

**Archaeological geophysical survey of
land west of Barleythorpe, Oakham
Rutland
March - April 2022**

Report No: 22/037

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OASIS REPORT FORM

Land west of Barleythorpe, Oakham, Rutland		OASIS No: molanort1- 506624	
ACTIVITY TYPE			
Project/Activity type	Geophysical survey		
Reason for investigation	Planning: Pre-application		
PROJECT LOCATION			
National grid ref	484200 309900		
Site name	Land west of Barleythorpe, Oakham		
REVIEWERS/ ADMIN			
HER for project	Leicestershire and Rutland Historic Environment Team		
National organisation	Historic England		
WORK UNDERTAKEN			
Methodological summary	Magnetometer survey with a cart-mounted array of Bartington Grad601 fluxgate gradiometers.		
Previous work?	No	Future works?	Not known
Dates - Start date:	28th March 2022	End date:	5th April 2022
GEOPHYSICS			
Geology	Whitby Mudstone Formation/Northampton Sand Formation/Oadby Member Diamicton		
Land use	Pasture		
Survey type	Magnetometer survey		
Size of survey area	46ha		
Instrumentation	Bartington Grad-01-1000L		
Configuration	Multiple		
Spatial resolution	Traverse spacing	0.5m	Sample interval
Resolution (data values)	0.1nT		
BIBLIOGRAPHY			
Title	Archaeological geophysical survey of land west of Barleythorpe, Oakham, Rutland, March - April 2022		
Author(s)	Meadows, A.		
Publisher, place and date	MOLA Northampton / Northampton / 2022		
Report number	22/037		
Report release delay?	6 months		
PEOPLE			
Organisation	MOLA Northampton		
Project manager	John Walford		
Project supervisors	Adam Meadows		
Funding body	RPS Group		
KEYWORDS			
Monuments found/ date	Enclosure - Undated Settlement - Iron Age or Roman Ridge and furrow - Medieval Ring ditch - Undated		
RESULTS			
Description of outcomes	The survey detected a complex of probable Iron Age or Roman enclosures with an associated trackway, a separate rectangular enclosure of broadly prehistoric or Roman date, and a large number of small ring ditches. The latter were widely dispersed, heterogenous in character and did not convincingly resemble barrow ditches or round-houses. The survey also detected responses from the medieval and later ridge and furrow earthworks which extended across much of the survey area.		
ARCHIVES			
Accession ID	None		
Paper Archive repository	None		
Digital Archive repository	Archaeology Data Service		
<i>No finds made during survey - no finds archive to be deposited</i>			

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Archaeological geophysical survey of land west of Barleythorpe, Oakham, Rutland March to April 2022

ABSTRACT

MOLA (Museum of London Archaeology) was commissioned to undertake an archaeological geophysical survey of circa 46ha of land west of Barleythorpe, Oakham, Rutland. The survey detected a complex of probable Iron Age or Roman enclosures with an associated trackway, a separate rectangular enclosure of broadly prehistoric or Roman date, and a large number of small ring ditches. The latter were widely dispersed, heterogenous in character and did not convincingly resemble barrow ditches or round-houses. The survey also detected responses from the medieval and later ridge and furrow earthworks which extended across much of the survey area.

1 INTRODUCTION

MOLA (Museum of London Archaeology) was commissioned by RPS Group Ltd to conduct a magnetometer survey on c46ha of land west of Barleythorpe, Oakham, Rutland (Fig 1). The survey was intended to identify areas of potential archaeological interest that may be disturbed by a proposed development scheme.

The survey took place between 28th March and 5th April 2022. It was conducted according to the Written Scheme of Investigation (WSI) for the project (Meadows 2022), the details of which were informed by Chartered Institute for Archaeologists and European Archaeological Council guidelines (ClfA 2014 and Schmidt *et al* 2015).

2 BACKGROUND

2.1 Location and land use

The survey area comprises a block of pasture fields located to the west of Barleythorpe, Oakham, Rutland, with Manor Lane bounding its southern edge and the B640 and residential properties along its eastern boundary. The remaining boundaries are demarcated by hedgerows with further agricultural land found beyond.

At time of survey, livestock had been removed from the survey area. The ground conditions were largely firm with short grass cover, though one field had a coarser surface of tussocks and weeds. A pump house was located among a clump of trees in the north-western portion of the survey area, and there were a number of other minor obstructions, such as small ponds, elsewhere.

The fields within the survey area have been numbered from Field 1 to Field 10 for ease of reference, as shown on Figure 1 and on inset keys on the other figures of this report.

2.2 Geology and topography

The central and eastern parts of the survey area lie on predominantly level ground measuring c130m above Ordnance Datum (aOD). The western end of site is more elevated, rising steeply to c170m aOD and c159m aOD in the north-western and south-western corners respectively. Between these two high points is a trough-shaped hollow forming the head of a small stream valley.

The solid geology of the survey area is predominantly Whitby Mudstone Formation mudstone of the Jurassic period, though a small area of Northampton Sand Formation ironstone, also of Jurassic age, underlies the high ground in the north-west. Drift geology, comprising Oadby Member Diamicton of the Quaternary period, is also mapped in the north-western corner of the survey area (BGS 2022).

2.3 Historical and archaeological background

A possible late Neolithic settlement is thought to be located c200m to the north-east of the survey area. Archaeological trial trench evaluation conducted there in 2007 and 2013 recorded pits and ditches with numerous finds including worked flints, grooved ware and beaker pottery (MLE18644). Less certainly, a geophysical survey conducted c1km north-west from the survey area at Pasture Farm, Langham in 2021 identified possible prehistoric ditches underlying medieval ridge and furrow (MLE26634, MLE26633).

Fragments of a Bronze Age vessel were recovered at a primary school in Langham in 1975, c1km north of the survey area. Described as a 'food vessel with legs' it is thought to possibly relate to a burial (MLE5441).

A findspot at 25 Cold Overton Road Langham, c900m north of the survey area, produced two flint cores dating from the Neolithic-Bronze Age as well as Roman pottery comprising a colour-coated ware beaker rim and sherds of grayware (MLE10112).

A possible Iron Age to Roman field system was uncovered during the trial trench evaluation north-east of the survey area in 2007 and 2013. Numerous ditches and pits were uncovered and finds from the site included slag, and Iron Age and Roman pottery sherds (MLE21087).

The 2007 evaluation also identified Saxon settlement remains c200m east of the current survey area. A sunken-floored structure contained charcoal, butchered animal bone and pottery dating from the 5th to 8th centuries AD. A later geophysical survey of the area, conducted in 2010 claimed to have detected evidence of a further two structures, and further trial trench evaluation in 2012 also found some potential structural remains, though dating evidence was lacking (MLE17746).

The historic core of the hamlet of Barleythorpe is located c300m south of the survey area. It is not mentioned in the Domesday Book of 1086; instead the earliest mention dates from 1179, in regards to a lay fee paid to the Exchequer by Willam the priest of 'Torp' (MLE9502).

Medieval ridge and furrow earthworks are present across much of the survey area with the alignment across much of the site running east to west, with the westernmost fields displaying a north to south alignment (Google Earth 2022).

3 METHODOLOGY

3.1 Fieldwork

The survey was undertaken with a Bartington magnetometer cart. This is a two-wheeled, lightweight sensor platform operated by hand. It incorporates a bank of six vertically-mounted Bartington Grad-01-1000L magnetic sensor tubes, spaced at sub-metre intervals along a bar aligned crossways to the direction of travel. It also incorporates a Leica Geosystems Viva GNSS antenna, mounted on the central axis.

The magnetic sensors were calibrated ('zeroed') at the start of each day's work to minimise any heading errors or offsets between the zero points of each individual sensor.

The cart was propelled along straight and parallel traverses across each survey area, with data logging being manually toggled on and off at the start and end of each traverse to avoid the collection of spurious data whilst turning. Traverse ends were marked with ranging poles to aid even coverage, and the evenness of coverage was further checked by monitoring the positional trace plotted in real time by the MultiGrad601 logging software.

The magnetic sensors were set to output data at a rate of eight readings per second. The GNSS antenna was set to output NMEA format data (GGA messages) at a rate of one position per second. These data streams were compiled into a single raw data file by MultiGrad601 logging software.

The typical speeds of coverage were c1.7m/s, with some variation depending on the terrain and slope. The combination of sensor spacing, survey speeds and data output rates ensured that the spatial resolution of all the data sets would be better than 0.25m x 0.50m.

3.2 Data processing and presentation

The raw survey data was initially processed with MLGrad601 software, which calculated a UTM co-ordinate for each data point by interpolating the GPS readings and applying offset corrections based on the array geometry and calculated heading direction. This produced an output file in XYZ format which could be imported into TerraSurveyor software for data visualisation and further processing.

The raw XYZ data exhibited striping caused by slight mis-matches in the calibration of the individual magnetic sensors. This was removed in TerraSurveyor by applying the median de-stripe function to runs of data from each sensor.

The processed survey data is presented in this report as greyscale raster images which have been rotated and scaled to fit against Ordnance Survey base-mapping. The processed results are presented at a scale of $\pm 4\text{nT}$ (Figs 2-4) and the raw data at $\pm 10\text{nT}$ (Figs 8-10).

The interpretation of the data has been undertaken in a qualitative manner, based on the recognition of distinctive anomaly types and patterns and taking into account field observations and historic map evidence. The interpretation overlays (Figs 5-7) show the main anomalies identified but, for clarity's sake, omit some minor anomalies including magnetic halos and the majority of small ferrous dipoles.

4 SURVEY RESULTS

4.1 Archaeology

The survey has identified two principal archaeological sites. One of these lies in the north-western corner of the survey area (Field 3), on the plateaued ground near the peak of the hill, and the other lies on lower ground towards the centre of the survey area (Fields 7 and 10). A few lengths of ditches in other locations may also be archaeological.

The north-western site contains a rectilinear enclosure measuring 36m by 20m, with its longest axis aligned east-north-east by west-south-west (Figs 2 and 5). There is a 4m wide entrance gap in the western arm of the enclosure ditch, and this is flanked by magnetically enhanced ditch terminals. Some gaps in the southern arm are more likely to be the result of truncation by later ridge and furrow, and a furrow also overlies the eastern arm of the enclosure.

A fragmented, sinuous linear ditch also lies in Field 3. It is aligned broadly north to south, running past the eastern end of the enclosure (Figs 2 and 5).

The other archaeological site lies in the east of Field 7 and the adjacent part of Field 10 (Figs 3 and 6). It comprises of an area of ditched enclosures, all broadly rectilinear in shape. The western enclosure has a simple form, with a partition in the north-western corner, whereas the eastern enclosures have a more complicated appearance and are probably a sequence of overlapping remains resulting from several phases of site development. A ditch appears to link the western and eastern enclosures, and another ditch is positioned to their south. To the north there is a discontinuous pair of ditches, probably defining a trackway, which leads away from the enclosures across Fields 8, 9 and 10 (Figs 4 and 7).

At the southern edge of the survey area, west of the Manor Lane farm buildings in Field 6, a linear ditch extends westwards before turning nearly 90 degrees to the south (Figs 3 and 6). This may represent the partial remains of another enclosure, a continuation of which could be expected to exist on the southern side of the lane.

4.2 Possible archaeology

The survey data features over twenty small sub-circular anomalies, perhaps representing ring ditches, that seem random in their spread and positioning. They have diameters measuring between 4m and 9m and are variable in form, some being nearly circular and others irregular or D-shaped. They are also variable in their magnetic intensity, with a few exhibiting moderately strong responses suggesting the presence of burnt soil. They show little, if any, evidence of having been cut by the ridge and furrow, which might suggest they are relatively recent and superficial features. However, they do not correspond to anything visible on the ground surface.

A slightly larger sub-circular anomaly is located in the north-western corner of Field 6, with a linear anomaly approaching it from the east (Figs 3 and 6). Unlike the other ring ditch anomalies these do appear to be cut by the ridge and furrow, suggesting that they may be traces of an enclosure and ditch pre-dating the medieval period. No internal features or clear entrance gap is discernible within this putative enclosure.

To the south of the stream in Field 1, there are slight anomalies which may represent parts of a small rectangular enclosure (Figs 2 and 5). However, the anomaly is more 'noisy' than a typical ditch response, and it lies in an area where there is a risk of former stream meanders mimicking man-made ditches.

Some linear anomalies lie in the north-west of Field 8 (Figs 2 and 5). These may represent ditches, but their weak magnetic response and broken up appearance precludes a more confident archaeological interpretation. Similarly, a loose scatter of discrete positive anomalies in the south of Field 10 may represent pits but cannot be definitively interpreted as such (Figs 4 and 7).

4.3 Medieval ridge and furrow cultivation

The survey area is covered with the earthwork remains of medieval to early post-medieval ridge and furrow cultivation, and these are represented by sets of parallel sets of linear anomalies extending throughout the entire data set. As noted previously, the furrows have cut through the underlying archaeology, giving many ditches a misleadingly segmented appearance.

The orientation of the furrows is mostly north to south in the southern and western portion of the survey area, whereas in the north and east the orientation is mostly east to west. There is some correlation between these alignments and the topography of the site, with the furrow tending to be aligned up and down slope.

4.4 Field drains

The survey has detected some probable ceramic field drains, represented by thin, weak linear anomalies composed of alternate positive and negative elements. Many of these lie along the bases of the ridge and furrow earthworks, although some cut across the furrows on other alignments.

Other anomalies in Fields 7 and 9 are also attributed to field drains, albeit with less confidence. The interpretation of these is not based on the anomaly type, but on their occurrence as groups of parallel features lying diagonally to the surrounding field boundaries.

4.5 Utilities

The data shows two strongly ferrous, magnetically alternating, linear anomalies that cross each other near the centre of the survey area. These represent buried metal pipes, with one leading eastwards towards Barleythorpe from the pump house in the north-west, and the other entering the survey area from the north and working its way southwards, terminating at the stream.

Much slighter anomalies of similar character occur south of the stream in the western tip of Field 1 (Figs 2 and 5). These may indicate drains associated with the canalisation of the stream; alternatively, they may be fragments of defunct pipes associated with a small agricultural building which historic Ordnance Survey maps show to have stood nearby in the late 19th and early 20th centuries (Fig 5).

Further buried services, present in the eastern half of the survey area, are marked by weak magnetically negative, linear anomalies. These are typical responses for utility trenches containing non-ferrous (plastic, copper, etc) pipes or cables. Two separate runs in the east of Field 6 lead north-east from the farm buildings on Manor Lane (Figs 3 and 6), and another crosses Field 10 and apparently continues into Field 7, terminating at a large ferrous object (Figs 4 and 7).

4.6 Modern paths and tracks

The data from Fields 9 and 10 exhibits a few pairs of thin, negative, linear anomalies that are aligned north-north-west to south-south-east (Figs 4 and 7).. These correspond to wheel ruts and a raised bank (perhaps the remains of a modern track) that were visible on the grounds surface at the time of survey.

Similar, though more sinuous and fragmented, anomalies are present in the south of Field 6 (Figs 3 and 6). These too represent minor tracks or paths, along with some sharp breaks in slope.

4.7 Uncertain

The survey data contains a few linear anomalies which are difficult to interpret and could have a wide variety of explanations including ditches, drains, backfilled wheel-ruts, plough marks or scars from earthmoving. Some may represent fragments of archaeological features whilst others could be natural or recent in origin.

4.8 Ferrous material

The survey has detected a multitude of individual dipolar anomalies scattered at random across the entire survey area. These will mostly result from ferrous materials in the topsoil, including discarded pieces of farming equipment, lost horseshoes and general rubbish. A few small concentrations of such anomalies may relate to patches of hardcore, such as may be used to firm up gateways or other pockets of soft ground, and one concentration on the southern edge of Field 1 probably indicates the debris from the small agricultural building which historic Ordnance Survey maps show to have stood there in the late 19th and early 20th centuries.

Two large, magnetically positive halos in Fields 6 and 8 are due to extant electrical pylons and a similar positive halo is present in Field 6, alongside the metal-framed barns by Manor Lane (Figs 3 and 6). Much smaller halos occur elsewhere, due to fences, cattle troughs and other metal objects.

4.9 Geology

Anomalies of a geological origin are mainly present in Fields 3 and 10, though a few outliers occur in other fields. They appear as diffuse bands and patches of magnetic disturbance, often with a weak negative halo and a weakly positive interior. The two main groups, although widely separated, both have similar north-west to south-east trending alignments, possibly indicating the direction of bedding the geology exhibits below.

5 CONCLUSION

The survey has identified two probable archaeological sites, one an enclosure and adjacent linear ditch in Field 1, and the other a larger complex of enclosures in Fields 7 and 10. The first of these sites is quite plain and undiagnostic so it cannot be closely dated. An Iron Age or Roman date might be a reasonable assumption based on the general abundance of enclosures from those periods, although an earlier prehistoric date cannot be ruled out.

The second, and larger archaeological site resembles a typical enclosed rural settlement dating from the Iron Age or the Roman period. Its layout shows some complexity, suggesting that it may have been a relatively long-lived site and that several overlapping phases of remains are present. A trackway, of presumably contemporary date, leads away from this site to the north-east.

Apart from the two main sites, the survey has detected some smaller and more doubtful archaeological features, including two possible small enclosures, a scatter of possible pits, and over twenty small ring ditches. The latter are unusual and challenging to interpret, being smaller, and (mostly) less regular than typical Iron Age or Roman roundhouse gullies, much smaller than typical prehistoric ring-ditches and too widely and randomly distributed to be regarded as any sort of coherent archaeological 'site'. Furthermore, unlike the definite archaeological features described above, they appear not to have been cut through by the medieval and later ridge and furrow.

Taking the above considerations into account, it seems most likely that the ring ditches are relatively recent and superficial features. One possible explanation which fits the evidence would be that they are post-medieval haystack gullies, dug to provide a measure of improved drainage around the stacks. This is by no means a definite interpretation, but is the most credible one that the author can think to suggest.

6 BIBLIOGRAPHY

Meadows, A, 2022 *Written Scheme of Investigation for archaeological geophysical survey of Barleythorpe Site 2, Oakham, Rutland*, MOLA Northampton

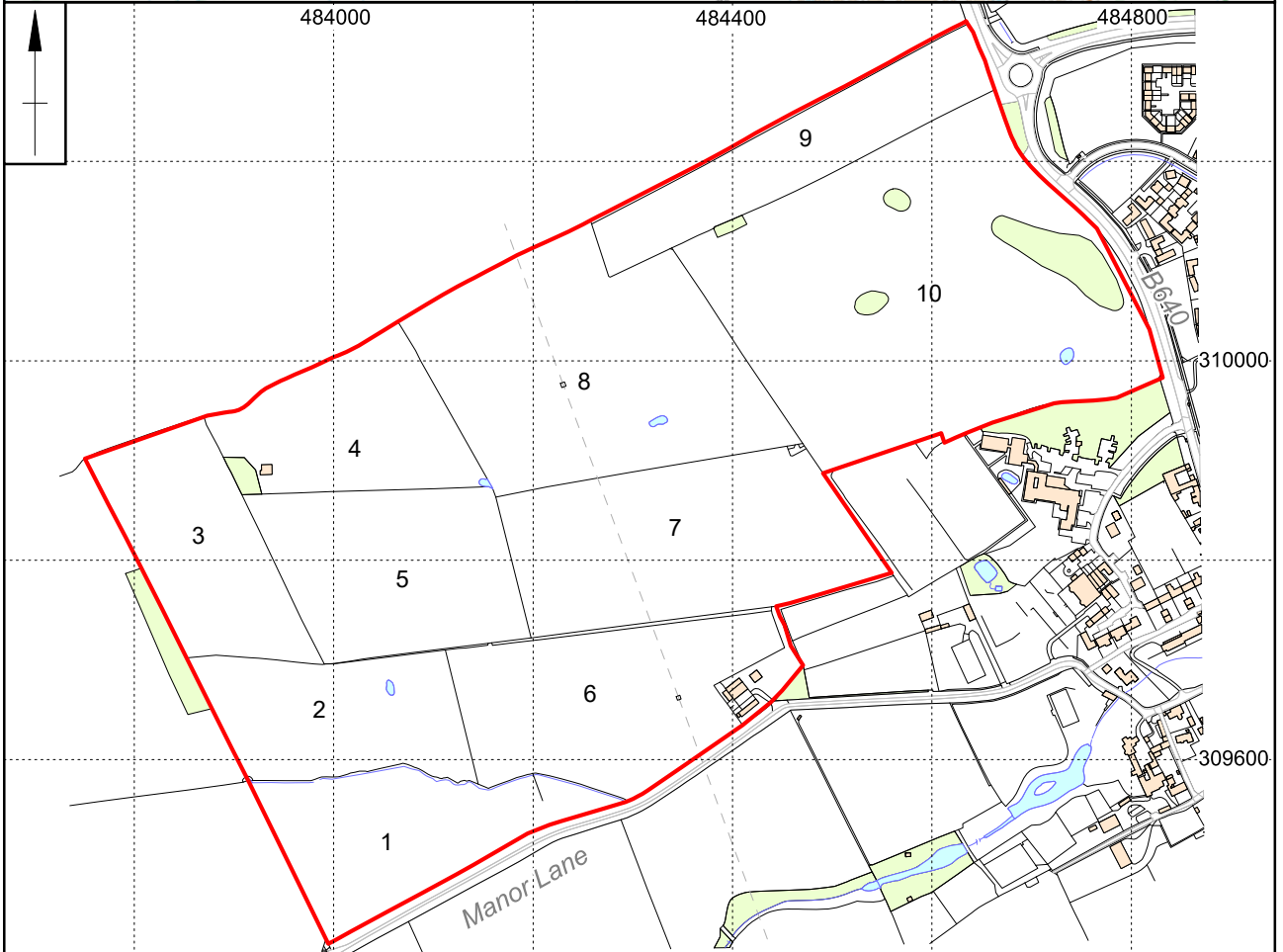
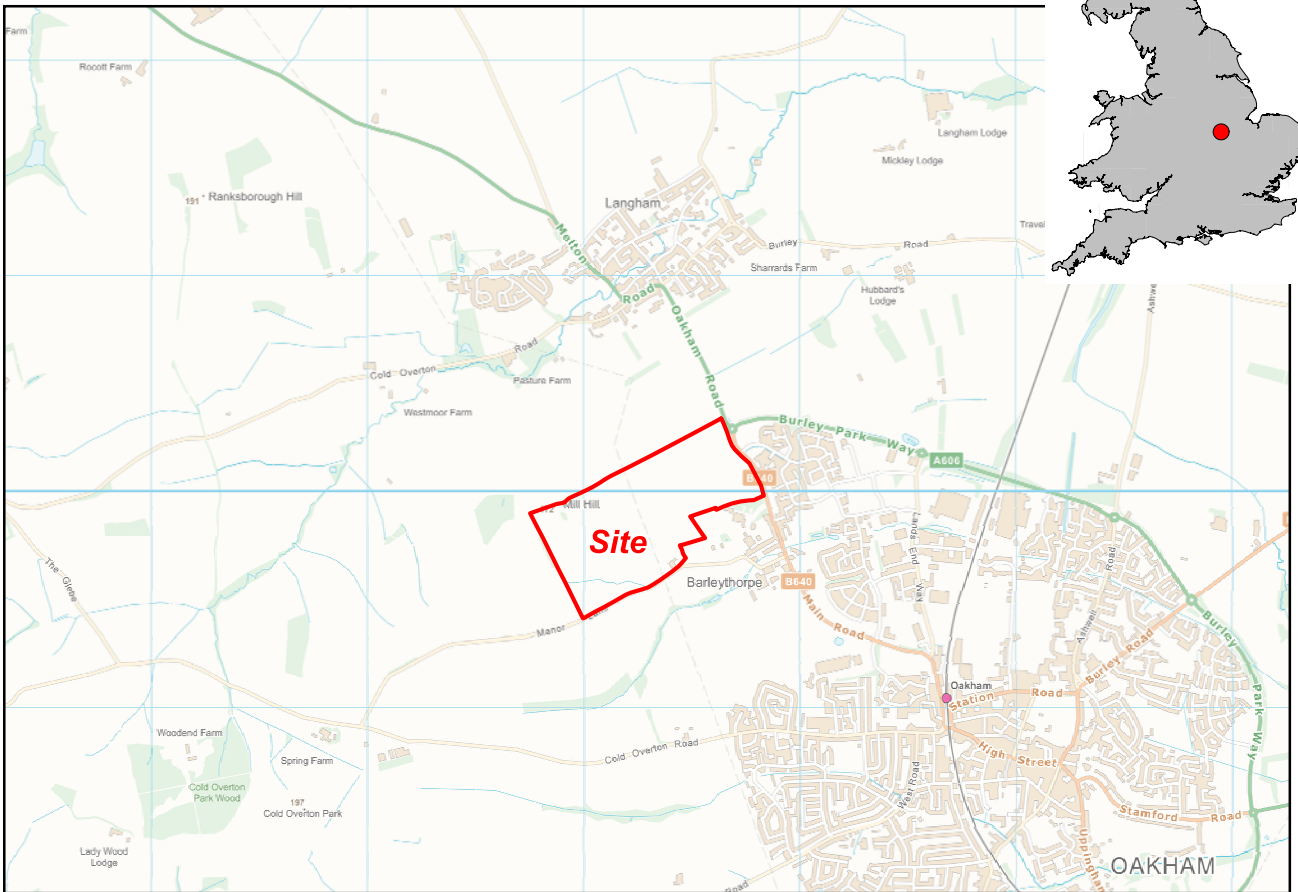
BGS 2022 The British Geological Survey Geology of Britain Viewer, available at <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>, accessed May 2022

CIfA 2020 *Standard and guidance for archaeological geophysical survey*, Chartered Institute for Archaeologists

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

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13th May 2022



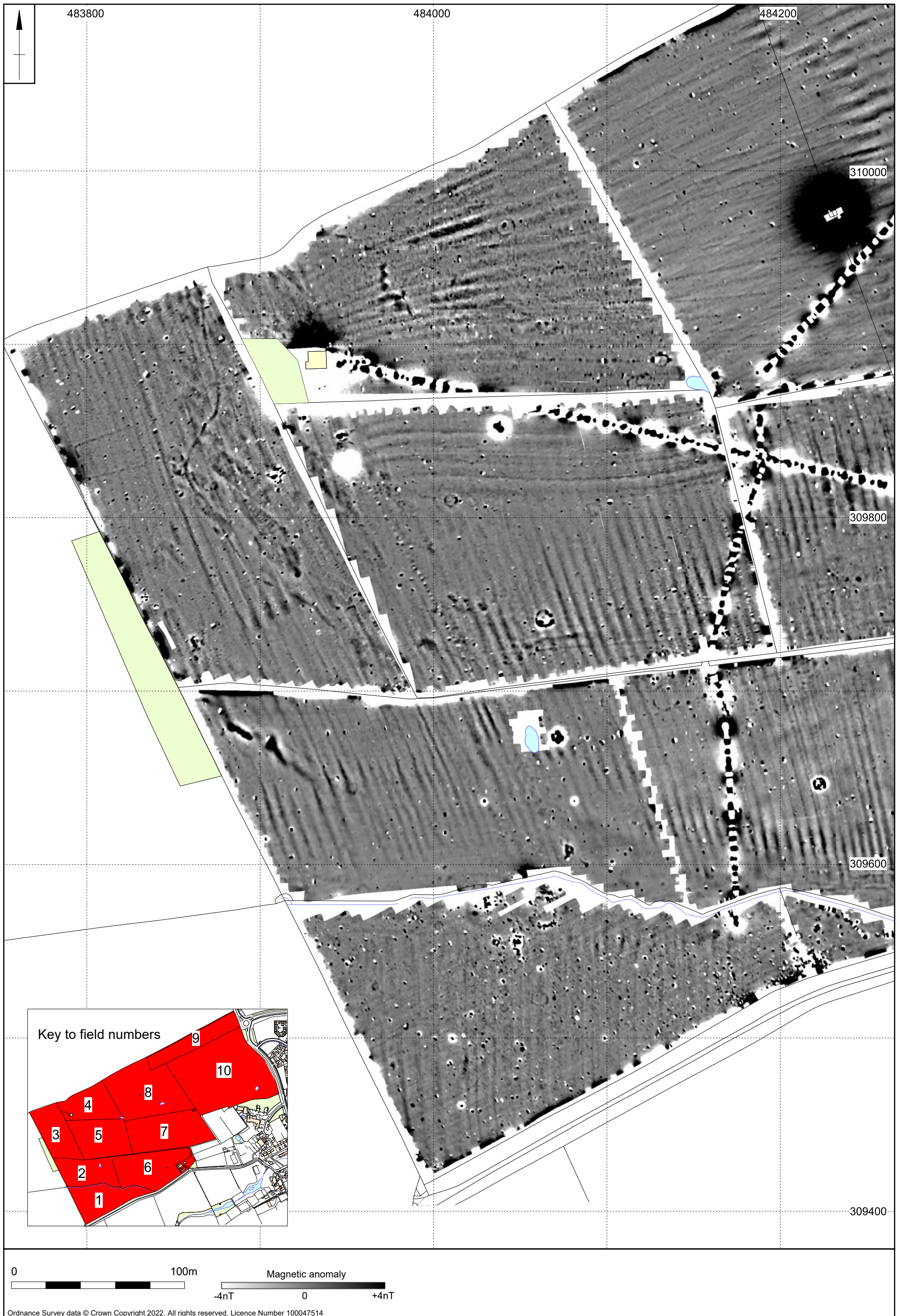
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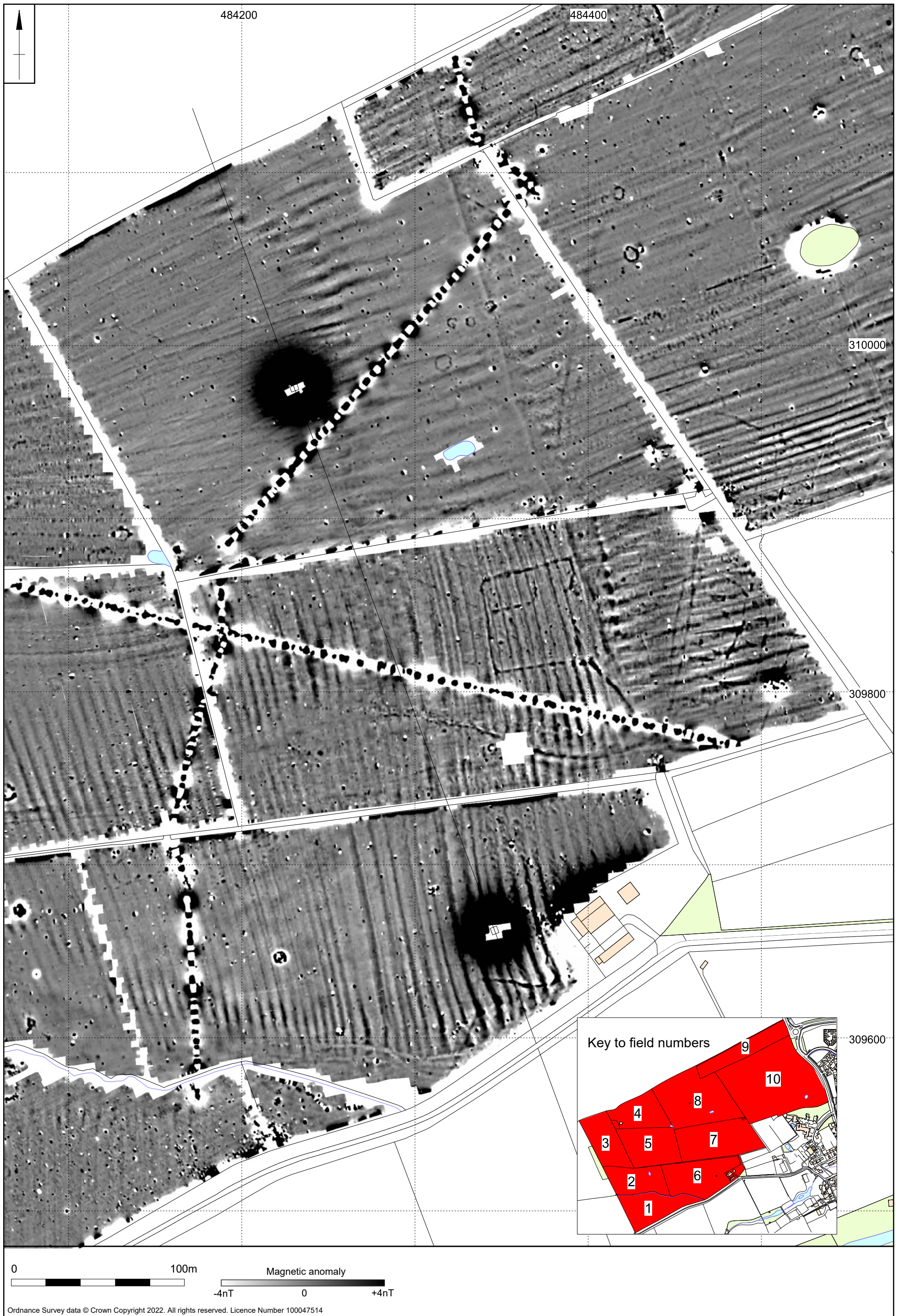
Survey area

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Scale 1:7500

Site location Fig 1

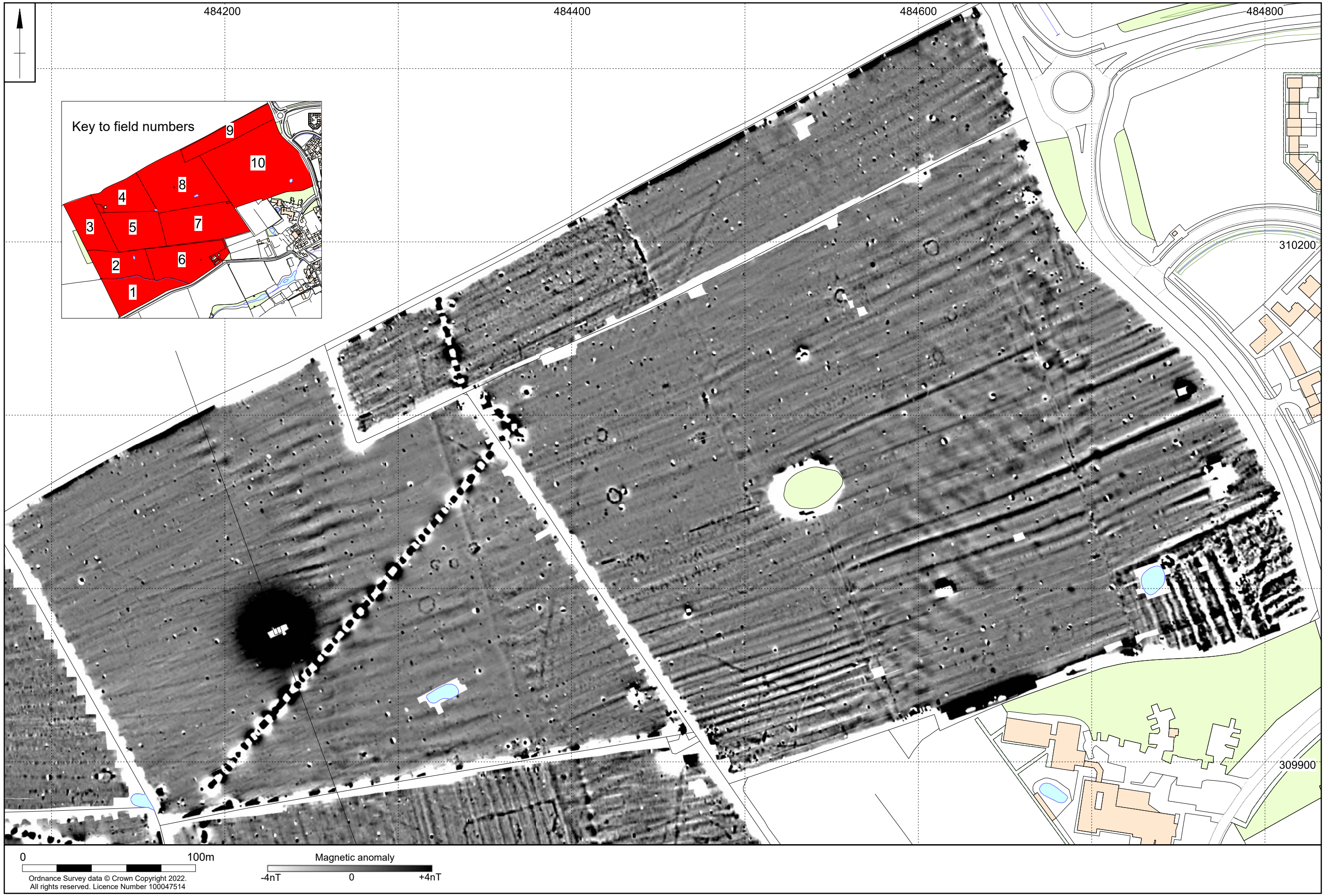




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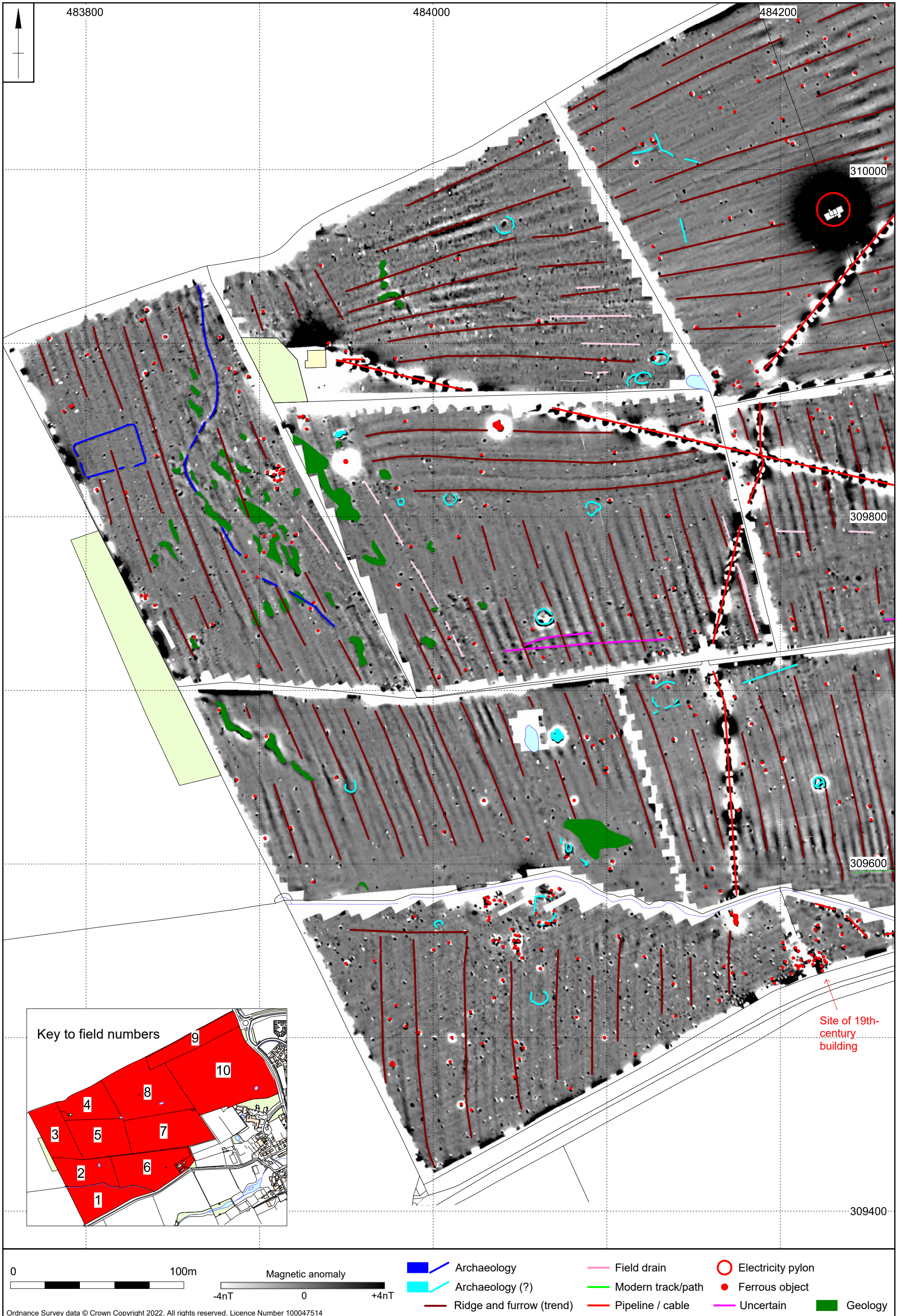
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Magnetometer survey results (central) Fig 3



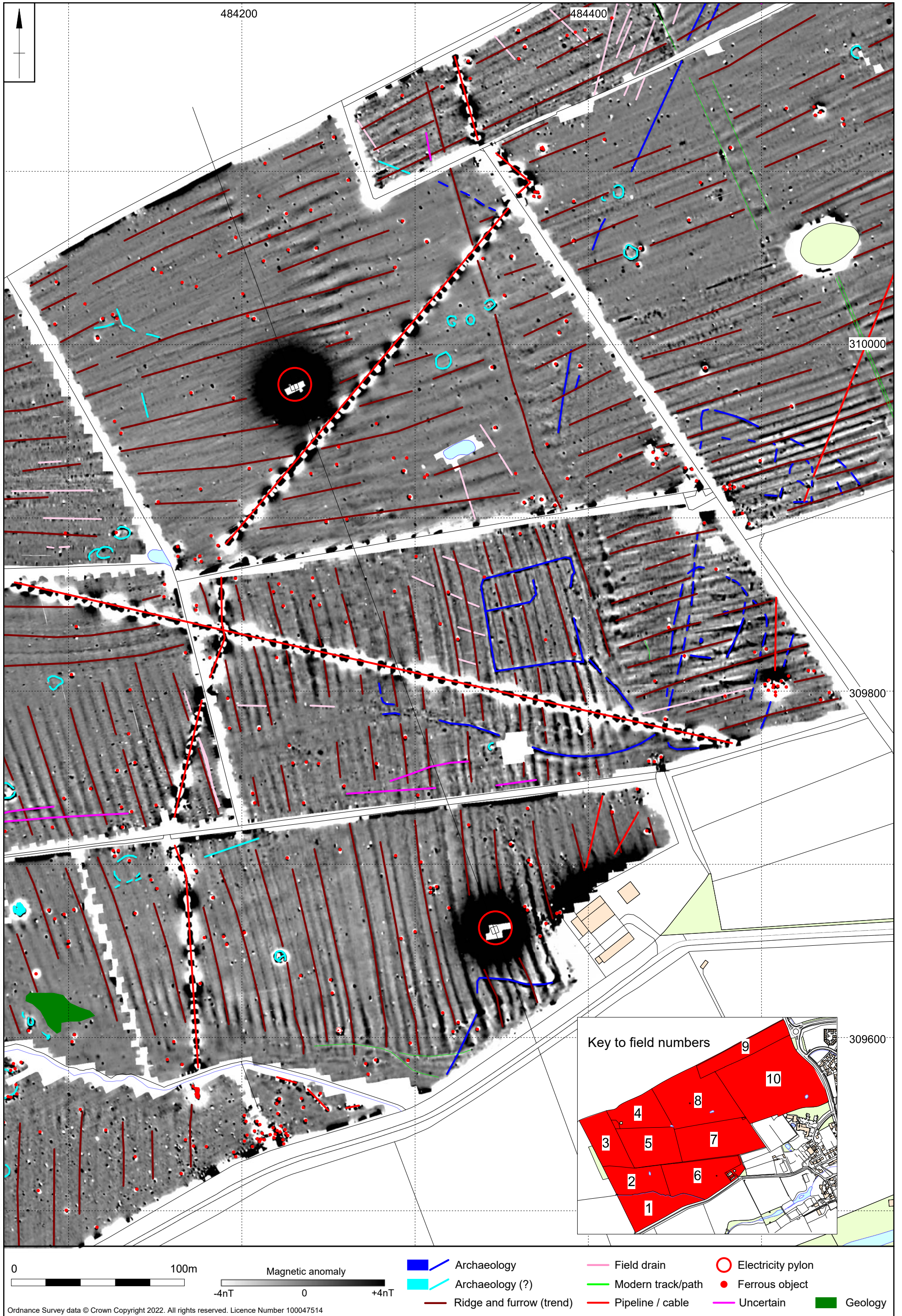
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Magnetometer survey results (east) Fig 4



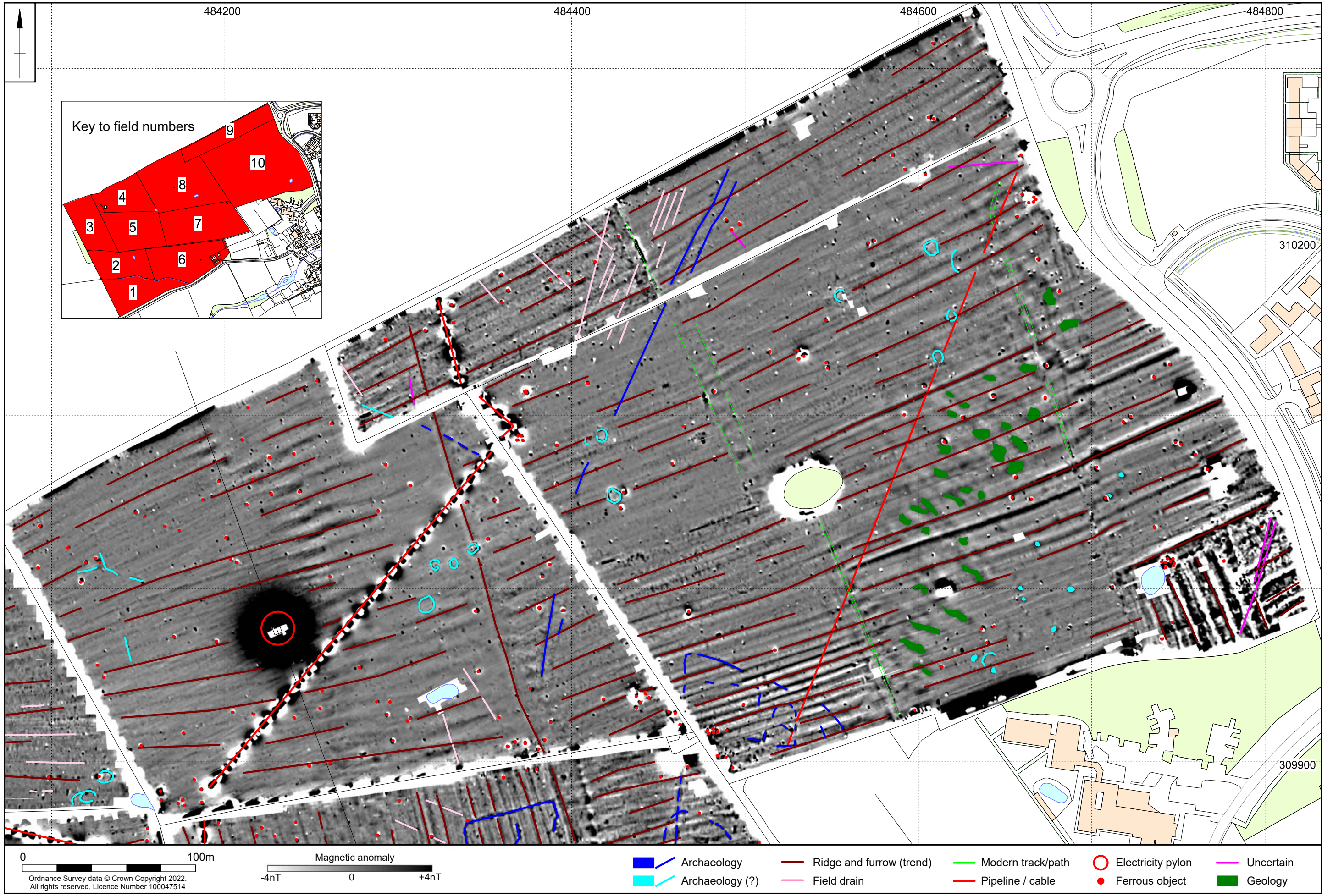
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Magnetometer survey interpretation (west) Fig 5



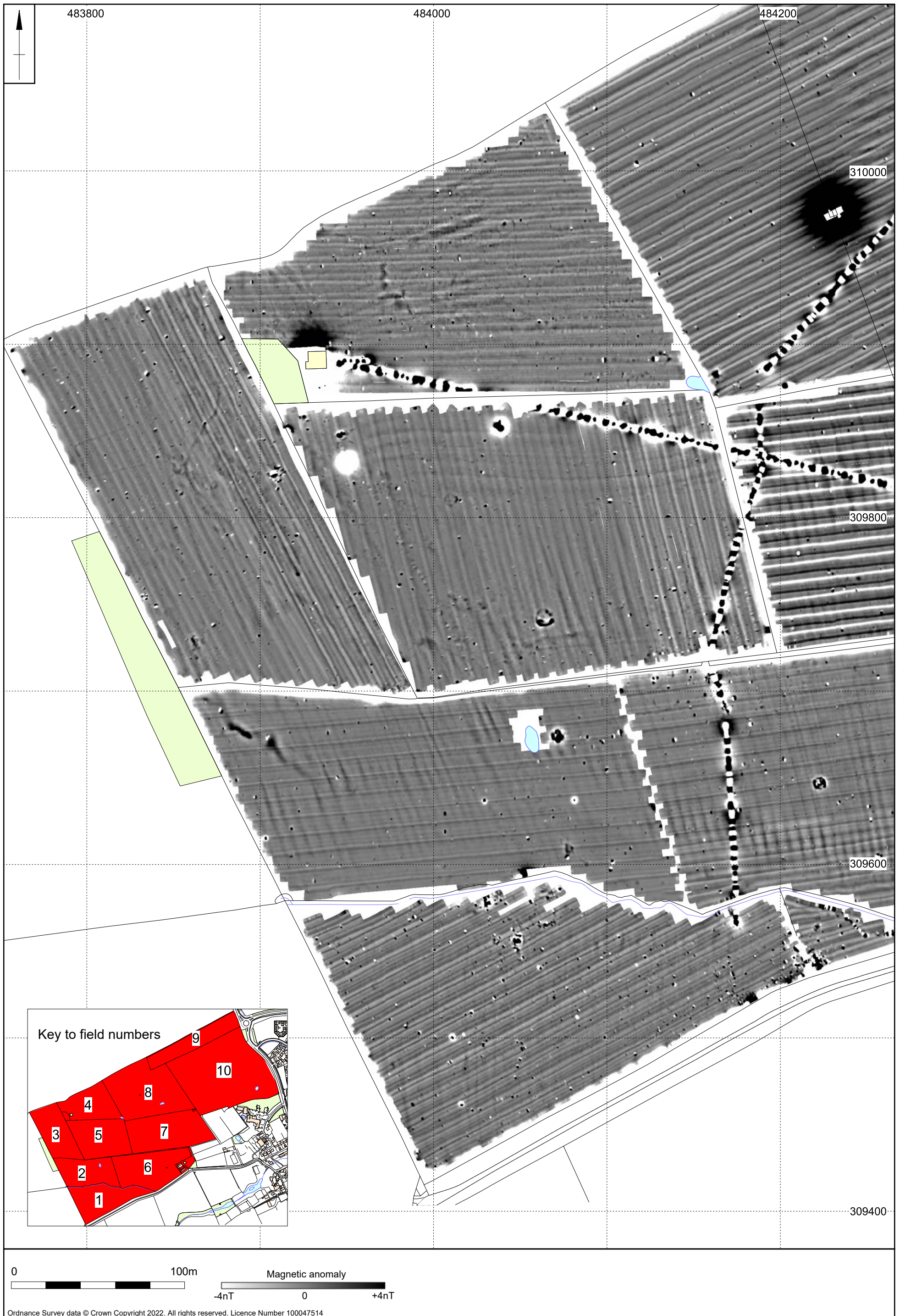
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Magnetometer survey interpretation (central) Fig 6

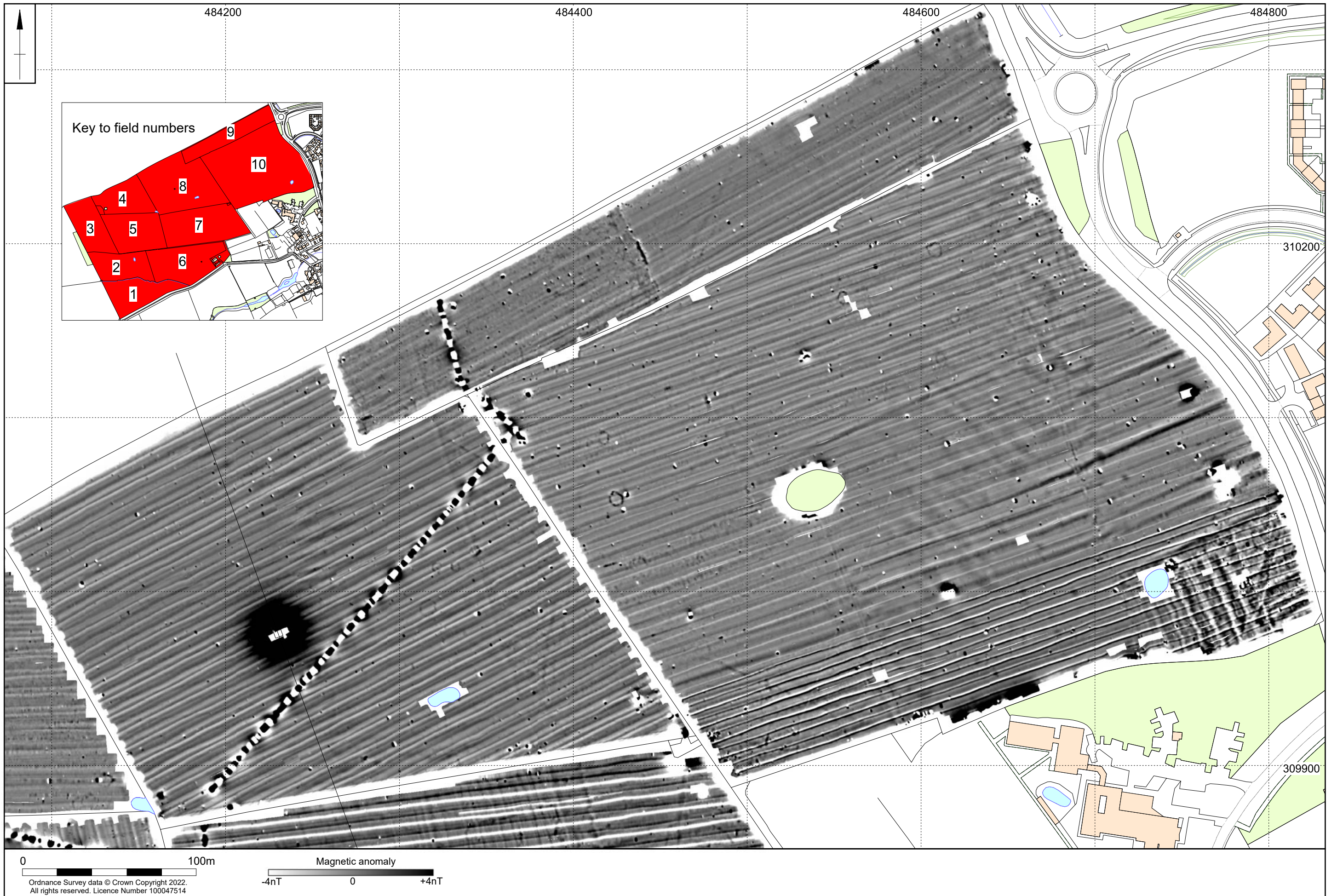


Scale 1:2000 (A3)

Magnetometer survey interpretation (east) Fig 7







Scale 1:2000 (A3)

Unprocessed magnetometer data (east) Fig 10



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