

**Archaeological geophysical survey of land  
west of Gold Lane, Biddenham  
Bedfordshire  
February 2017**

**Accession No: BEDFM2017.22**

Report No: 17/24

Authors: Graham Arkley  
John Walford

Illustrators: John Walford  
Ian Fisher





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**OASIS REPORT**

PROJECT DETAILS		<b>Oasis No. molanort1-279360</b>	
Project name	Archaeological geophysical survey of land west of Gold Lane, Biddenham, Bedfordshire		
Short description	MOLA (Museum of London Archaeology) was commissioned by CgMs Consulting to undertake a magnetometer survey of c18.3ha of land west of Gold Lane, Biddenham, Bedfordshire. The survey detected sets of magnetic anomalies which relate to enclosures, a ring ditch and possible track way. The majority of these features are probably prehistoric to Roman in date. Other anomalies evidenced medieval ridge and furrow and a probable post-medieval gravel quarry.		
Project type	Geophysical survey		
Site status	None		
Previous work	None known		
Current land use	Arable land		
Future work	Trial trenching		
Monument type/ period	Prehistoric ring ditch, prehistoric or Roman enclosures, medieval ridge and furrow, post-medieval quarry.		
Significant finds	None		
PROJECT LOCATION			
County	Bedfordshire		
Site address	Gold Lane, Biddenham		
Study area	c 8.3ha		
OS Easting & Northing	TL 017 504		
Height OD	c 30m - 38m aOD		
PROJECT CREATORS			
Organisation	MOLA Northampton		
Project brief originator	Vanessa Clarke - Bedford Borough Council Senior Archaeologist		
Project design originator	MOLA Northampton		
Director/Supervisor	Graham Arkley		
Project Manager	John Walford		
Sponsor or funding body	Bellway Homes Ltd		
PROJECT DATE			
Start date	2nd February 2017		
End date	8th February 2017		
ARCHIVES			
	Location	Content	
Physical	N/A		
Paper	BEDFM2017.22	Site survey records	
Digital		Geophysical survey & GIS data	
BIBLIOGRAPHY			
	Journal/monograph, published or forthcoming, or unpublished client report		
Title	Archaeological geophysical survey of land west of Gold Lane, Biddenham, Bedfordshire February 2017		
Serial title & volume	MOLA Northampton Reports 17/24		
Author(s)	Graham Arkley and John Walford		
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## ABSTRACT

*MOLA (Museum of London Archaeology) was commissioned by CgMs Consulting to undertake a magnetometer survey of c18.3ha of land west of Gold Lane, Biddenham, Bedfordshire. The survey detected sets of magnetic anomalies which relate to enclosures, a ring ditch and possible track way. The majority of these features are probably prehistoric to Roman in date. Other anomalies evidenced medieval ridge and furrow and a probable post-medieval gravel quarry.*

## 1 INTRODUCTION

MOLA (Museum of London Archaeology) was commissioned by CgMs Consulting, acting on behalf of Bellway Homes Ltd, to undertake an archaeological geophysical survey of land west of Gold Lane, Biddenham, Bedfordshire (NGR TL 017 504; Fig 1). This work was prompted by a requirement from Vanessa Clarke of Bedford Borough Council, and was intended to identify and map any archaeological remains which may be affected by a proposed development scheme. This work will also be used to inform the development of a trial trenching scheme for a robust assessment of surviving archaeology.

## 2 BACKGROUND

### 2.1 Topography and geology

The survey area lies to the north-west of Biddenham, and comprises four fields, c 18.3ha in extent, surrounding Duck End Lane. These include a large arable field north and west of Ouse Valley Farm, with an additional arable plot to the south separated from this by a footpath. The remaining two fields surveyed were located immediately north and south of Duck End Lane, and were fallow at the time of survey.

The northern boundary of the site is defined by the A4280, and the eastern boundary is defined by housing plots along Deep Spinney, Gold Lane and Duck End Lane. The west is bordered by a row of trees running parallel to the A428, while to the south is further agricultural land.

The survey area lies on a slight slope, rising from c30m above Ordnance Datum (aOD) in the west to c38m aOD in the north-east. The underlying geology and soils reflect this topographical change, with Kellaways Formation inter-bedded sandstone and siltstone underlying the upper slope and Great Oolite limestone forming the bedrock of the lower slope. These strata are covered by sand and gravel drifts of Stoke Goldington Member in the west and Biddenham Member in the east, forming the second and third of the River Great Ouse terraces. No superficial deposits are recorded across a central corridor (c 50-100m) of the site extending north-west from the end of junction of Duck End Lane and Gold Lane (BGS 2017).

## 2.2 Historical and archaeological background

Data sourced from the Bedfordshire Historic Environment Record shows that the site is situated in an area rich in features and sites of historic value. Recorded within the survey area is an assemblage of cropmarks indicative of a ring ditch, two discrete sub-rectangular enclosures, and miscellaneous linear features (MBD1866). This group occupies much of the west of the site. Cropmarks featuring similar ditches as well as postholes and pits have also been identified immediately east of site (MBD8677) suggesting that the survey may locate further features of interest in the intervening space.

An extensive programme of archaeological excavations conducted in the Biddenham Loop, 1km south of site between 1991 – 1995, has uncovered evidence of Mesolithic, late Iron Age and Romano-British activity (EBB695, EBB692, EBB694, EBB691). This is largely in the form of nucleated settlements located on the eastern slopes of the River Great Ouse.

The tools and landscape of prehistoric hunter-gatherers have been recovered and identified from locations surrounding the site. Palaeolithic tools, flints and implements have been found in post-medieval gravel pits and quarries to the north and east of site (MBD327, MBD328 & MBD680), and a polished Neolithic axe (MBD7447) was found in a gravel terrace of the Great Ouse, some 100m south-west of site. Further sets of cropmarks to the north and north-east of site have been interpreted as containing late Neolithic to early Bronze Age ring ditches, post holes and linear ditches (MBD730, MBD1867 and MBD1868), and have been confirmed as such through subsequent excavation. As the site lies on the same gravel terraces as the recovered implements and forms a continuation of the inner curve of the river bend, it is reasonable to suppose that the survey area could hold further prehistoric features.

Evidence of Romano-British settlement has been identified to the south-west of site in earlier works (MBD323) (which also discovered evidence of continued medieval settlement) and through a spread of Roman pottery sherds (MBD15905), both located north of the Church of St James. Romano-British field systems have been identified through excavation some 400m south of site (MBB18920), with the published interpretations including enclosures, field boundaries and possible roads or track-ways. Immediately to the north of site, beyond the modern Bromham Road, lies the site of a Roman well (MBD330) and putative villa. As yet there is no evidence to suggest Roman activity within the survey area itself.

Within the core of Biddenham survives numerous examples of the medieval and post-medieval periods. Principally this includes the Biddenham conservation area, which extends some 100m across the south of the survey area, and features 14 listed buildings. This chiefly comprises groups of cottages of predominantly 17th or 18th century and the medieval Church of St James (MBD1021). Further listed buildings some 300m to the north-west of site include an 18th century watermill (MBD1029), associated barn (MBD10156) and weighbridge upon the site of an earlier watermill. A scheduled 15th century bridge leads to this group, and likely formed access to the earlier watermill.

Duck End Lane itself demonstrates the continued occupation of the area, as it features the site of two 18th Century cottages (MBD1547) demolished in 1970, as well as three 18th Century cottages (MBD1548 & MBD10136) and a post-medieval cottage (MBD9198) which are extant. These are not currently designated but do represent post-medieval construction and agriculture in the area.



### 3 METHODOLOGY

The survey was undertaken with the MOLA magnetometer cart. This is a two-wheeled, lightweight structure designed to be pushed by hand. It incorporates a bank of six vertically-mounted Bartington Grad601 magnetic sensor tubes, spaced at half-meter intervals along a bar aligned crossways to the direction of travel, and also incorporates a Leica Geosystems Viva GPS antenna mounted on the central axis, 0.5m astern of the sensors. As a result of damage incurred to the cart in the field a portion of the survey was undertaken with only four operational sensors; however, measures were taken to ensure that the data resolution of 0.5m between sensor tracks was maintained throughout the survey.

The magnetic sensors each output data at a rate of six readings per second and the GPS antenna outputs NMEA format data (GGA messages) at a rate of one position every second. These data streams are fed into a laptop computer where they are compiled into a single raw data file by MultiGrad601 logging software specifically designed for that purpose.

The cart was propelled along straight and parallel traverses across the 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 average speed of coverage was c1.5m/s and the effective data resolution thus approximated to 0.25m x 0.50m.

The raw survey data was initially processed with MLGrad601 software, which calculated an actual 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 destripe function to runs of data from each sensor.

The processed data is presented in this report as a greyscale raster plot (range +5nT to -5nT / black to white), rotated and scaled for display against the Ordnance Survey base mapping (Fig 2). An interpretive overlay is presented in Figure 3 and a plot of the unprocessed survey data in Figure 4.

## 4 SURVEY RESULTS

The survey has detected a wide spread of archaeological features across the site. These can be grouped as follows: a western set including a ring-ditch, enclosures and a possible road or drove-way of prehistoric to Roman date, a set of undated enclosures around the western end of Duck End Lane, and a southern group of ditches of uncertain date and function. Other remains identified by the survey include traces of medieval and later ridge and furrow cultivation and, in the north-west of the site, a large backfilled quarry of probable post-medieval date.

### 4.1 *The western archaeological features*

The west of the site contains two positive linear anomalies representing large ditched enclosures, one having a broadly rectilinear form and the other, which is larger, being much more rounded. The smaller sub-rectangular enclosure measures c 40m north to south and 35m east to west. There is a possible entrance to the west and a distinct curve in the northern part of the eastern ditch. Within this curved section of ditch is a medium positive anomaly which could represent a pit.

The larger enclosure measures c 50m north to south and 75m east to west. A gap in the south-east corner of the curved ditch is likely an entrance to the enclosure, as it displays well defined termini to either side. There is apparently a second gap in the western part of the ditch but this has perhaps been caused by plough damage as it corresponds with a medieval furrow. Additionally, within the northern edge of this enclosure are a number of small positive anomalies which could represent pits or similar discrete features.

Intersecting with these two enclosures, and centred slightly to their west, are portions of an indistinct curvilinear anomaly which could define parts of a third, roughly ovoid enclosure. However, the anomaly is so weak and intermittent that a secure interpretation is not possible and the possibility of it having a natural origin cannot be ruled out.

Along the northern boundary of the survey area, north-east of these enclosures, lies a pair of positively magnetic linear anomalies aligned north-east to south-west. Between these, but not fully connecting to them, lie a second pair of very weak positively magnetic linear anomalies aligned north-west to south-east. Together these appear to define an enclosure of rhomboidal form, formed by much straighter ditches than those of southern enclosures. It is notable that the south-east edge of this enclosure lies parallel to a curvilinear ditch (discussed below) which crosses the site from north to south.

A strong, magnetically positive circular anomaly, c 35m in diameter, in the centre of Field 2 corresponds with one of the crop marks noted in HER entry MBD1866 and is thought to represent a large prehistoric ring ditch or a henge. The anomaly becomes very indistinct to the north-east, perhaps indicating a break in the ditch circuit. A weakly negative halo visible on the inside of the circle could indicate upcast material, possibly the remains of a low bank situated within the ditch, and four small discrete positive anomalies suggest the presence of a short row of internal pits.

A strong positive linear anomaly represents a ditch which enters the field from the south and follows a gently curving course north-eastwards past the eastern sides of the enclosures. There is a wide break in its course where it passes the ring-ditch, but its projected line across this break would be almost tangential to the north-western part of this feature. The spacing of the ditch to the enclosures is quite even and typically around 10m, which suggests that the enclosures and the ditch together may have defined the edges of a trackway.

In the vicinity of the ring ditch there are three linear anomalies which represent sections of ditch trending perpendicular to the main linear ditch. Two of these extend north-west, into an area disturbed by later quarrying (see below) and another extends south-east, passing across the entrance gap of the ring ditch.

In the south-west of Field 2 there is one large positive dumb-bell shaped anomaly which could represent a very large pit or a natural hollow. To the north of this are a pair of much smaller positive anomalies of elongated form and moderate magnetic intensity which could represent pits or burnt features such as ovens or kilns. Most of the other small positive anomalies in this western end of the field are likely to have a geological origin, although a few anomalies arising from pits may be concealed amongst them.

#### **4.2 *The southern archaeological features***

Field 4 contains two positive linear anomalies, one with a sharp right-angled corner and the other with a wider and more rounded corner. A smaller but otherwise comparable L-shaped anomaly occurs c 120m to the west in Field 1. All these anomalies represent ditches of uncertain function. Their dates are likewise unknown, but the fact that the two examples in Field 4 lie askew to the ridge and furrow (see below) suggests that they could be pre-medieval in date.

Field 4 also contains two closely spaced clusters of very small and weak positive anomalies. The southern of these resembles the typical response from a scatter of burnt soil fragments and other magnetic debris from a bonfire. However the one to the north, which lies across one of the linear anomalies, has a clearly defined rectangular extent that would rule out an interpretation as a bonfire and perhaps suggest some form of structural feature.

#### **4.3 *The archaeological features around Duck End Lane***

An irregular set of linear anomalies can be discerned in the north-east of Field 1 and the north-west of Field 4, immediately south of the end of Duck End Lane. The outermost of these seems to define part of an enclosure ditch the rest of which may lie under the present buildings and road to the north. The remainder probably represent other ditches but are too incoherent to be described in useful detail.

Immediately north-west of these features can be seen three curved stretches of magnetically positive linear anomalies, extending to either side of a magnetically 'noisy' response from a modern footpath. These seemingly define the eastern, southern and western portions of a roughly D-shaped enclosure with a very large opening in its northern side.

A pair of short and tightly curved anomalies lie across the 'missing' side of the D-shaped enclosure. These display stronger magnetic responses at the anti-clockwise ends, and encircle a single positive anomaly to the north of centre. This likely represents a small ditched enclosure of approximately 30m x 15m, with entrances to north and south and featuring a relatively large single pit in the centre.

North-west again from these features is a very weak positive anomaly representing an L-shaped ditch with a rounded corner. The northern arm of the ditch seems to be segmented, although this may be a result of truncation by the medieval ridge and furrow.

To the north of Duck End Lane, in Field 3, there is an irregular pattern of linear anomalies representing further ditches. The most conspicuous of these runs from south-west to north-east then turns onto a more northerly heading. Weaker examples to its east partly parallel its course, and others to its west define a small H-shaped feature.

The dating of all the features around Duck End Lane is uncertain. Their general appearance and their lack of an obvious relationship to the ridge and furrow suggest that they could be late prehistoric or Roman. However, their proximity to a historic part of Biddenham means that an interpretation as medieval, or even late Saxon, village remains cannot be completely disregarded.

#### **4.4 Ridge and furrow**

Medieval to early post-medieval ridge and furrow cultivation is evidenced by very tenuous parallel linear anomalies. These are aligned almost exclusively east to west, following the direction of slope, and can be seen across the southern and western parts of the site. There is little trace of them continuing to the north-east, but it is not clear whether this represents a genuine absence of ridge and furrow or just a change in the magnetic properties of the soil resulting in the furrows becoming undetectable.

#### **4.5 Quarrying**

A rectangular area in the north-west of Field 2, measuring c 90m wide by 120m long, is partially defined by positive linear anomalies and contains an incoherent mass of large and generally amorphous dipolar anomalies. Such a response is typically of a backfilled quarry pit containing large, deeply buried pieces of ferrous scrap. Part of another quarry pit may be indicated by the zone of intense magnetic noise in the north-eastern corner of the site. However, given its location, it is also possible that this noise represents a deposit of recent made ground associated with the re-alignment of the adjacent road junction.

#### **4.6 Miscellaneous modern features**

There are three weak linear anomalies of alternating magnetic polarity in Field 3, all of which are likely to represent modern field drains.

Field 2 is crossed by a set of very uniform, closely spaced weakly negative linear anomalies across the full width of the site. These correspond to modern agricultural 'tramlines' between the crop. There is also a negative linear anomaly which projects northwards into Field 2, continuing the line of the western boundary of Field 4. This very probably indicates the position of a recent field boundary.

Discrete but intense dipolar anomalies, representing ferrous objects, are spread across the site. These are most concentrated near the access gate in the north-east corner of Field 2 (in the area that had previously been allotments) and along the east of Field 4, and to a lesser extent along the perimeter of Field 3 backing onto the houses of Duck End Lane. The majority of these will have arisen from modern litter either on the surface or included in the plough soil.

Three large intense dipoles across the north of the site, just inside of the fence, represent the locations of metal service covers for a pipeline. A fourth cover was located within the area of quarrying in the north west of the field, but it is impossible to distinguish its anomaly from the other intense anomalies in the area. The line of these covers lies upon a faint positive and negative linear anomaly which runs parallel with the fence-line, and likely represents the underlying service trench.

Various magnetic halos have been detected around the edges of the survey area, due to the presence of fences, buildings and other modern structures with strong magnetic signatures. The most conspicuous of these are related to fences surrounding the north

and south of Field 2, and gates into Field 3 from the backs of properties along Duck End Lane.

#### **4.7 Geology**

There is a good general correspondence between the mapped geology of the site and the forms of magnetic patterning apparent in the survey data. Much of the western and southern parts of the data, from areas underlain by the second terrace gravels, is stippled with small positive anomalies, whereas the north-eastern part of the data, corresponding to the third terrace gravels, has large irregular mottles which transition eastwards into broad irregular stripes. The causes of these different magnetic responses are not well understood, although the stripes in the far east of the site are suggestive of periglacial 'patterned ground'.

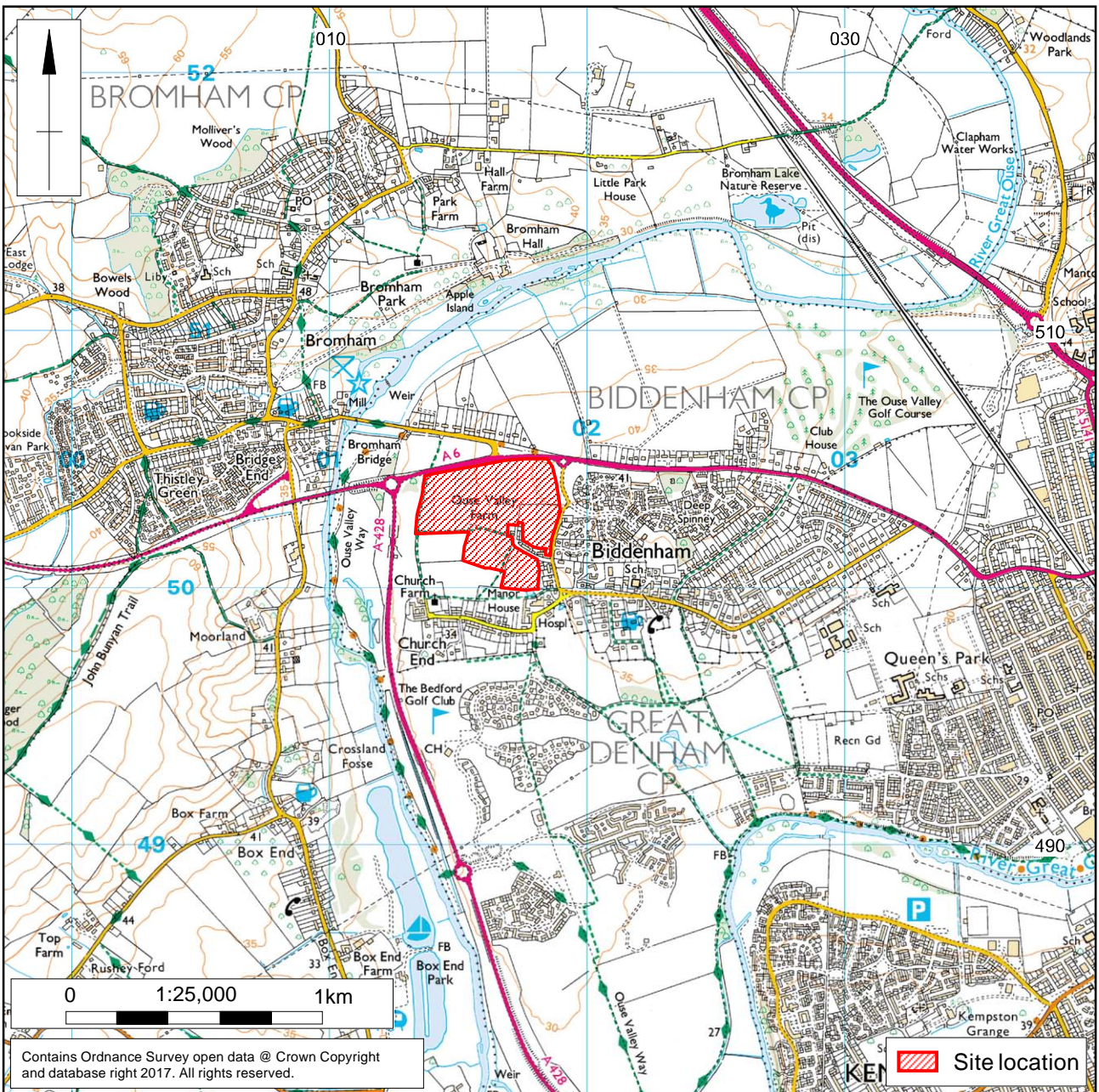
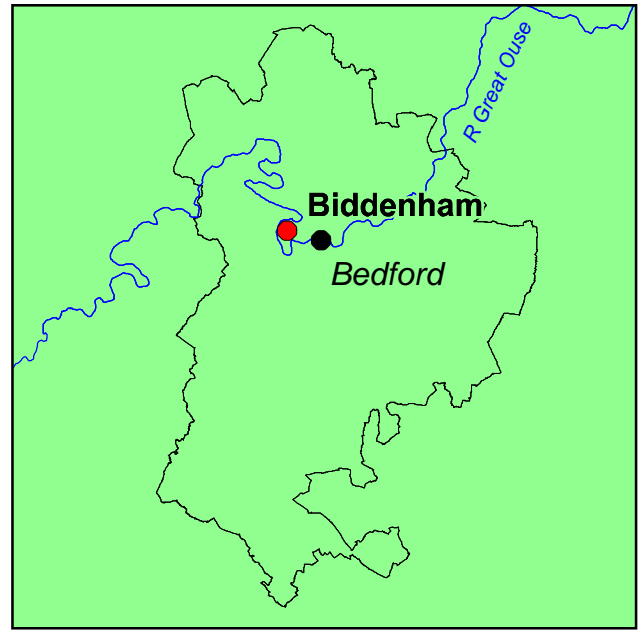
### **5 CONCLUSION**

The magnetometer survey has revealed extensive archaeological remains, with a prehistoric ring ditch and prehistoric or Roman enclosures in the north-west of the survey area, a separate group of undated enclosures around the end of Duck End Lane, and some angled sections of ditch which perhaps represent parts of further enclosures in the south. Evidence for medieval ridge and furrow cultivation and post-medieval gravel quarrying has also been detected.

### **BIBLIOGRAPHY**

BGS 2017 *Geology of Britain Viewer*, <http://mapapps.bgs.ac.uk/geologyofbritain>, British Geological Survey, consulted February 2017

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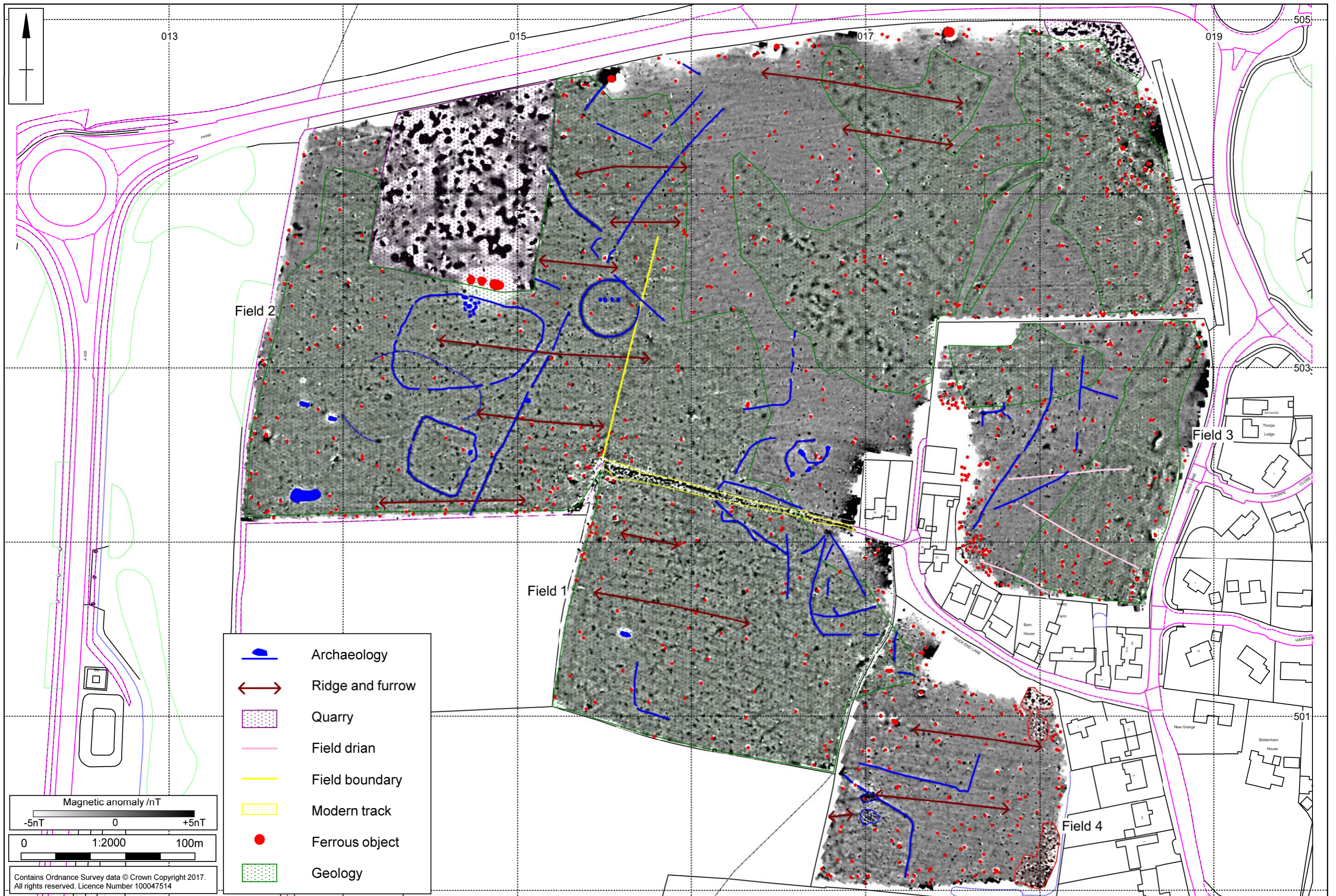
Scale 1:25,000

Site Location Fig 1



Scale 1:2000

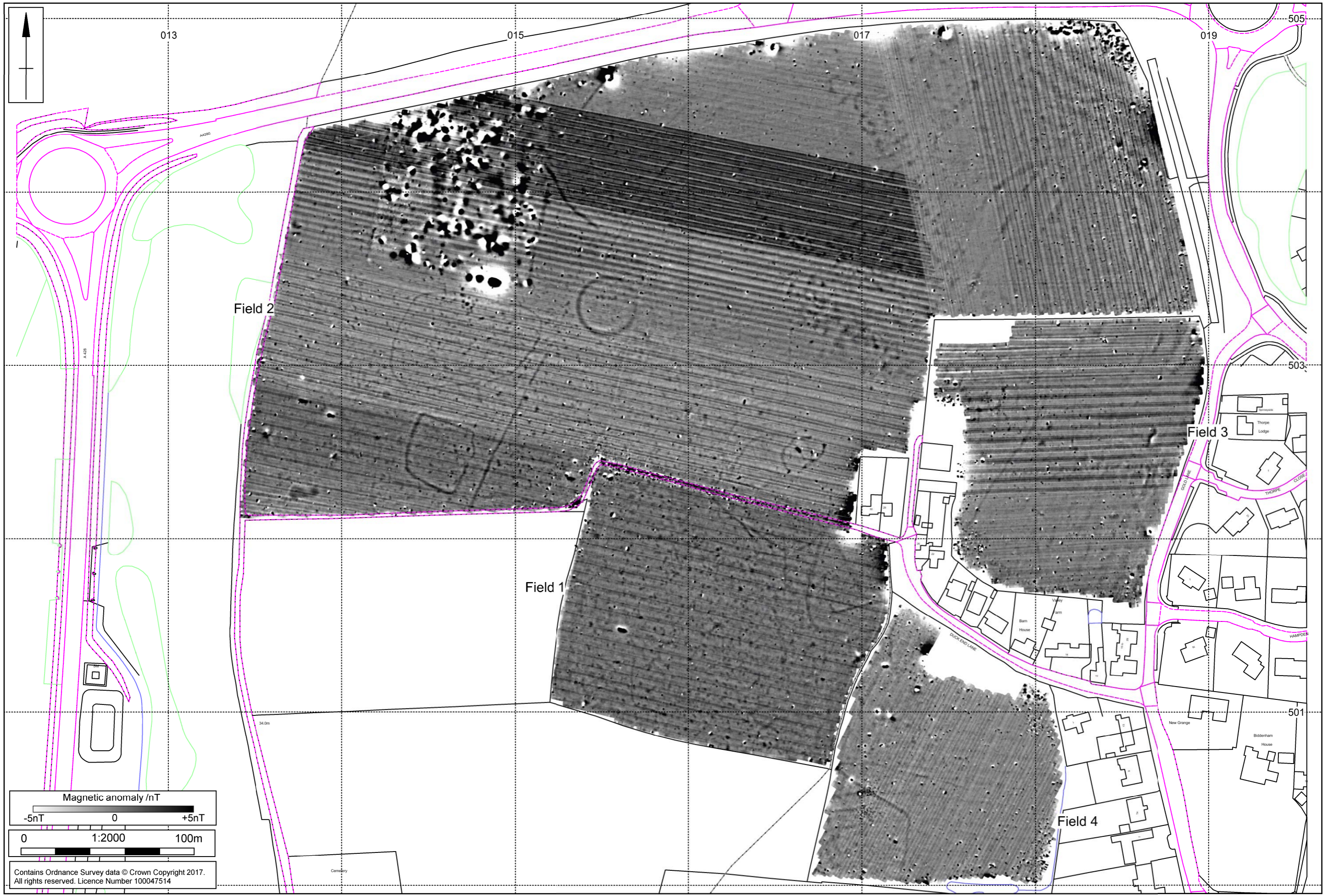
Magnetometer survey results Fig 2



Scale 1:2000

Magnetometer survey interpretation Fig 3





Scale 1:2000

Unprocessed magnetometer data Fig 4



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