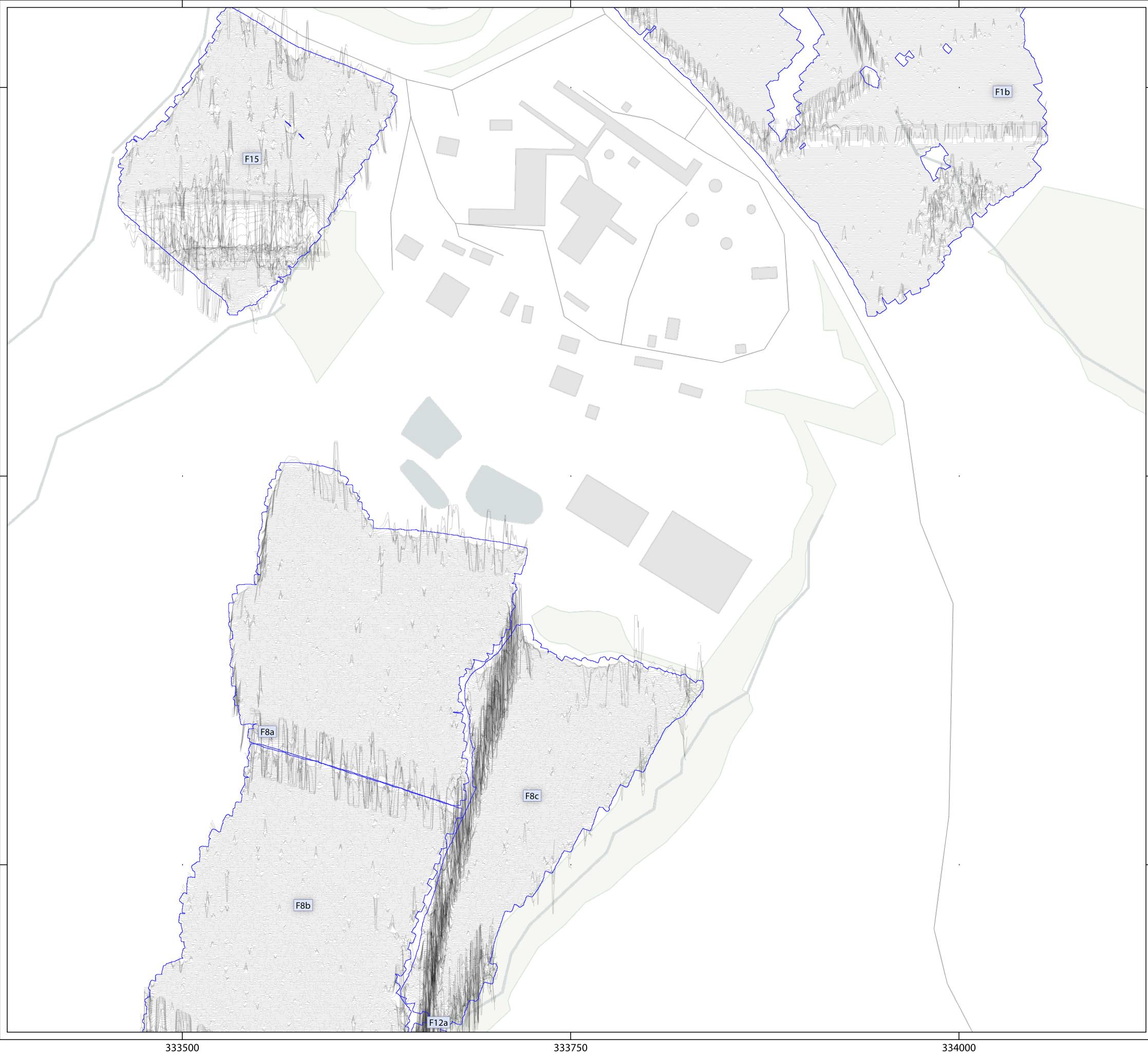
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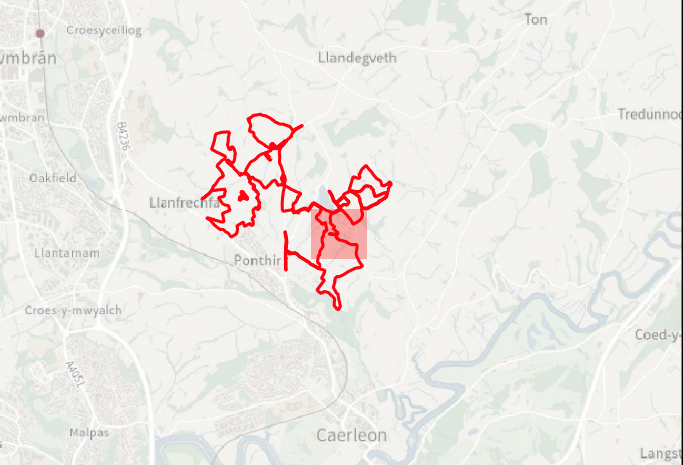
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Illus - 28 Processed greyscale magnetometer data; Sector 7









**Key**

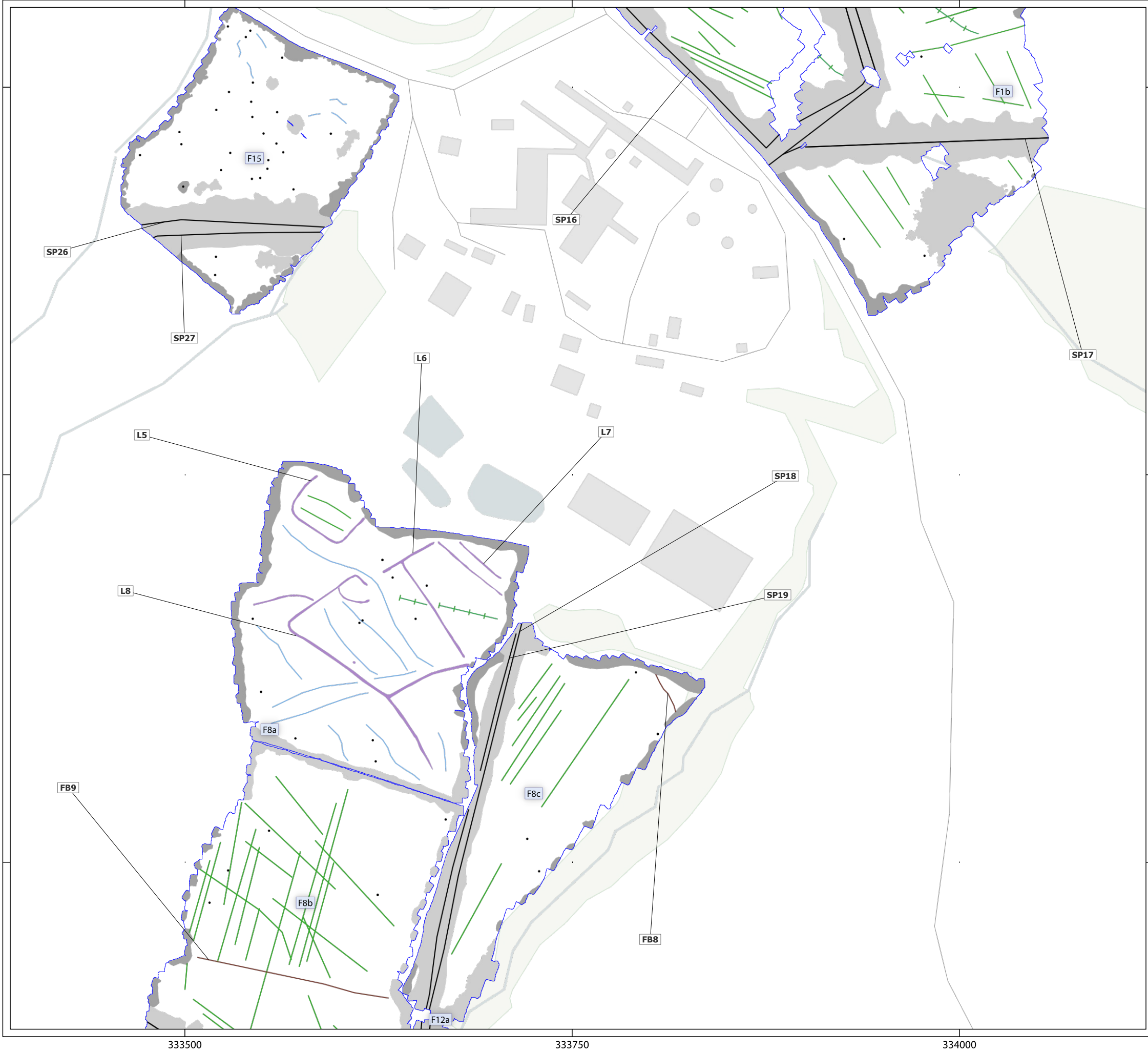
-  Geophysical Survey Area
-  XY Trace (25nT/cm)

0 50 100 m

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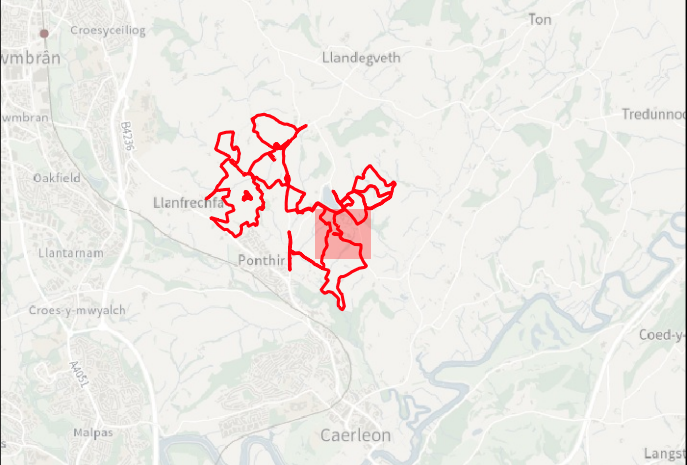
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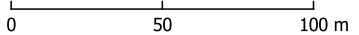


**Key**

- Geophysical Survey Area
- Ferrous Objects
- Agriculture
- Field Boundary
- Field Drain
- Natural
- Service
- Magnetic Disturbance (Above Ground)
- Magnetic Disturbance (Below Ground)
- Uncertain

**Abbreviation**

|    |                       |
|----|-----------------------|
| FB | Former Field Boundary |
| L  | Linear                |
| SP | Service Pipe          |

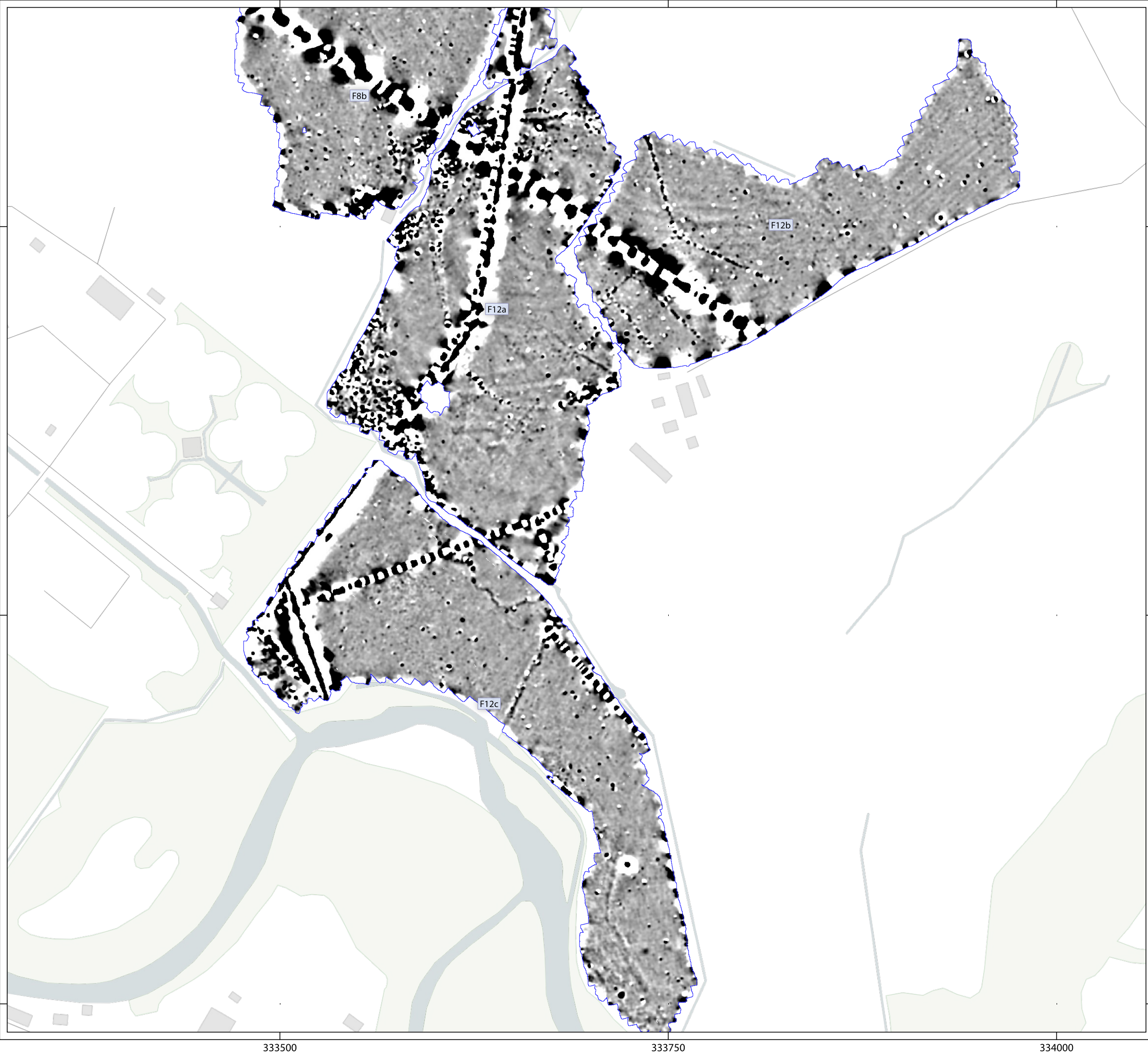


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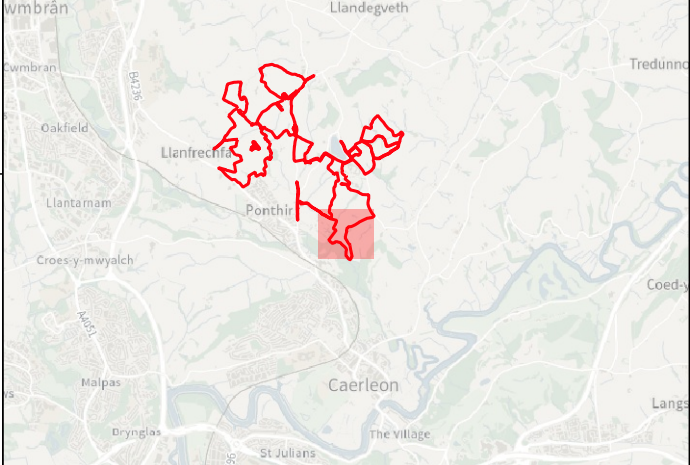
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**Key**

 Geophysical Survey Area



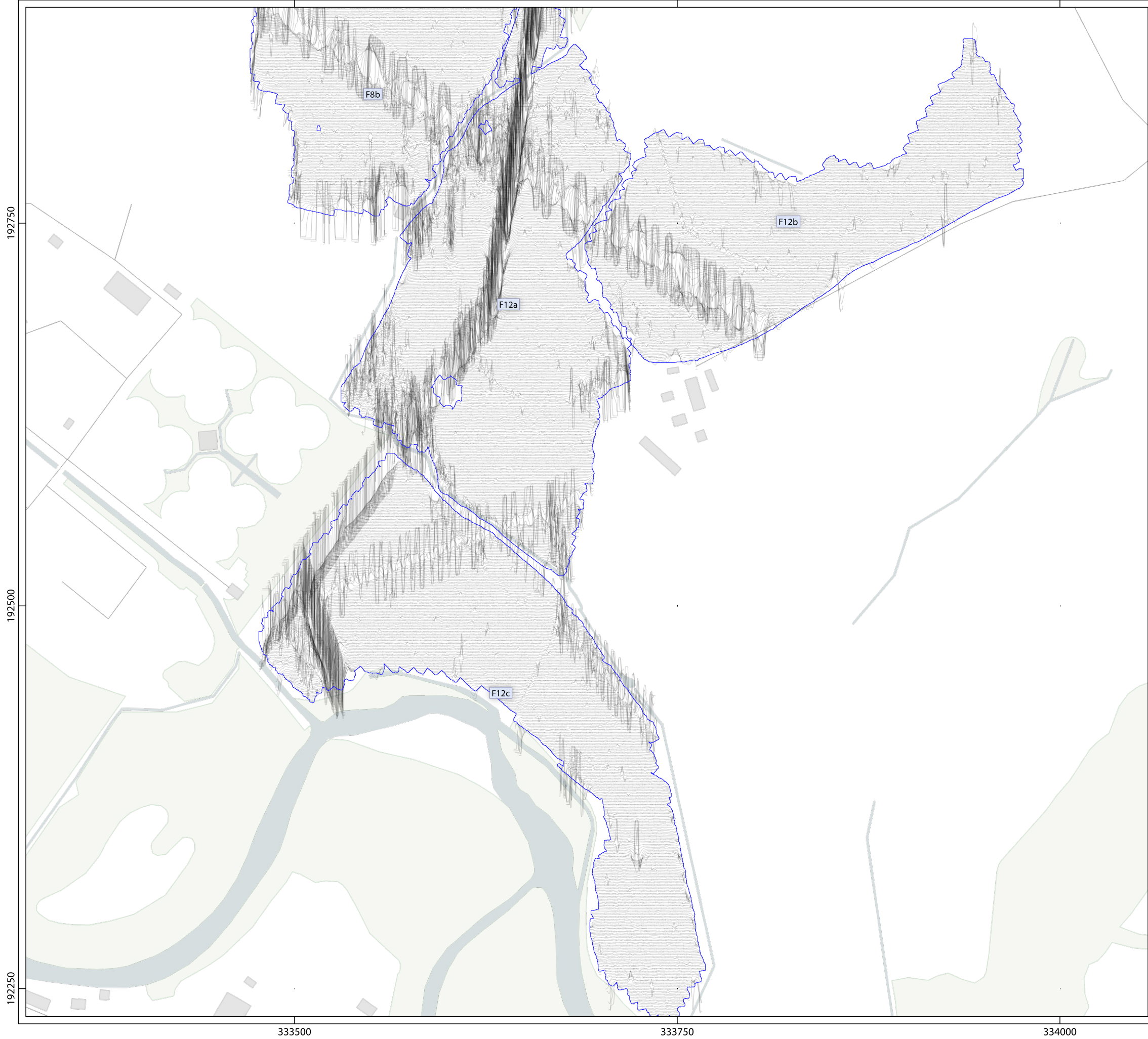
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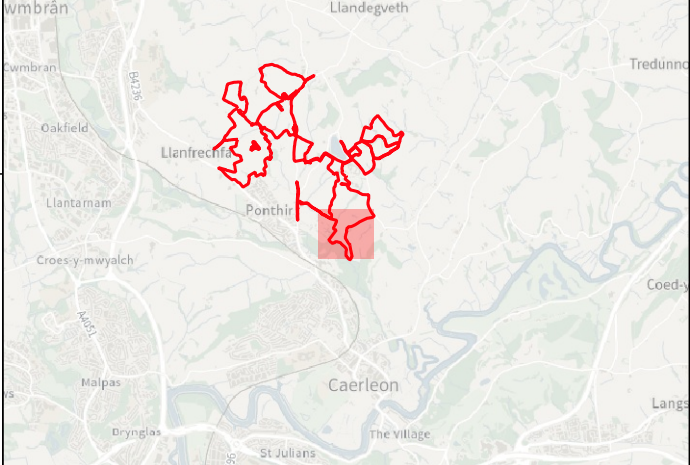
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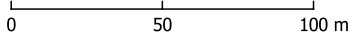






**Key**

-  Geophysical Survey Area
-  XY Trace (25nT/cm)

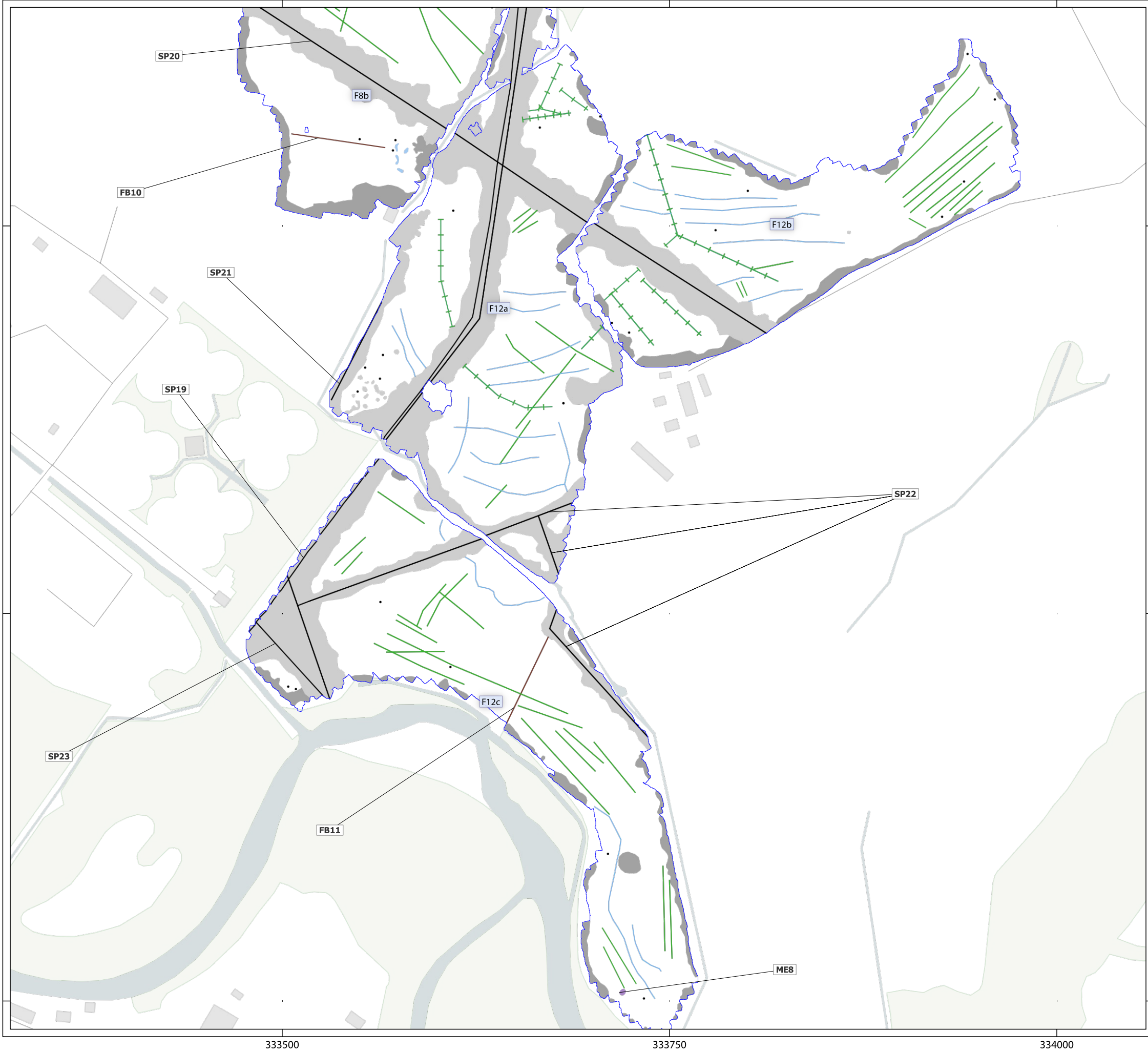


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| Date:       | 22/06/2026   |
| Scale:      | 1:2,500 @ A3 |





**Key**

- Geophysical Survey Area
- Ferrous Objects
- Agriculture
- Field Boundary
- Field Drain
- Natural
- Service
- Magnetic Disturbance (Above Ground)
- Magnetic Disturbance (Below Ground)
- Natural
- Uncertain

| Abbreviation |                       |
|--------------|-----------------------|
| FB           | Former Field Boundary |
| ME           | Magnetic Enhancement  |
| SP           | Service Pipe          |

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Illus - 33 Interpretation of magnetometer data; Sector 8

## 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 the topsoil, subsoil, and rock, 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 most 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 introduced into the topsoil during 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 and buried pipes can also cause the same disturbed response. A modern origin is usually assumed unless there is other supporting information.

**Lightning-induced remnant magnetisation (LIRM)** LIRM anomalies are thought to be caused in the near surface soil horizons by the flow of an electrical current associated with lightning strikes. These observed anomalies have a strong bipolar signal which decreases with distance from the spike point and often appear as linear or radial in shape.

**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

The magnetometer data was collected and is geo-located based on survey grade Real Time Kinetic (RTK) differential Global Positioning System (dGPS) used on both hand-carried and towed systems. The accuracy of this dGPS equipment is better than 0.01m. The GPS systems output in NMEA mode in real time, with a visual guide of survey tracks and any survey area boundaries displayed on a tablet device in view of the survey operator to ensure full coverage. Any survey area boundaries are uploaded as a string of co-ordinates or shapefile to the tablet prior to the commencement of survey.

## 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](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, heading errors and any other artificial data.

The XY data has been clipped to remove extreme values and to improve the interpretability of the data.



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