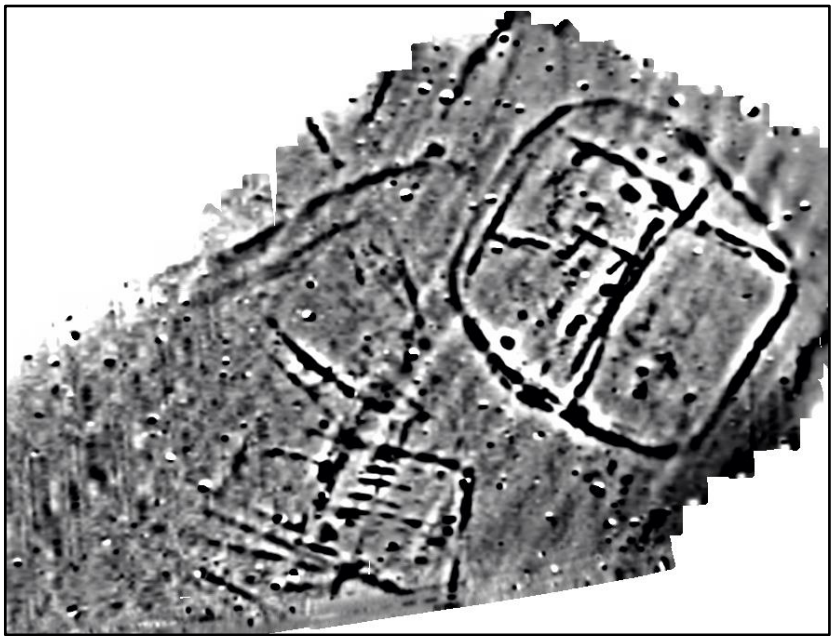

Archaeological geophysical survey on land at Granborough Buckinghamshire March - May 2023

Report number: 23/049

Author: Chris Manktelow

Illustrator: Daniel Whatton

Project Manager: John Walford
NGR: SP 755 251

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Project Manager: John Walford

Quality control and sign off**:**

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1	22/06/2023	A Reid	R Clare	J Walford	First issue

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Project: Land at Granborough			**OASIS Number:** molanort1-516819
ACTIVITY TYPE			
Project/Activity type	Geophysical survey		
Reason for investigation	Planning: Pre application		
Development type	Energy and power generation		
Planning reference ID	-		
PROJECT LOCATION			
National grid ref	SP 755 251		
Site name	Land at Granborough		
REVIEWERS/ ADMIN			
HER for project	Buckinghamshire		
National organisation	Historic England		
WORK UNDERTAKEN			
Methodological summary	Magnetometer survey with a cart-mounted array of Bartington Grad-01-1000L fluxgate gradiometers.		
Previous work?	Yes	Future works?	Unknown
Dates - Start date:	13/03/2023	End date:	26/05/2023
GEOPHYSICS			
Geology	Weymouth Member Oxford Clay Formation Alluvium		
Land use (i.e. arable)	Arable Grassland – undifferentiated Grassland - pasture		
Survey type	Magnetometer survey		
Size of survey area	40ha		
Instrumentation	Bartington Grad-01-1000L	Fluxgate – Multiple sensor	
Configuration	Pushed cart survey (6-probe)		
Spatial resolution	Traverse spacing 0.8m	Reading interval	0.225m
Resolution (data values)	0.1nT		
BIBLIOGRAPHY			
Title	Archaeological geophysical survey on land at Granborough, Buckinghamshire, March - May 2023		
Author(s)	Chris Manktelow		
Publisher / place / date	MOLA Northampton / Northampton / 2023		
Report number	23/049		
Report release delay?	Six months		
PEOPLE			
Organisation	MOLA		
Project manager	John Walford		
Project supervisor	Chris Manktelow		
Funding body	Statera Energy Ltd		
KEYWORDS			
Monuments found/ date	Enclosure – Iron Age / Roman Road – Roman Ridge and Furrow - medieval		
RESULTS			
Description of outcomes	The survey detected several archaeological sites located mostly in the north of the survey area. The sites consist of Iron Age or Roman enclosures, of varying sizes, ditches and pits. Some evidence of roundhouses was also detected in one of enclosures. The alignment of a Roman road is also thought to have been detected.		
ARCHIVES			
Accession ID	TBC		
Finds Archive repository	None	Expected date of submission:	-
Paper Archive repository	None	Expected date of submission:	-
Digital Archive repository	ADS	Expected date of submission:	2023

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ABSTRACT

MOLA (Museum of London Archaeology) was commissioned by Statera Energy Ltd to undertake an archaeological geophysical survey covering c40ha on land Granborough, Buckinghamshire. The survey detected several archaeological sites located mostly in the north of the survey area. The sites consisted of Iron Age or Roman enclosures, of varying sizes, ditches and pits. Some evidence of roundhouses was also detected in one of the enclosures. The alignment of a Roman road is also thought to have been detected.

1 INTRODUCTION

MOLA (Museum of London Archaeology) was commissioned by Statera Energy Ltd to undertake an archaeological geophysical survey covering *c*40ha of land at Granborough, Buckinghamshire (NGR SP 755 251) (Fig 1). The aim of the survey was to identify and map any archaeological remains which might be affected by a proposed development scheme.

The fieldwork comprised a magnetometer survey which was completed between the 13th March and 26th May 2023. The methodology for this was set out in a Written Scheme of Investigation (WSI, MOLA 2023) and took account of the Chartered Institute for Archaeologists and European Archaeological Council guidelines for geophysics (CIfA 2020; Schmidt *et al* 2015).

2 BACKGROUND

2.1 Location, topography and geology

The survey area is located 1km west of Granborough and *c*130m south-east of East Claydon substation and comprised a mix of arable and pasture fields (Fig 1). Two strips across the survey area were not surveyed due to the presence of 400kV overhead power lines. Two of the fields that were surveyed form part of an access track linking Hogshaw Road with the main development area, with another two fields surveyed north of Claydon Brook forming the route of a cable easement. The survey area in one of these fields, Field 10, was extended to find the extent of detected archaeological features.

The survey area lies to either side of Claydon Brook, in the base of a very shallow stream valley on broadly level ground ranging from 89m to 93m above Ordnance Datum.

The solid geology of the survey area comprises mudstone belonging to the Weymouth Member of the Oxford Clay Formation. This is overlain by alluvial deposits alongside the course of Claydon Brook (BGS 2023).

2.2 Historical and archaeological background

A heritage impact assessment has been conducted by MOLA in connection with this project to provide in-depth information on heritage assets in and around the survey area (Crothers 2023). For the purpose of this report only a summary of its findings is listed below.

The line of a Roman road, Margary Route 162 from Akeman Street at Fleet Marston to Thornborough (HER number MCB6013), is thought to lie across Fields 3 and 4 on a north-north-east to south-south-west alignment. However, this alignment is only projected and not reliably known. A linear feature, which may represent a ditch, is visible as a cropmark on recent aerial images on the eastern side of the assumed course of the road.

Two pottery scatters (MCB2108 and MCB2114) were found in the field to the west of Field 3 during a fieldwalking exercise. The scatters included tile and pottery sherds dating to the 2nd and 3rd centuries AD.

The Portable Antiquities Scheme (PAS) holds two records of finds within the vicinity of Granborough, a copper-alloy Roman coin (PAS number BUC-05227) and a medieval dagger with a double-sided human face (PAS number NARC654). The exact locations of the findspots are unknown.

A shrunken medieval village (MBC4757) lies *c*550m to the east of the survey area on the western side of Granborough. The area contains a primary hollow way and a series of small plots with house platforms linked by smaller hollow ways (Farley 1974). The remains are visible on LIDAR and have been documented through a topographic earthwork survey (EBC10353). Areas of ridge and furrow are still extant around the shrunken villages and surrounding areas (MBC2210).

A 16th-century watermill (MBC1327) lay on the northern edge of the survey area (Field 10) at the confluence of two streams. A ford may have also been located in the vicinity, along the route of the former Winslow to Granborough road.

The route of a branch line of the Aylesbury to Buckingham Railway that linked Quainton Road with Verney Junction (MBC1492) lies *c*180m to the west of the survey area. The line was closed to all traffic in 1947 but much of the route is still reflected in the pattern of field boundaries.

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 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, with an effective data resolution thus approximating to 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 GNSS 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 at a range of +/-2nT which have been rotated and scaled to fit against topographic base-mapping at a scale of 1:2000 (Figs 2 to 5). Interpretive drawings highlights notable anomalies for discussion (Figs 6 to 9). Raw magnetometer data plots are presented at a range of +/-10nT (Figs 10 to 13) as a comparison to the final de-striped results.

4 SURVEY RESULTS

4.1 Archaeological and historic features

The survey detected several areas of positive curvilinear and linear anomalies representative of ditches, mainly located towards the north of the survey area. For ease of reporting the archaeological features have been grouped into six sites, but these could form elements of a larger, more sprawling, site with multiple *foci*.

Site A

The results of Site A, located in Field 10 in the north of the survey area, consist of at least three enclosures, two of which appear to be superimposed (Figs 2 and 6). Positive linear and curvilinear anomalies in the north-east of the field are representative of ditches and they form a large enclosure of semi-rounded form, measuring *c*64m by *c*67m. A *c*48m by *c*30m rectangular enclosure is located within the larger rounded enclosure on its eastern side. The positive anomalies detected within the enclosures represent internal divisions or features such as pits, postholes and possible roundhouses.

A rectilinear enclosure with internal features, measuring *c*33m by *c*29m is located *c*30m to the south-west. A broad negative anomaly that cuts through the middle of the enclosure is thought to be the remains of a medieval or post-medieval furrow. A gap in the eastern side may represent an entrance way. Other linear features in the surrounding area may represent the remains of auxiliary features with two parallel linear anomalies orientated north-west to south-east forming a trackway. Another possible trackway is orientated east-north-east to west-south-west, to the west of the larger rounded enclosure.

Site B

Site B, located in the south of Field 10, consists of a complex of enclosures of multiple phases (Figs 2 and 6). The enclosures appear more fragmented that those in Site A, however this is probably because they have been poorly resolved by the survey rather than actually being fragmentary. Some short linear features at the western edge of the data in Field 9, possibly indicate a southward continuation of the same site.

Site C

Several positive linear and curvilinear anomalies in the north of Field 8 form Site C (Figs 2 and 6). The anomalies do not form any recognisable enclosures, although the ridge and furrow, which has the same orientation as many of the anomalies in question, may be masking some of the features. Several possible pits were also detected around Site C.

Site D

A collection of positive linear and curvilinear anomalies in the west of Field 8 have been labelled as Site D (Figs 3 and 7). The anomalies define the corner of an enclosure which extends into the unsurveyable area under the overhead lines. Several positive curvilinear anomalies within the enclosure could represent internal features of previous iterations of the enclosure. A right-angled positive anomaly just to the west forms a corner of another enclosure, measuring *c*30m by *c*40m. A long positive anomaly with a right angle at its south-eastern end represents a ditch, possibly forming the boundary of the site.

Site E

Located in the north-west of Field 7, *c*150m south-west of Site D, Site E comprises several short positive curvilinear anomalies indicative of ditches, possibly representing the remains of a small enclosure (Figs 3 and 7). Two large pit-shaped anomalies, *c*6m and *c*4m wide, could represent large storage pits, however the dotted geological patterning in the west of the survey area makes it hard to distinguish archaeological features from geological anomalies. A 17.5m long line of five small positive anomalies orientated north-east to south-west possibly represents a short alignment of pits or postholes.

Site F

Site F is located in the western corner of Field 2, *c*375m south-east of the other archaeological sites detected during the survey (Figs 4 and 8). It consists of a single *c*25m wide positive U-shaped anomaly, probably representing part of a small enclosure. Two small curvilinear positive anomalies located *c*50m north-west in Field 6 may represent short sections of ditches.

Roman road

Several sections of positive linear anomalies in the north of Field 4 match the proposed alignment of a Roman road (Figs 3 and 7), Margary Route 162 (MCB6013), and could therefore represent multiple cuts and recuts of roadside ditches. The southern continuations of these ditches have been obscured by the dense geological patterning in Field 3.

4.2 Ferrous material

The survey has detected many individual dipolar anomalies scattered at random across the survey area. These will mostly have resulted from small fragments of agricultural equipment and other scrap metal in the ploughsoil, though some may have other origins. Only a sample of the larger examples have been highlighted on the interpretation figures.

4.3 Utilities

Several utilities were detected during the survey. These are recognised by strong linear responses with an alternating positive to negative magnetic response, which are typical of metal pipes or ducting. Examples can be seen across Fields 1 and 5 and in the far eastern corner of Field 8.

4.4 Field drains

Several sets of field drains have been detected across the survey area, either appearing as stippled positive and negative linear features (Field 6) or positive linear features with a small negative halo (Fields 1-4, 7-8). A peculiarly shaped positive linear anomaly towards the centre of Field 4 has some uncertainty over its origin but has still been attributed as a drain. Another style of drains, displaying as weak parallel negative linear anomalies, are visible in the north of Field 4, but it is possible that these anomalies could represent ridge and furrow.

4.5 Geology

The dotted effect that is visible across the west of the survey area, most prominently in Field 3, is most likely caused by pockets of iron minerals in the underlying clays. The individual anomalies have not been drawn on the interpretation figures due to the density and number of them.

5 CONCLUSION

The survey has detected extensive archaeological remains across six sites within the survey area. The main bulk of the archaeological sites are located towards the north of the survey area, along the banks of Claydon Brook (Sites A-E), with only Site F as an outlier in the south. The proximity of the sites to a Roman road, detected in the west of the survey area in Field 4, and the numerous finds of Roman pottery in the area (MCB2108 and MCB2114) suggest that some of the features are likely to be Roman in date, though, it would be quite possible that the earliest elements of the sites date from the Iron Age. Unambiguous evidence of settlement features such as roundhouses were only detected in one of the enclosures in Site A. However, with some of the features detected appearing very weak with many features being poorly resolved, it is possible that some features have not been detected by the survey.

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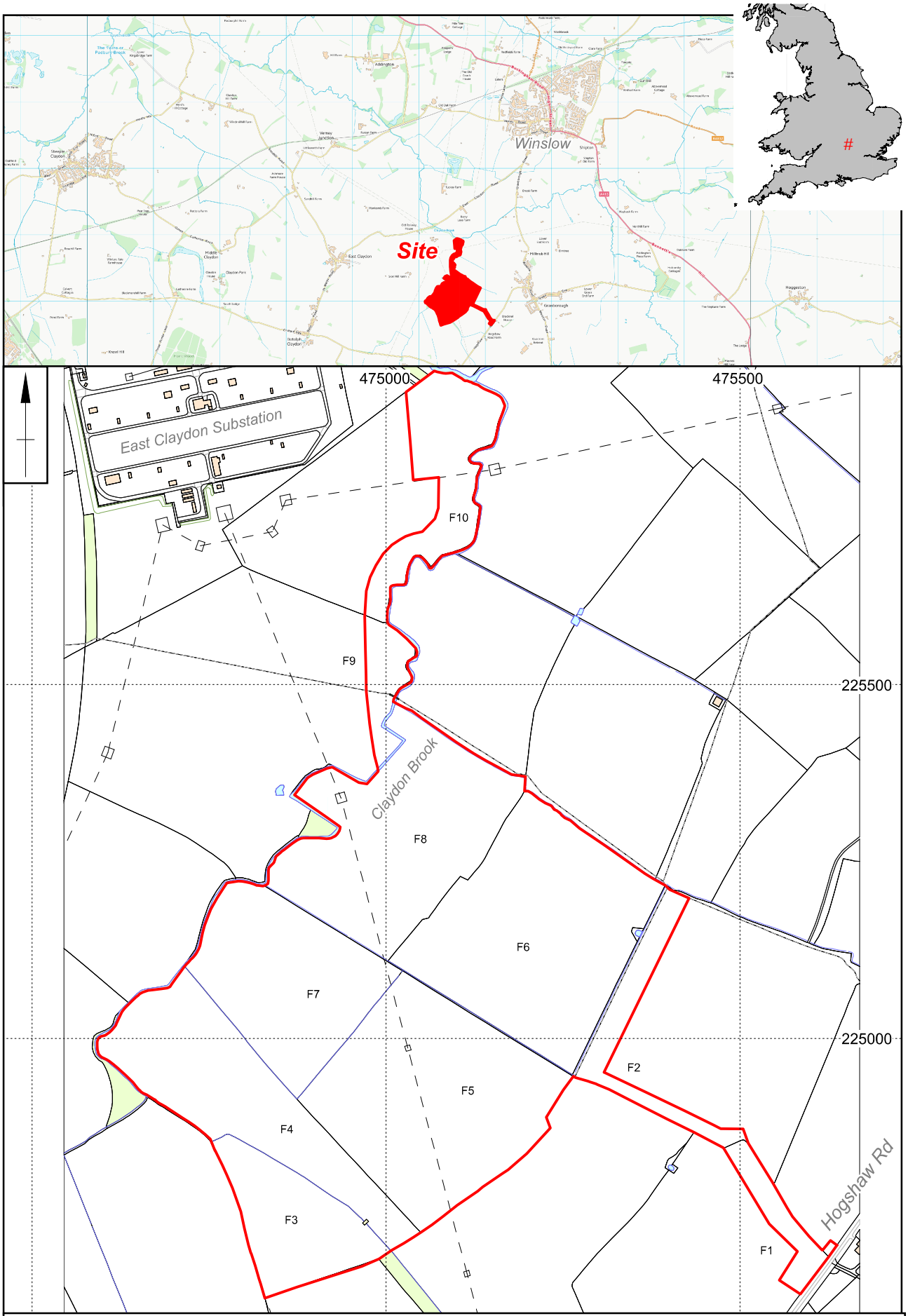
MOLA

June 2023



Scale 1:7500 (A4)

Site location Fig 1

475300

475500

475700

225700

225500

225300

225100

F10

F10

F9

F8

0 100m

Magnetic anomaly

-2nT 0 +2nT

Scale 1:2000 (A3)

Magnetometer survey results (North) Fig 2

475200

475400

475600

F8

F7

225100

F5

224900

F4

F3

224700

0 100m

Magnetic anomaly

-2nT 0 +2nT

Scale 1:2000 (A3)

Magnetometer survey results (West) Fig 3

475600

475800

225400

225200

225000

F8

F6

F2

F5

0 100m

Magnetic anomaly

-2nT 0 +2nT

Scale 1:2000 (A3)

Magnetometer survey results (East) Fig 4

475800

476000

225200

225000

224800

F6

F2

F5

F1

0 100m

Magnetic anomaly

-2nT 0 +2nT

Scale 1:2000 (A3)

Magnetometer survey results (South-east) Fig 5

475300
475500
475700
225700
225500
225300
225100
F10
Site A
Site B
F10
F9
F8
Site C
0
100m
Archaeology
Archaeology (?)
Field drains
Ridge and furrow
Utility
Ferrous

Scale 1:2000 (A3)

Magnetometer survey interpretation (North) Fig 6

475200
475400
475600
225100
224900
224700
F8
F7
F4
F3
F5
Site D
Site E
0
100m
Archaeology
Archaeology (?)
Field drains
Ridge and furrow
Utility
Ferrous

Scale 1:2000 (A3)

Magnetometer survey interpretation (West) Fig 7

475600

475800

225400

225200

225200

225000

F8

Site C

F6

Site F

F2

F5

0

100m

Archaeology

Archaeology (?)

Field drains

Ridge and furrow

Utility

Ferrous

Scale 1:2000 (A3)

Magnetometer survey interpretation (East) Fig 8

475800

476000

225200

225000

224800

F6

Site F

F2

F5

F1

0

100m

Archaeology

Archaeology (?)

Field drains

Ridge and furrow

Utility

Ferrous

Scale 1:2000 (A3)

Magnetometer survey interpretation (South-east) Fig 9

475300

475500

475700

225700

225500

225300

225100

F10

F10

F9

F8

0 100m

Magnetic anomaly

-10nT 0 +10nT

Scale 1:2000 (A3)

Unprocessed magnetometer data (North) Fig 10

475200

475400

475600

225100

224900

224700

F8

F7

F4

F5

F3

0 100m

Magnetic anomaly

-10nT 0 +10nT

Scale 1:2000 (A3)

Unprocessed magnetometer data (West) Fig 11

475600

475800

225400

225200

225200

225000

F8

F6

F2

F5

0 100m

Magnetic anomaly

-10nT 0 +10nT

Scale 1:2000 (A3)

Unprocessed magnetometer data (East) Fig 12

475800

476000

225200

225000

224800

F6

F2

F5

F1

0 100m

Magnetic anomaly

-10nT 0 +10nT

Scale 1:2000 (A3)

Unprocessed magnetometer data (South-east) Fig 13

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