Archaeology Wales

Shoals Hook Farm, Haverfordwest

Geophysical Survey



By Mark Houliston & Hywel Keen

Report No. 1286



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Non-Technical Summary

This report results from work undertaken by Archaeology Wales Ltd for RGE Energy UK Limited. It represents the results of a geophysical survey, undertaken using a gradiometer, on the site of a proposed solar farm at Shoals Hook Farm, Shoals Hook Lane, Haverfordwest. The geophysical survey covered an area of six fields comprising approximately 26ha.

All the fields have been deep-ploughed, a process which is likely to have disturbed, damaged or destroyed archaeological remains within the subsoil. Possible natural palaeochannels and geological features were identified in several of the fields.

The strongest signals were recovered from a trench or ditch located in Field 5, which is most likely to represent a modern service trench.

A probable east to west aligned hedge bank and an associated track-way were identified in Field 1. To the south of these, but on a separate alignment, was a series of linear features, possibly representing old paddocks or the remains of farm buildings, with two parallel ditches to the west of these. If these interpretations are correct, all these features are likely to predate 1841. Small structures may also have been identified in the southeast of Field 2 and in the northeast of Field 4. However, the interpretation of these is tentative at best.

A watching brief is recommended during ground-works in the southern half of Trench 1, to identify and record the remains of the possible buildings and associated ditches identified in this area. No archaeological mitigation measures are considered necessary in any other parts of the development area.

1. INTRODUCTION

1.1 **Project commission (Fig 1 & 2)**

- 1.1.1 The proposed development is for a solar power farm (Photovoltaic panels) on land at Shoals Hook Farm, Shoals Hook Lane, Haverfordwest (Henceforth the site) and comprises the construction of PV panels across six fields comprising approximately 26ha. The development proposal has been submitted on behalf of RGE Energy UK Limited, Communications House, 26 York Street, Mayfair, London, W1U 6PZ. The local planning authority is Pembrokeshire County Council and the planning application number is 14/0056/PA. The site is located at NGR SM 97500 16800 (Figure 1).
- 1.1.2 Dyfed Archaeological Trust Planning Services (Henceforth DAT PS), in their capacity as archaeological planning advisors to Pembrokeshire County Council (Henceforth PCC) have determined that the proposed development may potentially affect buried archaeological remains, but that they have insufficient information to identify the form, character, type, date or relative significance of the buried archaeology. Consequently, PCC were informed that further information on the historic asset would be required before the determination of the planning application.

- 1.1.3 The archaeological planning advisor therefore recommended that an archaeological evaluation should be undertaken (in accordance with Planning Policy Wales, March 2002, Section 6.5 and Welsh Office Circular 60/96, and in line with Policy GN.38 of the Pembrokeshire Local Development Plan, adopted 2013) comprising a Geophysical Survey.
- 1.1.4 Archaeology Wales Ltd (Henceforth AW) were commissioned to undertake the archaeological work. A Written Scheme of Investigation (WSI) was produced by AW and approved by DAT-PS (Appendix 1). This WSI was for a geophysical survey across the proposed development site, designed to detect archaeological features within the proposed development site using a gradiometer.

1.2 Project objectives

- 1.2.1 The primary objectives of the work were to locate and describe, by means of geophysical survey, archaeological features that may be present within the development area. The aim of the work was to elucidate the presence or absence of archaeological material that might be affected by the scheme, in particular its character, distribution, extent and relative significance. This work was undertaken during two weeks in November 2014.
- 1.2.2 AW is a Registered Organisation with the Institute for Archaeologists (IfA). All fieldwork was undertaken by suitably qualified staff and in accordance with the standards and guidelines of the IfA.

2. THE SITE

2.1 Location and Archaeological Potential (Fig 3)

- 2.1.1 The proposed development occupies six fields to the northwest of Haverfordwest and south of Crundale (SM 97500 16800). The fields are currently in agricultural use, surrounded by hedegrows, with post and wire fences added around the southern perimeters of the two larger fields on the western wide of the site area. Post and wire fences have also been used to divide some of the larger fields.
- 2.1.2 The topography of the area comprises southern facing slopes on the southern side of the site area, which are steeper to the west and shallower to the east. A steep slope is present along the eastern edge of the site. The northern and central parts of the site area lie on relatively level ground.
- 2.1.3 A previous archaeological Desk-Based Assessment on the site by Dyfed Archaeological Trust Archaeological Services (Meek 2014) was undertaken in March 2014 for Asbri Planning on behalf of their clients RGE Energy UK. The report concluded that the proposed development will have no physical impact on any known archaeological remains within the development site. However, it noted that there is a potential for the works to impact upon hitherto unknown archaeological remains, especially for those of Bronze Age date.

- 2.1.4 Furthermore, the report stated that the impact of the proposed solar farm on the wider historic environment in terms of visual impact is likely to be low. It concluded that because the development will mostly be low-level, and as the surrounding field boundaries will be retained and enhanced to the south and west, the overall appearance of the site will alter little.
- 2.1.5 The superficial geology of the site comprises glacial sands and gravels across the western half of the proposed solar farm area. Underlying bedrock across the entire site comprises mudstone, siltstone and sandstone of which the majority of the site is of the Ashgill Rocks (Undifferentiated) formation and the southeastern corner of Llandovery Rocks (Undifferentiated) formation (British Geological Survey information 2008).

3. METHODOLOGY

- 3.1 The area surveyed included all of the development area (**Figs 2 & 3**). Six fields were surveyed and the fields were numbered from west to east, with the most southerly named as Field 5. The site was located by GPS and all survey points were located with a Topcon GRS 1 GPS surveyor and plotted onto an O.S. base map.
- 3.2 The on-site work was undertaken by two teams of surveyors in a single phase lasting approximately two weeks. The survey was carried out using two pairs of Bartington Grad601 Magnetometers. Each survey area was divided into 30m square grids along a common north south alignment. Field 2 was surveyed in two halves, because the presence of a barbed-wire fence in the centre prevented the two portions from being joined as part of the same grid.
- 3.3 Within each grid, parallel traverses 1m apart were walked at rapid pace along the same orientation. Instrument readings were logged at 0.25m intervals, with an average cycle of 4 using an ST1 internal sample trigger. Incomplete survey lines resulting from irregular area boundaries or obstacles were completed using the "dummy log" key.
- 3.4 All data was downloaded in the field into a laptop computer. The location of the grid corners was recorded using a Topcon GRS 1 GPS surveyor so that the results could be accurately placed onto an OS map.
- 3.5 A composite of each detailed survey area was created and processed using the software package Terrasurveyor. A variety of processing tools were used to enhance any potential archaeology. The final results are presented at an appropriate scale tied to the Ordnance Survey National Grid, (**Figs 5 to 12**).
- 3.6 Due to the large areas covered by the survey the results are described and presented on a field-by-field basis.

4. **RESULTS**

4.1 Limitations

- 4.1.1 The survey was undertaken over two weeks in November 2014. Conditions were mixed, with periods of dry, mostly sunny weather, interspersed with period of heavy rain. A torrential downpour during the first week prevented work for approximately 1.5 days, as standing water had to be allowed to dissipate before work could continue.
- 4.1.2 Each field contained various features that either limited the survey or potentially affected the results. These are described on a field-by-field basis.
- 4.1.3 The underlying geology was shale of the Ashgill group and conglomerates of the Llandovery group. These caused localised fluctuations in the magnetic field, although corresponding distortions to the results were largely removed as a result of careful processing.

4.2 **Processing and presentation**

- 4.2.1 Processing was performed using the latest version of *Terrasurveyor*. This was generally minimised wherever possible. However, high magnetic values were caused by ferrous objects such as wire fencing and electricity poles, as well as the underlying geology, and these tended to hide fine details and obscure archaeological features. Therefore the values in these areas were 'clipped' to a range from 10nT to -10nT to remove the extreme values allowing the finer details to show through.
- 4.2.2 The processed data is presented as grey-scale plots overlaid on local topographical features (Figs 5 12). The main magnetic anomalies have been identified and plotted onto local topographical features as a level of interpretation.

4.3 Field 1 (Fig 5 & 6)

- 4.3.1 Field 1 lies at the western end of the proposed development site. 45 30m x 30m grids were surveyed across an area measuring 270m north to south by150m east to west.
- 4.3.2 Black Lines: In the south, two narrow, parallel, marks indicate the position of a probable east to west aligned hedge bank. To the north of this there is a broader, linear, mark that identifies the location of a possible track-way. These features are roughly perpendicular to the western and eastern boundaries of the present field.
- 4.3.3 Red Line: Two parallel marks, probably ditches, run east west from the western edge of the field. They are on a different alignment to the possible hedge bank and trackway and the boundaries of the present field.
- 4.3.4 Yellow Line: A series of faint parallel anomalies, running on the same alignment as the ditches marked by the red line, is located in the southeast of the field. This group also includes parallel cross anomalies, which are aligned roughly north to south, perpendicular to the others. They could represent old paddocks or buildings. However the response is quite low, indicating they are either very deep in the ground or the features are damaged, by ploughing perhaps.

4.4 Field 2 (Fig 5 & 6)

4.4.1 Field 2 lies to the east of Field 1 and to the west of Field 3, at the western end of the development site. It was surveyed in two parts (north and south) due to the presence of a defunct metal fence that ran, east to west, across the centre of the field. This caused considerable disturbance to the survey equipment.

4.4.2 Field 2 North16 30m x 30m grids were surveyed across an area measuring 90m north to south by180m east to west.

4.4.3 Green line: This marks the only anomaly found in this part of the field. At the end of the green line is a roughly circular anomaly around 15m across. This is joined on its western side by roughly linear feature, which is aligned approximately southeast to northwest. The circular feature could, very tentatively, be a ring ditch with a ditch section running to it. However the signal from the anomaly was not regular or strong, so it is more likely to be natural in origin.

4.4.4 Field 2 South

24 30m x 30m grids were surveyed across an area measuring 150m north to south by180m east to west.

- 4.4.5 Red Line: A rough, east to west aligned, linear mark located in the central western part of this area. The shape of the anomaly and the signals recovered from it during the survey suggest that it probably represents a natural paleochannel.
- 4.4.6 Green Line. Two roughly parallel, northeast to southwest aligned, marks, located in the east of the field are difficult to interpret. They may represent the remains of a small structure. However, the signals from it were very weak.

4.5 Field 3 (Fig 7 & 8)

- 4.5.1 Field 3 lies to the east of Field 2 and to the west of Field 4 in the centre of the development site. 42 30m x 30m grids were surveyed across an area measuring 270m north to south by150m east to west.
- 4.5.2 Black Line: This irregular, northeast to southwest aligned, anomaly probably represents the remains of a natural paleochannel.
- 4.5.3 Red line: A regular, linear, anomaly runs east to west from the western edge of the field. This might represent the remains of a field boundary ditch, or could also be a natural palaeochannel, possibly a continuation of that identified in the southern half of field 2.
- 4.5.4 Yellow line: A faint anomaly consisting of two lines running east to west. The lines follow the alignment of those representing the natural geology of the area, so the most likely explanation is that they are geological in origin.

4.6 Field 4 (Fig 7 & 8)

- 4.6.1 Field 4 lies to the east of Field 3 and to the west of Field 5, in the eastern half of the development site. 42 30m x 30m grids were surveyed across an area measuring 240m north to south by150m east to west.
- 4.6.2 Yellow line: This represents a faint, sub-rectangular, feature located close to the north eastern corner of the field. It is close to the current gate, which leads from the old trackway that runs along the northern edge of the fields. The marks could represent a building or a paddock. The faintness of the signals indicates that either it was a very slight building or that it was built of stone.

4.7 Field 5 (Fig 9 & 10)

- 4.7.1 Field 5 lies to the east of Field 4 and Field 6, at the eastern end of the development site. 52 30m x 30m grids were surveyed across an area measuring 300m north to south by180m east to west.
- 4.7.2 Yellow Line: This anomaly is clear and is likely to represent a ditch. It runs along a break in slope that is very marked, the slope west of it being relatively shallow, whereas to the east the ground runs at a steeper angle down to a nearby stream. The function of the ditch is unknown.
- 4.7.3 Black Line: The area marked by this line almost certainly represents a natural geological feature, probably an area where the underlying rock lies close to the surface. To the east, the area disappears, apparently because of the increased thickness of the sub-soil. The area marked by the black line was waterlogged and had thicker vegetation.

4.8 Field 6 (Fig 11 & 12)

- 4.8.1 Field 6 lies to the south of Field 4 and to the west of Field 5, in the eastern half of the development site. 34 30m x 30m grids were surveyed across an area measuring 180m north to south by240m east to west.
- 4.8.2 Black Lines: The conditions in this field mirrored those in field 5. The signals recovered from the areas marked in black appear to represent geological anomalies. The soil in these areas was thicker and waterlogged, in comparison to the thinner dryer soils observed elsewhere.

5. CONCLUSIONS

This report results from a geophysical survey (gradiometer) of six fields located to the northwest of Haverfordwest and south of Crundale. The fields cover a combined area of c.26 hectares and represent the site of a proposed solar farm.

Features can be identified in five of the fields. However, in all cases, these are of uncertain or low archaeological potential.

In general, it is clear that all the fields have been deep-ploughed. This ploughing is likely to have reached bedrock deposits across much of the higher ground, a process that probably disturbed, damaged or destroyed archaeological remains within the subsoil.

Possible natural palaeochannels were identified in Field 2 (south) and Field 3, and possible geological anomalies in Field 2 (north), Field 3, Field 5 and Field 6.

The strongest signal was recovered from a trench or ditch located in Field 5. The function of the feature is unknown, although it could have been cut relatively recently, and therefore represents a trench supplying services to buildings located further to the southeast.

A probable east to west aligned hedge bank and associated track-way were identified in Field 1. To the south of these, but on a separate alignment, were a series of linear features, possibly representing old paddocks or the remains of farm buildings, with two parallel ditches in the west. None of this complex shows on any of the maps consulted as part of the earlier Desk-based Assessment (Meek 2014), so if the interpretations are correct, they are likely to predate the earliest of these, the Tithe Map of 1841 (**Fig 4**). The signals recovered from the survey of these features were quite low, indicating that the remains are either deep in the ground or that they have been damaged, presumably as a result of ploughing. Small structures may also be indicated in the southeast of Field 2 and the northeast of Field 4, although in both cases the signals were faint and the interpretations therefore uncertain.

A watching brief is recommended during ground-works in the southern half of Trench 1, to identify and record the remains of any of the buildings or associated ditches that may survive in this area. No archaeological mitigation measures are considered necessary in any other parts of the development area.

6. SOURCES

British Geological Survey 1994 The Rocks of Wales 1:250,000

Clark A J 1996 Seeing Beneath the Soil (2nd edition). Batsford, London

Ordnance Survey	1889	1 st edition map Pembrokeshire 1;2500
Ordnance Survey	1902	2 nd edition map Pembrokeshire 1;2500

Meek, J. 2014, Proposed Solar Farm on Land North of Haverfordwest Golf Club, Pembrokeshire: Archaeological Desk Based Assessment, DAT Archaeological Services



Shoals Hook Farm, Haverfordwest Survey Area Figure 3 ARCHAEOLOGY WALES Revealing the past, informing the future

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Figure 4 Extract of 1841 Uzmaston Parish Tithe Map with approximate outline of propose solar farm

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Specification

For a Geophysical Survey at Shoals Hook Farm,

Haverfordwest

Prepared for: **RGE Energy UK Limited**

Project No: 2287

Date: 31st October 2014

Archaeology Wales Limited Rhos Helyg, Cwm Belan, Llanidloes, Powys, SY18 6QF Tel: +44 (0) 1686 440319 Email: admin@arch-wales.co.uk

NON TECHNICAL SUMMARY

This Written Scheme of Investigations details a proposal for a geophysical survey at land east of Shoals Hook Farm, Shoals Hook Lane, Haverfordwest, Pembrokeshire, designed as an initial investigation of potential buried archaeology within the proposed area of development. It has been prepared by Archaeology Wales Limited for RGE Energy UK Limited, Communications House, 26 York Street, Mayfair, London, W1U 6PZ. The survey area is approximately 26ha in size.

1. Introduction

The proposed development is for a solar power farm (Photovoltaic panels) on land east of Shoals Hook Farm, Shoals Hook Lane, Haverfordwest, Pembrokeshire, NGR SM 97325 16776 (Henceforth – the site) and comprises the construction of PV panels across several fields. A planning application has been submitted and approved (planning application no. 14/0056/PA) for an area of six fields covering approximately 26ha.

Dyfed Archaeological Trust – Planning Services (Henceforth DAT-PS), in its capacity as archaeological planning advisor to Pembrokeshire County Council (Henceforth – PCC), have recommended a geophysical survey to be undertaken at the site.

The purpose of the proposed work is to provide PCC with the information they are likely to request in respect of the proposed development, the requirements for which are set out in Planning Policy WALES, March 2002, Section 6.5, and Welsh Office Circular 60/96. The work is to highlight remains of potential archaeological interest to ensure that they are fully investigated and recorded if they are disturbed or revealed as a result of any subsequent activities associated with the development.

This Specification has been prepared by Mark Houliston, Managing Director, Archaeology Wales Ltd (Henceforth - AW) at the request of RGE Energy UK Limited. It provides information on the methodology which will be employed by AW during the proposed geophysical survey.

AW is a Registered Organisation with the Institute for Archaeologists (IfA). The proposed work will be managed by Mark Houliston (MIfA) and supervised by Hywel Keen. All field-work will be undertaken by suitably qualified staff and in accordance with the standards and guidelines of the IfA.

2 Results of the previous Desk-based Assessment

A Desk-based Assessment of the proposed development site was undertaken by Dyfed Archaeological Trust Archaeological Services (Report No. 2014/5) for Asbri Planning on behalf of their clients RGE Energy UK in March 2014.

The report concluded that the development proposal will have no physical impact on any known archaeological remains within the development site. However, it noted that there is a potential that the works could impact upon hitherto unknown archaeological remains, especially for those of Bronze Age date.

Furthermore, the report considered that the impact of the proposed solar farm on

the wider historic environment in terms of visual impact is low. The development will mostly be low level and as the surrounding field boundaries will be retained, and enhanced to the south and west, the overall appearance of the site will alter little.

3 Site specific objectives

The primary objective will be to assess the impact of the development proposals on the historic environment by means of a geophysical survey to help locate and describe archaeological features that may be present within the development area. The proposed archaeological work will attempt to elucidate the presence or absence of archaeological material that might be affected by the scheme, in particular its character, distribution, extent and relative significance.

A report will be produced that will provide information which is sufficiently detailed to allow informed planning decisions to be made that can safeguard the archaeological resource. The information could then be used to determine further archaeological investigation or appropriate mitigation strategies for any archaeological remains within the area to be implemented prior to or during the proposed development. The report will be used to allow a decision to be made on the planning application.

4 Methodology

The aim of the work will be to establish and make available information about the archaeological resource existing on the site. The work will include the following elements:

- A geophysical survey (Stage 1)
- The production of an illustrated report (Stage 2)

5 Geophysical Survey (Stage 1)

The area to be surveyed will include all of the development area (see the attached plan, Figure 1).

The site will be located by GPS. All survey points will be located with a total station and plotted onto an O.S. base map.

The on-site survey will be undertaken in a single phase lasting approximately two weeks. This will be followed by report production.

The survey will be carried out using a Bartington Grad601 Magnetometer. Each survey area will be divided into 20m square grids along a common alignment.

Within each grid, parallel traverses 1m apart will be walked at rapid pace along the same orientation. Instrument readings will be logged at 0.25m intervals, with an average cycle of 4 using an ST1 internal sample trigger. Incomplete survey lines resulting from irregular area boundaries or obstacles will be completed using the "dummy log" key.

Further survey information will be completed on the relevant pro-forma sheet. All data will be downloaded in the field into a laptop computer. The location of the grid

corners will be recorded using a total station so that results can be accurately placed onto an OS map.

A composite of each detailed survey area will be created and processed using the software package *Terrasurveyor v.3.* A variety of processing tools will be used to enhance any potential archaeology. The final results will be presented at an appropriate scale tied to the Ordnance Survey National Grid.

DAT will be contacted at least one week prior to the commencement of site works and subsequently once the work is underway.

Any changes to this Written Scheme of Investigations that AW may wish to make after approval will be communicated to DAT for approval on behalf of Planning Authority.

DAT will be given access to the site so that they can monitor the progress of the work, they will be kept regularly informed about developments, both during the site works and subsequently during the post-fieldwork programme.

6 The production of an illustrated report and the deposition of the site archive (Stage 2)

The results of the geophysical survey will be presented in such a way that data and supporting text are readily cross-referenced. The survey results will be presented on maps and plans clearly illustrating the outline of the site.

Within the report an attempt will be made to identify specific potential archaeological features as well as indicate areas of greater or lesser archaeological significance and the sites will be ranked in level of overall archaeological importance (locally, regionally and nationally).

Aerial photographs and historic maps will be included and be fully referenced if they are relevant to the interpretation of features identified during the survey.

The report will be used to inform future decision making regarding further stages of archaeological work (Field Evaluation, Watching Brief etc), the development construction and processes used.

The report will specifically include the following:

- 1. a copy of the Specification
- 2. Detailed plans of the site, including a location plan
- 3. all identified sites plotted on an appropriately scaled plan of the proposal site
- 4. Concise non-technical summary of the geophysical survey results
- 5. Site illustrations, related to Ordnance Datum
- 6. Written description of the geophysical survey results
- 7. Statement of local and regional context
- 8. Conclusions as appropriate
- 9. Bibliography

Copies of the report will be sent to RGE Energy UK Limited, DAT-PS (for approval on behalf of the LPA), and DAT heritage management (for inclusion in the HER). Digital copies will be provided in pdf format if required.

A summary report of the work will be submitted for publication to a national journal

(e.g. Archaeology in Wales) no later than one year after the completion of the work.

The site archive

A project archive will be prepared in accordance with the National Monuments Record (Wales) agreed structure and be deposited with an appropriate body on completion of site analysis and report production. It will also conform to the guidelines set out in 'management of research projects in the historic environment' (English Heritage, 2006).

Arrangements will be made for deposition of the physical archive with the County or National Museum before work starts. The digital archive will be deposited with the Archaeological Data Service.

Although there may be a period during which client confidentiality will need to be maintained, the report and the archive will be deposited not later than six months after completion of the work.

Other significant digital data generated by the survey (ie AP plots, EDM surveys, CAD drawings, GIS maps, geophysical survey data etc) will be presented as part of the report on a CD/DVD. The format of this presented data will be agreed with the curator in advance of its preparation.

8 Resources and timetable

Standards

The field evaluation will be undertaken by AW staff using current best practice.

AW is an IFA Registered Archaeological Organisation and all work will be undertaken to the standards and guidelines of the IFA.

<u>Staff</u>

The project will be undertaken by suitably qualified AW staff. Overall management of the project will be undertaken by Philip Poucher (a CV is available upon request).

Equipment

The geophysical survey will use a Bartington Grad601 set to standard specifications.

Timetable of archaeological works

The work will be undertaken at the convenience of the client. No start date has yet been agreed. It is anticipated that the fieldwork element could take in the region of two weeks.

Insurance

AW is an affiliated member of the CBA, and holds Insurance through the CBA insurance service.

Health and safety

All members of staff will adhere to the requirements of the *Health & Safety at Work Act*, 1974, and the Health and Safety Policy Statement of AW.

If AW has sole possession of the site, then AW will produce a detailed Risk Assessment for approval by the client before any work is undertaken. If another organisation has responsibility for site safety, then AW employees with be briefed on the contents of all existing Risk Assessments, and all other health and safety requirements that may be in place.

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