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MARCH 2020

Written Scheme of Investigation for an archaeological evaluation

Land off Hillock Lane, Gresford, Wrexham

Iceni Projects Limited on behalf of
Norris Jones Developments

13th of March 2020

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ON BEHALF OF NORRIS
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**Written Scheme of Investigation for an
archaeological evaluation**

Report tracking

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Non-technical Summary

This document is a Written Scheme of Investigation (WSI) for an archaeological evaluation at the site of Land off Hillock Lane, Gresford, Wrexham, LL12 8YL. The proposed development is currently in the pre-application stage of planning.

The evaluation will consist of 23 trenches excavated across the site by an archaeological contractor. The trenches are located to target anomalies identified in a recent geophysical survey of the site.

The archaeological potential of the site is:

Prehistoric remains: *there is high potential for remains of cut features and deposits to be present on the site. The recent geophysical survey identified potential enclosures, settlement activity and possibly a round barrow.*

Roman remains: *there is low to moderate potential for Roman features and deposits. The site is located to the south of a possible Roman road and finds from this period are known in the area.*

The results of the evaluation will determine the presence or absence of archaeology and will be used to inform the need for further archaeological fieldwork. It is intended that the report on the results of the archaeological evaluation will accompany the planning application. The purpose of this will be to inform the nature of any potential planning conditions relating to archaeology for the development. The decision regarding the requirement for further work rests with the Archaeological Advisor to the Local Planning Authority.

1. Introduction

Report Scope

- 1.1.1 This written Scheme of Investigation (WSI) is for an archaeological evaluation on the site of Land off Hillock Lane, Gresford, Wrexham, LL12 8YL (Figure 1). It has been commissioned from Icen Projects by Norris Jones Developments.
- 1.1.2 The site is currently occupied by agricultural (pastoral) fields. The centre of the site lies at National Grid reference 336047 354489. The highest part of the site is c 76.5m OD, in the north eastern corner, and it slopes to the south and south west to c 71.3m OD.
- 1.1.3 The proposed development of the site is for housing and is currently in the pre-application stage of planning. It is intended that the report on the results of the archaeological evaluation will accompany the planning application. The purpose of this will be to inform the nature of any potential planning conditions relating to archaeology for the development.
- 1.1.4 A recent geophysical survey of the site (TigerGeo 2020, APPENDIX B) revealed curving and linear anomalies and possibly features relating to settlement in the north eastern corner of the site. A ring ditch in the south east may represent a barrow or circular enclosure. The general agreement is that a number of the potential features have Bronze Age characteristics.
- 1.1.5 The archaeological potential of the site and the scope of the evaluation has been discussed and developed with Mark Walters, Development Control Archaeologist for Clwyd-Powys.
- 1.1.6 All works will be carried out in accordance with the ClfA standards and guidance (ClfA 2014a, b and c) and the Clwyd-Powys Archaeological Trust (CPAT) requirements for archaeological evaluations (APPENDIX C).

2. Archaeological background

The archaeological background of the site is described in detail in the Heritage Assessment (BWB 2019). A summary is provided here.

Geology, topography and site description

- 2.1.1 The site is formed of open agricultural fields and is surrounded by fields to the east, south and west. Hillock Lane and properties situated on the southern side of the lane form the northern boundary of the site.
- 2.1.2 The site is situated on a south/southwest facing slope. The ground height ranges between 75.10–76.50m OD along Hillock Lane in the north and 71.24–74.76m OD along the southern site boundary.
- 2.1.3 The British Geological Society viewer (www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer) shows the underlying superficial geology of the site as Devensian glaciofluvial sand and gravel Deposits formed up to 2 million years ago.

Archaeological and historical background

Prehistoric: Palaeolithic period to Iron Age (Prehistoric c800,000 BC – AD 43)

- 2.1.4 The site is located within an area of known prehistoric activity from a range of periods.
- 2.1.5 Prehistoric finds from the area include the Hollyfield Axe, which dates to the Neolithic period. It was found 800m to the north-west of the Site.
- 2.1.6 Recent excavations at Borrass Quarry, 1km to the south of the site, have revealed extensive areas of Neolithic and Bronze Age settlement evidence.
- 2.1.7 Within the area around Wrexham there are several scheduled round barrows of Bronze Age date including; the Bryn Alyn Round Barrow, the Fairy Oak Round Barrow and the Hillbury Round Barrow
- 2.1.8 Known Iron Age activity in the area includes Bryn Alyn Camp, a promontory enclosure situated c3km to the south west of the site.

Roman (AD43–c410)

- 2.1.9 When the Roman Legions reached Wroxeter in 48AD, Wrexham formed part of the territory held by the Iron Age Cornovii tribe. Around 70 - 75 A.D the Legionary fortress of Deva was constructed in what is now modern-day Chester and for the next 300 years it was the home of the Twentieth Legion.
- 2.1.10 Numerous Roman discoveries have been made in the local vicinity, including a coin hoard 500m to the south east and human remains dating to the 2nd century AD 800m south of the site.
- 2.1.11 It is thought that Gresford High Street may be on the line of a Roman road connecting Chester with Ffridd.

Medieval

- 2.1.12 The early medieval earthwork of Wat's Dyke lies, at its closest point, approximately 3.5km to the west of the site. The Dyke extends for around 40 miles, running generally parallel with and to the east of Offa's Dyke.
- 2.1.13 Gresford is recorded in the Domesday survey of 1086 and consisted of 24 households. The site would have been located outside of the settlement centre in the medieval period. The medieval settlement of Marford and Hoseley is also located c600m to the south of the site.
- 2.1.14 Several medieval coins and a silver sword pommel have been found in the area surrounding the site.

Post-medieval–modern (c16th century –present)

- 2.1.15 As is true of the present day, during this period the site was situated to the south west of Gresford centre, and latterly on the edge of the town's residential spread. All cartographic sources show the site as agricultural land.
- 2.1.16 The first map to show the site dates from 1844, where it comprises a series of enclosed rectilinear fields just to the south of a farmstead. These buildings are later identified as Hillock Farm on the 1900 OS map.
- 2.1.17 The 1900 map also shows the amalgamation of many of the fields into large ones, which form the same layout on the site today.

Past Archaeological Investigations

- 2.1.18 No archaeological investigations have taken place on the site. Investigations taken place in the surrounding study area are listed in the Heritage Assessment (BWB 2019).
- 2.1.19 A geophysical survey of the site was undertaken by TigerGeo in 2019 which showed a series of subsurface anomalies on the site likely to comprise archaeological remains. Many of them have Bronze Age characteristics and may represent a barrow, ditched enclosures (possibly for settlement/agriculture/land boundary purposes), pits and other cut features/spreads. The full results are appended (APPENDIX B) to this document.

3. Objectives

General Objectives

- 3.1.1 An archaeological evaluation is a programme of fieldwork designed to evaluate the archaeological potential of a site. It is often the first stage of fieldwork to be undertaken on a site and is used to inform the need and scope of further work.
- 3.1.2 The Chartered Institute for Archaeologists (CIFA) define an evaluation as:
A limited programme of non-intrusive and/or intrusive fieldwork which determines the presence or absence of archaeological features, structures, deposits, artefacts or ecofacts within a specified area or site. If such archaeological remains are present field evaluation defines their character, extent, quality and preservation, and enables an assessment of their worth in a local, regional, national or international context as appropriate.
- 3.1.3 As such, the general objectives of any evaluation are to determine where possible:
- The nature and level of natural geology
 - The earliest deposits identified
 - The latest deposits identified
 - The character of archaeological deposits encountered
 - The extent of modern disturbance
- 3.1.4 CIFA guidelines also state that during the evaluation stage of fieldwork, archaeological remains should not be:
...needlessly disturbed or damaged or inappropriate or excessive cost incurred.
- 3.1.5 The results of the evaluation will be used to establish if further fieldwork is necessary such as further evaluation, or mitigation fieldwork in advance of the development. This will be determined by consultation with the local curator; in this case the Development Control Archaeologist for Clwyd-Powys.

Site specific objectives

- 3.1.6 Taking into account the archaeological and historical background of the site and its wider area and the geophysical survey, in addition to the above general objectives (3.1.3), the site specific objectives of the evaluation are:
- Are any of the geophysical anomalies natural/geological in origin?
 - Do pre-Neolithic remains survive on site?
 - What is the form and likely function of any linear features?
 - What is the form and likely function of any curving linear features?
 - Do occupation horizons/spreads survive on site? If so, what is their nature?
 - Do structural features survive on site? If so, what is their nature?
 - Are any of the potential circular enclosures round barrows?
 - Are discrete cut features such as pits present? If so, what is their nature?
 - Are Roman features or deposits present? If so, what is their nature?
 - Are Medieval features or deposits present? If so, what is their nature?
 - Are post-Medieval features or deposits present? If so, what is their nature?

4. Methodology

Site specific evaluation methodology

- 4.1.1 The archaeological evaluation will consist of the excavation of 23 trenches, the proposed locations of which are shown on Figure 2.
- 4.1.2 APPENDIX C should be consulted for CPAT archaeological evaluation guidance.
- 4.1.3 The archaeological site contractor will be required to digitise the trench locations shown on Figure 2 in GIS. Trench locations will then need to be set out on site using electronic survey equipment (total station/GPS) prior to their excavation. The purpose of this is to allow accurate targeting of geophysical anomalies.
- 4.1.4 Service plans should be consulted and trench locations CAT scanned prior to excavation. If extant services are present at a trench location, the trench will be moved or if not practicable, not excavated.

Trench (Tr)	Geophysical anomaly targeted	Dimensions
1	15	10 x 1.8m
2	36	10 x 1.8m
3	19	15 x 1.8m
4	22	15 x 1.8m
5	23	10 x 1.8m
6	21	10 x 1.8m
7	24	15 x 1.8m
8	10	10 x 1.8m
9	13 (w)	10 x 1.8m
10	13 (e)	10 x 1.8m
11	14	10 x 1.8m
12	25	22 x 1.8m
13	35	15 x 1.8m
14	26	25 x 1.8m
15	28	25 x 1.8m
16	27	10 x 1.8m
17	3	15 x 1.8m
18	7	10 x 1.8m
19	37	25 x 1.8m
20	18	20 x 1.8m
21	29	10 x 1.8m
22	30 & 32	20 x 1.8m
23	31	10 x 1.8m

Table 1 Summary of proposed investigation

- 4.1.5 The trenches will be opened by a mechanical excavator (JCB or slew tracked type) using a toothless ditching bucket under the supervision of the attending archaeologist.

- 4.1.6 Machine excavation will continue until the first meaningful archaeological horizon is reached, as determined by the supervising archaeologist or until the natural substrate is reached, whichever is first. Investigation will then proceed by hand including cleaning, appropriate excavation and recording in plan and/or section.
- 4.1.7 Any cut features (e.g. ditches or pits) or structures encountered should be recorded in plan and manually excavated before proceeding with further excavation.
- 4.1.8 All archaeological features and deposits must be cleaned and investigated by hand in accordance with ClfA Standards and Guidance, with sufficient work undertaken to determine their date and character, and the remains should be recorded.
- 4.1.9 Excavation may be limited by health and safety constraints such as depth. It may be necessary, where practical, to 'step out' the trenches if the trench edges are deemed unsafe.
- 4.1.10 Excavation will not be carried out at the expense of significant remains and it may be necessary to preserve such remains in-situ.
- 4.1.11 Should features of national importance and possibly of schedulable quality be observed, fieldwork will cease until the remains have been inspected by the Development Control Archaeologist of Clwyd-Powys Archaeological Trust and the appropriate Cadw Regional Inspector of Ancient Monuments.
- 4.1.12 If human remains are found, they will be left in situ and covered. They will not be excavated unless their removal is essential and a Ministry of Justice licence is obtained.

Recording systems

- 4.1.13 A unique site code will be obtained from the local issuing organisation.
- 4.1.14 The recording system used during the evaluation, including written and drawn records, is set out in APPENDIX C CPAT archaeological evaluation guidance.
- 4.1.15 This will include, where appropriate:
- Written records on pro forma context sheets
 - Hand drawn plans on drafting film at a scale of 1:20
 - Hand drawn sections on drafting film at a scale of 1:10 or 1:20
 - Digital photographs
 - Context, photographic and sample registers
 - A stratigraphic 'Harris' matrix compiled and fully checked during the course of the excavation
- 4.1.16 Archaeological deposits will be levelled to Ordnance Datum (m OD) from a known height bench mark.
- 4.1.17 Archaeological trench locations will be recorded either with electronic survey equipment. Trench locations will be tied in to the National Grid system.

Treatment of finds and samples

- 4.1.18 Section 1.1 of APPENDIX C should be referred to for full CPAT guidance on the treatment of finds and samples.
- 4.1.19 Finds will be recovered from stratigraphic units and retained to help characterise the archaeological deposits.
- 4.1.20 Bulk environmental samples (40-60 litre) of deposits may be retrieved from suitable stratigraphic units if necessary. These may require offsite processing via tank flotation.
- 4.1.21 The sampling strategy should be developed in consultation with the Development Control Archaeologist for Clwyd-Powys during the works. Environmental and scientific dating sampling may need to be discussed with the science advisor.
- 4.1.22 Processed finds and samples will be assessed off site by appropriate specialists.
- 4.1.23 Marking, bagging and boxing of finds will follow the archive receiving body's guidelines.

- 4.1.24 Should gold, silver or other finds definable as treasure be made, they will be reported to the Coroner as stipulated in the Treasure Act of 1996, amended 2003.
- 4.1.25 Permission will be sought from the landowner, by the archaeological contractor carrying out the work, to deposit all finds with the archive receiving body. This will be secured via a signed Deed of Transfer.

Report and Archive

- 4.1.26 An Evaluation Report will be produced within 2 weeks of the completion of the field work and will be made available to the client and CPAT. Submission of the report to the Local Planning Authority will be carried out by the client or their planning consultant.
- 4.1.27 The Reporting and Archiving Section of APPENDIX C should be referred to for full CPAT guidance.
- 4.1.28 The Evaluation Report shall include:
- Summary
 - Introduction
 - Archaeological, historical and topographic background
 - Methodology
 - Results
 - Finds summary
 - Answering of original research aims
 - Discussion of potential and significance
 - Proposed development impact and conclusions
 - Location figures and figures detailing archaeological findings
 - Bibliography
 - OASIS form
- 4.1.29 Sections VI to X of Reporting and Archiving in APPENDIX C should be referred to for full details of archiving. For this site:
- The archive should be deposited with the RCAHMW NMR or ADS.
 - A high resolution copy of the digital report should be forwarded to the HER Officer Gary Duckers gary.duckers@cpat.org.uk
 - The finds archive should be deposited with Wrexham Museums by prior agreement
- 4.1.30 Appendix D - Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs) should be referred to.
- 4.1.31 The archive will be prepared in accordance to the standards set out in *Society of Museum Archaeologists: Towards an Accessible Archive. The Transfer of Archaeological Archives to Museums: Guidelines for Use in England, Northern Ireland, Scotland and Wales (1995)*. The minimum standard for a site archive is set out in *Management of Recording Projects in the Historic Environment (2015)*.
- 4.1.32 A short summary of the results of the evaluation will be submitted for inclusion in the appropriate academic journals.

5. Programme and site requirements

Programme

- 5.1.4 The evaluation can commence once the WSI has been submitted to and approved by the Development Control Archaeologist for Clwyd-Powys.
- 5.1.5 The Development Control Archaeologist will be given at least 5 days notice of the work starting on site, and will be kept updated as the work progresses, as well as being given access to site to look at the trenches.
- 5.1.6 The start date and duration of the archaeological evaluation will depend on the Site Contractor's or client's programme of works and the nature and extent of any archaeological remains encountered.

Site requirements

- 5.1.7 The archaeological contractor will need safe access to the trench locations and space for welfare and storage units, plant and vehicles.
- 5.1.8 If a Principal Contractor is present on site, the archaeological contractor will require access to welfare and some provision for on site storage.

6. Health and safety

- 6.1.1 The archaeological contractor will produce a site-specific Risk Assessment Method Statement (RAMS). This should be read in conjunction with this document.

7. Bibliography

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Figure 1 site location





Figure 2 Trench locations overlain on geophysical survey results

Appendix A – Planning background

The planning background is covered in detail in section 3 of the Heritage Assessment (BWB 2019)



Land off Hillock Lane, Gresford, Wrexham

Geophysical Survey Report
(Caesium Vapour Magnetic – Archaeology)
Version 1.0

Project code: HLG191

Produced for:

Iceni Projects (on behalf of Norris Jones
Developments)

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Land off Hillock Lane, Gresford, Wrexham

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Non-Technical Summary

A survey was commissioned by Icení Projects (on behalf of Norris Jones Developments) to prospect land off Hillock Lane, Gresford, for buried structures of archaeological interest. Survey was undertaken using an ATV-towed and GNSS-tracked non-gradiometric array of caesium vapour magnetometers on a non-magnetic platform.

Magnetic survey shows a variety of features of likely archaeological interest within the site which may be of prehistoric date, mostly clustered in three locations. The southeastern cluster may contain a barrow, whereas the northeastern cluster may represent settlement. A third cluster may also represent settlement or a field system but lies just outside the development redline (the survey area covered a slightly larger footprint).

{ Welsh translation to be inserted upon client acceptance }



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Drawing	Title
DWG 01	Site Location
DWG 02	Total Magnetic Intensity Data (TMI)
DWG 03	Interpretation
DWG 04	Interpretation – Vector Only

1 Introduction

TigerGeo was commissioned by Icen Projects (on behalf of Norris Jones Developments) to undertake a geophysical survey of land off Hillock Lane, Gresford. Survey was undertaken using an array of caesium vapour magnetometers to prospect for buried features possibly of archaeological interest.

Survey was undertaken within two fields, of an area of approximately 7.0 hectares and covering the whole of the specified area apart from a small area in the western end of the southern field, which was excluded as it was liquid mud and unsurveyable.

Country	Wales
County	Wrexham - Wrexham
Nearest Settlement	Gresford
Central Co-ordinates	336029, 354478

2 Context

2.1 Environment summary

Soilscapes Classification	Freely draining slightly acid sandy soils (10)
Superficial 1:50000 BGS	Glaciofluvial Sheet Deposits, Devensian - Sand And Gravel (GFSD)
Bedrock 1:50000 BGS	Salop Formation - Mudstone, Sandstone And Conglomerate (SAL) - west Kinnerton Sandstone Formation - Sandstone (KNSF) - east
Topography	Mostly fairly flat but with a natural-looking hollow in the middle, south of the field boundary
Hydrology	Freely draining, including in the hollow, but one small area of very wet ground in the west likely due to cattle poaching / slurry
Current Land Use	Agricultural - Pastoral
Historic Land Use	Agricultural - Mixed
Vegetation Cover	Grass (short)
Sources of Interference	Localised effects from fencing and agricultural equipment, minimal effect from substation in northeast corner and none visible from the overhead cable along east side

2.2 Heritage background

The survey area has previously been subject to a heritage assessment (BWB Consulting, 2019), which covered a wider area to the south and west than that surveyed. The recommendations of this state that:

"..... within the wider study area there are known assets of prehistoric, Roman, medieval and post-medieval activity. The assessment has considered that there is potential for undiscovered archaeological assets dating to the Roman period based on the finds found within the site/ within its immediate area. On this basis it is recommended that a geophysical survey is undertaken to further assess the potential for Roman activity to occur within the site."

The assessment also contains a map regression, which shows former field boundaries on the 1844 Map of the lordship of Merford and Hoseley (BWB Consulting, 2019, Fig. 5), but which are not present on any Ordnance Survey mapping, apart from one boundary that seems to have survived along the footpath route.



Additional Ordnance Survey map editions were also viewed and from the 1954-64 map until 1968 two additional divisions of the northern field also appear. From the late 1980s the fields appear as they are now.

A small pond is visible in the northern near the bend in the east-west dividing field boundary on the 1872 and 1879-82 Ordnance Survey maps but not thereafter.

3 Discussion

3.1 Character & Principal Results

3.1.1 Introduction

The following paragraphs represent an interpretive summary of the survey. The numbers in square brackets refer to individual anomalies described in detail in the catalogue below and shown on DWG 03 onwards.

3.1.2 Data

Data quality is good throughout and is only significantly affected in the immediate vicinity of the agricultural equipment parked in the southern field.

3.1.3 Geology

The dominant character within the data is likely to be due to the superficial deposits, with the sand and gravel of the Glaciofluvial deposits likely of uneven depth, inhomogeneous content and containing magnetic glacial erratics. The BGS (British Geological Survey) G-Base soil iron content is 2.6% (5 km resolution) and is not particularly high but is likely to be sufficient for the soils to support magnetic enhancement. Overall, magnetic contrast appears to be moderately strong, with a speckled background with occasional amorphous patches of more strongly magnetised soil, possibly due to very localised hydrological effects.

The local topographic low point within the survey area shows evidence of colluvium [17], with locally increased soil depth masking the character of the superficial geology. Within this zone, magnetic intensity of the cultivation seems slightly reduced. The band of slight enhancement [18] running into the base of the hollow seems likely due to drainage action.

3.1.4 Land use

Former field boundaries [1, 2, 11 and 12] are not magnetically detectable and a faint linear enhancement is the only trace of [16 and 20], which may be due to a slight topsoil build-up alongside them, rather than a ditch. The pasture seems smooth and likely much improved or previously cultivated, also indicated by the cultivation striation evident across the whole survey area [9]. This activity may have erased other traces of these boundaries, e.g. where hedges were grubbed out.

The pond visible on earliest mapping is identifiable by the debris fill [34]. A similar character is visible at [37] on the flank of the hollow, where it seems likely that material has been introduced.

[10] [35] and [36] may be associated with former field boundaries, as they all lie neatly adjacent to one. If so, they may be related to stock management.

3.1.5 Archaeology

Curving linear anomalies [5, 4, 6 and 7] seem likely to be associated, perhaps forming elements of a field system. Nearby [8 and 3] may also be related, though are straighter and don't appear to connect with the former.

Moving across the survey area, [13, 14, 15 and 19] are fairly short faint linear anomalies, some of which are barely distinguishable from the background. What these may be traces of is unclear, though they do not appear to be associated with the known former field boundaries.

In the northeastern corner of the survey area there appears to be a cluster of possibly settlement-related features, represented by [23, 22 and 21]. The short, ephemeral [24 and 27] and longer linears [25 and 26] hint at further traces of landscape-scale activity between that northeastern cluster and the southeastern cluster [28, 30, 32 and 31]. Ring-ditch [30] may represent a barrow or circular enclosure, with possible contained small anomalies [32].

Faint linear anomalies [29 and 33] may represent ditch fills, whether they are associated with the southeastern cluster is not evident.

3.2 Catalogue

ID	Data Class	Anomaly Class	Form Class	Feature Class	Feature Sub-class	Comments
1	Map	Observation	Linear - continuous			Known former field boundary, as seen on 1954 OS map. Last seen on 1968 OS map
2	Map	Observation	Linear - continuous			Known former field boundary, as seen on 1872 OS map. Last seen on 1899 OS map
3	TMI	Enhanced	Linear - continuous	Fill	Ditch?	Possible ditch fill on NW-SE alignment
4	TMI	Strong enhanced	Linear - continuous (group)	Fill	Ditch	Two probable curved ditch fills
5	TMI	Enhanced	Linear - continuous (group)	Fill	Ditch	Two probable curved ditch fills
6	TMI	Enhanced	Linear - continuous	Fill	Ditch?	Possible ditch fill and continuation of [4]
7	TMI	Enhanced	Linear - continuous	Fill	Ditch	Probable ditch fill aligned NE-SW
8	TMI	Enhanced	Linear - continuous	Fill	Ditch	Probable ditch fill aligned NW-SE with a sharp angled bend on the north side
9	TMI	Enhanced	Linear - continuous (group)	Agricultural	Cultivation	Former cultivation lines. W-E lines appear to be the most recent whilst any NW-SE or NE-SW lines are possibly ridge and furrow
10	TMI	Strong enhanced	Linear – continuous?	Fill	Ditch?	Possible semi circular ditch fill or patch of material, adjacent to former field boundary
11	Map	Observation	Linear - continuous			Known former field boundary, as seen on 1844 mapping
12	Map	Observation	Linear - continuous			Known former field boundary, as seen on 1954 OS map, last seen on 1968 OS map
13	TMI	Enhanced	Linear - continuous (group)	Fill	Ditch?	Faint possible curved ditch fills
14	TMI	Enhanced	Linear - continuous	Fill	Ditch	Probable ditch fill on NE-SW alignment
15	TMI	Enhanced	Linear - continuous	Fill	Ditch?	Possible ditch fill on NE-SW alignment like [14]
16	TMI	Enhanced	Linear - continuous	Fill?		Slightly enhanced material on line of known former field boundary, as seen on 1844 mapping
17	TMI	Texture	Area	Natural		Area of soil variation (colluvial)
18	TMI	Enhanced	Area	Fill		Possible (broad) channel fill
19	TMI	Enhanced	Linear - continuous (group)	Fill	Ditch	Two faint possible curved ditch fills, similar character to [13]

ID	Data Class	Anomaly Class	Form Class	Feature Class	Feature Sub-class	Comments
20	TMI	Enhanced	Linear - continuous	Fill?		Slightly enhanced material on line of known former field boundary, as seen on 1884 mapping
21	TMI	Enhanced	Linear - continuous (group)	Fill	Ditch	Two probable ditch fills which are potentially part of the same feature. aligned NW-SE
22	TMI	Strong enhanced	Linear - continuous	Fill	Ditch	Probable sub-circular ditch fill c. 13 m across, north side not visible or open shape
23	TMI	Enhanced	Linear - continuous	Fill	Ditch	Probable ring-ditch fill c. 8 m diameter, small gap on south side
24	TMI	Enhanced	Linear - continuous (group)	Fill	Ditch?	A series of possible ditch fills
25	TMI	Enhanced	Linear - continuous (group)	Fill	Ditch?	A series of possible ditch fills, consisting of two long linear features surrounding smaller features
26	TMI	Enhanced	Linear - continuous (group)	Fill	Ditch?	Two possible curved ditch fills
27	TMI	Enhanced	Linear - continuous	Fill	Ditch?	Possible semi circular ditch fill, similar to [13] and [19]
28	TMI	Strong enhanced	Linear - continuous (group)	Fill	Ditch	Two probable curved ditch fills across the modern field boundary, likely to be continuation of the same feature
29	TMI	Enhanced	Linear - continuous	Fill	Ditch?	Possible ditch fill, aligned NE-SW
30	TMI	Enhanced	Linear - continuous	Fill		Two probable ditch fills, likely of the same semi circular feature
31	TMI	Enhanced	Linear - continuous	Fill	Ditch	Probable semi circular ditch fill, similar to [30] and [23]
32	TMI	Enhanced	Linear - continuous (group)	Fill	Ditch?	A series of possible ditch fills, all located within [30]
33	TMI	Enhanced	Linear - continuous (group)	Fill	Ditch?	Two possible ditch fills, aligned NE-SW
34	TMI	Strong variable	Area	Debris		Known location of pond, as seen on early OS mapping
35	TMI	Strong variable	Area	Fill		Possible pit fill
36	TMI	Strong variable	Area	Debris?		Possible material spread, adjacent to former field boundary
37	TMI	Strong variable	Area	Debris		Spread of material within [18]

3.3 Conclusions

Magnetic survey shows a variety of features of likely archaeological interest within the site which may be of

prehistoric date, mostly clustered in three locations. The southeastern cluster may contain a barrow, whereas the northeastern cluster may represent settlement. The third cluster may also represent settlement or a field system but lies just outside the development footprint (the survey area covered a slightly larger footprint).

3.4 Caveats

Geophysical survey is reliant upon the detection of anomalous values and patterns in physical properties of the ground, e.g. magnetic, electromagnetic, electrical, elastic, density and others. It does not directly detect underground features and structures and therefore the presence or absence of these within a geophysical interpretation is not a direct indicator of presence or absence in the ground. Specific points to consider are:

- some physical properties are time variant or mutually interdependent with others;
- for a buried feature to be detectable it must produce anomalous values of the physical property being measured;
- any anomaly is only as good as its contrast against background textures and noise within the data.

TigerGeo will always attempt to verify the accuracy and integrity of data it uses within a project but at all times its liability is by necessity limited to its own work and does not extend to third party data and information. Where work is undertaken to another party's specification any perceived failure of that specification to attain its objective remains the responsibility of the originator, TigerGeo meanwhile ensuring any possible shortcomings are addressed within the normal constraints upon resources.

4 Methodology

4.1 Magnetic Principles

4.1.1 Physical concepts

Magnetic survey for any purpose relies upon the generation of a clear magnetic anomaly at the surface, i.e. strong enough to be detected by instrumentation and exhibiting sufficient contrast against background variation to permit diagnostic interpretation. The anomaly itself is dependent upon the chemical properties of a particular volume of ground, its magnetic susceptibility and hence induced magnetic field, the strength of any remanent magnetisation, the shape and orientation of the volume of interest and its depth of burial. Finally the choice and configuration of measurement instrumentation will affect anomaly size and shape.

Sites present a complex mixture of these factors and for some the causative affects are not known. However, depth of burial and size are usually fairly constrained and background susceptibility can be estimated (or measured). The degree of remanent magnetisation is harder to predict and depends on both the natural magnetic properties of the soil and any chemical processes to which it has been subjected. Fortunately heat will raise the susceptibility of most soils and topsoil tends to be more magnetic than subsoil, by volume.

It is hard to draw reliable conclusions about what sort of geology is supportive of magnetic survey as there are many factors involved and in any case magnetic response can vary across geological units as well as being dependent upon post-deposition and erosional processes. In general a relatively non-magnetic parent material contrasting with a magnetisable erosion product, i.e. one which contains iron in the form of oxides and hydroxides, will allow archaeological structures to exhibit strong magnetic contrast against their surroundings and especially if the soil has been heated or subjected to certain processes of fermentation. In the absence of either, magnetic enhancement becomes entirely reliant upon the geochemistry of the soil and enhancement will often be weaker and more variable.

Analysis of the British Geological Survey (BGS) Geochemical Atlas (G-Base) for total soil iron reveals that for England and Wales 50% of the samples (the interquartile range) lie between 1.9% and 3.6% percentage iron with the median at 2.7%.

The principal magnetic iron mineral is the oxide magnetite which sometimes occurs naturally but is more often formed during the heating of soil. Subsequent cooling yields a mixture of this, non-magnetic oxide haematite and another magnetic oxide, maghaemite. Away from sources of heat, other magnetic iron minerals include the sulphides pyrite and greigite while in damp soils complex chemistry involving the hydroxides goethite and lepidocrocite can create strong magnetic anomalies. There are thus a number of different geochemical reaction pathways that can both augment and reduce the magnetic susceptibility of a soil. In addition, this susceptibility may exhibit depositional patterns unrelated to visible stratigraphy.

Most structures of archaeological interest detected by magnetic survey are fills within negative or cut features. Not all fills are magnetic and they can be more magnetic or less magnetic than the surrounding ground. In addition, it is common for fills to exhibit variable magnetic properties through their volume, basal primary silt often being more magnetic than the material above it due to the increased proportion of topsoil within it. However, a fill containing burnt soil may be much more magnetic than this primary silt and sometimes a feature that has contained standing water can produce highly magnetic silts through mechanical depositional processes (depositional remanent magnetisation, DRM).

A third structural factor in the detection of buried structures is the depth of topsoil over the feature. As fills sink, the hollow above accumulates topsoil and hence a structure can be detected not through its own magnetisation but through the locally deeper topsoil above it. The volume of soil required depends upon the magnetic susceptibility of the soil but just a few centimetres are often sufficient. Such a thin deposit can, however, easily be lost through subsequent erosion by natural factors or ploughing.

4.1.2 Instrumentation

The use of the magnetic sensors in non-gradiometric (vertical) configuration avoids measurement sensitisation to the shallowest region of the soil, allowing deeper structures, whether natural or otherwise to

be imaged within the sensitivity of the instrumentation. This also allows the detection of shallow broad variations in magnetic susceptibility that might have archaeological significance. Suppression of ambient noise and temporal trends is reduced and therefore need reduction during processing.

The theoretical slightly reduced lateral resolution inherent to using non-gradiometric sensor arrays is practically not an issue and especially if processing includes a vertical pseudo-gradient conversion. The non-gradiometric system is thus overall a more capable configuration than the short gradiometers often used for archaeological studies.

Caesium instrumentation has a greater sensitivity than fluxgate instruments, however, at the 10 Hz sampling rate used here this increase in sensitivity is limited to about one order of magnitude. Greater benefit is obtained from a better signal-to-noise ratio meaning that sub-nanoTesla measurement is more practically achieved.

The array system is designed to be non-magnetic and to contribute virtually nothing to the magnetic measurement, whether through direct interference or through motion noise.

4.2 Magnetic Survey

4.2.1 Technical equipment

Measured variable	Magnetic flux density / nT (Total Magnetic Intensity / nT after removal of regional trend)
Instrument	Array of Geometrics G858 Magmapper caesium magnetometers
Configuration	Non-gradiometric transverse array (4 sensors, ATV towed)
Sensitivity	0.03 nT @ 10 Hz (manufacturer's specification)
QA Procedure	Continuous observation
Spatial resolution	1.0m between lines, 0.25m mean along line interval

4.2.2 Monitoring & quality assessment

The system continuously displays all incoming data as well as line speed and spatial data resolution per acquisition channel during survey. Rest mode system noise is therefore easy to inspect simply by pausing during survey, and the continuous display makes monitoring for quality intrinsic to the process of undertaking a survey. Rest mode test results (static test) are available from the system.

4.3 Magnetic Data Processing

4.3.1 Procedure

All data processing is minimised and limited to what is essential for the class of data being collected, e.g. reduction of orientation effects, suppression of single point defects (drop-outs or spikes) etc. The processing stream for this data is as follows:

Process	Software	Parameters
Measurement & GNSS receiver data alignment	Proprietary	
Temporal reduction, regional field suppression	Proprietary	Bandpassed 0.3 – 10.0s
Gridding	Surfer	Kriging, 0.25m x 0.25m
Smoothing	Surfer	Gaussian lowpass 3x3 data (0.75m)
Pseudo-gradient conversion	Proprietary	1m vertical

Potential field processing procedures are used where possible on gridded data from the above processing, allowing simulation of vertical gradient data, separation of deep and shallow magnetic sources, etc. The initial processing uses proprietary software developed in conjunction with the multisensor acquisition system. Gridded data is ported as data surfaces (not images) into Manifold GIS for final imaging, contouring and detailed analysis. Specialist analysis is undertaken using proprietary software.

4.4 Magnetic Interpretation

4.4.1 Introduction

Numerous sources are used in the interpretive process, which takes into account shallow geological conditions, past and present land use, drainage, weather before and during survey, topography and any previous knowledge about the site and the surrounding area. Old Ordnance Survey mapping is consulted and also older sources if available. Geological information (for the UK) is sourced only from British Geological Survey resources and aerial imagery from online sources. LiDAR data is usually sourced from the Environment Agency or other national equivalents, SAR from NASA and other topographic data from original survey.

Information from nearby surveys is consulted to inform upon local data character, variations across soils and near-surface geological contexts. Published data from other surveys may also be used if accompanied by adequate metadata.

Interpretation of magnetic data is undertaken using total intensity data, vertical pseudo-gradient and where relevant, shallow field, component models in parallel although for clarity only a subset of these may be presented in the report.

4.4.2 The contribution from geology and soils

On some sites, e.g. some gravels and alluvial contexts, there will be anomalies that can obscure those potentially of archaeological interest. They may have a strength equal to or greater than that associated with more relevant sources, e.g. ditch fills, but can normally be differentiated on the basis of anomaly form coupled with geological understanding. Where there is ambiguity, or relevance to the study, these anomalies will be included in this category.

Not all changes in geological context can be detected at the surface, directly or indirectly, but sometimes there will be a difference evident in the geophysical data that can be attributed to a change, e.g. from alluvium to tidal flat deposits, or bedrock to alluvium. In some cases the geophysical difference will not exactly coincide with the geological contact and this is especially the case across transitions in soil type.

Geophysical data varies in character across areas, due to a range of factors including soil chemistry, near surface geology, hydrology and land use past and present. These all contribute to the texture of the data, i.e. a background character against which all other anomalies are measured.

4.4.3 Agricultural inputs

Coherent linear dipolar enhancement of magnetic field strength marking ditch fills, narrow bands of more variable magnetic field or changes in apparent magnetic susceptibility, are all included within the category of former field boundaries if they correlate with those depicted on the Tithe Map or early Ordnance Survey maps. If there is no correlation then these anomaly types are not categorised as a field boundaries.

Banded variations in apparent magnetic susceptibility caused by a variable thickness of topsoil, depositional remanent magnetisation of sediments in furrows or susceptibility enhancement through heating (a by product of burning organic matter like seaweed) tend to indicate past cultivation, whether ridge-based techniques, medieval ridge and furrow or post medieval 'lazy beds'. Modern cultivation, e.g. recent ploughing, is not included.

In some cases it is possible to identify drainage networks either as ditch-fill type anomalies (typically 'Roman' drains), noisy or repeating dipolar anomalies from terracotta pipes or reduced magnetic field strength anomalies from culverts, plastic or non-reinforced concrete pipes. In all cases identification of a herring bone pattern to these is sufficient for inclusion within this category.

4.4.4 Features of archaeological interest

Any linear or discrete enhancement of magnetic field strength, usually with a dipolar character of variable strength, that cannot be categorised as a field boundary, cultivation or as having a geological origin, is classified as a fill potentially being of archaeological interest. Fills are normally earthen and include an often

invisible proportion of heated soil or topsoil that augments local magnetic field strength. Inverted anomalies are possible over non-earthen fills, e.g. those that comprise peat, sand or gravel within soil. This category is subject to the 'habitation effect' where, in the absence of other sources of magnetic material, anomaly strength will decrease away from sources of heated soil and sometimes to the extent of non-detectability.

Former enclosure ditches that contained standing water can promote enhanced volumetric magnetic susceptibility through depositional remanence and remain detectable regardless of the absence of other sources of magnetic enhancement.

Anything that cannot be interpreted as a fill tends to be a structure, or in archaeological terms, a feature. This category is secondary to fills and includes anomalies that by virtue of their character are likely to be of archaeological interest but cannot be adequately described as fills. Examples include strongly magnetic bodies lacking ferrous character that might indicate hearths or kilns. In some cases anomalies of ferrous character may be included.

On some sites the combination of plan form and anomaly character, e.g. rectilinear reduced magnetic field strength anomalies, might indicate the likely presence of masonry, robber trenches or rubble foundations. Other types of structure are only included if the evidence is unequivocal, e.g. small ring ditches with doorways and hearths. In some circumstances a less definite category may be assigned to the individual anomalies instead.

It is sometimes possible to define different areas of activity on the basis of magnetic character, e.g. texture and anomaly strength. These might indicate the presence of middens or foci within larger complexes. This category does not indicate a presence or absence of discrete anomalies of archaeological interest.

4.5 Glossary

Acronym / term	Type	Definition
A	Physical quantity	SI unit Amp of electric current
BGS	Organisation	British Geological Survey
CIfA	Organisation	Chartered Institute for Archaeologists
dB	Physical quantity	Decibel, unit of amplification / attenuation
DRM	Process	Depositional Remanent Magnetisation
EAGE	Organisation	European Association of Geoscientists and Engineers
EGNOS	Technology	European Geostationary Navigation Overlay Service
ERT	Technology	Electrical resistivity tomography
ETRS89	Technology	European Terrestrial Reference System (defined 1989)
ETSI	Organisation	European Telecommunications Standards Institute
EuroGPR	Organisation	European Ground Penetrating Radar Association, the trade body for GPR professionals
G-BASE	Data	British Geological Survey Geochemical Atlas
GeolSoc	Organisation	Geological Society of London, the chartered body for the geological profession
GNSS	Technology	Global Navigation Satellite System
GPR	Technology	Ground penetrating radar
GPS	Technology	Global Positioning System (US)
inversion	process	A combination of forward and backward modelling intended to construct a 2D or 3D model of the physical distribution of a variable from data measured on a 1D or 2D surface. It is fundamental to ERT survey
IP	Physical quantity	Induced polarisation (or chargeability) units mV/V or ms
m	Physical quantity	SI unit metres of distance
mbgl	Physical quantity	Metres below ground level
MHz	Physical quantity	SI unit mega-Hertz of frequency
MS	Physical quantity	Magnetic susceptibility, unitless
mS	Physical quantity	SI unit milli-Siemens of electrical conductivity

Acronym / term	Type	Definition
nT	Physical quantity	SI unit nano-Tesla of magnetic flux density
OFCOM	Organisation	The Office of Communications, the UK radio spectrum regulator
Ohm	Physical quantity	SI unit Ohm of electrical resistance
OS	Organisation	Ordnance Survey of Great Britain
OSGB36	Data	The OS national grid (Great Britain)
OSTN15	Technology	Current coordinate transformation from ETRS89 to OSGB36 co-ordinates
RDP	Physical quantity	Relative Dielectric Permittivity, unitless
RTK	Technology	Real Time Kinematic (correction of GNSS position from a base station)
s	Physical quantity	SI unit seconds of time
TMI	Physical quantity	Total magnetic intensity (measured flux density minus regional flux density)
TRM	Process	Thermo-Remanent Magnetisation
V	Physical quantity	SI unit Volt of electric potential
WGS84	Data	World Geodetic System (defined 1984)

4.6 Selected reference

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4.7 Archiving and dissemination

An archive is maintained for all projects, access to which is permitted for research purposes. Copyright and intellectual property rights are retained by TigerGeo on all material it has produced, the client having full

licence to use such material as benefits their project. Where required, digital data and a copy of the report can be archived in a suitable repository, e.g. the Archaeology Data Service, in addition to our own archive.

The archive contains all survey and project data, communications, field notes, reports and other related material including copies of third party data (e.g. CAD mapping, etc.) in digital form. Many are in proprietary formats while report components are available in PDF format.

The client will determine the distribution path for reporting, including to the end client, other contractors, local authority etc., and will determine the timetable for upload of the project report to the OASIS Grey Literature library or supply of report or data to other archiving services, taking into account end client confidentiality.

TigerGeo reserves the right to display data rendered anonymous and un-locatable on its website and in other marketing or research publications.

5 Supporting information

5.1 Standards and quality (archaeology)

TigerGeo is developing an Integrated Management System (IMS) towards ISO certification for ISO9001, ISO14001 and OHSAS18001/ISO45001. For work within the archaeological sector TigerGeo has been awarded CIfA (Chartered Institute for Archaeologists) Registered Organisation status.

A high standard of client-centred professionalism is maintained in accordance with the requirements of relevant professional bodies including the Geological Society of London (GeoSoc) and the Chartered Institute for Archaeologists (CIfA). Senior members of TigerGeo are professional members of the GeoSoc (FGS), CIfA (MCIfA & ACIfA grades) and other appropriate bodies, including the European Association of Geoscientists and Engineers (EAGE) Near Surface Division (MEAGE) and the Institute of Professional Soil Scientists (MISoilSci).

In addition TigerGeo is a member of EuroGPR and all ground penetrating and other radar work is in accordance with ETSI EG 202 730.

The management team at TigerGeo have almost 50 years of combined experience of near surface geophysical project design, survey, interpretation and reporting, based across a wide range of shallow geological contexts. Added to this is the considerable experience of our lead geophysicists in a variety of commercial and academic roles. All geophysical staff have graduate and in many cases also post-graduate relevant qualifications pertaining to environmental geophysics from recognised centres of academic excellence.

During fieldwork there is always a fully qualified (to graduate or post-graduate level) supervisory geophysicist leading a team of other geophysicists and geophysical technicians, all of whom are trained and competent with the equipment they are working with. Data processing and interpretation is carried out by a suitably qualified and experienced geophysicist under the direct supervision and guidance of the Senior Geophysicist. All work is monitored and reviewed throughout by the Senior Geophysicist who will appraise all stages of a project as it progresses.

Data processing and interpretation adheres to the scientific principles of objectiveness and logical consistency. A standard set of approved external sources of information, e.g. from the British Geological Survey, the Ordnance Survey and similar sources of data, in addition to previous TigerGeo projects, guide the interpretive process. Due attention is paid to the technical constraints of method, resolution, contrast and other geophysical factors.

There is a strong culture of internal peer-review within TigerGeo, for example, all reports pass through a process of authorship, technical review and finally proof-reading before release to the client. Technical queries resulting from TigerGeo's work are reviewed by the Senior Geophysicist to ensure uniformity of response prior to implementing any edits, etc.

Work is undertaken in accordance with the high professional standards and technical competence expected by the Geological Society of London and the European Association of Geoscientists and Engineers.

All work for archaeological projects is also conducted in accordance with the following standards and guidance:

- David et al, "Geophysical Survey in Archaeological Field Evaluation", English Heritage, 2008;
- "Standard and guidance for Archaeological Geophysical survey", Chartered Institute for Archaeologists, 2014 (Updated 2016);

and TigerGeo meets with ease the requirements of English Heritage in their 2008 Guidance "Geophysical Survey in Archaeological Field Evaluation" section 2.8 entitled "Competence of survey personnel".

5.2 Key personnel

Martin Roseveare, MSc BSc(Hons) MEAGE FGS MCIfA	Senior Geophysicist, Director
Martin specialised (MSc) in geophysical prospection for shallow applications and since 1997 has worked in commercial geophysics. Elected a GeolSoc Fellow in 2009 he is now working towards achieving CSci. A member of the European Association of Geoscientists & Engineers, he has served on the EuroGPR and CIfA GeoSIG committees and on the scientific committees of the 10th and 11th Archaeological Prospection conferences. He has reviewed papers for the EAGE Near Surface conference, was a technical reviewer of the Irish NRA geophysical guidance and is a founding member of the ISSGAP soils group. Professional interests include the application of geophysics to agriculture and the environment, e.g. groundwater and geohazards. He is also a software writer and equipment integrator with significant experience of embedded systems.	
Anne Roseveare, BEng(Hons) DIS MISoilSci	Operations Manager, Environmental Geophysicist, Data Analyst
On looking beyond engineering, Anne turned her attention to environmental monitoring and geophysics. She is a Member of the British Society of Soil Science / Institute of Professional Soil Scientists (BSSS/IPSS) and has specific areas of interest in soil physics & hydrology, agricultural applications and industrial sites. Working in shallow geophysics since 1998, Anne is a founding member of the ISSGAP soils group, also was the founding Editor of the International Society for Archaeological Prospection (ISAP). Specifications, logistics, health and safety, data handling & analysis are integral parts of her work, though she is happily distracted by the possibilities of discovering lost cities, hillwalking, dance and good food.	
Jennifer Smith, MSc	Fieldwork Manager, Environmental Geophysicist
Jen developed an interest in all aspects of topographical and geophysical survey whilst studying for a MSc in Archaeological Science at the University of Bristol. During her studies she obtained valuable experience in the use of and data analysis for various terrestrial geophysical techniques as well as develop her interest further by adding marine geophysical techniques to her working theoretical knowledge. She has worked as a near-surface geophysicist within archaeology for several years and has developed a good knowledge of UK geology. Outside of work, Jen is currently learning Java code but is easily distracted by keeping fit, exploring the world or some other hobby.	
Daniel Lewis, MA BA(Hons) ACIfA	Consultant Archaeologist
Daniel studied archaeology at the University of Nottingham and worked in field archaeology for many years, managing urban and rural fieldwork projects in and around Herefordshire. When the desk became more appealing he jumped into the world of consulting, working on small and large multi-discipline projects throughout England and Wales. At the same time, he returned to University, gaining an MA in Historic Environment Conservation. With experience in the heritage sector since 1998, Daniel has a diverse portfolio of skills. Here he ensures that geophysical work within the heritage sector is well grounded in archaeology. His spare time includes much running up mountains.	
Luigi Benente, MSc	Consultant Environmental Geophysicist
Luigi is an experienced geologist specialized in geophysics, who gained a blend of practical and technical experience within explorations carried out in Italy, Peru, Colombia, Ecuador, Mexico, Uzbekistan, Thailand and Nigeria. Resourceful and hardworking with a positive attitude in problem solving, he has the ability to lead a team through challenging tasks, organizing people and equipment in order to hit the goal in safety and with time conscious professionalism. He is attracted to discover hidden things within the earth and after celebrating with friends, good wine, good beer and lots of food he is able to repair most broken things...	

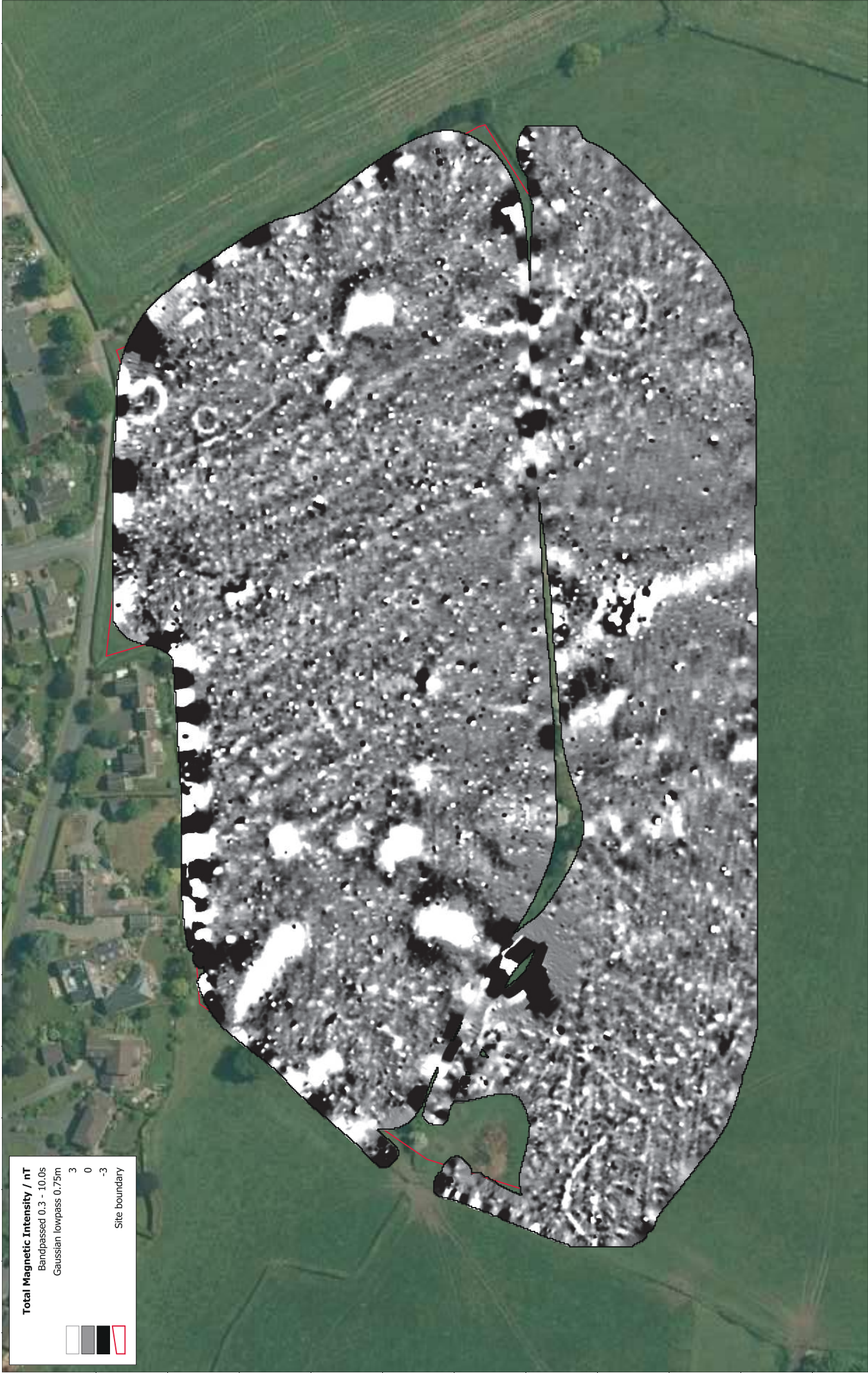
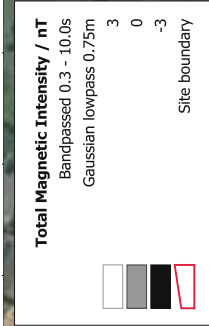
Alexandra Gereaa, MSc, BSc, PhD Candidate	Geophysical Processor & Analyst
Alexandra has a BSc in Geophysics and an MSc in Applied Geo-biology and is in the final stages of a PhD in the UK after living in Portugal for six months working on her master's degree. Since 2008 she has used most mainstream processing applications across electrical, magnetic and radar methods. She combines a love of nature and science and is currently studying plant roots in agricultural environments using geophysical methods. When not doing that she enjoys travelling, hiking, nature, yoga, books, foreign languages and cats. A few years ago she found a passion for electronics and started building different devices including intelligent gardening systems and coding in Python.	

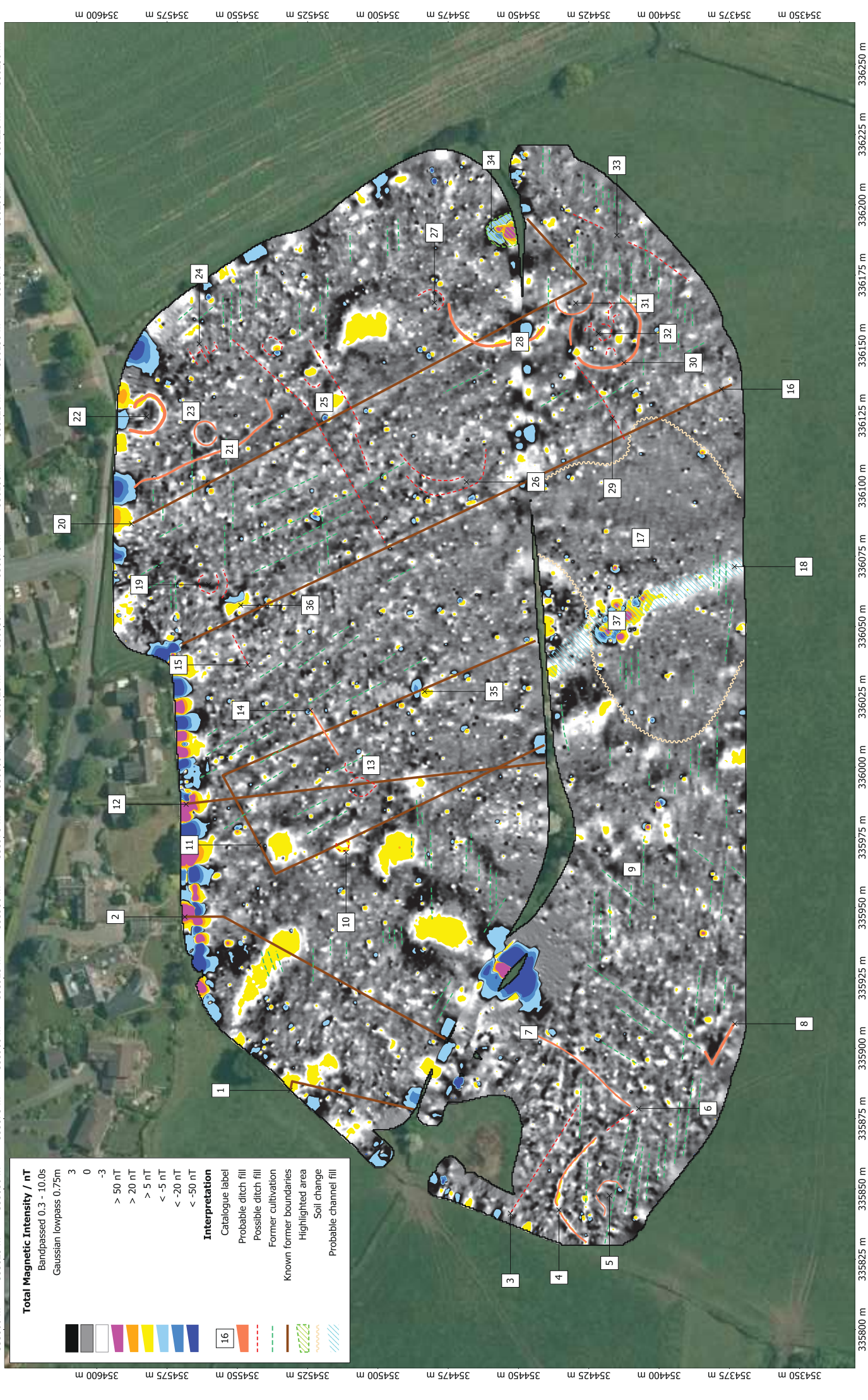


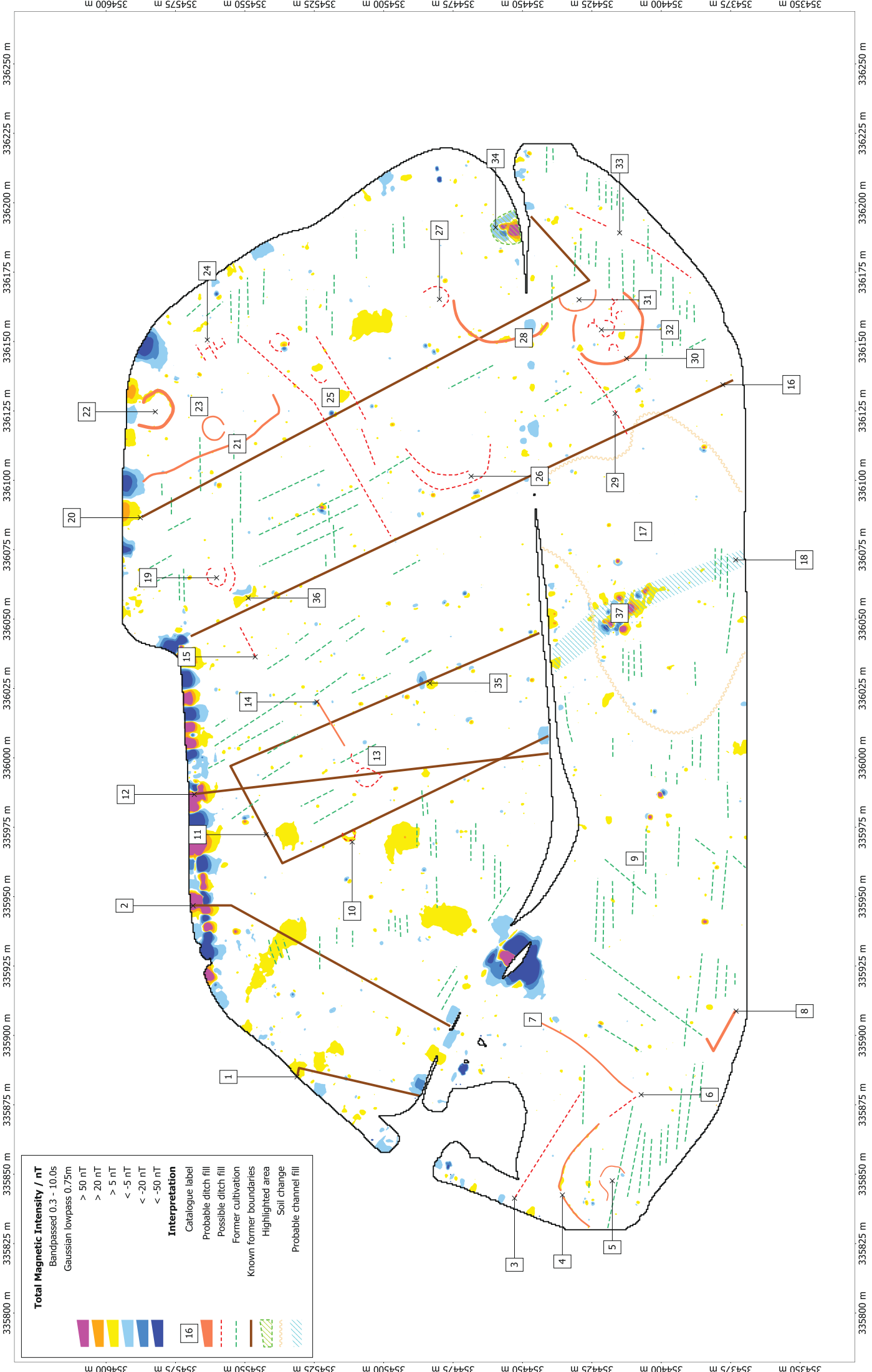
HLG191 Land off Hillock Lane, Gresford, Wrexham
DWG 01 - Site Location

Orthographic Scale: 1:10000 @ A3 Spatial Units: Meter. Do not scale off this drawing
File: HLG191.map Copyright TigerGeo Limited 2020 OS OpenData Crown Copyright & Database Right 2020









Appendix C – CPAT evaluation guidance

General Requirements for Archaeological Field Evaluations in the Clwyd-Powys Archaeological Trust Area

DEFINITION

The Chartered Institute for Archaeologists defines an archaeological field evaluation as ‘...a limited programme of non-intrusive and/or intrusive fieldwork which determines the presence or absence of archaeological features, structures, deposits, artefacts or ecofacts within a specified area or site ...If such archaeological remains are present field evaluation defines their character, extent, quality and preservation, and enables an assessment of their worth in a local, regional, national or international context as appropriate (CIfA 2014).

FIELDWORK METHODOLOGY

I. The positioning of evaluation locations must take into account the position of any extant services and any requirements of the landowner. A plan showing the location of the trenches or specified area and the rationale informing the locations will be submitted to the Development Control Archaeologist, Clwyd-Powys Archaeological Trust for approval, prior to the works commencing.

II. Prior to the commencement of the project, the Archaeological Contractor should seek to ensure that appropriate arrangements are in place for the storage and/or disposal of spoil resulting from any required excavation work and for the subsequent re-instatement of the excavated areas.

III. Topsoil and/or overburden may be removed by a mechanical excavator equipped with a wide (eg minimum 1.2m wide) toothless ditching bucket to the top of archaeological deposits or the natural substrate, whichever is observed first. Any cut features (e.g. ditches or pits) or structures encountered should be recorded in plan and manually excavated before proceeding with further excavation. If some evaluation locations need to be excavated throughout to a depth at which the sides of the trench/area are considered unstable, to reach the natural subsoil/ archaeological deposits, the sides of trenches must first be either shored, battered or “stepped back” to allow safe working. Archaeological deposits should never be removed by machine, except where such procedure has been authorised by the Development Control Archaeologist, Clwyd-Powys Archaeological Trust

IV. All machine work should be supervised by an experienced archaeologist.

V. Each evaluation location should be cleaned by hand to a level sufficient to allow the identification and planning of archaeological features. Where archaeological features appear to be absent, sufficient cleaning needs to be undertaken to demonstrate this.

VI. The evaluation will involve the systematic examination and accurate recording of all archaeological features, horizons and artefacts identified.

VII. All archaeological features and deposits must be cleaned and investigated by hand in accordance with CIfA Standards and Guidance, with sufficient work undertaken to determine their date and character, and the remains should be recorded.

VIII. Should features of national importance and possibly of schedulable quality be observed, fieldwork will cease until the remains have been inspected by the Development Control Archaeologist, Clwyd-Powys Archaeological Trust and the appropriate Cadw Regional Inspector of Ancient Monuments.

IX. In the event of human burials being discovered, they will initially be left in situ, and if removal is required, the archaeologist will procure and comply with all statutory consents and licences under the Burial Act 1857. X. All stratified finds should be collected by context, or where appropriate, individually recorded in 3 dimensions. Unstratified finds should only be collected where they contribute significantly to the project objectives or are particular intrinsic interest. XI. In the event of finding any artefacts covered by the provisions of the Treasure Act 1996, the appropriate procedures under this legislation must be followed. XII. The responsible use of metal detectors for locating buried metal artefacts is permitted. However, only by Metal Detecting Clubs and members of Metal Detecting Clubs that are recognised by the National Council for Metal Detecting and follow the National Council for Metal Detecting Code of Conduct, and they must follow the Portable Antiquities Scheme Code of practice for responsible metal detecting.

RECORDING

I. The areas evaluated should be accurately tied into the National Grid and located on a 1:2500 or 1:1250 map of the area. All archaeological features identified must also be tied to the OS survey grid and fixed local topographic boundaries.

II. Each evaluation area should be planned at an appropriate scale. Where complex deposits are present at 1:20, or 1:50 or 1:100 where deposits of lesser complexity are present.

III. All relevant trench sections drawn must be drawn where archaeological deposits and features have been identified and recorded, with levels related to the Ordnance Datum. For trenches with only a topsoil/subsoil profile and no archaeological features a representative section should be recorded with a record of the height of each key horizon at either end of the trench as well as the ground surface and maximum depths of the trench and these converted to OD heights.

IV. All archaeological contexts will be recorded using a continuous numbered context system on pro-forma recording sheets.

V. All archaeological features revealed and identified during the evaluation must be recorded and drawn at 1:50, 1:20 and 1:10 scales as appropriate.

VI. All archaeological deposits and features should be levelled and recorded with an above ordnance datum (aOD) level. Similarly the top and base of all ground works must be recorded with an above ordnance datum (aOD) level.

VII. A full and proper record (written, graphic and photographic as appropriate) should be made for all work, using pro forma record sheets and text descriptions appropriate to the work.

VIII. A photographic record of all contexts should be produced, with a digital camera (minimum 12mp). This should include a clearly visible, graduated metric scale. File formats retained should include Jpeg (Fine – highest resolution) and RAW.

IX. A register of all photographs should be kept.

X. Photographs should be of archive quality using a digital SLR (minimum 12mp).

XI. General location photographs can be taken using digital photography at a minimum resolution of 12mp.

XII. Digital records created as part of the project should comply with specific data standards.

XIII. An appropriate plan of all investigated archaeological features will be produced on water resistant draughting film accompanied by written records on pro-forma record sheets.

1.1. ARTEFACTS AND ENVIRONMENTAL SAMPLES

I. The treatment of artefacts and environmental samples will be integrated into all stages of the archaeological process, and an appropriate sampling strategy for artefacts and environmental samples, and subsequent arrangements for storage, conservation, analysis and publication will be developed in advance of the commencement of fieldwork and included within the specification or project design.

II. All finds and samples must be collected, processed, sorted, quantified, recorded, labelled, packed, stored, recorded, marked, assessed, analysed and conserved according to the specification or project design agreed by the Development Control Archaeologist, Clwyd-Powys Archaeological Trust.

III. Throughout the fieldwork and after the fieldwork all artefacts recovered must be stored appropriately, both in terms of storage materials and storage conditions, to ensure minimal deterioration and loss of information. This should include controlled storage, correct packaging, regular monitoring of conditions, and the immediate conservation of vulnerable materials.

IV. The Archaeological Contractor must make suitable arrangements to assess and study any artefacts, assemblages and environment samples collected during fieldwork.

V. In most cases any artefacts recovered during fieldwork will be the rightful property of the landowner. However, the landowner should be encouraged to deposit the finds from fieldwork with an appropriate museum or repository. An agreement with the appropriate museum or repository should be secured prior to the commencement of the fieldwork.

VI. A catalogue of all artefactual material found will be produced. This will be arranged by context and will be quantified by number and/or weight of material.

VII. Drawings of significant artefacts will be produced.

VIII. After the completion of the fieldwork arrangements should be made, with the agreement of the landowner, for the long term conservation and storage of all artefacts in an appropriate local or county museum.

REPORTING AND ARCHIVING

I. The evaluation report should be fully representative of the information gained from any documentary research, archaeological fieldwork and post-excavation analysis that has being undertaken. This includes when there is negative evidence to relay.

II. As a minimum standard reports should conform to the guidelines set out by the ClfA in their suite of Standards and Guidance documents.

III. Reports submitted in support of planning applications are public documents which need to be easily understandable by a non-specialist audience, therefore, they should be written in a clear, concise and logical style, and all technical terms should be explained.

IV. As a minimum the report must contain:

- a) Non-technical summary
- b) The aims and objectives of the field evaluation
- c) A clear location map of study area showing areas covered by the field evaluation, its relationship to local topography and the position of trial trenches, test pits or excavation areas
- d) Details of the field methodology used
- e) An objective summary of the results of the field evaluation
- f) Details of the results of the evaluation, including a detailed description of the deposits observed and recorded, their character, function, potential date and their relationship to adjacent contexts
- g) A location plan showing the location of any artefacts, features or structures found
- h) Specialist descriptions and illustrations of artefacts and environmental samples, and an assessment of its potential for further study, prepared by suitably qualified and experienced individuals
- i) Conclusions of the evaluation, including a statement regarding the importance of the archaeological remains in a local, regional or national context; a confidence statement and an indication of the potential for archaeological deposits that were not disturbed during the field evaluation
- j) Index to and location of the archive
- k) Appendices, including a detailed archive list that details all recorded contexts, all find retrieved and the find types, all samples taken, all drawing produced and all photographs taken
- l) Supporting photographs
- m) Supporting illustrations, plans and sections with appropriate scales and north arrows
- n) References.

V. The report should contain enough objective data to enable an informed decision to be made in relation to submitted planning applications, including requirements for further works (ClfA 2014).

VI. The resulting digital report will be submitted to the applicant, Local Planning Authority and the Development Control Archaeologist at Clwyd-Powys Archaeological Trust (Mark Walters mark.walters@cpat.org.uk) On approval the final report should be submitted in high resolution PDF format to the Historic Environment Record Officer (Gary Duckers gary.duckers@cpat.org.uk), Clwyd-Powys Archaeological Trust for inclusion within the Historic Environment Record.

VI.I The Archaeological Contractor should obtain copies of the HER Deposition Guidance and HER Depositor Licence from the HER Officer (Gary Duckers gary.duckers@cpat.org.uk) before any reports or archives are submitted to the Clwyd-Powys Archaeological Trust Historic Environment Record.

VIII. The overall archive will conform to guidelines described in Management of Research Projects in the Historic Environment (MoRPHE), Historic England 2006, the ClfA's Standard and Guidance for the creation, compilation, transfer and deposition of archaeological archives (ClfA, 2014c) and The National Standard and Guidance to Best Practice for Collecting and Depositing Archaeological Archives in Wales 2017 (NPAAW, 2017).

IX. The paper and digital archive will be deposited with the National Monuments Record, RCAHMW or ADS including a copy of the final report. This archive will include all written, drawn, survey and photographic records relating directly to the investigations undertaken. NMR Digital archives will follow the standard required by the RCAHMW (RCAHMW, 2015). A copy of the digital archive only will also be lodged with the Historic Environment Record, Clwyd-Powys Archaeological Trust.

X. Any artefacts recovered during the recording process should be deposited with the nearest regional or county museum and the museum should be contacted in advance for their archiving and deposition guidelines. The artefacts should be deposited along with a copy of the site report including a detailed list of all artefacts recovered. Where no regional deposition location exists the archaeological contractor should retain the artefactual archive until such time as the archive can be transferred to an approved deposition location. In the latter case the archive must be available for public and specialist access.

MONITORING

The evaluation works will be monitored by the Clwyd-Powys Archaeological Trust at an agreed date and time. Note that there will be a £150 charge per monitoring visit. For small evaluations only one visit is normally required when all trenches area open and cleaned to reveal any potential archaeological features.

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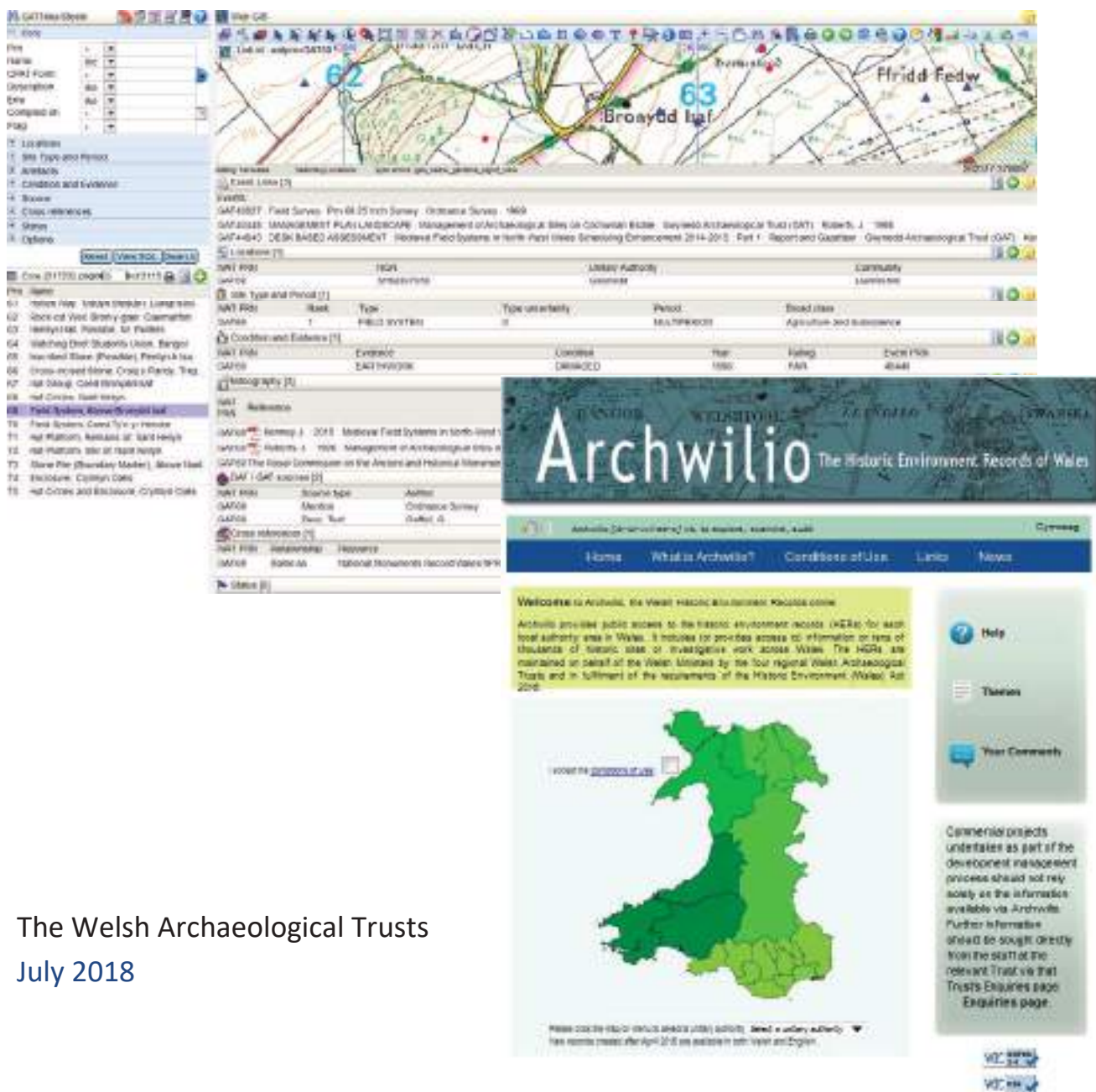
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Appendix D - Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)

Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)



The screenshot displays the Archwilio website interface. On the left, a sidebar lists various data entry categories such as 'Field Systems', 'Rivers', 'Walls', and 'Towns'. The main area shows a map of Wales with a data entry form for a field system. The form includes fields for 'Site Name', 'Grid Reference', 'Type', 'Period', 'Status', and 'Comments'. Below the form, there is a table with columns for 'Site Name', 'Grid Reference', 'Type', 'Period', 'Status', and 'Comments'. The table contains one entry: 'Field System' with grid reference 'SN621113', type 'Field System', period 'Medieval', status 'Active', and comments 'Field System'.

Archwilio The Historic Environment Records of Wales

Welcome to Archwilio, the Welsh Historic Environment Records online

Archwilio provides public access to the historic environment records (HERs) for each local authority area in Wales. It includes (or provides access to) information on tens of thousands of historic sites or investigative work across Wales. The HERs are maintained in detail of the Wales, United Kingdom by the four regional Welsh Archaeological Trusts and in fulfillment of the requirements of the Historic Environment (Wales) Act 2009.

Commercial projects undertaken as part of the development management process should not rely solely on the information available via Archwilio. Further information should be sought directly from the staff at the relevant Trust via that Trust's Enquiries page.

The Welsh Archaeological Trusts
July 2018

Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)

Version: 1

Date: July 2018

Review Date: August 2019

Description: This document aims to provide guidance to allow HER users to submit data in a format that can be easily integrated into the now-statutory regional HERs, taking into account the need for certain project types to supply Welsh translations for certain fields in accordance with new legislation.

Source: This document takes some influence from the draft GAT 2014 document *Historic Environment Record (HER) Guidelines for Contractors* but has been greatly revised and updated by GGAT, in collaboration with the other WATs, Cadw and RCAHMY, in order to reflect the new statutory status of the Welsh HERs following the passing of the Historic Environment Act (Wales) 2016.

Format: Word Document

Status: Operational

Coverage: Welsh HERs

Update procedure: To be updated when necessary by the HER Archaeologists at the Welsh Archaeological Trusts

Number of pages: 27 pages including Appendix A – Welsh HER Information Submission Form

Creator of current document: Charina Jones, GGAT, in collaboration with the Welsh HER Officers

Last updated by: Calli Rouse, GGAT

Owner: Welsh Archaeological Trusts

Contact: Clwyd-Powys Archaeological Trust, Dyfed Archaeological Trust, Glamorgan-Gwent Archaeological Trust, Gwynedd Archaeological Trust (contact details in section 7)

Access conditions: This document is available to the public.

Map images used in this document are joint © Crown Copyright and GGAT (database right and IPR)

Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)

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1. Introduction and purpose

The information within the Welsh HERs is compiled from a number of different sources. Sometimes data is incidentally provided, by people carrying out their own research, or by individuals who have discovered something of archaeological interest and would like more information. However, the *majority* of new HER information is generated by specific projects and professional archaeological work undertaken across Wales.

This guidance aims to support anyone creating information about the historic environment of Wales in order to present this to the HERs. It is good practice to submit this information to the relevant regional HER in a format which:

- meets national standards for data management
- will make it accessible to a wide audience
- is easy to manage, maintain and preserve as well as easy and more cost-effective to accession.

Supplying new or updated information to the HER is essential to support the on-going research, protection and conservation of the historic environment of Wales. The statutory HERs underpin all archaeological work in Wales and provide a point of access to a wealth of important information.

Those undertaking work as part of the planning process should ensure that information is submitted in accordance with this document and the associated guidance available to support it. Those working *outside* the planning process are also asked to consider this guidance when preparing data for the HERs.

HER users are asked to supply new or updated information generated from the use or analysis of HER data to the relevant record within 6 months of project completion, or within a timeframe previously agreed with HER staff¹. The supply of updated information or data to the HER is a condition of the terms and conditions of access to the record. A summary of the information required by the HERs is provided below in Section 3.

With the exception of maritime-related information, Wales **does not** participate in the current version of the OASIS mechanism for reporting and deposition (<https://oasis.ac.uk>). However, the Welsh HERs will be contributing to the Archaeology Data Service grey literature library and where relevant to event records in due course.

When submitting data to the HERs, contributors will be given the opportunity to sign a Data Submission Agreement (if one has not been completed previously). By signing this Agreement, contributors will specify how they would or would not like their data to be used by the HER. See Section 6 below for more detail.

HER staff are happy to discuss any queries regarding the supply of information as specified below, or the formats required. We welcome incidental reporting of new sites as well as corrections and

¹ Item 10 'The Welsh Archaeological Trusts Guidelines for Access and Cost Recovery'
https://www.archwilio.org.uk/arch/pdfs/WATsAccessandCostRecoveryPolicy2017_v3%204.pdf

additional information for existing records and it is worth noting that the HERs can only contain the best available information at any time so all contributions are important. See Section 7 for contact details.

For the purposes of this document, funded projects and contributors are defined as:

- commercial archaeological projects
- grant-aided project work undertaken for national and local Government
- externally-funded university/academic research projects
- Heritage Lottery Funded projects
- European Grant awarded work
- local and national public bodies
- commercial landowners and Trusts
- corporations
- commercial organisations
- work funded through other grants or raised income.

Non-funded projects and non-funded contributors are defined as:

- members of the public
- private land-owners (non-planning related developments)
- private researchers
- schools
- unfunded community and volunteer groups
- students

2. Information gathered through informal means

This section is relevant to HER users submitting information which has *not* been collected as part of a formal project. These methods of data submission should not be used for large research or field based-projects and **must not** be used by projects which are funded (these should follow the requirements under Sections 3 and 4).

Certain contributors will be required to provide bilingual information, as detailed in Section 4 below.

2.1 HER Information Submission Form

Some contributors to the HER, such as individuals, volunteers and community groups, can submit information for individual historic assets informally. The HERs encourage the use of the HER Information Submission Form,² ideally in a digital format, in order to allow HER staff to rapidly enhance the HER with the key information recorded on the form. We would also be happy to receive the form from our data sharing partners to inform us of incidental corrections or new information (where appropriate this would be subject to bilingual requirements for official bodies, see section 4.1 below).

The type of information we would expect to be submitted using the form may be:

- additional information for an existing historic asset
- correction of information for an existing historic asset with supporting evidence
- photographs or information relating to a previously unrecorded historic asset For photographs the minimum information and format specified in Section 4.5 should be provided.

For larger volumes of information, those submitting information, even informally, are asked to use a database structure and follow the requirements for data submission as described in Section 4 below. A template structure can be provided upon request.

² See Appendix A of this document.

3. Data generated through formalised means – overview

A check list is provided below for the information requested by the HERs that will be generated through funded means or by a funded contributor. Non-funded contributors submitting a large amount of data, as noted in section 2, should also follow the best practice guidance for funded contributions in sections 3 and 4.

Funded projects should supply the elements listed below, where relevant to the project type. Section 4 sets out the specifications of data format, recording standards and guidance, and minimum metadata requirements for each element. All information should be sent to the relevant HER digitally via email or file sharing service³ unless otherwise arranged with staff.

HER data submission checklist

- ✓ Digital report, where relevant
- ✓ Bilingual information, as described below
- ✓ Details of archive deposition
- ✓ Digital photographs, where available
- ✓ Event polygon(s) depicting the area of study/project area, where available
- ✓ Historic Asset polygon(s) depicting extent of resource where part of the project remit
- ✓ Associated project database where relevant e.g. MS Excel, GIS table
- ✓ Information Submission Form, where relevant
- ✓ Metadata
- ✓ Data Submission Agreement (for first submissions by an organisation or individual)
- ✓ Copyright notice or Data Exemption form, where relevant

Figure 1 below gives an overview of requirements for some types of project. This is not exhaustive, so please contact the relevant HER for clarification if your project type or work is not represented in the table. Contributors should refer to the full details in the relevant sections below relating to format and content.

³ Please check whether the HER you are corresponding with uses these services

Project element	Refer to Section	Desk-based Assessment	Field Survey /Site Visit	Research	Watching Brief	Evaluation/ Test pitting	Excavation	Condition Survey	Management Plan	Landscape Survey	Geophysical Survey	Building Survey
Digital Report	4.2	✓	✓	✓ where produced	✓	✓	✓	✓ where produced	✓	✓	✓	✓
Bilingual Report Summary	4.1	✓	✓	✓ where produced	✓	✓	✓	✓ where produced	✓	✓	✓	✓
Archive details	4.2	✓	✓	✓	✓	✓	✓	✓ where relevant	✓ where relevant	✓	✓	✓
Digital photos Contact relevant HER for quantity required	4.4	✓ where produced	✓	✓ where produced	✓	✓	✓	✓	✓ where produced	✓	✓ where produced	✓
Digital file depicting extent of work	4.5	✓ where produced	✓ where produced	✓ where produced	✓ where produced	✓ where produced	✓ where produced	✓ where produced	✓	✓ where produced	✓ where produced	✓
Digital project database/table Contact relevant HER regarding file types	4.3	✓ where produced	✓ where produced	✓ where produced	✓	✓	✓ where produced	✓ where produced	✓	✓ where produced	✓	✓
Bilingual summaries of new site records	4.1	✓ where project database/table exists	✓ where project database/table exists	✓ where project database/table exists	✓	✓	✓ where project database/table exists	✓ where project database/table exists	✓	✓ where project database/table exists	✓	✓
Digital polygon of historic asset	4.6	✓ where produced	✓ where produced	✓ where produced	✓	✓	✓ where produced	✓ where produced	✓	✓ where produced	✓	✓
Data Submission Agreement	6.2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Figure 1. Overview of HER data submission requirements by project type

4 Specific Requirements for Submission of Data to HERs

4.1 Language Requirements

In accordance with the *Welsh Language Standards (No. 1) Regulations 2015*,⁴ and associated compliance relevant to HER service delivery, all **new** records created in the HER from 1st April 2016 must have a summary description in both Welsh and English. In light of this, **all new data and reports supplied to the HER** must now be supplied with appropriately translated summary texts.

The requirement is made for:

- **local and national public bodies and authorities**
- **commercial archaeological work undertaken as part of the planning process**
- **university and cross-sector collaborative projects**
- **HLF and other projects** (including community-led) **funded by grant-awarding organisations and funding bodies** where project costings should be made for translation services.⁵

Private researchers, schools, unfunded local community groups and members of the public are encouraged to submit in the language of their choice. The data submitted by these groups does not need to be bilingual. However, if these users are able to supply bilingual information this will be greatly welcomed by the Welsh HERs.

Where the language requirement applies, information produced in the English language must be supplied with a Welsh language summary for:

- all *new* historic assets
- *each* piece of archaeological work (Event⁶) carried out.

Where the language requirement applies, information produced in the Welsh language must be supplied with an English language summary for:

- all *new* historic assets
- *each* piece of archaeological work (Event) carried out.

Summaries for archaeological work (Events) should be included in the resulting report submitted to the relevant planning authority and the HER.

⁴ <http://www.legislation.gov.uk/wsi/2015/996/schedule/1/made>

⁵ The Welsh Archaeological Trusts may be able to provide support for meeting this requirement to researchers, schools, local community groups and other members of the public undertaking works on an unfunded basis. However this will be dependent on resources being made available by government to the Trusts for such purposes. We are not able to extend this support to contributors whose requirements are funded, for example local and national public bodies and authorities, individuals or organisations (including trusts, companies, partnerships or universities) undertaking funded research, or commercial work undertaken as part of the planning process.

⁶ An *Event* is defined by the Historic Environment Data Standards Working Group of Wales as any piece of archaeological work, whether it is of an intrusive (*e.g.* Excavation), non-intrusive (*e.g.*, Photographic Survey), or management (*e.g.* Management Plan or Vegetation Control) nature.

Text should be translated to an appropriate standard, ideally by a translator with experience of working within the historic environment sector or familiarity with the terminology of the sector. Text translated using automated translation applications or services **will not be accepted**.

A list of translators can be supplied on request and membership of *Cymdeithas Cyfieithwyr Cymru - Association of Welsh Translators and Interpreters* is preferred. Approved Welsh terminology for *Monument Types, Events, archaeological Periods* and more, that will aid the creation of Welsh-language summaries, can be found beneath the English equivalent in the relevant thesauri and word lists for historic environment information found at <http://heritagedata.org/live/schemes.html>, as detailed in Section 5.

The HERs will not normally accept reports that meet the funding criteria which are submitted without bilingual summaries. In an archaeological planning management context this should be the final version as approved by a person acting as an archaeological advisor for a local planning or other authority.⁷

4.2 Summaries

It is important that summaries are created in accordance with the guidelines below in order to ensure that they are accessible to all HER users. Please contact the relevant HER if you have any concerns.

Archaeological Events

Event summaries, which may average 100-250 words, depending upon the scale and complexity of the work undertaken, should refer to the following as a guide to compilation. A translation of the executive summary in the case of a project report is preferred although some other examples are also provided below for comparison.

Event summaries should address these questions:

- Who undertook the work?
- Who was it commissioned by? (no personal names)
- When was the work undertaken?
- Where was the work carried out?
- Why was it undertaken?
- What work was undertaken?
- What were the results of the work?
- What were the conclusions? (if any)

Event summary examples:

1. "The Glamorgan-Gwent Archaeological Trust was commissioned by Dwr Cymru to undertake an archaeological watching brief in 1995 at the Chippenham car park in Monmouth, Gwent during the

⁷ See Chartered Institute for Archaeologists *Standard and guidance for archaeological advice by historic environment services* http://www.archaeologists.net/sites/default/files/CifAS&GArchadvice_2.pdf, (last updated Dec 2014) as well as archaeological planning requirements where documented. For GGAT, please see [Archaeological Report Monitoring Form](#). For GAT, Gwynedd Archaeological Planning Service (GAPS) undertakes this function, please see <http://www.heneb.co.uk/newplanning.html> for further information

process of conducting a new sewage pumping station. An associated field evaluation prior to this watching brief identified the possibility of Roman activity present within the site, however no archaeological sites or features associated with this period were noted. A horizon containing iron slag and charcoal was identified within the alluvial silts underlying the modern car park which contained Post-medieval pottery.” (88 words)

2. “Monmouth Archaeology was commissioned in 2005 by the house owner to undertake a Watching Brief during ground works in the extension of Old Mill barn, Rogerstone Grange, St. Aravans, Chepstow. The ground was predominately made-up of rubble, brick and redeposited loam. The humus had apparently been removed down to natural subsoil sometime in the past. All finds were 19th - 20th century and modern. No significant archaeological features or artefacts were found.” (72 words)
3. “GGAT was commissioned by JA Rewbridge Development Services in May 2004 to undertake a desk-based assessment to assess the effect on the archaeological resource in relation to a proposed development at the site of the former Gwernllwynchwyth House. A total of 20 sites of interest were identified within the study area, seven of which were within the development. The assessment identified that there would be a severe effect on six of these seven sites, and a minor effect on one. Mitigation measures identified to counter these effects included preservation of the Scheduled Gwernllwynchwyth Engine House within the development, along with consideration of the effects of the development on the Engine House. It was also recommended to preserve the Gwernllwynchwyth outbuildings, but that a full and comprehensive building survey (Level 3) should be carried out if preservation is not possible. Further surveys of buildings and a hedgerow were also recommended, as well as a watching brief during construction.” (157 words)

Historic Assets

Historic asset summaries which may average 50-100 words, depending upon the scale and complexity of the asset, should include the following information where known/relevant:

- Type and period of asset
- Location of asset
- Nature of discovery (if relevant)
- Method and material of construction (if known)
- Reference to any known associated assets or artefacts
- Possible interpretations (if relevant)
- Significant features or associations and their size and shape (where relevant)

Historic asset summary examples:

1. “A circular stone lined kiln was exposed during excavation of a potential Medieval Grange complex (O1165g). Study of the ceramics found suggested that the kiln was used to manufacture glazed ridge tiles during the later 14th or 15th centuries. A high proportion of wasters were also recovered. The kiln was not fully excavated, and therefore its full function was not established.” (61 words)
2. “A disused quarry, most likely of post-medieval date, identified from the 2nd Edition OS 6” map lies to the north of Cwm-Bedlan Farm. A subsequent field visit in 2011 recorded the site to be in an overgrown condition.” (38 words)

3. "A substantially intact building initially built as a machine shop for National Shipyard No.1 at Chepstow c. 1917. The building is rectangular and constructed from concrete blocks that were likely cast on site. Whilst a number of doorways have been blocked up, some door mechanisms and awnings are intact, the doors on the north-west are potentially original. The building continues to be used for engineering purposes." (65 words)

4.3 Project Reports

Project reports must be supplied to the relevant HER, following approval by an archaeological advisor, where appropriate. They should be in a PDF format suitable to allow for dissemination (PDF/A format is not acceptable as this is an archiving format). Word documents can also be accepted.

The PDF provided to the relevant HER should **not** contain any security or access restrictions such as passwords, or restrictions on printing, saving, copying, and viewing of the document. These restrictions will prevent the dissemination of the document, and the creation of security copies and backups.

The HERs are happy to accept PDF reports via email and may be able to accept reports on removable media such as USB sticks, or via a file hosting service such as Dropbox. Each HER has different requirements and while paper copies and CDs or DVDs are accepted by some, others prefer not receive either. Please contact the HERs directly to confirm the preferred method of delivery of reports.

All reports should conform to the criteria required by the Chartered Institute for Archaeologists (please see <http://www.archaeologists.net/codes/cifa>). Where produced as part of the planning process they should also conform to the requirements of the recognised archaeological planning advisor and regional archaeological planning guidance where this is available.⁸

In addition to the ClfA criteria, each report submitted to the relevant HER should contain:

- ✓ an HER Enquiry Reference Number, where obtained
- ✓ an Event number (Event PRN) for the project work (supplied by HER staff on request)
- ✓ **bilingual summaries (mandatory)**
- ✓ accession numbers for the project archive from an accredited archive repository such as the National Monuments Record and/or relevant museum
- ✓ The report author/s, and company/organisation details where appropriate
- ✓ The date of completion of the report
- ✓ An accurate NGR centred on the project location (to a minimum of 6 figures)

Please note that approval of a report by an archaeological advisor does not constitute its deposition in the Welsh HERs.

⁸ For GGAT [Archaeological Report Monitoring Form](#) and [Notes & Guidance for WSI and PD](#)

4.4 Project Data

Where collected as part of a project (e.g. field survey or desk-based research), any new or updated information for historic assets must be submitted to the HER, ideally in the form of a database, spreadsheet or other tabular form of data in a digital format that will meet the requirements of HER staff and that contains the elements shown in the table(s) below. **Mandatory** information is highlighted in bold. Controlled terminology should be used for a number of fields (highlighted in the tables below), please see Section 5 for more information regarding the approved thesauri for records in Wales.

Summary information for new sites must be supplied in both English and Welsh as detailed in 4.1 above.

HER Field Name	Field Definition (those shaded purple must use controlled terms available at heritagedata.org)
Historic Asset UID/PRN	Unique record identifier (Primary Reference Number) ⁹ .
Site name (Historic asset name)	The name given to a historic asset. Please use appropriate format for each HER: CPAT: 'Location, Type' e.g. Mynydd Ddu, Cairn. DAT: Name of building or structure where one exists GGAT: 'Type, Location' e.g. Cairn, Mynydd Ddu, Bridgend. GAT: 'Type, Location' e.g. Cairn, Mynydd Ddu
Summary Welsh	A brief Welsh language summary or short-text description of the site, following the format in section 4.2
Summary English	A brief English language summary or short-text description of the site, following the format in section 4.2
Description	The description should contain the following as a minimum: what the site is; where it is; details of construction/fabric; any significant notes, e.g. architect; importance; statement of condition; statement of discovery' any interpretations; references for information included, in the format 'Author, Year'.
NGR	The Ordnance Survey National Grid Reference. The OSGB36 projection should be used where possible.
Easting	A six-figure grid coordinate relating to the Easting or x coordinate
Northing	A six-figure grid coordinate relating to the Northing or y coordinate.
NGR Qualifier	Details how the NGR relates to the site – see terminology list
NGR Derivation	Details how the NGR was derived – see terminology list
Type	A narrow term used within <i>Broadclass</i> to define the use and function of historic asset or find – use terminology list
Period	Describes the general chronological classification to which the historic asset or find belongs – use terminology list
Survival Condition	Records the physical state of the historic asset when last observed based on comparison with its original form – use terminology list
Condition Rating	Records the overall condition of the historic asset – use terminology list
Condition Description	Detailed description of the monuments condition at the time the record was made
Broadclass	The highest hierarchical type classification term used as a searching aid – use terminology list

⁹ New PRNs are available from WAT HER staff on request – we encourage those creating new records to assign PRNs before submitting data.

Evidence	Indicates the evidence for a historic asset at the time the record was made – use terminology list
Year	Records the year in which a record of a historic asset's condition and evidence were recorded.
References	Any references cited in the description. Please provide full Harvard referencing.
Record Compiled By	Name of person creating the record.
Record Compiled On	Date of compilation of the record.
Copyright	The copyright holder of the record.

Figure 2. Key Information required for historic asset records

Providing the HERs with the minimum mandatory information allows staff to incorporate the records in accordance with the minimum standards of the MIDAS UK Heritage Data Standard to which the HERs adhere. Any additional information for the remaining fields that contributors are able to supply improves the breadth and depth of the record and is good practice.

Additional Information where available/applicable

The Welsh HERs, in collaboration with the other members of the Historic Environment Data Standards (HEDS) Working Group (Wales), have standardised ways for recording additional information, particularly that relating to Threat, Risk and Management of a historic asset. Some of these fields are detailed in the table below and existing terminology lists applicable to Wales should be used when compiling data. For any further information not specified here please contact the relevant HER staff directly to discuss recording practices.

HER Field Name	Field Definition (those shaded purple must use controlled terms available at heritagedata.org)
Cross Reference Relationship	Identifies the type of relationship between records – use terminology list available from HERs
Cross Reference Resource	Identifies the dataset to which the reference number refers– use terminology list available from HERs
Cross Reference number	Records the reference number of related record
Status	Identifies the status associated with a historic asset – use terminology list available from HERs
Status Reference	Records the reference number associated with a status
Status Grade	Records the status grade of a historic asset
Threat Type	Type of threat posed to a historic asset – use terminology list
Threat Significance	To record the significance of the threat in relation to effect upon a historic asset – use terminology list
Threat Record Date	The date the threat was recorded
Site at Risk?	Is the historic asset at risk – yes/no checkbox
Risk Level	The level of risk to a historic asset – use terminology list
Vulnerability	The vulnerability level of a historic asset to a risk – use terminology list
Management Recommendations	Any management recommendation made for a historic asset
Management Observations	Additional management information that is not a recommendation
Historic Asset Category (Monument Importance Category)	The relative importance/value assigned to a historic asset at the time of assessment – see terminology list
Site visit by	Name of person undertaking site visit
Site visit date	Date of site visit

Figure 3. Additional Information that may be recorded for historic assets

4.5 Photographs

Please discuss the requirements for submission of photographic material with the relevant HER staff: some HERs may be happy to take the entire catalogue, whereas some may only accept selected images. Unless the photographs are of some age, only digital images will be accepted.

It is important that digital photographs are taken in accordance with recognised standards, and that specific metadata is recorded for each image. Where possible, use TIFF format for image creation. When TIFF cannot be used, it is recommended that highest-quality (*i.e.* lowest compression) JPEG files should be used, unless it is possible to create RAW files and convert them to TIFF.

Software used to process the images must ensure that original exif data (information created by the camera to record the settings and date of the image) is retained. Photographs should be supplied as **individual image files** and not contained within a document (*e.g.* a PDF or Word file).

The HERs will accept images where the metadata has been created in accordance with the RCAHMW Guidelines for Digital Archives <http://rcahmw.gov.uk/wp-content/uploads/2016/09/RCAHMW-Guidelines-for-Digital-Archives.pdf>. Metadata (*i.e.* the photographic catalogue) should be supplied to the HER with digital images, preferably as an Excel file in 97-2003 (.xls) or 2010 (.xlsx) format.

The metadata should contain the following information as a minimum for native digital images (*i.e.* born digital images):

- Image ID
- PRN
- Project
- Context No (if relevant).
- Historic Asset Name
- Feature Name (if relevant)
- Date when photo was taken
- Direction of view (indicate if view "From" or "Facing")
- Name of photographer
- Location of master/original photograph.
- Copyright/Access Conditions
- Record Compiled By
- Record Compiled On

The following information is also useful to record:

- Short description of the photograph.
- Reason why photograph was taken, *e.g.* monitoring condition; recording archaeological excavation; enhancing HER

If digitised traditional (wet) photography forms part of the project collection, additional metadata may be required. Please discuss with the relevant HER.

4.6 Event Polygon(s)

Where a project has utilised GIS, CAD or drawing software to graphically depict the project coverage area, or specific elements that form part of the project, these should be shared with the relevant HER. This could include the area of excavation or survey, or the development area for a desk-based assessment, and should be provided in a common GIS or CAD format where possible (such as ESRI shapefile or MapInfo tab, although other formats can be accepted). It should have the following attribute information shown in Figure 5¹⁰ (a template file can be supplied in a number of formats on request).

Field Name	Example Data 1	Example Data 2
Event PRN	E001234	
Project Number	A4000	P1234
Project name	Geophysical Survey Castle Field	Monmouth Town DBA
Organisation	Geophysics R Us	Archaeology UK
Date	June 2015	August 2014
Digitisation Source	GPS Survey Grid	OS Digital Map 2014
Digitisation Scale	N/A	1:12,500
Description of digitised area	Extent of Survey Area	Extent of development area

Figure 4. Key Information required for spatial depictions of archaeological projects

¹⁰ Gwynedd Archaeological Trust may require additional metadata – please discuss with HER staff directly



Figure 5. Example event polygon depicting the area of a geophysical survey for Castle Field

4.7 Historic Asset Polygon(s)

Where a project has utilised GIS, CAD or drawing software to graphically depict the extent of the archaeological resource, and extents of historic assets have been created, these should be shared with the relevant HER. This should be provided in a common GIS format where possible (as with event polygons above) and have the attribute information shown in Figure 7¹¹ (a template file can be supplied in a number of formats on request). Where possible, these should be provided without a buffer. If a buffer is present, its size should be clearly indicated in the metadata.

Field Name	Example Data 1	Example Data 2
Site PRN or ID Number	01234w	SO12
Organisation	Archaeology UK	Archaeology UK
Date	June 2015	August 2014
Digitisation Source	OS 1 st Edition Map	OS Digital Map
Source Date	1878	2014
Digitisation Scale	1:500	1:250
Digitisation representation	Extent of original site	Extent of surviving remains

Figure 6. Key Information required for spatial depictions of historic assets

¹¹ Gwynedd Archaeological Trust may require additional metadata – please discuss with HER staff directly

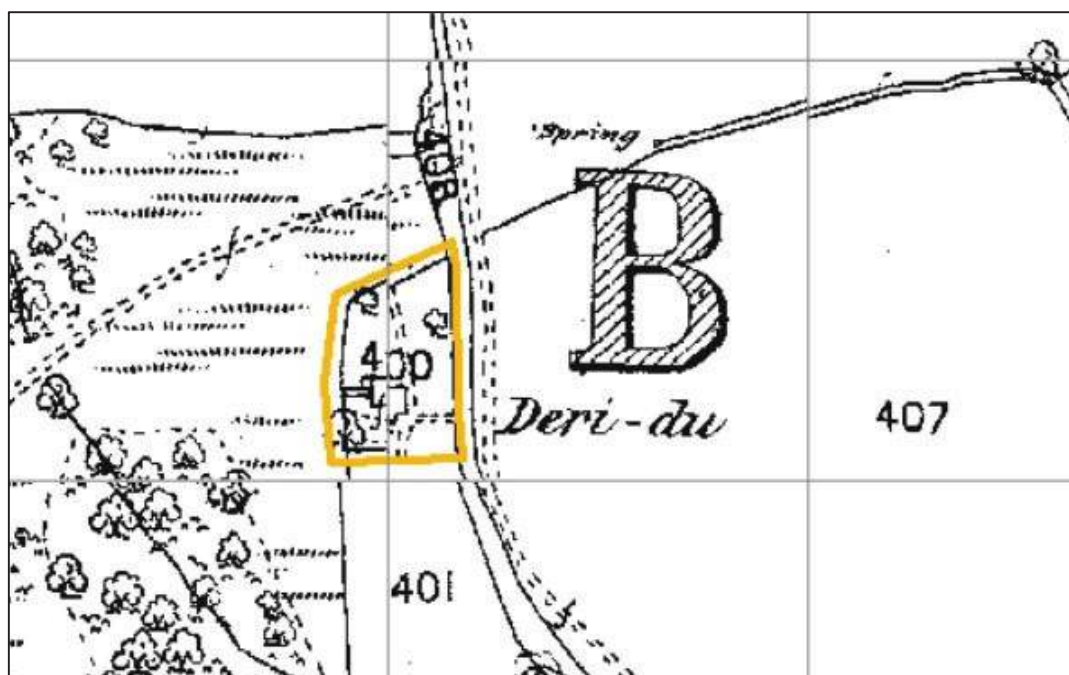


Figure 7. Example site polygon depicting the area of Deri-du House and Enclosed Land on 1st Edition OS map

4.8 Additional Metadata

Metadata should be provided for databases and GIS tables where the dataset is large or varies from the structure and content specified above. This metadata should be created in accordance with the RCAHMW Guidelines for Digital Archives¹² and other associated guidance. Please contact the relevant HER staff to discuss metadata requirements where relevant.

Please note that the HERs are not accredited archive repositories. Archives for archaeological projects undertaken in Wales should be deposited with the RCAHMW (for documentary or digital archives) and/or the relevant museum (for the artefact/ecofact archive). Please see section 5.2. for further information.

¹² <http://rcahmw.gov.uk/wp-content/uploads/2016/09/RCAHMW-Guidelines-for-Digital-Archives.pdf>

5. Historic Environment Data Standards and Thesauri for Wales

The Historic Environment Data Standards (HEDS) Working Group for Wales works to create, maintain and develop nationally-agreed standards and procedures for the creation, maintenance, storage, retrieval of, and access to, data relating to the historic environment across Wales. The group is comprised of representatives from Cadw, RCAHMW, the four Welsh Archaeological Trusts, the National Museum, National Trust and others who are responsible for national, regional and local datasets.

The group have compiled a number of thesauri and controlled terminology lists for the recording of various types of historic environment-related data. These are located on the UK-wide website <http://heritagedata.org/live/schemes.html> where linked data vocabularies for cultural heritage data can be accessed. Data creators should use the agreed thesauri and word lists for Wales in order to ensure consistent recording standards across Wales and aid the retrieval of data from the HERs and other historic environment datasets such as the National Monuments Record.

The HERs work to a number of national and UK-wide data standards and best practice guidance, including:

- MIDAS UK
- UK GEMINI v2 Metadata for Spatial Data
- MIDAS XML Spatial Schema
- ADS GIS Guide to Best Practice
- Informing the Future of the Past (IFP) Guidelines for HERs.

More information can be found at <http://archaeologydataservice.ac.uk/ifp/> and <http://heritage-standards.org.uk/>. Contributors providing the required information can help the HERs achieve these standards more consistently by avoiding gaps in the record and we appreciate this input.

5.1 Using heritagedata.org

In order to find specific terms used in Wales when creating data and writing summaries, please use the search form at <http://heritagedata.org/live/searchForm.php>. This allows users to select the appropriate thesaurus they wish to use (described as a *Scheme* – search the list under *RCAHMW*) and then the required term. In order to find terms in Welsh, users will need to click on the required term in the English search results and look at the [skos:prefLabel](#) below the English to see the Welsh equivalent term. See Figure 8 below for additional guidance. The Heritage Data website is only available in English.

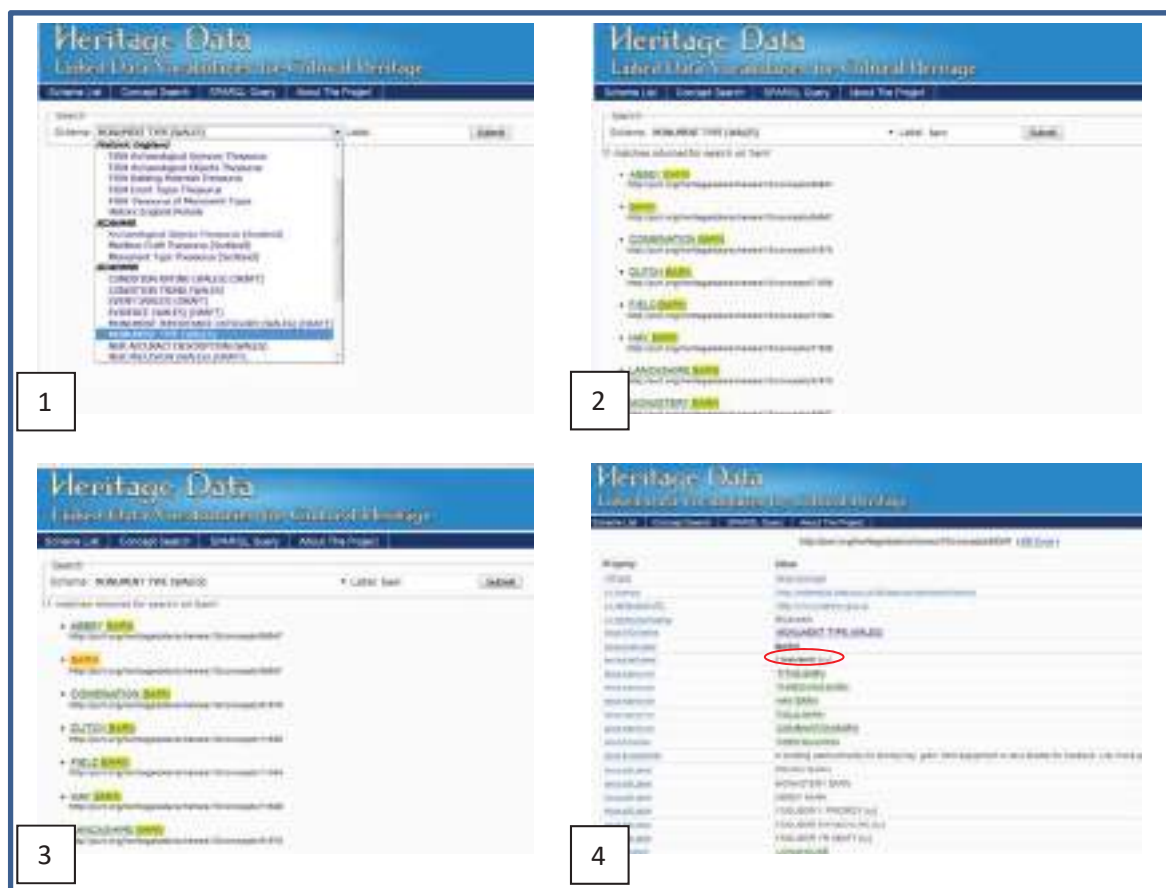


Figure 8. Method for finding translated terms on heritagedata.org: 1. Select the relevant thesaurus (scheme); 2. Submit a label relating to the search term of interest; 3. Select the most appropriate term; 4. Look for the Welsh translation listed below the English term, labelled *skos:prefLabel* and suffixed with (cy).

5.2 Archive Standards

The HERs, as noted above, are not formal archives and will not be able to accept archive materials. Archaeological archives should be prepared in accordance with the *National Standard and Guidance for Collecting and Depositing Archaeological Archives in Wales* (please see <http://www.welshmuseumsfederation.org/en/news-archive/resources-landing/Collections/national-standard-and-guidance-for-collecting-and-depositing-archaeological-archives-in-wales-2017.html>) and deposited with the appropriate accredited repository.

Digital archives should be prepared in accordance with the RCAHMW guidance referred to above¹³ and deposited with them directly. The Statutory HER may also require copies of the digital archive to be deposited with it. Advice on this will be given by individual HERs.

¹³ <http://rcahmw.gov.uk/wp-content/uploads/2016/09/RCAHMW-Guidelines-for-Digital-Archives.pdf>

6. Data Agreement and Copyright

6.1 Reproduction of data under HER Copyright

Where the report contains or reproduces information from the HER the relevant copyright statement and acknowledgment should be stated in the report, as follows:

Derived from information held by the GGAT HER Charitable Trust Database Right. This report contains material which is copyright of GGAT HER Charitable Trust and other third party copyrights, including Crown copyright where indicated.

This report contains CPAT HER Charitable Trust data © copyright and database right (year).

Derived from information held by the GAT HER Charitable Trust Database Right.

This report contains material which is the copyright of the DAT HER Charitable Trust.

The HERs recommend that PRNs are referenced in reports and publications in the following way:

HER PRN CPAT1234

HER PRN DAT1234

HER PRN GGAT01234w

HER PRN GAT1234

Please explain any HER/PRN abbreviations used in the report.

6.2 Data Agreement

Those submitting data should ensure that they have the rights (copyright, IPR, database right) to submit data to the HERs. Where the supplier is not the rights holder then accompanying documentation should be provided to detail the rights holder(s), including any permissions granted or restrictions in the use/distribution of any third party data.

HER contributors will be given the opportunity to sign a Data Submission Agreement (if one has not been completed previously), which can be provided by the relevant HER. By signing a Data Submission Agreement, HER contributors will be able to specify how they want their data to be used by the relevant HER. The HERs will not transfer any rights and all rights remain with the original rights holder(s). A Data Exemption Form should be completed if a Data Submission Agreement is already in place, but newly-deposited information does not fall under this agreement

HER contributors may be asked if they would allow summary descriptions compiled for reports and site records to be assigned to Crown Copyright so that these may be distributed through Archwilio. If the contributor agrees, then a deed of transfer would need to be completed between the contributor and Welsh Government.



6.3 Reproduction of data not under HER Copyright

In the case of distribution of 3rd party copyright material by the HER (*i.e.* material that is not the copyright of the Welsh Archaeological Trust HER Charitable Trust), the material will be accompanied by the following statement:

Release of Third Party Information

The data supplied is the copyright of a third party. Permission has been given for the HER to supply this material, however, this material is intended for information and research only. It may not be passed to third parties, reproduced or published without obtaining permission from the originating source.

The following material has been supplied under the terms of the above notice.

Material

Original Source



7. Contact details

Please contact the relevant HER if you have any questions or wish to discuss data requirements.

CPAT

her@cpat.org.uk

01938 553670

DAT

info@dyfedarchaeology.org.uk

01558 823131

GGAT

her@ggat.org.uk

01792 634225

GAT

her@heneb.co.uk

01248 352535

8. Glossary of terms and concepts

Archwilio	Archwilio provides public access to the historic environment records (HERs) for each local authority area in Wales. It includes (or provides access to) information on tens of thousands of historic sites or investigative work across Wales. The HERs are maintained on behalf of the Welsh Ministers by the four regional Welsh Archaeological Trusts and in fulfilment of the requirements of the Historic Environment (Wales) Act 2016. Please see www.archwilio.org.uk
Cadw	Cadw is the Welsh Government's historic environment service working for an accessible and well-protected historic environment for Wales (see http://cadw.gov.wales)
Clwyd-Powys Archaeological Trust (CPAT)	One of the four Welsh Archaeological Trusts (see www.cpat.org.uk)
Dyfed Archaeological Trust (DAT)	One of the four Welsh Archaeological Trusts (see http://www.dyfedarchaeology.org.uk/)
Event	An investigation into one of more aspects of the historic environment (see note 5 on page 9)
Geographical Information System (GIS)	A Geographical Information System is designed to create, view, store, and analyse digital mapping and spatial information.
Glamorgan-Gwent Archaeological Trust (GGAT)	One of the four Welsh Archaeological Trusts (see www.ggat.org.uk)
Gwynedd Archaeological Trust (GAT)	One of the four Welsh Archaeological Trusts (see www.heneb.co.uk)
HER Charitable Trust	Each Welsh HER is held in a separate charitable trust and managed by the parent Welsh Archaeological Trust
HEROS	Historic Environment Records Open System: the data management system used by the four Welsh Archaeological Trusts to access their HER heritage asset data (see http://heros.software/)
Historic asset	A site, building, object or other feature recorded in a historic environment record or other similar resource
Historic Environment Data Standards (HEDS) Working Group	The HEDS working group is chaired by the RCAHMW and meets quarterly to discuss and develop data standards. The organisations represented include RCAHMW, the four Welsh Archaeological Trusts, Cadw, the National Museum of Wales (NMW), the National Trust, and others involved in the creation or management of data such as representatives from the National Parks
Historic Environment Record (HER)	The HERs are the primary regional source of information about the historic environment. They are complex systems of information with a regularly-updated relational computerised database and GIS at its core. The digital resources are supported by additional digital and physical collections held at each WAT.

	The HERs include information relating to all aspects of human activity in the landscape, from earliest prehistory to the present day, and comprise area-, event-, object- and site-based information. The HERs have access to, or link to, data held by other providers such as Cadw, RCAHMW, NMW, Natural Resources Wales (NRW), and local authorities. The HERs were previously known as Sites and Monuments Records (SMRs) but became known as HERs to reflect the broader scope of information available, and to acknowledge that the HERs were externally judged to meet the stage 1 HER benchmarks detailed in the English Heritage/ALGAO 2002 document <i>Historic Environment Records: Benchmarks for Good Practice</i> that were adapted for use in Wales
JPEG	Joint Photographic Experts Group digital image. The format created by most digital cameras. This file type loses quality each time it is saved.
National Monuments Record (NMR)	The National Monuments Record is managed by the RCAHMW and is available online at http://www.coflein.gov.uk/
RAW	Raw (<i>i.e.</i> unprocessed) digital image. Many cameras are able to take RAW files, but the ability to open the files are usually tied to the make of the camera and it is recommended that they are saved as TIFF files for archiving. RAW files are sometimes referred to by a proprietorial name relating to the software/manufacturer of the camera used to create the image <i>e.g.</i> Nikon cameras create raw files with the file extension <i>.NEF</i> .
Royal Commission on the Ancient and Historical Monuments in Wales (RCAHMW)	The RCAHMW curates the National Monuments Record and the National Archaeological Archive of Wales (see https://rcahmw.gov.uk/home/). They undertake thematic projects and offer a range of expertise including specialist surveys. The RCAHMW monitor HER work programmes on behalf of Cadw.
TIFF	Tagged Image File Format digital image. Image type considered to be the archive standard because it does not lose quality when it is saved.
Welsh Archaeological Trusts (WATs)	There are four Welsh Archaeological Trusts, geographically covering the whole of Wales. Each Trust is partly grant-aided by Cadw and includes: a heritage management section that manages the regional Historic Environment Record and provides advice and information to a wide range of individuals and organisations including local and national government; and a commercial services section that tenders for archaeological projects.



Appendix A – Welsh HER Information Submission Form

WELSH HER Information Submission Form		
The information submitted is for ☐ an existing record, ☐ to record a new historic asset For an existing site please only complete information where changes/updates to the record are required. For new sites please complete all relevant information.		
HISTORIC ASSET DETAILS		
PRN/ID Number:	Site Name	WAT
LOCATION OF THE HISTORIC ASSET (if new record or incorrect) If possible mark the site location on an OS map and attach a copy to this form.		
National Grid Reference (NGR)		NGR taken from map? ☐ GPS? ☐
Use the centre of the historic asset if possible, otherwise note where the grid reference has been taken from:		
HISTORIC ASSET DESCRIPTION		
The description will help to identify the site type, function and date		
Full description (including approximate size of site area if possible)		
continue over if necessary		
Evidence: (please use HER standard terms)		
Estimated period: (please use HER standard terms)		
Site type: (please use HER standard terms)		
HISTORIC ASSET CONDITION		
This information will help to assess the condition of the site and threats to its survival		
Condition: (please use HER standard terms)		
Condition description: (including extent of survival, damage)		
Any threats to historic asset? (please select HER standard terms and include descriptions)		
ADDITIONAL INFORMATION		
Have you taken photos? Produced any drawings? What are the sources for the information submitted on this form?		
YOUR DETAILS		
Name	Project (where relevant)	Record date