Archaeology Wales

Land north of Cae'r Odyn, Pen y Garn, Rhydypennau, Ceredigion

Archaeological Strip, Map and Sample and Evaluation
Final Report

By

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Report No. 1243

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Summary

The site north of Caer Odyn is located on the western side of the A487 in the village of Rhydypennau, Ceredigion. In May 2014 Archaeology Wales were commissioned to carry out an archaeological Strip, Map and Sample within a field selected as a potential housing development site by Cymdeithas Tai Cantref. The field is possibly located near the site of a former funerary moument at Penygarn that was destroyed in 1807. Several features resembling possible early medieval inhumations together with an Early Neolithic pit were discovered within the field. Following the Strip, Map and Sample, an excavation of these features was carried out. It is likely that the site is part of a significant area that includes multi-phase burial that may have referenced a destroyed funerary monument.

1. Introduction

In April 2014 Archaeology Wales was commissioned by Cymdeithas Tai Cantref to carry out an archaeological Strip, Map and Sample on land north of Caer Odyn, Rhydypennau (centred on NGR SN 62792 85745; fig. 1). Cymdeithas Tai Cantref has applied for planning permission to build a housing development within the field. The local authority is Ceredigion County Council and the planning reference is A130848.

The aim of the archaeological Strip map and Sample was to locate, identify, describe and record any archaeological features that may be located within the field. The work was carried out by Andy Shobbrook and Simon Ratty for Archaeology Wales between the 2nd and 20th of June, 2014 (AW Project Number: 2236).

2. Site Description

Location, Topography, Geology

Rhydypennau is located approximately 870m north of Bow Street and 7.2km north-east of Aberystwyth. Cae'r Odyn (Kiln Field) is a relatively new housing estate located to the south of the proposed development site.

The site lies on a conspicuous plateau within the Bow Street valley in an area characterized by slightly acid loamy soils, Devensian sand and gravel glaciofluvial ice contact deposits overlying Silurian Borth Mudstone (BGS 2014; Soilscapes 2014). Immediately west of the site the superficial deposits are composed of silt, clay and sand and gravel resulting from soil creep and hill wash. A small stream, Bow Street Brook, runs south-westwards along the northern and eastern fields to the north and west of the site.

The higher part of the site (47m AOD) is along the southern quarter of the field north of the current Cae'r Odyn housing estate (fig. 2). The field gently slopes down towards the current east to west aligned access track where it levels at 43m AOD.

3. Historical Background and previous archaeological work

The valleys inland of Aberystwyth in north Ceredigion contain a number of plough-levelled burial and ritual complexes dating between the Neolithic and Early Medieval period (Driver 2009, 1). Many of these appear on gravel ridges, alluvial terraces or valley junctions rather than prominent hill tops with wide ranging vistas.

An example of a ridge-based complex, identified through aerial investigation in 1975, is located less than 100m north of the site at Cae'r Odyn. Rhydypennau Barrow Cemetery (NPRN 405452) consists of a cluster of four of five plough-levelled barrows between 6m a 10m in diameter (Driver 2006). Three hundred metres further north at Pwll Peran, Llandre (NPRN 405449), five circular enclosure cropmarks, again identified in 1975 aerial photographs and ranging between 27 and 33m in diameter, appear to be located at a valley junction (Driver 2008). Between these two sites an unexcavated rectangular enclosure cropmark (NPRN 405451) measuring 276m by 38.9m may also be of a similar date.

Approximately 2.2km south of Cae'r Odyn a 1986 excavation discovered a complex multi-period burial and ritual site at Gogerddan (Murphy 1992). The site contained numerous prehistoric pits, post-holes, ring-ditches, Iron Age crouched burials and extended inhumation burials dating between the third and seventh-century AD (Murphy 1992). These appeared to be clustered around a pit (132) interpreted as the socket for a standing stone, re-erected in the eighteenth or nineteenth-century (Murphy 1992, 7). Plas Gogerddan Barrow (NPRN 402198), defined as two concentric ring ditches, 14m and 25m in diameter, are also located immediately to the east of multi-period complex.

Cae1r Odyn is located near to Pen-y-garn, purportedly named after the location of a cairn which was once located in the area. J. Graham Williams describes the location and destruction of the cairn thus:

> 'At the foot of the hill [Caer Gywydd or Gaergywydd] was a large carn removed about fifty years ago in making the turnpike road: at a place which still retains the name of Penygarn. From this an immense number of human bones (unburnt) were removed to Llanbadarn churchyard. To the same ground were also removed, about the same time, other unburnt bones from a smaller carn in a field called Cae Ruel, not far from Pen-y-garn' (Williams 1867, 287).

It seems unlikely that a Bronze Age cairn would yield an 'immense' number of human bones, and consequently it is possibly an earlier burial structure. A tithe field name located 1.2km directly east of Cae'r Odyn (NGR SN 615 858) refers to

Cerrig Cromlech (PRN 8738) and has been interpreted within the HER as suggesting the presence of a Neolithic chambered tomb (PRN 8738). Although no Neolithic tombs survive in this part of Ceredigion, Daniel (1950, 215) suggests that they did once exist along the coast, and it is possibly that they were also found along river valleys. Given the acidic soil conditions, and unlikely survival of any unburnt bone in the soil, it is likely that any bones located in this area were either more recent or were protected within a chamber.

The tithe map of this area shows that a property called Cae Maelgwn was close to this location. Local tradition has it that it was named after a 'cairn', Carn Maelgwn (Tomas 1898). It is possible that this name is a legendary reference to Maelgwn Gwynedd, a sixth-century king of Gwynedd. The 1847 Llanfihangel Genau'r Glyn parish tithe map shows that Cae Malgwyn (probably a misspelling of Maelgwn) was located on land where Pen y Garn chapel is located now. This is 350 to 400 metres south from Cae'r Odyn field.

4. Evaluation

4.1 Objectives and Strategy

The initial phase of work at the site consisted of a two week Strip, Map and Sample, whereby the topsoil was removed by a mechanical excavator throughout the field under the conditions of an archaeological watching brief. All features observed on the surface of the natural subsoils were excavated, recorded and plotted whilst appropriate samples were taken for post-excavation analysis. Following discussions with Dyfed Archaeological Trust and Cymdeithas Tai Cantref, this initial phase led to a week's full excavation of features discovered within the field.

4.2 Evaluation Results

The locations of the features discussed below are shown in figures 3 and 4. The depth of the removed topsoil varied throughout the site, but was no deeper than 0.30m in any part of the field. This upper deposit (1000) was a dark-brown clayey silt with well sorted occasional sub-rounded and sub-angular stones. The finds discovered within this deposit were either modern or post-medieval in date. The natural subsoil (1001) within the field was mid-yellow brown silty clay with frequent stones. One unstratified piece of probable Roman pottery was discovered lying on the surface of the natural subsoil in the centre of the field. This was not associated with any features (see). In the south-eastern corner on the higher edge of the field there was an outcrop of shale, whereas gravels were more frequent in the lower north-western areas of the field. The well-mixed nature of the upper deposit and the disturbance to the subsoil surface suggest that the field had, in the past, been frequently ploughed.

The topsoil removal began in the south-eastern corner of the field to enable the stockpiling of soil in this area. Six features were discovered in this upper area of

the field. These presented as darker outlines on the surface of the lighter subsoil and were immediately apparent from the initial machining.

In the extreme south-eastern corner, a truncated elongated pit or the end of a ditch terminus [1003] was discovered, cut though the natural subsoil (1001) and running to the site's southern hedgerow (figs. 5, 14). The feature was 0.47m deep in the centre, 2.3m wide and 2.7m long from its southern end to its truncated southern end. A number of fills were visible within the feature (fig. 5b, 5c). The lower 0.11m deep fill was a silty, grey clay (1016) with some stone and may be the result of natural weathering. Overlying this, a 0.10m deep blackish brown horizon (1015) with mottled clay and fragments of possible burnt ceramic building material and charcoal was visible in the central northern end of the feature. On the western edge of the feature a light-brown silty clay (1014) was observed. The main upper fill (1002) was a 0.39m deep light-brown silty clay flecks of charcoal and sub angular stones. This feature appears to cut through a 0.45m wide and 0.31m deep curving gully [1012] located on the north-eastern edge of the possible ditch terminus and truncated by the eastern field boundary (fig. 5a, 5d). This gully contained a mid-dark-brown silty clay (1012) with patches of possible re-deposited natural soil that may indicate some backfilling following initial excavation. These features are truncated by the field boundaries at the southern edge of the site. The possible ditch terminus is truncated by the hedgerow between the site and Cae'r Odyn housing estate, whilst the gully is truncated by the hedgerow immediately west of the A487, and presumably its nineteenth-century Turnpike precursor.

Immediately to the west of the site's eastern boundary and 5m north of the curving gully in the south-eastern corner a possible grave [1005] was discovered (figs. 6a, 15). The sub-rectangular cut feature was east to west orientated, 1.84m long, 0.59m wide and 0.24m deep with rounded sloping edges (fig. 6b). A home office exhumation licence was acquired and the feature was examined. It was filled by a dark reddish brown clay silt (1004) although no bones or bone fragments were recovered, suggesting that the slightly acid soils had destroyed any surviving skeletal remains. This feature's eastern end was located against the hedgerow bank forming the eastern site boundary. No dating evidence was recovered from this feature.

A circular 0.42m diameter pit [1007] was located 10.2m to the north of the grave feature and 4.8m west of the site boundary (figs. 7a, 16). The shallow nature of the feature (0.06m deep) suggested that it had been plough damaged (fig. 7d). The surviving fill of this pit (1006) contained charcoal, occasional burnt bone fragments and also 87 sherds of pottery, possibly from a single, fine walled, large diameter vessel. The very small sherds of pottery lacked any diagnostic features and were 5mm thick.

Two flint fragments were recovered during sample processing, and included a fragment of polished stone axe (see Lithics below). Some of the cremated bone was identified as being derived from a human foot (see Bone below) and subsequent dating of a bone fragment and charcoal sample indicate that the pit contents were deposited in the early part of the fourth-millenium BC (Cal BC 3945 to 3758 - UBA- 27626 and 3795 to 3655 - Beta- 390566, both at 2 sigma):

the Early Neolithic period. The pottery was fragmentary and lacked diagnostic features although the 'corky' fabric, as identified by Mullin, is similar to Early Neolithic vessels recovered from north and south Wales (see Mullin below).Both the C14 dates are compatible with date for the polished stone axe fragment and pottery fragments discovered within the same deposit.

Two pit features were located and excavated 3m to the north-west of the plough damaged Early Neolithic pit. Shallow linear pit feature 1009 was 1.3m long and 0.45m wide and 0.11m deep and had curving edges (figs. 7a, 7b, 16). The feature was orientated east to west suggesting it may have been a plough-damaged grave although no bone or artefacts were recovered from its fill, which was a firm mid-reddish brown clay silt (1008).

Adjacent to this feature and 0.2m to the south, sub-rectangular pit 1011 was 0.6m long and 0.26m wide and contained a dark grey-brown clay silt (fig. 7a, 7c). No bone or pottery were recovered from this deposit although it closely resembled that associated with the Neolithic pit deposit (1006).

Around 27m north west of Neolithic pit 1007 a series of five plough disturbed possible burials were identified, each oriented north-east to south-west (fig. 3). These features although were arranged in a line along the downward slope towards the northeastern corner of the field. Feature 1028, the southernmost possible grave was 1.4m long and 0.79m wide with rounded edges sloping to a maximum depth of 0.10m (figs. 8a, 17). The feature appeared to be plough truncated and contained a dark-brown silty clay (1027) (fig. 8b, 8c). Feature 1018 was located 2.3m to the north-west of 1028 and was 2m long and 0.76m wide and 0.10m deep (figs. 9a, 18). It was filled by a dark-brown silty clay containing a single sheep's tooth (fig. 9b). No bone fragments were discovered within these deposits.

Feature 1022, an elongated pit or possible north-west to south-east aligned grave, was located 12m north-west of 1018 (fig. 10a, 19). It was 2m long, 0.8m wide and varied in depth between 0.17m on the south-eastern end and 0.04m on the truncated north-western end. The mid-grey brown fill contained some post-medieval pottery, presumably introduced by a plough. This possible grave was heavily plough damaged especially on its north-western end (fig.10c). Phosphate samples were taken from the basal fill of this feature and although no phosphate remained, this does not preclude a grave interpretation (see below and appendix 2).

Feature 1020 was north-west to south-east aligned, 1.82m long, 0.82m wide and 0.15m. This possible grave was located 15m north west of feature 1022 (figs. 11a, 11b, 11c, 20). It appeared to have an associated 2m long and 0.015m deep gully [1030] partly visible on its northern side but heavily truncated by ploughing (fig. 11a). This feature may well be the remains of a curvilinear 'horse-shoe' shaped gully [1024] fully observed on possible grave 1032. Putative grave 1032 and associated gully was located 5.5m north west of gully 1030 (figs. 12a, 12c, 21). 1032 was a very shallow sub-rectangular pit that was 1.4m long, 0.75m wide and contained a grey-brown clayey-silt (1031) in which a small undiagnostic sherd of red unglazed pottery and a coal fragment were recovered. The base of this feature was phosphate sampled (see below) but returned a negative result. The U shaped

gully [1024] located around the south-western end of 1032 was 0.14m deep and 0.75m wide had a mid grey-brown clayey silt fill containing two sherds of nineteenth-century china pottery (figs. 12b, 12e). Given the plough truncation associated with these features it is highly likely that the sherds are intrusive.

Although features 1022 and 1032 did not contain any bone, dating evidence or positive phosphate samples indicating the former presence of a body their morphology probably suggests that they are the remains of plough damaged early medieval graves. The linear arrangement together with partial evidence for gullies around two of the possible graves are possibly analogous with examples excavated at Gogerddan although the gullies at Cae'r Odyn appear to be more curvilinear rather than rectangular.

Two features were discovered in the lower north-western corner of the field (figs. 3, 13a, 13b, 22). A 0.78m diameter and 0.21m deep post-hole or pit [1034] contained a dark brown silty-clay and fire cracked stones (1033) (fig. 13a). The only dating evidence was a china teacup handle although given the plough damage throughout the site this cannot positively date the feature. Three metres to the northwest of this pit an 18.95m long, 1.81m wide and 0.23m deep linear gully [1036] aligned north-northeast to south-southwest was revealed (fig. 13b). The full extent of the feature was not revealed as it ran through two site boundaries in the north-west corner. The feature's mid-grey brown clayey silt fill (1035) contained a fragment of late nineteenth or earlier twentieth-century glass that may suggest that it is a relatively recent feature.

4.3 Finds and post-excavation analysis

Pottery

Pot Sherd from Cae'r Odyn, Rhydypennau: Context: (1000)
Dr Peter V Webster

A jar or flagon sherd in soft orange-red fabric with darker inclusions which are probably pieces of fired clay. On a piece which lacks diagnostic features, we are left with the characteristics of the fabric itself. One assumes that the softness of the fabric derives both from a low firing temperature and probably exposure to spoil action. Both these features argue against a recent origin, while the absence of gritty filler makes this unlikely to be a medieval piece. A Roman origin thus seems probable but not provable.

Prehistoric Pottery from Rhydypennau, Ceredigion
Dr David Mullin

A total of 87 sherds weighing 71g and a number of small crumbs of pottery were recovered from a single context (1006). Of these 36 sherds weighing 45g were recovered by hand, the other 26g and the crumbs from flots. The extremely low sherd size (average = 1.2g) makes meaningful identification of these sherds problematic, which is further compounded by the lack of featured sherds. Nevertheless, the sherds probably represent a single, fine-

walled vessel (wall thickness 5mm) of fairly large diameter (although the lack of reasonable size sherds makes measuring the diameter impossible).

Some of the sherds have a reduced inner surface and an oxidised outer and some of the surfaces have voids from burnt-out/dissolved inclusions. The fabric is otherwise fairly free of inclusions with some quartz sand visible.

Positive identification of this vessel is not possible due to it's fragmentary state and the lack of any decorative/diagnostic features. The fabric can be paralleled by the early Neolithic vessels form Llandegai site B1, where "corky" fabrics dominated the assemblage (Lynch and Musson 2004, 34). Similar fabrics are also known from Dyffryn Ardudwy, Merioneth (Powell 1973) and Clegyr Boia, Pembrokeshire (Williams 1952) and have been recovered in small amounts from early Neolithic chambered tombs in both north and south Wales (for a summary see Lynch 2000).

Lithics

Dr Amelia Pannett

The lithic assemblage comprises two pieces of struck flint from context (1006), sample <1>. One lithic comprises a small flake, 4.3mm in length, 2.8mm wide and 0.07mm thick, struck from the outer edge of a grey flint core. White cortext is present along the distal edge of the flake, where it terminates in a hinge fracture. The platform is planar, with no preparation and the piece is defined as microdebitage (<5mm in diameter). It is probably a by-product of knapping rather than a deliberately manufactured flake.

The second piece comprises an irregular flake struck from a polished flint axe. The axe was manufactured from mid-grey flint and had been ground and polished to form the distinct curved shape. The flake was struck along the length of the axe, and was a crude removal. It measures 13.9mm in length, 26.2mm wide and 3.4mm thick. At the proximal end of the flake scars from further removals indicate that the platform was deliberately removed, or that the initial flake was broken down into several smaller pieces. The termination is hinged. The dorsal surface of the flake is smooth and polished, with patches of gloss. The striations resulting from the grinding and polishing of the flint are visible on the surface, running the length of the flake.

The microdebitage piece is undiagnostic, but the flake struck from a polished stone axe is likely to be of Early Neolithic date. The polished flake was struck from the body of the axe and was therefore not removed in order to sharpen or rework the cutting edge. Instead, it would seem that the flake represents the deliberate breakage of the axe. There are a number of sites in Wales that have produced flakes struck from polished axes, some of which have been reworked to form tools. It has been suggested that the reuse of flint from axes represents the maximisation of high quality flint (Burrow 2003), which would have been a rare and valuable resource in Wales. Thomas (1999), however, argues that the deliberate destruction of axes constituted a more symbolic act. This is pertinent in the context of a pit, where the fragment of the axe was buried in the ground,

removed forever from circulation, and perhaps associated with notions of sacrifice and attachments to a particular place. The axe fragment, representative of a high value artefact, was broken up and some parts buried in a pit in a specific place in the landscape, perhaps symbolising control over the landscape and its resources.

Flotation analysis: Contexts 1004 and 1006
Contexts 1004 and 1006 were subject to flotation sieving using a 1mm mesh, 250mu sieve.

Context 1004, the fill of possible grave 1005: 71 litres (92.3kg) of the fill was 100% sieved but no bone was discovered.
Context 1006, fill of feature 1007: litres of context 1006, was 100% sieved and yielded 15g of Carbon, 24 g of probable pottery, 4 g of burnt bone and 2g of flint.

The bone, flint and possible pottery were subject to analysis (see below) and a charcoal sample and a selection of bone was subsequently sent for C14 dating at Beta Analytic and CHRONO laboratory, QUB Belfast (below).

Bone

Oesteological Analysis of the Cremated Bone from Cae'r Odyn, Rhydypennau, Ceredigion
Gaynor Western, Osteofreelance (full report- appendix 1)

The osteoarchaeological analysis of the cremated bone recovered from context [1006] revealed that the deposit was likely to contain the remains of at least one human individual. Only a very small amount of cremated bone was present in comparison to what would be expected from the remains of a complete individual and thus the sample was recorded as a 'cremation related deposit'. The majority of bone present had been fully oxidised through the cremation process and the bone was highly fragmented in preservation. Some breakage is thought to have occurred through post-depositional processes. Many of the fragments were non-diagnostic and none could be positively identified as animal remains. All the cremated bone present demonstrated evidence of cracking and fissuring, indicating that the bone was surrounded by soft tissue when it was burnt. Interestingly, the bone fragments that could be tentatively identified appeared to belong to the foot. This may suggest that this deposit represents a very small portion of cremated remains belonging to the extremities of the body that may have become intermingled within some pyre debris during the cremation process and the management of the cremation. This indicates that the vast majority of the cremated bone that would have been produced by the cremation was carefully separated or extracted and was treated separately to the deposit contained within pit cut [1007].

The earliest dates for cremation practice in Wales range between 3200-3100 cal. BC, around the late Neolithic period, with cremation and inhumation practices being noted as contemporary in many cases and some funerary monuments likely to have been re-used at later dates (Brittain 2006). Indeed, non-local soils were found adhering to the surfaces of cremated bone at Moel Goedog ring cairn 1 and

Great Carn ring cairn 1, suggesting the exhumation and reburial of cremated remains (Brittain 2006).

Phosphate

Phosphate Concentrations in soil samples from two supposed graves (1022 and 1032)

Dr J. Crowther (full report – appendix 2)

Excavations at Rhydypennau in 2014 revealed the presence of two enigmatic cut features (1022 and 1032) which appeared from their size and morphology to be graves. However, apart from one very small fragment of possible bone found in 1032, no skeletal remains were found. At nearby excavations undertaken on similar soils at a cemetery site at Gogerddan (Crowther 1997), a paucity of bones was also recorded (due to leaching in the well-drained, acidic soils), but clear evidence of burials was revealed through phosphate analysis. Accordingly, a programme of phosphate analysis was undertaken on 40 bulk soil samples (including control samples) taken from the two supposed graves at Rhydypennau in the hope that this might provide evidence of the likely origins of the cut features. The samples from within the features were taken from the very bottom of the fills, and would therefore be expected to show clear signs of phosphate enrichment if they are graves. Reviews of the basic principles and applications of phosphate analysis, including examples from burial and cremation sites, are presented by Bethel and Máté (1989), Crowther (1997, 2002) and Heron (2001).

Unfortunately, the fine earth (< 2 mm) fraction of the soils at Rhydypennau contains variable proportions of sands (derived from quite coarse glacio-fluvial deposits), which are effectively ‘inert’ in terms of their capacity to take up and retain phosphates. In previous work undertaken on samples from Gogerddan (Crowther 1997) it was found that, for these soils, analysis of the silt + clay fraction (i.e. < 0.063 mm; rather than the conventional fine earth fraction) provided a better basis for investigating phosphate enrichment associated with burials. This approach was therefore adopted in the present study. In addition phosphate-P (total phosphate), determinations were also made of loss-on-ignition (LOI), which provides an estimate of the organic matter concentration), in order to facilitate the interpretation of the phosphate results.

Supposed grave 1022

In total, 22 samples were analysed: 18 from within the cut of the feature and 4 as controls (as detailed in sketch plan in Figure 1). The samples from the basal fills are moderately organic (LOI range, 3.63–4.33%), which presumably reflects the inclusion of topsoil or other organic-rich materials. In this case, the control samples clearly comprise (more minerogenic) subsoil material with much lower LOI values (range, 1.13–1.79%). In view of the difference in character of the fill and control samples, the control samples do not provide a good basis for evaluating background phosphate concentrations against which the fills may be evaluated.

These results clearly provide no evidence to support the present interpretation of cut feature 1022 as being a grave. This is not to say that it is not a grave. The results from Gorgeddan demonstrate that bone-derived phosphate can survive in these soils. It seems unlikely therefore that no signs of phosphate enrichment would be evident in the basal fills if there had been a burial. However, it may be that any signs of phosphate enrichment within the fill may have been dispersed and 'diluted', either as a result of plough damage (the remains of the cut feature are quite shallow) or through leaching of phosphates into the underlying subsoil.

Supposed grave 1032

In this case, the control samples appear to be from the lower part of the topsoil horizon (LOI range, 4.31–4.80%), and are consistently rather more organic rich than the basal fill (range, 3.56–4.12%). This suggests that this fill, and also that in cut feature 1022 (which displays a similar range of LOI), includes some material of subsoil origin, that was presumably incorporated during the digging and back/infilling of the feature. As would be expected, there is a general underlying relationship between phosphate-P and LOI (Figure 4), but this is weak and not statistically significant.

The results of the phosphate analysis undertaken on samples from both cut features provide no evidence to support their interpretation as graves. Absence of evidence of phosphate enrichment is not, however, evidence of the absence of burials. As noted above, plough damage and/or leaching could well have weakened and dispersed the phosphate signal.

Dating

C14 Dating: (context 1006) (full results - appendix 3)

1. Context (1006), Cremated bone from fill of pit [1007] – 5029 +/-35 BP (UBA-27626), Cal BC 3945 – 3758 (at 2 sigma).

2. Context (1006), Charcoal from fill of pit [1007] – 4960 +/-30 BP (Beta-390566), Cal BC 3795 – 3655 (at 2 sigma).

Evaluation Context List

	AW Project 2248: COR/14/EV	
Context	**Description**	**Deposit/Fill/Cut**
1000	Dark brown clayey-silt (top soil)	Deposit
1001	Mid-yellow, brown silty clay (natural)	Deposit
1002	Light greyish brown silty clay (upper fill of 1003)	Deposit
1003	Possible ditch terminus	Cut
1004	Dark reddish brown clayey silt (fill of 1005)	Deposit
1005	Possible grave cut	Cut
1006	Dark grey brown clayey silt (fill of 1007)	Deposit

1007	Truncated pit	Cut
1008	Mid-reddish brown clayey silt (fill of 1009)	Deposit
1009	Truncated pit	Cut
1010	Dark grey brown clayey silt (fill of 1011)	Deposit
1011	Pit	Cut
1012	Mid-dark brown clayey silt (fill of 1013)	Deposit
1013	Curvilinear gully	Cut
1014	Light-brown silty clay (fill of 1003)	Deposit
1015	Black-brown, mottled silty clay	Deposit
1016	Grey silty clay	Deposit
1017	Dark brown silty clay	Deposit
1018	Sub-rectangular pit	Cut
1019	Dark grey brown clayey silt (fill of 120)	Deposit
1020	Sub-rectangular truncated pit	Cut
1021	Mid grey-brown clayey silt (fill of 1022)	Deposit
1022	Pit/grave?	Cut
1023	Mid-grey brown clayey silt (fill of 1024)	Fill
1024	Truncated curvilinear gully	Cut
1027	Dark brown silty clay (fill of 1028)	Deposit
1028	Truncated grave or rectangular pit	Cut
1029	Mid grey brown silty clay (fill of 1030)	Deposit
1030	Horse-shoe shaped gully	Cut
1031	Mid grey brown clayey silt (fill of 1032)	Fill
1032	Shallow sub rectangular pit	Cut
1033	Dark brown silty clay (fill of 1034)	Fill
1034	Pit	Cut
1035	Mid grey brown clayey silt	Fill
1036	Linear truncated field boundary?	Cut
1037	Mid grey brown clayey silt (fill of NW end of1024)	Deposit
1038	Dark brown silty clay (fill of SE end of 1024)	Deposit

Finds catalogue

	Context	Description	Amount	Weight (g)	Kept/Discarded
Pottery					
	1000	Roman?	1	8	Kept
	1000	ND- North Devon Gravel Tempered Ware (1650-1750)	4	292	Disc.
	1006	Early Neolithic	87	71	Kept
	1021	BC- Bone China (c. 1790-20th century)	1	8	Disc.
	1023	P.M. Red Earthenware (19th century)	1	4	Disc.
	1031	CBM/Pot? P.M	1	5	Disc.

	1033	BC- Bone China (c. 1790-20th century)	1	2	Disc.
	1035	ND- North Devon Gravel Tempered Ware (1650-1750)	1	23	Disc.
	1038	BC- Bone China (c. 1790-20th century)	2	1	Disc.
Misc.					
	1017	Splintered sheep's tooth	n/a	<1	Disc.
	1021	Clay Pipe Stem	1	3	Disc.
	1035	Top of glass bottle neck (19th to 20th century)	1	3	Disc.
		Total finds			
		Pottery:	99	88 kept	
		Miscellaneous:	2	0 kept	
		Grand Total:	101		

5. Discussion and Conclusions

The excavated site at Cae'r Odyn has clearly been plough disturbed over a considerable period and, as a result, some of the archaeological evidence is suggestive rather than definitive. The gulley feature at the upper south-eastern corner of the site appear to be truncated by the hedgerow and developments beyond and hint at historic or prehistoric activity beyond the site that is now lost. The possible boundary ditch and pit at the north-western was not dated but could relate to a number of periods. The remainder of site also appears to contain evidence that may relate to use over a wider range of periods. The Early Neolithic pit remains the only dated feature on the site and at c. 3700 BC may be one of the earliest from northern Ceredigion, with the pits at Cwm Meudwy, from the southern end of the county, dated to roughly the same period (Pannett 2011)

The dates associated with the fill of pit [1007] suggests that people in the early fourth-millenium, in northern Ceredigion, were possibly laying claim to the land by means of buried structured deposits that included a fragment of a polished axe, pottery and cremated human bone. Thomas (1991) notes that Neolithic pits are frequently shallow, not weathered and have homogenous fills suggesting relatively quick back filling. Whilst the profile of pit 1007 is probably not complete, due to plough damage, the remaining fill is characteristically homogenous. Thomas (1991, 64) notes also that they also frequently contain burnt material. The inclusion of a fragment of a deliberately broken polished flint axe may suggest

that it was regarded as 'polluted' and unsuitable for continued use, whilst the cremated human foot bone may have been a deposited 'artefact', rather than a grave, and of secondary or equal significance to the axe fragment and the pottery (Thomas 1991, 66-68). This act may, as Pannett suggests above, have been an attempt to symbolically lay claim to the landscape.

A small sherd of unstratified, probable Roman pottery was discovered on site suggesting possible activity within the field in the first four centuries of the first millennium AD though any other evidence of confirmed activity from this period is lacking.

Although heavily plough damaged and lacking phosphate concentrations derived from decayed skeletal remains, the common alignment, morphology and dimensions of features 1032, 1020, 1022, 1018, 1028 and 1005 suggests that they were graves. This cannot be stated with any certainty due to the lack of supporting evidence but the speculation is not unreasonable. The dimensions of the graves in terms of length, width and depth are comparable to the Gogerddan site (Murphy 1992, 16). Feature 1032 and 1020 appear to possess associated gullies, albeit ephemeral in the case of 1020, which may be compared to the Plas Gogerddan examples, located 2km to the south (Murphy 1992, 17-23). Some of the Gogerddan gullies, interpreted as foundation gullies for contiguous timber post structures, were also very shallow and discontinuous. The opening within the rectangular gullies at Gogerddan is, however, towards the eastern side whereas the Cae'r Odyn gullies appear to open on the western end. The C14 dating from the Gogerddan enclosed graves suggests a date range from the third to seventh-century AD, the interface of the Roman and early medieval periods.
The lack of an identified associated church is not problematic in this case as only 22% of those examined by Longley show an association with known early church sites (Longley 2002, 313). Although the alignment of the Gogerddan graves is described as east to west, the long axis of one of the associated structures (Gogerddan 374) does vary slightly (Murphy 1992, 17). Longley (2002) has postulated that the orientation of graves of the early medieval period may be primarily determined by sun rise or sun set on patronal feast days or Easter.

Excavated early medieval cemeteries at Tan Dderwen, Capel Eithin and Gogerddan have been shown to respect prehistoric funerary monuments (Williams 2006, 150-158). Whilst the Gogerddan graves appeared to reference a standing stone, at Cae'r Odyn the proximity of the barrow cemetery to the north, Carn or Cromlech to the south, may also have served as a 'commemorative focus' (Williams 1996, 150). In the same way the mechanism of re- referencing these special places may have legitimized their ties to this land.

It is likely that a number of features were truncated by developments and the roadway beyond the southern and eastern boundary of the site. It should, therefore, be noted that all green fields in this area have the potential for significant features spanning several millennia.

6. Acknowledgements

Archaeology Wales would like to thank Cymdeithas Tai Cantref, Andy Shobrook, Simon Ratty, Colin Davies, Dr. John Crowther, Dr Peter Webster, Dr Amelia Pannett, Gaynor Western, Dr David Mullin, Professor Howard Williams, Irma Bernardus, Dr Toby Driver, Ken Murphy and Zoe Bevans-Rice (DAT) for their assistance during the evaluation and subsequent post-excavation analysis.

The evaluation and excavation paper archive will be stored with the RCAHMW, Aberystwyth and the finds with Ceredigion Museum, Aberystwyth.

7. Bibliography

Bethell, P. and Máté, I. (1989) The use of phosphate analysis in archaeology: a critique. Pp. 1-29 in *Scientific analysis in archaeology* (J. Henderson, ed.), Oxford University Committee for Archaeology, Monograph, 19.

BGS Geology Viewer
http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html
(accessed 02/07/14).

Brittain, M. 1994. The Cremated Animal Bone. In The Anglo-Saxon Cemetery at Spong Hill, North Elmham: Part VIII The Cremations. McKinley, J. *East Anglian Archaeology* 69

Burrow, S. 2003. *Catalogue of the Mesolithic and Neolithic Collections in the National Museums and Galleries of Wales*. Cardiff: National Museum of Wales.

Charnock, R.B. and Driver,T. 2001. Prehistoric flint finds from Plas Gogerddan, near Aberystwyth, Ceredigion. *Studia Celtica*, XXXV, 341-362.

Crowther, J. (1997) Soil phosphate surveys: critical approaches to sampling, analysis and interpretation. *Archaeological Prospection, 4*, 93-102.

Daniel, G.E. 1950. *The Prehistoric Chambered Tombs of England and Wales* (Reissue edition 2013), Cambridge: Cambridge University Press.

Driver, T. 1998. Llandre, Geneu'r Glyn (SN 626 862) in *Archaeology in Wales* 38, 94-95.

Driver, T. 2006. Rhydypennau Barrow Cemetery. Coflein (RCAHMW) online database.
http://www.coflein.gov.uk/en/site/405452/details/RHYD+Y+PENNAU+BARROW+CEMETERY/ (accessed 20/06/14)

Driver 2008. Llandre Barrow Cemetery, Pant y Peran. Coflein (RCAHMS) online database.

http://www.coflein.gov.uk/en/site/405449/details/LLANDRE+BARROW+CEMETERY%2C+PANT+Y+PERAN/
(accessed 20/06/14)

Driver, T. 2009. Barrows, cropmarks and Lewis Morris: An Early Bronze Age ritual complex discovered at Dollwen, Goginan, Ceredigion in *Ceredigion* XVI, Number 1, 1-29.

Heron, C. (2001) Geochemical prospecting. Pp. 565-573 in *Handbook of archaeological sciences* (D.R. Brothwell and A.M. Pollard, eds). Chichester: Wiley.

Longley, D. 2002. Orientaton within Early Medieval Cemetries: Some Data from North-West Wales in *The Antiquaries Journal*, Volume 82, 309-321

Lynch, F 2000. Pottery in Lynch, F, Aldhouse-Green, S and Davies J.L *Prehistoric Wales*. Stoud: Sutton, 59-63.

Lynch, F and Musson, C 2004. A Prehistoric and Early Medieval Complex at Llandegai, near Bangor, North Wales. Excavations directed by C.H Houlder 1966-67. *Archaeologia Cambrensis* 150, 17-142.

Murphy,K. 1992. Plas Gogerddan, Dyfed: A Multi-Period Burial and Ritual Site. *Archaeology Journal* 149, 1-38.

Pannett, A. (2011). Pits, pots and plant remains: trends in Neolithic deposition in Carmarthenshire, South Wales. In J. Thomas and H. Anderson-Whymark (eds). *Regional Perspectives on Neolithic pit deposition: beyond the mundane*. Oxford: Oxbow, 126-143.

Powell, T,G.E 1973. Excavation of the megalithic chambered tomb at Dyffryn Ardudwy, Merioneth, Wales. *Archaeologia* 104, 1-49.

Soilscapes viewer: http://www.landis.org.uk/soilscapes2/ (accessed 02/07/14)

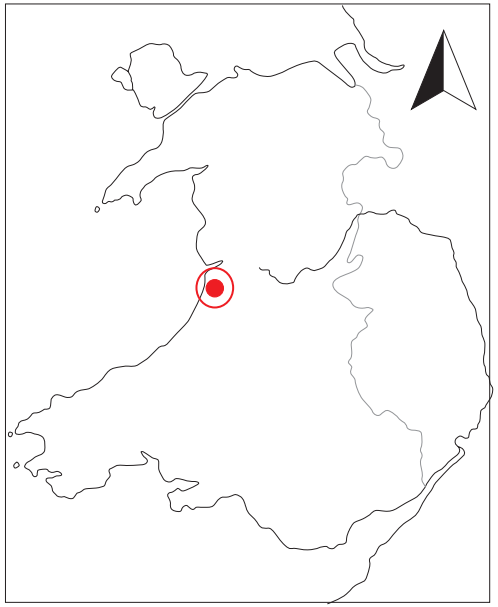
Thomas. J. 1999. *Understanding the Neolithic*. London: Routledge.

Tomas, J. 1898. Pen y Garn. Cymru. Cyf. XV (Gorffennaf). Rhif 84, 28-29.

Williams, A 1952. Clegyr Boia, St Davids (Pembrokeshire): Excavations in 1943. *Archaeologia Cambrensis* 102, 20-47.

Williams, H. 2006. *Death and Memory in Early Medieval Britain*. Cambridge: Cambridge University Press

Williams, J. G. 1867. Ancient Encampments near Abersytwyth, *Archaeologia Cambrensis*, Vol. XIII, Third Series



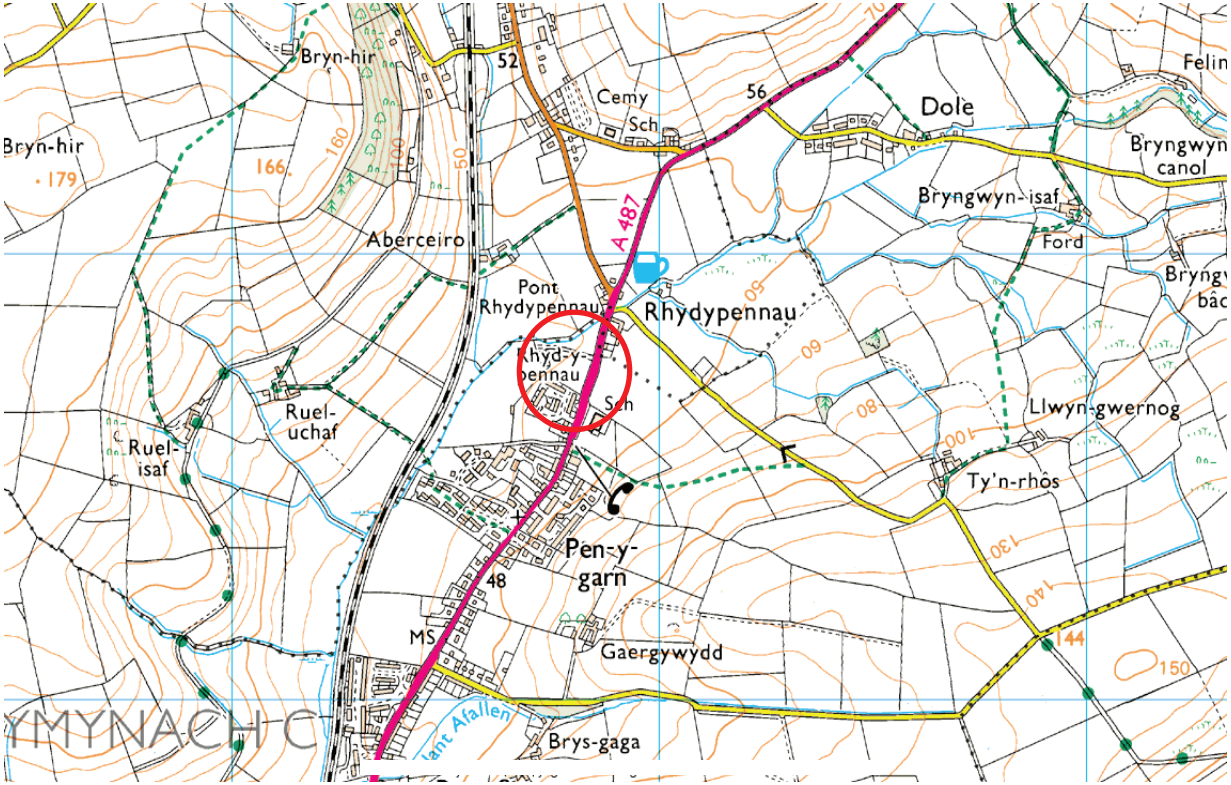


Fig. 1

Site location

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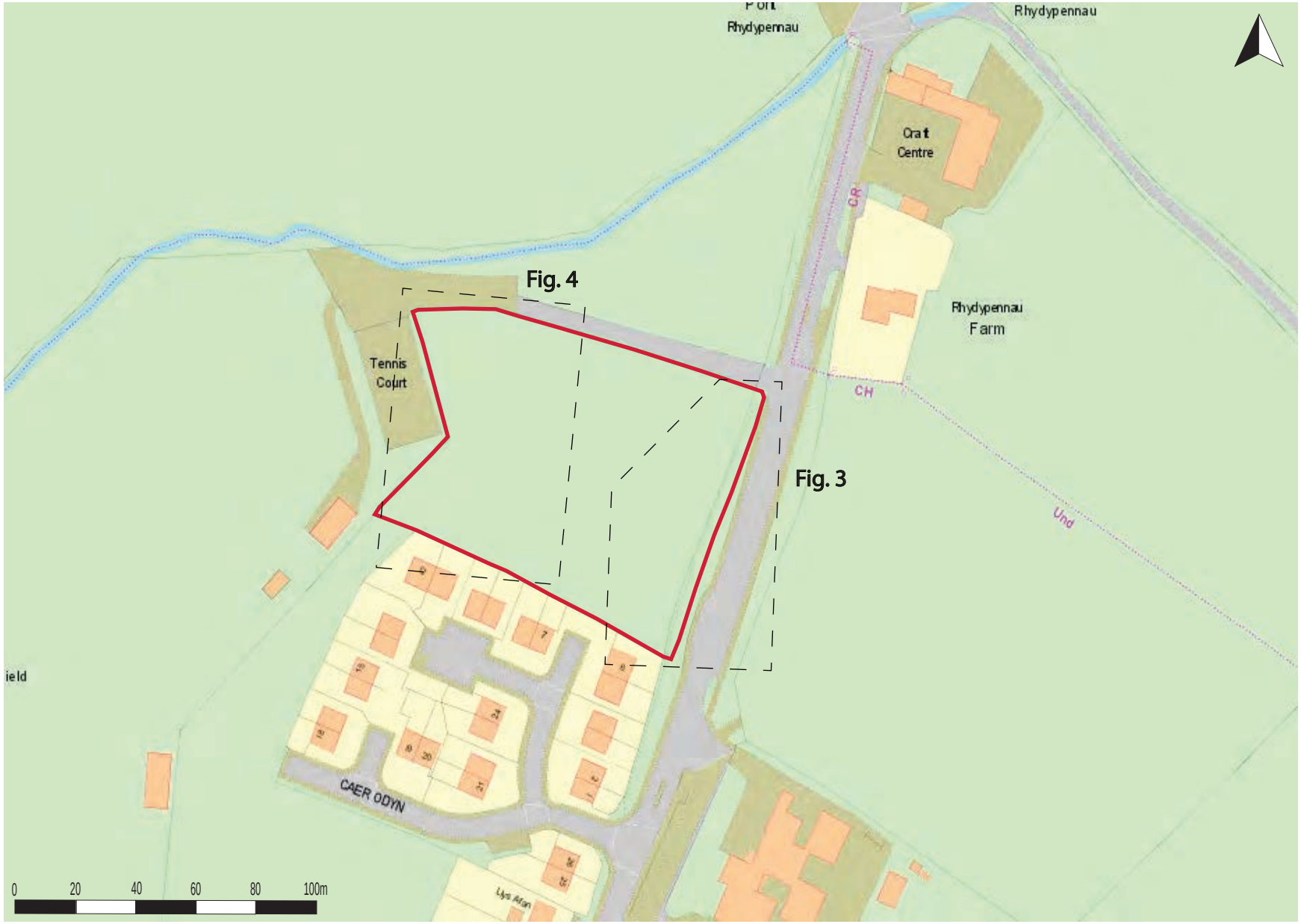

Fig. 2

Site Plan showing field and outlines of Figures 3 and 4

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Fig 3: Site Plan 1 (Eastern End)

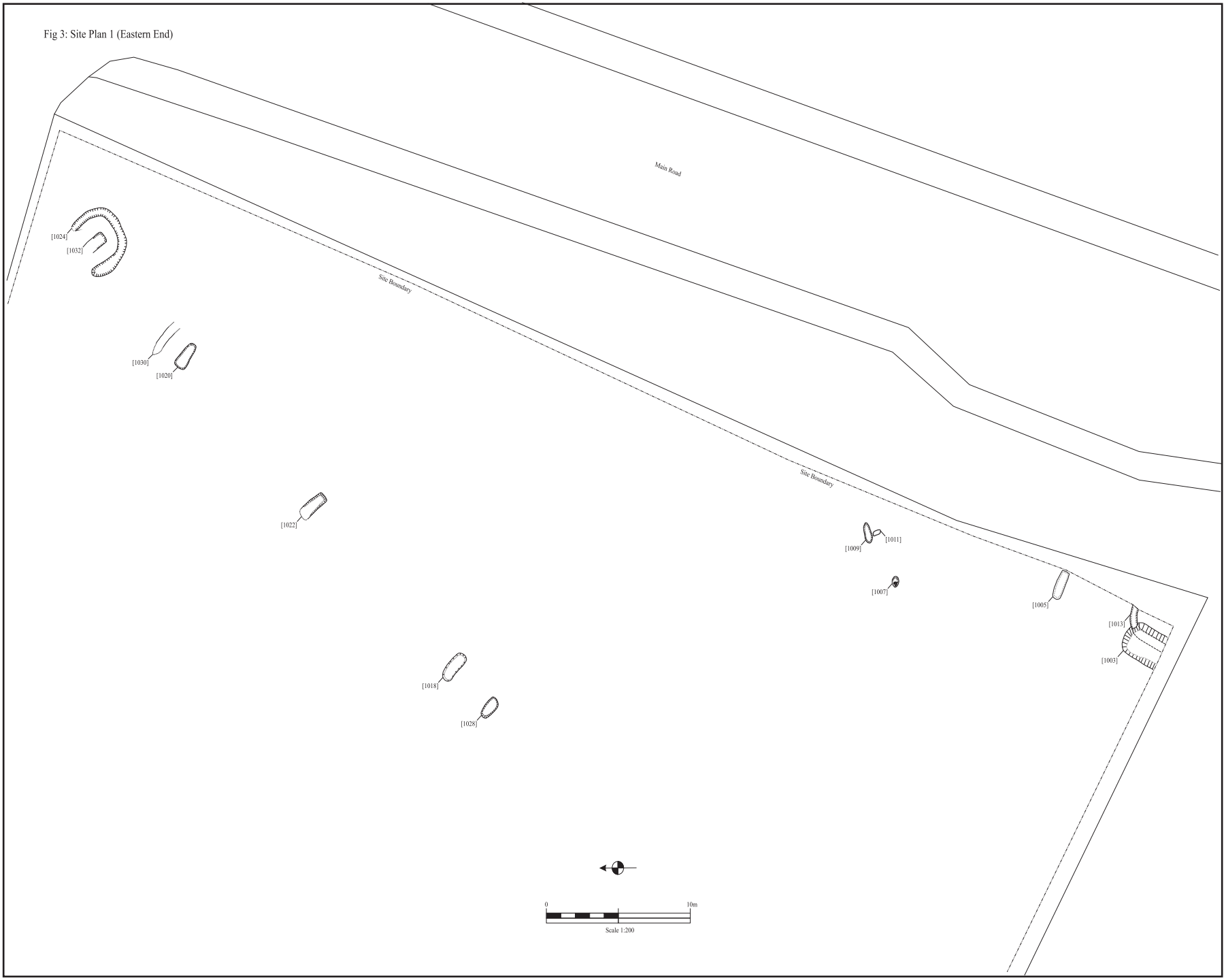

Fig. 3

Site Plan:
Eastern End

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Fig 4: Site Plan 2 (Western End)

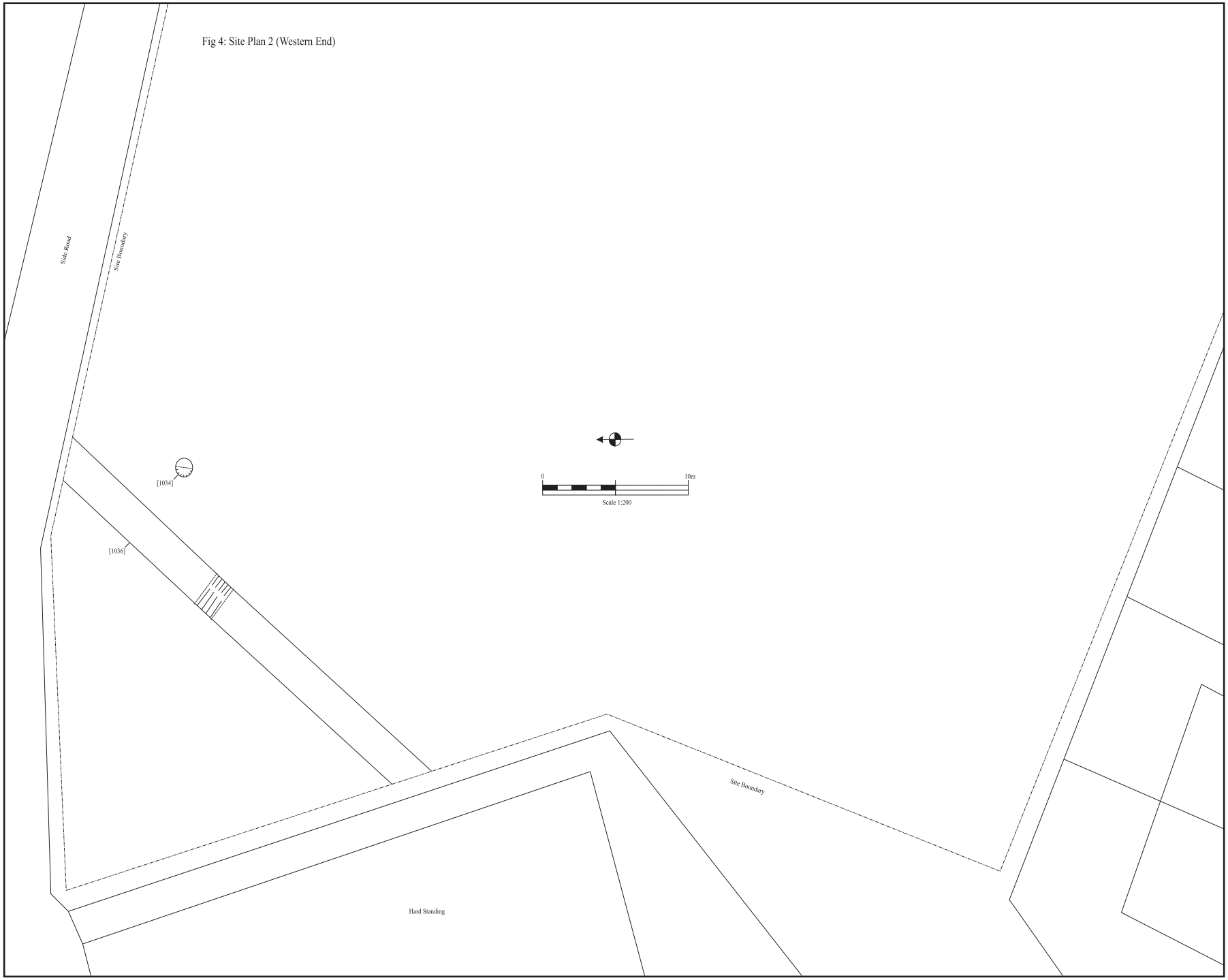

Fig. 4

Site Plan:
Western End

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Fig 5a: Plan of Linears [1003] and [1013]

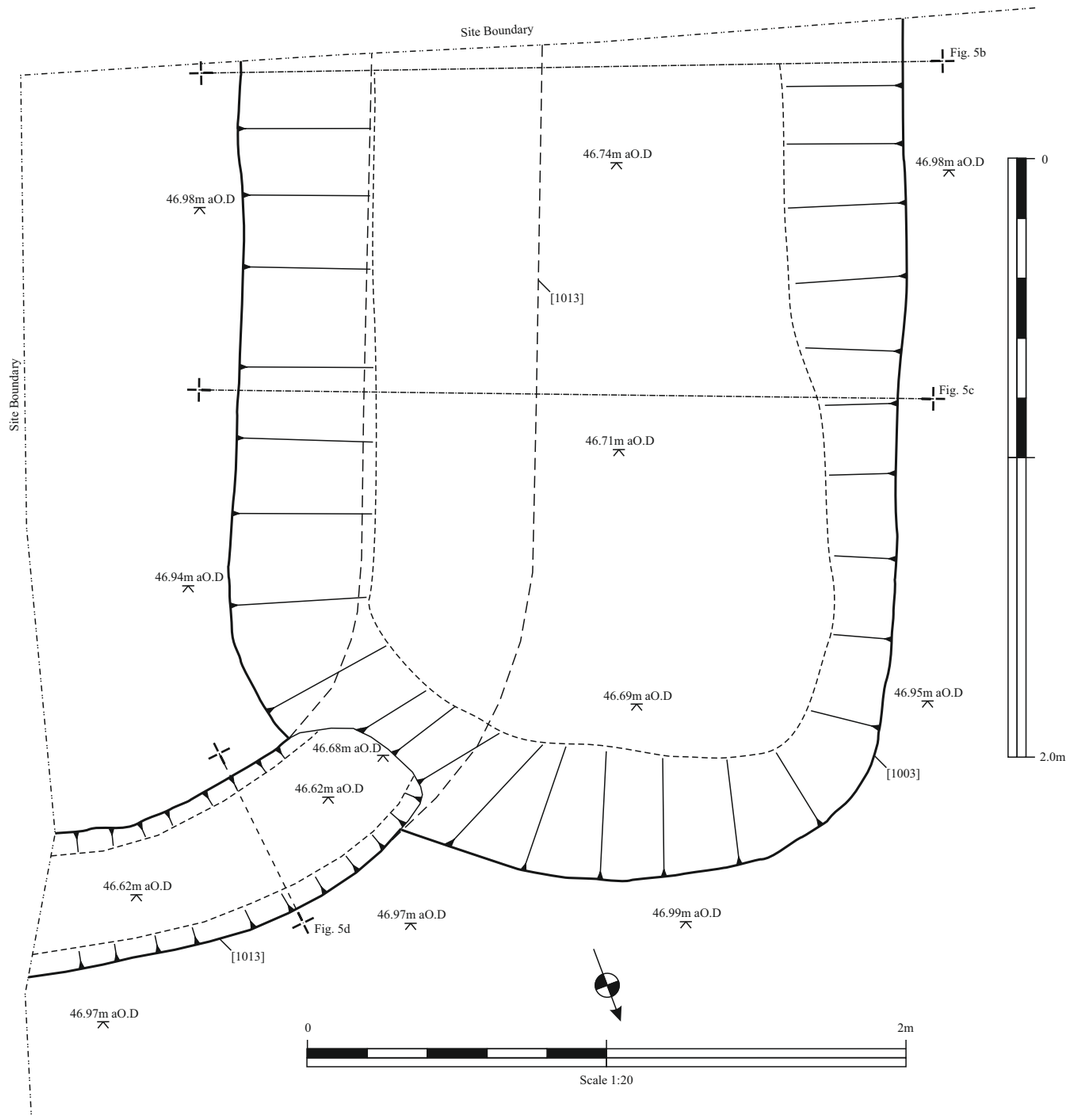

Fig 5b: North Facing Section in Linear Terminus [1003]

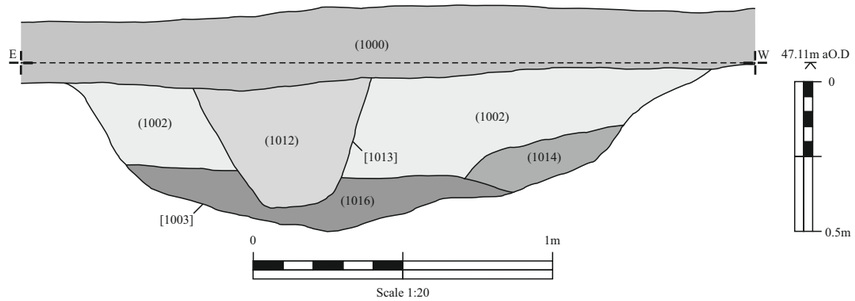

Fig 5c: North Facing Section in Linear Terminus [1003]

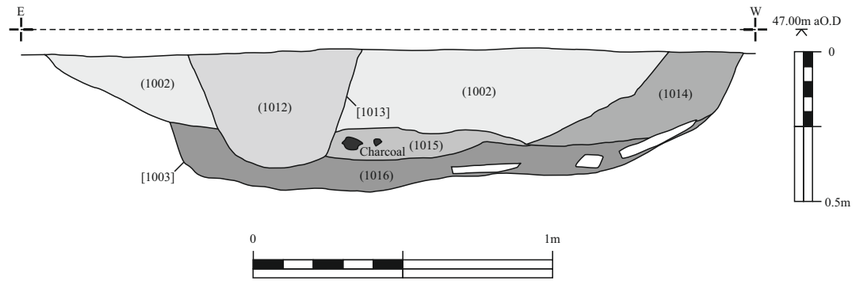

Fig 5d: South West Facing Section through Linear [1013]

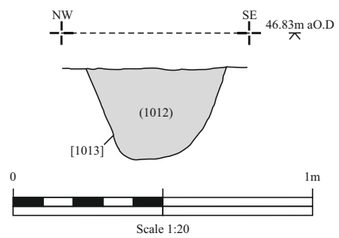

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Fig 5.
Plan and Sections of Features
[1003] and [1013]

scale
Plan 1:20
Section 1:20

Fig 6a: Plan of Grave [1005]

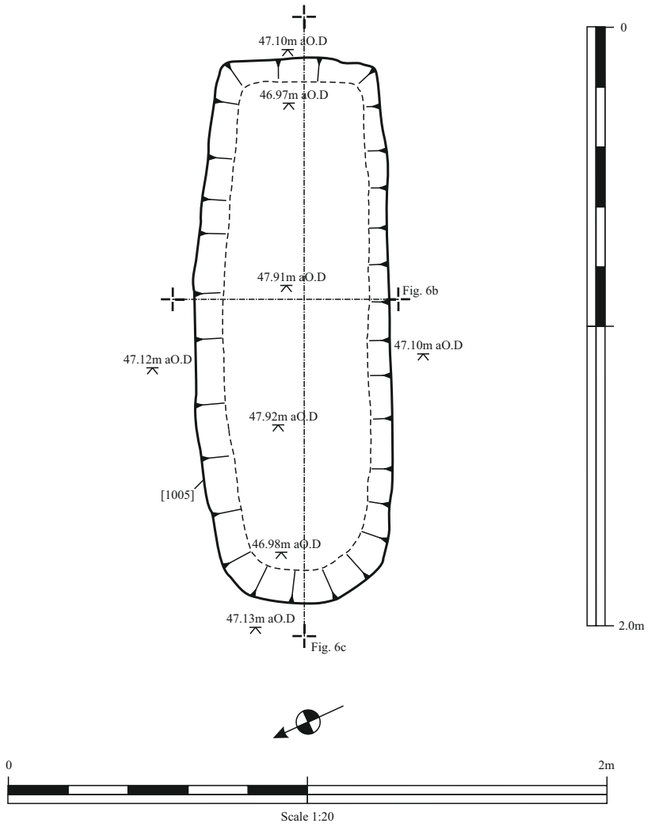

Fig 6b: West Facing Section through Grave [1005]

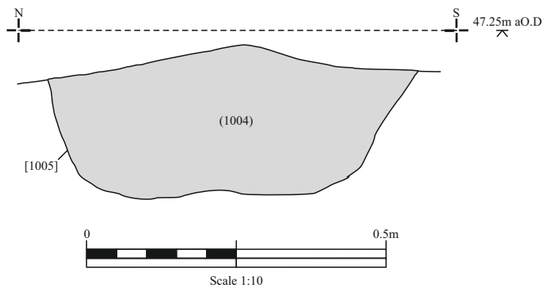

Fig 6c: East - West Profile through Grave [1005]

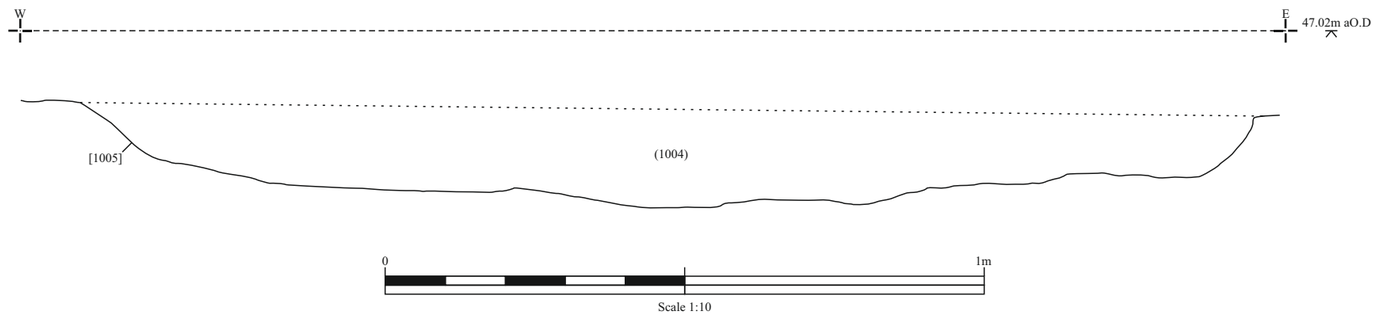

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Fig 6.
Plan and Sections of Grave [1005]

scale
Plan 1:20
Section 1:10

Fig 7a: Plan of Features [1007][1009] and [1011]

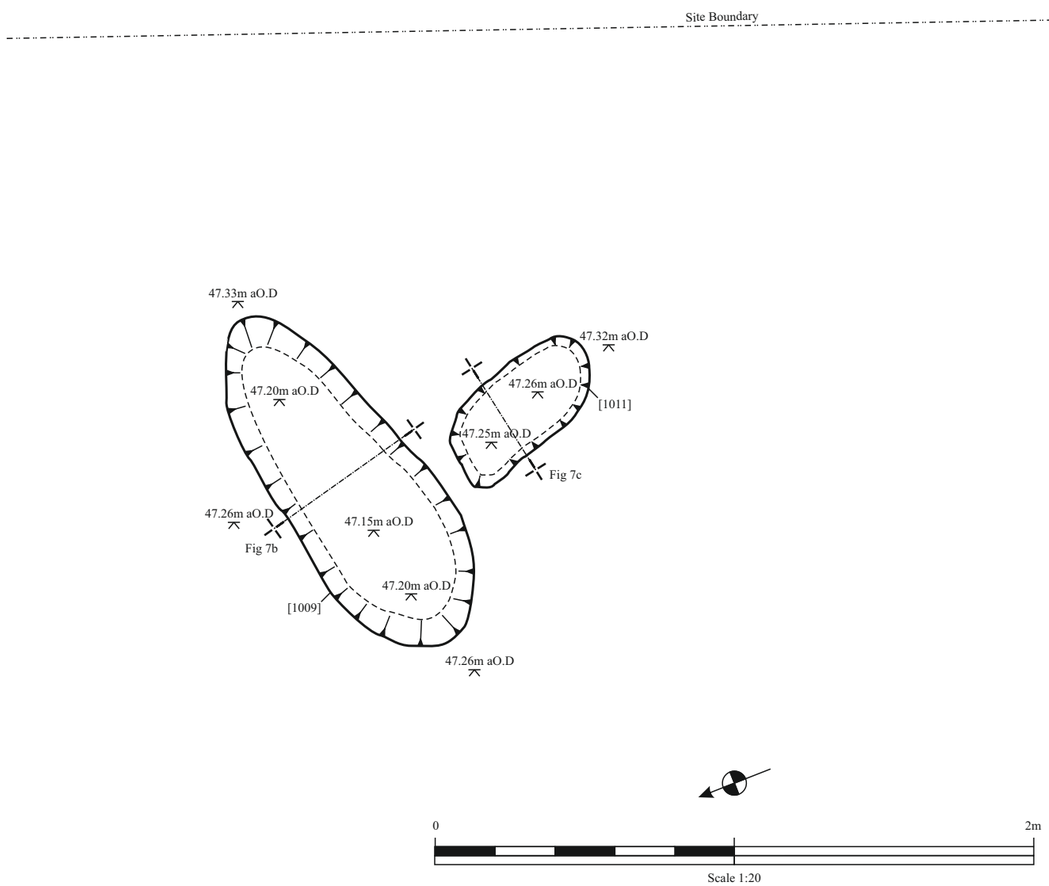


Fig 7b: South West Facing Section through Pit [1009]

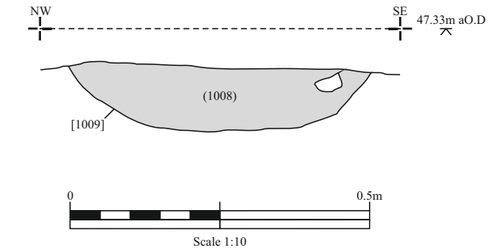
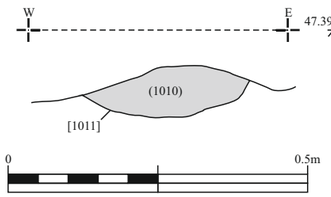


Fig 7c: South Facing Section through Pit [1011]



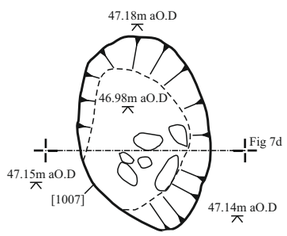


Fig 7d: East Facing Section through Cremation [1007]

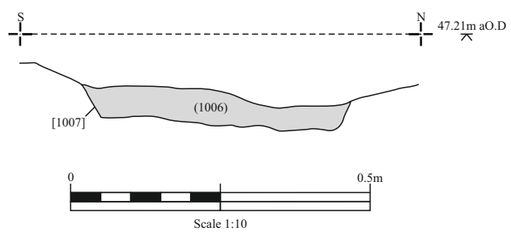


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Fig 7.
Plan and Sections of Features
[1007][1009] and [1011]

scale
Plan 1:20
Section 1:10

Fig 8a: Plan of Grave [1028]

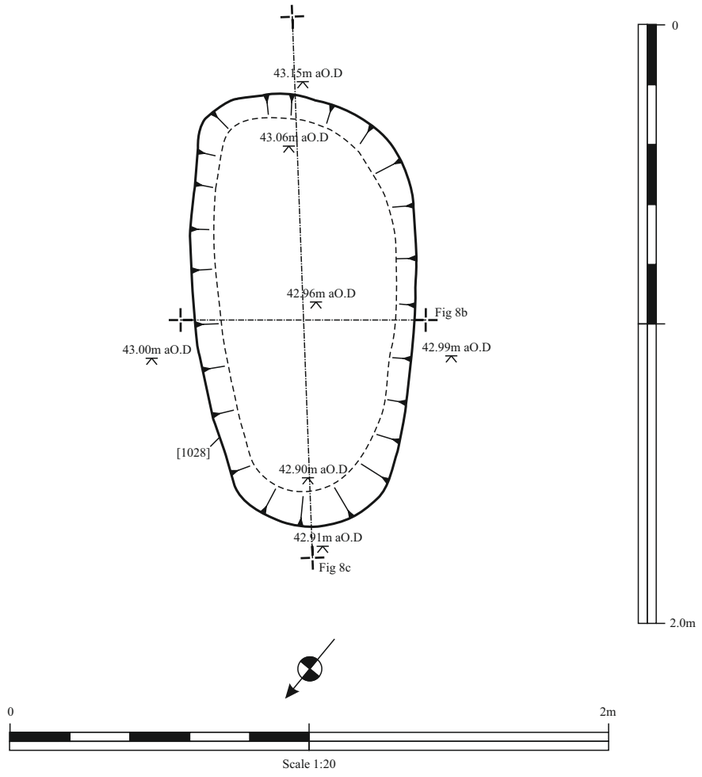

Fig 8b: Nort West Facing Section through Grave [1028]

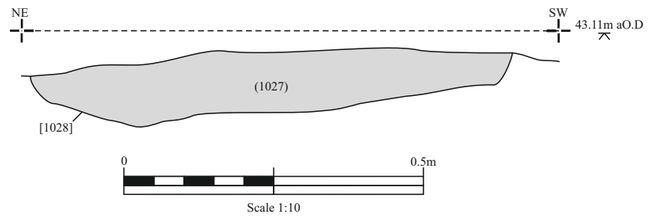

Figure 8c: South East - North West Profile through Grave [1028]

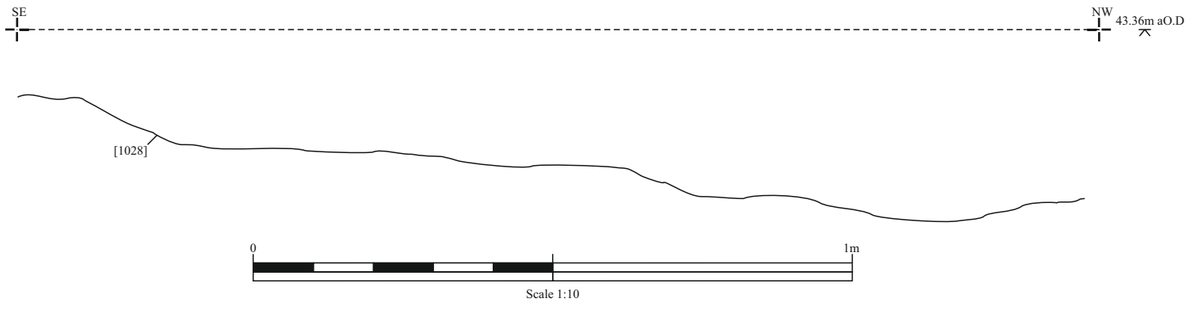

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Fig 8.
Plan and Sections of Grave [1028]

scale
Plan 1:20
Section 1:10

Fig 9a: Plan of Grave [1018]

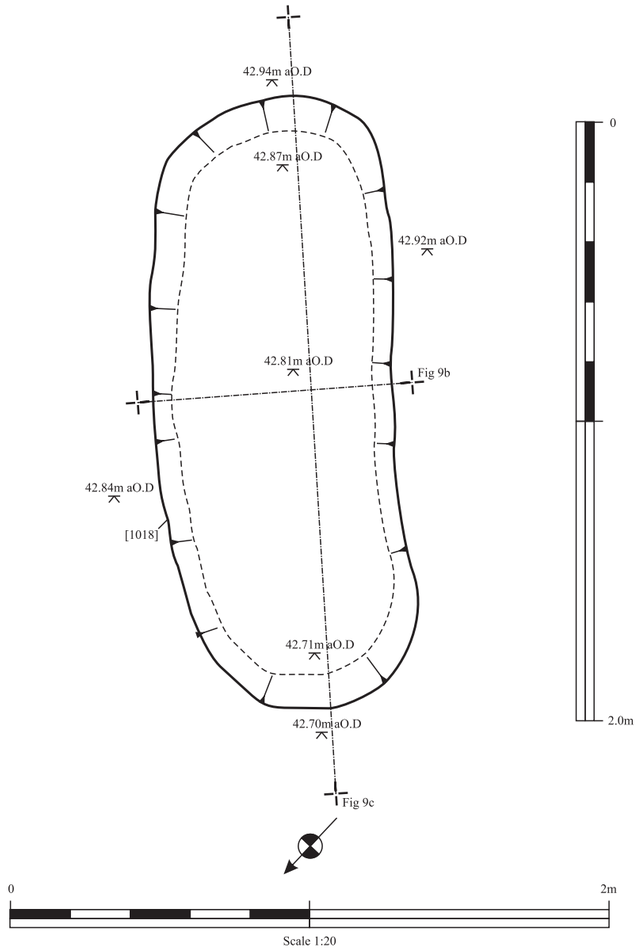

Fig 9b: North West Facing Section through Grave [1018]

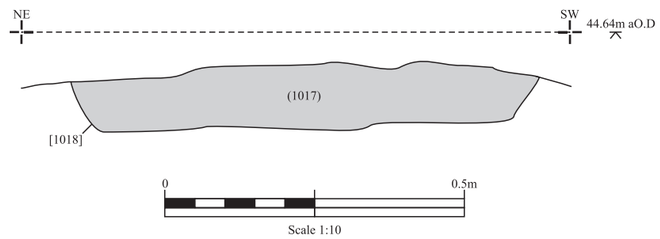

Fig 9c: South East - North West Profile through Grave [1018]

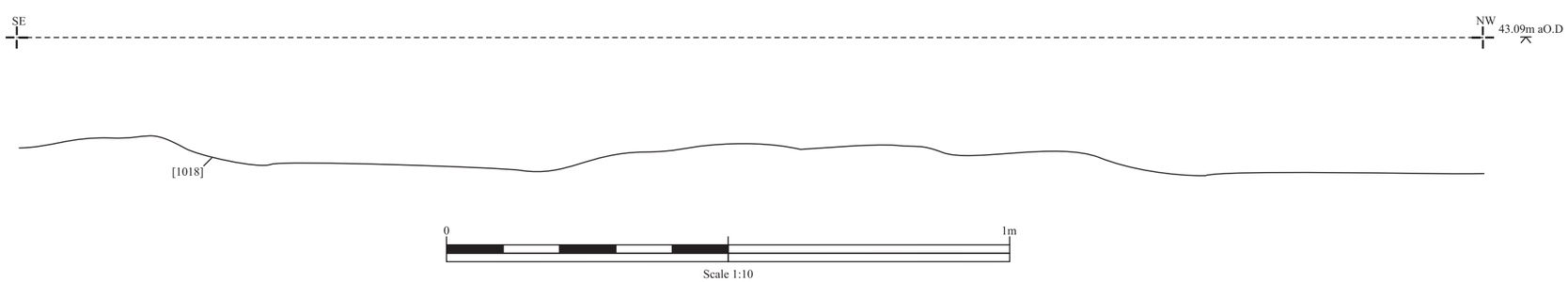

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Fig. 9
Plan and Sections of Grave [1018]

scale
Plan 1:20
Section 1:10

Fig 10a: Plan of Grave [1022]

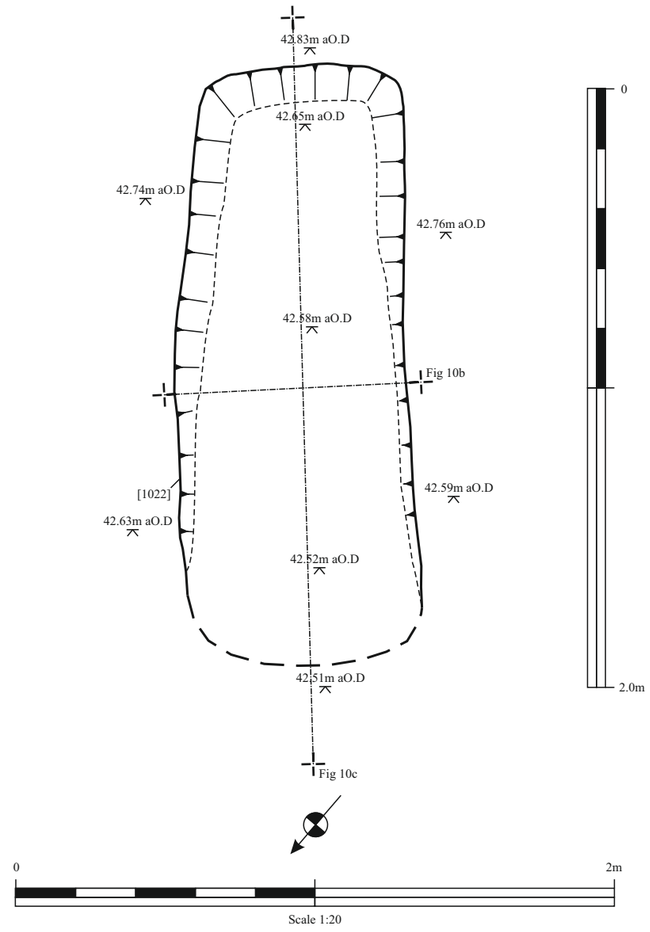

Fig 10b: North East - South Profile through Grave [1022]

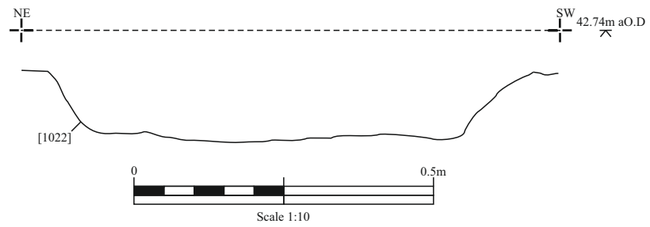

Fig 10c: South East - North West Profile through Grave [1022]

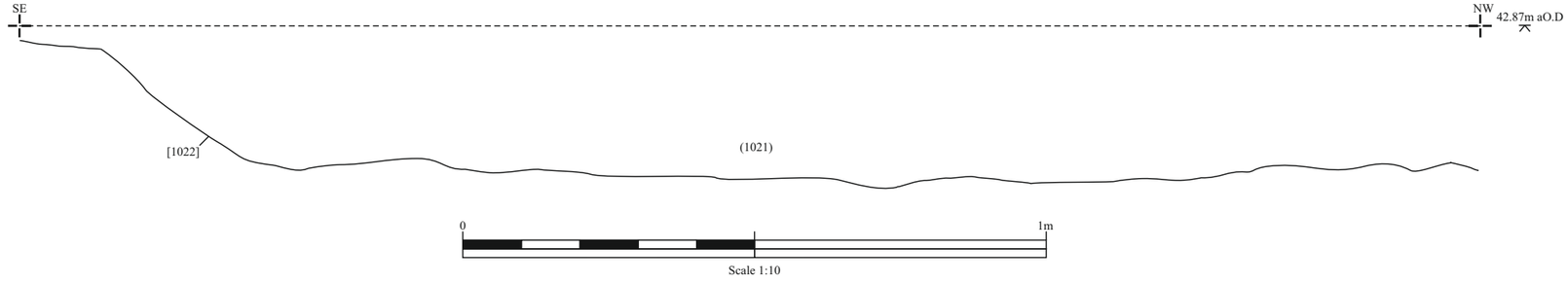

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Fig 10.
Plan and Sections of Grave [1022]

scale
Plan 1:20
Section 1:10

Fig 11a: Plan of Grave [1020] and Linear [1030]

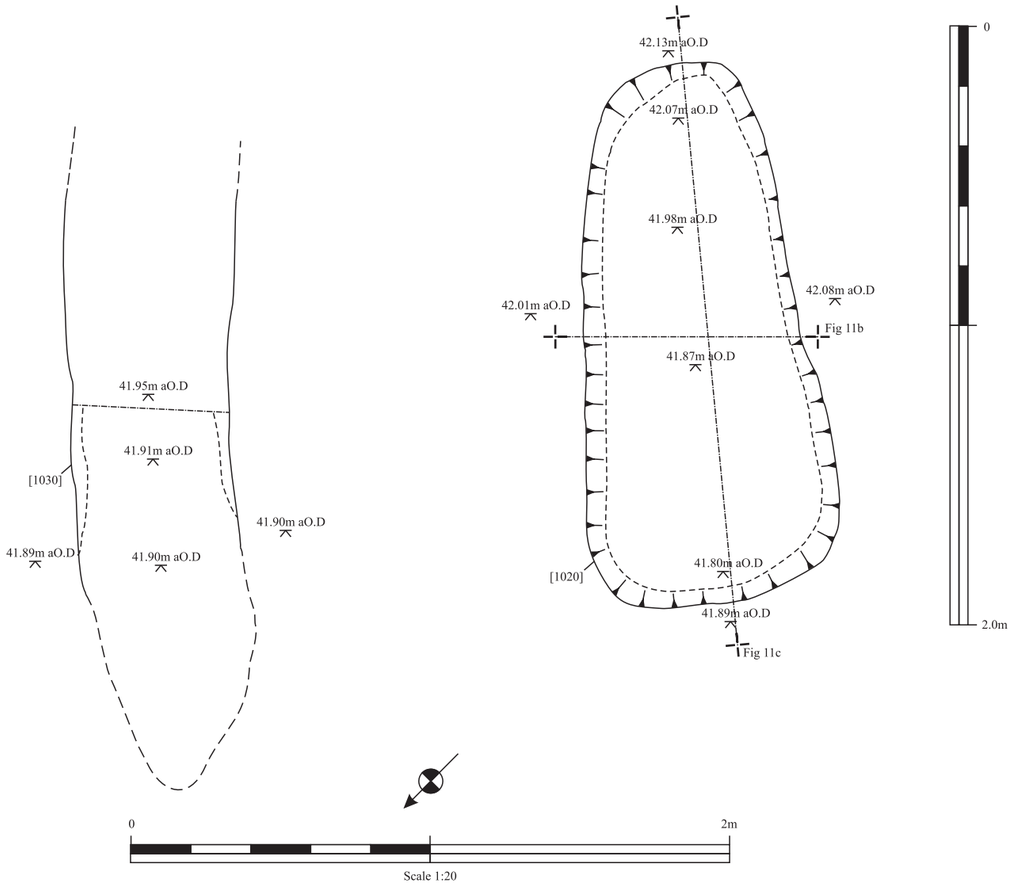

Fig 11b: North West Facing Section through Grave [1020]

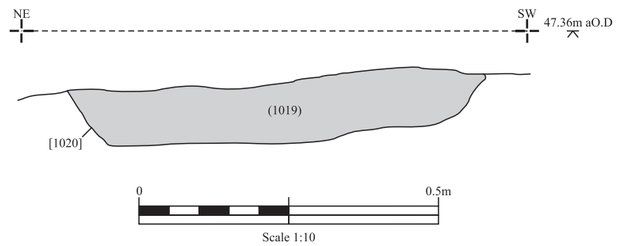

Fig 11c: South East - North West Profile through Grave [1020]

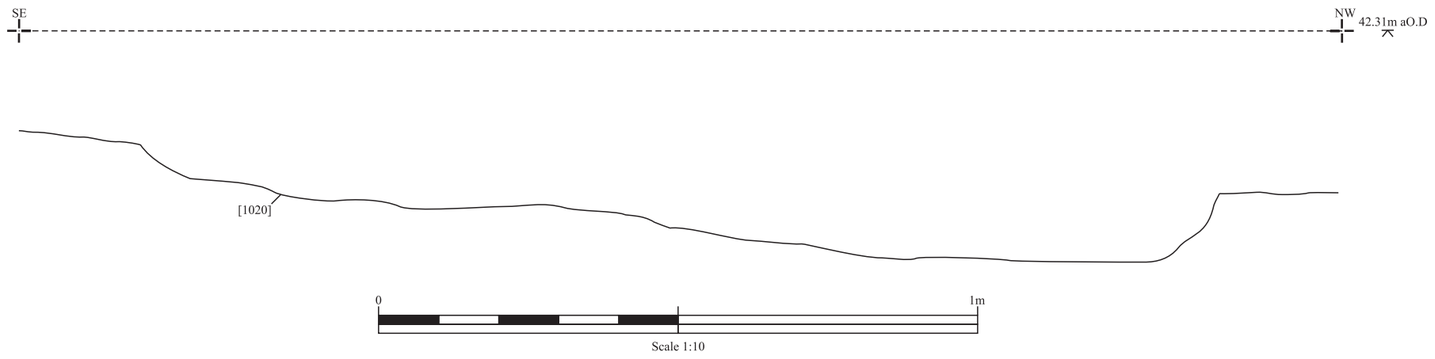

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Fig. 11.
Plan and Sections of Features [1020] and [1030]

scale
Plan 1:20
Section 1:10

Fig 12a: Plan of Grave [1032] and Linear [1024]

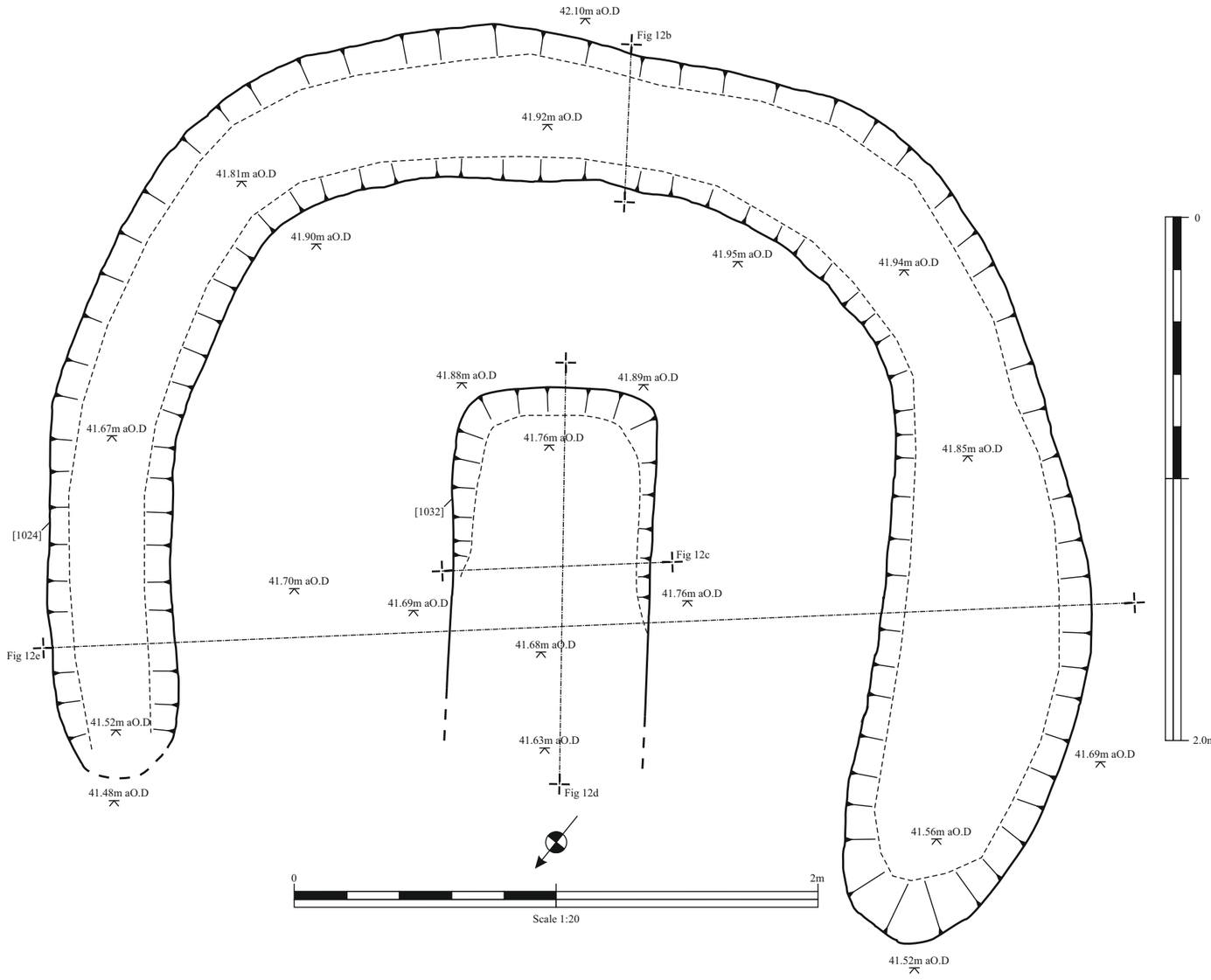

Fig 12b: South West Facing Section through Linear [1024]

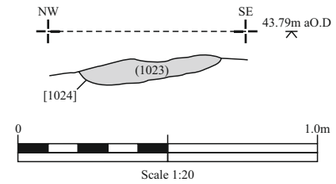

Fig 12c: South East Facing Section through Grave [1032]

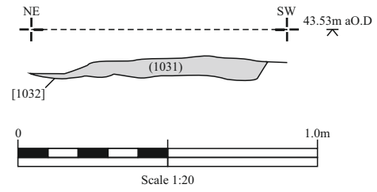

Fig 12e: North West Facing Section through Linear [1024]

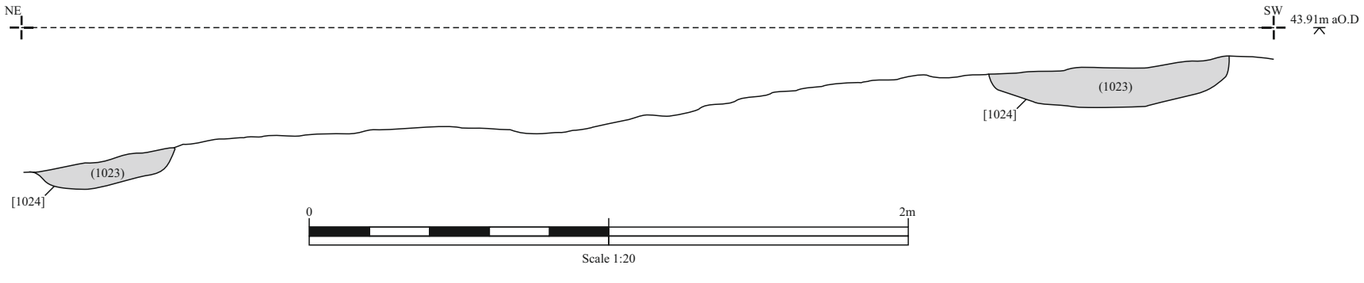

Fig 12d: South East - North West Profile through Grave [1032]

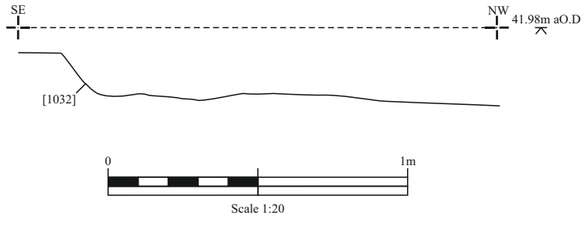

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Fig 12.
Plan and Sections of Features [1024] and [1032]

scale
Plan 1:20
Section 1:20

Fig 13b: West Facing Section through Pit [1034]

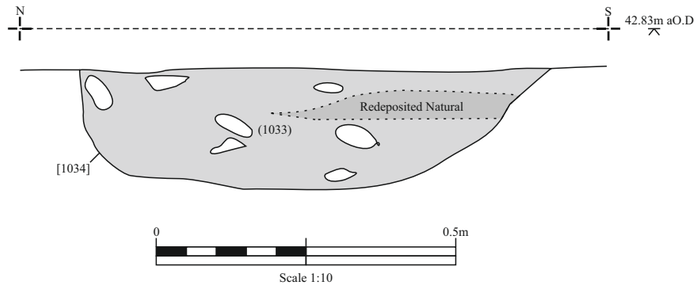

Fig 13a: North East Facing Section through Linear [1036]

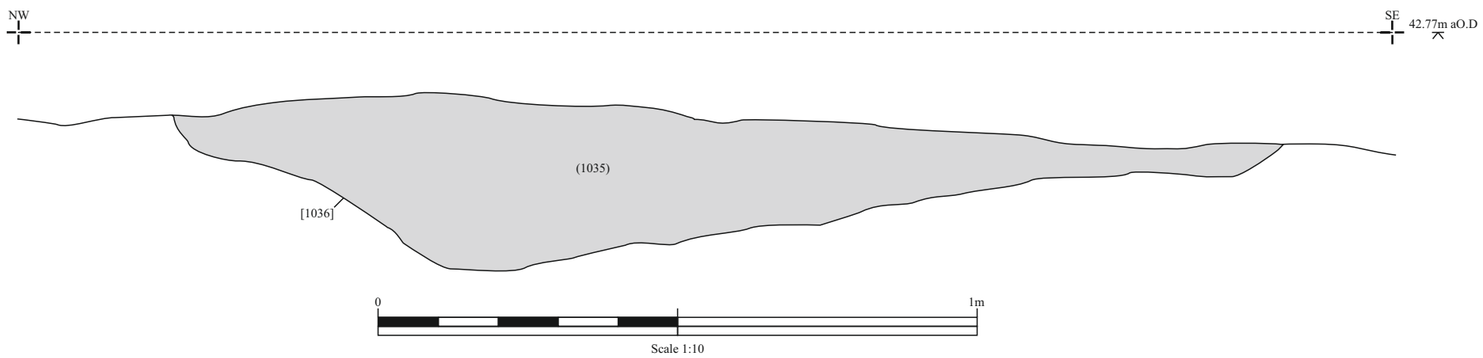

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Fig 13.
Plan and Sections of Features [1034] and [1036]

scale
Section 1:10

a. Pre-excavation image of 1003 (looking south)

b. Half-section image of 1003 (looking south)

c. Post-excavation image of 1003 and 1013 (bottom left) (looking south)

d. Post-excavation image of 1013 (looking east)

Fig. 14

Images of Features 1003 and 1013

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a. West-facing section image of 1005 (looking east)

b Post-excavation image of 1005 (looking east)

Fig. 15

Images of Feature 1005

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a. East- facing section image of 1007 (looking west)

c. Post-excavation image of 1011 (looking north)

b. Post-excavation image of 1009 (looking east)

Fig. 16

Images of Features 1007, 1009, 1011

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a. North-west facing section image of 1028 (looking south-east)

b Post-excavation image of 1028 - sprayed with water (looking south-east)

Fig. 17

Images of Feature 1028

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a. Pre-excavation image of 1018 (looking south-east)

b. South-east facing section image of 1018 (looking north-west)

Fig. 18

Images of Feature 1018

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a. Pre-excavation image of 1022 (looking south-east)

b. Post-excavation image of 1022 - sprayed with water (looking south-east)

Fig. 19

Images of Feature 1022

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a. Image of north-west facing section of feature 1020

b. Post-excavation image of 1020 - sprayed with water (looking south-east)

Fig. 20

Images of Feature 1020

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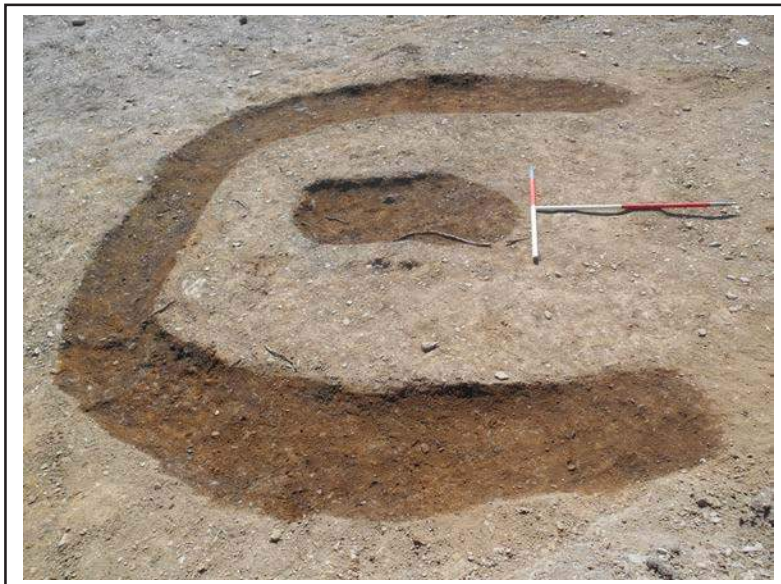
a. Mid-excavation image of 1032 and 1024 (looking north-east)

b. Post-excavation image of 1032 and 1024 (looking south-east)

c. Post-excavation image of 1032 and 1024 (looking north-west)



d. Post-excavation image of 1032 and 1024 (looking south)

Fig. 21

Images of Features 1032 and 1024

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a. Pre-excavation image of 1034 (looking south)

b. West-facing section image of 1034

c. Pre-excavation image of 1036 (looking south-west)

1d. image of north-east facing section of 1036 (looking south-west)

Fig. 22

Images of Features 1034 and 1036

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APPENDIX I:

Bone analysis

Osteological Analysis of the Cremated Bone from Cae'r Odyn, Pen y Garn, Rhydypennau, Ceredigion

A Report for Archaeology Wales Ltd.

October 2014

Project: OA1050

Abstract

Osteological analysis of the cremated bone recovered during an archaeological investigation undertaken by Archaeology Wales Ltd. from the site of *land north of Caer Odyn, Rhydypennau*, *was carried out in order to identify and quantify the material excavated. The cremated bone formed part of fill [1006] and was discovered in a shallow pit, cut [1007].*

Analysis revealed that only a very small quantity of bone was present. At least some of the fragments were likely to be human and the majority were fully oxidised, suggesting that there were the product of a deliberate cremation. Some fragments could be re-associated, indicating some post-deposition breakage of bone. The morphology of some of the larger fragments suggested that they originated from the extremities of the body, most likely the foot. It was not possible to make any inference about the age and sex of the individual present.

Charcoal was found in situ along with the bone, perhaps indicating that this was a token deposit of pyre debris. The very small quantity of bone present in the pit suggests that the vast majority of bone that would be expected from a cremation event had been carefully collected and deposited elsewhere.

The site represents an important prehistoric burial complex and the proposed radiocarbon dating of the bone sample analysed here will provide important independently established contextual information as to the nature of the funerary activity at the site.

1. Introduction

This report contains the results of the osteological analysis of the cremated bone recovered during an archaeological strip, map and sample of land north of Cae'r Odyn, Rhydypennau, which was undertaken by Archaeology Wales Ltd. between 2nd and 20th June 2014, for which a full archaeological report is in preparation (Jones 2014).

A small quantity of cremated bone [1006] was excavated fill of a small shallow pit, cut [1007]. Dating of the bone has yet to be undertaken but it is understood that the deposit is likely to be prehistoric as its associated fill contained some possible prehistoric pottery fragments. Archaeological investigations at the site revealed several features that appear to collectively represent a mortuary complex including seven probable inhumation graves, one of which was partially circumscribed by a penannular style or 'horse-shoe' shape gully (cuts [1032] and [1024] respectively). Unfortunately, no bone had survived in these graves, most likely due to a combination of soil acidity and the post-deposition truncation of these seemingly shallow features.

The osteological analysis aims to provide a detailed description of the nature of the cremated bone present, to quantify and differentiate, where possible, between animal and human cremated bone, to assess the age, sex and presence of pathological changes and to identify any evidence of pyre technology used during the cremation process.

2. Methods and Process

The cremated material was analysed according to the standards laid out in the guidelines recommended by the British Association of Biological Anthropologists and Osteologists in conjunction with the IFA (Guidelines to the Standards for Recording Human Remains, Brickley and McKinley (eds) 2004) as well as by English Heritage (Human Bones from Archaeological Sites: Guidelines for producing assessment documents and analytical reports, Centre for Archaeology Guidelines, 2002).

- The material was analysed macroscopically and where necessary with the aid of a magnifying glass for identification purposes.
- The material was sorted into three fractions of 10mm, 5mm and 2mm using UKAS accredited calibrated sieves.
- The material was weighed using calibrated digital scales to an accuracy of 0.1g.
- The material was analysed without prior knowledge of associated artefacts
- The material was recorded on sheets provided by AW

2.1 Reasons for the Analysis

Osteological analysis was carried out to ascertain:

- The type of deposit
- Total weight of the bone
- Identification and quantification of human bone
- Demographic data
- Pathology data
- Degree of fragmentation
- Efficiency of the cremation
- Presence and type of pyre goods
- Presence and type of pyre debris

3. Type of Deposit and Disturbance

3.1 Introduction

Recording of the type of deposit of cremated bone is necessary to make fair comparisons between different deposits from across a site, between one site and another and between cremated bone deposits from different historical contexts. Recording the type of deposit allows inferences to be made about the state of preservation of the material interred and how this may have affected bone content and fragmentation. This information is essential for accurate analysis of cremation processes due to diagnostic analytical techniques being based upon the weight and size of bone fragments present.

3.2 Observations

The nature of the deposit of the cremated bone was assessed during field excavation and recorded on the relevant context sheets. This information was subsequently classified according to the categories suggested by Brickley and McKinley (2004) and recorded on the Access database provided.

3.3 Results

The bone fragments under analysis were recovered from the fill of a small shallow pit, cut [1007]. The associated fill contained charcoal. Also found associated with the cremated bone were possible

prehistoric pottery sherds, although the bone did not appear to be contained within a vessel. The deposit has, therefore, been recorded as a 'cremation related deposit'.

4. Identification and Quantification of Cremated Bone

4.1 Introduction

Cremated bone deposits have been found on frequent occasions to contain both human and animal bone remains. Often, particularly if the bone fragments are very small, it is not possible to identify whether bone is categorically human or animal. However, it is clear from the analysis of cremated bone deposits that the deposition of both types of bone together is intentional and, therefore, it is imperative to approach the assessment of the cremated bone present holistically, as well as to attempt to identify human and animal elements.

An assessment of the quantity of bone recovered may give an indication of the state of preservation of the associated feature in which the bone was interred or, if recovered from relatively undisturbed context, may provide valuable information regarding cremation processes. This may relate not only to the actual pyre technology itself but also to the collection and ritual deposition of bone after the process was complete. McKinley (1993) found that modern cremation processes resulted in the production of between 1227.4g and 3001.3g of bone. From this she inferred that the cremation of a whole body and deposition of the remains in an archaeological context would realistically produce between 1001.5g and 2422g of cremated human bone.

Identification of particular elements of the human body serves to confirm the presence of human material and also may give an insight into any particular areas of the body which may have been purposefully collected following cremation. The absence of elements, especially those that are smaller, may be due to the lack of their survival as a result of fragmentation during the cremation, post-depositional preservation conditions or may be due to their loss during the cremation itself.

4.2 Observations

The total amount of bone present in this context was weighed and subsequently analysed for identifiable fragments. These fragments were then weighed and recorded separately according the area of the body they originated from. Full quantification of bone is given in the database.

4.3 Results

The results of the quantification analysis are summarised in Table 1 below:

Context	*1006*
Total Weight of Cremated Materials (g)	3.9
Total Weight of Identifiable ?Human Fragments (g)	1.8
Minimum Number of Individuals	1

Table 1: *Results of the quantification of bone present*

The quantity of cremated bone present is very small in comparison to the 1000g or thereabouts generally recovered from cremated bone burials containing complete adult individuals. Four fragments could be re-associated and together formed a concave articular surface, closely resembling that of the proximal end of a 1st metatarsal. It should be noted, however, that several skeletal elements, at least in part, consist of concave articular surfaces, especially those within the foot. Another fragment consisted of the end of a narrow diaphysis terminating in a convex articular surface. This fragment most closely resembled the distal portion of a proximal small toe phalanx; though there is a possibility of the phalanx belonging to the hand, the articular surface was angulated and was most similar to that of the toe.

Human bone can, on some occasions, be differentiated from animal bone on account of the density of the cortex (the outer wall) of long bone fragments. However, this method tends to discriminate positively for the identification of animal bone rather than conclusively identifying human individuals since there is invariably some overlap between the two given the potential number of skeletal elements and the variation between human individuals. Some long bone fragments found here appeared to be of a similar density observed in human bone. However, no diagnostic landmarks were present and based upon cortical density alone, this should be treated as a tentative identification.

Overall, the identification from morphological features suggested that at least some of the bone was likely to be human. However, many of the fragments of bone were non-diagnostic and no conclusive evidence was present to differentiate the fragments from animal species. The very small quantity of bone suggests that this cremation-related deposit may have consisted primarily of pyre debris with the inclusion of some very small fragments of bone originating from the extremities of the body that had become intermingled with debris during the cremation process.

There were no repeated elements present, so the fragments represent a minimum of one individual.

5. Demographic Data

5.1 Introduction

Demographic data recorded from human cremated bone gives an indication as to the age and sex of the individual. This information is derived from the macroscopic examination and metric assessment sexually dimorphic elements (e.g. Gejvall 1981, Van Vark (1975) and Whal (1982) as well as analysis of dental and bone development recommended by Buikstra and Ubelaker (1994). A large sample of well-preserved cremated bone deposits can provide a valuable insight into the demographic structure of the archaeological population and also into any ethnocentric funerary practices associated with the age and sex of the individual cremated.

5.2 Observations

Observations of material present and any indicators of age and sex were noted on the recording forms contained on the database.

No fragments present were large enough to allow metric assessments to be undertaken so any observations were based upon morphological features.

5.3 Results

Age: Due to the very small size of the cremated bone sample, the age of the individual present could not be assessed for a specific age at death.

Sex: Sex could not be assessed from any of the fragments present.

6. Pathology Data

6.1 Introduction

Palaeopathology is the study of diseases of past peoples and can be used to infer the health status of groups of individuals within a population as well as indicate the overall success of the adaptation of a population to its surrounding environment. Pathologies are categorised according to their aetiologies; e.g. congenital, metabolic, infectious, traumatic, neoplastic etc. Any pathological modifications to the bone are described. The size and location of any lesion is also noted. Pathology data is usually restricted, however, by intrinsic nature of cremated bone, although if fragment size is large enough, pathological changes may be observed.

6.2 Observations

Observations were recorded on the sheets provided in AW contexts sheets

6.3 Results

No pathology was observed among the fragments of cremated bone present.

7. Bone Fragmentation

7.1 Introduction

The observation and quantification of bone fragmentation is essential in assessing its impact on the quality of the overall data retrieved from the analysis of cremated bone. It may also be an indicator of practices carried out during the cremation process and give and insight into pyre technology. Fragmentation of bone is assessed by sorting all bone fragments into three sieve fractions (10mm, 5mm and 2mm) and comparing the proportion of bone in each fraction (Brickley and McKinley 2004). Measurement of the maximum bone fragment length is also recorded.

The fragmentation of bone can occur for several reasons, i.e. from the raking of the remains during the cremation process, the collection and the subsequent interment of the remains, making it difficult to assess whether bone was deliberately fragmented as part of the cremation ritual (McKinley 1994b, 2001). It is, however, generally believed that both the excavation and post-excavation processes can lead to the largest amount of damage caused to the remains (Lange *et al.* 1997, McKinley 1994b).

7.2 Observations

Observations of the weight of bone present in each sieve fraction and the percentage of each fraction of the total weight of bone were recorded on the sheets provided in AW Context sheets.

7.3 Results

Table 2 below summarises the results of the quantification of cremated bone present by sieve fraction weight and percentage of total weight:

Context	*1006*
>10mm Weight (g)	1.3
>10mm Percentage of Total	*33.3%*
>5mm Weight (g)	1.1
>5mm Percentage of Total	*28.2%*
>2mm Weight (g)	1.5
>2mm Percentage of Total	*38.5%*
Assessment of Bone Content Percentage <2mm residue	99%

Table 2: *Weight by fraction of cremated bone*

These results indicate that the majority of the fragments were between less than 5mm in length, with a proportion of larger fragments present. Maximum bone size for the sample was 14.8mm and estimated average was 3mm. Interestingly, four fragments could be re-associated to make one composite fragment. This indicates that it is highly likely that part of the fragmentation process occurred post-deposition and that some fragments could have been considerably larger when they were originally deposited.

8. Efficiency of the Cremation

8.1 Introduction

Effective cremation of a human body requires basically two elements: burning at high temperatures and a sufficient length of time of the application of this heat. Differences in temperature and length of time of exposure will result in variation in how the bone is burned. Complete burning will result in complete oxidation of the organic element of bone, leaving the mineral portion remaining (McKinley 1994a, Lange *et al.* 1987).

Holden *et al.* (1995) reports that generally, the range of colours seen in burnt bone relates to the temperature to which the bone was exposed:

Brown/Orange = Unburnt

Black = Charred (*c.*300°)

Blue/Grey = Incompletey Oxidised (*c.*600°)

White = Completely Oxidised (>600°)

The colour may vary from bone to bone as different elements of the body may be exposed to different temperatures for different lengths of time. It is, therefore, essential to record any differences in colouration according to skeletal elements affected and to the aspect of the element (i.e. interior, exterior) affected. The extent of the burning or oxidation of the bone represents the relative success of the cremation processed applied and contemporary knowledge of pyre technology.

Observations of dehydration of the bone should also be recorded. Shrinkage of bone due to dehydration can amount to a 25-30% decrease in cross-section width and accordingly approximately a 5% decrease in length (Lange *et al.* 1987). Evidence of dehydration presents itself on the bone fragments in the form of fissuring, transverse, concentric and parabolic cracking, especially on articular surfaces of long bones and cranial vault fragments (Lange *et al.* 1987, McKinley 1994a). These are generally interpreted as occurring due to the result of cremating the bone when soft tissue was still present on the bone.

8.2 Observations

Observations were noted on the recording forms contained in the database. Generally, the bone was observed to be white in colour but some variation was noted. One unidentifiable fragment of long bone cortex was largely white in colour but with some blue-grey colouration in the mid cortex observable in cross-section. This has occurred as a result of the element being incompletely oxidised during the cremation process and is often noted in the denser cortical bone in cremated deposits. Observations regarding dehydration of the bone were also noted.

8.3 Results

The results of the analysis of colour variation in the fragments of bone suggest that the vast majority of bone present was completely calcined or oxidised (Murray *et al.* 1993). This suggests that the bone had been exposed to a temperature of at least 600° for a substantial period of time. It is noteworthy that the fragment exhibiting the blue-grey variation in colour was of higher bone density.

Fissuring, transverse and longitudinal cracking was present on the vast majority of the elements contained in this context. Concentric cracking was also noted on the articular surfaces of fragments. This indicates that soft tissue was present on the bone when it was cremated. The presence of both transverse and longitudinal fissuring confirms that the bone has been cremated long enough for substantial amount of dehydration of the bone to occur, in concordance with the coloration of the bone.

9. Presence and Type of Pyre Goods

9.1 Introduction

Pyre goods are those items that were placed on the pyre and have been deliberately included for interment along with the cremated human bone. These can consist of objects manufactured from glass, ivory or metal, for example, which may have formed items of personal adornment. Metal items may only leave a trace of their presence in the form of staining on the bone, especially those manufactured from copper alloys.

It is most common for animal bone to be included with deposits of human bone (e.g. Wells, C 1960). It is generally perceived that these represent animal sacrifice or food offerings to the dead (McKinley 1994b, Bond 1994,). Williams (2005) has suggested, furthermore, that the deliberate admixture of animal and human cremated remains is deeply significant and may be associated with shamanistic rituals often observed ethnographically whereby not only can animals symbolically represent totemic ancestor lineages and but also both human and animal beings are seen to dynamically and mutually co-exist: “Animals were more than symbols of identity but agents of transformation, enabling the dead to be reconstituted into a new social status in death." (Williams 2005).

9.2 Observations

Observations regarding the identification, quantification and percentage of identifiable animal bone present were recorded on sheets contained in the database. Most of the bone present was non-diagnostic and no fragments could be conclusively identified as animal.

9.3 Results

The deliberate inclusion of animal remains in deposits of cremated human remains has been recorded in Wales at Carneddau cairn 2, where the remains of two children were found with the cremated carcass of a pig while beaver bone was discovered in the cremated bone burial of an adult (Brittain 2006). Animal remains appear to have been equally important in the role they played in cremation rituals during the Bronze Age throughout the UK; approximately 16% of burials of cremated bone contain faunal remains and typically include sheep or pigs and birds (McKinley 2001). The lack of grave goods found during the Bronze Age compared with the presence of pyre goods indicates that their presence is strongly linked to the funerary rituals carried out through the cremation (McKinley 2001).

The small size of the vast majority of the fragments in this deposit precludes making a positive identification of any animal bone in this deposit. Nonetheless, the lack of the inclusion of any substantial animal bone fragments or other pyre goods perhaps corroborates the interpretation that

this deposit of bone may represent a token deposit of pyre debris, with the majority of human bone, and possibly any other pyre items, having been collected and deposited elsewhere.

10. Presence and Type of Pyre Debris

10.1 Introduction

The presence and type of pyre debris is analysed in order to ascertain the nature of pyre technology and can be used to provide an insight into the type of deposit. Recent experimental reconstructions of pyre sites have determined that distinct features and types of debris can be left by former pyre sites and in particular that the use of different materials alters the type and form of deposit (Marshall 2005).

10.2 Observations

Observations regarding presence, quantity and type of pyre debris were made and recorded on the forms contained in the database.

10.3 Results

Only very small charcoal fragments weighing less than 0.1g was present in the sample analysed here; a small quantity of charcoal was observed to be present, however, in the associated fill [1006] which was not included in this sample. The restricted size of the sample of bone and charcoal make it difficult to make any inferences regarding the pyre technology employed at this site. However, the the presence of fissuring and the completeness of the oxidation process of the associated bone suggests that the charcoal deposited in the pit is the product of a deliberate cremation process.

11. Conclusion

Table 3 below summarises the findings of the osteological analysis of cremated bone deposit [1006].

The osteoarchaeological analysis of the cremated bone recovered from context [1006] revealed that the deposit was likely to contain the remains of at least one human individual. Only a very small amount of cremated bone was present in comparison to what would be expected from the remains of a complete individual and thus the sample was recorded as a ‘cremation related deposit’. The

	1006
Type of deposit	Cremation related deposit
Total weight of cremated materials	3.9g
Quantification of bone: Possibly Human	1.8g
Minimum Number of Individuals	1
Demographic data: Age	Unobservable
Demographic data: Sex	Unobservable
Pathology data	None
Maximum Fragment Size	14.7mm
Degree of fragmentation – average fragment size	3mm
Efficiency of the cremation	Overall colour: White Blue/Grey (c.5%)
Presence and type of pyre goods	None
Presence and type of pyre debris	<0.1g Charcoal

Table 3: *Summary of Osteoarchaeological Observations*

majority bone present had been fully oxidised through the cremation process and the bone was highly fragmented in preservation. Some breakage is thought to have occurred through post-depositional processes. Many of the fragments were non-diagnostic and none could be positively identified as animal remains. All the cremated bone present demonstrated evidence of cracking and fissuring, indicating that the bone was surrounded by soft tissue when it was burnt. Interestingly, the bone fragments that could be tentatively identified appeared to belong to the foot. This may suggest that this deposit represents a very small portion of cremated remains belonging to the extremities of

the body that may have become intermingled within some pyre debris during the cremation process and the management of the cremain. This indicates that the vast majority of the cremated bone that would have been produced by the cremation was carefully separated or extracted and was treated separately to the deposit contained within pit cut [1007].

Several prehistoric funerary sites of significance are already known in close proximity to the site at Cae'r Odyn, such as the Rhydypennau Barrow cemetery dating to the Bronze age and the cemetery at Plas Gogerddan (Jones 2014), dating from the Iron age to the early Medieval period. Recent excavations at Trefael near Nevern in South-west Wales have demonstrated the importance of cremation as a funerary ritual during the early prehistoric periods and its significance in the establishment of monuments, the use of which as foci for mortuary complexes can span many subsequent periods of time (http://www.bristol.ac.uk/news/2014/february/outputurl-36448-en.html). The presence of this 'token' cremation-related deposit in the context of several other inhumation burials suggests that this site was an important location in the landscape for funerary activity.

The earliest dates for cremation practice in Wales range between 3200-3100 cal. BC, around the late Neolithic period, with cremation and inhumation practices being noted as contemporary in many cases and some funerary monuments likely to have been re-used at later dates (Brittain 2006). Indeed, non-local soils were found adhering to the surfaces of cremated bone at Moel Goedog ring cairn 1 and Great Carn ring cairn 1, suggesting the exhumation and reburial of cremated remains (Brittain 2006). There was no clear dating evidence for the excavated features from stratified artefacts from Cae'r Odyn and therefore, the proposed future dating of the bone analysed here will provide important information regarding the time-frame of the funerary activity at the site and the context in which it was undertaken.

12. Acknowledgements

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REFERENCES

Brickley, M & McKinley, J. I. (eds)	2004	Guidelines to the Standards for Recording Human Remains. *IFA Paper No. 7* in association with BABAO.
Bond, J. M.	1994	The Cremated Animal Bone. In The Anglo-Saxon Cemetery at Spong Hill, North Elmham: Part VIII The Cremations. McKinley, J. *East Anglian Archaeology* 69
Brittain, M.	2006	Technologies of Disclosure: Posthuman Practices and Cremation in Neolithic and Early Bronze Age Wales. In *Archaeological Review from Cambridge,* 21.1.
Buikstra, J. E. and Ubelaker, D. H.	1994	*Standards for Data Collection from Human Skeletal Remains* Arkansas Archaeological Survey Research Series no. 44
English Heritage	2002	*Human Bones from Archaeological Sites: Guidelines for producing assessment documents and analytical reports*. English Heritage, Centre for Archaeology Guidelines.
Gejvall, N. G.	1981	Determination of Burned Bones from Prehistoric Graves: Observations on the Cremated Bones from the Graves at Horn. In *Ossa Letters* No. 2.
Grant, F. and Jones, N.	2006	Proposed Development Site, Buttington Cross, Welshpool, Powys. CPAT Report No. 794.
Holden, J. L., Phakey, P. P. & Clement J. G.	1995	Scanning Electron Microscope Observations of Heat-Treated Human Bone. In *Forensic Science Int.* 74: 29-45
Jones, I.	2014	Land north of Cae'r Odyn, Pen y Garn, Rydypennau, Ceredigion: Archaeological Strip, Map and Sample and Evaluation. Unpublished report no. 1243, Archaeology Wales Ltd.

	Lange, M., Schutkowski, H., Hummel, S. & Herrmann, B.	1987	*A Bibliography on Cremation.* Strasbourg: PACT.
	Marshall, A. J.	2005	Experimental Cremation of Prehistoric Type. http://www.brad.ac.uk/acad/archsci/ field_proj/amarsh/cremexp.htm
	McKinley, J.	1993	Bone Fragment Size and Weights of Bone from Modern British Cremations and their Implications for the Interpretation of Archaeological Cremations. In *Internat. J. Osteoarchaeology* 3, 283-7.
	McKinley, J.	1994a	Bone Fragment Size in British Cremation Burials and its Implications for Pyre Technology and Ritual. In *J. Arch. Sci:* 21, 339-342
	McKinley, J.	1994b	The Anglo-Saxon Cemetery at Spong Hill, North Elmham: Part VIII The Cremations. *East Anglian Archaeology* 69
	McKinley, J.	2001	*Bronze Age Cremation.* Transcript from a presentation made at the conference of The Cremation Society of Great Britain. Pharos International: 5-10.
	Murray, K. A. & Rose, J. C.	1993	The Analysis of Cremains: A Case Study Involving the Inappropriate Disposal of Mortuary Remains. In *J. Forensic Sciences*: 3, 98-103.
	Van Vark	1975	The Investigation of Human Cremated Skeletal Material by Multivariate Statistical Methods II Measures. In *Ossa*2: 47-68
	Wahl, J.	1982	Leichenbranduntersuchengen. Ein überblick über die Bearbeitungs-undAussagemölichkeiten von Brandgräbern. In *Prähistorische Zeitschrift* 57:2-125
	Wells, C.	1960	A Study of Cremation. In *Antiquity* XXXIV, 29-37.
	Williams, H.	2005	*Cremation in Early Anglo-Saxon England.* http://www.ex.ac.uk/archaeology/rcremation.html

THE ARCHIVE

Type	No	Type	No
Basic Context & Weights Recording Form	1	CD-Rom Database	1
Bone Fragment Analysis Recording Form	1		
Pyre Technology Recording Form	1		

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APPENDIX II:

Phosphate analysis

REPORT ON PHOSPHATE CONCENTRATIONS IN SOIL SAMPLES FROM TWO SUPPOSED GRAVES AT RHYDYPENNAU, BOW STREET, CEREDIGION

For: **Archaeology Wales**

By: **Dr J. Crowther (July 2014)**
Archaeological Services, University of Wales: Trinity Saint David, Lampeter, Ceredigion, UK SA48 7ED

INTRODUCTION

Excavations at Rhydypennau in 2014 revealed the presence of two enigmatic cut features (1022 and 1032) which appeared from their size and morphology to be graves. However, apart from one very small fragment of possible bone found in 1032, no skeletal remains were found. At nearby excavations undertaken on similar soils at a cemetery site at Gogerddan (Crowther 1997), a paucity of bones was also recorded (due to leaching in the well-drained, acidic soils), but clear evidence of burials was revealed through phosphate analysis. Accordingly, a programme of phosphate analysis was undertaken on 40 bulk soil samples (including control samples) taken from the two supposed graves at Rhydypennau in the hope that this might provide evidence of the likely origins of the cut features. The samples from within the features were taken from the very bottom of the fills, and would therefore be expected to show clear signs of phosphate enrichment if they are graves. Reviews of the basic principles and applications of phosphate analysis, including examples from burial and cremation sites, are presented by Bethel and Máté (1989), Crowther (1997, 2002) and Heron (2001).

Unfortunately, the fine earth (< 2 mm) fraction of the soils at Rhydypennau contains variable proportions of sands (derived from quite coarse glacio-fluvial deposits), which are effectively ‘inert’ in terms of their capacity to take up and retain

phosphates. In previous work undertaken on samples from Gogerddan (Crowther 1997) it was found that, for these soils, analysis of the silt + clay fraction (i.e. < 0.063 mm; rather than the conventional fine earth fraction) provided a better basis for investigating phosphate enrichment associated with burials. This approach was therefore adopted in the present study. In addition phosphate-P (total phosphate), determinations were also made of loss-on-ignition (LOI), which provides an estimate of the organic matter concentration), in order to facilitate the interpretation of the phosphate results.

METHODS

Phosphate-P (total phosphate) was determined on the silt + clay fraction of the samples, following alkaline oxidation of the sample with NaOBr, using the procedure described by Dick and Tabatabai (1977). LOI was determined on the fine earth fraction by ignition at 375ºC for 16 hours (Ball, 1964).

RESULTS AND DISCUSSION

The analytical results for the two supposed graves are presented in Tables 1 and 2; summary statistics for the control and supposed grave samples in Table 3; spatial plots of the LOI and phosphate-P data in Figures 1 and 2; and scatterplots of the relationships between phosphate-P and LOI in Figures 3 and 4.

Supposed grave 1022

In total, 22 samples were analysed: 18 from within the cut of the feature and 4 as controls (as detailed in sketch plan in Figure 1). The samples from the basal fills are moderately organic (LOI range, 3.63–4.33%), which presumably reflects the inclusion

of topsoil or other organic-rich materials. In this case, the control samples clearly comprise (more minerogenic) subsoil material with much lower LOI values (range, 1.13–1.79%). In view of the difference in character of the fill and control samples, the control samples do not provide a good basis for evaluating background phosphate concentrations against which the fills may be evaluated.

The surprising feature of the phosphate-P results is that two of the four samples highlighted in Figure 2 as having the highest phosphate-P concentrations (≥ 1.50 mg g^{-1}), two of these are control samples (A1 and A3). Normally, subsoil samples would tend to have a lower phosphate-P concentration than more organic contexts, simply because of the presence of organic phosphates within the organic fraction of the soil (see scatter plot in Figure 3, which shows the absence of any underlying relationship between phosphate-P and LOI). The range of phosphate-P concentrations recorded for the basal fills of the supposed grave (1.15–1.50 mg g^{-1}) is very similar to that of the control samples (0.926–1.63 mg g^{-1}); the mean values are also very similar (1.38 and 1.28 mg g^{-1}, respectively); and no clear pattern is evident in the phosphate data from the grave – i.e. there is no obvious concentration of higher values within the central part of the feature. For comparison, phosphate concentrations ≥ 5.00 mg g^{-1} were recorded in some of the samples taken from below the grave fills at the Gogerddan (Crowther, 1997).

These results clearly provide no evidence to support the present interpretation of cut feature 1022 as being a grave. This is not to say that it is not a grave. The results from Gorgeddan demonstrate that bone-derived phosphate can survive in these soils. It seems unlikely therefore that no signs of phosphate enrichment would be evident in the basal fills if there had been a burial. However, it may be that any signs

of phosphate enrichment within the fill may have been dispersed and 'diluted', either as a result of plough damage (the remains of the cut feature are quite shallow) or through leaching of phosphates into the underlying subsoil.

Supposed grave 1032

In this case, the control samples appear to be from the lower part of the topsoil horizon (LOI range, 4.31–4.80%), and are consistently rather more organic rich than the basal fill (range, 3.56–4.12%). This suggests that this fill, and also that in cut feature 1022 (which displays a similar range of LOI), includes some material of subsoil origin, that was presumably incorporated during the digging and back/infilling of the feature. As would be expected, there is a general underlying relationship between phosphate-P and LOI (Figure 4), but this is weak and not statistically significant.

Phosphate-P concentrations across this site display very little variability, with the control samples ranging from 1.07–1.19 mg g^{-1} and those from the fill from 0.969–1.17 mg g^{-1}. The absence of phosphate enrichment within the fill clearly does not support the interpretation of the feature as being a grave. As noted above with regard to supposed grave 1022, this does not necessarily mean that the feature 1032 is not a grave – since, again, the results may be compromised as a result of plough damage or the leaching of phosphates out of the fill.

CONCLUSION

The results of the phosphate analysis undertaken on samples from both cut features provide no evidence to support their interpretation as graves. Absence of evidence of phosphate enrichment is not, however, evidence of the absence of burials. As noted

above, plough damage and/or leaching could well have weakened and dispersed the phosphate signal.

REFERENCES

Ball, D.F. (1964) Loss-on-ignition as an estimate of organic matter and organic carbon in non-calcareous soils. *Journal of Soil Science*, *15*, 84-92.

Bethell, P. and Máté, I. (1989) The use of phosphate analysis in archaeology: a critique. Pp. 1-29 in *Scientific analysis in archaeology* (J. Henderson, ed.), Oxford University Committee for Archaeology, Monograph, 19.

Crowther, J. (1997) Soil phosphate surveys: critical approaches to sampling, analysis and interpretation. *Archaeological Prospection*, *4*, 93-102.

Crowther, J. (2002) The Experimental Earthwork at Wareham, Dorset after 33 years: Retention and leaching of phosphate released in the decomposition of buried bone. *Journal of Archaeological Science*, 29, 405-411.

Heron, C. (2001) Geochemical prospecting. Pp. 565-573 in *Handbook of archaeological sciences* (D.R. Brothwell and A.M. Pollard, eds). Chichester: Wiley.

Table 1: Analytical data for supposed Grave 1022

Sampling point	Sample type	LOI (%)	Phosphate-P (mg g^{-1})
A1	Control	1.29	1.50
A3	Control	1.40	1.63
B3	Grave?	4.03	1.50
B4	Grave?	4.33	1.48
B5	Grave?	4.18	1.41
B6	Grave?	3.86	1.35
B7	Grave?	4.09	1.45
C1	Grave?	3.80	1.50
C2	Grave?	3.69	1.49
C3	Grave?	4.07	1.44
C4	Grave?	4.03	1.45
C5	Grave?	3.66	1.41
C6	Grave?	3.77	1.42
C7	Grave?	4.24	1.16
C8	Grave?	4.20	1.15
D3	Grave?	4.07	1.26
D4	Grave?	3.63	1.27
D5	Grave?	3.95	1.38
D6	Grave?	3.89	1.36
D7	Grave?	4.07	1.33
E1	Control	1.13	0.926
E3	Control	1.79	1.06

Table 2: Analytical data for supposed Grave 1032

Sampling point	Sample type	LOI (%)	Phosphate-P (mg g^{-1})
A1	Control	4.62	1.07
A3	Control	4.31	1.17
B2	Grave?	4.05	1.08
B4	Grave?	3.96	1.15
C2	Grave?	3.75	1.09
C3	Grave?	3.56	1.06
C4	Grave?	3.79	1.10
D1	Grave?	3.96	1.08
D2	Grave?	3.98	0.994
D3	Grave?	3.88	1.01
D4	Grave?	3.70	1.10
E2	Grave?	3.84	1.13
E3	Grave?	3.82	1.08
E4	Grave?	3.88	1.13
F2	Grave?	3.94	0.969
F4	Grave?	4.12	1.17
G1	Control	4.61	1.19
G3	Control	4.80	1.13

Table 3: Summary statistics for data from the two supposed graves

Supposed grave	Sample type	n	Mean	Minimum	Maximum	Std dev.
Loss-on-ignition (%)						
1022	Control	4	1.40	1.13	1.79	0.281
	Grave?	18	3.98	3.63	4.33	0.207
1032	Control	4	4.59	4.31	4.80	0.203
	Grave?	14	3.87	3.56	4.12	0.146
Phosphate-P (mg g^{-1})						
1022	Control	4	1.28	0.926	1.63	0.339
	Grave?	18	1.38	1.15	1.50	0.108
1032	Control	4	1.14	1.07	1.19	0.053
	Grave?	14	1.08	0.969	1.17	0.058

Figure 1: Plots of LOI data at supposed graves

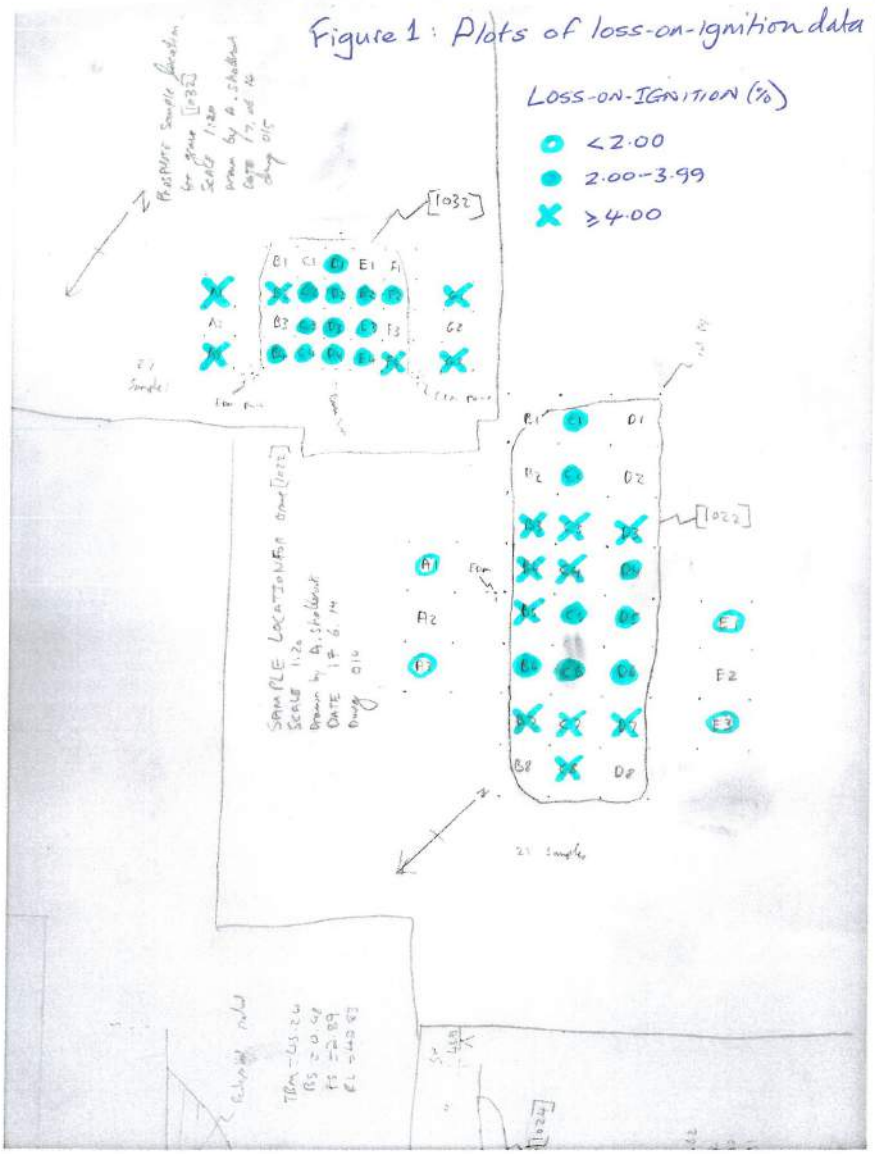


Figure 2: Plots of phosphate-P data at supposed graves

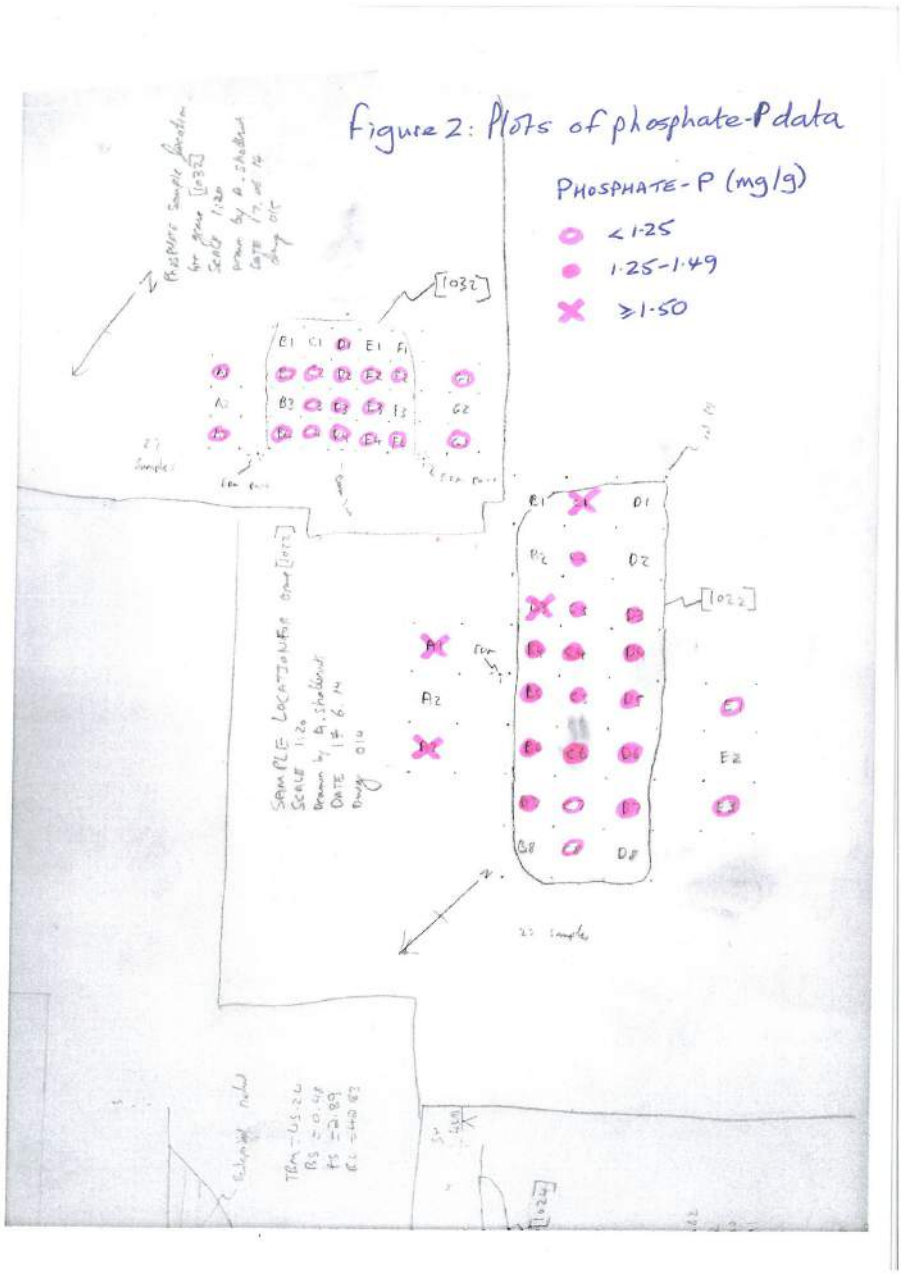


Figure 3: Scatterplot of relationship between phosphate-P and LOI at supposed grave 1022 (r = 0.203, not statistically significant)

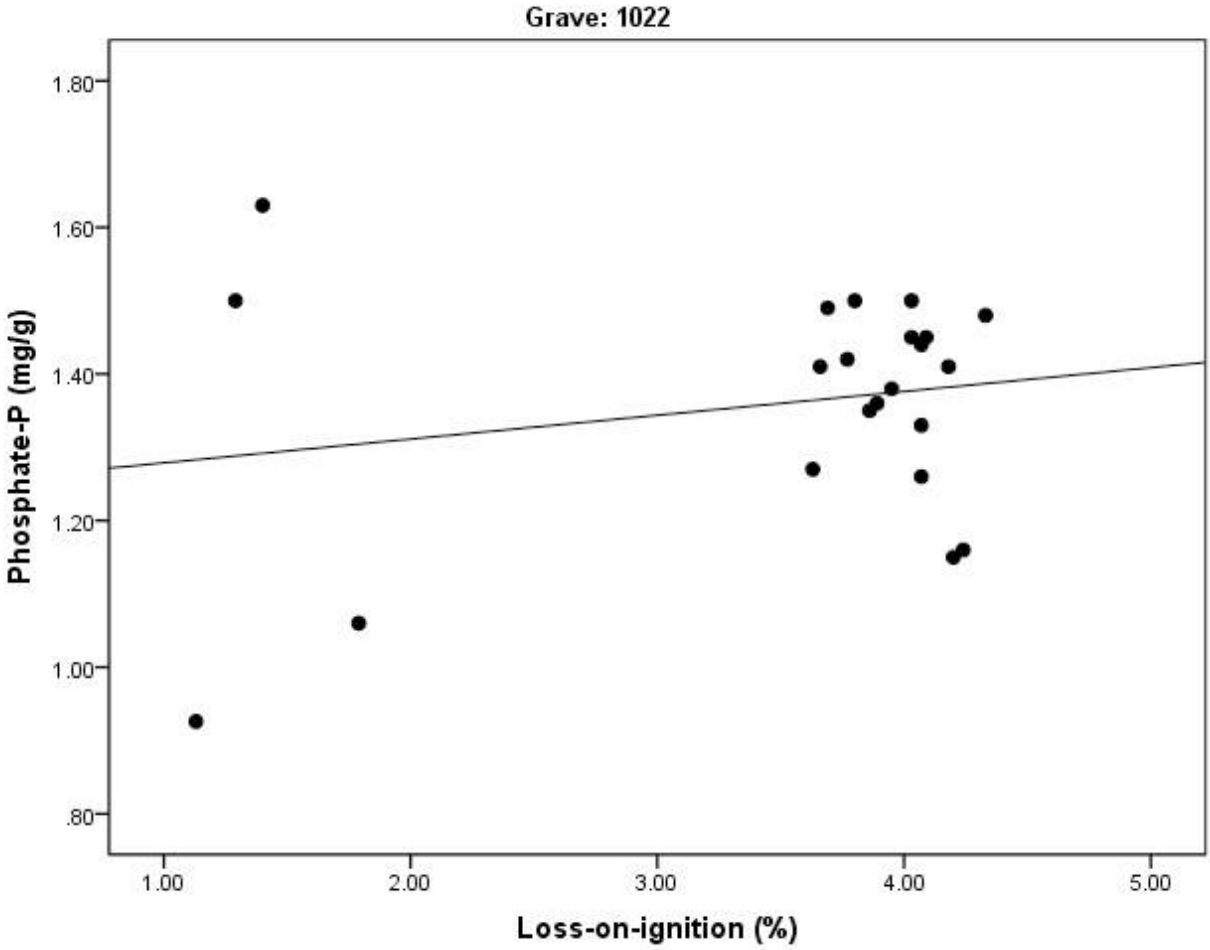
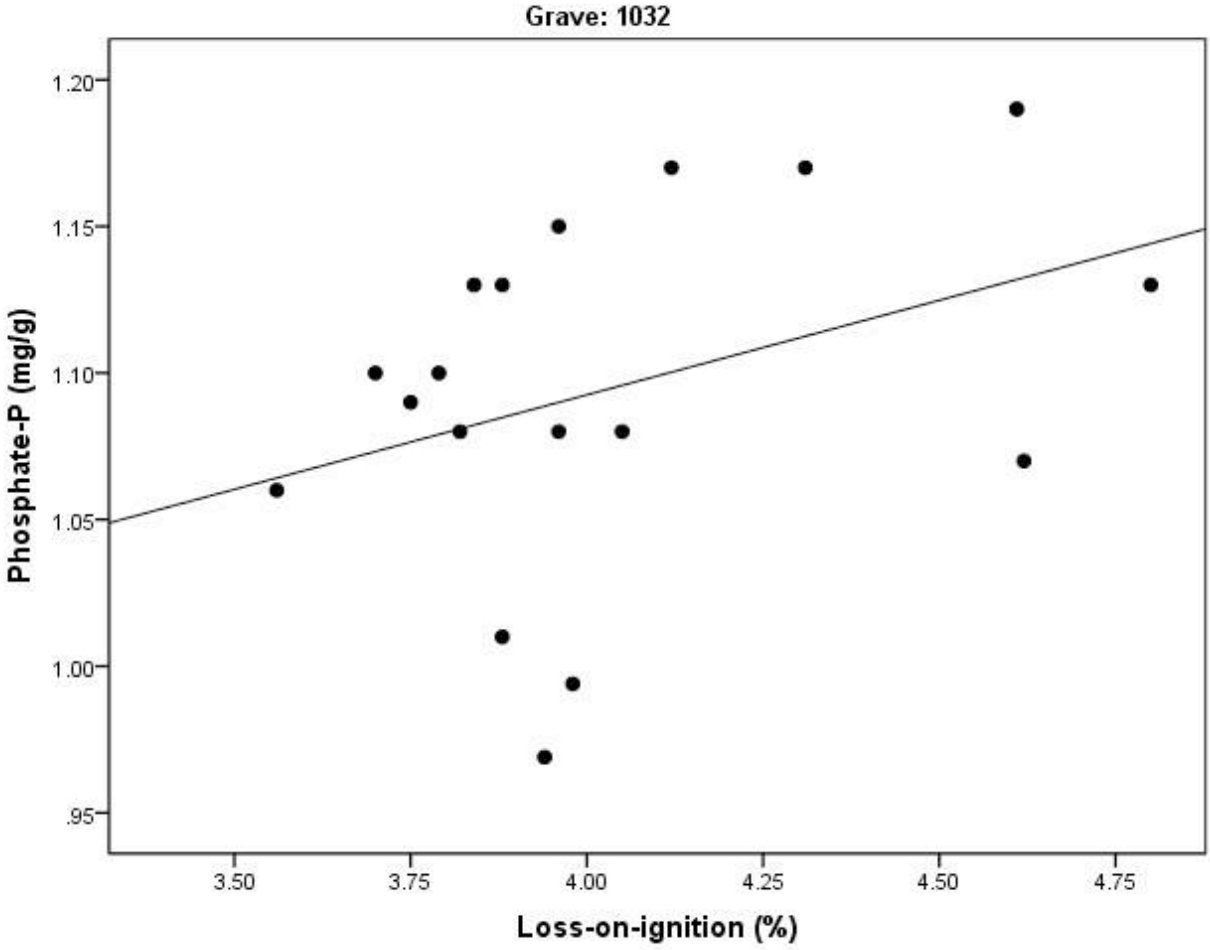


Figure 4: Scatterplot of relationship between phosphate-P and LOI at supposed grave 1032 (r = 0.361, not statistically significant)



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APPENDIX III:

Carbon dating reports

BETA ANALYTIC INC.
DR. M.A. TAMERS and MR. D.G. HOOD
4985 S.W. 74 COURT
MIAMI, FLORIDA, USA 33155
PH: 305-667-5167 FAX:305-663-0964
beta@radiocarbon.com

REPORT OF RADIOCARBON DATING ANALYSES

Miss Irma Bernardus

Report Date: 9/29/2014

Archaeology Wales Ltd.

Material Received: 9/18/2014

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 390566	4960 +/- 30 BP	-24.9 o/oo	4960 +/- 30 BP

SAMPLE : Sample 1 (1006)/389561 SUPPLEMENT
ANALYSIS : RadiometricPLUS-Standard delivery
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid
2 SIGMA CALIBRATION : Cal BC 3795 to 3655 (Cal BP 5745 to 5605)

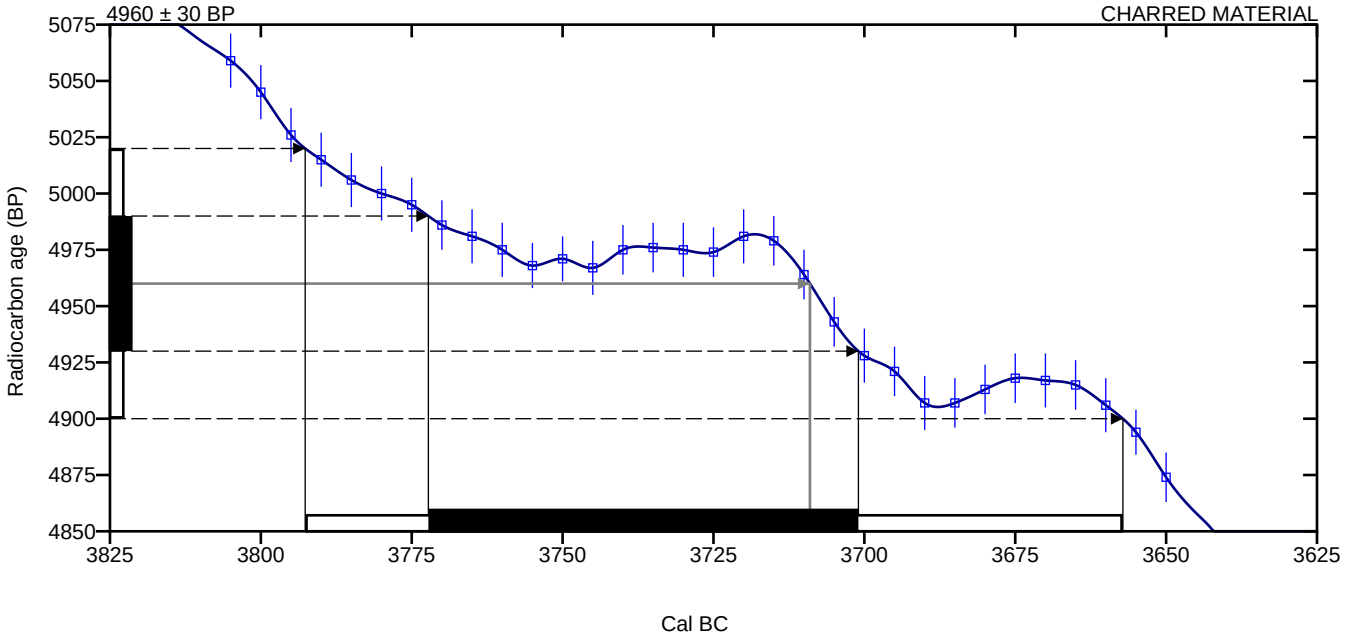
Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the 14C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby 14C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured 13C/12C ratios (delta 13C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta 13C. On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta 13C, the ratio and the Conventional Radiocarbon Age will be followed by "*". The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12 = -24.9 o/oo : lab. mult = 1)

Laboratory number	**Beta-390566**
Conventional radiocarbon age	**4960 ± 30 BP**
2 Sigma calibrated result 95% probability	**Cal BC 3795 to 3655 (Cal BP 5745 to 5605)**
Intercept of radiocarbon age with calibration curve	Cal BC 3710 (Cal BP 5660)
1 Sigma calibrated results 68% probability	Cal BC 3770 to 3700 (Cal BP 5720 to 5650)



Database used

INTCAL13

References

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates, Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

References to INTCAL13 database

Reimer PJ et al. IntCal13 and Marine13 radiocarbon age calibration curves 0– 50,000 years cal BP. Radiocarbon 55(4):1869– 1887.

UBANo	Sample ID	Material Type	^{14}C Age	±	F14C	±
UBA-27626	COR/14/EV (1006)	Human cremated bone	5029	35	0.5347	0.0024

Irma Bernardus
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Cwm Belan
Llanidloes, Powys SY18 6QF
UK
VAT No. 103612563

^{14}CHRONO Centre
Queens University Belfast
42 Fitzwilliam Street
Belfast BT9 6AX
Northern Ireland

Radiocarbon Date Certificate

Laboratory Identification:	UBA-27626
Date of Measurement:	2015-01-19
Site:	Caer Odyn, Rhydypennau, Wales
Sample ID:	COR/14/EV (1006)
Material Dated:	cremated bone
Pretreatment:	Cremated Bone
Submitted by:	Irma Bernardus

Conventional ^{14}C Age:	5029±35 BP
Fraction corrected	using AMS δ^{13}C

Information about radiocarbon calibration

RADIOCARBON CALIBRATION PROGRAM*
CALIB REV7.0.0

*To be used in conjunction with:
Stuiver, M., and Reimer, P.J., 1993, Radiocarbon, 35, 215-230.
Annotated results (text) - -
Export file - c14res.csv

COR14EV /
UBA-27626
Radiocarbon Age BP 5029 +/- 35
Calibration data set: intcal13.14c # Reimer et al. 2013

% area enclosed	cal AD age ranges	relative area under probability distribution
68.3 (1 sigma)	cal BC 3938- 3860	0.655
	3813- 3771	0.345
95.4 (2 sigma)	cal BC 3945- 3758	0.913
	3752- 3750	0.004
	3744- 3713	0.083

References for calibration datasets:
Reimer PJ, Bard E, Bayliss A, Beck JW, Blackwell PG, Bronk Ramsey C, Buck CE Cheng H, Edwards RL, Friedrich M, Grootes PM, Guilderson TP, Haflidason H, Hajdas I, HattÃ© C, Heaton TJ, Hogg AG, Hughen KA, Kaiser KF, Kromer B, Manning SW, Niu M, Reimer RW, Richards DA, Scott EM, Southon JR, Turney CSM, van der Plicht J.
IntCal13 and MARINE13 radiocarbon age calibration curves 0-50000 years calBP
Radiocarbon 55(4). DOI: 10.2458/azu_js_rc.55.16947

Comments:
* This standard deviation (error) includes a lab error multiplier.
** 1 sigma = square root of (sample std. dev.^2 + curve std. dev.^2)
** 2 sigma = 2 x square root of (sample std. dev.^2 + curve std. dev.^2)
where ^2 = quantity squared.
[ ] = calibrated range impinges on end of calibration data set
0* represents a "negative" age BP
1955* or 1960* denote influence of nuclear testing C-14

NOTE: Cal ages and ranges are rounded to the nearest year which may be too precise in many instances. Users are advised to round results to the nearest 10 yr for samples with standard deviation in the radiocarbon age greater than 50 yr.

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APPENDIX IV:

AW Specification for work

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Specification

For Strip, Map and Sample on

Land North of Caer Odyn, Rhydypennau, Ceredigion

Prepared for:

Cymdeithas Tai Cantref
Castell Newydd Emlyn
Sir Gaerfyrddin

Project No: 2239

Date: 9th May 2014

Archaeology Wales Limited
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NON TECHNICAL SUMMARY

This specification details the proposal for an archaeological strip, map and sample on land north of Caer Odyn, Rhydypennau, Ceredigion. The proposed development comprises the construction of Affordable Housing comprising flats, houses and access road within a green field to the north of Caer Odyn.

1. Introduction

The proposed development is land north of Cae'r Odyn, Rhydypennau, Bow Street, Ceredigion (Henceforth – the site), centred on NGR: SN 62792 85745. The development proposal has been submitted by Cymdeithas Tai Cantref. The local planning authority is Ceredigion County Council and the planning application number is A\130948.

The proposed development site comprises a plot of land to the north of Caer Odyn, Rhydypennau. The sub-rectangular field measures approximately 105m by 60m.

This specification has been prepared by Dr Iestyn Jones, Project Officer , Archaeology Wales Ltd (Henceforth - AW) at the request of Cymdeithas Tai Cantref. It provides information on the methodology that will be employed by AW during an archaeological strip, map and sample at the site.

The purpose of the watching brief is to provide Ceredigion County Council with the information that they have requested from Cymdeithas Tai Cantref, the requirements for which are set out in Planning Policy WALES (revised July 2010), Section 6.5, and Welsh Office Circular 60/96. The work is to ensure that all buried artefacts and deposits are fully investigated and recorded if they are disturbed or revealed as a result of activities associated with the development.

Dyfed Archaeological Trust – Heritage Management (DAT-HM), in its capacity as archaeological adviser to Ceredigion County Council, has recommended that an archaeological strip, map and sample is undertaken.

All work will conform to Standard and Guidance for an Archaeological Excavation (IfA 2008), and be undertaken by suitably qualified staff to the highest professional standards.

2 Site description

The site is currently a green field site (43m AOD) located on the west side of the A487 approximately 870m north of Bow Street and 7.2km north-east of Aberystwyth. Cae'r Odyn (Kiln Field) is a relatively new housing estate located to the south of the proposed development site.

The development plot is in Rhydypennau and within the Genau'r Glyn district of Ceredigion, which includes Bow Street and Pen-y-Garn.

Pen y Garn, located immediately south of the site is named after the site of a former round barrow (NPRN 405489) destroyed circa 1807 during construction of the turnpike road. The site yielded an 'immense number of unburnt human bones' as did nearby Cae Ruel', possibly associated with either Ruel-Isaf (lower) or Ruel-Uchaf

(upper) Farm, located approximately 800m and 500m respectively to the south-west of the proposed site (Driver 2006). Driver (2006) remarks that Pen y Garn is significantly located on an elevated conspicuous plateau within Bow Street Valley and that there is therefore the potential for undisturbed remains within other fields in the vicinity.

3 **Method Statement for a Strip, Map and Sample**

A strip, map and sample complying with the IfA Standards and Guidance on Excavation (2008) will be completed in all areas which will be subject to ground disturbances associated with the development.

The strip, map and sample is intended to ensure that all buried remains will be fully investigated and recorded if they are revealed.

Methodology
Prior to the strip map and sample, limited desk based research will be undertaken. This will include:

- consultation of the regional Historic Environment Record (HER)
- relevant published and unpublished sources (e.g. from regional or specialist journals, excavation reports, etc)
- relevant cartographic, illustrative and historical sources pertaining to the historical development of the site

The on-site archaeologist will be present during the soil strip on **all areas to be impacted by groundworks.** The soil strip will be undertaken to the top of archaeological features or the top of the natural deposits.

Exposed linear features will be 20% sampled (with particular attention paid to any junctions with other linear features). All pit and posthole features will be subject to 50% excavation. Features of significant archaeological interest may require 100% excavation. All features will be recorded prior to and after excavation.

Recording will be carried out using AW recording systems (pro-forma context sheets etc), using a continuous number sequence for all contexts.

Written, drawn and photographic records of an appropriate level of detail will be maintained throughout the course of the project. Digital photographs will be taken using cameras with resolutions of 14 mega pixels or above.

Plans and sections will be drawn to a scale of 1:50, 1:20 and 1:10 as required, and these will be related to Ordnance Survey datum and published boundaries where appropriate.

Artifacts
Archaeological artifacts recovered during the course of the excavation will be cleaned and labelled using an accession number which will be obtained from the local museum.

A single number sequence will be allocated to all finds. The artifacts will be stored appropriately until they are deposited with the museum.

All artefacts recovered during the project will be retained and be related to the contexts from which they were derived. All typologically distinct and closely datable finds will be recorded three-dimensionally.

The evaluation will carefully consider any artefactual or economic information and provide an assessment of the viability, for further study, of such information. It will be particularly important to provide an indication of the relative significance of such material for any subsequent decision-making process regarding mitigation strategies.

Any finds which are considered to be in need of immediate conservation will be referred to a UKIC qualified conservator (Phil Parkes of Cardiff Conservation Services).

A catalogue by context of all artefactual material found, quantified by number, weight, or both, and containing sketches of significant artefacts will be compiled.

Pottery will be analysed to the standards outlined in "Guidelines for the Preparation of Pottery Archives" as prepared by the Study Group for Roman Pottery in consultation with the IFA. All other material will be analysed following the advice given in the Institute of Field Archaeologists: Guidelines for Finds Work.

The requirements for the conservation of artefacts will be unpredictable until after the completion of the fieldwork. The archaeological contractor will ensure, however, that at least minimum acceptable standards are achieved (the UK Institute of Conservation's Guidelines for the Treatment of Finds from Archaeological Site should be used as guidance).

Environmental and technological samples

Samples will be taken where necessary when significant deposits are located. These will be retained for processing. The level of post-excavation processing will be dependent on the results of the field evaluation.

Any features containing deposits of environmental or technological significance will be sampled. If required, the project manager should arrange, through a suitably qualified expert the assessment of the environmental potential of the site through examination of suitable deposits. The assessment of potential should consider the guidelines set out in the English Heritage publication 'Guidelines for Environmental Archaeology' March 2002.

The requirements for the conservation of samples will be unpredictable until after the completion of the fieldwork. The archaeological contractor will ensure, however, that at least minimum acceptable standards are achieved (the UK Institute of Conservation's Guidelines for the Treatment of Finds from Archaeological Site should be used as guidance).

Human remains

Human remains will be left in situ, covered and protected when discovered. No further investigation will normally be undertaken until GAPS and the local Coroner have been informed. After discussion, it may be appropriate to take bone samples for C14 dating. If removal is essential it can only take place under the appropriate Ministry of Justice and Environmental Health regulations.

Monitoring
DAT-HM will be contacted prior to the commencement of the strip, map and sample, and subsequently once the work is underway.

Any changes to the specification that AW may wish to make after approval will be communicated to the DAT-HM for approval on behalf of Planning Authority.

Representatives of DAT – Heritage Management will be given access to the site so that they may monitor the progress of the strip, map and sample. DAT-HM will be kept regularly informed about developments, both during the site works and subsequently during the post-fieldwork programme.

4 Method statement for the production of an illustrated report and the deposition of the site archive

Report preparation
The report will contain the following:

- A fully representative description of the information gained, even if this should be negative evidence.
- A concise non-technical summary of the results.
- At least one plan showing the site's location in respect to the local topography, as well as the position of all excavated areas.
- Suitably selected plans and sections of significant archaeological features. All plans and sections should be related to Ordnance Datum.
- Written descriptions of all features and deposits excavated and their considered interpretation.
- A summary report on any artefactual and ecofactual assemblage and an assessment of their potential for further study, prepared by suitably qualified individuals or specialists.
- A statement of the local and regional context of the archaeological remains identified.

Copies of the report will be sent to Cymdeithas Tai Cantref, DAT- Heritage Management and for inclusion in the HER. Digital copies will be provided in pdf format if required.

A summary report of the work will be submitted for publication to a national journal (eg *Archaeology in Wales*) no later than one year after the completion of the work.

The site archive
A project archive will be prepared in accordance with the National Monuments Record (Wales) agreed structure and be deposited within an appropriate local museum (Ceredigion) on completion of site analysis and report production. It will also conform to the guidelines set out in 'Management of Archaeological Projects Two, Appendix 3' (English Heritage 1991).

Arrangements will be made with the local museum before work starts. Wherever the archive is deposited, this information will be relayed to the HER.

Although there may be a period during which client confidentiality will need to be

maintained, the report and the archive will be deposited not later then six months after completion of the work.

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

5 Resources and timetable

Standards
The watching brief will be undertaken by AW staff using current best practice.

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

Staff
The project will be undertaken by suitably qualified AW staff. Overall management of the project will be undertaken by Dr Iestyn Jones (a CV is available upon request).

Equipment
The project will use existing AW equipment.

Timetable of archaeological works
A start date of 7th November 2012 has been assigned to the project with a total run time of between 3 and 5 days.

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

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

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

References

Driver, T. 2006. Pen-y-Garn and Maes-y-Garn. Coflein, Online database maintained by RCAHMW: http://map.coflein.gov.uk/index.php?action=do_details&cache_name=ZXh0ZW50dHlwZSxCT1hfbWlueCwyNjIxNjZfbWlueSwyODUxMzdfbWF4eSwyODYwMjZfbWF4eCwyNjMxNDJfc2VhcmNodHlwZSxhZHZhbmNlZF9vcmE=&numlink=405489#tabs-4. (Accessed 09/05/14)

ARCHIVE COVER SHEET

Land at Cae'r Odyn, Rhydypennau, Ceredigion

Site Name:	Cae'r Odyn
Site Code:	COR/14/EV
PRN:	-
NPRN:	-
SAM:	-
Other Ref No:	-
NGR:	NGR SN 62792 85745
Site Type:	Green Field
Project Type:	Evaluation and excavation
Project Manager:	Iestyn Jones
Project Dates:	June 2014
Categories Present:	Early Neolithic to Modern
Location of Original Archive:	RCAHMW, Aberystwyth
Location of duplicate Archives:	NA
Number of Finds Boxes:	
Location of Finds:	Ceredigion Museum
Museum Reference:	-
Copyright:	AW
Restrictions to access:	None

Archaeology Wales

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