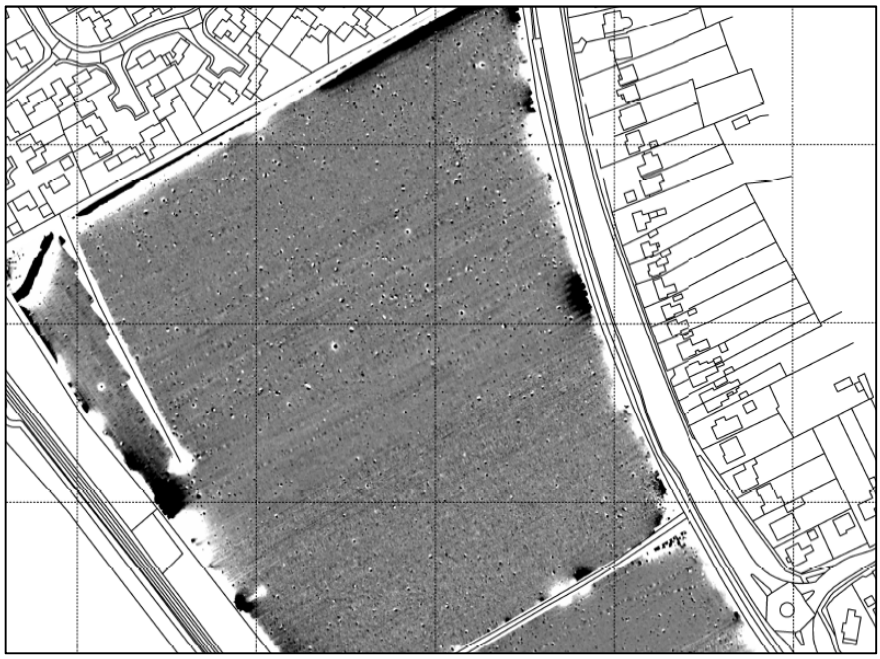

Archaeological geophysical survey of land at Wendover Road, Stoke Mandeville Buckinghamshire January to April 2017

Report No. 17/46

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Illustrators: Adam Meadows and John Walford

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OASIS REPORT

PROJECT DETAILS	**Oasis No. molanort1-284118**	
Project name	Archaeological geophysical survey of land at Wendover Road, Stoke Mandeville, Buckinghamshire	
Short description	MOLA (Museum of London Archaeology) was commissioned to undertake a magnetometer survey on land at Wendover Road in Stoke Mandeville, Buckinghamshire. The survey covered *c* 18ha of land and revealed two faint linear trends that may represent archaeological remains in the southern field.	
Project type	Geophysical survey	
Site status	None	
Previous work	Desk-based assessment (Crothers 2016)	
Current land use	Arable	
Future work	Not known	
Monument type/ period	None	
Significant finds	None	
PROJECT LOCATION		
County	Buckinghamshire	
Site address	Wendover Road	
Study area	*c* 18ha	
OS Easting & Northing	SP 843 102	
Height OD	*c* 105m aOD	
PROJECT CREATORS		
Organisation	MOLA	
Project brief originator	Eliza Alqassar, Buckinghamshire Archaeological Planning Officer	
Project design originator	MOLA	
Director/Supervisor	Graham Arkley and Adam Meadows	
Project Manager	John Walford	
Sponsor or funding body	Manor Oak Homes	
PROJECT DATE		
Start date	9th January 2017	
End date	13th April 2017	
ARCHIVES	Location	Content
Physical	N/A	
Paper	MOLA Northampton	Site survey records
Digital		Geophysical survey & GIS data
BIBLIOGRAPHY	Journal/monograph, published or forthcoming, or unpublished client report	
Title	Archaeological geophysical survey of land at Wendover Road, Stoke Mandeville, Buckinghamshire, January to April 2017	
Serial title & volume	MOLA Northampton Reports 17/46	
Author(s)	Adam Meadows	
Page numbers	4	
Date	3rd May 2017	

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Archaeological geophysical survey of land at Wendover Road, Stoke Mandeville, Buckinghamshire January to April 2017

ABSTRACT

MOLA (Museum of London Archaeology) was commissioned to undertake a magnetometer survey on land at Wendover Road in Stoke Mandeville, Buckinghamshire. The survey covered c 18ha of land and revealed two faint linear trends that may represent archaeological remains in the southern field.

1 INTRODUCTION

MOLA (Museum of London Archaeology) was commissioned by Manor Oak Homes to undertake an archaeological geophysical survey on a proposed development site at Wendover Road, Stoke Mandeville (NGR SP 843 102; Fig 1). The aim of the project was to identify and map any archaeological remains that may have been present within the site.

The fieldwork commenced on the 9th of January 2017 but, being delayed by adverse weather and ground conditions, was not completed until the 13th of April 2017.

2 BACKGROUND

2.1 Topography and geology

The survey area encompasses three adjacent arable fields located south-east of Stoke Mandeville. It is sandwiched between Wendover Road to the east and the Chiltern Mainline railway to the west, and is bounded to the north by residential properties along Meadows Park and Ligo Avenue.

The survey area occupies an almost flat location in the Vale of Aylesbury, beneath the scarp of the Chiltern Hills, at an elevation of *c*105m aOD. Its geology is mapped as Gault Clay and Upper Greensand overlain by chalky drift and loamy calcareous soils (BGS 2017).

2.2 Historical and archaeological background

A full description of the historic background can be found within the desk-based assessment carried out prior to these works (Crothers 2016). What follows is a summary of its findings.

A Neolithic polished stone axe head (MBC3211) and Bronze Age socketed axe head (MBC3225) have been found to the north-east of the survey area. Bronze Age ditches have also been discovered during a trial trench evaluation within this area (MBC17605; Jackson and Mounce 2012).

Extensive evidence of the Iron Age and Roman periods has been found within a 1km radius of the survey area, with a concentration of finds located to the north-east of site. These include an Iron Age Trinovantes gold stater (MBC2224) and a scatter of Roman

pottery (MBC13290) located very close to the north-eastern corner of the survey area. A trial trench evaluation and geophysical survey was also conducted to the north-east, identifying a Roman villa dating from between the 2nd and 4th centuries AD (EBC17605; Jackson and Mounce 2012).

A deserted medieval village site, including the churchyard of the former St Mary's Church, is located just under 1km to the south-west of the survey area, east of Mill House Farm (MBC2955). Large parts of this site have been destroyed by ploughing but some remains have been identified through aerial photography and through a geophysical survey conducted in 2013 by the Buckingham Archaeological Society (EBC17665).

3 METHODOLOGY

The survey fieldwork was conducted according to a variety of different methodologies, as dictated by logistical and operational considerations. The southern field was surveyed with hand-held Bartington Grad601 instruments, the central and northern field were largely surveyed with a Sensys GmBH magnetometer cart and the remainder of the site was surveyed with the MOLA magnetometer cart (which incorporates Grad601 sensors and dataloggers). All the data collected was of the same fundamental type (vertical magnetic intensity gradent) and is displayed seamlessly together in this report. For a plan of the areas surveyed by the different methodologies, see Figure 4.

3.1 Hand-held magnetometers

An independent network of 30m grid squares was established across each field to be surveyed by this technique. These grids were set out with a tape measure and optical square and were tied in to the Ordnance Survey National Grid by measurement with a Leica Viva GPS. The surveyors carried the Grad601 magnetometers at a brisk but steady pace through each grid square, collecting data along 1m spaced traverse lines. Measurements were automatically triggered every 0.25m along the traverses, giving a total of 3600 measurements per square.

The survey data was processed using Geoplot 3.00v software. Striping, caused by slight imbalances between the magnetic sensors, was typically removed using the 'Zero Mean Traverse' function and destaggering of the data was performed where necessary to correct errors introduced by an uneven survey pace. A few parts of the data were destriped by a different method, using an in-house spreadsheet routine designed to remove striping whilst preserving genuine magnetic anomalies running parallel to the direction of traverse.

3.2 MOLA magnetometer cart

The MOLA magnetometer cart 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. 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 *c*1.5m/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 de-stripe function to runs of data from each sensor.

3.3 Sensys magnetometer cart

The Sensys Magneto MXPDA is a lightweight, hand-operated magnetometer cart which incorporates a row of five fluxgate gradiometer sensors mounted at 0.5m intervals, crossways to the direction of travel and (in this instance) a Leica Geosystems Viva GPS antenna mounted on the central axis, 0.06m forward of the sensor array. Its method of operation is broadly similar to that of the MOLA cart - with real time streams of data from the sensors and GPS being logged as the cart is pushed along parallel traverses across the survey area. However, the Sensys sensors operate at a much higher frequency than the Grad601 sensors, giving readings at a rate of 100 per second, and thus producing very high data resolution in the traverse direction.

The initial processing of the Sensys data was undertaken with Sensys DLMGPS software, which converted the raw data files into XYZ files with an actual UTM co-ordinate calculated for each data point. The files thus produced were then down-sampled to a 20cm data interval with a Python script developed by MOLA, in order to reduce the files to a size suitable for visualization and median de-striping in TerraSurveyor.

3.4 Data presentation

All the different sets of data collected during the survey have been processed to produce greyscale raster plots (range +5nT to -5nT / black to white) which have been rotated and scaled for display against Ordnance Survey Master Map base mapping (Fig 2). An interpretative overlay is presented in Figure 3 and plots of the unprocessed survey data in Figure 4.

4 SURVEY RESULTS

The survey data contains two very weak magnetic linear trends in the southern field. Both spur southwards from Wendover Road, with the northern trend turning 90 degrees east before becoming indiscernible. The southern anomaly turns back on itself, following a U-shaped curve. Because these anomalies are so weak it is only possible to interpret them tentatively, noting that although they could represent ditches pre-dating the modern landscape, they could also represent plough furrows, field drains or other non-archaeological features

A linear scatter of ferrous anomalies is present in the western portion of the central field. This correlates with a field boundary depicted on the 1878 OS County Series map of the area. Historic field boundaries are often detected in this way as metallic objects tend to be discarded into hedge lines and ditches, becoming buried and remaining *in situ* long after the surface feature has been removed.

Other ferrous anomalies were detected across the survey area. Often represented by small positive anomalies with negative halos, these tend to represent buried metallic objects within the topsoil. Metallic halos are present around the boarders of the fields. These positive and negative halos originate from metal wired fences and gates that surround the perimeter.

A series of field drains have been detected within the northern two fields of the survey area. Represented by magnetically weak, fragmentary linear anomalies of often alternating polarity, they are predominantly aligned around a north-east to south-west axis. A modern pipeline was detected along the northern edge of the survey area. It is represented by a strong positive linear anomaly surrounded by a large negative halo.

5 CONCLUSION

The magnetometer survey has detected two weak linear anomalies within the southern field. These could represent archaeological features, as prior experience has shown that archaeological remains within the Vale of Aylesbury do not always have a clear magnetic signature, especially where there are peripheral to the main foci of settlement. However, other interpretations of the anomalies, such as plough furrows, field drains or minor geological features, could also be valid; thus the evidence is too slender to support any firm conclusion.

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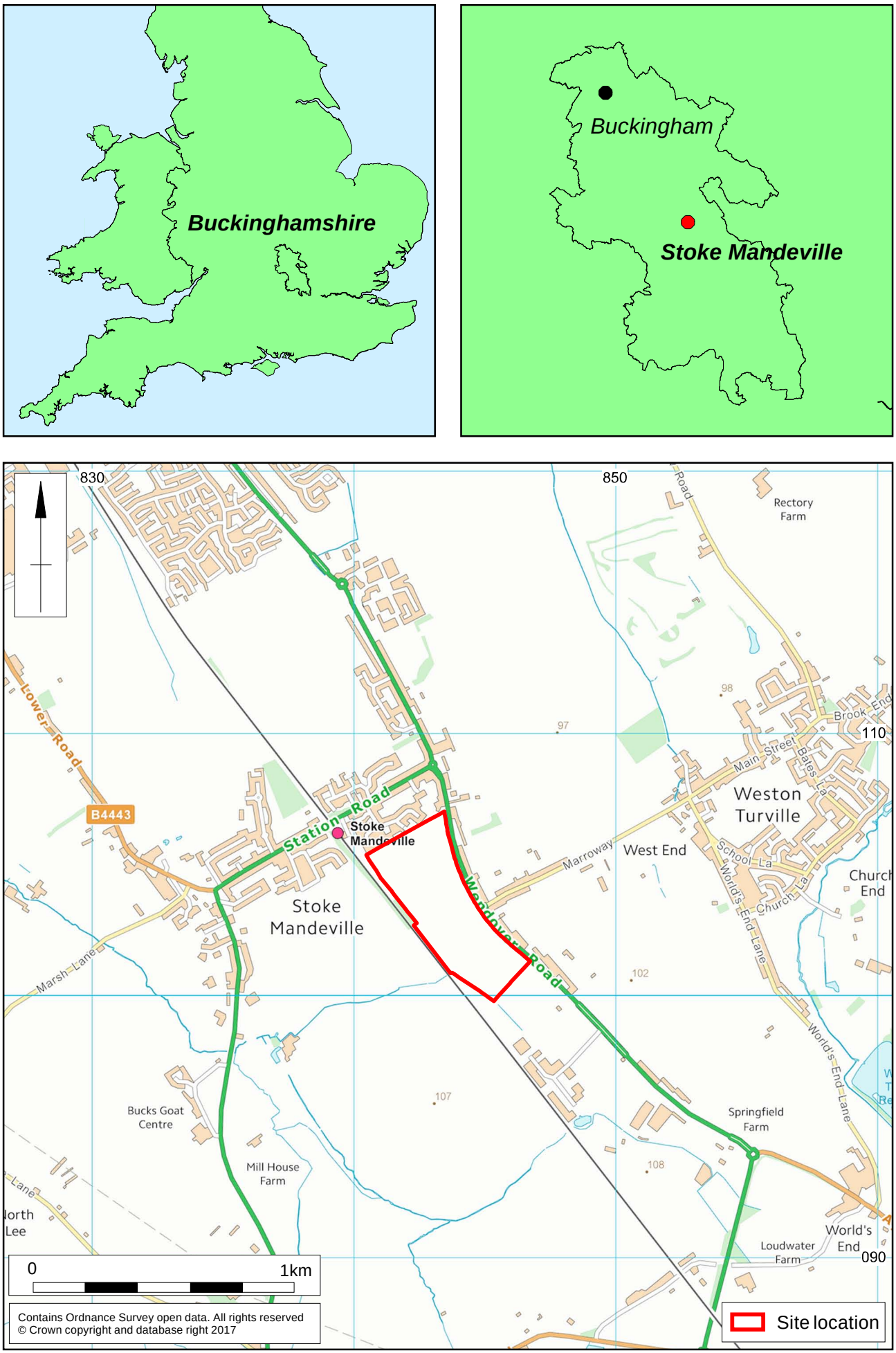
MOLA
3rd May 2017

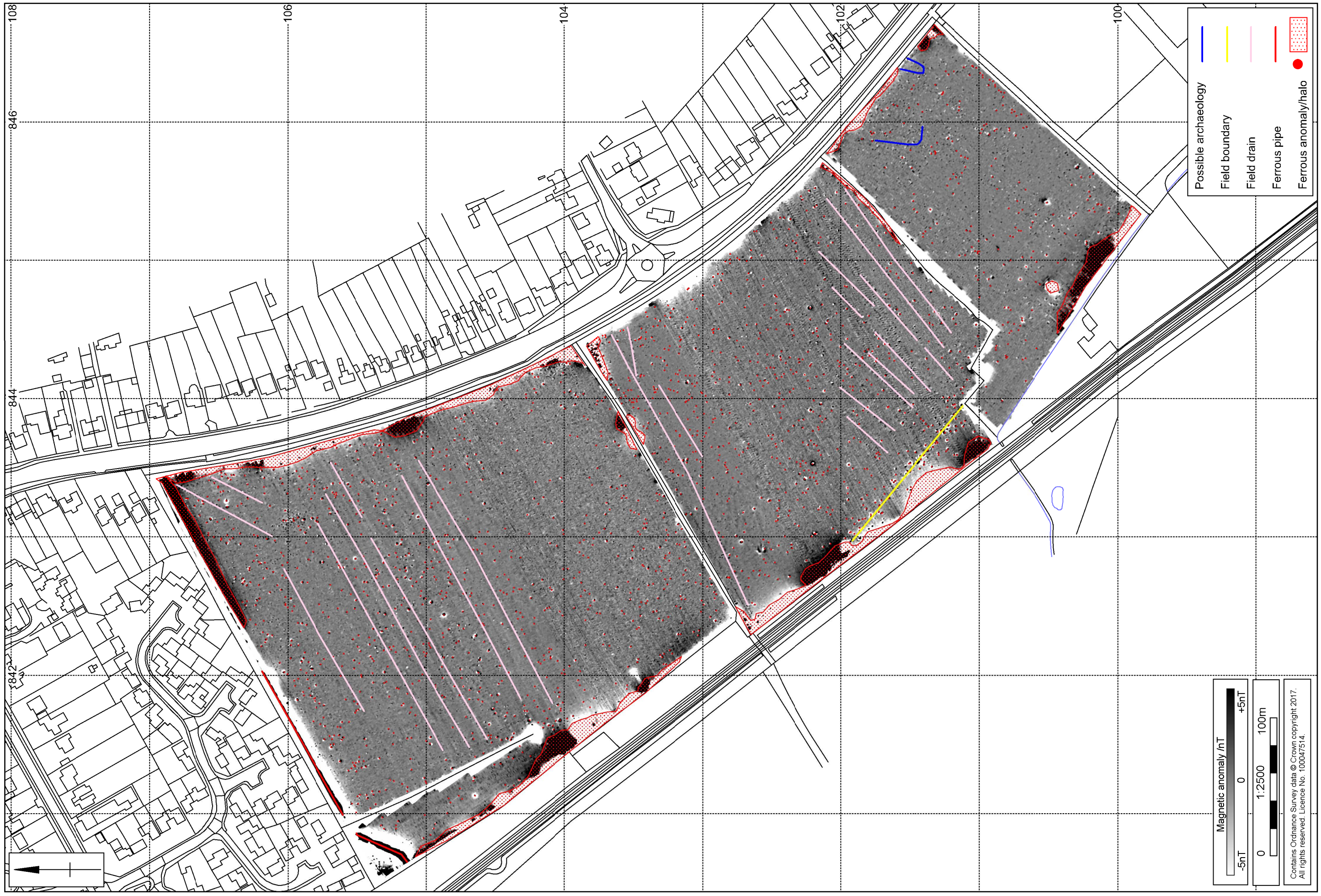


Scale 1:20,000

Site Location Fig 1

Scale 1:2500

Magnetometer suvey results Fig 2



Scale 1:2500

Magnetometer suvey interpretation Fig 3

Scale 1:2500

Unprocessed magnetometer data Fig 4

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