

Appendix 8.3

Geophysical Report



ACRE22



SPRINGWELL SOLAR FARM AND CABLE OPTION ROUTE, LINCOLNSHIRE

GEOPHYSICAL SURVEY REPORT

commissioned by RSK
on behalf of Springwell Energyfarm Ltd

November 2023

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PROJECT INFO:

HA Project Code **ACRE22** / HA Project No **2023-75** / NGR **TF 05901 57035 and TF 502947 356183** / Parish **Ashby de la Launde, Blankney, Cranwell, Graffoe, Rowston, Scopwick** / Local Authority **North Kesteven District Council** / Fieldwork Date - **17/10/2022 – 12/05/2023, Cable Option Route - 05/06/2023 – 07/06/2023 and 29/08/2023 – 31/08/2023** / OASIS Ref. **TBC**

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PROJECT SUMMARY

Headland Archaeology (UK) Ltd was instructed by RSK on behalf of Springwell Energyfarm Ltd (The Client) to undertake two geophysical (magnetometer) surveys on a contiguous parcel of land measuring approximately 1559ha in size (the Geophysical Survey Area – GSA), located 15km south of Lincoln between the villages of Metherringham and Brauncewell, Lincolnshire, at the site of the proposed 800MW Springwell Solar Farm.

The results of both an initial geophysical survey covering the main areas which may form part of the solar farm proposals measuring approximately 1490ha and a subsequent survey across four fields being considered for cable route options measuring roughly 69ha were originally reported on separately but are both detailed herein. The later survey covering the cable route option is contained within the Appendix of this report. This geophysical survey report, together with an archaeological desk-based assessment (DBA, Headland Archaeology 2023a) and Aerial Investigation Report (Headland Archaeology 2023b) will inform the Environmental Impact Assessment (EIA, Headland Archaeology forthcoming) produced in support of a development consent order (DCO) application for the construction of the solar farm. The geophysical survey results will also inform future archaeological strategy.

The original larger survey evaluated an area of approximately 1390ha and not unexpectedly recorded a wide variety of archaeological and non-archaeological anomalies. The results of the survey largely corroborated, but also greatly expanded, the current understanding of the archaeological potential of the proposed site as contained within the Lincolnshire Historic Environment Record (LHER). It is evident from the survey results and information contained within the LHER that there were significant levels of prehistoric activity within different areas of the GSA from at least the Bronze Age, likely continuing through into the Iron Age before the two Roman roads that bisect the site were constructed.

The main findings of the original larger survey include several foci of archaeological activity ranging from ring ditches and likely round barrows, pit alignments and extended series and/or concentrations of ditches, enclosures and pit-like anomalies

located at the southern extent of the GSA near Brauncewell Quarry, to the north and south of Hall Farm (Bloxholm), surrounding RAF Digby to the south, east and north-east, north of Ashby de la Launde and Scopwick and west of Brickyard Farm where the archaeological potential must be considered very high. The only findings of note from the subsequent survey for the cable route option were two pit alignments, one located adjacent to the A15 and the other south-west of RAF Digby which marked a continuation of a much longer pit alignment recorded in the original survey.

Outside of these foci of activity, a regular gridded pattern of weakly magnetically enhanced, linear trend anomalies aligned north-west/south-east was identified in almost every field west of the B1191. An anthropogenic cause for these ditch-like anomalies, such as a relict field system, is still considered most likely given the homogeneity and regularity of the responses over such a large area. Elsewhere, magnetic anomalies identifying; former ponds, buildings, pits and extraction sites, agricultural trends including ridge and furrow and modern cultivation patterns, former boundaries, field drains and buried services and those arising from natural/geological variations are widely recorded across the GSA.

Where the survey has identified more significant levels of archaeological activity not previously recorded in the LHER includes the land between Ashby de la Laund and RAF Digby, north-east of RAF Digby and south of Blankney. Whilst the survey data has shown dense areas of archaeological activity exist within and between locations identified in the LHER as containing archaeological assets, the results also identify large areas within the GSA where the archaeological potential is considered low, particularly across fields adjacent to the A15 (but further north of Brauncewell Quarry) and the easternmost fields of the site.

The level of detail and range of anomalies recorded across both surveys is argued to provide a high level of confidence in the findings and that they accurately reflect the archaeological potential of the GSA, notwithstanding the limitations of magnetometer survey to define particularly small, very weakly enhanced or anomalies masked by areas of disturbance and/or stronger magnetic anomalies.

The results from a contiguous survey of this size have contributed a wealth of information to the understanding of not only individual foci of archaeological activity within the GSA but the archaeological potential of the area and wider landscape. Further analysis of the archaeological significance of some of the features recorded by the survey beyond their spatial distribution and potential relationship with other features is perhaps merited, however lies beyond the scope of this survey report.

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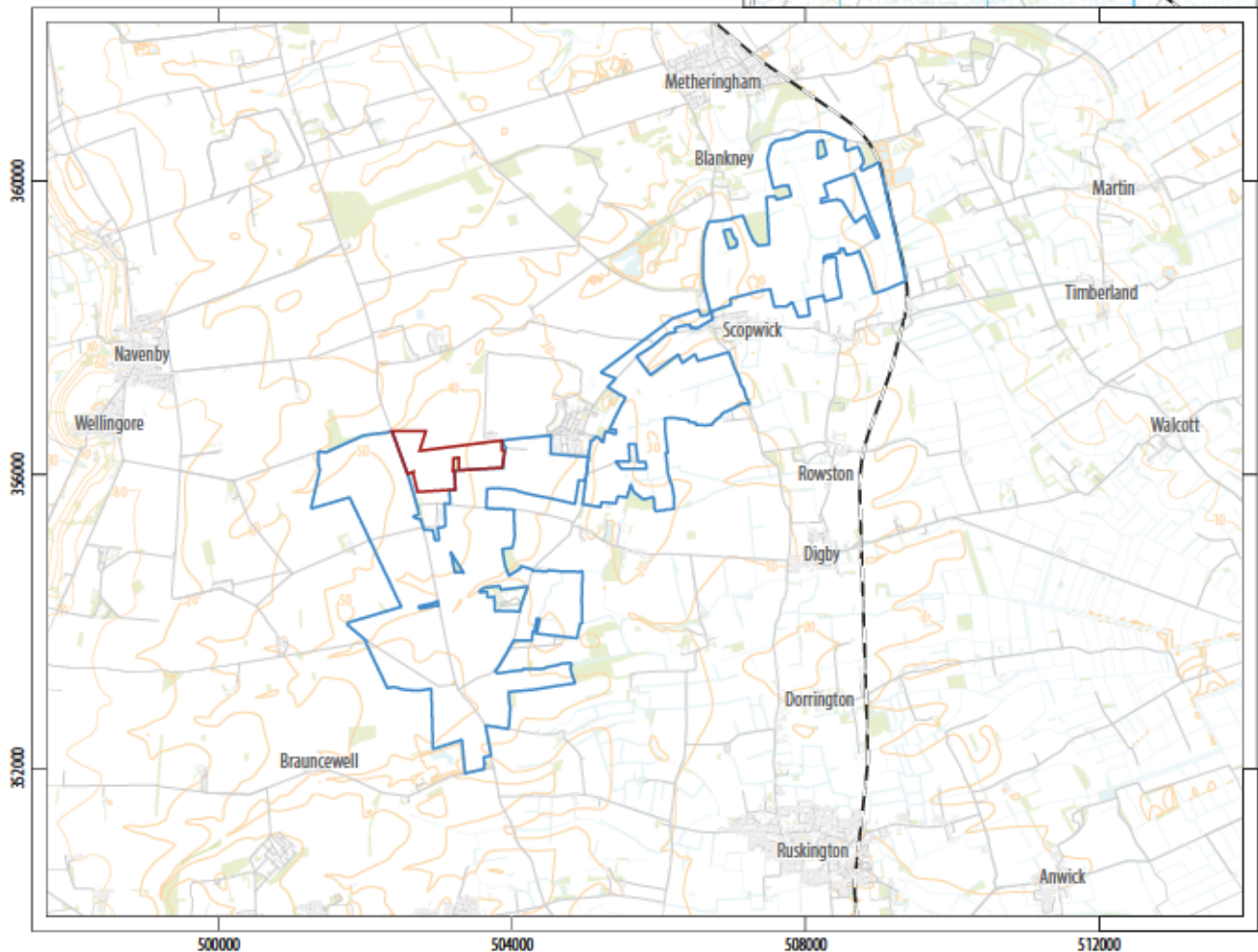
Springwell Solar Farm
Cable Option Route
Lincolnshire



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



TF



0 2km
1:100,000 @ A4

- Springwell Solar Farm, Cable Option Route
- geophysical survey area
- Springwell Solar Farm - geophysical survey area

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ILLUS 1 Site location

SPRINGWELL SOLAR FARM AND CABLE OPTION ROUTE, LINCOLNSHIRE

GEOPHYSICAL SURVEY REPORT

1 INTRODUCTION

Headland Archaeology (UK) Ltd was instructed by RSK on behalf of Springwell Energyfarm Ltd (The Client) to undertake a geophysical (magnetometer) survey on a contiguous parcel of land measuring approximately 1490ha in size located 15km south of Lincoln between the villages of Metheringham and Brauncewell, Lincolnshire, at the site of the proposed 800MW Springwell Solar Farm (Illus 1).

The geophysical survey report, alongside an archaeological desk-based assessment (DBA, Headland Archaeology 2023a) and Aerial Investigation Report (Headland Archaeology 2023b) will inform the Environmental Impact Assessment (EIA, Headland Archaeology forthcoming) produced in support of a development consent order (DCO) application for the construction of the solar farm. The geophysics survey results will also inform future archaeological strategy, if required.

The survey was undertaken in accordance with a Written Scheme of Investigation for Geophysical Survey (WSI) (Headland Archaeology 2022), following guidance contained in the National Planning Policy Framework (MHCLG 2021) and was carried out in line with current best practice (Chartered Institute for Archaeologists 2014, Europae Archaeologia Consilium 2016).

The significant majority of the survey was undertaken during an initial largely uninterrupted phase of work (except for Christmas and New Year) between October 17th, 2022 and March 9th, 2023. Revisions to the Geophysical Survey Area (GSA) boundary during the survey led to the inclusion of three additional fields (E1, W1 and W2) at the southern end of the site which were surveyed between March 15th and April 4th, 2023. Other fields were removed as design proposals evolved. Initially unsuitable fields under heavy plough at the time of the original survey were subsequently surveyed between May 9th and May 12th 2023.

Additional fields have since been added to the GSA to evaluate cable route options. This survey is ongoing, and the results will be added as an Addendum to the current report in due course.

All the accessible parcels within the GSA were surveyed with the total area surveyed amounting to approximately 1390ha. For such a large area there were generally very few areas within the GSA that were unsuitable for survey with only a few examples of overgrown or waterlogged patches and strips of bird cover at the field margins.

1.1 LOCATION, TOPOGRAPHY AND LAND-USE

The GSA comprises an irregular shape parcel of land broadly aligned north-east to south-west located approximately 15km south of Lincoln, spread across adjoining fields situated between the villages of Metheringham and Brauncewell, Lincolnshire. The GSA can broadly be sub-divided into three parcels spanning Sectors 1–4 (Illus 2–3) extending from NGR 503498 351995 adjacent to Brauncewell quarry in the south, to the northernmost field bound by Blankney Moor Lane at NGR 507969 360600.

The western and southern parts of the GSA covered by Sectors 1 and 2 lie immediately adjacent to the A15 to the east and west between Brauncewell Quarry and south of RAF Digby. Sector 3 spans the central section of the GSA surrounding RAF Digby to the south, east and north-east heading towards the village of Scopwick. The northernmost block of land within the GSA covered by Sector 4 lies north-east of Scopwick and is bound by the Peterborough to Lincoln railway to the east.

At the landscape scale the topography of the GSA gradually slopes down from a height of approximately 54m above Ordnance

Datum (AOD) west of the A15 at the north-west corner of Sector 1, down to roughly 7m AOD at the north-east corner of the GSA where it is bound by the railway and approximately 36m AOD at the southernmost boundary of the GSA. Generally, there is more topographic variation in the western half of the GSA, markedly in the location of sinuous variations in the underlying limestone bedrock geology as highlighted by LiDAR and geology data respectively (Illus 4). There is little topographic variation within the fields of the eastern half of the site.

The fields within the GSA are predominantly agricultural in nature containing a mix of arable crops and pasture. Ground conditions were generally very good across the GSA with many fields surveyed post-harvest and between crop rotations. Multiple wooded areas and coppices are scattered in and around the site and are not included in the GSA. There is one watercourse that runs roughly east-west through the GSA in Sector 3 to the water treatment plant east of RAF Digby.

1.2 GEOLOGY AND SOILS

The solid bedrock geology beneath most of the GSA consists of different formations of sedimentary Jurassic period limestone that belongs to the Southern Lincolnshire Edge, a north/south linear scarp of limestone running the length of Greater Lincolnshire. However, the geology is considerably more complex east of the B1191 compared to the west (Illus 4 inset). To the west limestone of the Upper Lincolnshire Limestone Member underlies nearly all the GSA covered by Sectors 1 and 2. The exception is a narrow band of Lower Lincolnshire Limestone Member limestone that runs from the B1191 in the east, on a broadly south-west/north-east alignment, to the western edge of the GSA on Temple Road, crossing fields TB3, TB4, Bcd114 and Bcd115. Just east of the A15 this band bi-furcates with a second band running in a north-westerly direction up to the western edge of the GSA in field BCD102. The sinuous spread of this band of Lower Lincolnshire limestone coincides with the topographic variations in this part of the GSA seen in LiDAR data (Illus 4) with dry valleys evident in the fields it crosses.

The only other variation in bedrock geology in these sectors underlies Bcd11 and Bcd120 where limestone of the Blisworth Limestone Formation is recorded surrounding a thin band of Argillaceous rocks with subordinate sandstone and limestone of the Rutland Formation.

The change in bedrock geology across Sector 3 largely respects the route of the B1191 through RAF Digby to the north and south where limestone of the Blisworth Formation lies to the east and Lincolnshire and Upper Lincolnshire Formations lay to the north-west and south-west respectively. Two small patches of mudstone of the Blisworth Clay formation lie within fields Rw02 and the north-eastern corner of RW10.

The bedrock geology underlying Sector 4 appears as four bands loosely aligned north to south the westernmost of which is recorded as Blisworth Limestone Formation limestone. To the east are two thin sinuous bands of mudstone and limestone of the Cornbrash Formation followed by a larger band of sandstone, siltstone and mudstone of the Kellaways Formation.

No superficial deposits are recorded over a significant majority of the GSA. Two sinuous bands of sedimentary sand and gravel deposits follow the course of dry valleys and natural depressions in the limestone bedrock aligned roughly east-west in the southern part of the GSA spanning the northern parts of fields Bcd108, Bcd109, Bcd110 and Bcd111 and across the southernmost field in the GSA, W2. A small spread of clay, silt, sand and gravel Head deposit is also recorded alongside the sand and gravel deposits in W2. A spread of clay and silt tidal flat deposits encroaches from the north into parts of By02 and By03 and are the only other superficial deposits recorded across the GSA (NERC 2022).

The overlying soils of the GSA are less varied than the underlying geology with three broad areas identified. To the south and west of RAF Digby (Sectors 1 and 2) the overlying soils are classified in the Soilscape 3 Association, characterised as shallow lime-rich loamy soils over chalk or limestone. To the east and north-east of RAF Digby (Sectors 3 and 4) the soils are classified in the Soilscape 5 Association described as freely draining lime-rich loamy soils. The easternmost fields of the GSA (Sector 4) around Acre Lane are classified in the Soilscape 22 Association, characterised as loamy soils with naturally high groundwater (Cranfield University 2021).

Guidance (English Heritage 2008; Table 4) indicates that magnetometer survey can be recommended over any sedimentary geology and average responses to magnetometer survey over Jurassic limestone are good, although a wide range of magnetic susceptibilities in the parent rock can result in very variable background responses to magnetometer survey. Also, any Quaternary deposits overlying the solid geology are a primary consideration as they often show a high degree of local variation, and the magnetic response is usually dependent on the magnetic mineralogy of the parent solid geology.

The combination of underlying limestone bedrock and widespread absence of superficial deposits means the prevailing geological and pedological conditions for much of the GSA are entirely appropriate for the application of magnetometer survey for the detection of archaeological features. Previous small scale magnetometer surveys bordering the GSA in advance of the expansion of the Brauncewell Quarry site (Oxford Archaeotechnics 1996 and 2008) also yielded positive results highlighting the suitability of the technique in this location.

2 ARCHAEOLOGICAL BACKGROUND

The following archaeological background is adapted from information detailed within a comprehensive archaeological desk-based assessment (ADBA - Headland Archaeology 2023a) and aerial investigation report (Headland Archaeology 2023b) compiled in support of an Environmental Impact Assessment (EIA) for the proposed solar development.

2.1 PREHISTORIC

There are 34 records held by the Lincolnshire Historic Environment Record (LHER) relating to prehistoric activity located in part or fully within the GSA. Most of this evidence has been recorded from air

photographs during the National Mapping Programme (NMP). Fields within Sectors 1 and 2 show evidence for prehistoric settlement and funerary activity. On the eastern boundary of the GSA in Sector 2 (field Bcd111) a potential prehistoric settlement has been recorded from cropmarks (MLI84458); settlement is also recorded within the northern parts of Sector 3 (fields Bcd066 and Bcd148; MLI87414). Surrounding these areas of settlement is evidence for prehistoric barrow burials. Immediately north of the settlement evidence in Sector 3 is a potential barrow cemetery (MLI87416) and south of RAF Digby (Bcd079) three possible round barrows are recorded close to each other (MLI90994; MLI90995; MLI 90998). Other isolated round barrows are recorded in the wider GSA, further away from settlement evidence in fields Bcd120 (MLI84453) and Bcd148 (MLI90982). A Bronze Age cremation (MLI82506) has also been recorded just outside the GSA, 200m north of field By20 in Sector 4 east of Brickyard Farm but inside the railway bounding the GSA. The relative commonality of round barrows within the GSA and the presence of a Bronze Age burial is indicative of Bronze Age occupation within the GSA.

There is also evidence within the GSA that this area was used during prehistory for agricultural exploitation. More broadly all areas contain cropmark evidence for linear ditches and enclosures. Notably areas east of the A15 in Sectors 1 and 2 which contain two pit alignments (MLI84452; MLI88357) and Sector 3 where two trackways with enclosures nearby are recorded (MLI86753; MLI87413). It is clear that the GSA was occupied during the prehistoric period, the reliance on aerial imagery to identify sites has created a generalisation in time period. However, the considerable presence of round barrows is indicative of a Late Neolithic to Bronze Age presence.

There is assessed to be high potential for prehistoric remains to be present across the GSA due to the considerable evidence recorded here by the NMP. However, it is possible that the continuous ploughing of the area through at least the post-medieval and modern periods has caused damage to below ground archaeological remains.

2.2 ROMANO-BRITISH

The LHER records eight assets of Romano-British date within the GSA, the most significant evidence of which is the Roman road running through Sector 3 crossing fields Rw01, Rw07, Rw08, Rw12 and Bk02 (MLI60813). There is another recorded Roman road following the same alignment as the present A15 (MLI86228). Both roads, described as continuations of Mareham Lane, run from the Roman settlement at Sleaford to the fort at Lincoln. Evidence of Romano-British activity within the GSA is solely made up of artefactual finds which is indicative of this area being frequented by travellers heading between Sleaford and Lincoln.

There is assessed to be low to medium potential for archaeological remains of Romano-British date to survive within the GSA. It is most likely that any remains would most likely be found in Sector 3, probably associated with the Roman road recorded here. Any other remains would likely be artefactual. However, it is possible that the continuous ploughing of the area through at least the post-medieval and modern periods has caused damage to below ground archaeological remains.

2.3 MEDIEVAL

The medieval period is poorly represented within the GSA with cropmarks seen in Sector 2 (Bcd111; MLI84457), a parish boundary recorded in Sector 3 (MLI89155) and a brass jetton find recorded immediately north of C6 but outside the GSA (MLI82650). During this period the nearby settlements of Ashby-de-la-Launde (MLI89166), Scopwick (MLI86774), Brauncewell (NHLE1018397) and Temple Bruer (MLI84449) started to develop and just outside Sectors 2, 3 and 4 medieval ridge and furrow is recorded (MLI60568; MLI87033; MLI87419; MLI87446). It is most likely that this area was used for agricultural exploitation during the medieval period.

There is assessed to be medium potential for archaeological remains of this date to survive within the GSA. There is good evidence that this area was farmed during the medieval period, so any remains are likely to be agricultural in nature, for example ridge and furrow ploughing. Such remains were unlikely detected by the NMP and are not visible on air photographs due to the post-medieval and modern ploughing here.

2.4 POST-MEDIEVAL TO MODERN

The agricultural use of the GSA continued into the post-medieval period. The field boundaries present today can largely all be traced back to tithe maps (Kirkby Green 1840 and Roulston 1843) and first edition Ordnance Survey mapping. The only other evidence recorded for the post-medieval period relates to highly localised, small-scale extraction dotted around the GSA.

The GSA has continued to be used for agriculture into the modern period and there is little evidence to suggest any other use of this area other than for agriculture. The LHER holds two records dating to the modern period: a World War 2 (WW2) aircraft crash site in Sector 4 (field By22; MLI125416) and RAF Digby in the north of Sector 3 (MLI60621).

There is medium to high potential that remains of a post-medieval to modern date survive within the GSA, but these would most likely be agricultural in nature. However, there is potential that remnants of localised post-medieval extraction could survive as well as evidence of the aircraft crash site in field By22.

There are 247 previous archaeological events within a 2km study area recorded by the Lincolnshire HER. Twenty-five of these are within the GSA. One of these archaeological events is an antiquarian investigation immediately outside the GSA east of Brickyard Farm in the location of a Bronze Age cremation (ELI2712). Another is a research-led investigation of a WW2 pillbox on the northern boundary of Bcd079 (ELI12971) and the remaining events are chance discoveries.

The GSA has been intensively ploughed since the post-medieval period which has caused extensive disturbance across the site. Many of the cropmarks are no longer visible on LiDAR or recent air photographs, likely due to modern agricultural activity.

3 AIMS, METHODOLOGY AND PRESENTATION

The general aim of the geophysical survey was to provide enough information to corroborate, identify and characterise sub-surface anomalies that may have an archaeological origin, including defining the spatial limits of already known or suspected heritage assets, within the defined survey areas. This information will form part of a much larger body of evidence from a variety of sources that, taken as a whole, will enable an assessment to be made of the impact of the proposed development on any sub-surface archaeological remains, where present and therefore help determine an appropriate mitigation strategy.

The specific archaeological objectives of the geophysical survey were:

- › to gather enough information to inform the extent, condition, character and date (as far as circumstances permit) of any archaeological features and deposits within the GSA,
- › to obtain information that will contribute to an evaluation of the significance of the proposed solar development upon cultural heritage assets, and
- › to prepare a fully illustrated report on the results of the survey that is compliant with all relevant standards, guidance and good practice.

3.1 MAGNETOMETER SURVEY

It is acknowledged that magnetometry has limitations and that certain types of sub-surface remains may, under certain circumstances, be more likely to be identified by other survey techniques such as earth resistance, ground penetrating radar (GPR) or electro-magnetic methods which measure different geophysical properties. However, to achieve the immediate project aims over such a large area constituting the GSA, magnetometry was selected as the best general-purpose methodology for assessing the site given the sub-surface remains most likely to be encountered, the results of earlier surveys and the project considerations.

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

The surveys were undertaken using two adaptations of four Bartington Grad601 sensors mounted at 1m intervals (1m traverse interval) onto a rigid frame. For most of the survey the frame was carried manually by the surveyors. When ground conditions were suitable the frame was towed on a wheeled array behind a quadbike.

In both configurations the system was programmed to take readings at a frequency of 10Hz (allowing for a 10–15cm sample interval) on roaming traverses (swaths) 4m apart. These readings were stored on an external weatherproof laptop and later downloaded for processing and interpretation. The system was linked to a Trimble R12 Real Time Kinetic (RTK) differential Global Positioning System (dGPS) outputting in NMEA mode to ensure a high positional accuracy for each data point.

MLGrad601 and MultiGrad601 (Geomar Software Inc.) software was used to collect and export the data. A combination of Terrasurveyor v3.0.35.1 (DWConsulting) and Anomaly GeoSurvey v1.11.11 (© 2018 Robbie Austrums) software packages were used to process and export the data plots. Subsequent data interpretation and illustration work was undertaken using Autodesk AutoCAD and QGIS v3.22.12 respectively.

An overall location plan of the GSA is presented at a scale of 1:100,000 in Illus 1. Overall processed greyscale and interpretation illustrations are shown in Illus 2 and Illus 3 respectively at a scale of 1:40,000. LiDAR data with the GSA outline superimposed is displayed in Illus 4 at a scale of 1:34,000. Bedrock geology data with GSA outline is displayed as the inset to Illus 4.

Due to the size and geographic spread of the GSA, twelve overview illustrations (three per Sector 1 through 4) detailing the location of the 1:2,500 illustrations, processed greyscale data and magnetometer interpretation with field names and LHER monument and event data, are shown at a scale of 1:12,500 in Illus 5 through Illus 16. Individual fields are referred to by names provided to Headland Archaeology at the commencement of the project. The survey data is shown in fully processed greyscale format, minimally processed XY trace plot format with accompanying interpretation plots at 1:2,500 in Illustrations 17 to 208 inclusive.

The full survey report including illustrations for the cable option route are included in Appendix 1. Technical information on the equipment used, data processing and magnetometer survey methodology is given in Appendix 2. Details of the survey location information are in Appendix 3. A note on the format of the geophysical data archive is present in Appendix 4. Data processing details for the magnetometer survey are presented in Appendix 4. The OASIS Archive entry is included as Appendix 6.

The survey methodology, report and any recommendations comply with guidelines outlined by Europae Archaeologia Consilium (EAC 2016) and by the Chartered Institute for Archaeologists (CIfA 2014b). All illustrations from Ordnance Survey (OS) 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 (see above) and over a range of different display levels. All illustrations are presented to display and interpret the data from this site to best effect based on the experience and knowledge of management and reporting staff.

4 RESULTS

The results are described by Sector in Table 1 below. Within each Sector fields have been grouped based on their geographic proximity and/or similar types of geophysical responses identified within. Many of the broader geological anomalies and some foci of archaeological activity extend beyond the modern field boundary

limits and therefore grouping of fields was required to best describe and define the characteristics of these features. The list of associated archaeological LHER assets and events included in the results table is not exhaustive and only includes those assets relevant to the anomalies identified in the survey lying within or immediately adjacent to those fields being discussed as part of the GSA.

SECTOR 1 ILLUS 5-7 AND 17-49

FIELD NO.	ARCHAEOLOGICAL ANOMALIES	ASSOCIATED ARCHAEOLOGICAL LHER ASSETS AND EVENTS WITHIN GSA LIMITS	SURVEY INTERPRETATION
Tb1 (Illus 17-22 and 26-28)	No?	None	<p>No anomalies of clear archaeological potential are identified in this field. A series of faint, regular parallel and perpendicular linear trend anomalies forming a grid like pattern cross the southern part of the field in a general north-west/south-east direction. These anomalies are tentatively interpreted as possibly forming part of a very large field system extending across many of the fields contained within Sectors 1 and 2. The more consistent nature of these linear anomalies lies in contrast to the irregular background mottling effects likely derived from natural periglacial processes or surface cracks in the limestone. The northern extent of these ditch-like features appears to respect a dry valley evident in the LiDAR data (Illus 4), possibly identifying another depression in the limestone bedrock as seen elsewhere in the GSA, crossing the northern part of Tb1 and Tb2. However, the absence of response here may be a result of the more homogenous deposits present within the depression and does not necessarily indicate an absence of features.</p> <p>Contained within the southern half of the field and located predominantly towards the peripheries of the present field boundaries are several discrete magnetically enhanced anomalies of uncertain origin but which are thought to possibly identify former extraction pits.</p> <p>Faint trends, tentatively interpreted as possible ridge and furrow based on their more regular appearance, are identified north of the southernmost pylon. However, these curving anomalies could equally be modern and/or natural in origin.</p> <p>Sinuus and discrete magnetically enhanced anomalies likely identifying a wide shallow depression in the limestone bedrock splitting in two directions at the location of the northernmost pylon, dominate the magnetic responses in the northern half of the field.</p> <p>Two service pipes and two pylon bases are also located within the field.</p>
Tb2 (Illus 17-28 and 32-34)	Yes	MLJ86694 MLJ86228 MLJ86690 ELJ5330	<p>Except for a short 45m linear section of discrete anomalies identifying a pit alignment in the north-east corner of the field (Illus 23-25), no other anomalies of clear archaeological potential are recorded. A range of overlapping magnetic anomalies of natural and anthropogenic origin are recorded in the southern half of the field but their cause, extent and any possible associations remain uncertain. No clear anomalies of likely archaeological origin are recorded in the location of a findspot for a Middle Bronze Age socketed spearhead (MLJ86690) east of the centre of the field. It should be noted that the superimposition of anomalies makes interpretation of individual features difficult at this location.</p> <p>The pit alignment, not previously recorded in the LHER, is oriented north-east/south-west and lies adjacent to a former quarry site (MLJ86694) off the A15 and former Roman road (MLJ86228) at NGR 502311, 356494. The alignment possibly extends to the west as more of a continuous curving ditch-like feature, but the response becomes difficult to differentiate from sinuous geological responses derived from a wide shallow dry valley, possibly identifying a depression in the limestone bedrock as seen elsewhere in the GSA to the south, extending in a similar direction across the field. The pit alignment is recorded to the east on the eastern side of the A15 extending into field Bcd044(Part) subsequently surveyed in a separate phase of works relating to cable route options (Headland Archaeology 2023 forthcoming).</p> <p>The same pattern of regular parallel and perpendicular linear trend anomalies forming a grid like design, present in many other fields within Sectors 1 and 2, are evident in all parts of the field not dominated by responses from the topographic depression crossing the field. The pattern of anomalies again does not appear to respect present or former field boundaries and may identify a former system of land division.</p> <p>The superimposition of various types of anomalies, particularly in the southern half of this field restricts a more confident interpretation of the nature, extent and any interrelationship (if present) between any of the underlying features. It remains unclear whether more regular patterns of anomalies in this area are a result of coincidental arrangements of geological effects or may have possible anthropogenic causes potentially associated with the hypothesized field system. Any anomalies that appear distinct from the magnetic background either due to their shape and/or magnetic signature are interpreted as of uncertain origin.</p> <p>Also recorded in this part of the field are a series of parallel linear trends, oriented east-west, identifying a pattern of ridge and furrow, a linear anomaly recording a former boundary and two magnetically enhanced discrete anomalies likely locating former localised extraction.</p> <p>Similar to the southern half of Tb1 and most fields adjacent to the A15, several discrete, widely spaced, magnetically enhanced anomalies of uncertain origin are recorded predominantly at the periphery of the field. These anomalies possibly identify former extraction pits.</p>

Bcd082	No	MLJ89517	No anomalies of clear archaeological potential are recorded across these three fields adjacent to and west of the A15. Findings from these fields are limited to a small area of magnetic enhancement recording extraction adjacent to a former stone quarry pit (MLJ89157) next to the A15, a continuation of the north-west/south-east aligned grid system of ditch-like anomalies and periodic magnetically enhanced discrete anomalies around the periphery of the field that are possibly due to modern extraction.
Bcd094		MLJ86228	
Bcd098		MLJ60759	
(Illus 26-31 and 35-40)		ELJ7075	Linear trends identifying field drains and/or modern cultivation patterns parallel to the modern-day field boundaries and irregular patterns of sinuous anomalies resulting from natural periglacial effects and/or surface cracks in the limestone are also identified.

FIELD NO.	ARCHAEOLOGICAL ANOMALIES	ASSOCIATED ARCHAEOLOGICAL LHER ASSETS AND EVENTS WITHIN GSA LIMITS	SURVEY INTERPRETATION
Bcd084	Yes	MLJ88357	A pit alignment (MLJ88357), oriented predominantly north/south spanning nine adjoining fields, extends uninterrupted for 2.1km southwards from the GSA limits to the north in Bcd084 at NGR 503463, 356058, towards the centre of field Bcd115 at NGR 503243, 354000 (discussed further below in Sector 2). In this sector the pit alignment crosses fields Bcd084, Bcd093, Bcd096, Bcd100, Bcd104 and Bcd105 but does not appear to be associated with any other anomalies/features recorded by the survey. The survey data adds detail to the LHER record showing that the two previously recorded pit alignments identified from cropmarks MLJ84452 and MLJ88357 are in fact a unified feature.
Bcd086		MLJ89203	
Bcd093		MLJ84520	
Bcd096		ELJ7068	
Bcd097		MLJ88323	
Bcd099		MLJ20943	
Bcd100		MLJ89194	
Bcd104		ELJ6372	
Bcd105		MLJ86228	
(Illus 35-40 and 44-49)			
			<p>The same arrangement of regular parallel and perpendicular linear trend anomalies forming a grid like pattern aligned north-west/south-east, present in many other fields within Sectors 1 and 2, are evident to varying degrees within all these fields. No definitive interpretation of these anomalies presents itself, but they could represent an extensive field system or form of land division predating the modern field arrangements which are identified from tithe maps from the mid-19th century (Headland Archaeology 2023a; Table 5 and Table 6). It remains unclear whether three faint partial circular anomalies identified adjacent/within the grid like anomalies in fields Bcd096 (NGR 503263, 355392), Bcd100 (NGR 503455, 355186) and Bcd104 (NGR 503292, 355499, very tentatively interpreted as of possible archaeological origin) are associated with these 'fields' or even if they have an anthropogenic cause (Illus 47-49).</p> <p>Two parallel ditch-like anomalies of uncertain origin, aligned roughly east/west, are recorded extending across fields Bcd096 and Bcd097 (Illus 47-49 and 113-115). No relationship is established with other features with which these anomalies appear to intersect including a wide, sinuous natural feature possibly identifying a depression in the limestone bedrock, pit alignment (MLJ88357) and the regular gridded arrangement of linear trend anomalies. These parallel anomalies could potentially define a trackway heading in the direction of Ashby de la Launde approximately 800m to the east. Two further ditch-like anomalies, also aligned roughly east/west and of uncertain origin, are identified at the boundary between fields Bcd084 and Bcd093. These remain difficult to interpret as they are parallel in part to modern agricultural trends close to the current field boundary.</p> <p>A former extraction pit (MLJ89203) recorded on historic mapping presents as a concentration of magnetic disturbance in the south-eastern corner of Bcd093 (Illus 44-46). South of this, at the eastern end of Bcd105, another area of likely extraction not identified on historic mapping is recorded as a cluster of magnetically enhanced amorphous responses. These anomalies lie immediately adjacent to LHER assets recording an unnamed farmstead (MLJ20943) and Gamekeepers Cottage and pheasantry (MLJ89194) located within a wood inside the GSA (Illus 47-49). No relationship between the previously recorded heritage assets and the magnetic anomalies can be established from the data and therefore these anomalies are interpreted as of uncertain origin.</p> <p>A small area of magnetic disturbance is also recorded in the location of a former windpump depicted on historic mapping due east of Ashby Lodge along the northern boundary of Bcd100 (Illus 47-49). The strong magnetic signature along the shared boundary between Bcd096 and Bcd100 in the direction of the former windpump suggests a service is buried within the boundary.</p> <p>As in most fields adjacent to the A15, several discrete, widely spaced, magnetically enhanced anomalies of uncertain origin, but possibly identifying former extraction pits, are recorded in field Bcd099.</p> <p>A broad sinuous feature of varied magnetic response identifying a geological trend, possibly a depression in the limestone bedrock, crosses fields Bcd096 and Bcd097 in an east/west direction.</p>

SECTOR 2
ILLUS 8-10 AND 50-106

FIELD NO.	ARCHAEOLOGICAL ANOMALIES	ASSOCIATED ARCHAEOLOGICAL LHER ASSETS AND EVENTS WITHIN GSA LIMITS	SURVEY INTERPRETATION
Bcd102 Bcd106 Bcd114 (Illus 38-40, 50-52 and 59-64)	No?	MLJ89204 MLJ86228	<p>Except for the continuation of the faint ditch-like responses, tentatively interpreted as possibly identifying a former field system, no anomalies of clear archaeological potential are identified in these three large fields adjacent to the A15. These fields broadly contain the same types of anomalies as those recorded further to the north where the most prominent features identified are either natural in origin, such as the sinuous geological trends crossing all the fields, or possibly identify localised areas of extraction respecting the periphery of the modern field boundaries.</p> <p>Two parallel ditch-like anomalies of uncertain origin are recorded in Bcd 114 aligned north-east/south-west extending to/from the pylon base in this field at NGR 502759, 354024 (Illus 62-64). It remains unclear whether these are associated with the pylon but do share an alignment with other ditch like features of possible archaeological origin further to the south heading in the direction of the pit alignments and ditches approximately 450m to the south-west. A further linear anomaly of uncertain origin, identified in Bcd 114 oriented east/west at the eastern edge of the field, could mark the continuation of a possible archaeological ditch from field Bcd 115 immediately to the east.</p> <p>Two parallel ditch-like anomalies of uncertain origin are recorded in Bcd 114 aligned north-east/south-west extending to/from the pylon base in this field at NGR 502759, 354024 (Illus 62-64). It remains unclear whether these are associated with the pylon but do share an alignment with other ditch like features of possible archaeological origin further to the south heading in the direction of the pit alignments and ditches approximately 450m to the south-west. A further linear anomaly of uncertain origin, identified in Bcd 114 oriented east/west at the eastern edge of the field, could mark the continuation of a possible archaeological ditch from field Bcd 115 immediately to the east.</p> <p>An area of magnetic disturbance recorded in the south-eastern corner of field Bcd 106 adjacent to the A15 identifies the location of a former windpump recorded on historic mapping (Illus 59-61). Discrete magnetic responses immediately north of the former windpump possibly identify a further extraction site similar to others recorded adjacent to the A15.</p>
Bcd099 Bcd105 Bcd107 Bcd108 Bcd109 Bcd115 Bcd118 Bcd123 Bcd129 (Illus 38-40, 50-52, 59- 64, 71-79 and 86-97)	Yes	MLJ84452 MLJ88357 MLJ86228 MLJ89159 MLJ89201	<p>Fields in this sector contain part of the continuous pit alignment recorded in the LHER as two separate features MLJ84452 and MLJ88357. In this sector the pit alignment alters course from a north/south alignment seen to the north in Sector 1, to a north-east/south-west alignment extending across the north-west corner of Bcd 108, through the sinuous geological trend recording a change in limestone geology in Bcd 107 and into Bcd 115 (Illus 62-64 and Illus 71-76). In this field the survey data suggests there is a gap of approximately 130m in the pit alignment across Bcd 115 and is not a continuous feature as suggested by cropmark data detailed in the LHER. The pit alignment does not appear to extend to the south-west beyond the western boundary of Bcd 115 which is bound by the A15, also the former Roman road marking an extension to Mareham Lane (MLJ86228). Given the clarity of magnetic response of the pit alignment across the remainder of the field with similar magnetic background, the absence of anomalies across a 130m stretch suggests a deliberate gap rather than a failure to detect anomalies in this location.</p> <p>An isolated ring ditch approximately 13m in diameter not previously recorded in the LHER is identified towards the north-west corner of Bcd 123 at NGR 503652, 353874 (Illus 74-76). Two similar sized but much less clear circular anomalies possibly identifying ring ditches are identified towards the eastern edge of Bcd 123 (NGR 503972, 353803; Illus 89-91) and to the north in Bcd 118 (NGR 503661, 354049; Illus 74-76).</p> <p>The same pattern of regular parallel and perpendicular linear trend anomalies forming a grid like design, present in many other fields within Sectors 1 and 2, and possibly identifying a relict field system, are recorded to varying extents in all parts of these fields other than where there are high magnitude responses from natural variations in the bedrock geology. It remains unclear whether these possible boundary features deliberately respect the location of geological/topographic changes or whether there is a lack of magnetic contrast provided in the location of these leading to reduced visibility of anomalies. Fields in this area appear to mark the eastern extent of these anomalies/features which broadly correlate with north/south aligned changes in bedrock geology from different limestone formations to the east and west bounding a strip of argillaceous rocks in between. It remains uncertain whether the failure to detect these regular, weak trend anomalies outside of areas underlain by Upper Lincolnshire Limestone Member bedrock geology is a genuine characterisation of their extent or a reflection of changing magnetic properties of the underlying bedrock geologies leading to a lack of visibility.</p> <p>Further evidence for localised extraction presents as amorphous patches of enhanced magnetic responses adjacent to the B1191 to the east of Bcd 108, Bcd 118, Bcd 123 and Bcd 129. All these responses lie close to former extraction pits recorded by the LHER (MLJMLJ89201).</p> <p>A series of parallel, widely spaced and slightly curving low magnitude responses along eastern parts of fields Bcd 118 and Bcd 123 (Illus 74-76 and Illus 89-91) and across Bcd 105 and Bcd 108 (Illus 71-73) likely identify patterns of ridge and furrow cultivation.</p> <p>A broad sinuous anomaly of varied magnetic response identifies a sinuous spread of Lower Lincolnshire Limestone Member limestone and lime-wackestone crossing fields Bcd 108 and Bcd 109 in a south-west/north-east direction, before forking at the boundary between fields Bcd 107 and Bcd 115 and heading separately into fields Bcd 106 and Bcd 114 west of the A15 detailed in Sector 1. A further spread of this bedrock branches off at the western edge of Bcd 115 where it heads in a south-east direction towards the southern edge of the field.</p> <p>Other linear anomalies in these fields identify former boundaries often parallel to the present layout that are detailed on historic mapping, field drains and/or modern agricultural trends.</p>

FIELD NO.	ARCHAEOLOGICAL ANOMALIES	ASSOCIATED ARCHAEOLOGICAL LHER ASSETS AND EVENTS WITHIN GSA LIMITS	SURVEY INTERPRETATION
Bcd110 Bcd111 Bcd120 (Illus 86-94 and 98-103)	Yes	MLJ88453 MLJ84458 MLJ89519 MLJ84454 MLJ84457 MLJ89160 MLJ89201 MLJ60743 ELJ7074	<p>The survey data records archaeological features in each of these three fields that largely corroborates, but also greatly expands, the current understanding of the archaeological potential of this part of the GSA. The survey has identified two adjacent foci of settlement activity in the form of interconnected enclosures, ditches and pits in the northern half of Bcd111 extending into Bcd110 (Illus 86-88 and Illus 98-100), which in part are recorded as cropmarks (MLJ84458), and by a Romano-British artefact scatter (MLJ60743 and ELJ7074) in the LHER. Immediately south of the settlement activity a small, previously unrecorded ring ditch, measuring approximately 11m in diameter, is identified at NGR 504774, 354247 (Illus 89-91).</p> <p>Towards the southern boundary of Bcd111 (NGR 504562, 353902; Illus 89-91) a series of conjoining rectangular enclosures aligned roughly north/south correlate to cropmarks interpreted as late medieval crofts (MLJ84457) recorded in the LHER. At the south-eastern corner of the field (NGR 504877, 353916; Illus 101-103) two small adjoining enclosures with possible associated trackway are identified in the survey. These features are also recorded as cropmarks (MLJ84454). In both instances the magnetometer survey has not identified extensive remains beyond those already detailed within the LHER.</p> <p>Two well-defined ring ditches are recorded in Bcd120 (Illus 89-91). The southernmost, and larger of the two features located at NGR 504084, 353866, measures approximately 24m in diameter and is recorded as a round barrow in the LHER (MLJ84453). The smaller of the ring ditches located towards the centre of the field at NGR 504222, 354098, measures approximately 16m in diameter. Roughly 125m north-east of this second barrow at NGR 504320, 354205, is a circular anomaly of possible archaeological origin measuring 22.5m in diameter (Illus 86-88). The precise nature of this feature however remains unclear due to the enhanced and varied magnetic background across this field which is not located on the surrounding limestone geology but on a band of argillaceous rocks. A further partial ring ditch is recorded in the northern part of adjacent field Bcd110 at NGR 504428, 354609 (Illus 86-88).</p> <p>Several ditch-like anomalies identified across these fields, which appear to extend from the settlement activity and/or that are determined less likely to be indicative of field drains or modern cultivation effects, are interpreted as possibly archaeological in origin.</p> <p>Outside of those features determined to have archaeological or possible archaeological causes are several linear and discrete anomalies characterised as of uncertain and natural/geological origin in addition to those due to modern and historic agricultural activity (cultivation trends, field drains and traces of ridge and furrow ploughing).</p> <p>Those anomalies of uncertain origin that are noteworthy include; a roughly circular cluster of magnetically enhanced anomalies in the north-west corner of Bcd110 close to Springwell Brook (NGR 504312, 354631; Illus 86-88), that possibly identify localised extraction, as recorded by other similar anomalies and LHER entries to the north-east and north-west (MLJ89159), pit-like anomalies immediately north of the round barrow (MLJ84453) that are difficult to differentiate from the magnetic background and a linear anomaly lying almost parallel to the modern cultivation effects along the western edge of fields Bcd110 and Bcd120.</p>

FIELD NO.	ARCHAEOLOGICAL ANOMALIES	ASSOCIATED ARCHAEOLOGICAL LHER ASSETS AND EVENTS WITHIN GSA LIMITS	SURVEY INTERPRETATION
Tb3 Tb4 Tb5 Bcd127 Bcd128 Bcd138 Bcd139 E1 W1 W2 (Illus 53-58, 62-70, 74-85 and 92-97)	Yes	MJ86228 MJ81837 MJ83186 MJ60845 MJ60845 MJ60846 MJ60847 MJ81843 MJ81840 MJ81841 MJ81845 MJ81846 MJ81849 ELJ2127 ELJ9267 ELJ6674 ELJ6675 ELJ8535 ELJ10911 MJ83181	<p>These fields cover a large area constituting the southern part of the GSA but have been grouped together because of the shared archaeological features that are identified within and across them. The results of the survey expand upon the existing archaeological knowledge of this part of the GSA which is already known to contain prehistoric archaeological assets (MJ81846, MJ81843 and MJ81840) from features identified from cropmarks, earlier magnetometer surveys (ELJ8535, ELJ10911, ELJ2132; Oxford Archaeotechnics 1996 and 2008) and excavations (ELJ2127, ELJ9267, ELJ6674, ELJ6675; Lindsey Archaeological Services 1994 and 2004) undertaken prior to the most recent expansion of Brauncwell Quarry which borders the GSA (fields W1 and W2) to the south-west.</p> <p>The survey results confirm the presence of extensive curving boundary ditches (MJ81837), extending from the Brauncwell Quarry to the north, arcing across W1 before heading east into field E1 entering Warren Pit Plantation immediately outside the GSA, and that are detailed within the LHER (Illus 65-70 and Illus 77-85). These ditches were excavated during archaeological investigations at Brauncwell Quarry though their dating remains uncertain, however were determined likely to have been in use during the Later if not Middle Iron Age (Lindsey Archaeological Services 2004).</p> <p>In addition to these ditch extents recorded in the LHER, the survey data identifies the ditches extending to the north-west along the southern boundary and northwards across Tb5 (Illus 65-67) and south in E1 (Illus 77-79). Further ditches seemingly not appended to, but with a similar magnetic response, and likely associated are recorded in Tb3, Tb4, Tb5 (Illus 53-58 and Illus 62-67), Bcd128 and Bcd138 (Illus 74-79). The data also shows that the continuous ditch response for these anomalies is sometimes interrupted or replaced by a pit alignment, the significance of which (if any) is unknown. It remains unclear whether there is a link, other than similar anomalous magnetic response, between the ditches/pit alignments identified extending from Brauncwell Quarry and the pit alignment (MJ84452 and MJ88357) extending south from Bcd084 over 3.8km away from the quarry. Also unclear is the relationship (if any) between the northern terminus of two of the ditches in Tb3 and Tb4 which coincides with the southern extent of the gridded pattern of linear trends tentatively interpreted as possibly identifying a relict field system.</p> <p>Also, in the vicinity of Brauncwell Quarry in W2, the survey has recorded an oval (NGR 503563, 352331) and square enclosure (NGR 503620, 352426) in addition to possible interconnecting ditches and discrete pit-like responses of possible archaeological origin (Illus 80-82). These anomalies/features are identified against a varied magnetic background derived from overlying Head (clay, silt, sand and gravel) and Sand and Gravel deposits. Of note are the several discrete pit-like responses recorded within the oval enclosure. These anomalies stand out clearly against a very localised homogenous magnetic background. This cluster of anomalies correlates with multiple asset locations recorded in the LHER identifying prehistoric cropmarks (MJ83187), cropmarks of enclosures (MJ60845), Bronze Age pottery (MJ60845), Romano British pottery (MJ60846) and medieval pottery (MJ60847). Possible archaeological responses here are difficult to differentiate from sinuous natural background variations aligned east-west.</p> <p>In the southernmost fields Bcd138, Bcd139, W1, W2 and E1, curvilinear, parallel trend anomalies identifying ridge and furrow cultivation are evident and possibly linked to medieval activity (MJ81840, MJ60855 and MJ60859) identified just outside the GSA on the western edge of Brauncwell village.</p> <p>Further examples of discrete, widely spaced, magnetically enhanced anomalies of uncertain origin, but that might identify former extraction pits, are recorded predominantly at the periphery of fields in this area adjacent to the A15. Other examples of possible extraction sites are recorded in W1 and E1 and quarrying activity more broadly in this area is attested to in the LHER in locations immediately outside the GSA (MJ83180 and MJ83181).</p> <p>A characteristic example of a lightning strike (LIRM - lightning-induced remanent magnetization) is evident in the data set towards the centre of an archaeological ditch at the southern end of field Bcd127 at NGR 503038, 353225 (Illus 65-67). Other prominent anomalies of natural/geological origin consist of a sinuous continuation of the Lower Lincolnshire Limestone Member limestone bedrock extending across the GSA (Bcd127, Tb3, Tb4 and Tb5) towards the south-west and east-west aligned variations identified in W1 and W2.</p> <p>Numerous linear agricultural trend anomalies in these fields are either caused by field drains and/or former field boundaries that are recorded on historic mapping.</p> <p>Areas of magnetic disturbance are recorded in various places at the field margins and surrounding the large electricity pylons that carry overhead wires across this part of the GSA.</p>
Bcd140 Bcd141 (Illus 92-94 and 104-106)	Yes	MJ83188 MJ86164 ELJ4828 MJ89202	<p>A complex arrangement of archaeological and non-archaeological magnetic anomalies is recorded spread across these two fields at the south-eastern limit of the GSA (NGR 504573, 353190). A clear sub-rectangular enclosure approximately 180m in diameter containing numerous ditch and pit like anomalies, indicating likely settlement activity, is clearly mapped at the southern boundary of the adjoining fields. Linear and curvilinear ditches extend from the main enclosure to the north and north-west. These anomalies directly coincide with the location of records of prehistoric cropmarks (MJ83188) and Romano-British metal detecting finds (MJ86164 and ELJ4828) and more broadly with a pattern of prehistoric activity in this area attested to by further records of prehistoric cropmarks (MJ84455 and MJ84456) in adjacent fields outside the GSA detailed in the LHER. Anomalies likely associated with the settlement activity and with high archaeological potential roughly span an area of 5ha across the two fields.</p> <p>Also present within these two fields and to a large degree superimposed on the archaeological features are a range of linear and curvilinear responses identifying ridge and furrow cultivation, modern agricultural ploughing trends, patterns of systematic field drains and natural/geological trends. It remains unclear whether the linear anomaly that extends across both fields, aligned south-west/north-east, through the archaeological enclosure (but which lies parallel to the ridge and furrow and also appears to delineate the extent of field drains in the south-east corner of Bcd141) is of archaeological, modern or even natural origin and hence an uncertain interpretation is given.</p>

SECTOR 3
ILLUS 11-13 AND 107-157

FIELD NO.	ARCHAEOLOGICAL ANOMALIES	ASSOCIATED ARCHAEOLOGICAL LHER ASSETS AND EVENTS WITHIN GSA LIMITS	SURVEY INTERPRETATION
Bcd076	Yes	MLJ90993	Most of the anomalies of archaeological potential identified in these fields are in the north-east corner of Bcd079 immediately south of RAF Digby (MLJ60621) where at least five ring ditches, two rectangular enclosures, one partial square enclosure and numerous ditch and pit-like anomalies are recorded east of the B1191 encompassing an area of approximately 7ha (Illus 122-127).
Bcd078		MLJ90994	
Bcd079		MLJ90995	
Bcd086		MLJ90997	Most of these anomalies are identified in the LHER including the three largest ring ditches identified as possible round barrows (MLJ90994, MLJ90995 and MLJ90998), a square enclosure bisected by the B1191 (MLJ90990) and two prominent ditches surrounding these features (MLJ90993 and MLJ90997). In addition to these features the survey results also identify a pit alignment oriented roughly north/south extending across fields Bcd076 (NGR 504396, 356507), Bcd078 and Bcd086 (NGR 504141, 355775) approximately 450m to the west of the concentration of features in Bcd079 (Illus 107-112). It remains unclear whether this pit alignment is associated with the other features within Bcd079, or indeed other pit alignments recorded elsewhere in the magnetometer data roughly 700m to the west or 1.5km to the north-east.
Bcd088		MLJ90998	
Bcd097		MLJ90990	
(Illus 107-115 and 122-127)		MLJ60568	
		MLJ60621	
		MLJ89187	
		ELJ2971	In addition to the anomalies of clear archaeological potential the survey has recorded further traces of the north-west/south-east aligned possible field system that extends across most of the GSA in Sectors 1 and 2, different patterns of ridge and furrow, a former field boundary and the occasional isolated low magnitude ditch-like feature of uncertain origin.
		A further wide, sinuous spread of increased magnetic background variation recorded in Bcd076 likely identifies variations in the limestone bedrock geology similar to the variation recorded in other locations across the GSA. This also occurs close to the boundary where the limestone geology changes to Lincolnshire Limestone Formation limestone recorded across RAF Digby and north of this.	
		A modern service aligned north-northeast/south-southwest towards the RAF airfield is also recorded in Bcd076. Modern cultivation effects parallel to the present boundaries are common across all these fields.	

FIELD NO.	ARCHAEOLOGICAL ANOMALIES	ASSOCIATED ARCHAEOLOGICAL LHER ASSETS AND EVENTS WITHIN GSA LIMITS	SURVEY INTERPRETATION
Rw01	Yes	MLJ90990	The fields in this contiguous block of land lying north of Ashby de la Launde and east of RAF Digby have been grouped together because of the shared archaeological features that are identified within and across them. The results of the survey here show this part of the CSA has a greater archaeological potential than previously recorded in the LHER though magnetic anomalies consistent with the records of prehistoric cropmarks (MLJ90987, MLJ90990, MLJ86753 and MLJ87411) in fields Bk02, Bk04, Bk07 (Illus 131-136) and pit alignment (MLJ87412) in Bk08 have been confirmed (Illus 140-145).
Rw10		MLJ90987	
Rw11		MLJ87411	
Rw12		MLJ87412	
Bk03		MLJ87413	Anomalies not previously recorded in the LHER include an almost contiguous spread of irregular shaped, rectilinear and square enclosures appended by ditches, trackways and pit-like anomalies running from the southern boundary of Rw10 immediately north of the hexagonal walled garden (MLJ88318) of Ashby Hall northwards towards RAF Digby and then also detected to the north-east parallel to the south of the B1911 heading towards the village of Scopwick. This encompasses an area of roughly 50 hectares and does not include other nearby areas of archaeological potential recorded west of the B1191 (Illus 122-133, Illus 140-142 and Illus 161-163) and in Rw04 and Rw06 (Illus 134-139).
Bk07		MLJ86753	
Bk08		MLJ60813	
Bk09			
Bk11			Though the individual anomalies are too numerous to describe, anomalies of note from this area include several ring ditches, the most striking being two large ring ditches, probably round barrows, measuring approximately 32m (NGR 505561, 357333) and 25m (NGR 505453, 357179) in diameter located at the centre and southern parts of Bk03 respectively (Illus 131-133). Another smaller ring ditch is recorded in Bk03 (NGR 505540, 357239), three are recorded in Bk07 (NGR 505554, 357137, 505638, 357010 and 505664, 357017), two isolated examples are mapped in fields Rw01 (NGR 505341, 356469 and 505259, 356441; Illus 122-124) and Rw11 (NGR 505049, 355972 and 505243, 356002; Illus 125-127) with as many as five ring ditches in Rw12 (NGR 505193, 356404, 505334, 356334, 505320, 356386, 505173, 356369 and 505138, 356618; Illus 122-124) and a further two ring ditches at the south-east corner of Rw10 (NGR 505410, 355643 and 505414, 355666; Illus 137-139).
Bk12			
Bk15			
(Illus 119-145 and 152-157)			
			Other anomalies and/or features of particular interest include a pit alignment curving across fields Bk11 and Bk12 for approximately 400m (Illus 140-145 and Illus 155-157) and another along the northern boundaries of Bk03 and Bk07 (Illus 128-133), two partially complete concentric square (NGR 505096, 355739) and circular (NGR 505129, 355774) anomalies approximately 22m and 17m in diameter respectively in the western part of Rw10 (Illus 125-127), a rectilinear enclosure at the north-east boundary of Bk12 (Illus 140-142 and 152-154), possible sites of localised extraction within Rw01, Bk07, Bk12 and Bk15 and possible locations of burning identified by a strongly enhanced magnetic signature within the densest concentrations of ditches and enclosures within Bk02, Bk06 and Bk07 (Illus 131-136).
			No magnetic anomalies consistent with the conjectured route of a Roman road (MLJ60813) crossing fields Bk02, Rw01, Rw07 and Rw08 are visible in the survey data. However, the distribution of surrounding archaeological findings ranging from settlement and funerary activity, enclosures, ditches and trackways perhaps indicates such a route existed nearby.
			A host of other magnetic anomalies of uncertain and/or non-archaeological origin are mapped in these fields ranging from linear features of uncertain origin adjacent to the B1191 south of RAF Digby and the south-eastern corner of Rw12, service pipes in fields Rw10, Rw11, Rw12 and Bk08 and former ponds in Rw10 and Rw12.
			Ridge and furrow agricultural trends are evident in most fields, as are modern ploughing trends, with an increasing presence of field drains further to the east as the overlying soil type changes.

B1	Yes	MLJ90981	The area covered by this group of fields comprises a curving corridor between 130m and 150m in width that lies adjacent to the B1191 to the north which links RAF Digby to the village of Scopwick. From the LHER data it is evident that this area contains further prehistoric archaeological activity likely associated with that identified around RAF Digby with heritage assets of a possible prehistoric settlement (MLJ87414), possible round barrow (MLJ90982) and cropmark of an undated linear feature (MLJ90983) recorded within the GSA limits and cropmarks of a possible pit alignment (MLJ90984), later prehistoric enclosure MLJ909845) and possible round barrow cemetery (MLJ87416) lying immediately outside the GSA.
Bcd065		MLJ90982	
Bcd066		MLJ90983	
Bcd067		MLJ90984	
Bcd068		MLJ90985	
Bcd148		MLJ87414	The survey results from these fields have confirmed the presence of several of the archaeological features recorded in the LHER, added detail to existing records and identified several more previously unrecorded features, thus raising the archaeological potential of this area. The character of the archaeological findings from these fields are slightly different however to those that are south of the B1191, with no further evidence of settlement activity as seen in fields Bk07 and Bk02.
(Illus 119-121, 128-133, 140-142 and 161-163)		MLJ87416	
		MLJ87417	
		MLJ86755	
		MLJ87402	
			Findings from these fields consist of four pit alignments located at the boundary of Bcd067 and Bcd068 (Illus 128-133), across Bcd148 forming a right-angle at the boundary with field B1 (Illus 140-142 and Illus 161-163) and across Bcd065 and Bcd066 (Illus 128-130), the latter being recorded as a cropmark of an undated linear feature (MLJ90983) in the LHER, an oval enclosure approximately 27m by 20m at the western end of Bcd068 (NGR 505641, 357595; Illus 128-130) and three, possibly four, ring ditches in the western half of Bcd148 (Illus 140-142). Of the ring ditches recorded in Bcd148, the two largest, which measure 36m and 20m in diameter respectively (NGR 506038, 358098 and 506374, 358123), are possibly associated with the possible round barrow cemetery (MLJ87416, MLJ90982 and MLJ86755) identified in the LHER in the adjoining field approximately 100m to the north.
			Anomalies of possible archaeological potential are identified in Bcd066 where three possible ring ditches are recorded and in Bcd068 where a right-angled ditch-like anomaly and possible area of burning are recorded (Illus 128-130).
			Outside of these anomalies of clear or possible archaeological potential the survey has recorded a large area of discrete, magnetically enhanced anomalies covering B1. The anomalies likely attest to ground disturbance caused by quarrying activity (MLJ87402) immediately to the north but also may record anomalies of archaeological potential that remain difficult to differentiate from the varied magnetic background (Illus 140-142 and Illus 161-163).
			Ridge and furrow and modern cultivation patterns are common across these fields as are natural/geological variations in Bcd066 and Bcd148.
			Three buried services are identified by very high magnitude linear anomalies crossing Bcd066 (Illus 128-130) and a further two are recorded in Bcd148 (Illus 140-142 and Illus 161-163).

FIELD NO.	ARCHAEOLOGICAL ANOMALIES	ASSOCIATED ARCHAEOLOGICAL LHER ASSETS AND EVENTS WITHIN GSA LIMITS	SURVEY INTERPRETATION
Rw04	Yes	MLJ87032	The survey has identified anomalies of archaeological potential in these two fields located east and south-east of Rowston Top Farm (Illus 137-139). Two partial rectangular enclosures measuring approximately 30m by 45m and joined by a curving ditch to the south are identified in the southern half of Rw04 (NGR 505958, 356019) in the location of LHER assets of a probable prehistoric cropmark enclosure (MLJ87032) and undated mound (MLJ89494).
Rw06		MLJ89494	
(Illus 137-139 and 149-151)		MLJ60813	
		MLJ60353	
		MLJ89155	
			A vague cluster of linear ditch and pit-like anomalies surrounding two discrete, strongly enhanced anomalies indicative of burning are recorded towards the centre of Rw06 (NGR 506061, 355658; Illus 137-139). No LHER assets are recorded in this field. However, the conjectured route of a Roman road associated with Mareham Lane (MLJ60813) is projected immediately to the west of the field, as is the parish boundary (MLJ89155) and the site of a possible Roman villa (MLJ60353) lies roughly 300m outside the GSA to the south-west. It remains unclear whether features identified in these fields are linked or associated with settlement activity identified in the survey approximately 600m to the west in Rw10.
Rw05	No?	MLJ60813	Though these fields adjoin others containing archaeological features identified in the survey data and the projected line of a Roman road (MLJ60813) crosses the centre of Rw07 and Rw08, no anomalies of clear archaeological potential are identified in these three fields. Findings are limited to three ditch-like anomalies of possible archaeological origin recorded at the eastern boundary of Rw05 (Illus 149-151) and across Rw08 (Illus 137-139).
Rw07		MLJ89163	
Rw08			
(Illus 137-139 and 149-151)			
			One LHER asset is recorded in this area, a former extraction pit (MLJ89163) in the northern half of Rw05, subsequently identified as a pond on historic mapping. The survey has recorded a small area of localised magnetic disturbance in this location.

Bk05	Yes (limited)	—	Despite the proximity of these three large fields, located between RAF Digby and the B1188, to varied and dense archaeological activity mapped in adjoining fields, the only anomaly of clear archaeological potential identified across the north-east corner of Bk05 (Illus 143-145) is a short section of the pit alignment recorded in the LHER (MLJ87412). Although the individual responses are very faint the pit alignment may extend into the north-west corner of Bk10. There is no evidence in the data that the pit alignment continues west of the service pipe that crosses Bk05 and Bk08; the response from the pipe completely swamps the response from the individual pits in the vicinity of the pipe.
Bk10			
Rw02			
(Illus 131-136, 143-145 and 155-157)			The remainder of the survey findings from these fields are limited to a small rectangular enclosure of possible archaeological origin at the eastern end of Bk10 (Illus 155-157), uncertain linear anomalies possibly forming a rectangular enclosure approximately 95m in diameter at the southern boundary of Rw02, a small circular anomaly of uncertain origin approximately 10.5m in diameter at the eastern edge of Rw02 (Illus 134-136) and two short parallel linear anomalies located towards the centre of Bk05 (Illus 143-145).
			Patterns of ridge and furrow are recorded in each field in addition to a former boundary in Rw02 and Bk05. Linear trends derived from modern cultivation are evident in all three fields which also contain at least one pattern of field drains. The increasing presence of fields drains heading eastwards reflects the change in underlying geology and soils away from the shallower soils, overlying Upper Lincolnshire Limestone Member limestone which provided greater magnetic contrast and therefore visibility to anomalies west of the B1191.

SECTOR 4**ILLUS 5-7 AND 158-208**

FIELD NO.	ARCHAEOLOGICAL ANOMALIES	ASSOCIATED ARCHAEOLOGICAL LHER ASSETS AND EVENTS WITHIN GSA LIMITS	SURVEY INTERPRETATION
C7	Yes	MLJ90986	A long ditch feature with appended rectilinear enclosures is recorded extending for at least 800m north from the southern boundary of Md05 at Scopwick village through these three fields before linking to a small cluster of adjoining enclosures at the south-west corner of C7 close to the B1188 (NGR 506469, 359141; Illus 158-163). Though the main ditch feature linking these enclosures is recorded as an undated cropmark in the LHER (MLJ90986), the identification of several adjoining enclosures along the length of the ditch is additional detail provided by the magnetometer survey. In the location of at least three of the enclosures, one in each field, large, discrete anomalies with low levels of magnetic enhancement are recorded. These anomalies possibly locate large pit-type features rather than areas of burning. Also located adjacent to this extended ditch feature in C7 and Md03 are small, amorphous areas of enhanced magnetic response possibly indicative of localised extraction. The linear spread of these anomalies covers an area of approximately 7.5ha just east of the B1188. Patterns of ridge and furrow cultivation and modern ploughing on differing orientations are evident in all three fields. A buried service runs along the southern boundary of Md03 and Md04 and likely links to another service which runs along the edge of the B1188 (Illus 161-163 and 173-175).
Md04		MLJ87383	
Md05		ELJ5920	
(Illus 158-163 and 173-175)			
Md01	Yes? (limited)	MLJ90986	There is limited evidence of anomalies with archaeological potential within these three fields. The survey findings are restricted to a right-angled ditch like anomaly located west of centre in Md02 (Illus 173-175) and a small, amorphous patch of magnetic enhancement at NGR 506823, 358672, possibly due to localised extraction associated with enclosures off linear feature (MLJ90986) in adjacent field Md04. The identification of clear archaeological features in adjoining fields to the north and south suggests that although the magnetic background is more homogenous across these parts of the GSA, overall, the geological and pedological conditions are suitable for the detection of archaeological features. Therefore, the absence of anomalies in this location likely reflects a genuine absence of archaeological features. The remaining anomalies recorded across these fields are caused by field drains, agricultural activity (although ridge and furrow is only recorded in Md03) and a buried service identified in Md04 and Md03 running along the southern boundary of Md01 and Md02 (Illus 173-175 and 185-187).
Md02			
Md03			
(Illus 158-163, 170-175 and 185-187)			

C6	Yes	MLJ87423	Three concentrations of archaeological activity are identified in these three (C6, C8 and C9) adjoining fields east of the B1188 and south of Hall Farm.
C8		MLJ20843	
C9		MLJ125417	A sub-square enclosure, approximately 68m by 72m, centred at NGR 507326, 359070 in C8, is partitioned by internal ditches (Illus 170-172). Several discrete anomalies are also clearly recorded within this enclosure. A ditch extending from the south-western corner of this enclosure appears to link to a larger open sided rectangular enclosure measuring 145m by 90m which spans both fields C8 and C9. This enclosure corresponds with cropmarks interpreted as a probable prehistoric enclosure (MLJ87423).
By22		ELJ3473	
Lf05			Two further clusters of archaeological activity not previously recorded in the LHER are also recorded. Firstly, in C6, a double-ditched curving sub-rectangular enclosure again with internal linear subdivisions and discrete pit-like responses indicative of small-scale settlement activity, is identified on the eastern boundary of the field at NGR 507136, 359431 (Illus 167-172). Secondly, a large rectangular enclosure measuring approximately 85m by 210m containing a possible ring ditch and further subdivision is located at the shared boundaries of C8, C9, Md01, BY22 and Lf05 at NGR 507570, 358962 (Illus 170-172).
(Illus 167-172 and 179-187)			Three separate but adjacent clusters of discrete magnetically enhanced anomalies of uncertain origin are recorded south of centre in field By22 (Illus 170-172 and Illus 182-184). These anomalies lie close to the recorded spot of a World War 2 Hurricane plane crash site (MLJ125417 and ELJ3473) and could potentially record the cleaned-up location of the crash site. The anomalies are largely devoid of ferrous responses one might expect from a crash site unless any aircraft debris was removed, and any impact craters infilled. However, it is perhaps equally plausible that the anomalies have a more prosaic explanation, perhaps identifying accumulations of material/debris associated with efforts to drain the field.
			Field drains are present to varying extents in each of the fields as are modern agricultural trends. Former field boundaries are recorded in By22 and Lf05 where two ponds are also identified as concentrations of magnetic disturbance within the former boundary itself. The service pipe previously identified along the southern boundaries of Md01-Md04 also continues along the southern boundary of Lf05 (Illus 185-187).
			Localised variations in the magnetic background are identified in the north-west corner of By22 possibly as a result of the presence of encroaching clay and silt tidal flat deposits recorded to the north and in C8, C9 and north-west corner of Lf05 where the anomaly response is indicative of surface cracks in the limestone bedrock or periglacial effects.
Lf07	No	None	Although these two fields lie adjacent to others where the survey has identified anomalies/features of archaeological potential, no anomalies/features of interest have been recorded in either of these fields. The survey findings are limited to extensive patterns of field drains, a continuation of the buried service in Lf07 (also recorded in Lf05 and Md01-Md04) and traces of a former pond from localised magnetic disturbance at the western boundary of Lf13.
Lf13			
(Illus 182-187)			

FIELD NO.	ARCHAEOLOGICAL ANOMALIES	ASSOCIATED ARCHAEOLOGICAL LHER ASSETS AND EVENTS WITHIN GSA LIMITS	SURVEY INTERPRETATION
Lf08	Yes	MJ86860	Anomalies of clear archaeological potential have been recorded in these three fields located towards the southern boundary of Sector 4 north of Main Street which runs between the villages of Scopwick and Kirkby Green.
Lf12		MJ87443	
Lf16		MJ87444	There is some correlation between the survey data and records held in the LHER which attests to prehistoric activity in Lf08 in the form of possible prehistoric (MJ87443) and undated cropmarks (MJ87444) and the findspot of a Palaeolithic hand axe (MJ60508). Here the survey data records a clear, isolated, concentric ring ditch, measuring approximately 25m in diameter, at NGR S08306, 358559 in the location of possible prehistoric (MJ87443) and undated cropmarks (MJ87444; Illus 185-187). However no further anomalies of archaeological potential are identifiable. The remaining anomalies in Lf08 comprise a small cluster of discrete, low magnitude anomalies of uncertain origin and anomalies due to agricultural activity such as ridge and furrow and modern cultivation and field drainage.
(Illus 173-175, 182-187 and 194-199)		MJ60508	
		MJ87455	Three further areas of archaeological potential are recorded across Lf12 and Lf16 in locations where no prior information was held in the LHER (Illus 173-175 and Illus 185-187). A small square enclosure, likely part of a bigger enclosure is recorded at the north-west corner of Lf12 (NGR S07597, 358489) immediately north of a larger enclosure in the south-west corner of the field centred at NGR S07619, 358364. The square enclosure in the north-west corner of the field is not detected in the adjacent field to the north Md01. A linear spread of magnetically enhanced responses within the larger enclosure in the south-western corner of the field could indicate another ditch-like feature but remains unclear positioned so close to the field boundary. Collectively it is also unclear whether these features are associated with medieval earthworks (MJ87419) recorded immediately to the west outside the GSA.
		MJ87419	
		MJ87446	
		MJ87419	
		ELI5478	
		ELI5363	
		ELI5401	Approximately 200m east of these enclosures, but still within Lf12 (NGR S07856, 358489), are faint traces of a square enclosure approximately 50m in diameter (Illus 185-187). No clear internal features are visible and any possible association with either the enclosures to the west or a series of other faint ditch-like anomalies forming possible enclosures to the south in Lf16 remains uncertain.
			The remaining anomalies in these fields are predominantly agricultural in nature recording systematic patterns of field drains and ploughing trends.
By11	Yes	MJ82639	Anomalies of clear archaeological potential have been recorded in three out of four of these fields located towards the centre of Sector 4 west of Bridyard Farm and north of Low Field Farm. LHER references to Roman material (MJ82639), casual findspots (ELI7864) and undated cropmarks (MJ87449) across these fields are clearly indicative of some archaeological potential.
By12		MJ87445	
By24		MJ87448	Likely settlement activity in the form of a series of adjoining enclosures, ditches and trackways covering an area of approximately 3.5ha, is recorded extending southwards from the centre of By12 (Illus 176-181 and Illus 188-193). It is probable that this activity extends into field By18 immediately to the south, however, this field is not included within the GSA. The location of this archaeological activity centred at NGR S08421, 360164, correlates with recorded position of LHER assets relating to the collection of Roman material (MJ82639) and events recording fieldwalking (ELI2860). It remains likely these features are associated with a second, more faint set of rectilinear enclosures and ditches located roughly 150m to the west in the north-west corner of the field at NGR S08194, 360202 not previously identified in the LHER.
Lf02		MJ87449	
(Illus 176-184, and 188-196)		ELI7864	Two parallel curvilinear anomalies, interpreted as ditches possibly defining a trackway extending from the likely settlement site identified in By12, are recorded crossing the centre of By11 at NGR S08008, 360166 in the location of a casual find (ELI7864) recorded on the LHER (Illus 179-181).
		ELI2860	
		ELI2826	
		ELI2825	Further south, towards the southern boundary of By24 (Illus 194-196), the survey has recorded a square enclosure, approximately 42m in diameter, with a possible entrance on its eastern side in the location of an undated cropmark boundary ditch (MJ87449) recorded on the LHER at NGR S08433, 359346. No obvious internal features are evident in the magnetic data but a series of weakly enhanced ditch-like anomalies, possible ring ditch and short section of pit alignment are tentatively interpreted immediately to the north-west.
			Two widely spaced but parallel linear ditch-like anomalies aligned north/south in the eastern half of Lf02 are interpreted as of uncertain origin due to an absence of any archaeological potential nearby (Illus 194-196). These anomalies could record an extension to cropmarks recorded in the HER (MJ87445) and/or relate to a potential prehistoric cropmark enclosure (MJ87448) just to the east but are located over 160m from the square enclosure identified in the south of By24.
			The location of former ponds detailed on historic mapping identified in By12, By24 and Lf02, a service crossing Lf02 and traces of ridge and furrow in Lf02, By11 and By12 constitute the remaining anomalies of interest from these fields. Extensive patterns of field drains are also evident in each field.

FIELD NO.	ARCHAEOLOGICAL ANOMALIES	ASSOCIATED ARCHAEOLOGICAL LHER ASSETS AND EVENTS WITHIN GSA LIMITS	SURVEY INTERPRETATION
By13	No	MJ82678	No anomalies of clear or possible archaeological potential are identified in any of these fields which lie along the eastern edge of the GSA.
By20		MJ87448	One anomaly of uncertain origin is recorded spanning fields By20 and By28 at the eastern edge of the GSA (NGR 508985, 359923), an angular, weakly enhanced and poorly defined linear trend (Illus 191-193). The anomaly response is not indicative of a field drain but is not so vague or indistinct as to suggest a natural/geological feature. The anomaly could have an anthropogenic cause and the lack of visibility possibly explained by changes in both the underlying geology and overlying soils in this location. The underlying geology changes from limestone recorded to the west, which is more receptive to magnetometer survey, to sandstone, siltstone and mudstone of the Kellaways Formation. In conjunction with changes to the parent geology the overlying soils also change from more freely draining loamy soils in the west, to loamy soils with naturally high groundwater. The combined effect of these changes has created a more homogenous magnetic background with little contrast and reduced visibility.
By28		MJ87449	
Lf03		EL2838	
Lf04			
Lf10			
Lf11			
(Illus 188-208)			The change in geology and overlying soils also explains the concentration of field drains evident in all these fields. The only other findings of note from these fields are two buried services immediately south of Brickyard Farm (MJ82678), across the southern parts of Lf10 and Lf11 (Illus 197-199 and Illus 206-208) and the south-western corner of Lf03 (Illus 194-196).
			Lf03 was largely surveyed before design alterations lead to it being dropped from the GSA. No anomalies of archaeological potential were identified within the part of the field that was initially started although the HER does record potential prehistoric cropmarks (MJ87449) and Roman material (MJ82639) in adjoining fields to the south and north respectively.
By02	No?	MJ82732	LHER references to cropmark field boundaries (MJ82375) within the eastern part of By02 and to prehistoric and undated cropmarks of enclosures and field boundaries (MJ82732, MJ82733, MJ82734 and MJ82736) and a Romano-British artefact scatter (MJ60764) immediately outside the GSA to the north and east attest to archaeological activity in the vicinity of By02 and By03 located at the very northern end of the GSA adjacent to Blankney Moor Lane.
By03		MJ82733	
(Illus 164-169 and 176-178)		MJ82734	No anomalies of clear archaeological potential however are recorded in these two fields, but a linear ditch anomaly and possible partial enclosure are identified towards the centre of By03 just north of a buried service (Illus 164-166 and Illus 176-178).
		MJ82735	
		MJ82736	The interpretation of anomalies in By02 is complicated in part by a more variable magnetic background derived from clay and silt tidal flat deposits encroaching from the north (Illus 176-178). Amongst this more variable magnetic background, towards the centre of the field, is a cluster of discrete strongly enhanced magnetic anomalies of uncertain origin but that have a magnetic signature indicative of an anthropogenic cause. One linear ditch-like anomaly, not obviously a drain or cultivation effect, is also identified in addition to very faint curving trend anomalies recorded towards the southern boundary of the field, the causes of which remain uncertain.
		MJ60764	
			Ridge and furrow cultivation and a pattern of field drains are also recorded in By03. Two former boundaries and a former pond in By02 are recorded as faint linear anomalies and area of magnetic disturbance respectively.
By04	No	MJ82735	No anomalies of clear or possible archaeological potential are recorded in any of these fields located towards the centre of the block of land constituting Sector 4.
By05		MJ82734	
By10			One isolated linear ditch-like anomaly of uncertain origin is recorded at the eastern boundary of By05 in the location of prehistoric cropmarks recorded within (MJ82735) and immediately outside (MJ82734) the GSA boundary (Illus 188-190). No heritage assets are identified in any of the other fields. All the anomalies recorded within these fields are predominantly prescribed an agricultural (ploughing trends, field drains, former boundaries) and/or natural interpretation.
By16			
By23			
CS			
(Illus 167-169 and 176-184)			

5 DISCUSSION AND CONCLUSION

The survey has successfully evaluated all the suitable areas contained within the Geophysical Survey Area (GSA) and has recorded a wide variety of archaeological and non-archaeological features. The level of detail and range of anomalies recorded across the survey is argued to provide a high level of confidence in the findings and that they accurately reflect the archaeological potential of the GSA having likely recorded the extent of any significant archaeological remains, notwithstanding the limitations of magnetometer survey to define particularly small, very weakly enhanced or anomalies masked by areas of disturbance and/or stronger magnetic anomalies.

The results from a contiguous survey of this size have contributed a wealth of information to the understanding of not only individual foci of archaeological activity within the GSA but the archaeological potential of the area and wider landscape. The results of the survey largely corroborate but also greatly expand the current understanding of the archaeological potential of the GSA as contained within the Lincolnshire HER and detailed in the archaeological desk-based assessment for the project (Headland Archaeology 2023a).

The most significant concentrations of archaeological activity, containing examples of ring ditches and likely round barrows, pit alignments and extended series and/or concentrations of ditches, enclosures and pit-like anomalies are identified at the southern extent of the GSA near Brauncwell Quarry, to the north and south of Hall Farm (Bloxholm), surrounding RAF Digby to the south, east and north-east, north of Ashby de la Launde and Scopwick and west of Brickyard Farm, were broadly recorded in areas identified in the LHER as having at least some archaeological potential, which can now be confirmed as very high.

Where the survey has proved invaluable is being able to accurately map the layout and extent of these extended areas of archaeological activity at a truly landscape level, features such as the multiple pit alignments spread across western and central areas of the GSA. One drawback however of the geology being so receptive to magnetometer survey has been in select locations where the superimposition of various types of anomalies of natural and/or anthropogenic origin has restricted a more confident interpretation of the nature, extent and any interrelationship (if present) between features recorded. Although the survey has detailed landscape scale archaeological features, further discussion of their archaeological significance beyond their spatial distribution as recorded by the survey however lies beyond the scope of this survey report.

Where the survey has identified more significant levels of archaeological activity not previously recorded in the LHER includes the land between Ashby de la Launde and RAF Digby, north-east of RAF Digby and south of Blankney.

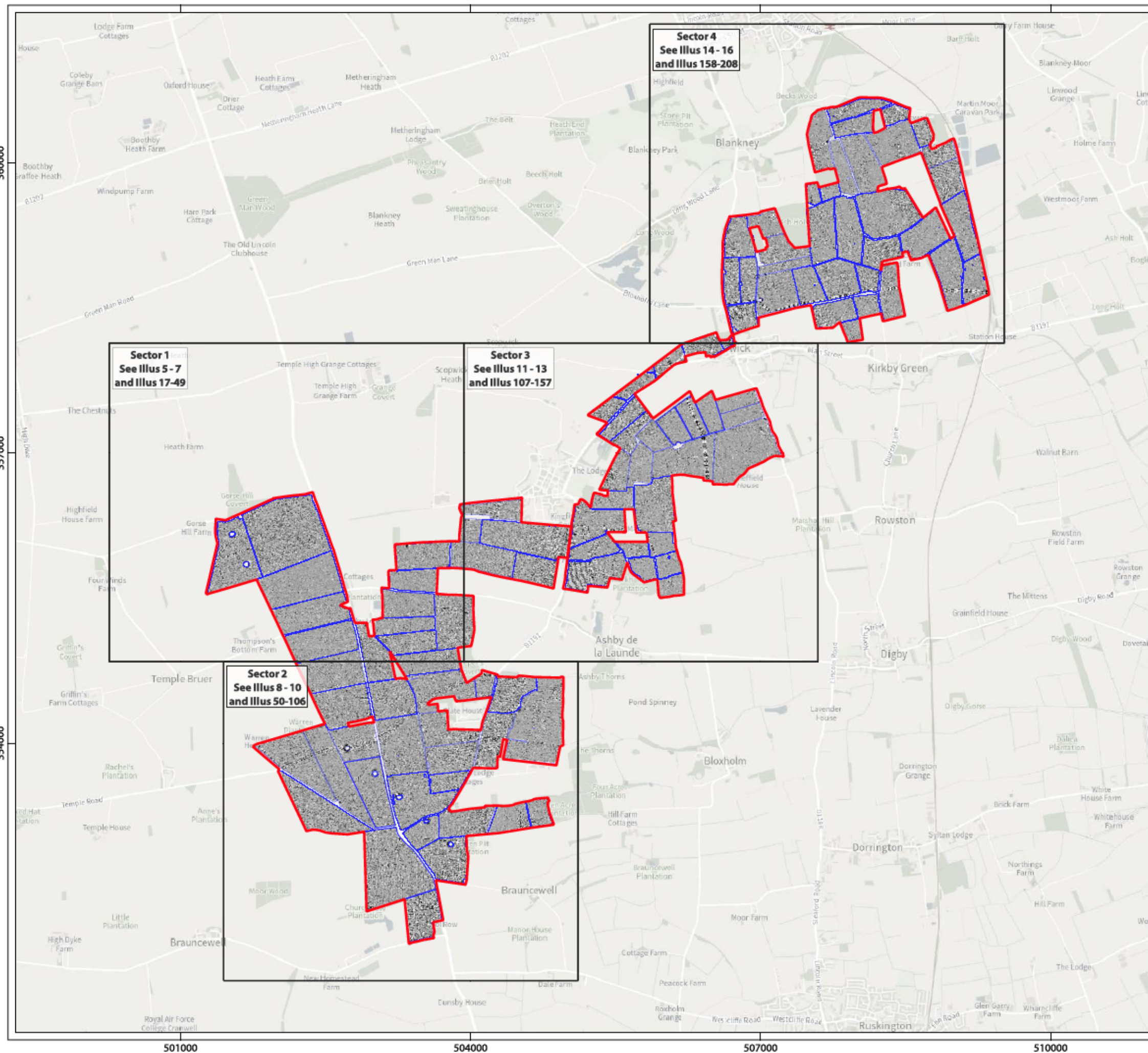
Perhaps the most enigmatic feature recorded by the survey is the extensive gridded pattern of weakly magnetically enhanced linear trend anomalies, aligned north-west/south-east that are identified in almost every field west of the B1191 constituting the western third of the GSA. An anthropogenic cause for these ditch-like anomalies, such as a relict field system, is considered most likely given the homogeneity and regularity of the responses over such a large area. If this large feature was to identify some form of systematic, pre-modern land management it would certainly be of archaeological interest but perhaps of low intrinsic value. Their relationship (if any) with the other landscape scale features recorded by the survey remains uncertain. However, it is noteworthy these anomalies are not detected in the location of broad, sinuous geological variations crossing the western part of the GSA. It is unclear whether the failure to detect these regular, weak trend anomalies outside of areas underlain by Upper Lincolnshire Limestone Member bedrock geology is a genuine characterisation of their extent or a reflection of changing magnetic properties of the underlying bedrock geologies leading to a lack of visibility.


Other broad trends discernible from the results includes the propensity of archaeological activity to be predominantly sited on the higher ground underlain by the limestone geology of the Blisworth Limestone Formation and eastern fringes of the limestone of the Upper Lincolnshire Limestone Member towards the west and centre of the GSA. The identification of some anomalies of archaeological potential away from these areas suggests a preference for these conditions and is not necessarily a bias due to a lack of magnetic contrast on the other geologies.

It is evident from the survey results and information contained within the LHER that there were significant levels of prehistoric activity within different areas of the GSA from at least the Bronze Age, likely continuing through into the Iron Age before the two Roman roads that bisect the site were constructed. The vast majority of the archaeological anomalies identified by the survey appear prehistoric in character and generally fit the narrative of later medieval settlement being more focused towards the modern-day villages of Ashby de Launde, Brauncwell, Scopwick, Thorpe Tilney and Temple Bruer located outside the GSA. It is important to highlight the anomalies at the southern end of GSA lie within an archaeological prehistoric landscape with excavations at Brauncwell Quarry some of the largest and most concentrated investigations of prehistoric multiple boundaries in Lincolnshire and the East Midlands as a whole. The results of the survey which have accurately mapped the extent and layout of these enigmatic landscape features across large areas will further contribute to the understanding of these features and the archaeological record of the region.


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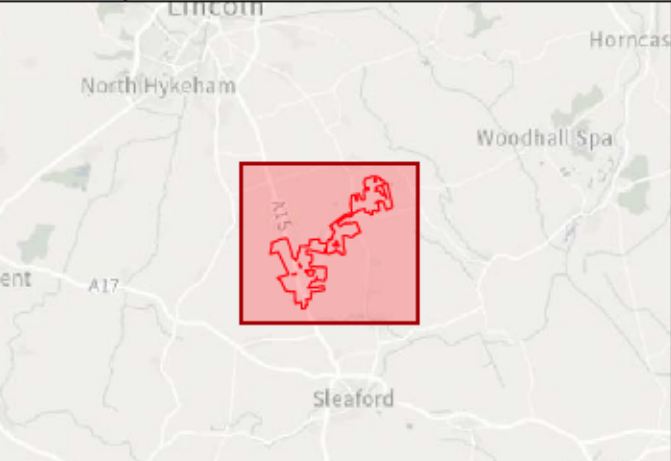


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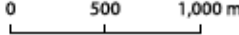


Key

- Geophysical Survey Area
- Survey Extent
- Areas for Illus 5 - 16 - Scale 12500



+2nT
-1nT



0 500 1,000 m

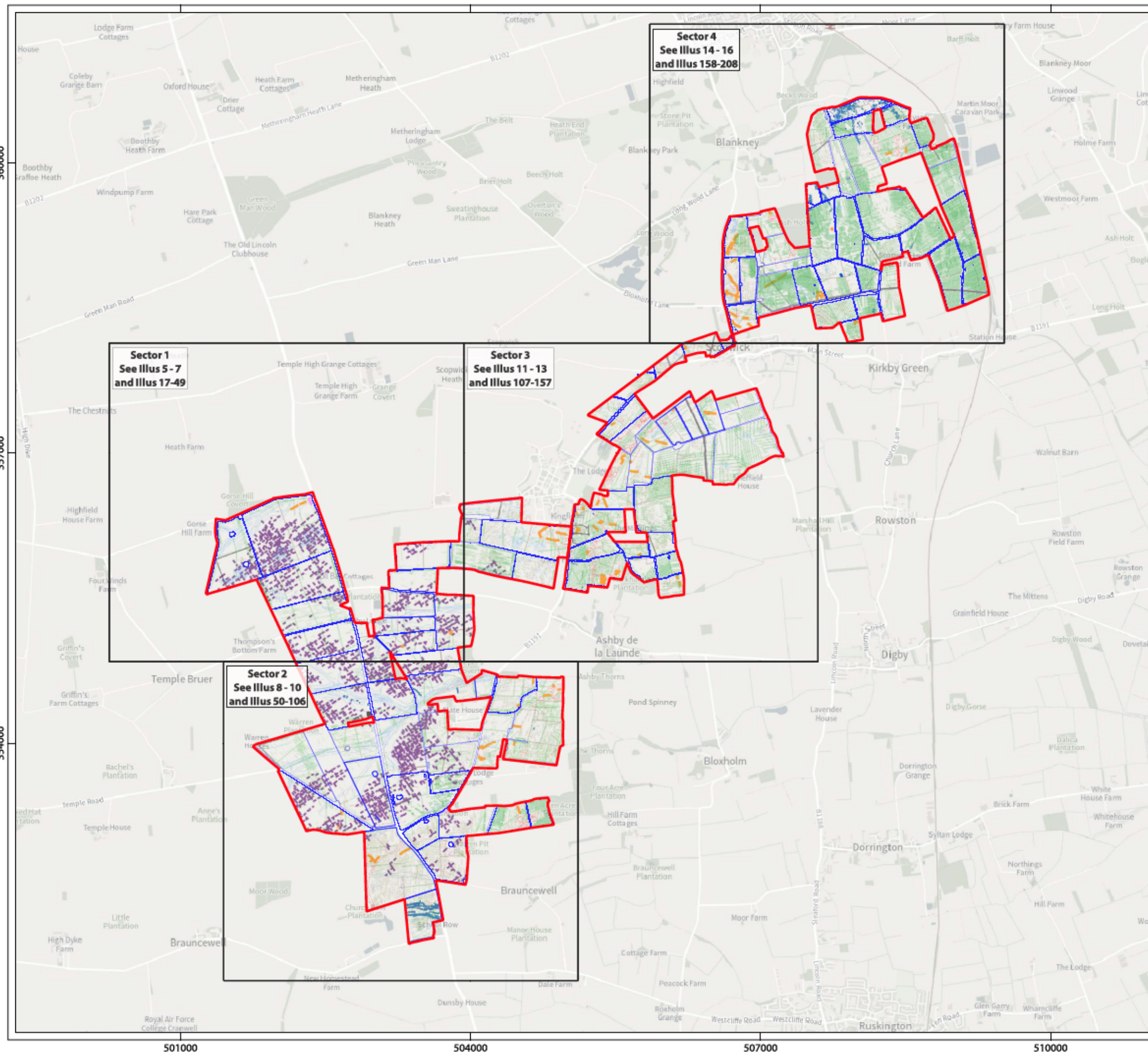
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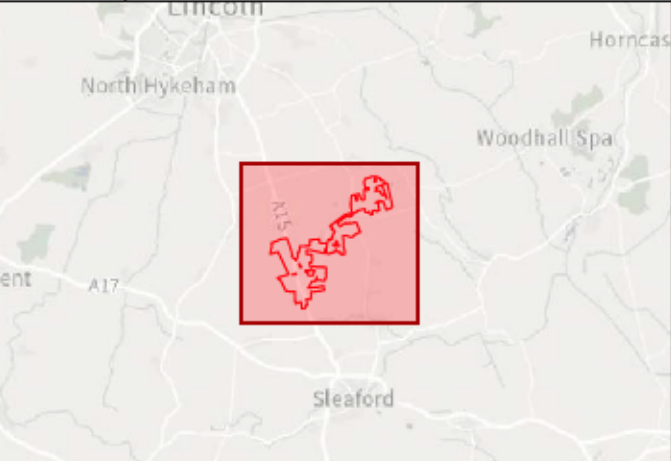
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Checked by:	JM
Version:	v1.2
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Illus 02 - Overall greyscale plot of processed magnetometer data





























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Key

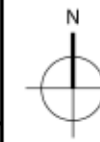
 Geophysical Survey Area	 Archaeology
 Survey Extent	 Magnetic Disturbance
 Areas for Illus 5 - 16 - Scale 12500	 Possible Archaeology
Interpretation	
 Agriculture	 Quarry
 Field Boundary	 Uncertain
 Possible Field Boundary	 Former Building
 Field Drain	 Former Pond
 Natural	 Geology
 Pipe	 Burning
 Uncertain	 Null Value
 Ridge and Furrow	
 LIRM	
 Field System	
 Possible Archaeology	
 Quarry	

0 500 1,000 m

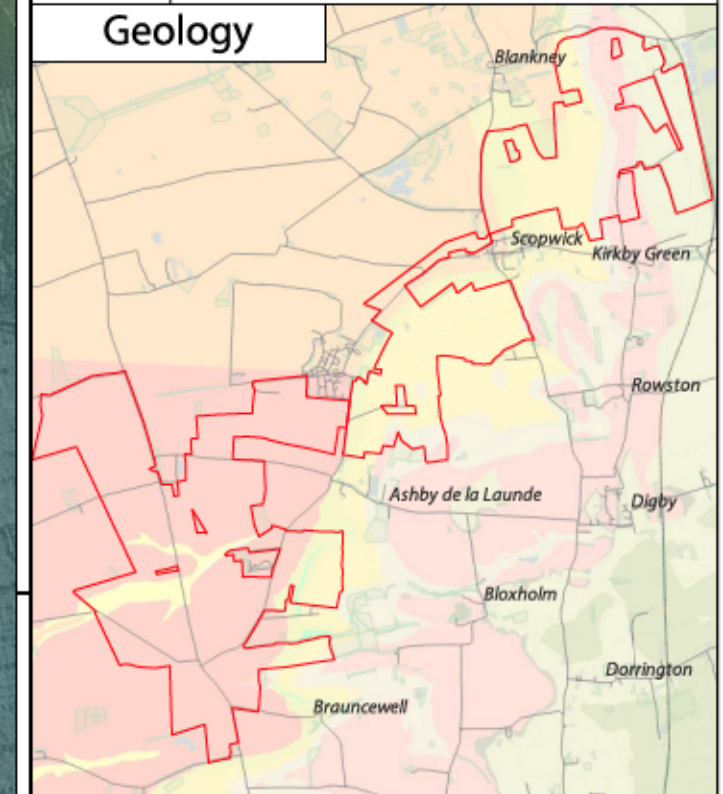
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LiDAR



Geology

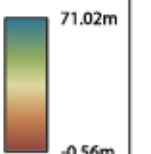


Key

 Geophysical Survey Area

Key for BGS Geology Map

- Upper Lincolnshire Limestone Member - Limestone
- Lincolnshire Limestone Formation - Limestone
- Blisworth Limestone Formation - Limestone
- Rutland Formation - Limestone
- Blisworth Clay Formation - Mudstone
- Cornbrash Formation - Limestone
- Peterborough Member - Mudstone
- Kellaways Sand Member - Sandstone and siltstone, interbedded
- Kellaways Clay Member - Mudstone



0 500 1,000 m

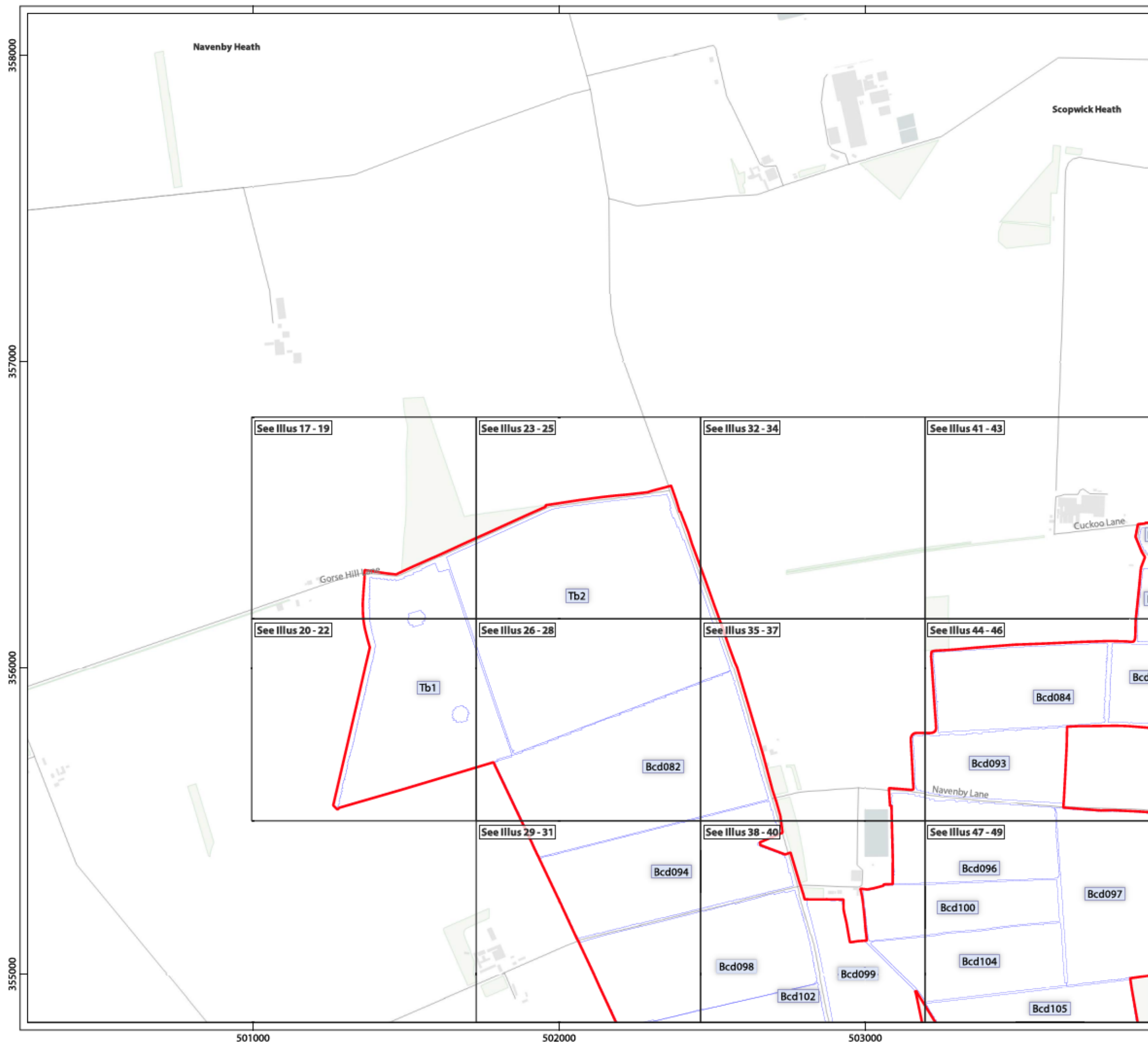
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Illus 04 - Site location superimposed on LiDAR and bedrock geology data



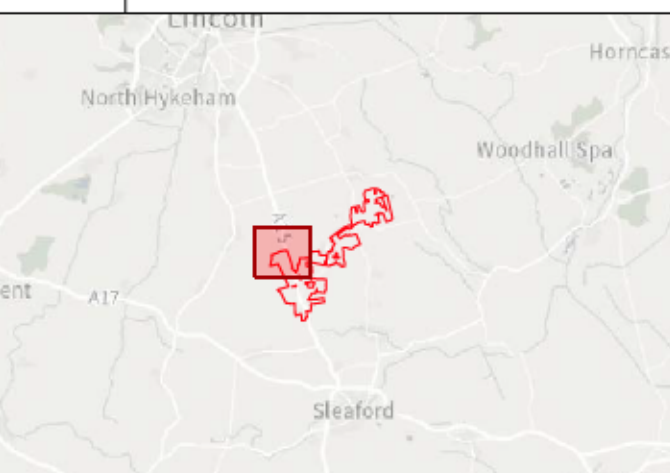


N



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Key

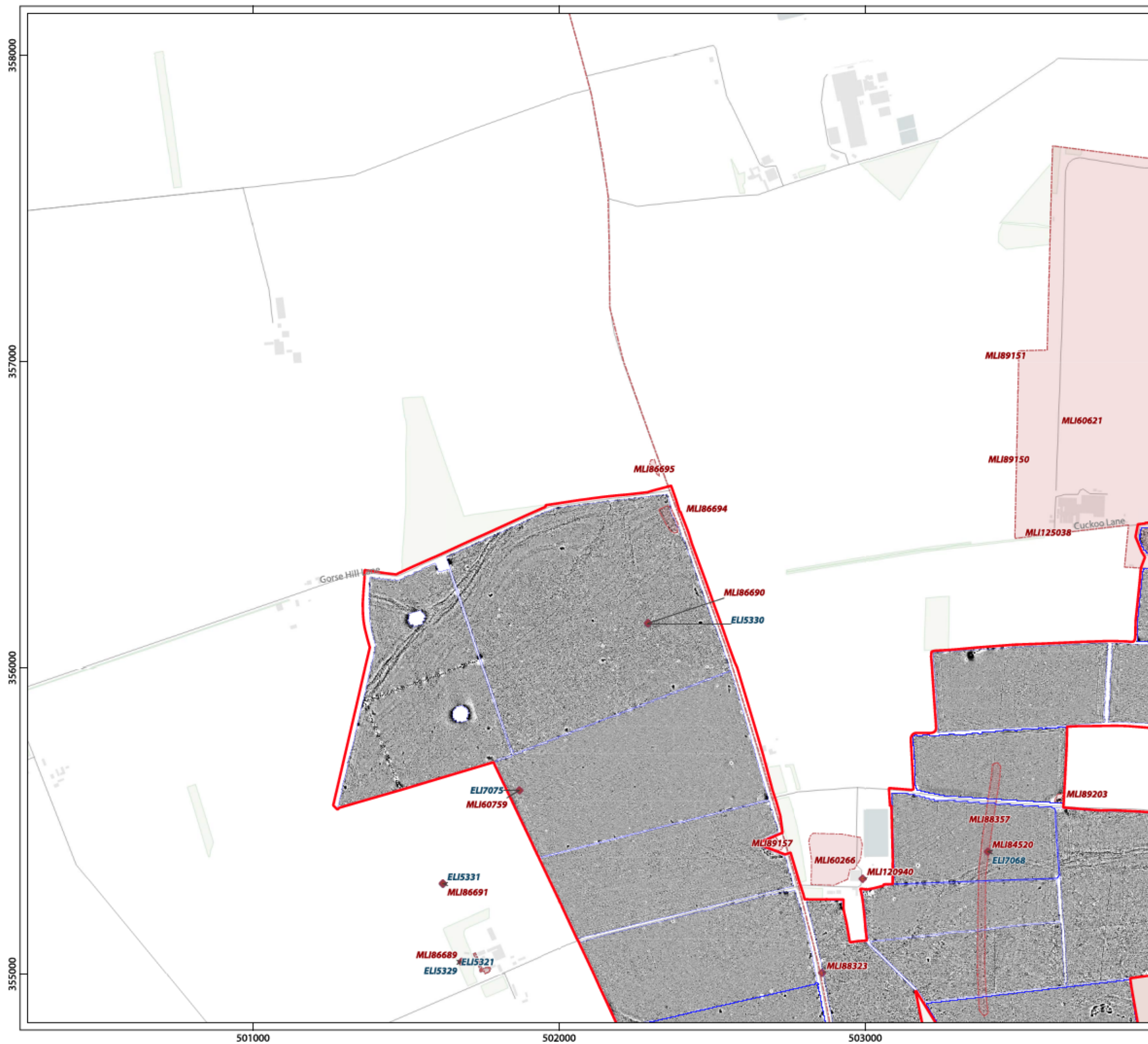
- Geophysical Survey Area
- Survey Extent
- Area 12500
- Areas for Illus 17 - 208 - Scale 2500


0 100 200 m


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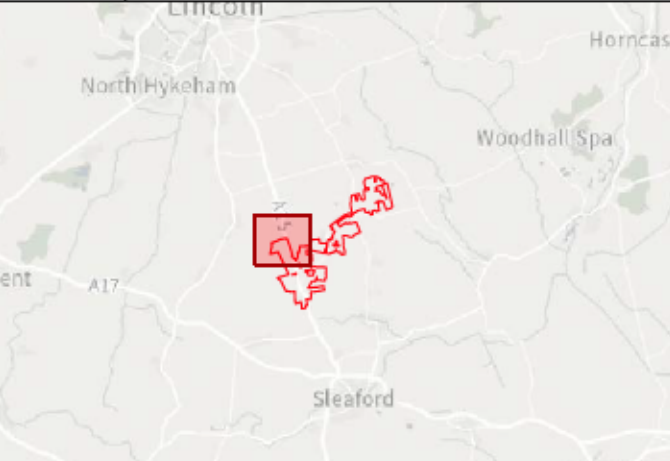
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Version:	v1.2
Date:	05/07/2023
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Illus - 05 Location map of processed greyscale, XY trace and interpretation illustrations; Sector 1






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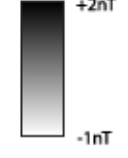


Key

- Geophysical Survey Area
- Survey Extent

HER

- ◆ Acre Lane Monuments Point
- ◆ Acre Lane Events Point
- Acre Lane Monuments Line
- Acre Lane Monuments Polygon
- Acre Lane Events Polygon



0 100 200 m

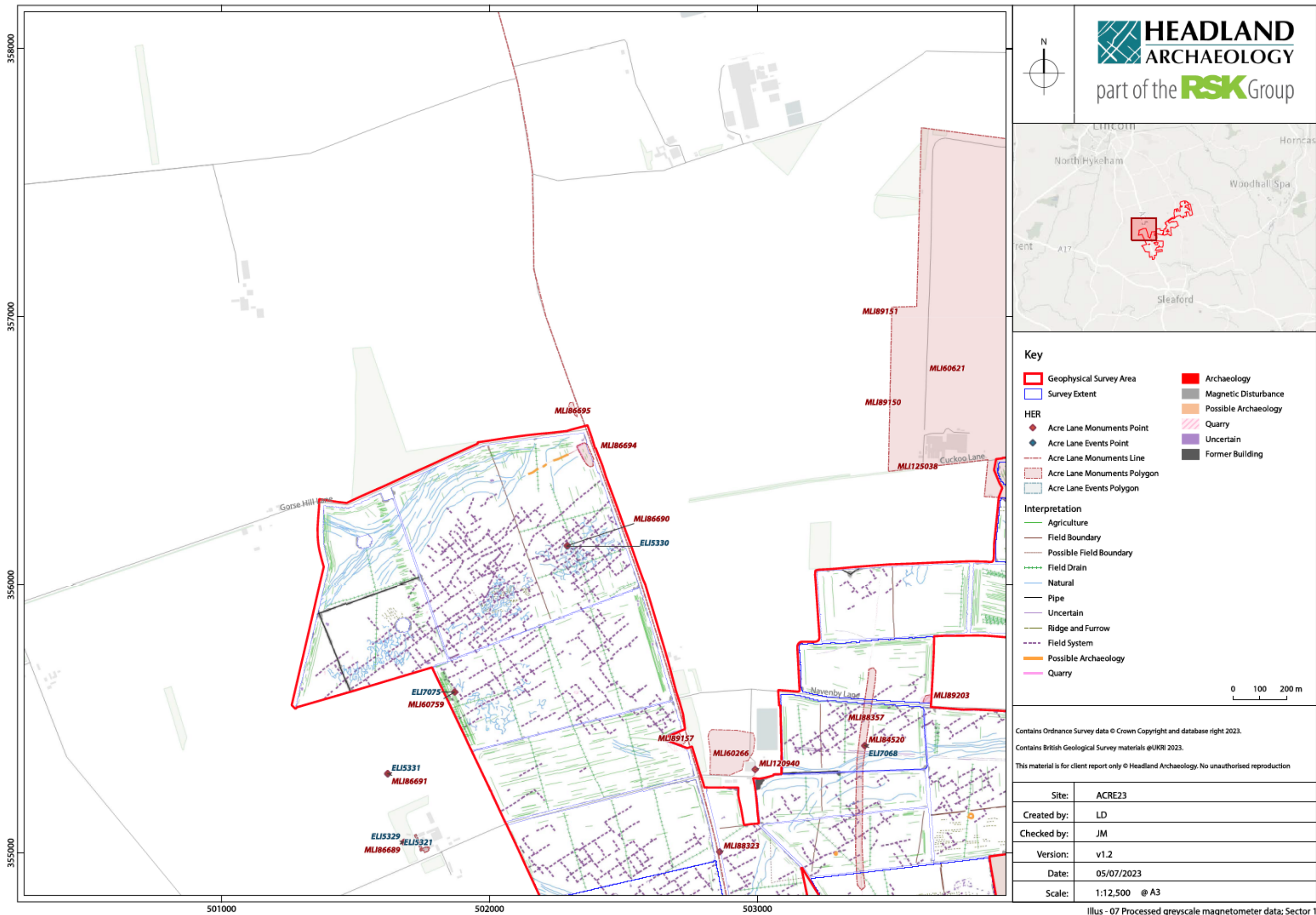
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Illus - 06 Greyscale plot of processed magnetometer data; Sector 1

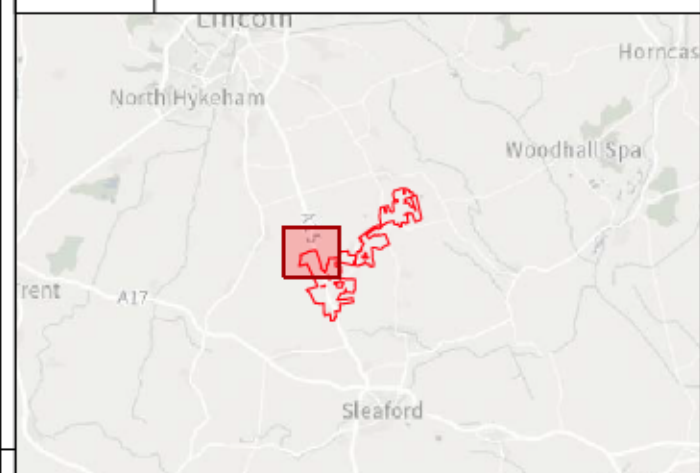







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Key

 Geophysical Survey Area

 Survey Extent

 Acre Lane Monuments Point

 Acre Lane Events Point

 Acre Lane Monuments Line

 Acre Lane Monuments Polygon

 Acre Lane Events Polygon

 Agriculture

 Field Boundary


 Possible Field Boundary

 Field Drain

 Natural

 Pipe

 Uncertain

 Ridge and Furrow

 Field System

 Possible Archaeology

 Quarry

 Archaeology

 Magnetic Disturbance

 Possible Archaeology

 Quarry

 Uncertain

 Former Building

Interpretation

 Agriculture

 Field Boundary

 Possible Field Boundary

 Field Drain

 Natural

 Pipe

 Uncertain

 Ridge and Furrow

 Field System

 Possible Archaeology

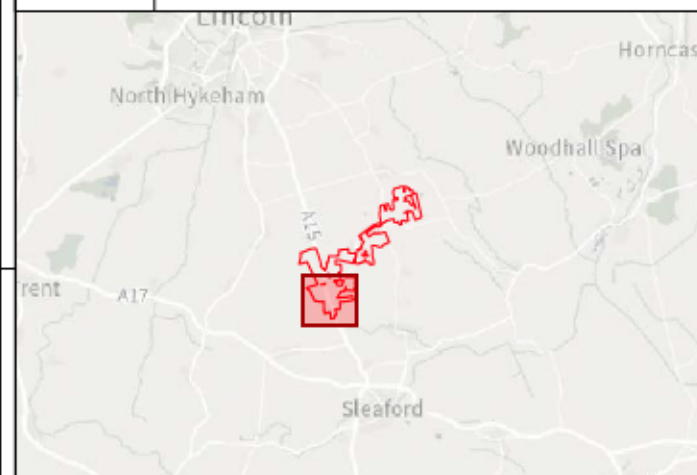
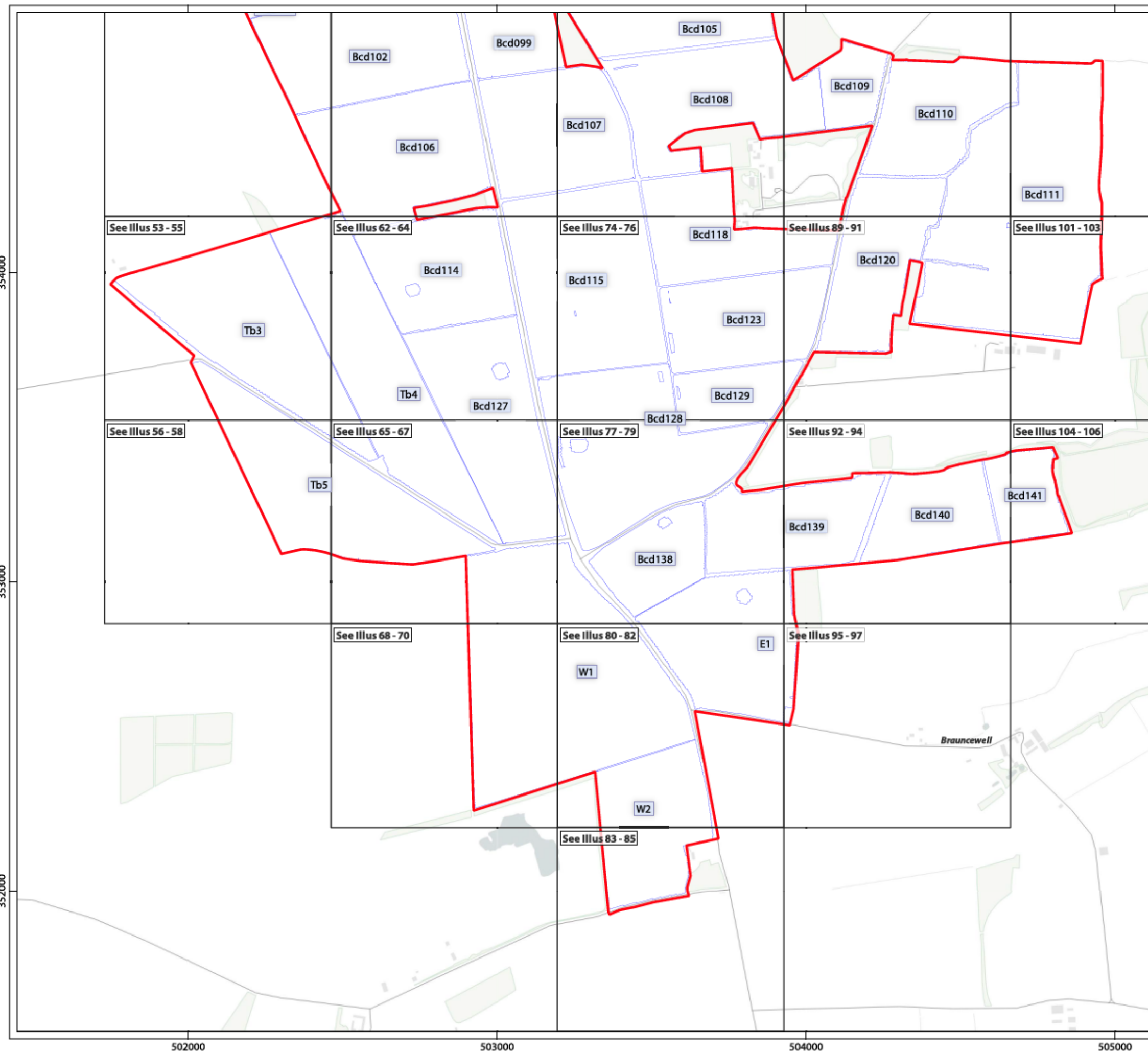
 Quarry

0100200

m

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Key

- Geophysical Survey Area
- Survey Extent
- Area 1:2500
- Areas for Illus 17 - 208 - Scale 2500

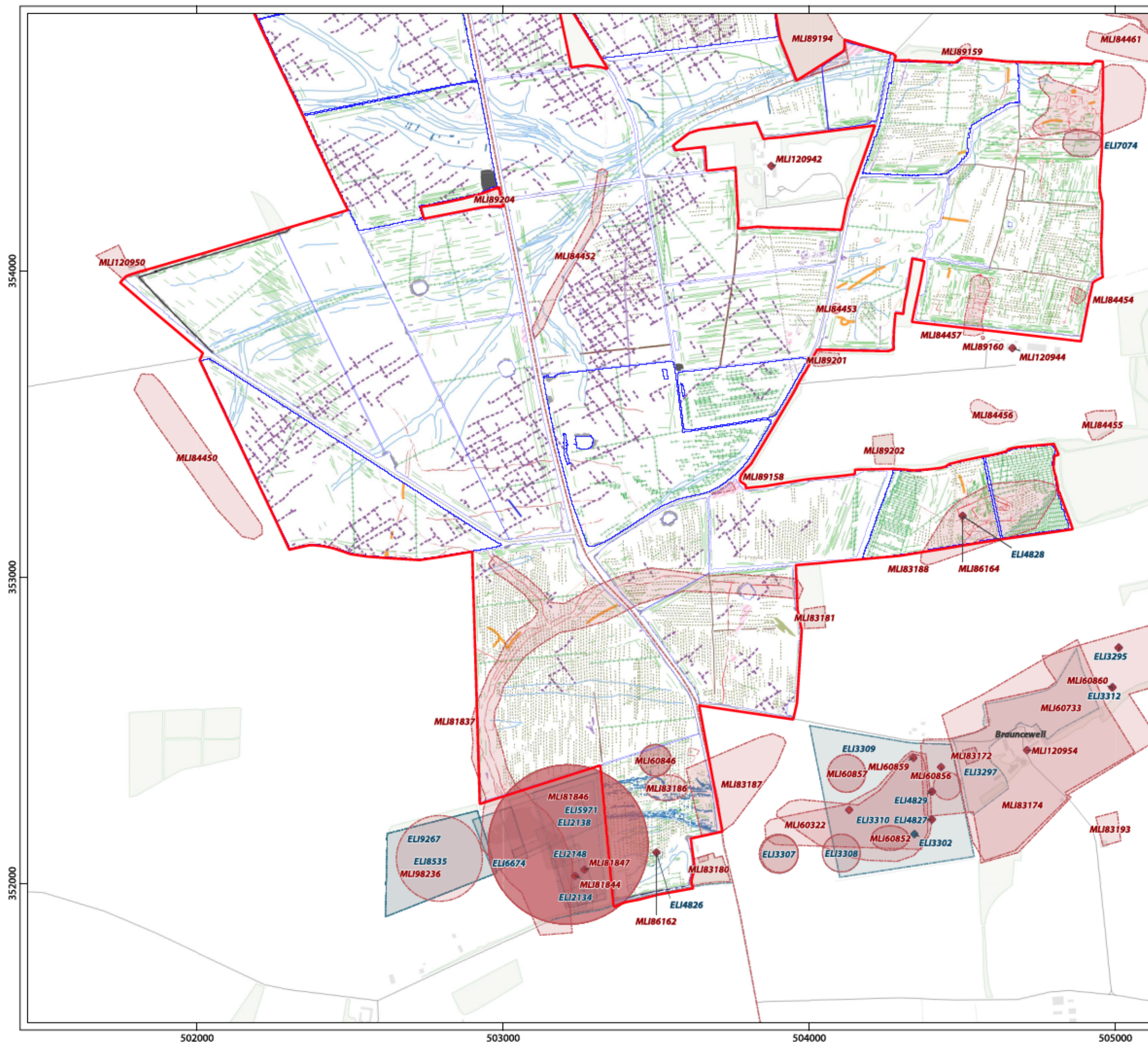
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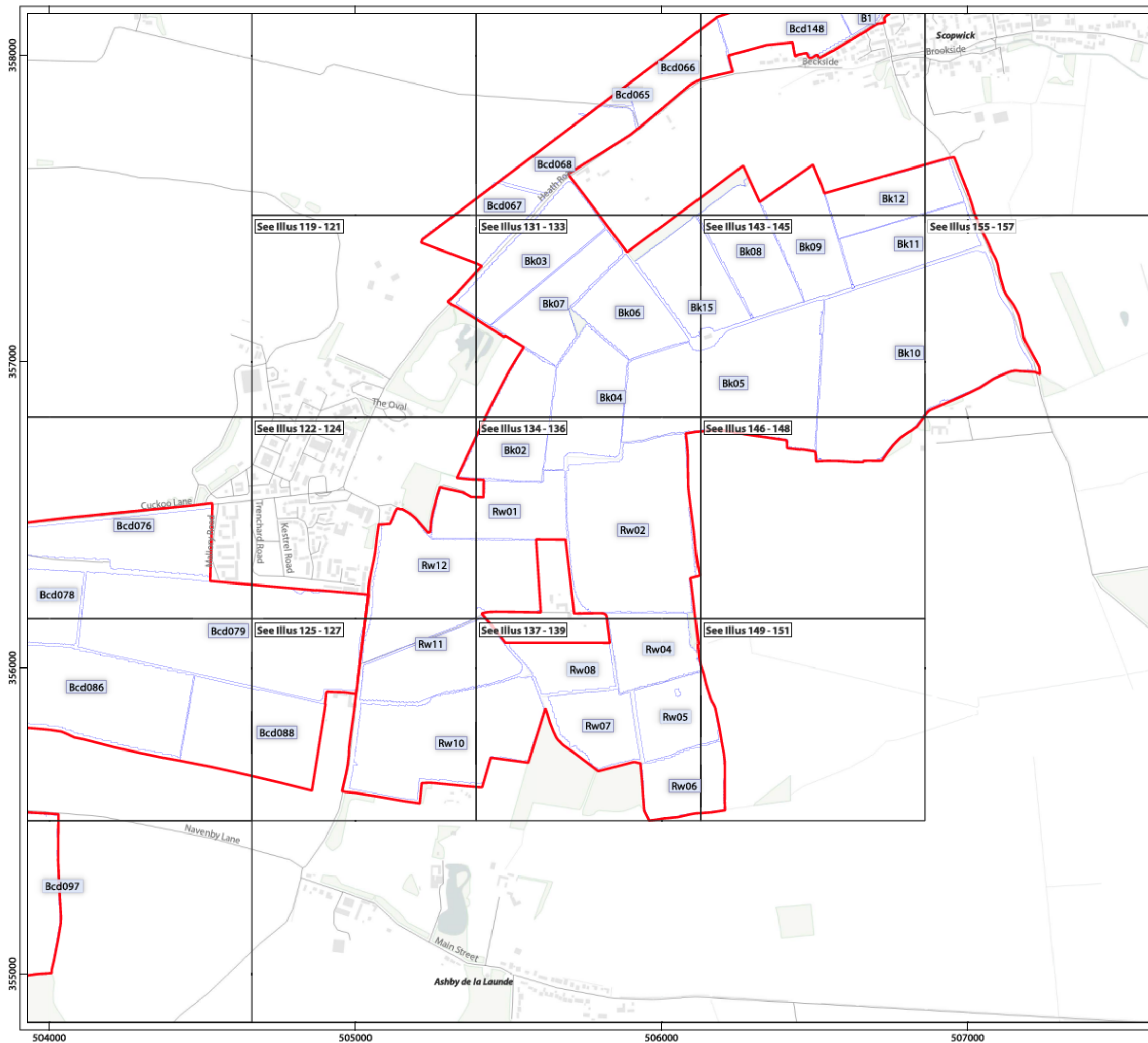
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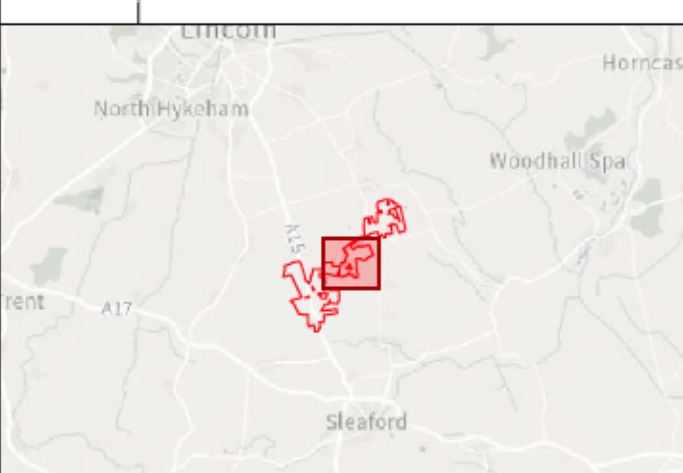








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Key

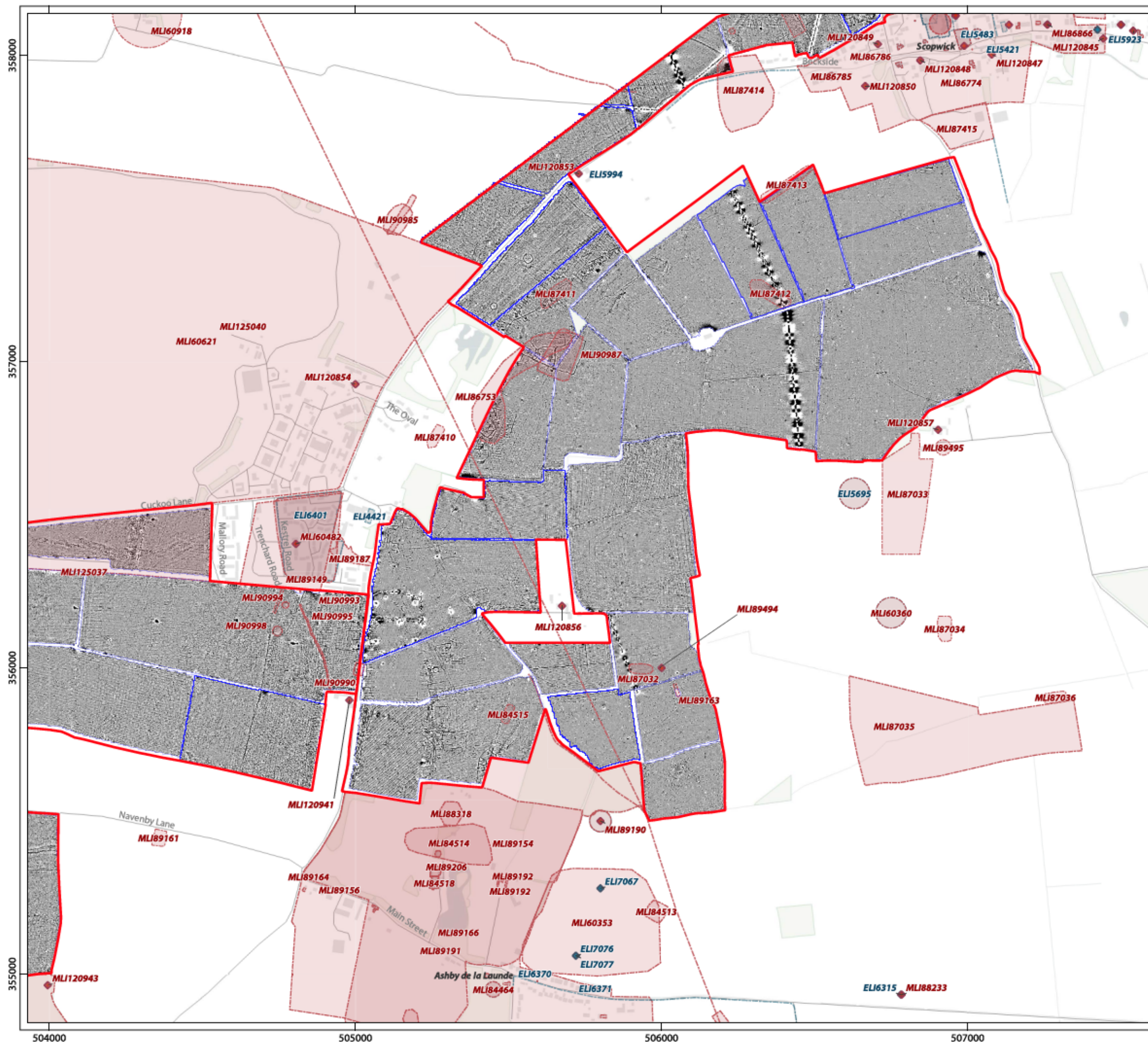
- Geophysical Survey Area
- Survey Extent
- Area 12500
- Areas for Illus 17 - 208 - Scale 2500


0 100 200 m


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Illus - 11 Location map of processed greyscale, XY trace and interpretation illustrations; Sector 3

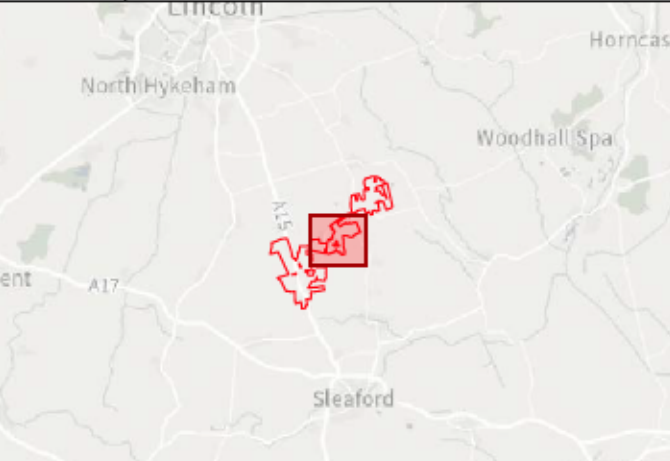






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Key

- Geophysical Survey Area
- Survey Extent

HER

- ◆ Acre Lane Monuments Point
- ◆ Acre Lane Events Point
- Acre Lane Monuments Line
- Acre Lane Events Line
- Acre Lane Monuments Polygon
- Acre Lane Events Polygon



0 100 200 m

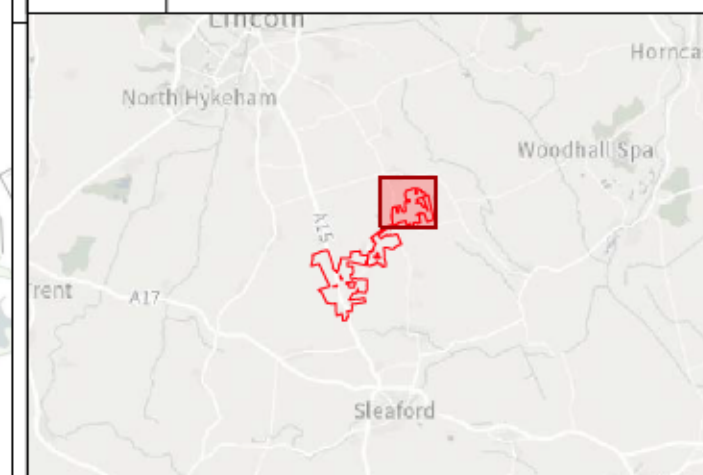
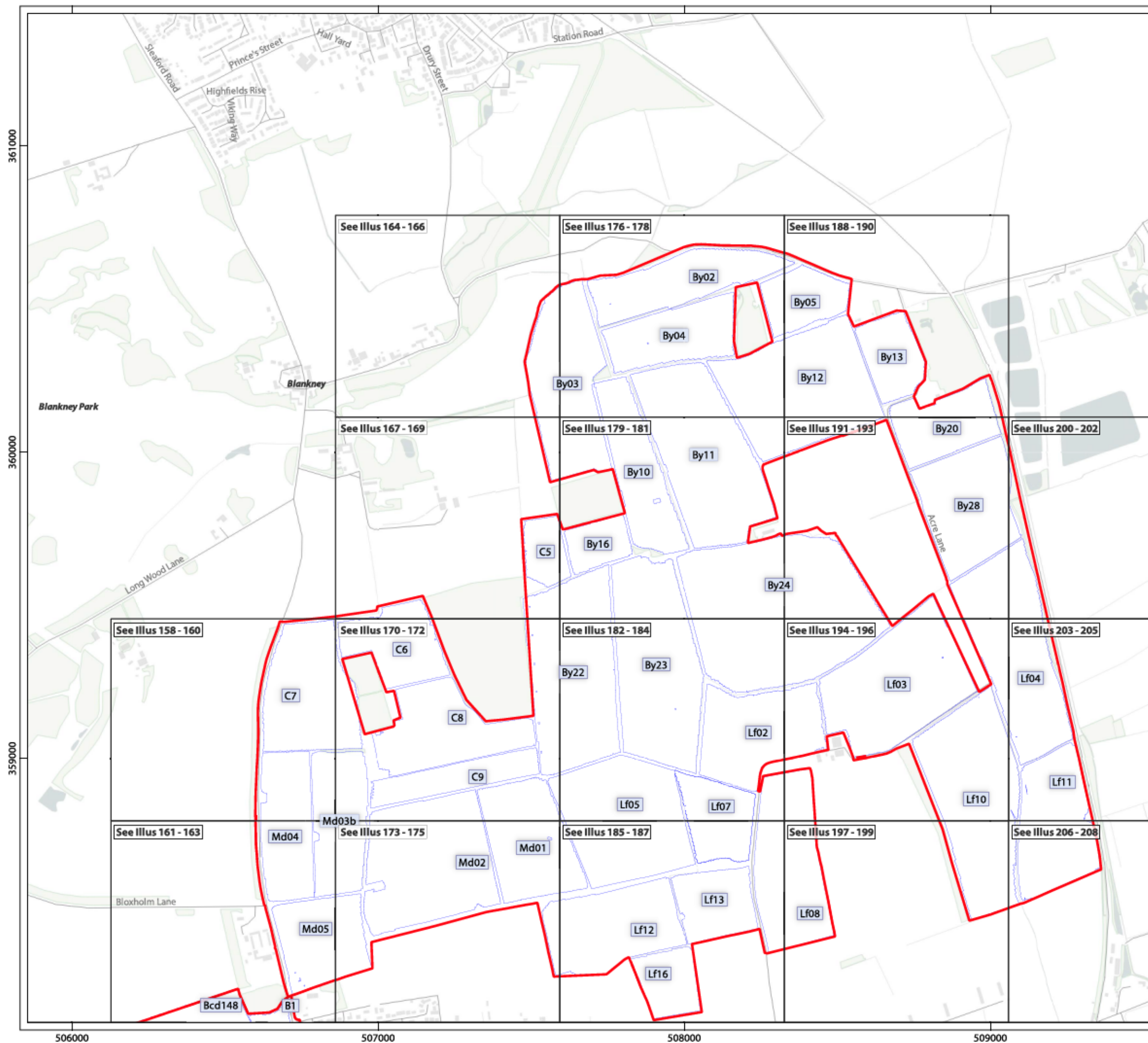
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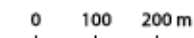
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Checked by:	JM
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Illus - 12 Greyscale plot of processed magnetometer data; Sector 3



Key

-  Geophysical Survey Area
 Survey Extent
 Area12500
 Areas for Illus 17 - 208 - Scale 2500

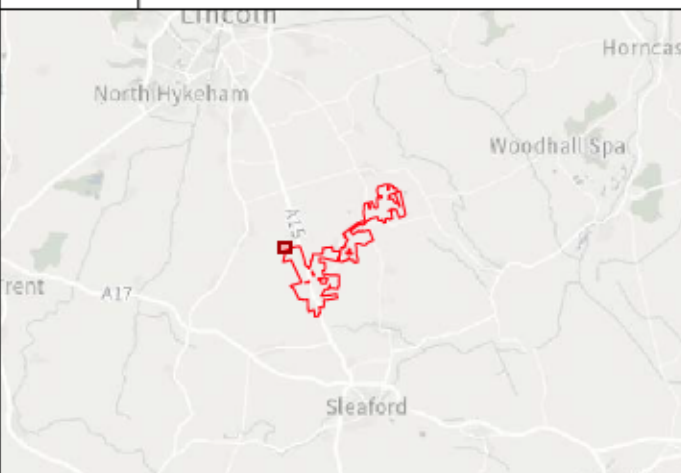


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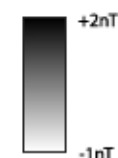
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Key

- Geophysical Survey Area
- Survey Extent



0 50 100 m

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Illus - 17 XY trace plot of minimally processed magnetometer data; Sector 1

356700

356400

501000

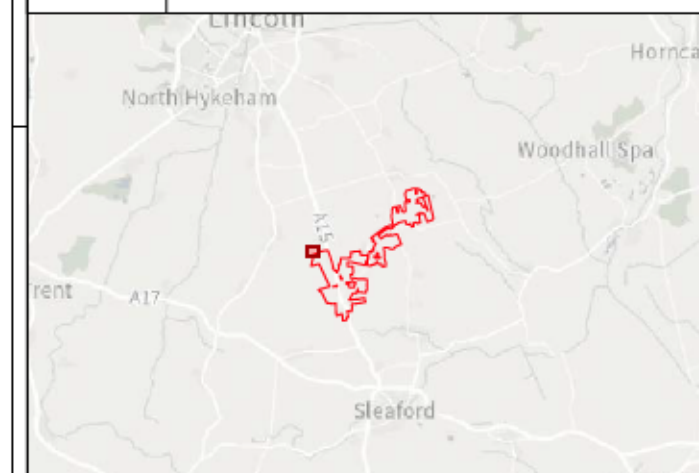
501300

501600

Gorse Hill Lane

Tb1

Tb2



Key

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

0 50 100 m

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Illus - 18 XY trace plot of minimally processed magnetometer data; Sector 1

356700

356400

501000

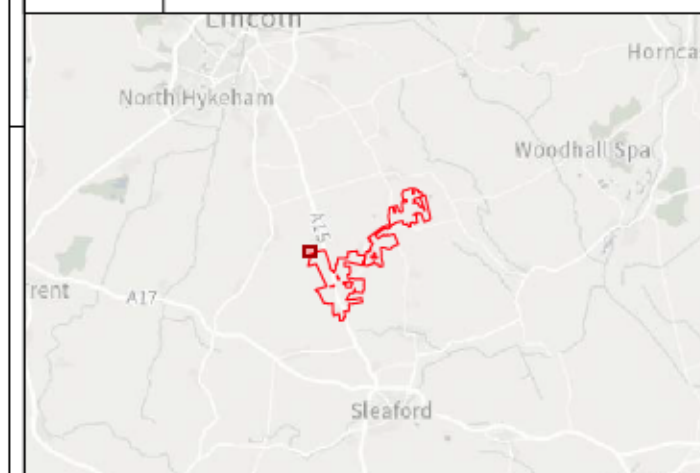
501300

501600

Gorse Hill Lane

Tb1

Tb2



Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- Natural
- Magnetic Disturbance
- Uncertain

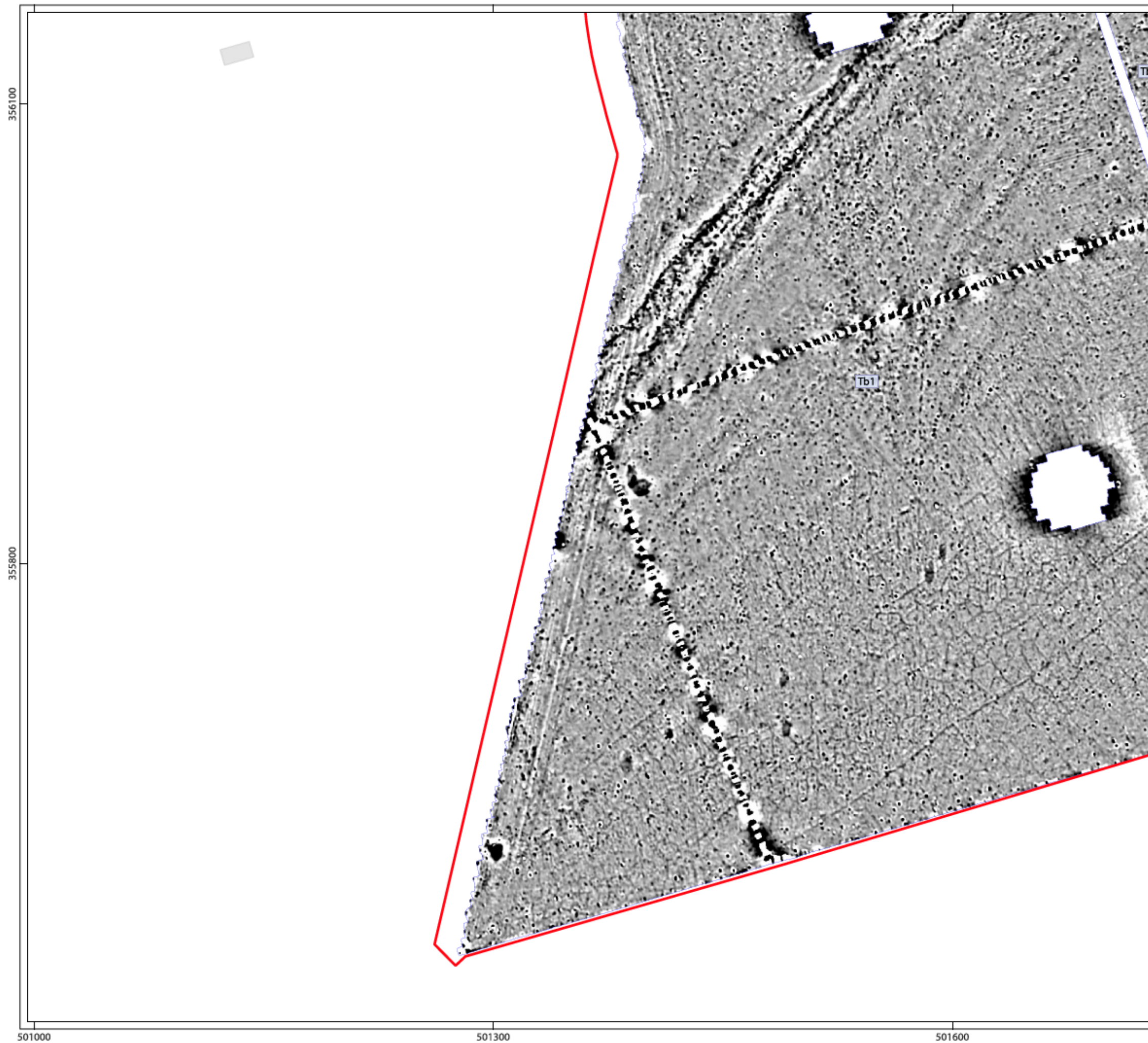
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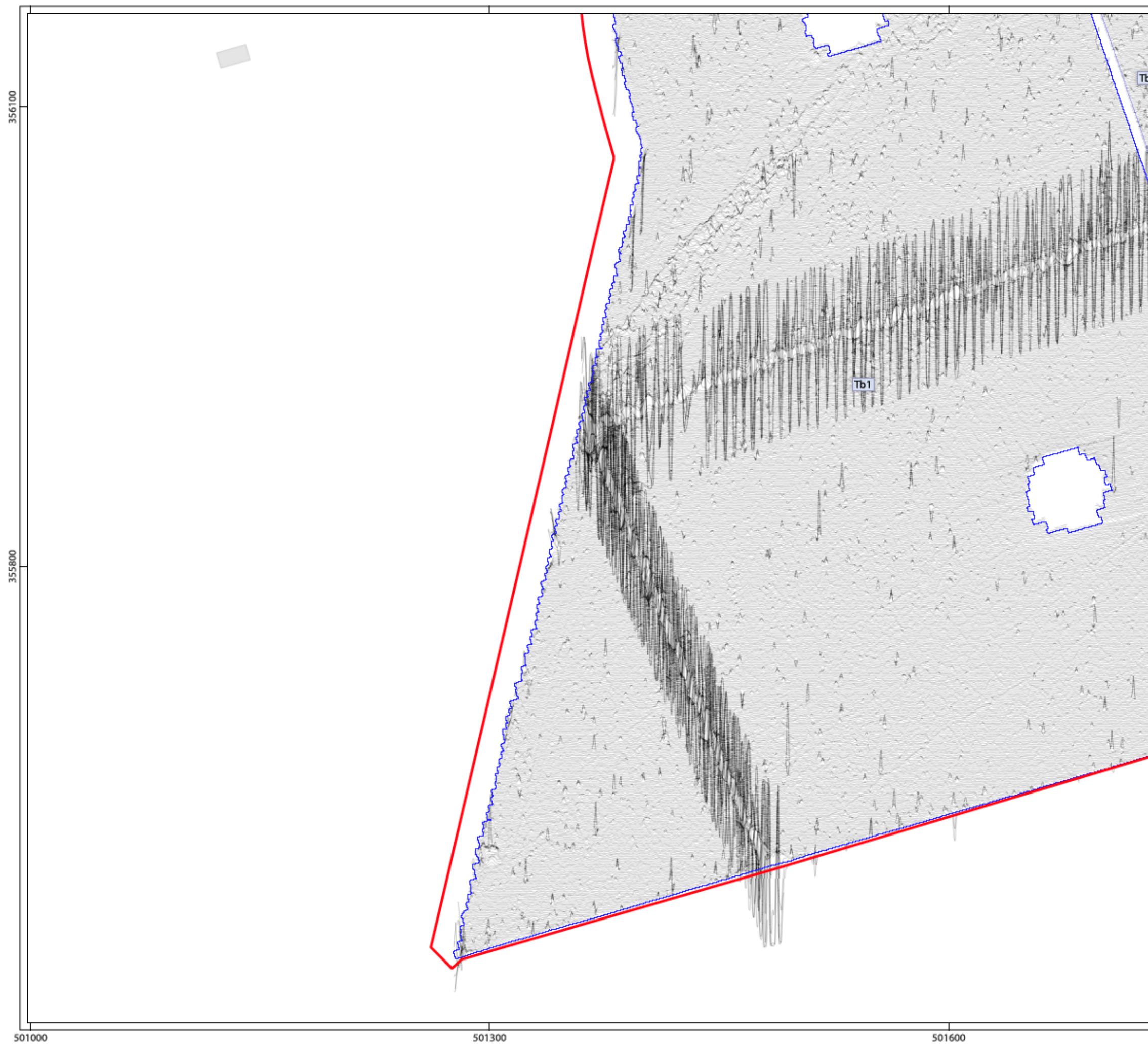
Key

- Geophysical Survey Area
- Survey Extent

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Illus - 20 XY trace plot of minimally processed magnetometer data; Sector 1



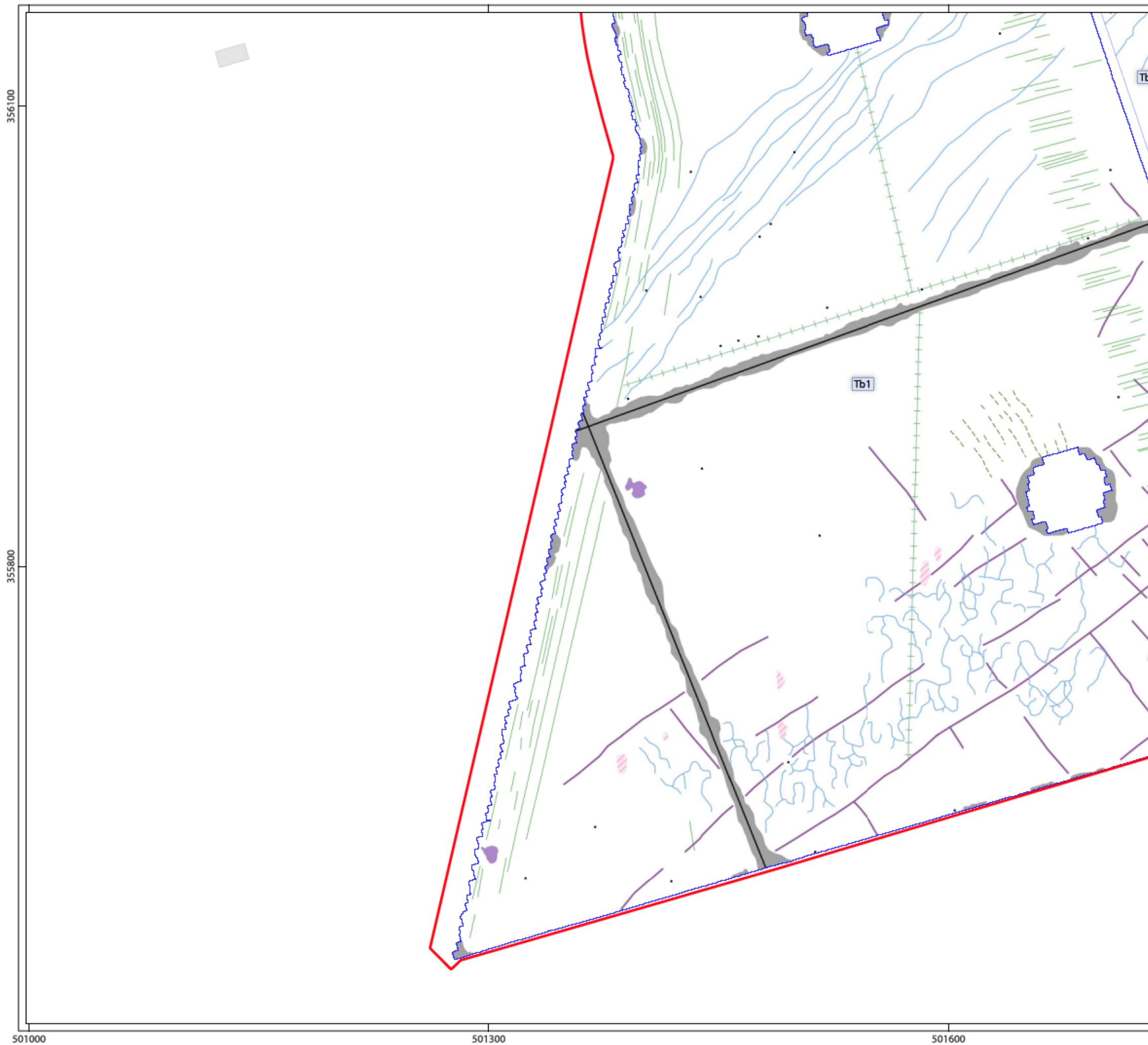
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Key

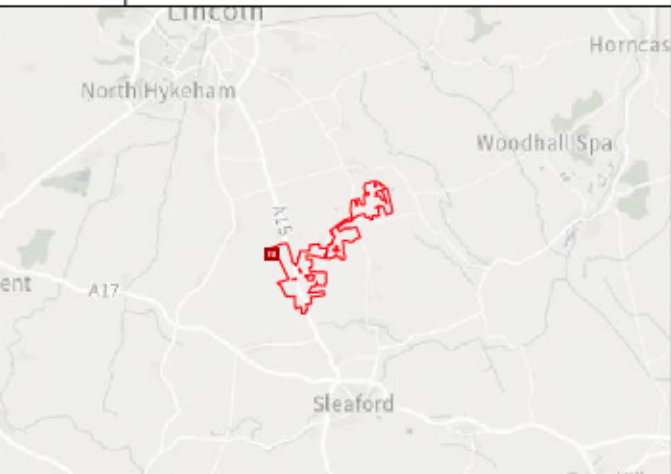
- Geophysical Survey Area
- Survey Extent
- XY Trace (25nT/cm)

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Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- Field Drain
- Natural
- Pipe
- Ridge and Furrow
- Field System
- Magnetic Disturbance
- Quarry
- Uncertain

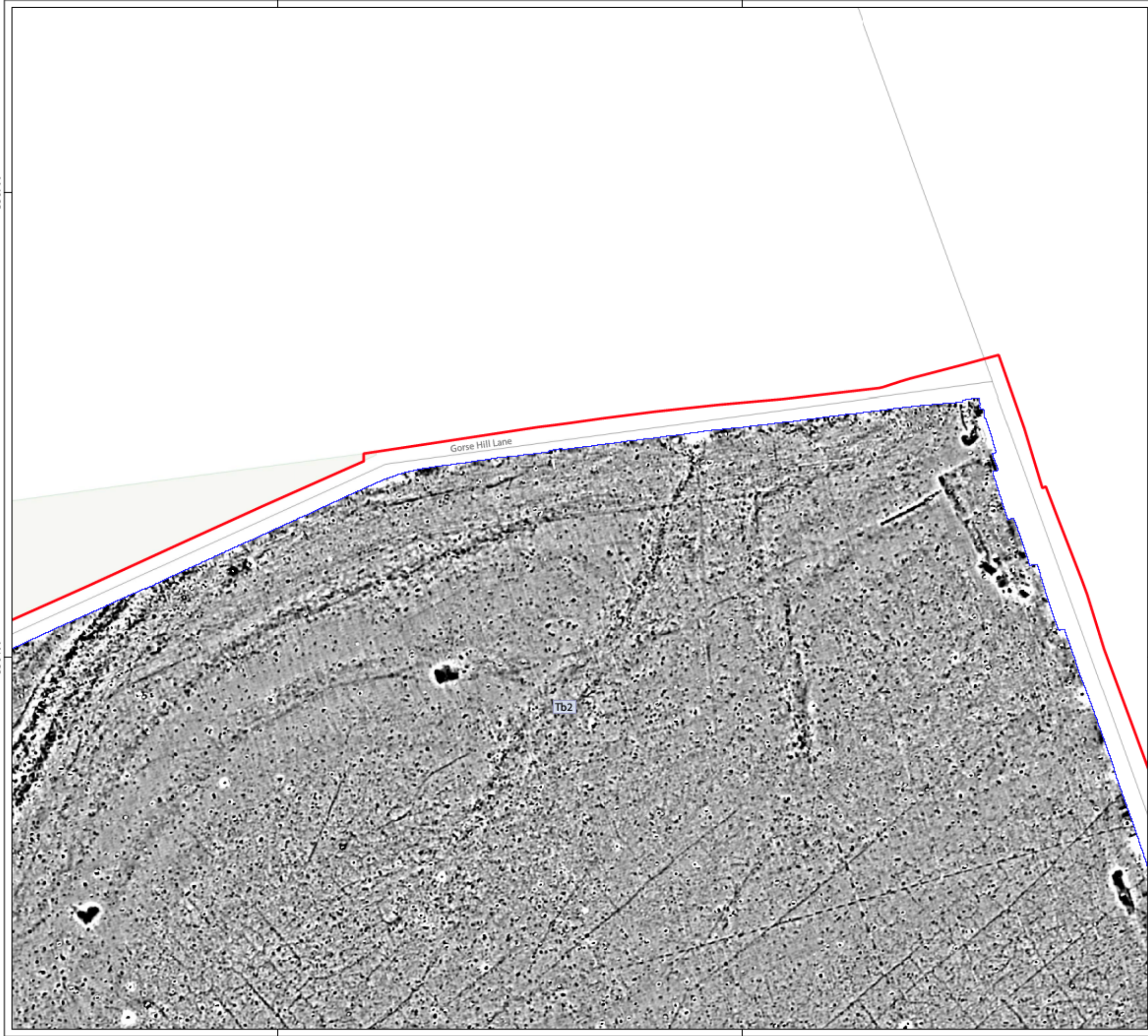
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356700

356400

501900

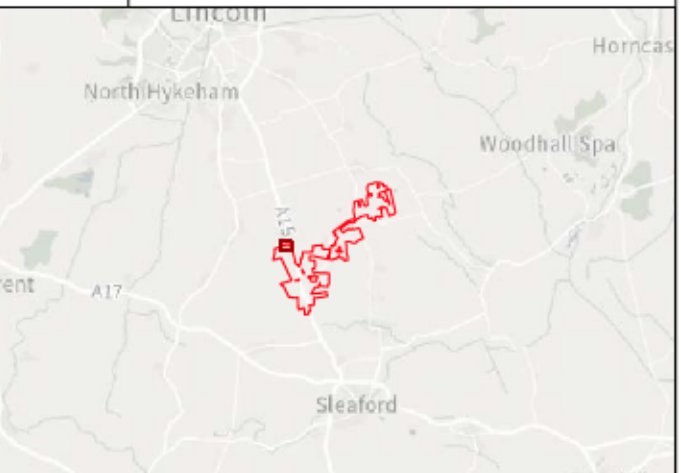
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Key

-  Geophysical Survey Area
-  Survey Extent

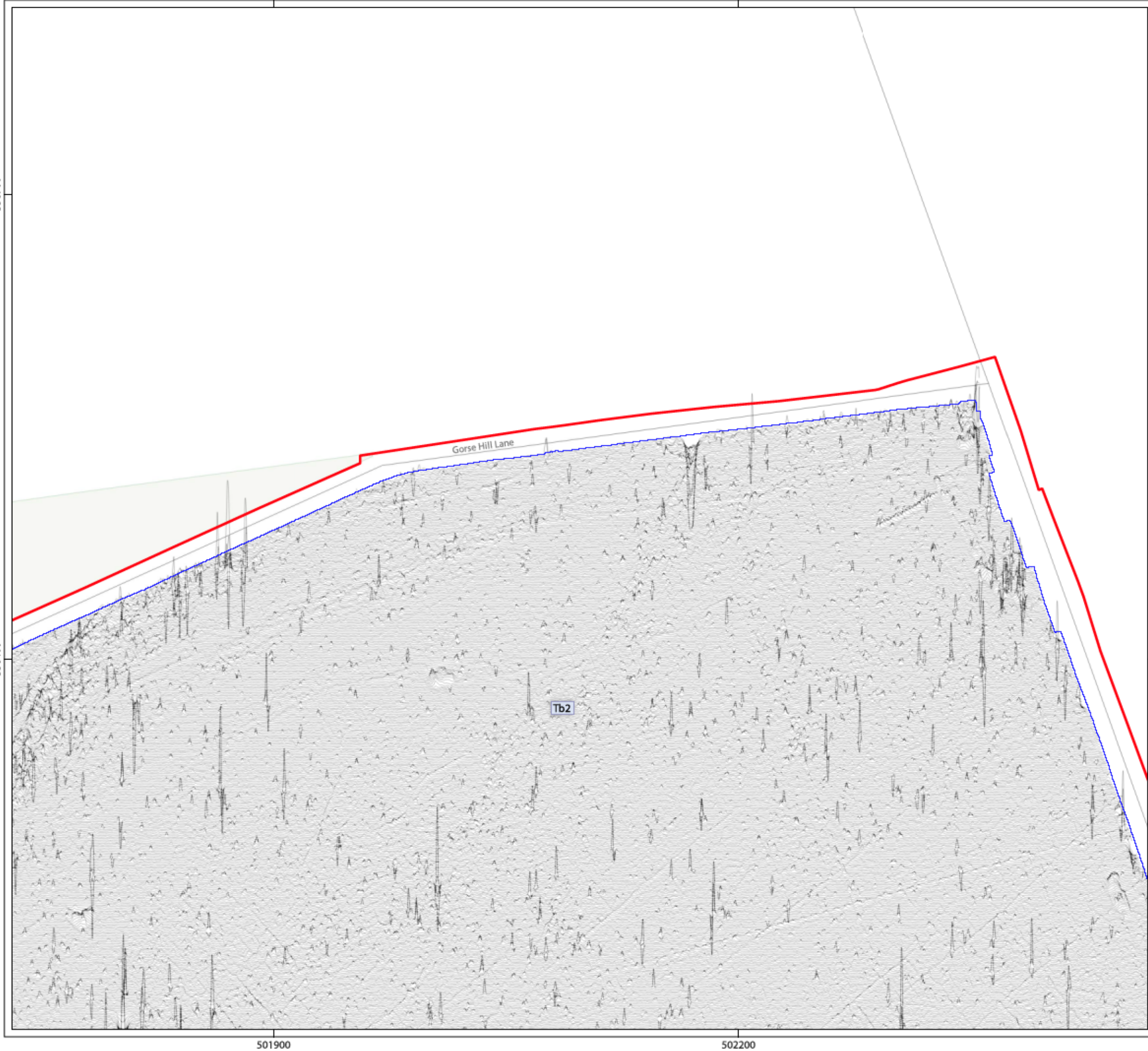


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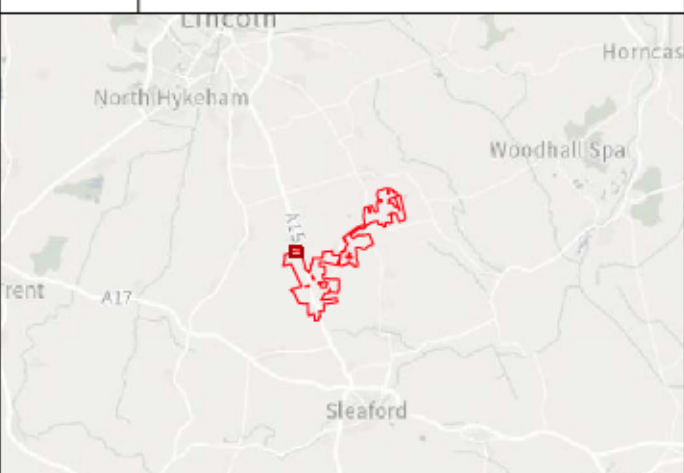
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Illus - 23 XY trace plot of minimally processed magnetometer data; Sector 1






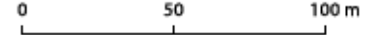


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Key

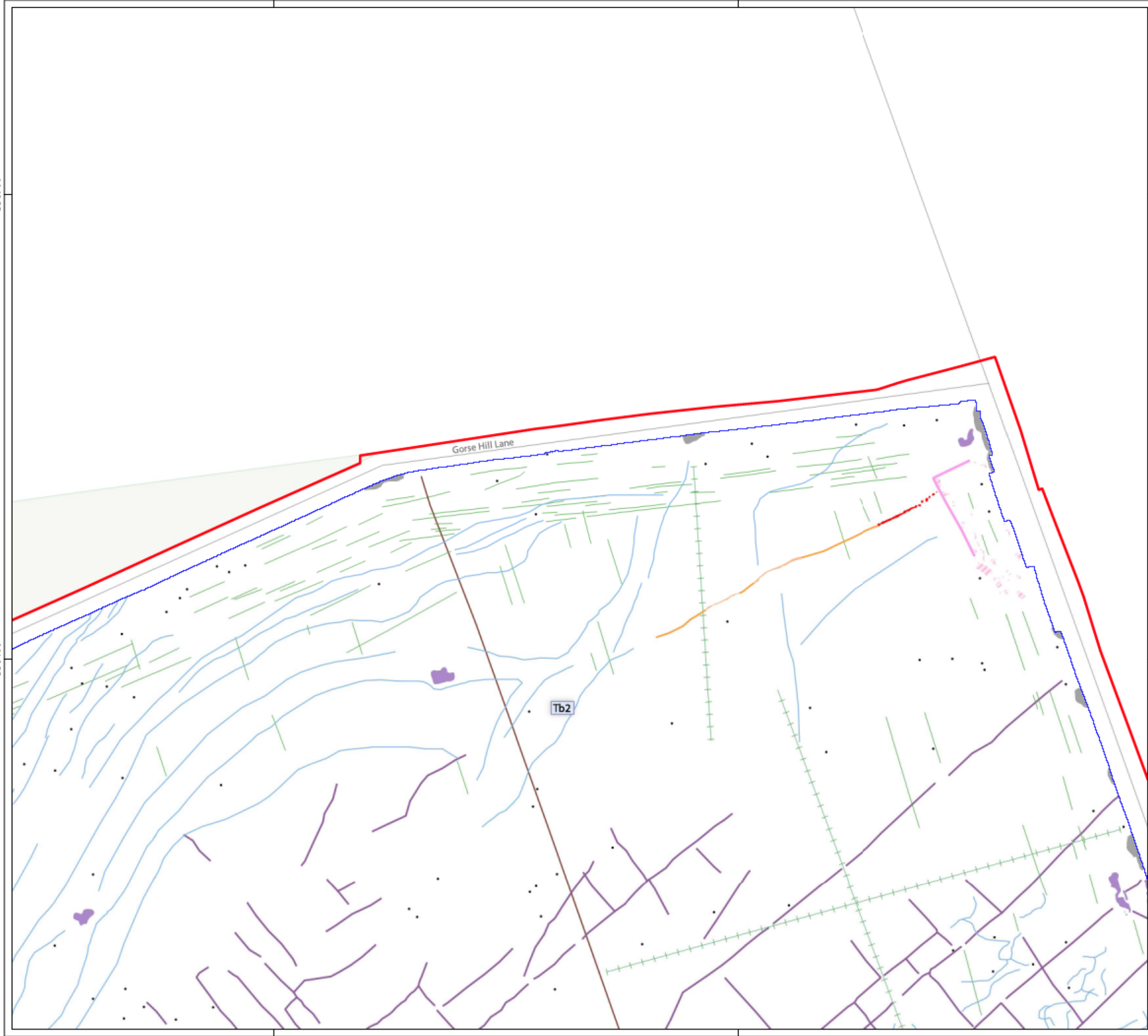
-  Geophysical Survey Area
-  Survey Extent
-  XY Trace (25nT/cm)



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Illus - 24 XY trace plot of minimally processed magnetometer data; Sector 1

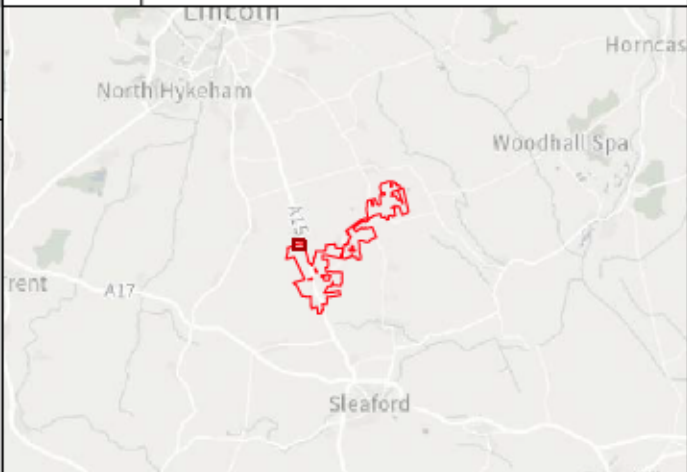
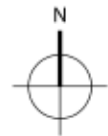


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356400

501900

502200



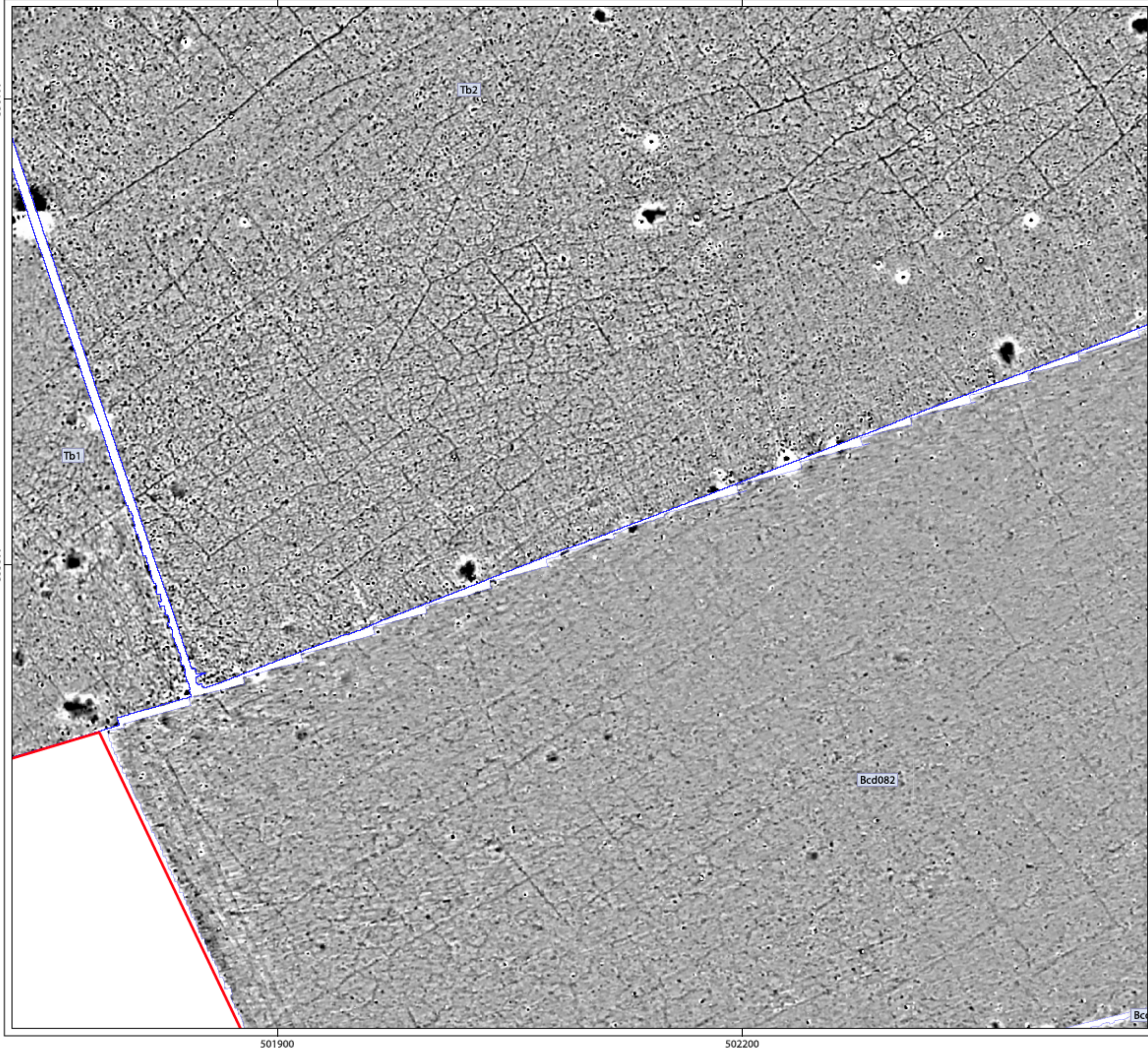
Key

- Geophysical Survey Area
- Survey Extent
- Interpretation**
- Ferrous Objects
- Agriculture
- Field Boundary
- +— Field Drain
- Natural
- Field System
- Possible Archaeology
- Quarry
- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- Quarry
- Uncertain

0 50 100 m

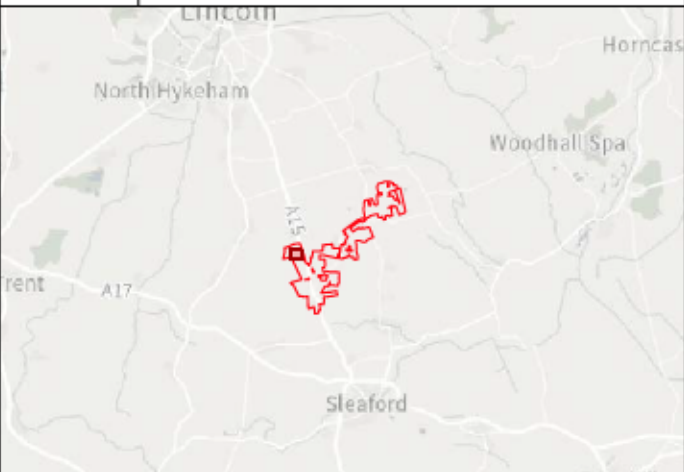
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Key

-  Geophysical Survey Area
-  Survey Extent



+2nT
-1nT

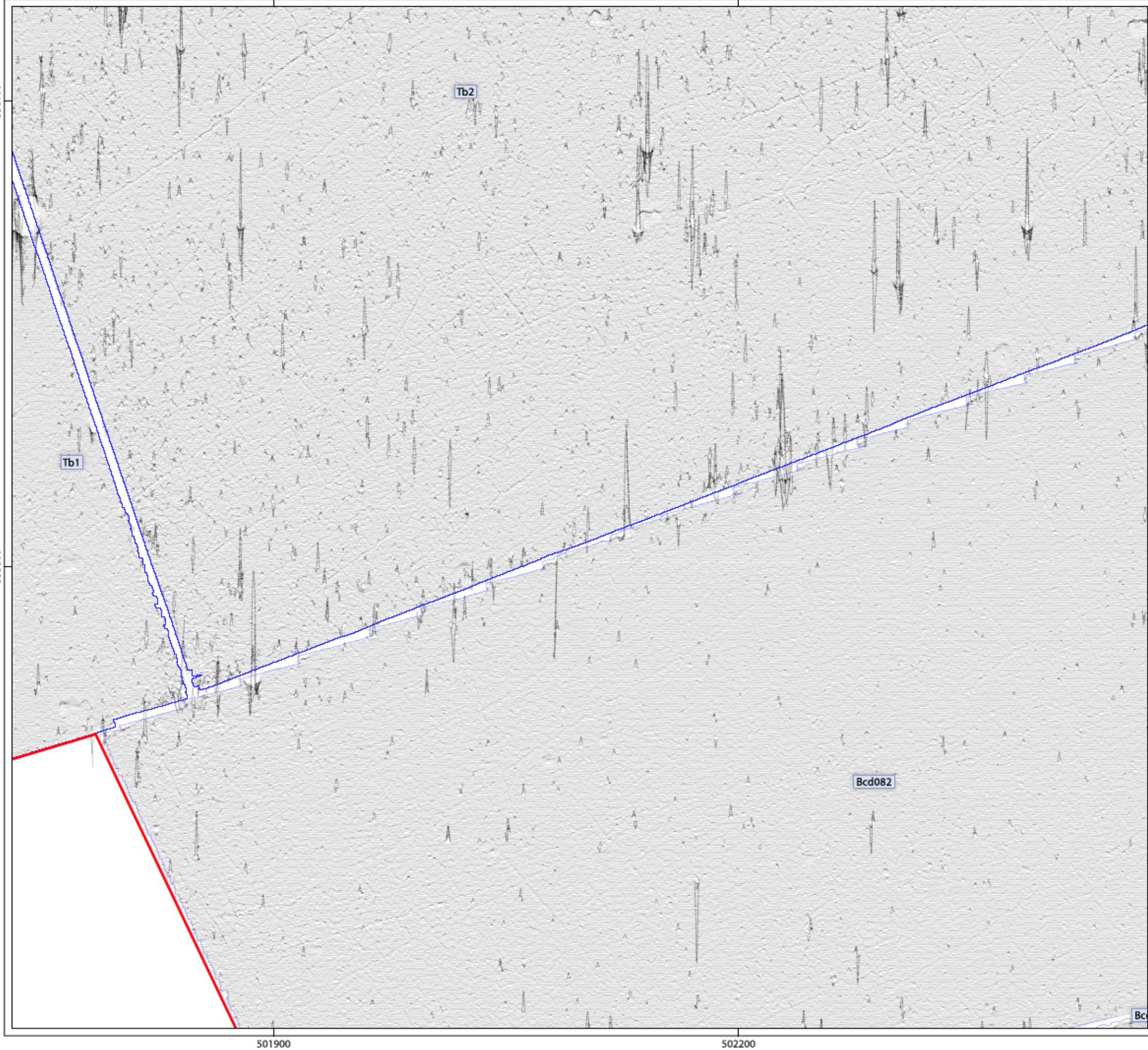
050100

050

100 m

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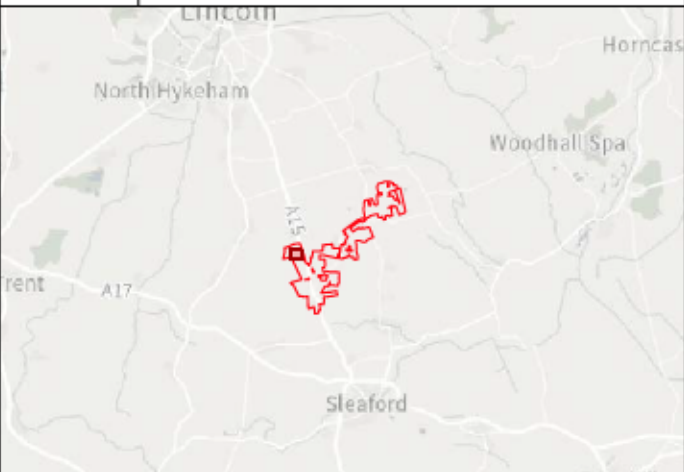








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Key

 Geophysical Survey Area

 Survey Extent

 XY Trace (25nT/cm)

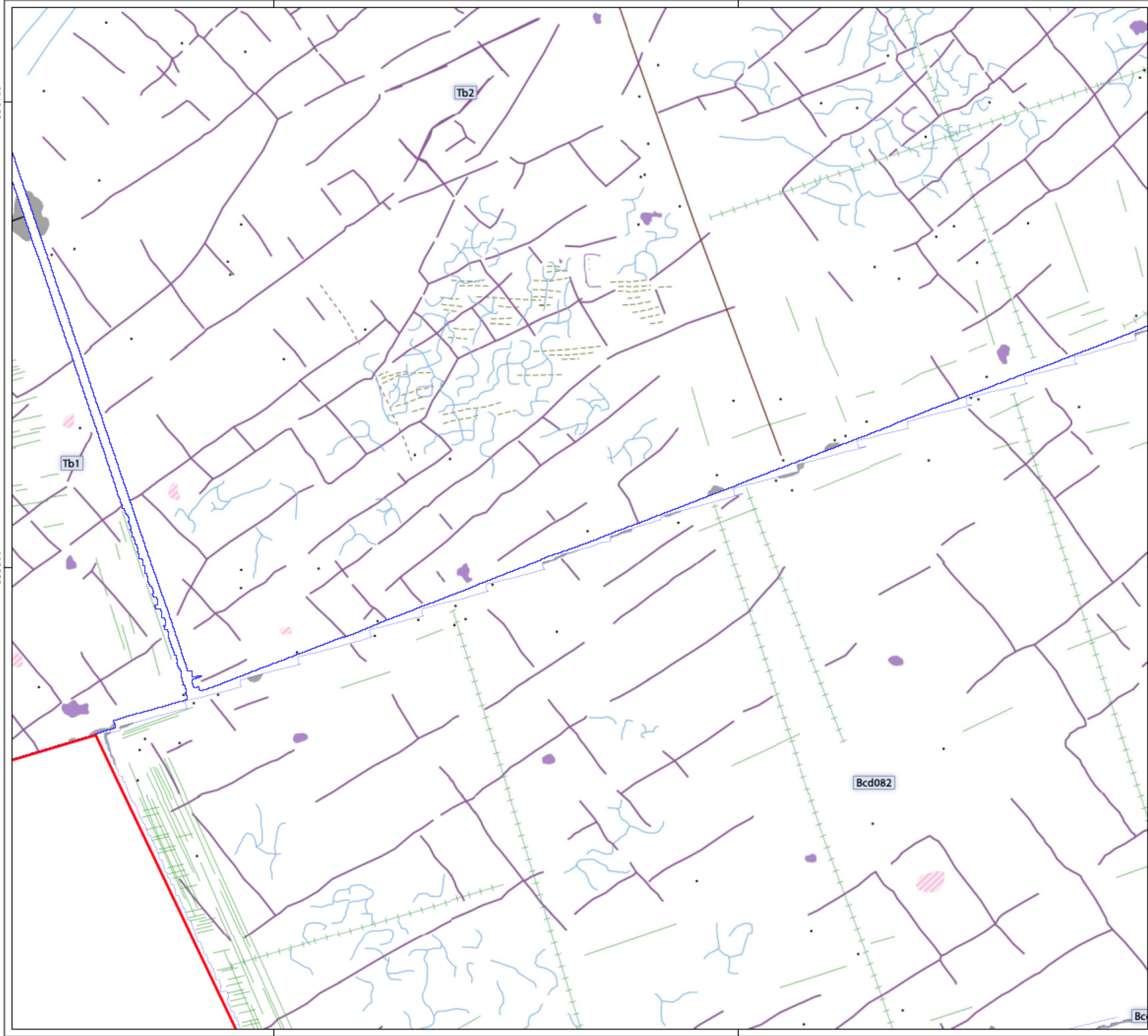
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50


100 m

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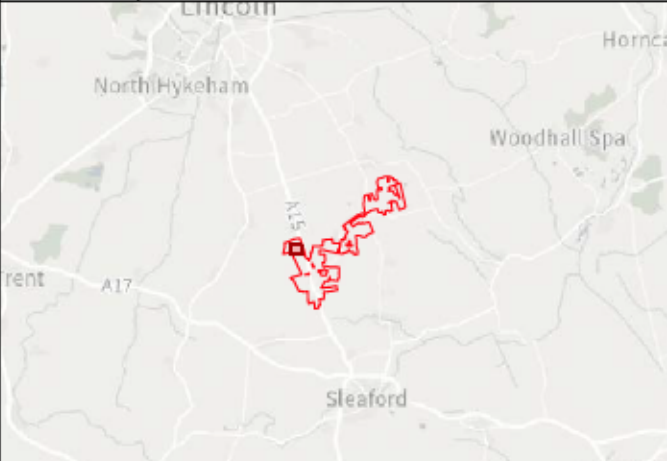








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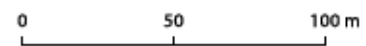
Key

 Geophysical Survey Area

 Survey Extent

Interpretation

-  Ferrous Objects
-  Agriculture
-  Field Boundary
-  Possible Field Boundary
-  Field Drain
-  Natural
-  Pipe
-  Ridge and Furrow
-  Field System
-  Magnetic Disturbance
-  Quarry
-  Uncertain



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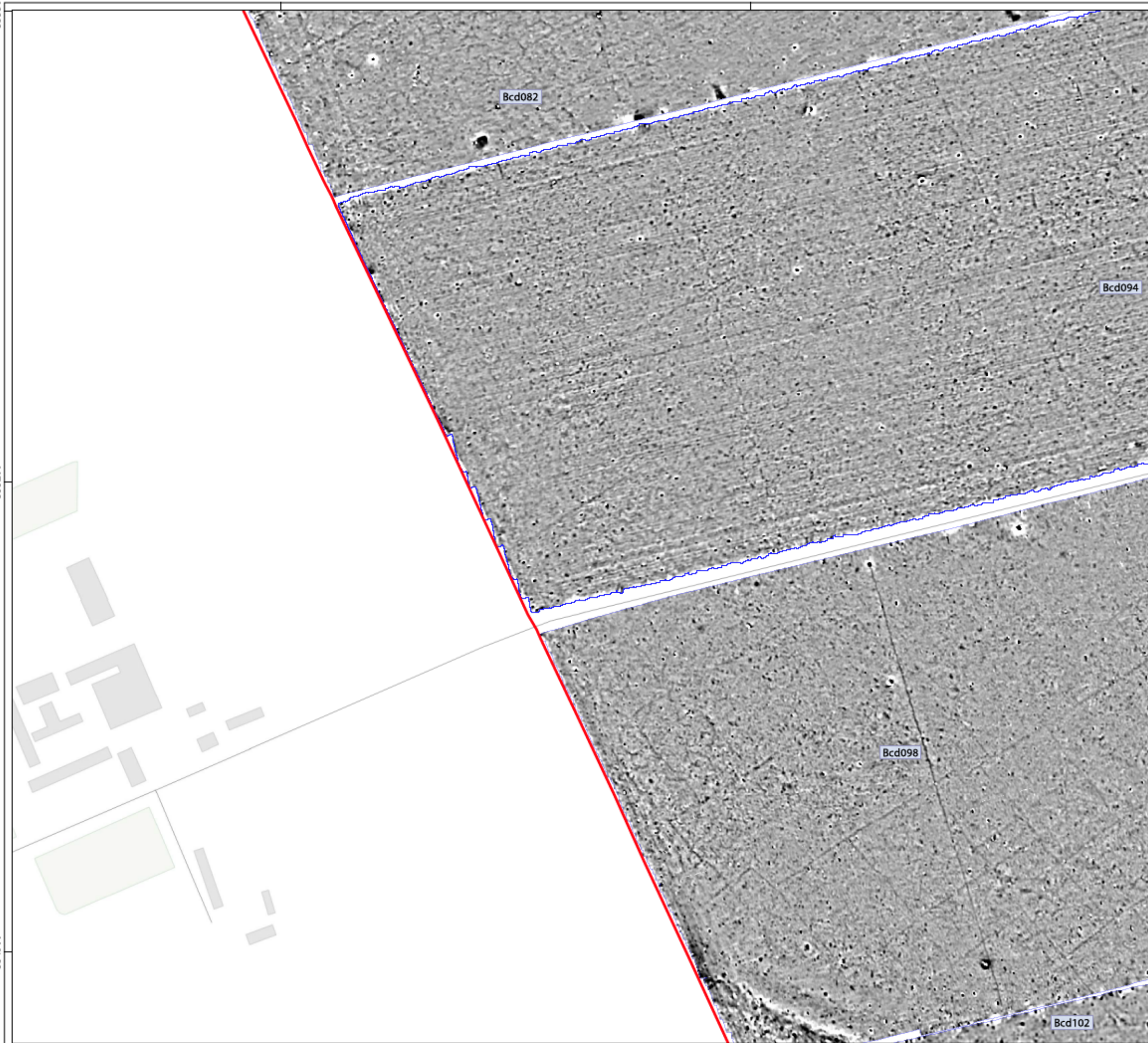
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355500

355200

354900

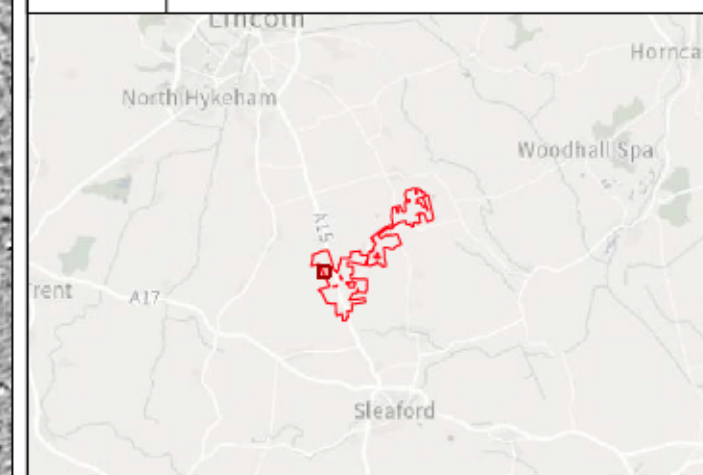


501900

502200

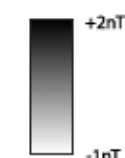


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Key

- Geophysical Survey Area
- Survey Extent



0 50 100 m

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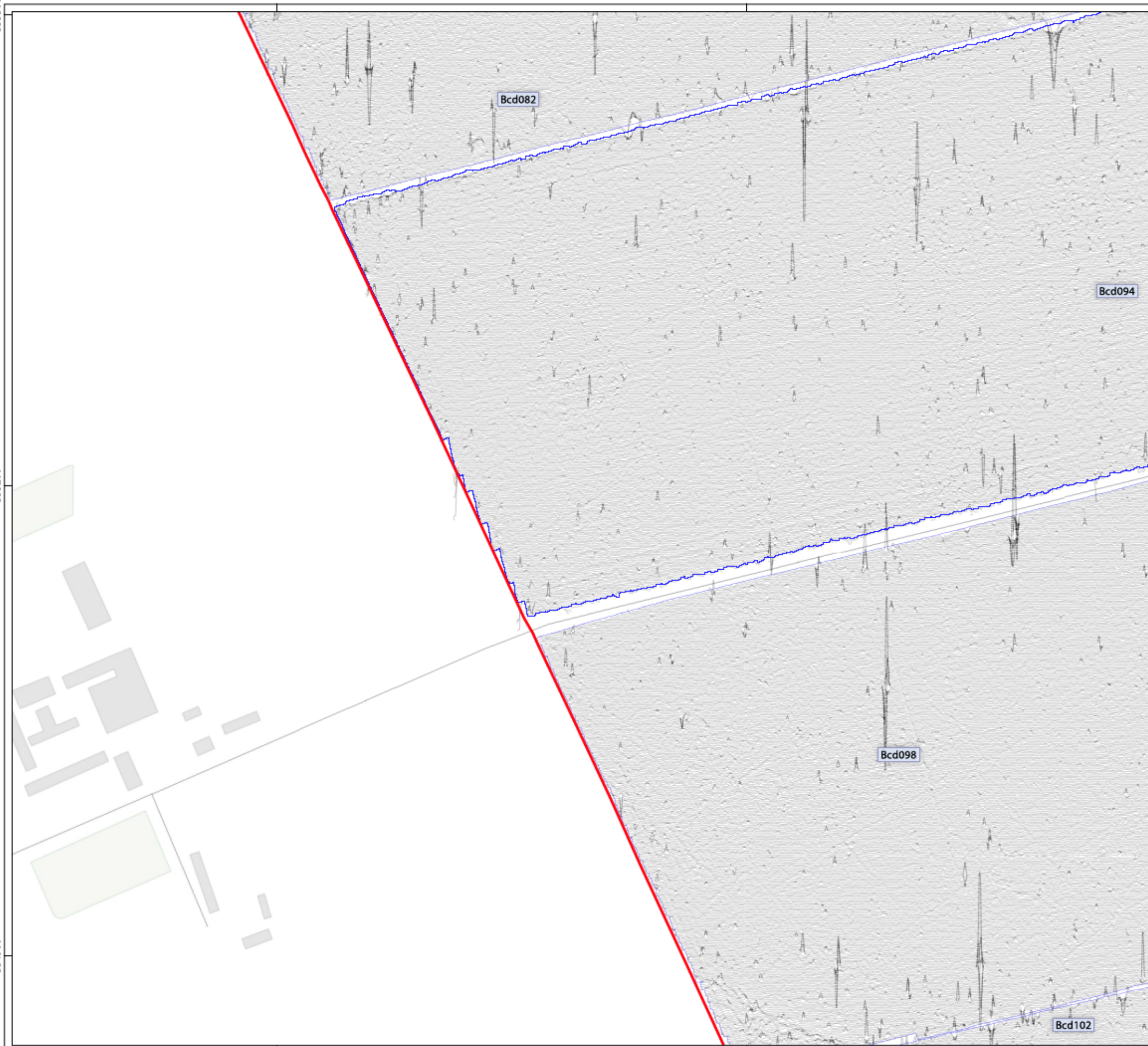
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Checked by:	JM
Version:	v1.2
Date:	05/07/2023
Scale:	1:2,500 @ A3

Illus - 29 XY trace plot of minimally processed magnetometer data; Sector 1

355500

355200

354900

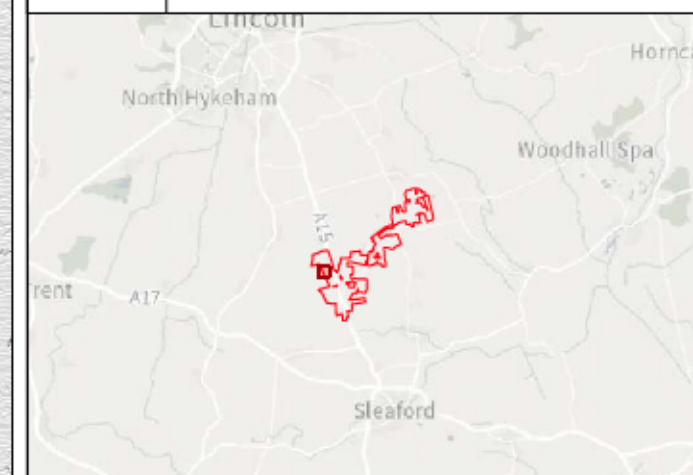


501900

502200



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Key

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

0 50 100 m

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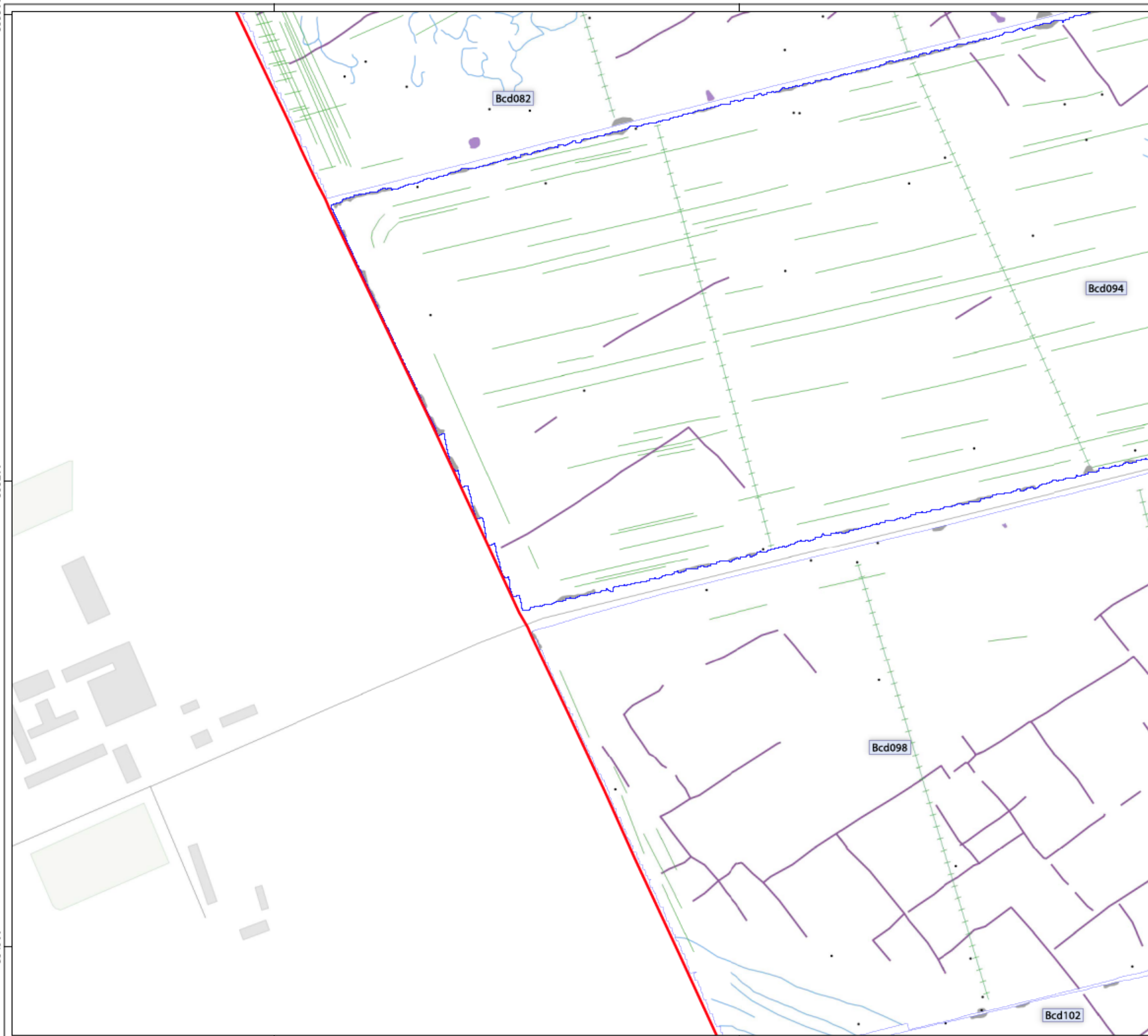
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Created by:	LD
Checked by:	JM
Version:	v1.2
Date:	05/07/2023
Scale:	1:2,500 @ A3

Illus - 30 XY trace plot of minimally processed magnetometer data; Sector 1

355500

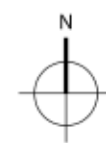
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354900

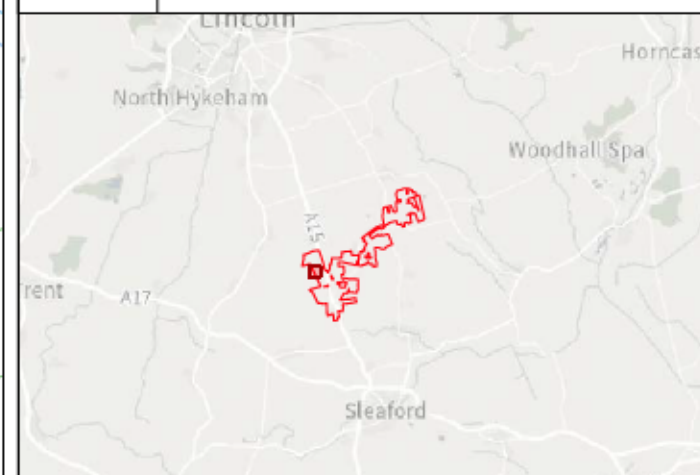


501900

502200



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Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- Field Drain
- Natural
- Field System
- Magnetic Disturbance
- Uncertain

0 50 100 m

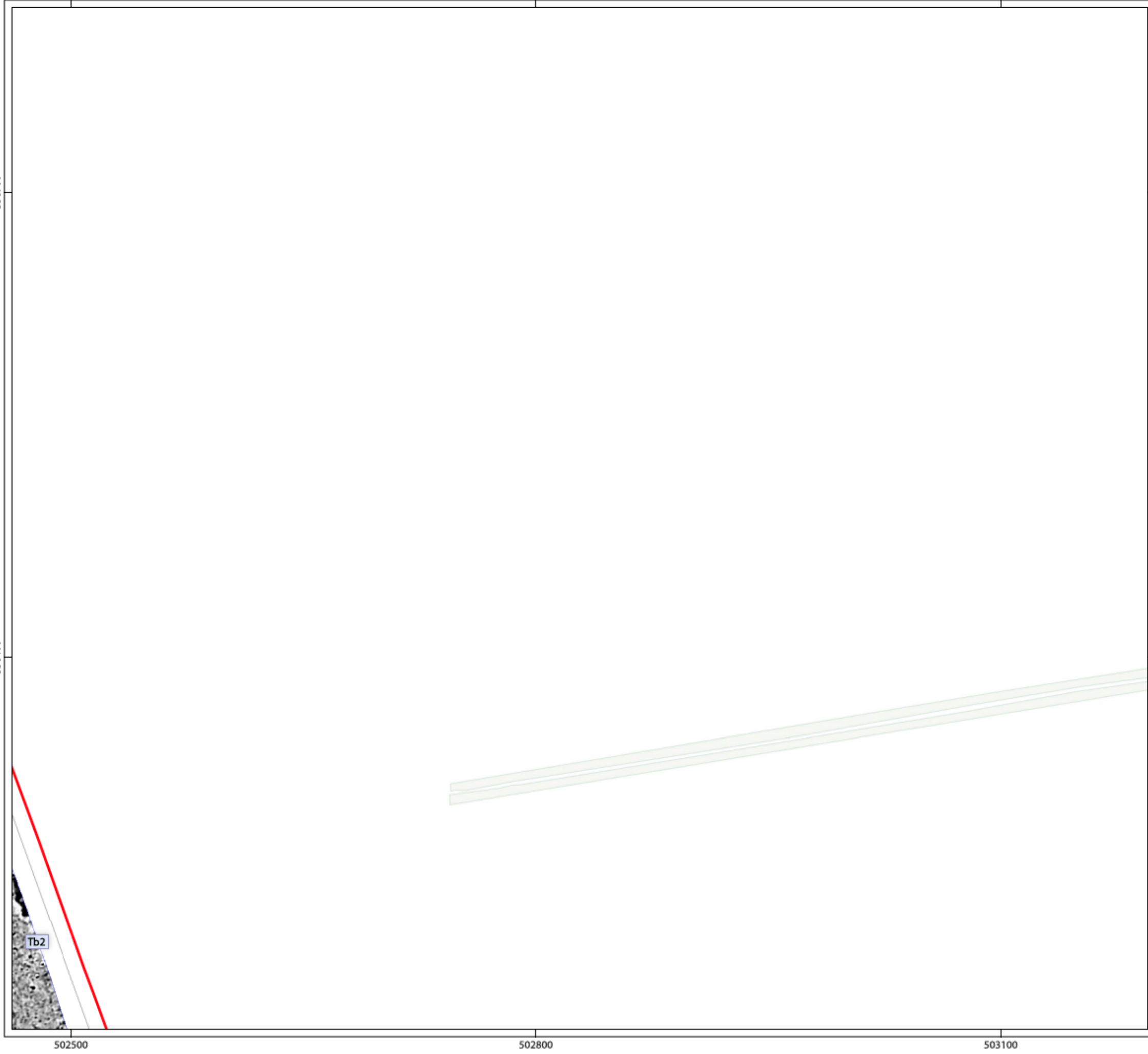
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Date:	05/07/2023
Scale:	1:2,500 @ A3

Illus - 31 Interpretation of magnetometer data; Sector 1



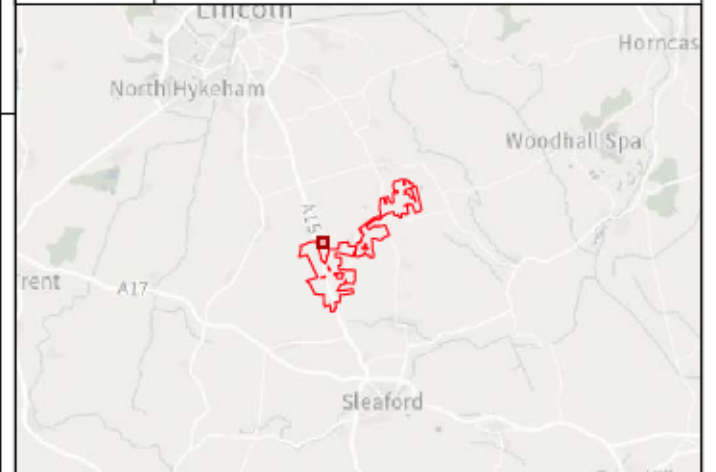
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356400



502500

502800

503100



Key

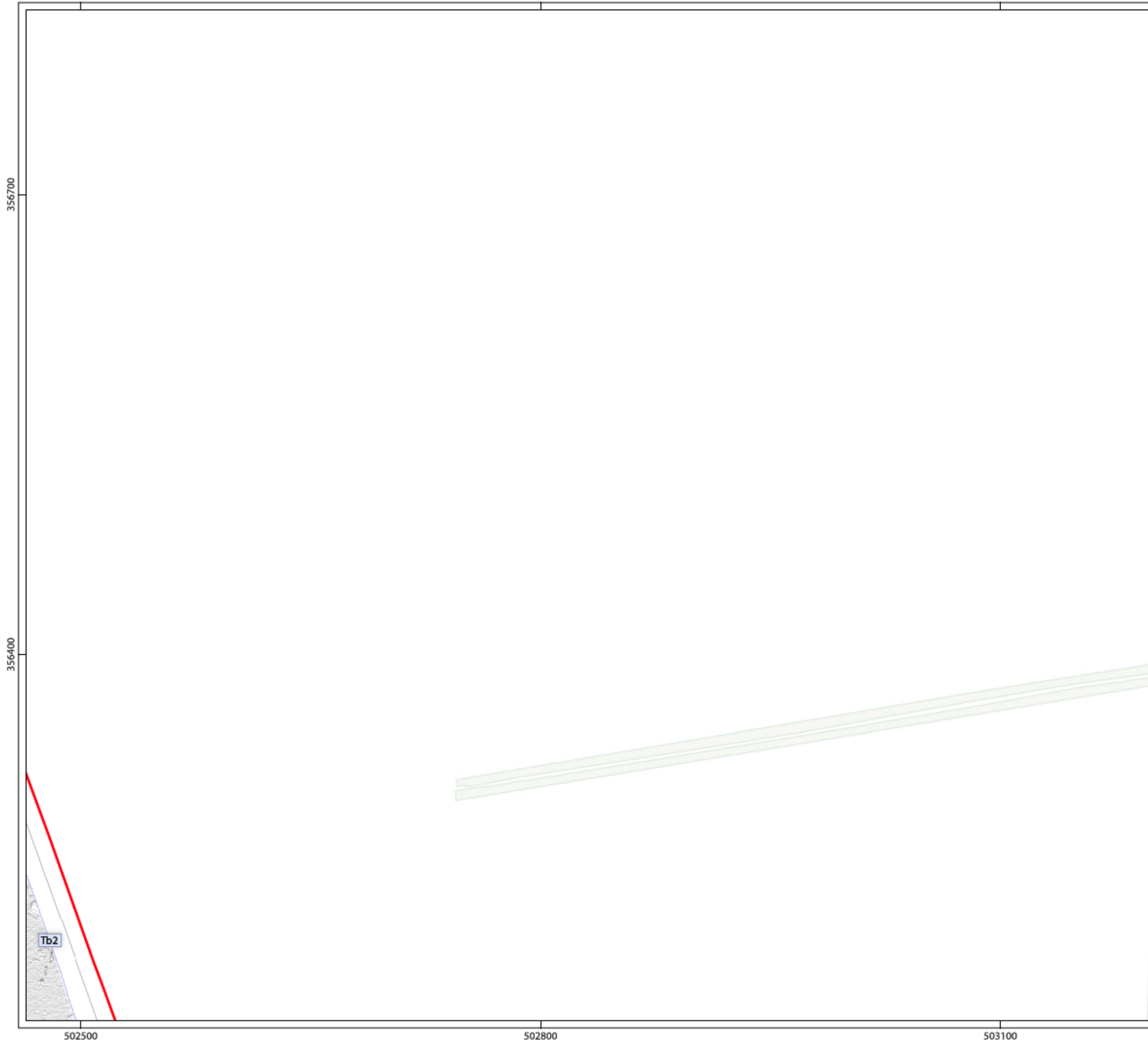
-  Geophysical Survey Area
-  Survey Extent





0 50 100 m

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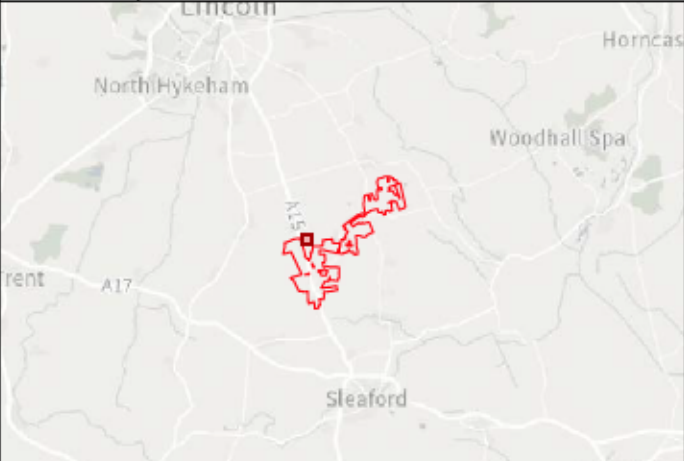









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Key

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

0

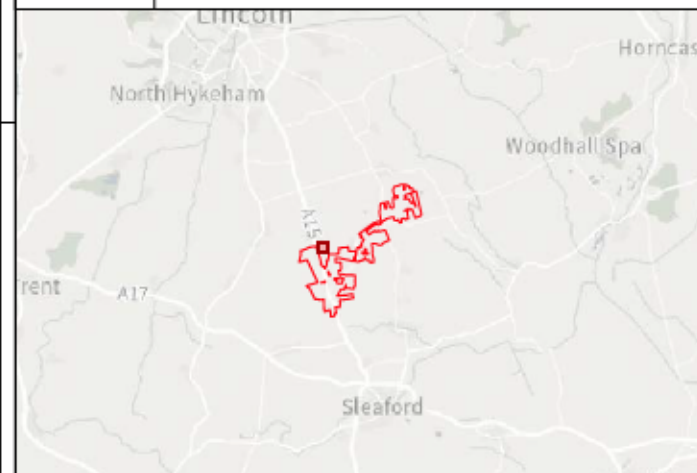
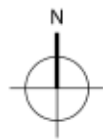
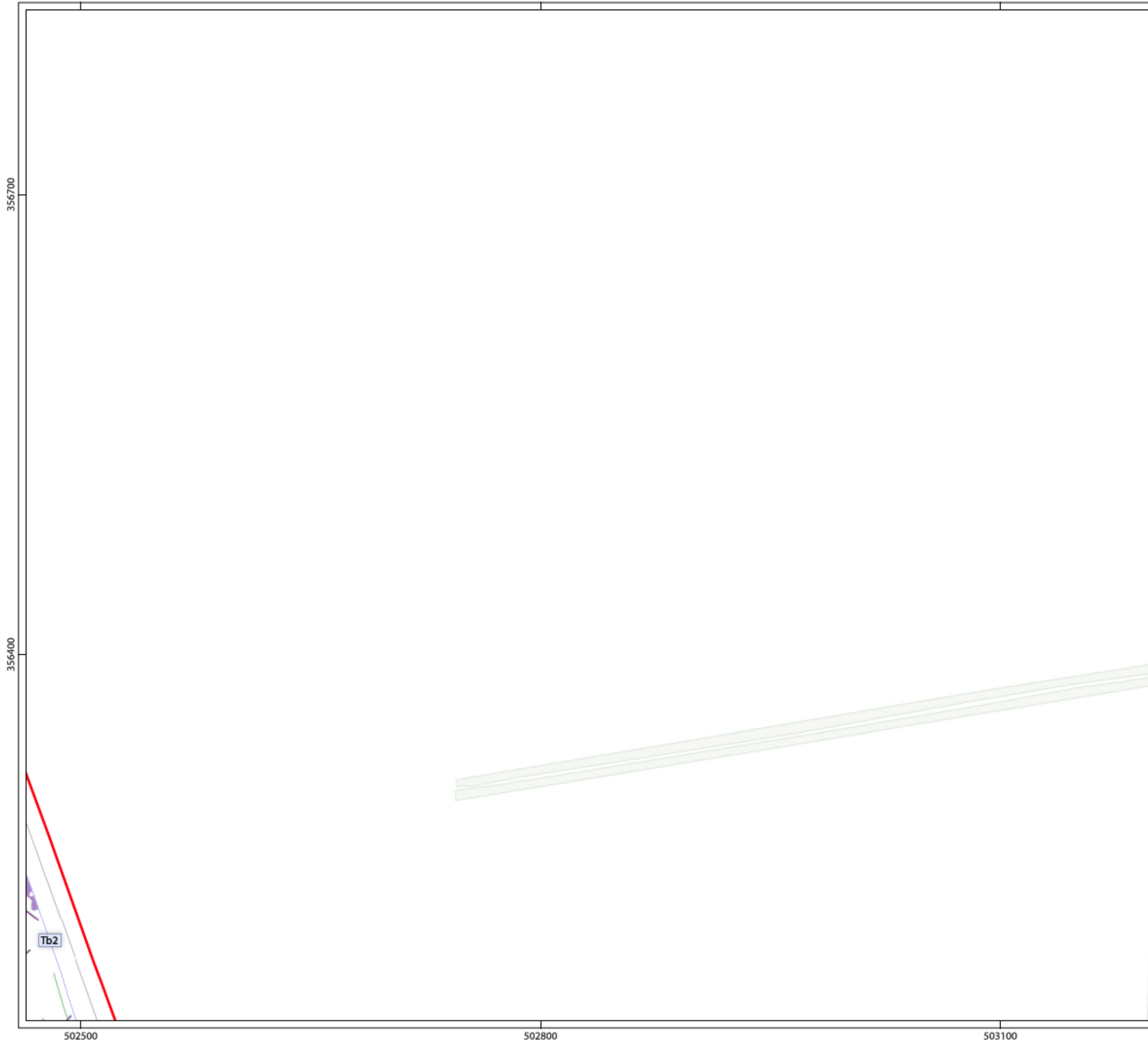
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100 m

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Scale:	1:2,500 @ A3

Illus - 33 XY trace plot of minimally processed magnetometer data; Sector 1



Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Agriculture
- Natural
- Field System
- Uncertain

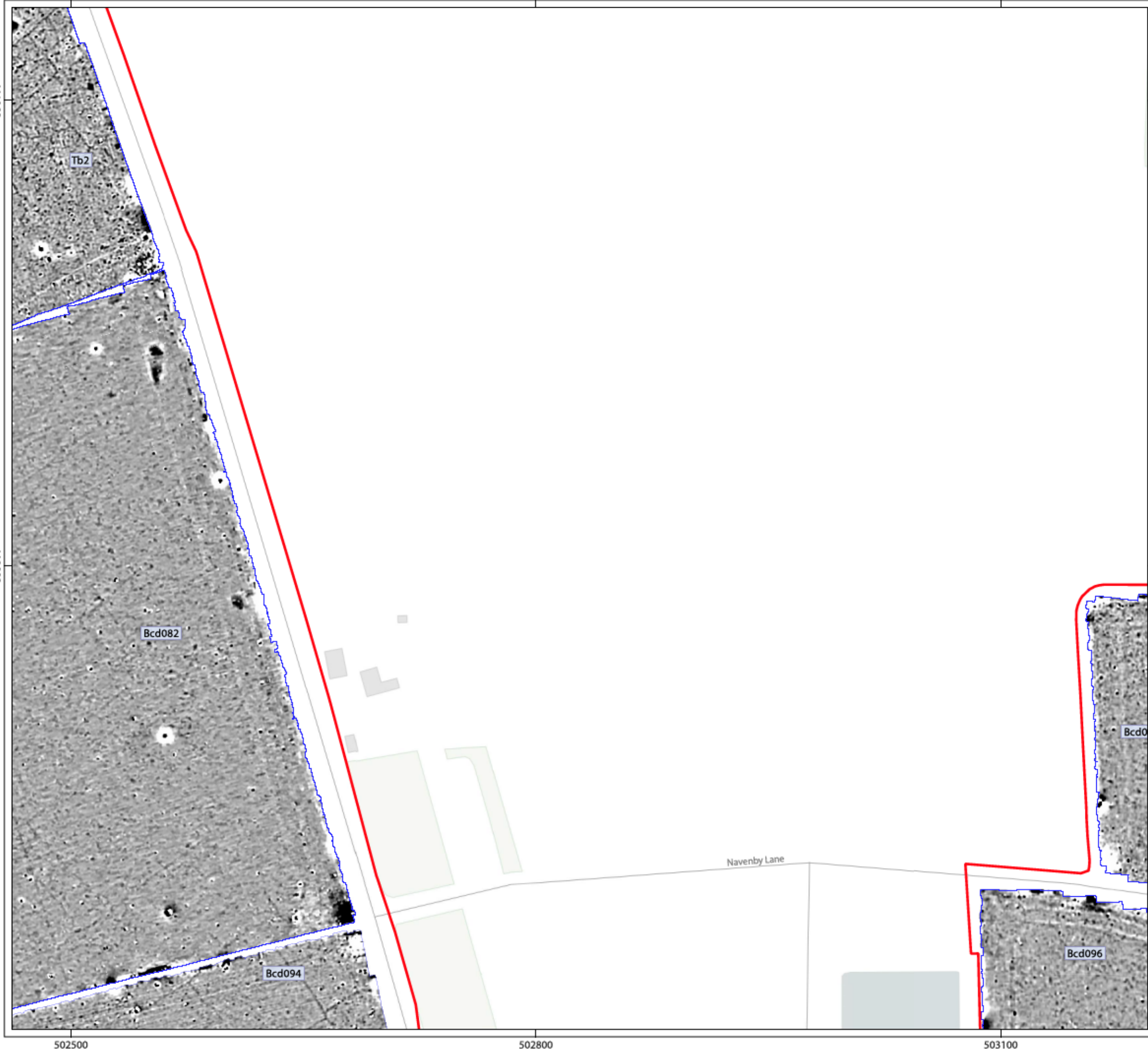
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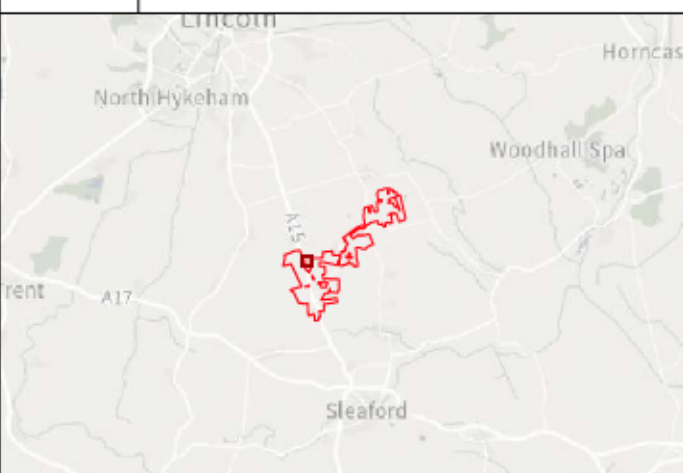








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Key

 Geophysical Survey Area

 Survey Extent



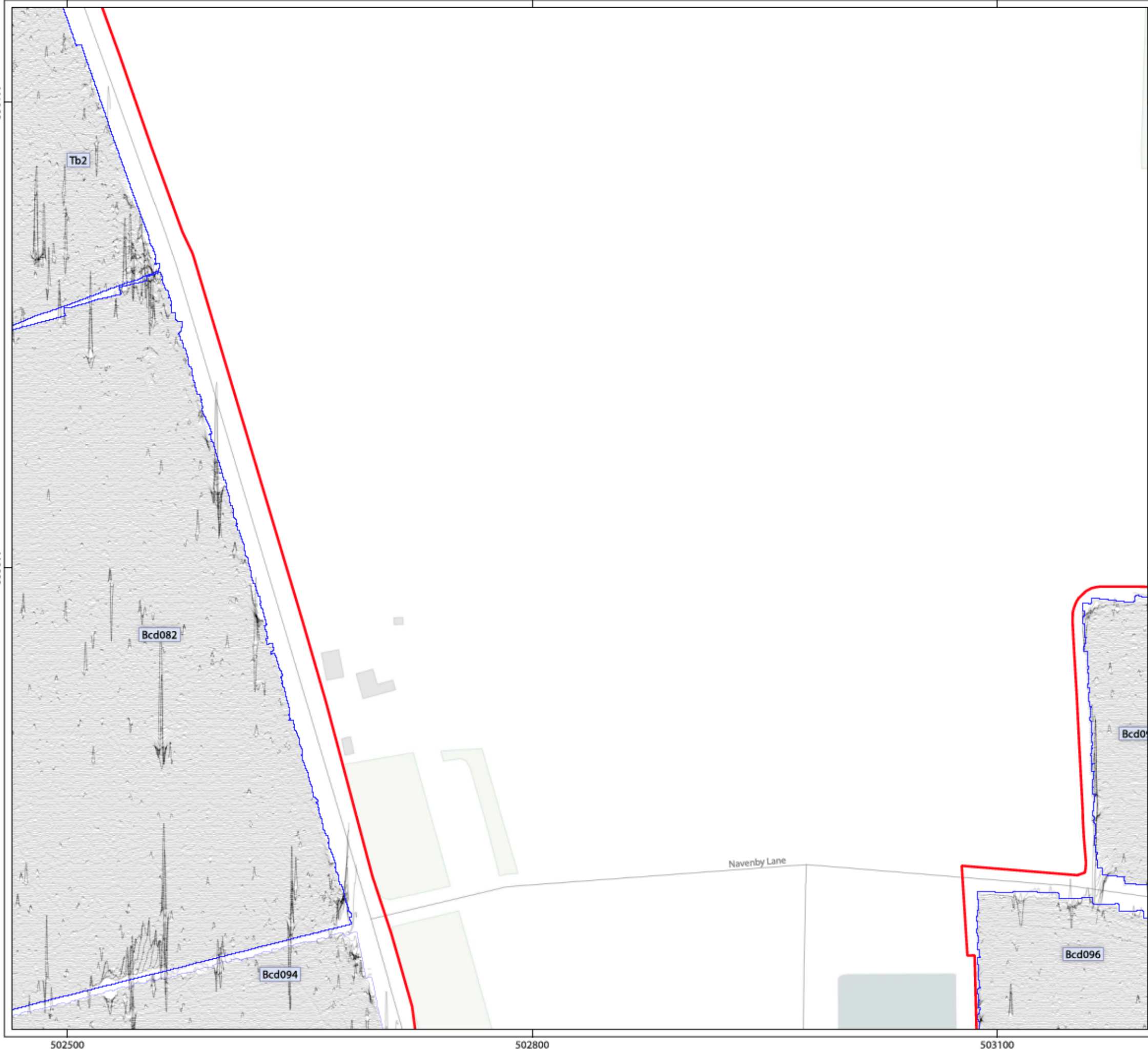
0 50 100 m


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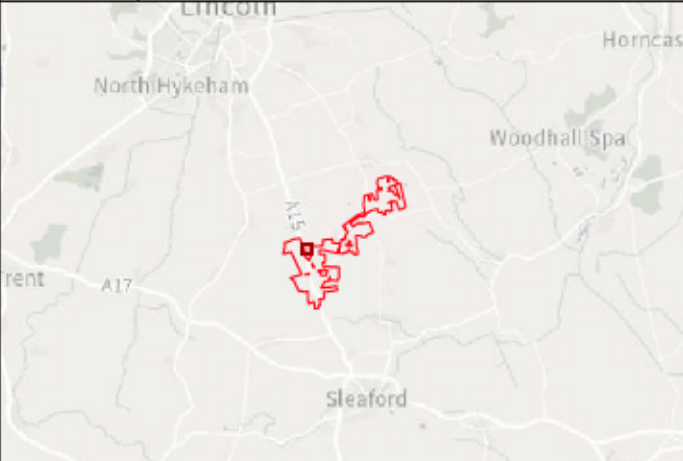









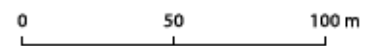
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Key

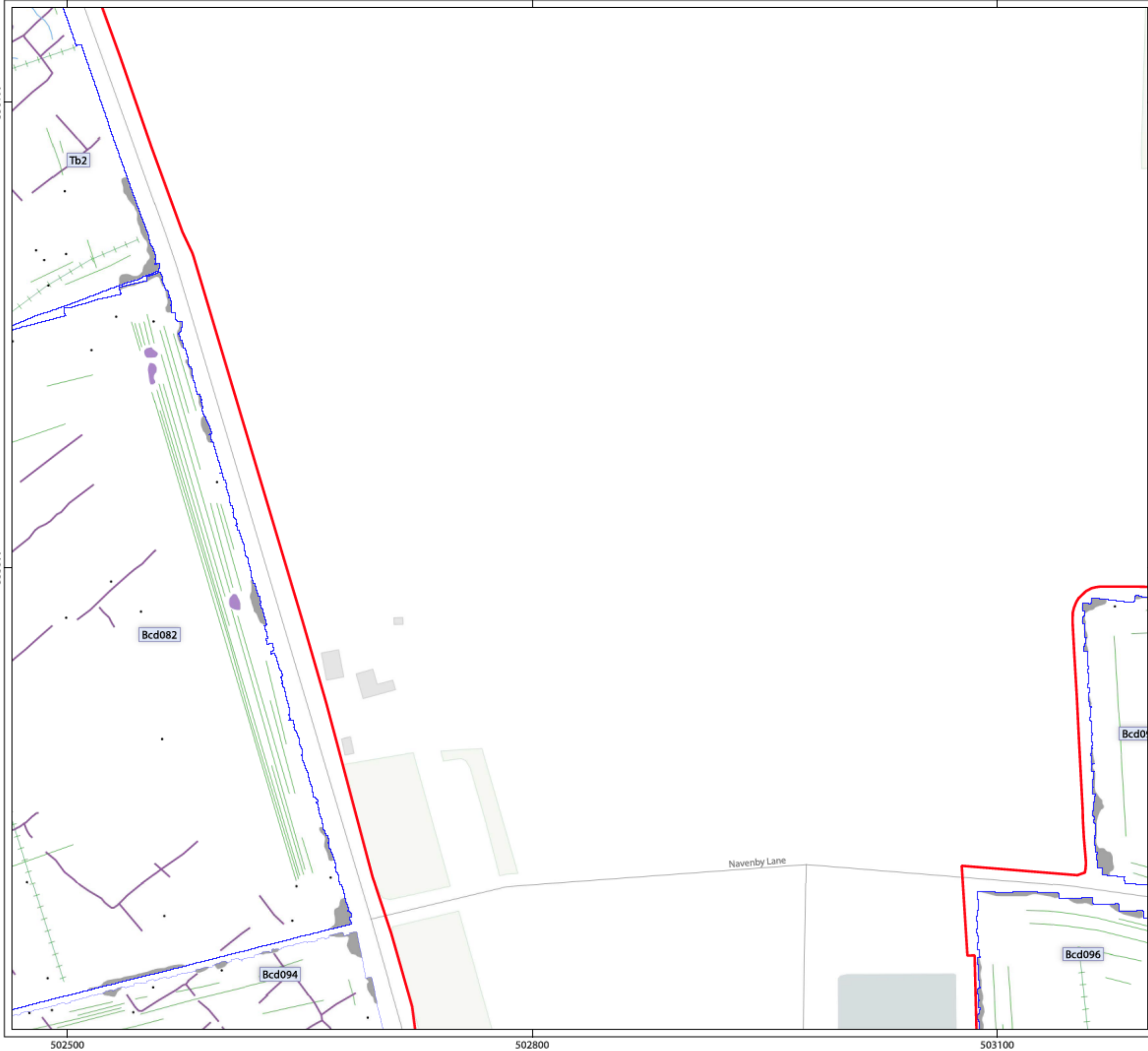
-  Geophysical Survey Area
-  Survey Extent
-  XY Trace (25nT/cm)





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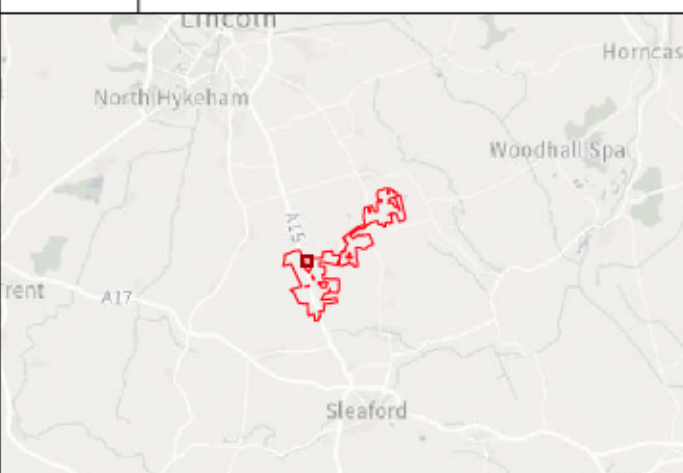
Illus - 36 XY trace plot of minimally processed magnetometer data; Sector 1







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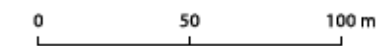


Key

- Geophysical Survey Area
- Survey Extent

Interpretation

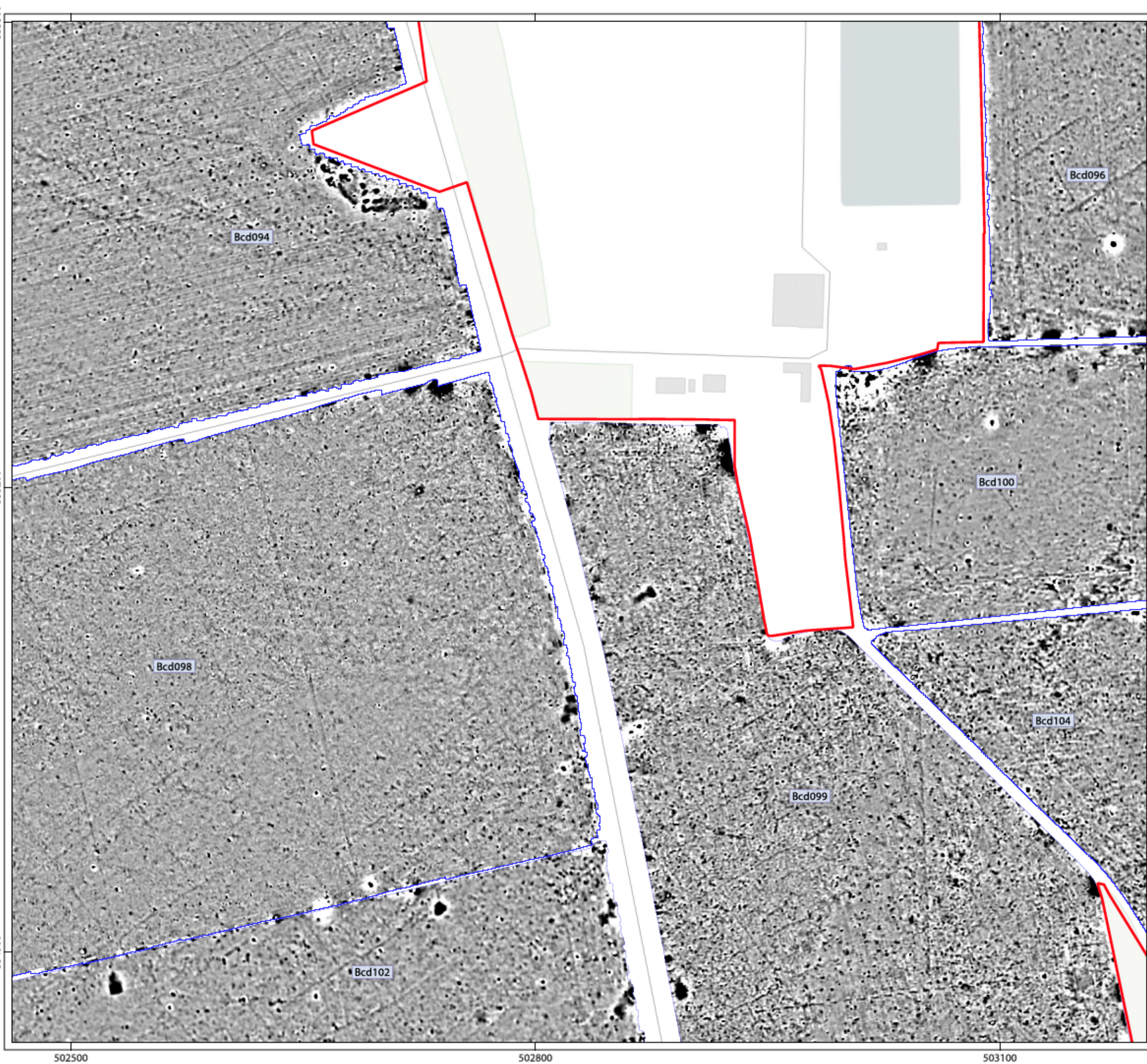
- Ferrous Objects
- Agriculture
- +— Field Drain
- Natural
- Field System
- Magnetic Disturbance
- Uncertain




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Version:	v1.2
Date:	05/07/2023
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355500
355200
354900



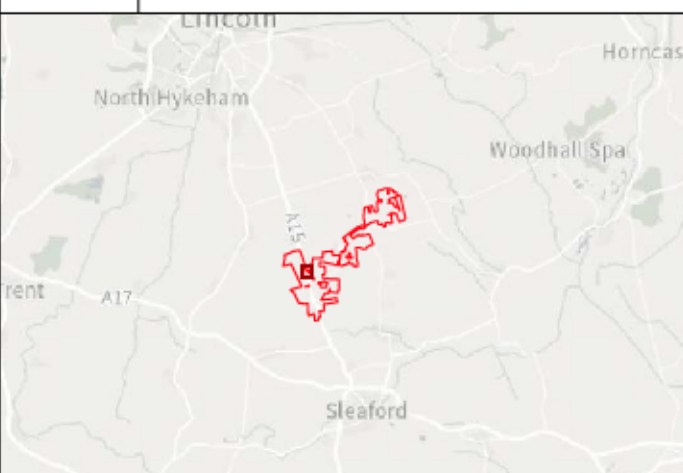
502500 502800 503100







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Key

 Geophysical Survey Area

 Survey Extent



0 50 100 m

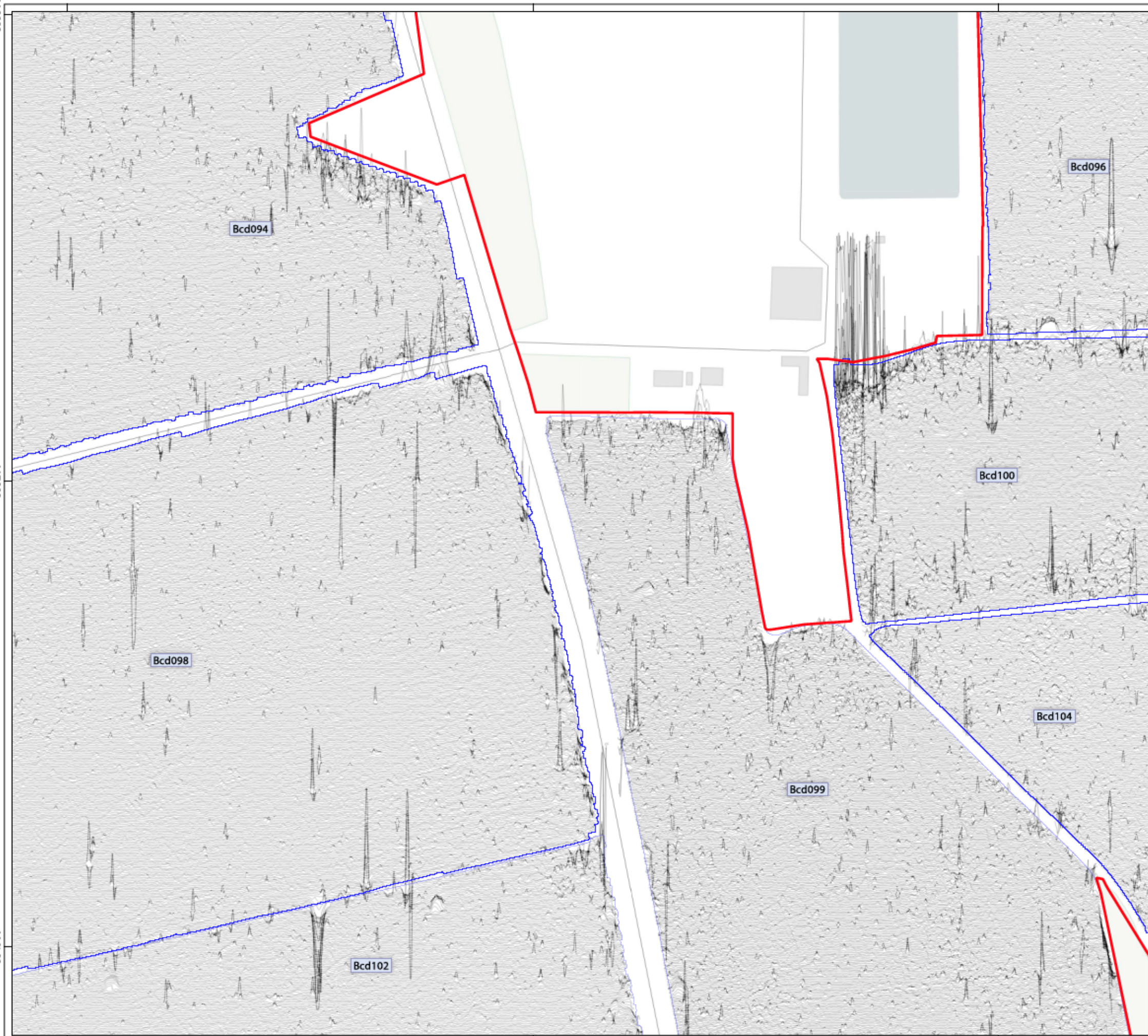
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355200

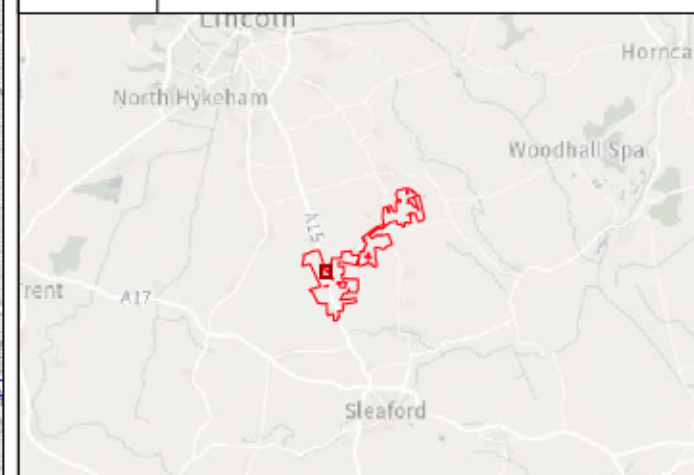
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502500

502800

503100



Key

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

0 50 100 m

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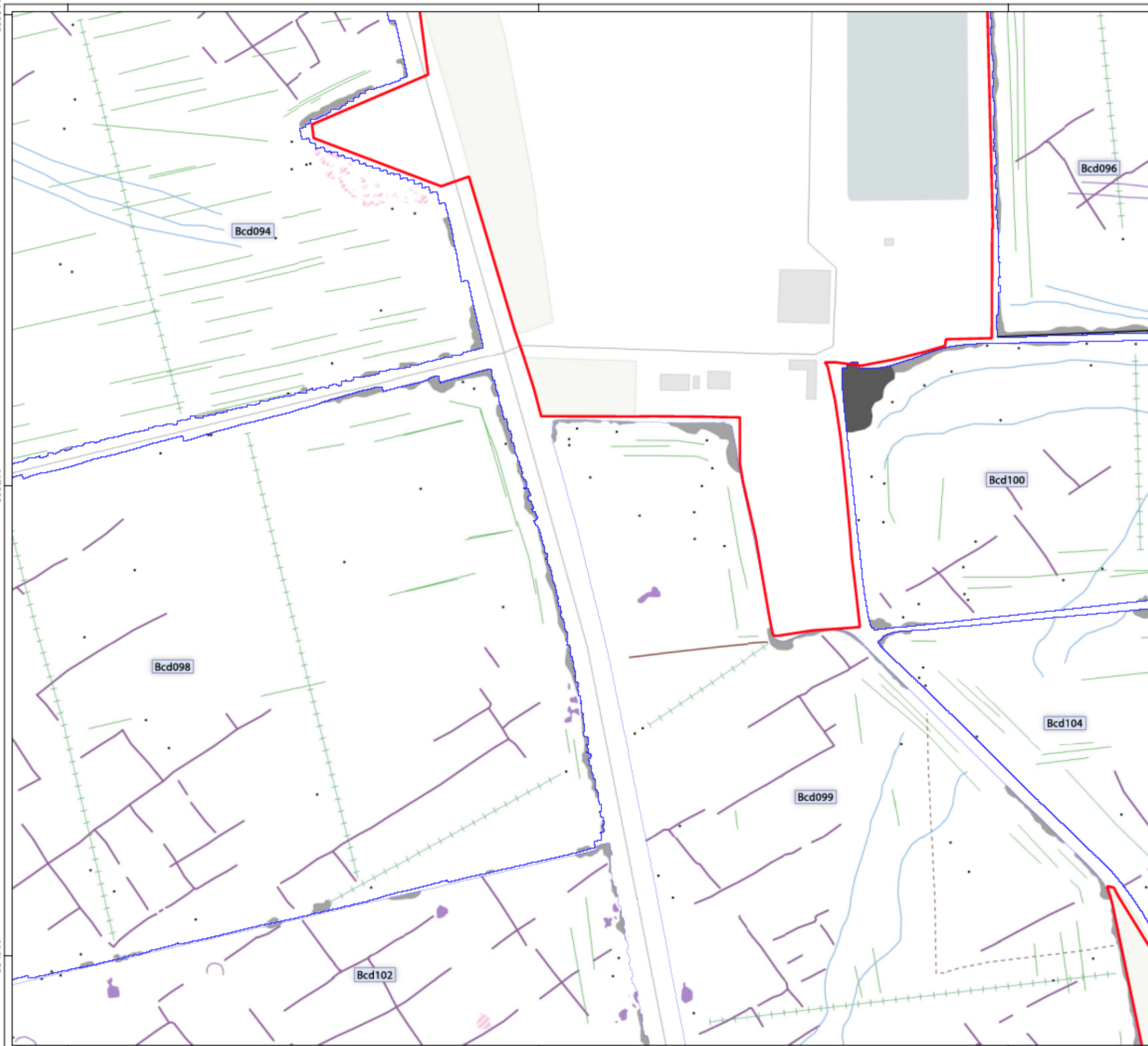
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355500

355200

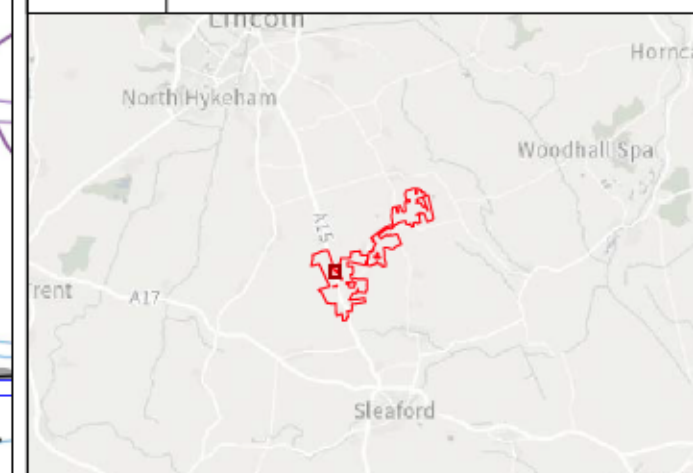
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502500

502800

503100



Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- Field Boundary
- Possible Field Boundary
- Field Drain
- Natural
- Pipe
- Uncertain
- Field System
- Magnetic Disturbance
- Quarry
- Uncertain
- Former Building

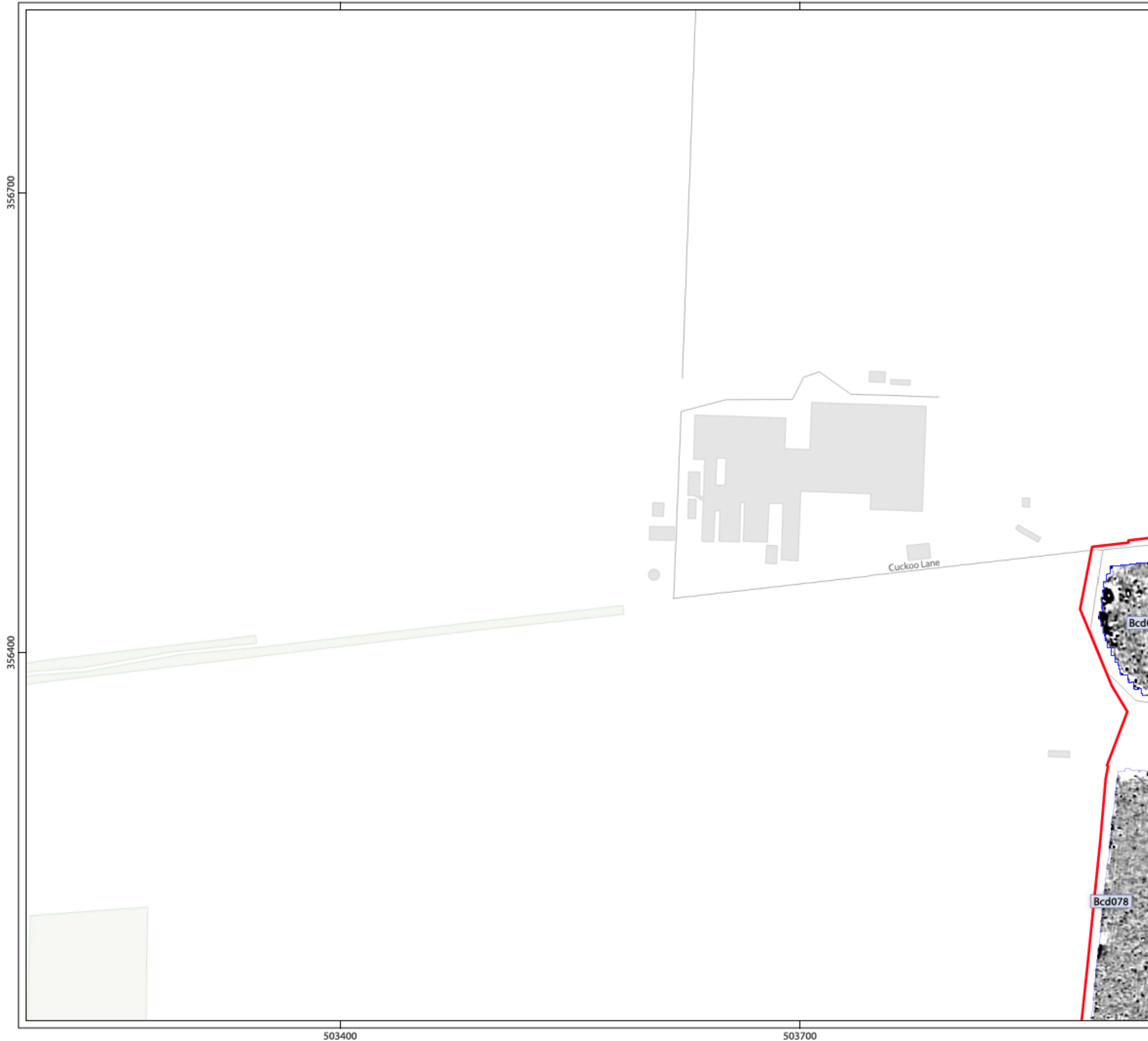
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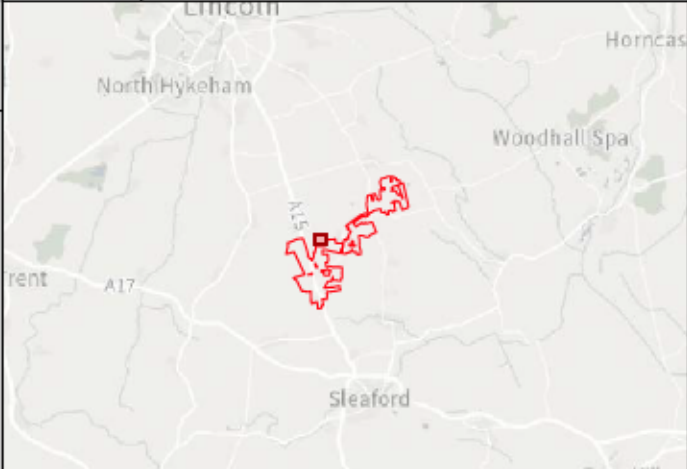
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Key

- Geophysical Survey Area
- Survey Extent

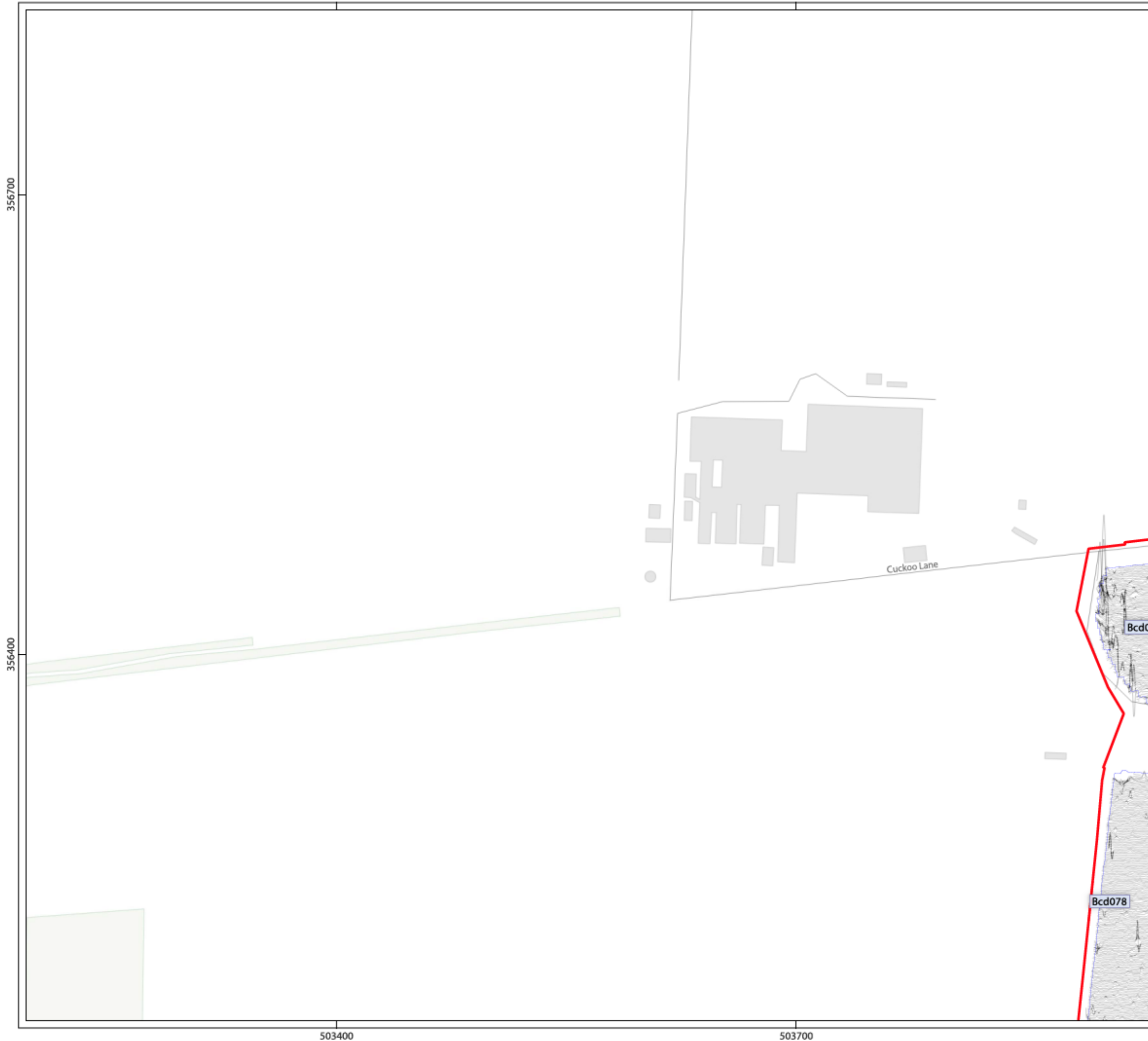


0 50 100 m

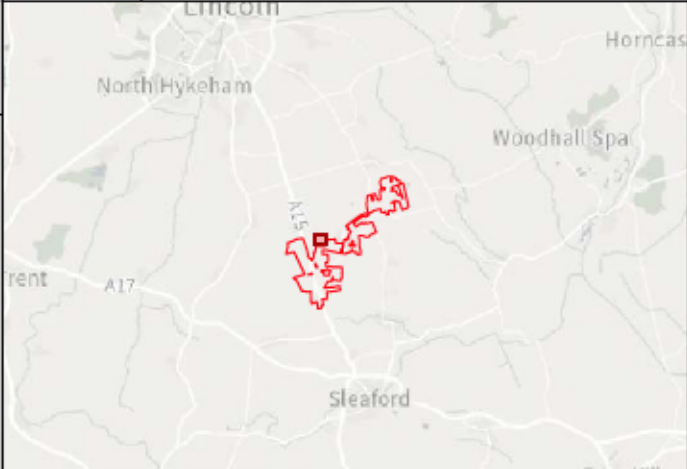
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Date:	05/07/2023
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Illus - 41 XY trace plot of minimally processed magnetometer data; Sector 1

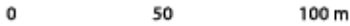


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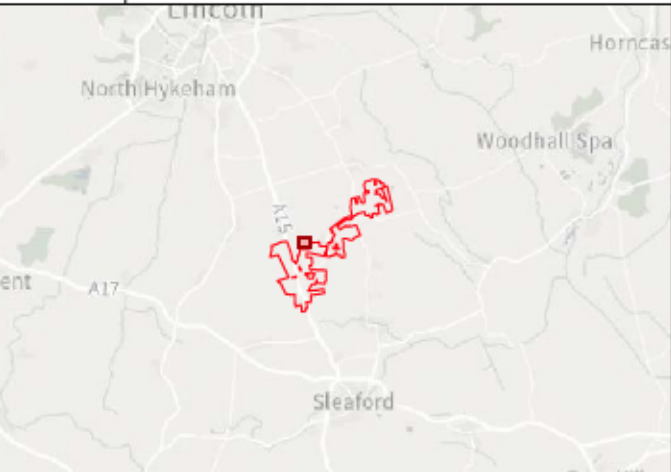
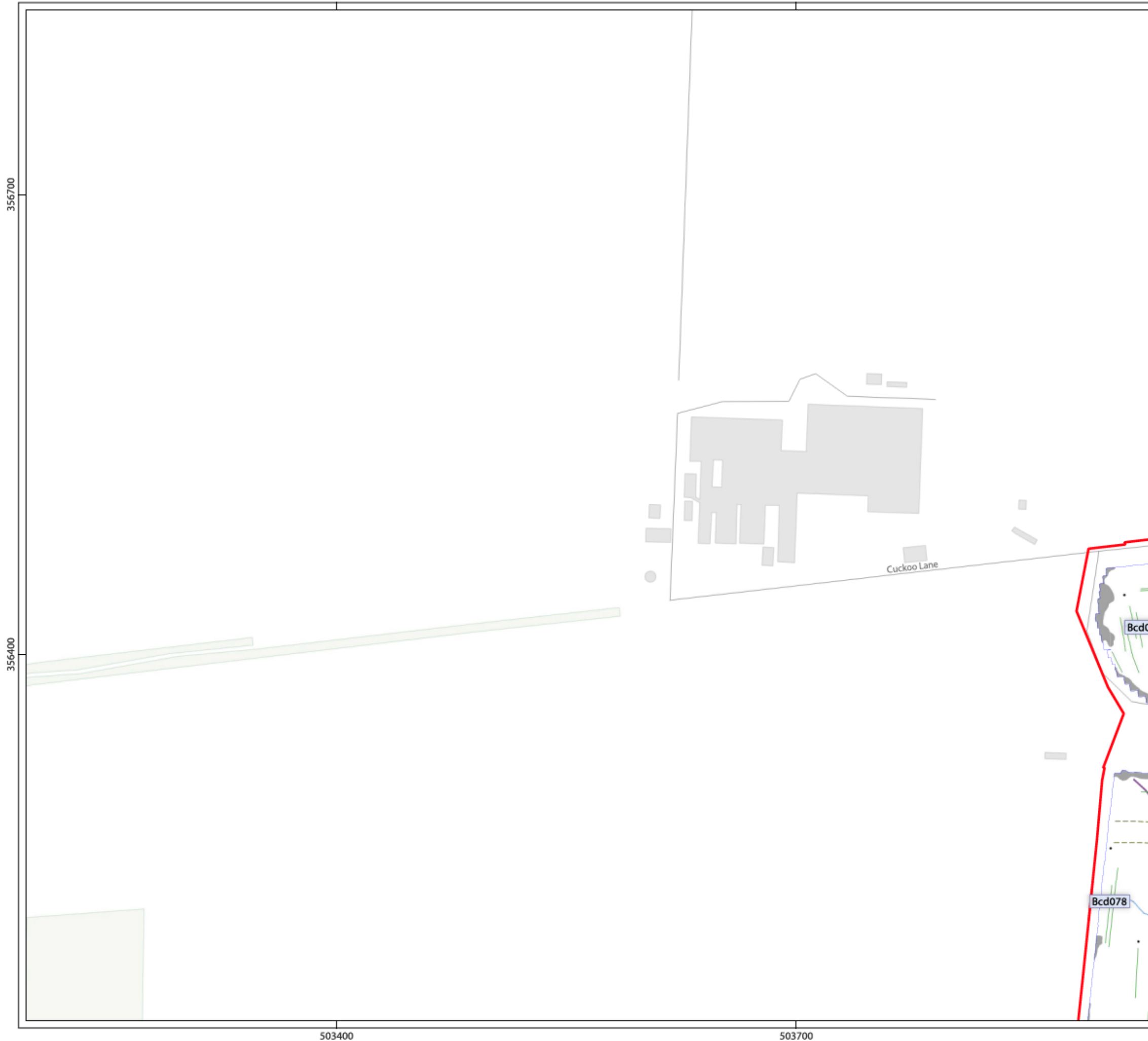
Key

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



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Scale:	1:2,500 @ A3



Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- Natural
- Ridge and Furrow
- Field System
- Magnetic Disturbance

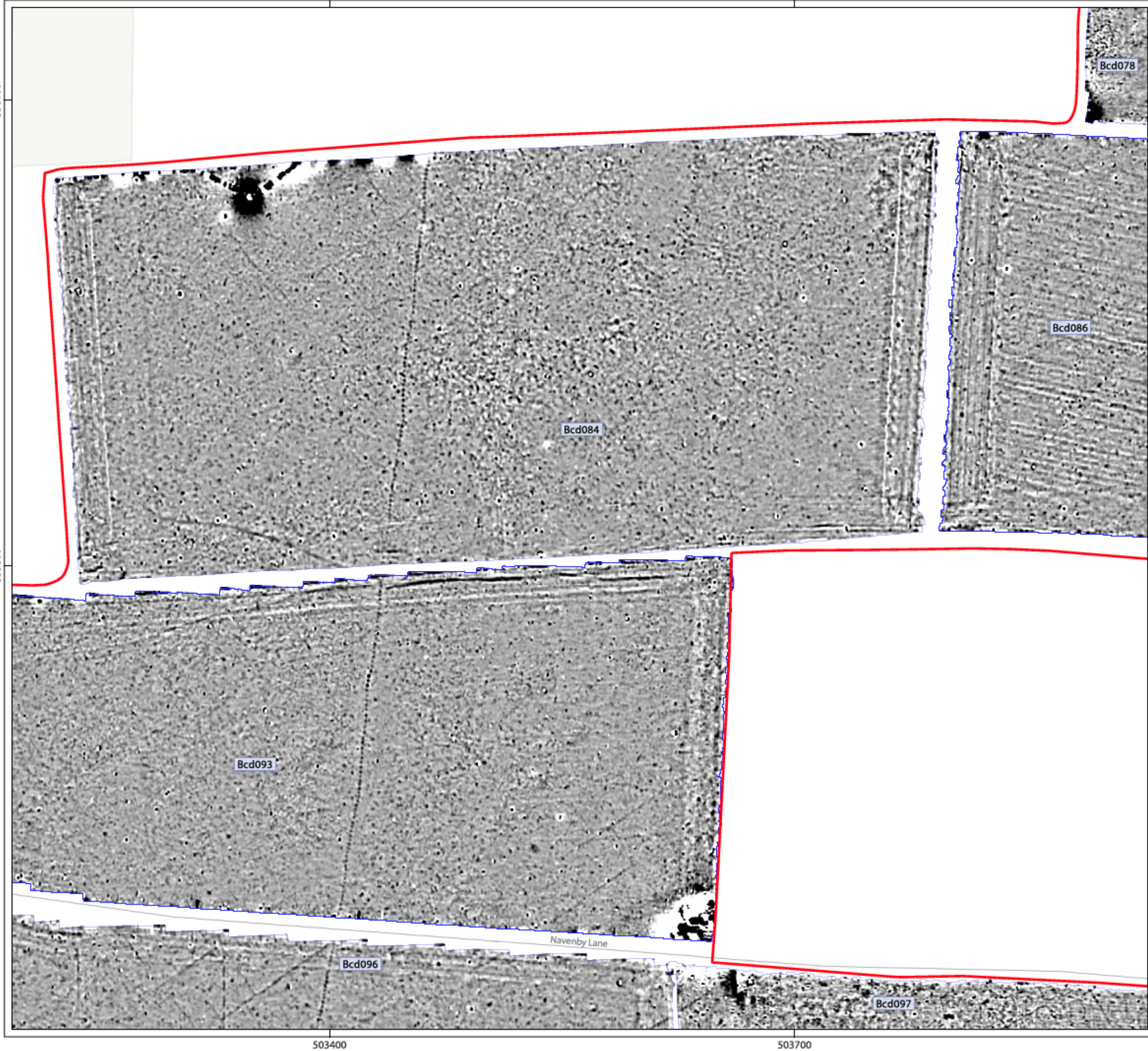
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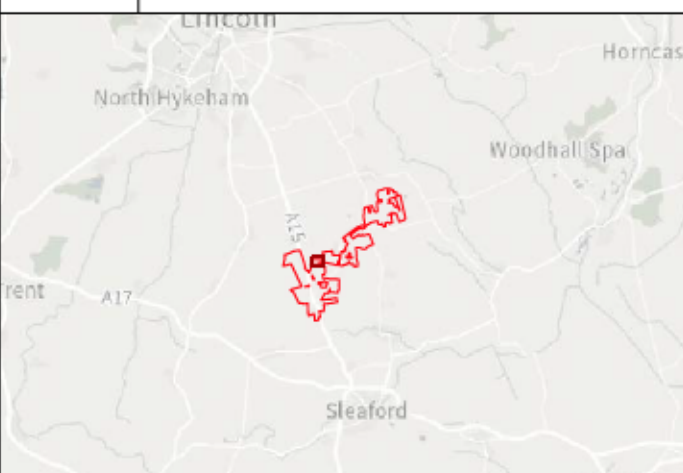







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Key

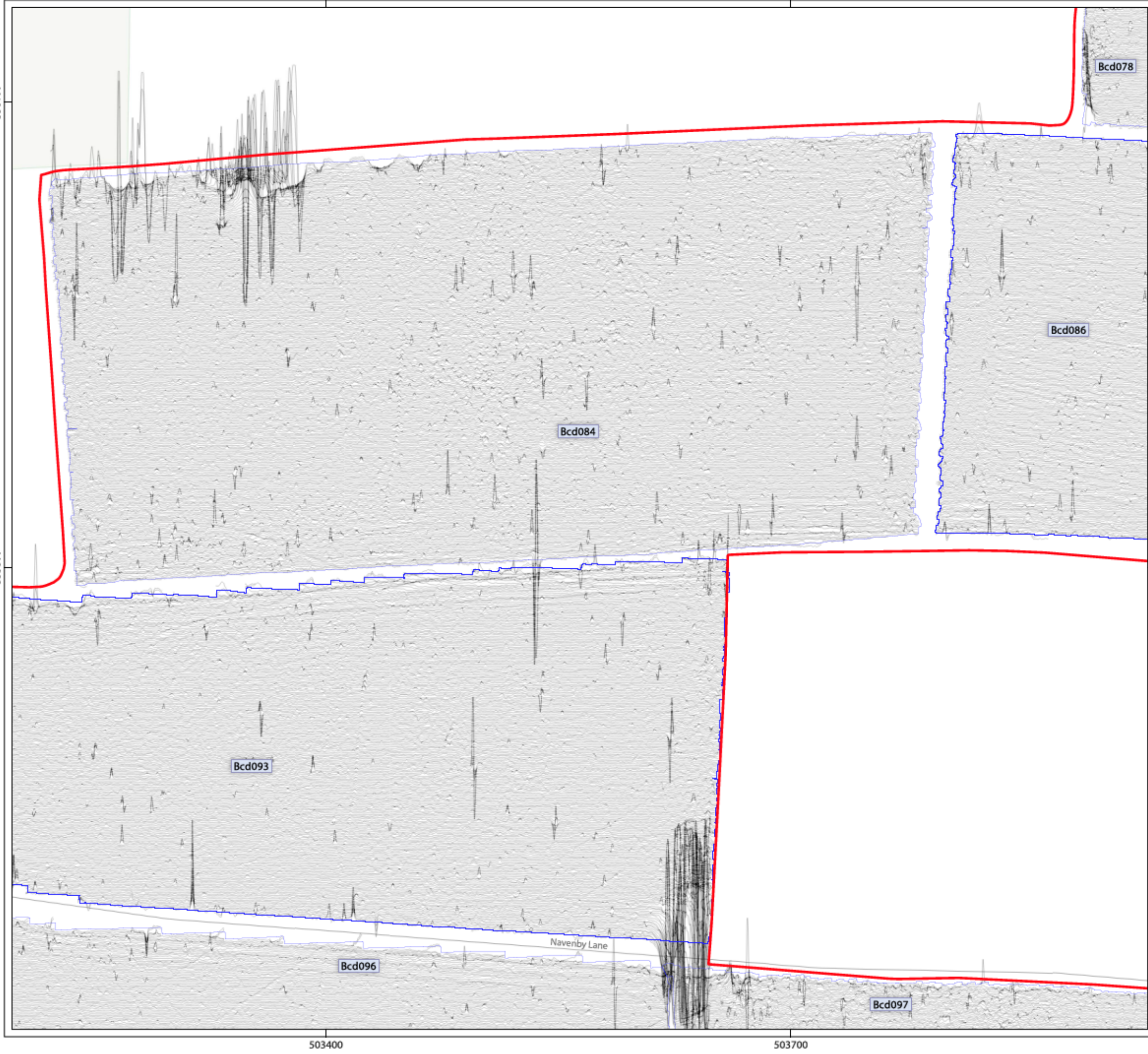
-  Geophysical Survey Area
-  Survey Extent





0 50 100 m

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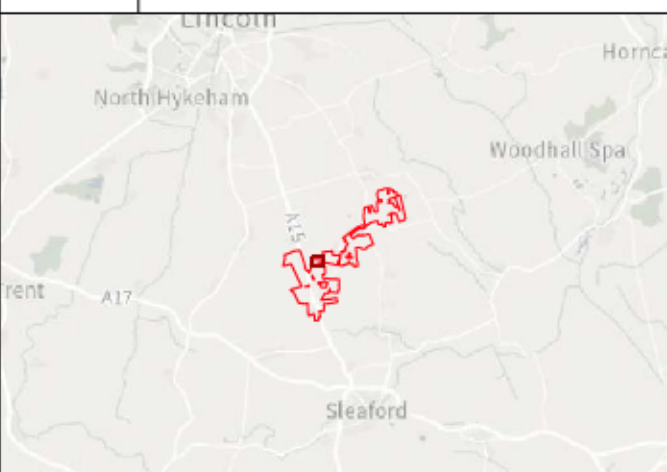









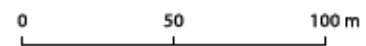
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Key

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



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Illus - 45 XY trace plot of minimally processed magnetometer data; Sector 1





356100

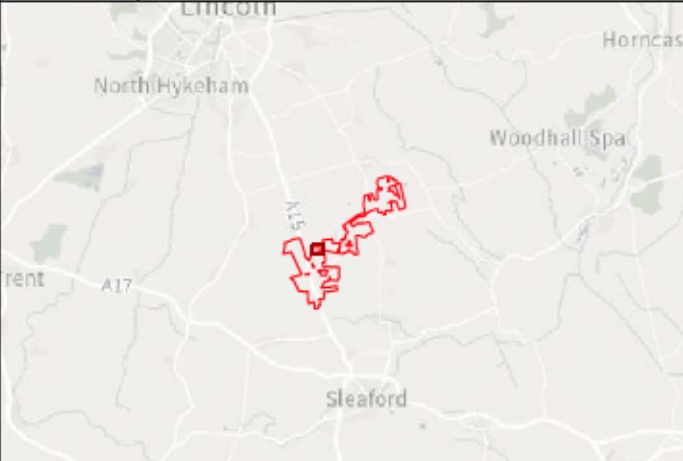
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503400

503700



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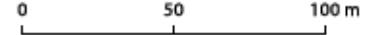


Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- Field Boundary
- Field Drain
- Natural
- Pipe
- Ridge and Furrow
- Field System
- Archaeology
- Magnetic Disturbance
- Quarry
- Uncertain



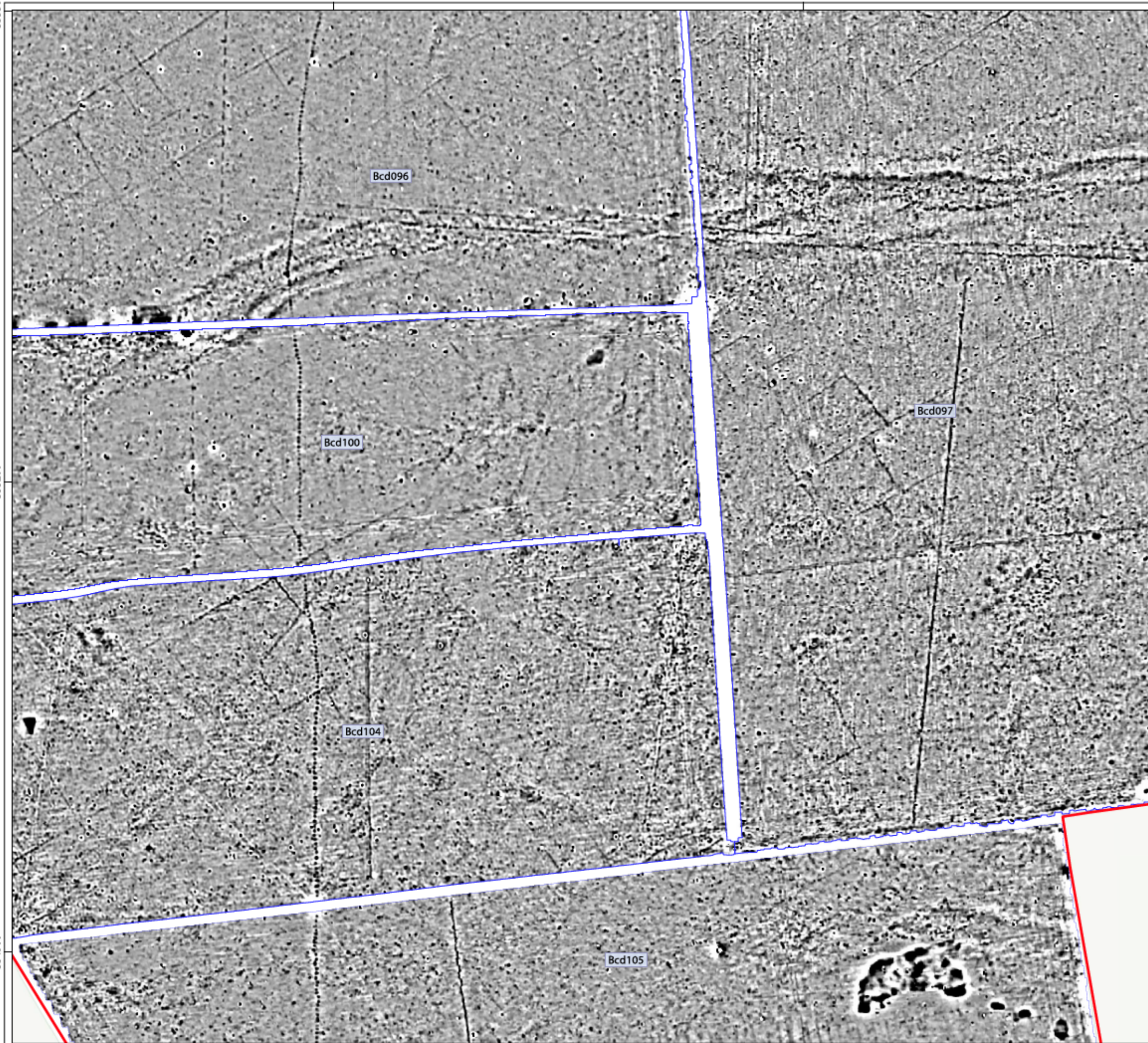
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Version:	v1.2
Date:	05/07/2023
Scale:	1:2,500 @ A3

355500

355200

354900

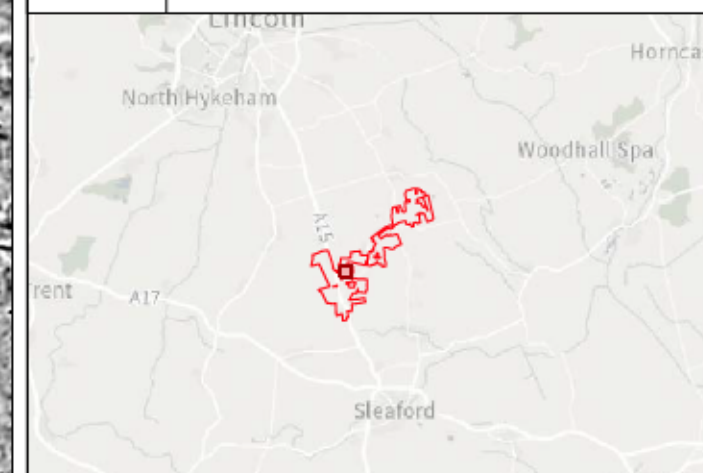


503400

503700

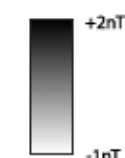


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Key

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- Survey Extent



0 50 100 m

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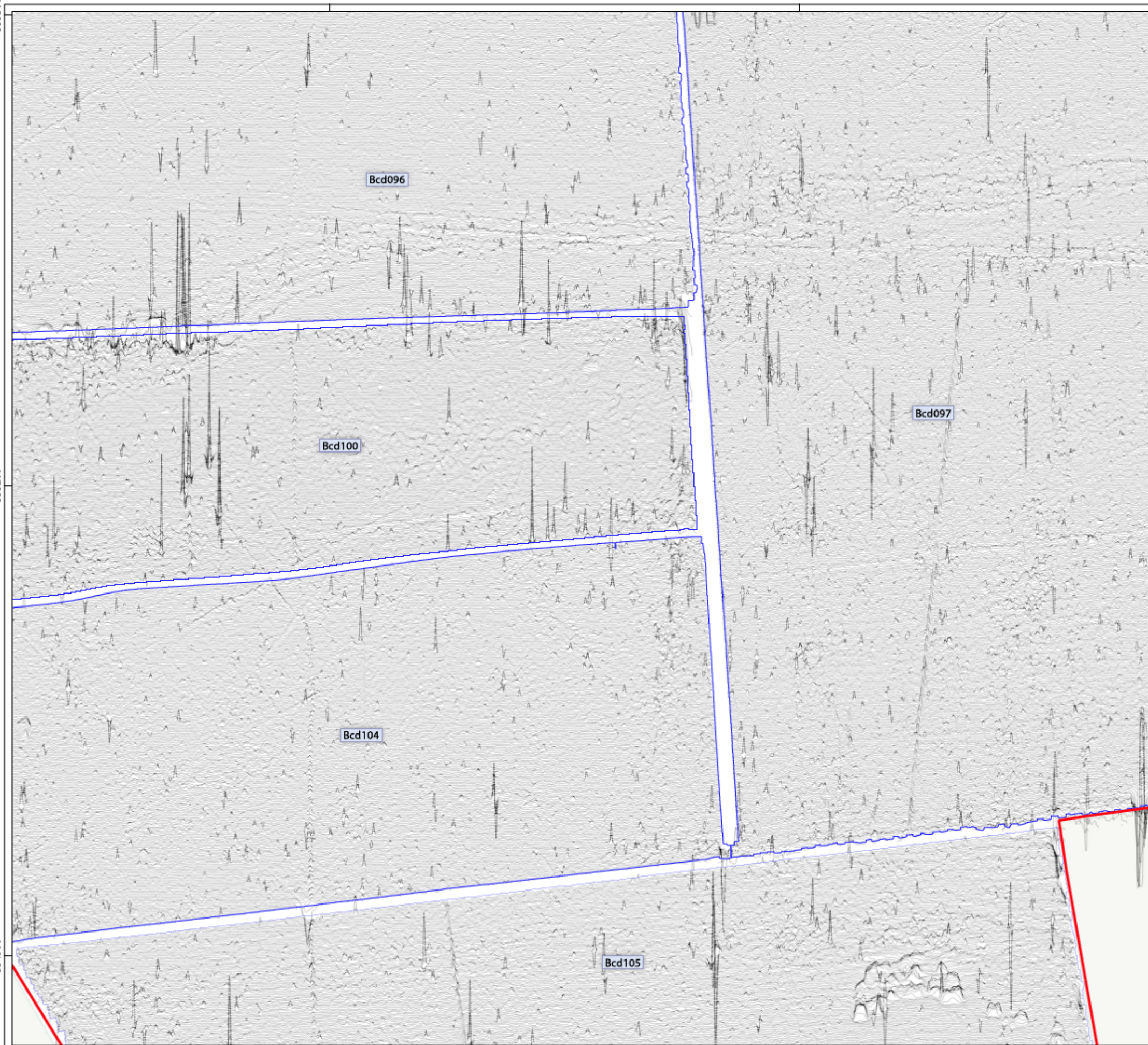
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Illus - 47 XY trace plot of minimally processed magnetometer data; Sector 1

355500

355200

354900

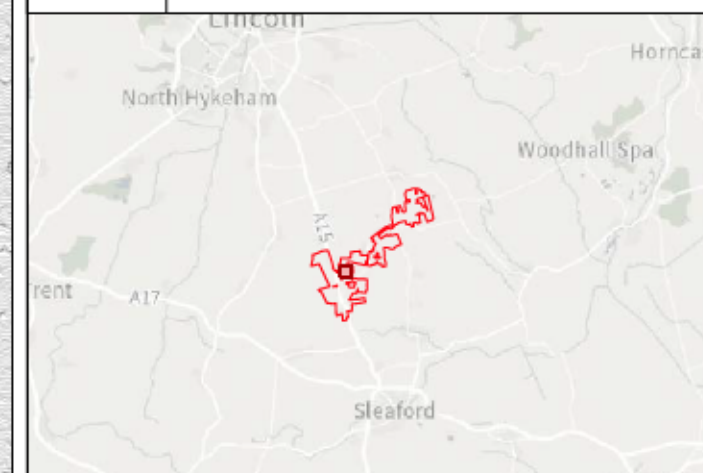


503400

503700



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Key

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

0 50 100 m

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Version:	v1.2
Date:	05/07/2023
Scale:	1:2,500 @ A3

Illus - 48 XY trace plot of minimally processed magnetometer data; Sector 1

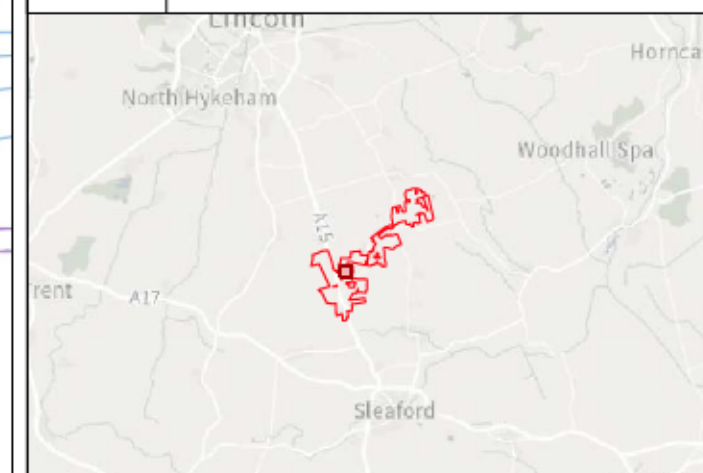
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503400

503700



Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- Field Boundary
- + Field Drain
- Natural
- Pipe
- Uncertain
- - - Ridge and Furrow
- Field System
- Possible Archaeology
- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- Uncertain
- Former Building

0 50 100 m

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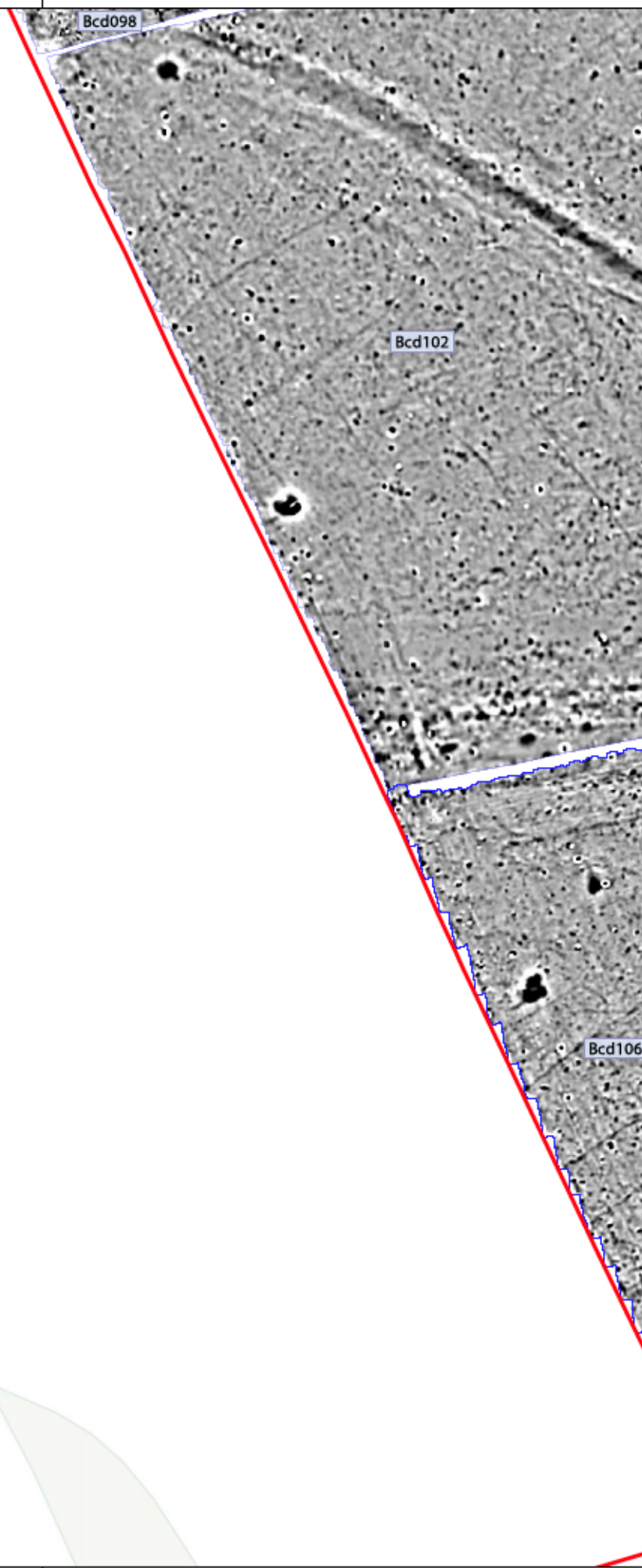
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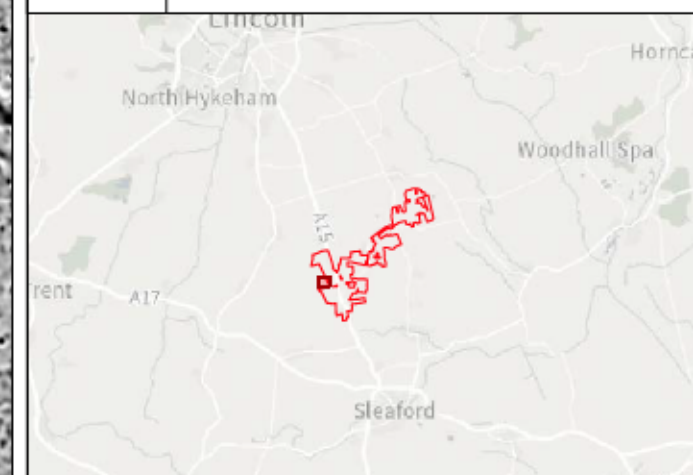
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501900

502200

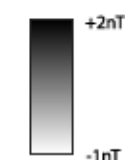


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Key

- Geophysical Survey Area
- Survey Extent



0 50 100 m

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Date:	05/07/2023
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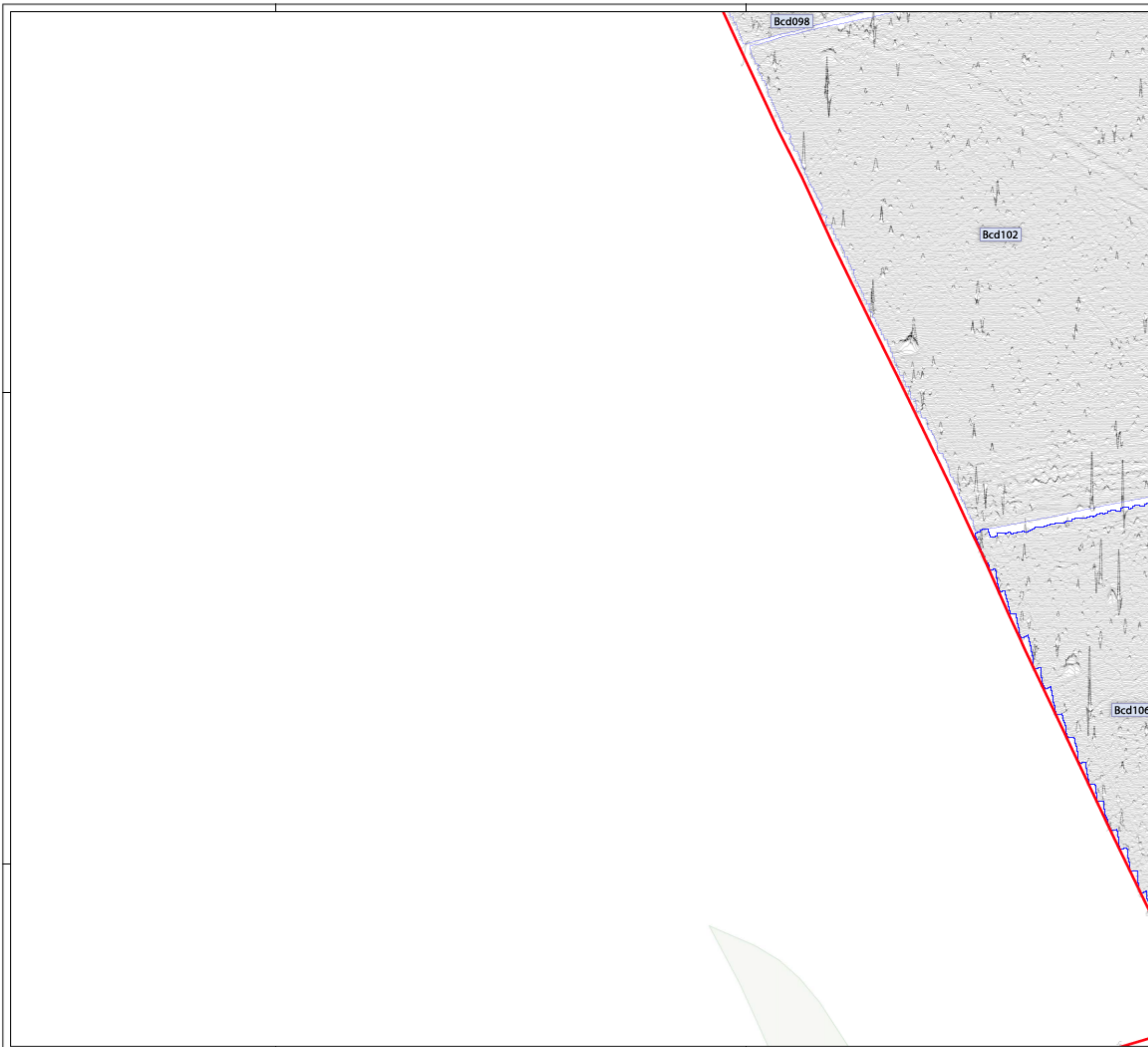
Illus - 50 XY trace plot of minimally processed magnetometer data; Sector 2

354600

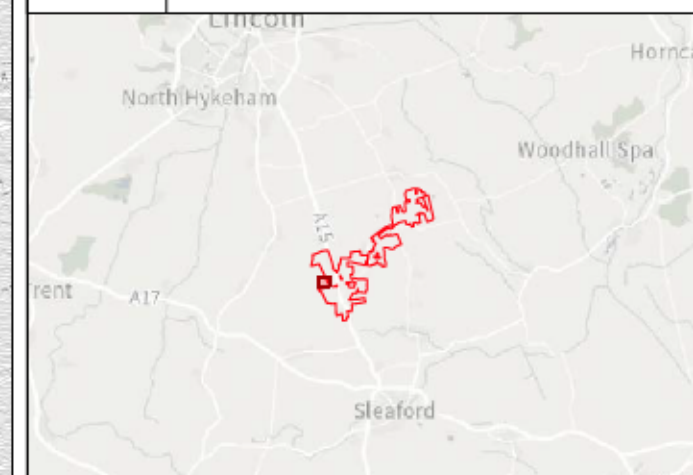
354300

501900

502200



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Key

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

0 50 100 m

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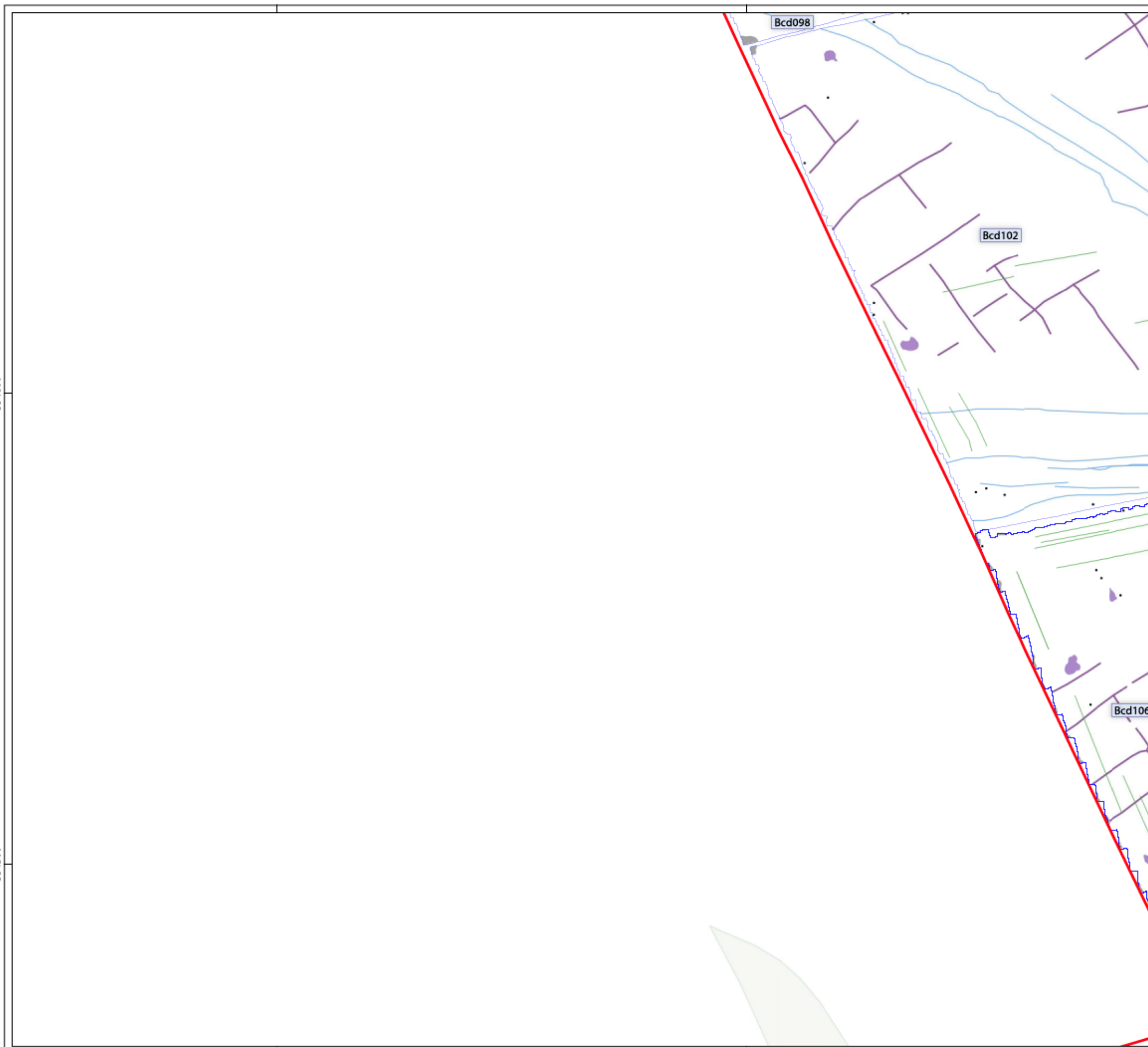
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Illus - 51 XY trace plot of minimally processed magnetometer data; Sector 2

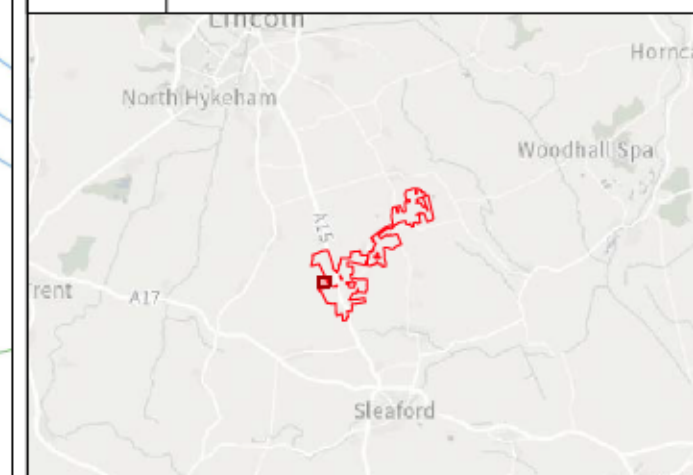
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354300



501900

502200



Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- Natural
- Field System
- Magnetic Disturbance
- Uncertain

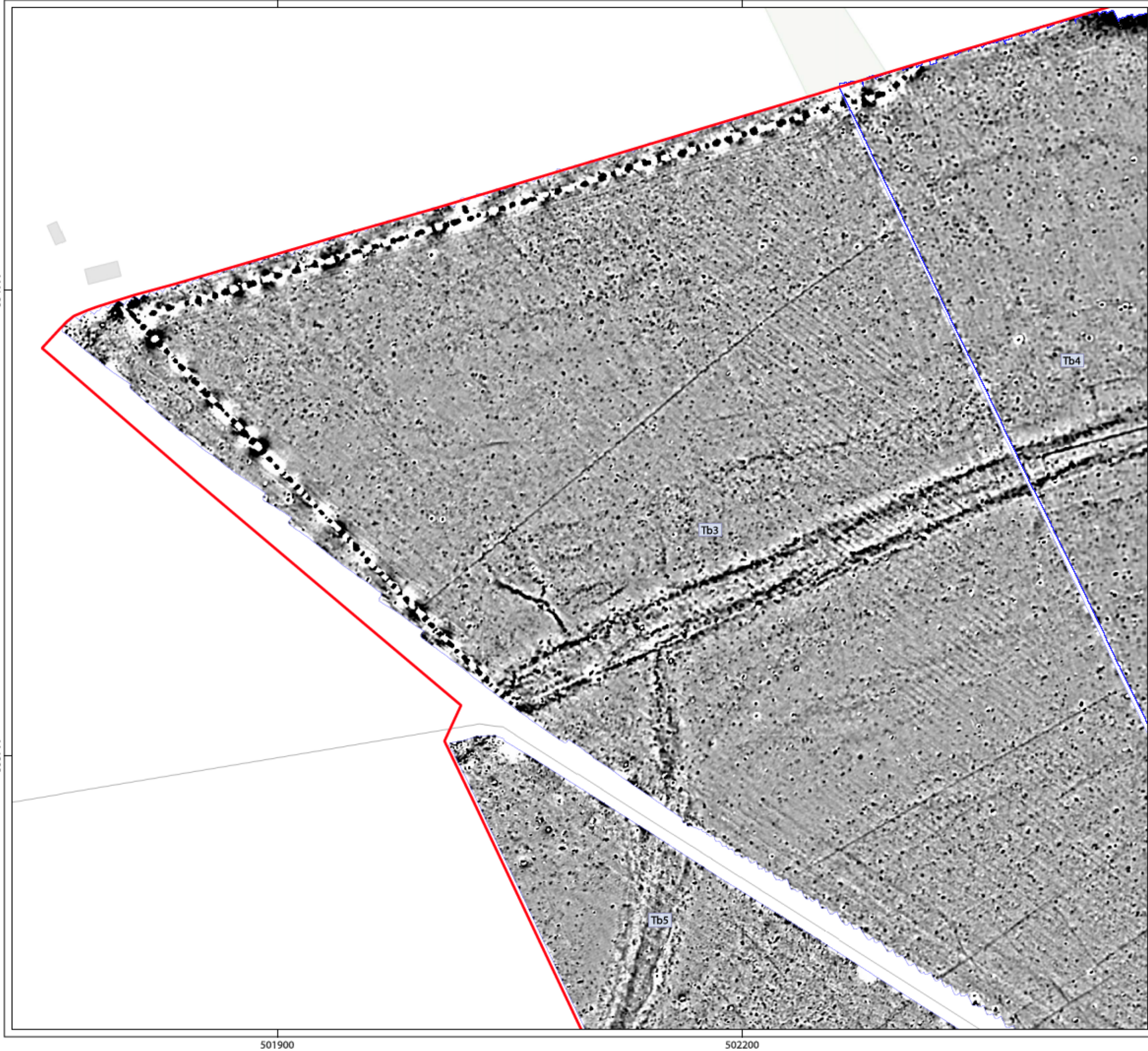
0 50 100 m

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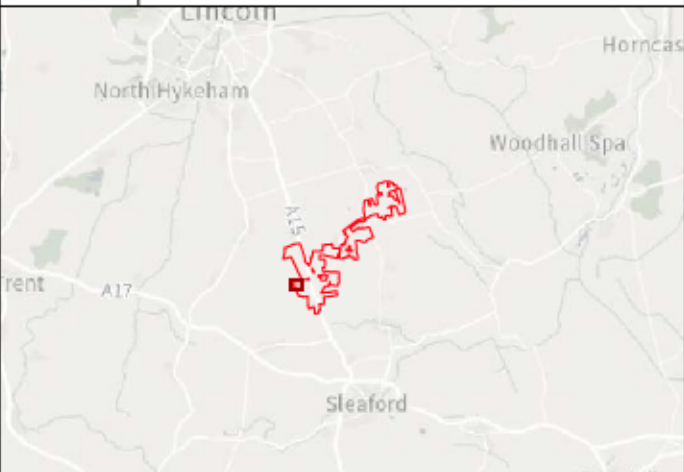









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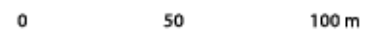
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Key

-  Geophysical Survey Area
-  Survey Extent

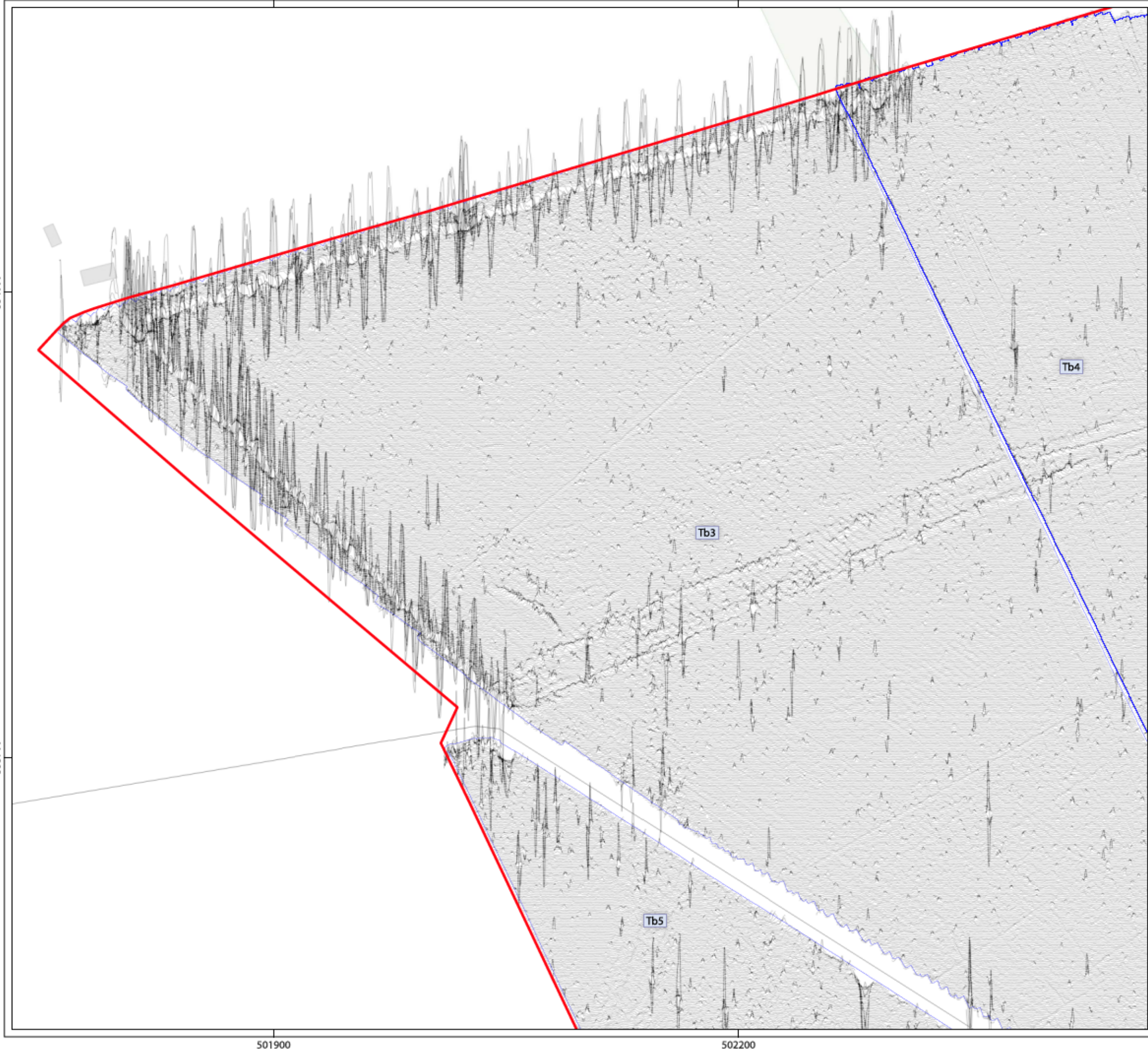






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Illus - 53 XY trace plot of minimally processed magnetometer data; Sector 2

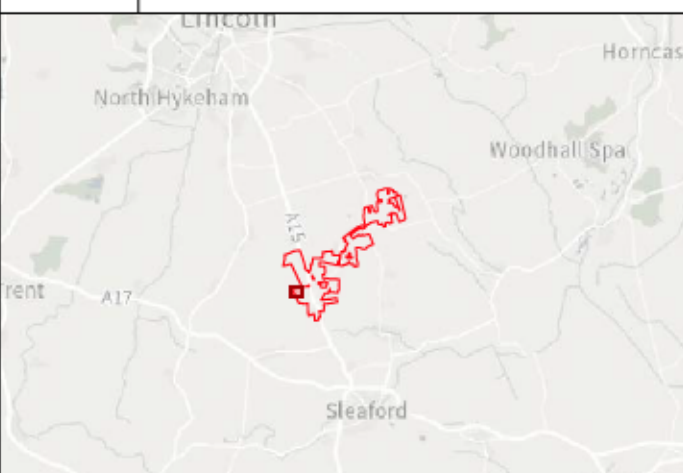









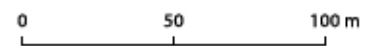
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Key

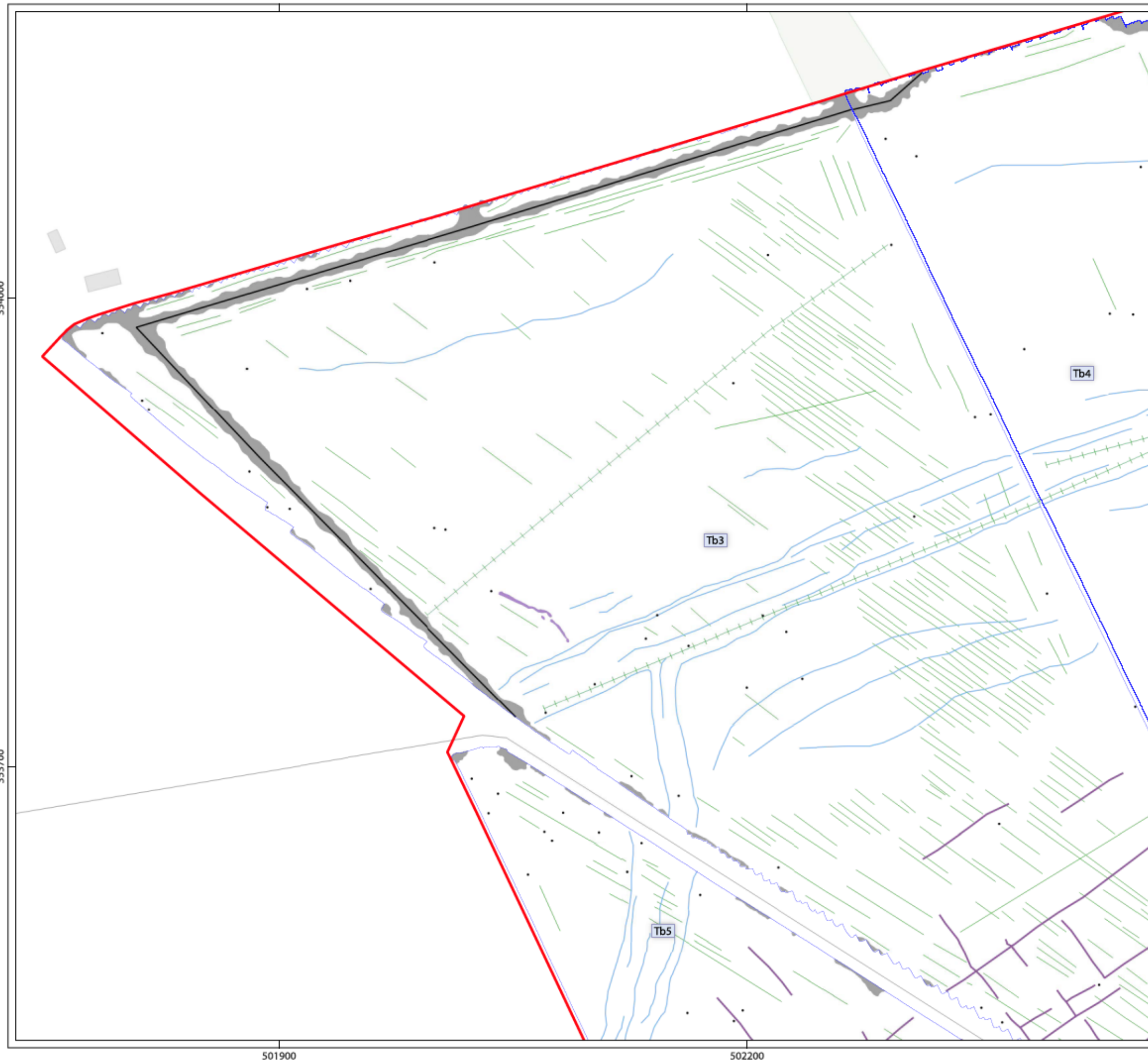
-  Geophysical Survey Area
-  Survey Extent
-  XY Trace (25nT/cm)





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Illus - 54 XY trace plot of minimally processed magnetometer data; Sector 2

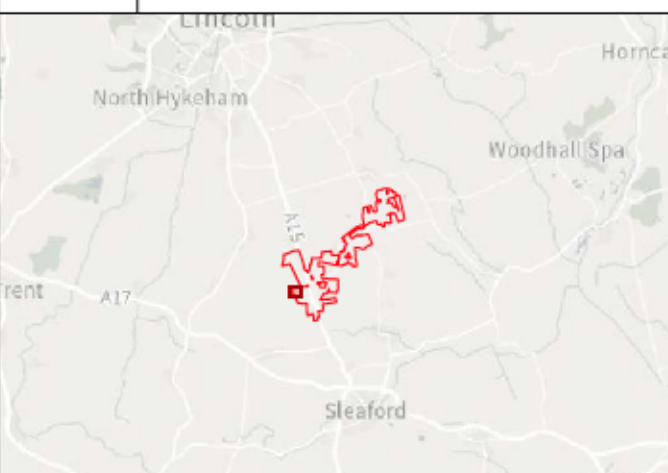








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Key


 Geophysical Survey Area


 Survey Extent


Interpretation


 Ferrous Objects


 Agriculture


 Field Drain

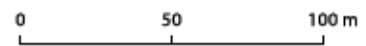
 Natural

 Pipe

 Field System

 Magnetic Disturbance

 Uncertain



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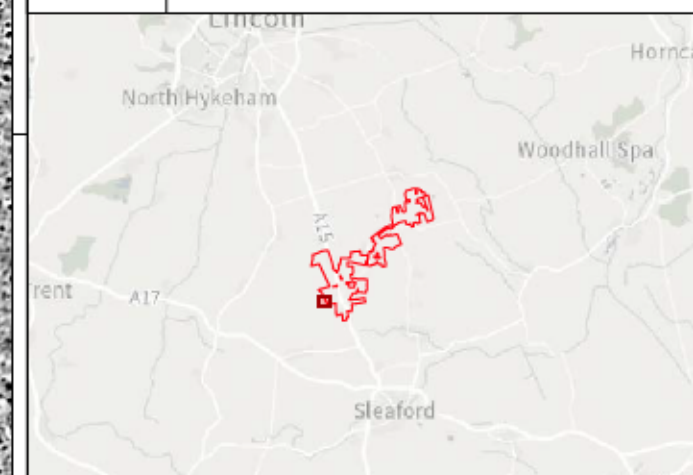
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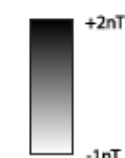
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353100



Key

- Geophysical Survey Area
- Survey Extent



0 50 100 m

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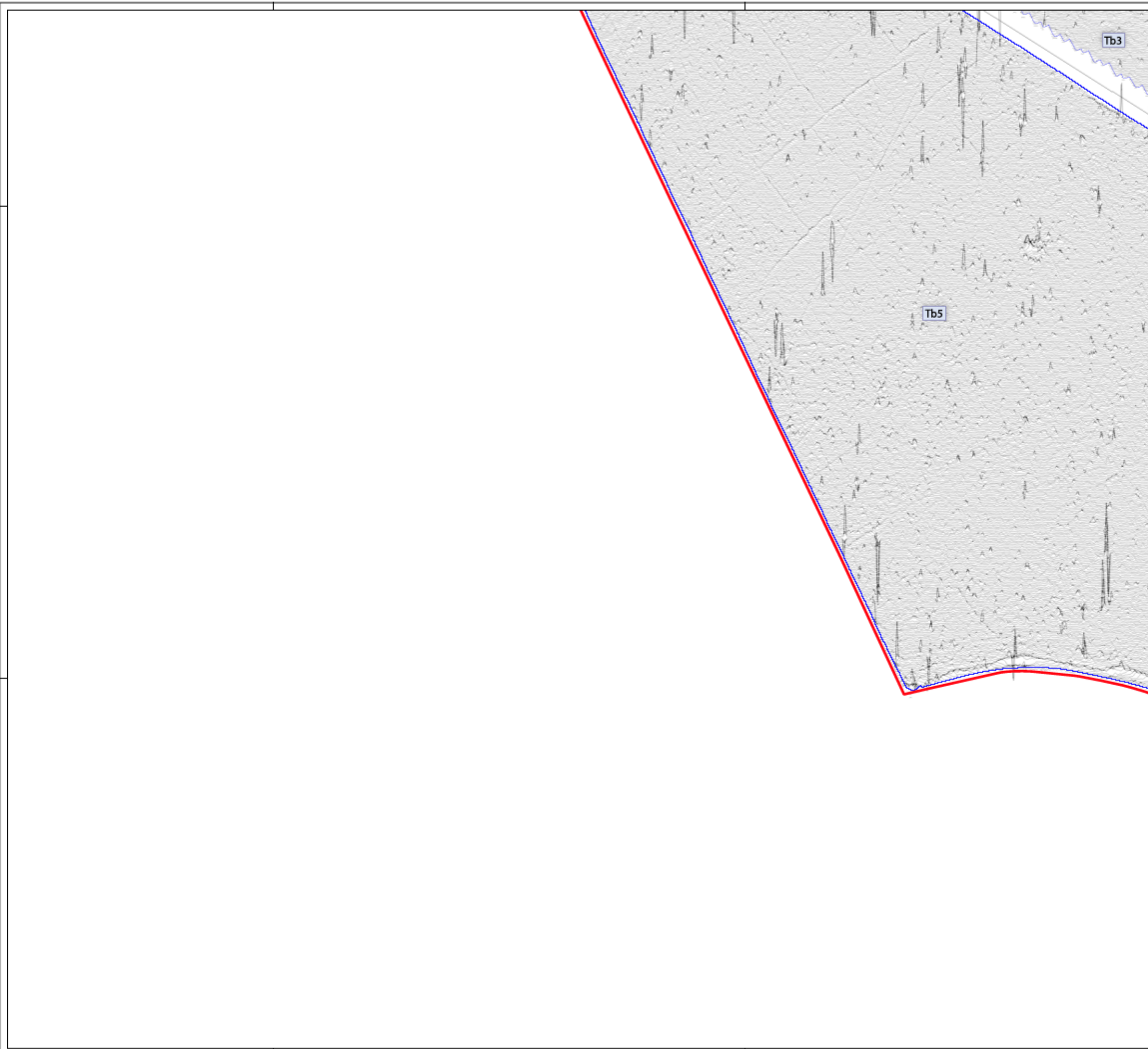
501900

502200

Illus - 56 XY trace plot of minimally processed magnetometer data; Sector 2

353400

353100

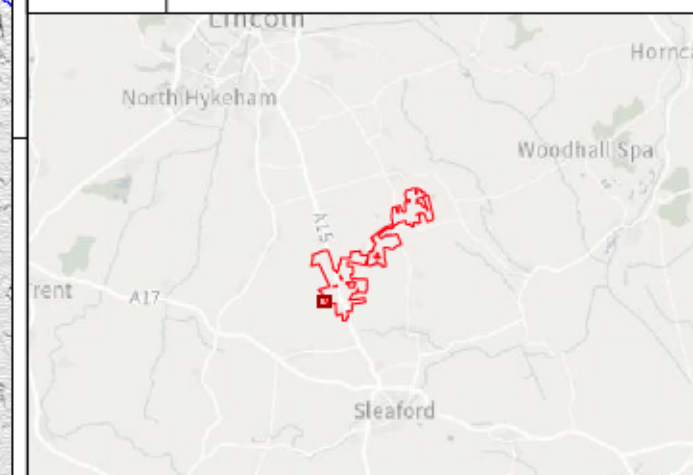


501900

502200



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Key

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

0 50 100 m

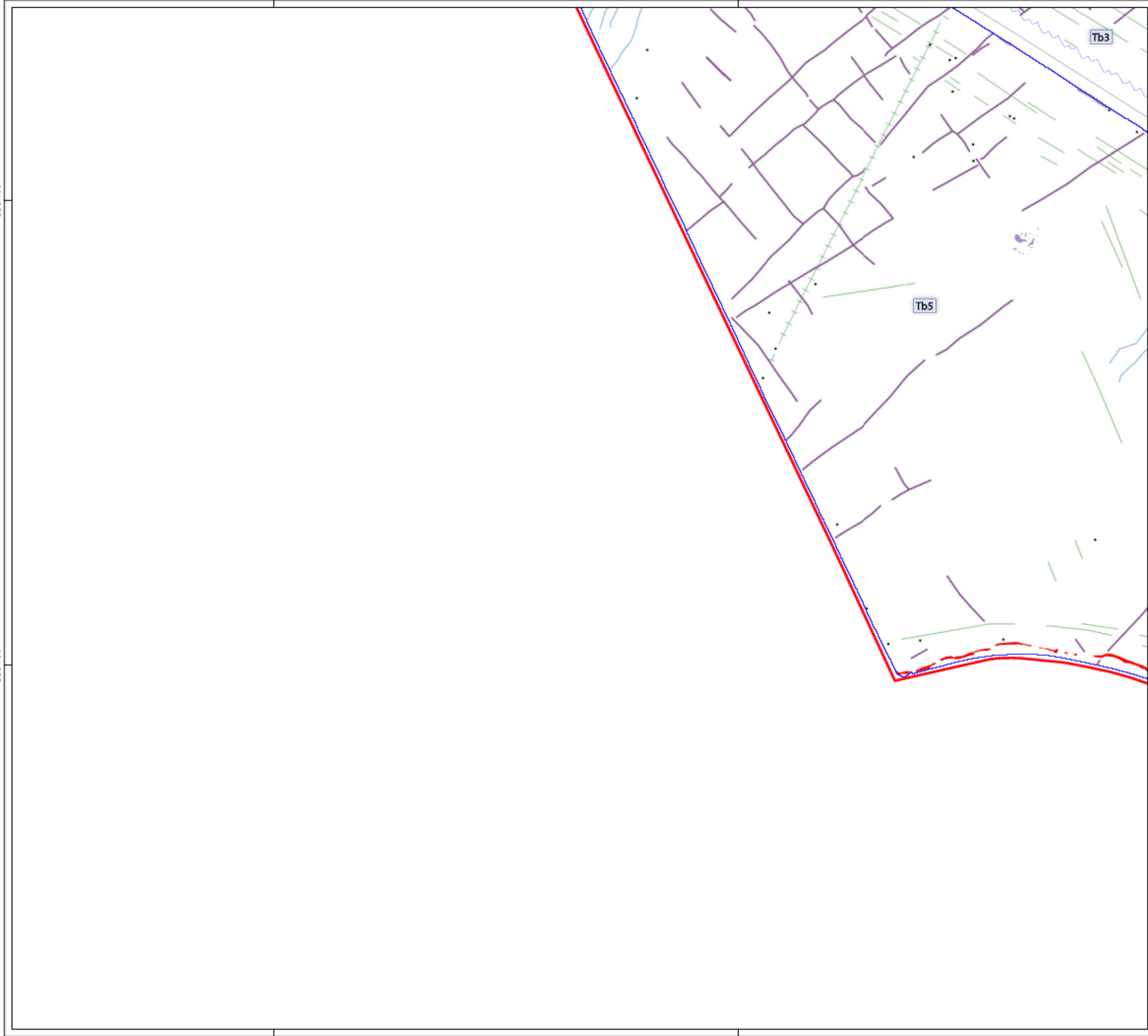
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Illus - 57 XY trace plot of minimally processed magnetometer data; Sector 2

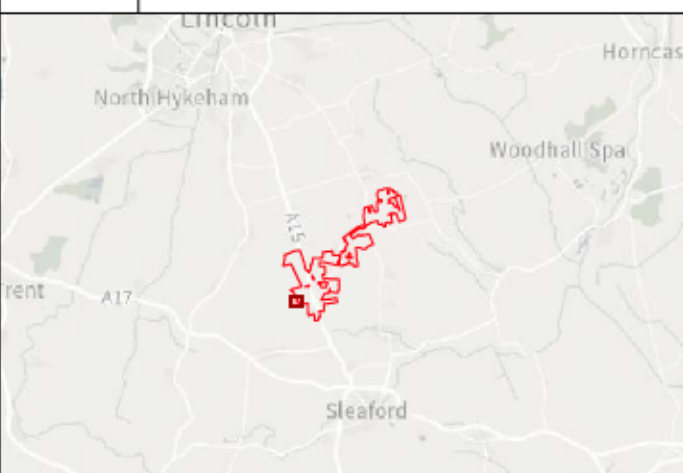








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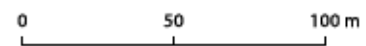


Key

-  Geophysical Survey Area
-  Survey Extent

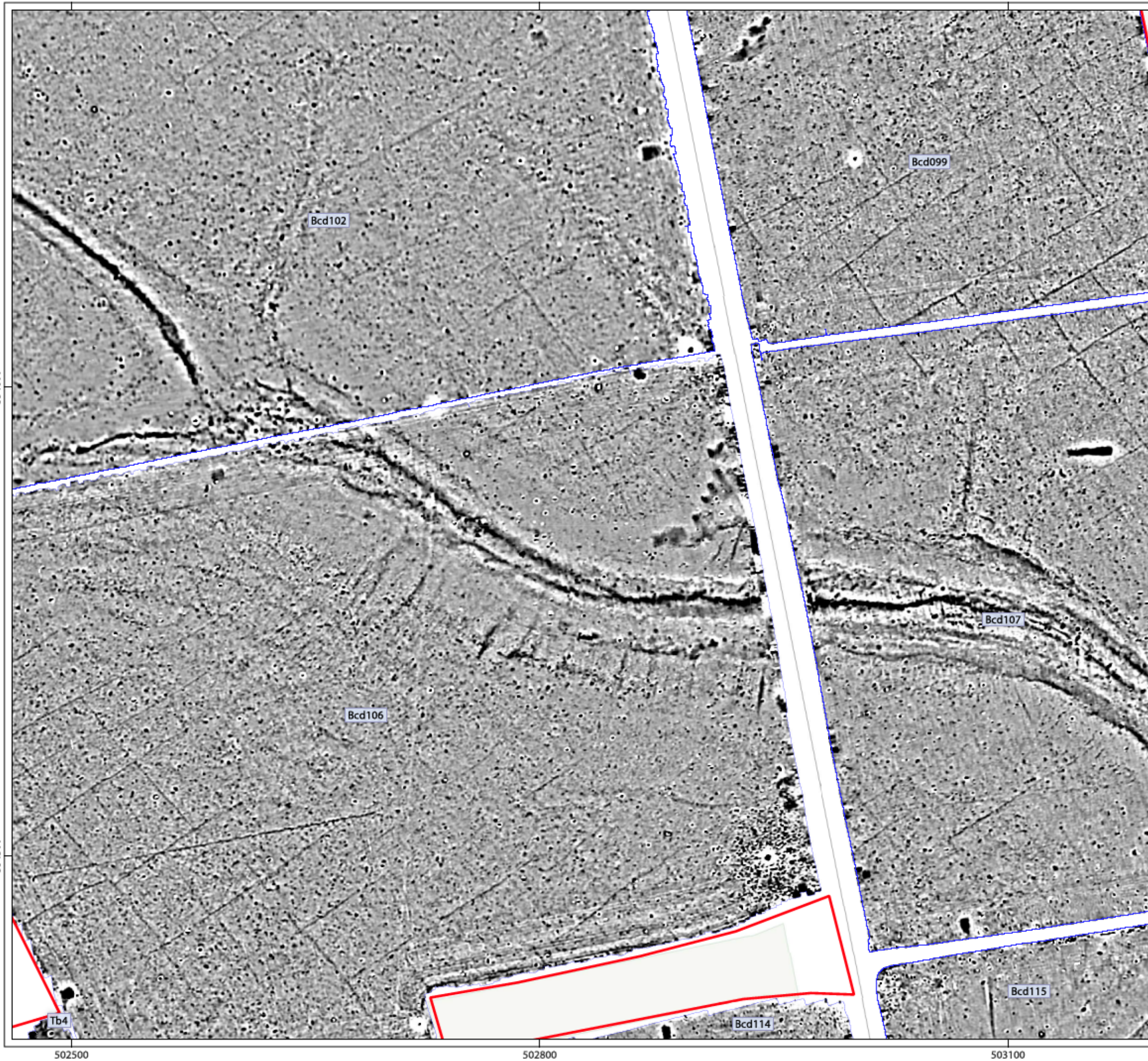
Interpretation

-  Ferrous Objects
-  Agriculture
-  Field Drain
-  Natural
-  Field System
-  Archaeology
-  Magnetic Disturbance
-  Uncertain



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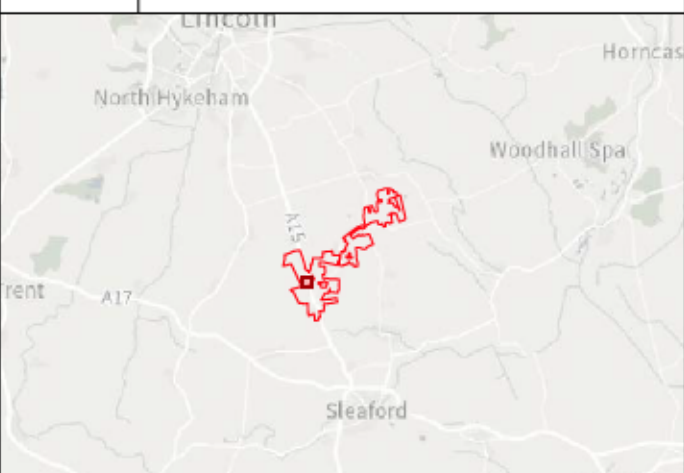









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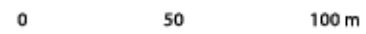


Key

-  Geophysical Survey Area
-  Survey Extent



+2nT
-1nT

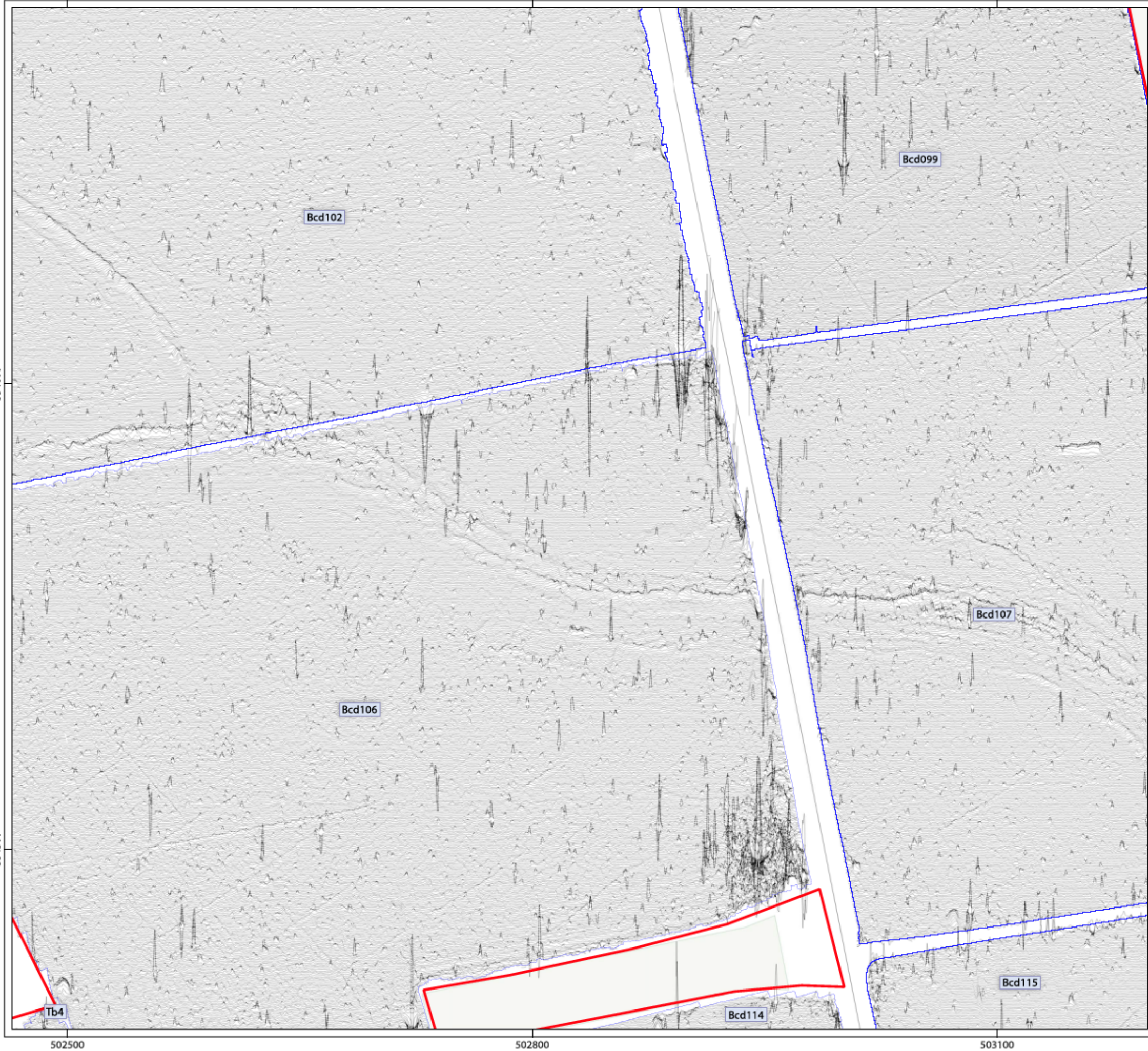



0 50 100 m


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Illus - 59 XY trace plot of minimally processed magnetometer data; Sector 2

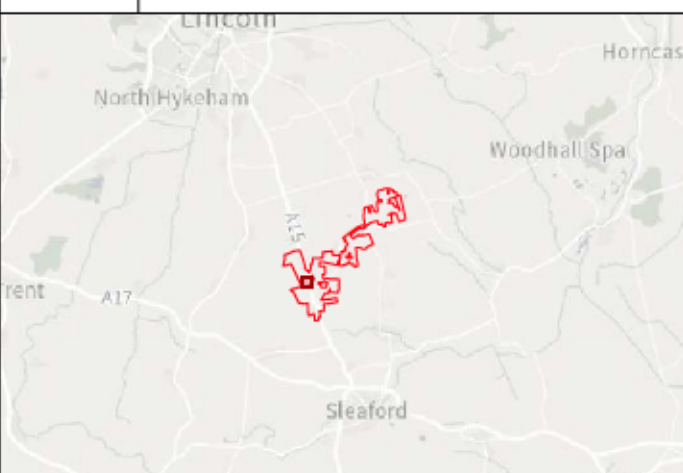









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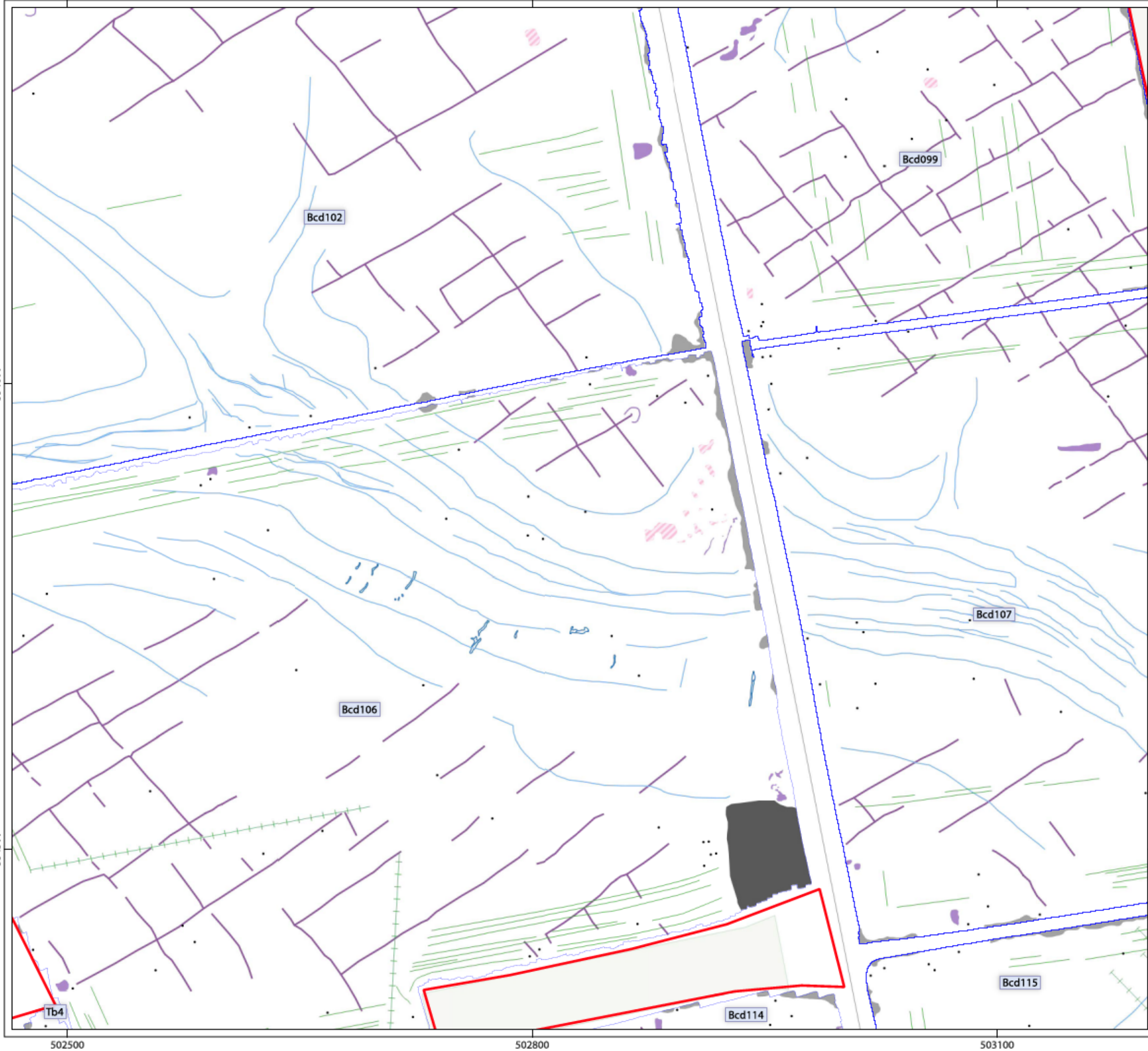
Key

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

0 50 100 m

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354600


354300

502500

502800

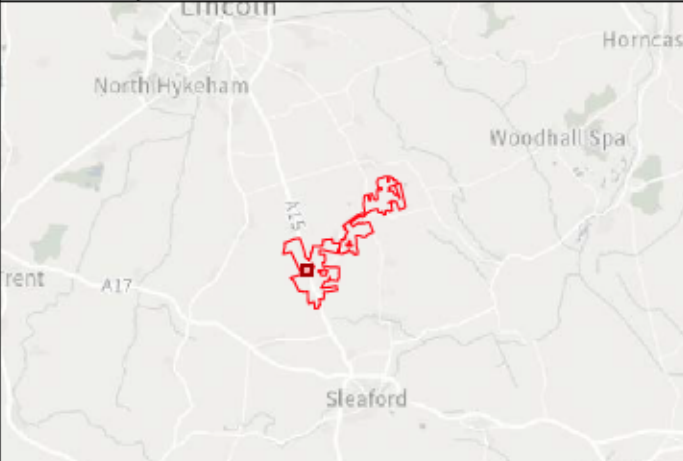
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Key

-  Geophysical Survey Area
-  Survey Extent

Interpretation

-  Ferrous Objects
-  Agriculture
-  Field Drain
-  Natural
-  Uncertain
-  Field System
-  Magnetic Disturbance
-  Quarry
-  Uncertain
-  Former Building
-  Geology
-  Burning

0

50

100 m

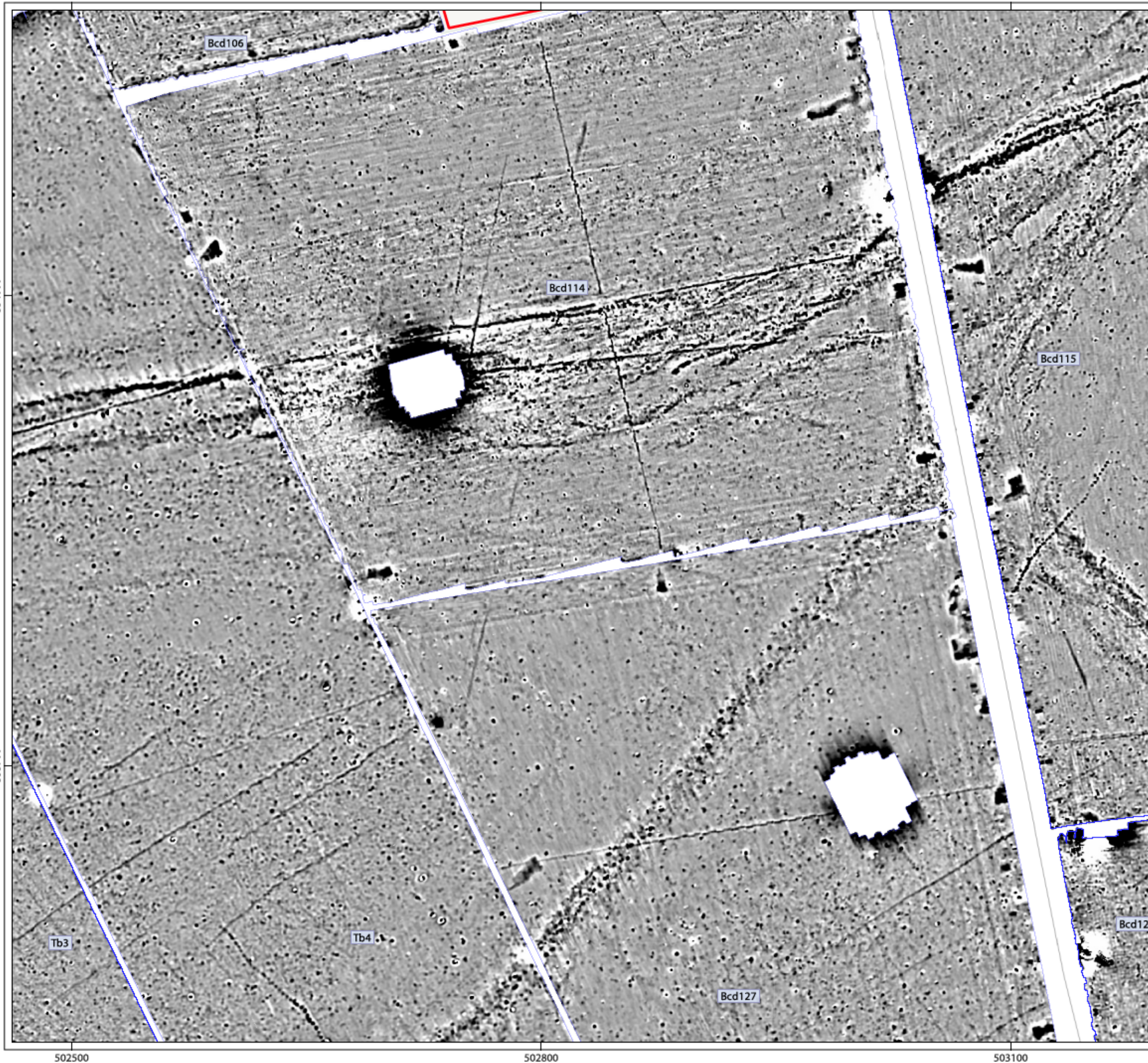
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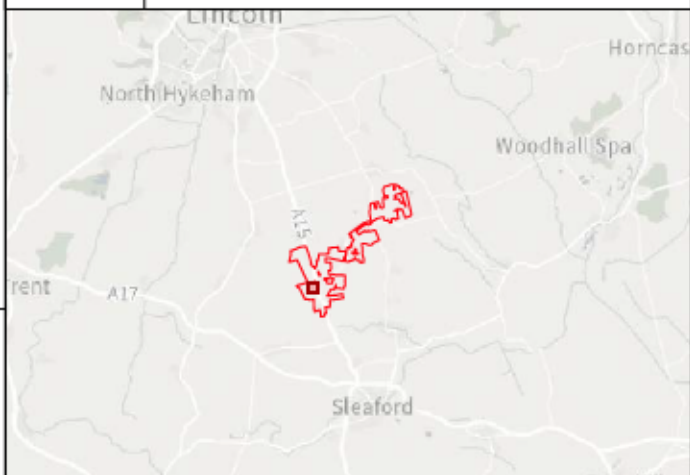
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Date:	05/07/2023
Scale:	1:2,500 @ A3

Illus - 61 Interpretation of magnetometer data; Sector 2



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Key

Geophysical Survey Area

Survey Extent

+2nT

-1nT

0 50 100 m

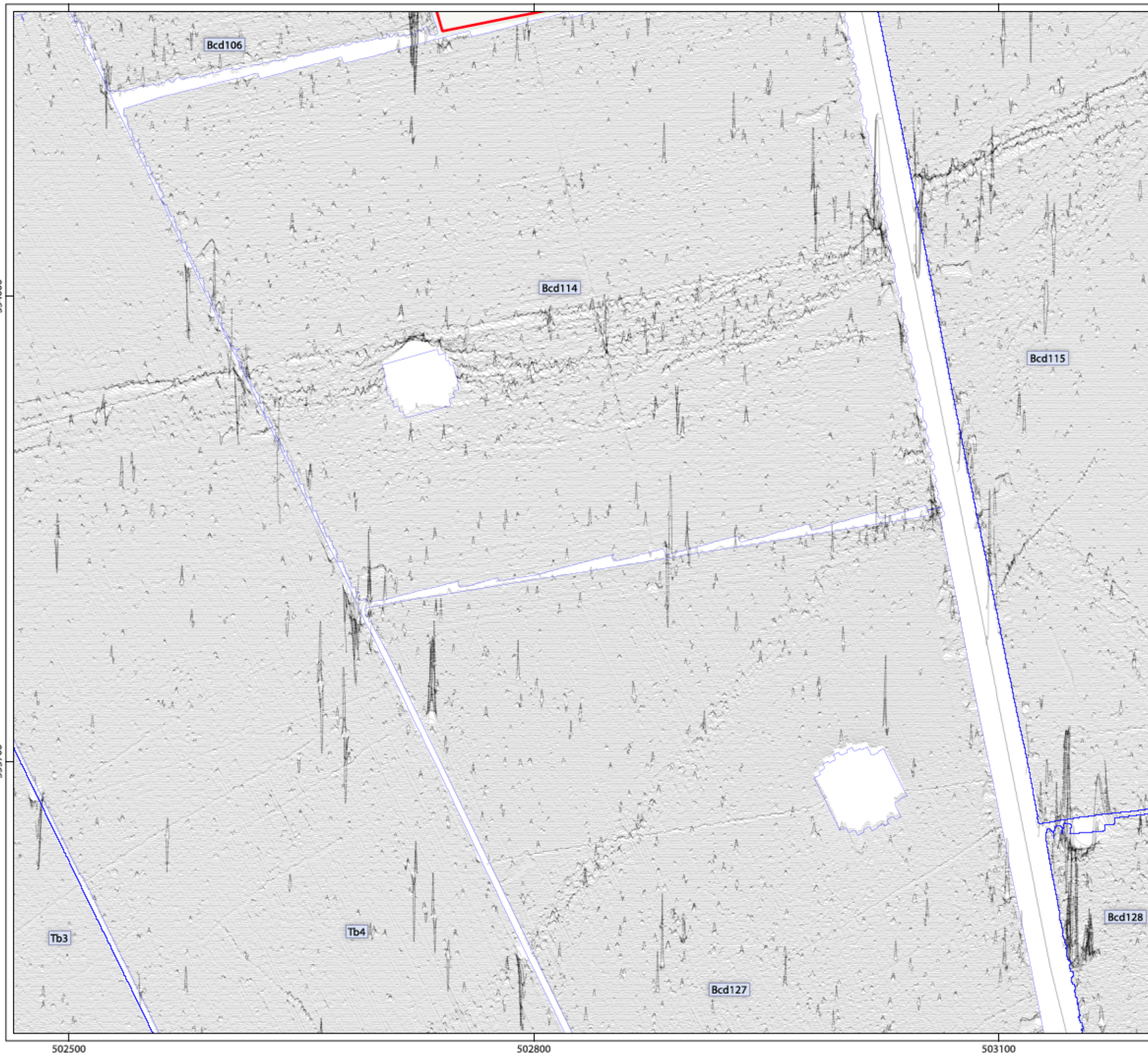
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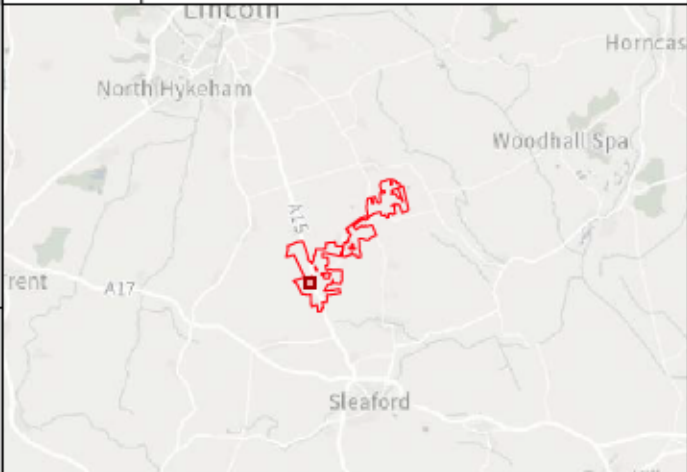
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Illus - 62 XY trace plot of minimally processed magnetometer data; Sector 2

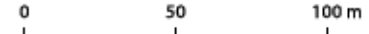


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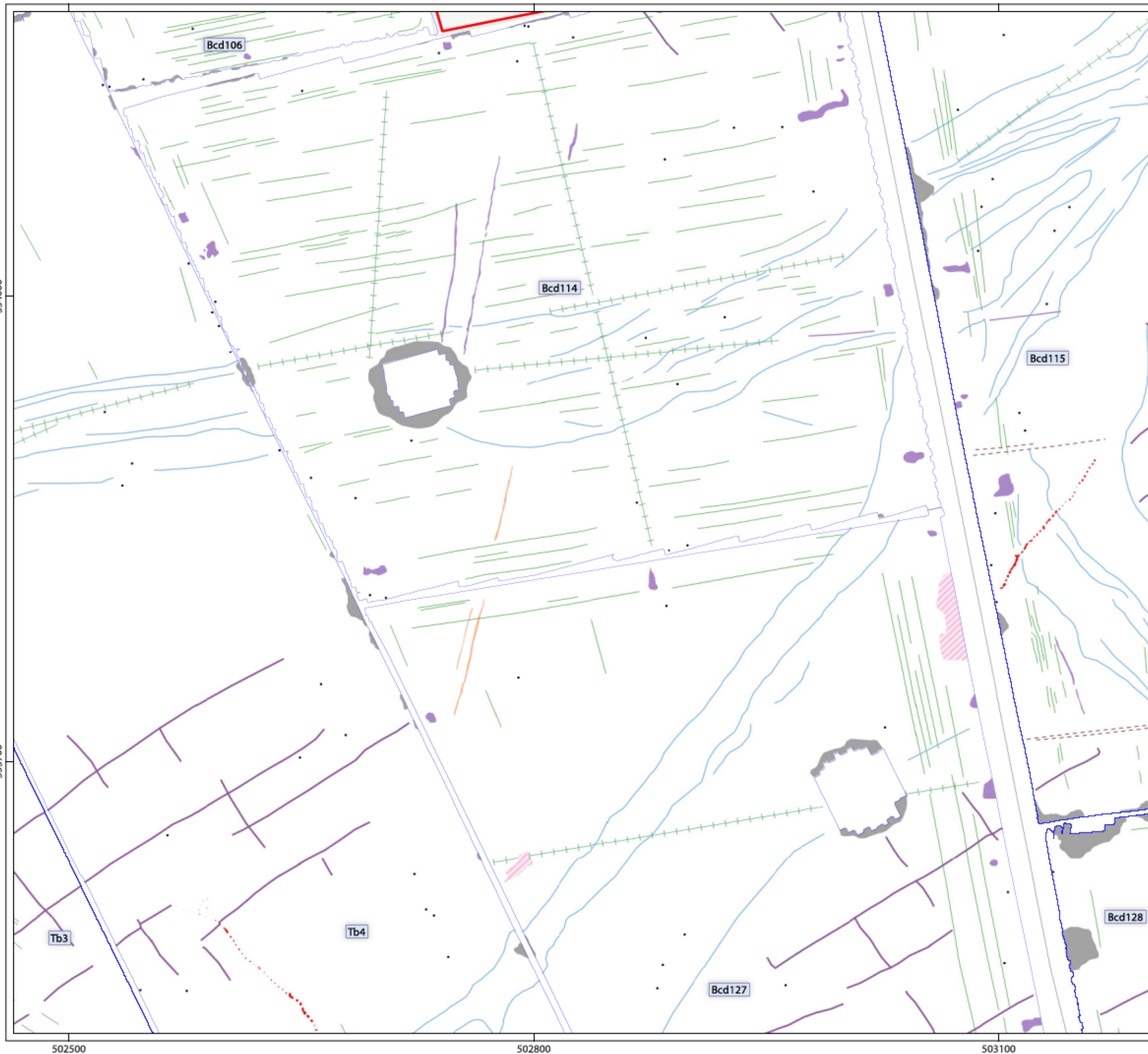
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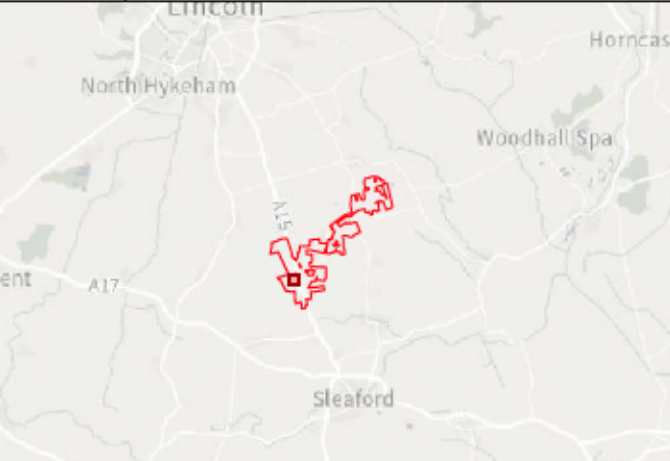

- Geophysical Survey Area
- Survey Extent
- XY Trace (25nT/cm)




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Key

- Geophysical Survey Area
- Survey Extent

Interpretation


- Ferrous Objects
- Agriculture
- - - Possible Field Boundary
- + + + Field Drain
- Natural
- Uncertain
- Field System
- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- Quarry
- Uncertain


0 50 100 m

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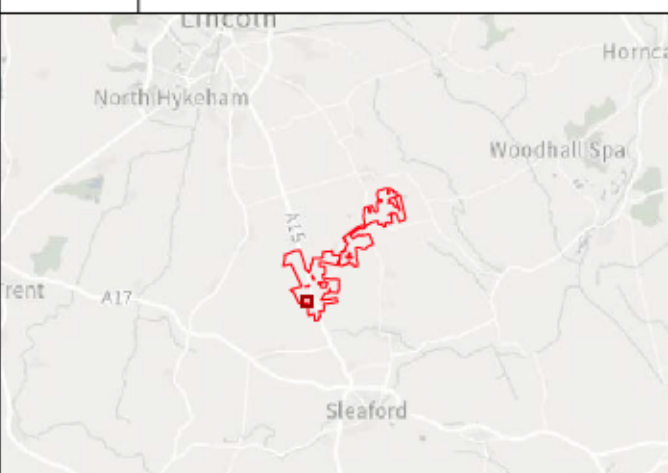







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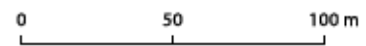


Key

- Geophysical Survey Area
- Survey Extent



+2nT
-1nT



0 50 100 m

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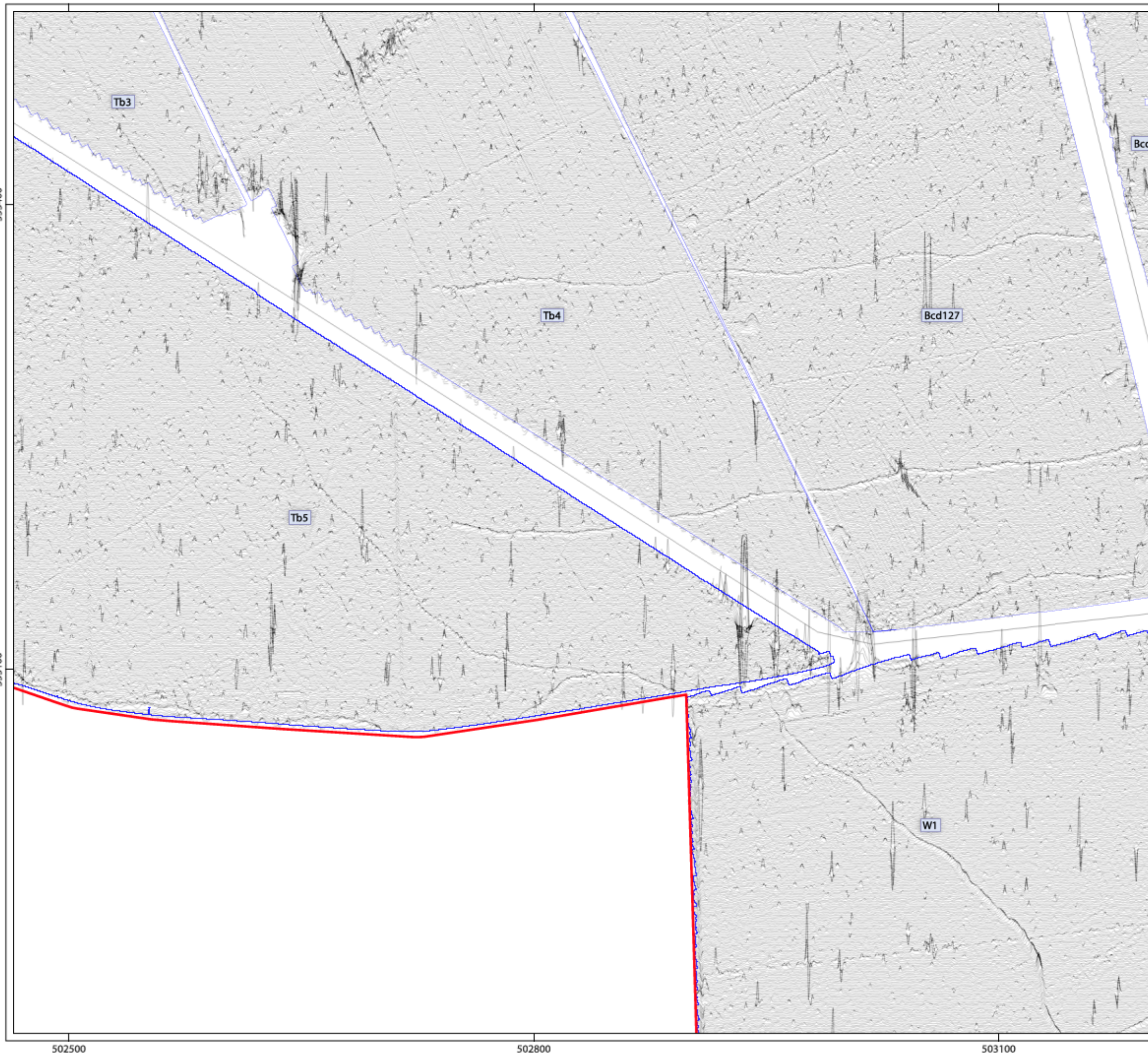
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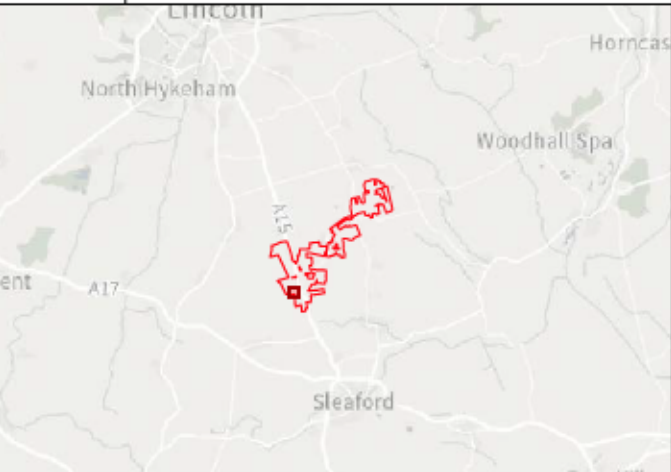
502800

503100

Illus - 65 XY trace plot of minimally processed magnetometer data; Sector 2



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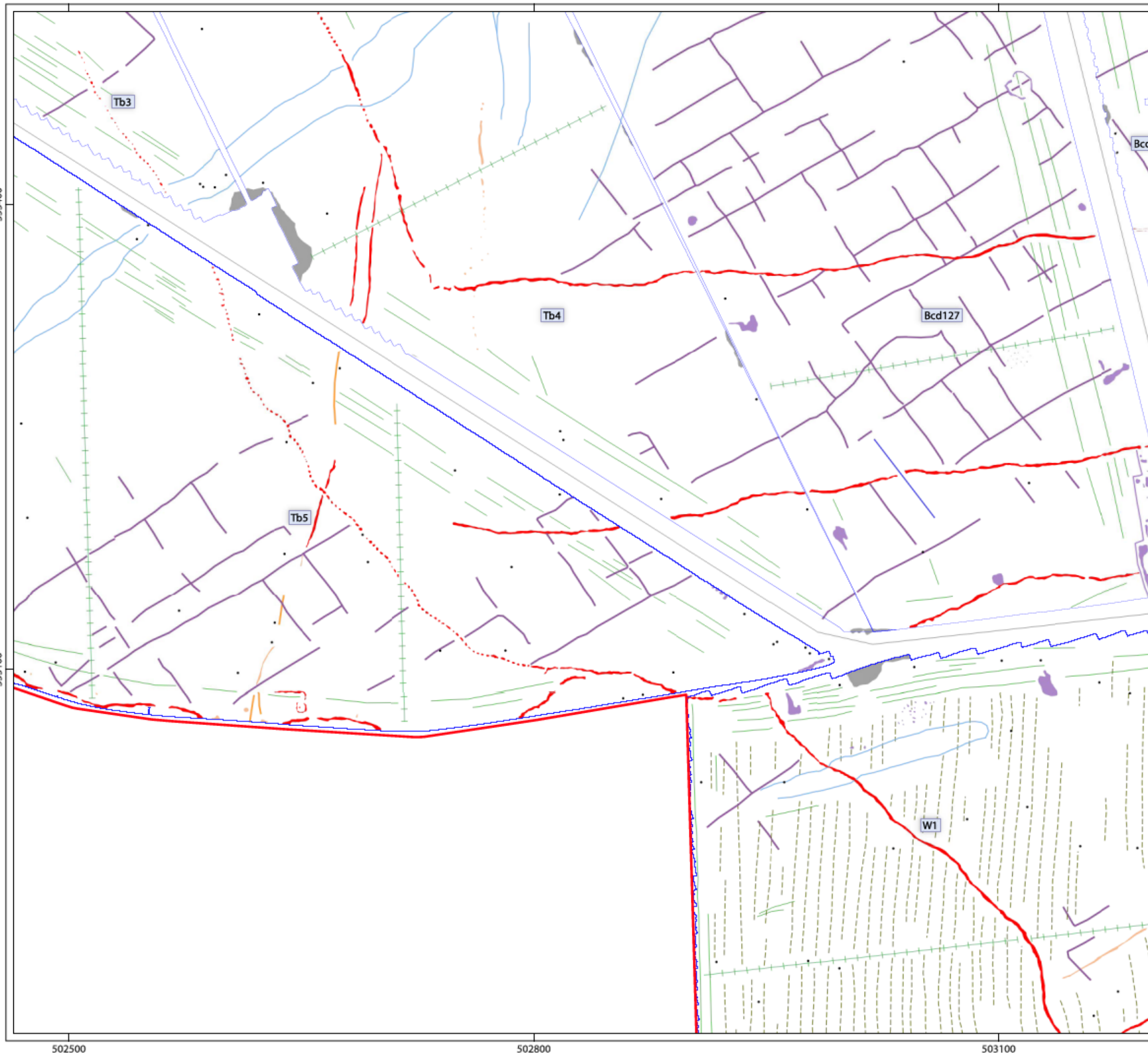


- Key**
- Geophysical Survey Area
 - Survey Extent
 - XY Trace (25nT/cm)

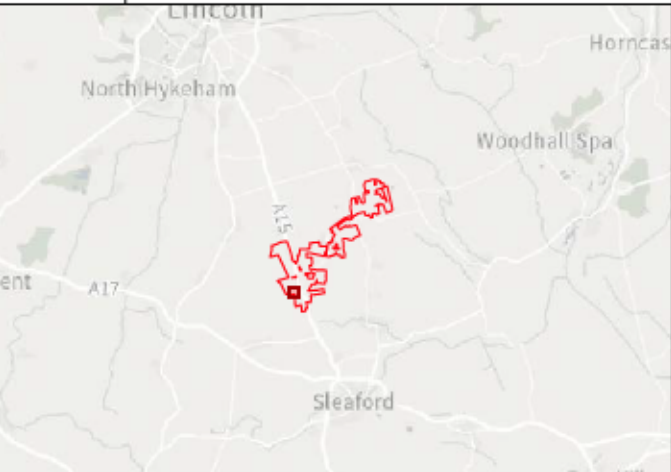


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Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- + Field Drain
- Natural
- Uncertain
- Ridge and Furrow
- LIRM
- Field System
- Possible Archaeology
- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- Uncertain

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Date:	05/07/2023
Scale:	1:2,500 @ A3

352800

352500

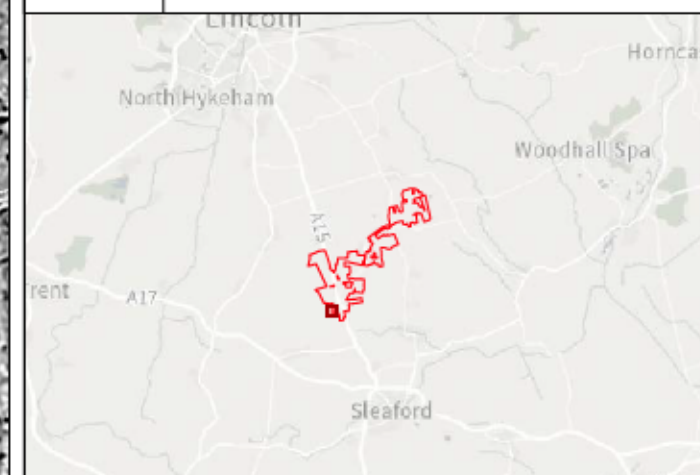
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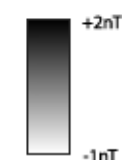


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Key

- Geophysical Survey Area
- Survey Extent



0 50 100 m

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Illus - 68 XY trace plot of minimally processed magnetometer data; Sector 2

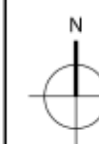
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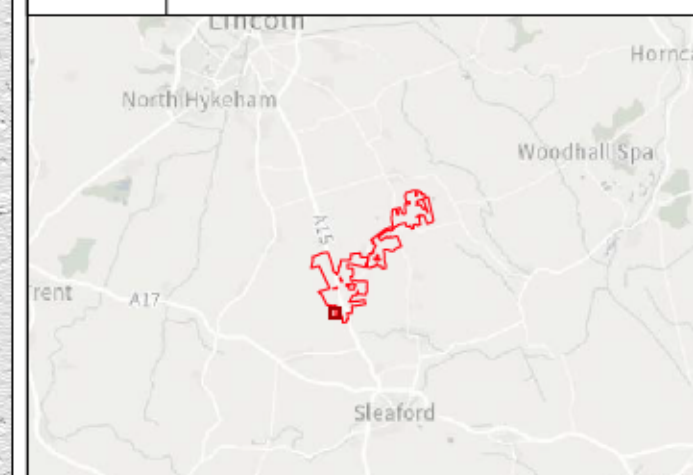
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503100



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Key

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

0 50 100 m

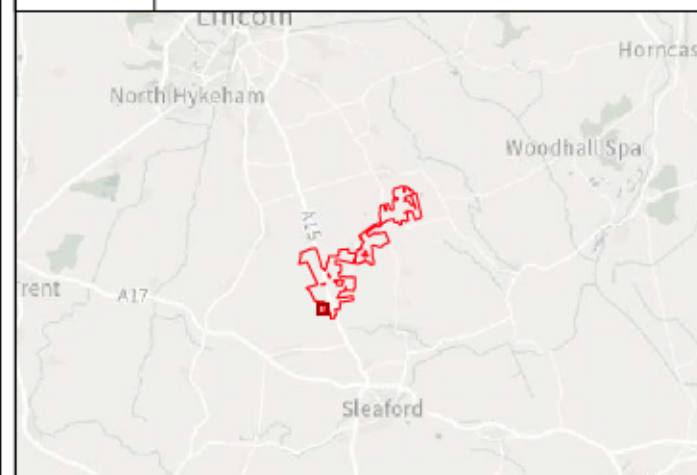
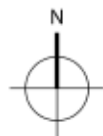
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Illus - 69 XY trace plot of minimally processed magnetometer data; Sector 2



Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- +— Field Drain
- Natural
- - - Ridge and Furrow
- Field System
- Possible Archaeology
- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- Quarry
- Uncertain

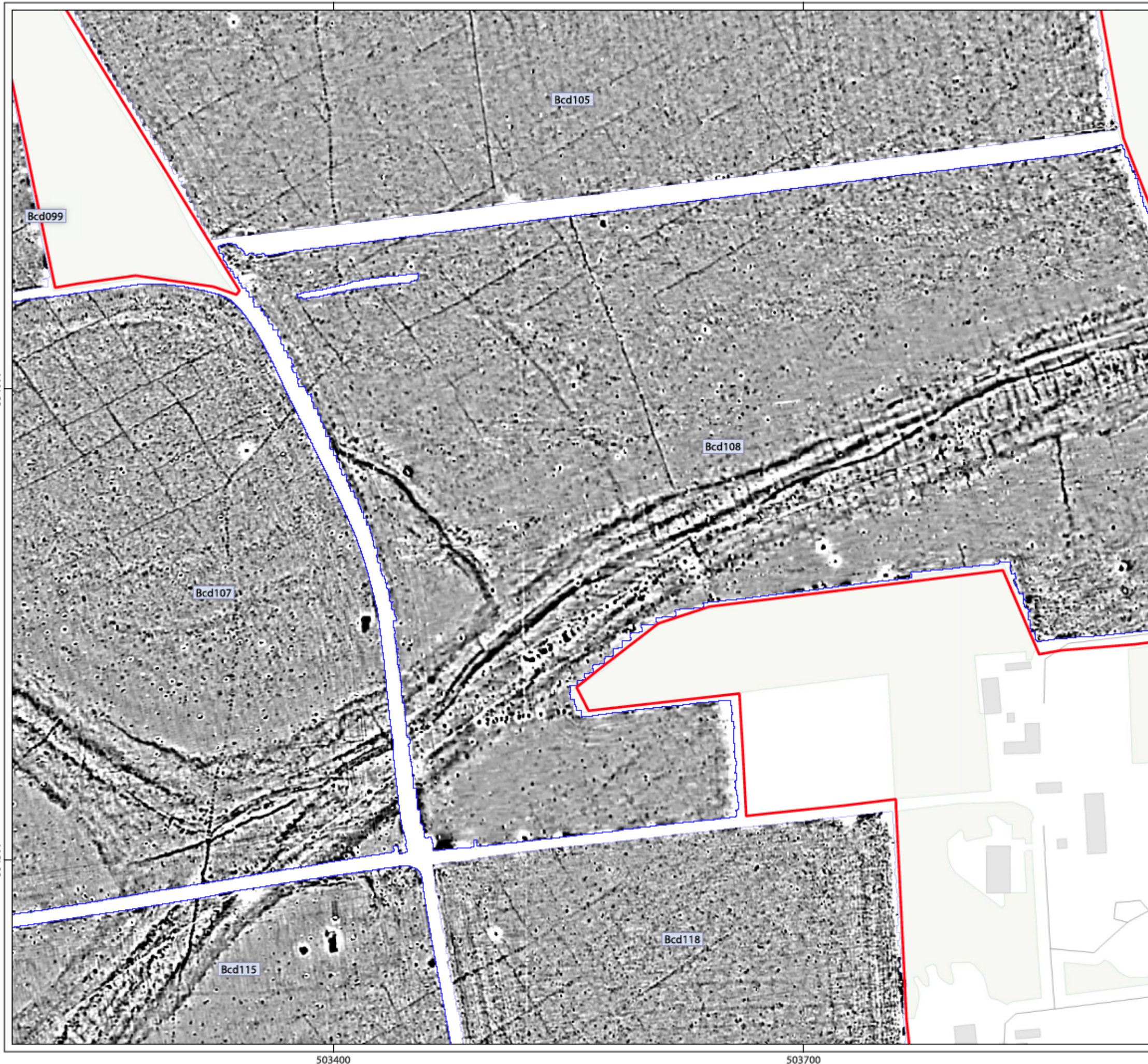
0 50 100 m

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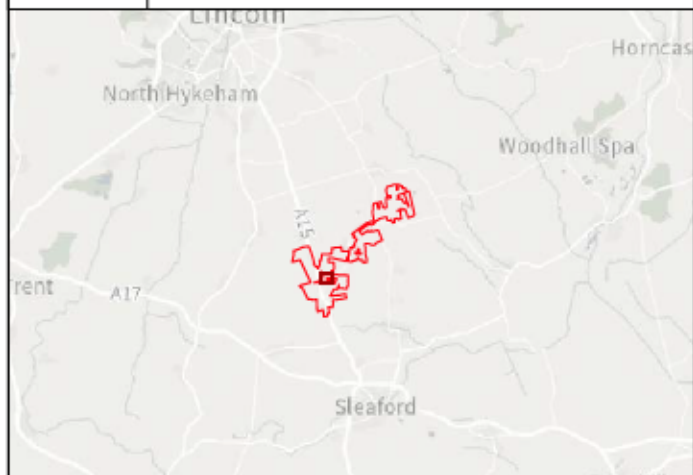
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Key

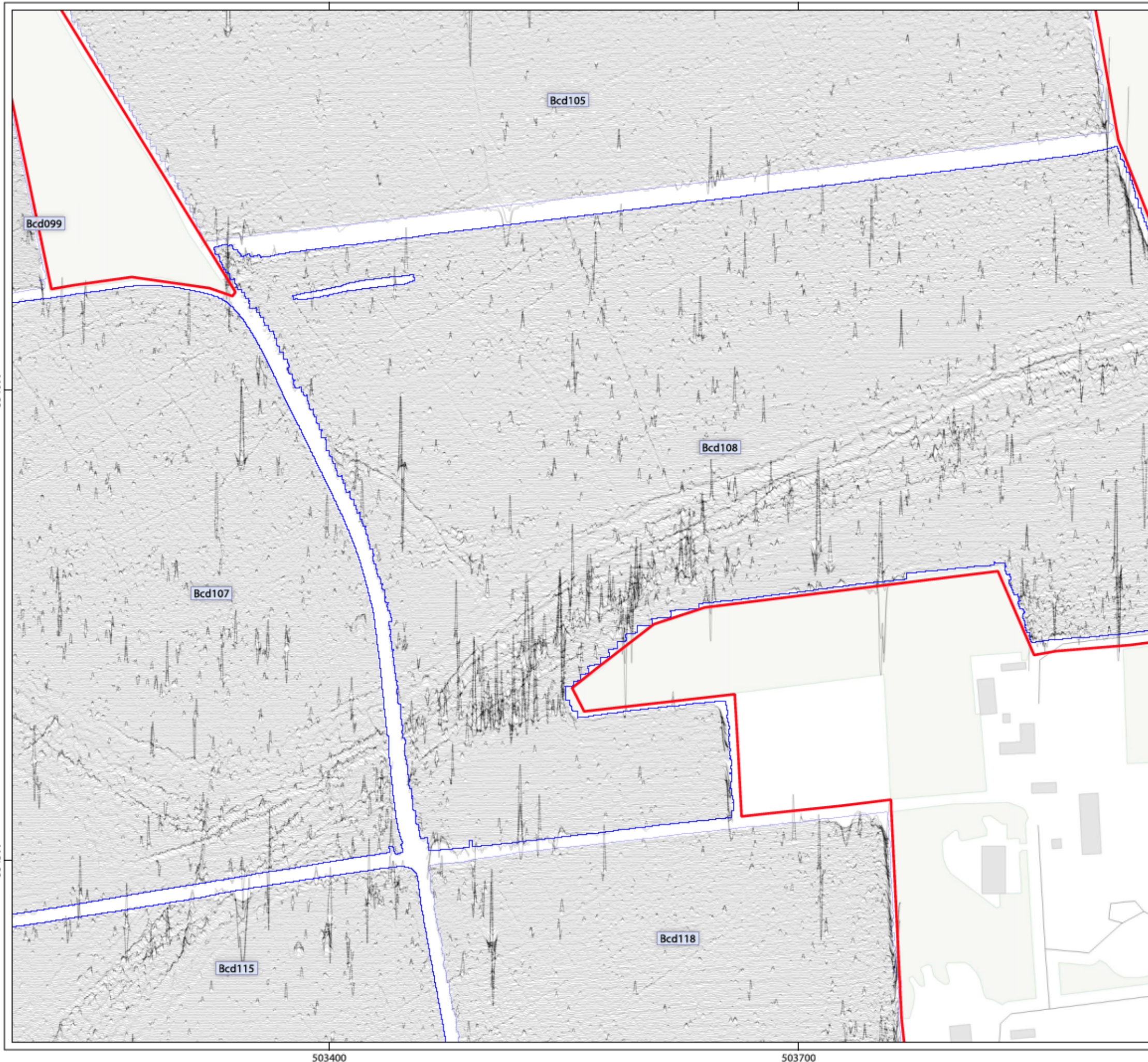
- Geophysical Survey Area
- Survey Extent

+2nT
-1nT

0 50 100 m

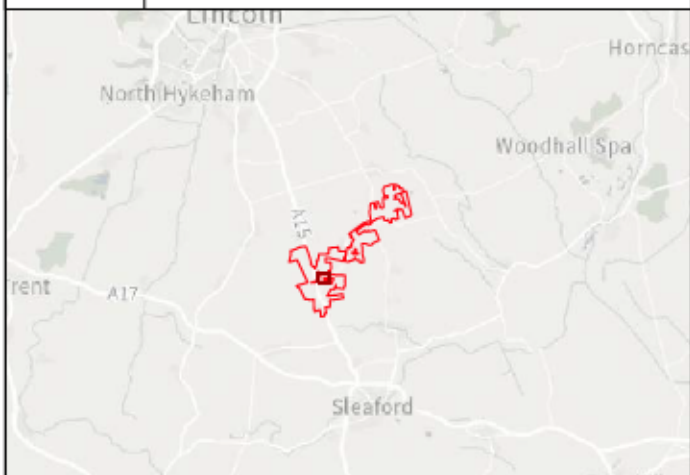
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Version:	v1.2
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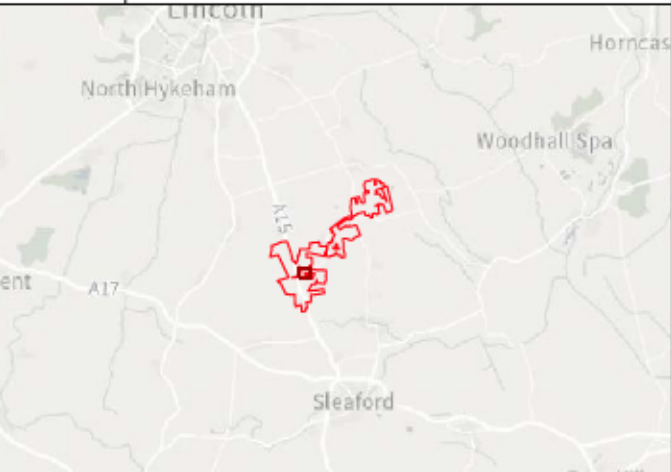
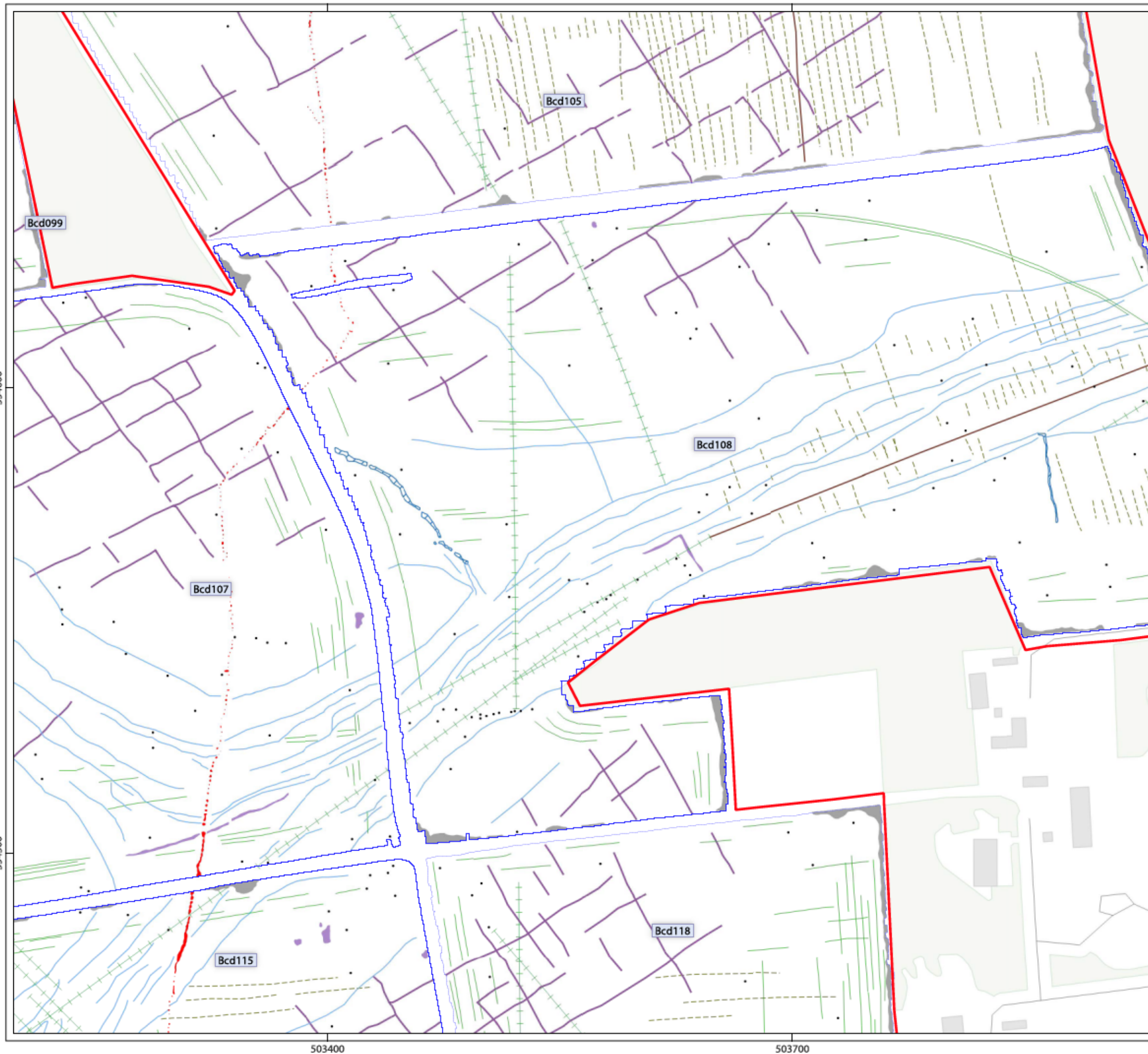


Key

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

0 50 100 m

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Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- Field Boundary
- + Field Drain
- Natural
- Ridge and Furrow
- Field System
- Archaeology
- Magnetic Disturbance
- Uncertain
- Geology

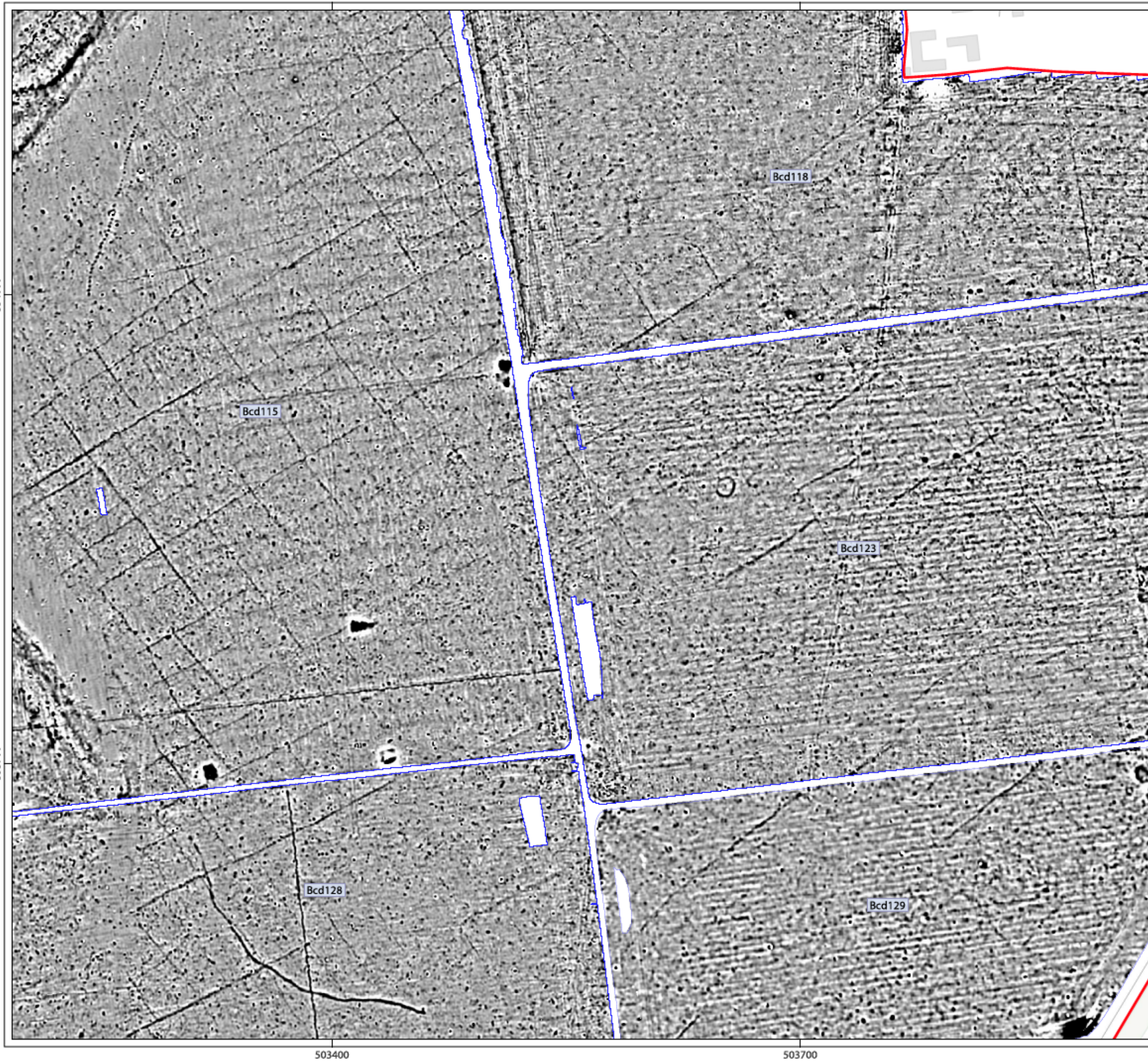
0 50 100 m

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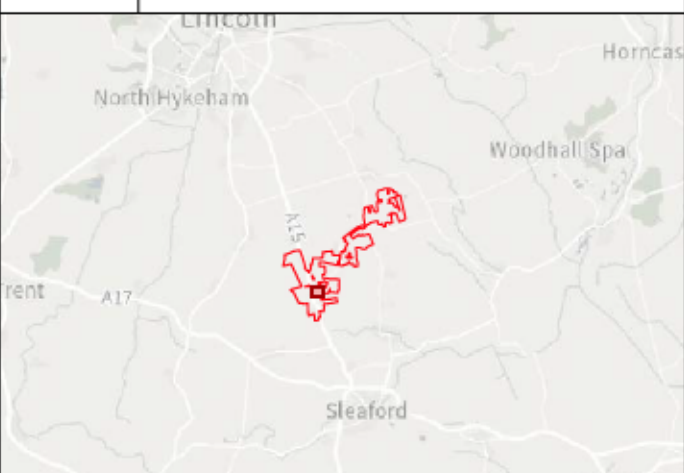








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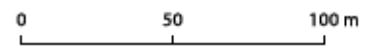
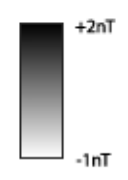
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Key

 Geophysical Survey Area

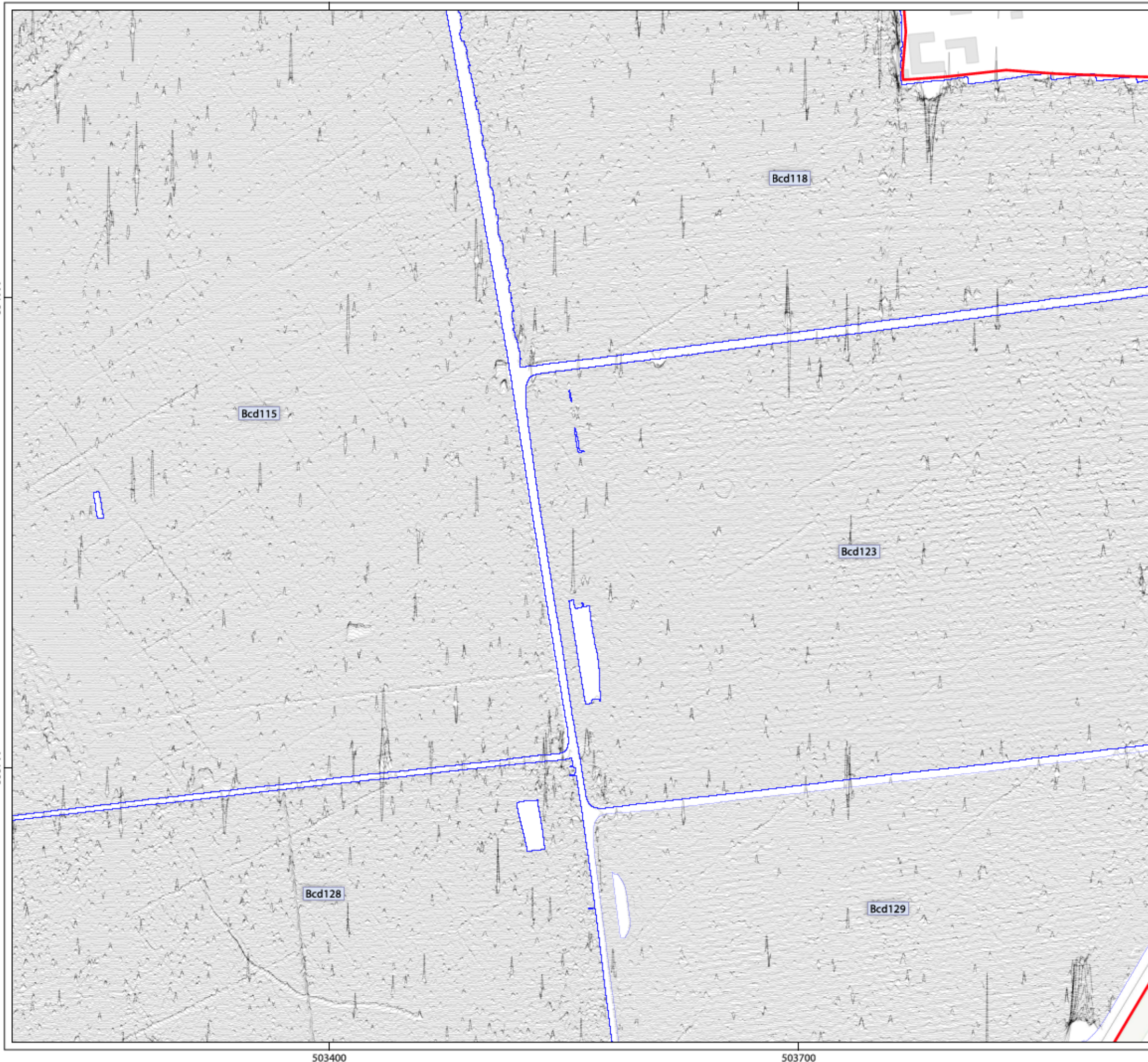
 Survey Extent





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Illus - 74 XY trace plot of minimally processed magnetometer data; Sector 2

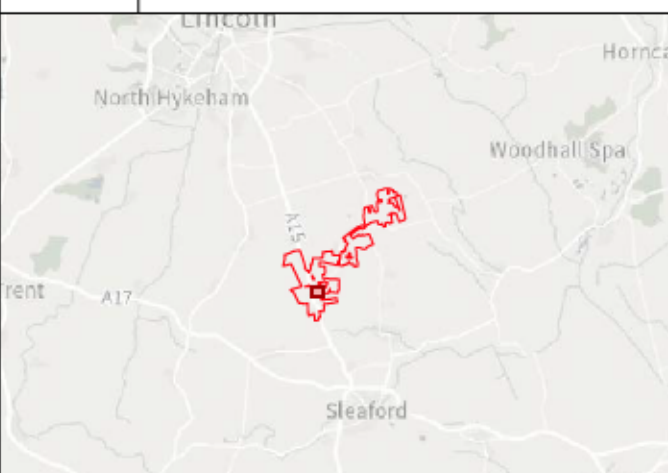









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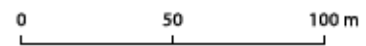
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Lincoln
North Hykeham
Woodhall Spa
Sleaford
A17
rent

Key

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

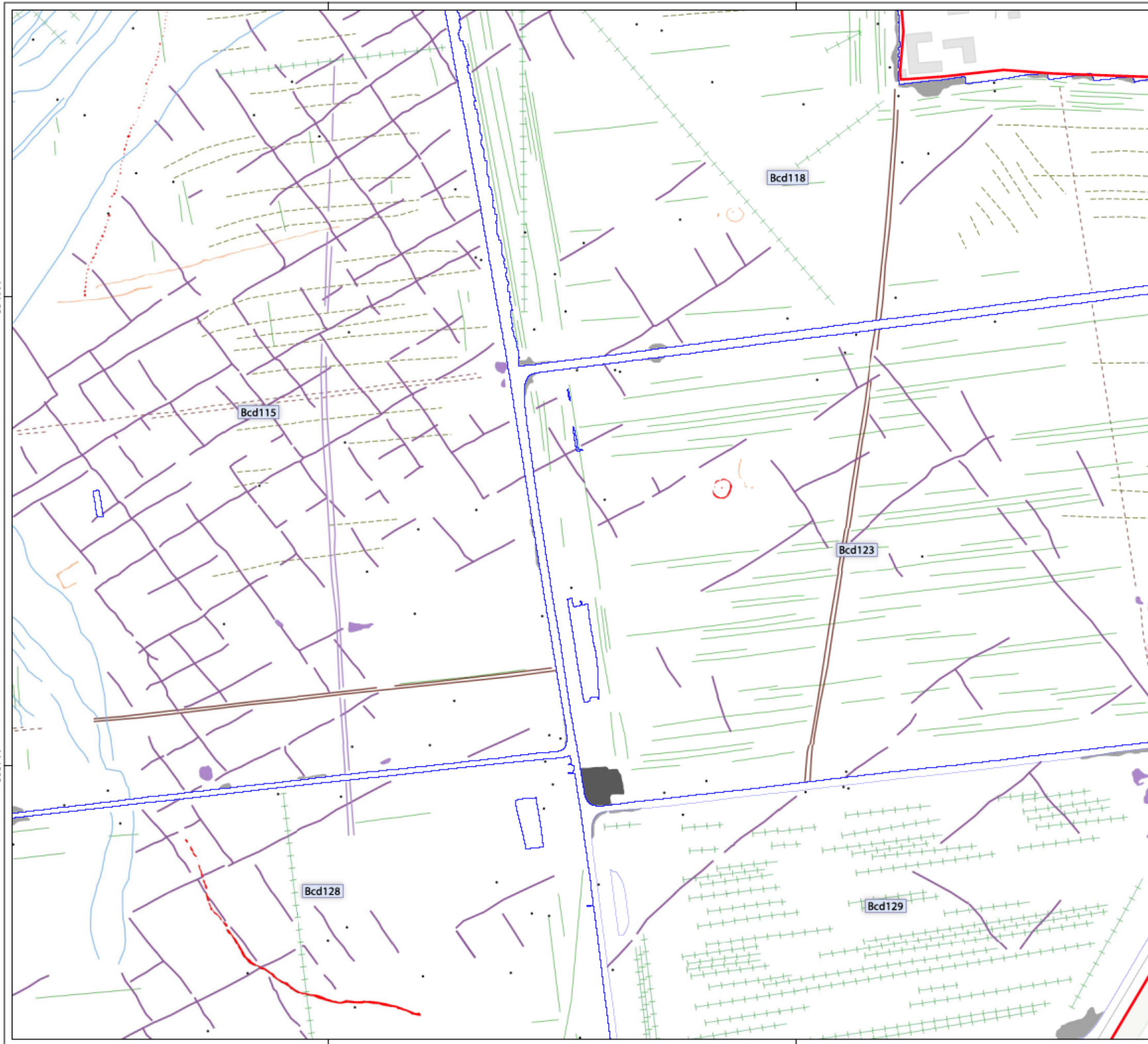



0 50 100 m


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Illus - 75 XY trace plot of minimally processed magnetometer data; Sector 2

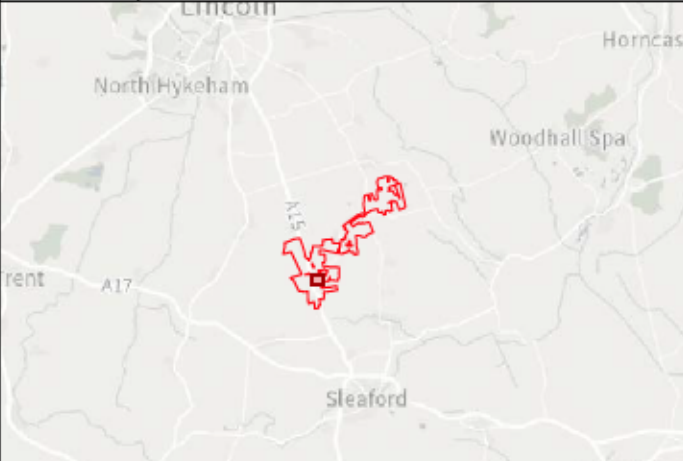








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Key


 Geophysical Survey Area


 Survey Extent


Interpretation


 Ferrous Objects


 Agriculture


 Field Boundary


 Possible Field Boundary


 Field Drain


 Natural


 Uncertain


 Ridge and Furrow


 Field System


 Archaeology

 Magnetic Disturbance

 Possible Archaeology

 Quarry

 Uncertain

 Former Building

0

50

100 m

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Key

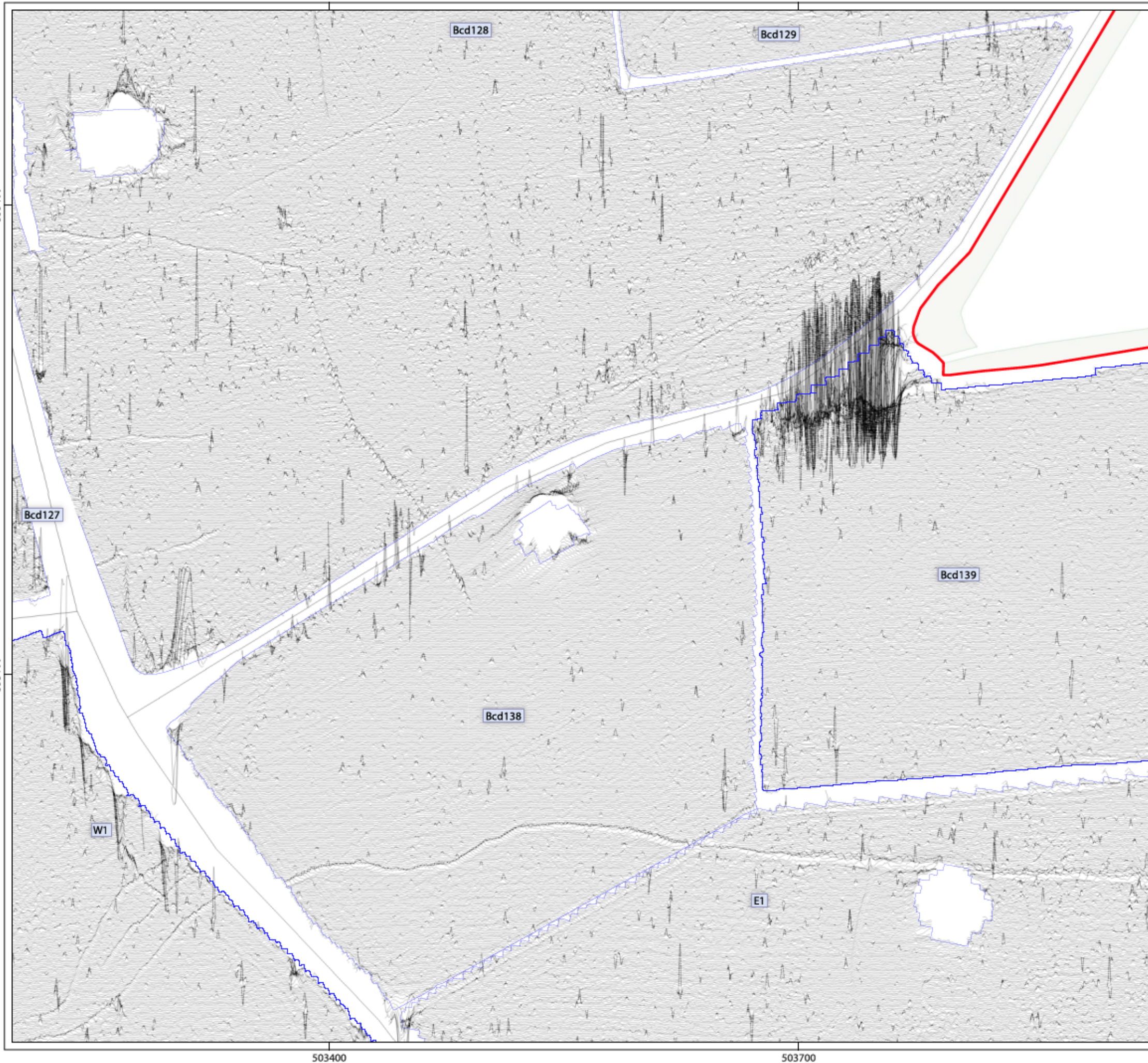
- Geophysical Survey Area
- Survey Extent

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Key

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

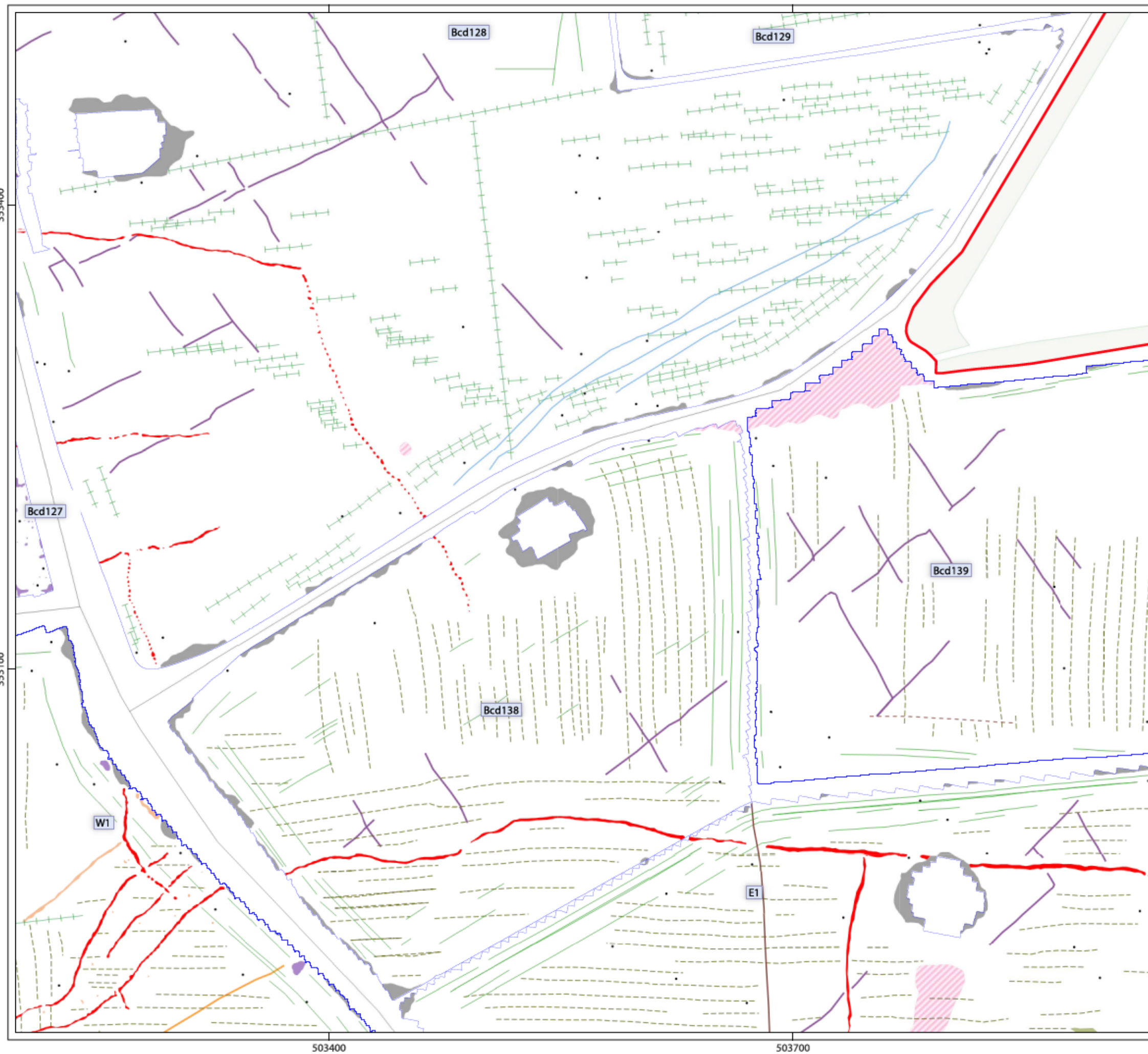
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Key

- Geophysical Survey Area
- Survey Extent

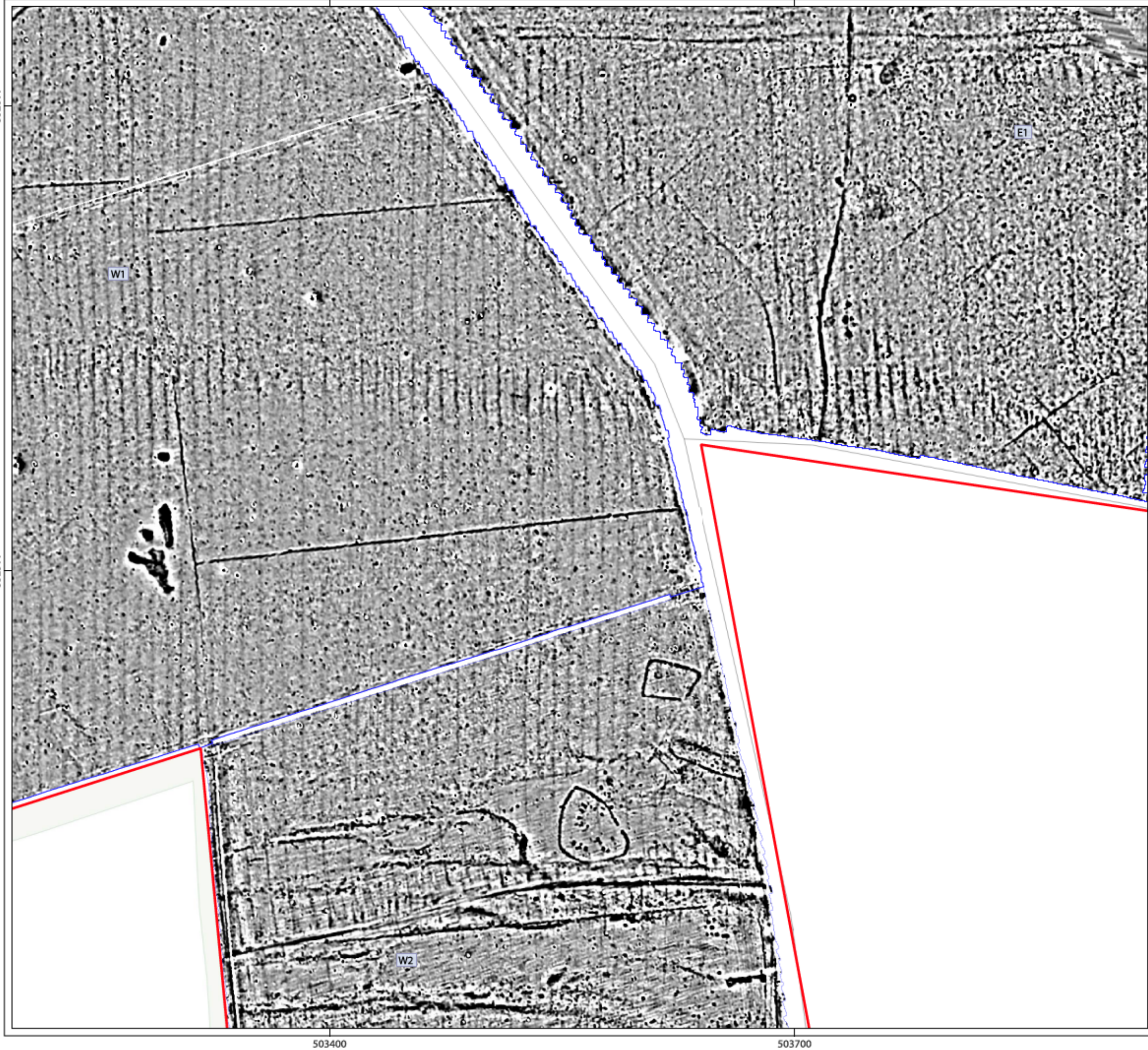
Interpretation


- Ferrous Objects
- Agriculture
- Field Boundary
- Possible Field Boundary
- Field Drain
- Natural
- Ridge and Furrow
- Field System
- Possible Archaeology
- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- Quarry
- Uncertain
- Null Value


0 50 100 m

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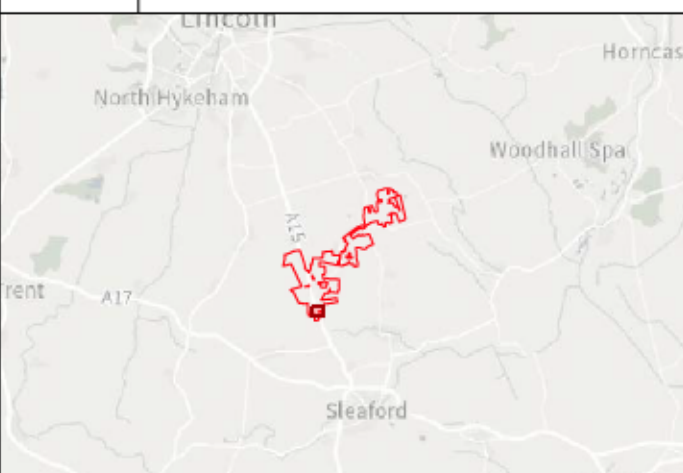








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Key

-  Geophysical Survey Area
-  Survey Extent



0 50 100 m

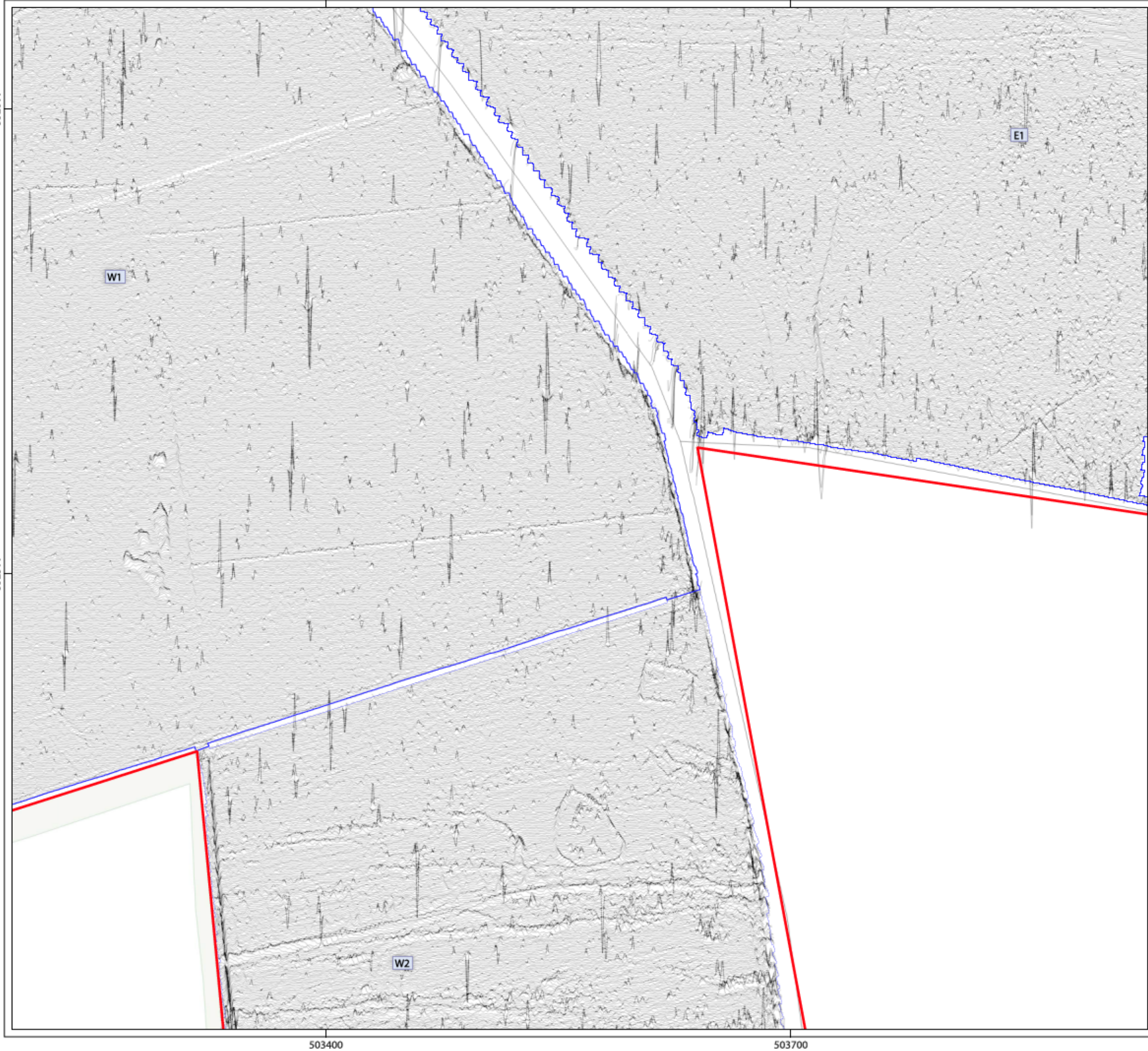
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503400

503700

Illus - 80 XY trace plot of minimally processed magnetometer data; Sector 2

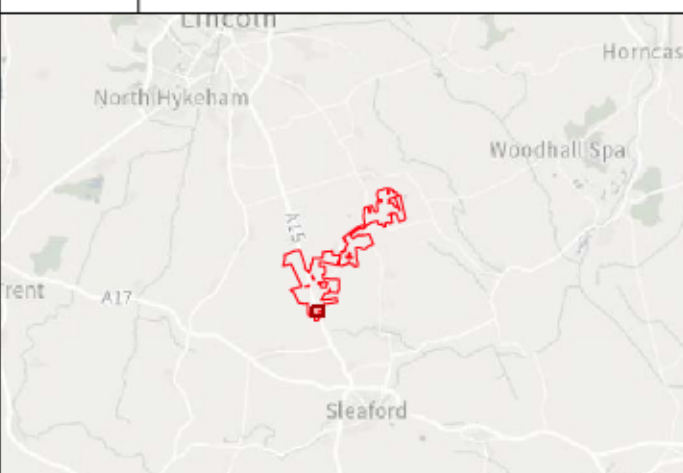









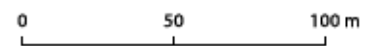
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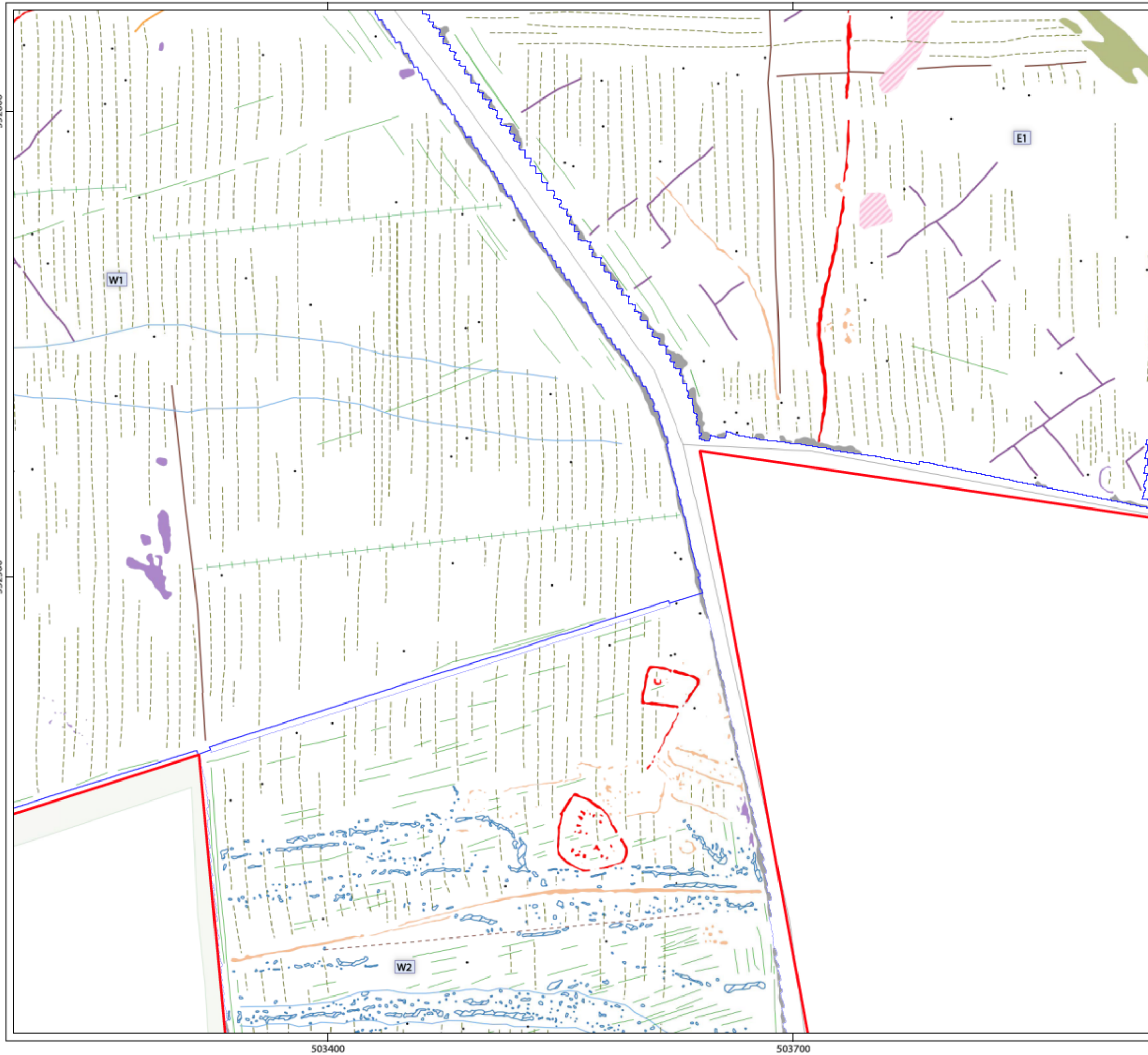
Key


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




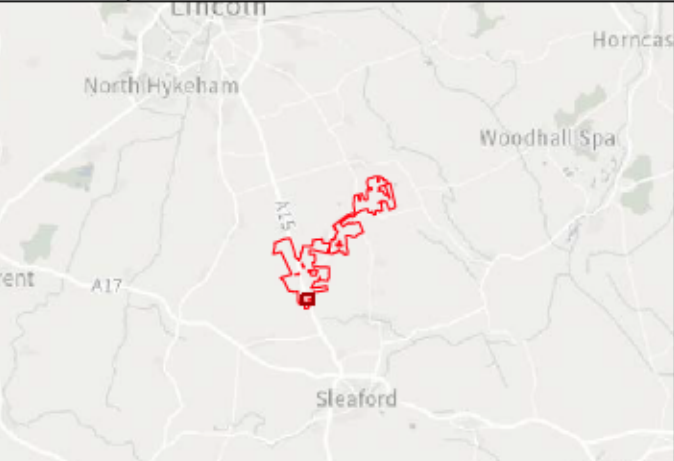
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Key

 Geophysical Survey Area

 Survey Extent

Interpretation

-  Ferrous Objects
-  Agriculture
-  Field Boundary
-  Possible Field Boundary
-  Field Drain
-  Natural
-  Ridge and Furrow
-  Field System
-  Possible Archaeology
-  Archaeology
-  Magnetic Disturbance
-  Possible Archaeology
-  Quarry
-  Uncertain
-  Geology
-  Null Value

0

50

100 m

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Date:	05/07/2023
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503700

352200

351900

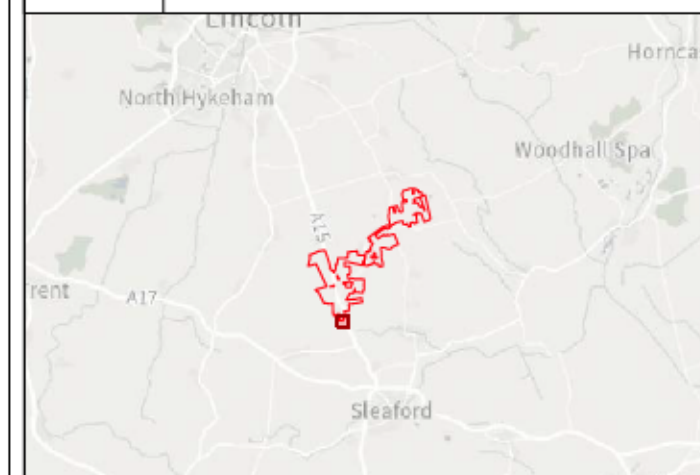
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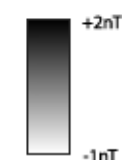


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Key

- Geophysical Survey Area
- Survey Extent



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Scale:	1:2,500 @ A3

Illus - 83 XY trace plot of minimally processed magnetometer data; Sector 2

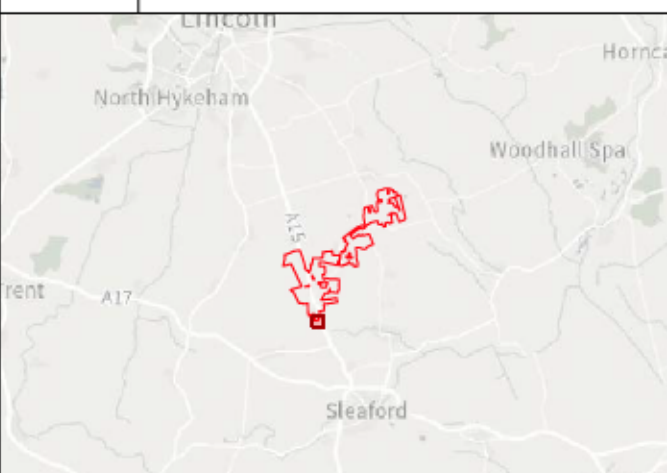






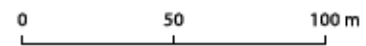
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Key

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



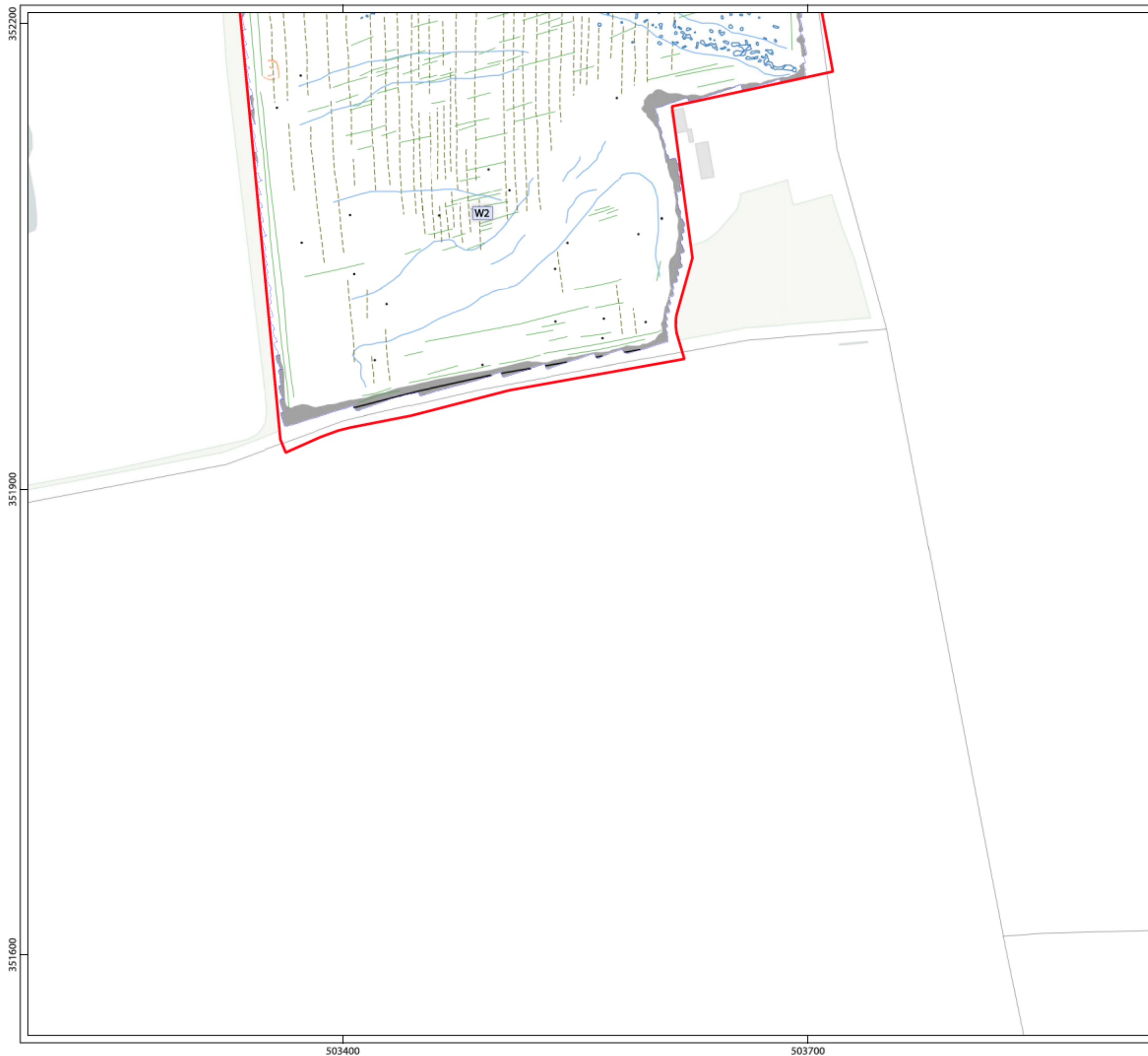
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Illus - 84 XY trace plot of minimally processed magnetometer data; Sector 2



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Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- Natural
- Pipe
- Ridge and Furrow
- Magnetic Disturbance
- Possible Archaeology
- Geology

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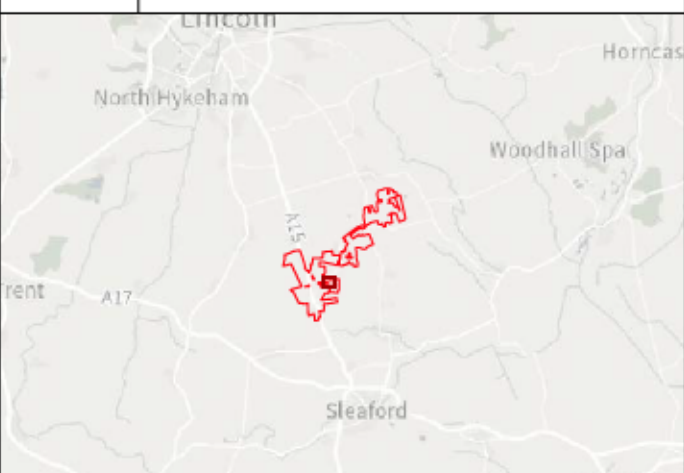
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503700








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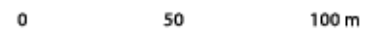


Key

-  Geophysical Survey Area
-  Survey Extent



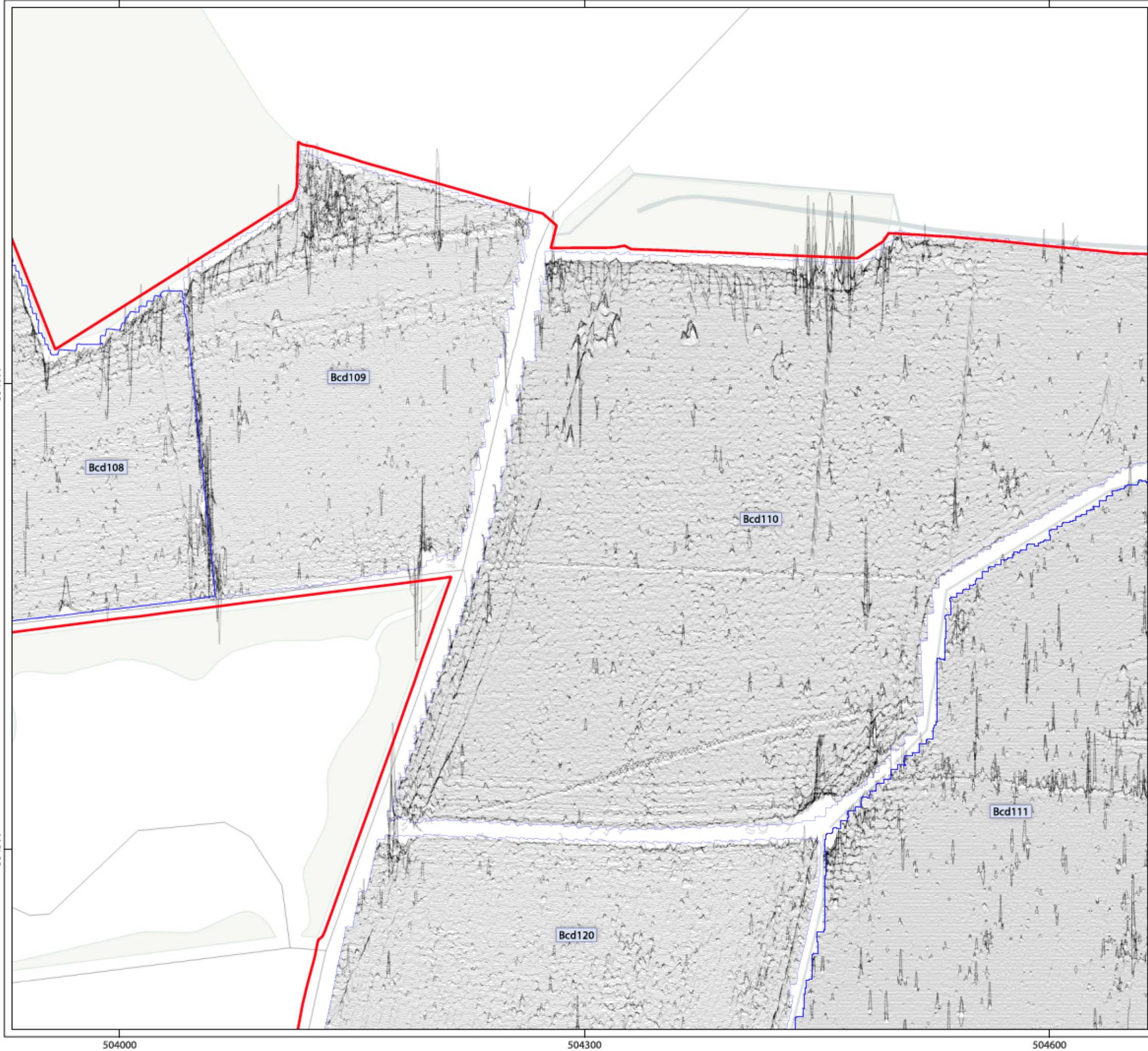
+2nT
-1nT



0 50 100 m

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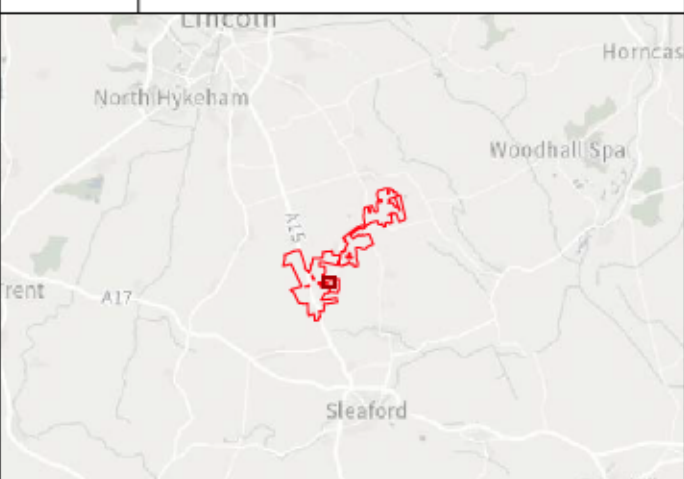









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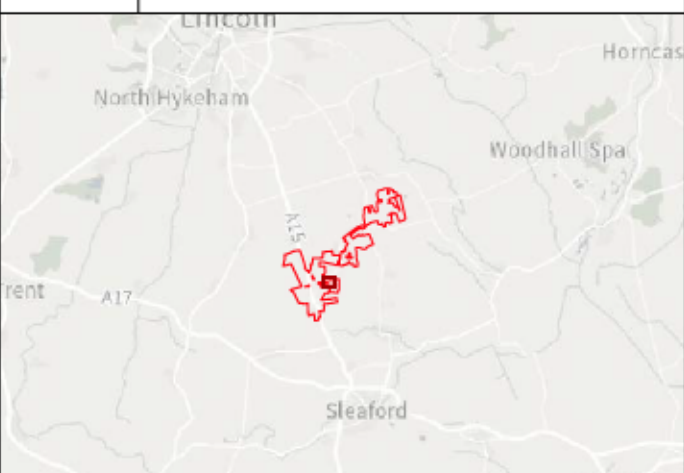
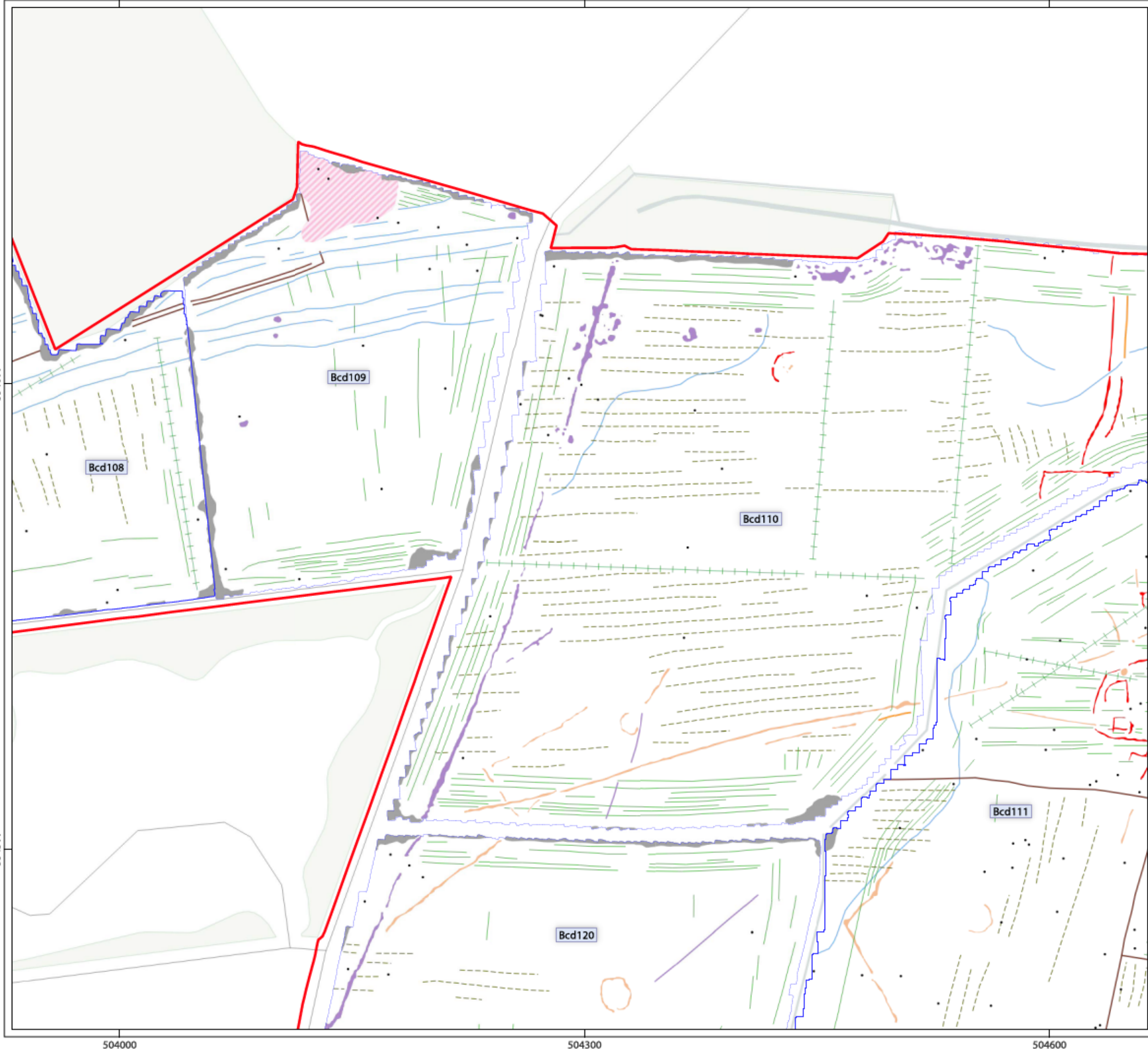
Key

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




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Key

-  Geophysical Survey Area
-  Survey Extent

Interpretation


-  Ferrous Objects
-  Agriculture
-  Field Boundary
-  Field Drain
-  Natural
-  Uncertain
-  Ridge and Furrow
-  Possible Archaeology
-  Archaeology
-  Magnetic Disturbance
-  Possible Archaeology
-  Quarry
-  Uncertain


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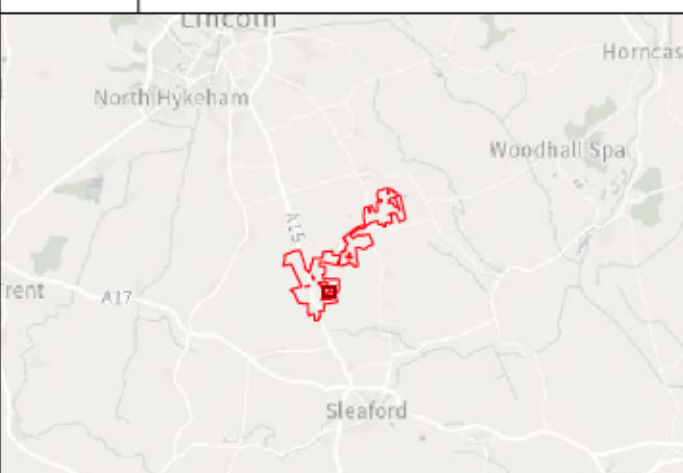








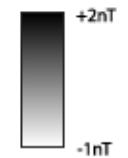
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Key

-  Geophysical Survey Area
-  Survey Extent

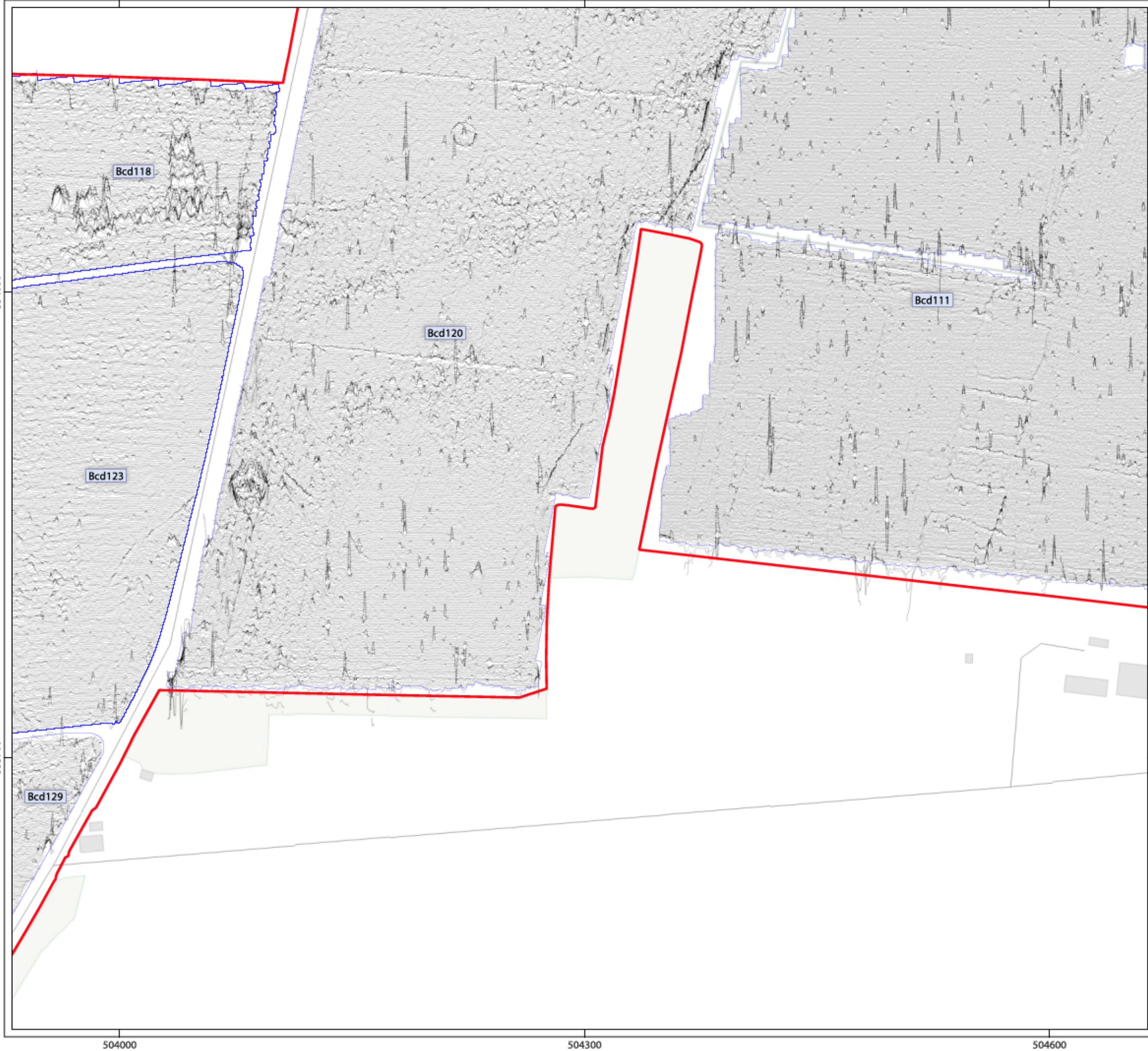



0 50 100 m


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Illus - 89 XY trace plot of minimally processed magnetometer data; Sector 2

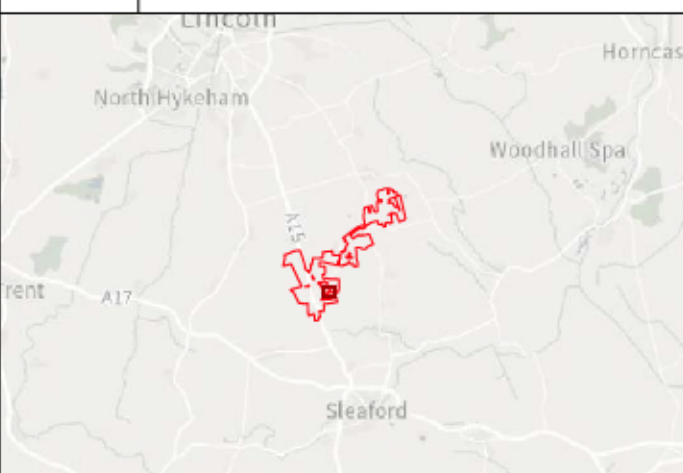









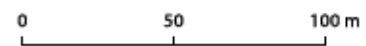
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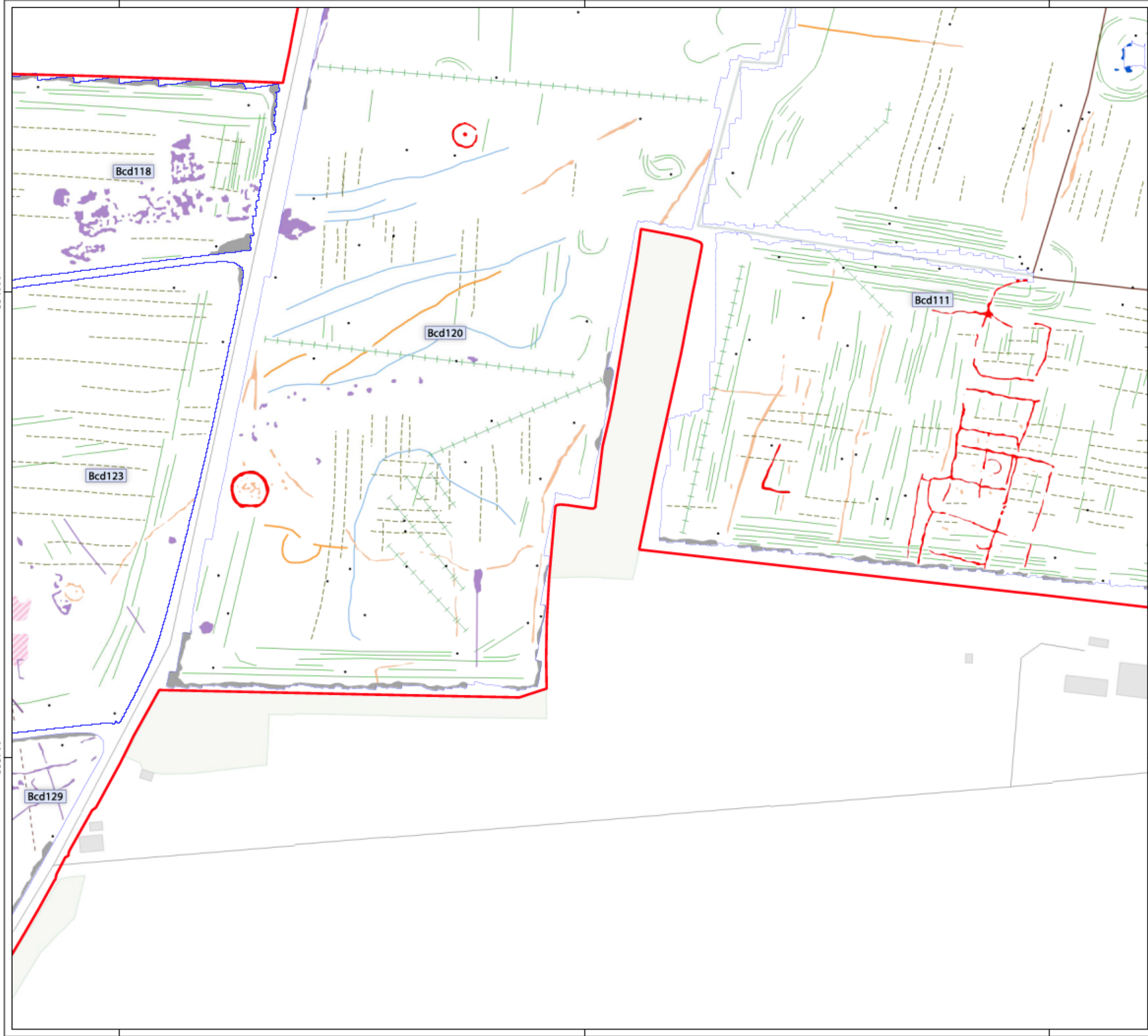
Key


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




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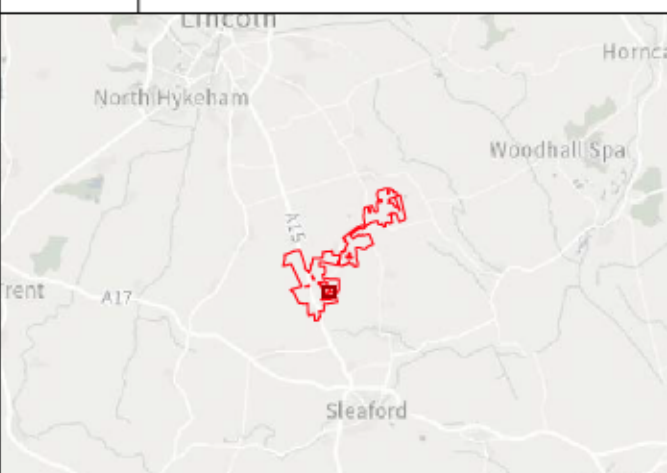
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Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- Field Boundary
- - - Possible Field Boundary
- + Field Drain
- Natural
- Uncertain
- - - Ridge and Furrow
- Field System
- Possible Archaeology
- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- Quarry
- Uncertain
- Former Pond

0

50

100 m

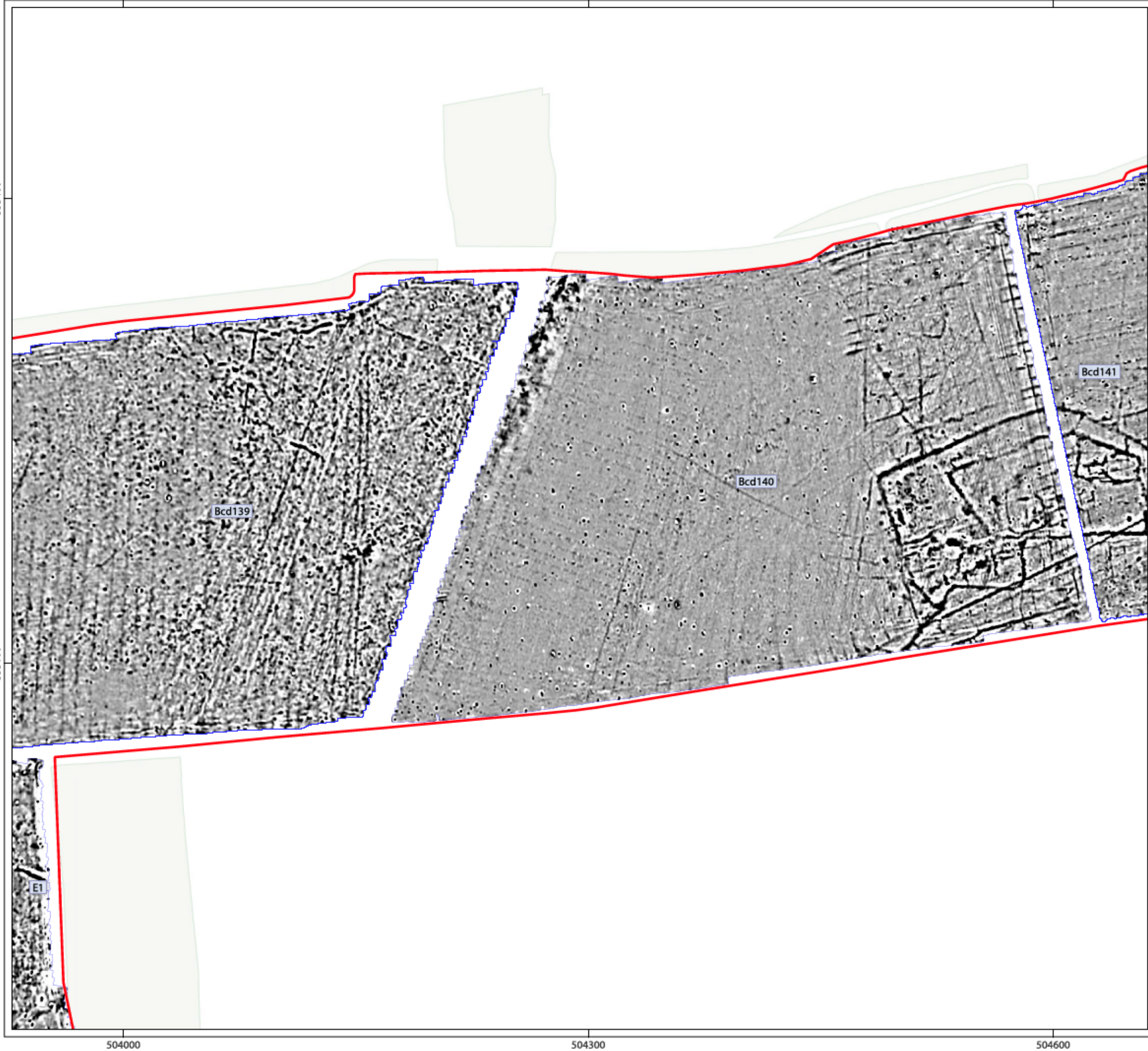
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504300

504600

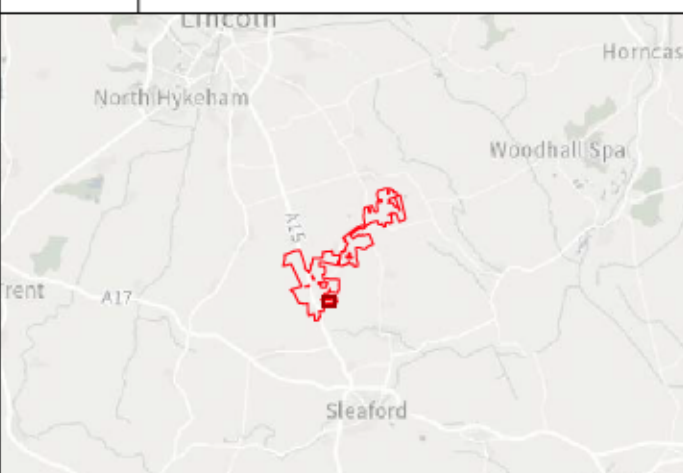








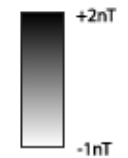
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Key

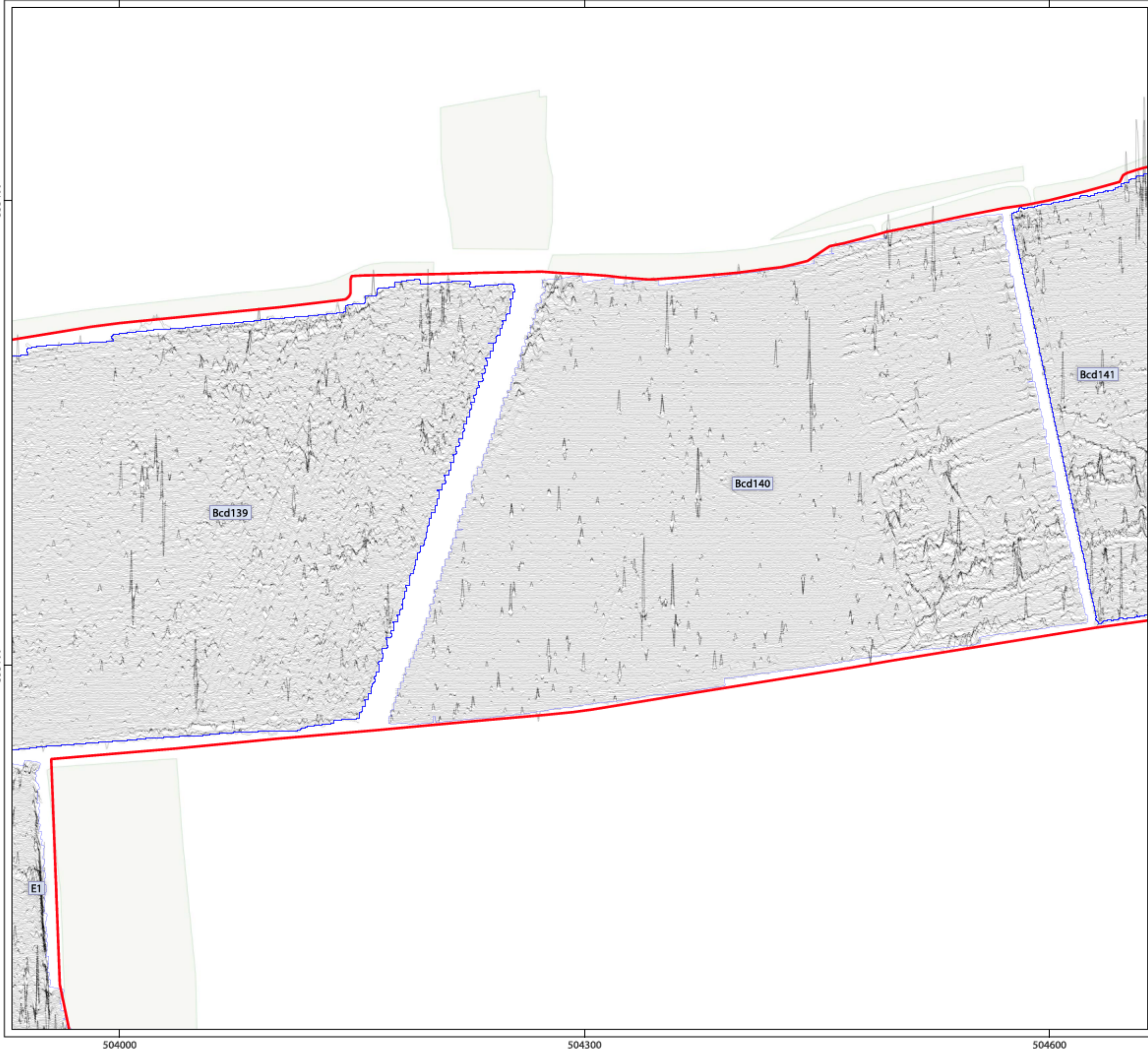
-  Geophysical Survey Area
-  Survey Extent





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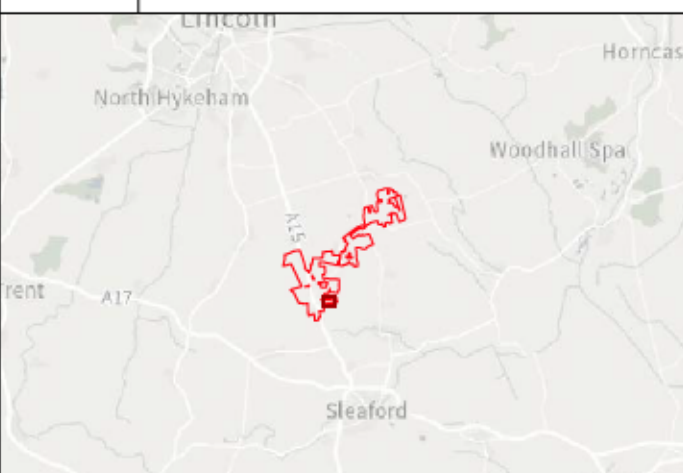









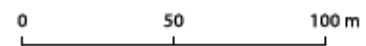
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Key

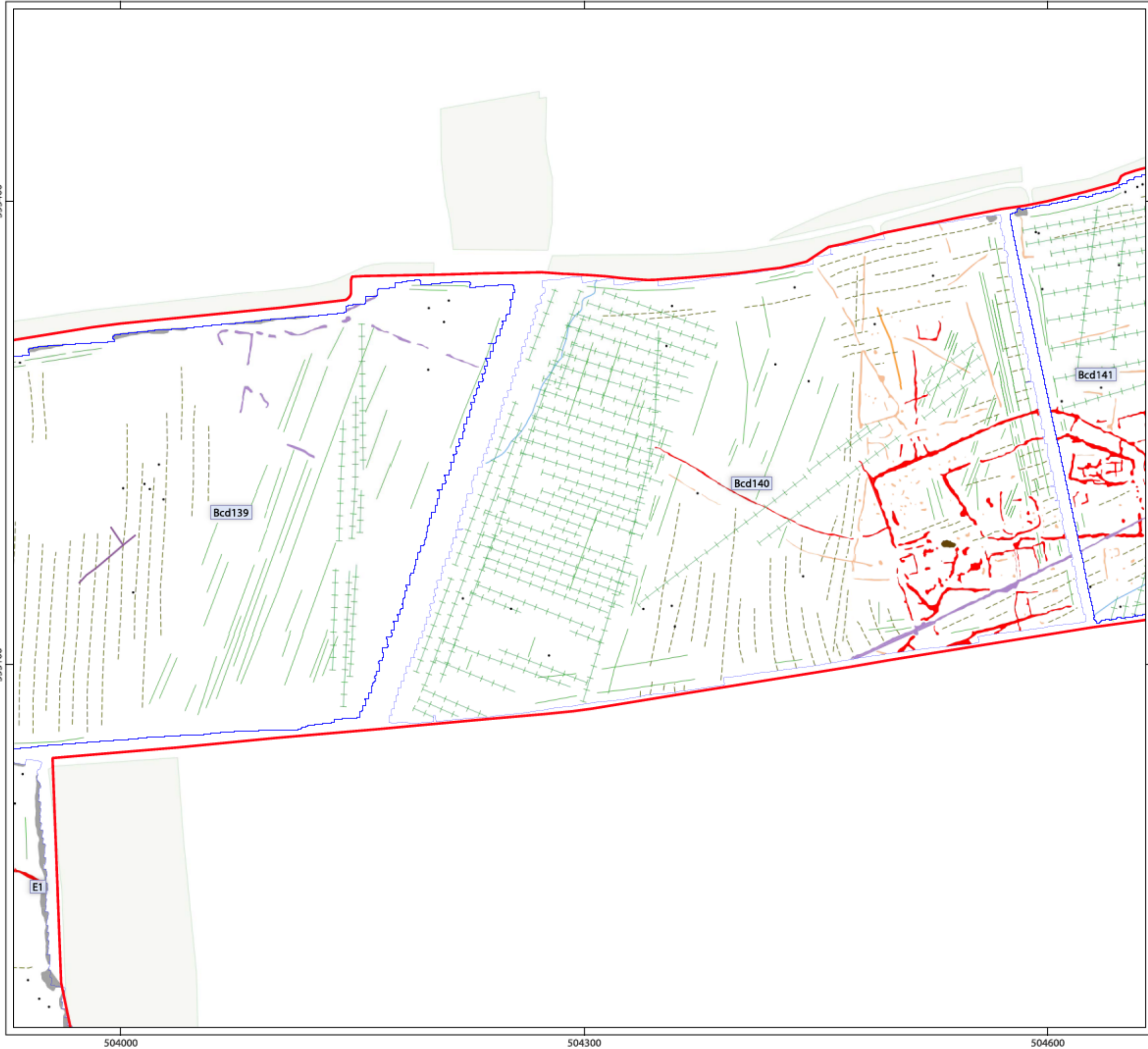
-  Geophysical Survey Area
-  Survey Extent
-  XY Trace (25nT/cm)





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Illus - 93 XY trace plot of minimally processed magnetometer data; Sector 2

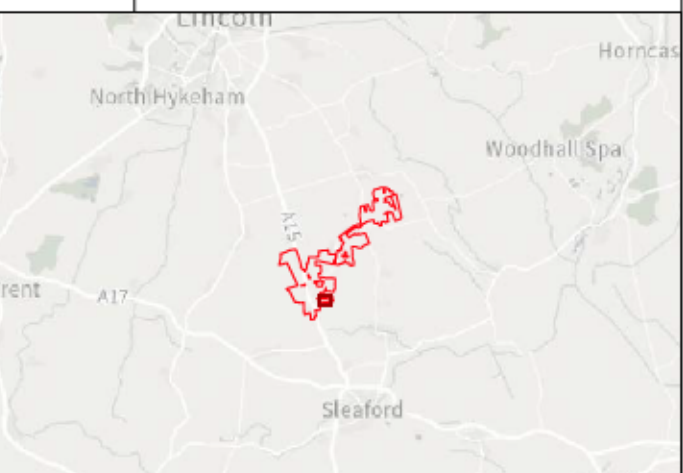








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Key

 Geophysical Survey Area

 Survey Extent

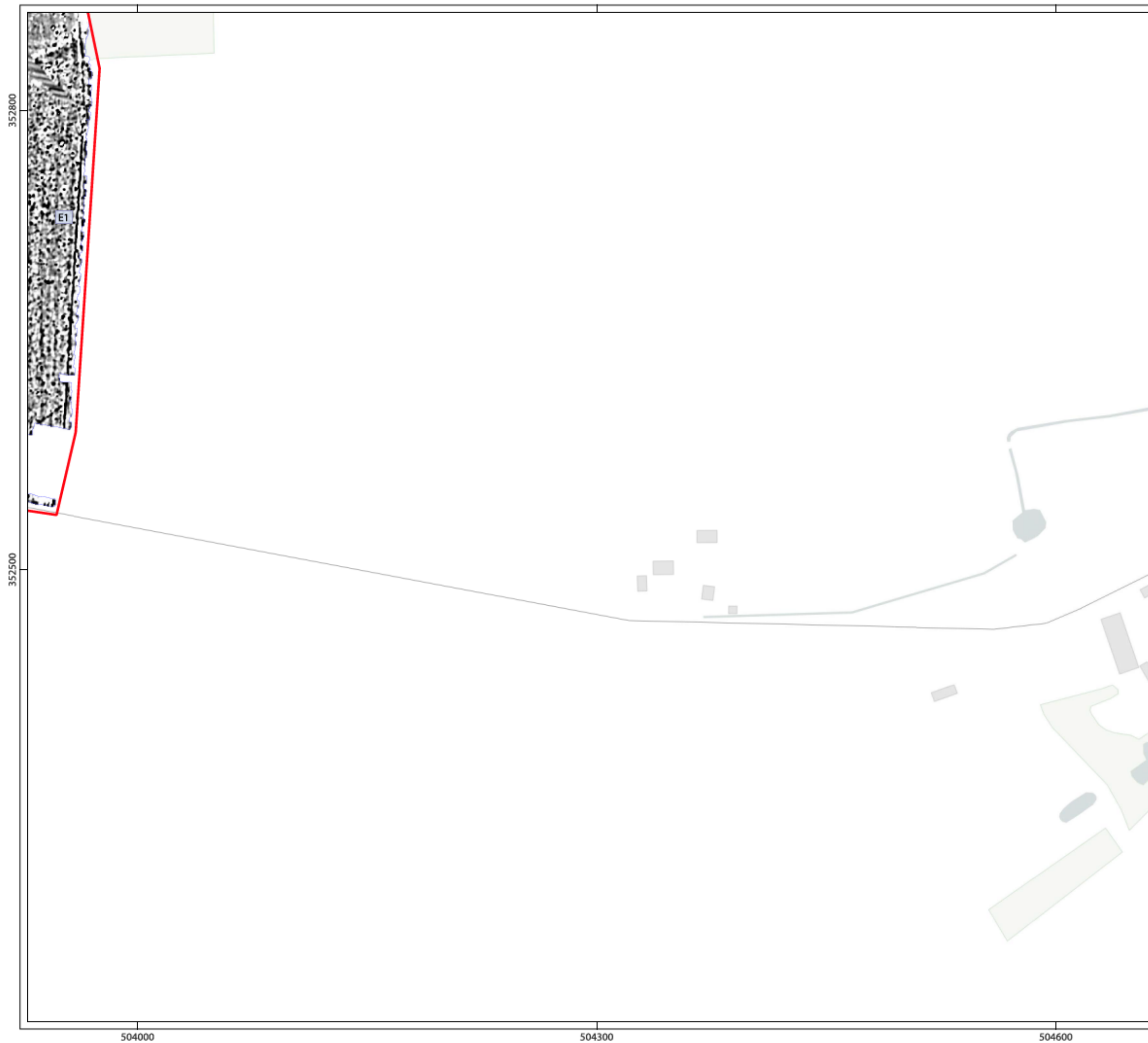
Interpretation


-  Ferrous Objects
-  Agriculture
-  Field Drain
-  Natural
-  Ridge and Furrow
-  Field System
-  Possible Archaeology
-  Archaeology
-  Magnetic Disturbance
-  Possible Archaeology
-  Uncertain
-  Burning




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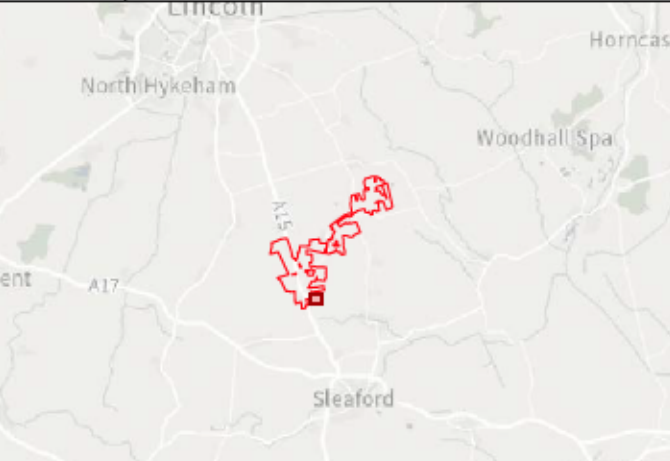


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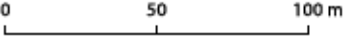


Key

- Geophysical Survey Area
- Survey Extent



+2nT
-1nT



0 50 100 m

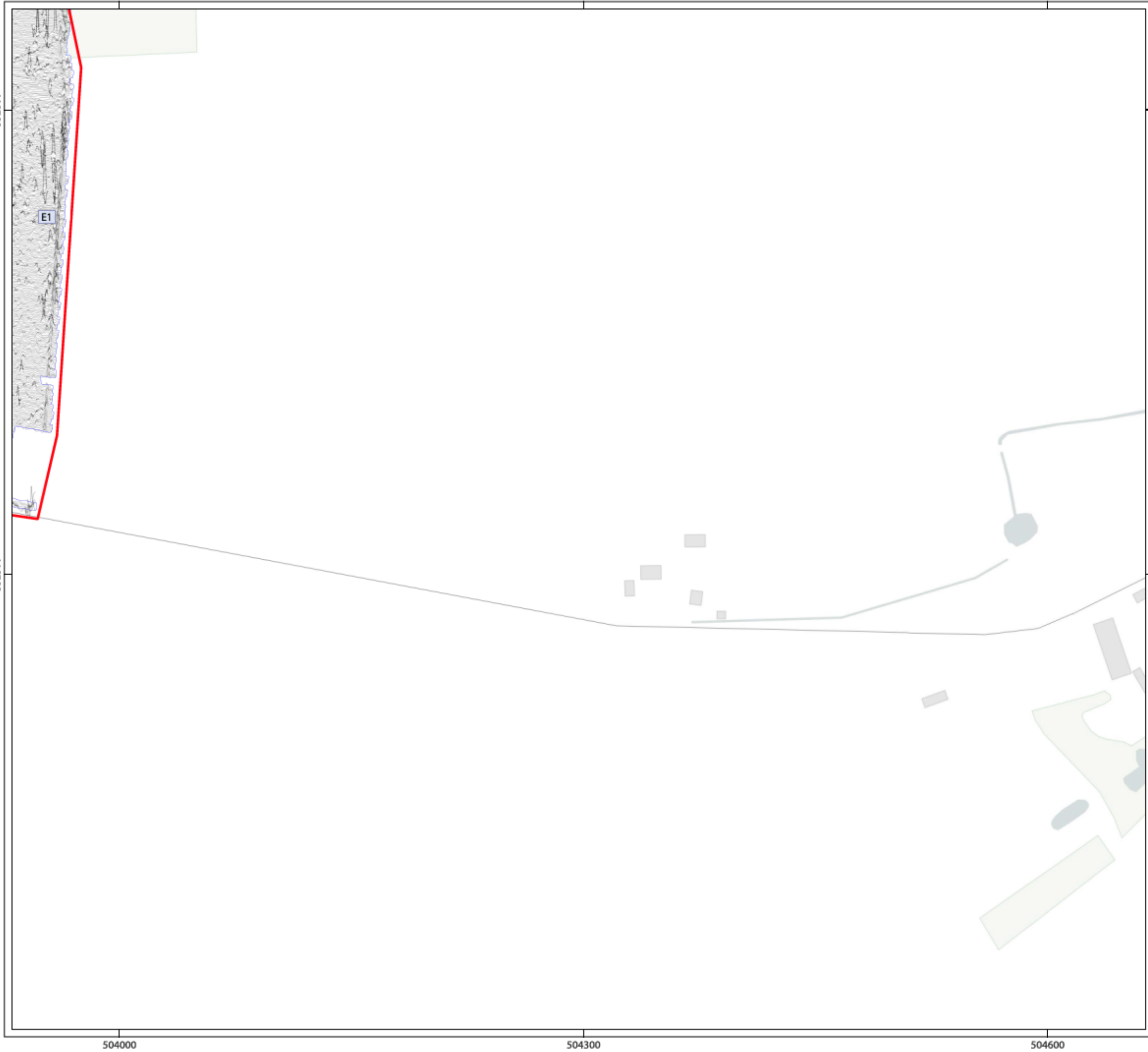
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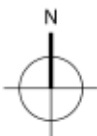
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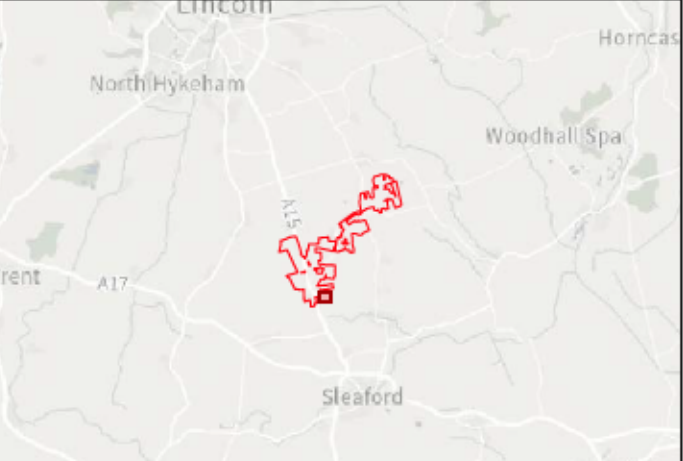
Illus - 95 XY trace plot of minimally processed magnetometer data; Sector 2








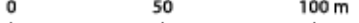
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Key

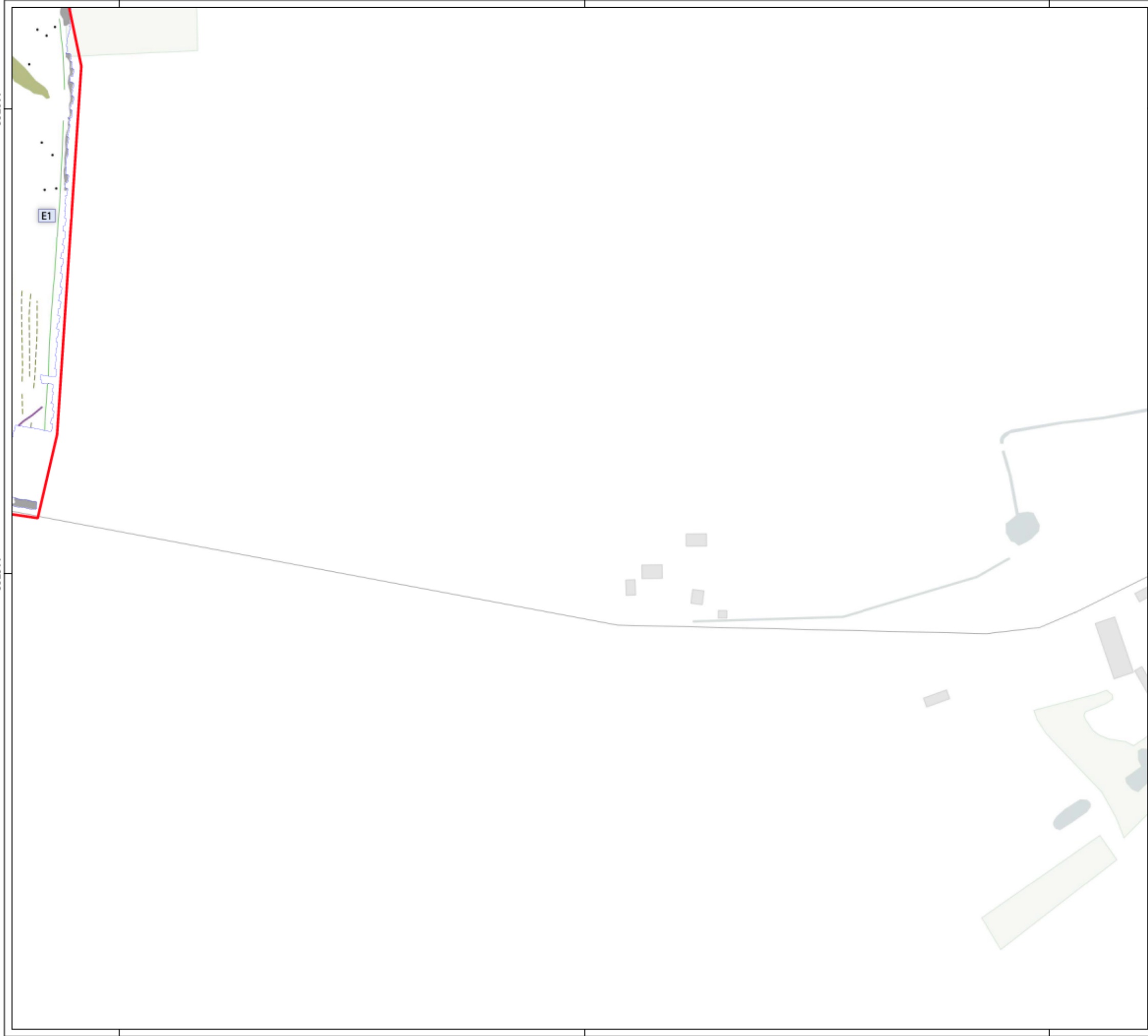
-  Geophysical Survey Area
-  Survey Extent
-  XY Trace (25nT/cm)





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Illus - 96 XY trace plot of minimally processed magnetometer data; Sector 2

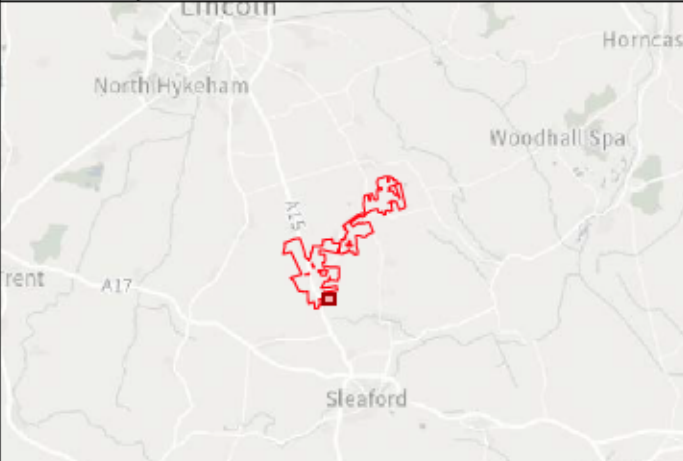








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Key


 Geophysical Survey Area


 Survey Extent


Interpretation


 Ferrous Objects

 Agriculture

 Ridge and Furrow

 Field System

 Magnetic Disturbance

 Null Value

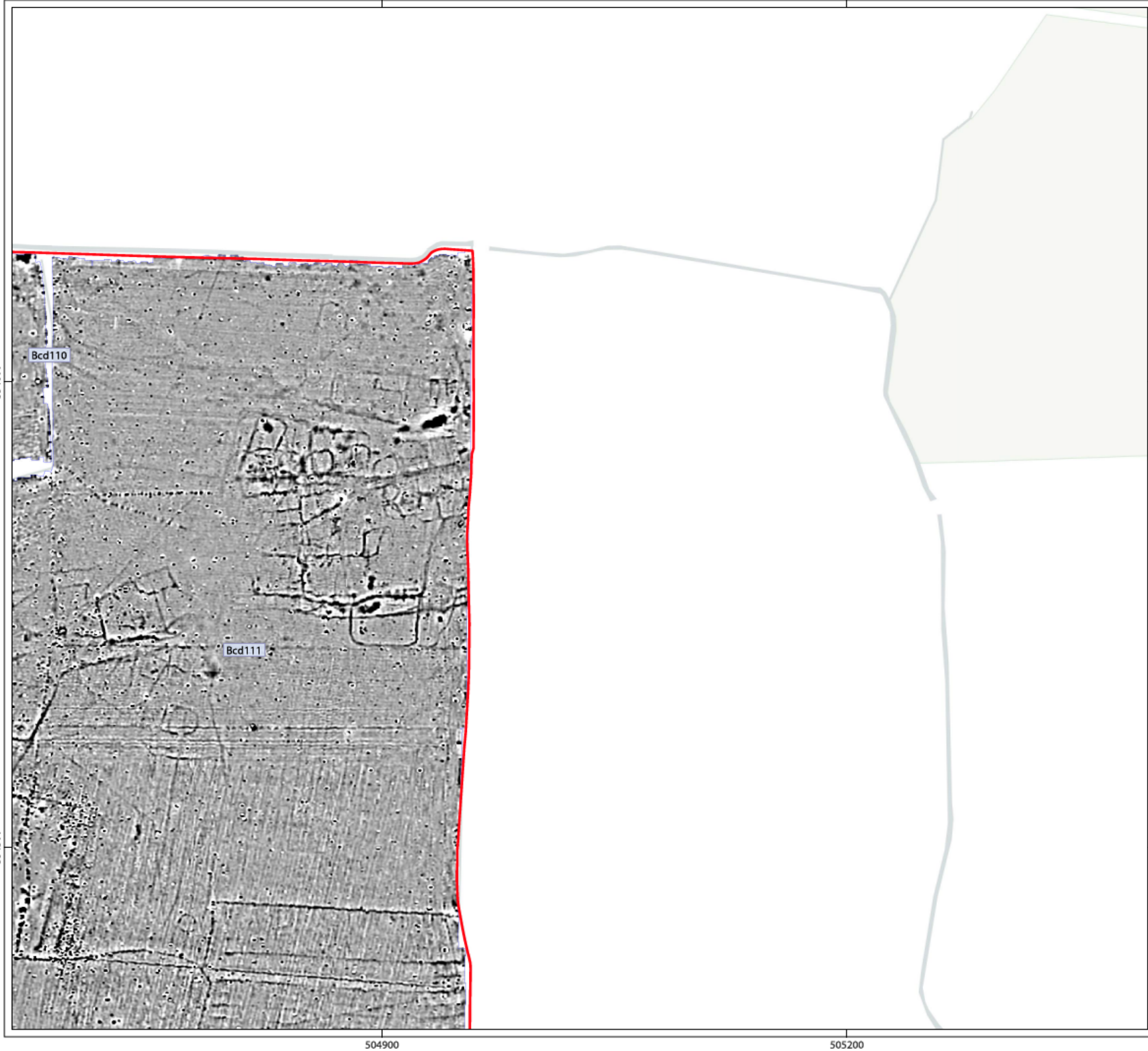
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354600

354300

504900

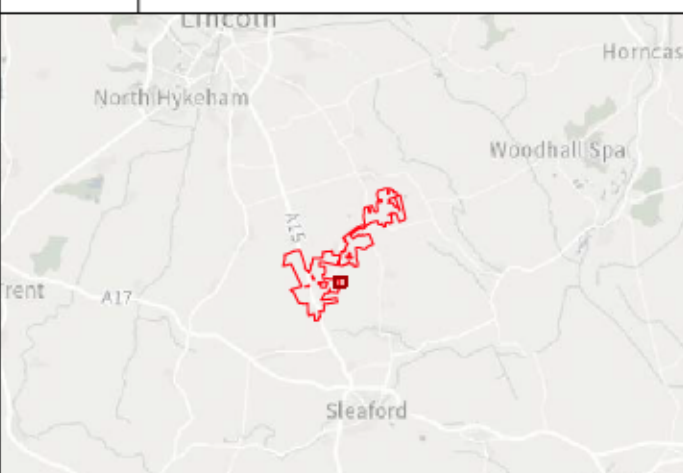
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Key

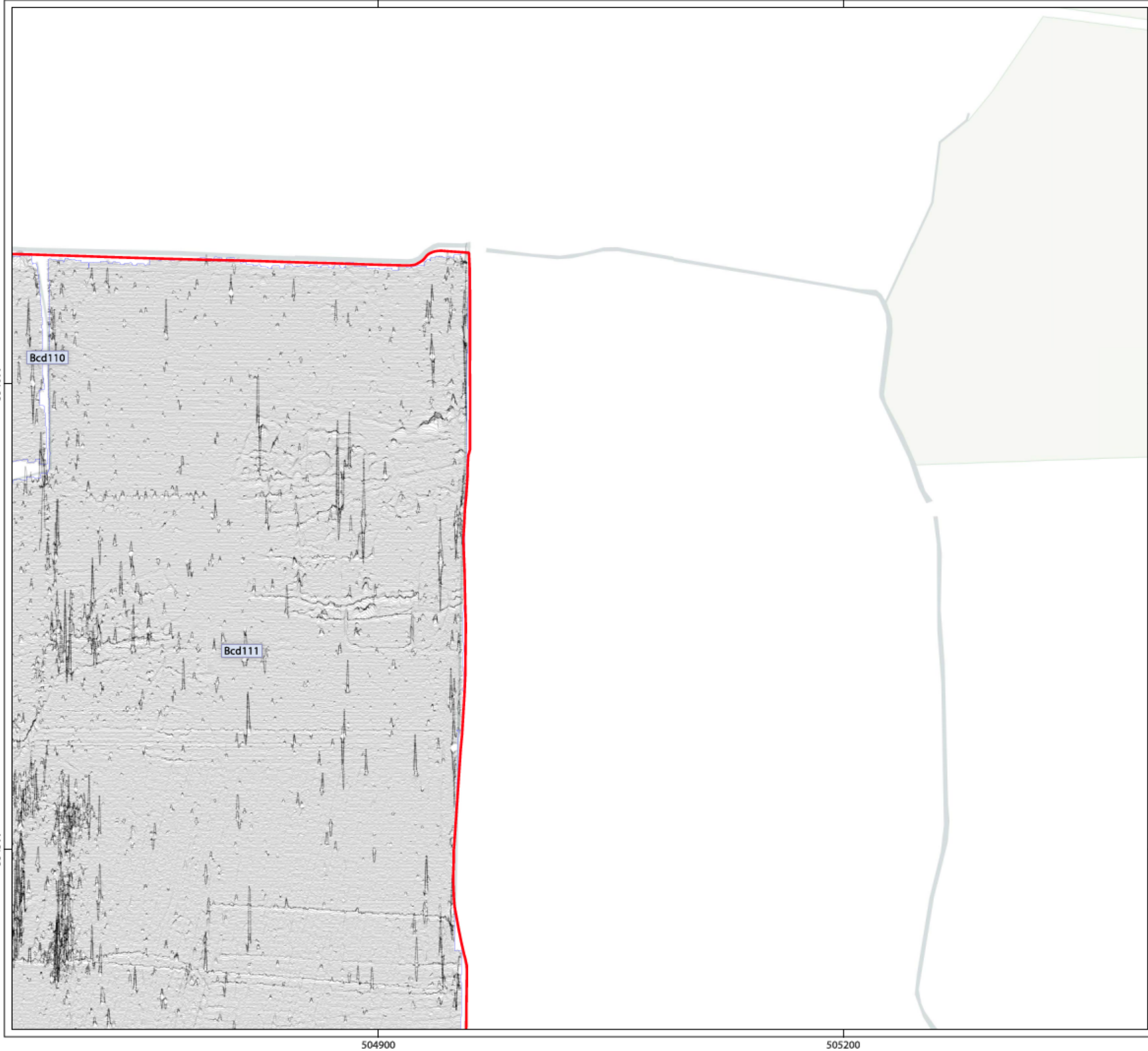
-  Geophysical Survey Area
-  Survey Extent





0 50 100 m

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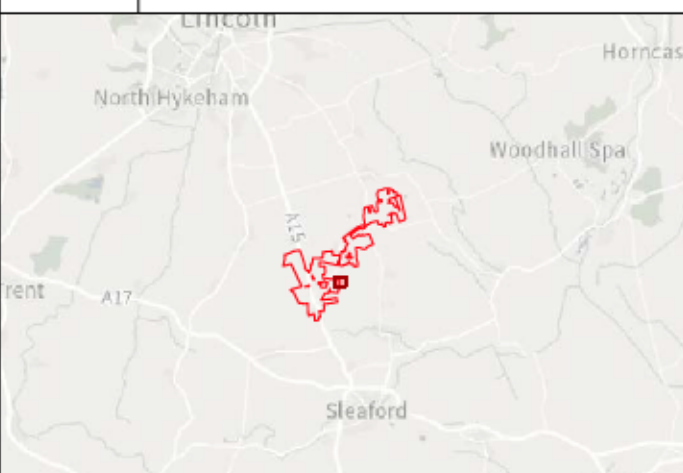









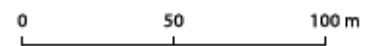
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Key

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

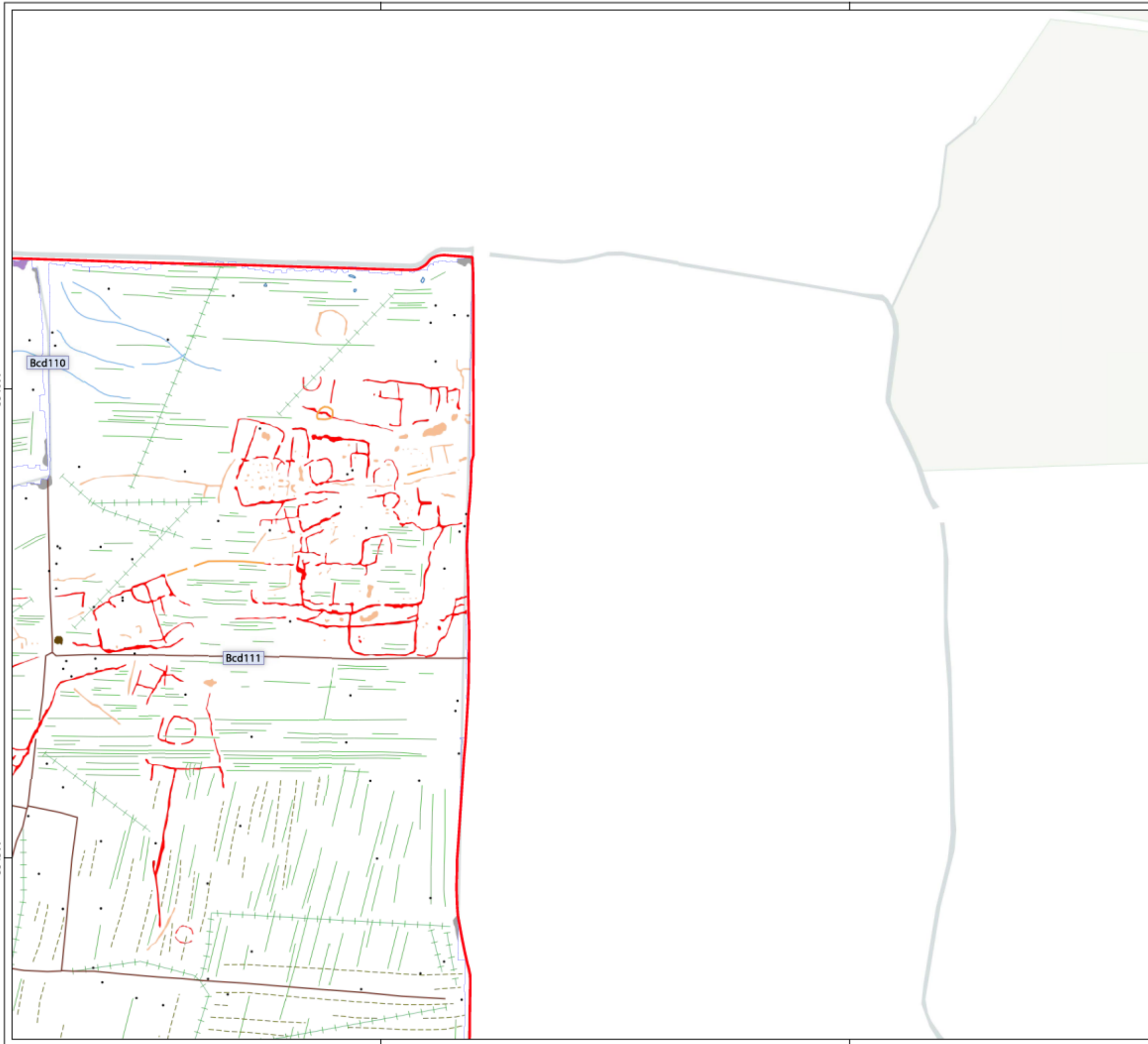


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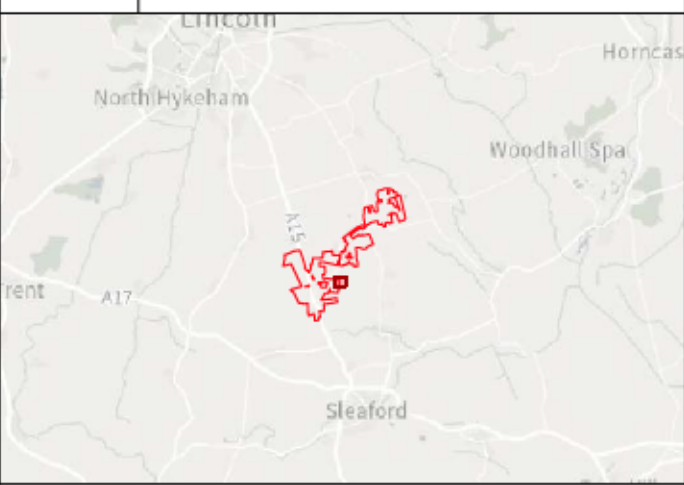








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Key


 Geophysical Survey Area


 Survey Extent


Interpretation


 Ferrous Objects


 Agriculture


 Field Boundary


 Field Drain


 Natural


 Ridge and Furrow


 Possible Archaeology


 Archaeology

 Magnetic Disturbance

 Possible Archaeology

 Uncertain

 Geology

 Burning

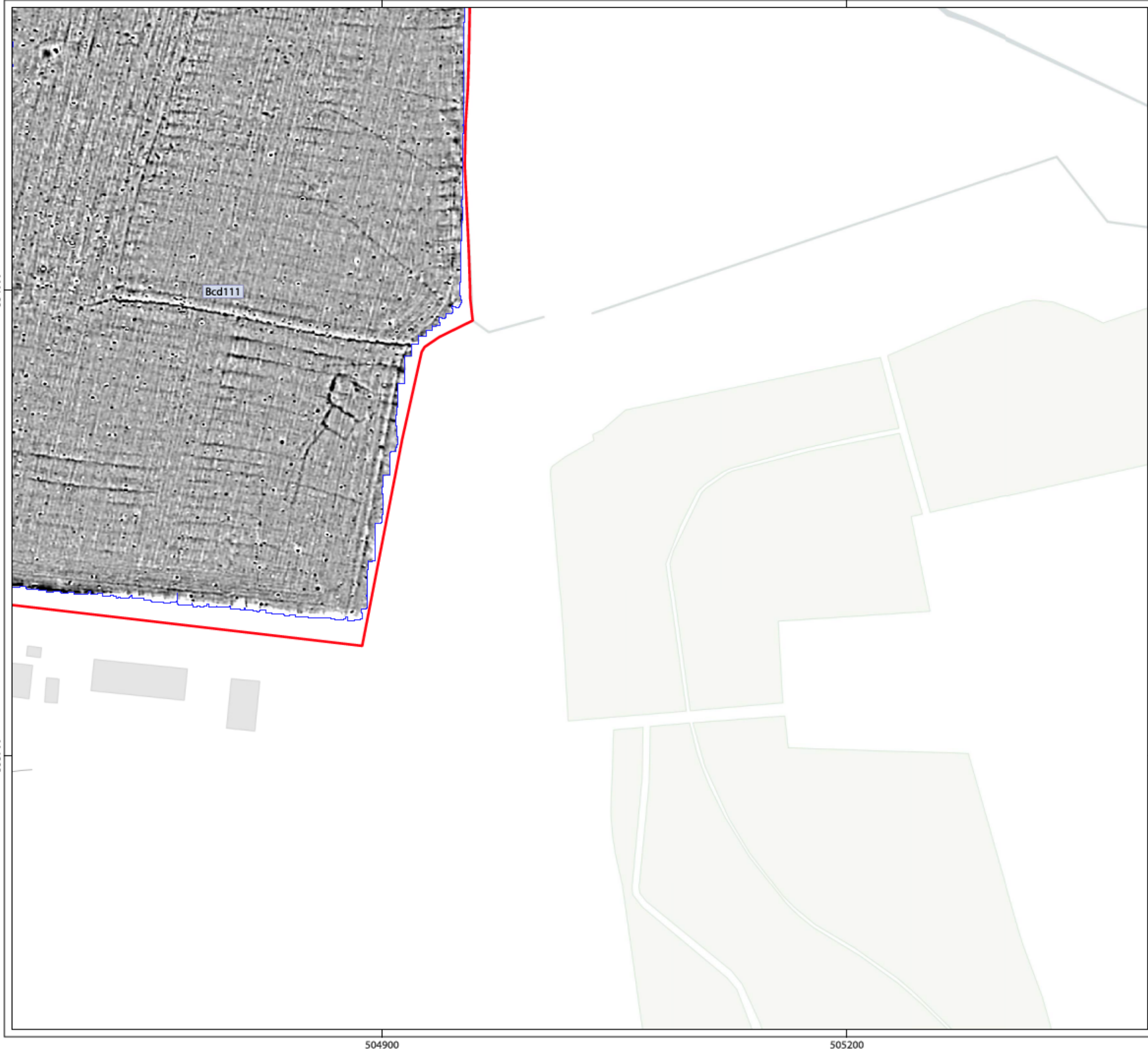
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050

100 m

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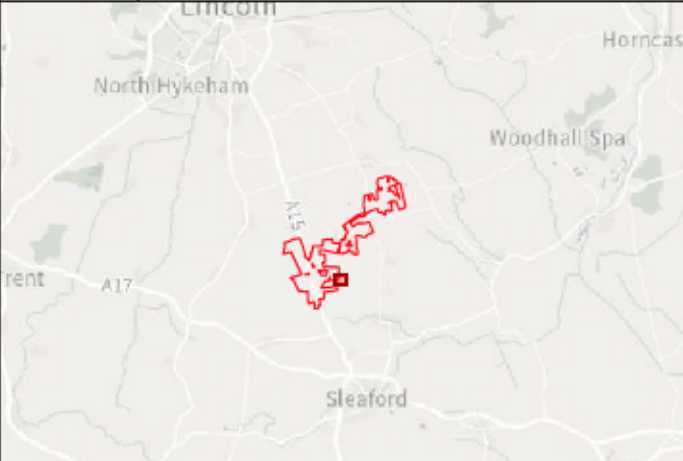








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Key

 Geophysical Survey Area

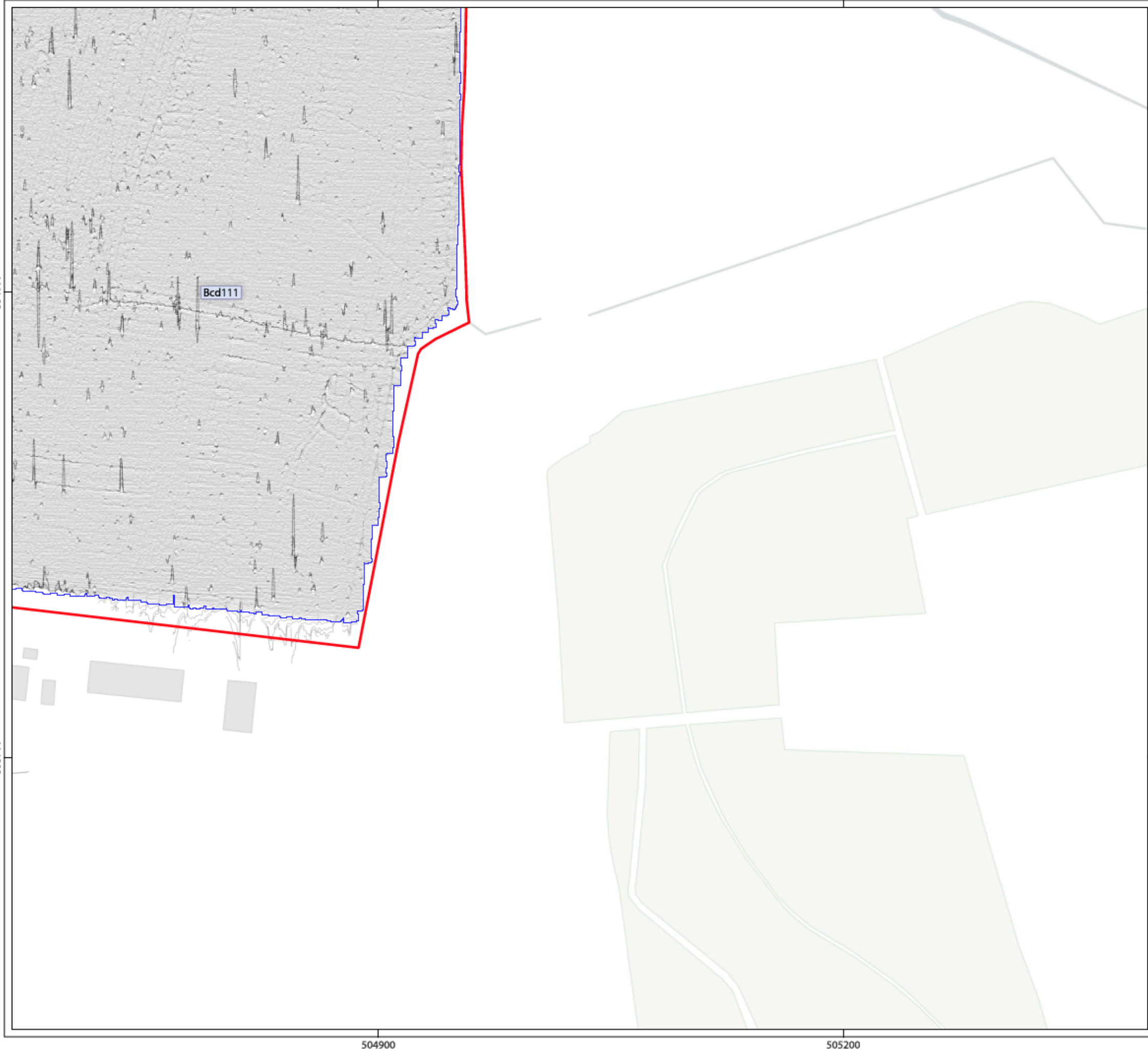
 Survey Extent





0 50 100 m

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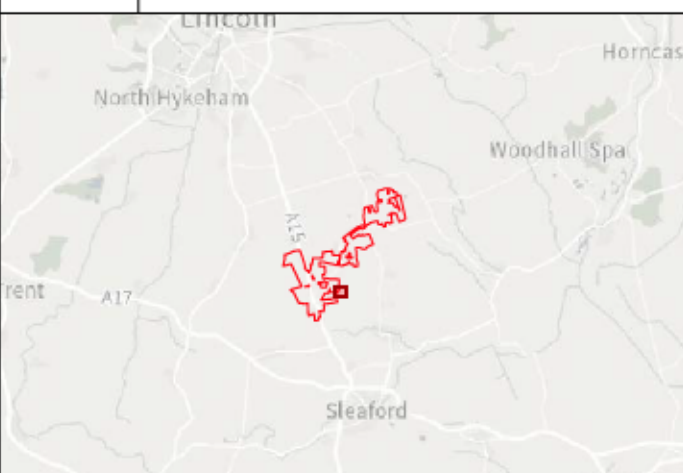









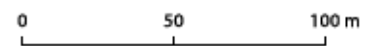
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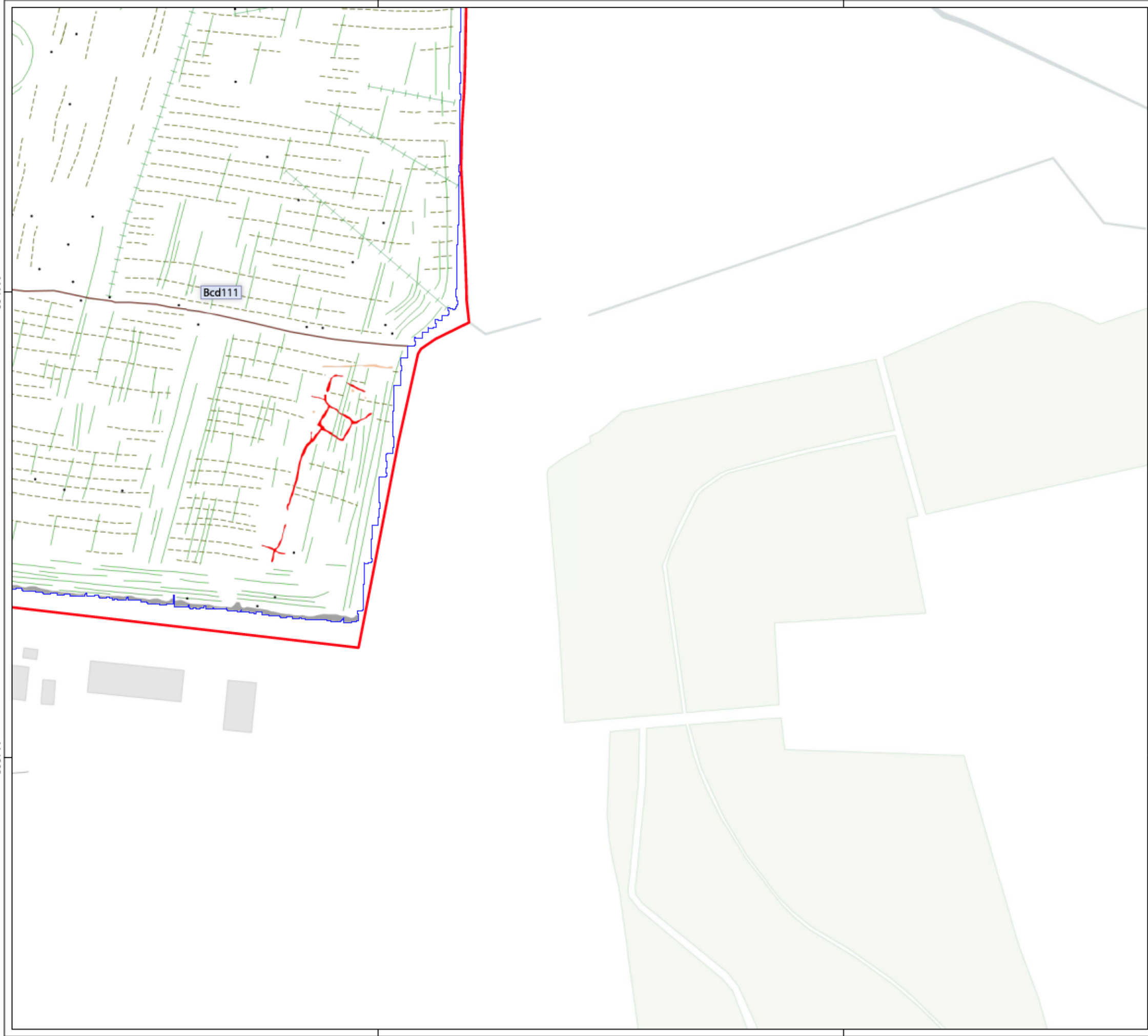
Key


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




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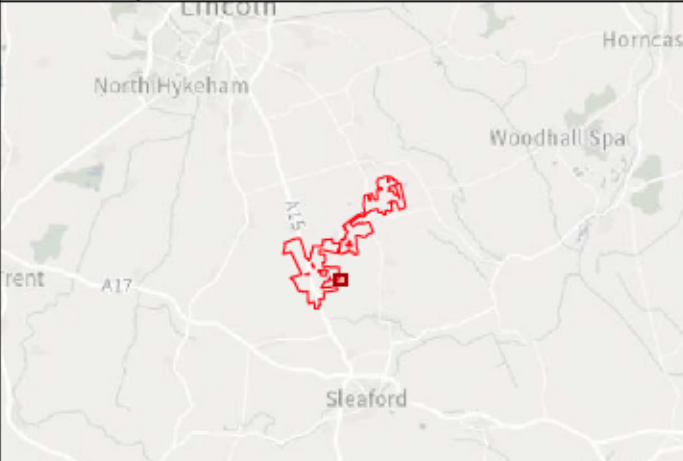








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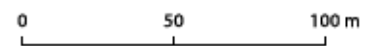


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-  Geophysical Survey Area
-  Survey Extent

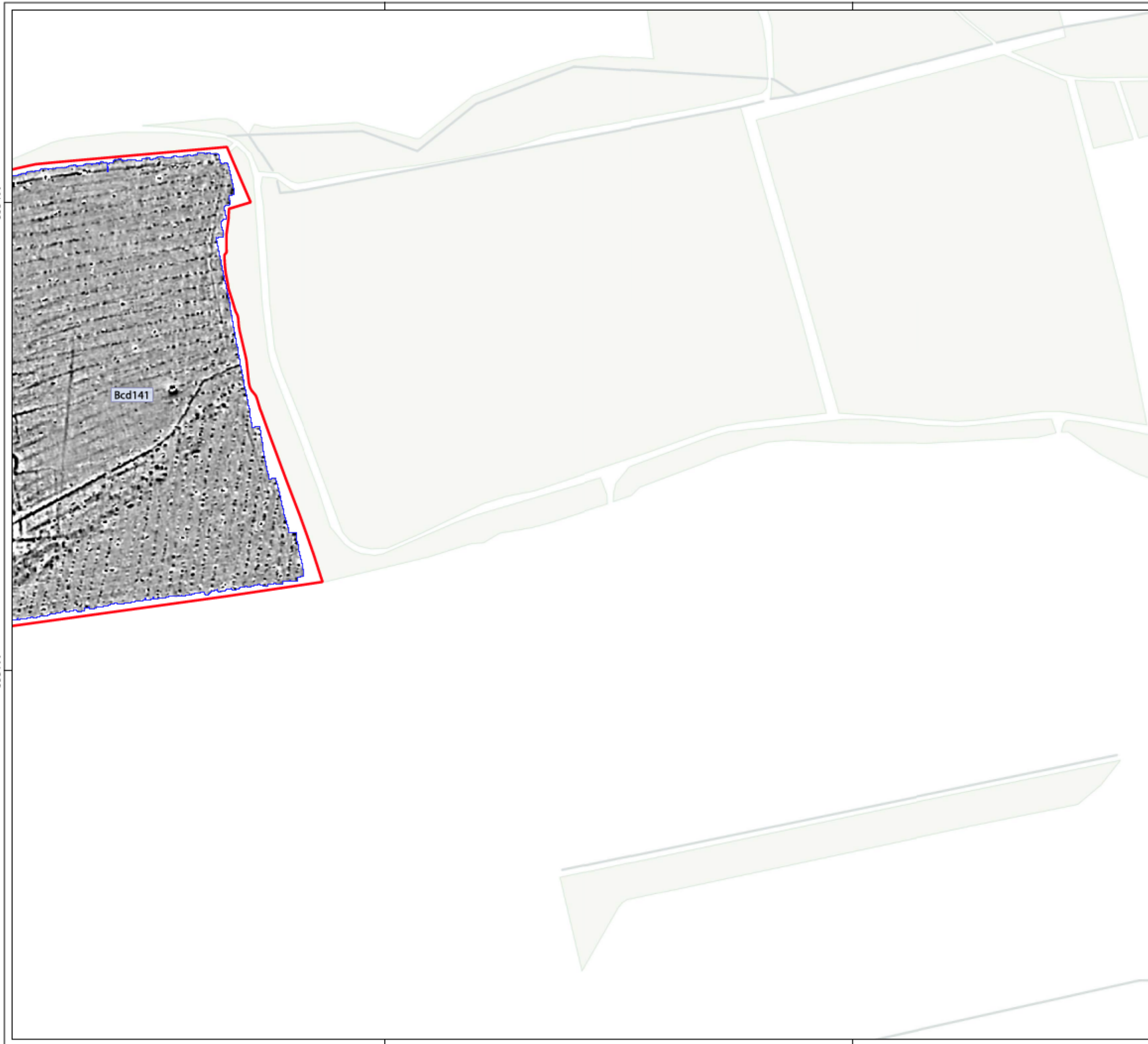
Interpretation

-  Ferrous Objects
-  Agriculture
-  Field Boundary
-  Field Drain
-  Ridge and Furrow
-  Archaeology
-  Magnetic Disturbance
-  Possible Archaeology



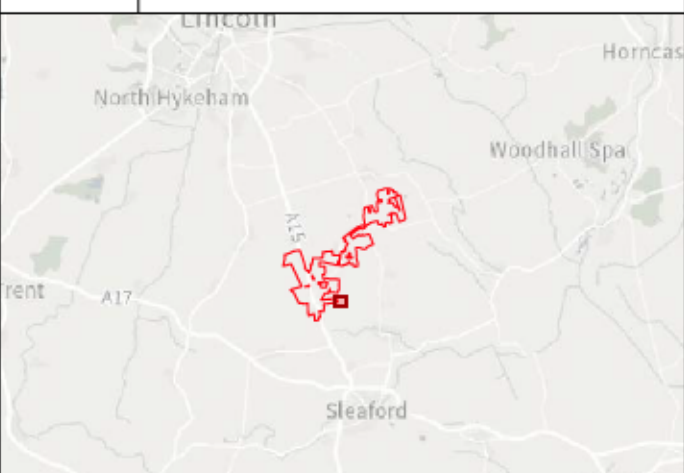
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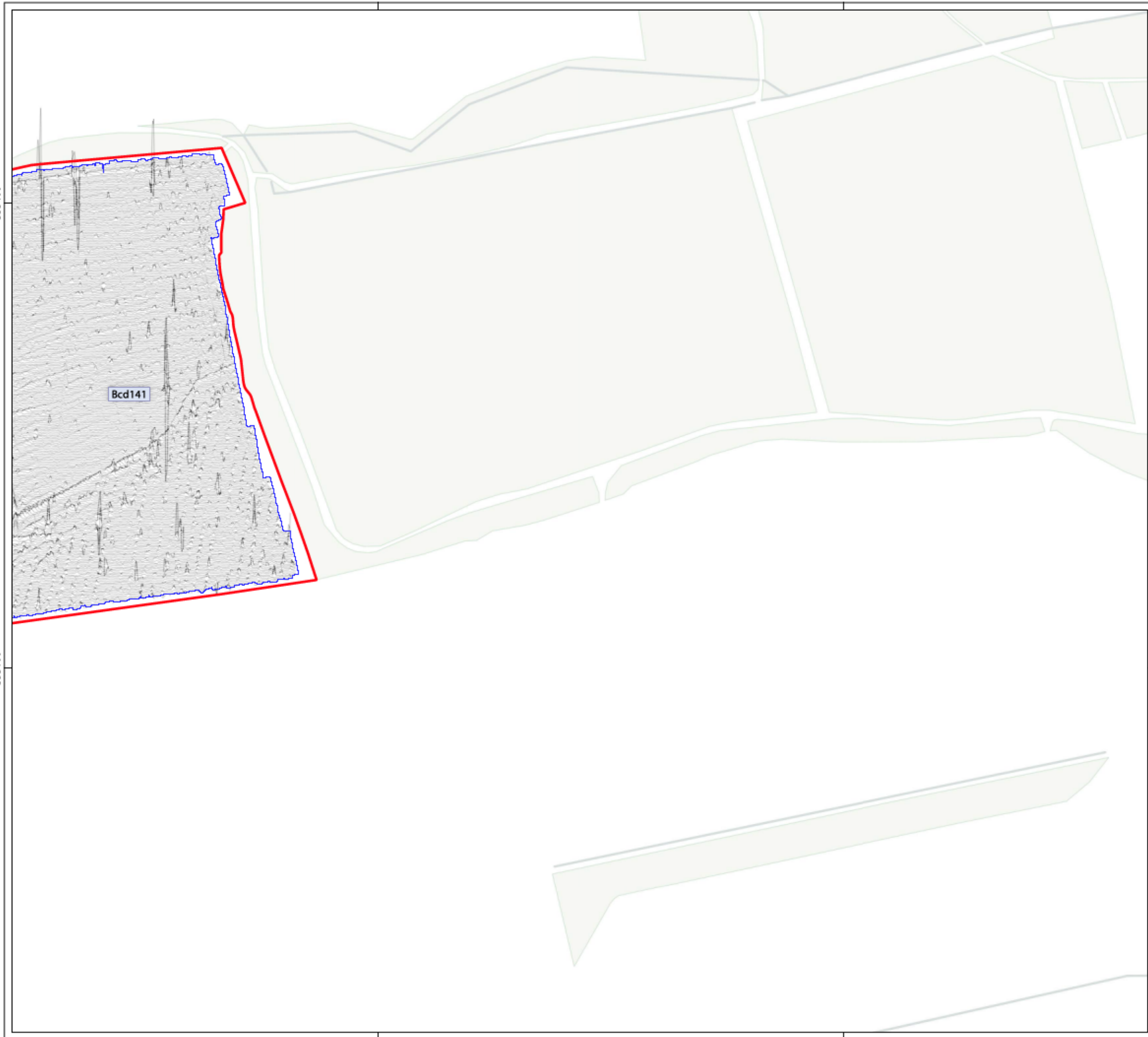
Key

Geophysical Survey Area

Survey Extent

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353400

353100

504900

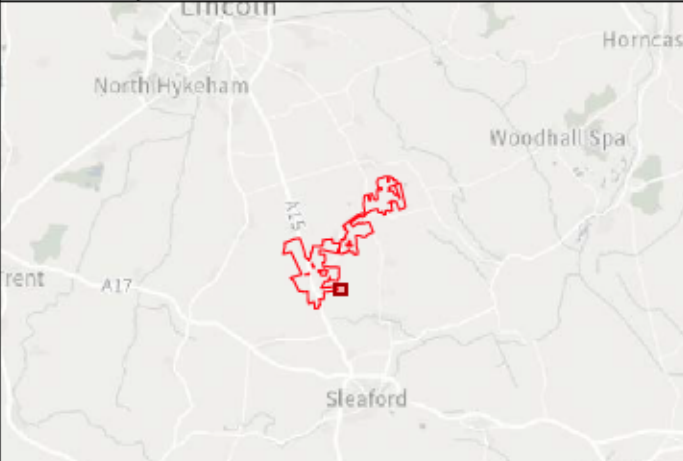
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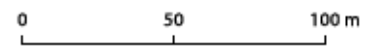
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Key

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

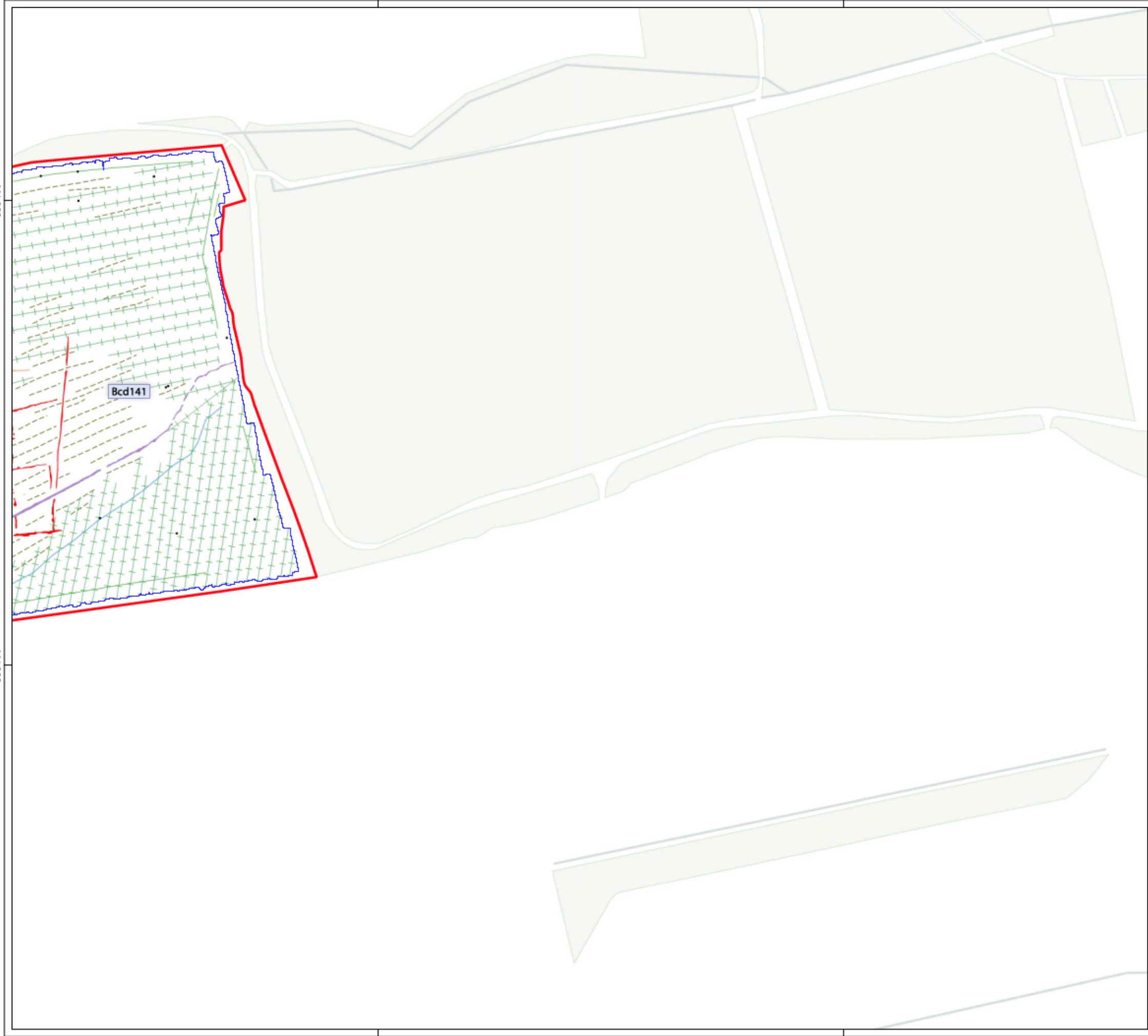


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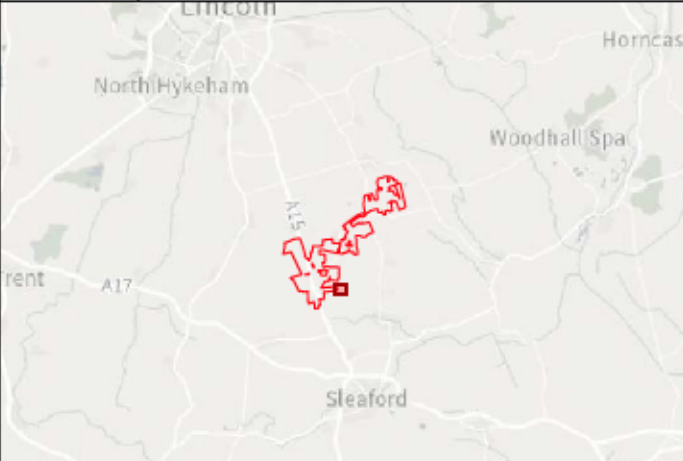
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Key


 Geophysical Survey Area


 Survey Extent


Interpretation


 Ferrous Objects


 Agriculture


 Field Drain

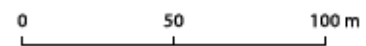
 Natural

 Ridge and Furrow

 Archaeology

 Possible Archaeology

 Uncertain

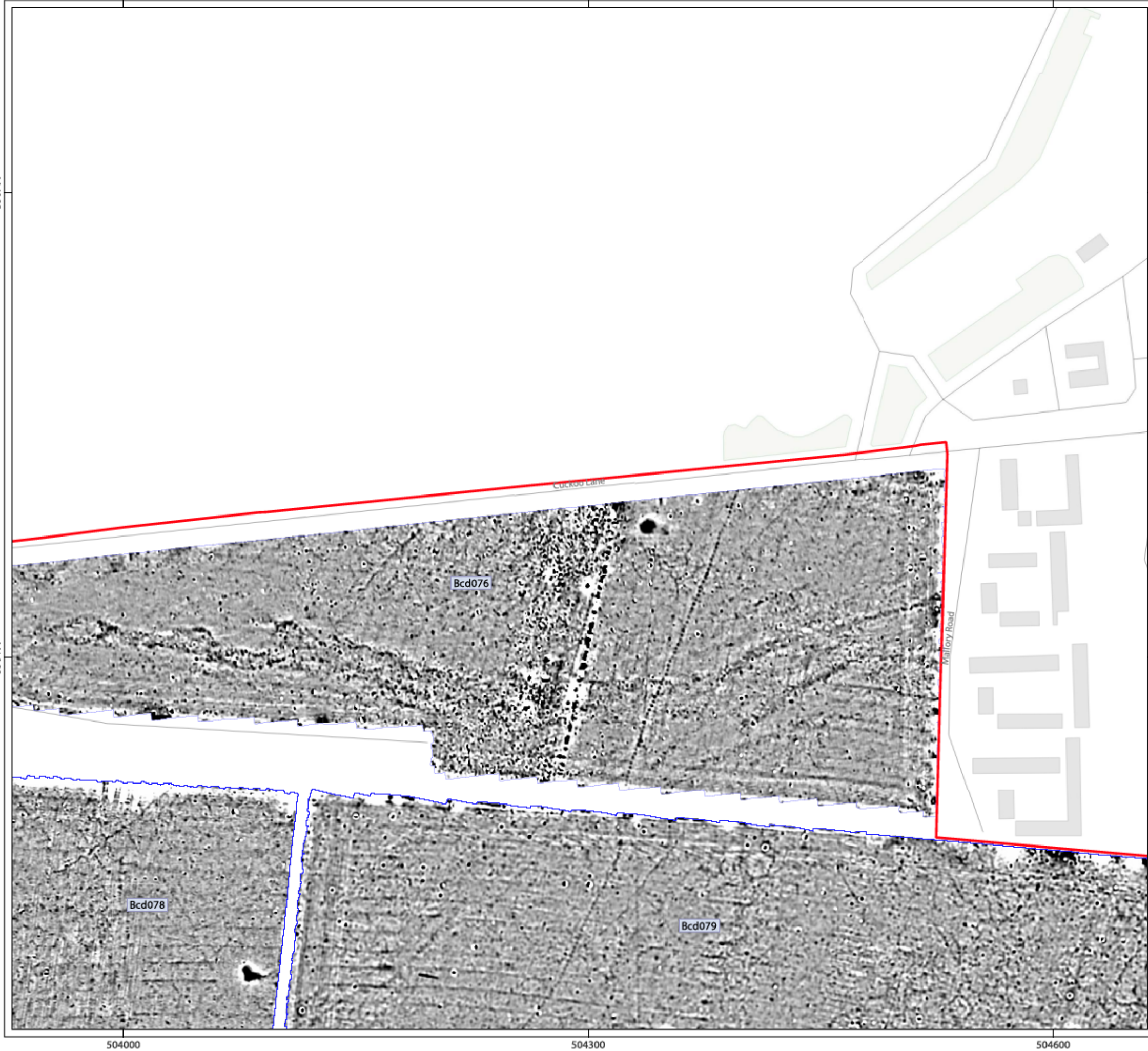


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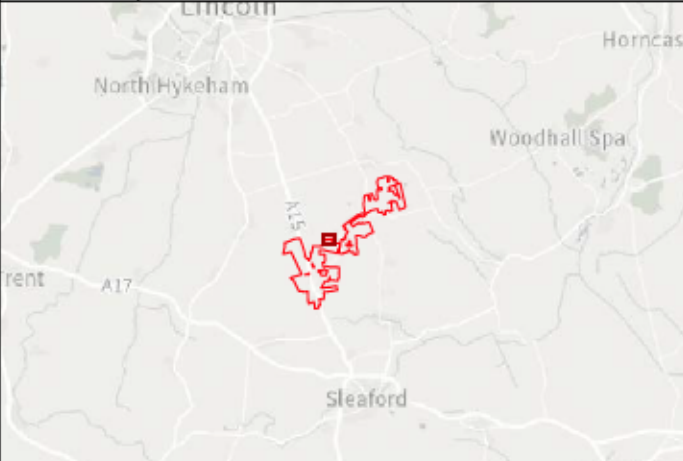








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Key

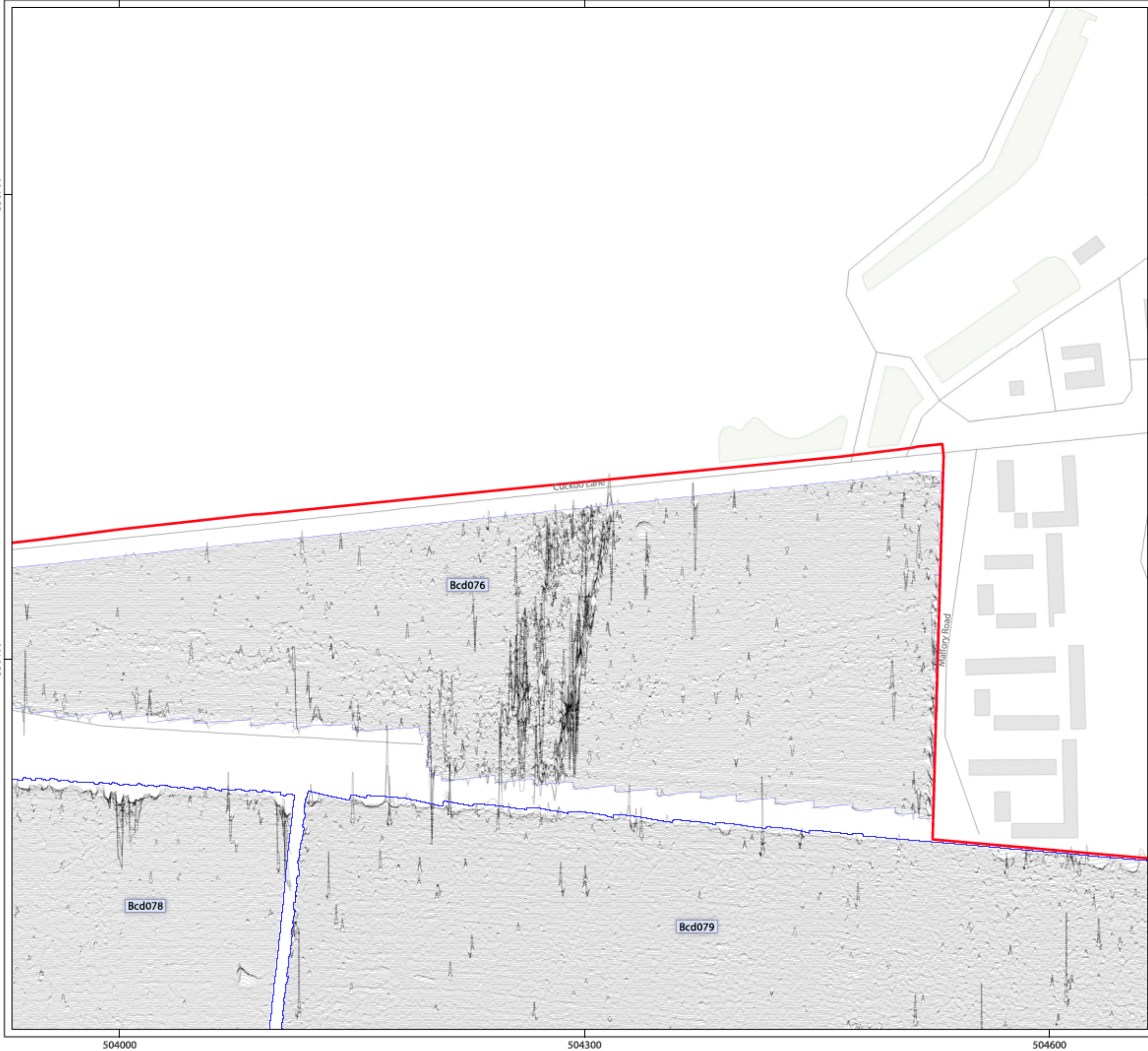
-  Geophysical Survey Area
-  Survey Extent



0 50 100 m

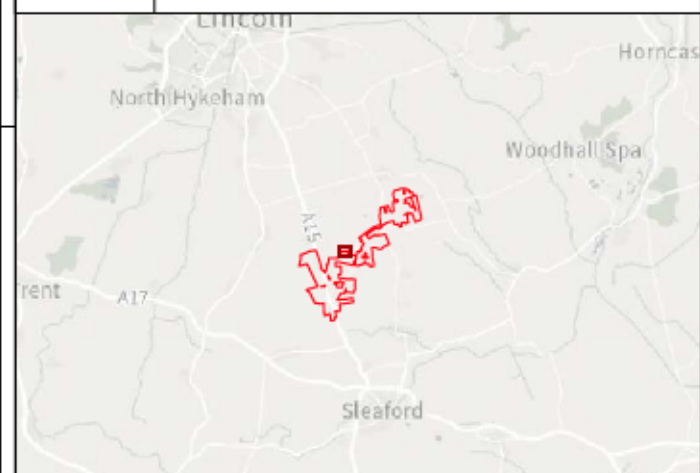
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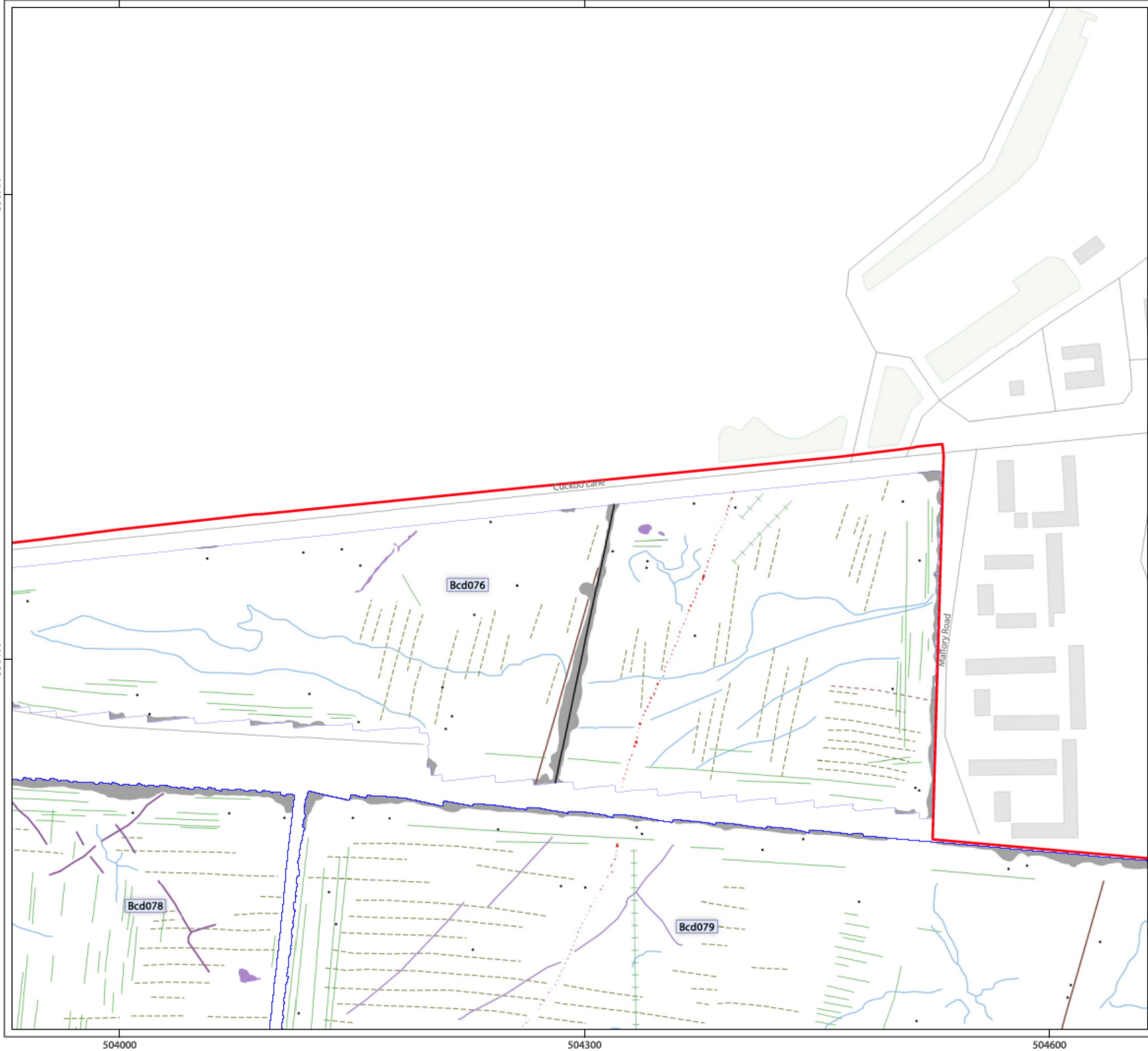
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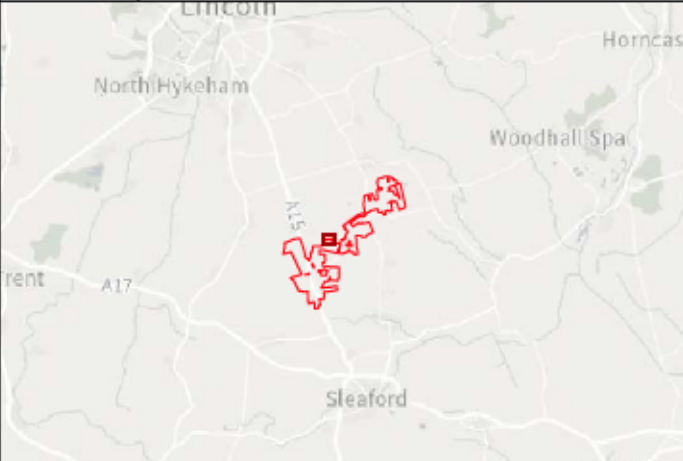








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Key


 Geophysical Survey Area


 Survey Extent

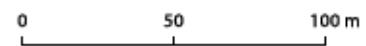
Interpretation

-  Ferrous Objects
-  Agriculture
-  Field Boundary
-  Possible Field Boundary
-  Field Drain
-  Natural
-  Pipe
-  Uncertain
-  Ridge and Furrow
-  Field System

 Archaeology

 Magnetic Disturbance

 Uncertain



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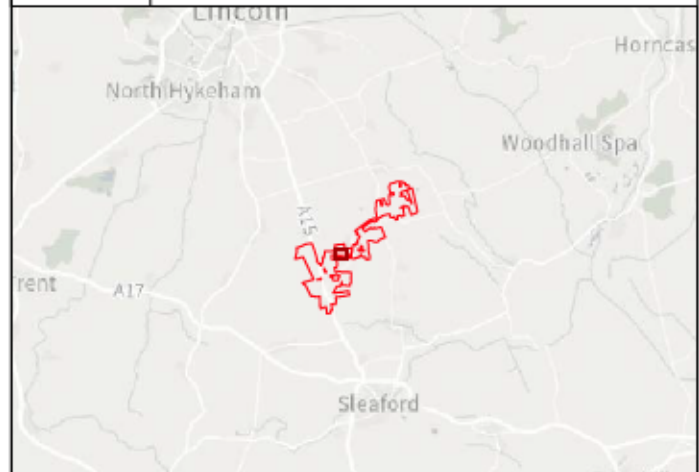
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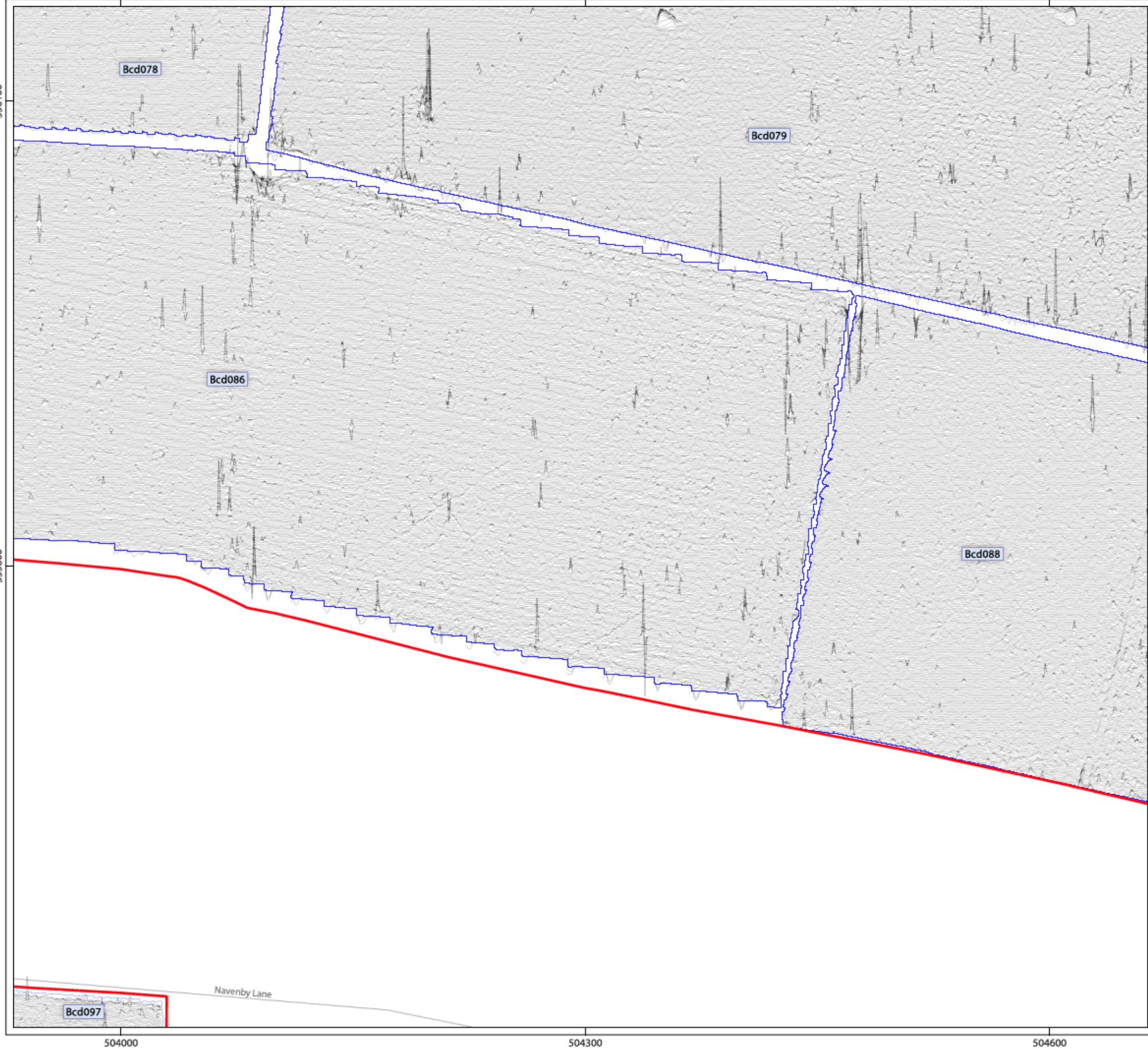
Key

Geophysical Survey Area

Survey Extent

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Key

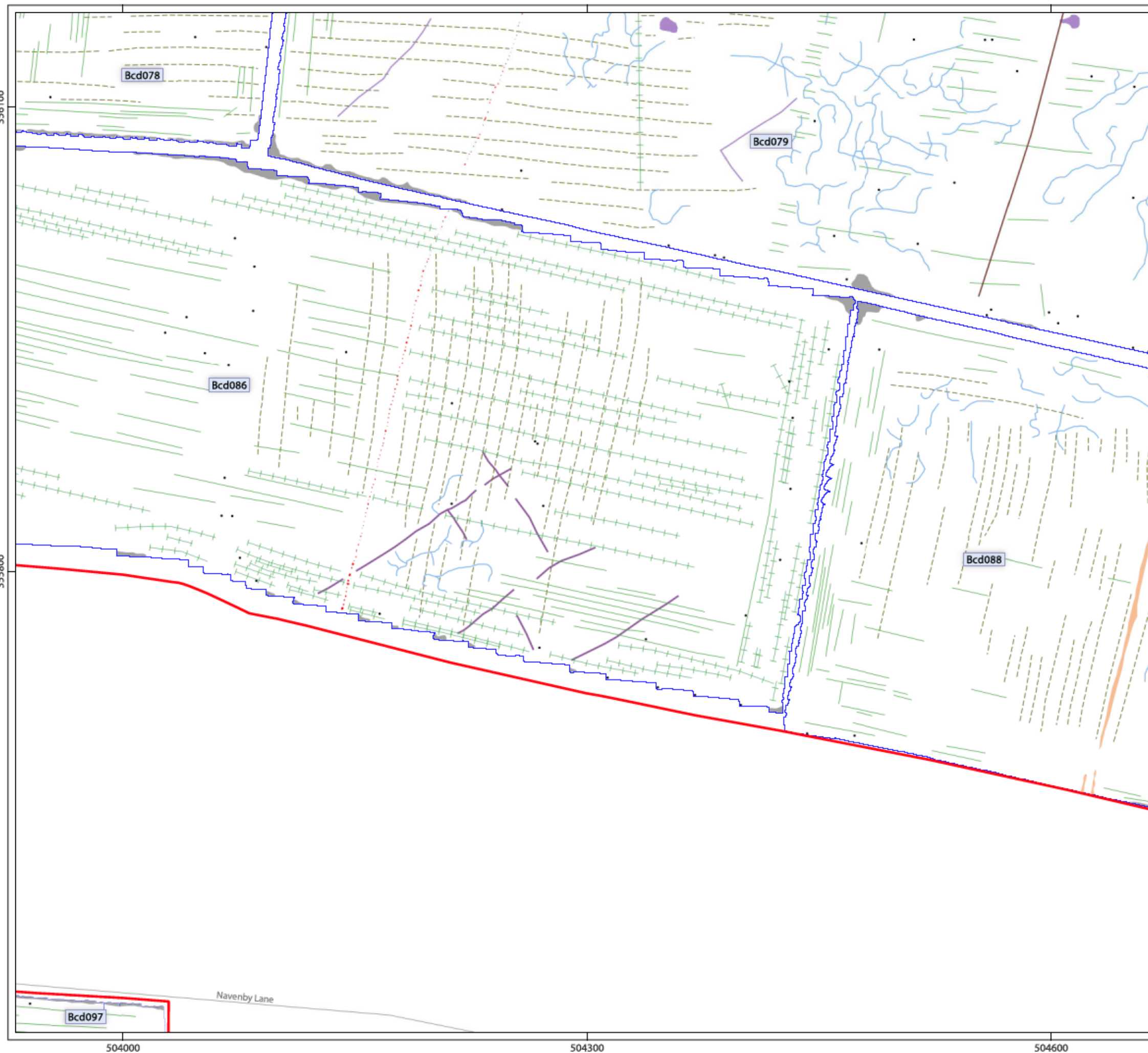
- Geophysical Survey Area
- Survey Extent
- XY Trace (25nT/cm)


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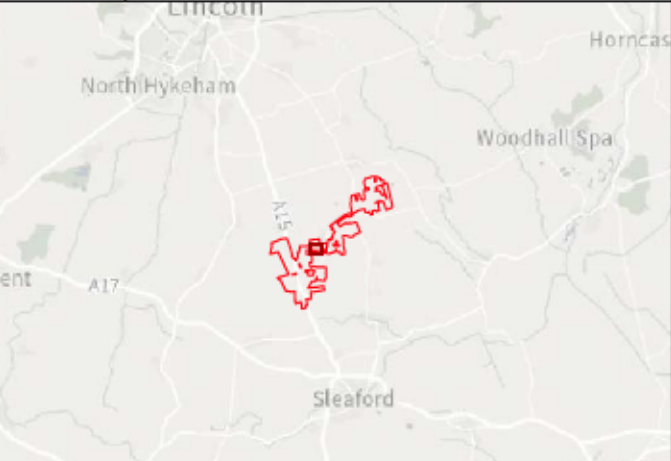
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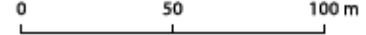


Key

- Geophysical Survey Area
- Survey Extent

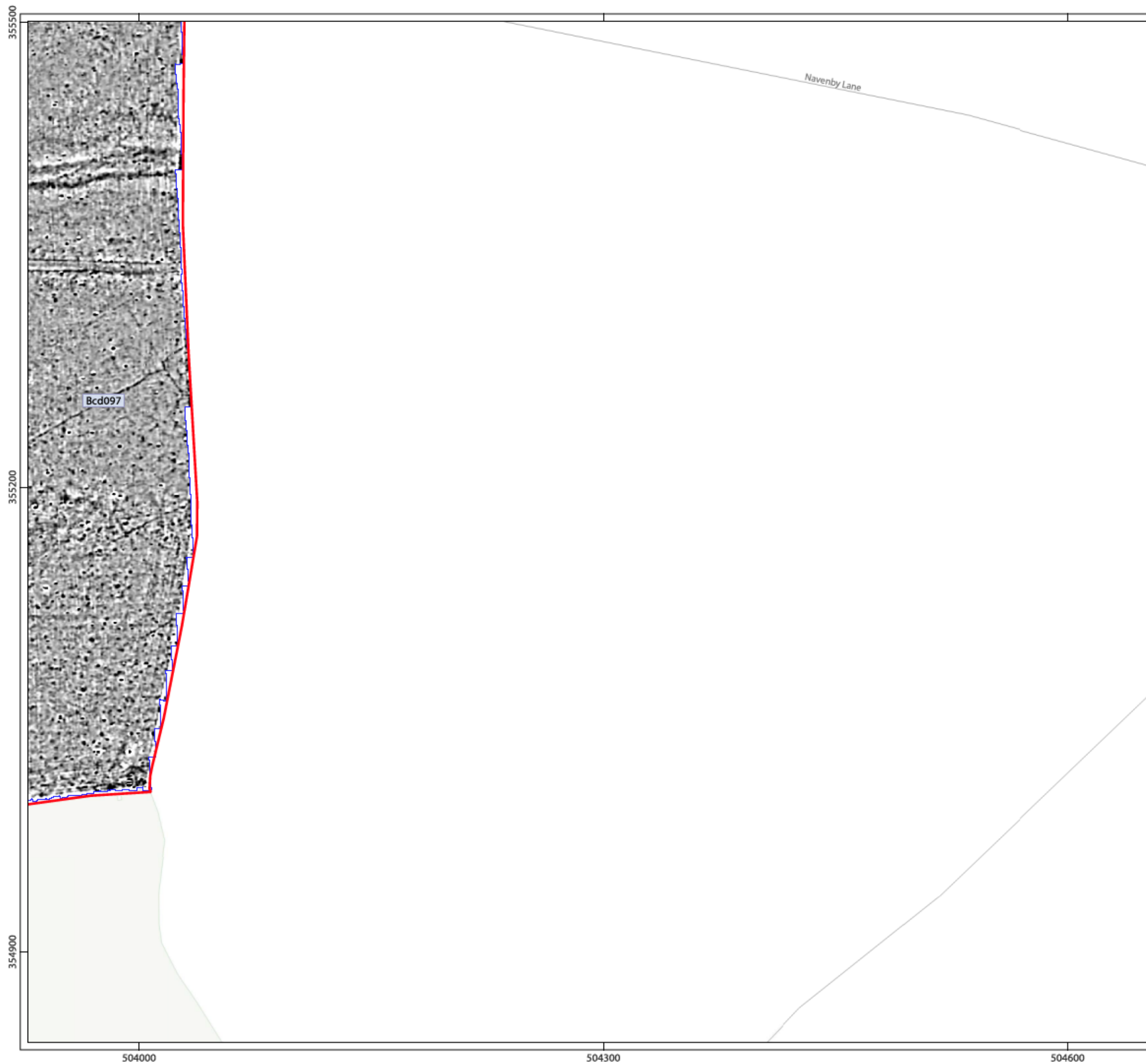
Interpretation


- Ferrous Objects
- Agriculture
- Field Boundary
- Field Drain
- Natural
- Uncertain
- Ridge and Furrow
- Field System
- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- Uncertain




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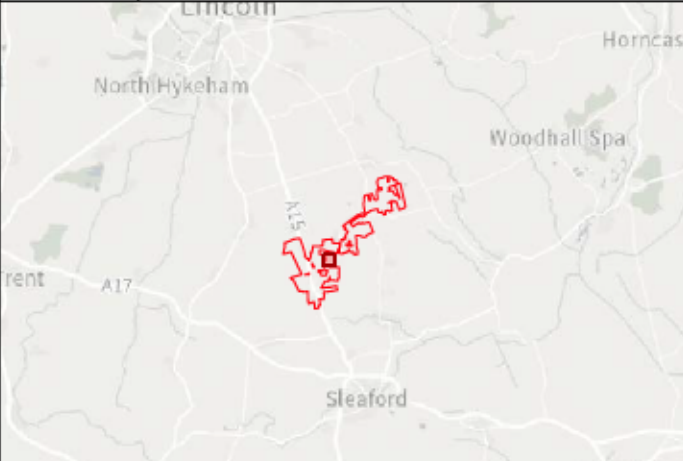







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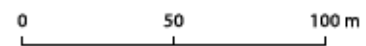


Key

- Geophysical Survey Area
- Survey Extent



+2nT
-1nT



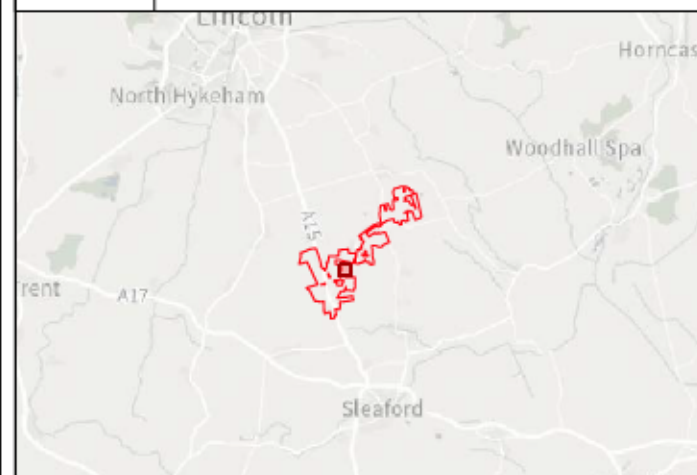
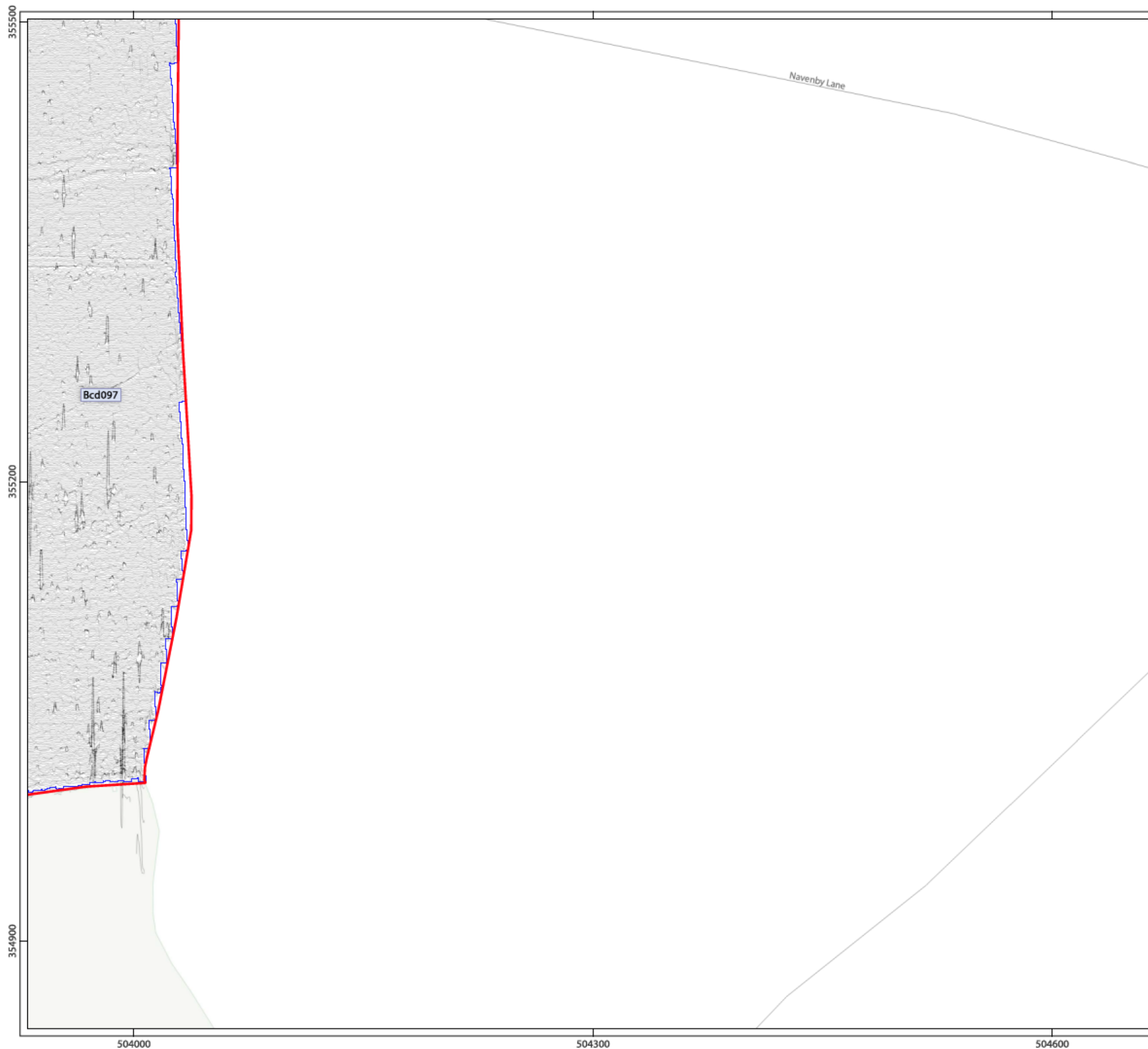
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Key

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

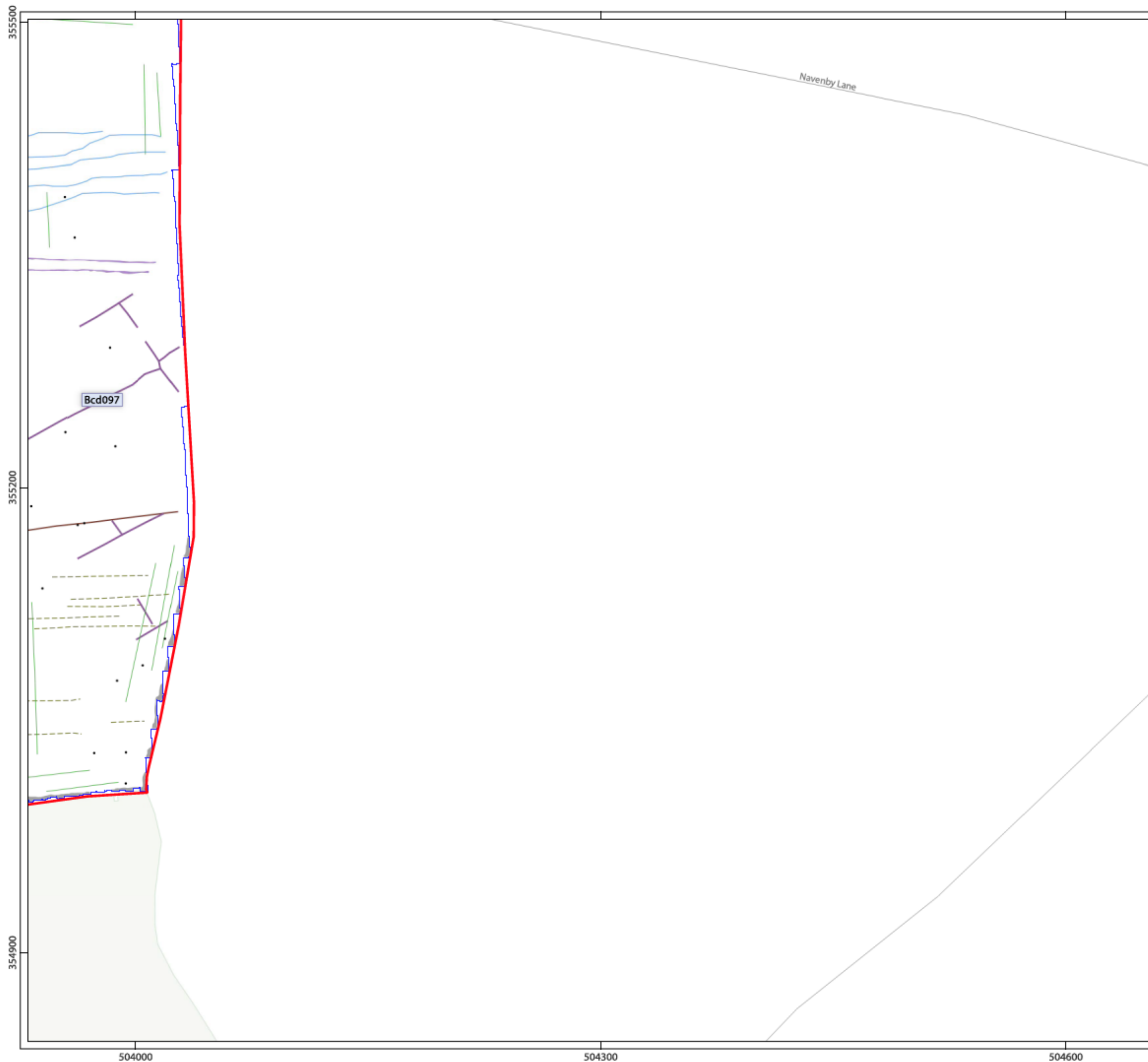
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Key

- Geophysical Survey Area
- Survey Extent

Interpretation

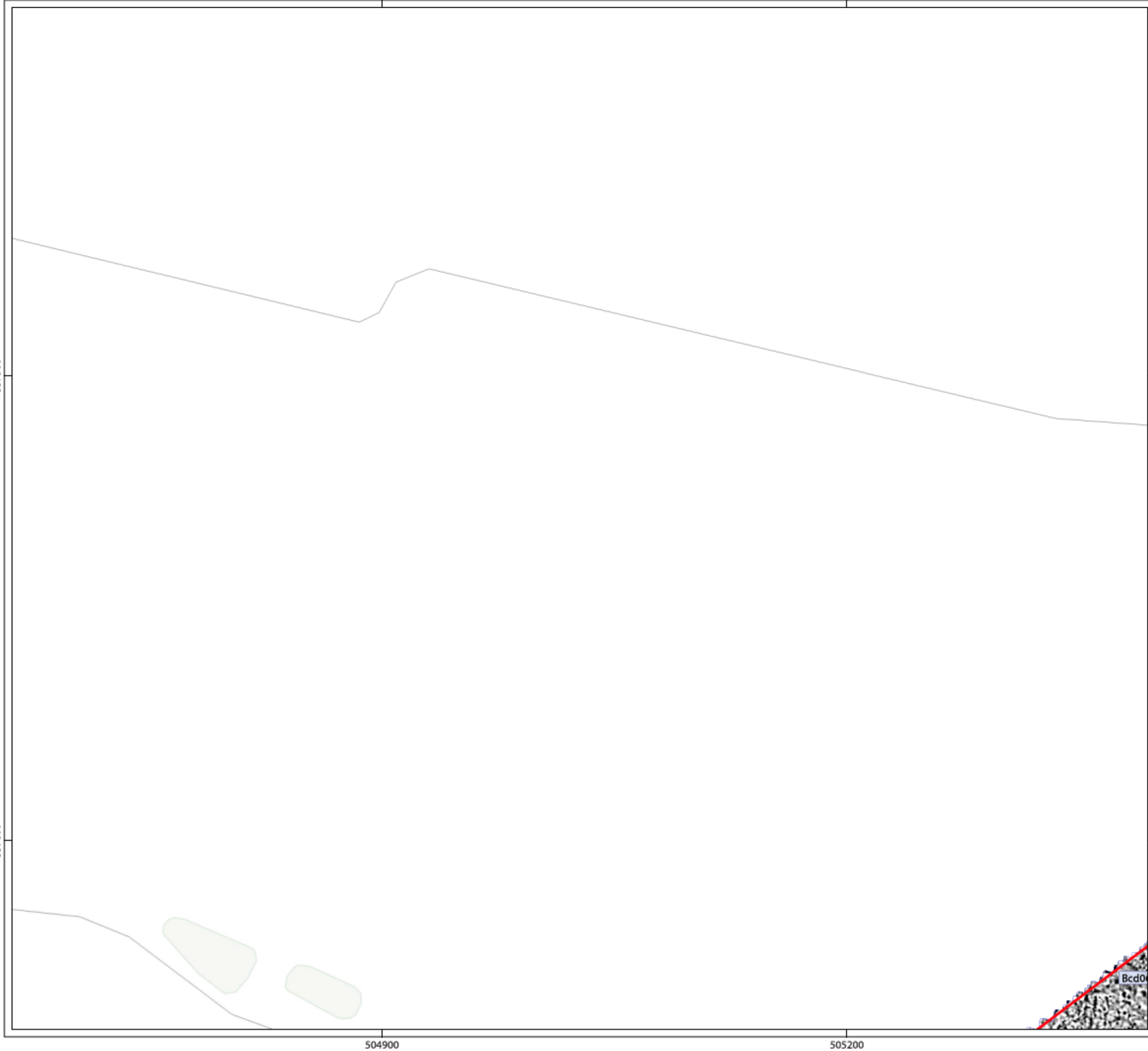
- Ferrous Objects
- Agriculture
- Field Boundary
- Natural
- Ridge and Furrow
- Field System
- Magnetic Disturbance
- Uncertain



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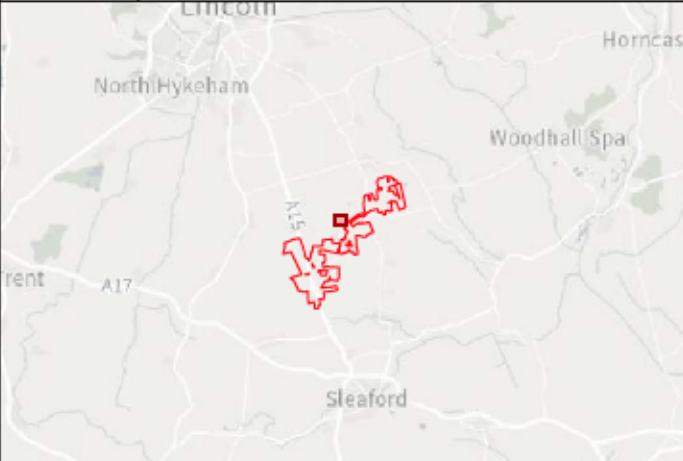
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Key

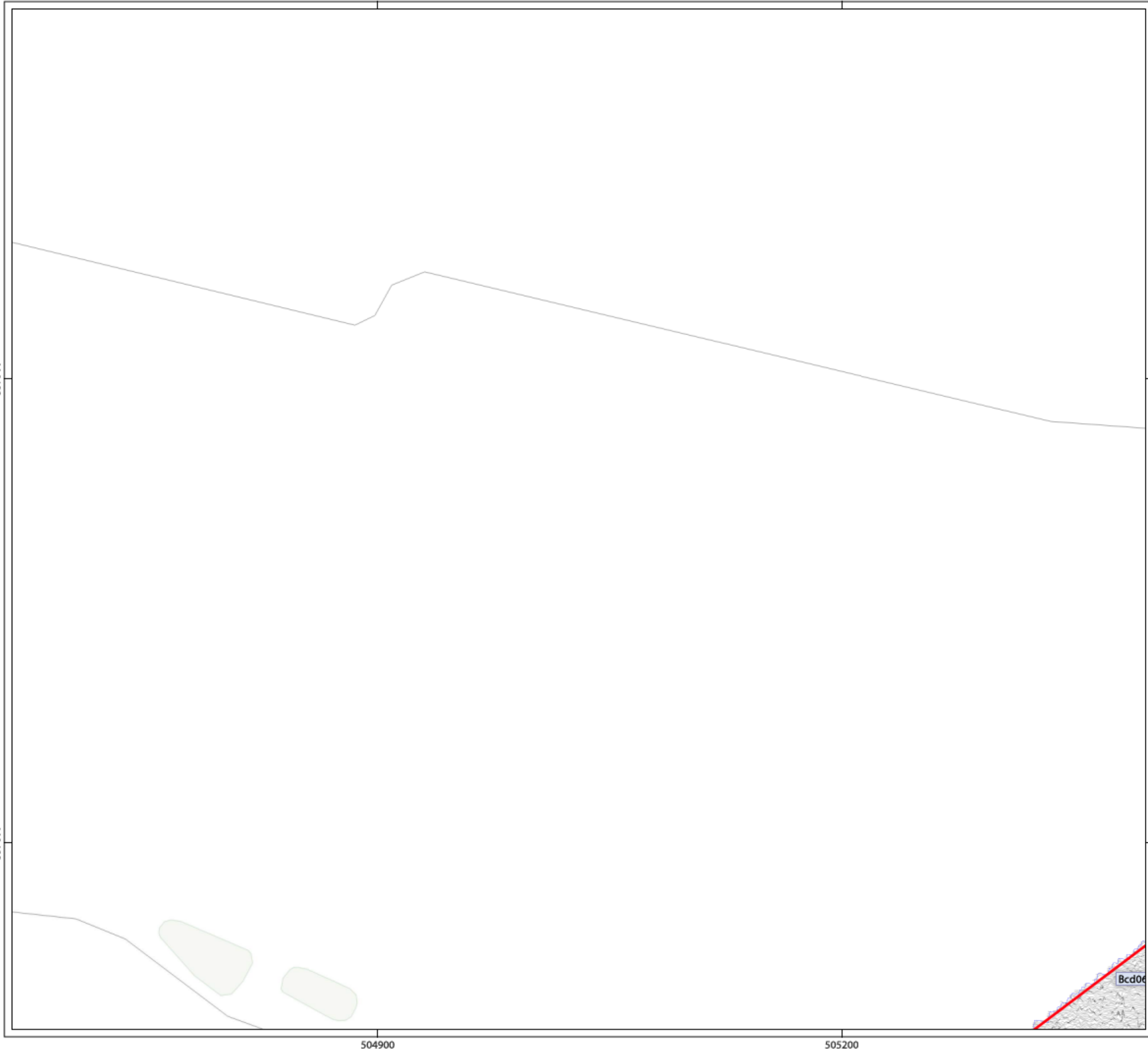
-  Geophysical Survey Area
-  Survey Extent

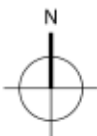



0 50 100 m

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Created by:	LD
Checked by:	JM
Version:	v1.2
Date:	05/07/2023
Scale:	1:2,500 @ A3

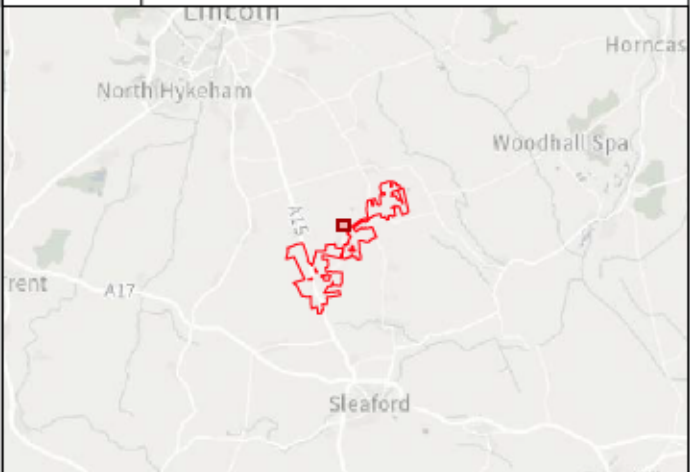









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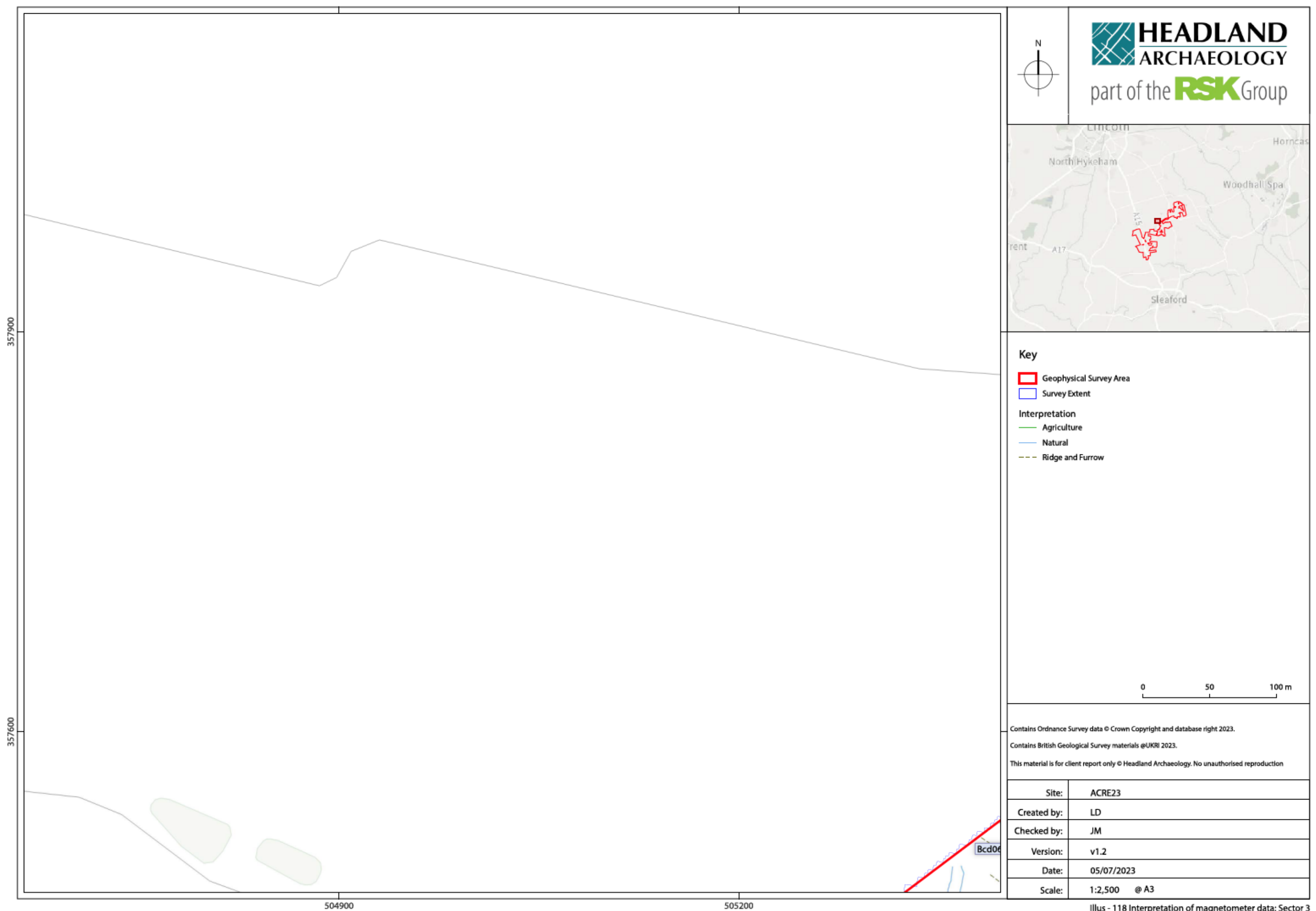
Key

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

0 50 100 m

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Date:	05/07/2023
Scale:	1:2,500 @ A3

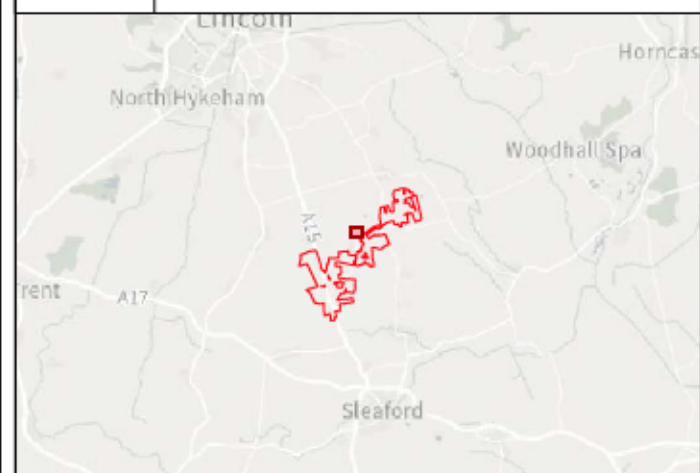








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Key


 Geophysical Survey Area

 Survey Extent

Interpretation

 Agriculture

 Natural

 Ridge and Furrow

050000

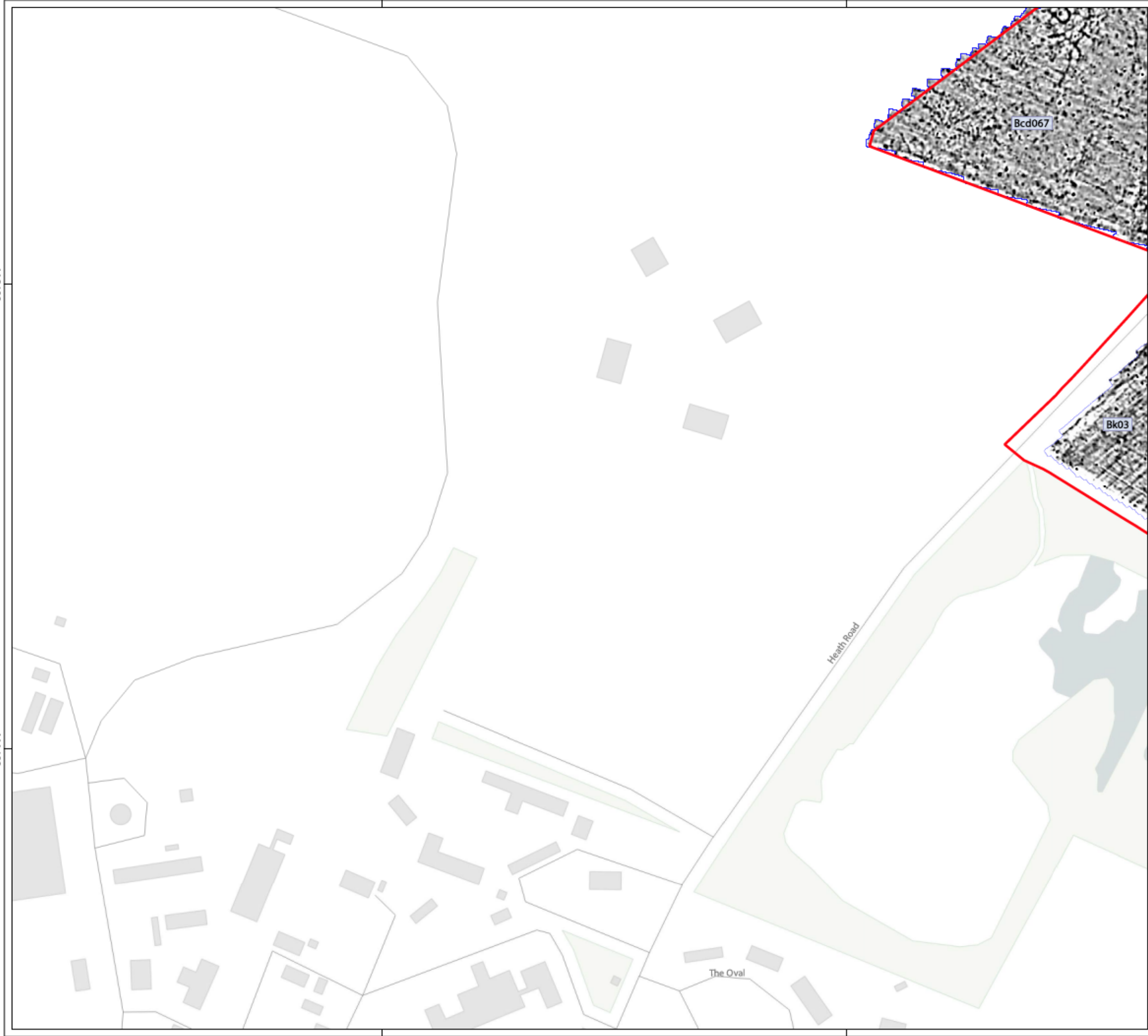
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50


100 m

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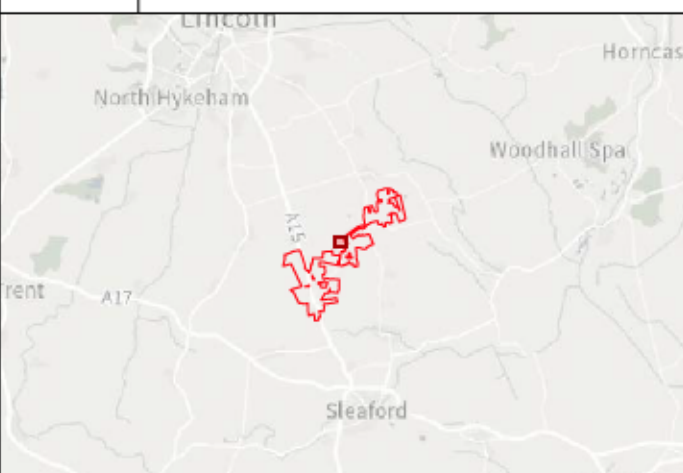









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Key

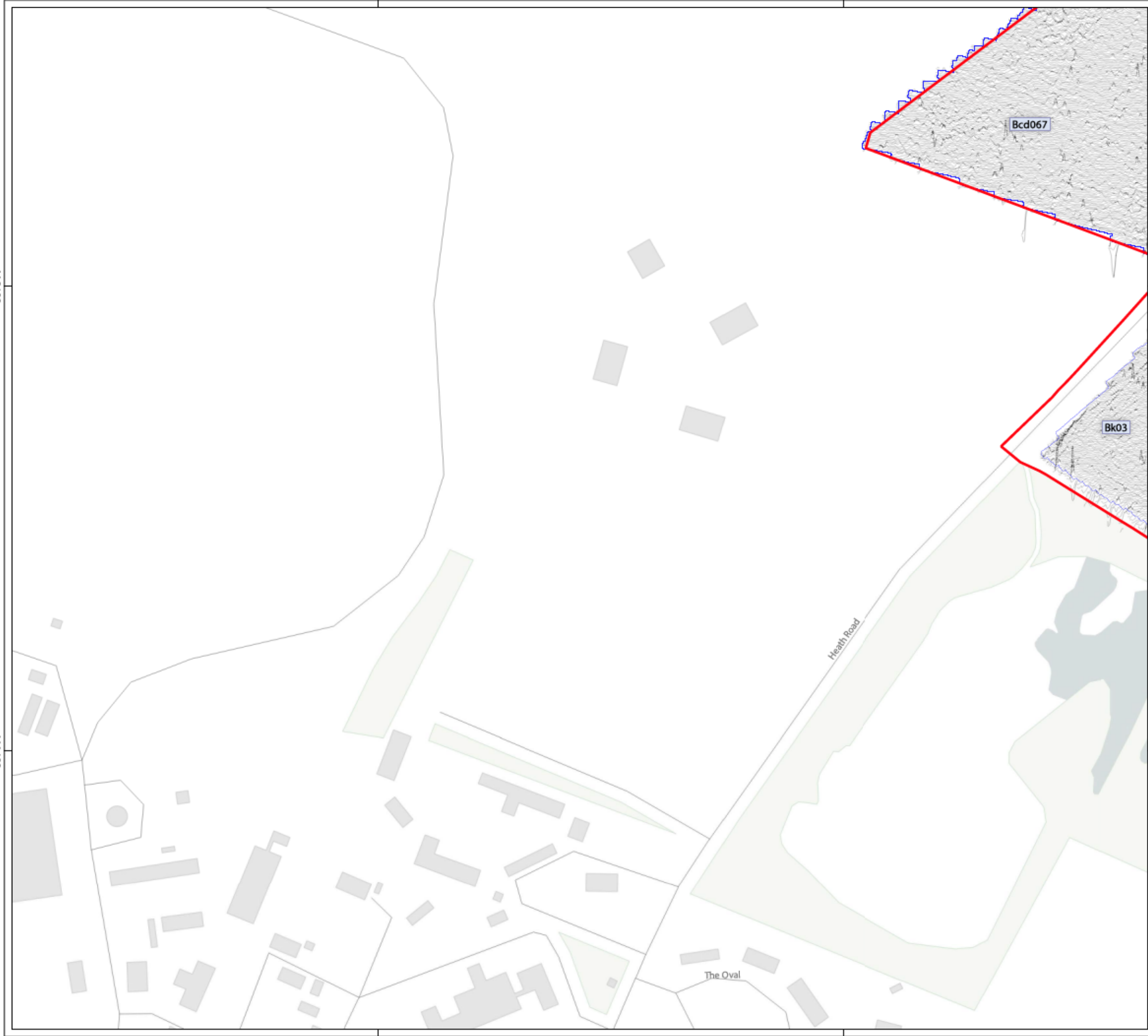
-  Geophysical Survey Area
-  Survey Extent





0 50 100 m

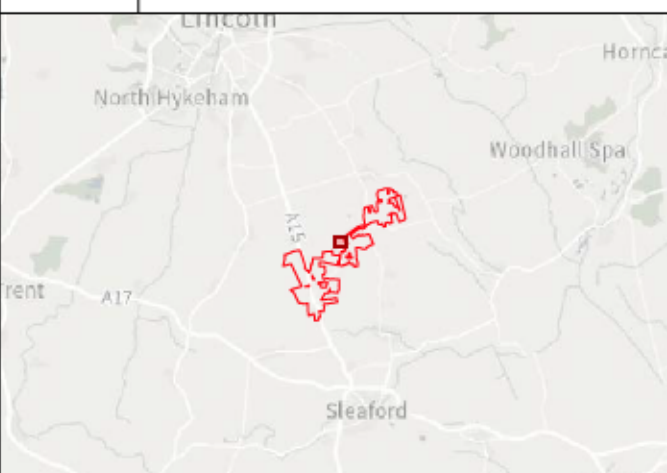
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Checked by:	JM
Version:	v1.2
Date:	05/07/2023
Scale:	1:2,500 @ A3





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Key

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

0 50 100 m

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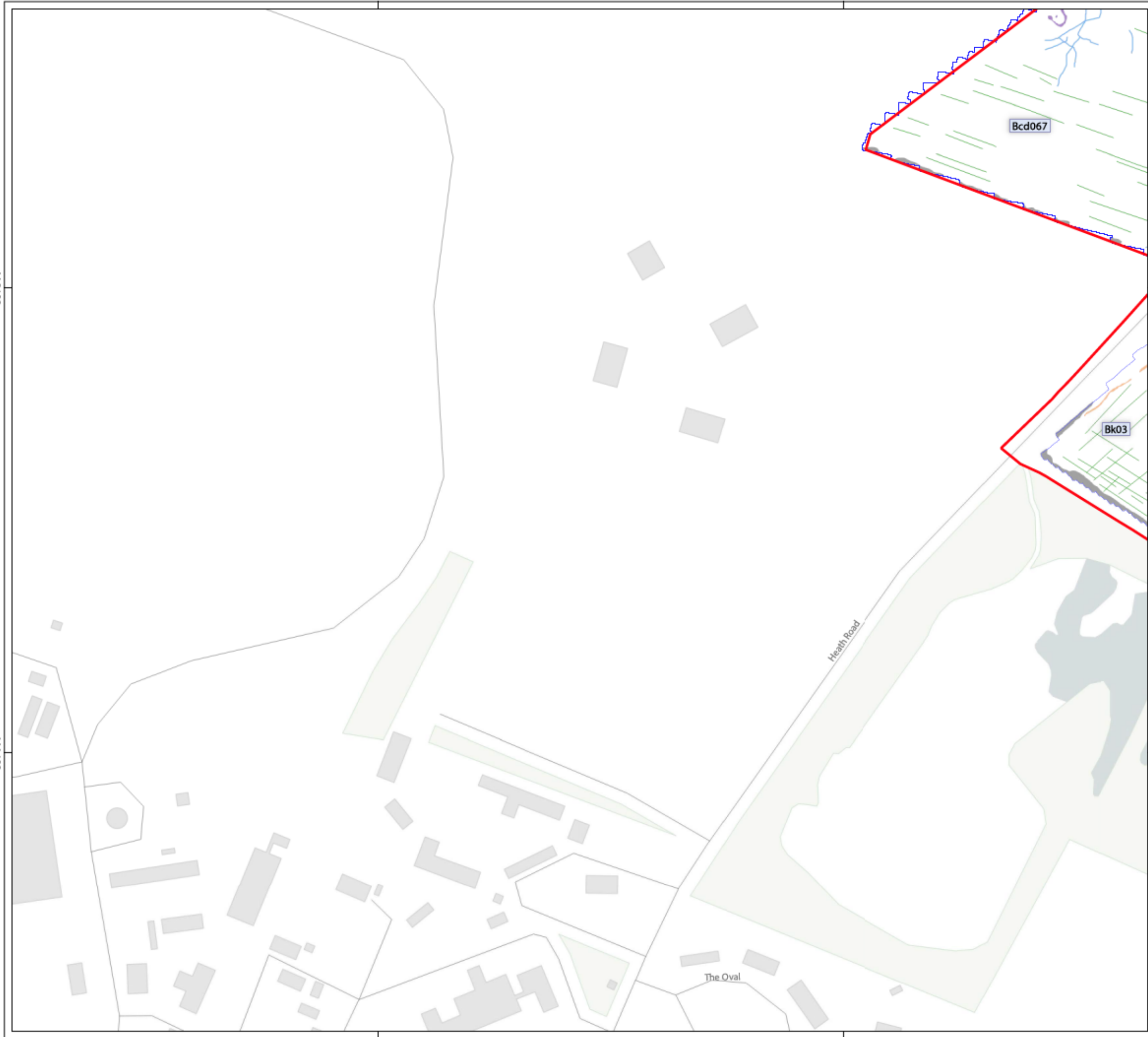
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Checked by:	JM
Version:	v1.2
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357000

504900

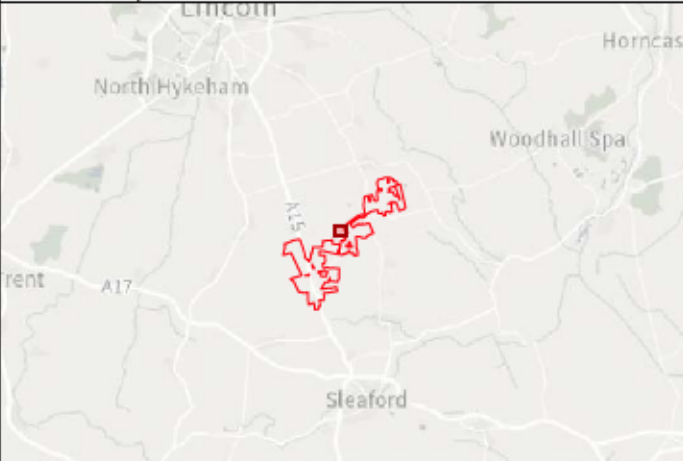
505200









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Key


 Geophysical Survey Area


 Survey Extent


Interpretation

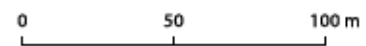
 Agriculture

 Natural

 Magnetic Disturbance

 Possible Archaeology

 Uncertain

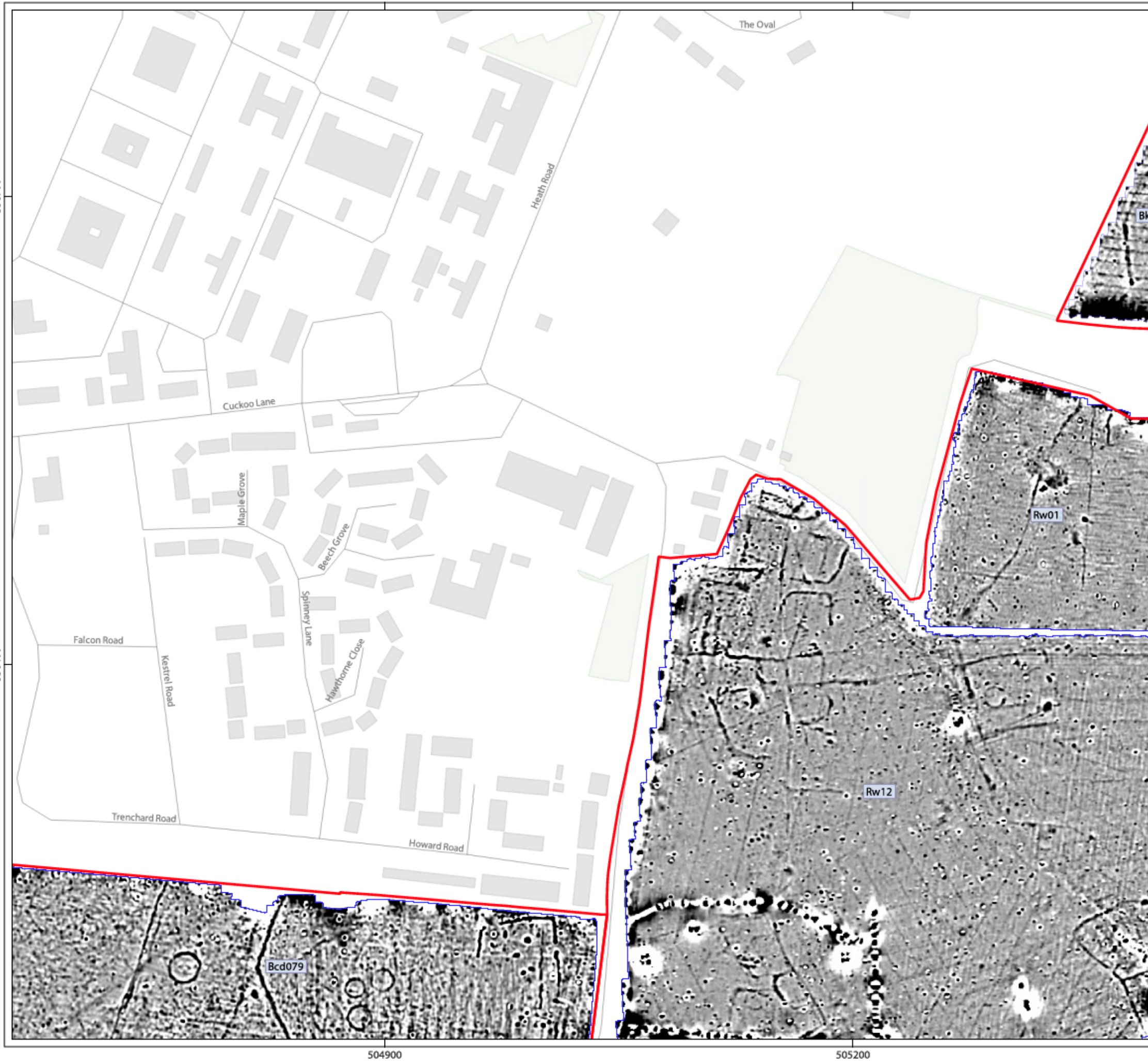


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Version:	v1.2
Date:	05/07/2023
Scale:	1:2,500 @ A3

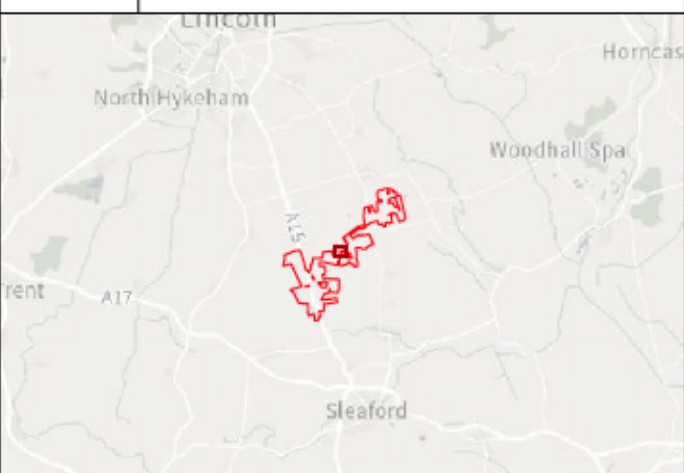









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Key

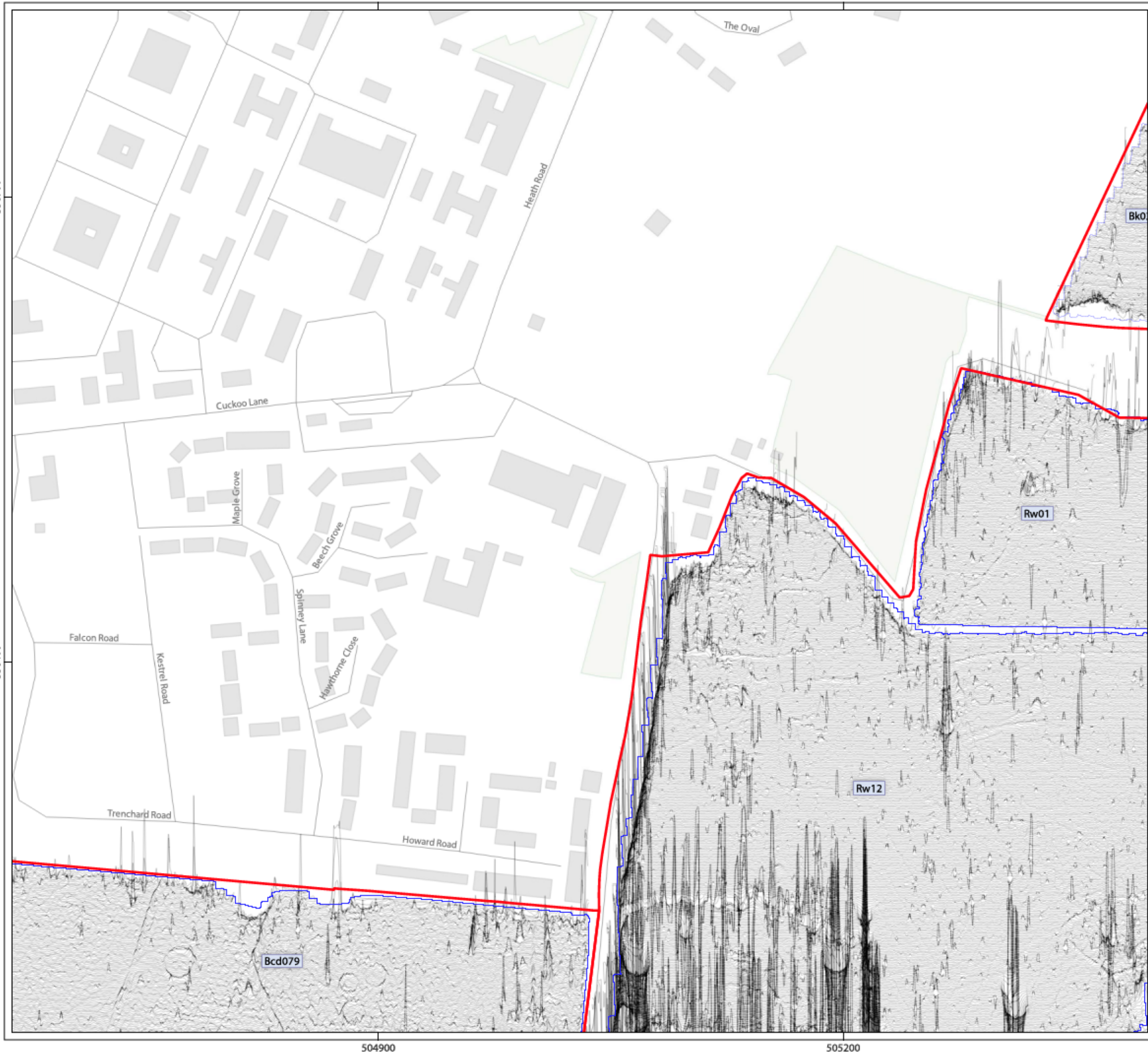
-  Geophysical Survey Area
-  Survey Extent





0 50 100 m

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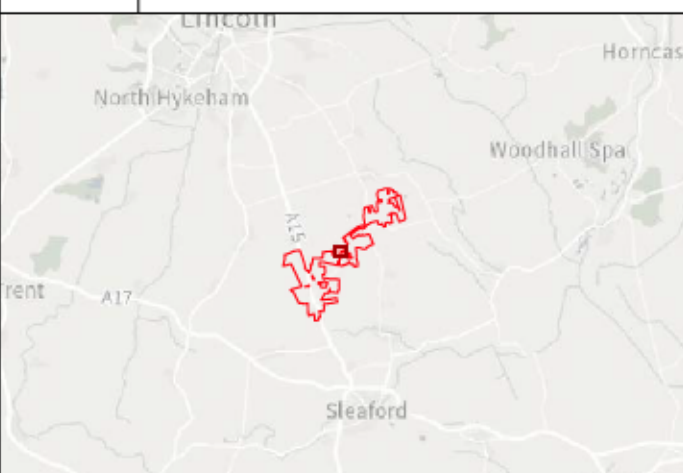
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Created by:	LD
Checked by:	JM
Version:	v1.2
Date:	05/07/2023
Scale:	1:2,500 @ A3







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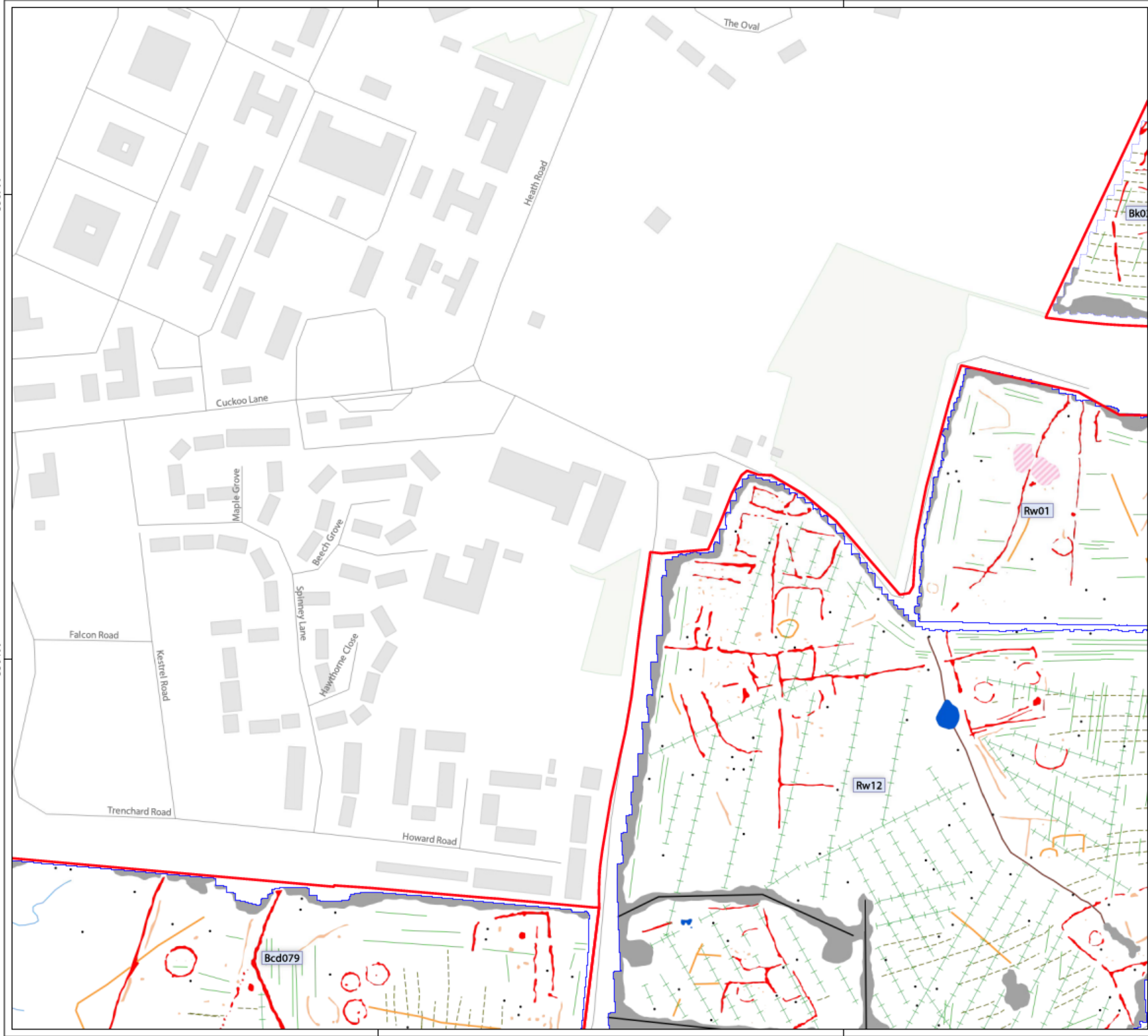
Key


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


0 50 100 m

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Scale:	1:2,500 @ A3

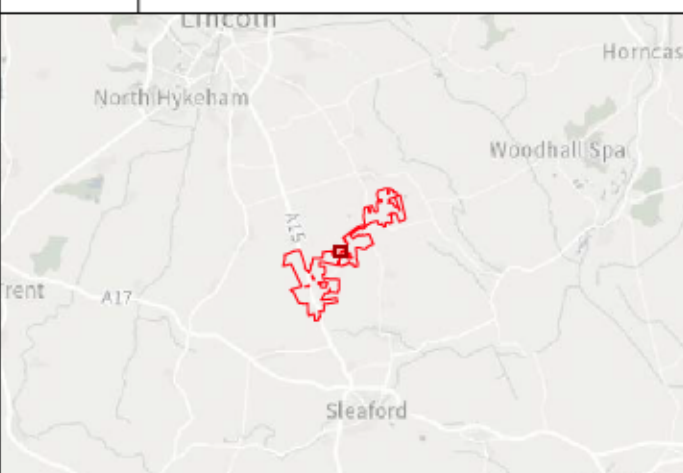








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Key

 Geophysical Survey Area

 Survey Extent

Interpretation

-  Ferrous Objects
-  Agriculture
-  Field Boundary
-  Field Drain
-  Natural
-  Pipe
-  Ridge and Furrow
-  Possible Archaeology
-  Archaeology
-  Magnetic Disturbance
-  Possible Archaeology
-  Quarry
-  Former Pond

0

50

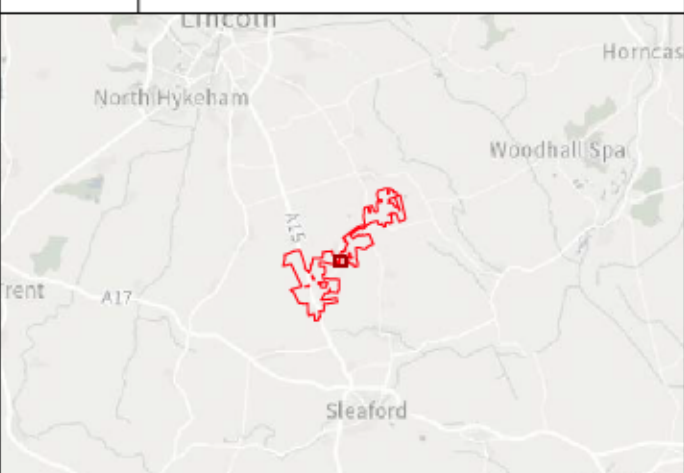
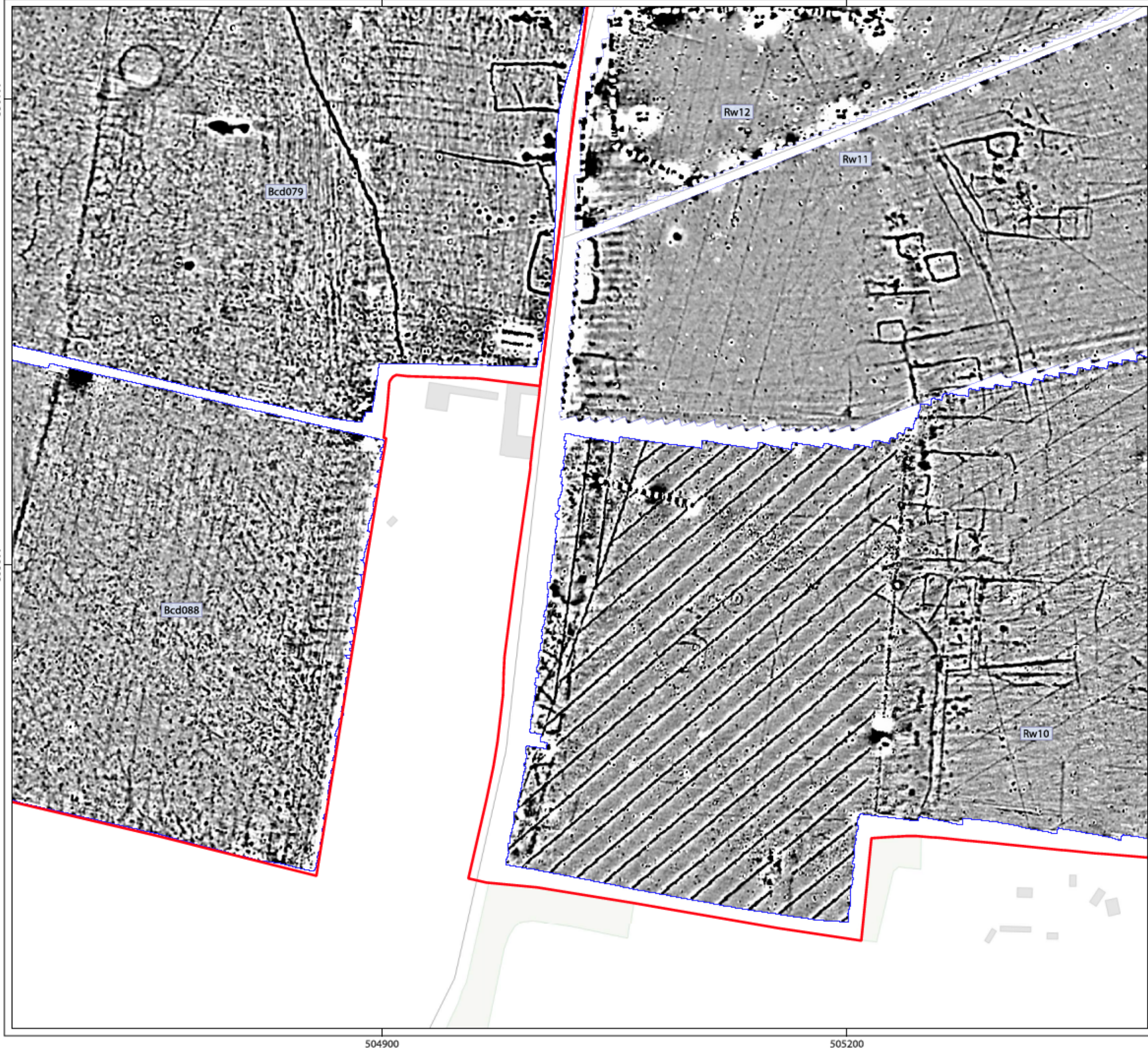
100 m

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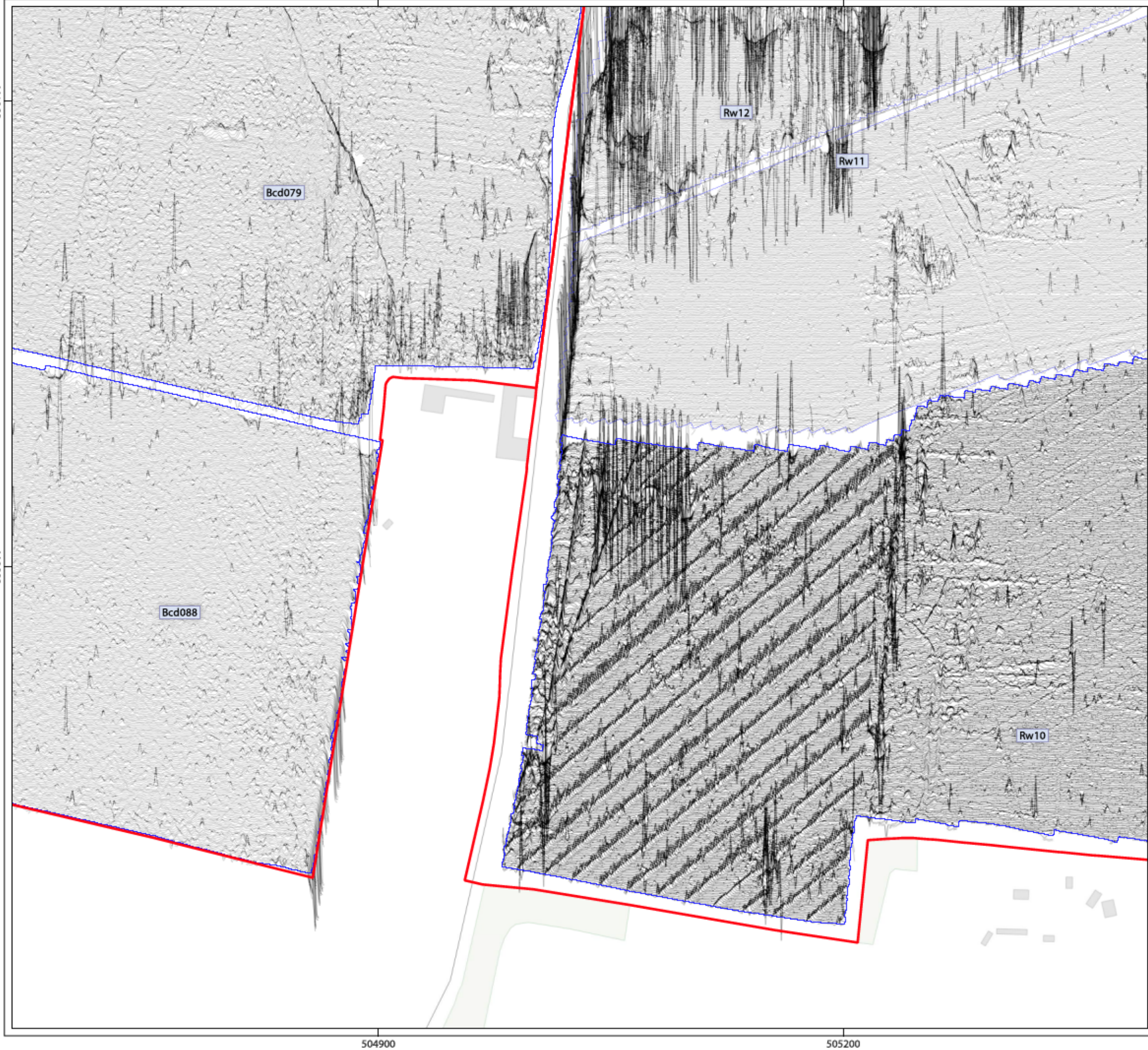
Key


Geophysical Survey Area


Survey Extent

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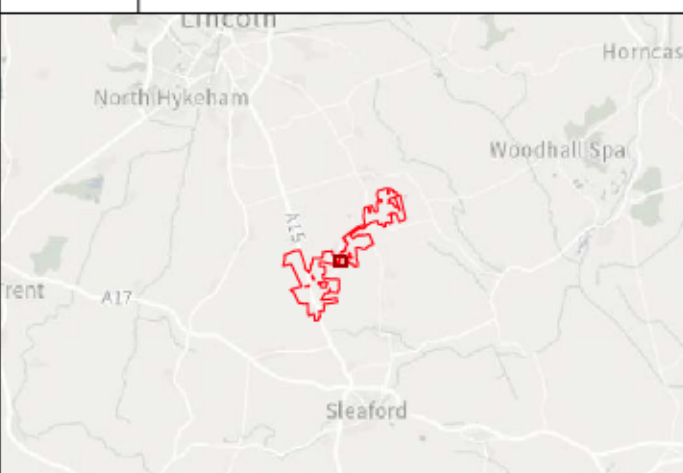









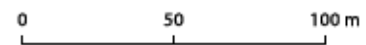
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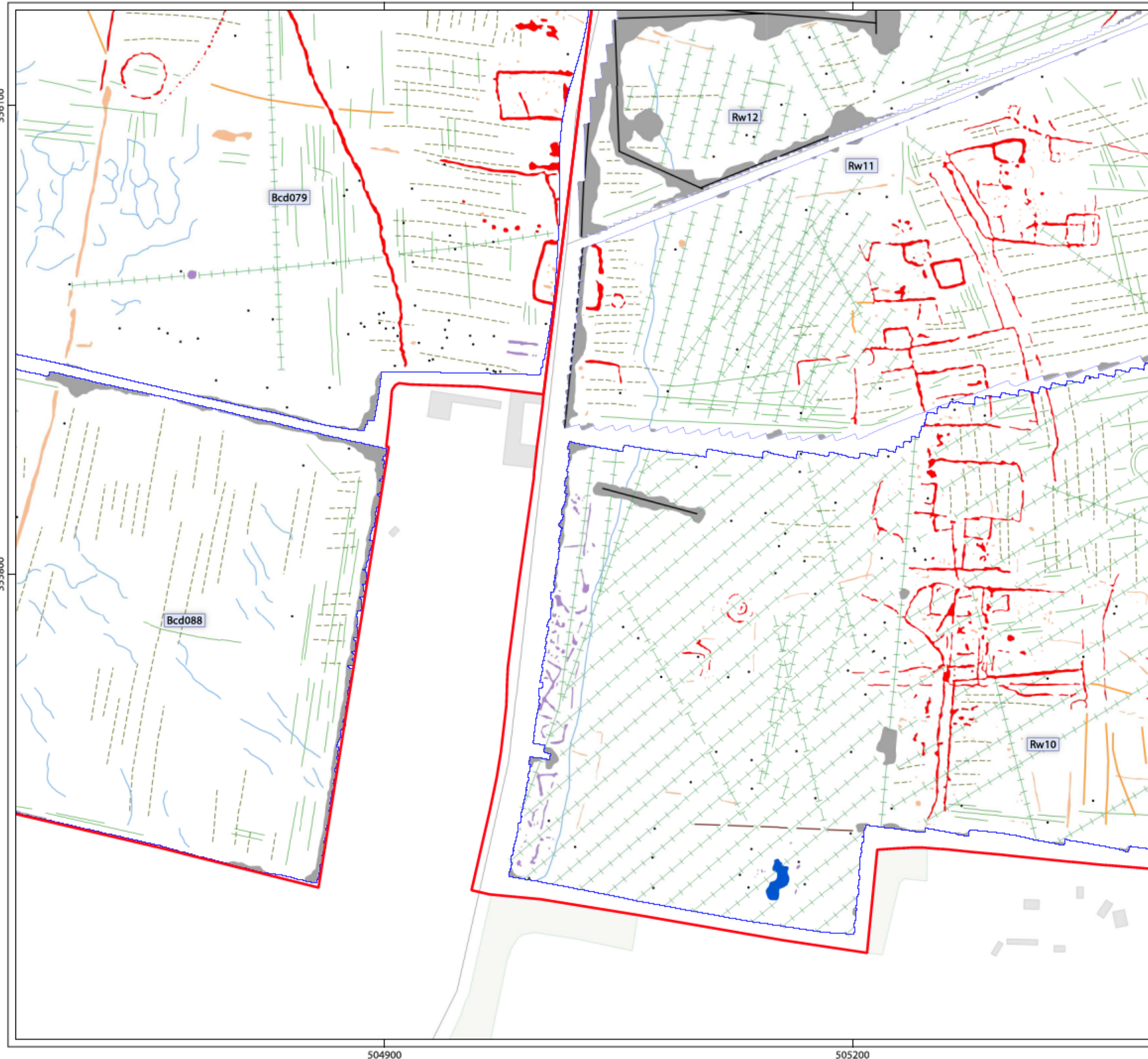
Key

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



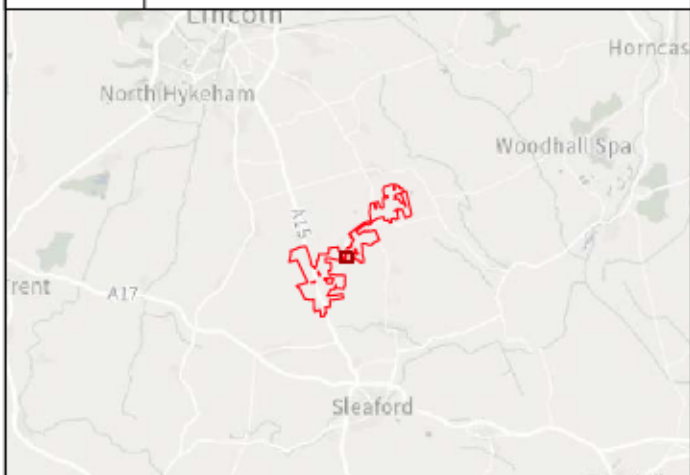
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- Key**
- Geophysical Survey Area
 - Survey Extent
- Interpretation**
- Ferrous Objects
 - Agriculture
 - Field Boundary
 - Field Drain
 - Natural
 - Pipe
 - Ridge and Furrow
 - Possible Archaeology
 - Archaeology
 - Magnetic Disturbance
 - Possible Archaeology
 - Uncertain
 - Former Pond

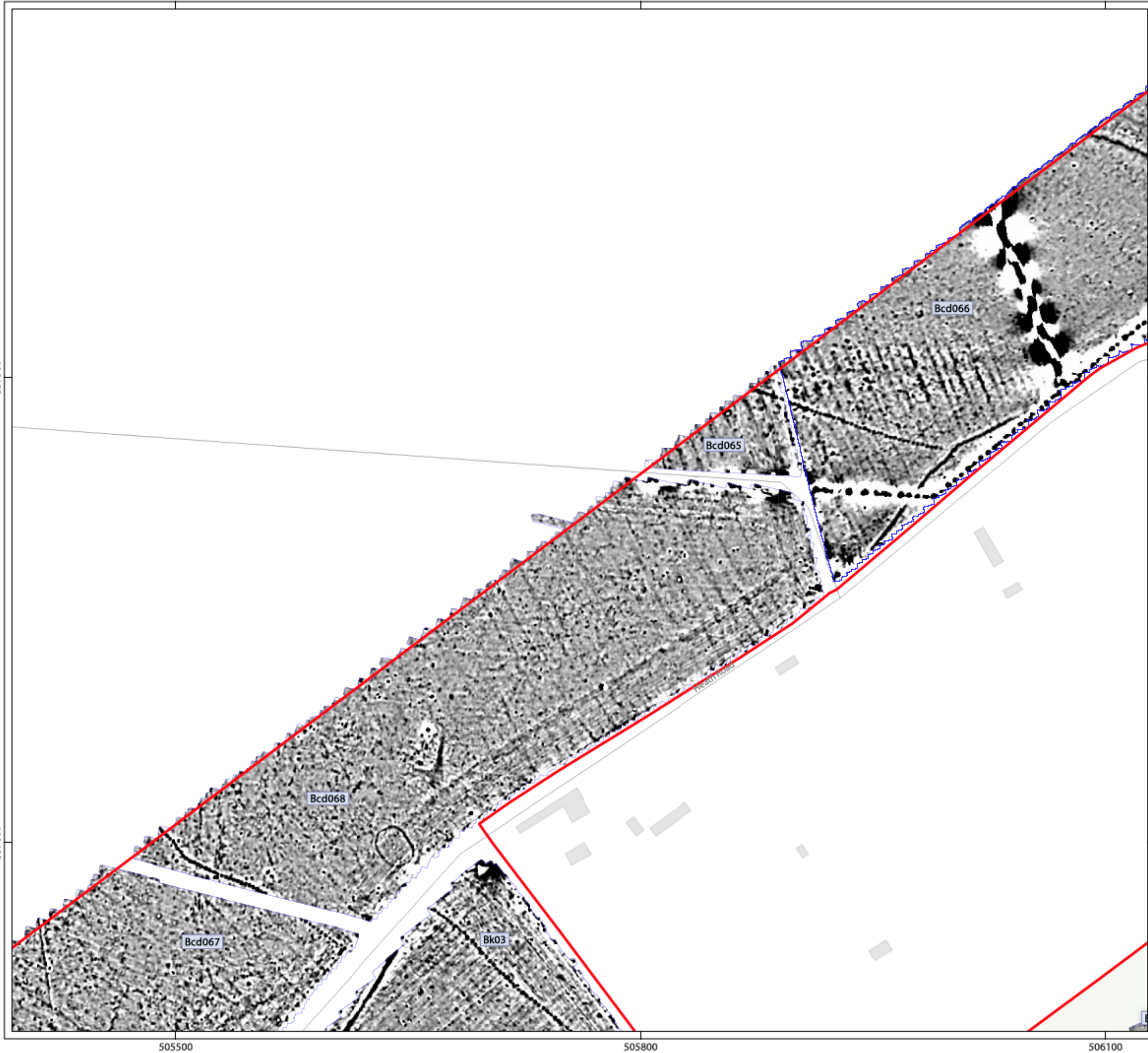
0 50 100 m


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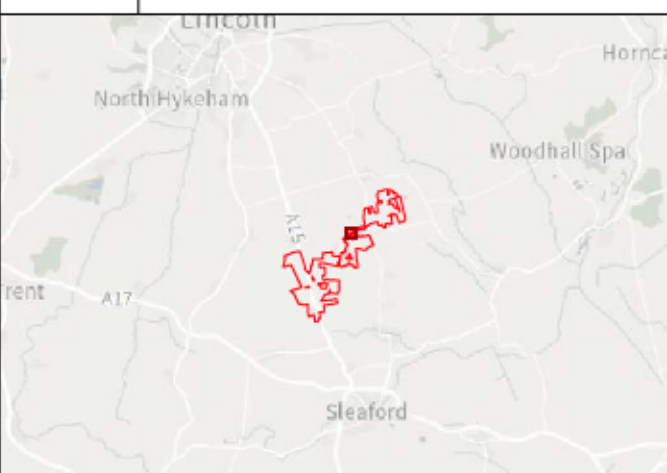









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Key

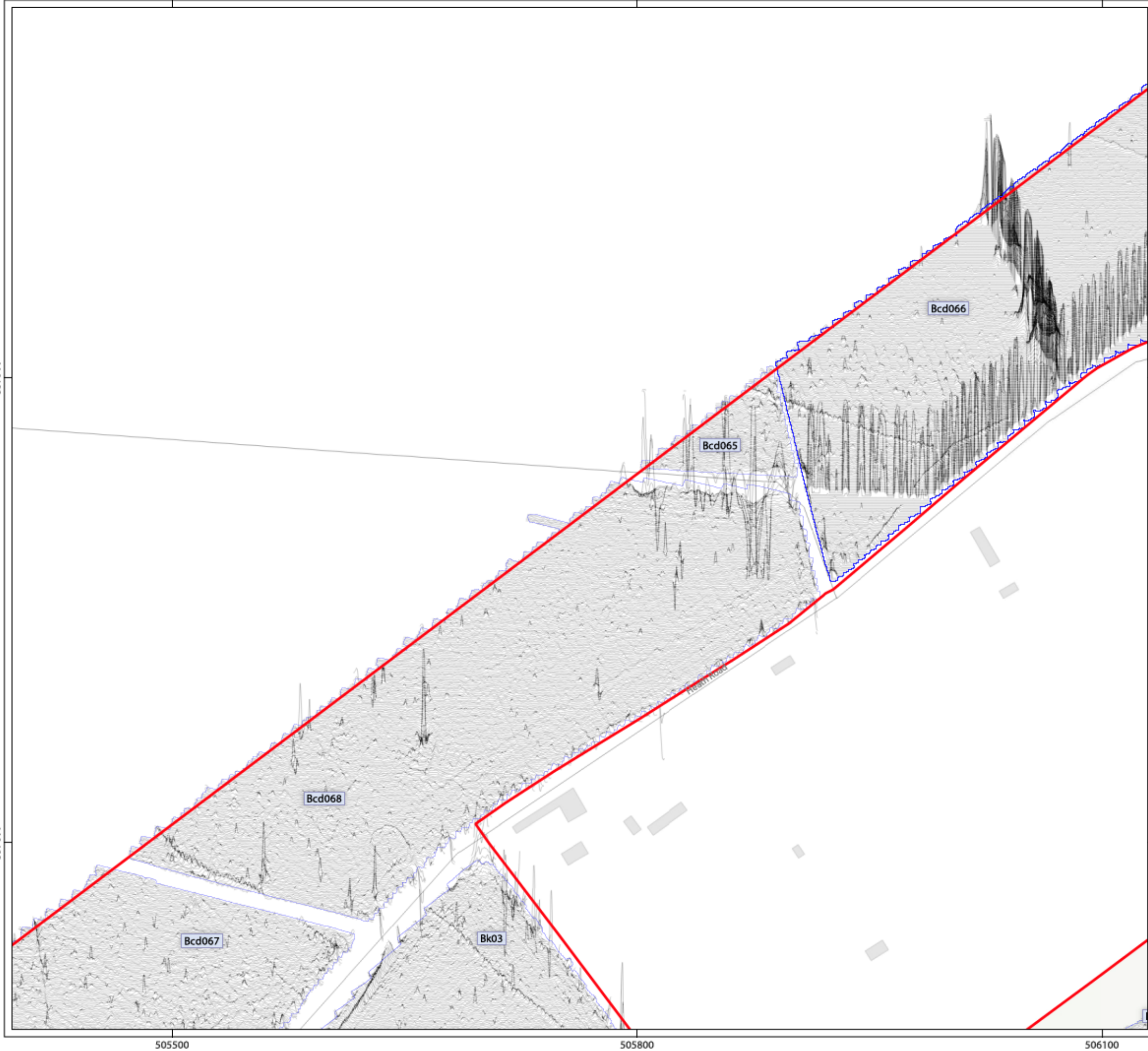
-  Geophysical Survey Area
-  Survey Extent





0 50 100 m

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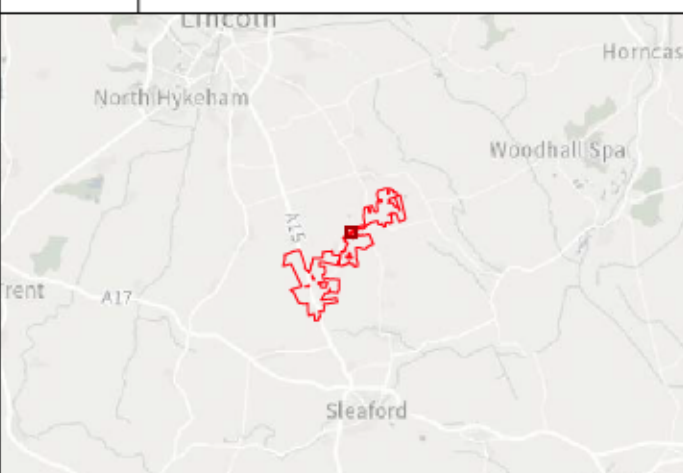









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Key

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

050

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52100

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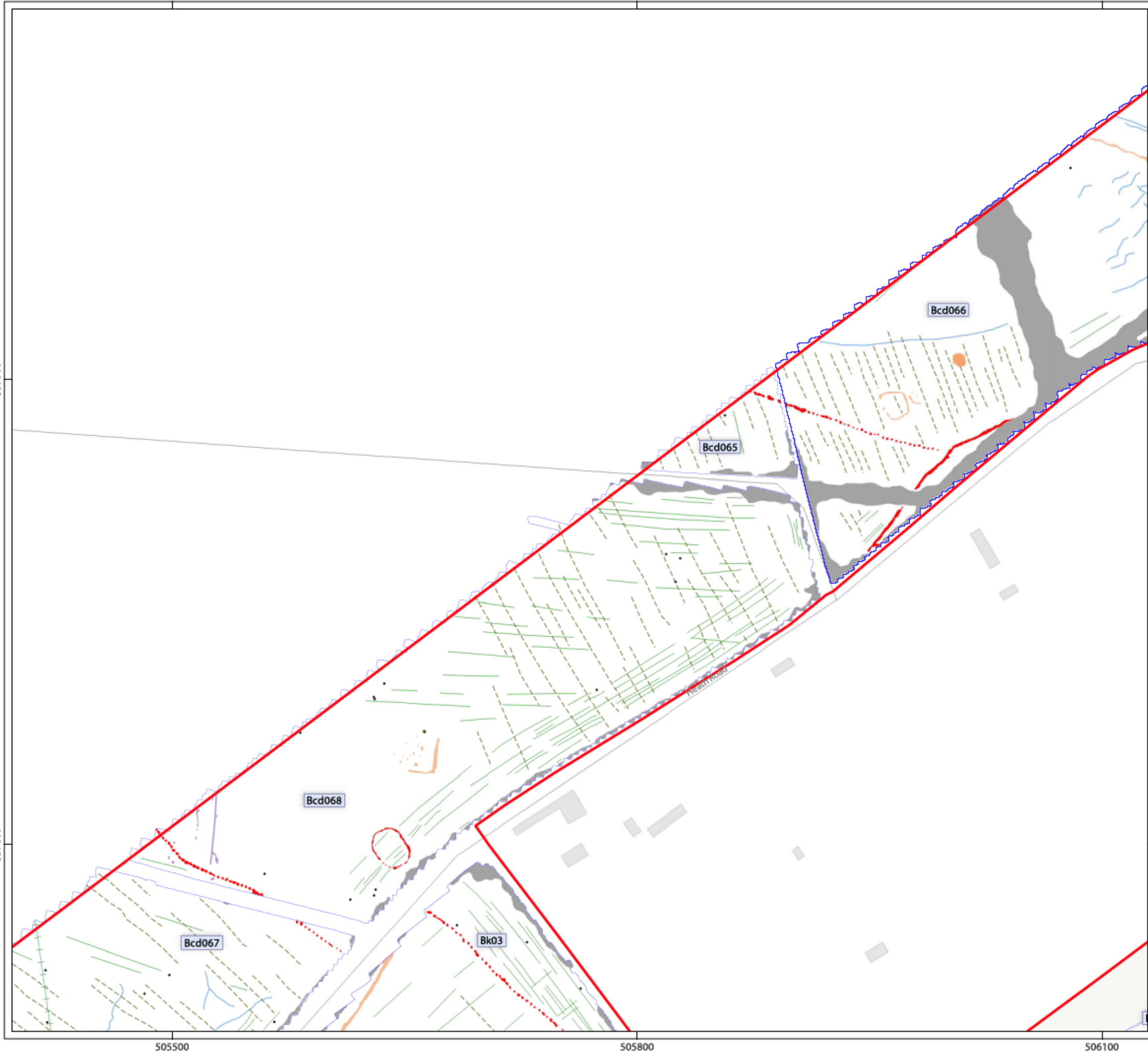
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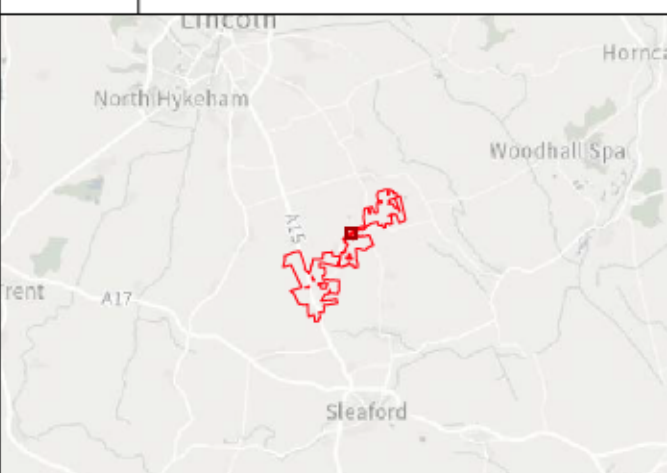








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Key


 Geophysical Survey Area


 Survey Extent


Interpretation


 Ferrous Objects


 Agriculture


 Field Drain


 Natural


 Uncertain


 Ridge and Furrow

 Archaeology

 Magnetic Disturbance

 Possible Archaeology

 Uncertain

 Burning

050

100

150

200

250

300

350

400

450

500

550

600

650

700

750

800

850

900

950

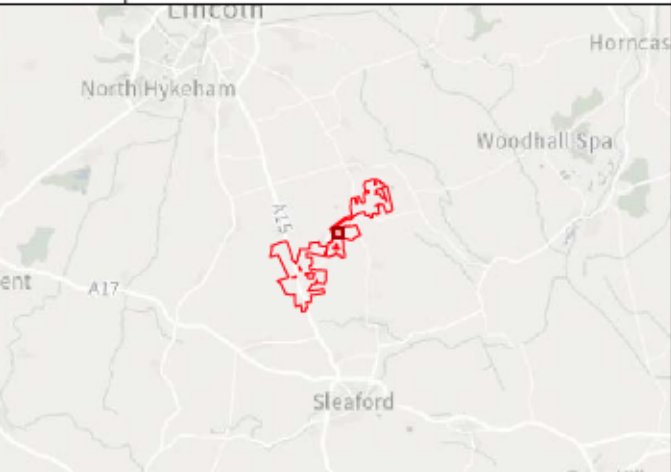
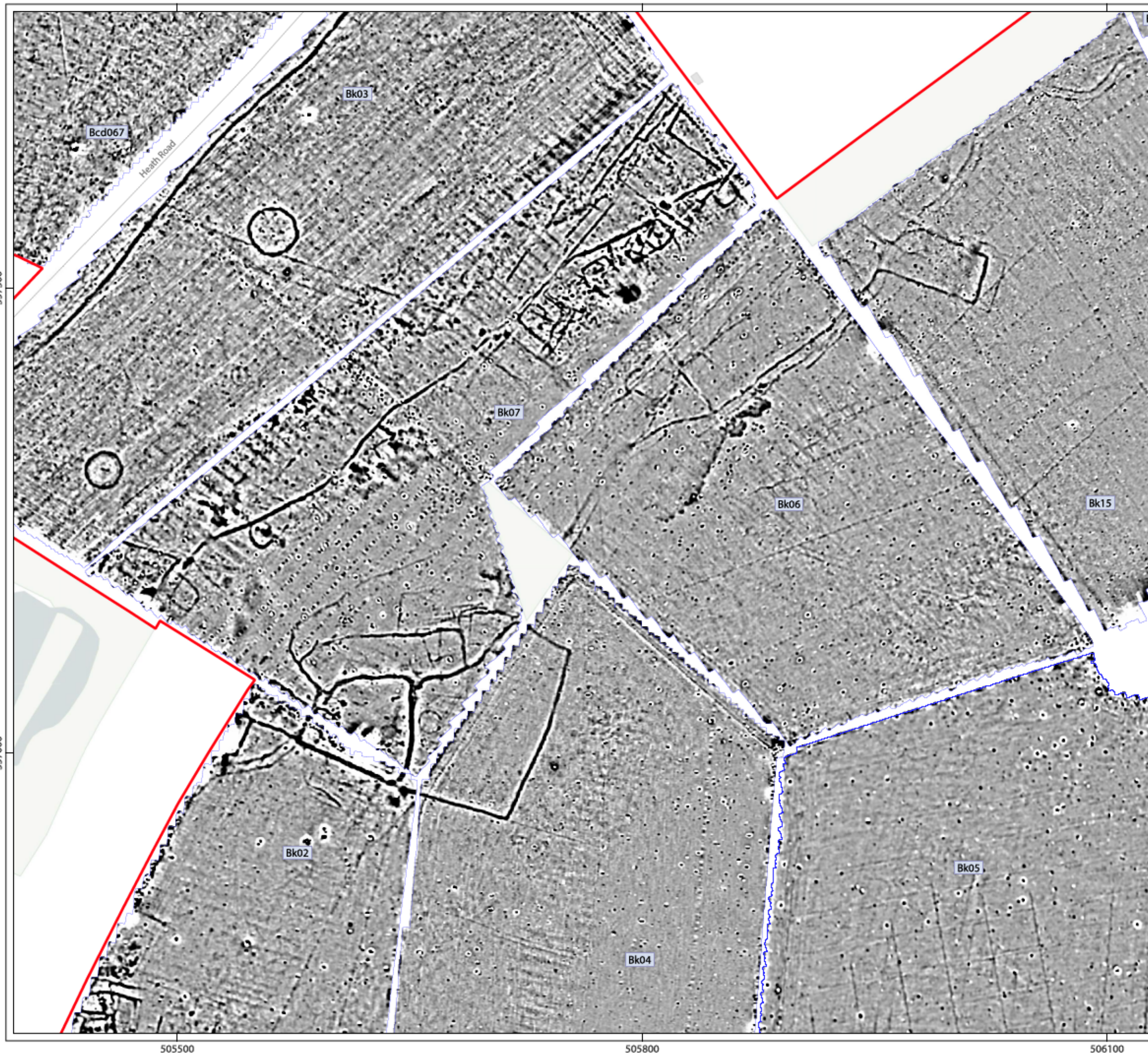
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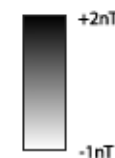
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Key

- Geophysical Survey Area
- Survey Extent



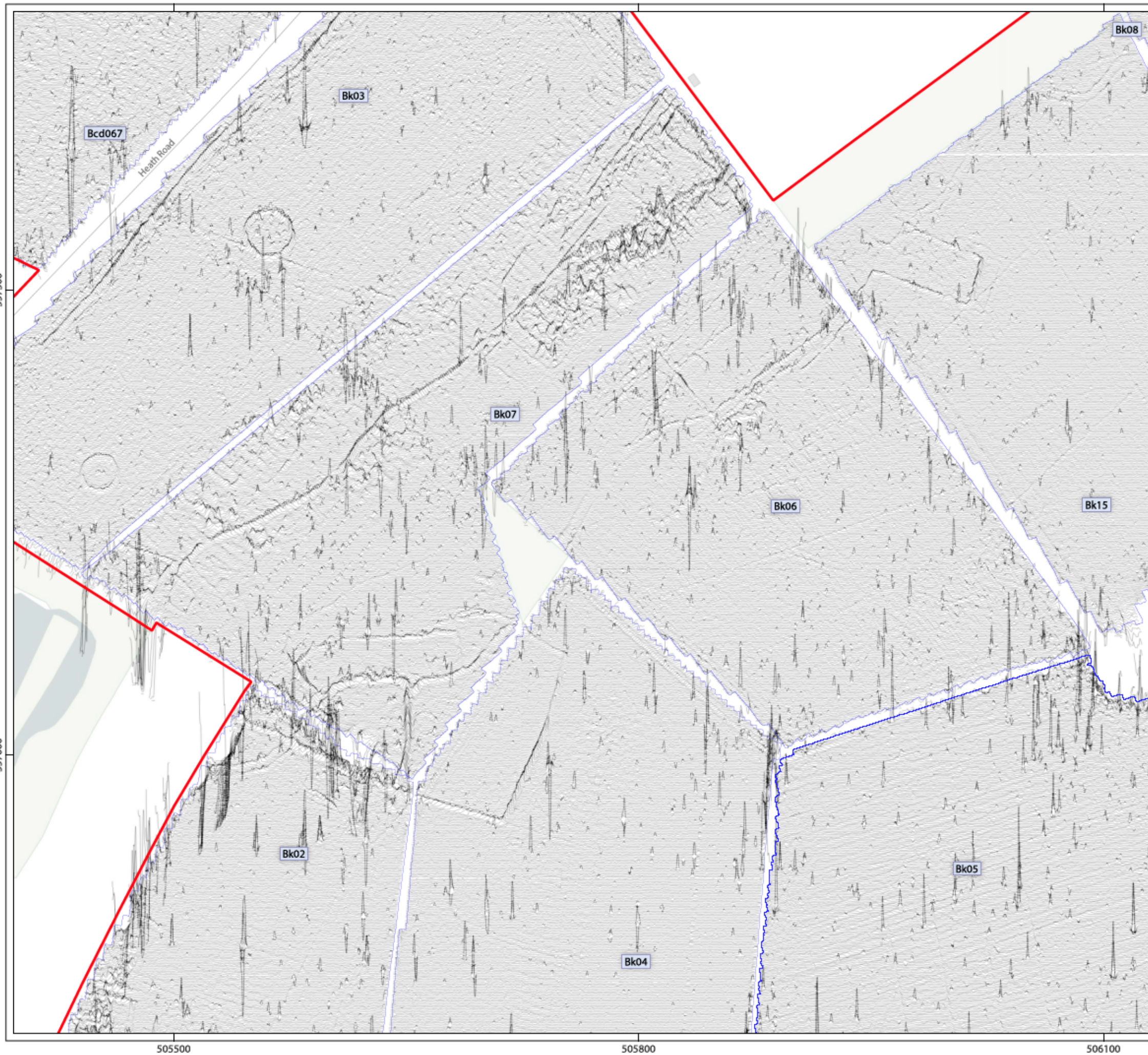
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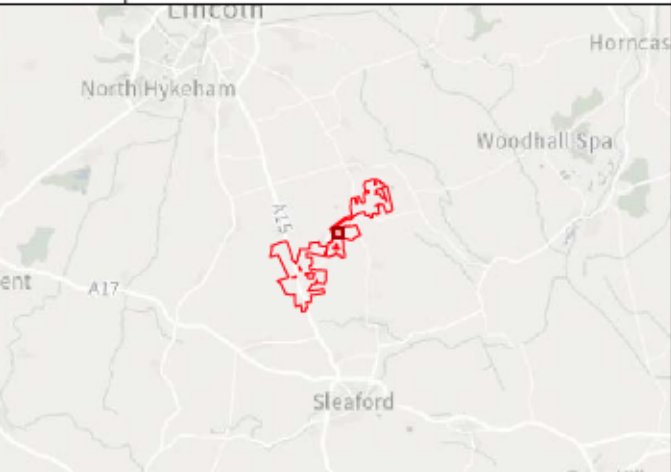
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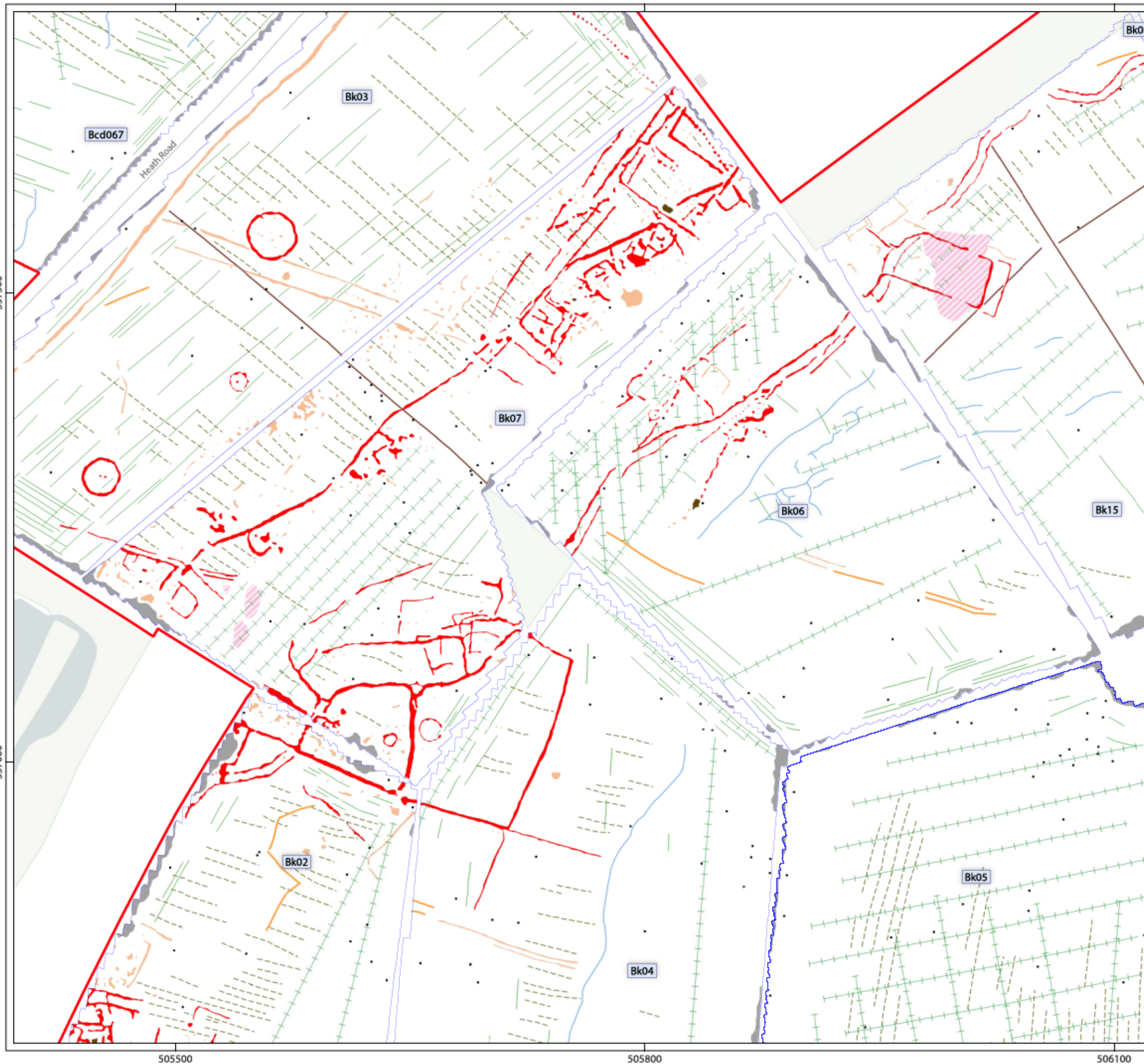


Key

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

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Key

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- Survey Extent

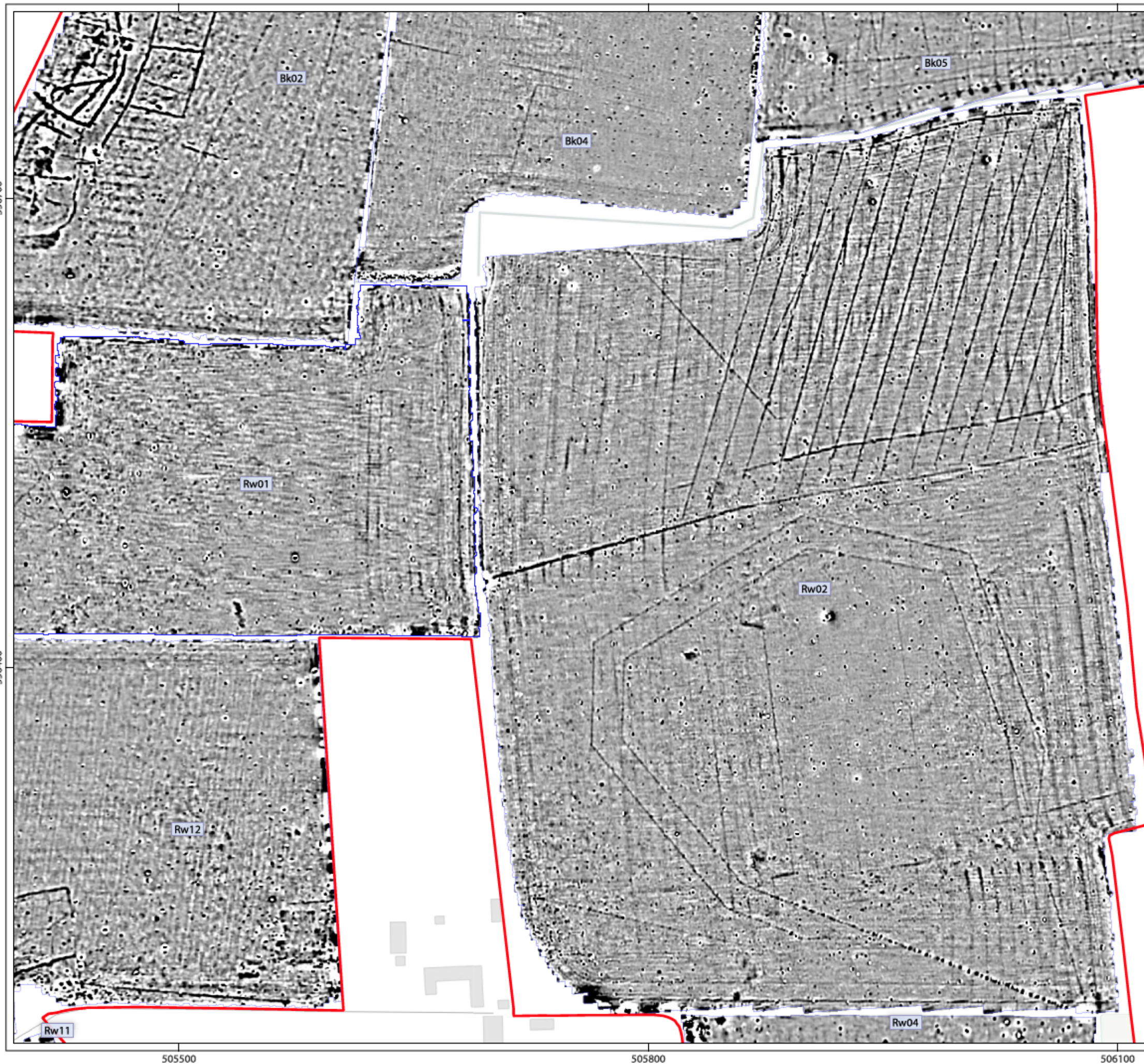
Interpretation

- Ferrous Objects
- Agriculture
- Field Boundary
- Field Drain
- Natural
- Ridge and Furrow
- Possible Archaeology
- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- Quarry
- Burning

0 50 100 m

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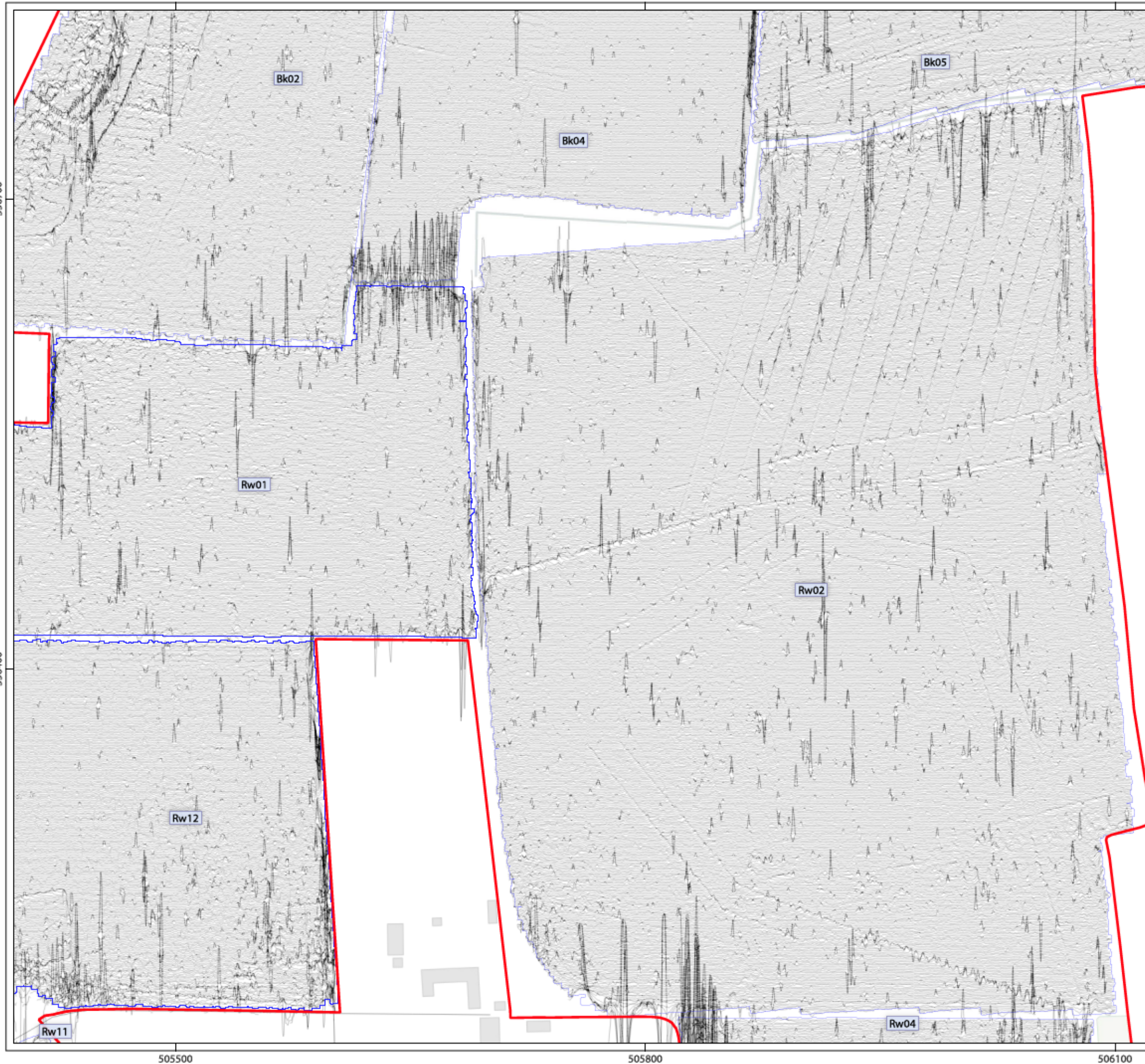
- Geophysical Survey Area
- Survey Extent

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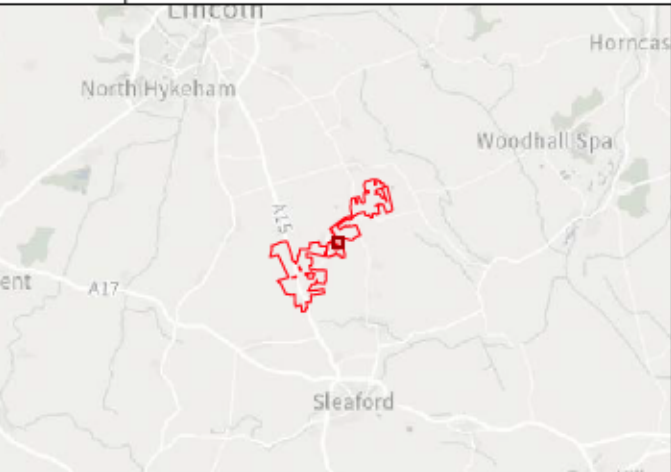
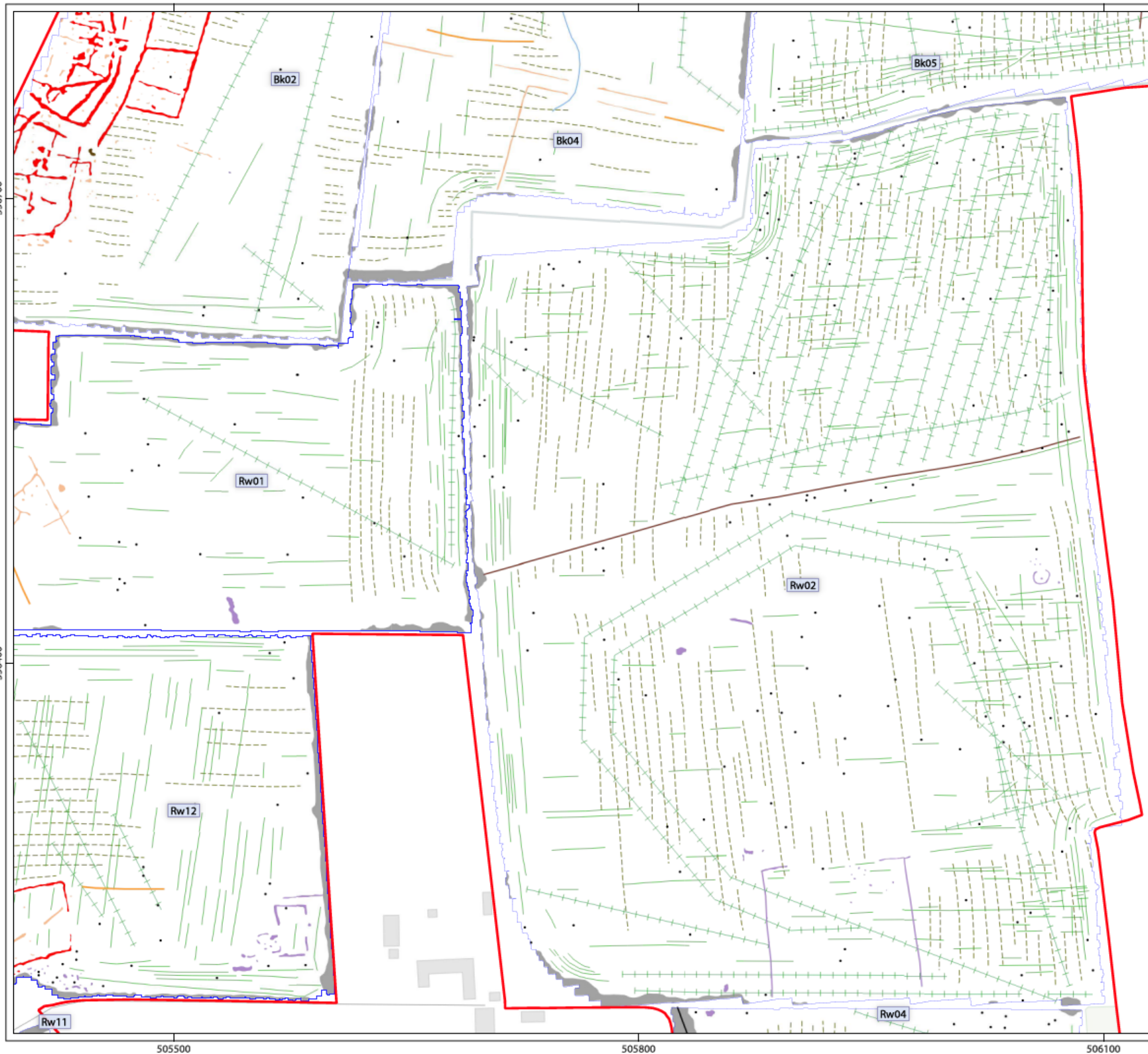
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- Survey Extent
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Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- Field Boundary
- + Field Drain
- Natural
- Pipe
- Uncertain
- Ridge and Furrow
- Possible Archaeology
- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- Uncertain
- Burning

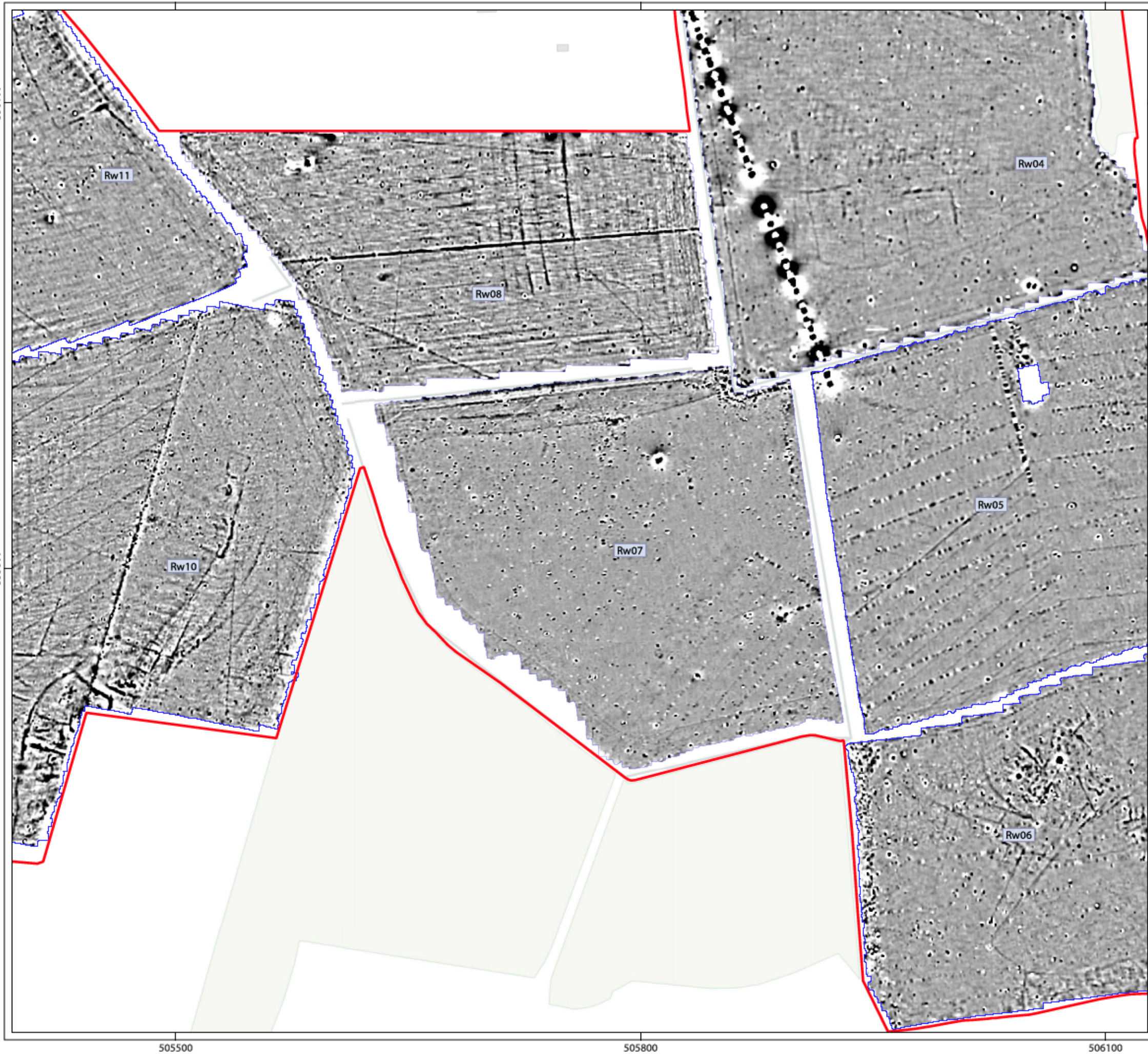
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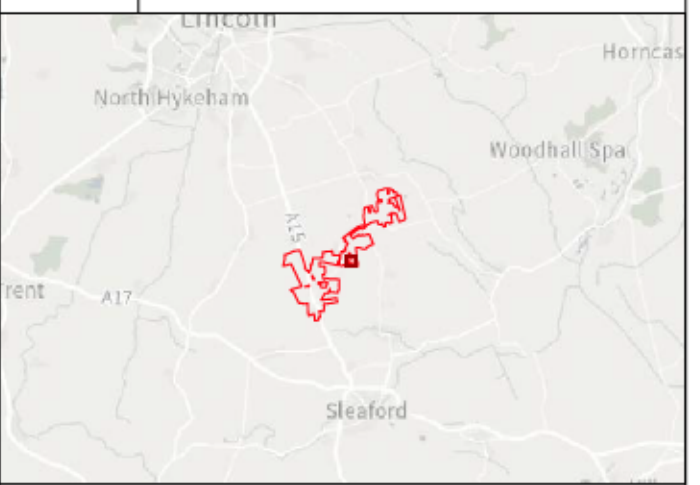
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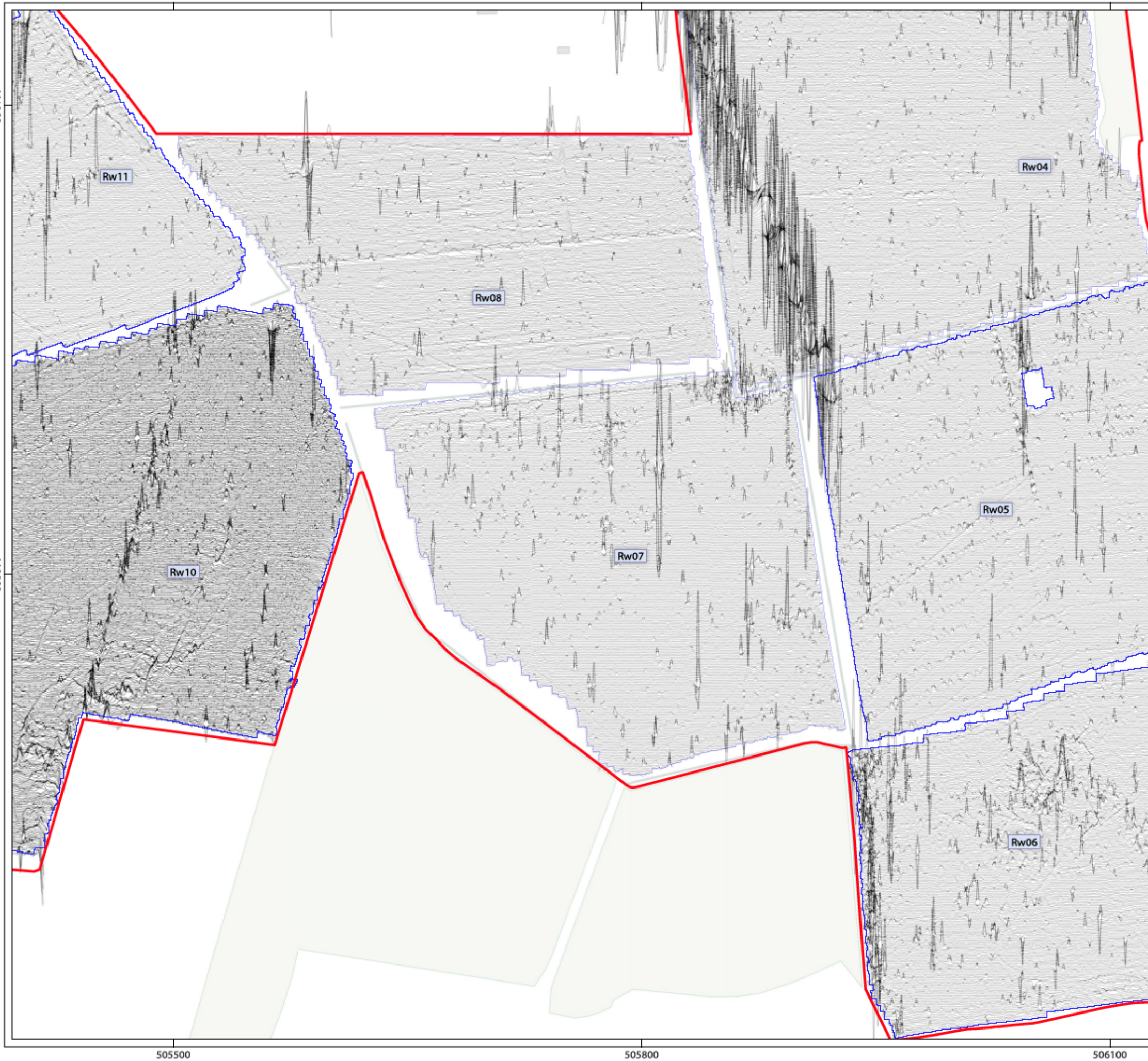
- Geophysical Survey Area
- Survey Extent

+2nT
-1nT

0 50 100 m

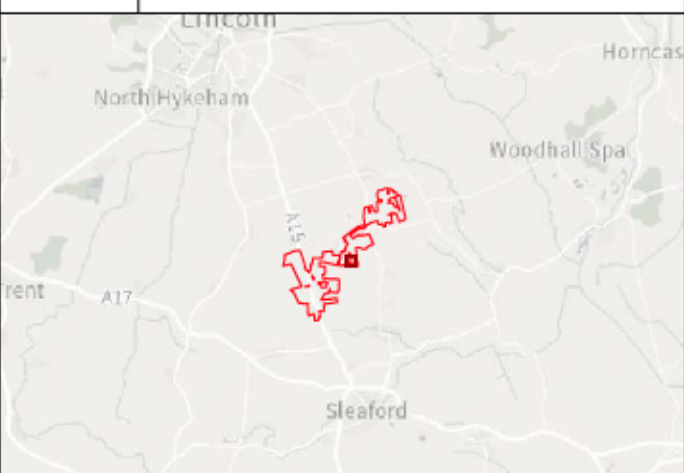
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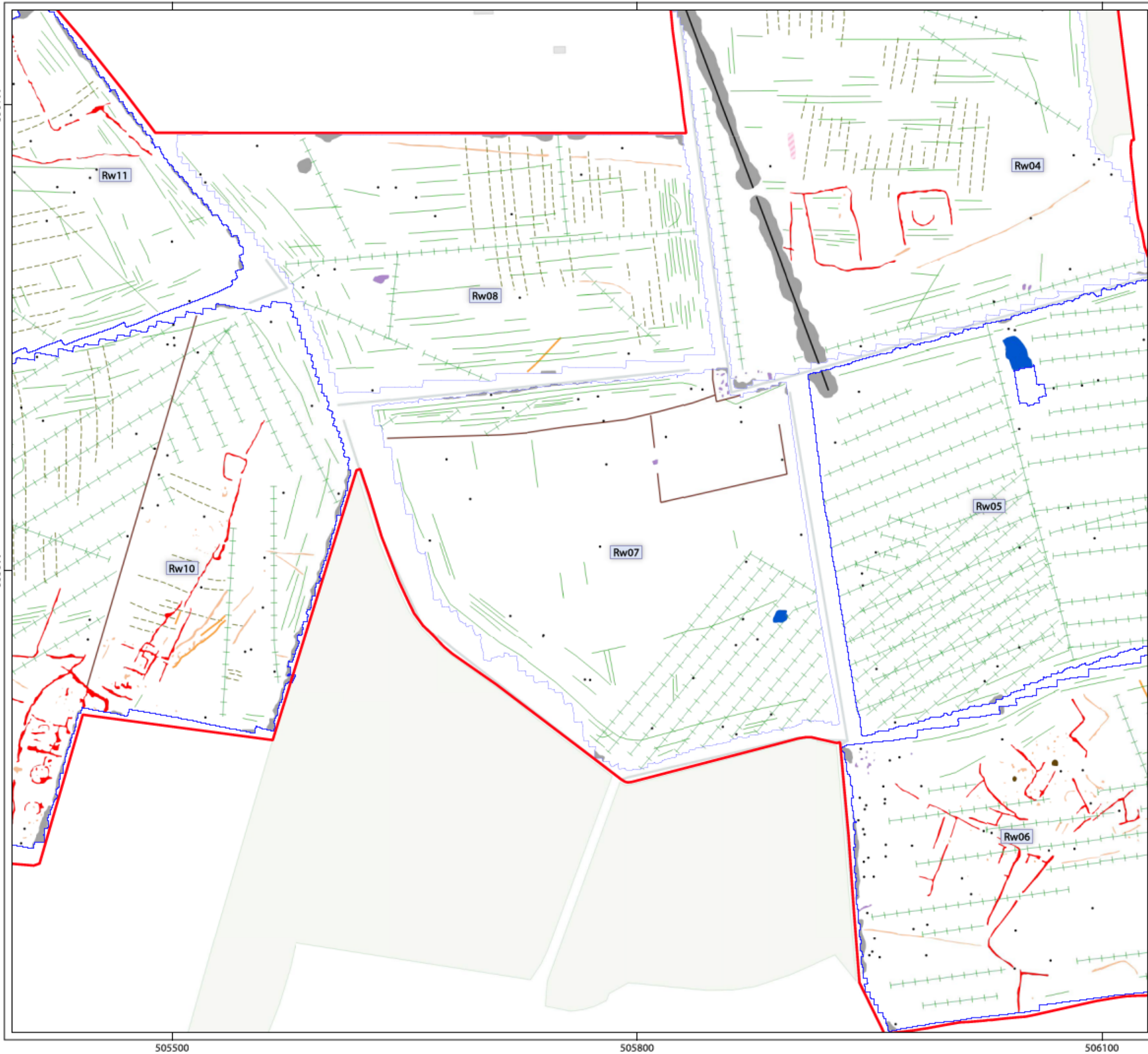
Key


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


0 50 100 m

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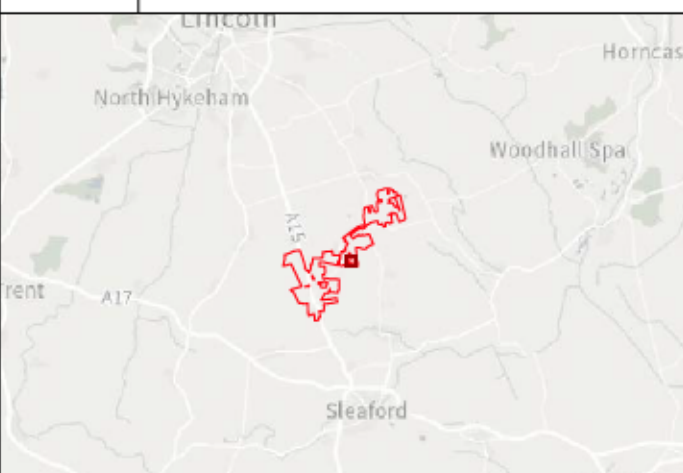








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Key


 Geophysical Survey Area


 Survey Extent


Interpretation


 Ferrous Objects


 Agriculture


 Field Boundary


 Field Drain


 Pipe


 Ridge and Furrow


 Possible Archaeology


 Archaeology


 Magnetic Disturbance

 Possible Archaeology

 Quarry

 Uncertain

 Former Pond

 Burning

0 50 100 m

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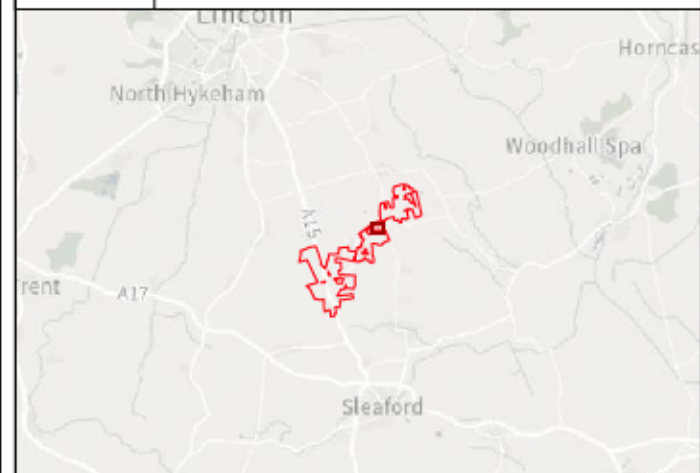
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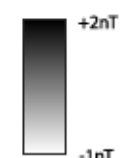
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Key

- Geophysical Survey Area
- Survey Extent



0 50 100 m

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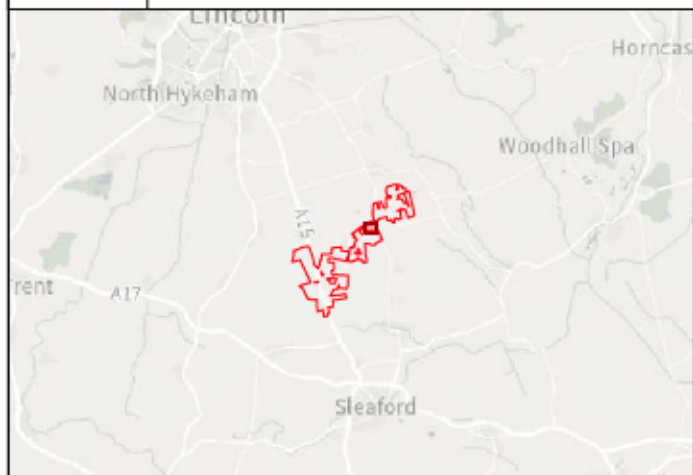
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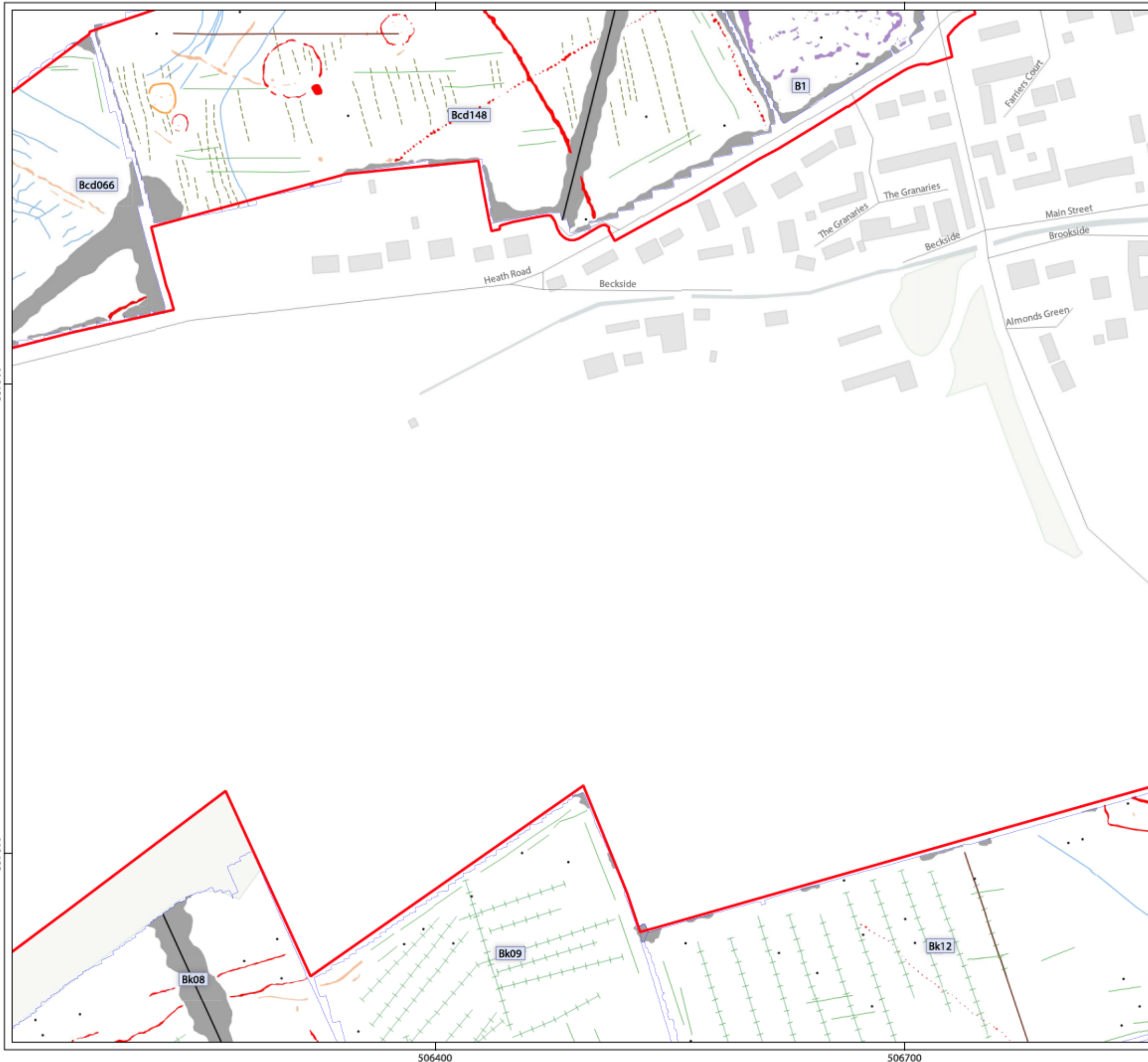
- Geophysical Survey Area
- Survey Extent
- XY Trace (25nT/cm)

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Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- Field Boundary
- Field Drain
- Natural
- Pipe
- Ridge and Furrow
- Possible Archaeology
- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- Quarry
- Uncertain

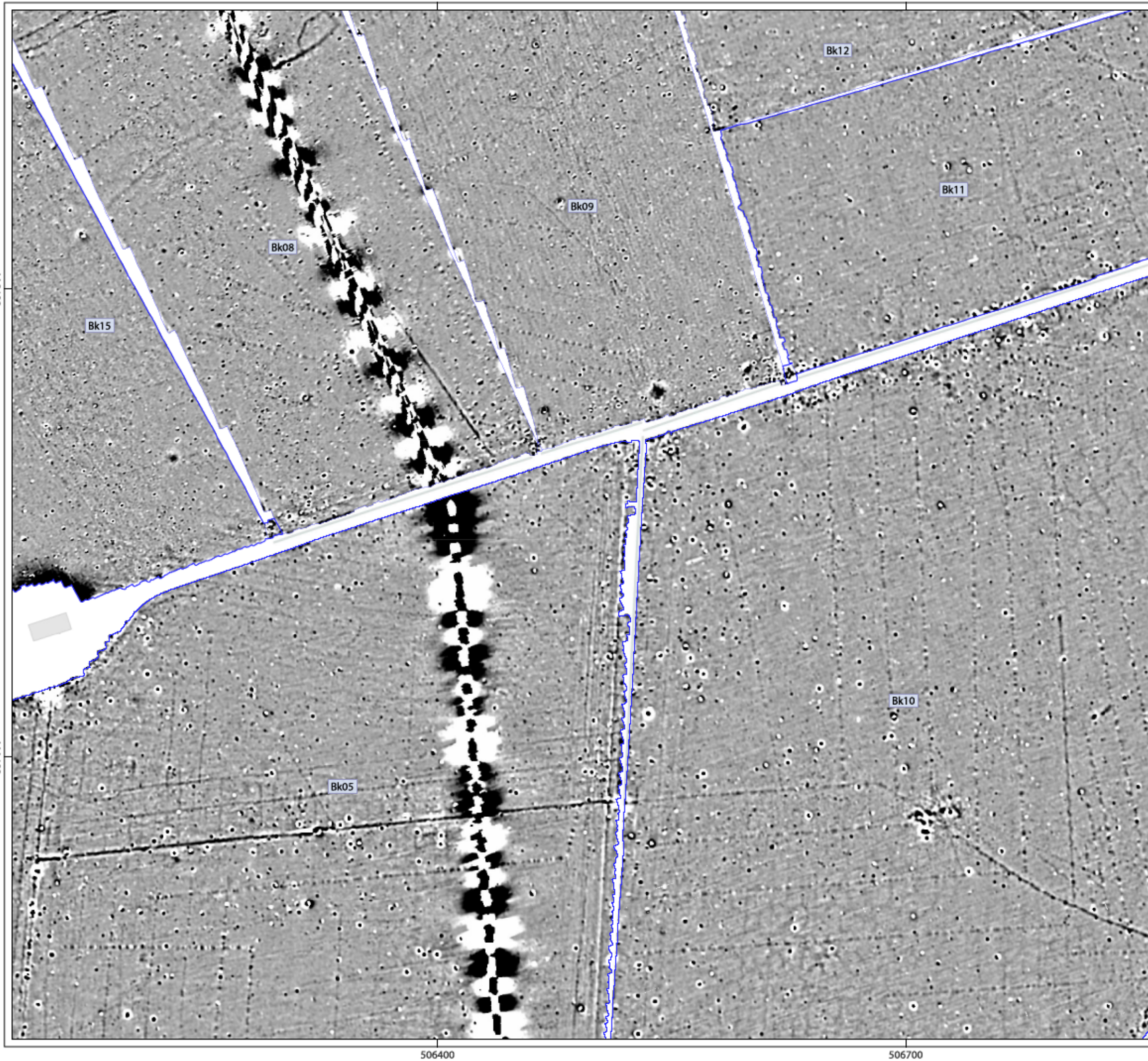
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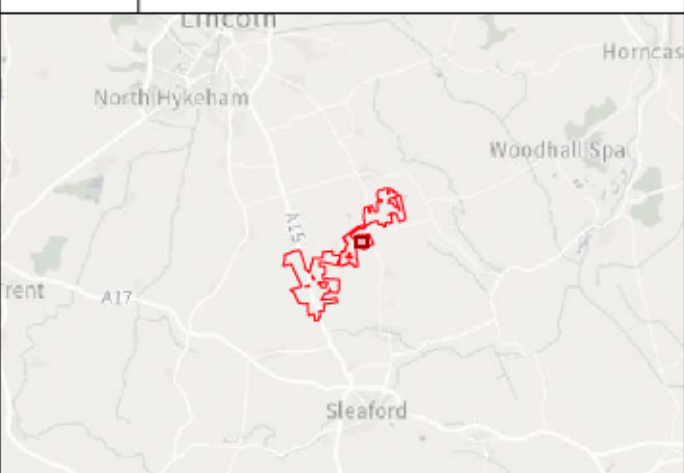
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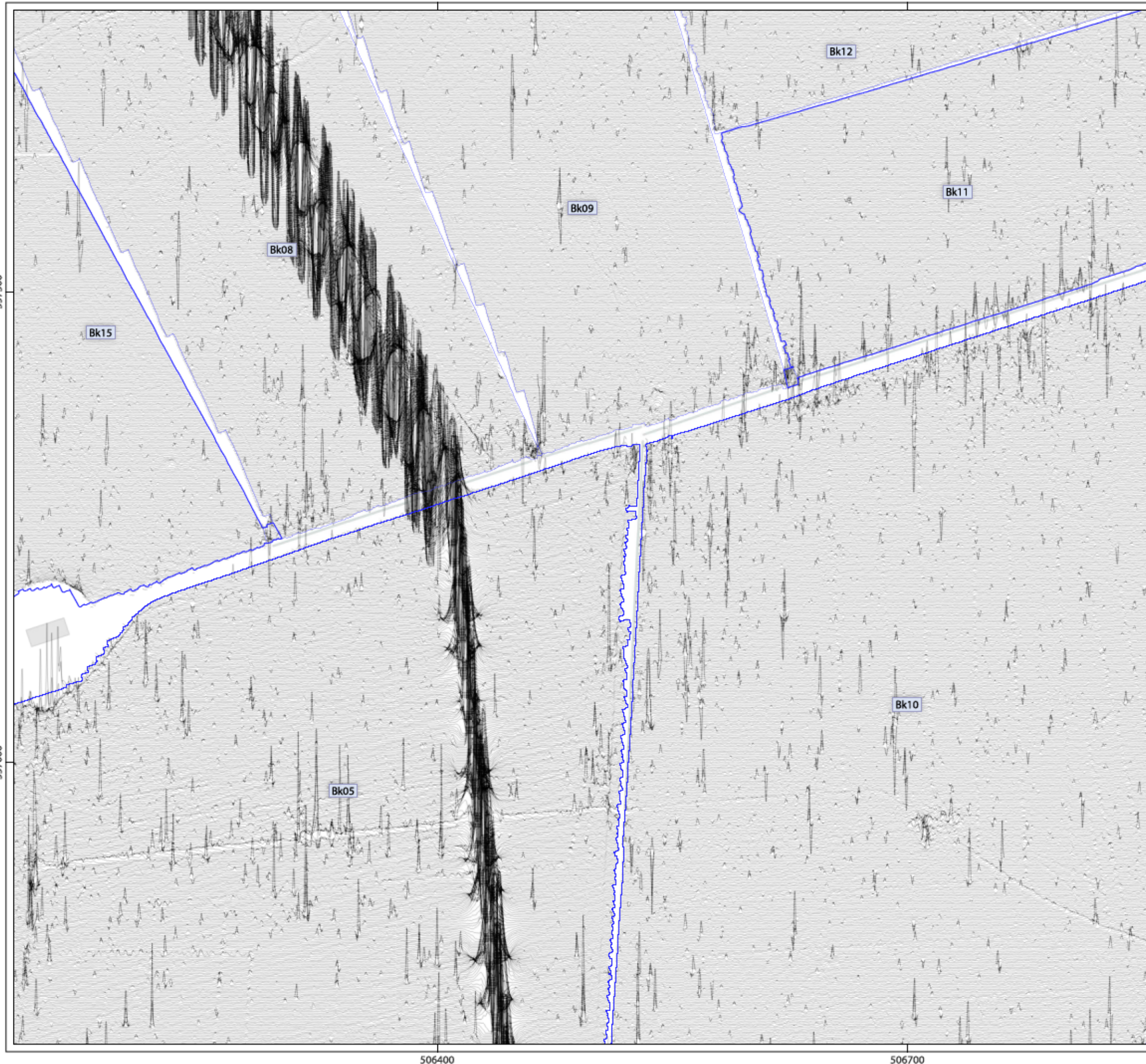
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Survey Extent

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Key

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

0 50 100 m

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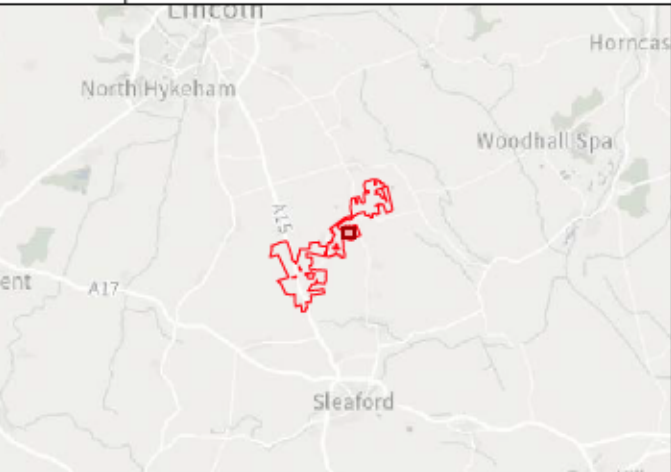
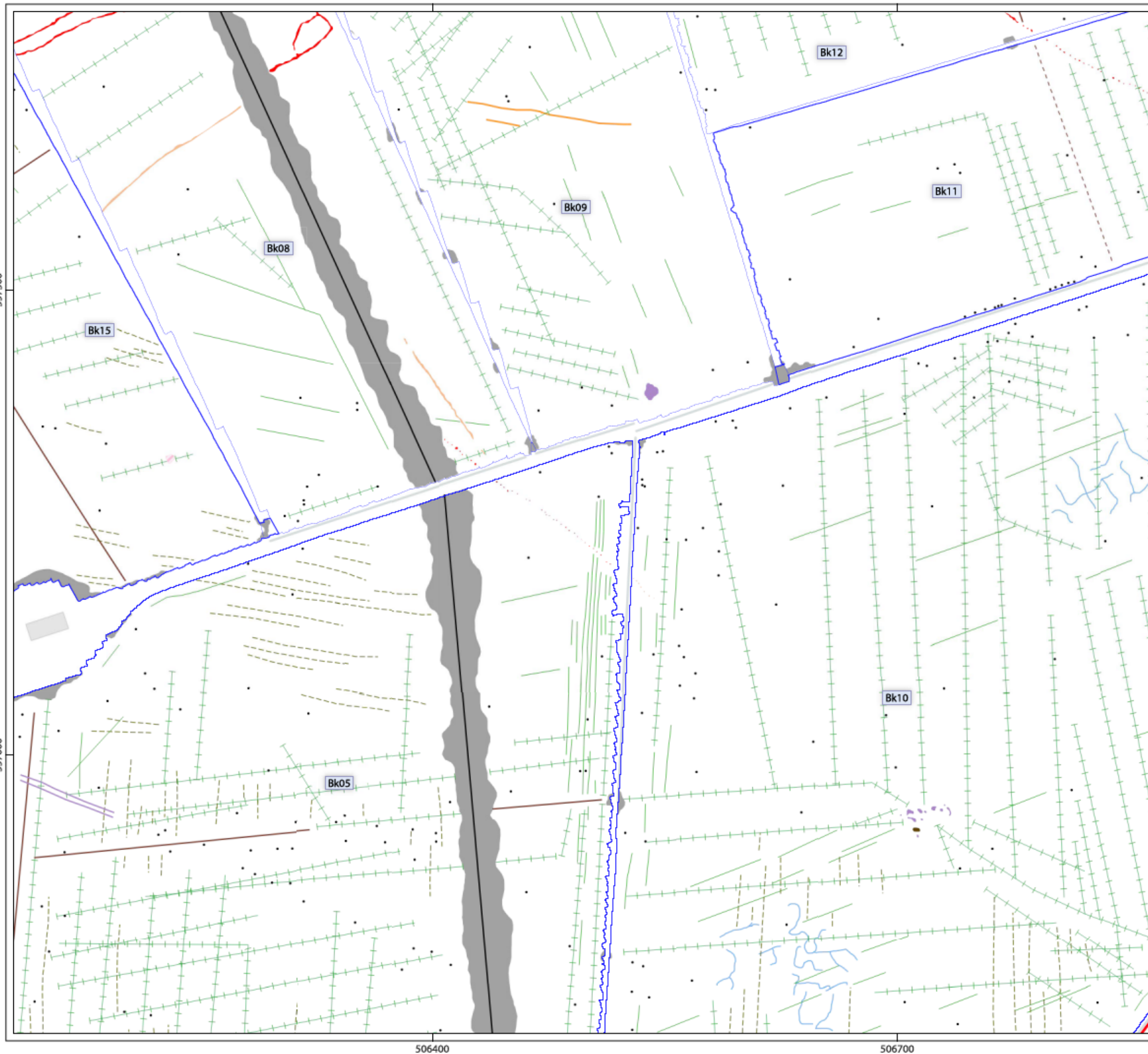
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506400

506700



Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- Field Boundary
- - - Possible Field Boundary
- + Field Drain
- Natural
- Pipe
- Uncertain
- - - Ridge and Furrow
- Possible Archaeology
- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- ▨ Quarry
- Uncertain
- Burning

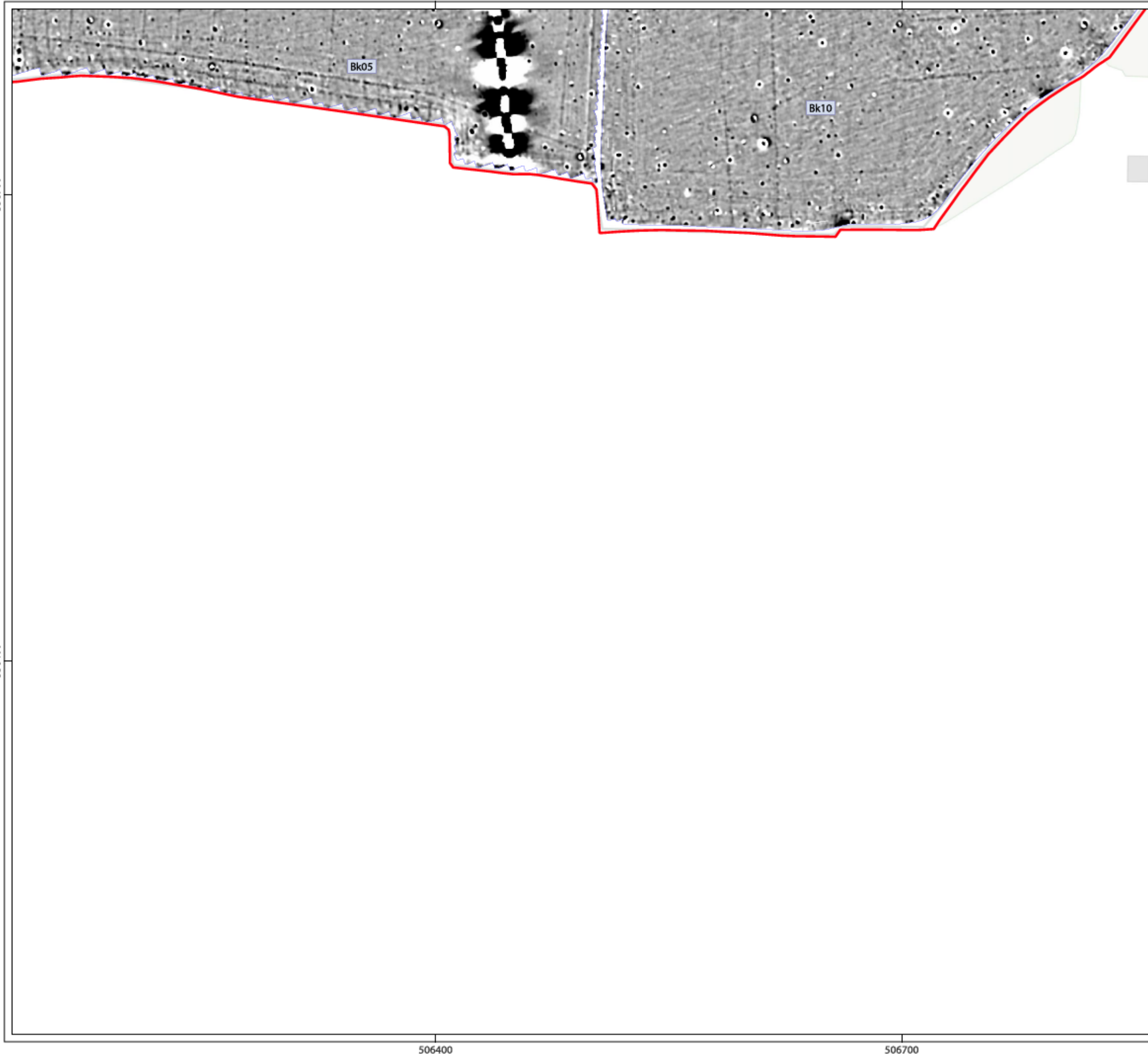
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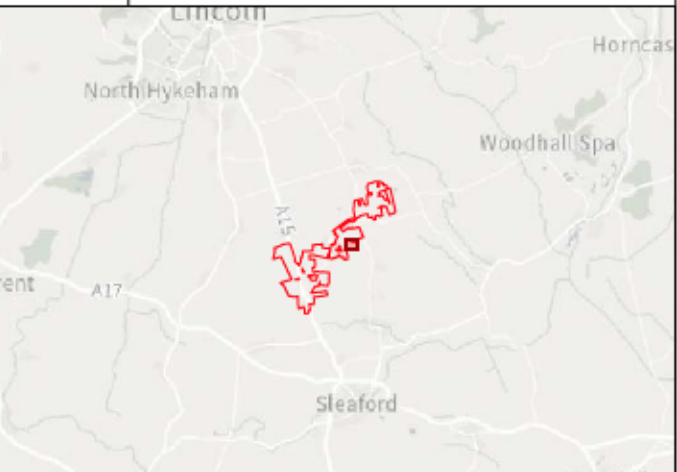
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Key

Geophysical Survey Area

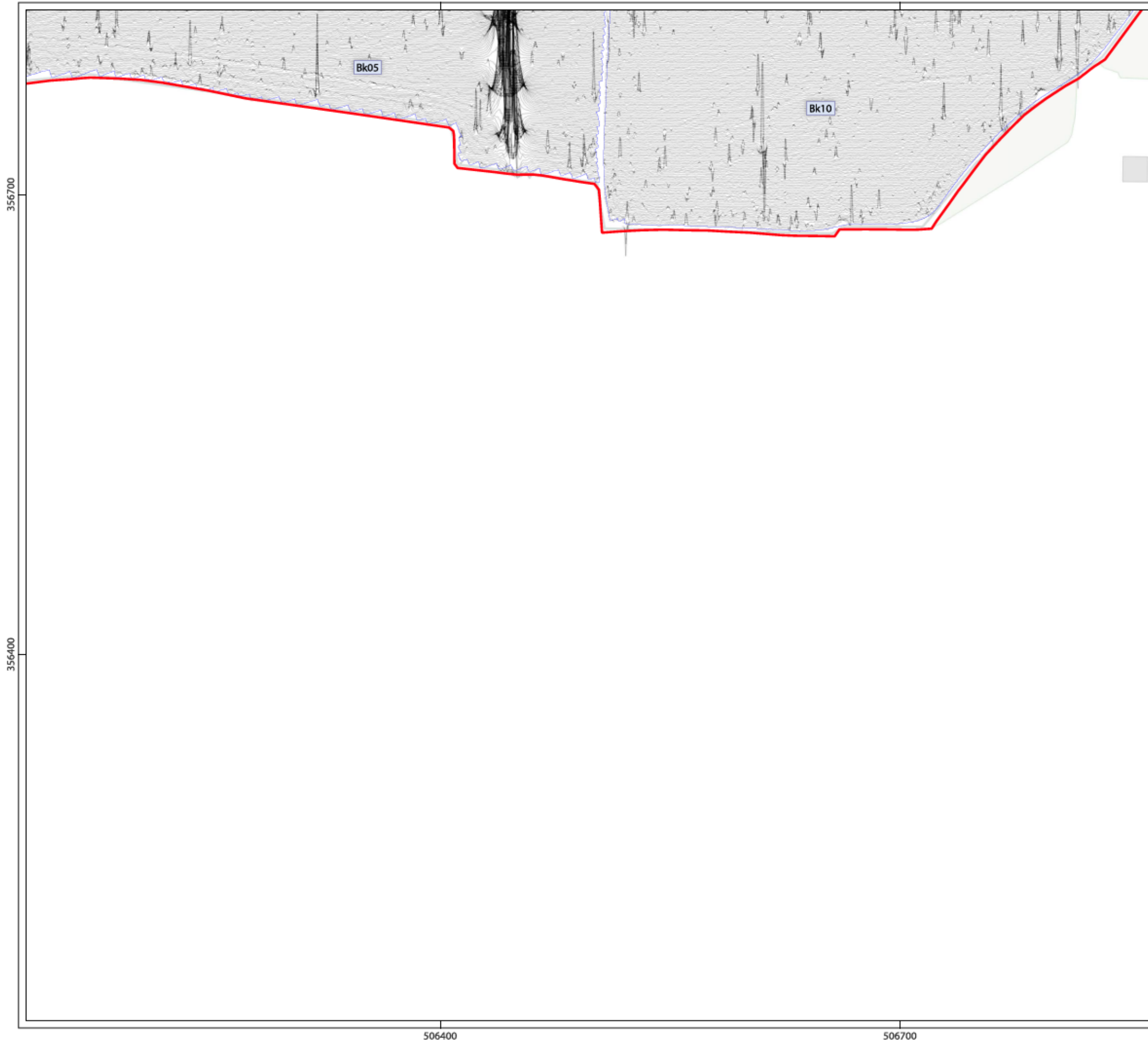
Survey Extent

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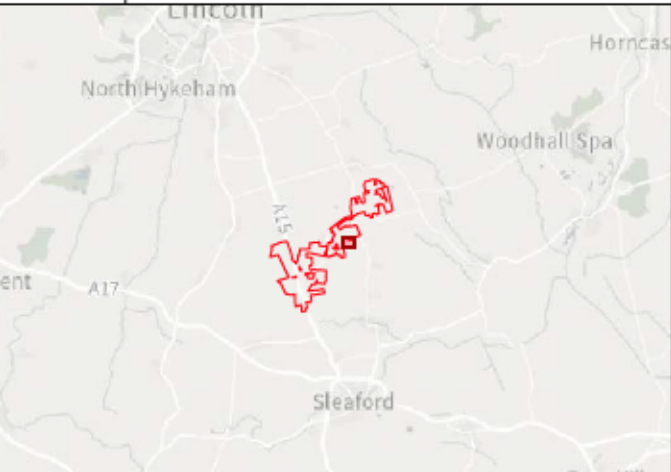
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506400

506700



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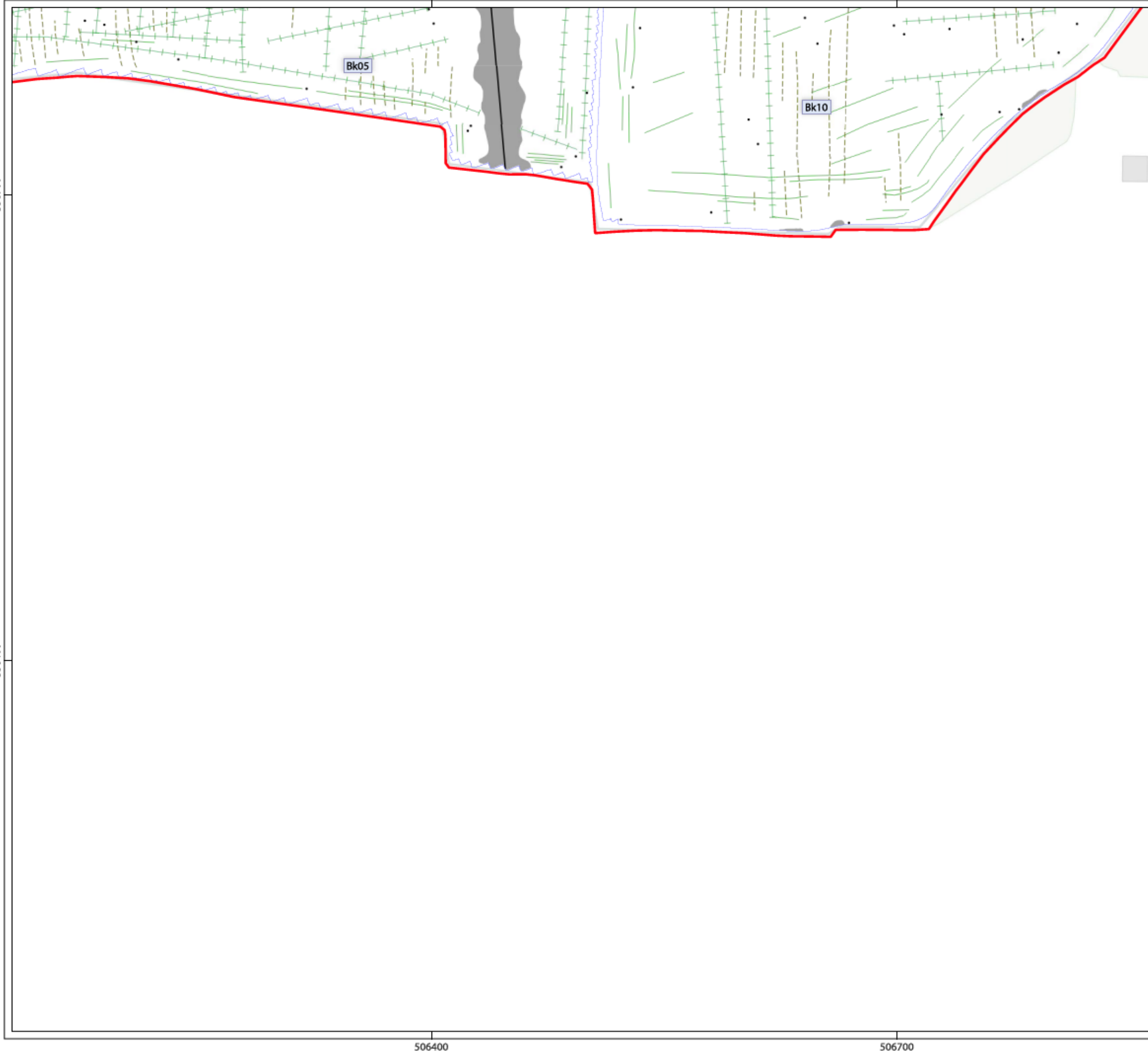
Key


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


0
50
100 m

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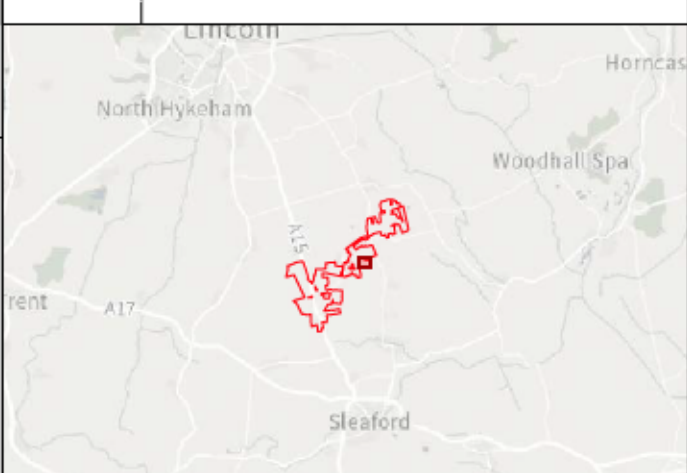
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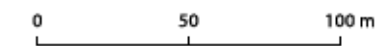


Key

-  Geophysical Survey Area
-  Survey Extent

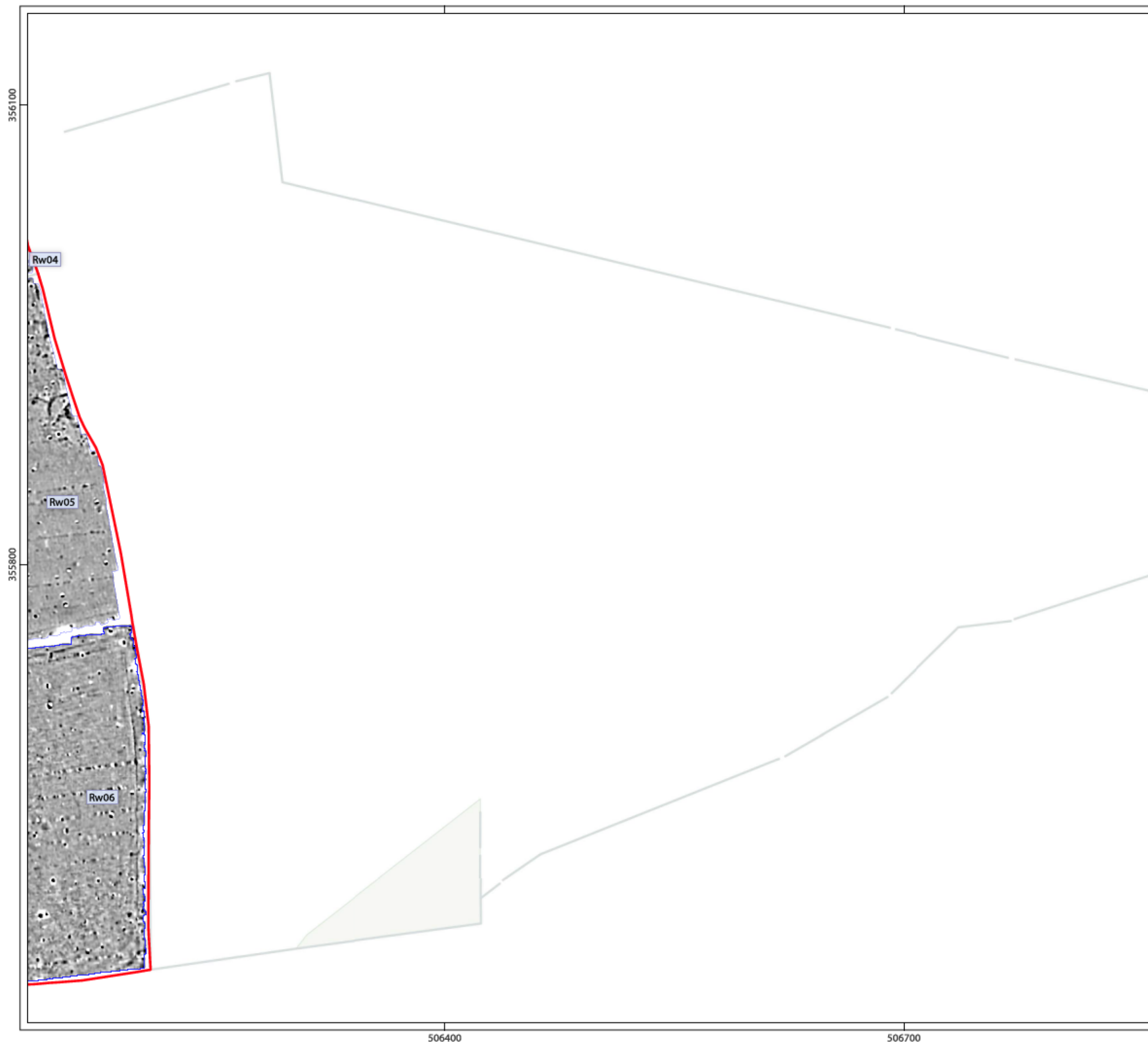
Interpretation


-  Ferrous Objects
-  Agriculture
-  Field Drain
-  Pipe
-  Ridge and Furrow
-  Magnetic Disturbance




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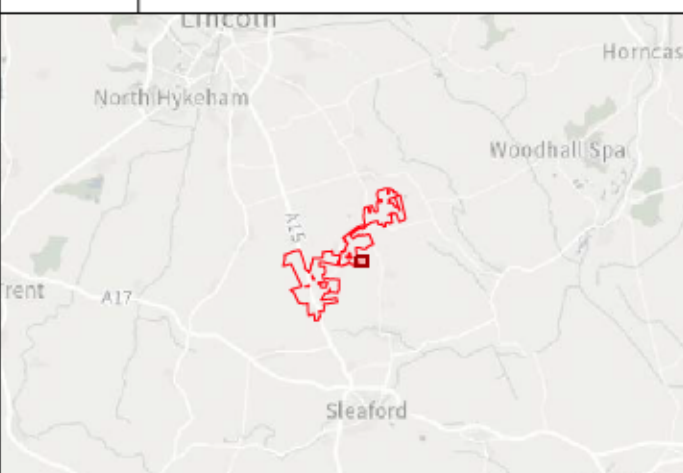







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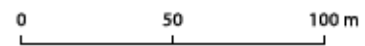


Key

- Geophysical Survey Area
- Survey Extent



+2nT
-1nT



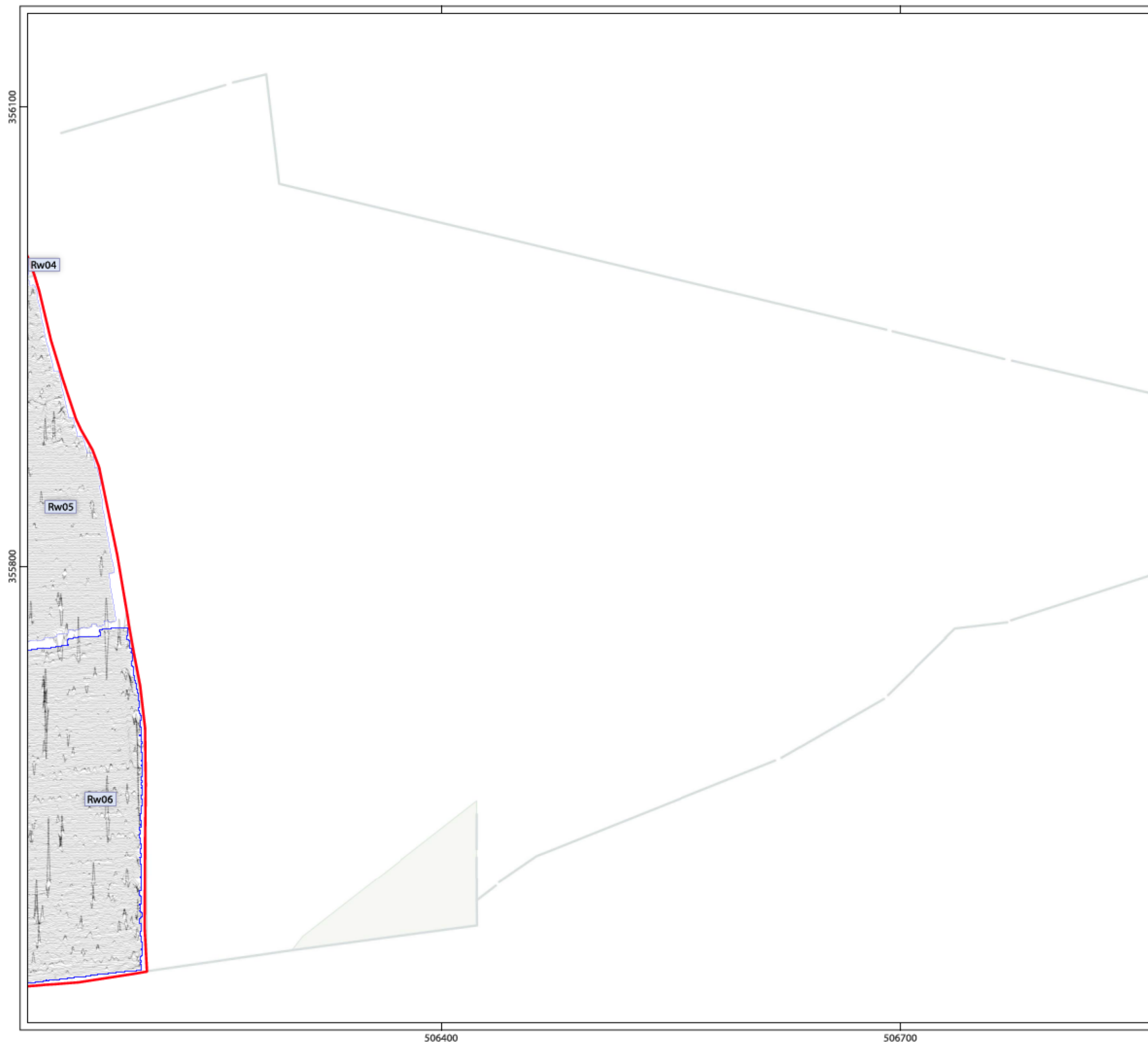
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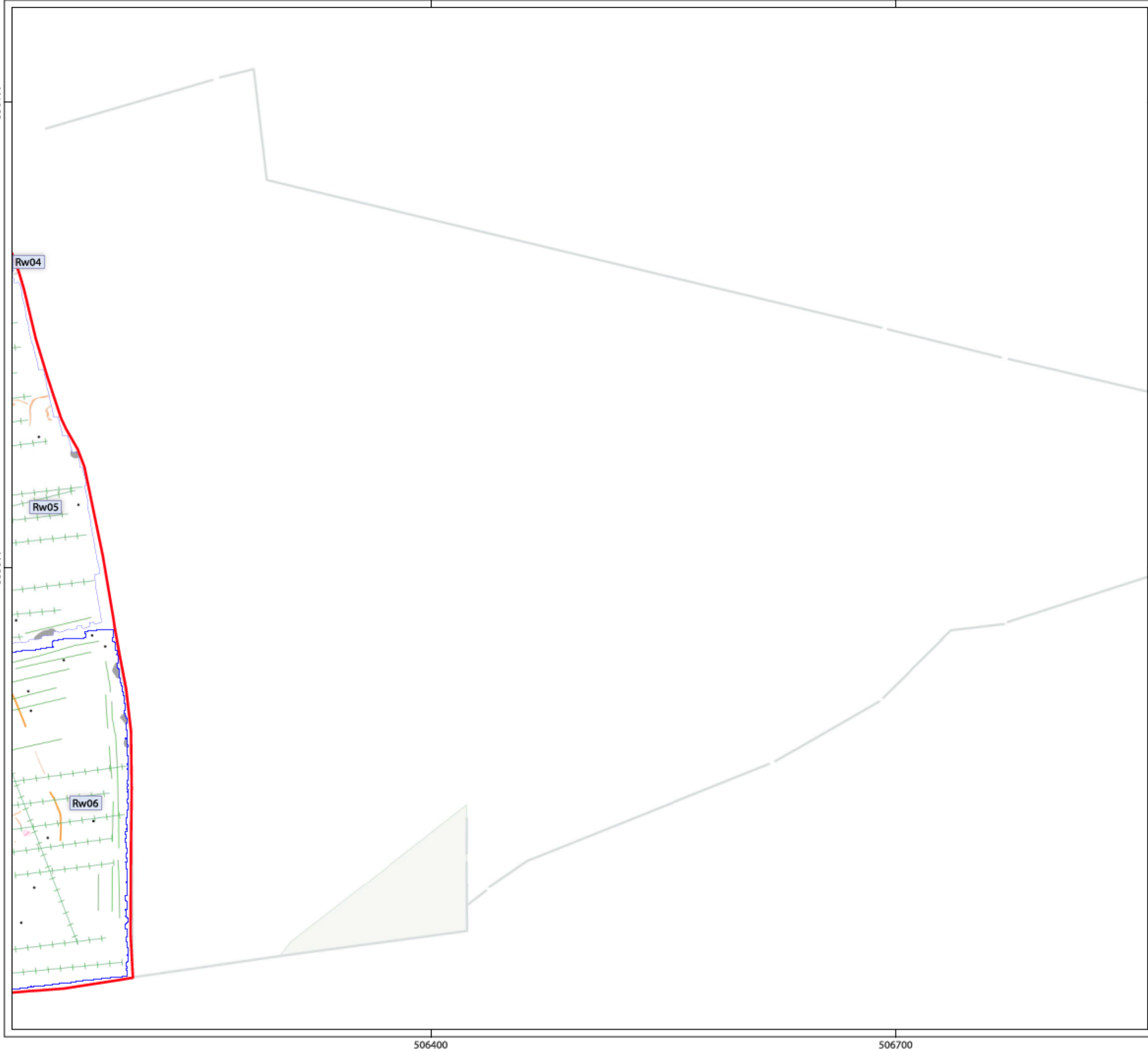
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Key


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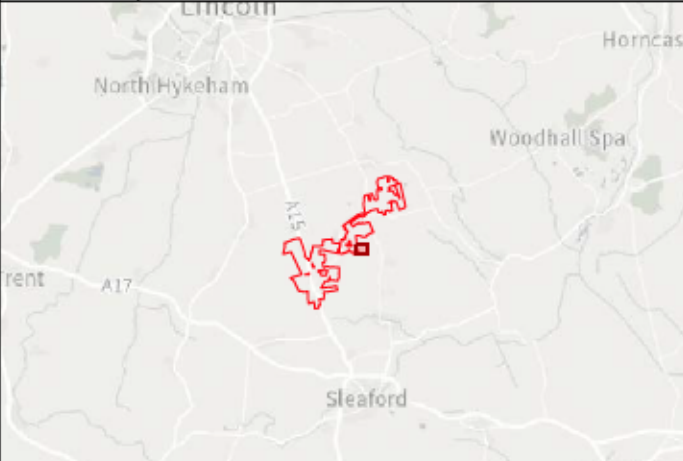








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Key


 Geophysical Survey Area


 Survey Extent


Interpretation


 Ferrous Objects

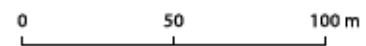
 Agriculture

 Field Drain

 Possible Archaeology

 Magnetic Disturbance

 Quarry



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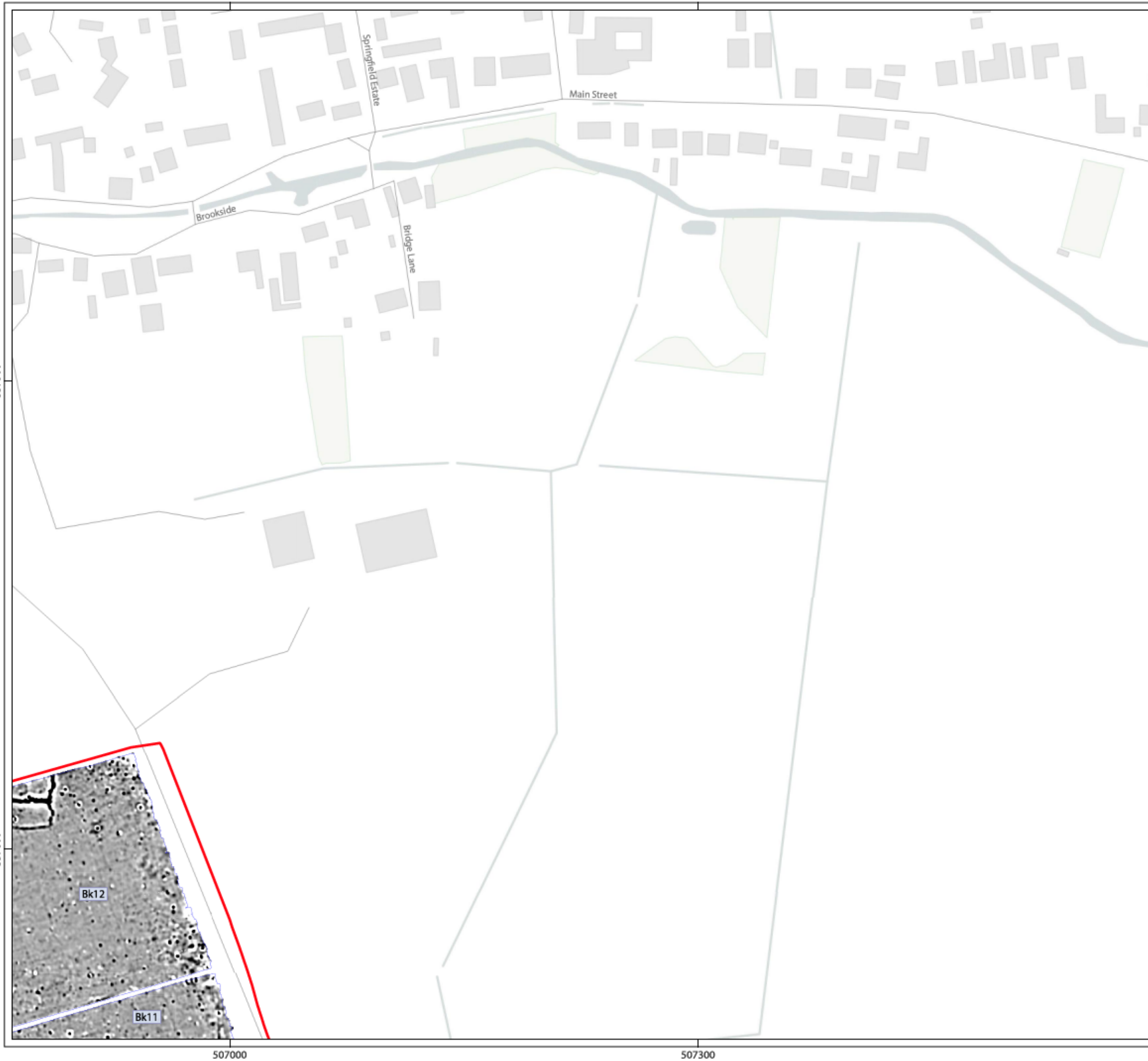
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506700





357900

357600

507000

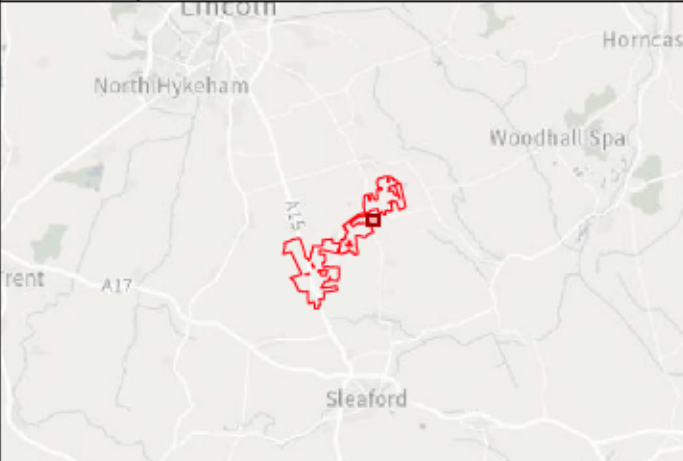
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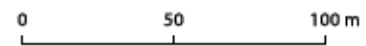
Lincoln
North Hykeham
Woodhall Spa
Sleaford
A17
rent
Hornsea

Key

-  Geophysical Survey Area
-  Survey Extent



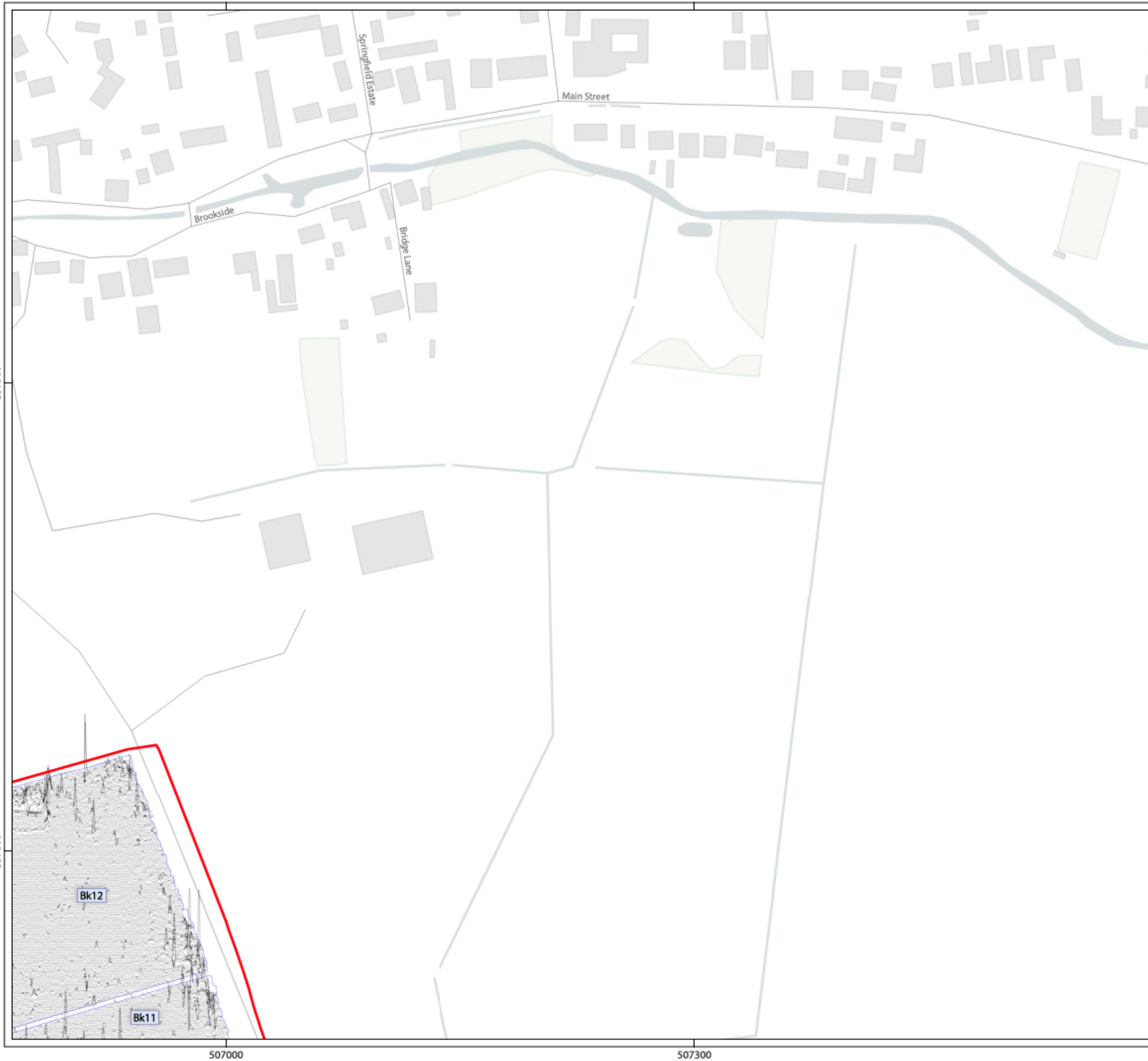
+2nT
-1nT



0 50 100 m

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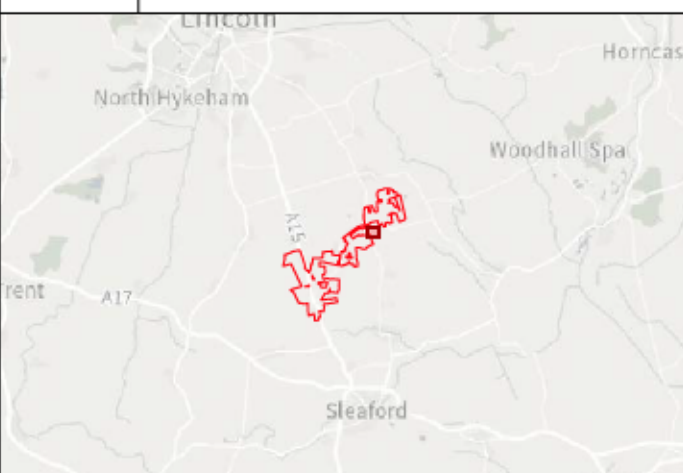
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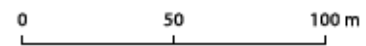
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Key

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

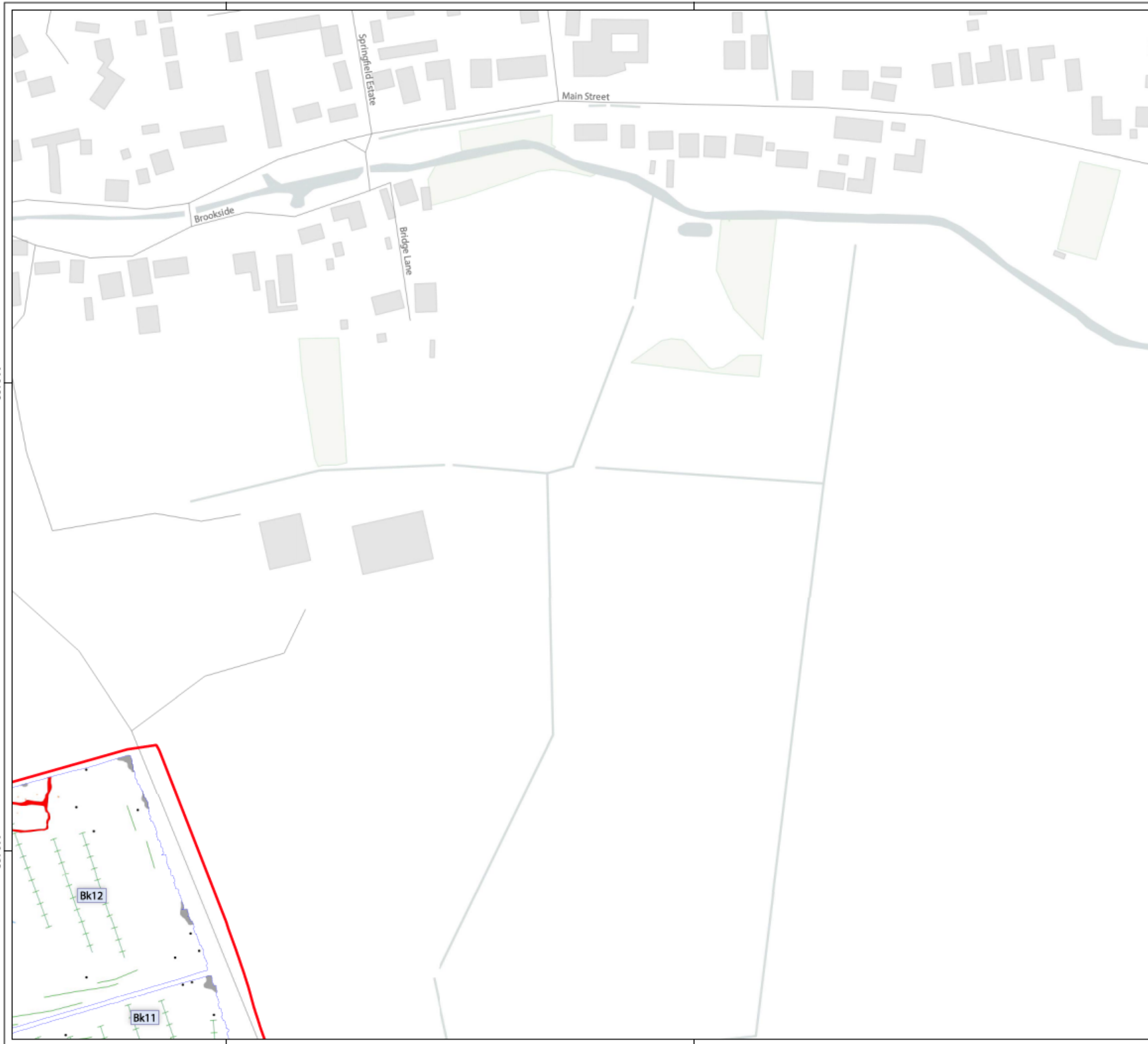



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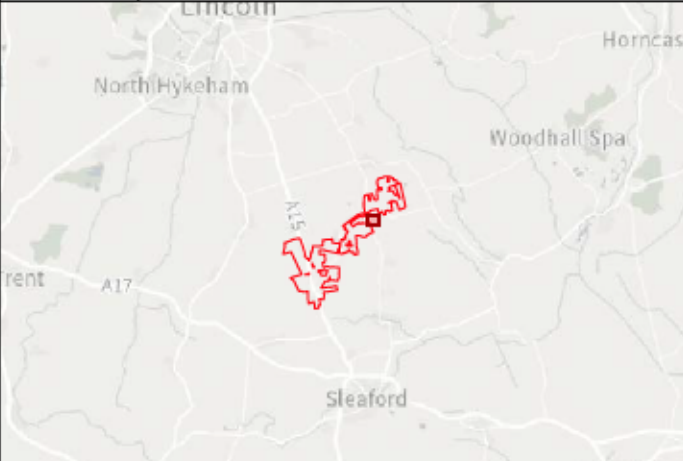








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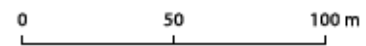


Key

-  Geophysical Survey Area
-  Survey Extent

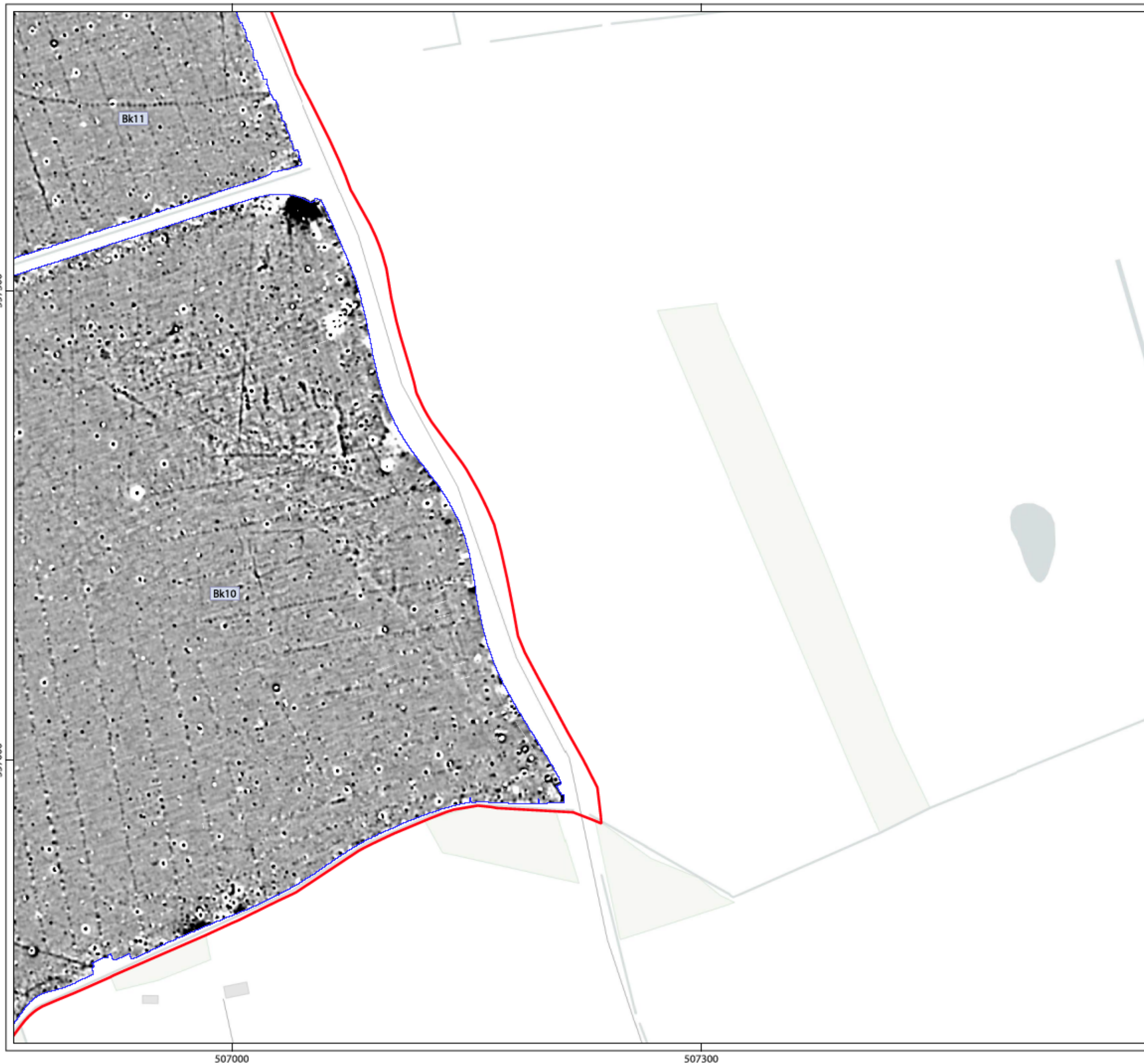
Interpretation


-  Ferrous Objects
-  Agriculture
-  Field Drain
-  Natural
-  Archaeology
-  Magnetic Disturbance
-  Possible Archaeology




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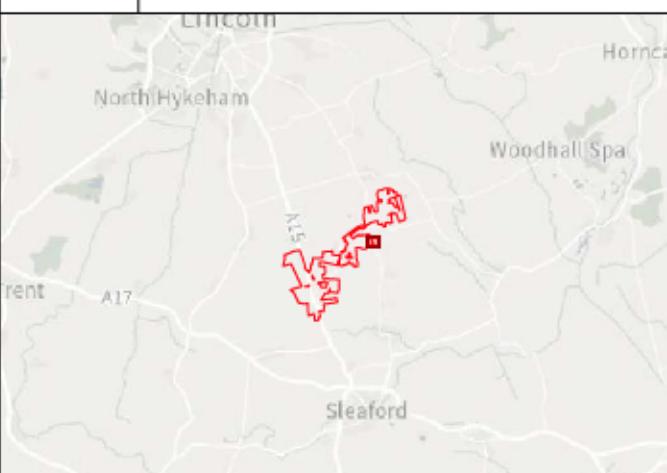







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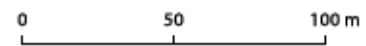
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Key

- Geophysical Survey Area
- Survey Extent



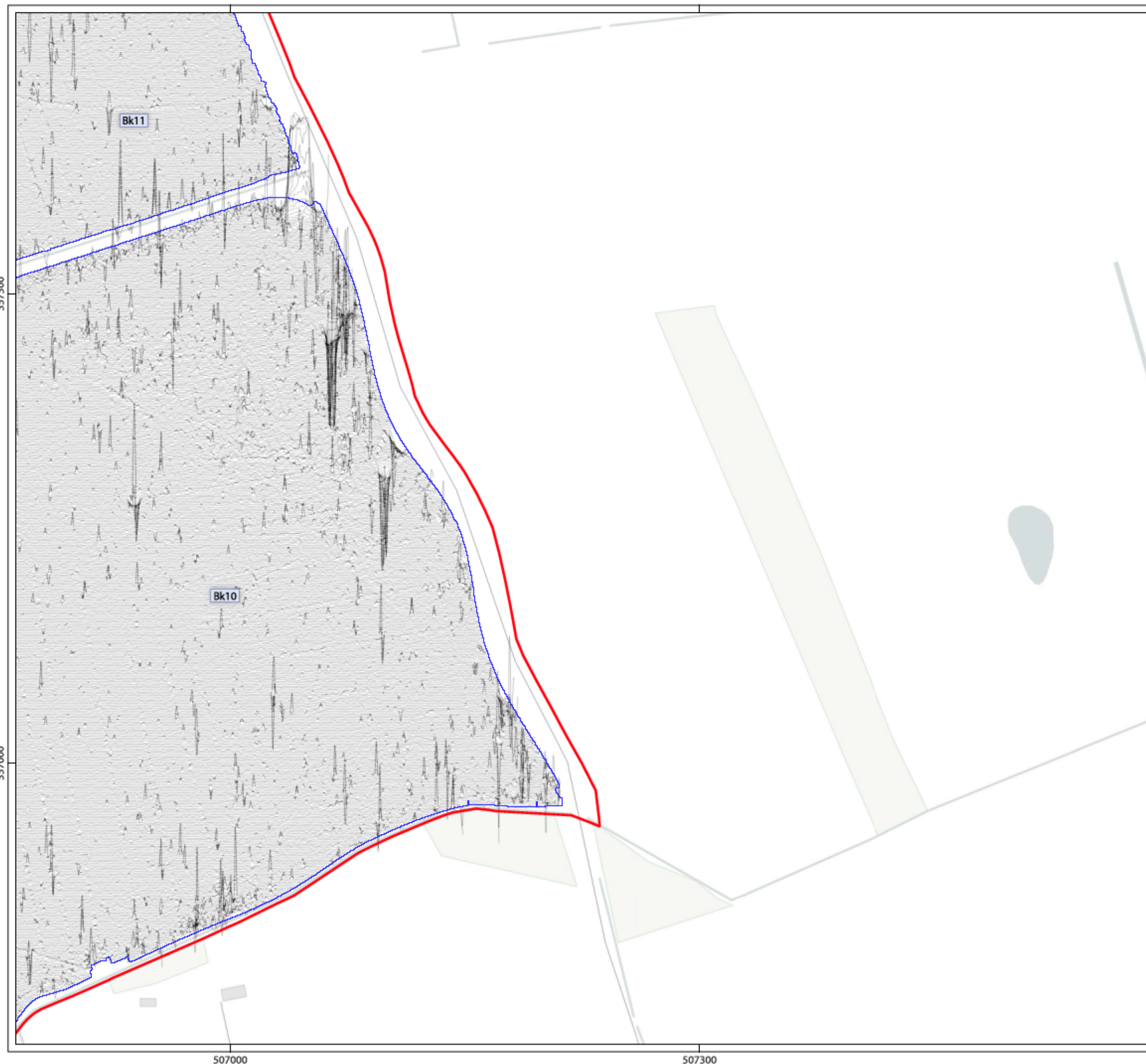


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Key

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


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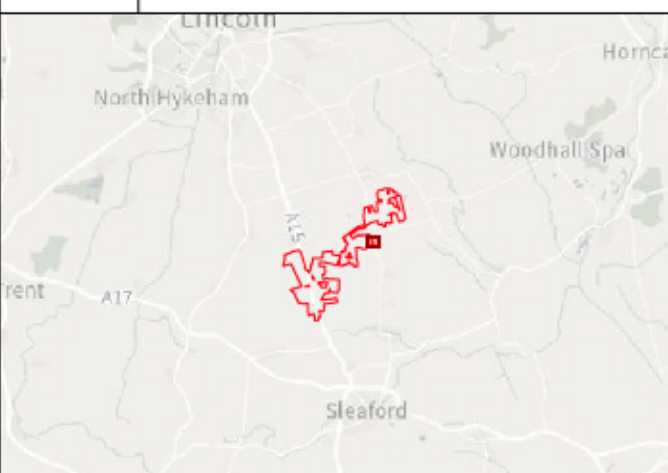
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Key

- Geophysical Survey Area
- Survey Extent
- Interpretation**
- Ferrous Objects
- Agriculture
- Field Drain
- Natural
- Uncertain
- Ridge and Furrow
- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- Uncertain

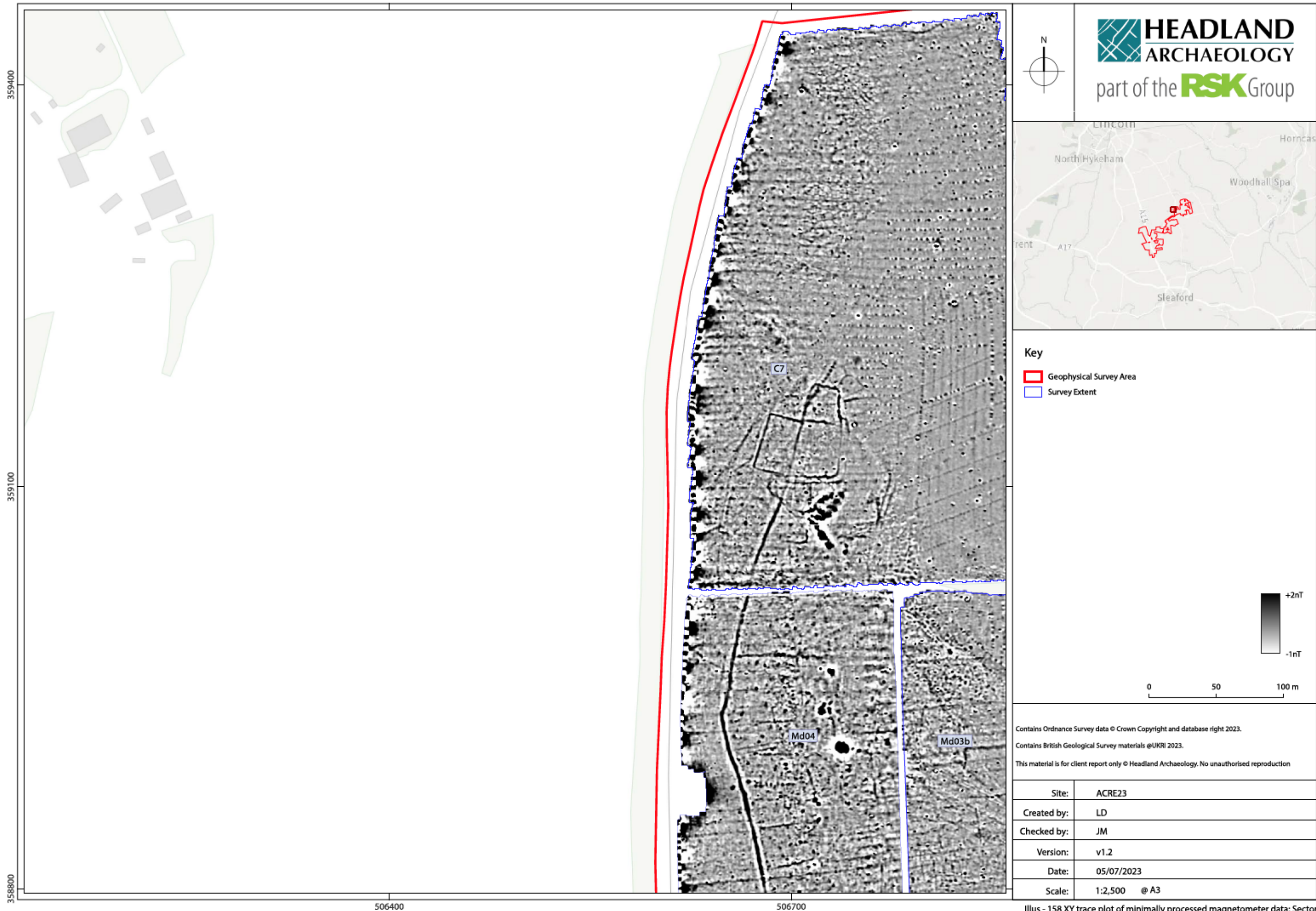
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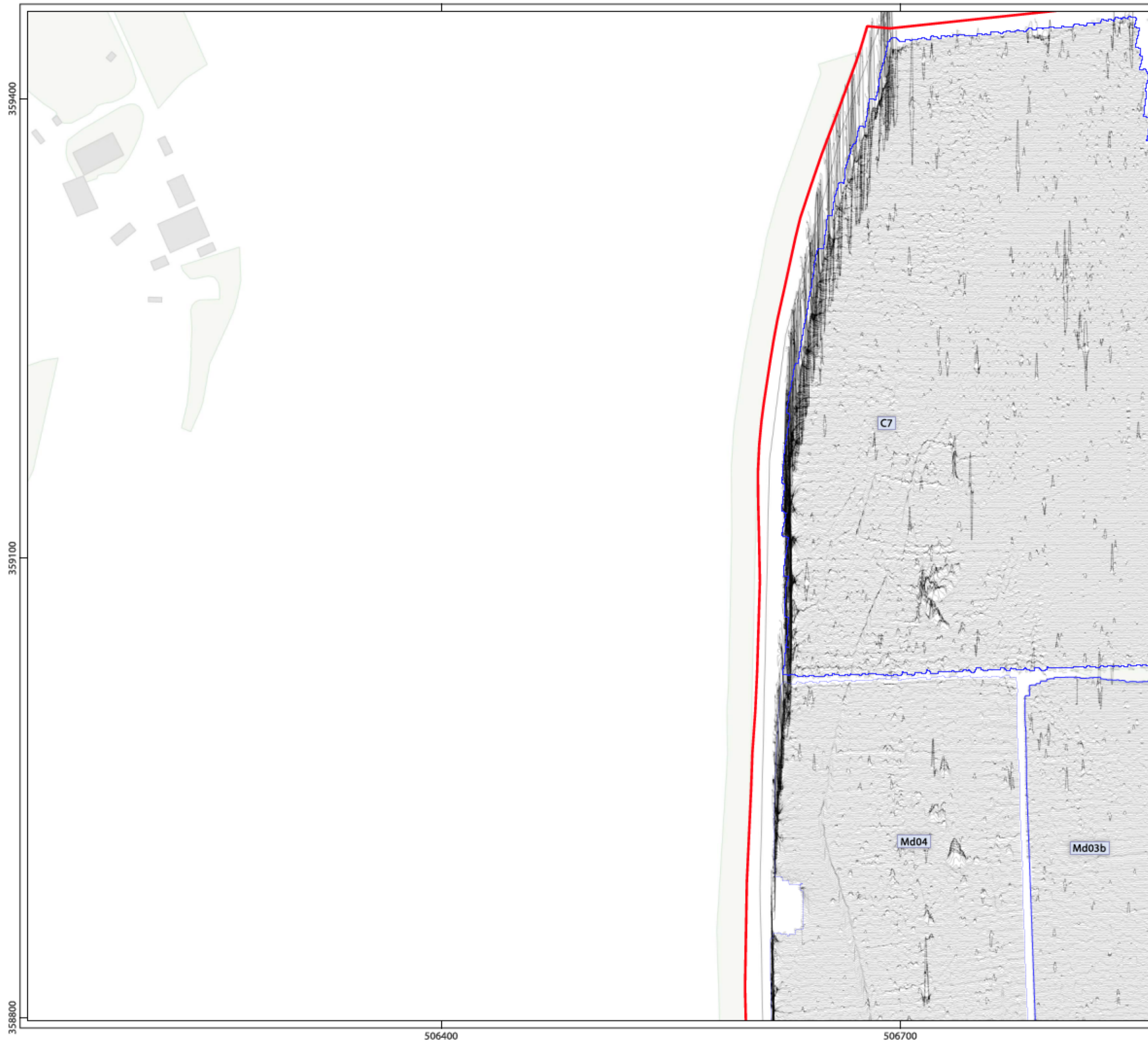
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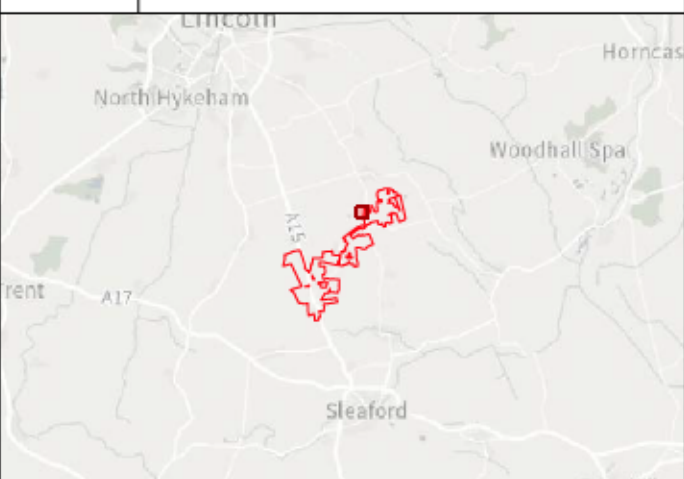
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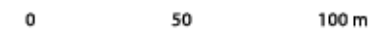
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Key

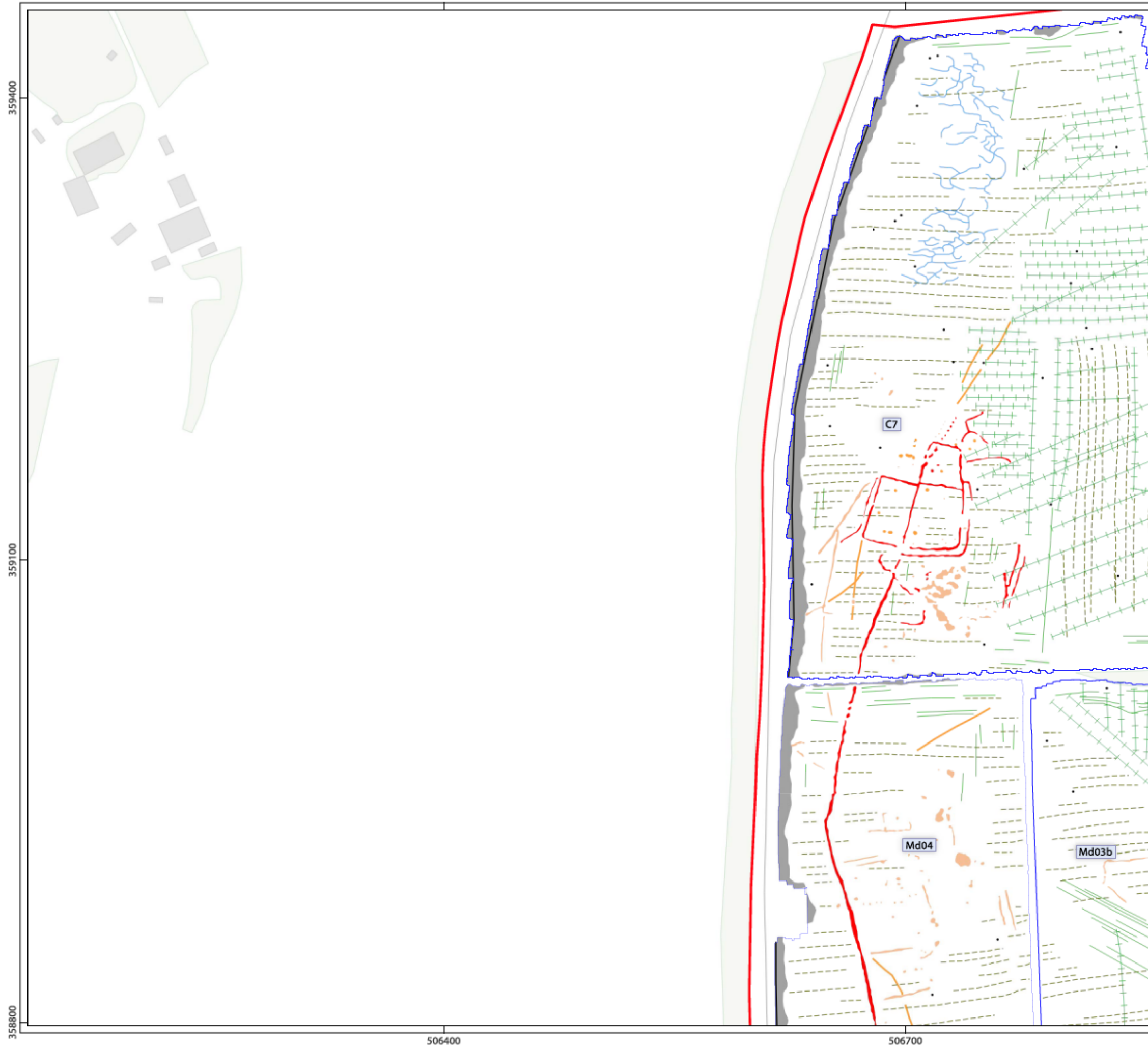
- Geophysical Survey Area
- Survey Extent
- XY Trace (25nT/cm)



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Illus - 159 XY trace plot of minimally processed magnetometer data; Sector



Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- Field Drain
- Natural
- Pipe
- Ridge and Furrow
- Possible Archaeology
- Archaeology
- Magnetic Disturbance
- Possible Archaeology

0 50 100 m

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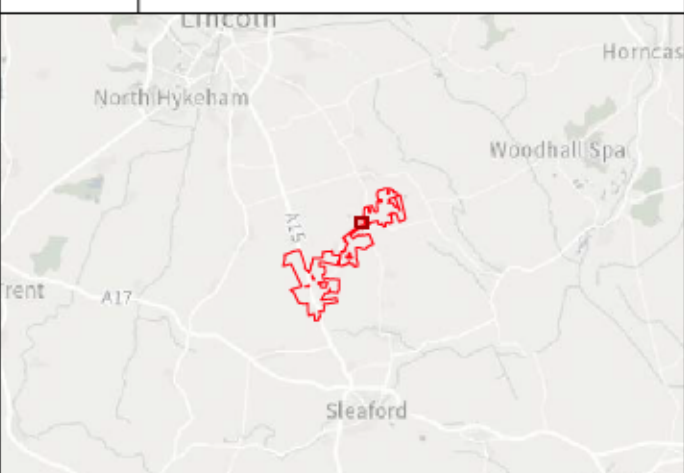
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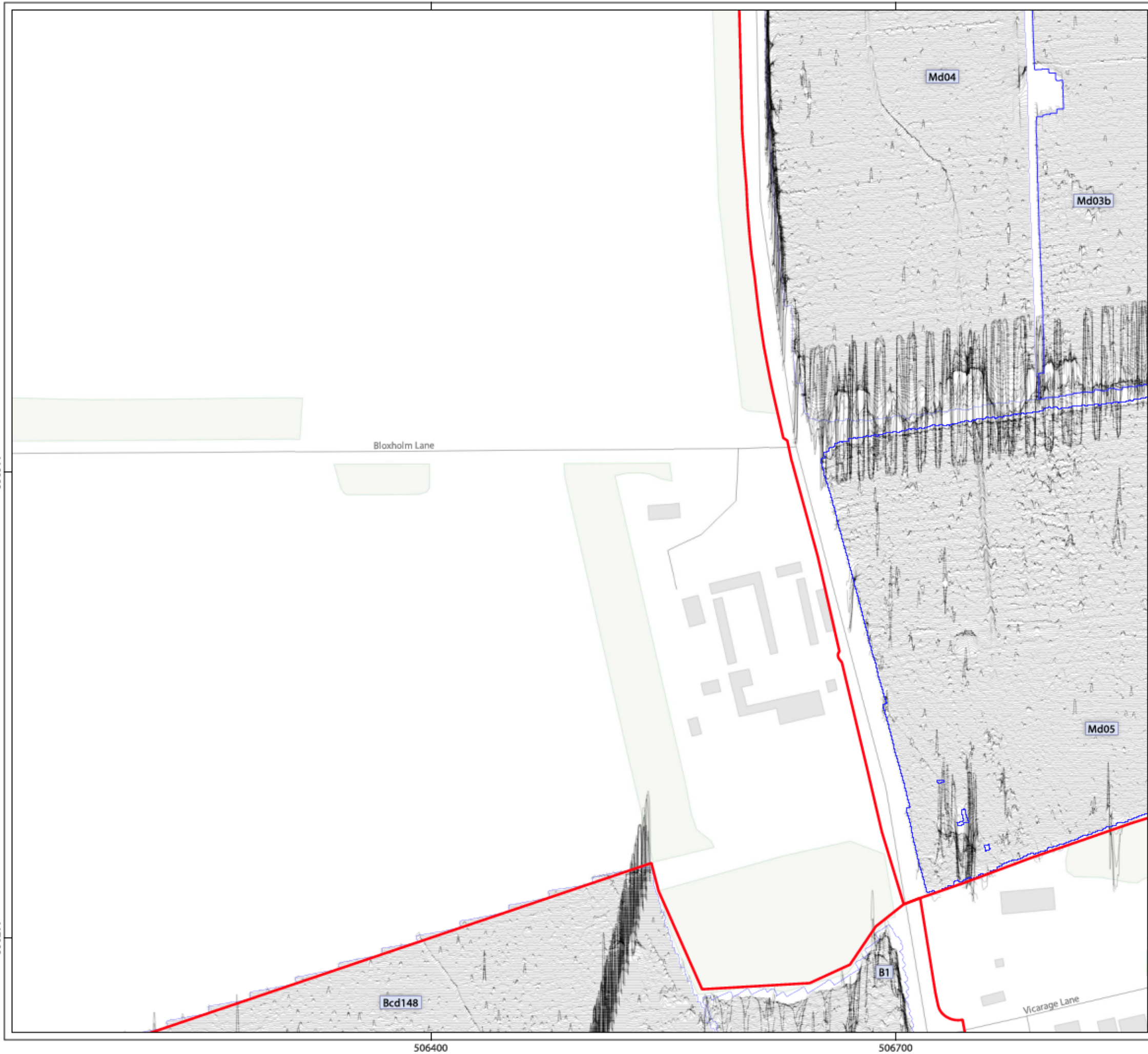
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Geophysical Survey Area

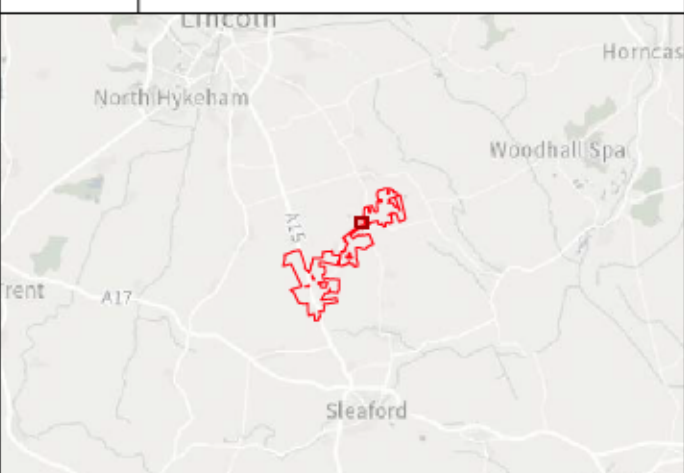
Survey Extent

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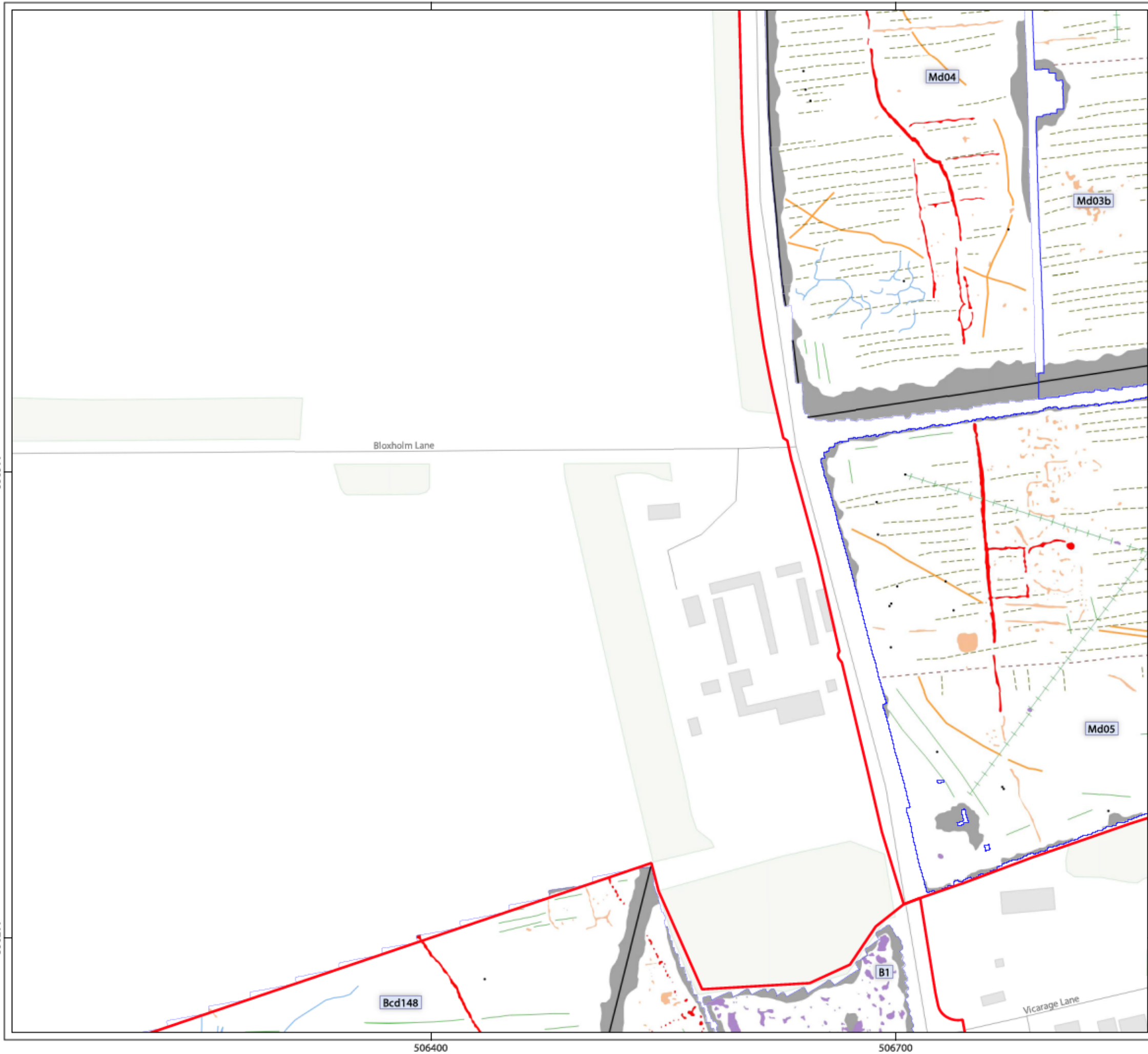
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Key
 Geophysical Survey Area
 Survey Extent
 XY Trace (25nT/cm)

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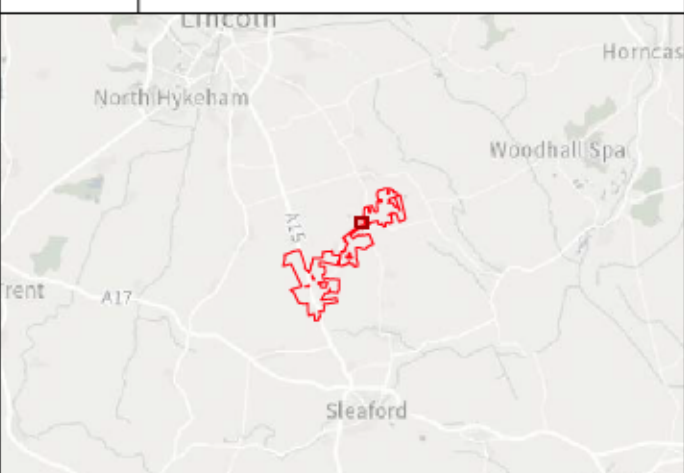






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Key

 Geophysical Survey Area

 Survey Extent

Interpretation

 Ferrous Objects

 Agriculture

 Possible Field Boundary

 Field Drain

 Natural

 Pipe

 Ridge and Furrow

 Possible Archaeology

 Archaeology

 Magnetic Disturbance

 Possible Archaeology

 Uncertain

0

50

100 m

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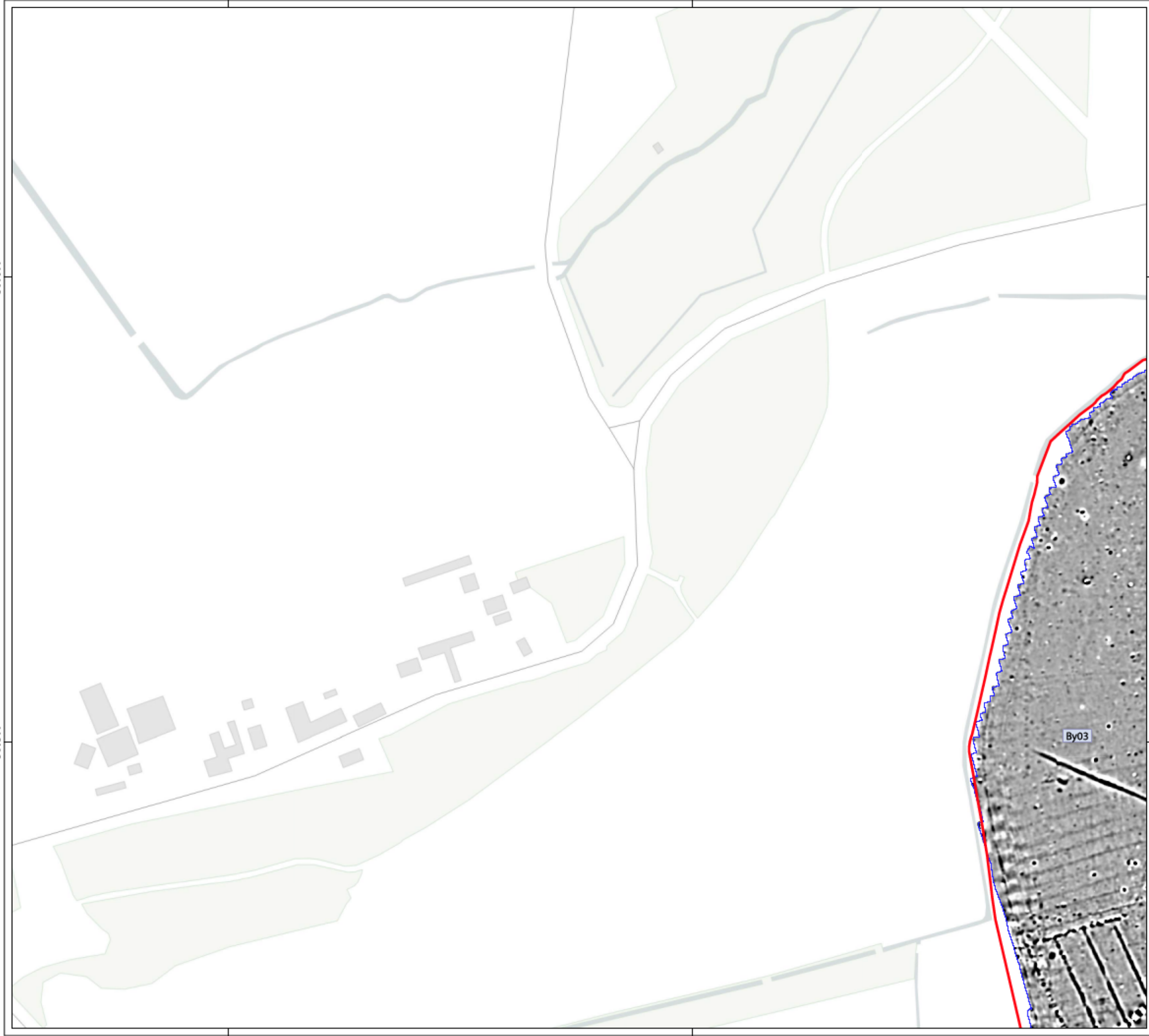
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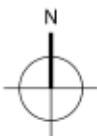
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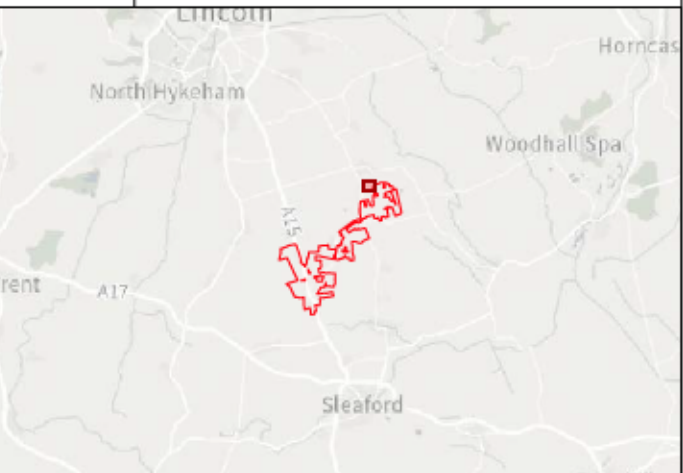
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Key

-  Geophysical Survey Area
-  Survey Extent

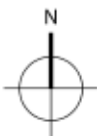



0 50 100 m

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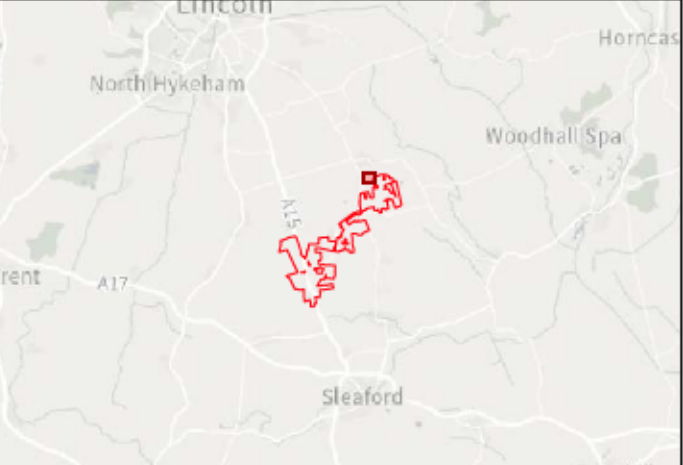









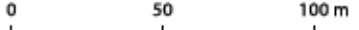
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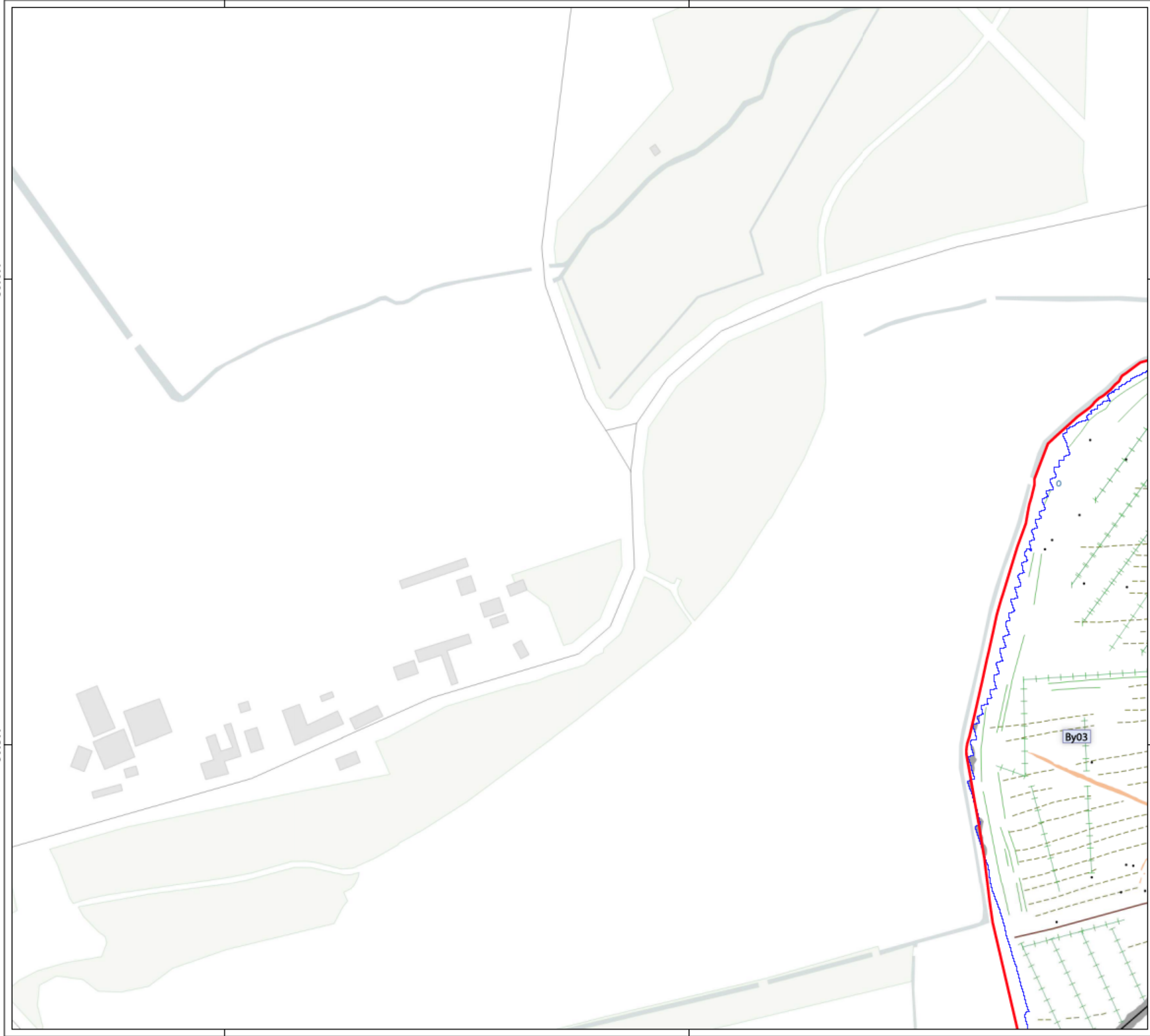
Key


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




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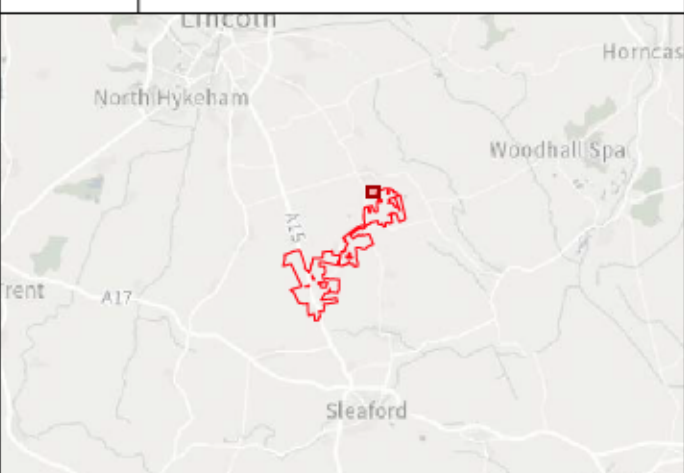
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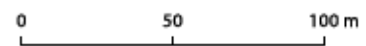


Key

-  Geophysical Survey Area
-  Survey Extent

Interpretation

-  Ferrous Objects
-  Agriculture
-  Field Boundary
-  Field Drain
-  Pipe
-  Ridge and Furrow
-  Magnetic Disturbance
-  Possible Archaeology
-  Geology




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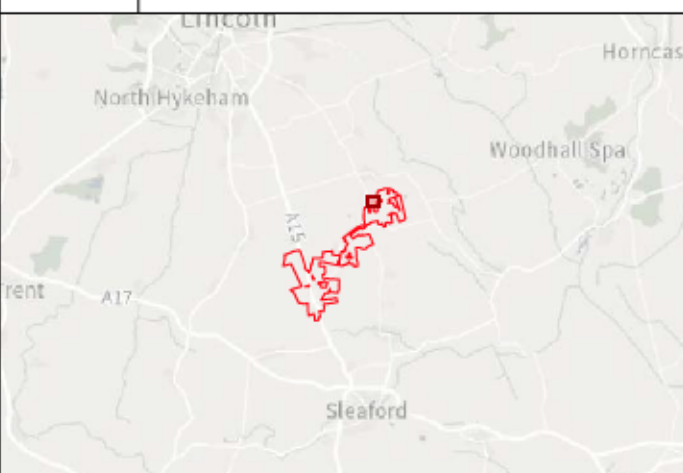







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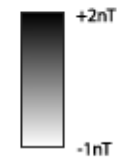
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Key

 Geophysical Survey Area

 Survey Extent



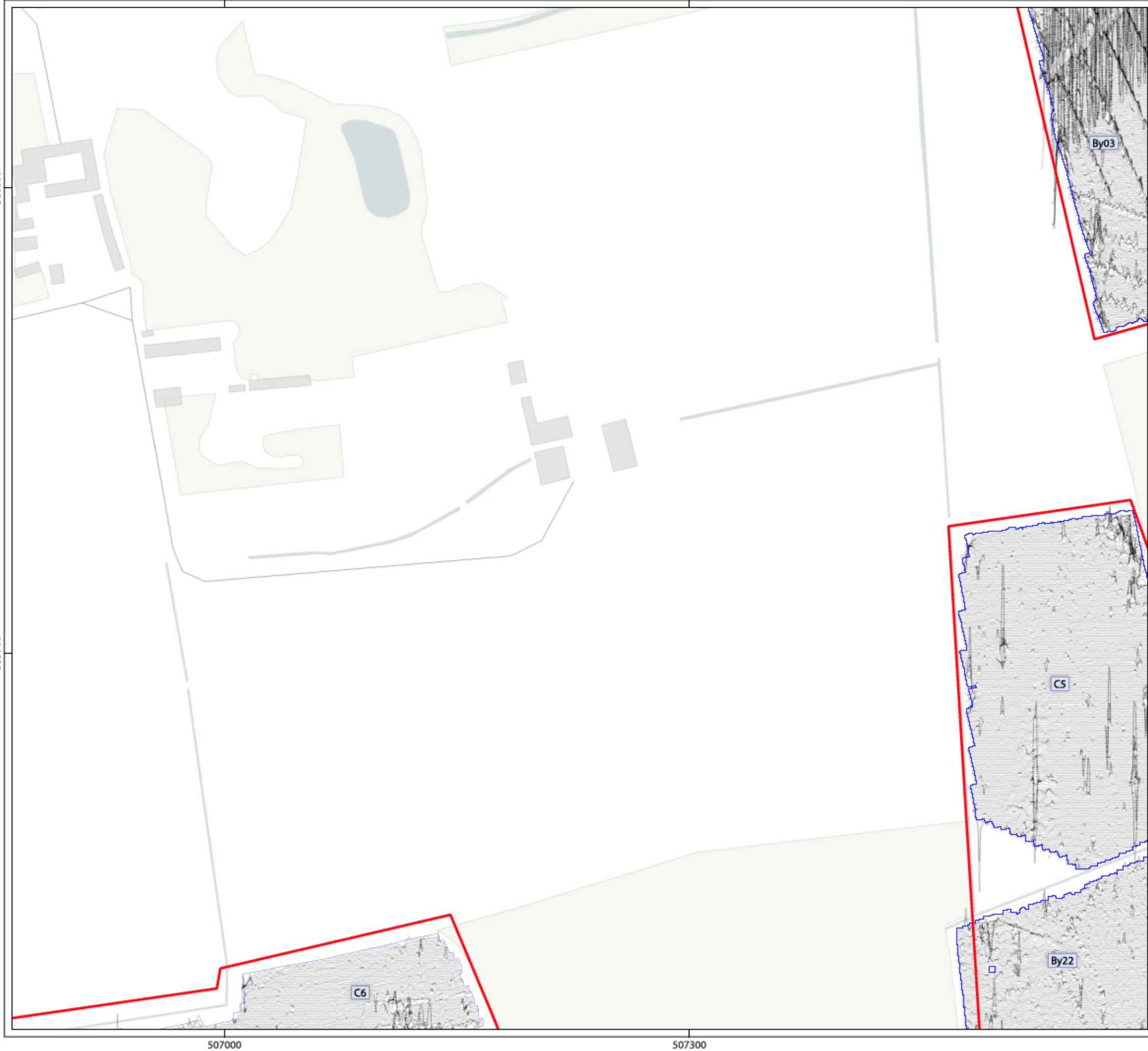
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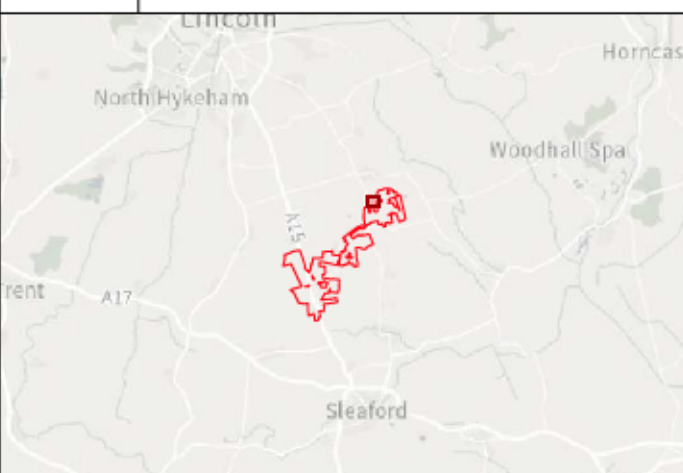









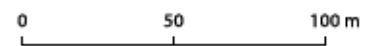
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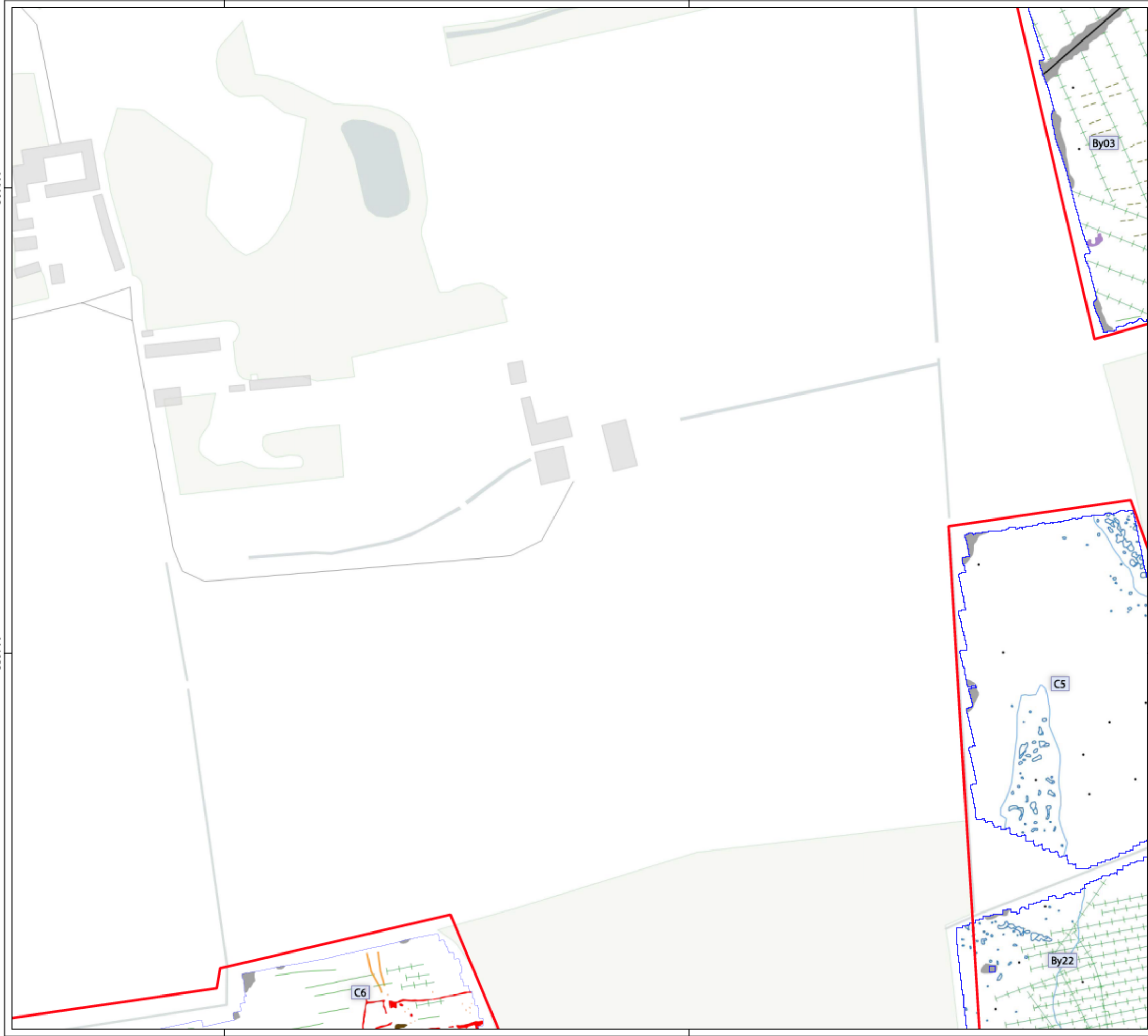
Key


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




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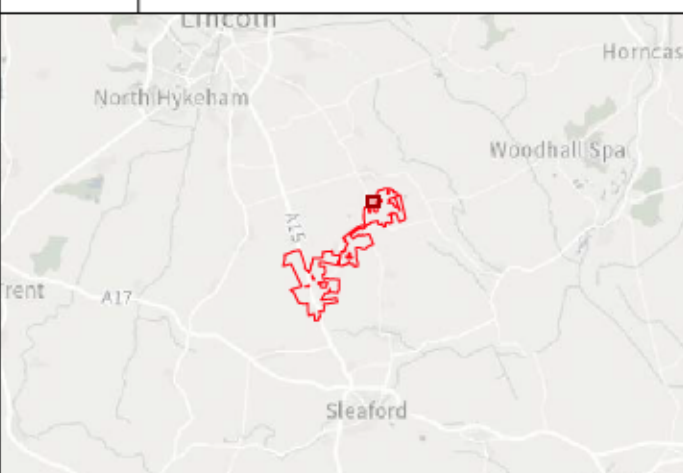








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Key

 Geophysical Survey Area

 Survey Extent

Interpretation

-  Ferrous Objects
-  Agriculture
-  Field Drain
-  Natural
-  Pipe
-  Ridge and Furrow
-  Possible Archaeology
-  Archaeology
-  Magnetic Disturbance
-  Possible Archaeology
-  Uncertain
-  Geology
-  Burning

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50

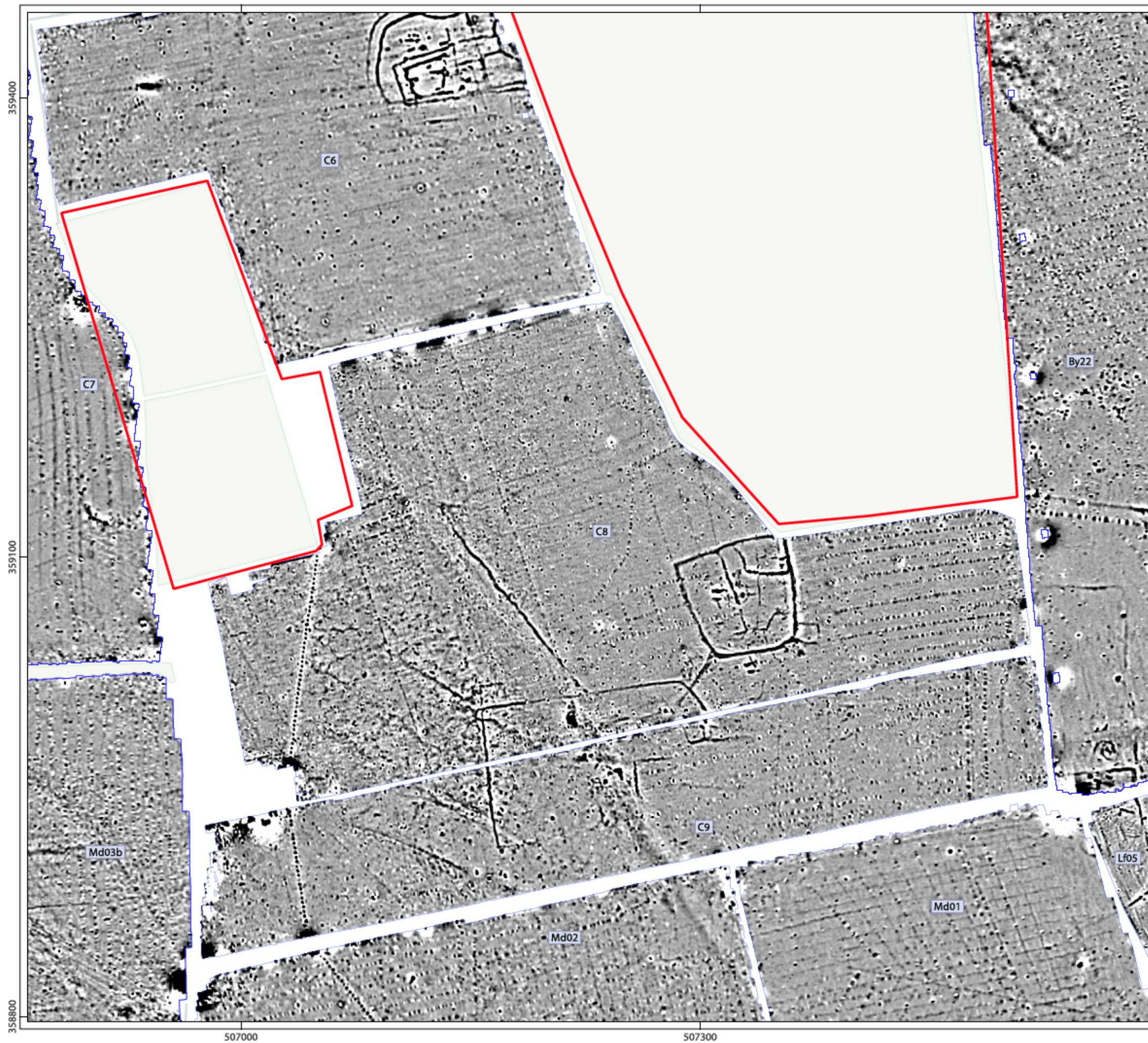
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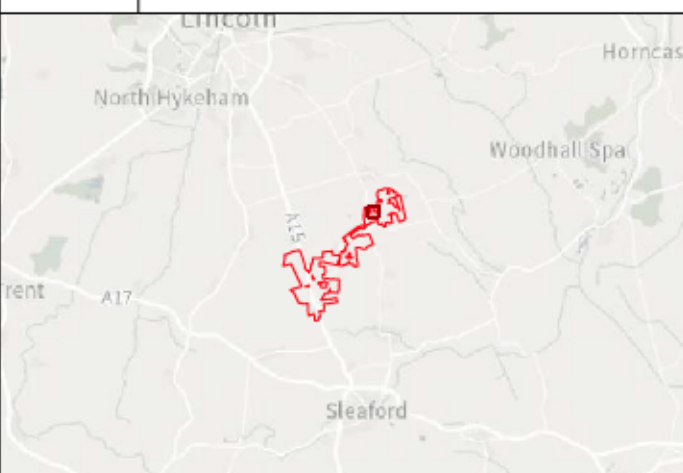




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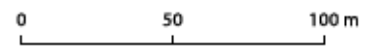


Key

- Geophysical Survey Area
- Survey Extent



+2nT
-1nT



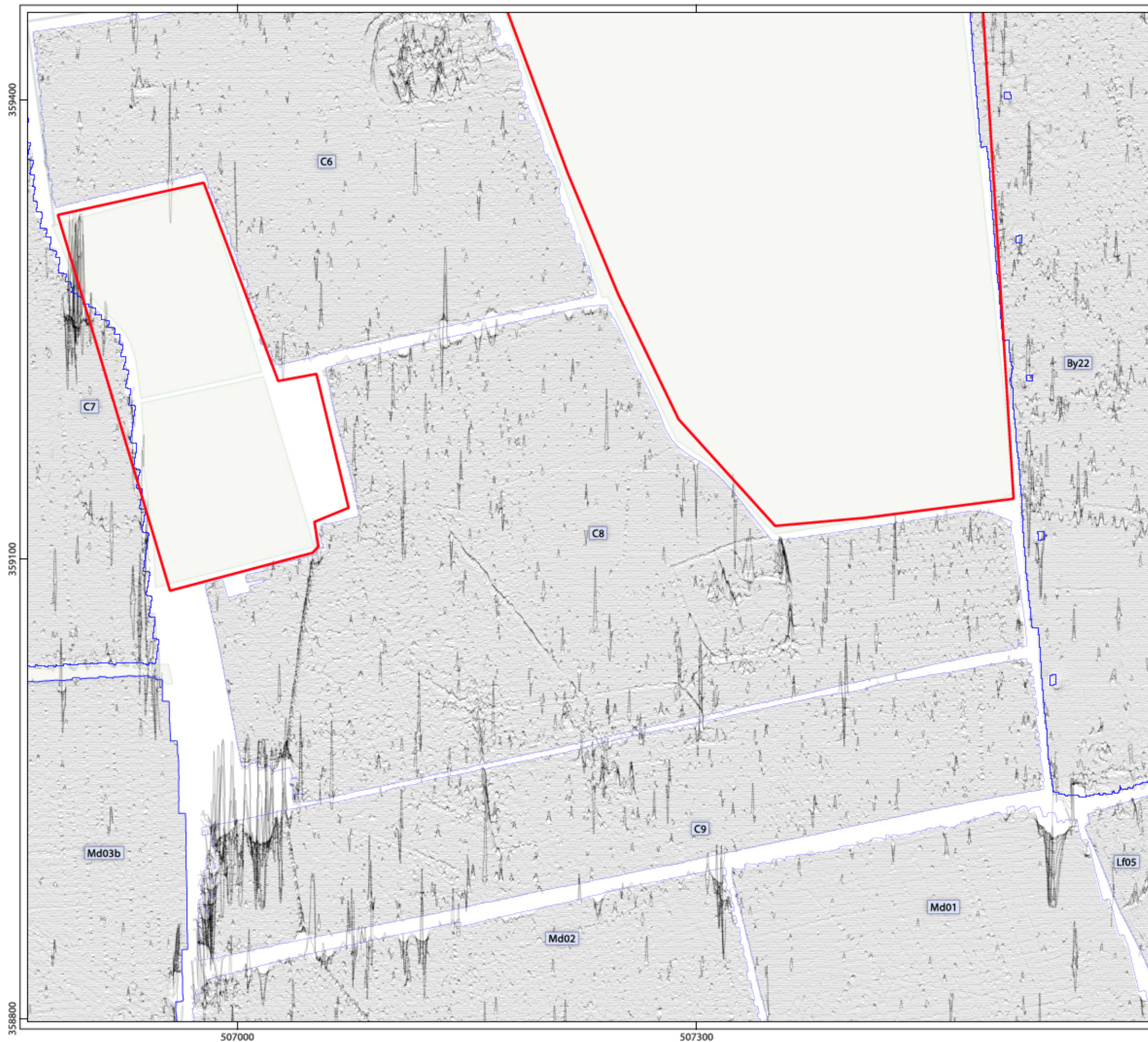
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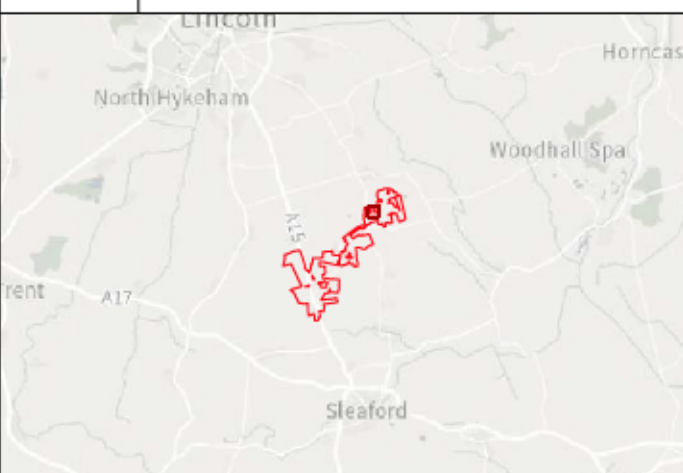
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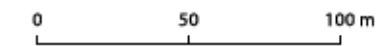


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Key

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

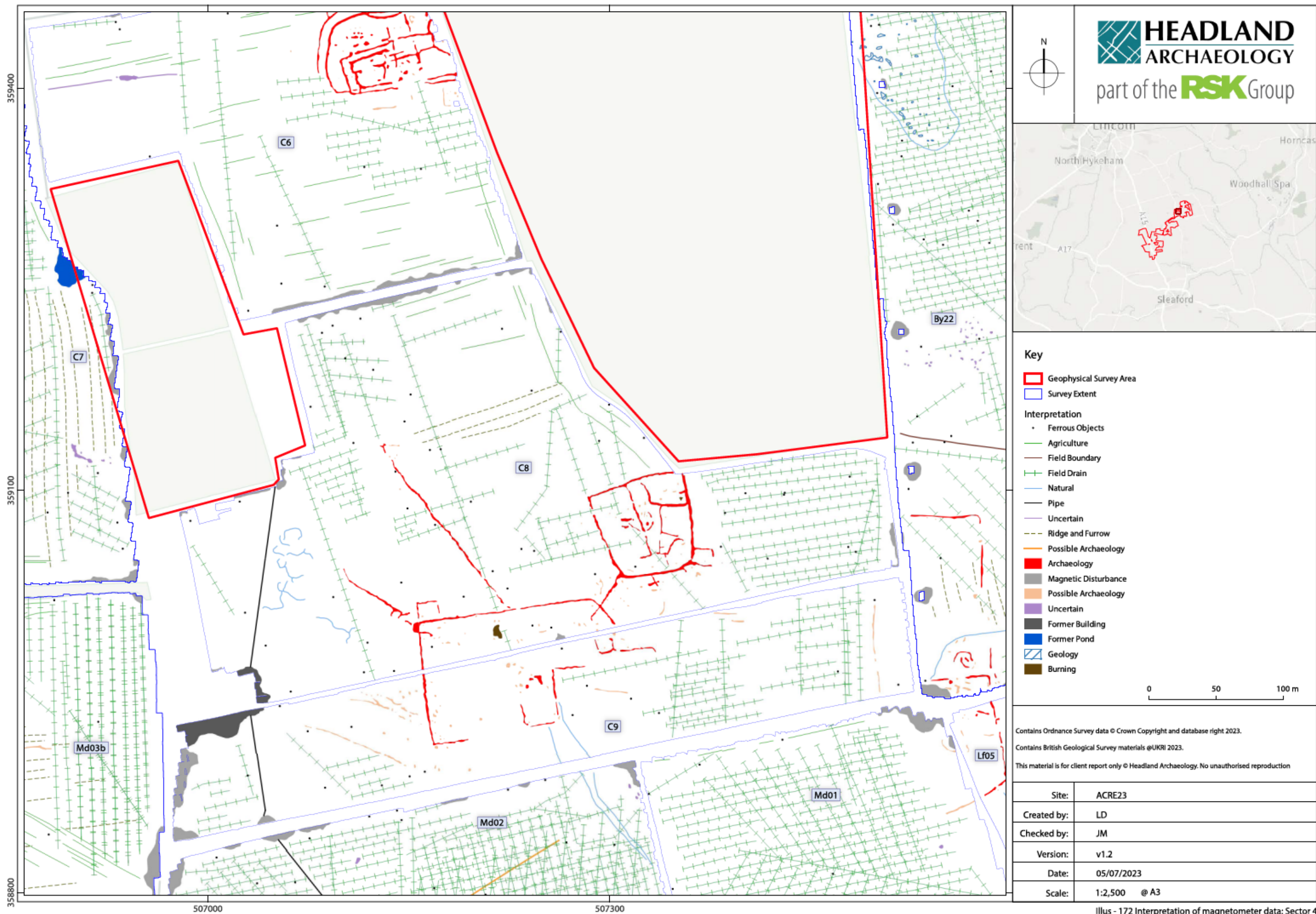


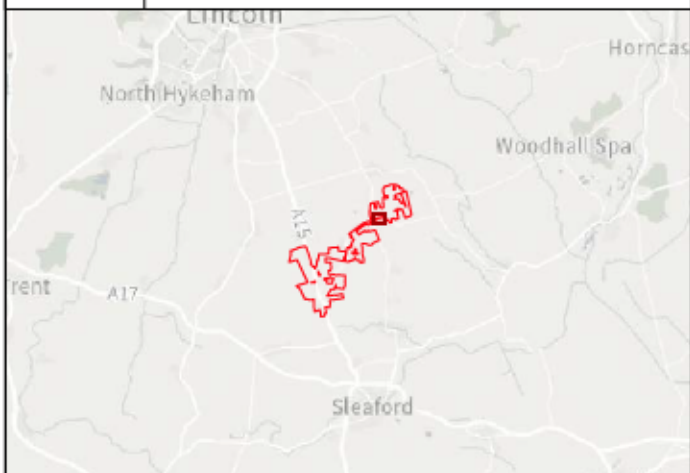
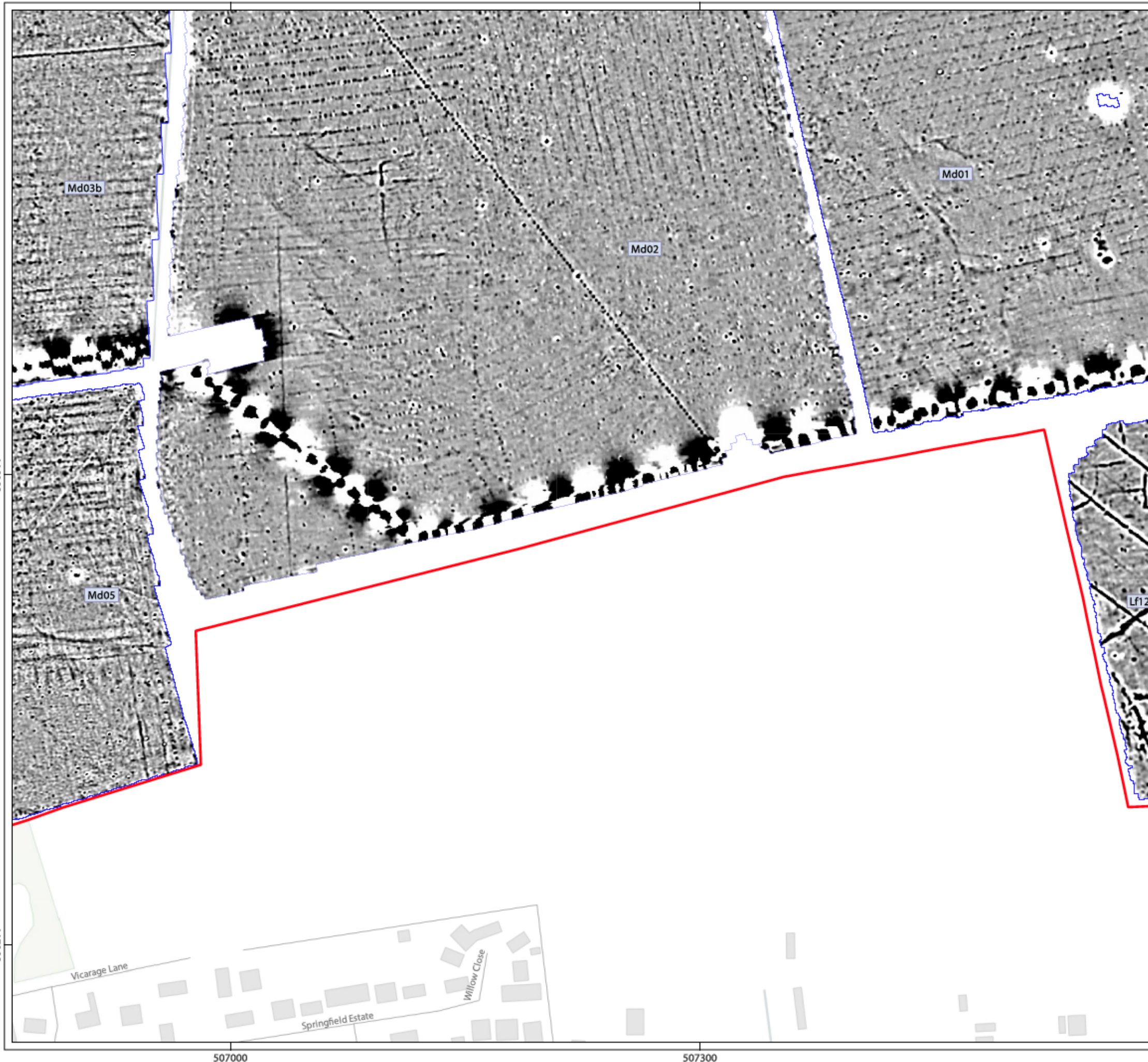
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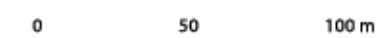
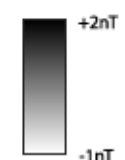
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Key

- Geophysical Survey Area
- Survey Extent

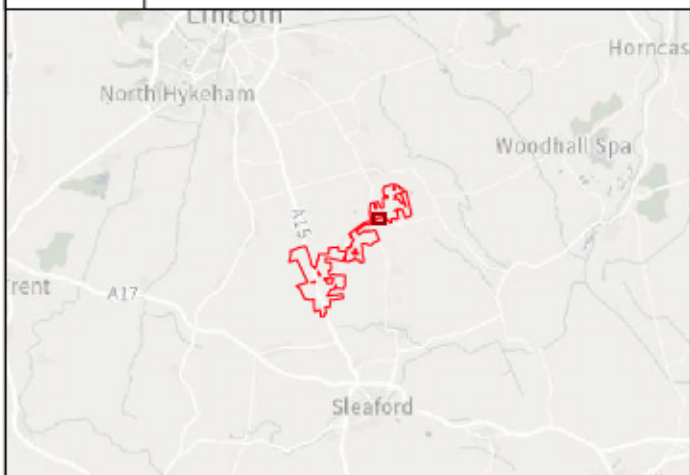
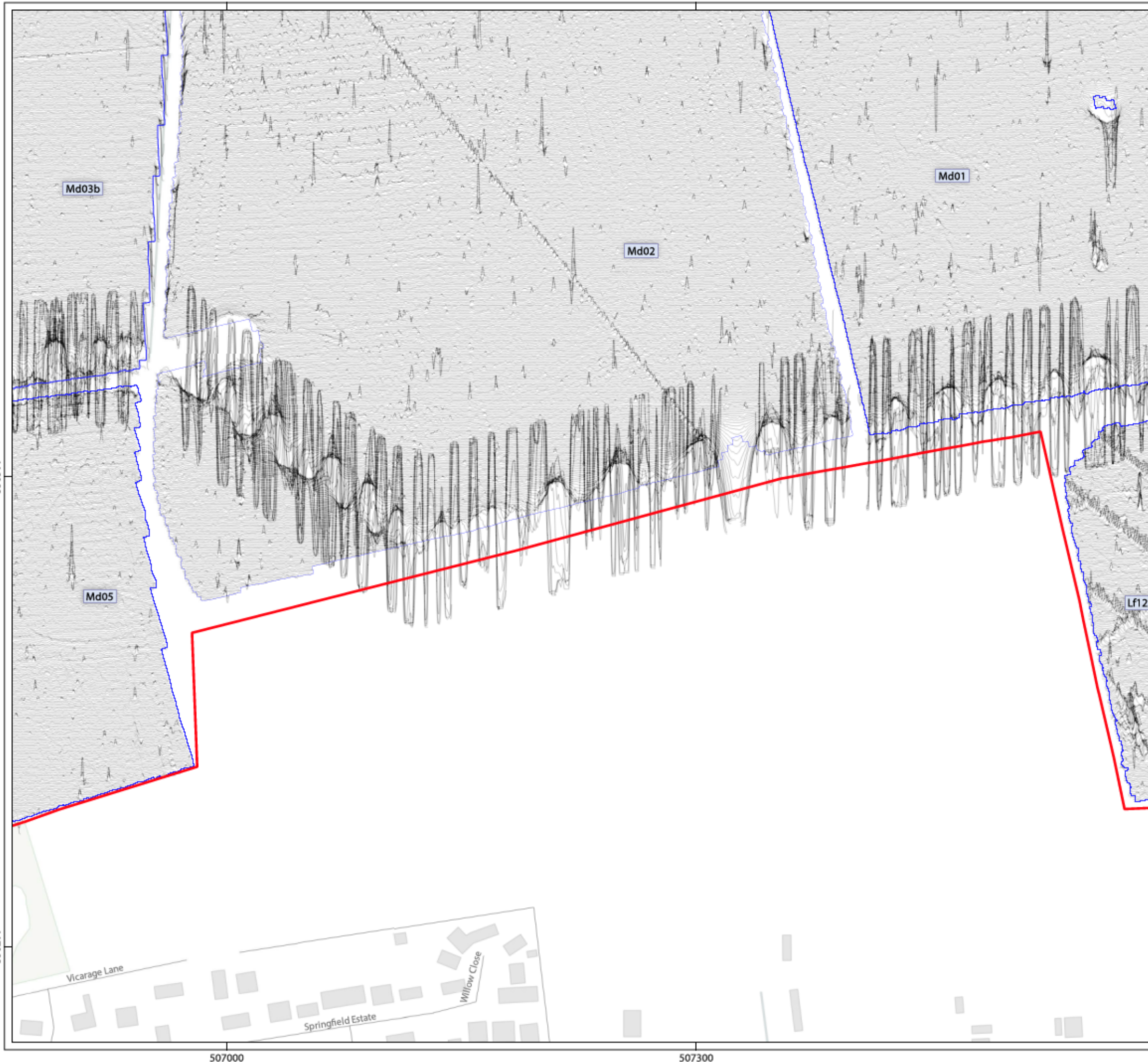


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Key

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

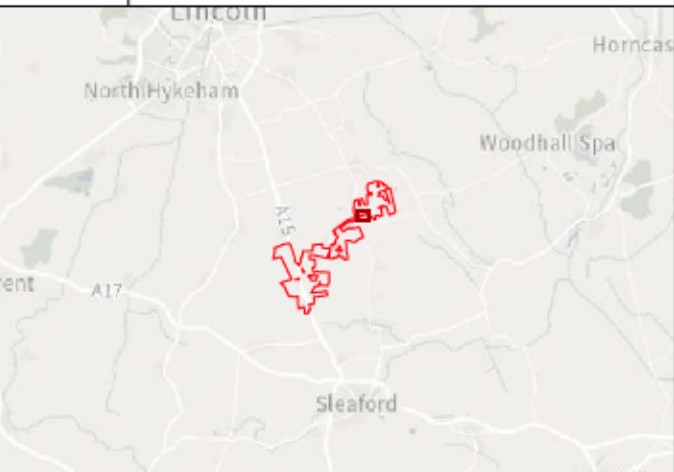
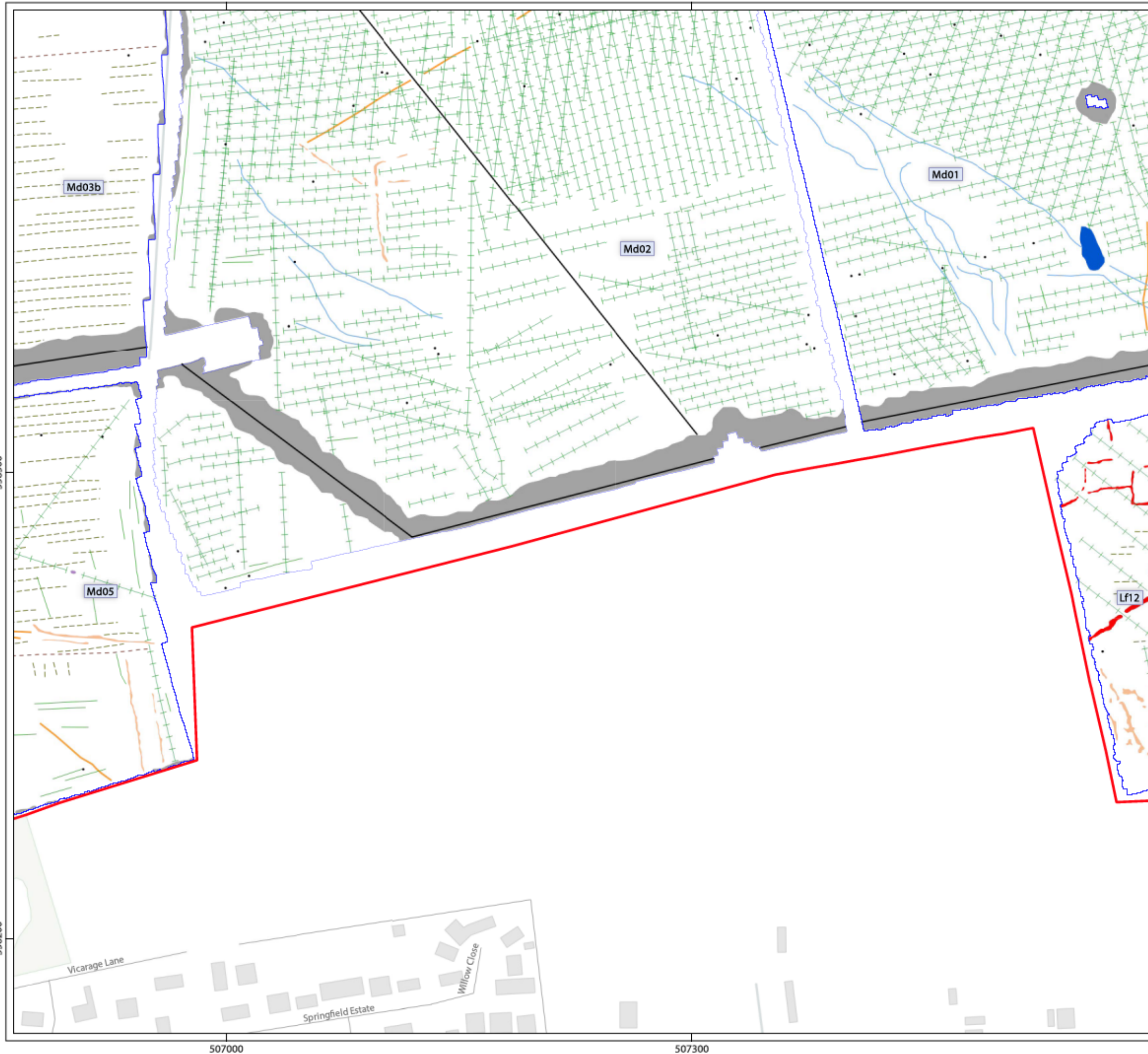
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Key

- Geophysical Survey Area
- Survey Extent

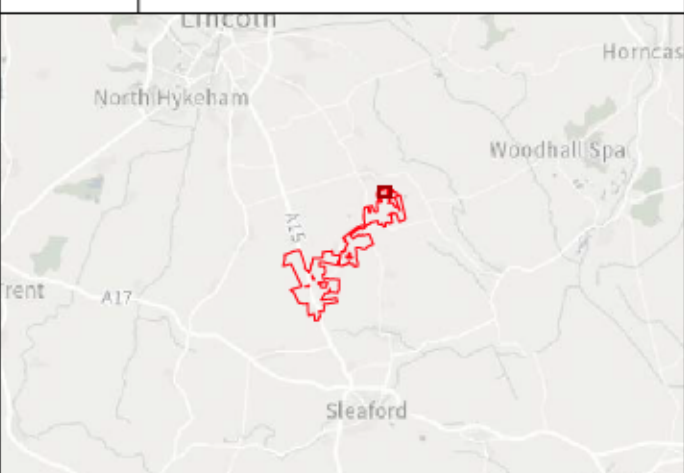
Interpretation

- Ferrous Objects
- Agriculture
- Possible Field Boundary
- Field Drain
- Natural
- Pipe
- Ridge and Furrow
- Possible Archaeology
- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- Uncertain
- Former Pond



0 50 100 m

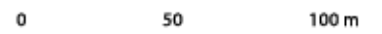
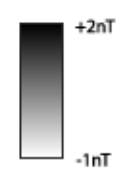
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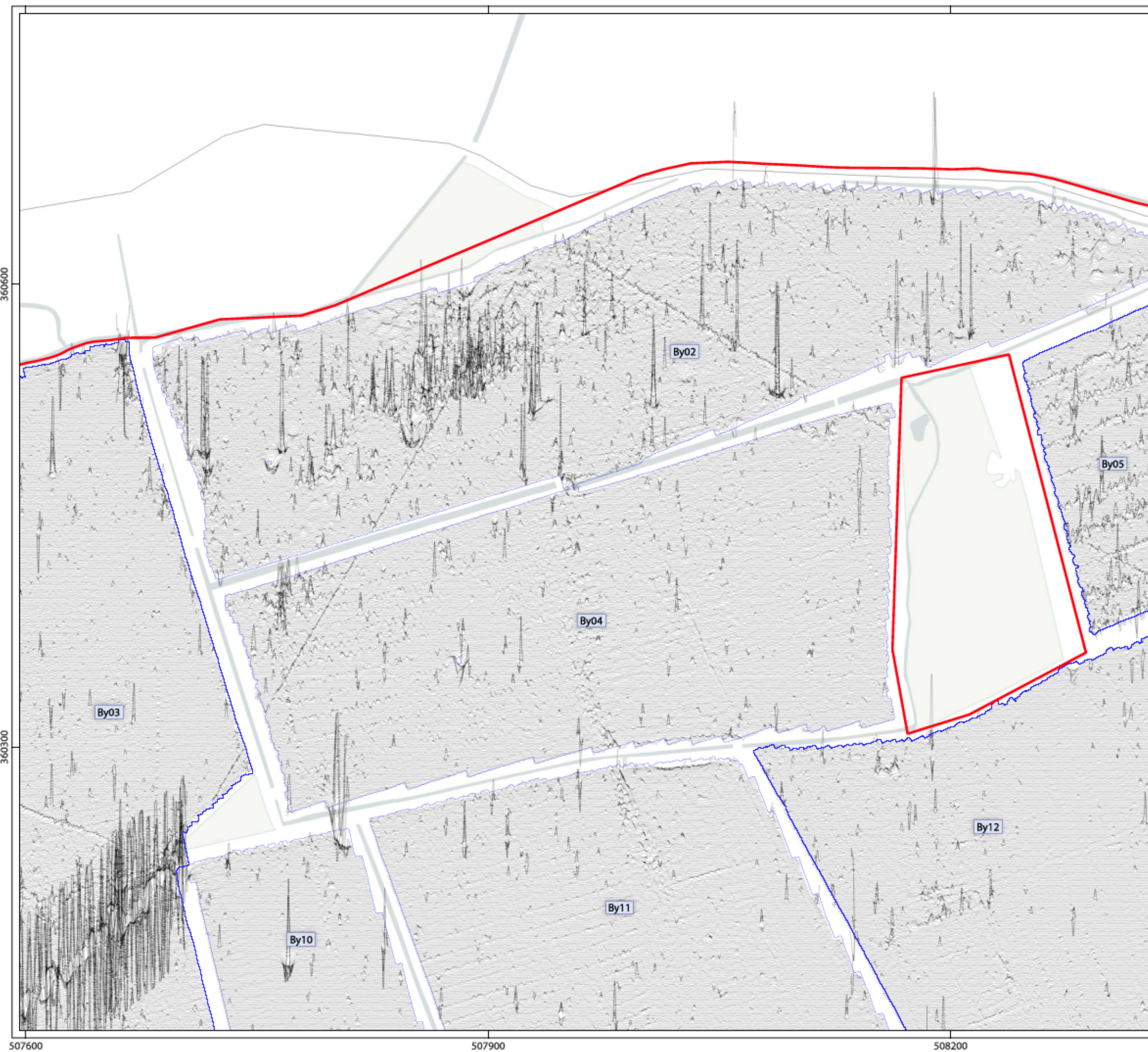
-  Geophysical Survey Area
-  Survey Extent





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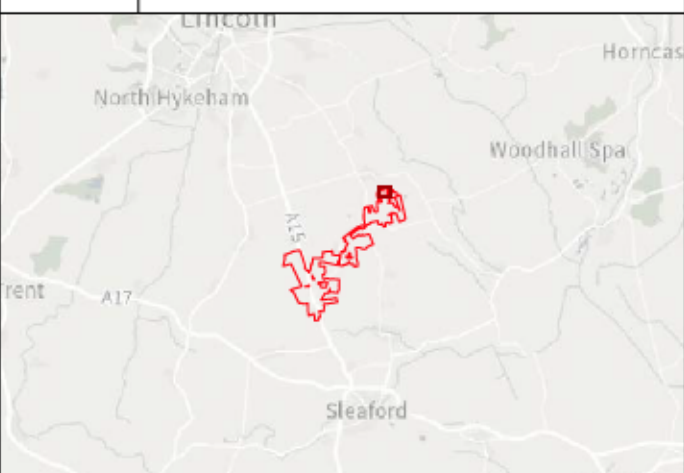
507600 507900 508200





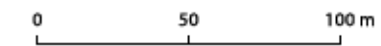


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Key

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



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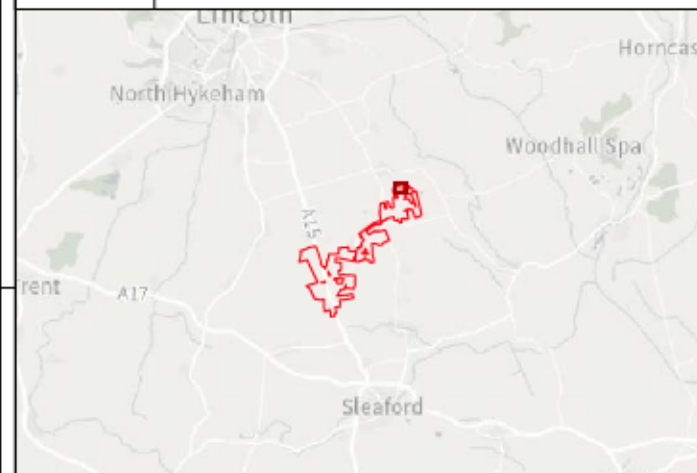
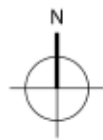
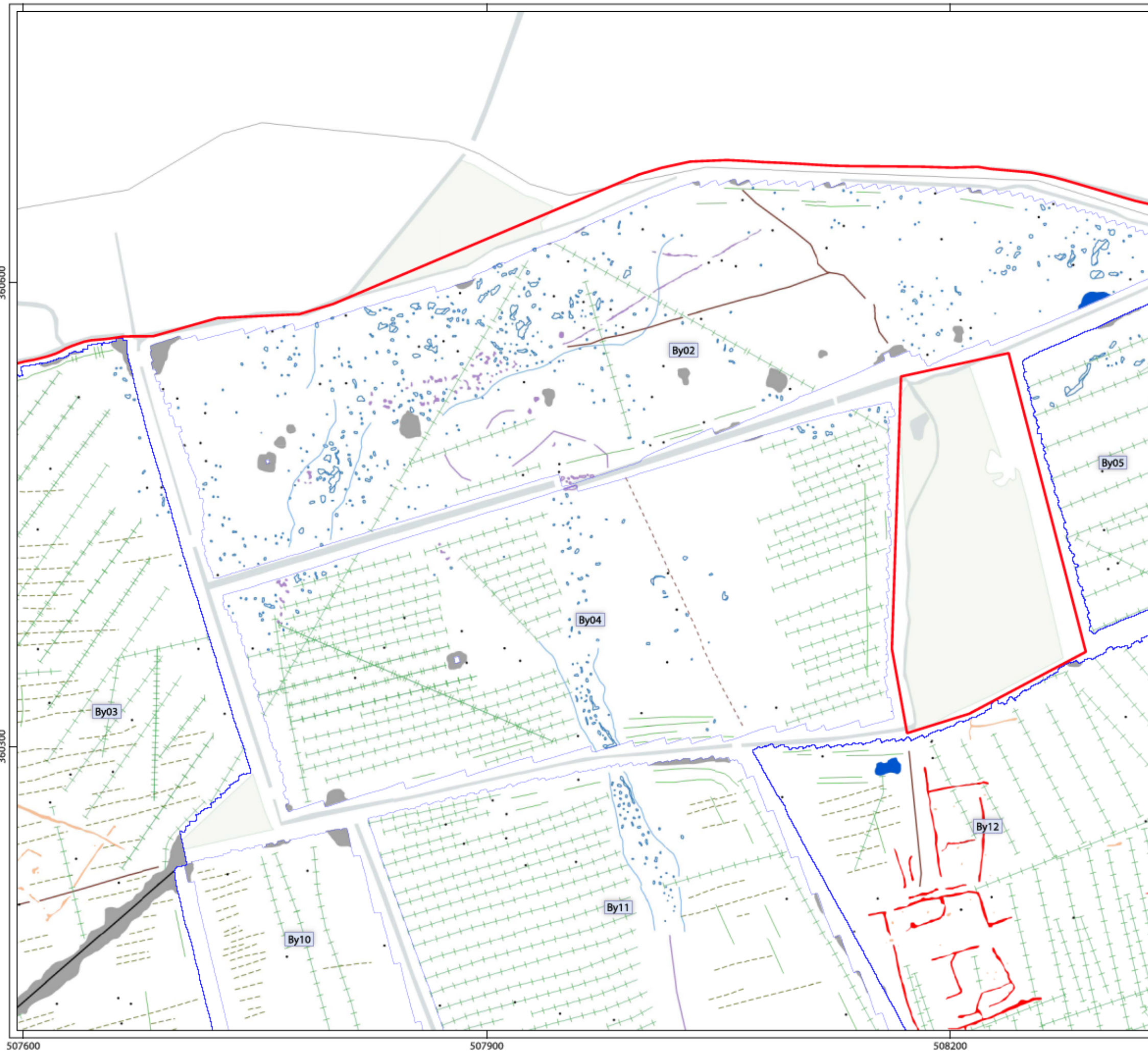
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507600 507900 508200

Illus - 177 XY trace plot of minimally processed magnetometer data; Sector



Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- Field Boundary
- - - Possible Field Boundary
- - - Field Drain
- Natural
- Pipe
- Uncertain
- - - Ridge and Furrow
- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- Uncertain
- Former Pond
- Geology

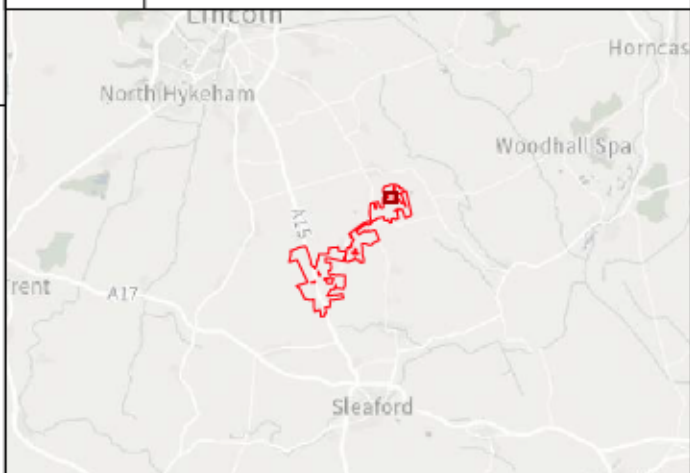
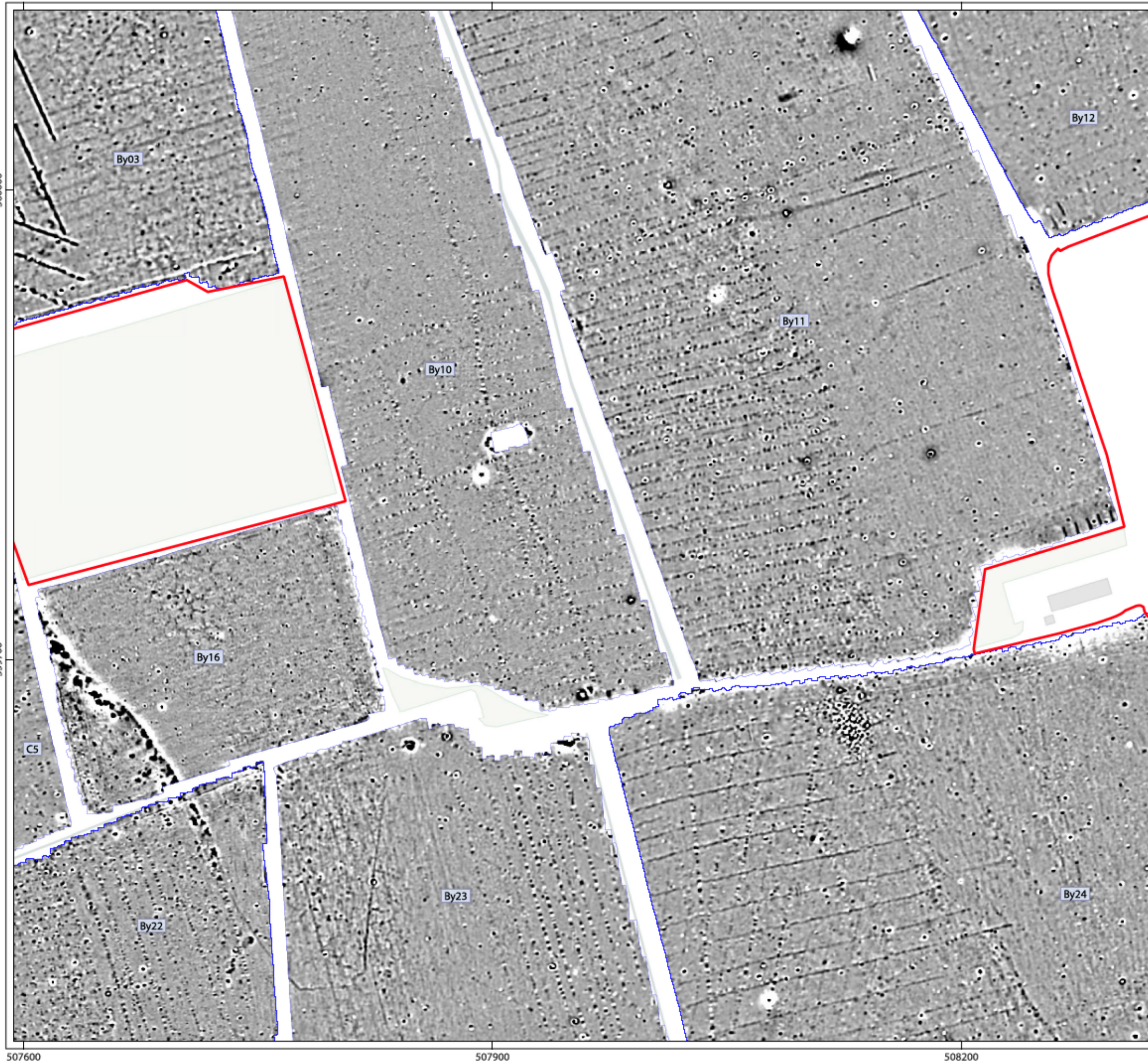
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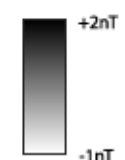
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Key

- ▬ Geophysical Survey Area
- ▬ Survey Extent



0 50 100 m

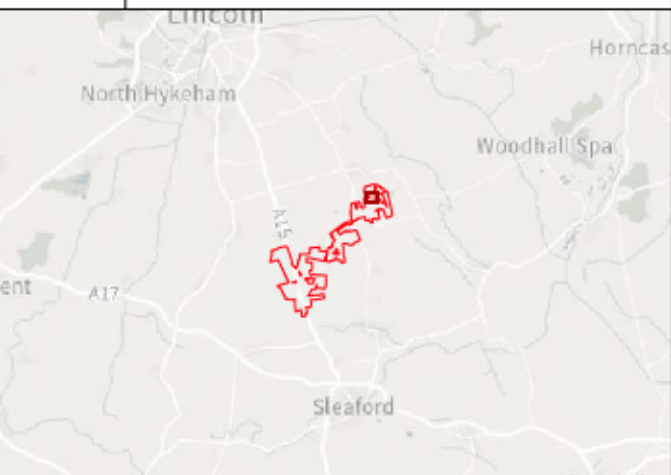
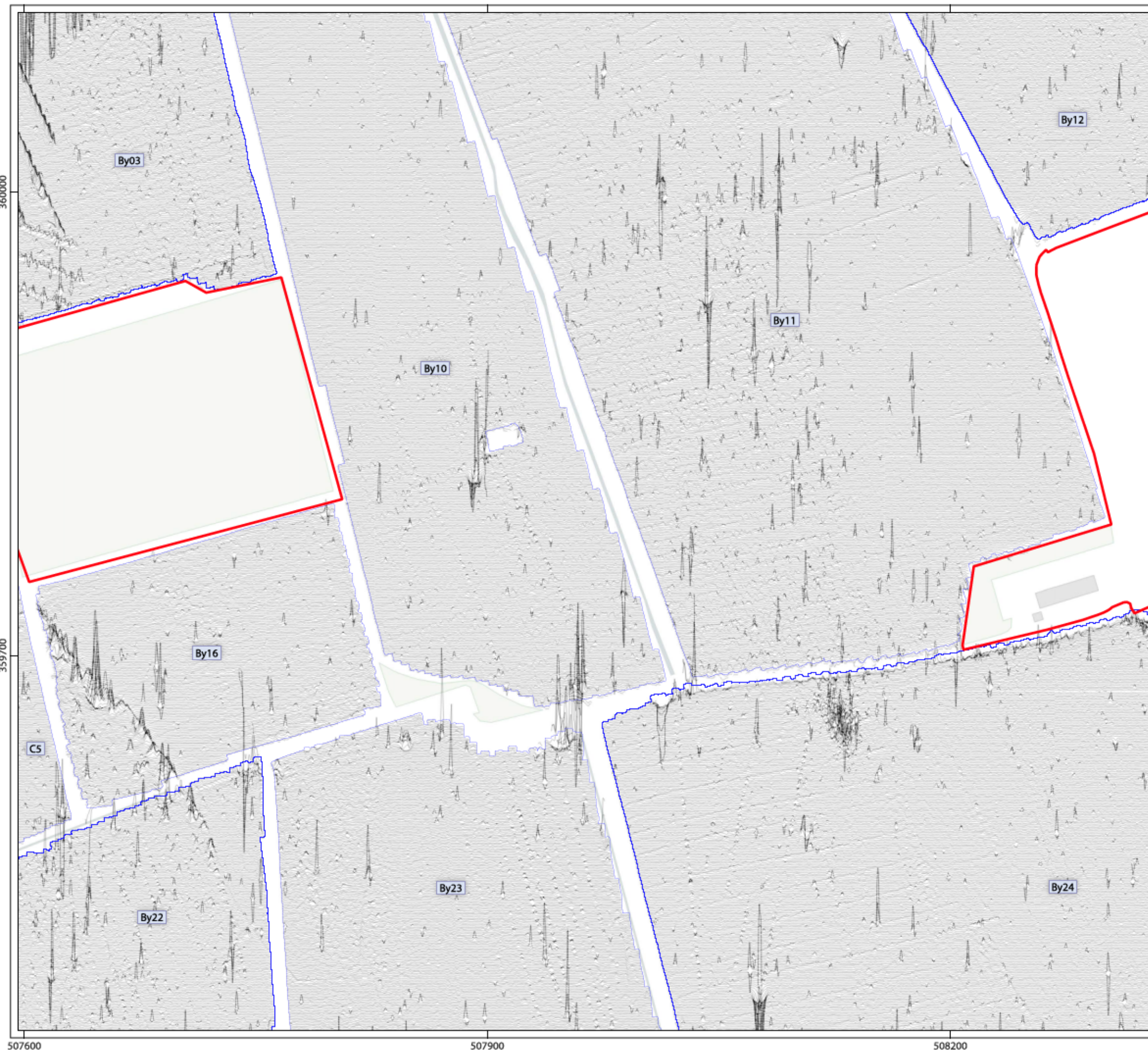
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Key

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

0 50 100 m

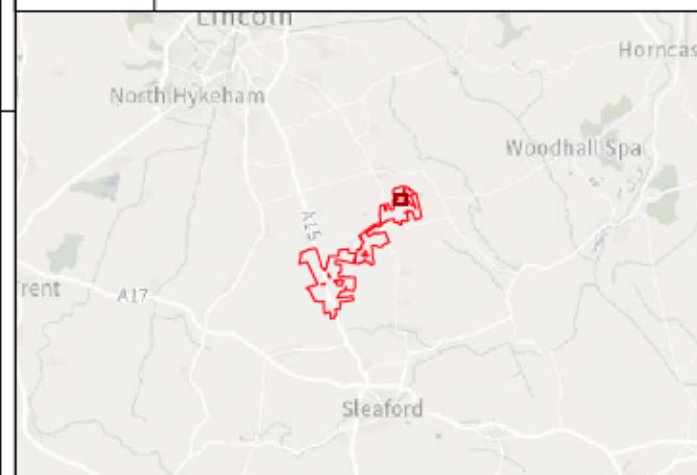
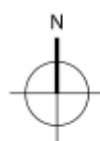
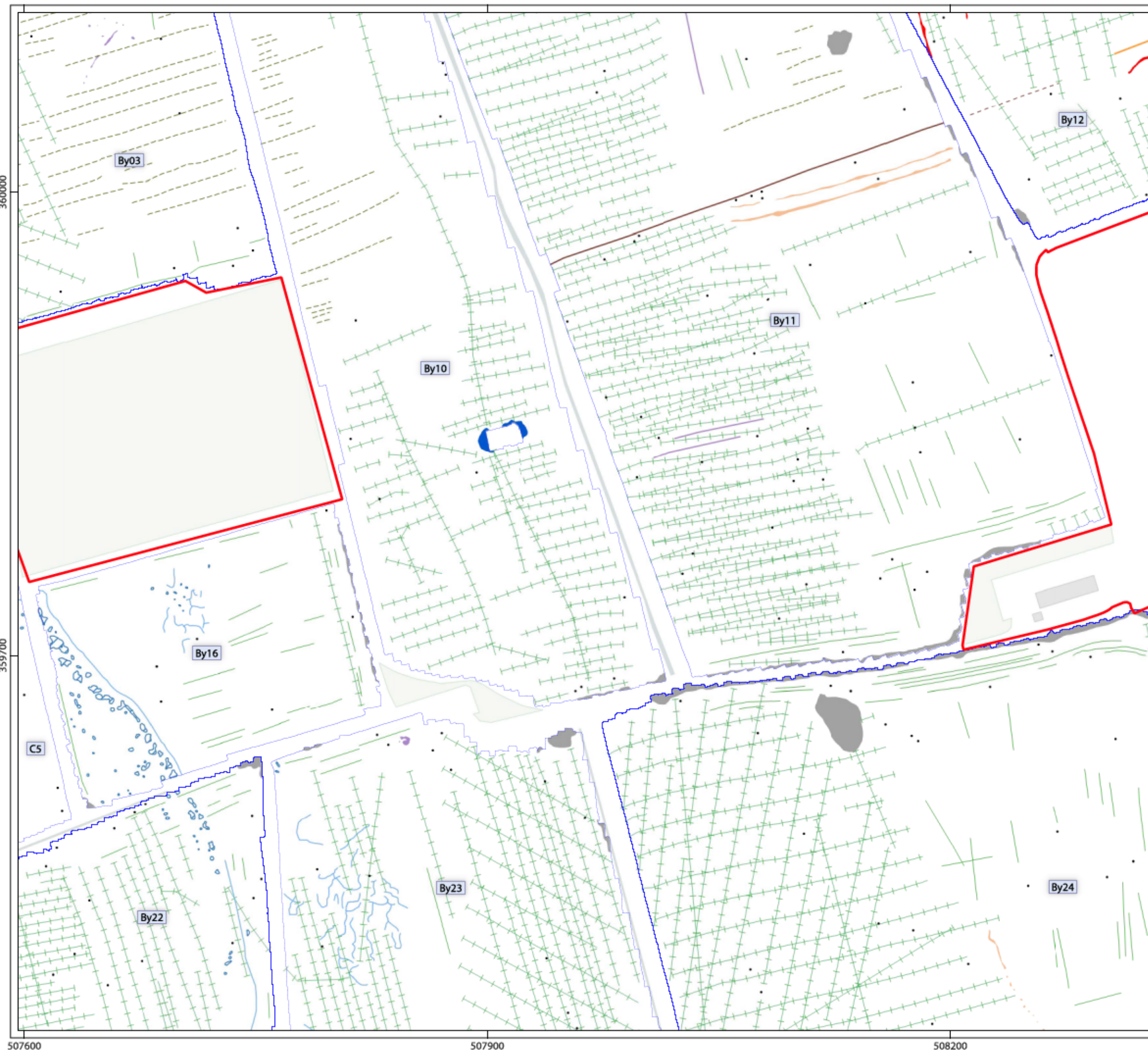
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Illus - 180 XY trace plot of minimally processed magnetometer data; Sector



Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- Field Boundary
- Possible Field Boundary
- Field Drain
- Natural
- Uncertain
- Ridge and Furrow
- Possible Archaeology
- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- Uncertain
- Former Pond
- Geology

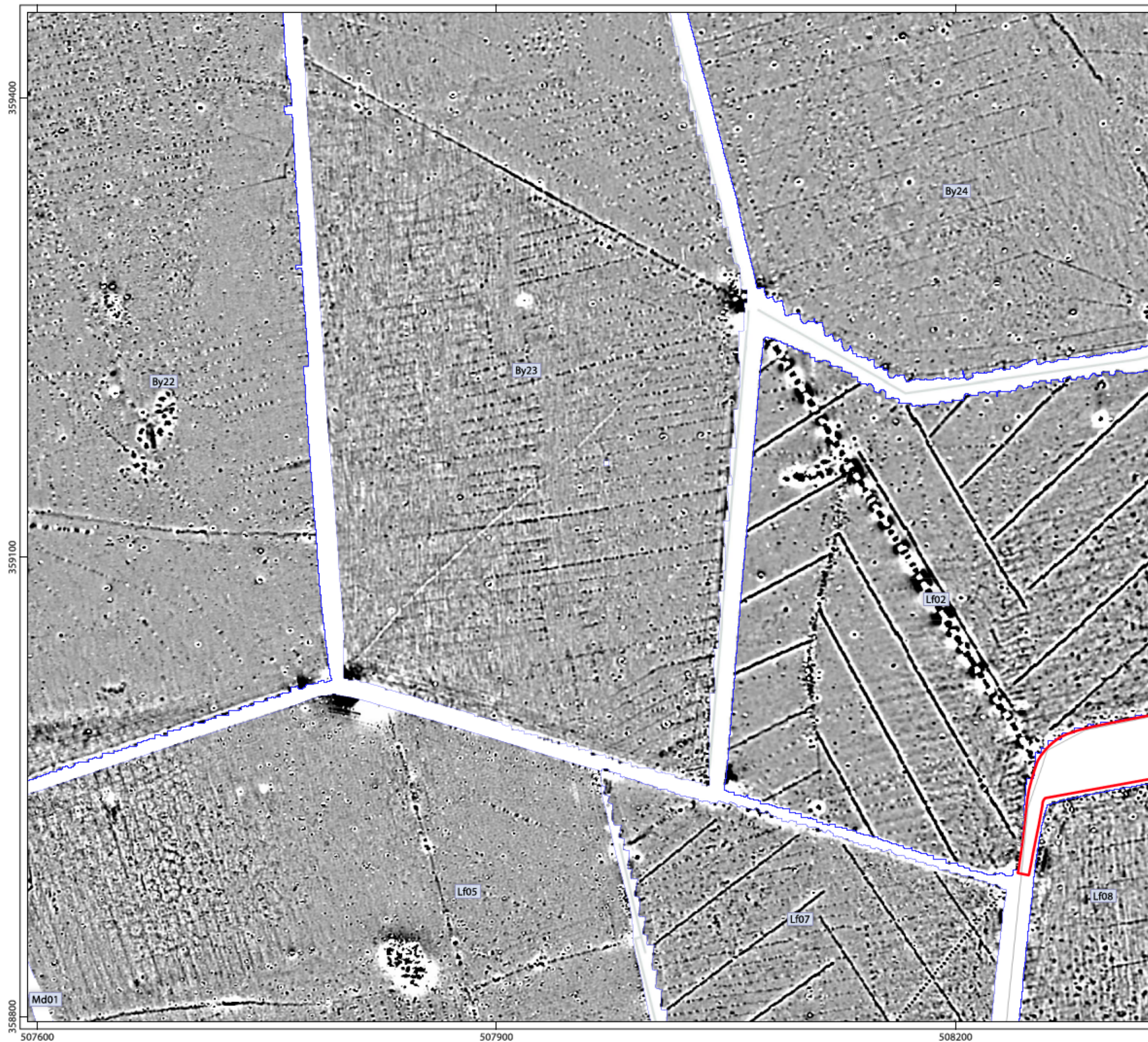
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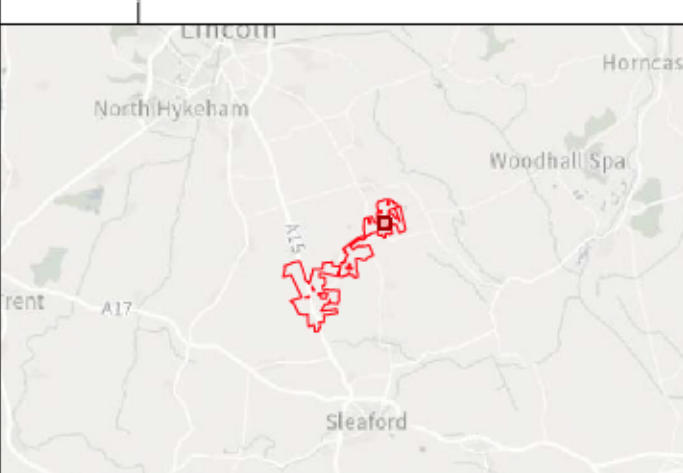







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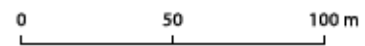


Key

- Geophysical Survey Area
- Survey Extent



+2nT
-1nT



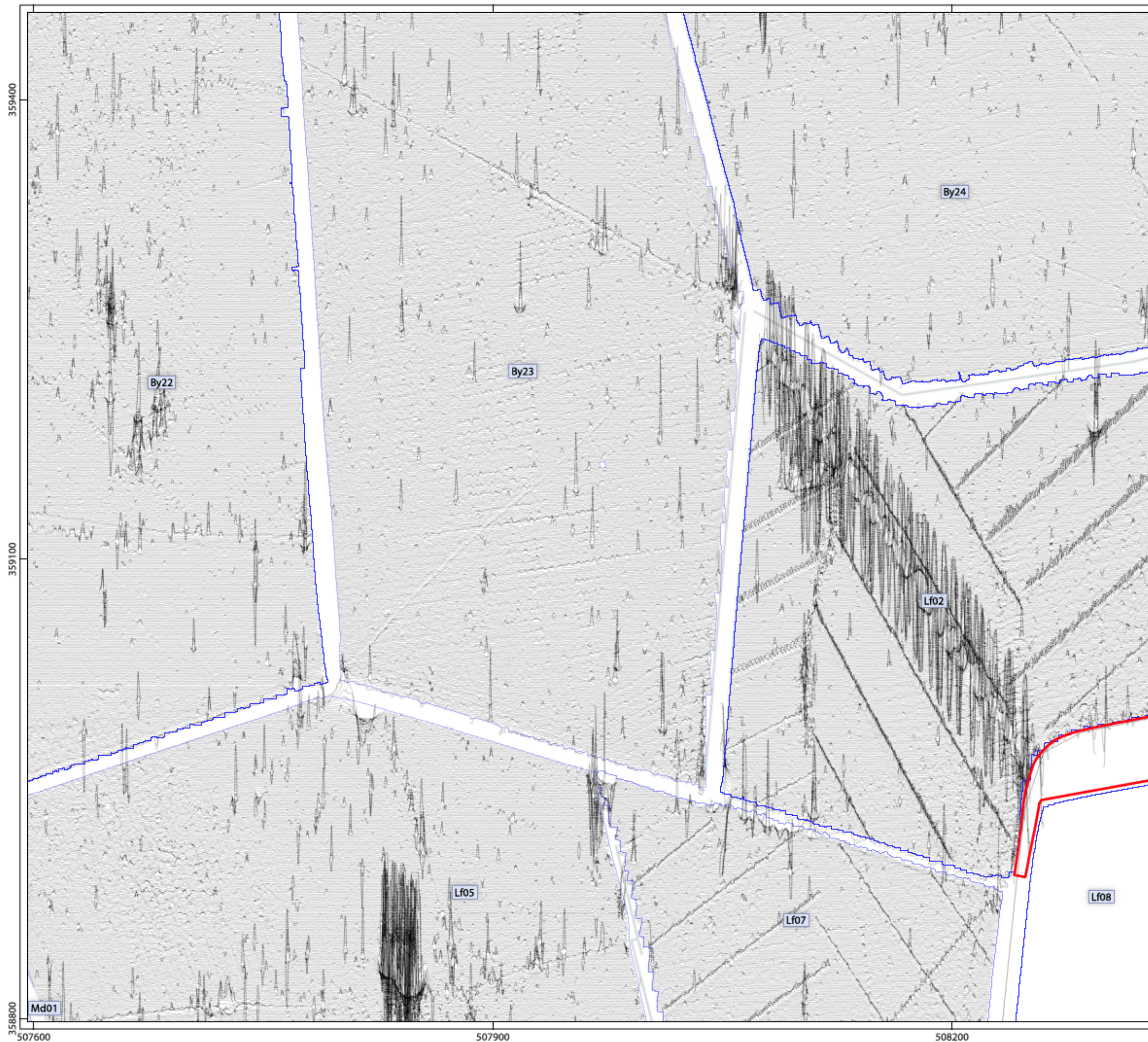
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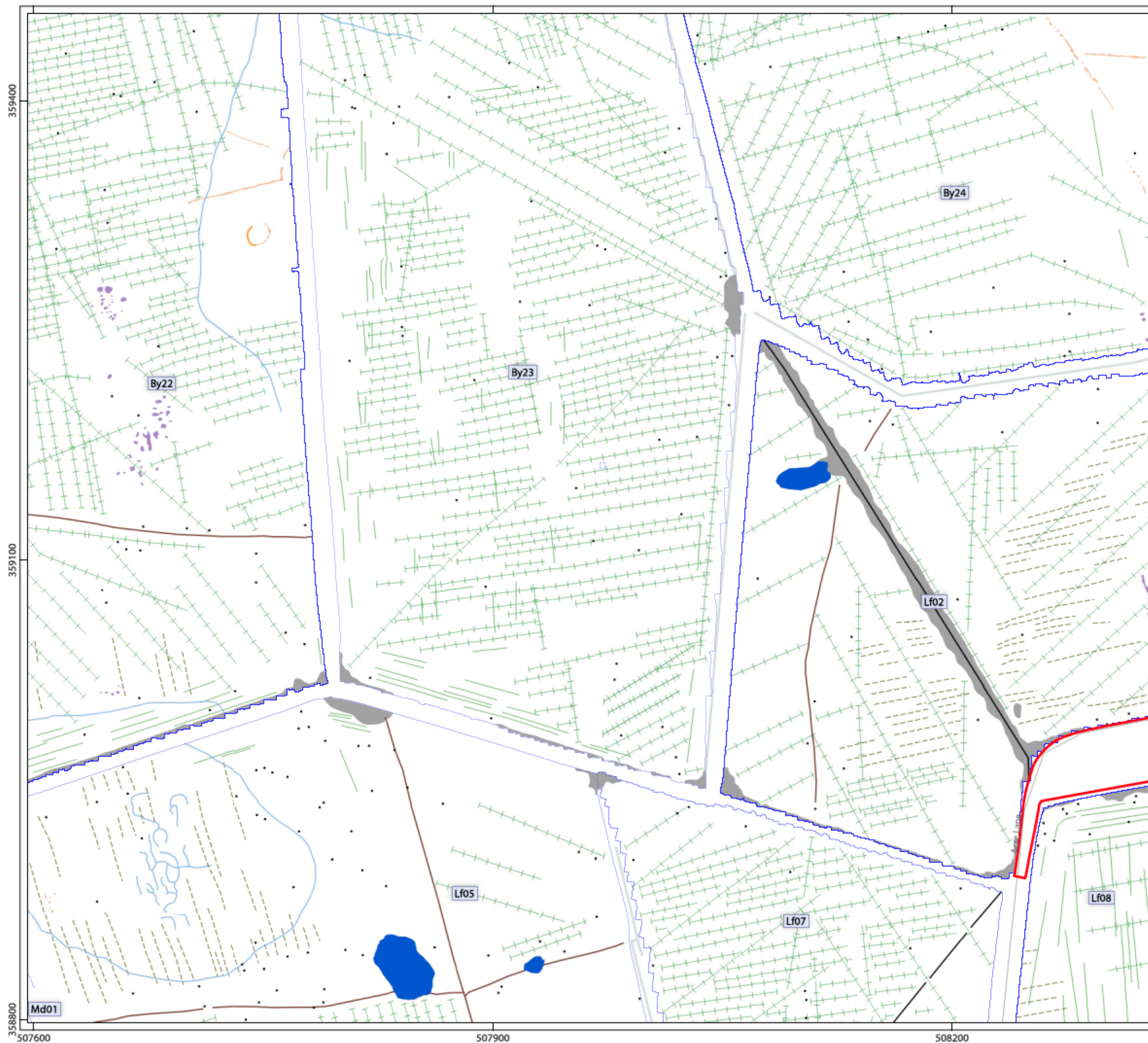
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Key


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

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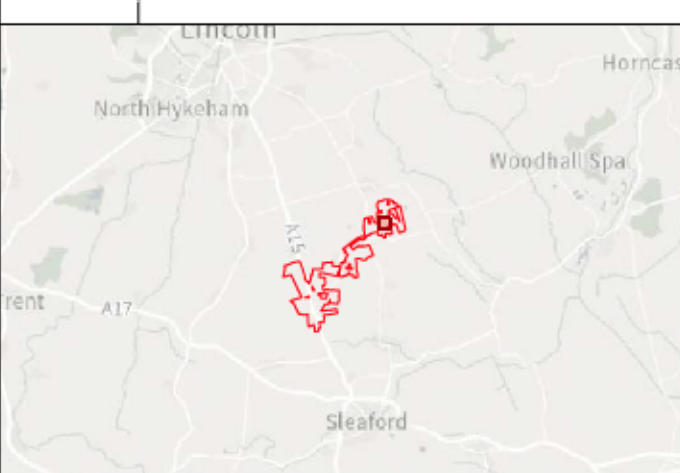
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Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- Field Boundary
- Field Drain
- Natural
- Pipe
- Ridge and Furrow
- Possible Archaeology
- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- Uncertain
- Former Pond

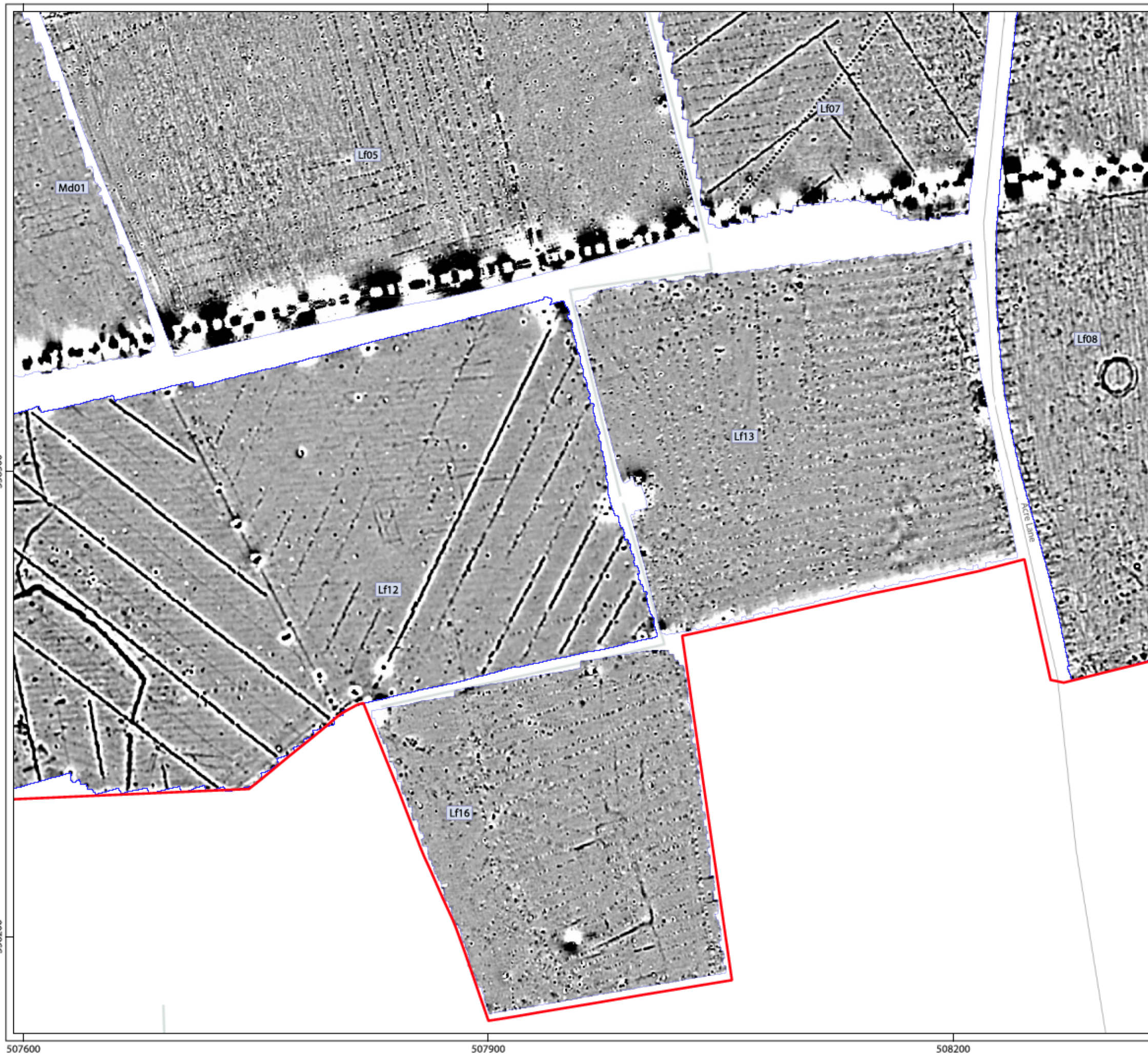
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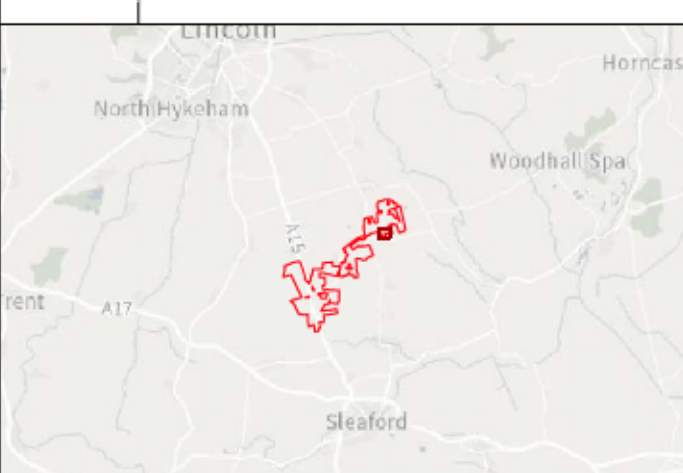
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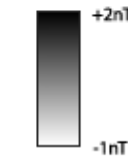


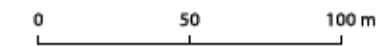
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Key

- Geophysical Survey Area
- Survey Extent





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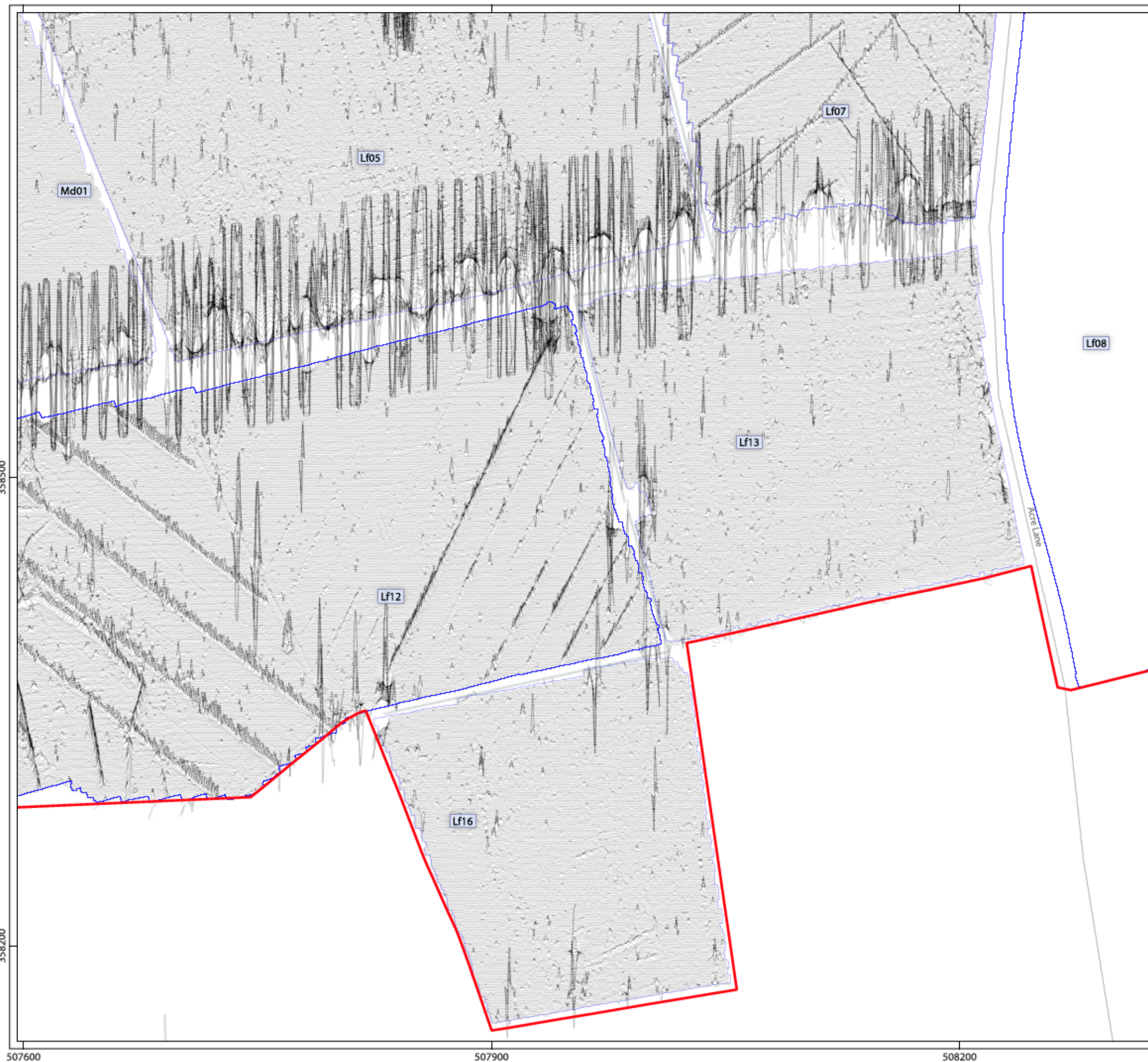
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507600 507900 508200

358200 358500

Illus - 185 XY trace plot of minimally processed magnetometer data; Sector

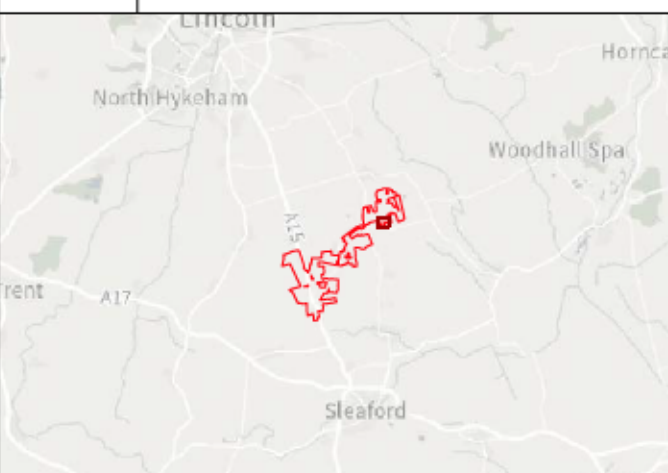






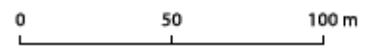
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Key

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



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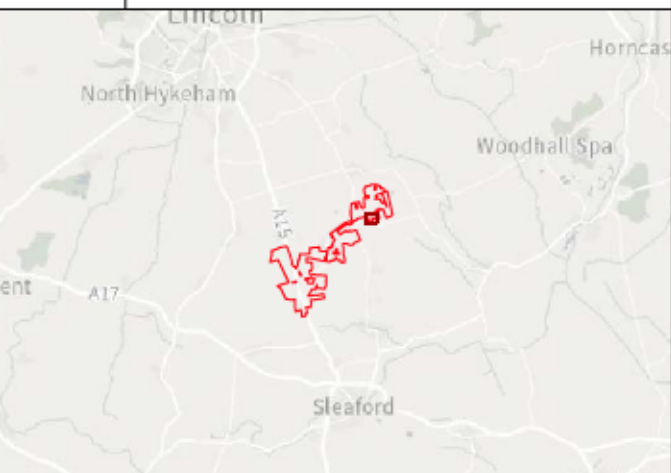
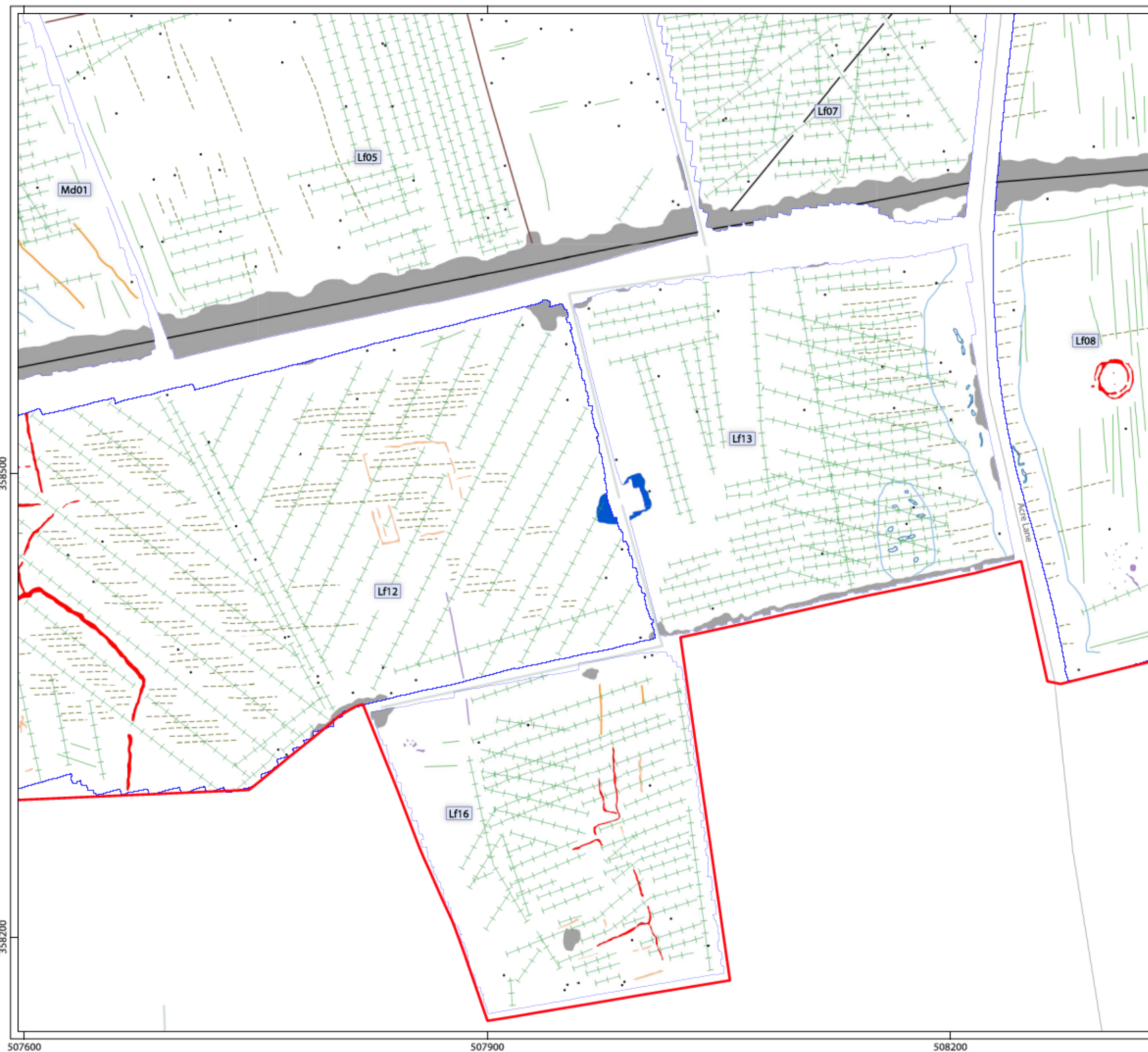
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507600 507900 508200

358200 358500



Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- Field Boundary
- Field Drain
- Natural
- Pipe
- Uncertain
- Ridge and Furrow
- Possible Archaeology
- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- Uncertain
- Former Pond
- Geology

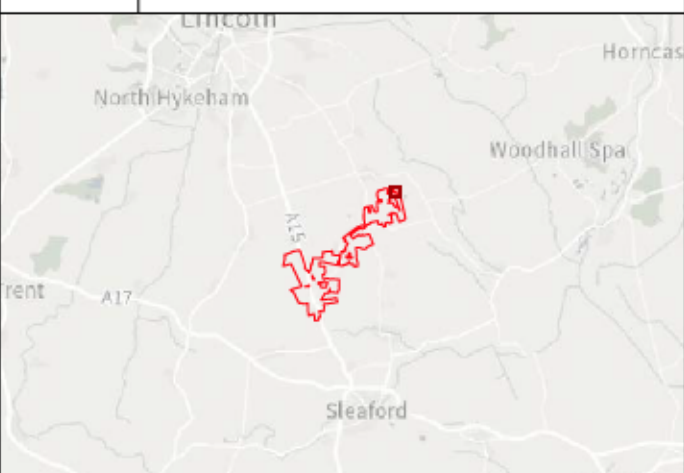
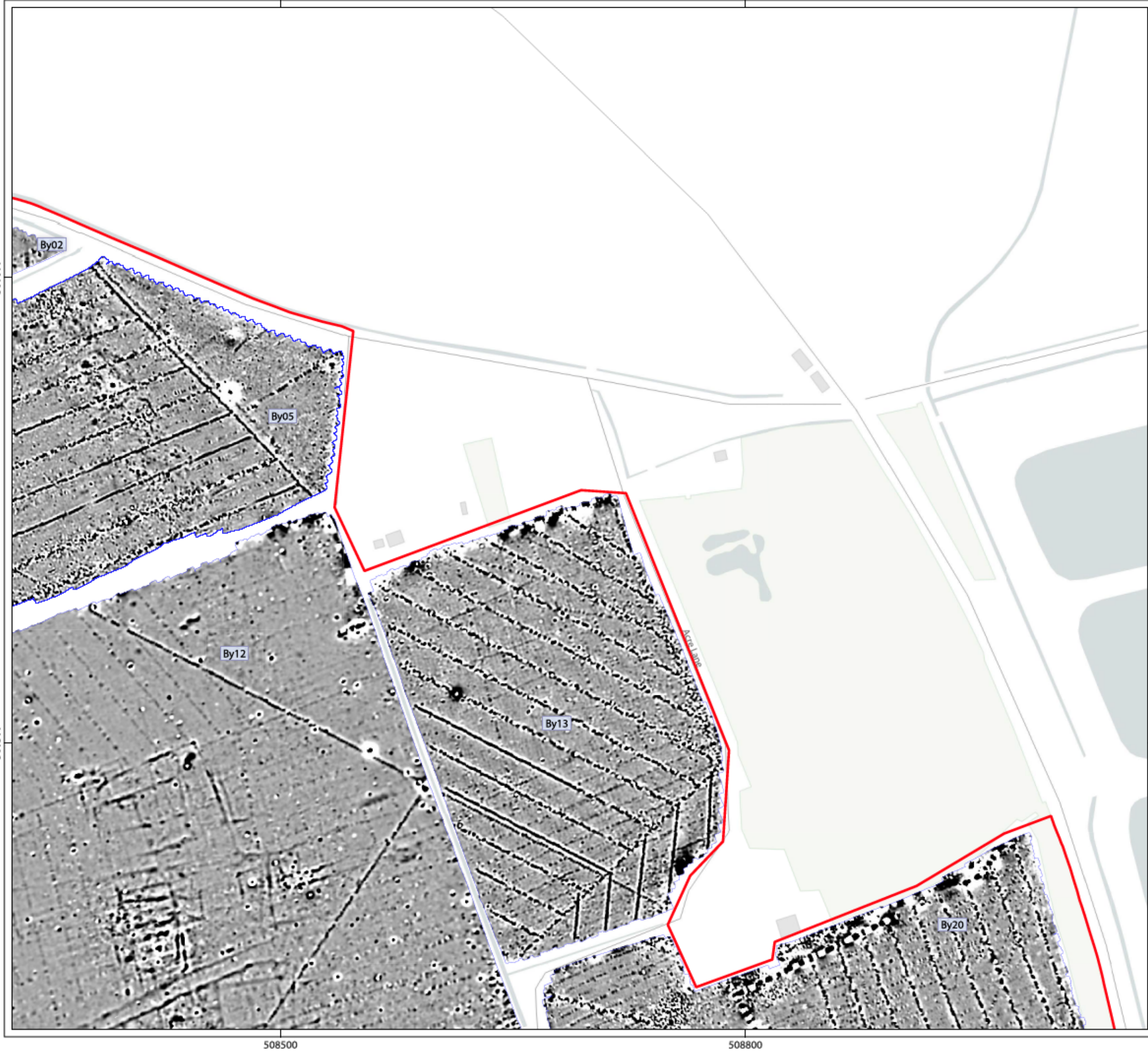
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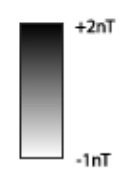
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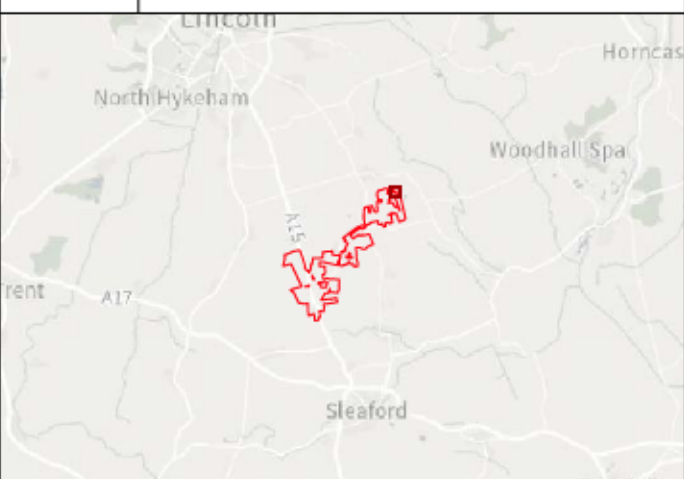
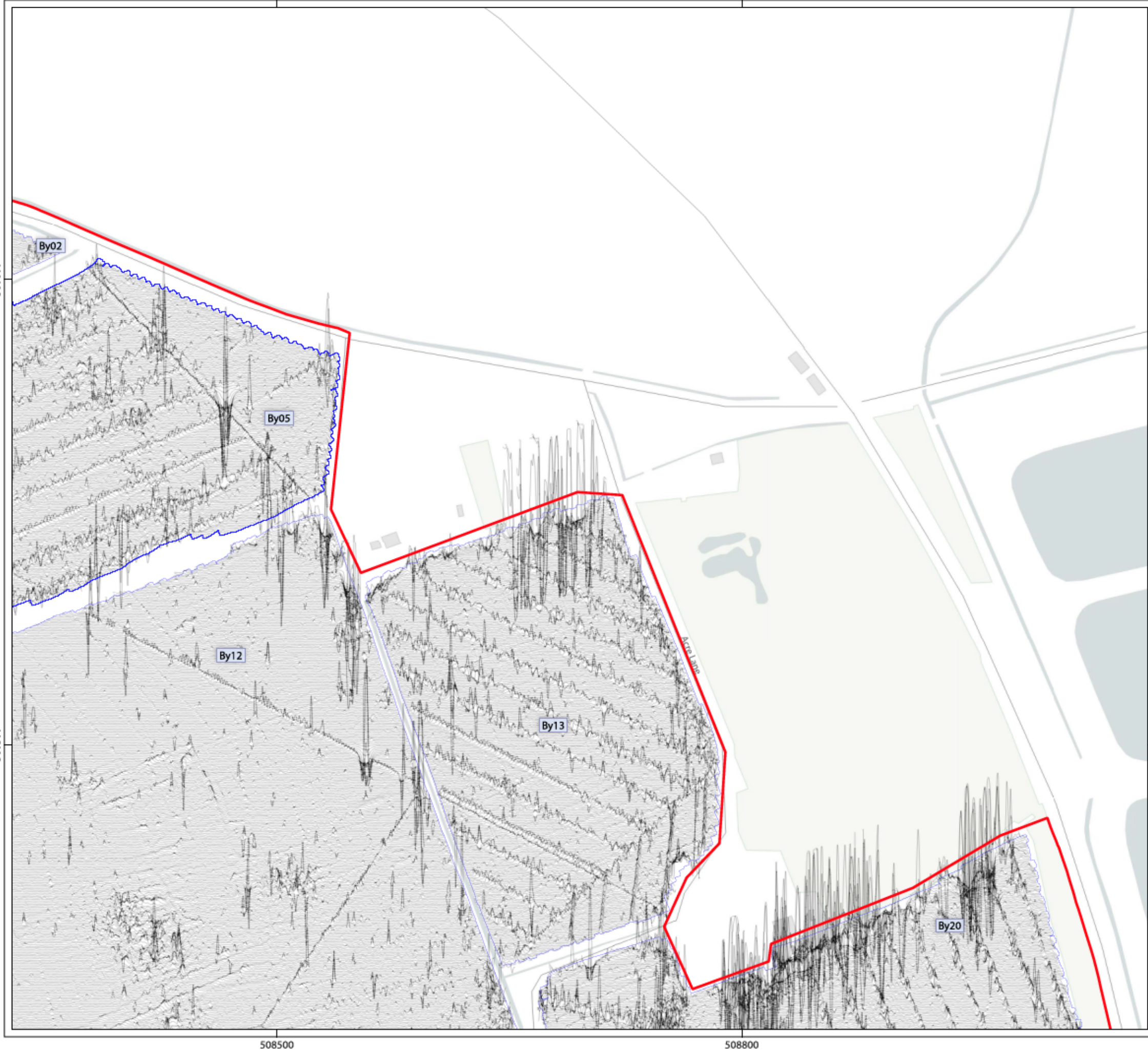
-  Geophysical Survey Area
-  Survey Extent



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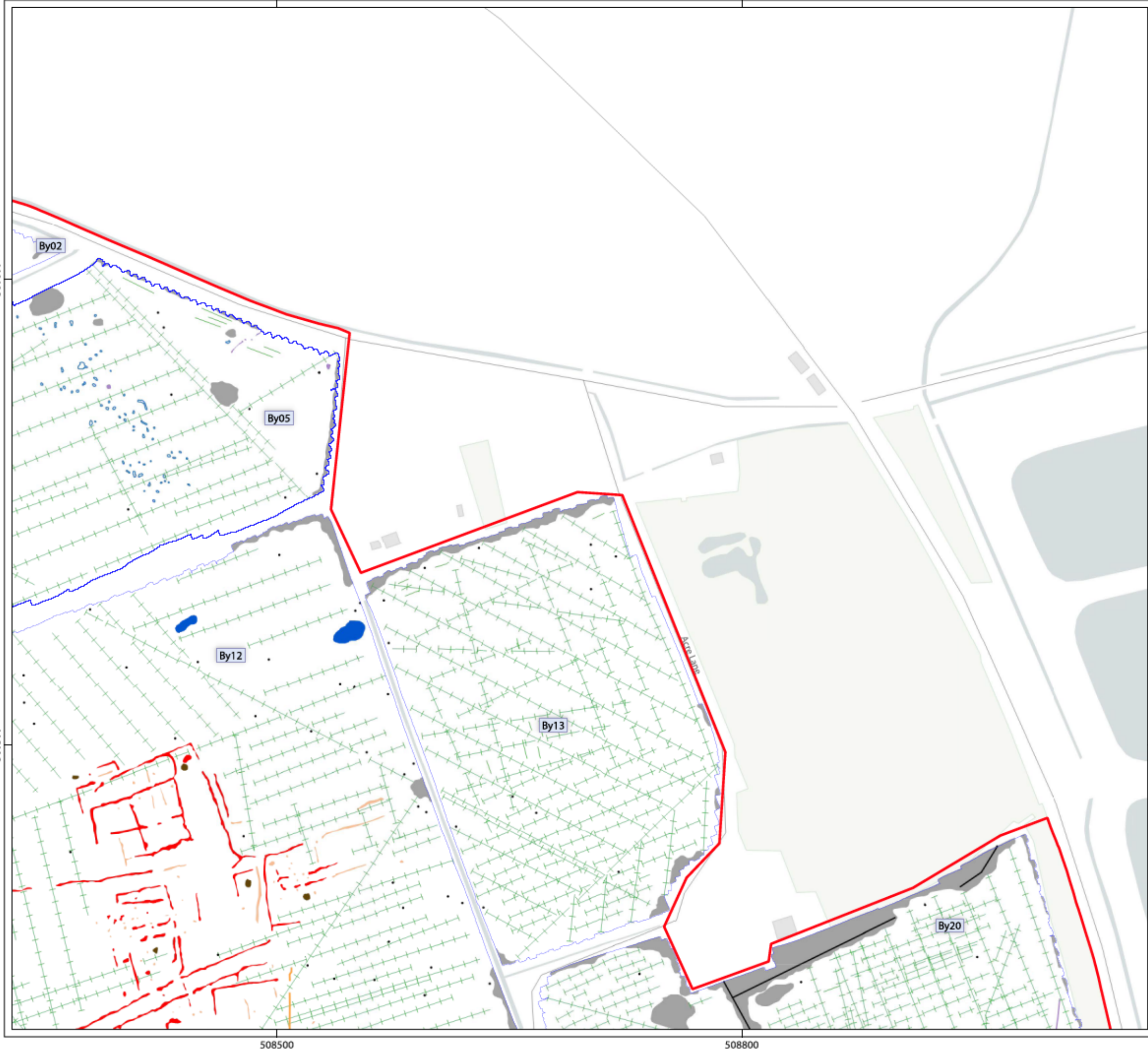




Key

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

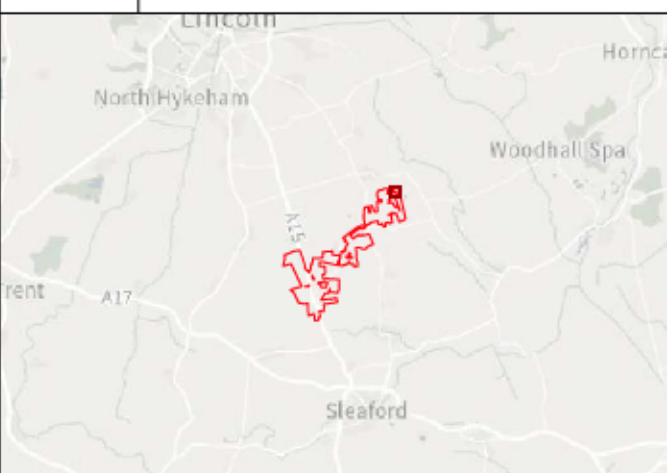
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Key

- Geophysical Survey Area
- Survey Extent
- Interpretation**
- Ferrous Objects
- Agriculture
- Field Drain
- Pipe
- Uncertain
- Possible Archaeology
- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- Uncertain
- Former Pond
- Geology
- Burning

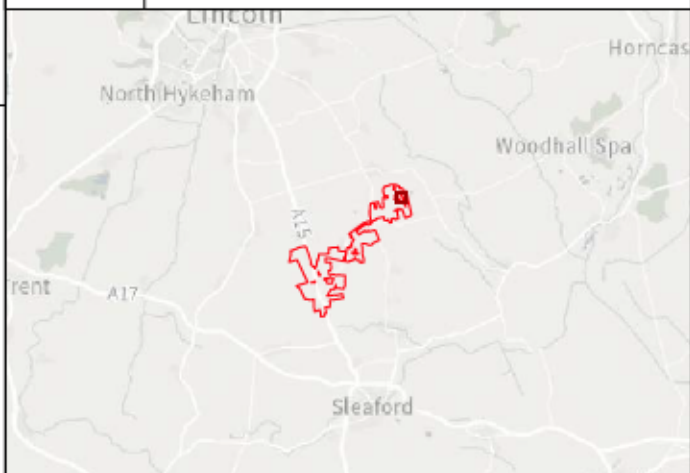
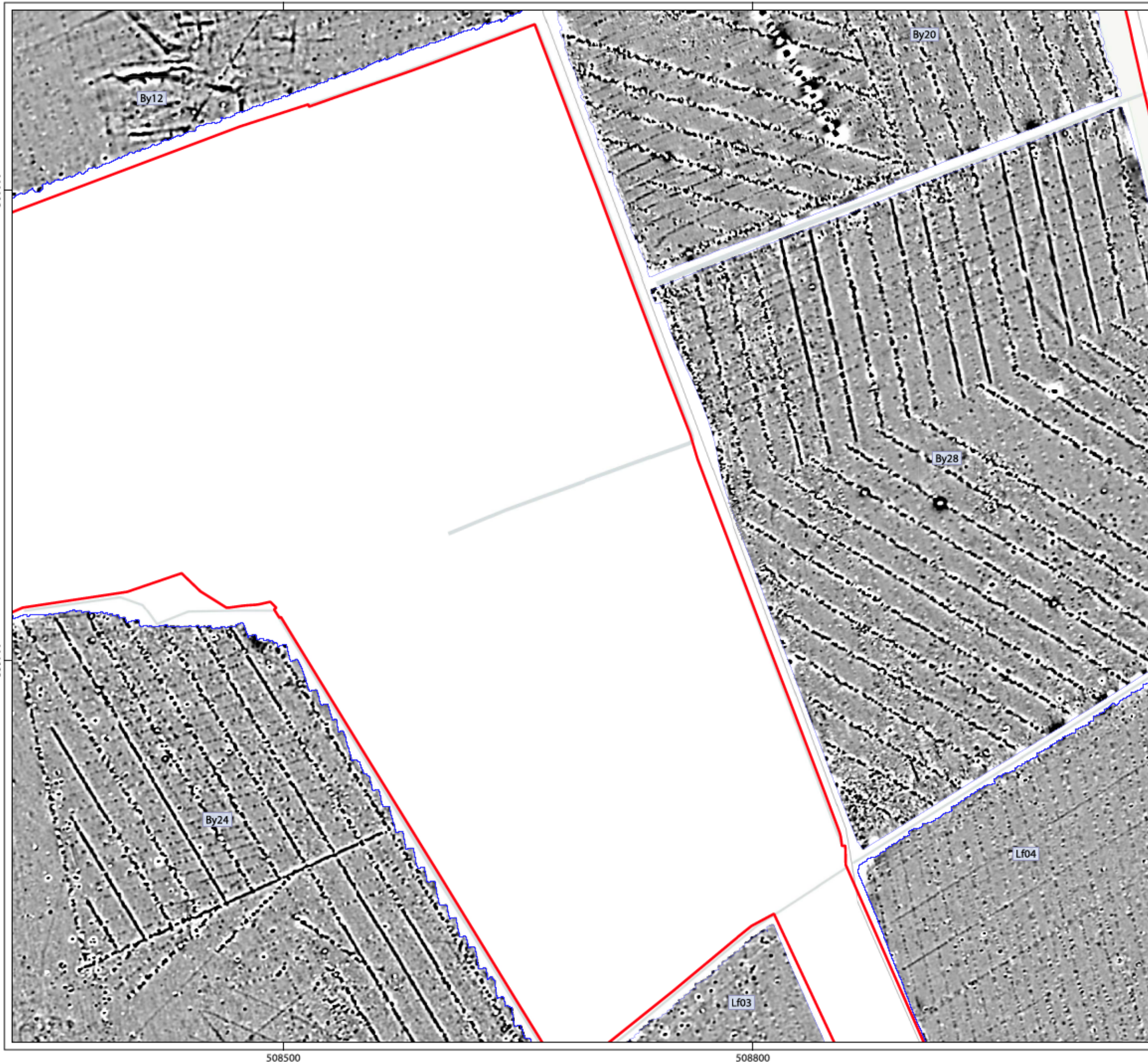
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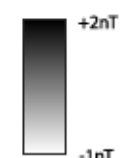
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508800



Key

- Geophysical Survey Area
- Survey Extent



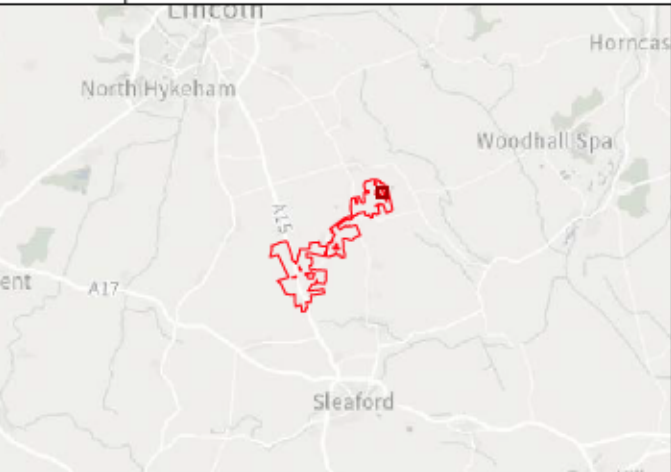
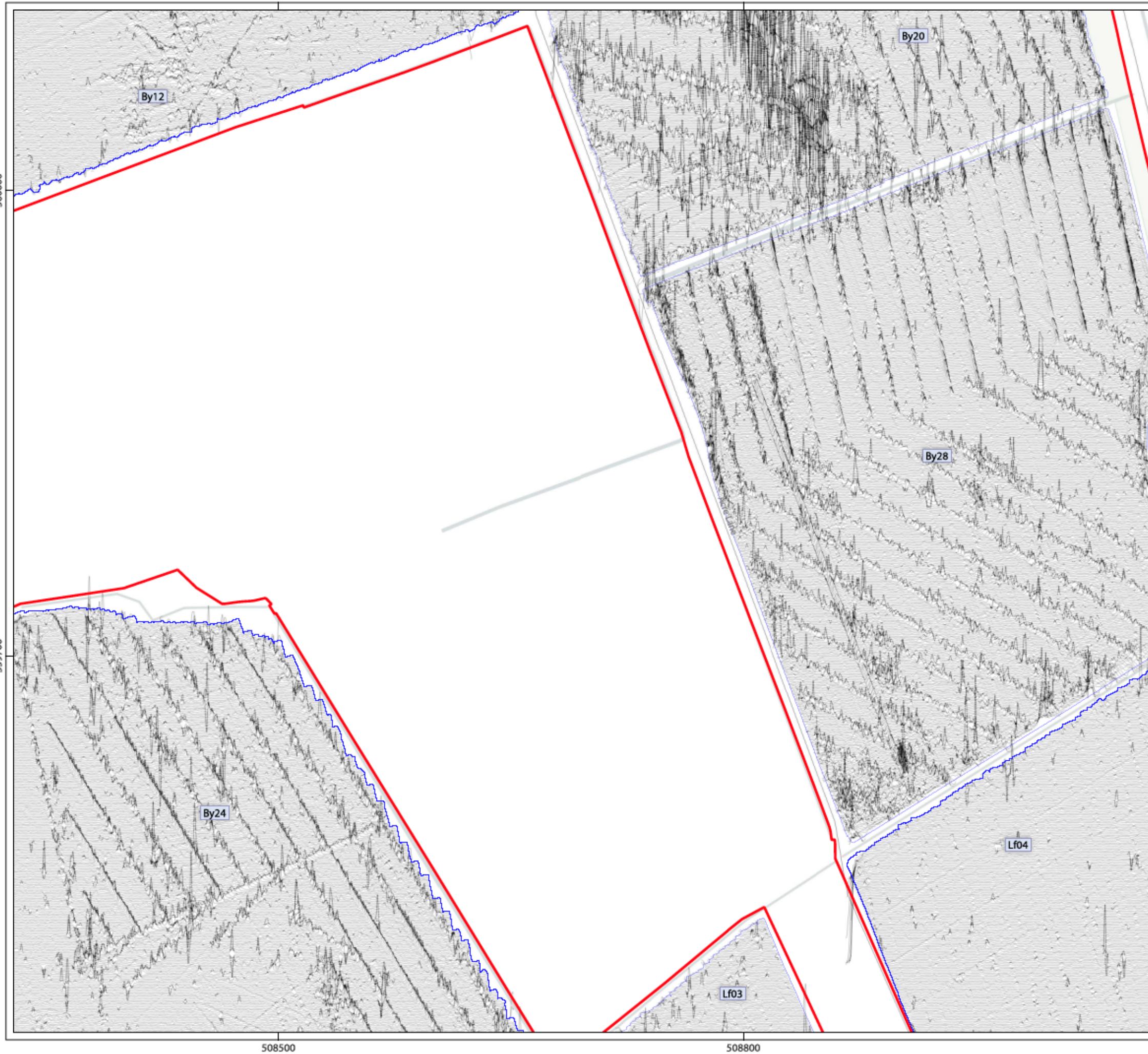
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Key

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

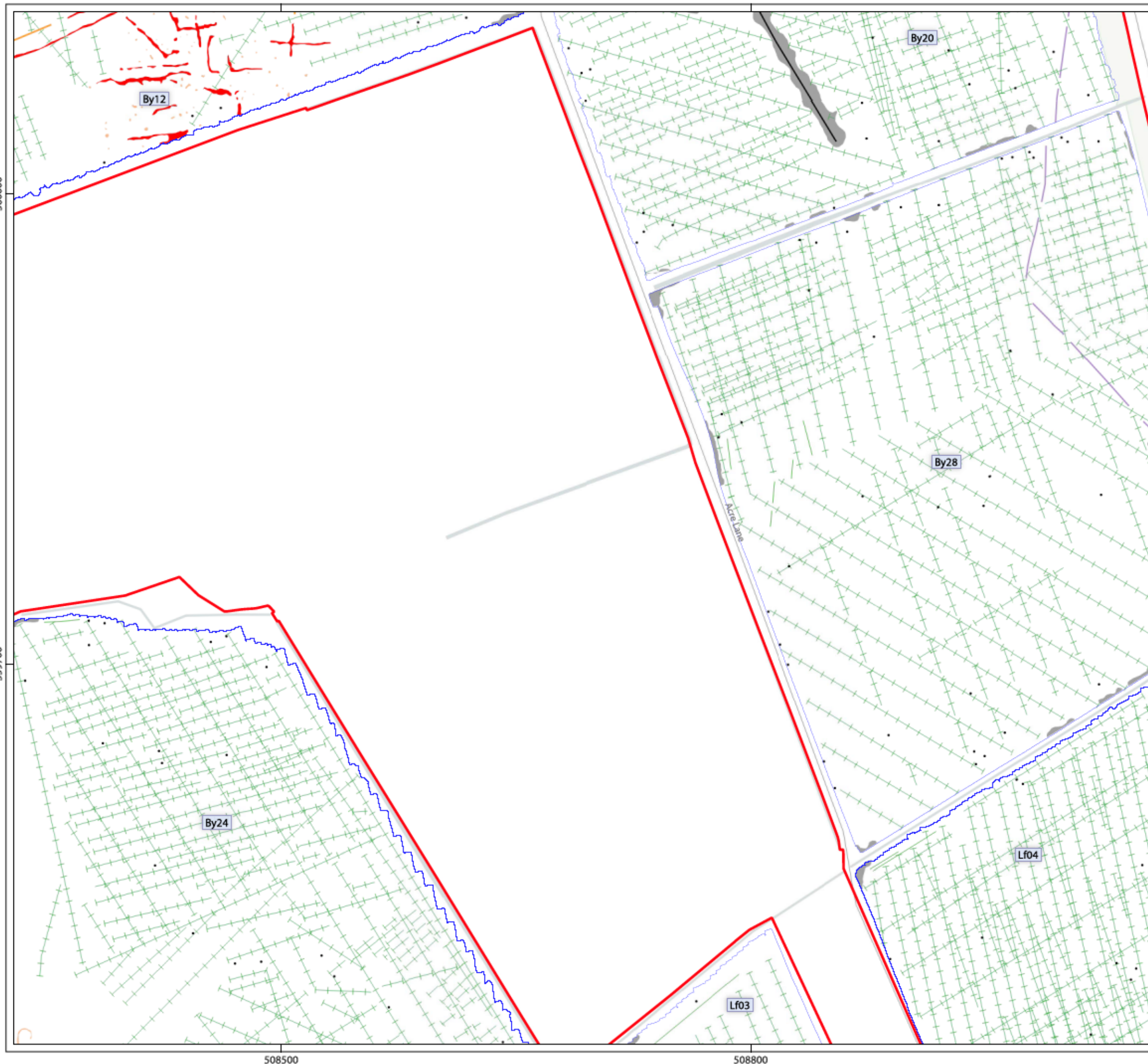
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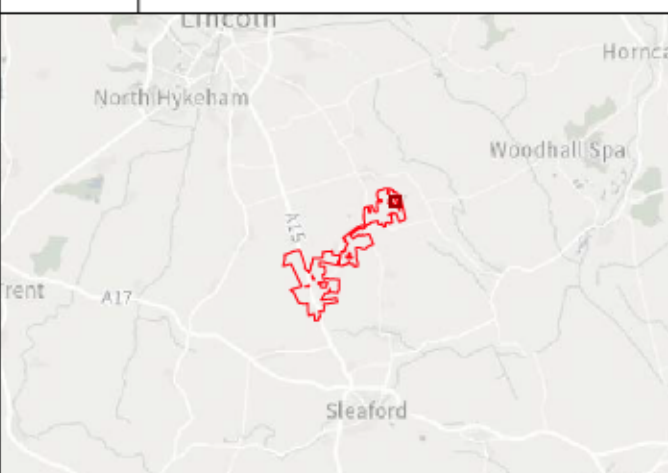
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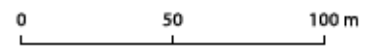


Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- Field Drain
- Pipe
- Uncertain
- Possible Archaeology
- Archaeology
- Magnetic Disturbance
- Possible Archaeology

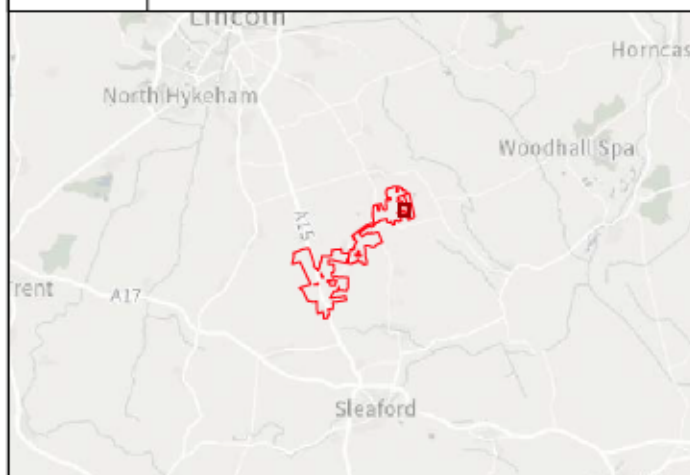


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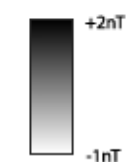
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Key

- ▬ Geophysical Survey Area
- ▬ Survey Extent



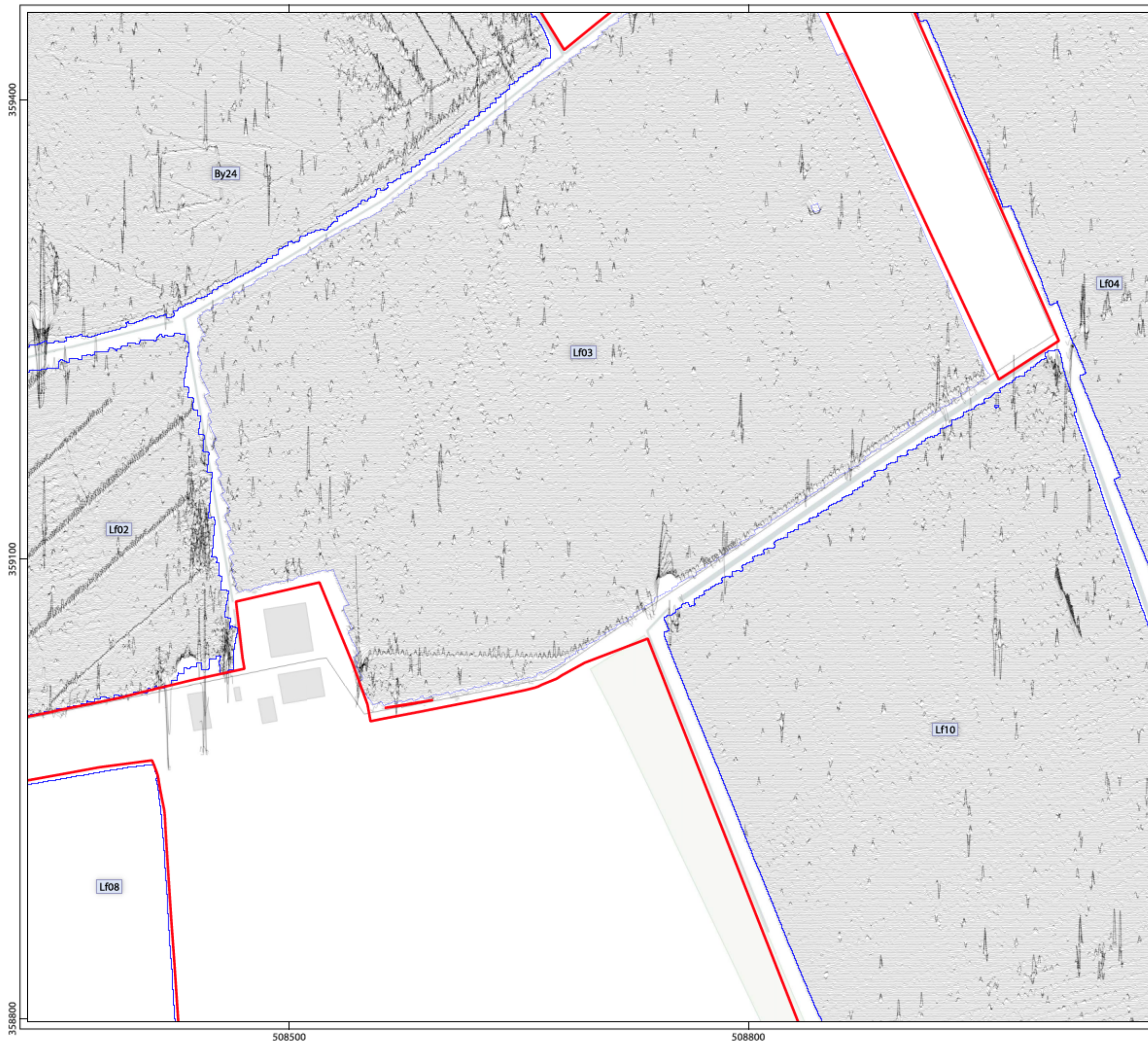
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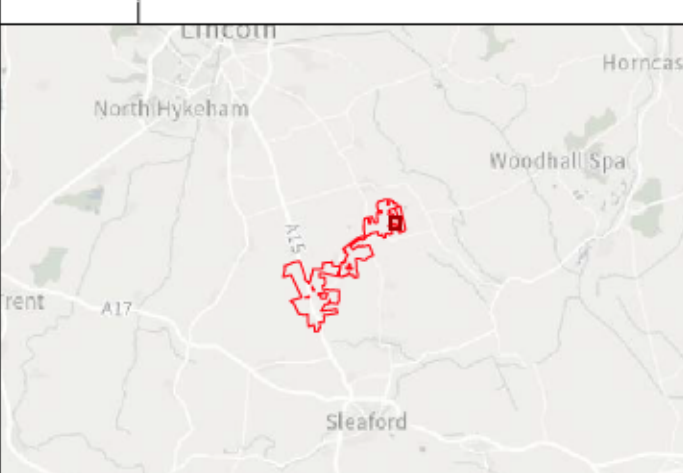


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Key

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

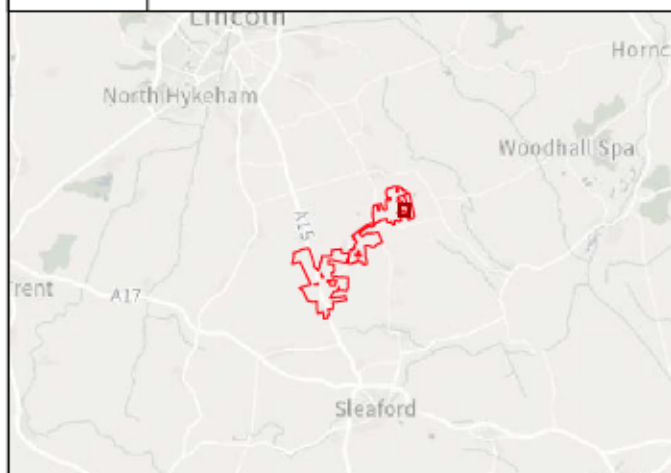
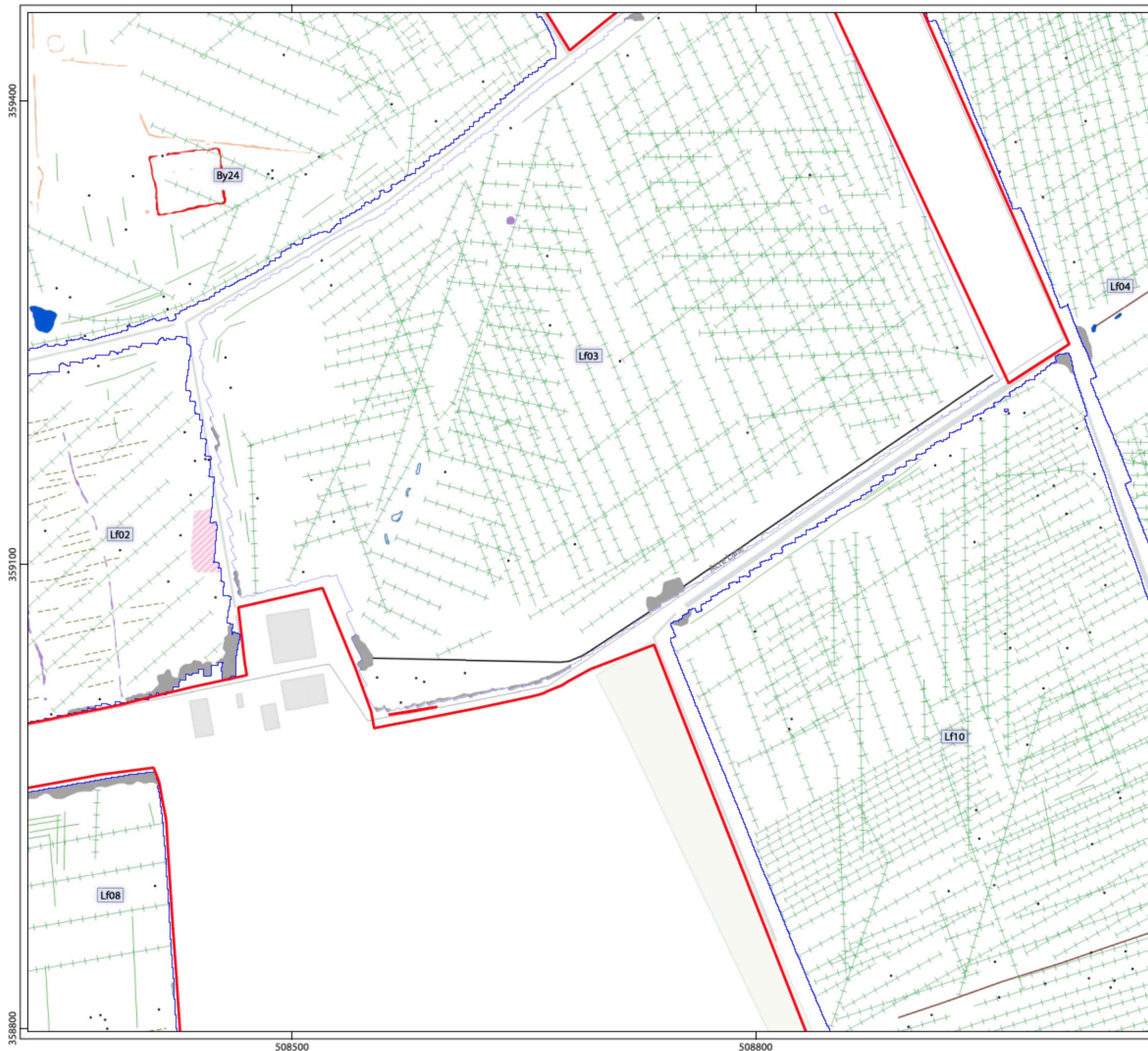
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Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- Field Boundary
- + Field Drain
- Pipe
- Ridge and Furrow
- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- Quarry
- Uncertain
- Former Pond
- Geology

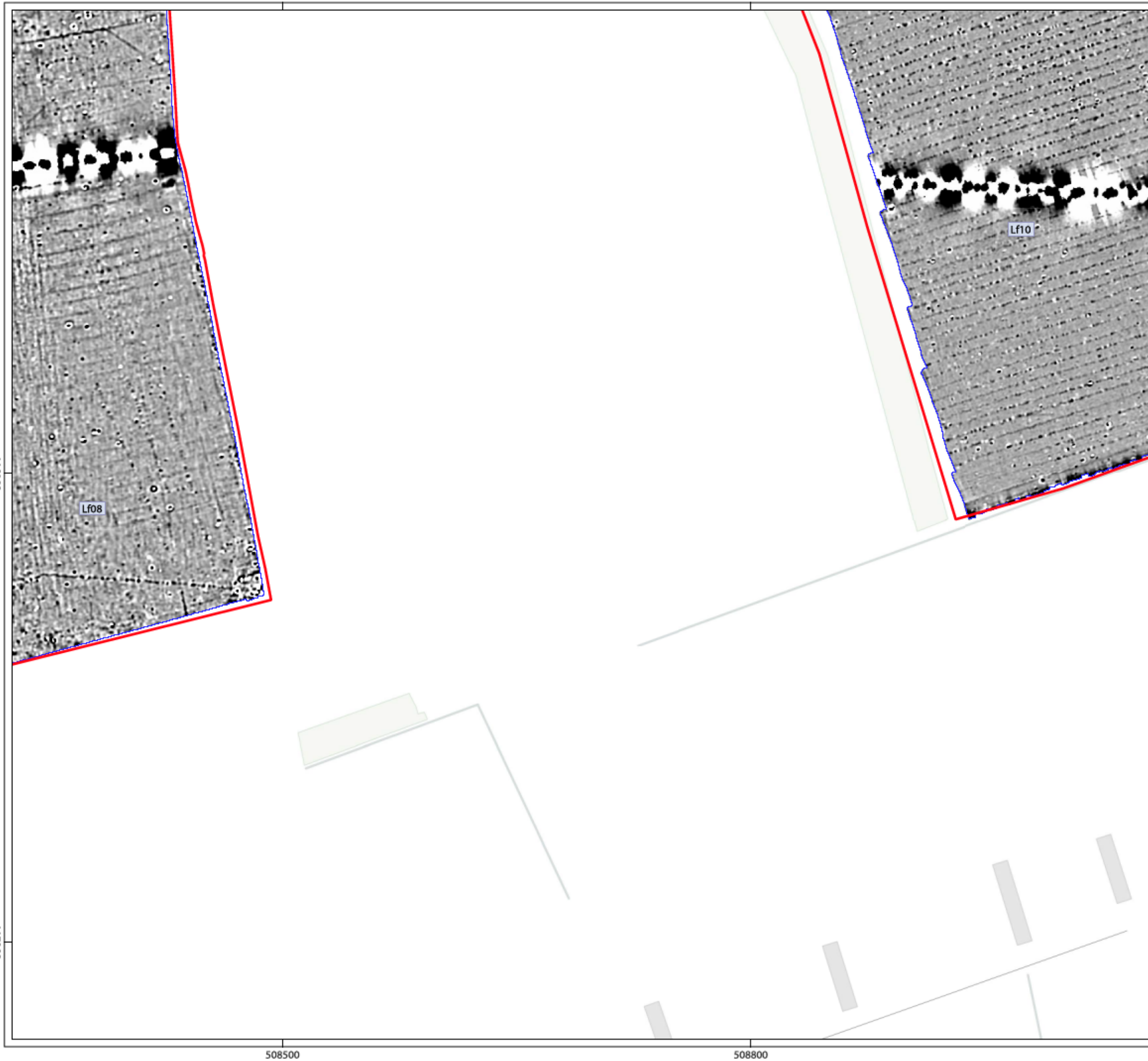
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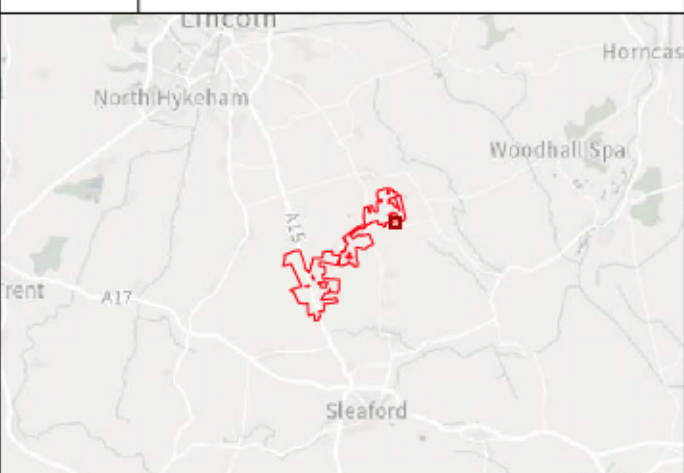
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Key

Geophysical Survey Area

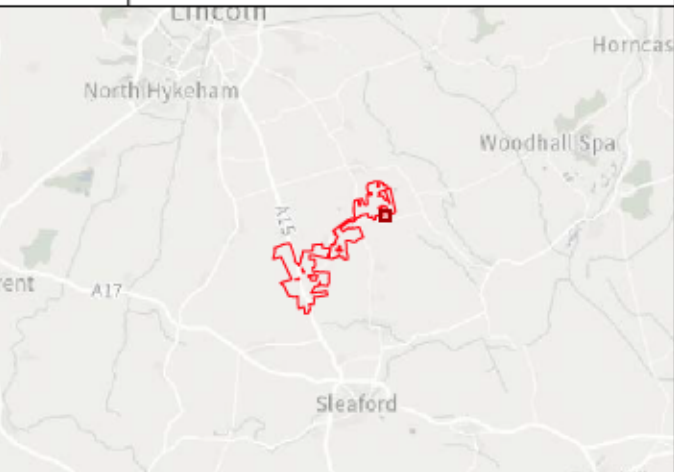
Survey Extent

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Key

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- Survey Extent
- XY Trace (25nT/cm)

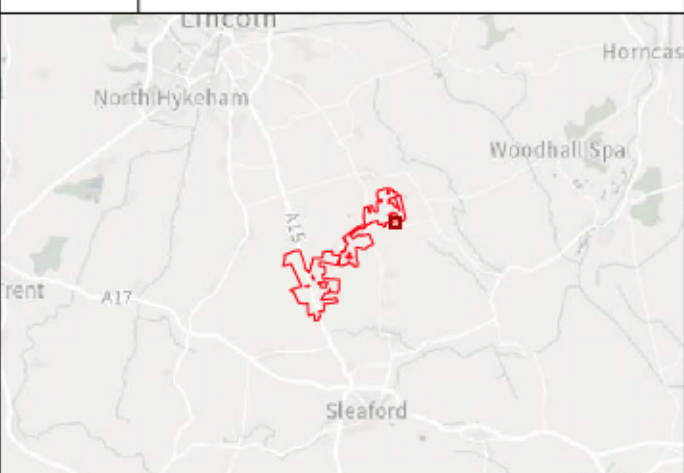
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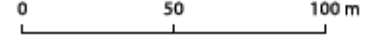
Key

 Geophysical Survey Area

 Survey Extent

Interpretation

-  Ferrous Objects
-  Agriculture
-  Field Drain
-  Pipe
-  Ridge and Furrow
-  Magnetic Disturbance
-  Uncertain



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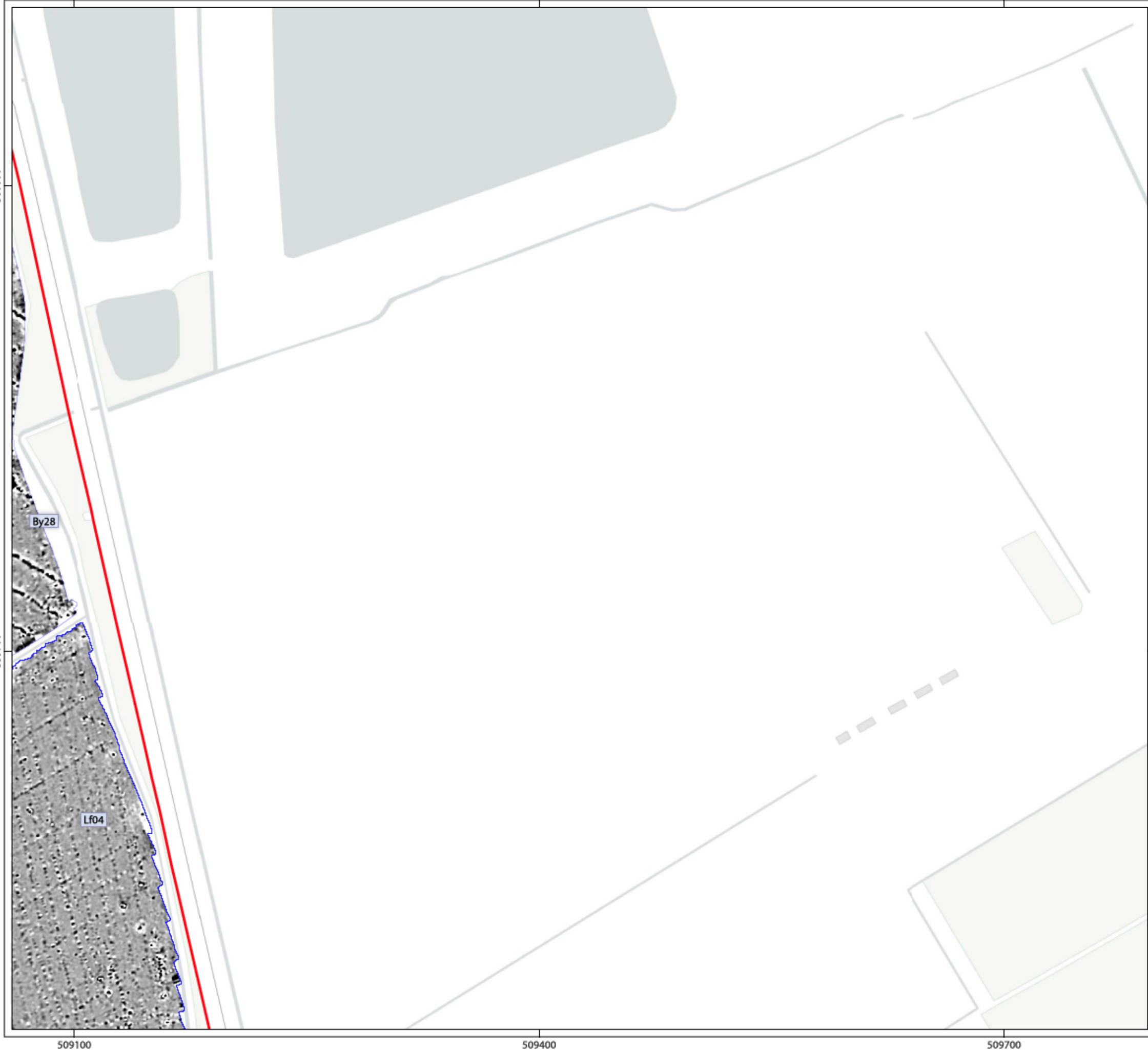
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358500

358200

508500

508800



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Key

- Geophysical Survey Area
- Survey Extent

+2nT
-1nT

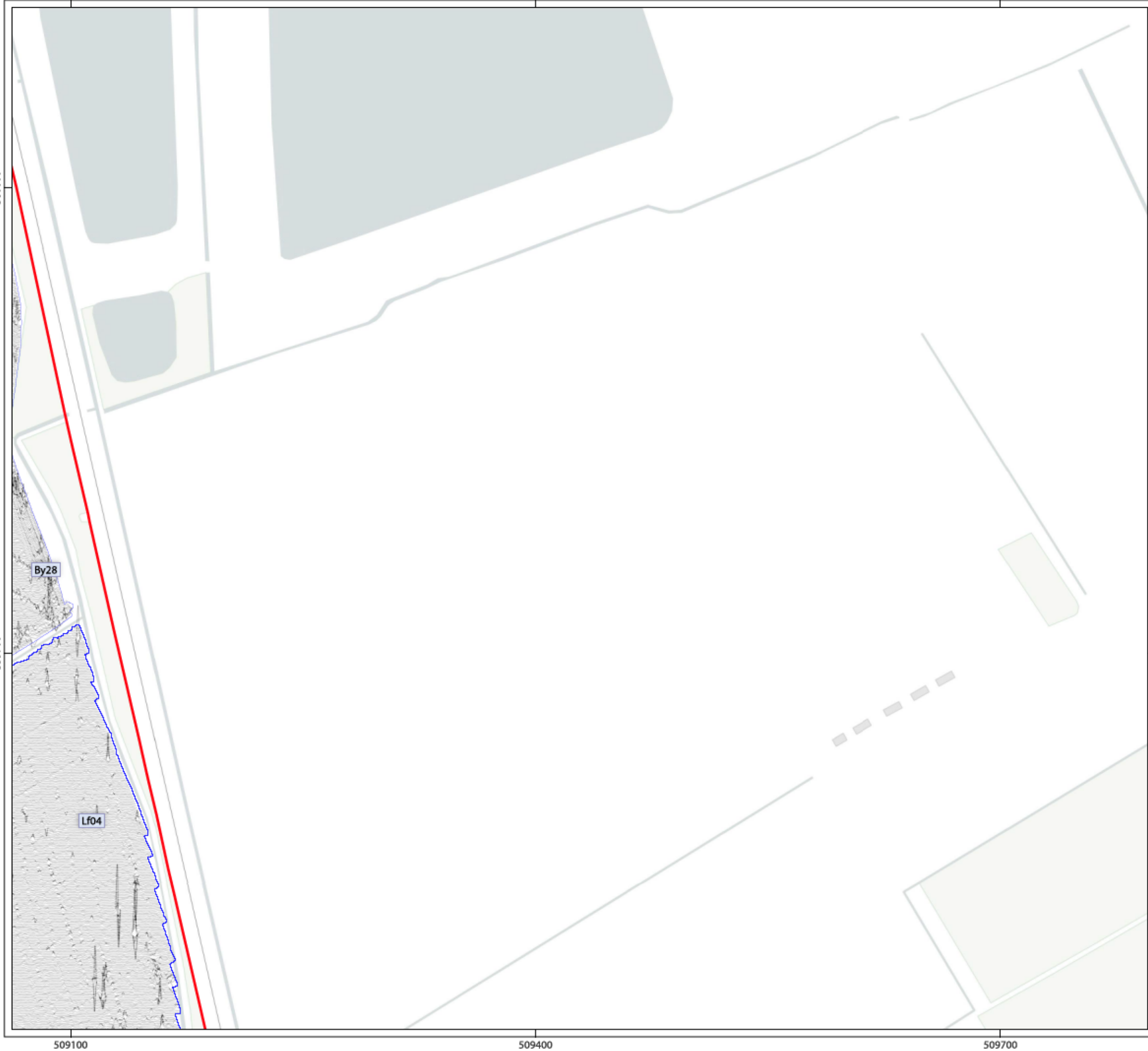
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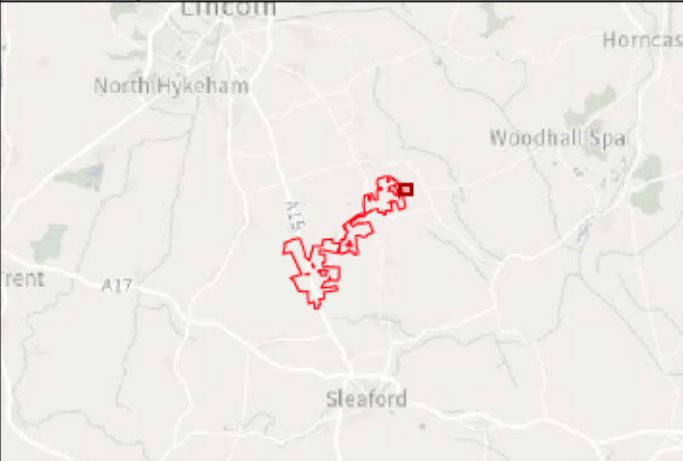









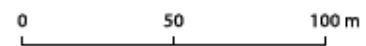
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Key


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




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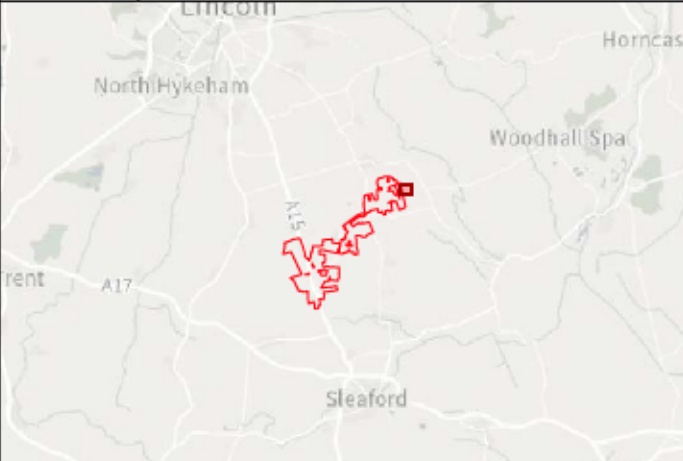








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Key


 Geophysical Survey Area


 Survey Extent

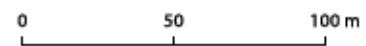
Interpretation

 Ferrous Objects

 Agriculture

 Field Drain

 Magnetic Disturbance

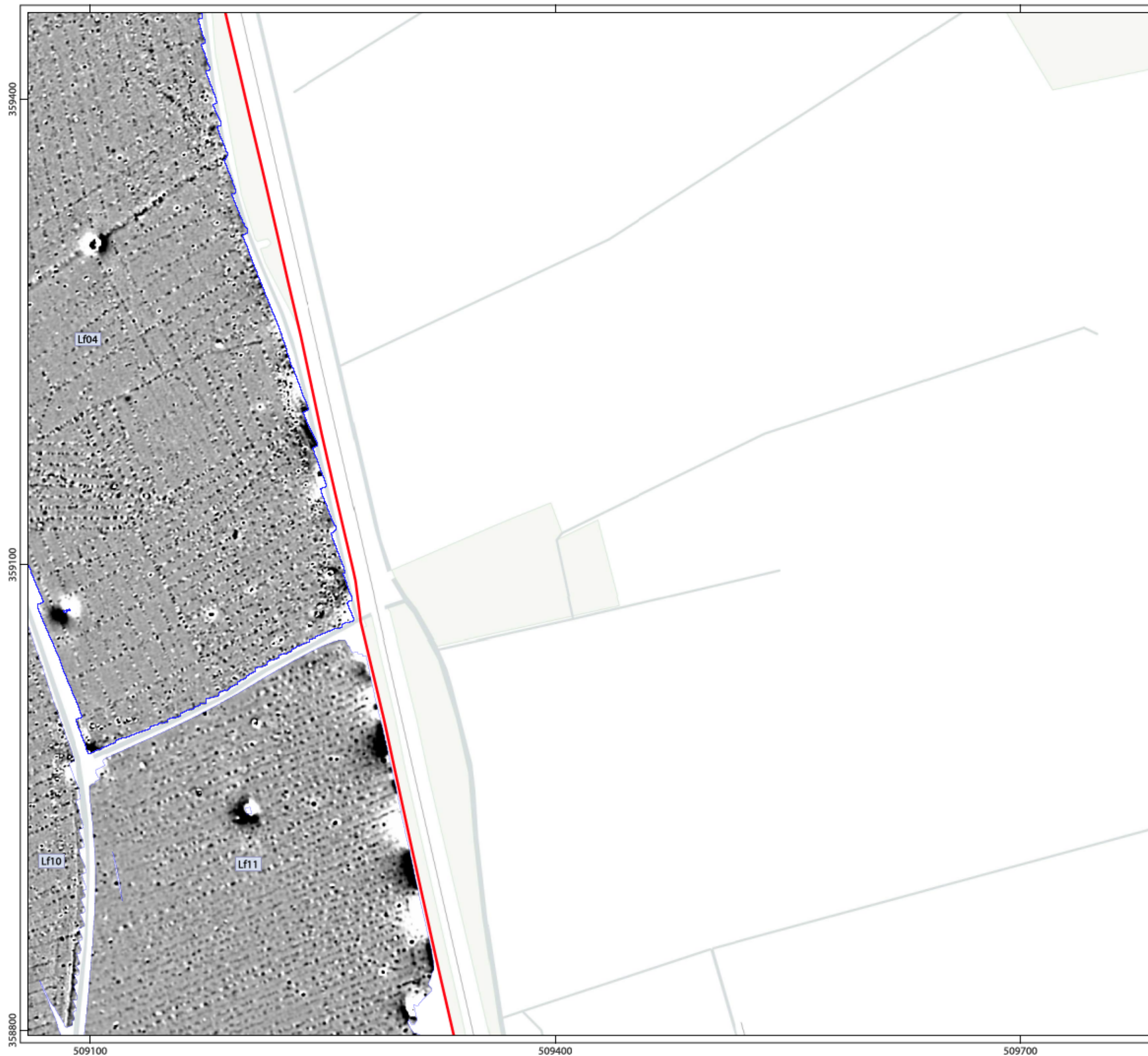


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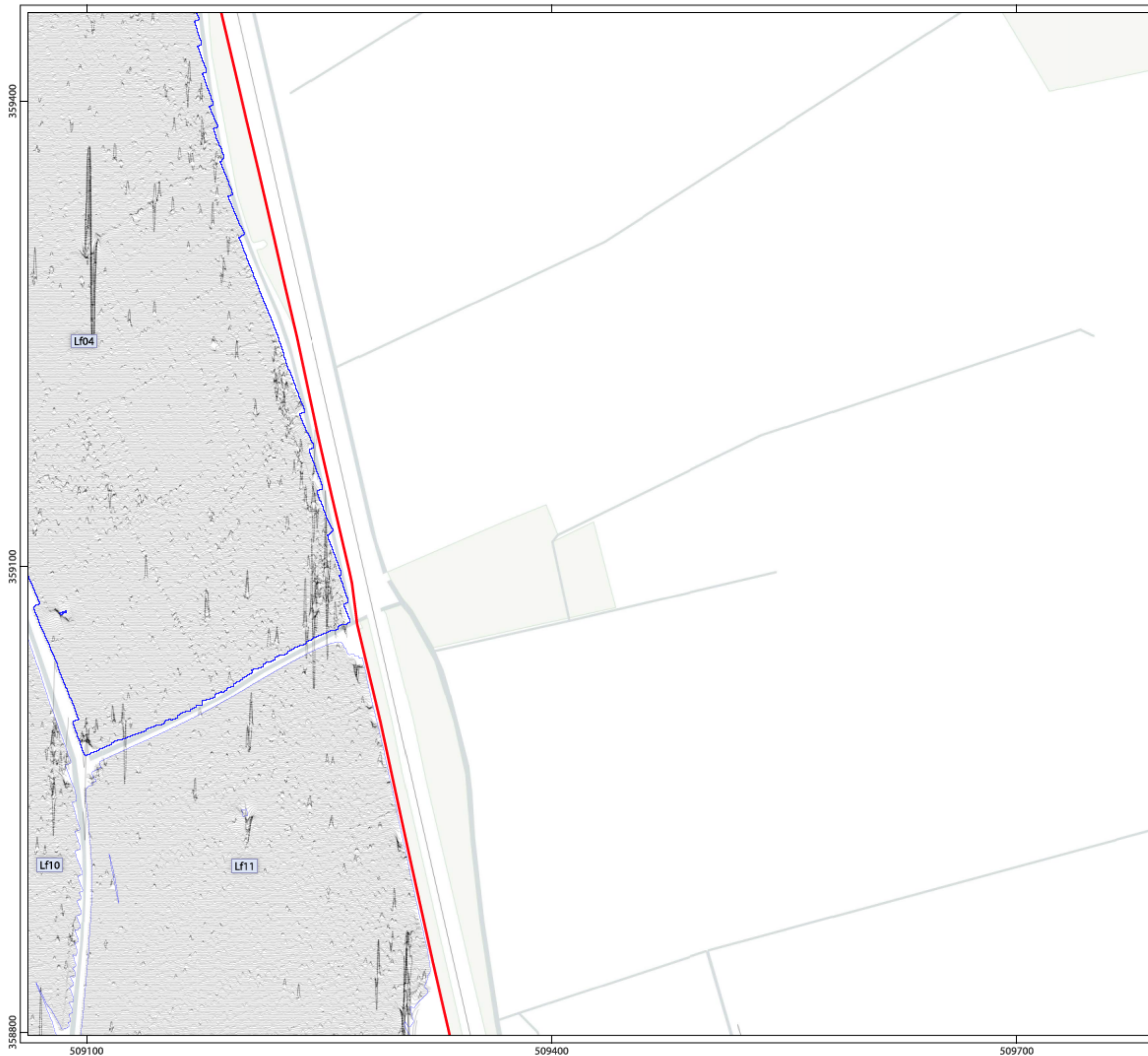
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- Survey Extent

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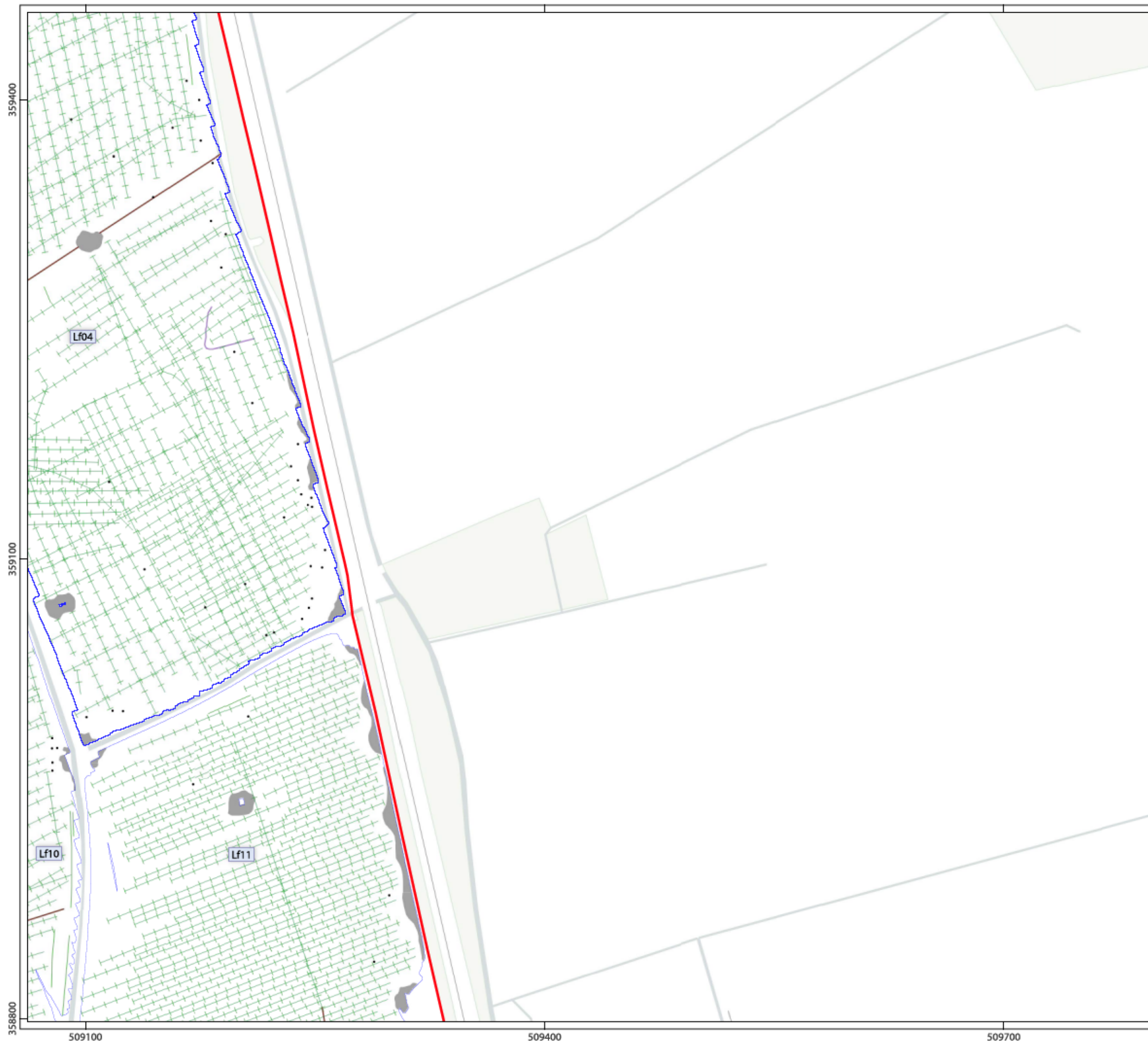
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- Survey Extent
- XY Trace (25nT/cm)

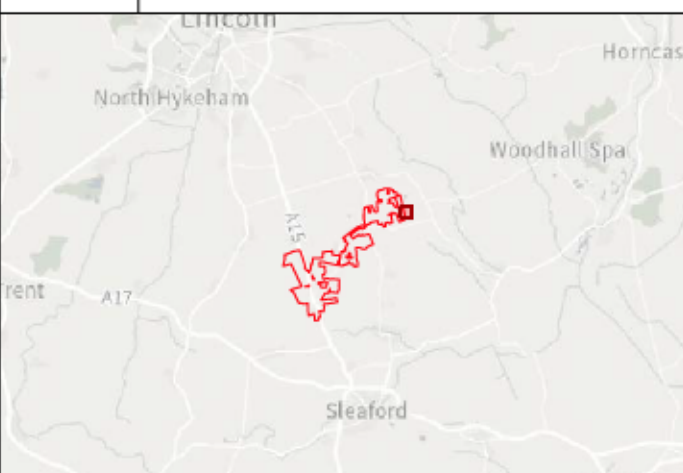
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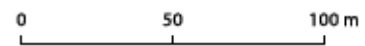


Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- Field Boundary
- Field Drain
- Uncertain
- Magnetic Disturbance

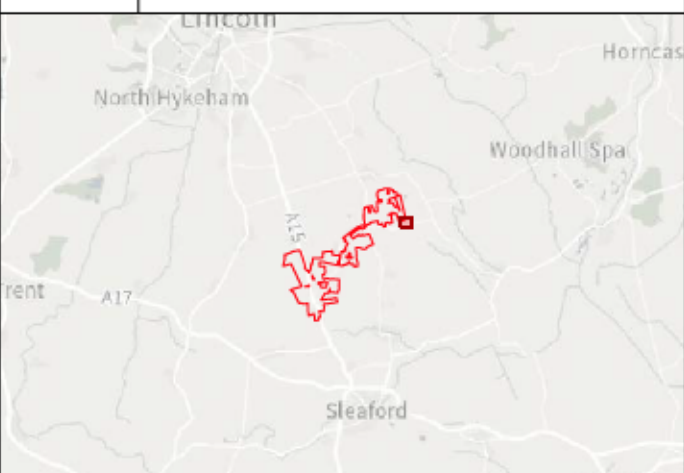


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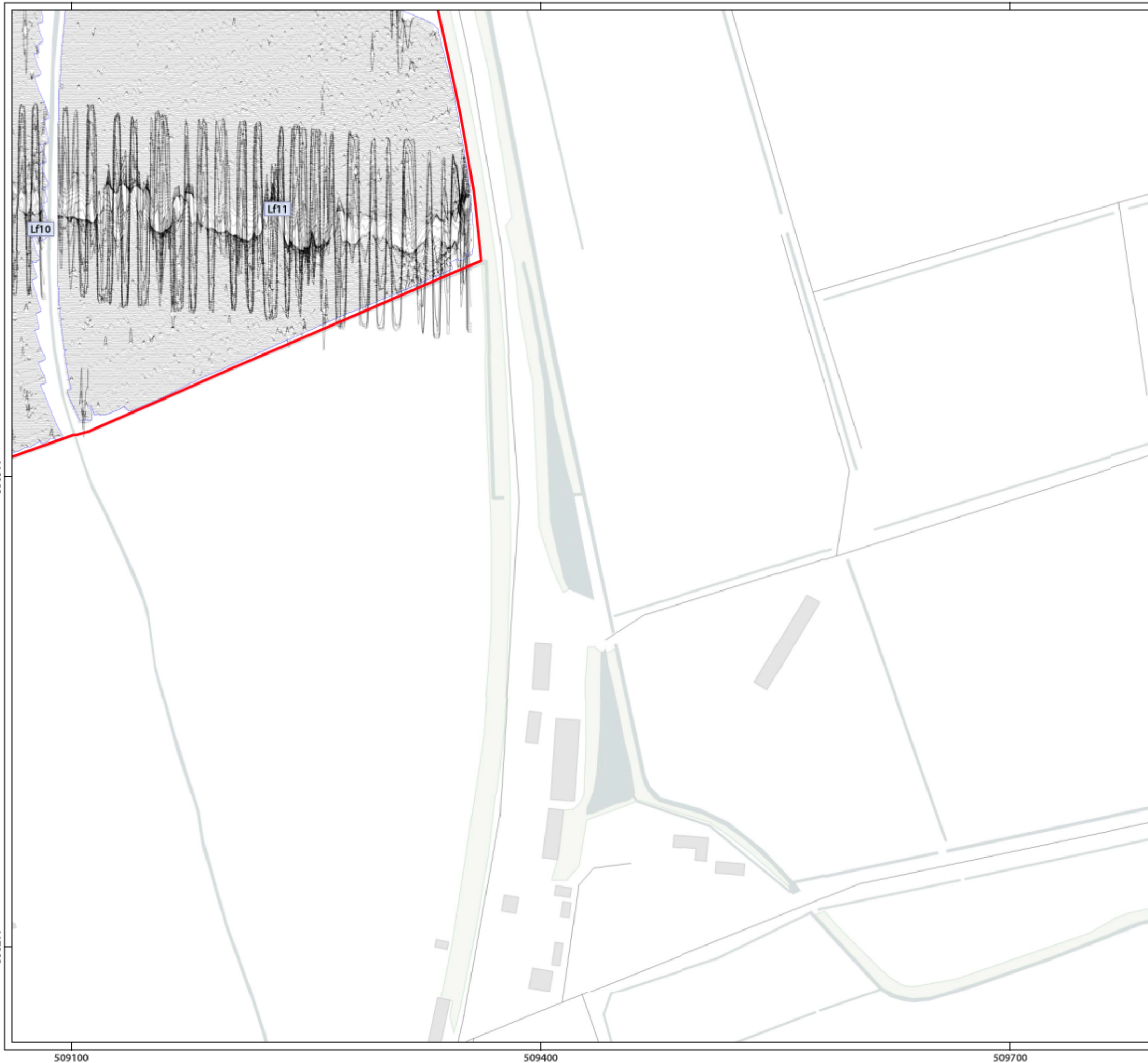
- Geophysical Survey Area
- Survey Extent

+2nT
-1nT

0 50 100 m

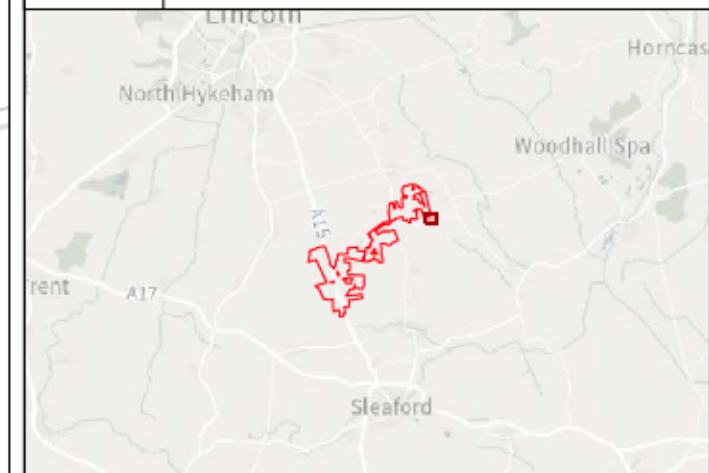
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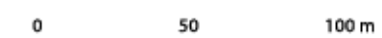
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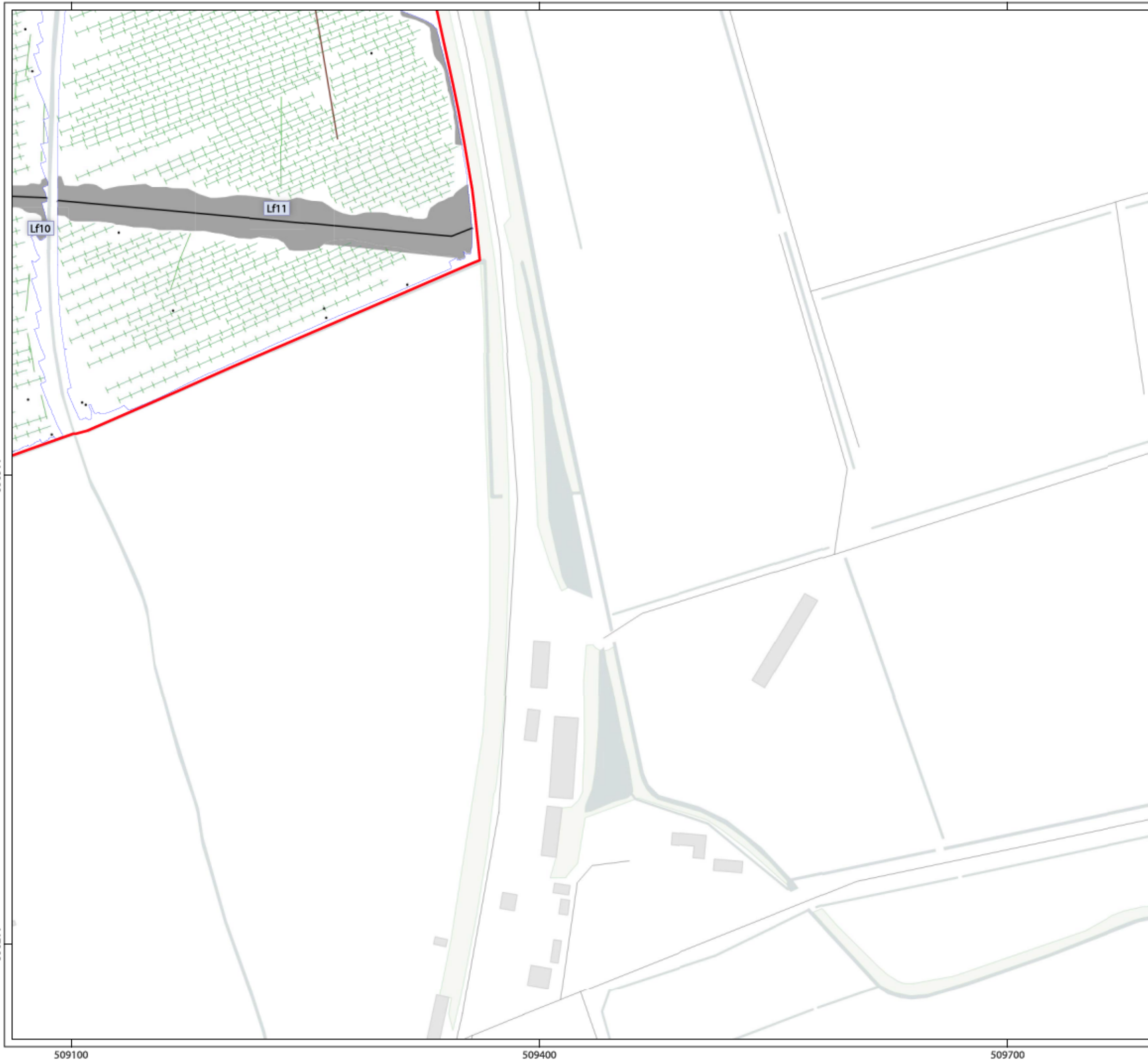
- Geophysical Survey Area
- Survey Extent
- XY Trace (25nT/cm)



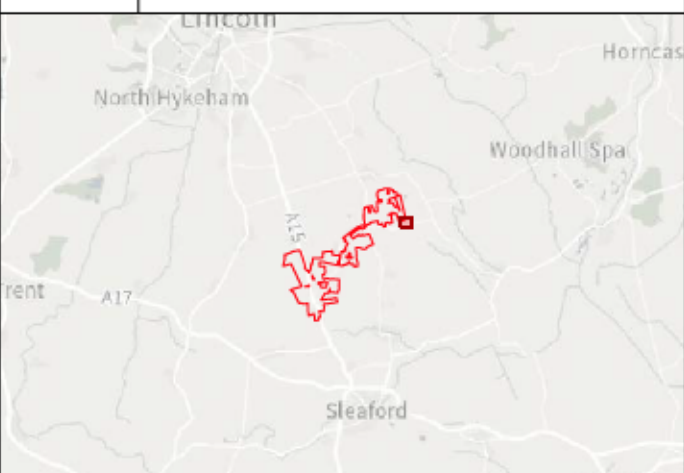
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Illus - 207 XY trace plot of minimally processed magnetometer data; Sector



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Key

- Geophysical Survey Area
- Survey Extent

Interpretation

- Ferrous Objects
- Agriculture
- Field Boundary
- Field Drain
- Pipe
- Magnetic Disturbance

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7 APPENDICES

APPENDIX 1 SPRINGWELL SOLAR FARM CABLE OPTION ROUTE, LINCOLNSHIRE GEOPHYSICAL SURVEY REPORT

ACRE22



SPRINGWELL SOLAR FARM CABLE OPTION ROUTE, LINCOLNSHIRE

GEOPHYSICAL SURVEY REPORT

commissioned by RSK
on behalf of Springwell Energyfarm Ltd

November 2023

SPRINGWELL SOLAR FARM CABLE OPTION ROUTE, LINCOLNSHIRE

GEOPHYSICAL SURVEY REPORT

commissioned by RSK
on behalf of Springwell Energyfarm Ltd

November 2023

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

PROJECT INFO:

HA Project Code **ACRE22** / HA Project No **2023-75** / NGR **TF 502947 356183** / Parish **Ashby de la Launde, Graffoe** / Local Authority **North Kesteven District Council** / Fieldwork Date **05/06/2023 – 07/06/2023 and 29/08/2023 – 31/08/2023** / OASIS Ref. **TBC**

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PROJECT SUMMARY

Headland Archaeology (UK) Ltd was instructed by RSK on behalf of Springwell Energyfarm Ltd (The Client) to undertake a geophysical (magnetometer) survey to assess the archaeological potential of four fields, covering approximately 69ha, being considered for cable route options as part of the proposed 800MW Springwell Solar Farm located 15km south of Lincoln between the villages of Metheringham and Braunton, Lincolnshire. A geophysical survey covering the main areas which may form part of the solar farm proposals has been previously reported on (Headland Archaeology 2023a). This report forms an addendum to the earlier report. The geophysical survey report and addendum, together with an archaeological desk-based assessment (DBA, Headland Archaeology 2023b) and Aerial Investigation Report (Headland Archaeology 2023c) will inform the Environmental Impact Assessment (EIA, Headland Archaeology forthcoming) produced in support of a development consent order (DCO) application for the construction of the solar farm. The geophysical survey results will also inform future archaeological strategy.

The original survey evaluated an area of approximately 1390ha and recorded a wide variety of archaeological and non-archaeological anomalies. The results of this survey largely corroborated, but also greatly expanded, the current understanding of the archaeological potential of the proposed site as contained within the Lincolnshire Historic Environment Record (LHER). The main findings included several foci of archaeological activity ranging from ring ditches and likely round barrows, pit alignments and extended series and/or concentrations of ditches, enclosures and pit-like anomalies. The only findings of note in fields adjacent to those in the current geophysical survey area (GSA) were two pit alignments, one located adjacent to the A15 and the other south-west of RAF Digby. The current survey has confirmed that these features extend into the current GSA.

The two pit alignments are the only anomalies of clear archaeological potential identified in this second phase of survey. Four low magnitude, partial circle anomalies possibly recording

the location of ring ditches are all interpreted with moderate to low levels of confidence due primarily to their weak response and/or interference from stronger anomalies and effects of modern cultivation. The survey has also recorded an extension of the gridded pattern of weakly magnetically enhanced, linear trend anomalies aligned north-west/south-east to varying degrees in all four fields, that were identified in almost every field west of the B1191 by the original survey. An anthropogenic cause for these ditch-like anomalies, such as a relict field system, is still considered most likely given the homogeneity and regularity of the responses over such a large area.

Elsewhere several discrete, amorphous low magnitude anomalies of uncertain origin, possibly identify former extraction pits and are comparable to features identified in the previous survey close to the A15. Four service pipes, two former field boundaries and a large number of linear anomalies of agricultural origin identifying field drains and/or modern ploughing trends constitute the remainder of the interpretable anomalies.

Similar to the previous survey the level of detail and range of anomalies recorded across the survey is argued to provide a high level of confidence in the findings and that they accurately reflect the archaeological potential of the GSA, notwithstanding the limitations of magnetometer survey to define particularly small, very weakly enhanced or anomalies masked by areas of disturbance and/or stronger magnetic anomalies. The archaeological potential of the GSA is therefore regraded as generally low except in the location of the two pit alignments.

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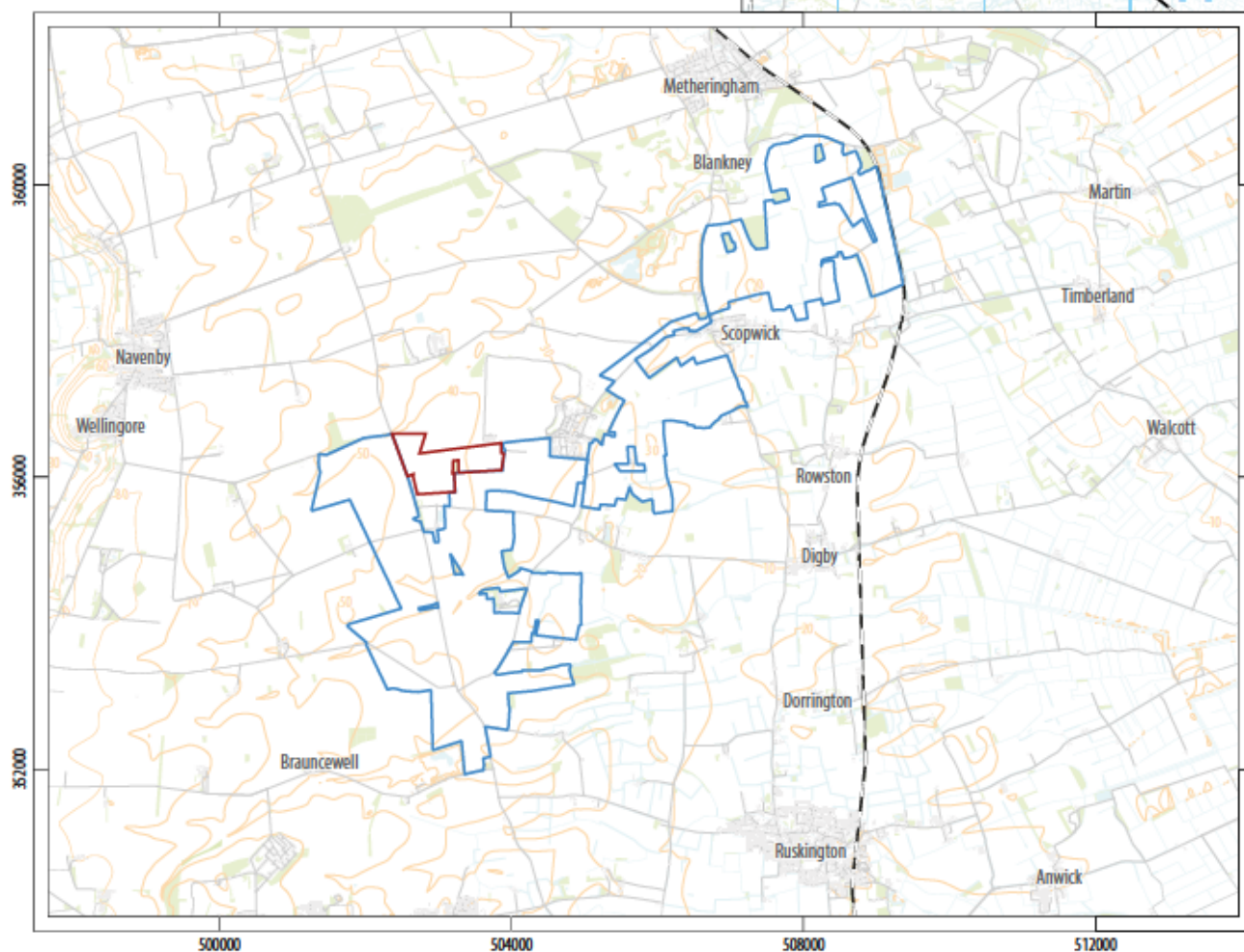
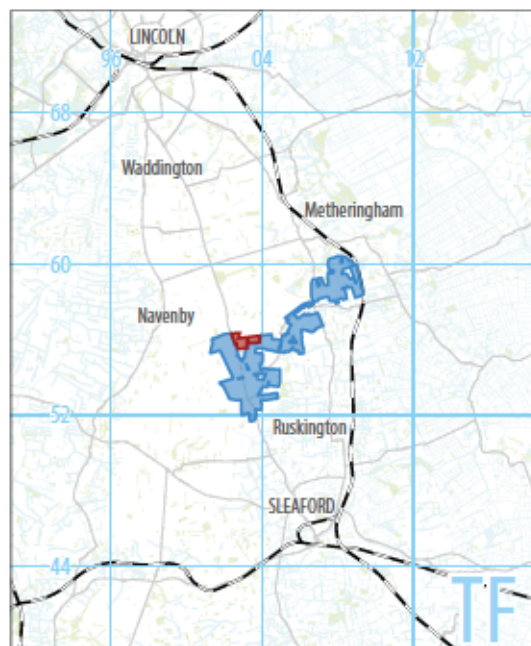
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Springwell Solar Farm
Cable Option Route
Lincolnshire

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



0 2km
1:100,000 @ A4

- Springwell Solar Farm, Cable Option Route
- geophysical survey area
- Springwell Solar Farm - geophysical survey area

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ILLUS 1 Site location

SPRINGWELL SOLAR FARM CABLE OPTION ROUTE, LINCOLNSHIRE

GEOPHYSICAL SURVEY REPORT

1 INTRODUCTION

Headland Archaeology (UK) Ltd was instructed by RSK on behalf of Springwell Energyfarm Ltd (The Client) to undertake a geophysical (magnetometer) survey to assess the archaeological potential of on an additional four fields, amounting to approximately 69ha, being considered for cable route options as part of the proposed 800MW Springwell Solar Farm located 15km south of Lincoln between the villages of Metheringham and Brauntonwell, Lincolnshire (Illus 1).

A geophysical survey covering the main areas which may form part of the solar farm proposals has been previously reported on (Headland Archaeology 2023a). This report forms an addendum to the earlier report. The geophysical survey report and addendum, together with an archaeological desk-based assessment (DBA, Headland Archaeology 2023b) and Aerial Investigation Report (Headland Archaeology 2023c) will inform the Environmental Impact Assessment (EIA, Headland Archaeology forthcoming) produced in support of a development consent order (DCO) application for the construction of the solar farm. The geophysical survey results will also inform future archaeological strategy.

The current survey was undertaken in accordance with the original Written Scheme of Investigation for Geophysical Survey (WSI) (Headland Archaeology 2022), following guidance contained in the National Planning Policy Framework (MHCLG 2021) prior to its revision in September 2023, and was carried out in line with current best practice (Chartered Institute for Archaeologists 2014, Europae Archaeologia Consilium 2016).

The survey was undertaken in two phases. An initial survey over pasture fields bcd044 and bcd072 was undertaken between the June 5th and June 7th 2023, with bcd073 and bcd083 surveyed on August 30th and August 31st 2023, post-harvest.

1.1 LOCATION, TOPOGRAPHY AND LAND-USE

The current geophysical survey area (GSA) comprises four adjoining fields, appended to the north of the previous survey area, located between the A15 and RAF Digby and south of Cuckoo Lane, centred at NGR TF 502947 356183. The spatial relationship between the current and earlier survey areas is indicated on Illus 1 to Illus 5 inclusive.

The topography of the GSA gradually slopes down from a height of approximately 47m above Ordnance Datum (AOD) from the western boundary adjacent the A15, down to roughly 36m AOD at the eastern boundary of field bcd073 immediately south of RAF Digby airfield.

1.2 GEOLOGY AND SOILS

The solid bedrock geology comprises sedimentary Jurassic period limestone of the Upper Lincolnshire Limestone Member that belongs to the Southern Lincolnshire Edge, a north/south linear scarp of limestone running the length of Greater Lincolnshire. The bedrock geology changes immediately north of the GSA to another type of Jurassic limestone, that of the Lincolnshire Limestone Formation. No superficial deposits are recorded over a significant majority of the GSA (NERC 2022).

The overlying soils are classified in Soilscape 3 Association as loamy, shallow lime-rich soils over chalk limestone (Cranfield University 2021).

Guidance (English Heritage 2008; Table 4) indicates that magnetometer survey can be recommended over any sedimentary geology and average responses to magnetometer survey over Jurassic limestone are good, although a wide range of magnetic susceptibilities in the parent rock can result in very variable background responses to magnetometer survey. Also, any

Quaternary deposits overlying the solid geology are a primary consideration as they often show a high degree of local variation, and the magnetic response is usually dependent on the magnetic mineralogy of the parent solid geology.

The combination of underlying limestone bedrock and widespread absence of superficial deposits means the prevailing geological and pedological conditions are appropriate for the application of magnetometer survey for the detection of archaeological features. The suitability of magnetometry in these conditions is demonstrated by the results of the previous survey (Headland Archaeology 2023a) in fields adjacent to the GSA.

2 ARCHAEOLOGICAL BACKGROUND

A detailed archaeological background adapted from information compiled within a comprehensive archaeological desk-based assessment (ADBA - Headland Archaeology 2023b) and aerial investigation report (Headland Archaeology 2023c) gathered in support of an Environmental Impact Assessment (EIA) for the wider solar development including the fields covered by this survey, was included in the original geophysical survey report. Only information pertaining to the current survey area is included here.

No designated or non-designated heritage assets are identified within the GSA boundary. Non-designated assets located adjacent or close to the GSA include the former Roman road, now the A15 (MLI86228), World War 2 (WW2) infrastructure such as pillboxes (MLI89150, MLI89151) associated with RAF Digby (MLI69621) to the west or post-medieval quarry sites (MLI86694, MLI86695) and farmsteads (MLI60266) to the west and south respectively.

Analysis of historic maps indicates the presence of former field boundaries in fields bcd072 and bcd083 aligned roughly north/south and splitting the fields in half.

The results of the previous survey largely corroborated but also greatly expanded the current understanding of the archaeological potential of the proposed site as contained within the Lincolnshire Historic Environment Record (LHER). The main findings of the original survey included several foci of archaeological activity ranging from ring ditches and likely round barrows, pit alignments and extended series and/or concentrations of ditches, enclosures, and pit-like anomalies however these are all located at least 850m from the nearest part of the GSA.

The original survey did however, identify two pit alignments adjacent to the A15 in field Tb2 and south-west of RAF Digby in field Bcd084 which, on their current alignment, looked likely to extend into the GSA in fields Bcd044 and Bcd073 respectively.

3 AIMS, METHODOLOGY AND PRESENTATION

The general aim of the geophysical survey was to provide enough information to corroborate, identify and characterise sub-surface anomalies that may have an archaeological origin, including defining the spatial limits of already known or suspected heritage assets, within the defined survey areas. This information will form part of the much larger body of evidence from a variety of sources, including the previous magnetometer survey, that taken as a whole, will enable an assessment to be made of the impact of the proposed development on any sub-surface archaeological remains, where present and therefore help determine an appropriate mitigation strategy.

The specific archaeological objectives of the geophysical survey were:

- › to gather enough information to inform the extent, condition, character and date (as far as circumstances permit) of any archaeological features and deposits within the GSA,
- › to obtain information that will contribute to an evaluation of the significance of the proposed solar development upon cultural heritage assets, and
- › to prepare a fully illustrated report on the results of the survey that is compliant with all relevant standards, guidance and good practice.

3.1 MAGNETOMETER SURVEY

It is acknowledged that magnetometry has limitations and that certain types of sub-surface remains may, under certain circumstances, be more likely to be identified by other survey techniques such as earth resistance, ground penetrating radar (GPR) or electro-magnetic methods which measure different geophysical properties. However, given the success of the preceding survey and other project considerations, magnetometry was selected as the best methodology for assessing the additional survey area.

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

The surveys were undertaken using four Bartington Grad601 sensors mounted at 1m intervals (1m traverse interval) onto a rigid carrying frame. The system was programmed to take readings at a frequency of 10Hz (allowing for a 10–15cm sample interval) on roaming traverses (swaths) 4m apart. These readings were stored on an external weatherproof laptop and later downloaded for processing and interpretation. The system was linked to a Trimble R12 Real Time Kinetic (RTK) differential Global Positioning System (dGPS) outputting in NMEA mode to ensure a high positional accuracy for each data point.

MLGrad601 and MultiGrad601 (Geomar Software Inc.) software was used to collect and export the data. Anomaly GeoSurvey v1.12.3 (Lichenstone Geoscience) and QGIS v3.28.5 software was used to process and present the data respectively.

An overall location plan of the GSA shown in relation to the original survey for the solar farm is presented at a scale of 1:100,000 in Illus 1. Overall processed greyscale and interpretation illustrations of all the results from both surveys are shown for reference in Illus 2 and Illus 3 respectively at a scale of 1:40,000.

Overview greyscale and interpretation plans of the cable option route GSA with Sector boundaries indicated are shown in Illus 5 and Illus 6 respectively at a scale of 1:10,000. Fully processed (greyscale) data, minimally processed data (XY trace plot) data and interpretative plans are presented by Sector, at 1:2,500, in Illus 7 to Illus 18 inclusive.

Individual fields are referred to using nomenclature provided to Headland Archaeology at the commencement of the project.

Technical information on the equipment used, data processing and magnetometer survey methodology is given in Appendix 1. Details of the survey location information are in Appendix 2. A note on the format of the geophysical data archive is present in Appendix 3. Data processing details for the magnetometer survey are presented in Appendix 4. The OASIS Archive entry is included as Appendix 5.

The survey methodology, report and any recommendations comply with guidelines outlined by Europae Archaeologia Consilium (EAC 2016) and by the Chartered Institute for Archaeologists (CIfA 2014b). All Illustrations from Ordnance Survey (OS) 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 (see above) and over a range of different display levels. All illustrations are presented to display and interpret the data from this site to best effect based on the experience and knowledge of management and reporting staff.

4 RESULTS

As with the previous survey the results are described in tabular format by field (see below). The associated archaeological LHER assets and events included in the results table are not exhaustive and only include those assets relevant to the anomalies identified in the survey lying within or immediately adjacent to those fields forming the current GSA. Any relevant findings from the previous geophysical survey are also discussed herein.

TABLE 1 Description of results

FIELD NO	ARCHAEOLOGICAL ANOMALIES	ASSOCIATED ARCHAEOLOGICAL LHER ASSETS AND EVENTS WITHIN GSA LIMITS	SURVEY INTERPRETATION
Bcd044 (Sectors 1 and 3 Illus 7-9 and 13-15)	Yes	ML186694 ML186228	<p>A roughly linear section of discrete anomalies aligned north-east/south-west identifying a pit alignment (P1; Illus 7-9), is recorded across the north-west corner of the field and marks a continuation of the same feature recorded in the previous survey within field Tb2 on the opposite side of the A15 (former Roman road ML186228). The pit alignment was not previously recorded in the LHER and its western extent within Tb2 remains unclear given the presence of strong geological responses. The feature lies adjacent to a former quarry site (ML186694) also within field Tb2.</p> <p>No other anomalies of clear archaeological potential are recorded within this field. However, there is a clear continuation of the pattern of regular low magnitude parallel and perpendicular linear trend anomalies forming a grid like design, that was recorded adjacent to the A15 in the previous survey (Sectors 1 and 2). As previously identified the pattern of anomalies does not respect the alignment of present or former field boundaries. The interpretation of this landscape scale feature as some form of relict field system remains unchanged.</p> <p>Two parallel, low magnitude, linear ditch-like trend anomalies at the northern boundary of the field (D21; Illus 7-9) remain of uncertain origin. The anomalies share an alignment with the regular grid like pattern of linear features but not the modern field boundaries or approximate east/west trend of natural/geological trends.</p> <p>As recorded in the previous survey in fields adjacent to the A15, several discrete, widely spaced, magnetically enhanced anomalies of uncertain origin are identified predominantly, but not exclusively, at the periphery of the field adjacent the A15. These anomalies possibly identify former extraction pits. Four lower magnitude but similarly amorphous responses may also indicate some form of localised extraction (and are interpreted separately as such) but with little other context provided by the survey results, could also represent natural variations in the limestone geology.</p> <p>Linear trends identifying modern cultivation patterns parallel to the modern-day field boundaries and irregular patterns of sinuous anomalies resulting from natural periglacial effects and/or surface cracks in the limestone are also identified.</p>

FIELD NO	ARCHAEOLOGICAL ANOMALIES	ASSOCIATED ARCHAEOLOGICAL LHER ASSETS AND EVENTS WITHIN GSA LIMITS	SURVEY INTERPRETATION
Bcd072 (Sectors 1-3 Illus 7-15)	No	None	<p>The only findings from this field include a patchy continuation of the grid like pattern of linear features as seen widely in adjacent fields, a former field boundary aligned north-south across the centre of the field and one discrete low magnitude anomaly at the northern boundary of uncertain origin. This anomaly is again similar to other features seen at the periphery of nearby fields that are interpreted as possible sites of localised extraction.</p>
Bcd083 (Sector 3 Illus 13-15)	No?	MLI86228	<p>No anomalies of clear archaeological potential are recorded in this field close to the A15 and north of Navenby Lane.</p> <p>Findings from this field are limited to three very faint, partial circular anomalies of uncertain origin (RD?1-RD?3; Illus 13-15) located towards the centre and in the northern half of the field. All three anomalies are suggestive of possible ring ditches but are interpreted with a low level of confidence, largely because the magnetic response is so weak but also because of the effects of stronger features that lay adjacent such as a former boundary and service pipes (SP1 and SP2; Illus 13-15).</p> <p>A continuation of the grid like pattern of faint linear trend anomalies aligned north-west/south-east seen in adjacent fields is also recorded in parts of this field.</p> <p>Linear trends identifying field drains and/or modern cultivation patterns parallel to the modern-day field boundaries and irregular patterns of sinuous anomalies resulting from natural periglacial effects and/or surface cracks in the limestone are also identified.</p>
Bcd073 (Sectors 2 and 4 Illus 10-12 and 16-18)	Yes	MLI88357 MLI125038 MLI60621	<p>A pit alignment oriented roughly north-northeast/south-southwest is recorded as a series of low magnitude discrete anomalies extending for approximately 340m across the centre of the field. This pit alignment in the LHER (MLI88357) and marks a continuation of the same feature recorded to the south in the previous survey where it was recorded in nine adjoining fields, extending uninterrupted for 2.1km southwards from the previous GSA limits at the northern boundary of Bcd084 at NGR 503463, 356058, towards the centre of field Bcd115 at NGR 503243. In this section the pit alignment was identified as crossing fields Bcd084, Bcd093, Bcd096, Bcd100, Bcd104 and Bcd105 but did not appear to be associated with any other anomalies/features recorded by the previous survey. The survey data showed that the two previously recorded pit alignments identified from cropmarks MLI84452 and MLI88357 are in fact a single unified feature.</p> <p>An isolated low magnitude partial circular anomaly, approximately 17m in diameter, located towards the south-east corner of the field possibly identifies a ring ditch (RD1; Illus 16-18). The anomaly response remains somewhat unclear however due to the effects of modern cultivation close to the field boundary. No other anomalies of possible or clear archaeological potential are identified in the immediate vicinity which further restricts a more confident interpretation.</p> <p>A continuation of the grid like pattern of faint linear trend anomalies aligned north-west/south-east seen in adjacent fields is also detected in parts of this field.</p> <p>Similar to the results from fields adjacent to the A15 in the previous survey, three discrete, widely spaced, magnetically enhanced anomalies of uncertain origin are recorded close to the field boundary. These anomalies possibly identify former sites of localised extraction.</p> <p>Modern agricultural trends aligned parallel to the modern field boundaries and two service pipes and/or field drains (SP3 and SP4; Illus 10-12) located parallel to the western boundary of the field are the only other anomalies recorded in this field.</p>

5 DISCUSSION AND CONCLUSION

The survey has evaluated all the areas within the additional Geophysical Survey Area (GSA) and has recorded a similar pattern of anomalies and extension of some landscape scale features recorded in the previous survey but has not identified any new foci of archaeological activity.

The current survey has mapped an extension of two separate pit alignments, one adjacent to the A15 in the north-west corner of the GSA that was previously unrecorded in the LHER, as well as a 340m continuation of the pit alignment (MLI88357 and MLI84452) which is now identified as extending uninterrupted for over 2.4km from the northern boundary of Bcd073 southwards towards the centre of field Bcd115.

In addition to the pit alignments the survey has also identified four low magnitude partial circular anomalies all interpreted with moderate to low levels of confidence as identifying possible ring ditches. The very weak nature, presence of stronger anomalies and/or cultivation effects adjacent to them restricts a more confident interpretation of these anomalies.

The survey has also recorded an extension of the gridded pattern of weakly magnetically enhanced linear trend anomalies aligned north-west/south-east to varying degrees in all four fields, previously identified in almost every field west of the B1191 constituting the western third of the previous survey area. An anthropogenic cause for these ditch-like anomalies, such as a relict field system, is still considered most likely given the homogeneity and regularity of the responses over such a large area. If this large feature was to identify some form of systematic, pre-modern land management it would certainly be of archaeological interest but perhaps of low intrinsic value. Their relationship (if any) with the other landscape scale features recorded by both surveys remains uncertain.

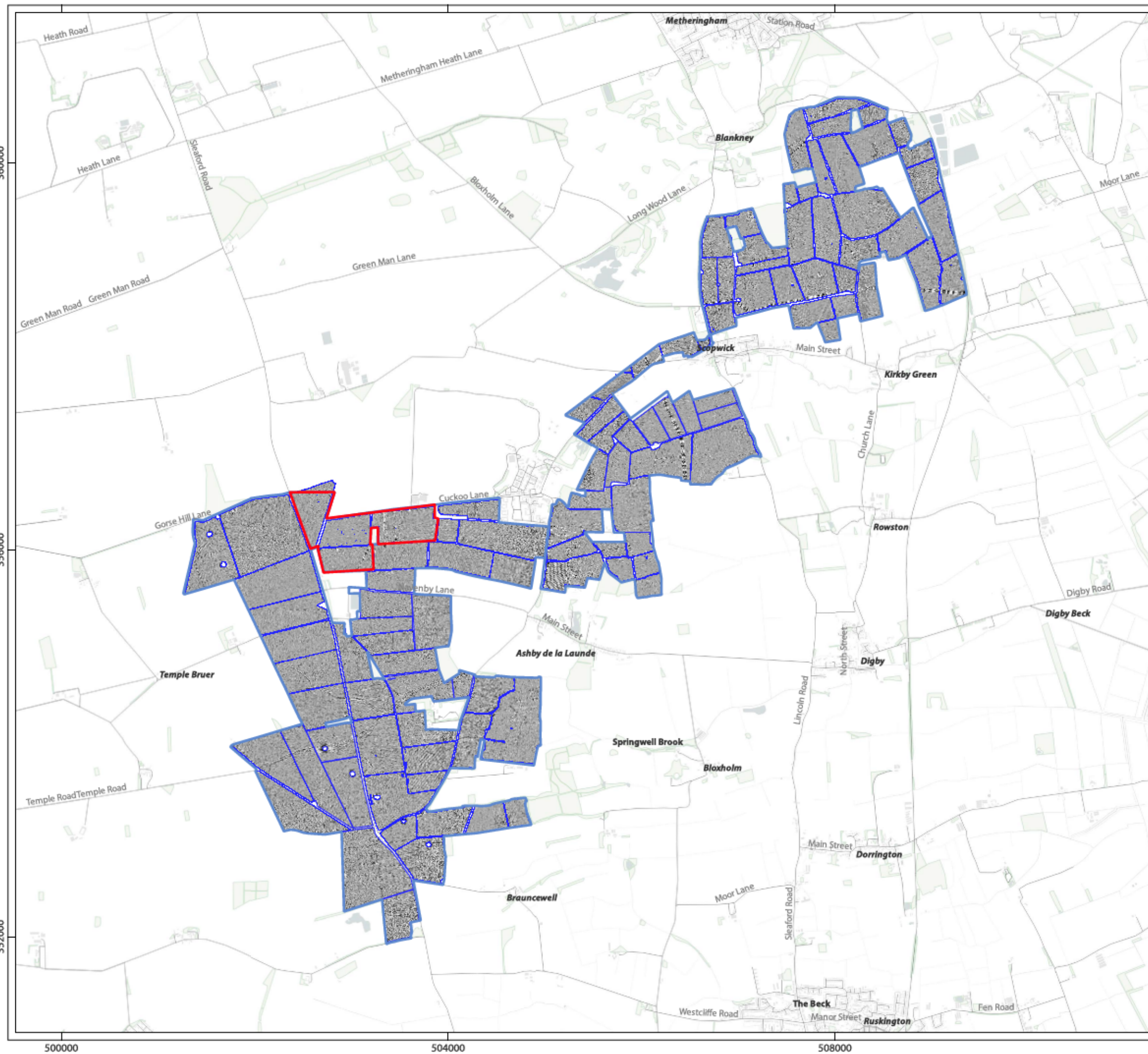
Several discrete, widely spaced, magnetically enhanced amorphous anomalies of uncertain origin recorded predominantly but not exclusively at the periphery of some of the field boundaries possibly identify former extraction pits and are comparable to features identified in the previous survey close to the A15.


Elsewhere the survey has recorded four probable service pipes, two former field boundaries and a large number of linear anomalies of agricultural origin identifying field drains and/or modern ploughing trends.


Similar to the previous survey the level of detail and range of anomalies recorded across the survey is argued to provide a high level of confidence in the findings and that they accurately reflect the archaeological potential of the GSA having likely recorded the extent of any significant archaeological remains, notwithstanding the limitations of magnetometer survey to define particularly small, very weakly enhanced or anomalies masked by areas of disturbance and/or stronger magnetic anomalies. The archaeological potential of the GSA is therefore regraded as generally low except in the location of the two pit alignments present within fields Bcd044 and Bcd073

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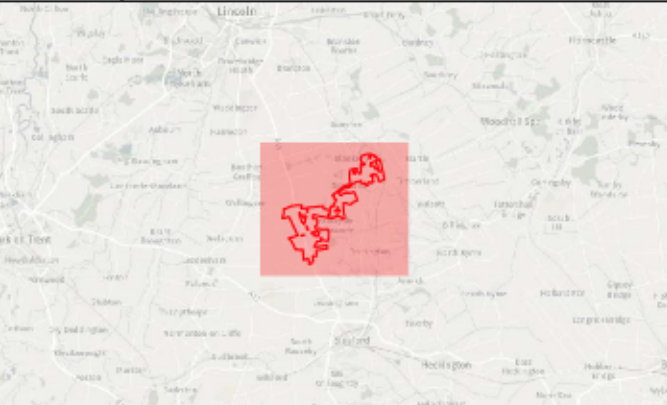






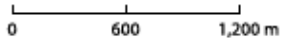
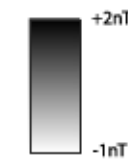
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Key

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- Geophysical Survey Area
- Survey Extent

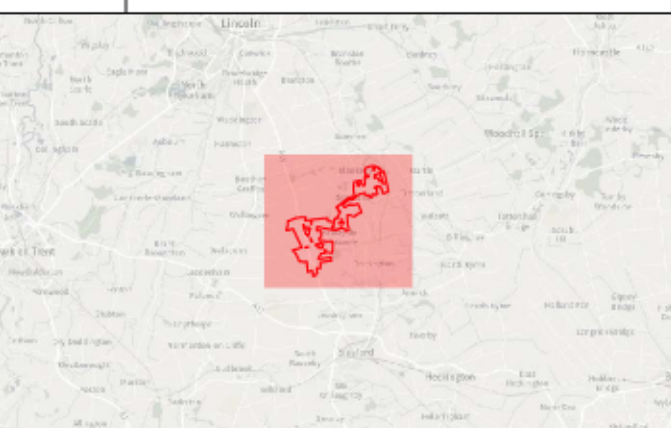
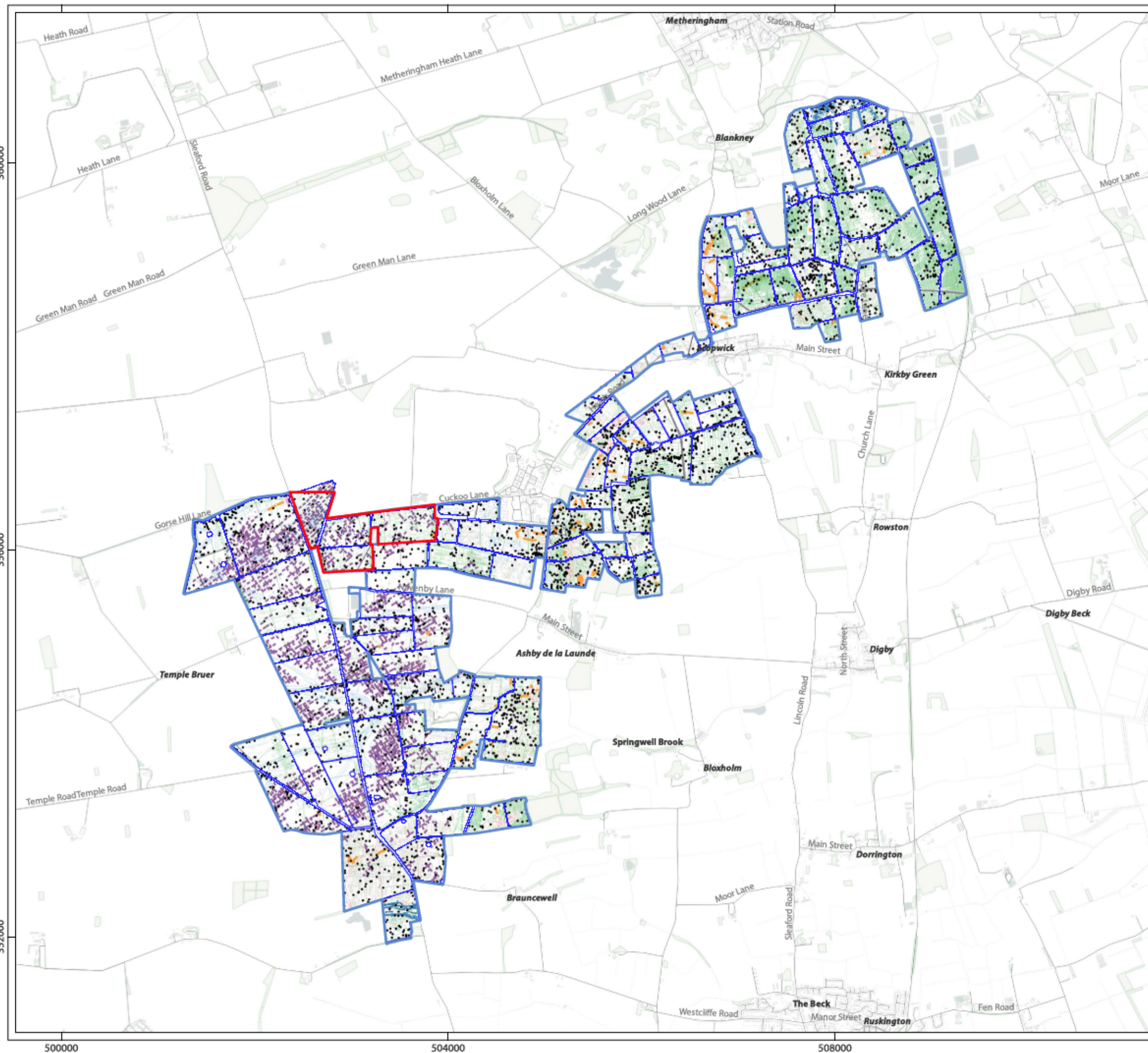



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Illus 03 - Overall greyscale plot of processed magnetometer data



Key

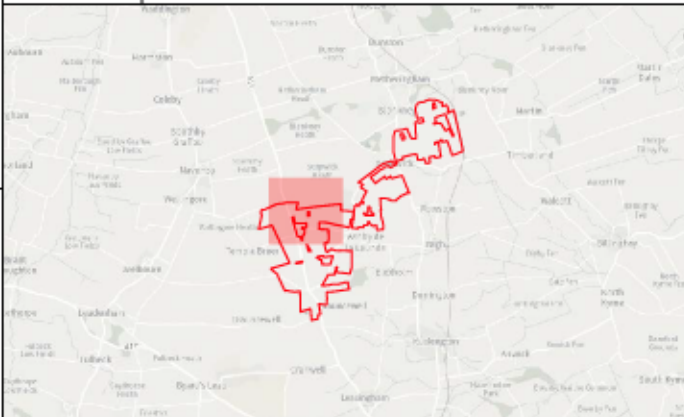
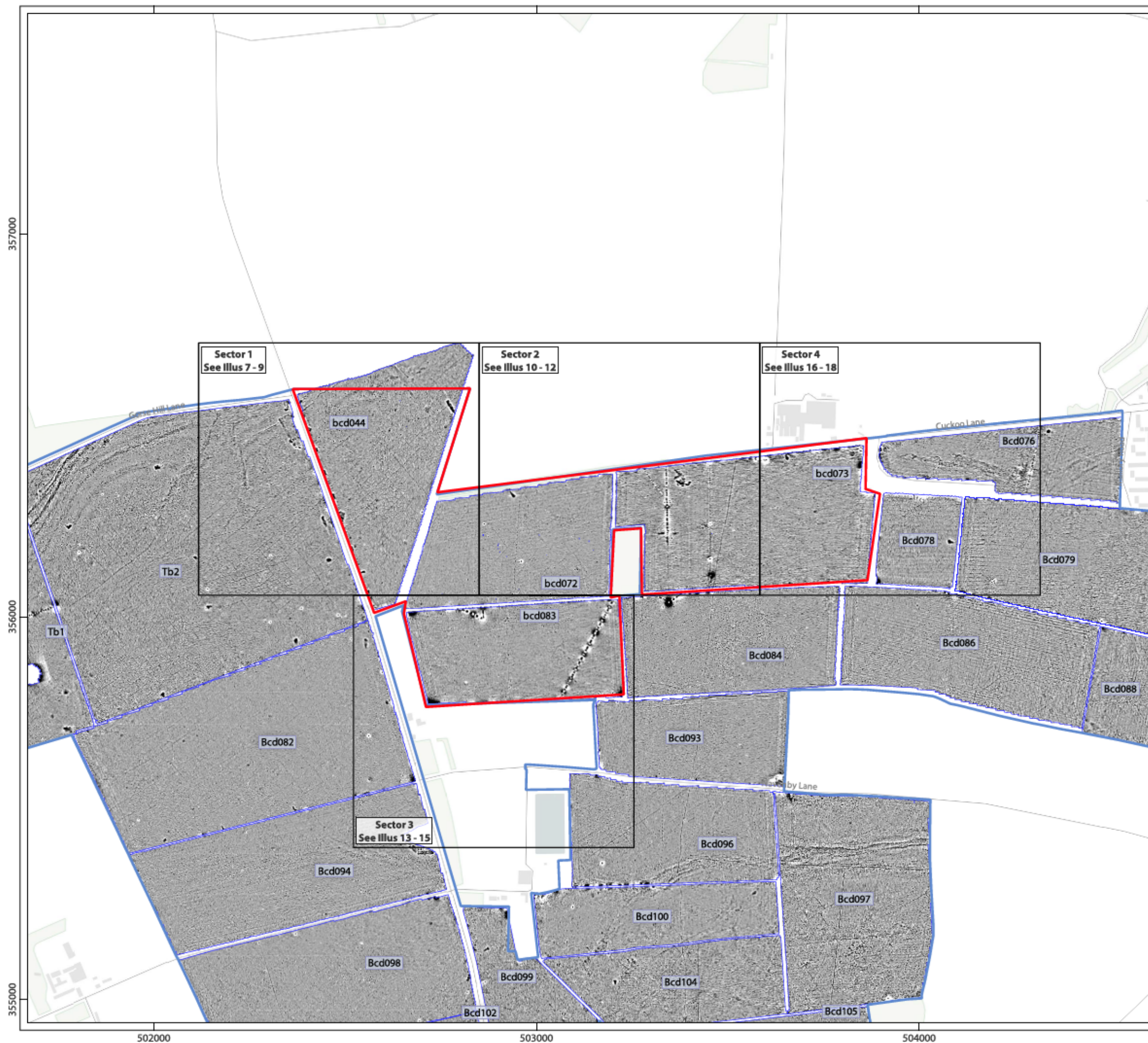
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- Geophysical Survey Area
- Survey Extent
- Ferrous Objects
- Agriculture
- Field Boundary
- Possible Field Boundary
- Field Drain
- Natural
- Pipe
- Uncertain
- Ridge and Furrow
- LIRM
- Field System
- Possible Archaeology
- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- Quarry
- Uncertain
- Former Building
- Former Pond
- Geology
- Kiln Burning
- Null Value

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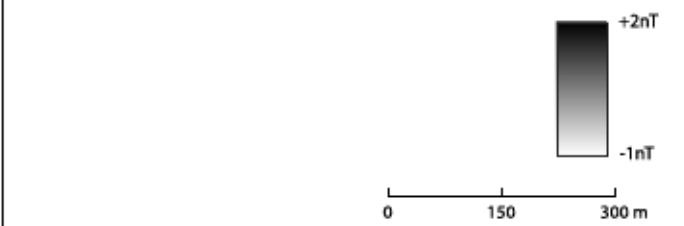
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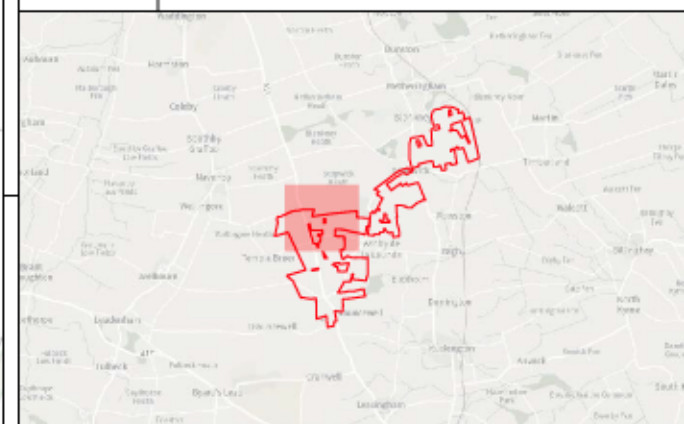
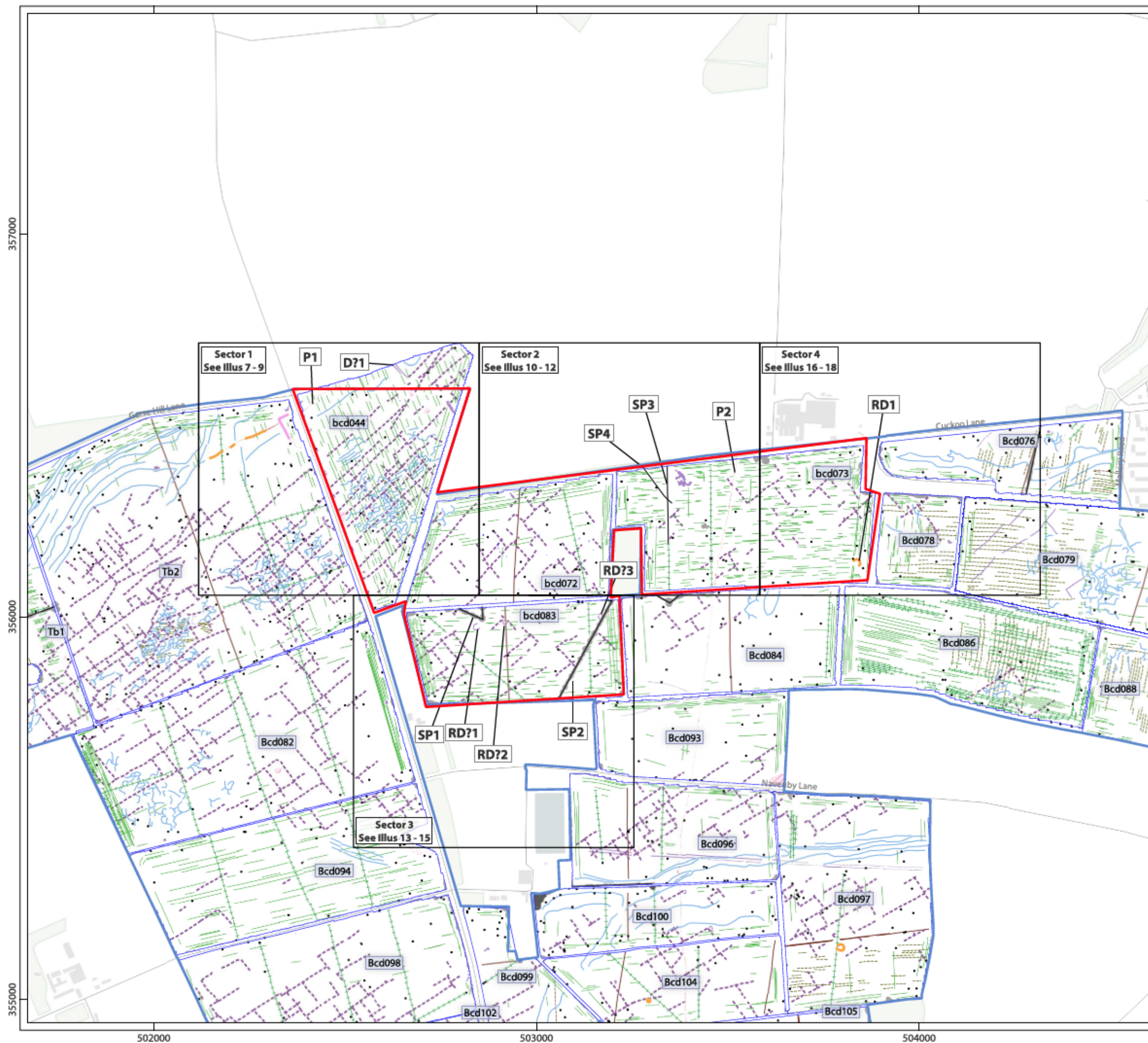
- Key**
- Cable Option Route - Geophysical Survey Area
 - Geophysical Survey Area
 - Survey Extent
 - Areas for Illus 7 - 15



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Illus 05 - Cable option route greyscale plot of processed magnetometer data



Key

- Cable Option Route - Geophysical Survey Area
- Geophysical Survey Area
- Survey Extent
- Areas for Illus 7 - 15
- Ferrous Objects
- Agriculture
- Field Boundary
- Possible Field Boundary
- Field Drain
- Natural
- Pipe
- Uncertain
- Ridge and Furrow
- Field System
- Possible Archaeology
- Quarry
- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- Quarry
- Uncertain
- Former Building

Abbreviations

D?	Ditch?
P	Pit Alignment
SP	Service Pipe
RD	Ring Ditch
RD?	Ring Ditch?

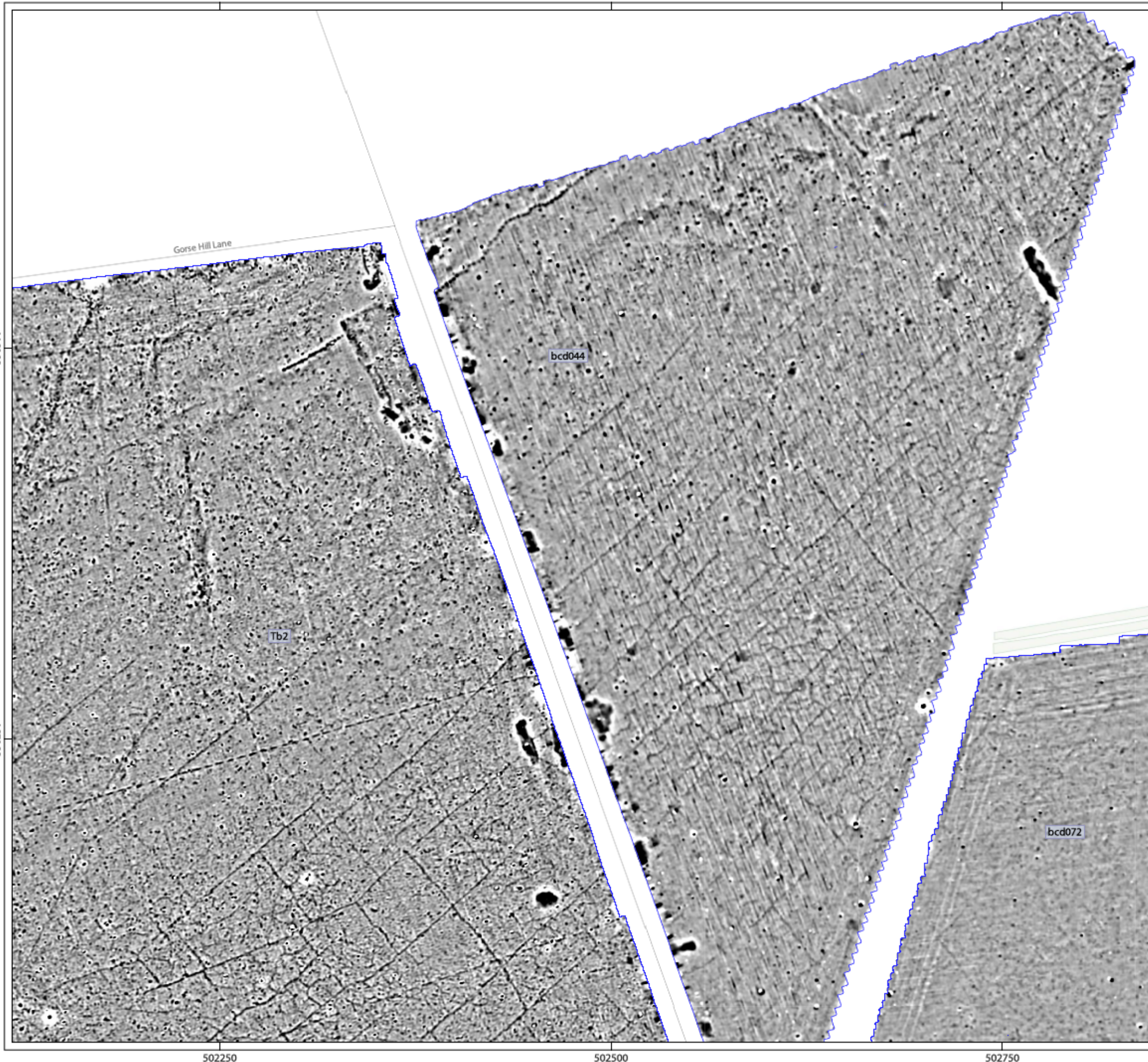
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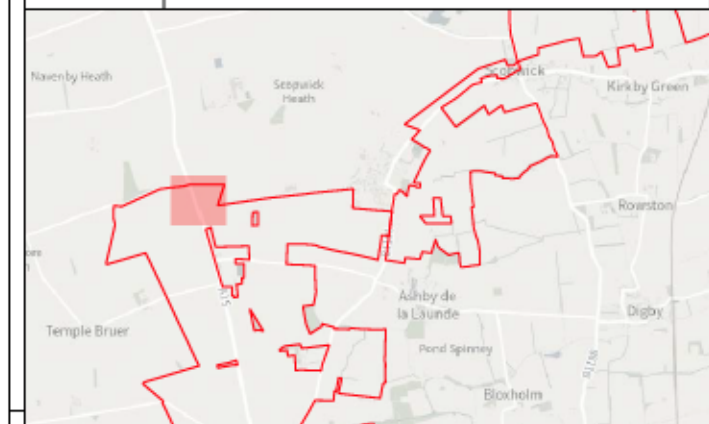
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Illus 06 - Cable option route interpretation of magnetometer data



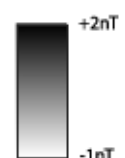
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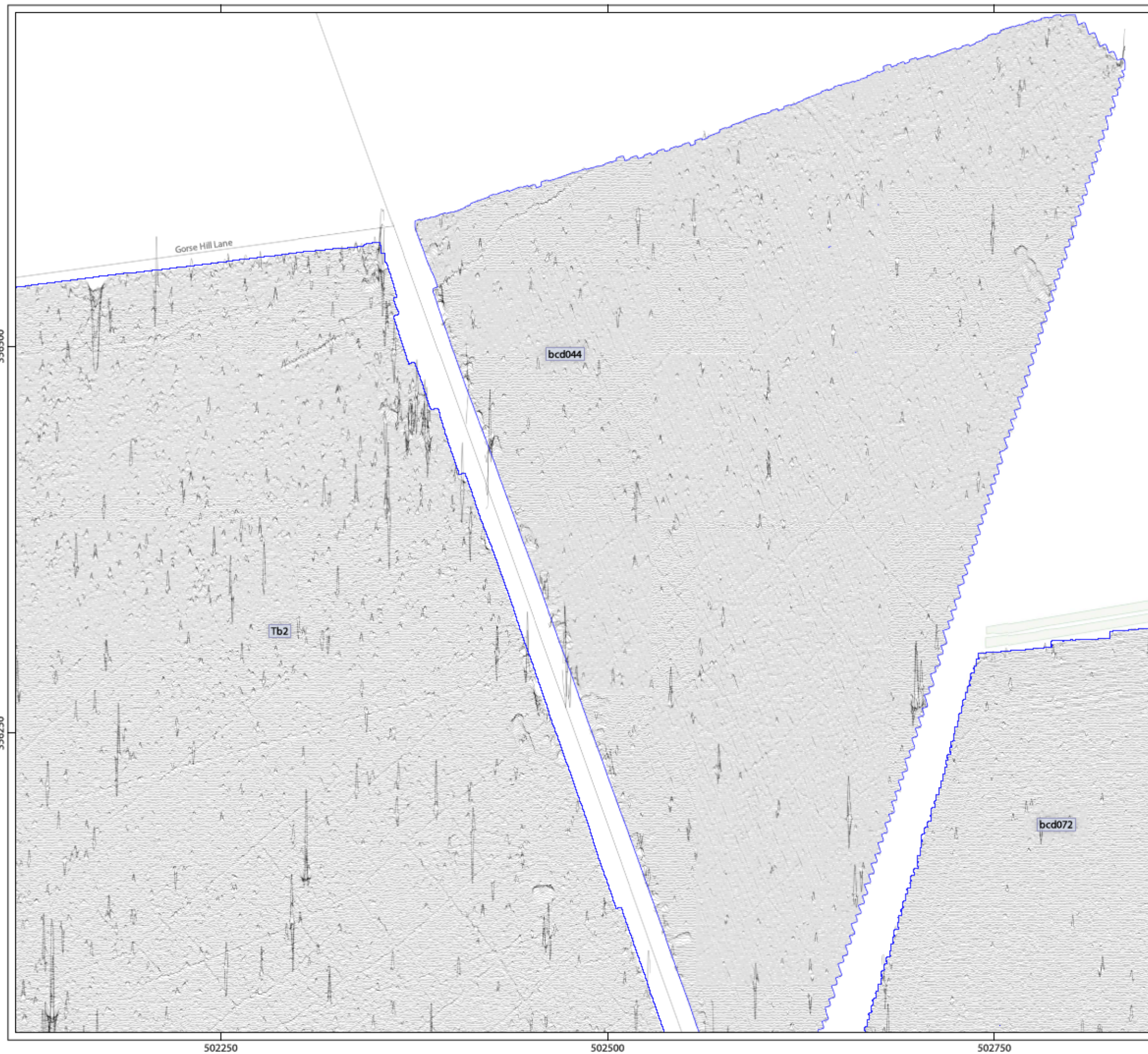


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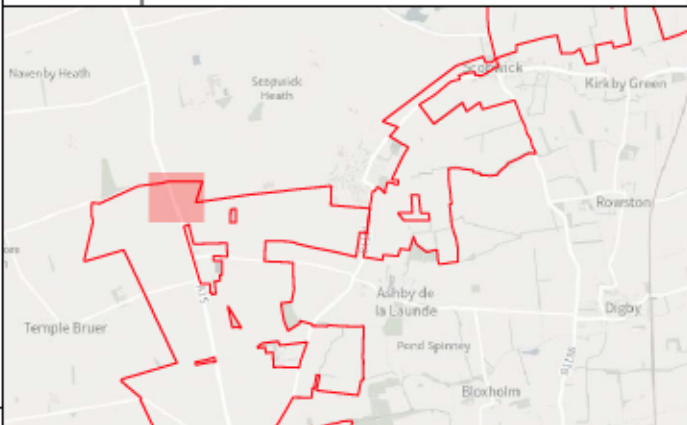
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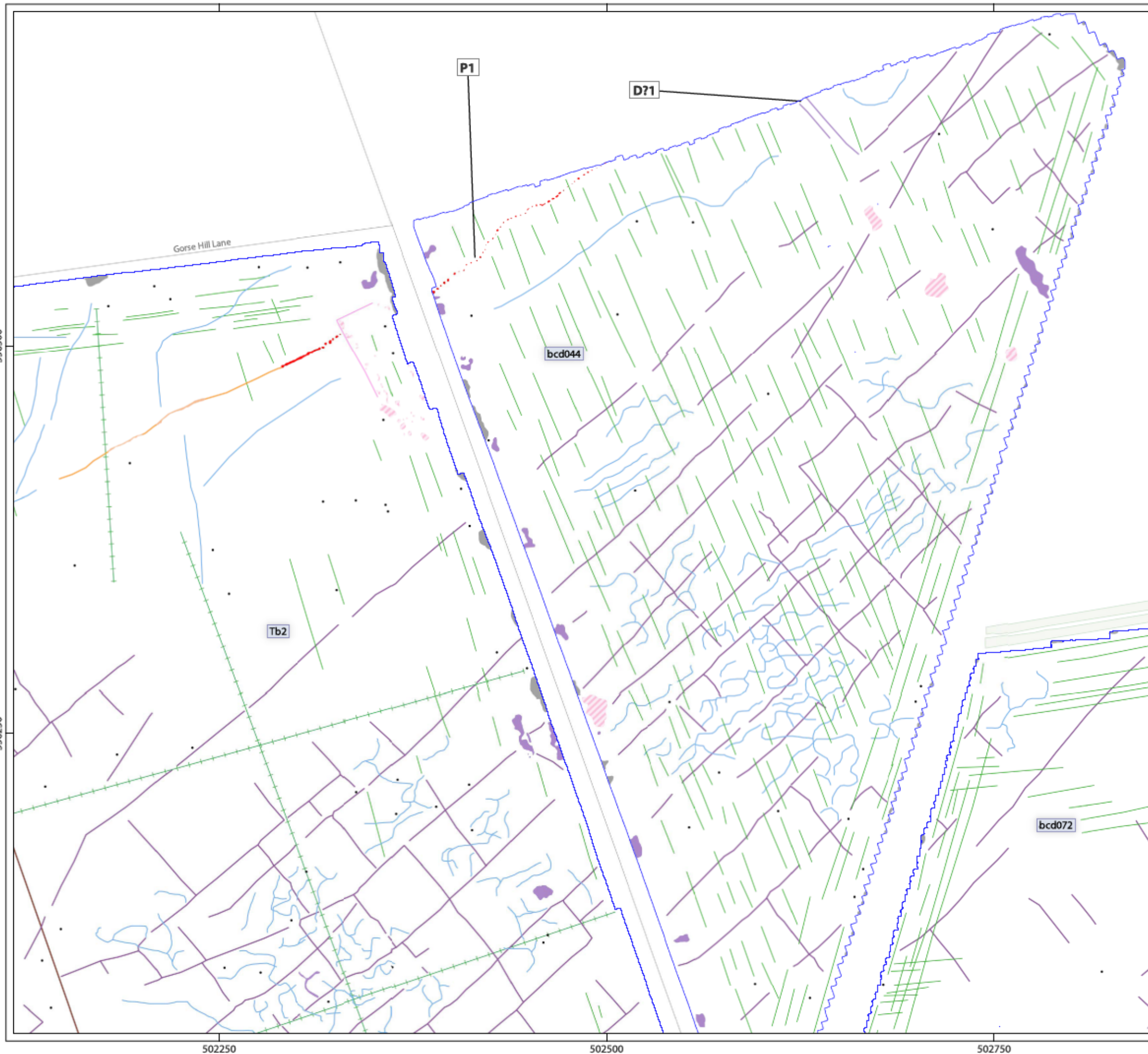
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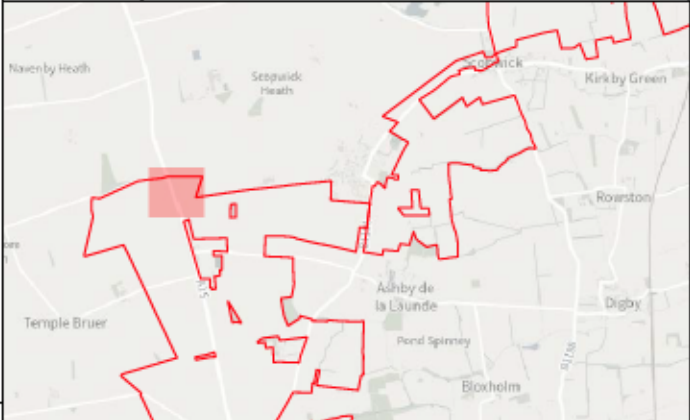
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Key

- Survey Extent
- Ferrous Objects
- Agriculture
- Field Boundary
- Field Drain
- Natural
- Uncertain
- Field System
- Possible Archaeology
- Quarry
- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- Quarry
- Uncertain

Abbreviations

D?	Ditch?
P	Pit Alignment

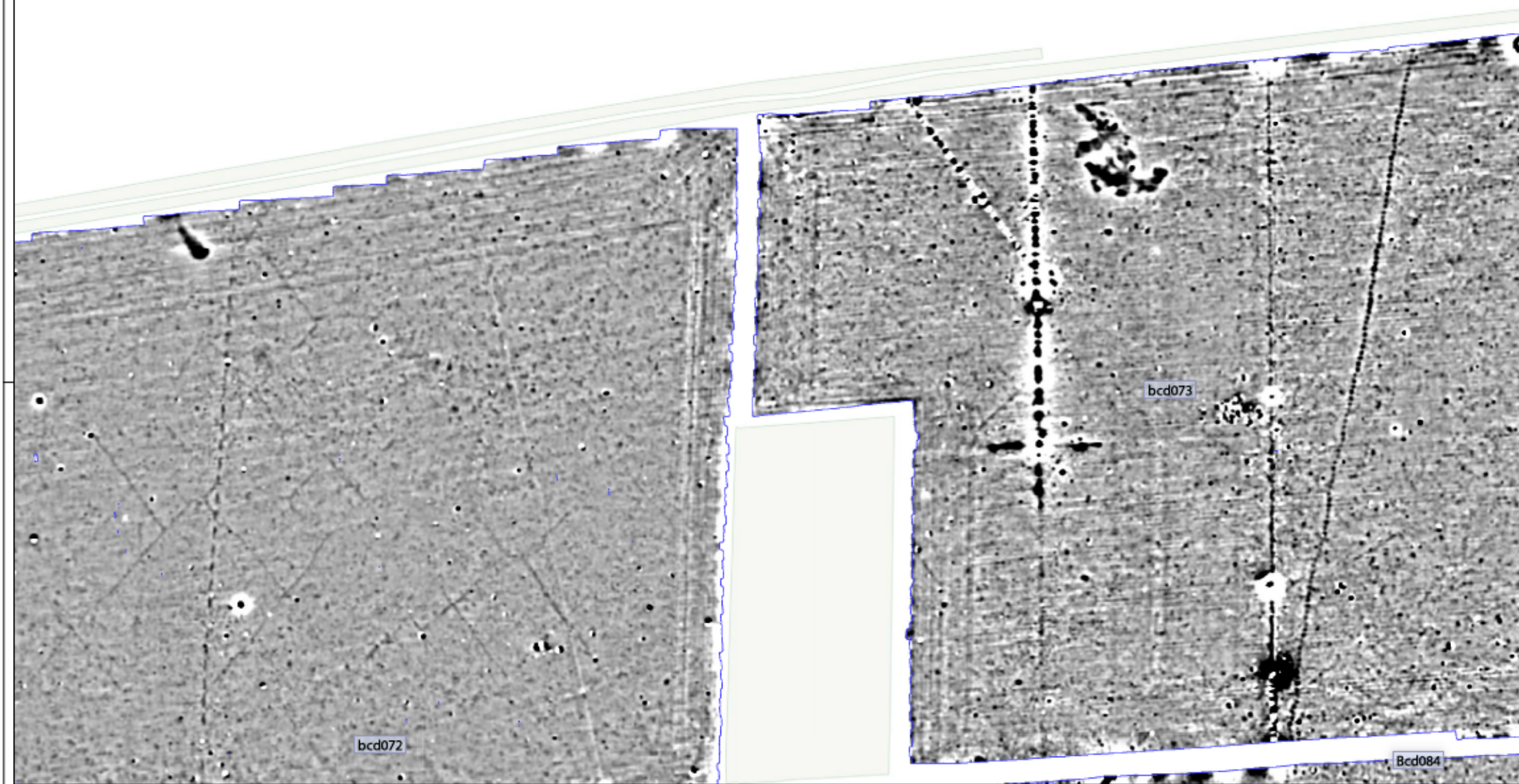
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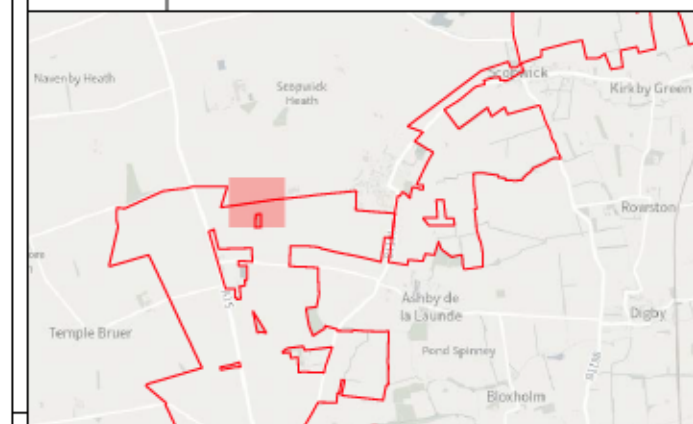
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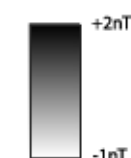
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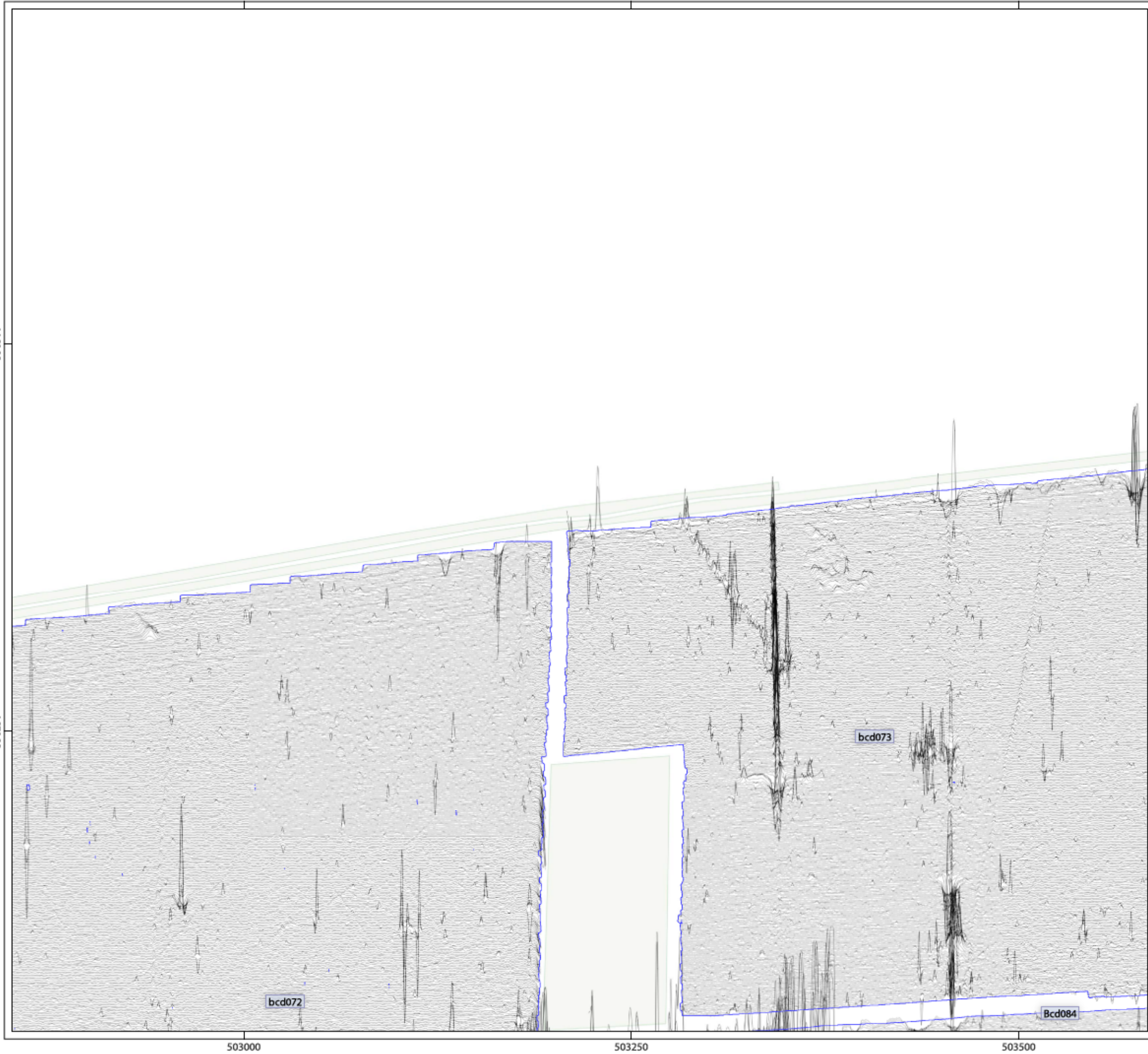



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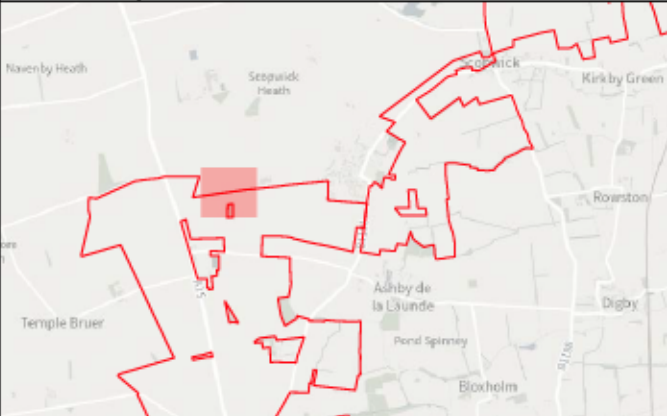






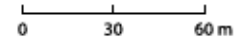


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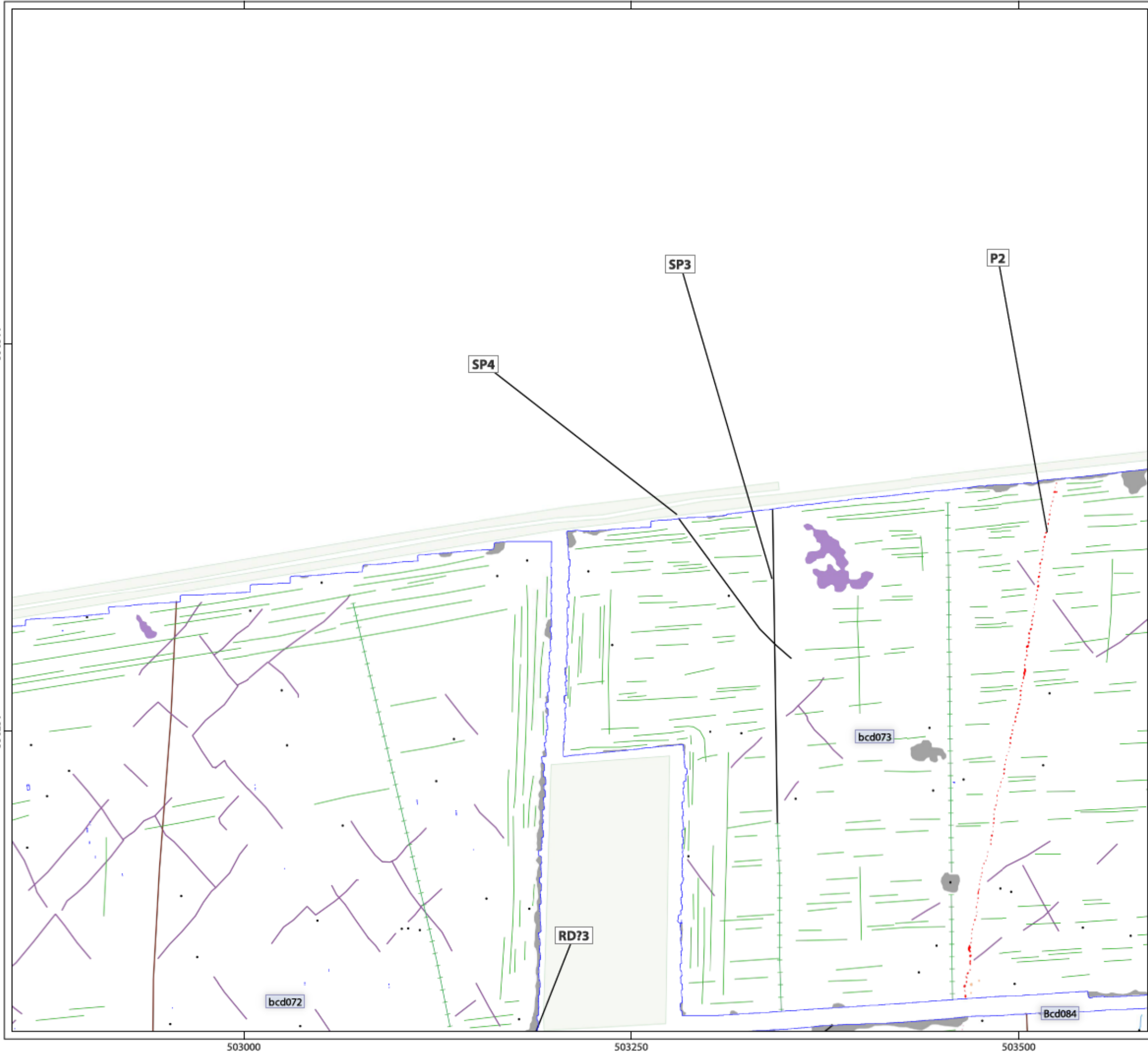



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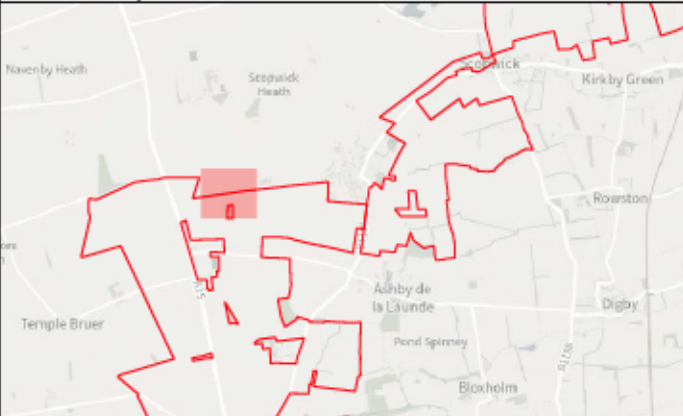






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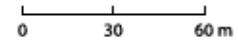


Key

- Survey Extent
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- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- Uncertain

Abbreviations

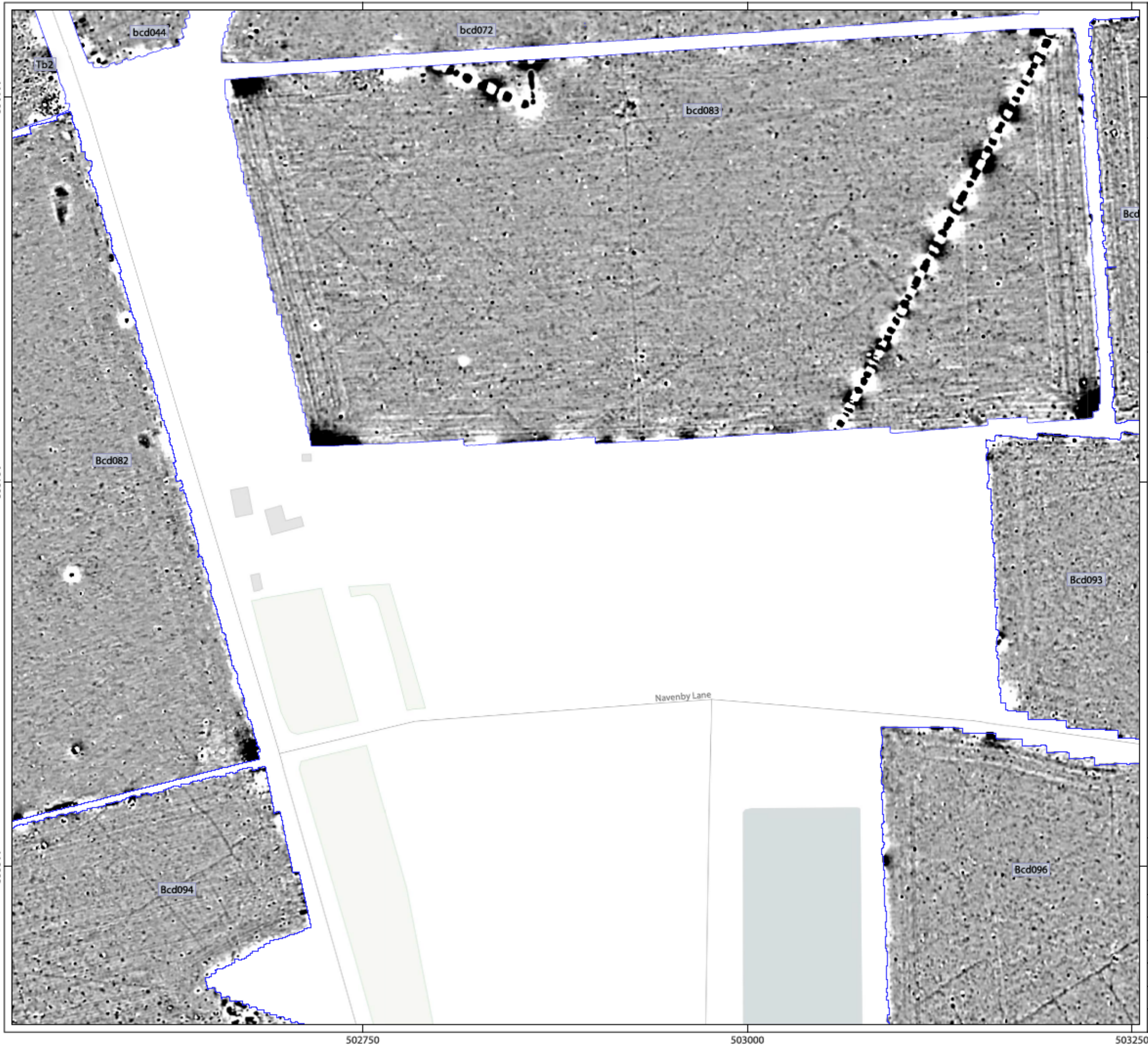
P	Pit Alignment
SP	Service Pipe
RD?	Ring Ditch?



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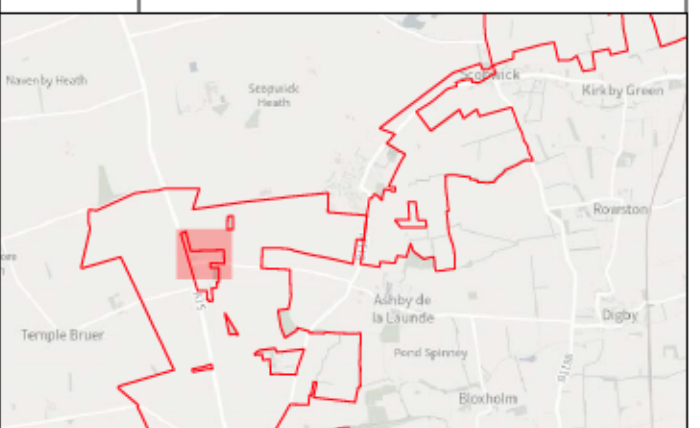
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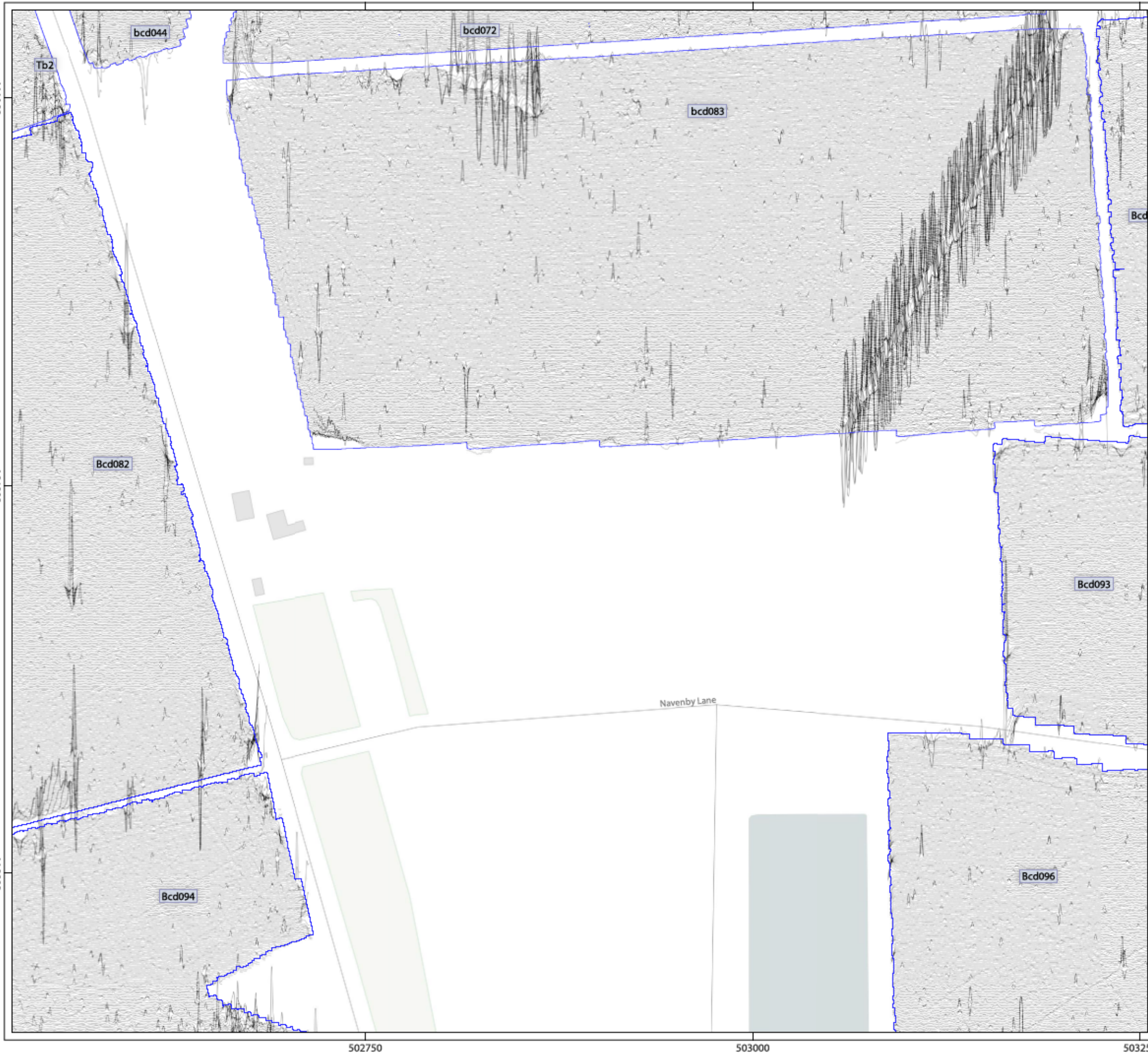
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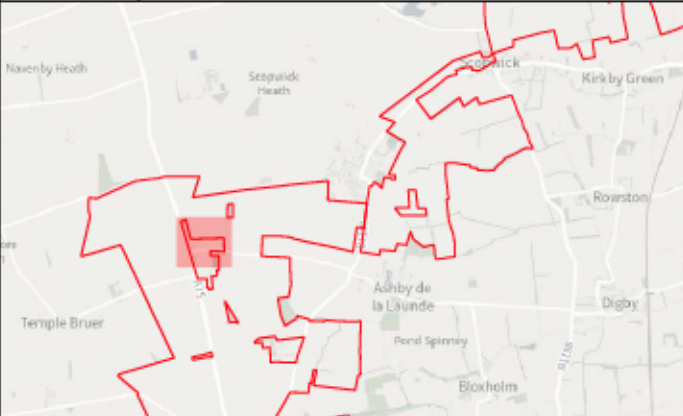






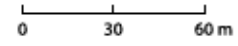
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Key

- Survey Extent
- XY Trace (25nT/cm)



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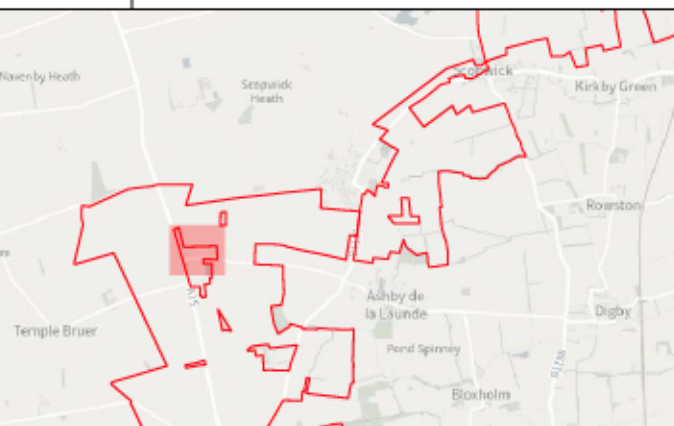
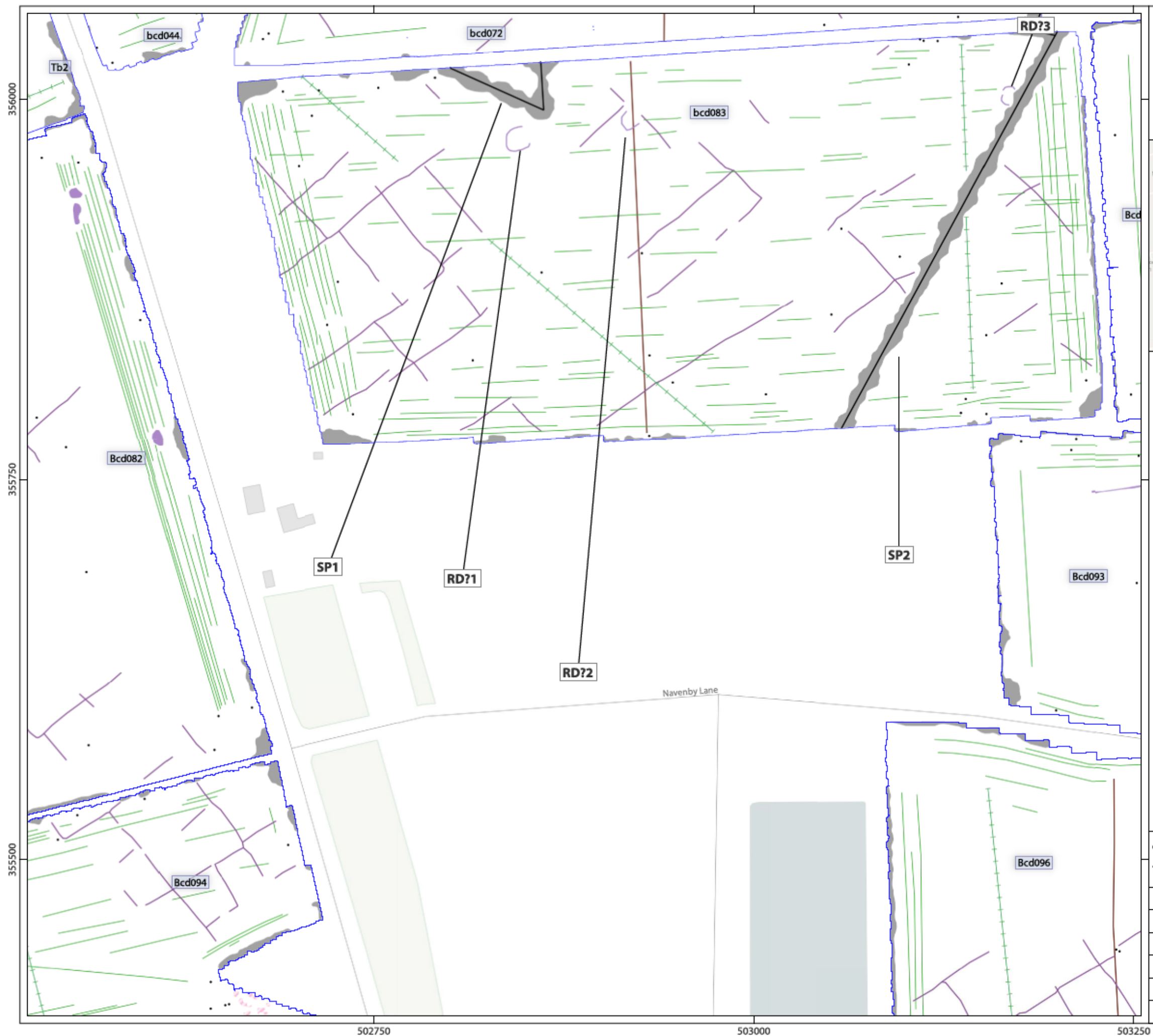
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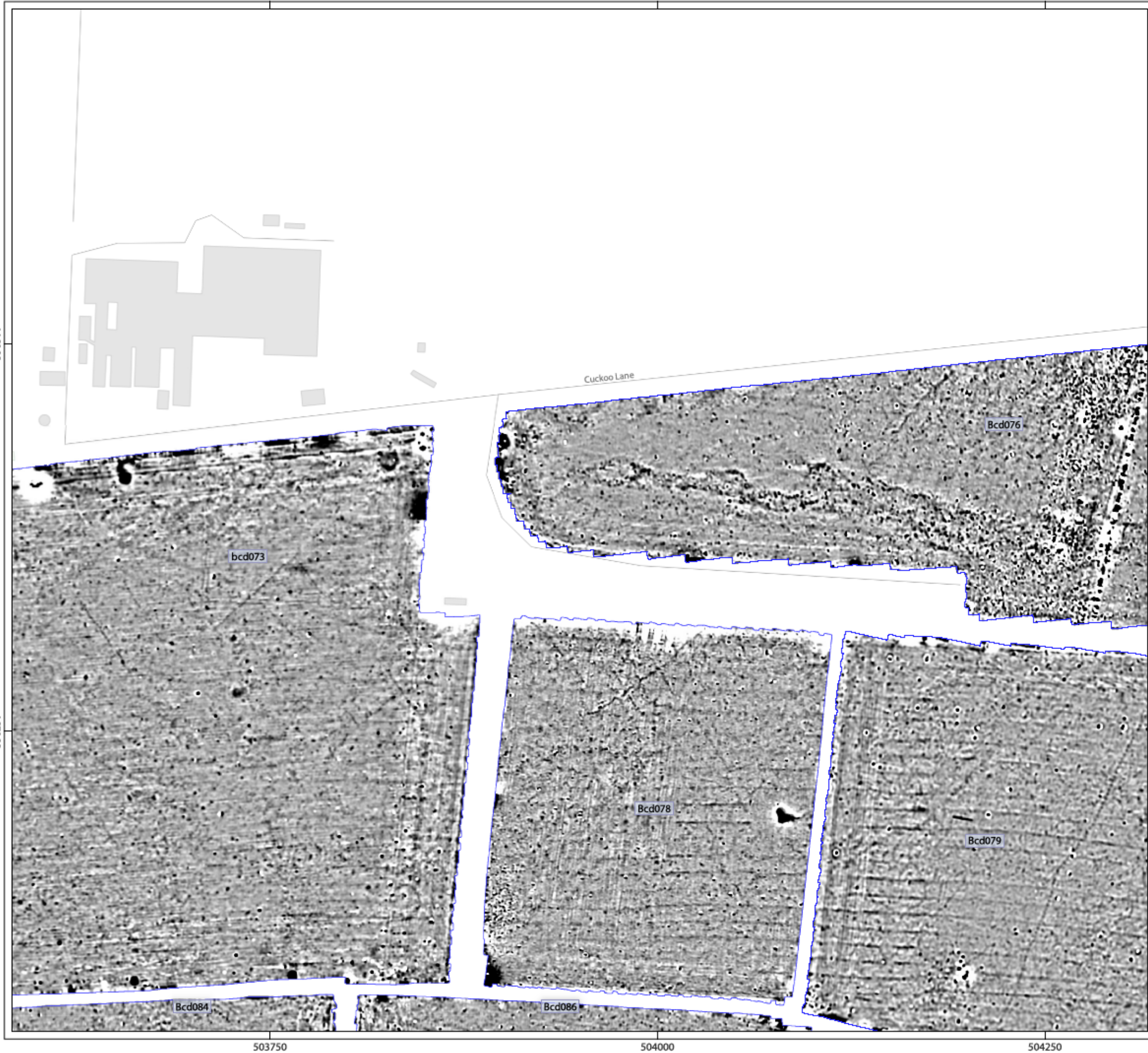


Key	
	Survey Extent
•	Ferrous Objects
—	Agriculture
—	Field Boundary
+ +	Field Drain
—	Pipe
—	Uncertain
—	Field System
	Magnetic Disturbance
	Quarry
	Uncertain

Abbreviations

SP	Service Pipe
RD?	Ring Ditch?


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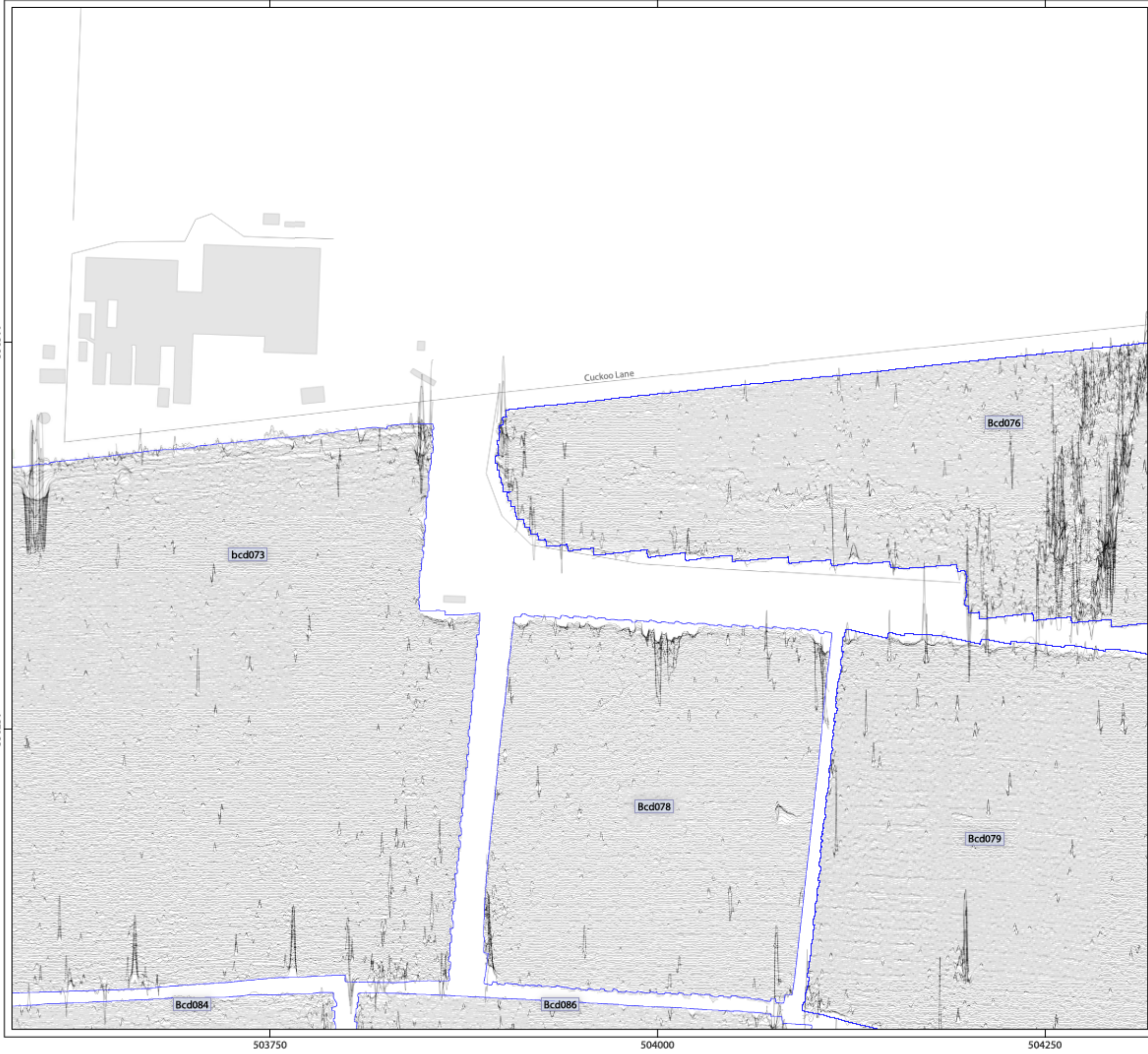
Key
 Survey Extent


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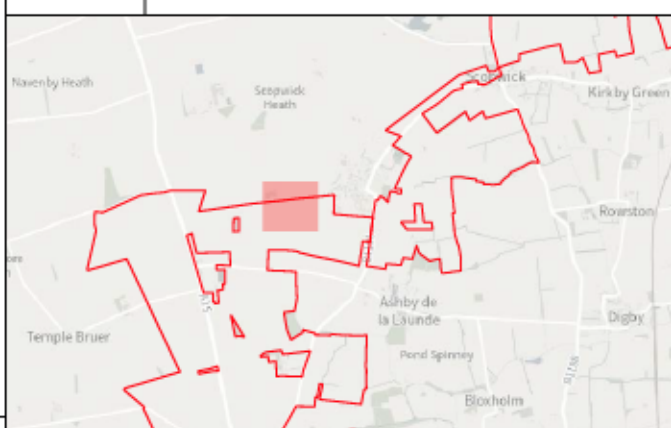
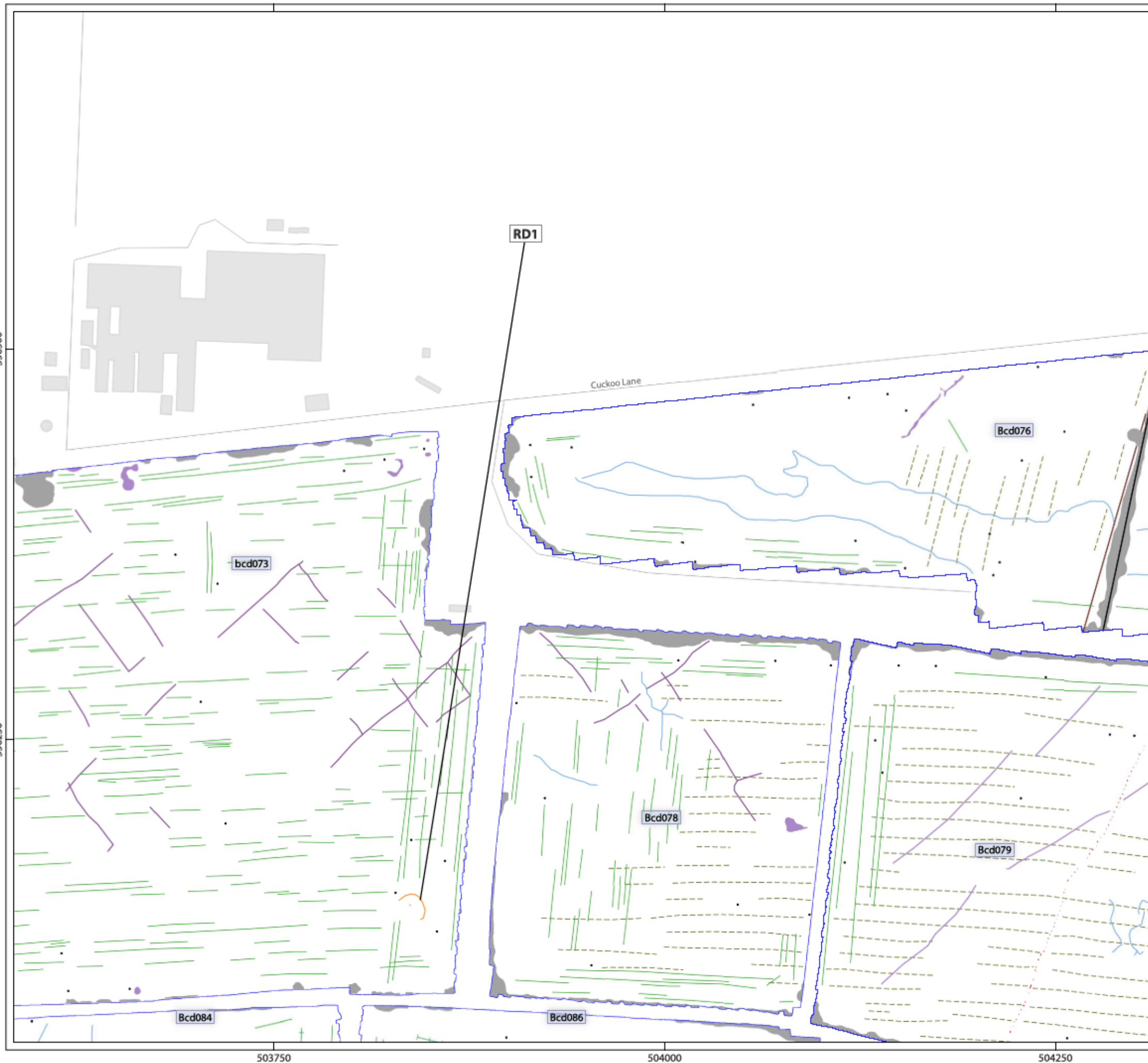
Key
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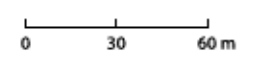


Key

- Survey Extent
- Ferrous Objects
- Agriculture
- Field Boundary
- Field Drain
- Natural
- Pipe
- Uncertain
- Ridge and Furrow
- Field System
- Possible Archaeology
- Archaeology
- Magnetic Disturbance
- Possible Archaeology
- Uncertain

Abbreviations

RD Ring Ditch



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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 (clay) can also be enhanced by the application of heat. This effect can lead to the detection of heat affected features such as hearths, kilns or areas of burning.

Types of magnetic anomaly

In most cases 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 soil 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 fencing 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

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 associated 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 MAGNETOMETER DATA PROCESSING

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

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

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

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



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