Cottam Solar Project

Environmental Statement Appendix 13.2:

Archaeological Geophysical Survey Reports (Part 8 of 13)

Prepared by: Archaeological Services WYAS

January 2023

PINS reference: EN010133

Document reference: APP/C6.3.13.2

APFP Regulation 5(2)(a)





Cottam Solar Project

Cottam 3

Lincolnshire

Geophysical Survey

Report no. 3756 April 2022









West Burton Solar Project Cottam 3 Lincolnshire

Geophysical Survey

Summary

A geophysical (magnetometer) survey was undertaken on two parcels of land consisting of approximately 172 hectares of land associated with Cottam 3a and approximately 72 hectares of land associated with Cottam 3b located to the east of Blyton, Lincolnshire. The majority of the anomalies recorded are agricultural including field drains, ridge and furrow cultivation, modern ploughing and former field boundaries. Anomalies associated with the former airfield of RAF Blyton have been recorded in Cottam 3a. Archaeological and possible archaeological responses have been recorded in at least four separate clusters which are likely to relate to settlement activity of a possible Romano-British date. Based on the geophysical survey, the archaeological potential of this site is deemed to be high in the east of Cottam 3a and the centre of Cottam 3b and low elsewhere.



Report Information

Client: Cottam Solar Project Limited

Report Type: Geophysical Survey

Location: Cottam 3
County: Lincolnshire
Grid Reference: SK 8688 9570

SK 8725 9449

Period(s) of activity: Romano-British/medieval/post-medieval/modern

Report Number: 3756
Project Number: XB85
Site Code: CWB21

OASIS ID: archaeol11-506208

Date of fieldwork: July, November, December 2021 & February, April 2022

Date of report: April 2022

Project Management: Emma Brunning BSc MCIfA

Fieldwork: Alastair Trace BSc MSc

Jake Freeman BA

Amy Chatterton BSc MA

Jet Jansen BA MA

Claire Stephens BA MA

Illustrations: Emma Brunning
Report: Emma Brunning

Authorisation for

distribution: ------



© Archaeological Services WYAS 2022 Nepshaw Lane South, Morley, Leeds LS27 7JQ

Telephone: 0113 535 0163 Email: admin@aswyas.com



Document Issue Record

| Ver | Author(s) | Reviewer | Approver | Date |
|-----|-----------|----------|----------|------------|
| 1.0 | EB | JR/DW | JR | April 2022 |

Contents

| Rep | port information | ii |
|-----|--|-----|
| | cument Issue Record | |
| Coı | ntents | iii |
| Lis | st of Figures | iv |
| 1 | Introduction | 1 |
| 1 | Site location, topography and land-use | |
| | Soils and geology | |
| 2 | Archaeological Background | |
| _ | Prehistoric and Roman periods (c. 9500 BC – c. AD 410) | |
| | Early medieval and medieval periods (c. AD 410– c. 1540) | |
| | Post-medieval to present (1540-present) | |
| 3 | Aims, Methodology and Presentation | |
| | Magnetometer survey | 3 |
| | Reporting | |
| 4 | Results and Discussion | 4 |
| | Ferrous anomalies and magnetic disturbance | 4 |
| | Geological anomalies | 5 |
| | Agricultural anomalies | 5 |
| | Uncertain anomalies | 6 |
| | Archaeological and possible archaeological anomalies | 6 |
| 5 | Conclusions | |

Figures

Appendices

Appendix 1: Magnetic survey - technical information

Appendix 2: Survey location information

Appendix 3: Geophysical archive and metadata

Appendix 4: Oasis form

Bibliography

List of Figures

- 1 Site location (1:50000)
- 2 Location of survey areas (1:10000 @A3)
- 3 Cottam 3a location showing processed magnetometer data (1:10000 @A3)
- 4 Cottam 3a overall interpretation of magnetometer data (1:10000 @ A3)
- 5 Processed greyscale magnetometer data; Sector 1 (1:1500 @ A3)
- 6 XY trace plot of minimally processed magnetometer data; Sector 1 (1:1500 @ A3)
- 7 Interpretation of magnetometer data; Sector 1 (1:1500 @ A3)
- 8 Processed greyscale magnetometer data; Sector 2 (1:1500 @ A3)
- 9 XY trace plot of minimally processed magnetometer data; Sector 2 (1:1500 @ A3)
- 10 Interpretation of magnetometer data; Sector 2 (1:1500 @ A3)
- 11 Processed greyscale magnetometer data; Sector 3 (1:1500 @ A3)
- 12 XY trace plot of minimally processed magnetometer data; Sector 3 (1:1500 @ A3)
- 13 Interpretation of magnetometer data; Sector 3 (1:1500 @ A3)
- Processed greyscale magnetometer data; Sector 4 (1:1500 @ A3)
- 15 XY trace plot of minimally processed magnetometer data; Sector 4 (1:1500 @ A3)
- 16 Interpretation of magnetometer data; Sector 4 (1:1500 @ A3)
- 17 Processed greyscale magnetometer data; Sector 5 (1:1500 @ A3)
- 18 XY trace plot of minimally processed magnetometer data; Sector 5 (1:1500 @ A3)
- 19 Interpretation of magnetometer data; Sector 5 (1:1500 @ A3)
- 20 Processed greyscale magnetometer data; Sector 6 (1:1500 @ A3)
- 21 XY trace plot of minimally processed magnetometer data; Sector 6 (1:1500 @ A3)
- 22 Interpretation of magnetometer data; Sector 6 (1:1500 @ A3)
- 23 Processed greyscale magnetometer data; Sector 7 (1:1500 @ A3)
- 24 XY trace plot of minimally processed magnetometer data; Sector 7 (1:1500 @ A3)
- 25 Interpretation of magnetometer data; Sector 7 (1:1500 @ A3)
- Processed greyscale magnetometer data; Sector 8 (1:1500 @ A3)
- 27 XY trace plot of minimally processed magnetometer data; Sector 8 (1:1500 @ A3)
- 28 Interpretation of magnetometer data; Sector 8 (1:1500 @ A3)
- 29 Processed greyscale magnetometer data; Sector 9 (1:1500 @ A3)
- 30 XY trace plot of minimally processed magnetometer data; Sector 9 (1:1500 @ A3)
- 31 Interpretation of magnetometer data; Sector 9 (1:1500 @ A3)
- 32 Processed greyscale magnetometer data; Sector 10 (1:1500 @ A3)
- 33 XY trace plot of minimally processed magnetometer data; Sector 10 (1:1500 @ A3)
- 34 Interpretation of magnetometer data; Sector 10 (1:1500 @ A3)
- 35 Processed greyscale magnetometer data; Sector 11 (1:1500 @ A3)
- 36 XY trace plot of minimally processed magnetometer data; Sector 11 (1:1500 @ A3)
- 37 Interpretation of magnetometer data; Sector 11 (1:1500 @ A3)
- 38 Processed greyscale magnetometer data; Sector 12 (1:1500 @ A3)
- 39 XY trace plot of minimally processed magnetometer data; Sector 12 (1:1500 @ A3)

- 40 Interpretation of magnetometer data; Sector 12 (1:1500 @ A3)
- 41 Processed greyscale magnetometer data; Sector 13 (1:1500 @ A3)
- 42 XY trace plot of minimally processed magnetometer data; Sector 13 (1:1500 @ A3)
- 43 Interpretation of magnetometer data; Sector 13 (1:1500 @ A3)
- 44 Processed greyscale magnetometer data; Sector 14 (1:1500 @ A3)
- 45 XY trace plot of minimally processed magnetometer data; Sector 14 (1:1500 @ A3)
- 46 Interpretation of magnetometer data; Sector 14 (1:1500 @ A3)
- 47 Processed greyscale magnetometer data; Sector 15 (1:1500 @ A3)
- 48 XY trace plot of minimally processed magnetometer data; Sector 15 (1:1500 @ A3)
- 49 Interpretation of magnetometer data; Sector 15 (1:1500 @ A3)
- 50 Cottam 3b location showing processed magnetometer data (1:5000 @ A3)
- 51 Cottam 3b overall interpretation of magnetometer data (1:5000 @ A3)
- 52 Processed greyscale magnetometer data; Sector 16 (1:1500 @ A3)
- 53 XY trace plot of minimally processed magnetometer data; Sector 16 (1:1500 @ A3)
- 54 Interpretation of magnetometer data; Sector 16 (1:1500 @ A3)
- Processed greyscale magnetometer data; Sector 17 (1:1500 @ A3)
- 56 XY trace plot of minimally processed magnetometer data; Sector 17 (1:1500 @ A3)
- 57 Interpretation of magnetometer data; Sector 17 (1:1500 @ A3)
- Processed greyscale magnetometer data; Sector 18 (1:1500 @ A3)
- 59 XY trace plot of minimally processed magnetometer data; Sector 18 (1:1500 @ A3)
- 60 Interpretation of magnetometer data; Sector 18 (1:1500 @ A3)
- Processed greyscale magnetometer data; Sector 19 (1:1500 @ A3)
- 62 XY trace plot of minimally processed magnetometer data; Sector 19 (1:1500 @ A3)
- 63 Interpretation of magnetometer data; Sector 19 (1:1500 @ A3)
- Processed greyscale magnetometer data; Sector 20 (1:1500 @ A3)
- 65 XY trace plot of minimally processed magnetometer data; Sector 20 (1:1500 @ A3)
- 66 Interpretation of magnetometer data; Sector 20 (1:1500 @ A3)
- 67 Processed greyscale magnetometer data; Sector 21 (1:1500 @ A3)
- 68 XY trace plot of minimally processed magnetometer data; Sector 21 (1:1500 @ A3)
- 69 Interpretation of magnetometer data; Sector 21 (1:1500 @ A3)

1 Introduction

Archaeological Services ASWYAS has been commissioned by Lanpro Services on behalf of their client, Cottam Solar Project Limited to undertake a geophysical survey in advance of the Cottam and West Burton Solar Scheme, North Lincolnshire. This survey relates to the Cottam 3 parcel of land, split into Cottam 3a and Cottam 3b, hereafter referred to as the 'study site'. This was undertaken in line with current best practice (CIfA 2014; Schmidt *et al.* 2015). The survey was carried out in July, November-December 2021, February and April 2022 to provide additional information on the archaeological resource of the study site.

Site location, topography and land-use

Cottam 3a comprises c. 172ha split over 18 areas (K1-K18) centred at approximately SK 8688 9570 whilst Cottam 3b comprises c. 72ha split over 6 areas (J1-J6) centred at approximately SK 8725 9449. Both areas are located to the east of Blyton in the district of West Lindsey (see Fig. 1).

The study site consists of arable land, and at the time of survey was under a young crop. Further arable land surrounds Cottam 3a with Kirton Road bounding the southern limits. Blyton Park Race Track lies immediately to the northwest. The B1205 lies to the east and Laughton Road to the west. Cottam 3b is bound to the north by a railway line, Station Road to the west and the B1205 to the east. Both sites are generally level lying between 19m and 21m aOD (above Ordnance Datum).

Soils and geology

The recorded bedrock geology comprises Scunthorpe Mudstone Formation, a sedimentary bedrock that formed approximately 191 to 210 million years ago in the Jurassic and Triassic Periods. Superficial deposits have been recorded as Till, comprising mid-Pleistocene Diamicton deposits formed up to 2 million years ago in the Quaternary Period (BGS 2022). Soils are described as slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils (Soilscape 18) (CSAI 2022).

2 Archaeological Background

The archaeological background below is taken from an environmental impact assessment scoping report prepared by Lanpro Services (Crichton 2022) for Cottam sites 1-3. This included a review of monuments and events within the site boundary and also a 1km search area around the study site.

The Cottam site in its entirety (hereafter referred to as the 'study area') does not contain any designated heritage assets. There is one Scheduled Monument situated wholly within the

search area, the Cross in St Martin's Churchyard (NHLE 1018291) in the village of Blyton, situated approximately 950m to the west of Cottam 3a.

Prehistoric and Roman periods (c. 9500 BC – c. AD 410)

There is a lack of recorded evidence for prehistoric and Roman period activity within the study area and evidence for these periods from the wider search area is limited. It is possible, however, that features relating to a late prehistoric and/or Romano-British settlement previously identified outside, but adjacent to, the north-east boundary of the Cottam 3a Site could extend westwards into the Site, or that the remains of similar activity dating to these periods could survive within other areas of the Site. The prehistoric/Roman period remains identified during the archaeological investigations to the Site's north-east are not, however, considered to be of greater than local significance based on the criteria used in this assessment.

Early medieval and medieval periods (c. AD 410–c. 1540)

It is considered that, although there may be some limited potential for the survival of previously unrecorded remains relating to Early Anglo-Saxon period activity away from the pattern of settlements that may have emerged in the Middle to Late Anglo-Saxon periods, it is likely that the study area remained in primarily agricultural use throughout the early and later medieval periods.

Post-medieval to present (c. 1540-present)

The study area has remained in agricultural use throughout the post-medieval period. Across the majority of the study area, any potential buried archaeological features dating to the post-medieval period would likely relate to agricultural activity, such as ploughing, field boundaries and drainage, and would be considered to be of negligible significance.

Plans for a new Bomber Command training base, RAF Blyton (MLI54074), were created in early 1941, and the base opened in November 1942. The base is situated within Cottam 3a. It was a standard 'Class A' pattern, with 3 hardened runways and a concrete perimeter track linking 36 aircraft hard-standings. RAF Blyton was first occupied by the 18 (Polish) Operational Training Unit, and then the 1481 Gunnery Flight, 199 Squadron and their Wellington bombers, and the 1661 Heavy Conversion Unit. During peak occupation in summer 1944, there were up to 40 bomber crews, with 1966 male and 389 female personnel on site. These crew members were housed at six dispersed accommodation sites to the west of the airfield, so they were out of immediate danger if the airfield was bombed. The only surviving example of these accommodation sites is Site No.8, located in Laughton Wood, where there are four extant Stanton air raid shelters, and the concrete and brick bases of 28 Nissen huts. After the war, the base was used for equipment storage until 1947, when it was put on care and maintenance, and it briefly returned to use as a relief landing ground in the 1950s. RAF Blyton was officially closed in May 1954, and the land was sold and mostly

returned back to agricultural use by the early 1960s. Part of the former airfield is now being reused as a racetrack.

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 objectives 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 location of the survey areas at a scale of 1:10000. Figure 3 shows the processed magnetometer data of Cottam 3a at a scale of 1:10000 whilst Figure 4 shows an overview of the interpretation of Cottam 3a at the same scale. Processed and minimally processed data, together with interpretation of the survey results are presented in Figures 5 to 49 inclusive at a scale of 1:1500. Figure 50 shows the processed magnetometer data of Cottam 3b at a scale of 1:5000 whilst Figure 51 shows an overview of the interpretation of Cottam 3b at the same scale. Figures 52 to 69 show the processed and minimally processed along with interpretations at a scale of 1:1500 for the Cottam 3b areas.

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 2014). All figures reproduced from Ordnance Survey mapping are with the permission of the controller of Her 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 49 and 52 to 69)

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.

Magnetic responses associated with the former RAF Blyton airbase can be clearly seen within the data, including runways of the 'Class A' pattern and areas of aircraft dispersals which would minimise the damage to aircraft should an attack have been made (Brown *et al.* 1996).

Magnetic disturbance in the west of Area K1 (Sector 1) is likely to be caused from a combination of service pipes and possible demolition material, although there is nothing in the field or on historic mapping to suggest the latter. There are parch marks on Google Earth, however, which correspond to the size of the disturbance.

Much of Area K2 (Sector 3) is magnetically disturbed, some of which may be associated with the airbase but it has been difficult to interpret the anomalies further.

Large circular areas of magnetic disturbance (F1) in Areas K4 and K6 (Sectors 2 and 3) correspond to electricity pylons which cross the western part of Cottam 3a.

An area of magnetic disturbance (**F2**) in Area K7 (Sector 5) corresponds to buildings associated with Blyton Farm, a post-medieval to mid-20th century farmstead (HER number MLI117386). The buildings are shown on mapping dating from 1905 but have been demolished by 1953 (NLS 2022).

Magnetic disturbance (**F3**) in Area K13 (Sector 12) lies adjacent to a large building, which will be responsible for at least some of the response. It is also likely that remains of the airbase are partly responsible for some of this disturbance. Responses **F4** in Area K14 (Sector 13) also lie adjacent to a building and the same interpretation as above can be assigned here.

The southern section of Area K17 (Sector 15) has a 'speckled' appearance 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).

Magnetic disturbance (F5) in the south of Area K18 (Sector 15) is due to the location of a wind turbine and a building.

Magnetic disturbance along the limits of the survey areas is due to metal fencing within the field boundaries. It must be noted that some areas of disturbance in Cottam 3a may also be linked to the former airbase, but due to the complexity of the anomalies in the dataset, interpretation has been difficult. Disturbance along the northern limits in Cottam 3b is due to interference from the adjacent railway line.

Linear dipolar trends have been recorded in Areas K6, K14 and K15 which relate to service pipes.

Geological anomalies

The survey has detected a handful of anomalies in Area K18 (Cottam 3a) and Areas J2 and 3 (Cottam 3b) 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.

Agricultural anomalies

Former field boundaries (**FB1** - **FB18** (Cottam 3a) **FB19-FB26** (Cottam 3b) have been recorded which correspond to the first edition Ordnance Survey mapping dating from 1904. Boundaries **FB2** and **FB4** - **FB12** have been removed by the 1953 published map, most likely when the airbase was constructed in 1941. Boundaries **FB1**, **FB3**, **FB13** – **FB26** are still visible on the historic map published in 1956 (NLS 2022).

Field drains can be seen within most of the fields. They are of differing magnetic strength which is likely to be associated with the construction of the drains. Those that are particularly strong are likely to be of a fired clay construction.

Medieval or post-medieval ridge and furrow cultivation have been recorded throughout and can be seen despite the complex of drainage systems in place.

Other parallel linear trends can be seen within all 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 such as those at U1 - U4 which can be seen in Areas K1, K3, K6 and K14 respectively. There is a possibility that these have an archaeological origin but, given the amount of agricultural responses across the Site, their origin is likely to be agricultural.

Archaeological and possible archaeological anomalies

Circular response (P1) along the northern limits of Area K1 (Sector 1) measures approximately 11m in diameter and may indicate a ring ditch. The response is isolated and therefore the interpretation is cautious.

A cluster of linear responses (**P2**) in the southwest of Area K7 (Sector 5) have been interpreted as having a possible archaeological origin due to their alignment being different to the agricultural responses in this area. It is possible they are the remains of a field system or part of an enclosure. Similar responses (**P3**) have been recorded in the southeast of K9 (Sector 9) and the same interpretation can be applied as above.

Ditches and linear trends (A1) have been recorded in the northeast of Area K14 (Sector 11) and are likely to be associated with settlement activity. They cover an area of approximately 80m by 65m. Similar responses to the east at P4 are on the same alignment but also follow the orientation of the ridge and furrow and are weaker in magnetic strength so a possible archaeological interpretation has been given to these anomalies. They also cover an area of approximately 80m by 65m.

In the east of Area K18 (Sector 14) a group of ditches and trends have been recorded at A2. These responses lie approximately 250m to the southwest of a Roman settlement or farmstead (HER number MLI54147) which were recorded outside the study site during a watching brief (ELI6987) in 1997 at Abbey Farm. It is possible, therefore, that these responses are also Roman in date and relate to settlement activity. The responses A2 lie on a north to south alignment, covering an area of approximately 75m by 57m.

Approximately 150m to the southeast of **A2** further archaeological responses have been recorded at **A3** and consist of linear ditches and trends along with a handful of pit-type responses. This archaeological activity covers an area of approximately 110m by 75m and is on a northeast to southwest alignment and is likely to be Roman in date given the date of known archaeological activity to the immediate north.

Along the western edge of Area J3 (Sector 17) ditches and trends (A4) have been recorded. The responses extend slightly into Area J2 to the west. The anomalies lie on a similar alignment to the ridge and furrow cultivation but are of a much stronger magnetic strength and appear to show possible enclosures of field systems that cover an area of approximately 122m by 32m. Linear trends (P5) appear to extend from the northwest of A4 to the west but are weaker in magnetic strength and therefore given a possible archaeological interpretation.

To the south east of A4 a group of possible archaeological responses (P6) have been recorded. They again, follow the alignment of the ridge and furrow cultivation in this area but unlike A4 they have a weak magnetic strength.

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 in the east of Cottam 3a and in the centre of Cottam 3b which comprise linear ditches and trends of possible settlement activity. A single possible ring ditch has been recorded in the northwest of Cottam 3a. Other possible archaeological responses may be associated with further field systems or enclosures.

The dataset from Cottam 3a is quite complex due to the various phases of activity that have taken place on the site. Anomalies which have been difficult to interpret have been given an uncertain origin. The former airbase of RAF Blyton can clearly be seen in the data showing former runways, turning circles and associated service pipes.

Magnetic disturbance within the dataset can be attributed to adjacent modern buildings, a wind turbine, demolition material, green manuring and metal fencing within field boundaries.

Based on the geophysical survey the archaeological potential of the study site is deemed to be high in the east of Cottam 3a and in the centre of Cottam 3b (Area J3) and low elsewhere.

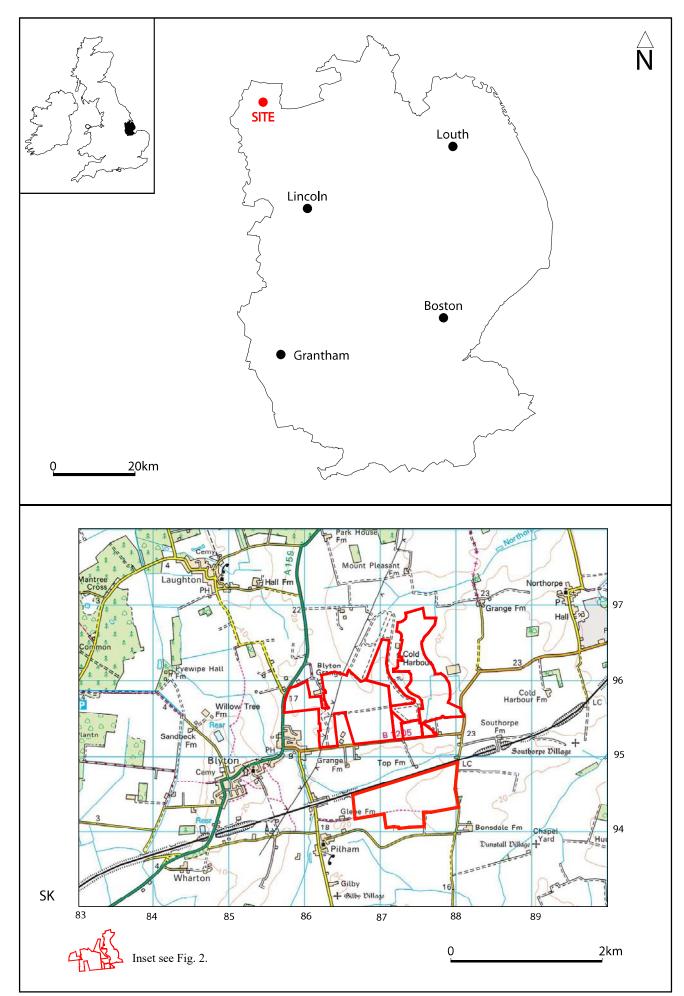


Fig. 1. Site location

