ARCHAEOLOGICAL DESK-BASED ASSESSMENT

Land at Sudbury Road
Yoxall
East Staffordshire

DECEMBER 2013
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Executive Summary

This archaeological desk-based assessment has been researched and prepared on behalf of Howard Sharp and Partners and assesses the archaeological potential of land at Sudbury Road, Yoxall, East Staffordshire. This report forms the desk-based assessment required by paragraph 128 of the NPPF to identify the presence of heritage (archaeological) assets and, where present, to assess impact on their significance.

The assessment has established that the Grade II Lea Fields Farmhouse is located in the southwestern corner of the study site. Lea Cottage and the Old School House, also Grade II, are located on the southern side of Hadley Street (opposite the study site), whilst Thimble Hall and School Green Cottage (both Grade II) are located to the southwest at the triangular junction of Hadley Street with Morrey Lane. The Yoxall Conservation Area includes the Lea Fields farm buildings within the study site which front onto Hadley Street and those extending back along the western boundary. The Yoxall Conservation Area extends east along King Street and then north to include Victoria Street and south along Main Street. There are additional listed buildings within the Conservation Area. Any development of the study site will need to take careful consideration of the impact on the setting of these designated built heritage assets and its contribution to the overall character of the Conservation Area.

This assessment now focusses solely on the archaeological issues. There are no designated archaeological heritage assets within the study site or within the wider search area. The Historic Environment Record includes an entry for the Lea Fields Farm buildings located in the southwestern corner of the study site. Ridge and furrow was also noted during a site visit and by subsequent geophysical survey.

Pre-application discussions have been held with Steve Dean, Planning Archaeologist for Staffordshire County Council. The combination of this assessment along with the results of a geophysical survey across the study site, have addressed initial concerns that significant activity associated with a cremation site dating to the Bronze Age, Roman or Saxon periods might extend north into the study site. The geophysical survey does not suggest that there is any earlier activity underlying the ridge and furrow and, on this basis, no further work is anticipated to support an application for development of the study site. It is possible that the Planning Archaeologist may require some targeted trial-trench investigations to confirm the absence of significant archaeology from the study site. A proportionate response, in line with NPPF, would be to attach any such requirement as a condition of consent.
1.0 **INTRODUCTION AND SCOPE OF STUDY**

1.1 This archaeological desk-based assessment has been researched and prepared by Cathy Patrick of CgMs Consulting on behalf of Howard Sharp and Partners.

1.2 The assessment considers land on the western side of Sudbury Road, Yoxall, East Staffordshire (hereafter referred to as the study site) which is currently being considered for residential development. The study site has an area of approximately 2.45 hectares and is centred at NGR 413980, 319370 (Fig. 1).

1.3 In accordance with government policy on archaeology within the planning process (Section 12 of the National Planning Policy Framework), this assessment draws together the available archaeological, topographic and land-use information in order to clarify the archaeological potential of the study site.

1.4 Additionally, in accordance with the ‘Standard and Guidance for Historic Environment Desk-Based Assessments’ (Institute for Archaeologists (IfA) 2012), it incorporates an examination of evidence in the Staffordshire Historic Environment Record (HER), and Stafford Record Office, incorporates published and unpublished material and charts historic land-use through a map regression exercise. A site inspection was undertaken in December 2013.

1.5 A geophysical survey of the study site has also been carried out. The results are used to inform this assessment and are included at Appendix 2.

1.6 As a result, the assessment enables relevant parties to assess the significance of any designated and non-designated heritage assets within the study site, assess the potential for as yet to be discovered archaeological assets and 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), which replaced national policy relating to heritage and archaeology (Planning Policy Statement 5: Planning for the Historic Environment).

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 that heritage contributes to our knowledge and 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.
- 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 Policies relating to archaeology within the East Staffordshire Local Plan, adopted 2006, were not saved.

2.4 This assessment aims to clarify the specific archaeological potential of the study site and, in accordance with the NPPF, to identify the significance of any archaeological assets which might be impacted by development, enabling appropriate mitigation measures to be formulated.
3.0 GEOLOGY AND TOPOGRAPHY

3.1 Geology

3.1.1 The solid geology of the study site comprises Mudstone of the Mercia Mudstone Group. No superficial geology is identified. River Terrace Deposits of sand and gravel are recorded along the western bank of the River Swarbourn, c100m to the east of the study site. Alluvium is recorded along the course of the river (British Geological Survey online).

3.1.2 No geotechnical information for the study site is currently available.

3.2 Topography

3.2.1 The study site is located on the northern edge of Yoxall. Its topography slopes gradually from northwest to southeast, with a level of 74.60m Above Ordnance Datum (AOD) being recorded in the northwestern field corner and a level of 68.95m AOD in the southeastern corner.

3.2.2 A series of linear undulations were noted during the site visit, representing the upstanding remains of ridge and furrow.

3.2.3 The River Swarbourn is located c100m to the east of the study site.
4.0 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND, INCLUDING ASSESSMENT OF SIGNIFICANCE

The timescales used in this report are as follows:

**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
- Saxon/Early Medieval: AD 410 - 1066
- Medieval: AD 1066 - 1485
- Post Medieval: AD 1486 - 1800
- Modern: AD 1800 - Present

4.1 Introduction

4.1.1 This assessment is based on a consideration of evidence in the Staffordshire Historic Environment Record (HER) and the National Heritage List (NHL) for the study site and a zone 1km in extent surrounding its boundary. It is noted that only those HER entries with direct relevance to the study site are considered within this report. The Stafford Record Office was also visited in order to examine historic maps relating to the study site.

4.1.2 There are no designated archaeological assets (scheduled ancient monuments, registered parks and gardens and registered battlefields) identified within the study site or within the wider search area.

4.1.3 The Grade II Lea Fields Farmhouse is located in the southwestern corner of the study site. Lea Cottage and the Old School House, also Grade II, are located on the southern side of Hadley Street (opposite the study site), whilst Thimble Hall and School Green Cottage (both Grade II) are located to the southwest at the triangular junction of Hadley Street with Morrey Lane. The Yoxall Conservation Area includes the Lea Fields farm buildings within the study site which front onto Hadley Street and those extending back along the western boundary. The Yoxall Conservation Area
extends east along King Street and then north to include Victoria Street and south along Main Street. There are additional listed buildings within the Conservation Area.

4.1.4 Undesignated heritage assets recorded by the HER (i.e. archaeological finds/features within the study site and its surroundings) are reviewed below; their distribution is illustrated at Appendix 1.

4.1.5 This chapter reviews existing archaeological evidence for the study site and the archaeological/historical background of the general area, and, in accordance with the NPPF, considers the potential for as yet undiscovered archaeological evidence on the study site.

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

4.2 Previous Archaeological Investigations

4.2.1 There has been no previous intrusive investigation of the study site itself. However, as the HER Events plan included at Appendix 1 shows, there have been a number of non-intrusive investigations undertaken in the wider study area. These comprise archaeological building recording, assessment of a bypass route, fieldwalking and geophysical survey. It is also noted that there has been a County-led analysis of historic farmsteads and landscape character and a water meadows survey which both included Yoxall.

4.3 Prehistoric (Palaeolithic – Iron Age)

4.3.1 Metal detecting in the fields surrounding Yoxall has recorded an Early Bronze Age cast copper-alloy flat axehead c750m to the northeast of the study site (MST 19901) and a Late Iron Age or Early Roman copper alloy linch pin foot terminal in the field immediately to the north of the study site (MST 12184). In addition, forty urns containing ash and fragments of human remains were found during the 18th century “at or near” Yoxall (MST 935). The HER records this cemetery c100m to the south of the study site and also notes that it has been subsequently dated to the Roman or Saxon periods. The lack of any other Prehistoric or Roman finds from the surrounding landscape and the proximity of the cemetery to the later Medieval church and historic core would suggest that a Saxon date is more likely.
4.3.2 Although metal detecting finds do suggest some movement across the wider landscape during the Prehistoric period, the study site is at some distance from the more favourable River Terrace deposits by the River Swarbourn and it is acknowledged that the underlying Mudstone geology would not have produced soils that could be easily worked in this period. A low potential, limited to artefactual recovery, is therefore identified for the study site.

4.4 Roman

4.4.1 In addition to the linch pin foot terminal found in the field immediately to the north of the study site (MST 12184), the HER also records a 1\textsuperscript{st} – 2\textsuperscript{nd} century brooch findspot, c775m to the west of the study site (MST 16720).

4.4.2 As highlighted above, a possible Roman cremation site which is located c100m to the south of the study site, is considered more likely to be Saxon in date (MST 935).

4.4.3 The study site is removed from any known Roman trading route or centre and although a potential for artefactual recovery is recognised, a low potential for settlement activity dating to this period is identified.

4.5 Saxon - Early Medieval

4.5.1 The HER contains an entry for the settlement of Yoxall which is recorded by the Domesday Survey as one of fifteen places with a total of 82 households (MST 2602). The exact focus of this Saxon settlement is not known, but it is likely to be close to the later 13\textsuperscript{th} century Church of St. Peter, its associated churchyard, and a well-preserved moated enclosure which are all located over 250m to the southeast of the study site. The proximity of the cremation site which may be attributed to the Saxon period (MST 935) to this potential focus of settlement is noted.

4.5.2 Later historic maps suggest that the study site lay beyond the settlement boundary of Yoxall until the 18\textsuperscript{th} century. It is likely that the study site formed part of an open field system around the settlement until the Post-Medieval period. On this basis, and combined with the negative results of a geophysical survey carried out across the study site, a low potential is identified for this period.

4.6 Medieval

4.6.1 The Domesday Survey description does not suggest an extensive settlement at Yoxall, but the granting of a market charter by 1300 is noted. As highlighted above, the
focus of settlement in this period is likely to have been located c250m to the southeast of the study site. As the later historic maps, and the presence of ridge and furrow on the study site itself suggests, the study site formed one part of an agricultural landscape which surrounded the Medieval settlement.

4.6.2 Ridge and furrow is noted across the study site, but a low potential is identified for settlement activity dating to the Medieval period.

4.7 **Post-Medieval and Modern**

4.7.1 The 18th century Lea Fields Farm (MST 14537) and its listed farmhouse (MST 7980; NHL 1294613) are recorded within the southwestern corner of the study site. The original loose courtyard arrangement has undergone some change through the 19th and 20th centuries and remains as a working farm to the present day. The wider search area is characterised by farmsteads, water meadows to the northeast and by a string of listed buildings within the Yoxall Conservation Area. These do not have a bearing on our understanding of the study site and will not be considered further here.

4.7.2 In this period, understanding of settlement, land-use and the utilisation of the landscape is enhanced by cartographic and documentary sources which can give additional detail to data contained within the HER.

4.7.3 A tracing of the 1811 Plan of part of the parish of Yoxall in the County of Stafford (taken from Frost 2002 and which is an extract of the Needwood Forest Enclosure Plan) shows, that there are thin field strips immediately to the north of the study site, extending west from Sudley Road.

4.7.4 The 1839 Tithe Map (Fig. 2) confirms this layout of fields and records that the study site comprises pasture fields at this time. A cluster of buildings within the southwestern corner of the study site represents Lea Fields Farm.

4.7.5 This layout is also mapped by the Ordnance Survey in 1882, along with a pond in the southeastern corner (Fig. 3). It is noted that there is a network of footpaths which link the various outlying fields and historic farmsteads to the main street frontages and settlement core.

4.7.6 There is some change to the arrangement of farm buildings by 1902 (Fig. 4) and again in 1923 (Fig. 5), 1974 – 1975 (Fig. 6) and finally by 2013 (refer back to Fig. 1). The two pasture fields remain unchanged.
4.7.7 With the exception of the designated Lea Fields farmhouse and courtyard arrangement of outbuildings, there is obvious archaeological survival in the form of ridge and furrow across parts of the study site. This ridge and furrow has not been identified as being of specific historic interest by the HER or by English Heritage and is itself considered to be of local significance.

4.8 **Designated Heritage Assets**

4.8.1 The Grade II Lea Fields Farmhouse is located in the southwestern corner of the study site. Lea Cottage and the Old School House, also Grade II, are located on the southern side of Hadley Street (opposite the study site), whilst Thimble Hall and School Green Cottage (both Grade II) are located to the southwest at the triangular junction of Hadley Street with Morrey Lane. The Yoxall Conservation Area includes the Lea Fields farm buildings within the study site which front onto Hadley Street and those extending back along the western boundary. The Yoxall Conservation Area extends east along King Street and then north to include Victoria Street and south along Main Street. There are additional listed buildings within the Conservation Area.

4.9 **Historic Landscape**

4.9.1 The Staffordshire Historic Landscape Characterisation identifies the majority of the study site as comprising "Woodland, Broadleaf Plantation (early woodland with sinuous boundaries)" (HST 16619) which does contrast with the early map evidence suggesting early agricultural field systems. The southwestern corner, including the Lea Fields Farm buildings, is listed as Pre 1880s settlement (HST 16600).

4.9.2 Within the study site, it is noted that there is a remnant of an historic hedgerow running east–west across the southern portion of the study site. This hedgerow boundary is recorded on early historic mapping and, as such, would be classed as an Historic Hedgerow under the regulations of 1997.

4.10 **Assessment of Significance**

4.10.1 The Grade II listed Lea Fields Farmhouse is located within the southwestern corner of the study site, coinciding with the Yoxall Conservation Area. This designated building is of national significance.

4.10.2 Undesignated assets comprising ridge and furrow have been identified within the study site; these are not considered to be of more than local significance. Based on current
evidence, including the results of a geophysical survey, a low potential for survival of other non-designated assets relating to all periods is identified. The significance of any as yet to be discovered non-designated assets is likely to be no more than local.
5.0 SITE CONDITIONS, THE PROPOSED DEVELOPMENT AND IMPACT ON HERITAGE ASSETS

5.1 Site Conditions

5.1.1 The study site was visited on 4th December 2013. It comprises the courtyard arrangement of Lea Fields Farm, with the farmhouse and outbuildings extending back from Hadley Street. Some brick detail was noted, including the name of “Mr. W. Hall” in one farm building brick wall and graffiti of “1900” in another. There are modern barns, concrete hardstanding and storage areas extending along the western boundary. The majority of the study site comprises two pasture fields used for grazing. Ridge and furrow was noted across parts of the study site, along with depressions in the ground which correspond with disturbed areas mapped by the subsequent geophysical survey. Ground levels across the study site fall from the northwest towards the southeastern corner and there is a marked dip in levels either side of an east – west field boundary remnant within the southern portion of the study site. A pond was noted in the southeastern corner, adjacent to Sudley Road ( Plates 1 – 10).

5.2 The Proposed Development

5.2.1 The proposed development will comprise residential dwellings, with associated infrastructure.

5.3 Impact on Heritage Assets

5.3.1 This assessment has established that the Grade II Lea Fields Farmhouse is located in the southwestern corner of the study site. Lea Cottage and the Old School House, also Grade II, are located on the southern side of Hadley Street (opposite the study site), whilst Thimble Hall and School Green Cottage (both Grade II) are located to the southwest at the triangular junction of Hadley Street with Morrey Lane. The Yoxall Conservation Area includes the Lea Fields farm buildings within the study site which front onto Hadley Street and those extending back along the western boundary. The Yoxall Conservation Area extends east along King Street and then north to include Victoria Street and south along Main Street. There are additional listed buildings within the Conservation Area. Any development of the study site will need to take careful consideration of the impact on the setting of these designated built heritage assets and its contribution to the overall character of the Conservation Area.
5.3.2 In terms of the below-ground archaeology, it has been demonstrated that the study site formed part of an outlying agricultural field system until the 18th century when it became part of Lea Fields Farm.

5.3.3 The combination of this assessment along with the results of a geophysical survey across the study site, have addressed initial concerns that significant activity associated with a cremation site dating to the Bronze Age, Roman or Saxon periods might extend north into the study site. The geophysical survey does not suggest that there is any earlier activity underlying the ridge and furrow.

5.3.4 With the exception of ridge and furrow which is recorded as upstanding earthworks across parts of the two pasture fields, this assessment has identified a low potential for any other as yet undiscovered non-designated assets. The significance of any such remains should not preclude or constrain development within the study site.
### 6.0 SUMMARY AND CONCLUSIONS

#### 6.1 This desk-based assessment has established that the Grade II Lea Fields Farmhouse is located in the southwestern corner of the study site. Lea Cottage and the Old School House, also Grade II, are located on the southern side of Hadley Street (opposite the study site), whilst Thimble Hall and School Green Cottage (both Grade II) are located to the southwest at the triangular junction of Hadley Street with Morrey Lane. The Yoxall Conservation Area includes the Lea Fields farm buildings within the study site which front onto Hadley Street and those extending back along the western boundary. The Yoxall Conservation Area extends east along King Street and then north to include Victoria Street and south along Main Street. There are additional listed buildings within the Conservation Area. Any development of the study site will need to take careful consideration of the impact on the setting of these designated built heritage assets and its contribution to the overall character of the Conservation Area.

#### 6.2 This assessment focusses solely on the archaeological issues. There are no designated archaeological heritage assets within the study site or within the wider search area. The Historic Environment Record includes an entry for the Lea Fields Farm buildings located in the southwestern corner of the study site. Ridge and furrow was also noted during a site visit and recorded by subsequent geophysical survey.

#### 6.3 In accordance with NPPF, pre-application discussions have been held with Steve Dean, Planning Archaeologist for Staffordshire County Council. The combination of this assessment along with the results of a geophysical survey across the study site, have addressed initial concerns that significant activity associated with a cremation site dating to the Bronze Age, Roman or Saxon periods might extend north into the study site. The geophysical survey does not suggest that there is any earlier activity underlying the ridge and furrow and, on this basis, no further work is anticipated to support an application for development of the study site.

#### 6.4 It is possible that the Planning Archaeologist may require some targeted trial-trench investigations to confirm the absence of significant archaeology from the study site. A proportionate response, in line with NPPF, would be to attach any such requirement as a condition of consent.
**SOURCES CONSULTED**

**General**
Staffordshire Historic Environment Record
Stafford Record Office
British Geological Survey
National Planning Policy Framework
English Heritage National Heritage List

**Bibliographic and Documentary**

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<td>Pevsner, N</td>
<td>1968</td>
<td>The Buildings of England, Staffordshire</td>
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<td>Williams, A and Martin, G</td>
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**Cartographic Sources**

1657 Needwood Forest Enclosure Plan
1811 Enclosure Plan
1839 Tithe Map

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Figure 1:
Site Location
Figure 2: 1839 Tithe Map

Legend
- Site boundary

Sudbury Road, Yoxhall
Figure 2: 1839 Tithe Map
Figure 4:

1902 Ordnance Survey

Legend
- Site boundary
Figure 5:

Sudbury Road, Yoxhall

Not to Scale:
Illustrative only

Legend
- Site boundary
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Plate 3: Looking northeast to farm buildings

Plate 4: Looking northeast towards Sudbury Road
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Plate 6: Looking west across northern end of the study site

Plate 7: Looking south along eastern study site boundary

Plate 8: Looking southwest across the study site, showing ridge and furrow
Plate 9: Looking east along a former field boundary

Plate 10: Looking northwest across the study site, showing ridge and furrow
Appendix 1

Staffordshire Historic Environment Record plan and entries and Historic Landscape Characterisation data
Appendix 1: Designated Assets & HER Events

- Site Boundary
- 1km Radius

Designated Heritage Assets:
- Listed_Buildings
- Conservation

Previous Archaeological Work:
- Event Lines
- Event Polygons
- Event Points
Appendix 2

Geophysical Survey report (Stratascan 2013)
Project name:
Sudbury Road, Yoxall, Staffs

Client:
CgMs Consulting Ltd

December 2013

Job ref:
J6157

Report author:
Orlando J. Prestidge  BA(Hons) MA PIfA
Andrew Bateman BSc
GEOPHYSICAL SURVEY REPORT

Project name:
Sudbury Road, Yoxall, Staffs

Client:
CgMs Consulting Ltd

Job ref: J6157

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Techniques:
Detailed magnetic survey – Gradiometry

Survey date:
26th November 2013

Site centred at:
SK 139 192

Post code:
DE13 8NA
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Figure 5  1:1000  Abstraction and interpretation of gradiometer anomalies
1 SUMMARY OF RESULTS

A detailed gradiometry survey was conducted over approximately 1.9 hectares of pasture. Evidence of ridge and furrow ploughing can be seen across the survey area, and there is also a feature present which is considered to possibly be archaeological in origin. This is a linear positive anomaly which forms a dog-leg, and a connection to a weaker positive linear anomaly to the north of the corner. These are possibly representative of an archaeological cut feature, although could also be of a modern, agricultural origin.

2 INTRODUCTION

2.1 Background synopsis
Stratascan were commissioned to undertake a geophysical survey of an area outlined for development. This survey forms part of an archaeological investigation being undertaken by CgMs Consulting Ltd.

2.2 Site location
The site is located near Yoxall, Staffordshire at OS ref. SK 139 192.

2.3 Description of site
The survey area is 1.9 hectares of agricultural land currently under rough pasture. The topography is mainly flat and unobstructed. The site is bordered by farm buildings on Hadley Street to the west of the site and the A515 Sudbury Road to the eastern extent. These farm buildings were included in the original survey area but were obviously unsurveyable using magnetometry.

2.4 Geology and soils
The underlying geology is Mercia Mudstone Group - Mudstone. (British Geological Survey website). There is no recorded drift geology (British Geological Survey website).

The overlying soils are known as Salwick which are typical deep reddish fine loamy soils with slowly permeable subsoils and seasonal waterlogging. (Soil Survey of England and Wales, Sheet 3 Midland and Western England).

2.5 Site history and archaeological potential
No specific details were available to Stratascan, but English Heritage’s Pastscape website identifies five historic sites within 500m of the survey area. These include a possible Romano-British cemetery, a medieval earthwork moat and a post medieval water-powered corn mill. However, none of these sites are within the survey area, so the archaeological potential of the site is considered to be low.
2.6 **Survey objectives**

The objective of the survey was to locate any features of possible archaeological origin in order that they may be assessed prior to development.

2.7 **Survey methods**

This report and all fieldwork have been conducted in accordance with both the English Heritage guidelines outlined in the document: *Geophysical Survey in Archaeological Field Evaluation, 2008* and with the Institute for Archaeologists document *Standard and Guidance for Archaeological Geophysical Survey*.

Detailed magnetic survey (gradiometry) was used as an efficient and effective method of locating archaeological anomalies. More information regarding this technique is included in the Methodology section below and in Appendix A.

2.8 **Processing, presentation and interpretation of results**

2.8.1 **Processing**

Processing is performed using specialist software. This can emphasise various aspects contained within the data but which are often not easily seen in the raw data. Basic processing of the magnetic data involves 'flattening' the background levels with respect to adjacent traverses and adjacent grids. Once the basic processing has flattened the background it is then possible to carry out further processing which may include low pass filtering to reduce 'noise' in the data and hence emphasise the archaeological or man-made anomalies.

The following schedule shows the basic processing carried out on all minimally processed gradiometer data used in this report:

1. **Destripe** (Removes striping effects caused by zero-point discrepancies between different sensors and walking directions)
2. **Destagger** (Removes zigzag effects caused by inconsistent walking speeds on sloping, uneven or overgrown terrain)

2.8.2 **Presentation of results and interpretation**

The presentation of the data for each site involves a print-out of the minimally processed data both as a greyscale plot and a colour plot showing extreme magnetic values, together with a greyscale plot of the processed data. Magnetic anomalies have been identified and plotted onto the 'Abstraction and Interpretation of Anomalies' drawing for the site.

3 **RESULTS**
The detailed magnetic gradiometer survey conducted at Sudbury Road, Yoxall has identified anomalies that have been characterised as being either of a *probable* or *possible* archaeological origin.

The difference between *probable* and *possible* archaeological origin is a confidence rating. Features identified within the dataset that form recognisable archaeological patterns or seem to be related to a deliberate historical act have been interpreted as being of a probable archaeological origin.

Features of possible archaeological origin tend to be more amorphous anomalies which may have similar magnetic attributes in terms of strength or polarity but are difficult to classify as being archaeological or natural.

The following list of numbered anomalies refers to numerical labels on the interpretation plots.

### 3.1 *Probable Archaeology*

1. Widely spaced curving parallel linear anomalies, probably related to ridge and furrow ploughing.

### 3.2 *Possible Archaeology*

1. Positive linear anomaly, possibly indicative of a cut feature of archaeological origin. Could also be caused by modern agricultural drainage.

### 3.3 *Other Anomalies*

2. Areas of magnetic disturbance are the result of substantial nearby ferrous metal objects such as fences and underground services. These effects can mask weaker archaeological anomalies, but on this site have not affected a significant proportion of the area.

3. Strong magnetic debris, possibly caused by disturbed or made ground.

4. A number of magnetic ‘spikes’ (strong focussed values with associated antipolar response) indicate ferrous metal objects. These are likely to be modern rubbish.

5. Area of amorphous geological variation. Probably of a geological or pedological
4 CONCLUSION

The site was considered to have a low archaeological potential, and the only anomalies identified within the survey area are areas of ridge and furrow ploughing and a single anomaly representing probable archaeology. This anomaly is present in the centre of the site, and is possibly indicative of a cut feature of archaeological origin. However its very regular shape, isolated nature, and that it seems to be directed towards a small pond to the south east of the survey area, it is likely that is a drainage feature.

Other anomalies found are thought to be modern in origin. Areas of magnetic disturbance tend to be focussed adjacent to the boundaries of the survey area, and are considered to be resulting from ferrous materials in these boundaries. There are areas of magnetic debris, and distributed throughout the site are a number of individual magnetic spikes, which indicate ferrous magnetic objects in the shallow subsurface and are likely to be formed of modern debris. These may be the result of the infilling of small ponds, similar to the one present to the south east of the survey area. There is also a small area of natural geological variation in the south west of the site.
5 REFERENCES


English heritage – Pastscape website, www.pastscape.org.uk
APPENDIX A – METHODOLOGY & SURVEY EQUIPMENT

Grid locations
The location of the survey grids has been plotted together with the referencing information. Grids were set out using a Leica 705auto Total Station and referenced to suitable topographic features around the perimeter of the site or a Leica Smart Rover RTK GPS.

An RTK GPS (Real-time Kinematic Global Positioning System) can locate a point on the ground to a far greater accuracy than a standard GPS unit. A standard GPS suffers from errors created by satellite orbit errors, clock errors and atmospheric interference, resulting in an accuracy of 5m-10m. An RTK system uses a single base station receiver and a number of mobile units. The base station re-broadcasts the phase of the carrier it measured, and the mobile units compare their own phase measurements with those they received from the base station. A SmartNet RTK GPS uses Ordnance Survey’s network of over 100 fixed base stations to give an accuracy of around 0.01m.

Survey equipment and gradiometer configuration
Although the changes in the magnetic field resulting from differing features in the soil are usually weak, changes as small as 0.2 nanoTeslas (nT) in an overall field strength of 48,000nT, can be accurately detected using an appropriate instrument.

The mapping of the anomaly in a systematic manner will allow an estimate of the type of material present beneath the surface. Strong magnetic anomalies will be generated by buried iron-based objects or by kilns or hearths. More subtle anomalies such as pits and ditches can be seen if they contain more humic material which is normally rich in magnetic iron oxides when compared with the subsoil.

To illustrate this point, the cutting and subsequent silting or backfilling of a ditch may result in a larger volume of weakly magnetic material being accumulated in the trench compared to the undisturbed subsoil. A weak magnetic anomaly should therefore appear in plan along the line of the ditch.

The magnetic survey was carried out using a dual sensor Grad601-2 Magnetic Gradiometer manufactured by Bartington Instruments Ltd. The instrument consists of two fluxgates very accurately aligned to nullify the effects of the Earth’s magnetic field. Readings relate to the difference in localised magnetic anomalies compared with the general magnetic background. The Grad601-2 consists of two high stability fluxgate gradiometers suspended on a single frame. Each gradiometer has a 1m separation between the sensing elements so enhancing the response to weak anomalies.

Sampling interval
Readings were taken at 0.25m centres along traverses 1m apart. This equates to 3600 sampling points in a full 30m x 30m grid.

Depth of scan and resolution
The Grad 601-2 has a typical depth of penetration of 0.5m to 1.0m, though strongly magnetic objects may be visible at greater depths. The collection of data at 0.25m centres provides an optimum methodology for the task balancing cost and time with resolution.

Data capture
The readings are logged consecutively into the data logger which in turn is daily down-loaded into a portable computer whilst on site. At the end of each site survey, data is transferred to the office for processing and presentation.
APPENDIX B – BASIC PRINCIPLES OF MAGNETIC SURVEY

Detailed magnetic survey can be used to effectively define areas of past human activity by mapping spatial variation and contrast in the magnetic properties of soil, subsoil and bedrock.

Weakly magnetic iron minerals are always present within the soil and areas of enhancement relate to increases in *magnetic susceptibility* and permanently magnetised *thermoremanent* material.

Magnetic susceptibility relates to the induced magnetism of a material when in the presence of a magnetic field. This magnetism can be considered as effectively permanent as it exists within the Earth’s magnetic field. Magnetic susceptibility can become enhanced due to burning and complex biological or fermentation processes.

Thermoremanence is a permanent magnetism acquired by iron minerals that, after heating to a specific temperature known as the Curie Point, are effectively demagnetised followed by re-magnetisation by the Earth’s magnetic field on cooling. Thermoremanent archaeological features can include hearths and kilns and material such as brick and tile may be magnetised through the same process.

Silting and deliberate infilling of ditches and pits with magnetically enhanced soil creates a relative contrast against the much lower levels of magnetism within the subsoil into which the feature is cut. Systematic mapping of magnetic anomalies will produce linear and discrete areas of enhancement allowing assessment and characterisation of subsurface features. Material such as subsoil and non-magnetic bedrock used to create former earthworks and walls may be mapped as areas of lower enhancement compared to surrounding soils.

Magnetic survey is carried out using a fluxgate gradiometer which is a passive instrument consisting of two sensors mounted vertically 1m apart. The instrument is carried about 30cm above the ground surface and the top sensor measures the Earth’s magnetic field whilst the lower sensor measures the same field but is also more affected by any localised buried field. The difference between the two sensors will relate to the strength of a magnetic field created by a buried feature, if no field is present the difference will be close to zero as the magnetic field measured by both sensors will be the same.

Factors affecting the magnetic survey may include soil type, local geology, previous human activity, disturbance from modern services etc.
APPENDIX C – GLOSSARY OF MAGNETIC ANOMALIES

Bipolar

A bipolar anomaly is one that is composed of both a positive response and a negative response. It can be made up of any number of positive responses and negative responses. For example a pipeline consisting of alternating positive and negative anomalies is said to be bipolar. See also dipolar which has only one area of each polarity. The interpretation of the anomaly will depend on the magnitude of the magnetic field strength. A weak response may be caused by a clay field drain while a strong response will probably be caused by a metallic service.

Dipolar

This consists of a single positive anomaly with an associated negative response. There should be no separation between the two polarities of response. These responses will be created by a single feature. The interpretation of the anomaly will depend on the magnitude of the magnetic measurements. A very strong anomaly is likely to be caused by a ferrous object.

Positive anomaly with associated negative response

See bipolar and dipolar.

Positive linear

A linear response which is entirely positive in polarity. These are usually related to in-filled cut features where the fill material is magnetically enhanced compared to the surrounding matrix. They can be caused by ditches of an archaeological origin, but also former field boundaries, ploughing activity and some may even have a natural origin.
Positive linear anomaly with associated negative response

A positive linear anomaly which has a negative anomaly located adjacently. This will be caused by a single feature. In the example shown this is likely to be a single length of wire/cable probably relating to a modern service. Magnetically weaker responses may relate to earthwork style features and field boundaries.

Positive point/area

These are generally spatially small responses, perhaps covering just 3 or 4 reading nodes. They are entirely positive in polarity. Similar to positive linear anomalies they are generally caused by in-filled cut features. These include pits of an archaeological origin, possible tree bowls or other naturally occurring depressions in the ground.

Magnetic debris

Magnetic debris consists of numerous dipolar responses spread over an area. If the amplitude of response is low (+/-3nT) then the origin is likely to represent general ground disturbance with no clear cause, it may be related to something as simple as an area of dug or mixed earth. A stronger anomaly (+/-250nT) is more indicative of a spread of ferrous debris. Moderately strong anomalies may be the result of a spread of thermoremanent material such as bricks or ash.

Magnetic disturbance

Magnetic disturbance is high amplitude and can be composed of either a bipolar anomaly, or a single polarity response. It is essentially associated with magnetic interference from modern ferrous structures such as fencing, vehicles or buildings, and as a result is commonly found around the perimeter of a site near to boundary fences.
Negative linear

A linear response which is entirely negative in polarity. These are generally caused by earthen banks where material with a lower magnetic magnitude relative the background top soil is built up. See also ploughing activity.

Negative point/area

Opposite to positive point anomalies these responses may be caused by raised areas or earthen banks. These could be of an archaeological origin or may have a natural origin.

Ploughing activity

Ploughing activity can often be visualised by a series of parallel linear anomalies. These can be of either positive polarity or negative polarity depending on site specifics. It can be difficult to distinguish between ancient ploughing and more modern ploughing, clues such as the separation of each linear, straightness, strength of response and cross cutting relationships can be used to aid this, although none of these can be guaranteed to differentiate between different phases of activity.

Polarity

Term used to describe the measurement of the magnetic response. An anomaly can have a positive polarity (values above 0nT) and/or a negative polarity (values below 0nT).

Strength of response

The amplitude of a magnetic response is an important factor in assigning an interpretation to a particular anomaly. For example a positive anomaly covering a 10m² area may have values up to around 3000nT, in which case it is likely to be caused by modern magnetic interference. However, the same size and shaped anomaly but with values up to only 4nT may have a natural origin. Colour plots are used to show the amplitude of response.
Thermoremanent response

A feature which has been subject to heat may result in it acquiring a magnetic field. This can be anything up to approximately +/-100 nT in value. These features include clay fired drains, brick, bonfires, kilns, hearths and even pottery. If the heat application has occurred in situ (e.g. a kiln) then the response is likely to be bipolar compared to if the heated objects have been disturbed and moved relative to each other, in which case they are more likely to take an irregular form and may display a debris style response (e.g. ash).

Weak background variations

Weakly magnetic wide scale variations within the data can sometimes be seen within sites. These usually have no specific structure but can often appear curvy and sinuous in form. They are likely to be the result of natural features, such as soil creep, dried up (or seasonal) streams. They can also be caused by changes in the underlying geology or soil type which may contain unpredictable distributions of magnetic minerals, and are usually apparent in several locations across a site.
Closely spaced parallel linear anomalies - probably related to agricultural activity such as ploughing
Magnetic disturbance associated with nearby metal object such as service or field boundary
Strong magnetic debris - possibly disturbed or made ground. Possibly caused by the infilling of ponds
- Scattered magnetic debris

Area of amorphous magnetic variation - probably natural e.g. geological or pedological origin

Positive anomaly/weak positive anomaly - possible cut feature of archaeological origin
Negative anomaly/weak negative anomaly - possible cut feature of archaeological origin

Moderate strength discrete anomaly - possible thermoremanent feature

Strong magnetic debris - possibly disturbed or made ground
- Scattered magnetic debris

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