Archaeological geophysical survey for the proposed High Ercall Solar Farm, Osbaston Shropshire
May to October 2022

Report No: 22/082

Author: Graham Arkley
Illustrators: Graham Arkley
Chris Manktelow

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Project Manager: John Walford
NGR: 360500, 318400

MOLA
Kent House
30 Billing Road
Northampton
NN1 5DQ 01604 809800
www.mola.org.uk
business@mola.org.uk

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Kent House
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NN1 5DQ
01604 809 800
www.mola.org.uk
business@mola.org.uk

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STAFF

Project Manager:	John Walford MSc
Supervisors:	Graham Arkley MSc PCIfA Adam Meadows BSc PCIfA Chris Manktelow BSc PCIfA
Assistant:	Daniel Whatton
Text:	Graham Arkley
Illustrations:	Graham Arkley Chris Manktelow

OASIS REPORT FORM

Project: High Ercall Solar Farm			**OASIS No: molanort1-510533**	
ACTIVITY TYPE				
Project/Activity type	Geophysical survey			
Reason for investigation	Planning: Pre-application			
Development type	Energy and power generation – Solar power			
PROJECT LOCATION				
National grid ref	360500, 318400			
Site name	High Ercall Solar Farm, Osbaston			
REVIEWERS/ ADMIN				
HER for project	Shropshire Historic Environment Record			
National organisation	Historic England			
WORK UNDERTAKEN				
Methodological summary	Magnetometer survey with a cart-mounted array of Bartington Grad-01-1000L fluxgate gradiometers.			
Previous work?	No	Future works?	Not known	
Dates - Start date:	30-05-22	End date:	12-10-22	
GEOPHYSICS				
Geology	Bridgnorth Formation sandstone Diamicton till			
Land use	Arable			
Survey type	Magnetometer survey			
Size of survey area	*c*87ha			
Instrumentation	Bartington Grad-01-1000L			
Configuration	Multiple			
Spatial resolution	Traverse spacing	0.8m	Sample interval	0.25m
Resolution (data values)	0.1nT			
BIBLIOGRAPHY				
Title	Archaeological geophysical survey for the proposed High Ercall Solar Farm, Osbaston, Shropshire, May to October 2022			
Author(s)	Arkley, G.			
Publisher, place and date	MOLA Northampton / Northampton / 2022			
Report number	22/082			
Report release delay?	6 months			
PEOPLE				
Organisation	MOLA Northampton			
Project manager	John Walford			
Project supervisors	Adam Meadows, Chris Manktelow, Graham Arkley			
Funding body	Wardell Armstrong			
KEYWORDS				
Monuments found/ date	Ring ditch – Undated (late prehistoric?) Airfield – 20th century			
RESULTS				
Description of outcomes	The survey detected one possible prehistoric ring ditch and a plethora of material related to the 20th-century airfield. The survey also detected buried utilities and drainage networks.			
ARCHIVES				
Accession ID	None			
Paper Archive repository	None			
Digital Archive repository	TBC			
No finds made during survey - no finds archive to be deposited				

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Figures

Archaeological geophysical survey for the proposed High Ercall Solar Farm, Osbaston, Shropshire, May to October 2022

ABSTRACT

MOLA (Museum of London Archaeology) was commissioned to undertake an archaeological geophysical survey of c87ha of land across the former RAF High Ercall airfield, Shropshire, of which c78ha proved surveyable. The survey detected one possible prehistoric ring ditch and a plethora of material related to the 20th-century airfield. The survey also detected buried utilities and drainage networks.

1 INTRODUCTION

MOLA (Museum of London Archaeology) was commissioned by Wardell Armstrong to conduct a magnetometer survey at the former RAF High Ercall airfield, east of Osbaston, Shropshire (Fig 1). The survey was conducted with the aim of identifying areas of potential archaeological interest that may be disturbed by the proposed High Ercall Solar Farm development. The survey extent as initially defined was *c*74ha, but the addition of an extra 13ha in areas A and B to the north took the final extent to *c*87ha, of which *c*78ha ultimately proved surveyable.

The survey took place in three intermittent phases between 30th May and 12th October 2022, as different portions of the land became available.

The survey was conducted in anticipation of a requirement from Shropshire Historic Environment Team, although no formal brief for the works was issued. The methodology was set out in a Written Scheme of Investigation (Meadows 2022), which was drawn up with reference to Chartered Institute for Archaeologists and European Archaeological Council guidelines (CIfA 2020 and Schmidt *et al* 2015).

2 BACKGROUND

2.1 Location and land use

The survey area lay on the former airfield, to the north of High Ercall village. It was bounded by the Greenhous Group vehicle depot to the north-west and the North Shropshire Autograss track to the east, with further arable fields lying beyond in all directions (Fig 1).

The core of the survey area comprised poultry ranges within the perimeter track of the airfield. These lay under short grass and were surrounded and sub-divided by 8ft post and chicken-wire fencing. Three arable fields to the west and north-west were also surveyed; these had been recently harvested and were under wheat stubble and the remains of carrot beds. Approximately 9ha of the survey area was obstructed and unsurveyable due to stands of recently planted trees; a large, modern chicken shed (not featured on Ordnance Survey mapping); roads along the former runways; and minor obstacles such as chicken coops and feed stations (Fig 1).

Overall, the various fences and stands of trees divided the survey area into seventeen surveyable portions. These have been grouped loosely into eight larger blocks of land (A to H) for ease of reference in this report (Fig 1).

2.2 Topography and geology

The survey area lies on naturally undulating ground with a broad incline from *c*61m above Ordnance Datum (aOD) in the north-east to a peak of 70m aOD in the south-west.

The solid geology of the survey area comprises Bridgnorth Sandstone Formation sandstones formed under arid climatic conditions during the Permian Period. Superficial deposits of Devensian Diamicton Tills deposited in the Quaternary Period have been recorded covering parts of the northern end of the survey area (BGS 2022).

2.3 Historical and archaeological background

An appraisal of available online resources including the Shropshire Historic Environment Record (SHER), historic Ordnance Survey maps and Historic England's 'Aerial Photo Explorer' website (HE 2022) suggested a potential for Iron Age to Roman and medieval activity in the area and provided details of 20th-century remains relating to RAF High Ercall.

Cropmarks of an irregularly shaped, single ditched enclosure have been observed on land south of Cotwall Lane, *c*300m south of the survey area. Recorded by aerial photography in 1977, it is thought to be Iron Age to Roman in date though no excavations or finds have confirmed this (PRN 02023).

Medieval tenements may be located in the south-western corner of the survey area, *c*300m south of the Greenhous compound. Documentary evidence records a manorial borough that obtained a market charter in 1267, but had limited success, with only three shops being registered in a survey conducted in 1399 and the site ultimately declining to nothing. No map evidence or field observations confirm the exact location of the site, which has been inferred entirely from written sources (PRN 05602).

Documentary records also suggest the approximate location for a medieval grange *c*100m south of the south-eastern corner of the survey area. Land was given to the Prioress of Brewood in 1245 to build a grange at La Mora, though its exact position is unknown with no physical evidence recovered (PRN 04073).

The HER records for the post-medieval period show the survey area as being in an agricultural landscape, with numerous farmsteads like the early 19th-century farmstead The Chestnuts located *c*400m east of the survey area (PRN 25548), and Pool Farm located *c*200m north of the western side of the survey area (PRN 25549).

The survey area is located on the site of RAF High Ercall (also known as USAAF Station AAF-346). Originally constructed between 1938 and 1940, the airfield was first operated by 29 Maintenance Unit. By 1941 the airfield was taken over by Fighter Command with 68, 255, 256 Squadrons and 1456 Flight based here, predominantly night fighter units. The United States 8th Air Force's 309 fighter squadron was also based here briefly in 1942; the following year the airfield became a training site operated by 60 Operational Training Unit. Post-war, the site was used by the RAF up until 1968 as an aircraft storage and scrapping site, after which the Road Transport Industry Training Board took over, using the site as a training and educational centre. By the 1990s the airstrips had been destroyed and few structures survived, the land having largely returning to agricultural use (PRN 29109).

SHER records refer to several features relating to the airfield. A brick pillbox is located *c*100m west of the western limit of the survey, guarding the approach from Muckleton

Lane (PRN 35402) and a second pillbox of similar construction stood *c*200m south of the south-eastern corner of the survey area, on the north side of Cotwall Lane (PRN 03470). The latter structure was demolished in 1996 with no surface evidence surviving. An Air Raid Wardens' post is located *c*100m beyond of the south-western corner of the survey area and has been converted into a small museum (PRN 35405).

One other pillbox, not noted on the SHER, was observed by MOLA staff during the survey (see back cover photo). This was an Air Ministry pattern brick-shuttered pillbox which stood immediately outside the eastern boundary of Area B (Fig 2) and was positioned in such a way as to guard the northern end of the runway and the small cluster of adjacent buildings from attack from outside of the airfield.

3 METHODOLOGY

3.1 Fieldwork

The magnetometer survey was undertaken with a Bartington magnetometer cart. This is a two-wheeled, lightweight sensor platform designed to be pushed by hand. It incorporates a bank of six vertically-mounted Bartington Grad-01-1000L magnetic sensor tubes, spaced at consistent 0.8m intervals along a bar aligned crossways to the direction of travel. These sensors were calibrated ('zeroed') at the start of each day's survey to minimise heading errors and offsets in their zero values.

The cart also incorporates a Leica Geosystems Viva GNSS antenna mounted on the central axis, 1.02m astern of the sensors. The magnetic sensors each output data at a rate of eight readings per second and the GNSS antenna outputs NMEA format data (GGA messages) at a rate of one position per second. These data streams are compiled into a single raw data file by MultiGrad601 logging software.

The cart was propelled along straight and parallel traverses across the survey area, with data logging being 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 typical speed of coverage was under 1.8m/s, resulting in an effective data resolution better than 0.225m x 0.80m.

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 mismatches 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 topographic base-mapping at a scale of 1:2500, and at a range of -/+10nT (Figs 2 to 5). Minimally processed data images are presented at a range of +/-10nT (Figs 10 to 13) as a comparison to the de-striped results.

The interpretation of the data has been undertaken in a qualitative manner, based on the recognition of distinctive anomaly patterns and taking into account field

observations and historic map and photographic evidence. The interpretation drawings (Figs 6 to 9) 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 Possible archaeology

One small, very weak magnetically positive curvilinear anomaly in the south-west of Area H forms a three-quarter circle with a diameter of *c*16m (Figs 5 and 9). It perhaps represents a late prehistoric ring ditch, but being such a subtle feature it is hard to interpret with confidence and lacks sufficient distinguishing characteristics for a detailed assessment.

4.2 Airfield features

The 'airfield features' interpretation category (Figs 6-9) includes anomalies of various types which can be positively correlated with features visible on mid to late 1940s aerial photographs of the site (HE 2022). Most examples are magnetically positive linear anomalies which correlate with, or lie adjacent to, the edges of the runways, taxiways and tracks around the airfield and perhaps represent the remains of kerbs or drainage gullies. There are also rows of discrete dipolar responses lying at regular intervals (albeit with intermittent gaps) along the runway edges. These probably indicate a series of runway light fittings or similar features.

In the north of Area A there is a small cluster of strong magnetic dipoles (Figs 2 and 6), the southern side of which is obscured by the halo of a large gas pipe (discussed in 4.7). The location of this correlates with a large, bunded rectangular pit, visible on late 1940s aerial photographs (eg HE2022, photo reference raf_cpe_uk_2492_rp_3006, dated 1948), which, although not specifically identified seems likely to have had a function related to munitions or firearms[1]. Whilst the anomalies themselves can only be interpreted generically as indicating buried ferrous debris, it does seem likely that this material lies within the backfill of the pit.

4.3 Probable airfield features

The survey has detected some anomalies which do not correlate with features on either aerial photographs or maps, but which can reasonably be judged to relate to the airfield either through their locations or their similarity to the known airfield-related anomalies. Most are short linear anomalies between recorded tracks, but there is also a possible hardstanding or pad between known dispersal pans along the north-west of Area C (Figs 3 and 7).

4.4 Uncertain

Two short, magnetically positive linear anomalies form an acute corner in the north-west of Area G (Figs 5 and 9). They resemble the nearby taxiway edges but are wrongly positioned for this to be a convincing interpretation, lying centrally under a junction of former routes. It may be that they represent earlier airfield features, not

[1] Several MOLA staff with knowledge of military archaeology have been consulted. None have given a conclusive interpretation, but opinions include a machine gun range or a pit for the storage or disposal of munitions.

recorded on the aerial photographs; alternatively, they may relate to boundary ditches or other features of much earlier date.

Very weak, diffuse positive linear anomalies occur in Areas E and H (Figs 4 and 8). These could have a variety of causes including ditches, geological features or earthmoving scars from the airfield construction. One in the east of Area H has a small number of magnetic dipoles along its length; these indicate metal objects and suggest that that this particular feature may be of recent, rather than ancient, date. Other isolated linear anomalies in Areas D and G are similarly difficult to interpret.

4.5 Drains

Magnetically positive linear anomalies across various parts of the site indicate drainage infrastructure, although whether these are all contemporary with the airfield is unclear. Some in the south of Area C form a parallel set with a kink in their alignment (Figs 3 and 7), whilst others, such as those south of the runway in Area F (Figs 4 and 8), have dendritic patterns typical of drains, with parallel feeders leading obliquely into a larger trunk.

4.6 Ferrous

Small magnetic dipoles are scattered throughout the survey area, indicating pieces of iron and steel debris buried in the topsoil. The concentrations are markedly higher than on typical agricultural fields due, in large part, to the amount of debris from the former airfield and from the post-war aircraft scrappage. However, much modern rubbish was also noted on the surface of Area A and the west of Area H (*pers obs*), and this probably derives from recent manuring with a poorly sorted green waste.

Two particularly large and dense foci of ferrous material have been detected. The largest lies north of the water treatment plant in Area A (Figs 2 and 6), correlating with an area of disturbed and slightly raised ground visible on the previously referenced aerial photograph. The other lies to the south-east of the water treatment plant. Both are likely to represent substantial concentrations of scrap metal.

A small focus of ferrous debris in the south-east of Area B (Figs 3 and 7) broadly correlates with a blast pen visible on 1940s aerial photographs (eg HE2022, photo reference raf_106g_uk_1483_rs_4445, dated 1946), though whether it relates directly to the structure of the pen is unclear as no other pen visible on the same photographs has produced a similar magnetic response

Only the larger magnetic dipoles have been indicated in the interpretation figures, both in an attempt to discern cohesive patterns, and in order to bring substantial obstacles to the attention of future ground investigation works. Very few of these can be attributed to known causes, and whilst most are likely to arise from innocuous pieces of material the possibility that some may relate to ordnance cannot be discounted

Two of the large ferrous dipoles in Area A correlate with metal manhole covers set into raised concrete plinths (*pers obs*), thus indicating the line of an otherwise un-detected non-ferrous utility (Figs 2 and 6). A row of large ferrous dipoles in the west of area G (Figs 5 and 9) may indicate a short ditch filled with ferrous material, but it seems more probable that this also indicates a section of utility, perhaps a redundant pipe of which only fragments survive.

4.7 Utilities

Several linear anomalies with alternating magnetic polarity have been detected across the site. These are the typical responses of buried pipes or cable ducts with a ferrous component. The strongest response can be found across the north of Area A, correlating with the expected route of a high-pressure gas pipe (Figs 2 and 6). Weaker utility responses have also been detected in Area A, with a further single response crossing the centre of the survey area through Areas C, D, E and F (Figs 3 to 4 and 7 to 8). Two much weaker linear responses in the south of Area G are probably also the result of small utilities, with one extending to the new chicken shed (Figs 5 and 9).

A section of non-ferrous utility has been inferred in Area B from a combination of large discrete magnetic dipoles along a broad, strong positive linear anomaly (Figs 2 and 7). This indicates a probable non-ferrous pipe with metal connectors laid within a reasonably deep service trench.

Some of the magnetic responses from upstanding fencing and gates, particularly the steel mesh fencing between poultry ranges, resemble the responses from buried utilities. They have been deliberately left unmarked on the interpretation plans to avoid any possible confusion between the two types of feature.

The positions of wooden telegraph poles supporting overhead cables have been noted in Areas A and G, though only the former has produced a clear magnetic anomaly (Figs 2 and 6).

4.8 Modern disturbance

Multiple areas with strong but non-ferrous magnetic responses have been detected in the central and northern parts of the survey area. Their shapes and intensities suggest they are likely to relate to rubbish pits or areas of burnt soil, the latter perhaps caused by bonfires. Some weaker and more amorphous anomalies have also been placed in this interpretation category; these can only be interpreted in the most generic way as possible areas of disturbed ground.

5 DISCUSSION

The survey has identified tenuous evidence for a possible prehistoric ring ditch in the west of Area H, but there are no other indications of archaeology except for 20th-century airfield remains. The medieval tenements putatively located in or around the south-west of the survey area (PRN 05602) have not been detected.

The survey data is dominated by anomalies arising from airfield infrastructure and debris from the post-war aircraft scrappage works; interpretation of the former has been greatly aided by reference to 1940s aerial photos of the site (HE 2022). It is interesting to note that while the survey has detected some small metallic features such as the light fittings alongside the runways, many larger features such as dispersal pads and blast pens have not been detected. This lack of significant response suggests these features were constructed of relatively non-magnetic materials, such as concrete slabs without reinforcing bars.

In the north of Area A, the survey has detected a cluster of metallic objects which, from their location, appear to be within the backfill of a large bunded pit visible on late 1940s aerial photographs. The function of this pit is open to question, but suggestions have included a machine-gun range or a munition disposal pit. A much larger concentration of metal debris occurs slightly to the south. However, it is beyond the scope of this

report, and MOLA's professional competence, to advise on the specific nature of this detected material or the extent to which it may or may not be hazardous.

The 1940s aerial photos show extensive areas of Nissen huts in the west of Area A and a small group of buildings in Area B, but the remains of these have not been detected. A local resident informed MOLA's survey team that when the Nissen huts were scrapped, cables were pulled out of the ground and the building bases pushed into a large pit along the southern edge of Area A. However, the survey has not detected any evidence of this pit, which ought to have produced a clear magnetic response if present within the area of survey coverage.

The survey has also detected a number of buried utilities, including one high-pressure gas pipe in the north, at least two large utilities within the centre of the airfield, and a number of smaller cables or pipes nearer the perimeters of Areas A, B and G. Telegraph poles also support overhead cables in Areas A and G

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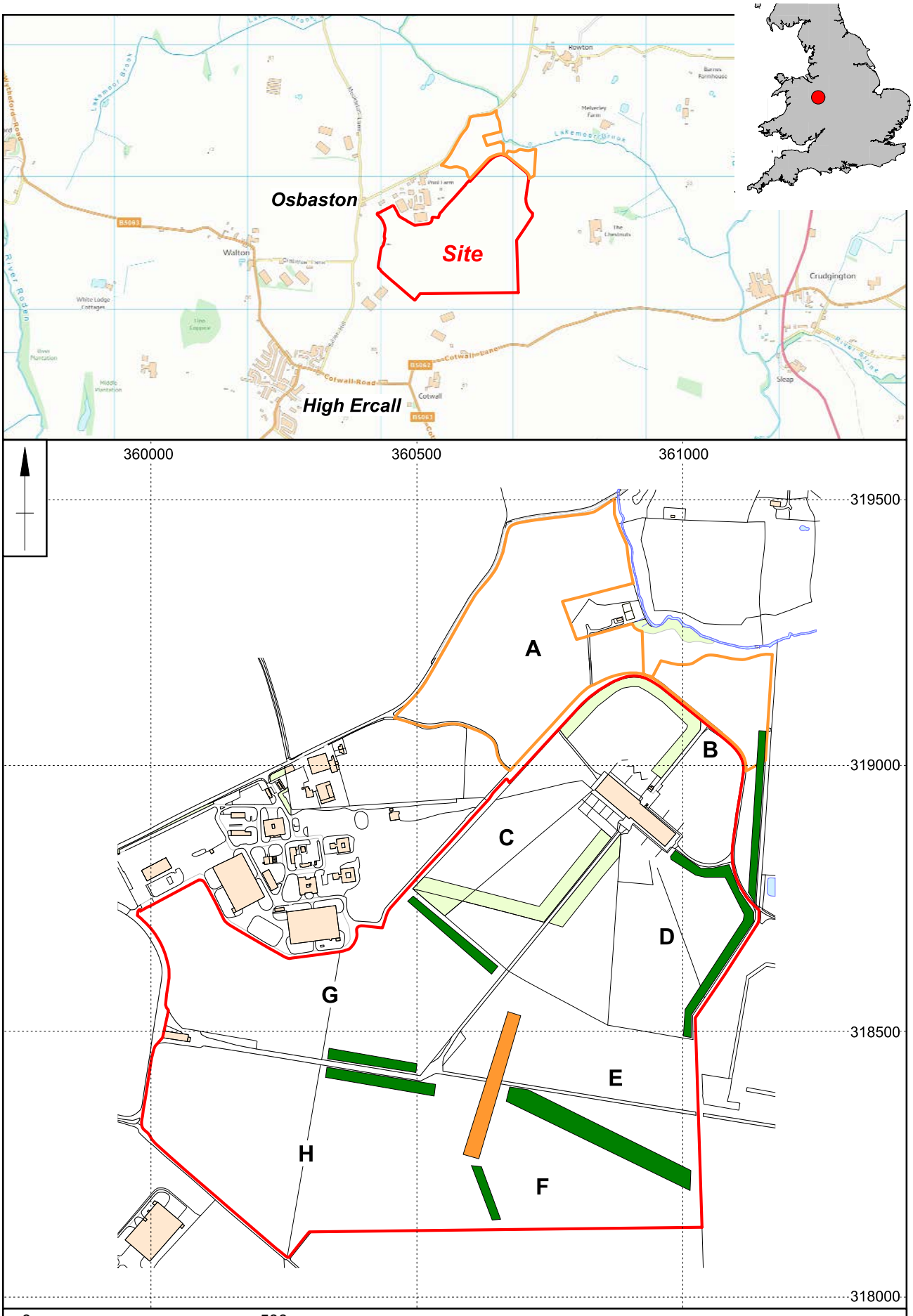
December 2022



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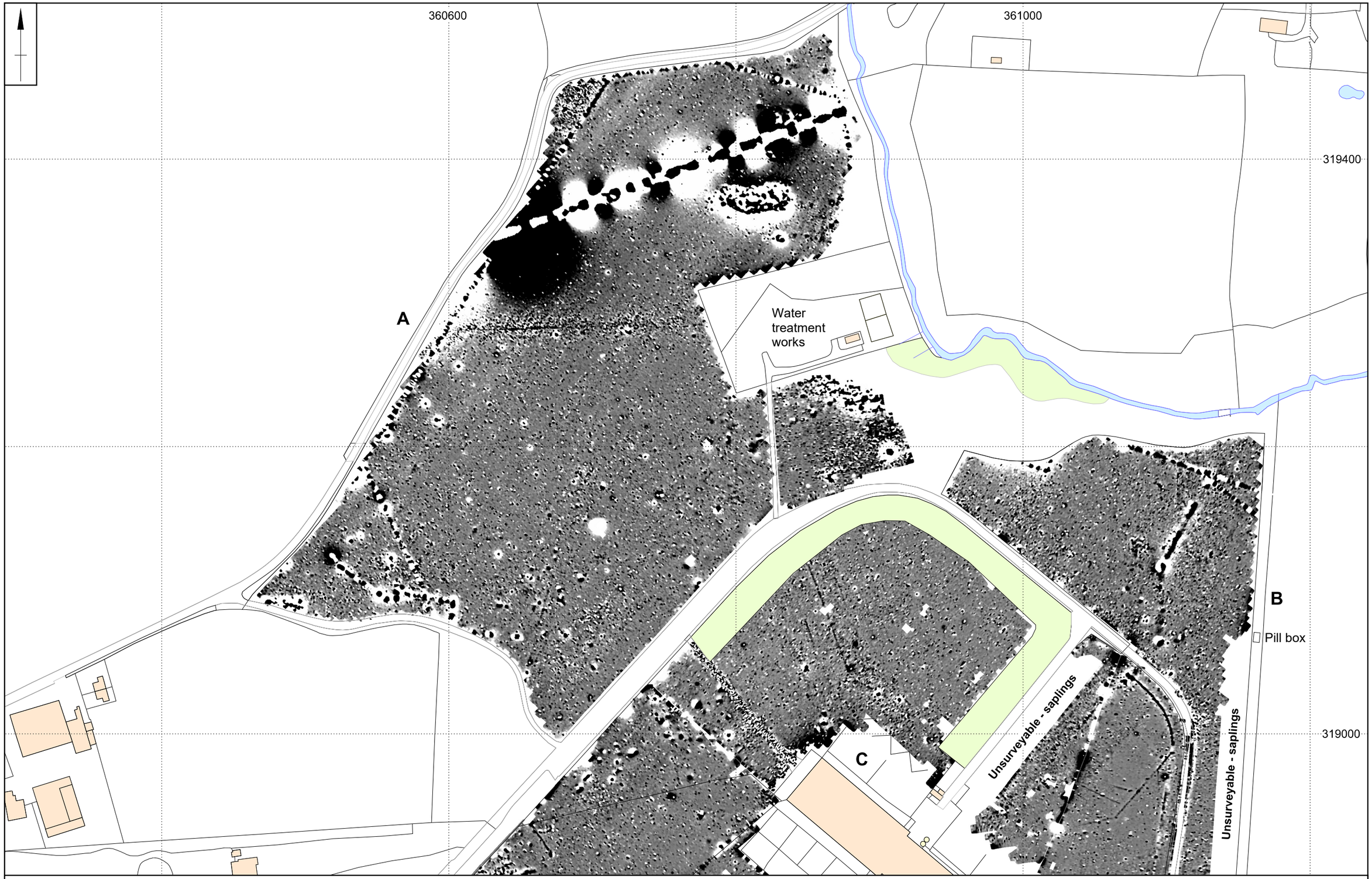
Scale 1:10,000 (A4)

Site location Fig 1



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Scale 1:2500 (A3)

Magnetometer survey results (north) Fig 2

360600
361000
318000
318400
A
B
C
D
E
F
Chicken Shed
Unsurveyable - saplings
Unsurveyable - saplings
Unsurveyable - saplings
Unsurveyable - saplings
Unsurveyable - saplings
Location of new chicken shed
0
100m
Magnetic anomaly
-10nT
0
+10nT
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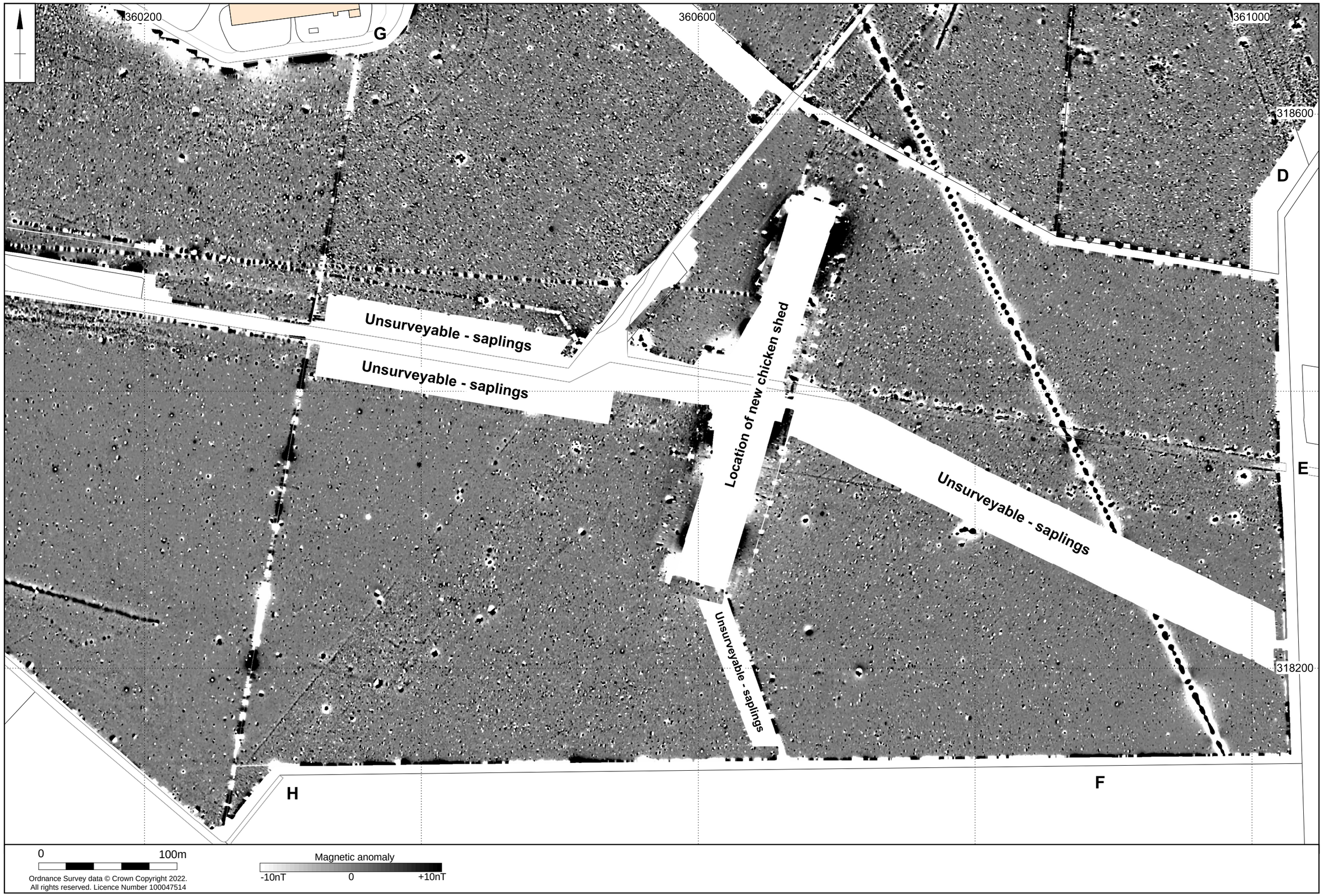
Scale 1:2500 (A3)

Magnetometer survey results (central) Fig 3



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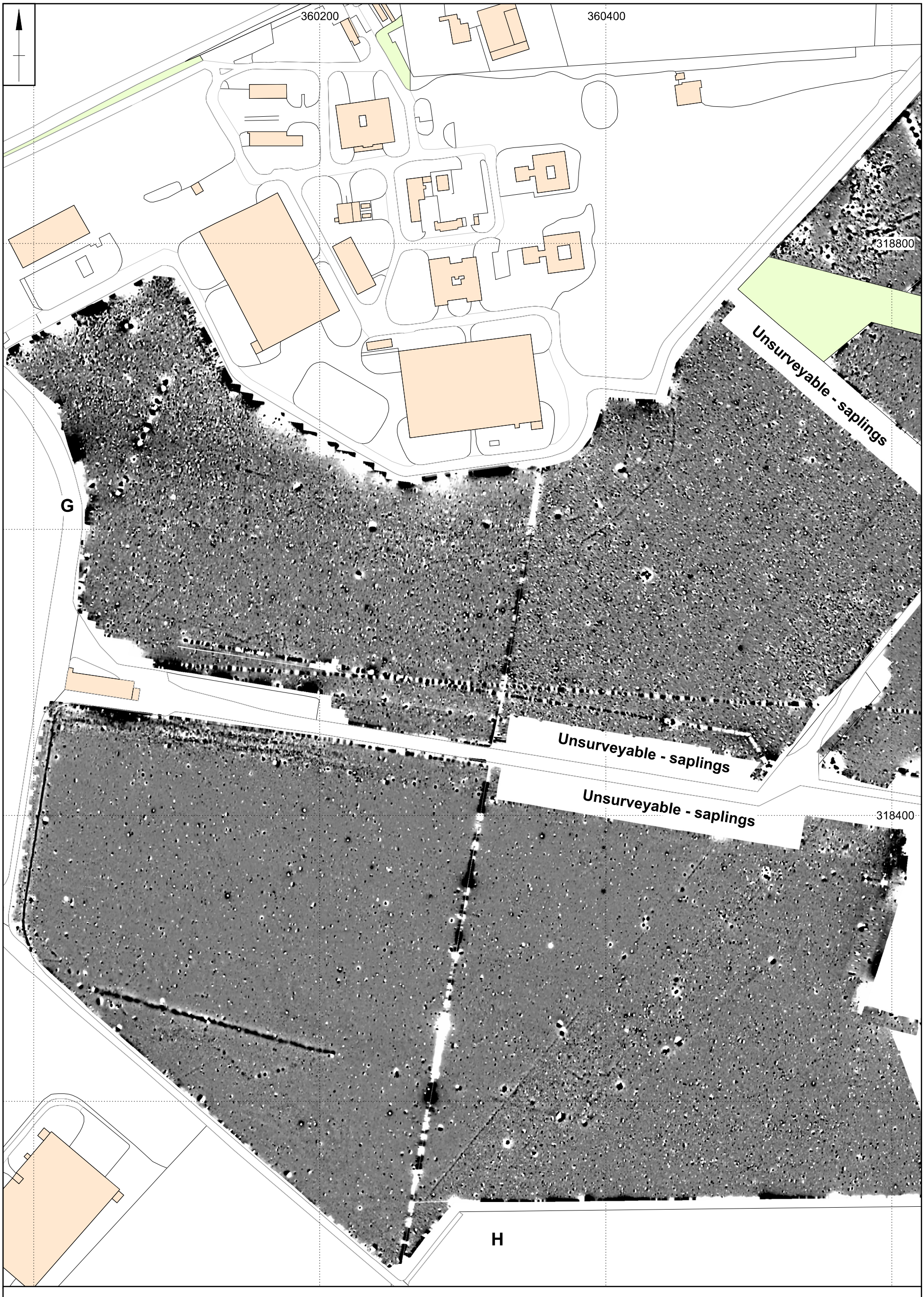
Scale 1:2500 (A3)

Magnetometer survey results (south) Fig 4



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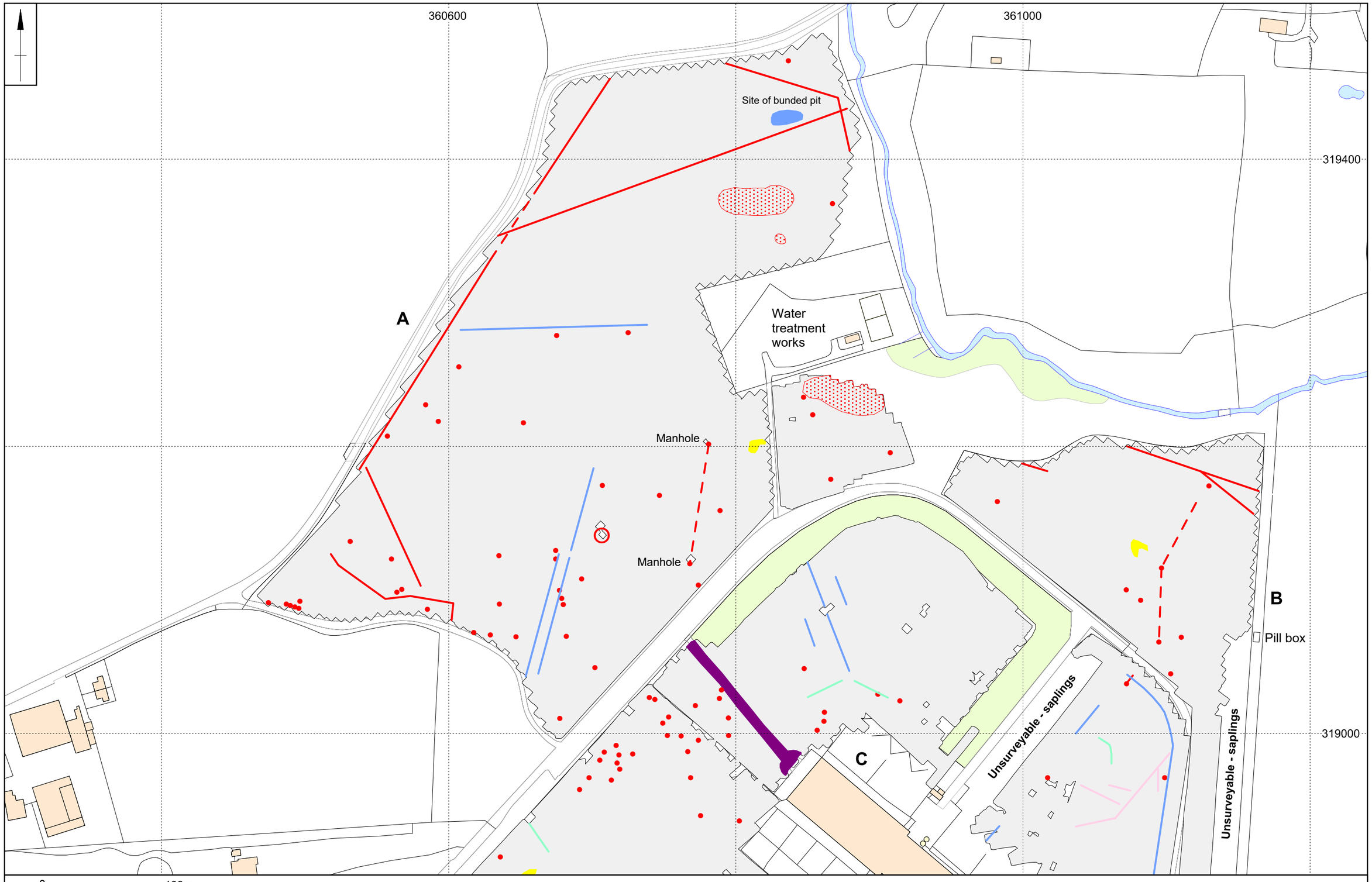
Scale 1:2500 (A3)

Magnetometer survey results (south-west) Fig 5



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Scale 1:2500 (A3)

Magnetometer survey interpretation (north) Fig 6

360600
361000
318000
318400
A
B
C
D
E
F
edge of dispersal pan?
Chicken Shed
Unsurveyable - saplings
Unsurveyable - saplings
Unsurveyable - saplings
Unsurveyable - saplings
Unsurveyable - saplings
site of blast pen
Location of new chicken shed
0
100m
Archaeology (?)
Airfield features
Possible airfield features
Modern disturbance
Utility
Inferred utility
Modern track
Ferrous debris
Ferrous object
Telegraph pole
Field drain
Uncertain
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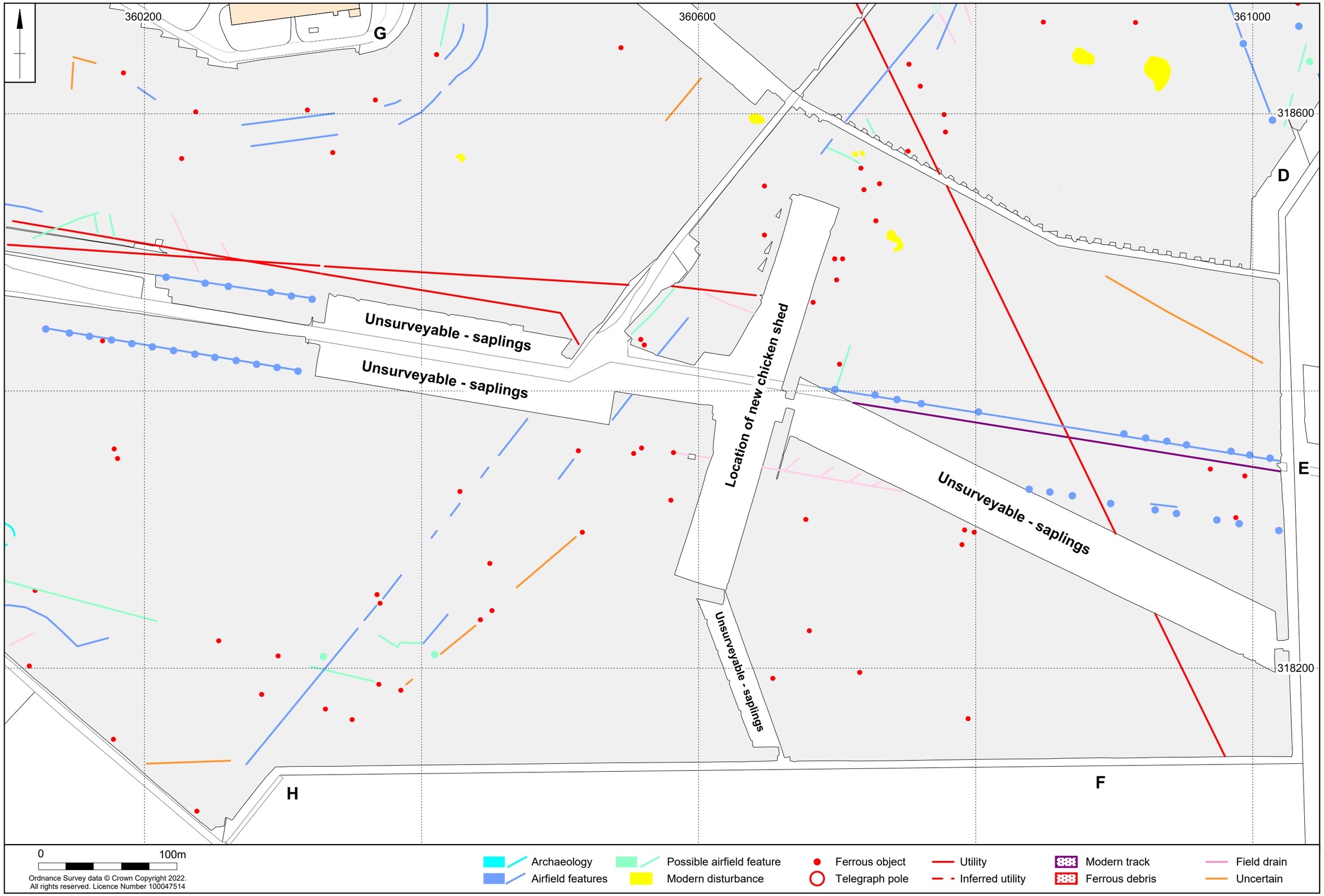
Scale 1:2500 (A3)

Magnetometer survey interpretation (central) Fig 7



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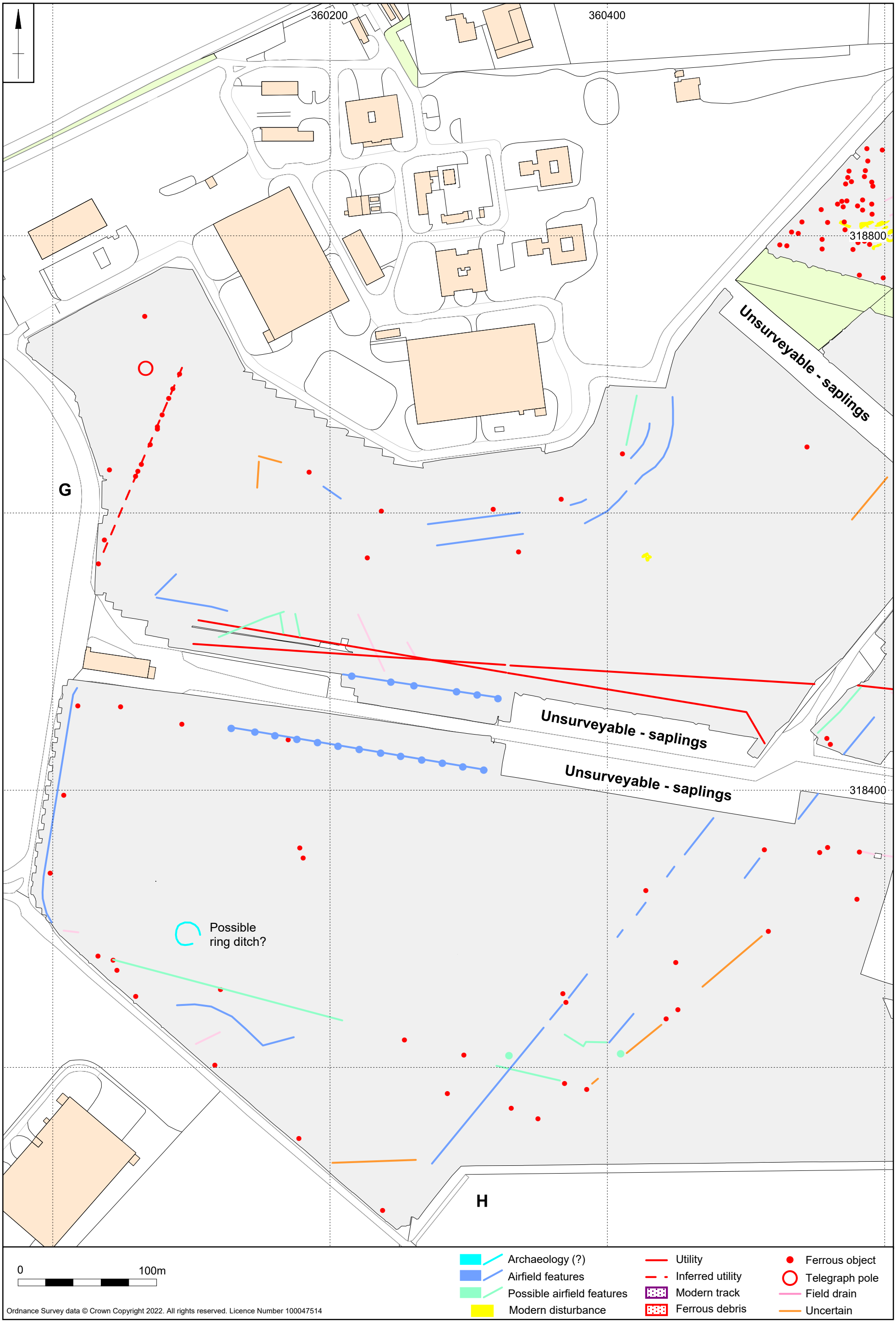
Magnetometer survey interpretation (south) Fig 8



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Magnetometer survey interpretation (south-west) Fig 9

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Unprocessed magnetometer data (north) Fig 10

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Unprocessed magnetometer data (central) Fig 11

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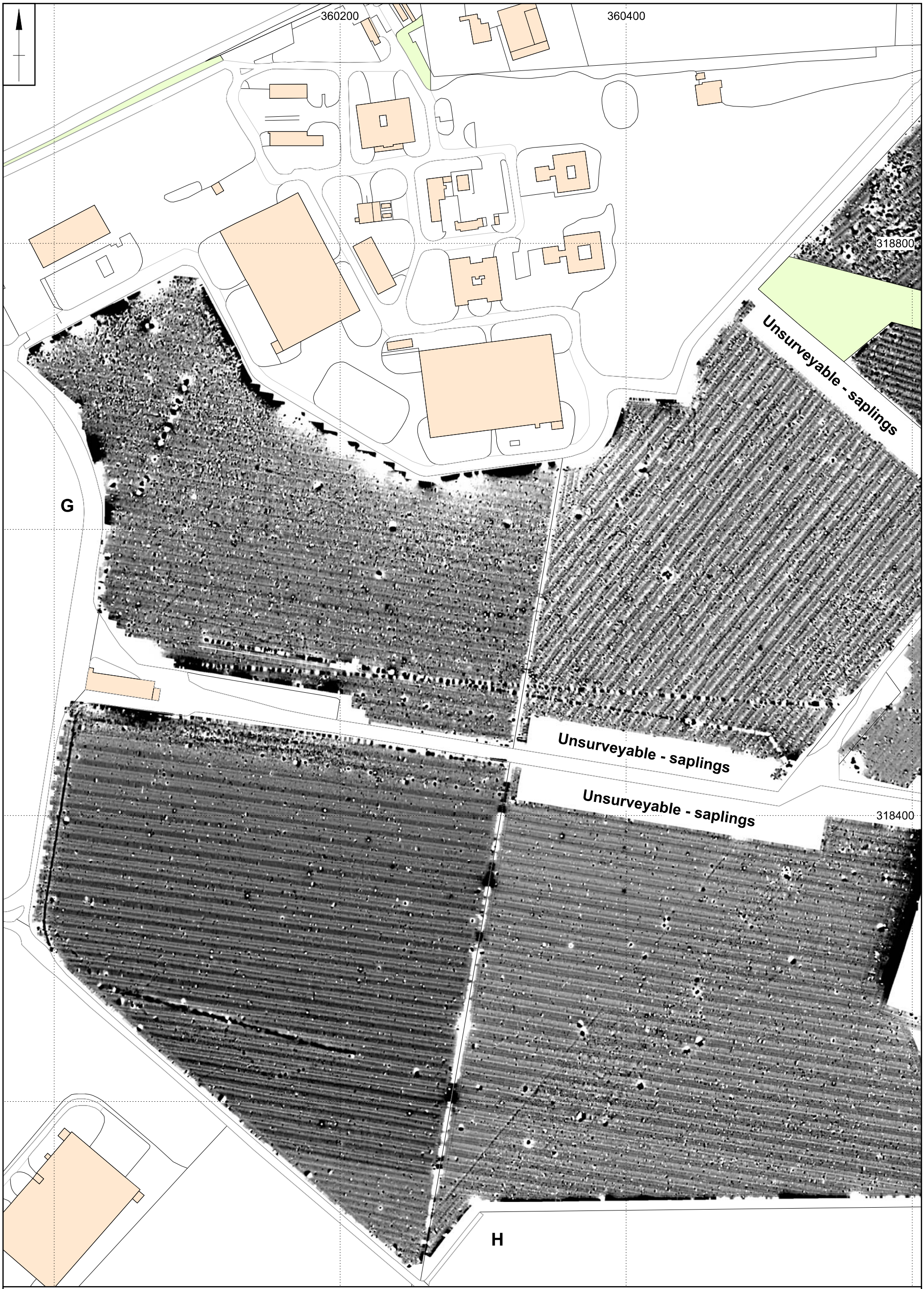
Unprocessed magnetometer data (south) Fig 12



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Unprocessed magnetometer data (south-west) Fig 13

MOLA
Kent House
30 Billing Road
Northampton
NN1 5DQ
01604 809800
www.mola.org.uk
business@mola.org.uk