

Green Hill Solar Farm EN010170

Environmental Statement
Appendix 12.4: Archaeological
Geophysical Survey Reports
Revision A (Tracked)
(Part 1 of 10)

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Schedule of Changes

Revision	Section Reference	Description of Changes	Reason for Revision
<u>A</u>	[cover]	Updated document reference to Revision A	Updated survey results (see Parts 8-10 of 10).



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Issue Sheet

Report Prepared for: Green Hill Solar Farm

Appendix 12.4: Archaeological Geophysical Survey

Prepared by

Name: Alice James BA (Hons) MSc MCIfA

Job title: Technical Director

Approved by

Name: Mitchell Pollington BA (Hons) MA MCIfA FSA

Job title: Director (Historic Environment)

Revision	Date	Prepared by	Approved by
Original	12/05/2025	AJ	MP



1.1 Introduction

- 1.1.1 This document has been prepared by Lanpro Services Ltd on behalf of Green Hill Solar Farm Limited ('the Applicant'). It provides the results of the archaeological geophysical (magnetometer) surveys undertaken across land within the Green Hill Solar Farm ('the Scheme') in support of an application for a Development Consent Order (DCO). The Scheme is located within the administrative boundaries of West Northamptonshire, North Northamptonshire and Milton Keynes (see Figure 12.4.1), and consists of consists of a series of Solar Arrays across Green Hill A, A.2, B, C, D, E, F and G, Battery Energy Storage Systems (BESS), two 400kV substations and a number of 132kV and 33kV substations and other infrastructure integral to the construction, operation and maintenance of the Scheme.
- The geophysical surveys were undertaken in line with nationally recognised standards by Archaeological Services WYAS, who are registered organisation with Charted institute for Archaeologists (ClfA). They were undertaken between September 2023 and April 2025. The geophysical surveys were informed by the results of archaeological desk-based assessments (Ref 1.1 to Ref 1.7). Clear concentrations of magnetic anomalies have been identified within the Scheme Order Limits that are indicative of possible prehistoric, Roman and medieval activity. Evidence of agricultural activity, including ridge and furrow, former field boundaries, land drains and ploughing, as well as anomalies of a modern and geological origin have also been mapped (Ref 1.8 to Ref 1.16).
- 1.1.3 The data is considered to be of a high quality providing a reliable source of information for identifying the presence, absence and extent of buried archaeological features. The results of the geophysical survey, along with supplementary non-intrusive surveys including air photo and LiDAR mapping and interpretation, were used to inform a programme of evaluation trial trenching undertaken between August 2024 and March 2025, as agreed in advance with the Northamptonshire County Council and Milton Keynes City Historic Environment Teams. The nature of geophysical anomalies were confirmed by trial trench evaluation, which provided further information regarding the character and depth of features (Ref 1.17 to Ref 1.23). Consequently, it is considered that there is limited potential for buried archaeological remains to be present outside of areas where geophysical survey has identified a potential for archaeological remains to be present.

1.2 Survey Areas

- 1.2.1 Nine phases of geophysical survey have been undertaken as part of the proposed Green Hill Solar Project and are provided in Appendices A to I:
 - Green Hill A and A.2 (Appendix A)
 - Green Hill B (Appendix B)
 - Green Hill C, D and E (Appendix C)
 - Green Hill F (Appendix D)
 - Green Hill G (Appendix E)
 - Green Hill BESS Site (Appendix F)
 - Green Hill Cable Route Corridor (Appendix G)



References

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- Ref 1.9 ASWYAS, 2024a. Green Hill Solar Project Area A, Northamptonshire: Geophysical Survey. Unpubl. ASWYAS report no. 4163.
- Ref 1.10 ASWYAS., 2024b. Green Hill Solar Project Area B, Northamptonshire: Geophysical Survey. Unpubl. ASWYAS report no. 4134
- Ref 1.11 ASWYAS, 2024c. Green Hill Solar Project Area F, Northamptonshire: Geophysical Survey. Unpubl. ASWYAS report.
- Ref 1.12 ASWYAS, 2024d. Green Hill Solar Project Area G, Buckinghamshire: Geophysical Survey. Unpubl. ASWYAS report.
- Ref 1.13 ASWYAS., 2024e. Green Hill Solar Project BESS, Northamptonshire: Geophysical Survey. Unpubl. ASWYAS report.
- Ref 1.14 ASWYAS, 2025a. Green Hill Solar Area C, D and E, Northamptonshire: Geophysical Survey. Unpubl. ASWYAS report.
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- Ref 1.18 CFA Archaeology, 2025, Green Hill Solar Farm, Site A.2, Northamptonshire. Unpubl CFA Archaeology Report No. 4573
- Ref 1.19 CFA Archaeology, 2025, Green Hill Solar Farm, Site B, Northamptonshire. Unpubl CFA Archaeology Report No. 4576
- Ref 1.20 CFA Archaeology, 2025, Green Hill Solar Farm, Site C, Northamptonshire. Unpubl CFA Archaeology Report No. 4574
- Ref 1.21 CFA Archaeology, 2025, Green Hill Solar Farm, Site E, Northamptonshire. Unpubl CFA Archaeology Report No. 4577
- Ref 1.22 CFA Archaeology, 2025, Green Hill Solar Farm, Site F, Northamptonshire. Unpubl CFA Archaeology Report No. 4578

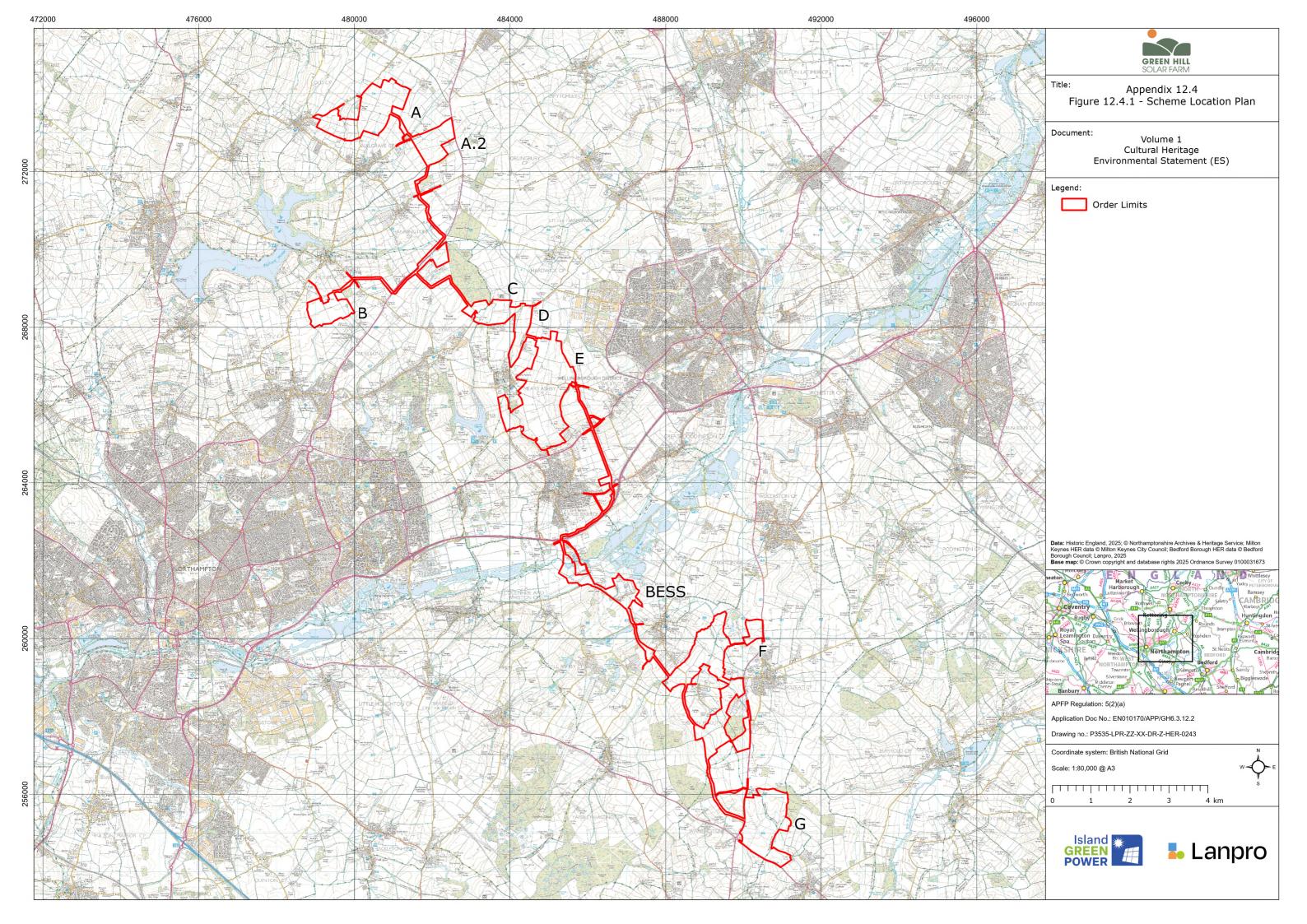


Ref 1.23 CFA Archaeology, 2025, Green Hill Solar Farm, Site G, Northamptonshire. Unpubl CFA Archaeology Report No. 4640



Figure 1

Scheme Location Plan





Appendix A

Green Hill A and A.2 Geophysical Survey Report



Green Hill Solar Project

Site A

Northamptonshire

Geophysical Survey

Report no. 4163 July 2024

Client: Green Hill Solar Project





Green Hill Solar Project Site A and A.2 **Northamptonshire**

Geophysical Survey

Summary

A geophysical (gradiometer) survey was undertaken on approximately 238 hectares of land associated with Area A of the Green Hill Solar Project, Wellingborough, Northamptonshire. The majority of the anomalies recorded are agricultural including former field boundaries, medieval/post-medieval ridge and furrow cultivation, modern ploughing and land drains. Archaeological and possible archaeological responses have been recorded in two concentrated areas with scattered anomalies elsewhere. These comprise ring ditches, linear ditches and trends and rectilinear enclosures, indicative of settlement activity. Magnetic disturbance within the dataset can be attributed to adjacent tracks and metal fencing within field boundaries and also 'green manuring' in some of the fields. Former ponds and service pipes have also been recorded. Uncertain anomalies recorded within the data may also have an anthropogenic origin. Geological responses seen within the dataset reflect either the topography of the site, possible quarrying or discrete pockets of natural variations. Based on the geophysical survey, the archaeological potential of this Site is deemed to be high where there are areas of activity and low elsewhere.



Report Information

Client: Green Hill Solar Project Report Type: Geophysical Survey

Location: Grendon

County: Northamptonshire

SP 8043 7360 and SP 8207 7271 Grid Reference: Period(s) of activity: ?Prehistoric - post-medieval

Report Number: 4163 Project Number: XK77 Site Code: EXG23

OASIS ID: archaeol11-526919

Date of fieldwork: October 2023 – July 2024

July 2024 Date of report:

Project Management: Emma Brunning BSc MCIfA Fieldwork: Amy Chatterton BSc MA

Jake Freeman BA

Jacob Hurst-Myszor BA

Marina Rose BA

Claire Stephens BA MA Cameron Whitley BA

Illustrations: Emma Brunning Photography: Amy Chatterton Research: Emma Brunning Report: Emma Brunning

Authorisation for

distribution:



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Telephone: 0113 535 3007 Email: admin@aswyas.com



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1 Introduction

Archaeological Services ASWYAS has been commissioned by Lanpro on behalf of the Green Hill Solar Project to undertake a geophysical survey on land for the proposed Green Hill Site A and Site A.2, which is located within the administrative boundary of Wellingborough, Northamptonshire. This report details Site A only. This was undertaken in line with current best practice (CIfA 2020; Schmidt *et al.* 2015). The survey was carried out between October 2023 and July 2024 when the land became available.

Site location, topography and land-use

Site A comprises approximately 173ha of arable land across 29 fields (AF1-AF29); Site A.2 consists of 65ha across four fields (A2F.1 – A2F.4). At the time of survey, ground use was pasture, young crop, or rolled fields (Plates 1-12). Areas AF7, AF8, AF10 and AF12 were unsuitable for survey.

Sites A and A.2 are located to the north (Site A) and northeast (Site A.2) of Walgrave, Northamptonshire. Site A is centred at approximately SP 8043 7360 and Site A.2 is centred at approximately SP 8207 7271. Broughton Road bounds Parcel AF to the west with Newland Road bisecting this parcel. Kettering Road lies to the north of Site A.2 and the A43 is to the east.

Site A lies between 136m aOD (above Ordnance Datum) in the north, and 118m aOD in the southeast. Site A.2 lies between 134m aOD in the northeast to 130m in the south.

Soils and geology

The bedrock geology across the Site varies, with the areas to the east of Newland Road comprising the Stamford Member – sandstone and siltstone, interbedded; Northampton Sand Formation - ironstone, ooidal and the Whitby Mudstone Formation – mudstone, all of which are sedimentary bedrocks that formed during the Jurassic period (BGS 2024).

Superficial deposits have been recorded largely as belonging to the Oadby Member – Diamicton, a sedimentary superficial deposit that formed between 480 and 423 thousand years ago during the Quaternary period. Small areas of Glaciofluvial deposits, Mid Pleistocene – sand and gravel have also been recorded, again forming in the Quaternary period (BGS 2024).

Soils across the majority of the Site have been described as Lime-rich loamy and clayey soils with impeded drainage (Soilscape 9). Soils in the west of Site A are freely draining slightly acid but base-rich soils (Soilscape 7). Alluvium – clay, silt, sand and gravel also follow a water course in Site A (LandIS 2024).

2 Archaeological Background

The following is a brief summary of archaeological data held by the Northamptonshire Historic Environment Record (HER) relevant to the immediate vicinity of the survey area.

Prehistoric

Within the west of the Site, cropmarks of possible prehistoric activity have been recorded (MNN131218, MNN131219, MNN131220, MNN131221, MNN131222, MNN2161) including enclosures and ditches.

A possible Bronze Age barrow (MNN1707570), boundary ditch (MNN171300) and prehistoric/Roman activity (MNN170757) lies approximately 430m to the southwest of the Site.

Approximately 670m to the north of the Site, a series of ditches were excavated within the Hannington to Pitsford pipeline corridor and are likely to be part of a wider system of enclosures and boundary ditches of late Iron Age date (MNN168196).

Romano-British

An extensive area of rectilinear enclosures was identified during geophysical survey immediately southwest of the Site. Trial trench excavation at the south-western edge identified a number of ditches. Roman pottery was recovered from one of the ditches (MNN171300).

Within the north of the Site, possible Romano-British activity is recorded (MNN143053).

A spot find of an unstratified Roman bronze coin of Marcus Aurelius was recorded 470m to the north of Site (MNN28134).

Medieval

To the immediate southwest of the Site lies the shrunken village of Old (MNN5961). There is no evidence to suggest that shrunken medieval settlement extends into the Site.

Lying between the two survey parcels, earthworks of possible medieval Hollow Ways are recorded (MNN118406, MNN118407).

Immediately to the west of Site, areas of ridge and furrow are recorded within the HER (MNN133172 and MNN133940). Further ridge and furrow are recorded to the immediate north (MNN133939, MNN133173, MNN133938). MNN168194 lies 425m to the northeast and MNN133174 380m to the northeast of Site.

To the immediate east of Site, a series of undated enclosures and ditches have been identified on aerial photographs (MNN1727; MNN119556).

3 Aims, Methodology and Presentation

The aims and objectives of the programme of geophysical survey were to gather sufficient information to establish the presence/absence, character and extent, of any archaeological remains within the specific area and to inform an assessment of the archaeological potential of the site. To achieve this aim, a magnetometer survey covering all amenable parts of the Site was undertaken (see Fig. 2).

The general aims of the geophysical survey were:

- to provide information about the nature and possible interpretation of any magnetic anomalies identified;
- to therefore determine the presence/absence and extent of any buried archaeological features; and
- to prepare a report summarising the results of the survey.

Magnetometer survey

The cart-based survey was undertaken using an eight channel SenSYS MX V3 system containing eight FGM650 sensors. Readings are taken every 20MHz (between 0.05 and 0.1m). Data were recorded onto a device, using a Carlson GNSS Smart antenna, for centimetre accuracy. These readings were stored in the memory of the instrument and downloaded for processing and interpretation. DLMGPS and MAGNETO software, alongside bespoke in-house software was used to process and present the data. Further details are given in Appendix 1.

Reporting

A general site location plan, incorporating the 1:50000 Ordnance Survey (OS) mapping, is shown in Figure 1. Figure 2 displays the survey areas at a scale of 1:12500 whilst Figure 3 shows an overview of the processed magnetometer data and Figure 4 shows an overview of the interpretation both at a scale of 1:12500. Processed and minimally processed data, together with interpretation of the survey results are presented in Figures 5 to 61 inclusive at a scale of 1:1500.

Technical information on the equipment used, data processing and survey methodologies are given in Appendix 1. Technical information on locating the survey area is provided in Appendix 2. Appendix 3 describes the composition and location of the archive. A copy of the completed OASIS form is included in Appendix 4.

The survey methodology, report and any recommendations comply with guidelines outlined by the European Archaeological Council (Schmidt *et al.* 2015) and by the Chartered Institute for Archaeologists (CIfA 2020). All figures reproduced from Ordnance Survey mapping are

with the permission of the controller of His Majesty's Stationery Office (© Crown copyright).

The figures in this report have been produced following analysis of the data in processed formats and over a range of different display levels. All figures are presented to most suitably display and interpret the data from this site based on the experience and knowledge of Archaeological Services staff.

4 Results and Discussion (see Figures 5 to 61)

Ferrous anomalies and magnetic disturbance

Ferrous anomalies, as individual 'spikes', or as large discrete areas are typically caused by ferrous (magnetic) material, either on the ground surface or in the plough-soil. Little importance is normally given to such anomalies, unless there is any supporting evidence for an archaeological interpretation, as modern ferrous debris or material is common on rural sites, often being present as a consequence of manuring or tipping/infilling. There is no obvious pattern or clustering to their distribution in this survey to suggest anything other than a random background scatter of ferrous debris in the plough-soil.

Linear dipolar trends have been recorded in Fields A2F1, A2F2, A2F3 and A2F4 which relate to service pipes. The pipes in A2F1 have produced a large magnetic halo which will have masked any features, if present.

An area of magnetic disturbance (**F1**) detected in Field AF3 corresponds with the location of an infilled pond shown on historic mapping dating from 1884 (NLS 2024). Other ponds can be seen in Field AF16 (**F2**), Field AF18 (**F3**) and Field A2F4 (**F4**).

Areas of magnetic disturbance (**F5**) in Field AF4 are likely to be associated with modern dumped materials and broadly correlate to two square features seen in aerial images from 2004 (GE 2024). Magnetic disturbance (**F6**) along the northern extent of Field A2F4 corresponds to a building shown on historic mapping dating from 1884. By the 1954 Ordnance Survey map, the building is no longer present (NLS 2024).

Large areas of magnetic disturbance have been recorded in Fields AF17, AF18, AF22 and AF23 which is likely to be a result of 'green manuring'. The green waste is produced from organic and biodegradable household waste as a fertiliser and soil conditioner. Up to 0.25% of this material, however, can be from non-organic waste including metal fragments and batteries (Gerrard et al. 2015). Possible Romano-British activity (MNN143053) is recorded by the HER being in Field AF23. The record relates to metal detecting so could just be that there is no site i.e., if it did exist, we might still see it through the non-organic waste.

Magnetic disturbance along the limits of the survey areas is due to interference from metal fencing and adjacent tracks.

Geological anomalies

The survey has detected anomalies that have been interpreted as geological in origin. It is thought that the responses have been detected because of the variation in the composition and depth of the deposits of superficial material in which they derive.

A large response in Field AF9 and the in northwest corner of Field AF11 may be associated with former quarrying although there is no cartographic evidence to support this. However, there is a change in the bedrock geology within these fields which consist of ironstone. LiDAR imagery also shows large features which correspond to the geophysical anomalies (NLS 2024). Further possible quarrying has been recorded in Field AF29.

A band of geological response in Field AF11 is likely due to a change in the bedrock geology. The magnetic strength of the ridge and furrow is also stronger within this band.

Agricultural anomalies

Former field boundaries (**FB1** – **FB15**) have been recorded within Fields AF4, AF11, AF20, AF23, AF24, A2F1, A.2F2, A2F3 and A2F4. The majority of these boundaries correspond to historic mapping dating from 1884 (NLS 2024).

Medieval or post-medieval ridge and furrow cultivation has been recorded within most of the areas on differing alignments.

Field drains have been recorded in Fields AF3, AF20, AF24, AF27 and A2F1. These have quite a low magnetic strength, and it is likely that their construction is of a non-fired clay construction.

Other parallel linear trends can be seen within most of the areas and are associated with modern ploughing. Only a selection of these have been highlighted on the interpretation diagrams to show the direction of the plough lines.

Uncertain anomalies

A handful of anomalies within the dataset have been interpreted as having an uncertain origin.

A ditch like response (U1) in Field AF4 corresponds to a depression within the LiDAR data (NLS 2024) and also to a change in the crop seen in the aerial image dated 2009 (GE 2024). This response may have some association with the areas of magnetic disturbance (F5).

A cluster of pit-like responses and linear trends (U2) in Field AF5 lies to the southeast of a large settlement complex and may also be archaeological. However, they also lie to the west of a watercourse and therefore a geological or natural origin is also possible.

Ditch responses (U3) in the west of Field AF9 may have a number of origins; whilst an archaeological one is preferred, such as boundary ditches, they also may be agricultural or geological in origin.

A group of anomalies (**U4**) in Field AF11 may be associated with archaeological responses to the immediate north. However, they are not as well defined, and an *uncertain* interpretation has been reached.

Weak circular responses (U5) in Field AF18 may be of interest, although due to their magnetic strength, this interpretation is tentative.

Anomalies **U6** in Field AF25 may be of some interest, although an agricultural origin, such as field drains is also likely.

Magnetically weak responses (U7) in the east of Field AF26 appear to form two circular features with a connecting linear trend and while they may be of some interest interpretation is very tentative.

Possible and definite archaeological anomalies

Anomalies of both an archaeological and possible archaeological origin have been recorded within the Site. A large complex of features has been recorded in Field AF1 covering an area of approximately 270m by 225m which possibly continues to the east. The archaeological anomalies are almost certainly settlement features with numerous ring ditches measuring between 10m and 20m in diameter, with some showing clear entrances and a central pit response. Ring ditches, linear ditches and enclosures have also been recorded with a large, possible triple ditched enclosure (A1) noted along the eastern boundary of the field. The enclosure measures at least 66m by 55m and within its centre is a large ring ditch (A2) measuring approximately 28m with a single large pit towards its south. The HER records possible prehistoric activity within this area (MNN2161).

Possible archaeological anomalies have been recorded within a zone of geological responses in Field AF9. It is difficult to determine clear features but there does appear to be possible enclosures within the strong geological responses.

Another area of archaeological activity has been recorded in Field AF11 and consists of a large rectilinear enclosure, smaller enclosures, ring ditches, linear ditches and pits. The large enclosure (A3) measures 65m by 70m and is seen to have smaller enclosures located to the north (A4) and appended to the southern arm (A5). Numerous weak linear ditches and trends can be seen, but a clear picture is impossible due to the masking from the large geological

feature. At least three partial ring ditches (A6) have been recorded within A3 but are not as defined as those in Field AF1.

A group of anomalies in the east of Field AF15 consist of two ring ditches (A7) which appear to be within an enclosure. A larger enclosure (A8 and P1) can be seen to its south. This measures at least 92m by 60m.

Anomalies **A9** recorded along the western boundary of Field AF16 almost certainly continue out of the survey area to the west. Double ditches (**P2**) appear to lead from **A9** to the east and are approximately 20m apart. Within the east of Field AF16, possible archaeological anomalies (**P3**) can be seen consisting of curvilinear responses and small lengths of linear ditches.

A small, possible rectilinear enclosure (**P4**) within Field AF20 measures approximately 25m by 22m. To the north of **P4**, a possible ring ditch is recorded measuring 11m in diameter.

A group of anomalies (A10, P5) in the east of Field A2F1 appear to form part of a large enclosure with smaller enclosures inside. Unfortunately, the service pipe has masked part of this, making it difficult to obtain a full picture.

An isolated ring ditch (A11) in the northwest of Field A2F4 measures approximately 14m in diameter and there is the possibility of internal pits.

To the southeast of Field A2F4, anomalies A12 form a 'D' shaped enclosure with a possible trackway (P6) leading to it. This group of anomalies varies in magnetic strength and P6 lies on the same alignment as the field drains so a trackway interpretation is tentative. There is the possibility of a ring ditch to the immediate east of the enclosure along with a smaller enclosure.

5 Conclusions

The geophysical survey has detected a number of magnetic anomalies associated mainly with an agricultural landscape including former field boundaries, medieval/post-medieval ridge and furrow cultivation, modern ploughing and land drains. Archaeological and possible archaeological responses have been recorded within the Site over two well defined areas and then further sporadic areas. These comprise ring ditches, linear ditches and trends and rectilinear enclosures, possibly indicative of prehistoric or Roman activity.

Magnetic disturbance within the dataset can be attributed to adjacent tracks and metal fencing within field boundaries and also 'green manuring' in some of the fields. Former ponds and service pipes have also been recorded. Uncertain anomalies recorded within the data may also have an anthropogenic origin.

Geological responses seen within the dataset reflect either the topography of the site, possible quarrying or discrete pockets of natural variations.

Based on the geophysical survey, the archaeological potential of this Site is deemed to be high where there are areas of activity and low elsewhere.

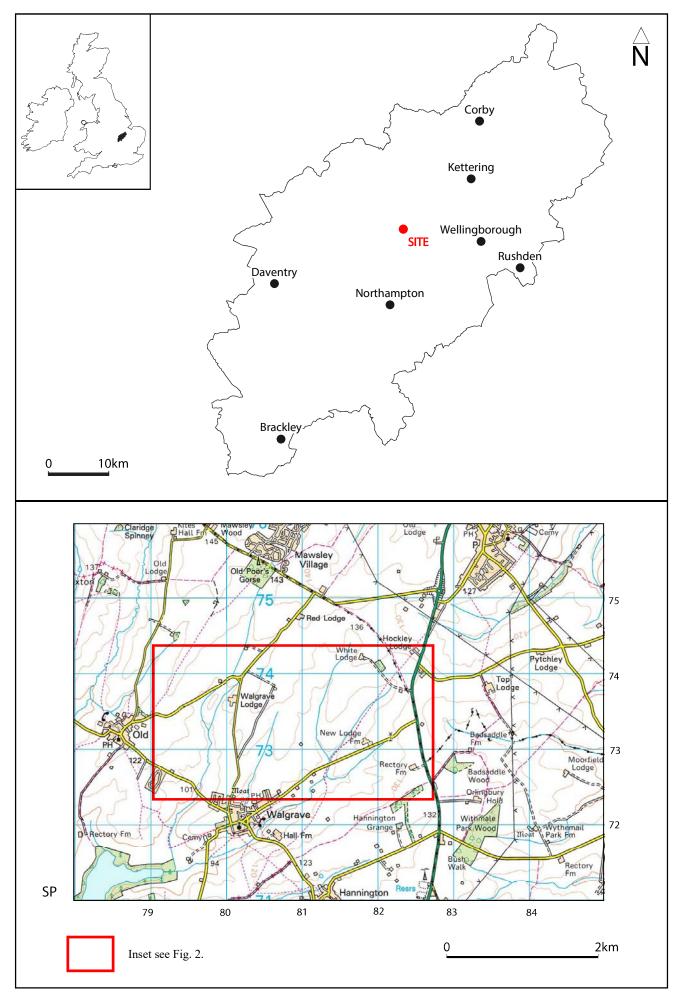


Fig. 1. Site location

