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June 2024



Helios Renewable Energy Project,
Camblesforth
North Yorkshire

**Geophysical Survey** 

Report no. 3975 September 2023

Client: Enso Energy





# Helios Renewable Energy Project, Camblesforth, North Yorkshire

**Geophysical Survey** 

# Summary

A geophysical (magnetometer) survey was undertaken on approximately 530 hectares of land located to the northwest of Camblesforth known as the Helios Renewable Energy Project. The majority of the anomalies recorded are agricultural including field drains, medieval or postmedieval ridge and furrow cultivation, modern ploughing and former field boundaries. Archaeological and possible archaeological responses have been recorded within the study which comprise linear ditches and trends, rectilinear enclosures and sub-circular trends, perhaps indicative of settlement activity. Based on the geophysical survey, the archaeological potential of this Site is deemed to be high in the areas of likely settlement and low elsewhere.



# **Report Information**

Client: Enso Energy

Report Type: Geophysical Survey

Location: Camblesforth
County: North Yorkshire
Grid Reference: SE 64168 25505

Period(s) of activity: ?Prehistoric - modern

Report Number: 3975
Project Number: XF70
Site Code: HLO22

OASIS ID: archaeol11-515749

Date of fieldwork: July 2022 – January and Sugust 2023

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Project Management: Emma Brunning BSc MCIfA

Fieldwork: Emma Brunning

Jake Freeman BA

Amy Chatterton BSc MA

Claire Stephens BA

Jacob Hurst Myszor BA Haydyn Evans BA MA

Alex Davies

Illustrations: Emma Brunning

Photography: Jake Freeman & Amy Chatterton

Research: Jake Freeman

Report: Jake Freeman & Emma Brunning

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



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#### 1 Introduction

Archaeological Services ASWYAS has been commissioned by Pegasus Group Ltd on behalf on Enso Energy to undertake a geophysical survey for the Helios Renewable Energy Project, Camblesforth, North Yorkshire. This was undertaken in line with current best practice (CIfA 2020; Schmidt *et al.* 2015). The survey was carried out between 21st July 2022 and 4th January 2023 with a return visit in August 2023 to complete the survey after harvest was completed.

## Site location, topography and land-use

The Site is located at SE 64168 25505 (approximate centre), comprising 475.68ha in which 530ha of land (survey area) was surveyed due to changes of the Site boundary during the fieldwork. The Site is situated to the northwest of Camblesforth, North Yorkshire see Fig. 1).

The Site is primarily located to the northwest of Camblesforth village with land consisting of pasture, arable and rough ground. Railway lines lie to both the west and southeast of the Site with the A1401 to the north and Hirst Road to the south. The Site is relatively flat across its entirety laying between 3m and 6m aOD (above Ordnance Datum).

#### Soils and geology

The recorded bedrock geology comprises Triassic Rocks (undifferentiated), a sedimentary bedrock consisting of interbedded sandstone and conglomerate that formed approximately 200 to 251 million years ago in the Triassic Period. Superficial deposits have been recorded as Lacustrine Deposits – Clay, formed up to 3 million years ago in the Quaternary Period. (BGS 2022). Soils across site are variable, however the primary soil type is described as Everingham association (821a) which are typical sandy gley soils. Soil described as Sessay association (831a) which are typical cambic gley soils are present in the southwest of site, and to the east of site are soils described as Foggathorpe 2 association (712i), described as Pelostagnogley soils (SSEW 1983).

## 2 Archaeological Background

The following archaeological background has been summarised from available online sources (Heritage Gateway 2022) and previous investigations within a 1km radius, from the centre of the Site.

Previous works within the vicinity of Site include a geophysical survey by ASWYAS (Trace 2021) of approximately 110 hectares of land to the north of Camblesforth which detected a square enclosure and a small array of possible archaeological features including a possible ring ditch, in addition to former field boundaries and a former railway line.

Further geophysical survey was carried out in 2014, on land near the Site as part of the Thorpe Marsh gas pipeline (Lefort 2014) which identified a number of archaeological anomalies including a sub-rectangular enclosure, at least two ring ditches and several isolated pits.

There are several instances of cropmarks visible on aerial photographs, both within the boundaries of the Site and within 1km proximity. These are primarily of a proposed Romano-British or Iron Age date, with a small amount of possible medieval features. The first instance consists of an area of Possible medieval settlement in the form of toft property boundaries and associated field boundaries to the south of the A104. The second instance consists of an area of proposed Romano-British settlement to the west of Station Road, with features comprising a rectilinear enclosure, roughly square-shaped, measuring approximately 40m by 40m, with fragmentary remains of others to the east, and a ditched trackway on the west. Approximately 0.2km west of the second instance, just outside of the Site boundary, further similar cropmarks likely to be Iron Age or Roman fragmentary rectilinear ditched enclosures and associated boundaries are visible on aerial photographs.

To the north of Sandwith Lane, cropmarks show a possible linear settlement of Roman date to the west and east of Quosquo House. It shows as an elongated series of enclosures to the west of Quosquo House, approached by a wide funnel entrance from the east, and more fragmentary enclosures adjacent to Rosehill Farm. In places the enclosures are overlain by field boundaries of medieval date. Further cropmarks including an elongated rectilinear enclosure to the southeast of Quosquo Hall have been recorded on aerial photographs. The enclosure is of uncertain date and function, but it follows a different alignment to the adjacent medieval field boundaries, and is presumably of different date.

The moated grange of Drax Abbey (MID 57932) has been recorded to the north of the survey area, to the immediate northeast of Camblesforth. It was associated with the Augustinian order and has been lost under later developments.

To the east of Camela Lane, approximately 0.7km to the northeast of the survey area, a Royal Observer Corp monitoring post has been recorded (MID 1415781). During the Defence of Britain Survey, the condition of the structure was considered to be good.

## 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). At the time of survey, the majority of the fields had been recently harvested which made conditions for data collection good.

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 shows the location of the survey area at a scale of 1:12,500. Figures 3 to 14 show overviews of the data at a scale of 1:7500. Processed and minimally processed data, together with interpretation of the survey results are presented in Figures 15 to 80 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 15 to 80)

#### 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 anywhere within the total survey area to suggest anything other than a random background scatter of ferrous debris in the plough-soil.

Magnetic disturbance along the limits and internal boundaries of the survey areas are due to metal fencing within the field boundaries and interference from the adjacent roads.

Linear dipolar<sup>1</sup> trends have been recorded in Fields 21-24 (Figs. 54-62), 37 and 38 (Figs. 75-80) which relate to service pipes. The magnetic halo which has been produced in Fields 24, 37 and 38 is quite large and as such will have masked any features, if present.

Overhead power cables have caused interference within the data which can be seen in the northwest of Field 17 (Figs. 39-41).

## 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.

Sinuous<sup>2</sup> responses in Fields 5 (Figs. 21-23), 9-10 (Figs. 24-32), 30 and 31 (Figs. 66-68) may be associated with former palaeochannels or natural drainage channels.

#### **Agricultural anomalies**

At least 59 former field boundaries (**FB1** – **FB59**) have been recorded throughout the survey area. Most of these boundaries correspond to historic mapping dating from 1908 and are still visible on the historic map published in 1958 (NLS 2023). Boundaries **FB11** and **FB12** in Field 9 (Figs. 24-26) do not appear on historic mapping but aerial imagery from 2022 (Google Earth 2023) clearly show a number of boundaries within this field, many of which haven't been recorded within the magnetic data.

<sup>&</sup>lt;sup>1</sup> Magnetically strong positive and negative responses

<sup>&</sup>lt;sup>2</sup> Anomalies which twist and curve

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 material of the drains. Those that are particularly strong such as in Fields 7 (Figs. 27-29) and 18 (Figs. 42-47) are likely to be of a fired clay construction.

Possible medieval or post-medieval ridge and furrow cultivation has been recorded within Fields 18 (Figs 42-47), 20 (Figs 48-50), 24 (Figs. 6-62), 28-30 (Figs. 66-68) and 33 (Figs. 69-71).

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. Linear responses in Fields 1 (Figs. 21-23), 5 (Figs. 27-29), 12 (Figs. 33-35), and 38 (Figs. 78-80) are likely to represent former field boundaries pre-dating available historic mapping.

A number of responses (**U1**) in Field 9 (Figs. 24-32) have been difficult to interpret. These responses have a slightly different magnetic signature and are on a different alignment to the nearby drains, former field boundaries and possible archaeological responses, and may also be of archaeological origin. Their magnetic strength is stronger than the nearby possible archaeological responses and their shape is more distinctly linear which suggests these may be a much more modern anthropogenic feature, although an older archaeological or agricultural explanation cannot be ruled out.

Fragmentary linear parallel trends in the east of Field 24 (Figs. 60-62) are likely to be ploughing responses but as only a handful have been recorded and their alignments slightly differ, an uncertain interpretation has been given. They may also represent desiccation cracks within the soil.

Pit-like anomalies have been recorded along the length of **P12** within Field 24 (Figs. 60-62). The pit-like responses have a strong magnetic signature and may be of some archaeological interest although the interpretation remains uncertain due to how different the shape and magnetic signature are compared with those of **P12**. There is also a possibility that the pit-like anomalies may simply mask parts of **P12** and otherwise be unrelated.

A pair of rectilinear areas of increased response (U2) in Field 24 (Figs. 60-62) have a particularly strong response and clear rectangular character, although they are partially masked by the strong dipolar 'halo' caused by a service pipe directly to the north. These are not marked on any available mapping or visible on satellite imagery and may represent small

enclosures, in-filled ponds, or even structural remains but no interpretation can be assigned with certainty.

#### Possible and definite archaeological anomalies

Anomalies of both a definite and possible archaeological origin have been recorded throughout the dataset, some of which correspond to known cropmarks, along with others adding further detail to the known archaeological record. These anomalies include enclosures and trackways, likely dating from the late prehistoric through to Romano-British period. Anomalies which have been highlighted on the interpretation diagrams are discussed below.

The most prominent archaeological responses are centred within the north of Field 8 (Figs. 21-23). The anomalies are visible as a pair of 'D' shaped enclosures with associated trackways and an appended rectangular enclosure. The first enclosure (A1) measures 32m by 37m and contains multiple internal features suggesting settlement activity. The eastern boundary of enclosure A1 sits parallel to another linear approximately 4m to its east to form a short trackway which leads into a partial rectangular enclosure (A2) below. Rectangular enclosure A2 measures approximately 28m by 33m and also contains internal features and is highly likely to be contemporaneous with A1. Directly north of A1 a weakly responsive pair of linear anomalies that intersect to form a right angle have been detected (P5). These have only been given a possible designation despite their shape due to the weakness of their magnetic response, and their alignment and similarity with agricultural trends within the same field.

Northeast of A1, responses which form a second partial D shaped enclosure (A3) have been detected, measuring 30m by 38m. The eastern length of enclosure has a much stronger magnetic strength than either the southern or fragmentary northwestern lengths detected but are all very likely to be contemporaneous with each other and also with A1 and A2 due to similarities in their sizes, appearances, and character. Another short length of trackway is also visible within the northeast of Field 8 where a strongly magnetic linear approximately 7m to the east of A3 forms the parallel alignment of trackway with the eastern length of A3.

Within Field 5 (Figs. 21-23), short well-defined linear anomalies (**A4**) and some weaker linear trends form a rectilinear pattern. These may represent part of a small enclosure appended to an old boundary which may be contemporaneous with features **A1**, **A2**, and **A3** within Field 8 to the east. The weaker responses here are roughly aligned with modern ploughing trends and share a similar magnetic strength, so a cautious 'possible' archaeological designation has been assigned to these. Within the eastern boundary of Field 8 (Figs. 21-23), a pair of magnetically positive linear responses (**P6**) form a right angled 'corner' measuring 20m along the SW-NE axis and 8m along the NW-SE axis. These responses line up very well with linear responses which make up both **A1** and **A2** across the western boundary of Field 8. Whilst it is likely this could be a continuation of these

enclosures, the interference from the modern road that separates Field 5 and Field 8 prevents a firmer interpretation.

Within the north of Field 38 (Figs. 78-80), a sub-rectangular enclosure (**A5**) measuring approximately 50m by 22m has been detected. A strong circular response (**A6**) can be seen in the eastern corner of enclosure **A5** and measures approximately 4.5m in diameter. It is likely the response represents a contemporaneous internal ring ditch.

A trapezoid shaped set of linear responses (A7) measuring approximately 59m by 41m is located within Field 32 (Figs. 63-65), continuing over the western boundary of the field into Field 26, and is likely to represent an enclosure. A strong curvilinear response (A8) has been detected within the narrower southern end of the trapezoid linear responses and measures approximately 12m. It is likely the response represents a contemporaneous internal feature within A7. A short south aligned linear anomaly (A9) has been detected adjoined to the southern corner of A7 and measures approximately 25m before petering out. The linear anomaly (A9) may continue although responses beyond the 25m stretch have been given a possible designation due to the change in magnetic strength and fragmentation of the linear beyond this point.

Two areas of possible archaeological activity (**P3**, and **P4**) have been detected within the intersections of Fields 2 and 3 (Figs. 15-17). These anomalies appear as linear and rectilinear alignments and are present within the southwestern corner of Field 2 (**P3**), and the northwestern corner of Field 3 (**P4**). Collectively they appear to form part of a small complex of possible archaeology. Whilst there are strongly magnetic anomalies within the responses here, there are also several weaker trends at the field edges which appear to form rectilinear patterns also. Due to the magnetic disturbance within the field boundaries, the variations in the strength and character of the detected anomalies, and both axes of the rectilinear responses aligning with modern ploughing regimes, only a possible archaeological designation can be reached.

Similar to the previously mentioned **P5** within Field 8, there are other faintly responsive intersecting linear anomalies across the survey area which intersect at a right angle creating what appears to be a corner of enclosure. These responses can be seen in **P6** (Field 9; Figs. 24-26)) and **P8** (Field 31; Figs. 66-68). Unlike **P5**, none of these are within proximity to definitive archaeological responses and an agricultural or other anthropogenic cause cannot be ruled out, however their magnetic strengths, shape and dimensions are all very similar to each other and as such they have been designated similarly.

A varied cluster of possible archaeological responses have been detected within Field 36 (Figs. 72-74). The majority of the responses here appear as fragmentary and magnetically weak intersecting linear anomalies (**P10**) with some individual 'blotch' responses that differ from nearby examples of ferrous responses. A semi-circular anomaly (**P9**) directly west of

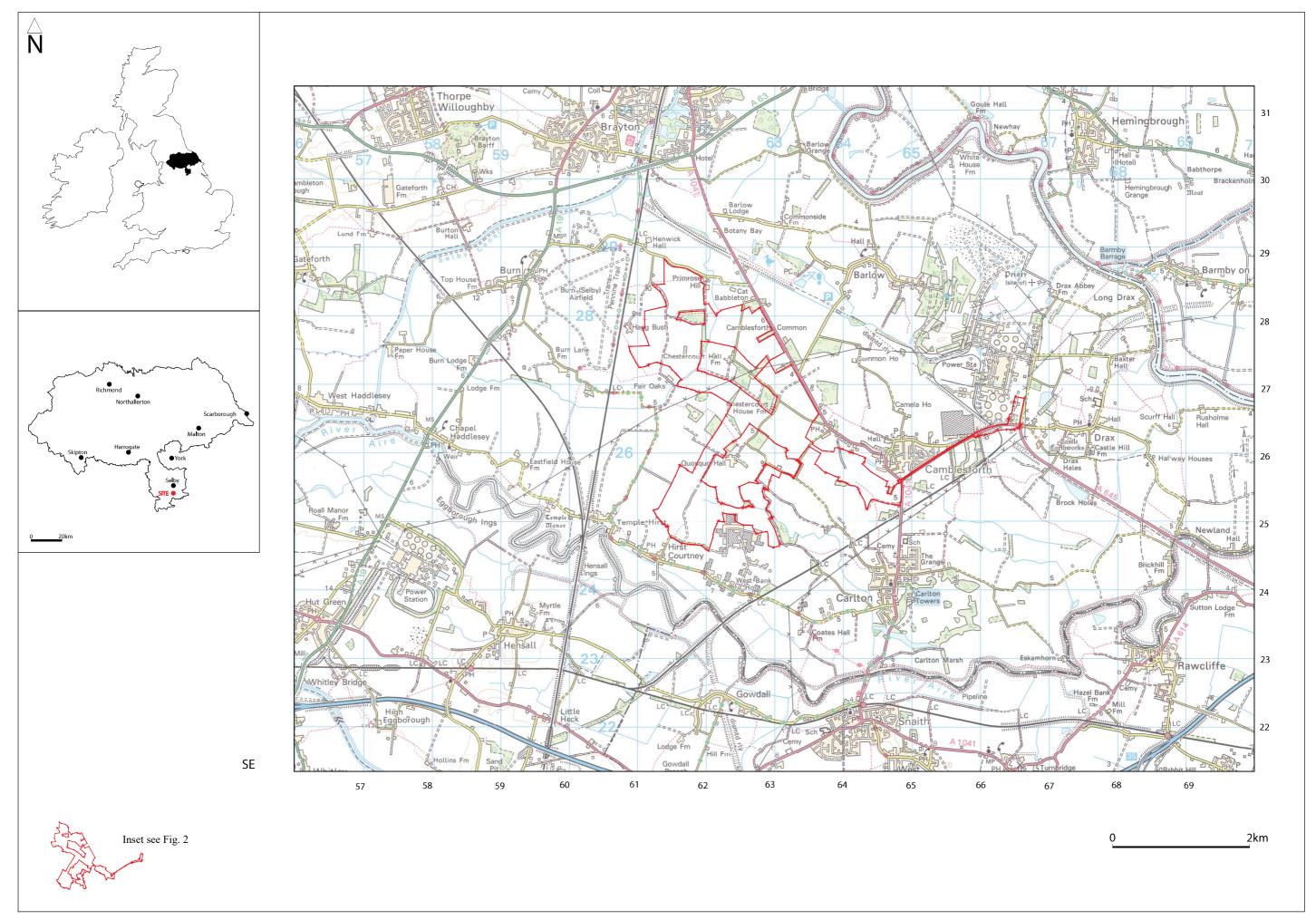
**P10** has also been designated as a possible archaeological response due to its shape and magnetic strength, although a geological or agricultural explanation cannot be ruled out.

Several linear anomalies have been detected across the entirety of site which have been assigned a possible archaeological designation due to a number of factors including their magnetic strength, shape and character, proximity to definitive archaeological responses, and their difference to other surrounding features. Each of **P1** (Field 1; Figs 15-17)), **P2** (Field 2; Figs. 15-17)), **P7** (Field 10; Figs 30-32), and **P12** (Field 23; Figs 60-62) fit within this definition, as these responses may have an archaeological explanation but cannot be ruled out as unmapped former field boundaries or stronger agricultural trends.

#### **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 study which comprise linear ditches and trends, rectilinear enclosures and sub-circular trends, perhaps indicative of settlement activity.

Magnetic disturbance within the dataset can be attributed to adjacent modern buildings, demolition material and metal fencing within field boundaries. A large service pipe has also been recorded in the east of the survey area.



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