CD1.15

CgMs CONSULTING

ARCHAEOLOGICAL STATEMENT

LAND OFF DUKES PARK WOODBRIDGE SUFFOLK

November 2015

Planning • Heritage

Specialist & Independent Advisors to the Property Industry

Planning Authority:
Suffolk Coastal District Council

Site centred at:
TM25684778

Author:
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Approved by:
Paul Chadwick BA (Hons) FSA MIFA

Report Status:
Final

Issue Date:
November 2015

CgMs Ref:
17159

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Executive Summary

In accordance with Government planning policy, land off Dukes Park, Woodbridge, Suffolk has been assessed for its archaeological potential in order to clarify whether development of the site will impact areas of archaeological interest.

No Scheduled Monuments or other designated heritage assets lie on the site.

Bronze Age artefacts (a razor, socketed axe and a number of worked flints) and a single Roman coin have been found on the site during metal detecting.

A geophysical survey was undertaken across the site in July 2014. No anomalies of archaeological interest were recorded.

Past ground disturbance caused by quarrying or terracing in the west and south-west of the site will have removed any archaeological remains within these areas.

Based on the available evidence, it is likely that the planning authority's archaeological advisor will seek further archaeological work to secure the modest archaeological interest on the site. This work can follow planning permission secured by a standard condition.

1.0 INTRODUCTION AND SCOPE OF STUDY

1.1 This archaeological statement has been prepared by Suzanne Gailey of CgMs Consulting on behalf of Gladman Developments Ltd.

1.2 The assessment considers a plot of land, 12.67ha in extent (also referred to as the study site) on land off to Duke's Park, Woodbridge, Suffolk. The site is centred at TM25684778 (Fig. 1).

1.3 In accordance with government policy, National Planning Policy Framework (NPPF), this assessment draws together the available archaeological, historic, topographic and land-use information in order to clarify the archaeological interest of the site.

1.4 Additionally, in accordance with the 'Standard and Guidance for Historic Environment Desk-Based Assessments' (Institute for Archaeologists 1994 [revised 2012]), the assessment includes an examination of published and unpublished material, and charts historic land-use through a map regression exercise.

1.5 As a result, the assessment enables relevant parties to assess the significance of archaeological assets on and close to the site, assesses the potential for hitherto undiscovered archaeological assets and thus enables potential impacts on assets to be identified along with the need for design, civil engineering or archaeological solutions.

2.0 PLANNING BACKGROUND AND DEVELOPMENT PLAN FRAMEWORK

2.1 In March 2012, the Government published the National Planning Policy Framework (NPPF); this was supplemented by the Planning Practice Guidance (PPG) in March 2014.

2.1.1 Section 12 of the NPPF, entitled *Conserving and enhancing the historic environment* provides guidance for planning authorities, property owners, developers and others on the conservation and investigation of heritage assets. Overall, the objectives of Section 12 of the NPPF can be summarised as seeking the:

- Delivery of sustainable development;
- Understanding the wider social, cultural, economic and environmental benefits brought by the conservation of the historic environment;
- Conservation of England's heritage assets in a manner appropriate to their significance; and
- Recognition of the contribution that heritage assets make to our understanding of the past.

2.1.2 Section 12 of the NPPF recognises that intelligently managed change may sometimes be necessary if heritage assets are to be maintained for the long term. Paragraph 128 states that planning decisions should be based on the significance of the heritage asset and that the level of detail supplied by an applicant should be proportionate to the importance of the asset and should be *no more than sufficient* to review the potential impact of the proposal upon the significance of that asset.

2.1.3 *Heritage Assets* are defined in Annex 2 of the NPPF as: a building, monument, site, place, area or landscape positively identified as having a degree of significance meriting consideration in planning decisions. They include designated heritage assets (as defined in the NPPF) and assets identified by the local planning authority during the process of decision-making or through the plan-making process.

2.1.4 Annex 2 also defines *Archaeological Interest* as a heritage asset which holds or potentially could hold evidence of past human activity worthy of expert investigation at some point. Heritage assets with archaeological interest are the primary source of evidence about the substance and evolution of places, and of the people and cultures that made them.

2.1.5 A *Designated Heritage Asset* comprises a: World Heritage Site, Scheduled Monument, Listed Building, Protected Wreck Site, Registered Park and Garden, Registered Battlefield or Conservation Area.

2.1.6 *Significance* is defined as: The value of a heritage asset to this and future generations because of its heritage interest. This interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting.

2.1.7 In short, government policy provides a framework which:

- Protects nationally important designated Heritage Assets (which include World Heritage Sites, Scheduled Ancient Monuments, Listed Buildings, Protected Wreck Sites, Registered Parks and Gardens, Registered Battlefields or Conservation Areas);
- Protects the settings of such designations;
- In appropriate circumstances seeks adequate information (from desk based assessment and field evaluation where necessary) to enable informed decisions; and
- Provides for the excavation and investigation of sites not significant enough to merit *in-situ* preservation.

2.2 In considering any planning application for development, the planning authority will be mindful of the framework set by government policy, in this instance the NPPF, by current Development Plan Policy and by other material considerations.

2.3 There are no 'saved' policies on the Suffolk Coastal Local Plan relating to archaeological matters.

2.4 The Suffolk Coastal District Council Core Strategy was adopted in July 2013. The Core Strategy highlights the importance of the Historic Environment but does not contain any Policy solely relating to this issue. Heritage Assets are mentioned however in the following policies:

STRATEGIC POLICY SP15 – LANDSCAPE AND TOWNSCAPE

THE POLICY OF THE COUNCIL WILL BE TO PROTECT AND ENHANCE THE VARIOUS LANDSCAPE CHARACTER AREAS WITHIN THE DISTRICT EITHER THROUGH OPPORTUNITIES LINKED TO DEVELOPMENT OR THROUGH OTHER STRATEGIES…….

……..MANY OF THE TOWNS AND VILLAGES IN THE DISTRICT ARE OR DISTINCTIVE HISTORICAL AND ARCHITECTURAL VALUE AS WELL AS LANDSCAPE VALUE AND CHARACTER AND THE COUNCIL WILL SEEK TO ENHANCE AND PRESERVE THESE ATTRIBUTES AND THE QUALITY OF LIFE IN THE GENERALITY OF URBAN AREAS…….

DEVELOPMENT MANAGEMENT POLICY DM21 – DESIGN: AESTHETICS

PROPOSALS THAT COMPRISE POOR VISUAL DESIGN AND LAYOUT, OR OTHERWISE SERIOUSLY DETRACT FROM THE CHARACTER OF THEIR SURROUNDINGS WILL NOT BE PERMITTED.

DEVELOPMENT WILL BE EXPECTED TO ESTABLISH A STRONG SENSE OF PLACE, USING STREETSCENES AND BUILDINGS TO CREATE ATTRACTIVE AND COMFORTABLE PLACES TO LIVE, WORK AND VISIT. ACCORDINGLY, DEVELOPMENT WILL BE PERMITTED WHERE THE FOLLOWING CRITERIA ARE MET:

(A) PROPOSALS SHOULD RELATE WELL TO THE SCALE AND CHARACTER OF THEIR SURROUNDINGS PARTICULARLY IN TERMS OF THEIR SITING, HEIGHT, MASSING AND FORM;

(B) IN AREAS OF LITTLE OR NO VARIED TOWNSCAPE QUALITY, THE FORM, DENSITY AND DESIGN OF PROPOSALS SHOULD CREATE A NEW COMPOSITION AND POINT OF INTEREST, WHICH WILL PROVIDE A POSITIVE IMPROVEMENT IN THE STANDARD OF THE BUILT ENVIRONMENT OF THE AREA GENERALLY;

(C) ALTERATIONS AND EXTENSIONS TO EXISTING BUILDINGS SHOULD NORMALLY RESPECT THE PLAN FORM, PERIOD, STYLE, ARCHITECTURAL CHARACTERISTICS AND, WHERE APPROPRIATE, THE TYPE AND STANDARD OF DETAILING AND FINISHES OF THE ORIGINAL BUILDING;

(D) IN ORDER FOR EXTENSIONS TO EXISTING BUILDINGS TO BE ACCEPTABLE, PARTICULARLY ON THOSE THAT ARE CONSIDERED TO BE ARCHITECTURALLY AND HISTORICALLY IMPORTANT (INCLUDING VERNACULAR ARCHITECTURE) AND THOSE LOCATED IN SENSITIVE LOCATIONS, THE EXTENSION SHALL BE VISUALLY 'RECESSIVE' AND ITS SIZE AND DESIGN SHALL BE SUCH THAT THE ORIGINAL BUILDING WILL REMAIN THE MORE DOMINANT FEATURE ON THE SITE;

(E) LAYOUTS SHOULD INCORPORATE AND PROTECT EXISTING SITE FEATURES OF LANDSCAPE, ECOLOGICAL, HERITAGE OR AMENITY VALUE AS WELL AS ENHANCE SUCH FEATURES E.G. HABITAT CREATION; AND

(F) ATTENTION MUST BE GIVEN TO THE FORM, SCALE, USE, AND LANDSCAPE OF THE SPACES BETWEEN BUILDINGS AND THE BOUNDARY TREATMENT OF INDIVIDUAL SITES, PARTICULARLY ON THE EDGE OF SETTLEMENTS……..

2.5 There are no designated heritage assets within the site. The closest Listed Building is 1 Top Street to the west of the study site. This report will assess below ground archaeological matters only.

2.6 Therefore, in accordance with NPPF, this assessment will consider the significance of non-designated assets on and near the site and assess the potential of as yet unknown archaeological assets to be present on the site.

3.0 GEOLOGY AND TOPOGRAPHY

3.1 Geology

3.1.1 The British Geological Survey indicates that the north of the site is located on Red Crag Formation comprising Sand. This is overlain by superficial deposits of Kesgrave Sand and Gravels. The south of the site is situated on Thames Group comprising Clay and Silt.

3.1.2 No geotechnical information is currently available.

3.2 Topography

3.2.1 The study site lies on sloping ground which slopes generally from north-east to south towards the river Fynn, from c. 30m AOD in the north-east down to c. 10m AOD in the south.

3.2.2 A drainage ditch crosses the eastern part of the site. The River Fynn lies c. 600m south of the site and drains into the Martlesham Creek.

4.0 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND, INCLUDING ASSESSMENT OF SIGNIFICANCE

Timescales used in this report.

Prehistoric

Palaeolithic	450,000	-	12,000 BC
Mesolithic	12,000	-	4,000 BC
Neolithic	4,000	-	1,800 BC
Bronze Age	1,800	-	600 BC
Iron Age	600	-	AD 43

Historic

Roman	AD 43	-	410
Anglo Saxon/Early Medieval	AD 410	-	1066
Medieval	AD 1066	-	1485
Post Medieval	AD 1486	-	1799
Modern	AD 1800	-	Present

4.1 Introduction

4.1.1 Archaeological information from a 'study area' comprising land within a 1km from the centre of the site held in the Suffolk Historic Environment Record (HER) has been collected and reviewed (Appendix 1). In addition a geophysical survey was undertaken across the site in July 2014 (Appendix 2).

4.1.2 This chapter considers any existing archaeological evidence for the site and the archaeological/historical background of the general area, and considers any heritage assets on the site and the potential for as yet undiscovered archaeological evidence on the site.

4.1.3 Chapter 5 subsequently considers the site conditions and whether the theoretical potential identified in this chapter is likely to survive.

4.2 **Prehistoric**

4.2.1 No evidence of activity dating to the Palaeolithic and Mesolithic periods have been recorded within the vicinity of the study site.

4.2.2 From about 4,000 BC, the mobile hunter-gathering economy of the Mesolithic gradually gave way to a more settled agriculture-based subsistence. The pace of woodland clearance to create arable and pasture-based agricultural land varied regionally and locally, depending on a wide variety of climatic, geological, topographic, social and other factors. The trend was one of a slow, but gradually increasing pace of forest clearance and within these partially cleared environments monument building, in the form of Long Barrows and Causewayed Camps, took place.

4.2.3 Isolated finds of Neolithic date including blades cores and arrowheads were found c. 150m north west of the site during archaeological investigations at Notcutts Nursery (MRM023 TM25554805). Further evidence for Neolithic activity was recorded during excavations associated with the Martlesham By-Pass on land immediately north-west of the site where four small pits containing Grooved Ware pottery sherds and worked flints were found (MRM30 TM25624798, TM25524793, TM25644799).

4.2.4 Further afield, evidence of Neolithic activity was recorded at Creek Farm Nursery c. 250m east of the site (WBG008 TM26154785) and c. 650m north-west of the site (BEG026 TM24894816).

4.2.5 A Bronze Age razor and a number of worked flints were found during metal detecting across the site. The HER also records that a Bronze Age socketed axe was also discovered in the same field (MRM029 TM25784782). These finds may suggest Bronze Age activity on the site or in the near vicinity.

4.2.6 A watching brief in advance of construction of a golf course c. 650m north-west of the site recorded a small scatter of prehistoric isolated finds, comprising pottery and lithics (BEG011 TM25184828).

4.2.7 Fieldwalking and limited trial trenching at Notcutts Nursery recorded a number of worked flints and a ditch and pit of possible Iron Age date c. 100m north of the northern most part of the site (MRM022 TM25754825), and a small Iron Age pit was recorded during excavations on land immediately north-west of the site.

4.2.8 Excavations during the Martlesham By-Pass roadworks recorded four small pits containing Grooved Ware pottery, worked flints and pottery, a sherd of beaker pottery and a small Iron Age pit on land immediately north-west of the site (MRM30 TM25624798, TM25524793, TM25644799).

4.2.9 Iron Age pottery sherds were found as surface finds in Sluice Wood c. 650m south of the site (MRM003 TM25854695 and MRM004 TM25954695).

4.2.10 Prior to the geophysical survey undertaken in July 2014, the site was considered to have a moderate archaeological potential for evidence of settlement activity dating to the Neolithic, Bronze Age and Iron Age. However based on the results of the geophysical survey, evidence of prehistoric settlement activity on the site is considered to be less likely (Appendix 2). The potential for isolated artefactual evidence is considered to be moderate to good.

4.3 **Roman**

4.3.1 No evidence of in situ Roman activity has been recorded within a 1km radius of the study site, although a number of isolated finds have been recorded during either metal detecting or fieldwalking.

4.3.2 A single isolated Roman coin was found on the site during metal detecting (MRM029 TM25754785).

4.3.3 Further finds including brooches, coins and pottery sherds have been found in the wider vicinity (BEG007 TM24934786, BEG008 TM24744805, BEG011 TM25124833, MRM003 TM25854695, MRM004 TM25954695, MRM022 TM25754815, MRM028 TM25154770 MRM040 TM24854743, MRM044 TM25574856, MRM107 TM25855688, WBG007 TM26454765, WBG015 TM26284809).

4.3.4 The archaeological potential of the site is therefore considered to be low for in situ Roman settlement evidence, as confirmed by the results of the recent geophysical survey (Appendix 2). There is a moderate to good potential for further isolated artefacts.

4.4 Anglo-Saxon and Medieval

4.4.1 No evidence of in situ settlement evidence dating to the Anglo-Saxon and Medieval periods has been recorded within a 1km radius of the study site. However, a number of isolated finds have been recorded during either metal detecting or fieldwalking (BEG007 TM24934786, BEG008 TM24744800 BEG026 TM24894816, MRM028 TM25124773, MRM040 TM24744754 BEG007 TM24934786, BEG011 TM25134832, BEG015 TM25174800, MRM028 TM25154770, MRM040 TM24854745, WBG007 TM26254765, WBG030 TM26084785 and WBG031 TM26074775).

4.4.2 During these periods the site comprised agricultural land away from the settlements of Martelsham and Woodbridge (both recorded as settlements in the Domesday Survey of 1086). Therefore, the archaeological potential is considered to be low, as confirmed by the results of the recent geophysical survey.

4.5 Post-Medieval and Modern

4.5.1 During the Post-Medieval period the study site continued to comprise agricultural land away from any settlement activity (Fig. 2).

4.5.2 By the early 19th century, the site comprised of a number of enclosed pasture fields (Fig. 3).

4.5.3 By the late 19th century, the railway line bounds the south of the site. In 1881, the centre of the site comprised a wooded and roughly grassed area traversed by a trackway. Evidence of a large pit, possibly a remnant of former quarrying on the site, is shown on the 1881 Ordnance Survey (Fig. 4).

4.5.4 There was little change by the early 20th century (Figs. 5 and 6), although by the 1920s a small outbuilding had been constructed in the west of the site.

4.5.5 Between 1927 and 1968, the majority of the former field boundaries had been removed and a circuitous trackway laid out. A number of works buildings had been constructed in the west of the site (Fig. 7).

4.5.6 Between 1968 and 1989, many of the former tracks on the site had been cleared whilst a number of additional buildings had been constructed in the west of the site (Fig. 8).

4.5.7 A current site plan indicates that the majority of the former buildings on the site have been demolished (Fig. 1).

4.5.8 In light of the above information, the archaeological potential of the site for Post-Medieval and more recent evidence is therefore considered to be nil/negligible, although evidence of land division and agricultural activity will be represented, as confirmed by the results of the recent geophysical survey.

4.6 Geophysical Survey

4.6.1 A geophysical survey was undertaken across the site in July 2014. No anomalies of archaeological interest were recorded (Appendix 2).

4.7 Assessment of Significance

4.7.1 There are no designated archaeological assets on or close to the site.

4.7.2 No potential archaeological anomalies were recorded during the recent geophysical survey across the site.

4.7.3 Isolated finds dating to the Bronze Age and Roman period have been found on the site. These could have been stray finds brought into the site from elsewhere or they may represent evidence of occupational activity on the site. The results of the recent geophysical survey would suggest that occupational activity is unlikely.

4.7.4 As a result, the site has a moderate to good potential for further artefactual evidence dating from the Bronze Age and Roman period.

4.7.5 Any archaeological remains, if they occur on the site are considered to be of local importance.

5.0 SITE CONDITIONS, THE PROPOSED DEVELOPMENT AND IMPACT ON ARCHAEOLOGICAL ASSETS

5.1 Site Conditions

5.1.1 A site visit was undertaken in April 2014. It currently comprises marginal land to the south-west of Woodbridge and the north-east of Martlesham. The natural topography of the site has been substantially altered in the west and south-west of the site, most likely due to past quarrying activity (Plates 1-3). In the south of the site the land has been levelled ahead of laying out a ground floor slab (Plates 4 and 5), the spoil of which may have been used to form a recent embankment running north-south towards the railway line in the southern part of the site (Plates 6 and 7). The trackway that crosses the site is levelled and bound to the north by a substantial earthwork embankment (Plates 8 and 9). A drainage ditch crosses the south-eastern part of the site (Plate 10). The remainder of the site comprises natural sloping ground (Plates 11 and 12).

5.1.2 Terracing or quarrying into the site will have removed any archaeological potential from that part of the site, whilst the cutting of the drainage ditch will have had a severe but localised below ground archaeological impact.

5.2 The Proposed Development

5.2.1 It is proposed to develop the site for residential purposes for up to 215 dwellings and a convenience store, with associated infrastructure and landscaping.

5.3 Impact on Archaeological Assets

5.3.1 There are no designated archaeological assets on the site and no potential archaeological anomalies were recorded during the recent geophysical survey undertaken across the site.

5.3.2 If present, the proposed development could impact potential archaeological remains of local importance.

6.0 SUMMARY AND CONCLUSIONS

6.1 In accordance with central and local government planning policy, an archaeological statement has been undertaken to clarify the archaeological potential of the study site.

6.2 No Scheduled Monuments or other designated heritage assets lie on the site.

6.3 A geophysical survey undertaken across the site in July 2014 recorded no anomalies of archaeological interest.

6.4 Isolated finds dating to the Bronze Age and Roman period have been found on the site. These could have been stray finds brought into the site from elsewhere or they could represent evidence of occupational activity on the site. The results of the recent geophysical survey would suggest that occupational activity is unlikely.

6.5 As such, the site has a moderate to good potential for further artefactual evidence dating from the Bronze Age and Roman period.

6.6 Past ground disturbance caused by quarrying or terracing in the west and south-west of the site will have removed any archaeological remains within these areas.

6.7 It is likely that further archaeological assessment will be required by the Suffolk County Council Archaeological Officer, in their role as archaeological advisor to the Suffolk Coastal District Council, in order to secure the modest archaeological interest on the site. This work can follow planning permission secured by a standard condition.

SOURCES CONSULTED

General

Suffolk Historic Environment Record

British Library

Suffolk Record Office

Cartographic

1787 Hodgkinson

1837 Tithe Map

1881 Ordnance Survey

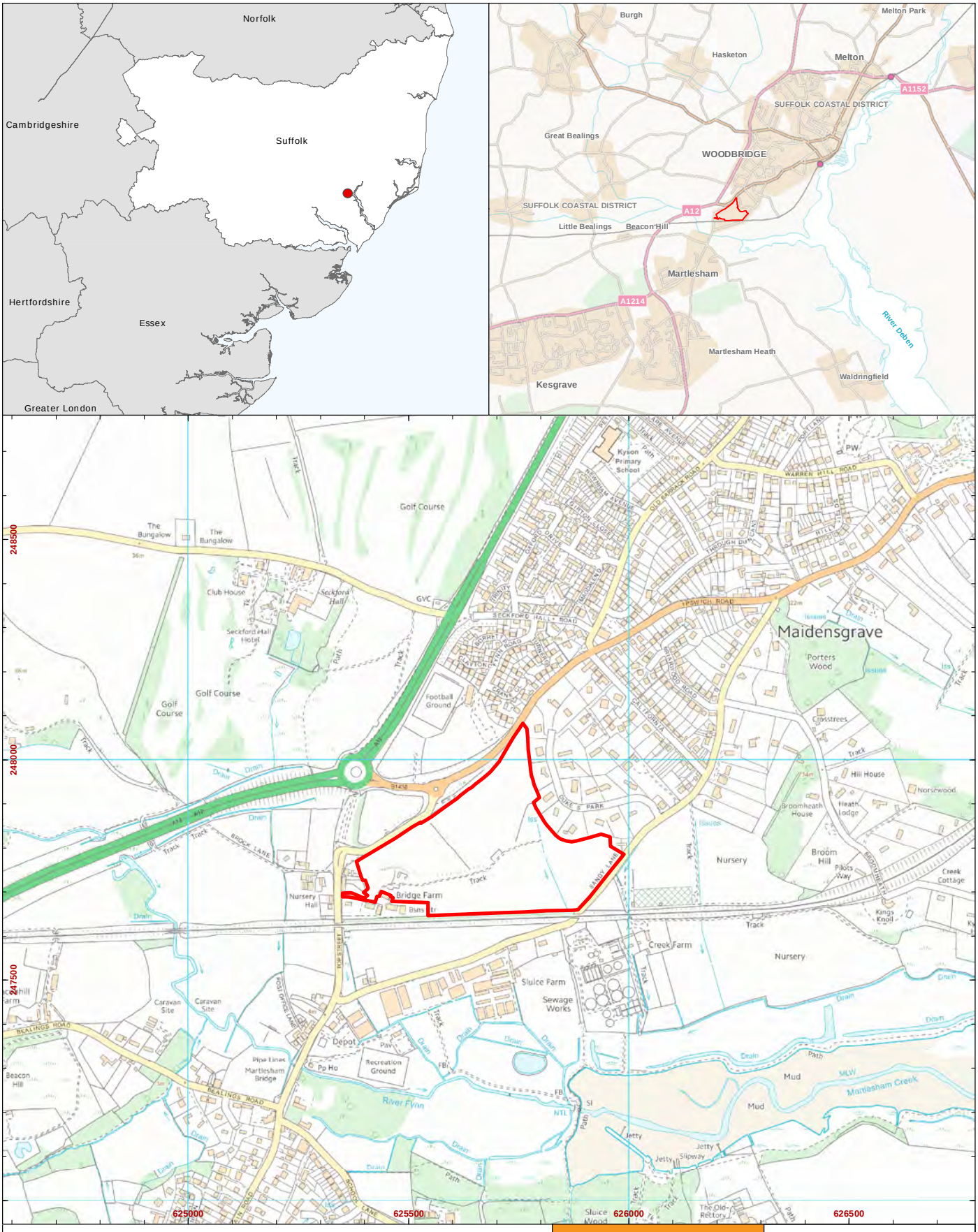
1902 Ordnance Survey

1927 Ordnance Survey

1968 Ordnance Survey

1989 Ordnance Survey

2014 Ordnance Survey



Site Boundary

N

Scale at A4: 1:12,000

0 300 m

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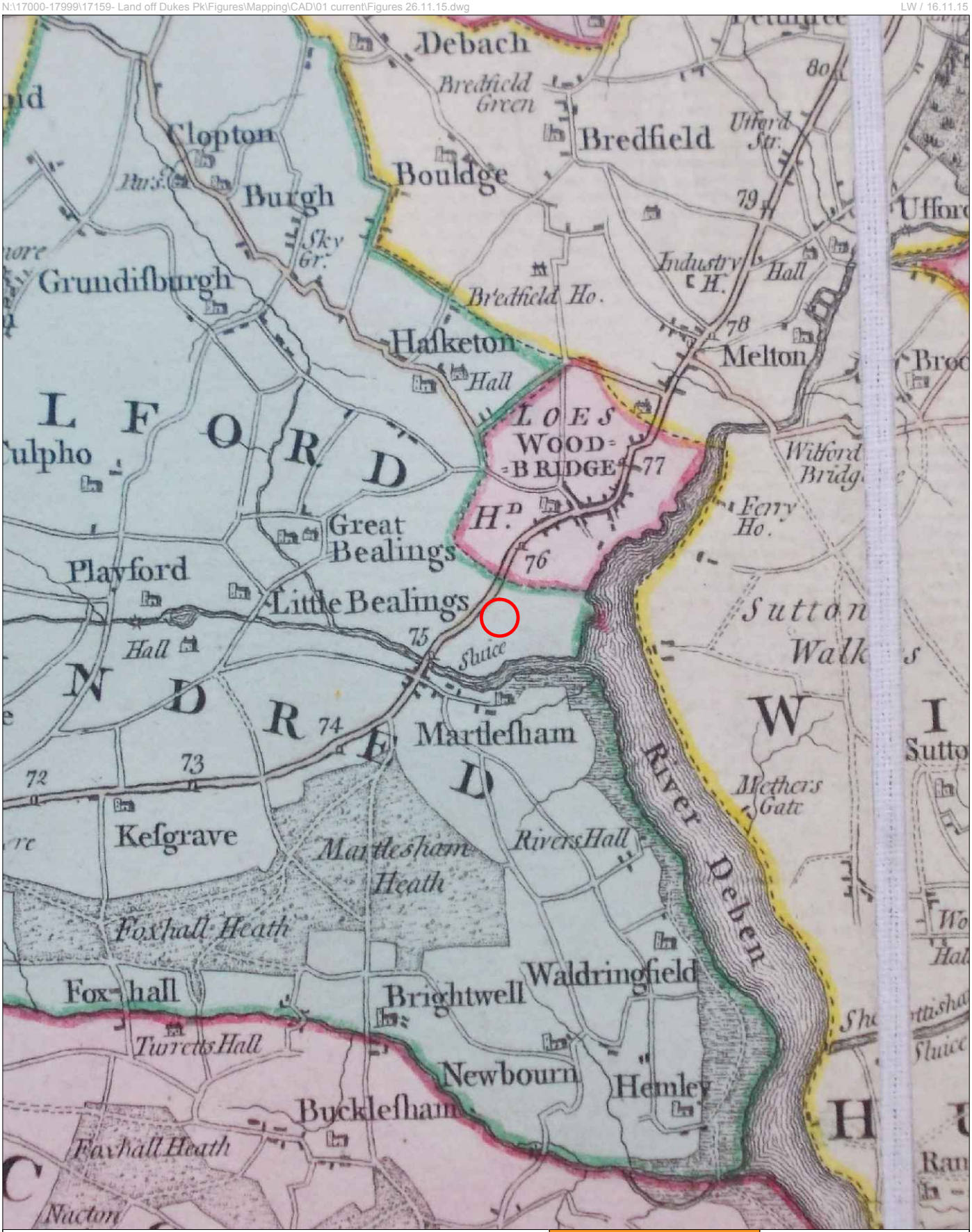
Figure 1:
Site Location



Site Location

N

Not to Scale:
Illustrative Only

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Figure 2:
1787 Hodgkinson

Site Boundary

N

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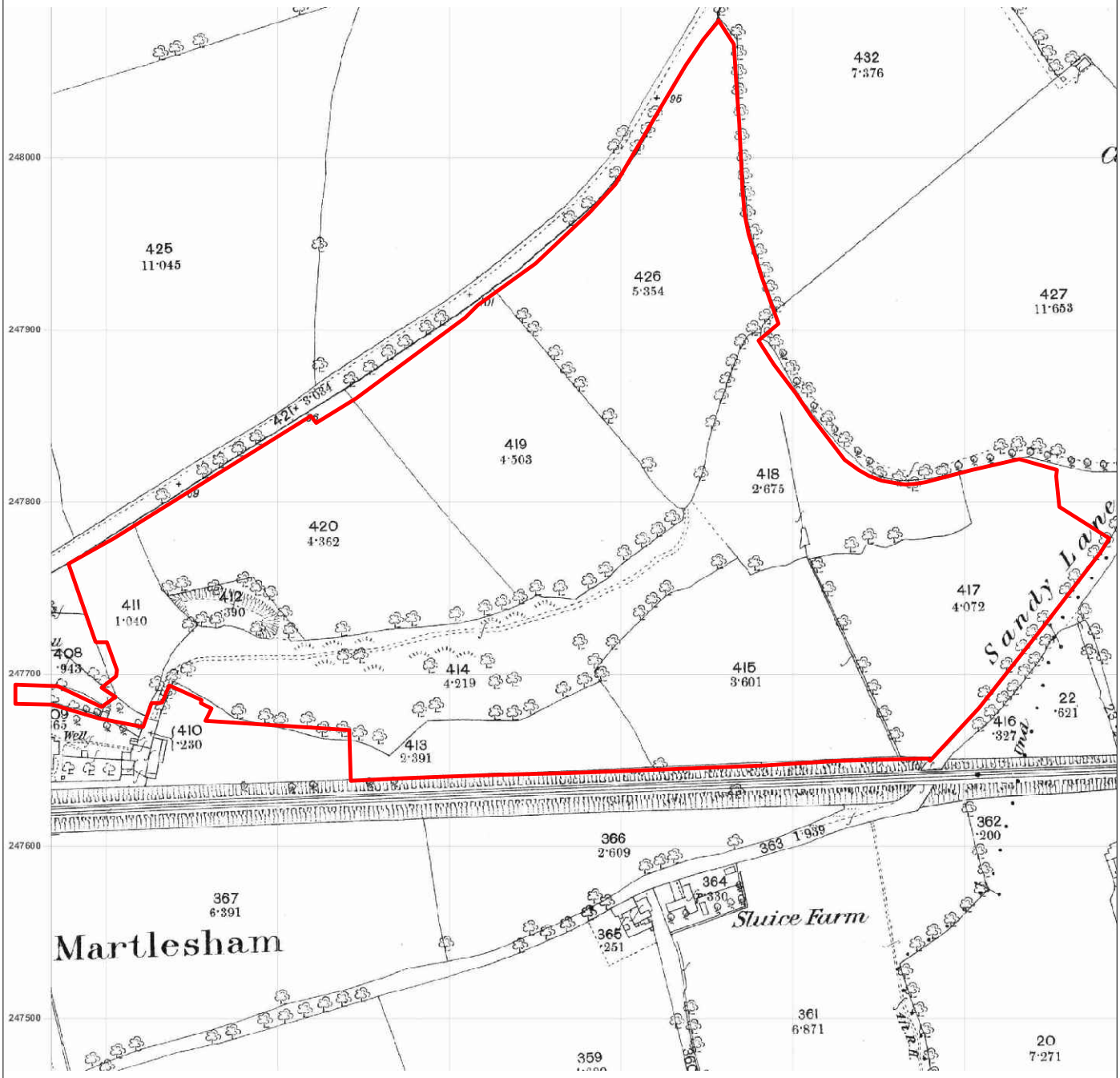
Not to Scale:
Illustrative Only

Figure 3:
1837 Martlesham
Tithe Map



Site Boundary

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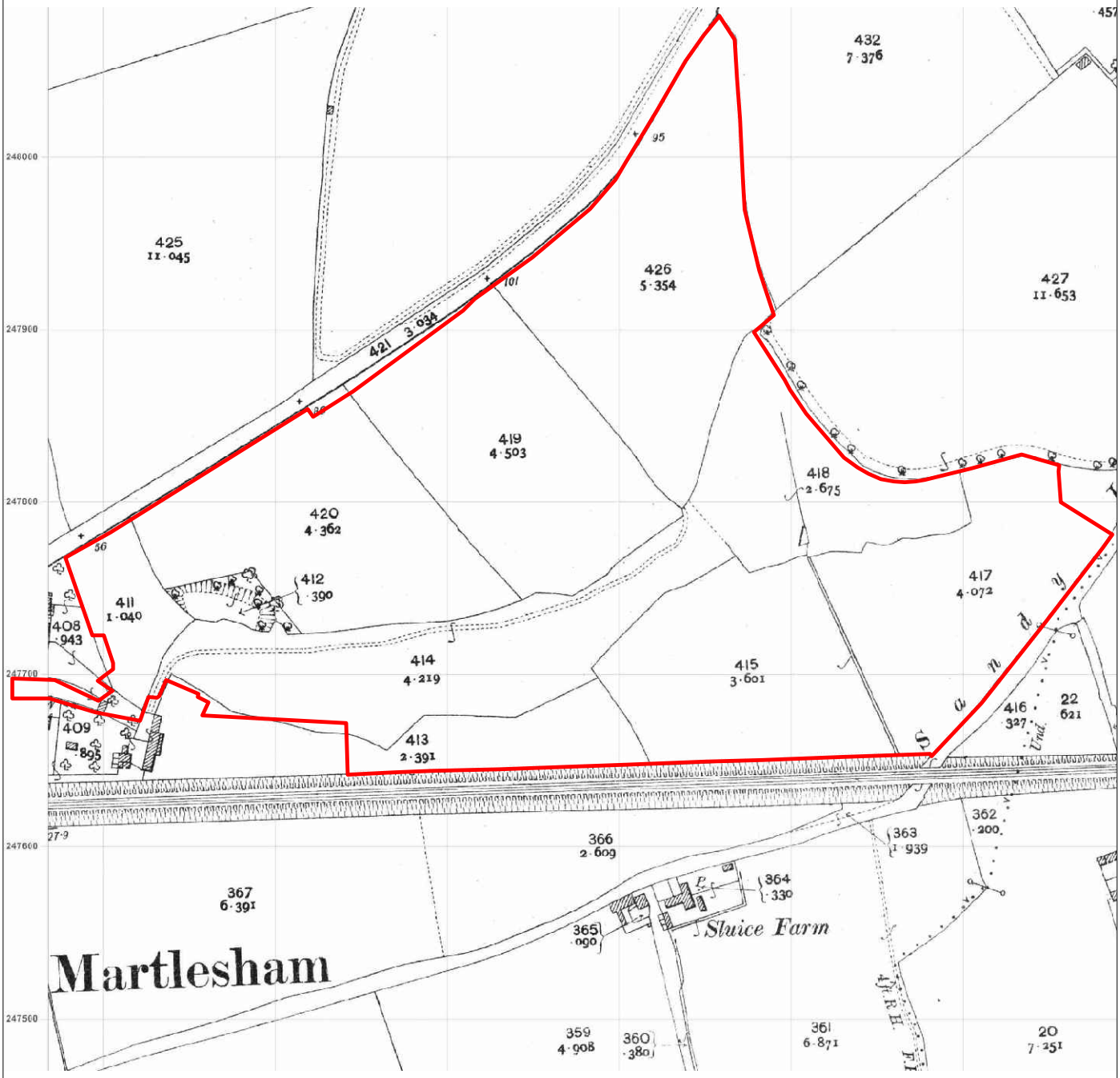
Figure 4:
1881 Ordnance Survey



Site Boundary

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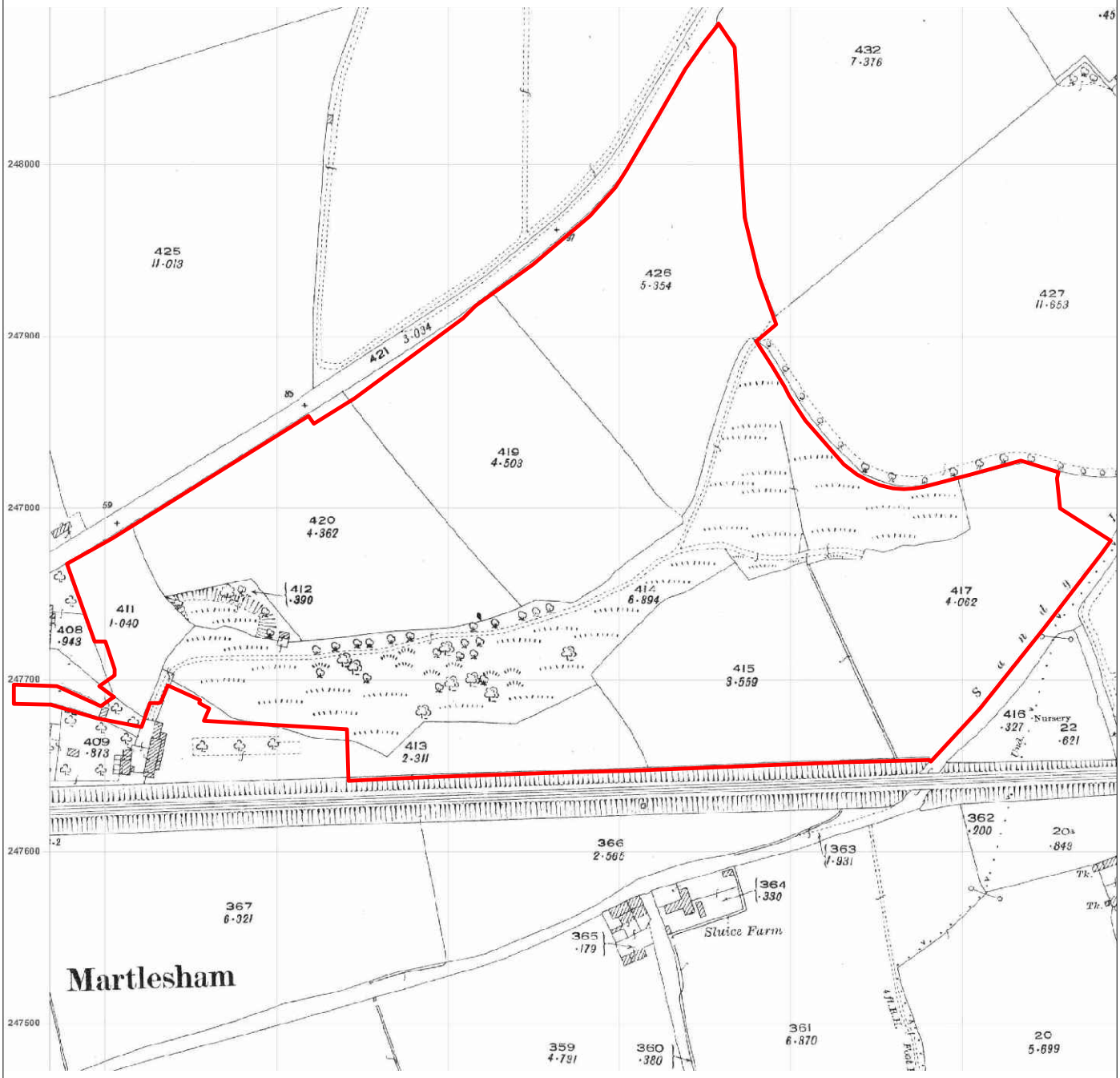
Figure 5:
1902 Ordnance Survey



Site Boundary

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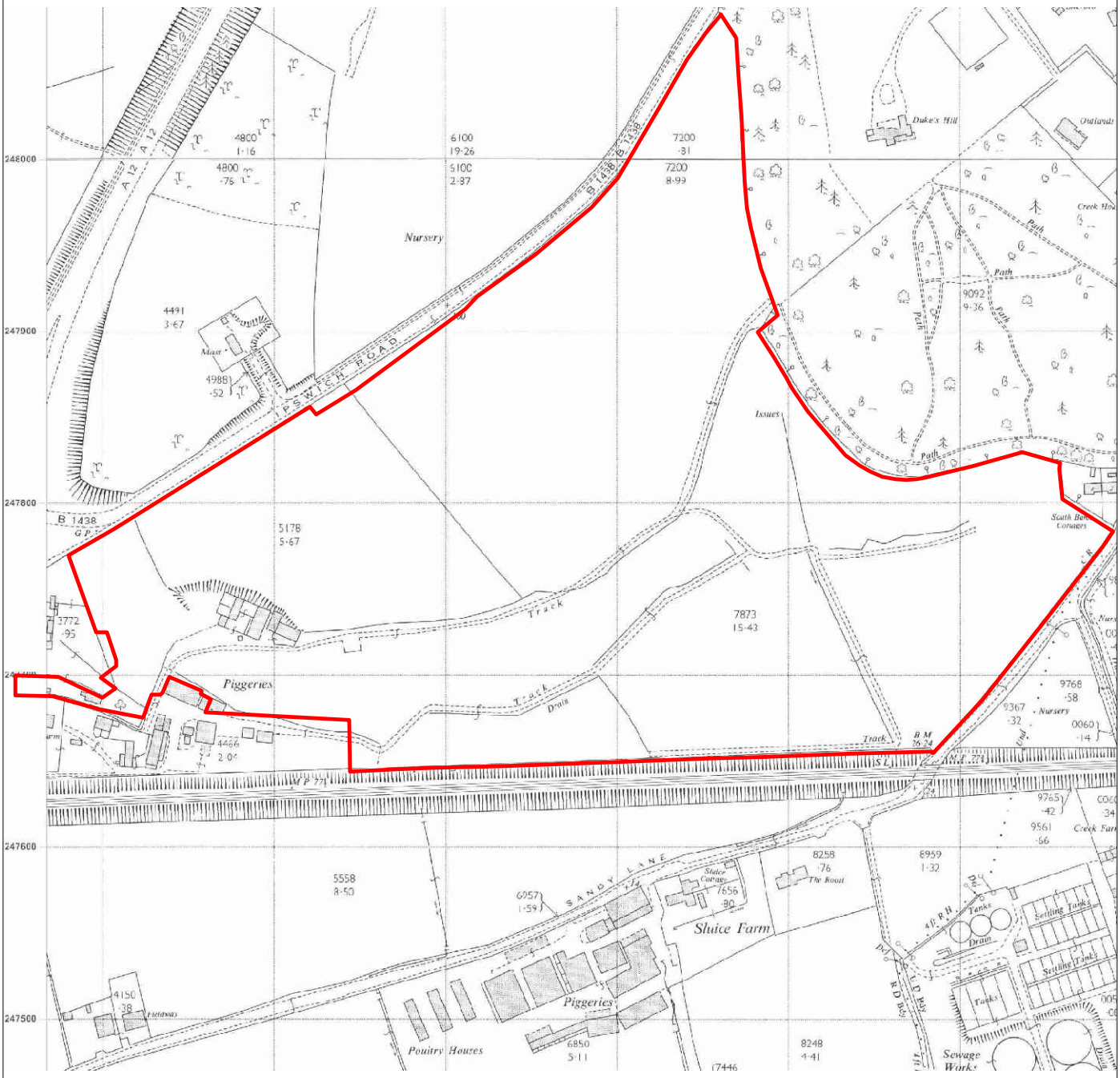
Figure 6:
1927 Ordnance Survey



Site Boundary

N

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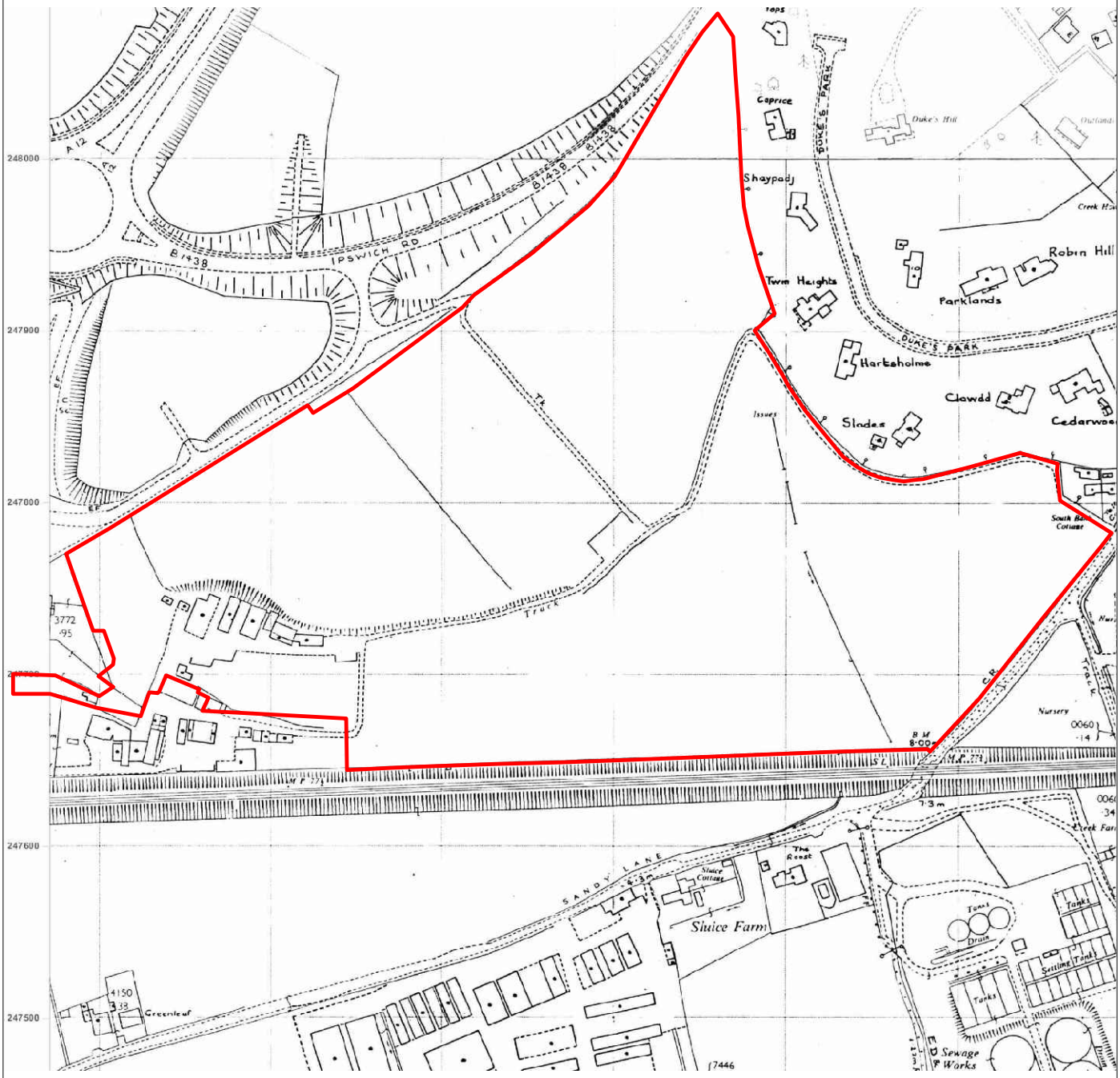
Figure 7:
1968 Ordnance Survey



Site Boundary

N

Not to Scale:
Illustrative Only

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Figure 8:
1989 Ordnance Survey

Site Boundary

N

Not to Scale:
Illustrative Only

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Figure 9:
Aerial Photograph
of the site
(Google Earth 2007)

Plate 1: North facing photograph taken from site entrance looking towards the car park area in the west of the site

Plate 2: South-west facing photograph looking along the northern boundary of the car park area in the west of the site

Plate 3: South facing photograph showing the car park area cut into the natural slope

Plate 4: South facing photograph of levelled area and concrete slab laid out in the southern most part of the site

Plate 5: South-east facing photograph of concrete slab laid out in the southern most part of the site

Plate 6: South-west facing photograph of bank of spoil in the south of the site

Plate 7: East facing photograph of bank of spoil in south of the site

Plate 8: East facing photograph of levelled trackway with earthwork embankment to the north

Plate 9: West facing photograph of levelled trackway

Plate 10: South-east facing photograph of drainage ditch in the south east of the site

Plate 11: South-west facing photograph taken from northern most part of the site

Plate 12: South-east facing photograph looking along field boundary in the north of the site

Appendix 1

HER Location Plan
(Suffolk HER 2014)

N:\17000-17999\17159- Land off Dukes Pk\Figures\Mapping\GIS\Projects\HER A3 Landscape.mxd

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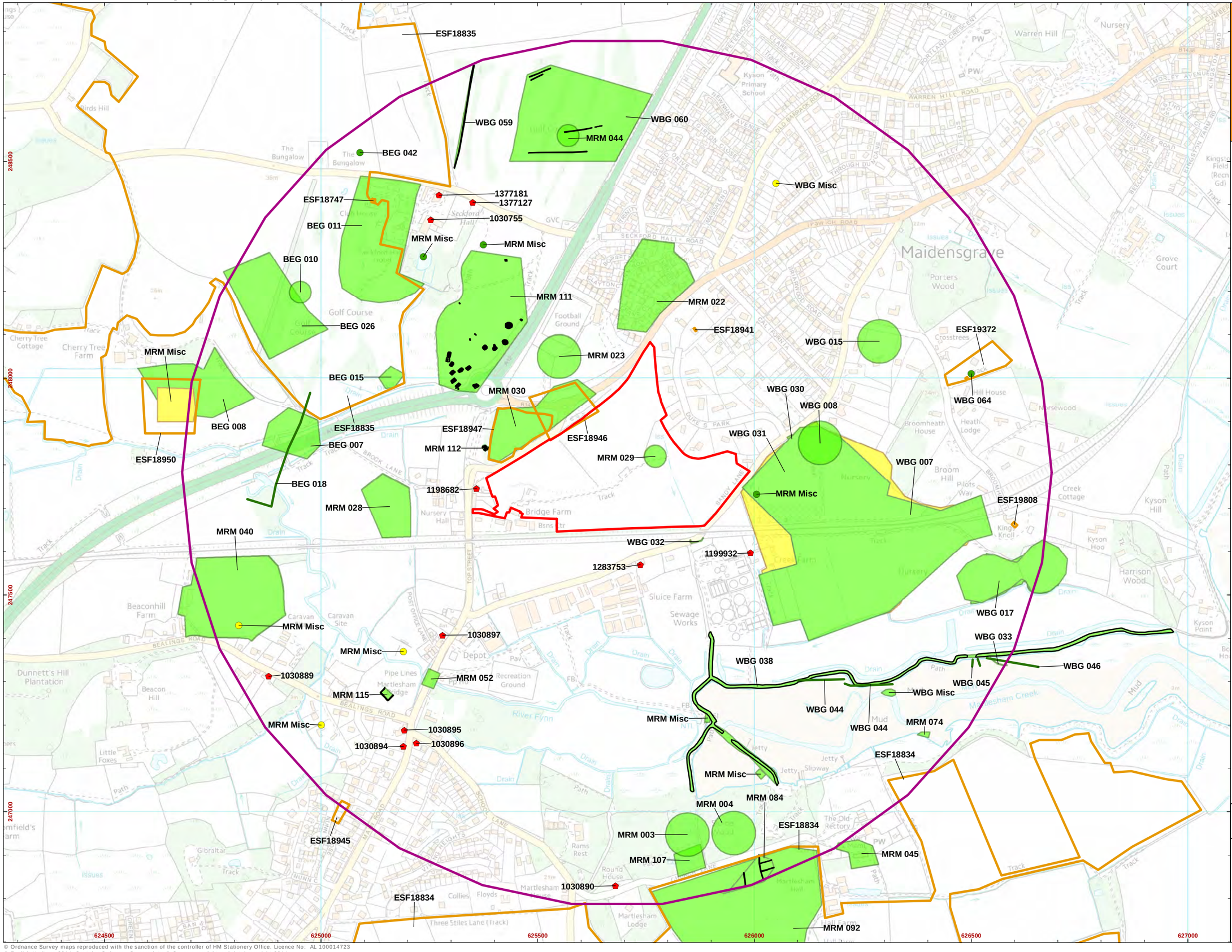

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Search Radius (1km)

Designated Heritage Assets:

Site Boundary

Site Boundary

Listed Building

Non-Designated Heritage Assets:

HER Record (Point)

Find Spot

Monument

HER Record (Linear)

Monument

HER Record (Polygon)

Find Spot

Monument

NMP Record (Linear)

NMP Record (Polygon)

Previous Archaeological Work:

Event Record (Polygon)

N

Scale at A3: 1:8,000

0 250 m

Appendix 1:
HER Data Plot
(Suffolk HER 2014)

Appendix 2

Geophysical Survey Report

(GSB 2014)

GEOPHYSICAL SURVEY REPORT G1446

Land Off Dukes Park
Woodbridge
Suffolk

Client:

GSB PROSPECTION Ltd

Celebrating over 25 years
at the forefront of
Archaeological Geophysics

sumo Survey Services

GSB Survey Report No. G1446

Land off Dukes Park, Woodbridge, Suffolk

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List of Archive Figures (on CD only)

Survey Personnel

Field Co-ordinator: Robert Knight BSc

Report Author: Emma Brunning BSc MIfA

Project Assistants: Rebecca Davies BSc & Jessica Gallagher

Dates

Fieldwork: 2 - 8 July 2014
Report: 16 July 2014

Report Approved: Dr John Gater MIfA FSA

Background Project Details

NGR	TM 256 478
Location	Site is located approximately 11km to the northeast of Ipswich, on the southern outskirts of Woodbridge; it is bound to the north by Ipswich Road, to the east by Duke's Park and to the south by a railway line.
HER/SMR	Suffolk
District	Suffolk Coastal
Parish	Martlesham
Topography	Generally flat with a slight slope.
Current Land Use	Pasture
Soils	Newport 4 (551g): deep well drained sandy soil. Some very acid soils with bleached subsurface horizon especially under heath or in woodland (SSEW 1983).
Geology	Red Crag Formation - sand (BGS 2014).
Archaeology	Isolated Bronze Age artefacts and a single Roman coin have been found on site during metal detecting (CgMs 2014).
Survey Methods	Detailed magnetometer survey (fluxgate gradiometer).
Study Area	12 hectares

Aims

To locate and characterise any anomalies of possible archaeological interest within the study area. The work forms part of a wider archaeological assessment being carried out by **CgMs Consulting.**

Summary of Results

No anomalies of archaeological interest were detected within the magnetic data. A handful of former field boundaries have been noted which correspond to old mapping. Responses associated with natural variations can be seen in the southern section of the data, the majority of which relates to an area of woodland shown on the 1881 Ordnance Survey map.

Method

All survey grid positioning was carried out using Trimble R8 Real Time Kinematic (RTK) VRS Now GNSS equipment. The geophysical survey areas are georeferenced relative to the Ordnance Survey National Grid. These tie-ins are presented in Figure T1. Please refer to this diagram when re-establishing the grid or positioning trenches.

Technique	Instrument	Traverse Interval	Sample Interval
Magnetometer	Bartington Grad 601-2	1m	0.25m

All survey work is carried out in accordance with the current English Heritage guidelines (EH 2008).

Data Processing

Data processing was performed as appropriate using both in-house and commercial software packages (GeoSuB and Geoplot) as outlined below.

Magnetic Data
Zero Mean Traverse, Step Correction (De-stagger) and Interpolation (on the Y axis).

Interpretation

When interpreting the results several factors are taken into consideration, including the nature of archaeological features being investigated and the local conditions at the site (geology, pedology, topography etc.). Anomalies are categorised by their potential origin. Where responses can be related to very specific known features documented in other sources, this is done (for example: *Abbey Wall*, *Roman Road*). For the generic categories levels of confidence are indicated, for example: *Archaeology – ?Archaeology*. The former is used for a confident interpretation, based on anomaly definition and/or other corroborative data such as cropmarks. Poor anomaly definition, a lack of clear patterns to the responses and an absence of other supporting data reduces confidence, hence the classification *?Archaeology*. Details of the data plot formats and interpretation categories used are given in the Appendix: Technical Information at the end of the report.

General Considerations

Site conditions were suitable for survey as the ground cover consisted of recently mown pasture. The southwest of the application area consisted of hard standing, ‘car parks’ and areas of dumped material which were unsuitable for survey.

1.0 Survey Results - Magnetometer Survey

1.1 No anomalies of definite archaeological interest have been detected in the data. Old field boundaries can be seen which correspond to the tithe map, dated 1837 through to maps of 1927 (CgMs 2014). The former boundary in Area 1 is very weak and can just be seen as a trend. Boundaries in Areas 3 and 4 have a ferrous element to them suggesting the infill is very magnetic. A linear trend in Area 2 has been interpreted as *?Drain*; although, as it is on the same alignment as the old boundaries, it too could be of a similar origin.

1.2 A number of linear and curvilinear trends within the data have been categorised as *Uncertain Origin*; whilst the majority of these are likely to relate to agriculture some may be of interest, such as those recorded at [**A**]. Discrete anomalies, also of an uncertain origin may also have an anthropogenic cause, however, as they have no pattern or bear any correlation to known features the interpretation remains cautious.

1.3 Anomalies that are typical of natural and/or geological variations have been recorded in Area 3; these are in the vicinity of a former woodland shown on the 1881 Ordnance Survey map (CgMs 2014).

1.4 A rectilinear area of magnetic disturbance [**B**] in Area 1 corresponds to a building shown on mapping from 1989. Ferrous responses along the limits of the data relate to metal fencing in the boundaries, other large responses may be associated with deeply buried large ferrous objects. Smaller scale responses are due to iron debris within the topsoil or on the surface and are best seen in the XY trace plot which can be found on the Archive CD.

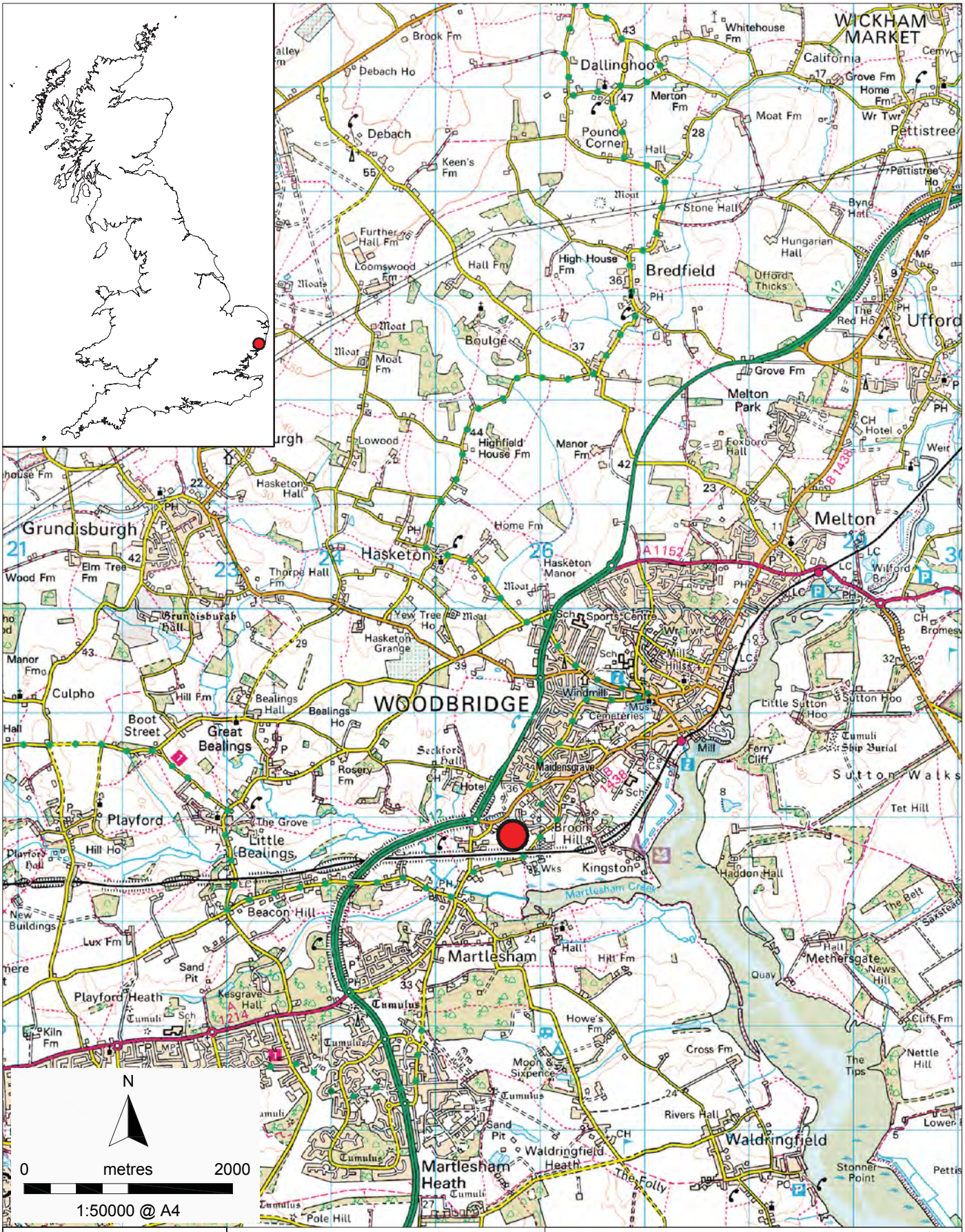
2.0 Conclusions

2.1 The results from the magnetic survey have not detected any anomalies of definite archaeological interest; a few trends of uncertain origin have been recorded. Former field boundaries can be seen which are shown on old mapping.

2.2 Responses associated with natural variations can be seen in Area 3, the majority of which relate to an area of woodland shown on the 1881 Ordnance Survey map.

References

BGS 2014	British Geological Survey, Geology of Britain Viewer http://mapapps.bgs.ac.uk/geologyofbritain/home.html 1:50,0000 scale geology, centred on 625689 247770. Accessed 14/07/2014.
CgMs 2014	*Archaeological Desk Based Assessment: Land Adjacent to Dukes Park, Woodbridge, Suffolk.* May 2014.
EH 2008	*Geophysical Survey in Archaeological Field Evaluation.* English Heritage, Portsmouth.
SSEW 1983	*Soils of England and Wales. Sheet 4, Eastern England*. Soil Survey of England and Wales, Harpenden.



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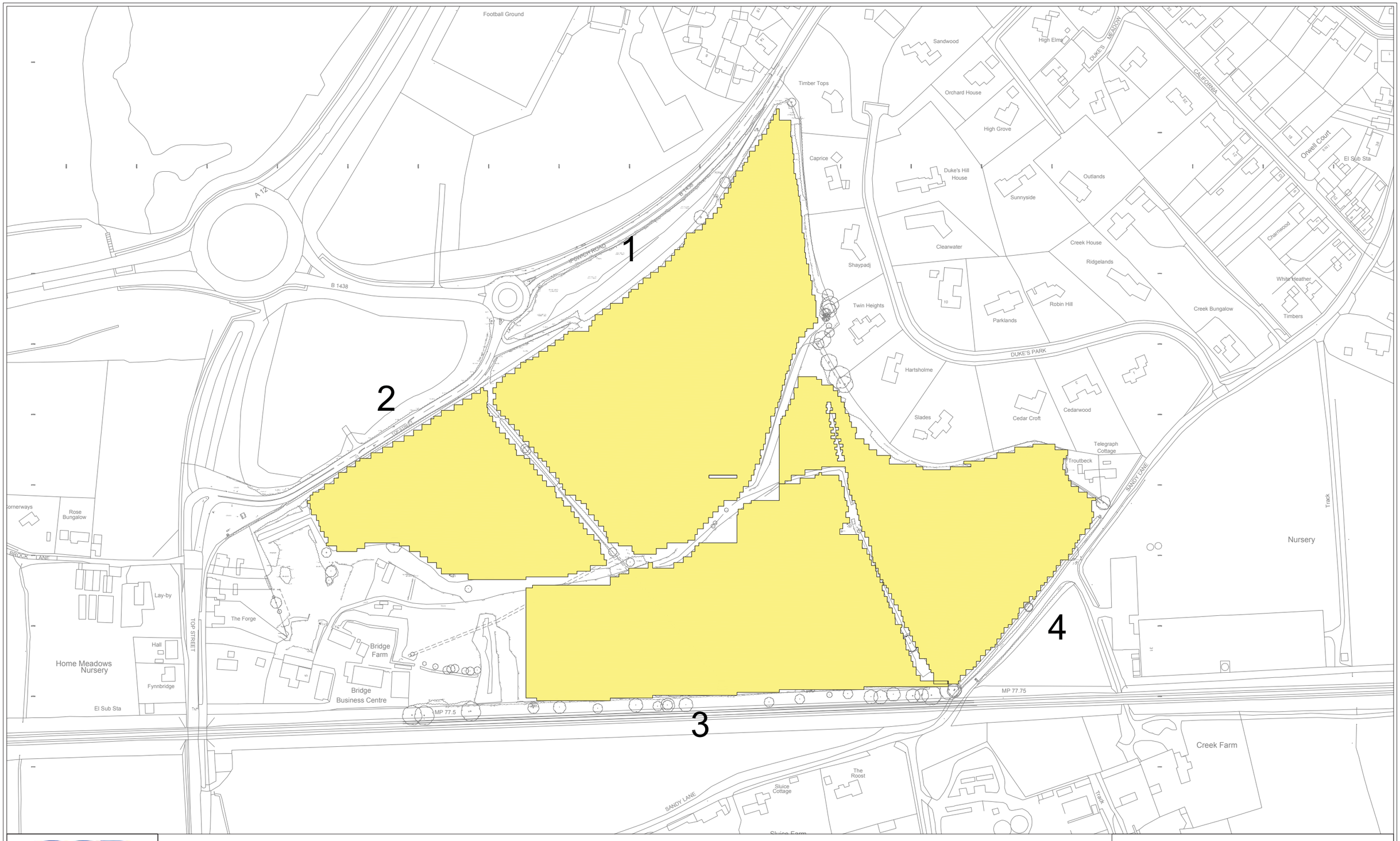
Site Location

Project: G1446 Land off Dukes Park, Woodbridge

Title: Site Location

Drawn by: ELBrunning

Figure 1



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N

0 metres 100

1:2500 @ A3

Gradiometer Survey

Project: G1446 Land Off Dukes Park, Woodbridge

Title: Location of Survey Areas

Drawn by: ELBrunning

Figure 2

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N

0 metres 80

2
nT
-2

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Title: Magnetometer Survey - Greyscale Plot

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N

0 metres 80

Old Field Boundary (discrete / weak)

Drain

Uncertain Origin (discrete anomaly / trend)

Magnetic Disturbance

Project: G1446 Land Off Dukes Park, Woodbridge

Title: Magnetometer Survey - Interpretation Plot

Appendix - Technical Information: Magnetometer Survey

Instrumentation: Bartington *Grad*601-2 / GSB CARTEASY^{N} Cart system

Both the Bartington and CARTEASY^{N} instruments operate in a gradiometer configuration which comprises fluxgate sensors mounted vertically, set 1.0m apart. The fluxgate gradiometer suppresses any diurnal or regional effects. The instruments are carried, or cart mounted, with the bottom sensor approximately 0.1-0.3m from the ground surface. At each survey station, the difference in the magnetic field between the two fluxgates is measured in nanoTesla (nT). The sensitivity of the instrument can be adjusted; for most archaeological surveys the most sensitive range (0.1nT) is used. Generally, features up to 1m deep may be detected by this method. The Bartington instrument can collect two lines of data per traverse with gradiometer units mounted laterally with a separation of 1.0m. The CARTEASY^{N} system has four gradiometer units mounted at 0.75m intervals across its frame – rather than working in grids, the cart uses an on-board survey grade GNSS for positioning. The cart system allows for the collection of topographic data in addition to the magnetic field measurements.

Data Processing

Zero Mean Traverse	This process sets the background mean of each traverse within each grid to zero. The operation removes striping effects and edge discontinuities over the whole of the data set.
Step Correction (Destagger)	When gradiometer data are collected in 'zig-zag' fashion, stepping errors can sometimes arise. These occur because of a slight difference in the speed of walking on the forward and reverse traverses. The result is a staggered effect in the data, which is particularly noticeable on linear anomalies. This process corrects these errors.
Interpolation	When geophysical data are presented as a greyscale, each data point is represented as a small square. The resulting plot can sometimes have a 'blocky' appearance. The interpolation process calculates and inserts additional values between existing data points. The process can be carried out with points along a traverse (the x axis) and/or between traverses (the y axis) and results in a smoother greyscale image.

Display

XY Trace Plot	This involves a line representation of the data. Each successive row of data is equally incremented in the Y axis, to produce a stacked profile effect. This display may incorporate a hidden-line removal algorithm, which blocks out lines behind the major peaks and can aid interpretation. The advantages of this type of display are that it allows the full range of the data to be viewed and shows the shape of the individual anomalies. The display may also be changed by altering the horizontal viewing angle and the angle above the plane.
Greyscale/ Colourscale Plot	This format divides a given range of readings into a set number of classes. Each class is represented by a specific shade of grey, the intensity increasing with value. All values above the given range are allocated the same shade (maximum intensity); similarly all values below the given range are represented by the minimum intensity shade. Similar plots can be produced in colour, either using a wide range of colours or by selecting two or three colours to represent positive and negative values. The assigned range (plotting levels) can be adjusted to emphasise different anomalies in the data-set.
3D Surface Plot	This is similar to the XY trace, but in 3 dimensions. Each data point of a survey is represented in its relative position on the x and y axes and the data value is represented in the z axis. This gives a digital terrain, or topographic effect.

Interpretation Categories

In certain circumstances (usually when there is corroborative evidence from desk based or excavation data) very specific interpretations can be assigned to magnetic anomalies (for example, *Roman Road, Wall,* etc.) and where appropriate, such interpretations will be applied. The list below outlines the generic categories commonly used in the interpretation of the results.

Archaeology	This term is used when the form, nature and pattern of the response are clearly or very probably archaeological and /or if corroborative evidence is available. These anomalies, whilst considered anthropogenic, could be of any age.
?Archaeology	These anomalies exhibit either weak signal strength and / or poor definition, or form incomplete archaeological patterns, thereby reducing the level of confidence in the interpretation. Although the archaeological interpretation is favoured, they may be the result of variable soil depth, plough damage or even aliasing as a result of data collection orientation.
Increased Magnetic Response	An area where increased fluctuations attest to greater magnetic enhancement of the soils, but no specific patterns can be discerned in the data and no visual indications on the ground surface hint at a cause. They may have some archaeological potential, suggesting damaged archaeological deposits.
Industrial / Burnt-Fired	Strong magnetic anomalies that, due to their shape and form or the context in which they are found, suggest the presence of kilns, ovens, corn dryers, metal-working areas or hearths. It should be noted that in many instances modern ferrous material can produce similar magnetic anomalies.
Old Field Boundary	Anomalies that correspond to former boundaries indicated on historic mapping, or which are clearly a continuation of existing land divisions.
Ridge & Furrow	Parallel linear anomalies whose broad spacing suggests ridge and furrow cultivation. In some cases the response may be the result of more recent agricultural activity.
Ploughing	Parallel linear anomalies or trends with a narrower spacing, sometimes aligned with existing boundaries, indicating more recent cultivation regimes.
Natural	These responses form clear patterns in geographical zones where natural variations are known to produce significant magnetic distortions. Smaller, isolated responses which do not form such obviously 'natural' patterns but which are, nonetheless, likely to be natural in origin may be classified as *?Natural*.
Uncertain Origin	Anomalies which stand out from the background magnetic variation, yet whose form and lack of patterning gives little clue as to their origin. Often the characteristics and distribution of the responses straddle the categories of *?Archaeology* and *?Natural* or (in the case of linear responses) *?Archaeology* and *?Ploughing*; occasionally they are simply of an unusual form.
Magnetic Disturbance	Broad zones of strong dipolar anomalies, commonly found in places where modern ferrous or fired materials (e.g. brick rubble) are present. They are presumed to be modern.
Ferrous	This type of response is associated with ferrous material and may result from small items in the topsoil, larger buried objects such as pipes, or above ground features such as fence lines or pylons. Ferrous responses are usually regarded as modern. Individual burnt stones, fired bricks or igneous rocks can produce responses similar to ferrous material.

Where appropriate some anomalies will be further classified according to their form (positive or negative) and relative strength and coherence (trend: weak and poorly defined).

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