NANT FARM PREHISTORIC BURNT MOUND, PORTH NEIGWL, LLANENGAN, GWYNEDD: ASSESSMENT RECORDING AND RESCUE EXCAVATION 2008 PRELIMINARY REPORT

Project No.G2010

Report No. 796

Prepared for
Cadw

March 2009

By
George Smith
with specialist reports by
Astrid E. Caseldine. Catherine J. Griffiths, Alexandra Schmidl, John Carrott and Bethan Upex

Ymddiriedolaeth Archaeolegol Gwynedd
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Cover: Lifting the trough timbers in a south-west gale.
Left to right: Steve Burrow, Louise Mumford, Dave Chapman, George Smith

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1 SUMMARY

Following identification by David Chapman of an eroding coastal exposure of a prehistoric activity area, recording and assessment were carried out in March 2008. This showed that this was an unusually well preserved Bronze Age burnt mound site with a surviving timber trough and associated stakes together with other palaeo-botanical preservation including seeds and cereal grains. Radiocarbon dates showed use of the site centred on a date of about 1500 Cal BC. It was shown that erosion of the cliffs here over the last century had been occurring at a rate of about 0.55m per annum, which could be projected to show that the remains would be all eroded in about the next 15 years and that the timber trough, on the cliff face could begin to erode in the coming winter. A rescue excavation was therefore organised in partnership with the National Museum, Cardiff. The central area of the mound was excavated and recorded, the trough lifted and transported for study and conservation and samples taken for scientific study.

2 INTRODUCTION

A prehistoric site producing worked flint and stone and preserved organic material was reported at Porth Neigwl, Llanengan, Llŷn, Gwynedd at SH 290257 by David Chapman of Ancient Arts, Llandudno in January 2008. The presence of worked stone similar to that from the nearby Rhiw Neolithic axe factory site was particularly exciting since it indicated a possibly similar period. The site consisted of an extensive layer of burnt stone (Fig. 10) associated with a buried soil horizon that extended for several kilometres along the bay. The cliff face here is of soft glacial deposits and facing the prevailing winds is subject to continued serious erosion. The site was clearly at risk of being lost without record and Cadw subsequently funded a rapid assessment and recording exercise in March 2008. This showed that the site was an Early Bronze Age burnt mound with a well-preserved timber trough and adjoining palaeo-channels (Fig. 11), all associated with preserved botanical material (Smith 2008). After radiocarbon dating and palaeo-botanical assessment a proposal was made to excavate the main part of the mound containing the trough and its surroundings to record the timbers, take samples and recover the timbers before the next winter when storms could threaten the remains.

Cadw provided contingency funding and the National Museum, Cardiff agreed to help with the lifting and to carry out the conservation and the work was carried out in November 2008. This report provides a preliminary description of the work and some assessment results, prior to further radiocarbon dating, full study of the soil pollen and palaeo-botanical samples and study and recording of the artefacts.

Acknowledgements: Thanks go to Cadw for providing funding for the work. This could not have been carried out without the kind agreement of the landowners, Mr and Mrs Evans of Nant Farm, Llanengan. Permission for the work was also granted from the Countryside Council for Wales, because the site lies within a SSSI for the sand dune flora and fauna and in a Special Area of Conservation - the Llŷn ar Sarnau Marine Conservation Area.

3 METHODS

The work was carried out between 3rd to 11th November 2008 by the author with Dr Jane Kenney of GAT, David Chapman of Ancient Arts, Steve Burrow and Louise Mumford of the National Museum and Jeff Marples with thanks for his voluntary assistance.

The assessment in March 2008 provided a detailed record in the form of a plan and an elevation drawing of through the deposits along the cliff face, recorded by total station and

tied in to a local grid (Figs 4 and 5). It was therefore possible to locate the trough precisely for the later work. A trench 5m square was laid out to encompass the position of the trough at the cliff edge. The grass cover was set aside for later replacement and the overburden of blown sand up to 1m deep was removed by machine as far as the top of the buried deposits. Excavation then continued by hand. The south-east corner of the trench was left unexcavated after it was found to have been disturbed by a modern farm animal burial. After completion of the excavation and recording the trench was backfilled by machine, the turf replaced and all reconsolidated.

4 OBJECTIVES

The area where the artefacts were identified was shown to be part of a very widespread buried old land surface that continues along the whole 5km length of Port Neigwl. Study of earlier maps showed that the site had been *c*. 60m away from the coast edge in 1889, demonstrating that the cliff has been eroding at an average rate of *c*. 0.55m a year (Figs 2 and 3). Moreover, the area of interest lay next to a modern stream channel that is deeply incised into the soft sediments. The site lay on a promontory of land between the sea cliff edge and the stream cliff edge and so was threatened with much more rapid erosion than the rest of the open beach cliff. Large scale excavation of the whole of the identified deposits was not feasible because of its extent and because to do so would in itself result in widespread new cliff erosion. The results of the present excavation could justify phased rescue of other parts of the site when limited areas could be excavated, backfilled, reconsolidated and left to re-grow without threatening the integrity of the cliff face.

5 EXCAVATION RESULTS

5.1 The assessment recording

In March 2008 the face of the cliff was cleaned back, where it was not already clearly visible, for a length of 30m, covering the whole exposure of the burnt stone deposit and the adjoining palaeo-channel which was exposed both at the front of the cliff and at the side of the modern stream channel. The deposits were cleaned sufficiently to reveal the relationship to the underlying natural clay which makes up about two thirds of the height of the cliff from upper beach level at this point. Further to the north-west along the bay the cliffs are much higher, although still consisting only of soft clay.

The surrounding area and whole cliff in the area of the buried archaeological deposits were surveyed by total station, in plan and elevation (Figs 4 and 5). The upper part of the cliff in the area of the burnt mound and adjoining palaeo-channels were then drawn by hand to 1:20 scale with descriptions of the deposits (Fig. 6). One part of the cliff was obscured by a large slipped block of material that had subsequently grown over. This was not removed in order to avoid making the cliff unstable and so a small area of the deposits was not recorded.

The eastern part of the cliff face was approximately straight (Fig. 6, c-e). In this area about 1m of blown sand overlaid a thin buried humic soil. This old land surface in turn developed on top of a layer of a layer of quite pure, stone-free mid-grey clay, 0.2 to 0.4m thick. This covered an extensive deposit off burnt stone, showing in about a 19m length of the cliff face, at its thickest in the centre and thinning very gradually to the east and more rapidly to the west (Fig. 10). The burnt stone lay directly on top of another grey clay layer, which made up the rest of the lower cliff face and appeared to be a natural fluvio-glacial deposit. However, the topmost part of this layer included a scatter of small charcoal fragments and at this level was likely to be either contemporary with human activity nearby or had been reworked prior to the deposition of the burnt stone.

The deepest part of the burnt stone spread showed a dip in the centre and it became apparent that this was a typical 'burnt mound' with a central 'trough'. The burnt material showed some variation and different phases of deposition. The central trough area dipped into a narrow cut in which was revealed some well-preserved timbers, identified as the corner of a trough built of vertical timber slabs. What seemed to be a small detached piece of timber was seen inside the corner and a sliver of this was taken for radiocarbon dating. During the later excavation this 'detached' piece was found to be actually a supporting stake.

To the west of the trough and sealed by the burnt stone deposit at the side of the trough were two preserved vertical wood stakes driven into the underlying clay. Nearby was the edge of a pit of which only part was exposed in the area that had been cleared and recorded (Fig. 6).

Further west the cliff edge turned to join up with the edge of the modern stream channel. The face in this part had to be recorded in a series of joining facets (Fig. 6 a-b). The confusing, complex deposits in this area resolved into a series of small alluvial palaeo-channels, built up to a depth of over 2m, containing very varied inter-bedded silts of gravel, sand and silts, some containing charcoal fragments and pieces of preserved wood. The upper burnt stone deposit thinned and dipped down gently into the edge of the palaeo-channel and included some pieces of what appeared to be deliberately split pieces of branch wood (Fig. 6, finds 1-3).

The lowermost palaeo-channel was quite deeply incised with coarse sand and gravel fill suggesting rapid flow. Higher up the channels were shallower, more diffuse and perhaps braided containing finer silts as well as scattered wood and charcoal fragments. The westernmost part of the cliff face (a-a^1) lay along the line of the modern stream channel and provided a longitudinal section through the lower palaeo-channel deposits, which were almost horizontal at this point.

5.2 Excavation results

The overlying layers: The uppermost layer of blown sand (121) was deep and fairly homogeneous apart from one slight horizon seen in the north section (Fig7 and 12). The sand therefore seemed to have been deposited in a single major episode. At present its surface has a well-developed turf cover and if this was buried by a new sand blow would appear as a buried humic horizon.

The sand lay directly on top of a thin dark grey silty humic horizon (122) which appeared to be a buried old topsoil and this had developed on top of a thick layer of mid-grey, stone-free clay (102). Although stone-free the clay contained small scattered fragments of charcoal and twigs.

The clay lay abruptly over dark, charcoal-rich burnt stone deposits with no intermixing. The surface of the burnt stone deposits was undulating and at the south-east side dipped into an elongated feature that had also been partly filled with the overlying grey clay. This was the first indication of the timber-lined trough [166]. The burnt stone deposits surrounded it, heaped up higher than the trough and had partially filled it. Owing to the lack of identifiable stratigraphy in the burnt stone deposits it is not possible to say for certain how much of the burnt deposit had encroached on the trough while it was in use or had eroded into it after its abandonment. However, some burnt stone deposits filled the lower part of the trough and so it appeared to have been abandoned for at least a short period before it was covered and sealed by the grey clay (102).

Excavation showed that there was more than one phase of burnt stone deposition. This was shown most clearly at the north-west side where a timber channel, built to supply water to the trough, had been built on top of some of the burnt mound. After excavation and removal of

the trough timbers the pit for the trough could be seen to have been cut through this earlier burnt mound deposit, which was exposed on the side of the cut.

The timber channel or launder [107] had been built to supply a flow of water to the lower, west end of trough [166]. It consisted of a 2m long hollowed-out straight log of 32cm width and 12cm depth (Figs 8 and 13). Although shallow the original log would have been at least 0.5m diameter and the channel would have been somewhat deeper, since it edges were clearly eroded (Fig. 8). The log proved to have been hollowed out to such an extent that it was only about 20mm thick with only the bark and a thin layer of wood remaining. This was not due to decay because tool marks from hollowing could be seen inside the channel. The channel was set in a shallow linear hollow in the underlying layer (103), which was a mixture of grey clay and burnt stone.

The trough [166] was a trapezoidal structure, 1.7m long, 0.6m wide at the east, upper end, 0.8m wide at the west, lower end and 0.30m deep to the inside of the base. The sides and lower end were single slabs of timber averaging 70mm thick and 300mm wide. The exposed faces were smooth and the upper edges rounded, suggesting wear from repeated use. The side slabs butted up neatly to the end slab at the west corners and were held in place by vertical stakes. The stakes had been shaped to fit into the corners and on excavation proved to have neatly trimmed leaf-shape points that had been driven 200mm into the underlying clay (Fig. 15).

At the east end of the trough there was no end slab and the upper part of the trough cut extended 0.30m beyond the end of the side slabs in which was a ‘step’ at the height of the trough side timbers. There were three vertical stakes where the side timbers ended and their position suggested that they had supported an end timber. One of them [138] occupied a small notch cut in the edge of the basal timber (Fig. 8). Lying in and across the ‘step’ was the remains of a very decayed timber that was *c*. 52cm long, and possibly the partial remains of an end slab. After this was recorded and lifted a ‘slot’ 120mm deep and 70mm front to back was seen in the face of the step (Fig. 9 profile a-a1 and Fig. 14). This had a curving lower end but was quite neat and vertical at the rear and so probably had held a shaped timber, perhaps a designed to provide support for a removable end timber held in place by the stakes.

The basal timber was a single large slab 1.64m long, 0.42m wide at the east, 0.60m wide at the west and 80mm thick. It was smooth surfaced and gently concave. Excavation and lifting showed that the concavity was an original feature, it being set tightly on the underlying clay so had not changed shape during use or as a result of decay. The base slab was rectangular-cornered at the east end but had a carefully made rectangular cut-out, like a joint, at the south-east corner (Fig. 8). Since a similar feature was not present on the opposite side it may indicate that the cut-out was not part of the trough construction but that the slab was reused from some earlier structure. Alternatively, it could have been left over from a change in the design of the trough during construction. It seems most likely that the trough was designed to have a removable east end, and this meant that there had to be a system to hold both the side and end planks as well as the rear pit wall in place when the end plank was removed.

At the west end the base timber had chamfered corners, allowing space for the corner supporting stakes to be inserted.

The lowermost fill of the trough consisted of a small discrete spread of clayey silt and burnt stones (130) that lay in the basal concavity (Figs 8 and 13). This was possibly a remnant from the last use of the trough but amongst it was a fragment of a timber stake that could have derived from the initial abandonment.

Immediately to the east of the trough and continuing beyond the edge of the trench was an undefined area of compact, heat-altered clay and perhaps trampled surface associated with

stone-free charcoal (Figs 7, 8 and 14)). This is interpreted as the fire place [149] serving the trough.

The earlier trough and burnt mound: The trough pit described above had been cut down through a layer of burnt stones and the launder was laid on top of the same layer. The largest part of the burnt stone deposits actually pre-dated trough [166] and its fire area (Fig. 7). The previous recording of the cliff face had shown the presence of an earlier pit at the north-east edge of the excavated area, sealed by some of the burnt stone deposits (Fig. 6). This was investigated during the excavation, which showed that it was the east end of another, probably sub rectangular pit for another trough [139] which still contained some *in situ* timber, but of which most had already been lost to cliff erosion (Figs 8 and 16). An area of burnt clay (Fig. 8, [143]) to the east of the trough was probably the fireplace belonging to it. Its position in relation to the trough suggested that the one timber found was the east end of a trough oriented west to east in the same way as trough [166].

A thin layer of mixed grey clay and burnt stones (103) separated the surface associated with later trough from the burnt stone deposit (106) associated with the earlier trough. Also, another layer of clay (108) containing fewer burnt stones had filled the earlier trough [139] and continued some way beyond it (Fig. 7). The lowermost fills of the earlier trough were another layer of clay with some burnt stones (111) and a layer of more stone-free clay (144) that may have derived from the actual use of the trough or from weathering of sealing material.

Outlying stakes: Several vertically set stakes were recorded beyond the troughs. Two were noted in the cliff face recording (Fig. 6) and another [147] found further east during the excavation (Fig. 8). It is impossible to ascertain to which phase these stakes belong since they could have been driven through earlier deposits and deposits could have accumulated over them after they were disused and eroded. Two stakes [132] and [140] however, served a recognisable function. These were set at either side of the launder at it lower end and must have been so placed to keep the launder in position.

A few shallower angled holes were also found on the east side of the pit for trough [139] (Figs 8 and 16). They were clearly not holes for driven stakes but could have been the impressions of some kind of light temporary structure over the trough, such as for a cover or support.

6 ARTEFACTS

The main artefacts were those of wood, the trough parts, stakes, launder and isolated pieces of possibly split wood. A few stone and flint objects were found. One flint core and a flint flake were found in the material fallen from the cliff edge. Two flint flakes were found in layer (108) – the old ground surface, two flint flakes, one burnt, in layer (152), another possible old ground surface beneath the earlier burnt mound and one flint flake in (158), the later burnt mound. Two possibly struck flakes of stone were found in layer (123), the fill of the launder [107].

7 DISCUSSION

The dark grey main fill (108) of the earlier trough [139] could represent natural silting in a period of abandonment before construction of the second trough. As can be seen from the cliff-face section (Fig. 6) the level of the palaeo-channels gradually rose so the earlier trough may have become unusable because the water supply for the later trough would have been about 0.5m higher than that for the earlier.

The discovery of the launder shows how the trough was used. The water inlet at the lower end means that it was kept clear of the fire place and the area where access to the pit was made. The space taken up by the launder and the fire place means that all the discarded burnt stone was likely to have been deposited to the south and the residue from this pit may have been just that later material seen in the cliff face section to the south (Fig. 6).

There was no identifiable micro-stratigraphy in the burnt stone deposits to indicate numerous episodes of dumping, so the activity could have been one continuous episode, such as during a large scale seasonal processing activity. Similarly only one fire place was found for trough [166], with no sign of episodes of burning.

The charcoal contained in the burnt stone deposits was notably finely comminuted although the initial assessment showed that it was largely alder wood charcoal. There were no ashy deposits. If heated to a considerable temperature the charcoal would have been consumed to ash but a portion would have remained as charred material by quenching if all the burnt stone and fire were dumped in the water of the trough. This would have made the process very dirty but there were no sediments in the base of the trough and even the silts remaining in its crevices appeared clean and charcoal-free. These micro-sediments will be the subject of further study.

As part of the initial assessment and recording a bulk soil sample was taken from a large intact fragment of burnt deposit that had broken off from the cliff face close below where the earlier trough pit was found. Palaeo-botanical assessment of a 5 litre sub-sample was carried out on this at the University of Lampeter (Caseldine and Griffiths, Appendix 2, below). This was found to contain wood charcoal, seeds of wild wetland species and a notable concentration of cereal remains comprising mainly barley and wheat chaff and a few indeterminable cereal grains including one wheat/barley (*Triticum/Hordeum*) grain. The wild seeds represent the local wetland flora but the presence of cereals is of interest in relation to use of the trough. The presence of chaff was suggested to derive from processing waste thrown onto the fire as fuel and this indicates a late summer use of the trough.

One piece of alder twig from this sample and one fragment of timber from the trough, which turned out to be a corner stake, identified as oak, probably heartwood, were sent for radiocarbon dating (Identifications by A. Caseldine). The alder twig produced a date of Cal BC 1610-1420 and the oak produced a date of Cal BC 1740-1520 (Appendix 1, below). The date from the oak would be expected to be older than the alder because it was from the heartwood of a tree of some age at death.

During the excavation bulk samples were taken from all significant layers and two soil columns taken from the north section face to span the complete sequence of deposits (Figs 7 and 17). Sub-samples were taken from four of the samples from layers (106), (128), (130) and (158) for palaeo-botanical and invertebrate assessment at Palaeoecology Research Services (Schmidl, Carrott and Upex, Appendix 3, below). (158) was the later burnt mound, (128) the earlier burnt mound and (128) and (130) were, respectively, the upper and lower fill of trough [166]. The assessment showed that the burnt mound contexts contained mainly very fragmented wood charcoal and that further analysis is probably not justified. The trough fills produced macro-botanical and invertebrate evidence, mainly indicating an essentially wet environment and the only evidence of cereals was a single barley grain (in the basal fill of the trough). The lack of correspondence of these results with the sample assessed in 2008 is problematic but should be corrected by study of more of the original sample.

So far the macro-botanical and invertebrate analysis has not been able to add a great deal to the ongoing debate about the possible uses of burnt mound troughs although the presence of some cereal remains may be significant and brewing is still a possibility! However, if chaff

was used as fuel then the presence of the occasional grain is likely to be purely accidental. Even so, processing of larger samples should provide a more useful quantity of cereal remains, which, being rare for the Early Bronze Age, will be useful for understanding agriculture. Initial processing of some of the burnt stones for geological identification has produced two pieces of burnt bone and this could also be significant. It is hoped that lipid analysis might be carried out on the trough timbers, which may show if foodstuffs, such as meat were being cooked. The full environmental study of the samples, together with pollen analysis will provide a much fuller picture of the local environment and its changes. Further radiocarbon dates will also be obtained.

Conservation: After excavation the timbers of the trough and all stakes and other timbers were numbered and lifted, packed and taken to the National Museum, Cardiff. There they are in a stable environment awaiting specialist timber assessment, before any other work, such as timber identification and assessment of timber-working techniques, drawing and photography. Initial study shows the presence of well-preserved axe marks on the previously unexposed edges of the trough timbers as well as on the buried portions of the stakes. It also suggests that the trough was open for a while after abandonment, allowing some decay to begin, before eventual burial, sealing and preservation by the clay deposits (Louise Mumford, pers. comm.).

General interpretation: The burnt mound was built on an area of fairly level wet clayey floodplain, possibly salt marsh, which must have had a number of small streams running across it. No evidence of topsoil development was found beneath the burnt mound deposits or beneath the overlying deposit beyond the burnt stone spread to the south although the surface of the underlying natural clay deposits contained charcoal fragments and appeared to have been laid down or re-worked immediately prior to the burnt mound activity.

There were at least two phases of use here, with separate troughs, and there could have been other pits and troughs nearby, evidence of which could be found in future. The farmer recalls that when the fields to the east had been ploughed there dark patches were visible in the exposed soil, which could indicate the presence of other burnt mounds. Disuse of both of the troughs here was followed by phases of flooding and clay deposition. The flooding over the later trough seems to have been on a very large scale, perhaps sufficient to cause erosion and re-distribution of the burnt stone deposits. Elsewhere along the bay other finds have been made, including other pits (GAT PRN 7297) and artefacts including a re-worked Neolithic axe, a stone arrow shaft smoother and part of a jet or lignite ring (D. Chapman, pers. comm.). The flood created a thick band of silty clay across the whole of the Porth Neigwl basin, after which a thin peaty soil developed, followed not long after by a major sand blow. The ‘flood’ horizon has only very fine sediments and is similar to the lagoonal/estuarine clay that was deposited around the North Wales coast around the time of the maximum sea level transgression (Whittow 1965). It may be that the deposition of this layer, followed by the sand blow were related events deriving from a change in sea level, perhaps with creation of a sand bar and lagoons followed by erosion of the sand bar and exposure of beach deposits. It is hoped that the work will attract some geomorphological study and can be tied in to study of the intertidal peats that exist in the bay, further to the north These are normally buried beneath the sand and gravel of the beach, and represent a period of much lower sea-level than at present, when the shore line must have been much further to the west.

8 FUTURE WORK

8.1 Specialist study and publication: The above discussion will be extended after completion of specialist study. This is aimed at understanding the function of the trough and its relation to the contemporary environment. It will include:

- Further macrobotanical study (A. Caseldine)

- Pollen analysis (A. Caseldine)
- Geological identification of burnt stone (D. Jenkins)
- Identification of wood species of the timbers (NMW)
- Further radiocarbon dating (Beta).

Some of the work will be further assessment, which, if the recommendations are accepted will need further funding. This comprises:

- Assessment for specialist study of the timbers and the methods of working (N. Nayling)
- Assessment of potential for identification of food residues in the trough timbers (R. Evershed).

The acquisition of specialist information should be incorporated into a published report.

8.2 Future work: The area excavated was only a small part of the Nant Farm site, designed to recover the main trough. The more comprehensive and detailed studies of burnt mounds have pointed out that they must have had a key role in the contemporary and local economy and society and were not just isolated, temporary cooking places (Hedges 1975). Other features such as buildings may be present in the immediate vicinity of burnt mounds. Also, settlement associated with mixed agriculture is to be expected in the nearby area.

The area around the 2008 excavation needs to be monitored by regular visits.
Further work carried out to provide a better understanding of the site as a whole. This could involve cleaning of the modern drainage ditch sides just to the east of the excavated area. This would show if other features are present and help to define the extent of the burnt stone spread.

The rest of Porth Neigwl needs to be monitored because of the presence of the buried horizon with the discovery of other features and prehistoric finds across the whole of the bay, as a result of continuous coastal erosion. This is emphasised by the fact that the site of two pits filled with burnt stones recorded by GAT as part of the Cadw coastal survey in 1995 (PRN 7297) was re-visited in 2008 as part of the Cadw monument evaluation project and it appeared that the pits had already been eroded away. The buried horizon and any features in it need recording by total station and where necessary by detailed drawing, sampling and dating.

The SSSI and SAC status of part of the bay means that CCW should be involved in any work. The continued erosion has already been identified as a problem, but not one that has been addressed. It is also relevant to the current debate on global warming and predicted sea-level rise and the presence of eroding archaeological horizons here needs to be met by a long term strategy.

In order to understand the burnt mound and other features in the buried horizon it is necessary to carry out more general study of the area inland from the bay to find out more about its development and the environment contemporary with the burnt mound. Settlement and agricultural evidence, such as early field ditches should be present and could be found. This could involve study of aerial photographs to look for features such as settlement, fields, other burnt mounds or palaeo-channels. Augering and cleaning of field ditches could help identify the prehistoric land surface further inland.

The presence of intertidal peats at Porth Neigwl and of unexplained Holocene deposits such as the grey clay of the buried horizon means that the development of the bay and its hinterland should be of interest to other specialists and their contributions are needed and will be sought.

In terms of more regional study, the link between burnt mounds and contemporary society has been unknown because of the lack of settlement evidence. The only settlement of the Bronze Age date known in this area, if of somewhat later date, is that of Mellteyrn Uchaf, excavated by Richard Kelly (Ward and Smith 2001). This produced some deposits of burnt stone from within the houses. The wider area around the settlement could be studied in detail to look for evidence of burnt mound activity, which, if present might be linked to the settlement by radiocarbon dating.

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APPENDIX 1

RADIOCARBON DATING

Mr. George Smith

Report Date: 7/17/2008

Gwynedd Archaeological Trust

Material Received: 6/17/2008

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 245602	3260 +/- 40 BP	-26.6 o/oo	3230 +/- 40 BP
SAMPLE : G2010121			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 1610 to 1420 (Cal BP 3560 to 3370)			
Beta - 245603	3350 +/- 40 BP	-25.0 o/oo	3350 +/- 40 BP
SAMPLE : G2010152			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (wood): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 1740 to 1520 (Cal BP 3690 to 3470)			

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-26.6:lab. mult=1)

Laboratory number: **Beta-245602**

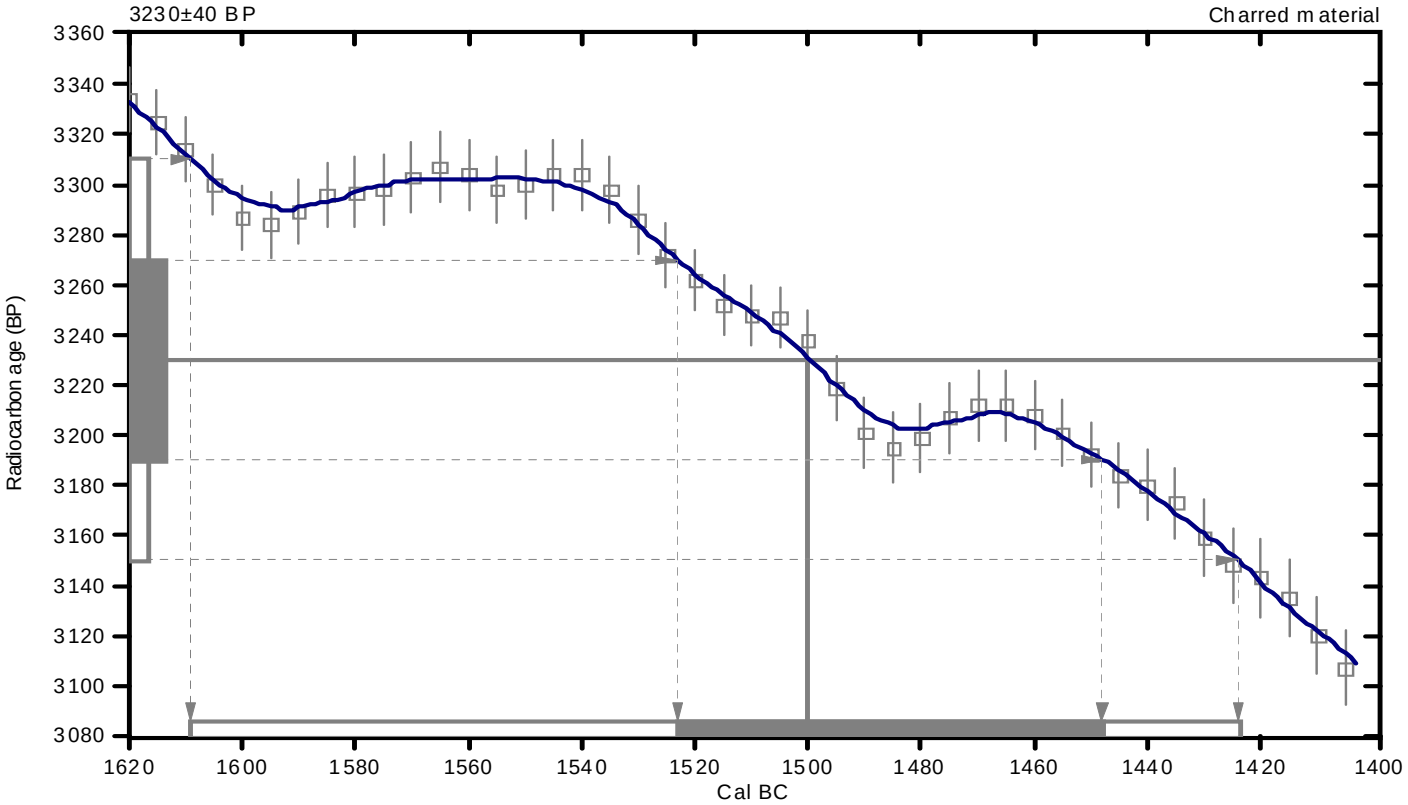
Conventional radiocarbon age: **3230±40 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 1610 to 1420 (Cal BP 3560 to 3370)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 1500 (Cal BP 3450)

1 Sigma calibrated result: (68% probability) Cal BC 1520 to 1450 (Cal BP 3470 to 3400)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

Beta Analytic Radiocarbon Dating Laboratory

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-25:lab. mult=1)

Laboratory number: **Beta-245603**

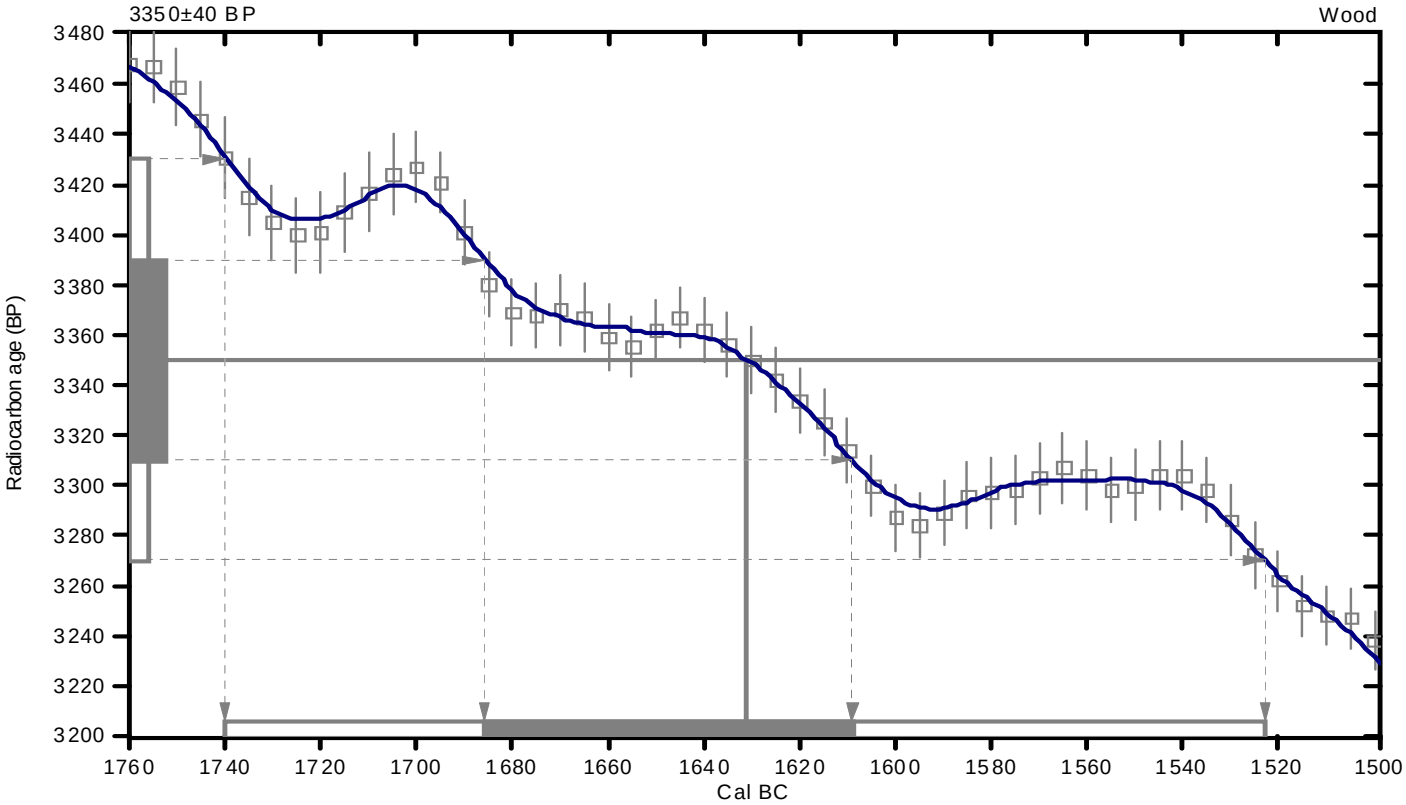
Conventional radiocarbon age: **3350±40 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 1740 to 1520 (Cal BP 3690 to 3470)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 1630 (Cal BP 3580)

1 Sigma calibrated result: (68% probability) Cal BC 1690 to 1610 (Cal BP 3640 to 3560)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

Beta Analytic Radiocarbon Dating Laboratory

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APPENDIX 2

INITIAL PALAEO-ENVIRONMENTAL ASSESSMENT

Assessment of Plant Remains from Nant Farm, Porth Neigwl

Astrid E. Caseldine and Catherine J. Griffiths

During the excavations at Nant Farm a bulk sample was taken from the burnt mound for plant macrofossil analysis. A five litre sub-sample was processed by Gwynedd Archaeological Trust for an assessment of the potential of the material. The sample received for analysis was the 1 mm flot. As well as assessment of the plant macrofossil remains, a small amount of charcoal was identified and a sample selected for radiocarbon dating. In addition a sample of wood from the wooden trough was identified.

Laboratory Methods

Plant macrofossils

The flot was re-sieved and floated in the laboratory to produce cleaner material for examination. The flots and residues were collected in a stack of sieves. The finest mesh used was 250 µm. The plant remains were sorted and identified using a Wild M5 stereo microscope. The plant material consisted of both charred and waterlogged remains. A reference collection and standard reference works (e.g. Berggren 1981, Schoch *et al* 1988, Jacomet 2006) were used to identify the remains. The results are presented in Table 1. Nomenclature follows Stace (1991).

Charcoal and wood identification

A small amount of charcoal was identified from the bulk sample. The charcoal was fractured to produce clean sections (transverse, transverse longitudinal and radial longitudinal). Thin sections were cut for the wood. The charcoal was examined using a Leica DMR with incident light and the wood was examined using transmitted light. The charcoal and wood were identified by reference to Schweingruber (1978) and Schoch *et al* (2004). The results are given in Table 2.

Results and discussion

The plant remains include both waterlogged and charred material. Some taxa may be underrepresented because a 1 mm sieve was used to retain the flot rather than a 500 µm sieve and because the residue has not been examined. However, finer material was trapped in the 1 mm sieve and the assemblage recovered gives a clear indication of the potential of the site for plant macrofossil analysis.

The waterlogged assemblage, in particular, indicates the environmental conditions in the vicinity of the burnt mound. The assemblage includes a number of taxa which suggest wet or damp conditions, whilst others suggest disturbed ground habitats and possibly cultivation. Species such as celery-leaved buttercup (*Ranunculus sceleratus*), crowfoot (*R.* subgenus *Batrachium*), water-pepper (*Persicaria hydropiper*), common/slender spike-rush (*Eleocharis palustris*/*E. uniglumis*), sedges (*Carex* spp.) and rushes (*Juncus* spp.) are all commonly found on marshy ground or in shallow ponds or streams. The occurrence of water flea (*Daphnia* sp.) egg pouches confirms the presence of standing water, whilst an alder (*Alnus glutinosa*) seed indicates wet carr woodland in the area. Creeping buttercup (*Ranunculus repens*) is typical of wet grassland and docks (*Rumex* sp.) frequently occur on damp grassy or bare ground near streams and rivers, although they also occur on waste and cultivated ground. The presence of nettle in the assemblage could be a further indicator of disturbed ground or cultivation taking place in the area, or possibly nitrogen enrichment as a result of defecating animals. Slender parsley-piert (*Aphanes inexspectata*) and knotgrass (*Polygonum aviculare*) are found in

similar open habitats. Overall the waterlogged assemblage is in keeping with the stratigraphic evidence which indicates the burnt mound was located close to a stream (Smith 2008).

The charred assemblage, apart from wood charcoal, largely comprises cereal remains. It consists of small amounts of wheat chaff, mainly spikelet forks and glume bases, and slightly greater quantities of barley rachis. A few indeterminable cereal grains are present and a wheat/barley (*Triticum/Hordeum*) grain. The wheat chaff includes emmer wheat (*T. dicoccum*) glume bases. The remains probably represent waste thrown onto a fire. The only other identifiable charred plant remains are charred alder and grass seeds and grassy stem material and probably represent material deliberately gathered as fuel or material that was burnt incidentally.

The occurrence of charred cereal remains supports the rather more tentative evidence from the waterlogged assemblage for arable agriculture in the area and is particularly interesting because it is unusual to find charred cereal remains associated with burnt mounds, certainly in Wales. The presence of emmer wheat and barley is consistent with the earlier Bronze Age date for the site and with assemblages from other parts of Wales (Caseldine 1990). Bronze Age cereal assemblages are relatively scarce from Wales and therefore this is a valuable addition to the archaeobotanical record.

The wood from the trough was identified as oak (*Quercus* sp.) and the charcoal from the mound was largely alder, apart from one piece of birch (*Betula* sp.). It is probable that the nearest available woodland was exploited for fuel. The predominance of alder charcoal is in keeping with the plant macrofossil results which suggest that alder was growing in the area, although the alder seeds could be from wood collected for fuel rather than trees in the immediate vicinity. Alder carr, with some birch, may have been growing along the edge of the stream represented by the palaeochannel. The oak used to make the trough was probably from drier woodland away from the stream.

Conclusions and recommendations

The plant macrofossil results confirm the stratigraphic evidence that the burnt mound was constructed near to a stream. There is some evidence for disturbed ground habitats and possibly cereal cultivation in the local area. Barley and emmer appear to have been the main crops. The cereal evidence is in accordance with Bronze Age records from elsewhere in Wales.

The plant macrofossil assemblage is of especial interest because it contains charred cereal grain and it is unusual to find this associated with burnt mounds in Wales. Together with the archaeological artefacts and the burnt mound itself, the plant remains can help to provide a detailed picture of human activity at the site and in the surrounding area.

The assessment suggests that the recovery of further samples would allow a detailed reconstruction of the local environmental conditions. Samples should be taken from other contexts, including the palaeochannel and the peat deposit overlying the occupation horizon, as well as further samples from the burnt mound itself. The recovery of a larger charred grain assemblage could, potentially, provide further information about arable farming and crop processing activity in the earlier Bronze Age, making a useful contribution to the relatively limited record that exists for this period in Wales.

A 500 µm sieve should be used to recover the flot to ensure that all chaff and smaller weed seeds are recovered. The residues should also be checked to make sure that all the remains have floated.

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Table 1. Plant macrofossil remains from Nant Farm burnt mound.

Sample	**1**
Context	**12**
Waterlogged	
Ranunculus repens type (Creeping buttercup)	2
Ranunculus sceleratus L. (Celery-leaved buttercup)	2
R. lingua type (Greater spearwort)	1
R. subgenus *Batrachium* (DC.) A. Gray (Crowfoot)	2
Ranunculus sp. (Buttercups)	1
Alnus glutinosa (L.) Gaertner (Alder)	1
Urtica dioica L. (Nettle)	38
Atriplex sp. (Oraches)	1
Silene sp. (Campions)	1
Persicaria hydropiper (L.) Spach (Water-pepper)	3
Polygonum aviculare L. (Knotgrass)	3
Rumex sp. (Docks)	62
Viola sp. (Violets)	1
Rubus fruticosus L. agg (Brambles)	7
Potentilla sp. (Cinquefoils)	1
Aphanes inexspectata Lippert (Slender parsley-piert)	1
Rosaceae type - thorn	1
Mentha arvensis L./*M. aquatica* L. (Corn/water mint)	12
Plantago major L. (Greater plantain)	1
Sonchus asper (L.) Hill (Prickly sow-thistle)	1
Juncus sp. (Rushes)	>80
Eleocharis palustris (L.) Roemer & Schultes/*E. uniglumis* (Link) Schultes (Common/slender spike-rush)	1
Carex sp. - biconvex (Sedges)	2
Poaceae (Grasses)	25
Seeds indet.	10
Monocot. Plant remains	++++

Daphnia sp. - ephippia (Water fleas)	14
Charred	
Alnus glutinosa (L.) Gaertner (Alder)	1
Triticum monococcum/T. dicoccum - spikelet forks (Einkorn/Emmer)	4
T. monococcum/T. dicoccum - glume base	4
T. monococcum/T. dicoccum - rachis	1
T. dicoccum - glume base	4
Triticum sp./*Hordeum* sp. - grain (Wheat/Barley)	1
Hordeum sp. - rachis (Barley)	20
Cereal indet.	10
Poaceae (Grasses)	1
cf. Flower head	2
Organic material indet.	9
Monocot. Stem material	3
Wood charcoal	+++++

++++ = abundant (50-100), +++++ = very abundant (> 100)

Table 2.Charcoal identification from Nant Farm burnt mound

Sample	**1**
Context	**12**
Taxa	
Alnus glutinosa (L.) Gaertner (Alder)	9
Betula sp. (Birch)	1

APPENDIX 3

EXCAVATION PALAEO-ENVIRONMENTAL ASSESSMENT

Palaeoecology Research Services ***PRS*** **2009/20**

Assessment of biological remains from an excavation at Nant Farm, Porth Neigwl, near Abersoch, Gwynedd (site code: G2010)

by
Alexandra Schmidl, John Carrott and Bethan Upex

Summary

Four sediment samples, recovered from deposits encountered during an archaeological investigation at Nant Farm, Porth Neigwl, near Abersoch, Gwynedd, were submitted for an assessment of their bioarchaeological potential. The works were undertaken as the site was under threat of destruction as a result of coastal erosion and revealed the remains of a Bronze Age burnt mound, within which was a wood-lined trough.

Ancient biological remains recovered from the two subsamples from the upper and lower layers of the burnt mound were largely restricted to charcoal fragments most of which were too small to be identified; although some larger fragments were identified as alder/birch/hazel or alder/hazel. Of more interest were the two organic-rich deposits from the timber-lined trough which gave interpretatively useful assemblages of waterlogged plant and invertebrate remains.

Overall, the plant and invertebrate assemblages were of essentially 'natural' character, indicating standing water (within the trough), with wetland (including alder carr), hedgerow and areas of waste ground in the vicinity, and seemed to reflect infilling of the trough once it had fallen into disuse. A single charred barley grain was recovered from the basal fill and probably derived from previous domestic activity in the vicinity, but this was of no interpretative value in isolation. A comparison of the assemblages from the upper and lower trough fills suggested that standing water within the trough became more permanent with time (perhaps reflecting a general increase in the wetness of the area) and that the more substantial elements of the local vegetation (e.g. alder, hedgerow species) were reasserting themselves in the immediate vicinity, presumably reflecting abandonment of the site and the corresponding cessation of management and clearance by humans.

The plant macrofossil assemblages recovered were small and/or the identifiable remains too restricted in range to warrant any further study. Detailed analysis of the invertebrate assemblages from larger subsamples from the fills of the trough would probably allow some refinement of the reconstruction of ecological conditions within and around this feature, however.

Any future interventions in the area should allow for the possibility of encountering other deposits with good organic preservation and for their systematic sampling and assessment and, if appropriate, analysis of assemblages of recovered organic remains.

KEYWORDS: NANT FARM; PORTH NEIGWL; NEAR ABERSOCH; GWYNEDD; WALES; ASSESSMENT; BRONZE AGE; PLANT REMAINS; CHARRED PLANT REMAINS; CHARRED GRAIN; INVERTEBRATE REMAINS; INSECTS; BEETLES

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27 March 2009

Assessment of biological remains from an excavation at Nant Farm, Porth Neigwl, near Abersoch, Gwynedd (site code: G2010)

Introduction

An archaeological investigation was undertaken by Gwynedd Archaeological Trust at Nant Farm, Porth Neigwl, near Abersoch, Gwynedd (NGR SH 290 257), during March 2008. The works were undertaken as the site was under threat of destruction as a result of coastal erosion.

The excavations revealed the remains of a Bronze Age burnt mound, within which was a wood-lined trough. Preliminary investigations of a sample recovered from the burnt mound deposits identified both waterlogged and charred plant macrofossils, the latter including cereal remains. Radiocarbon dating of alder charcoal from the surrounding burnt material returned a Bronze Age 2-sigma calibrated date of Cal BC 1610 to 1420 (Beta-245602).

Four bulk sediment samples ('GBA'/'BS' *sensu* Dobney *et al*. 1992) were submitted to Palaeoecology Research Services Limited (PRS), County Durham, for an assessment of their bioarchaeological potential.

Methods

The samples were inspected in the laboratory and their lithologies were recorded, using a standard *pro forma*, prior to processing. Each was processed, broadly following the techniques of Kenward *et al*. (1980; 1986) for the recovery of plant and invertebrate macrofossils. Before processing the samples were disaggregated in water and their volumes recorded in a waterlogged state.

Plant and invertebrate remains in the processed subsample fractions (residues, washovers and flots) were assessed by 'scanning' using a low-power microscope, identifiable taxa and other biological and artefactual components being listed on paper. One of the residues and all of the washovers contained a significant component of waterlogged plant material and were examined wet, whilst the other residues were largely mineral in nature and were dried before being recorded. The washovers from the two subsamples from fills of the trough contained waterlogged invertebrate remains and paraffin flotation was employed to separate these from the bulk of the plant remains. The resultant flots were stored in plastic jars in industrial methylated spirits.

Remains were identified by comparison with modern reference material at PRS and the use of published works (e.g. Cappers *et al*. 2006 for seeds and fruits). Larger pieces of well preserved charcoal were randomly selected from the different contexts for closer examination and identification of the taxa present. Identification of charcoal was undertaken with reference to the photographs and descriptions in 'Wood anatomy of central European Species' (Schoch *et al*. 2004).

Nomenclature for plant taxa follows Stace (1997) and for insects follows Kloet and Hincks (1964-77).

During recording, consideration was given to the identification of remains which would be for radiocarbon dating by standard radiometric technique or accelerator mass spectrometry (AMS).

Results

The results are presented in context number order by feature. Archaeological information, provided by the excavator, is given in square brackets. A brief summary of the processing method and an estimate of the remaining volume of unprocessed sediment follows (in round brackets) after the sample numbers.

BURNT MOUND

Context 106 [upper burnt mound deposit]
Sample 12/T (2.8 kg/2 litres sieved to 300 microns with washover; no unprocessed sediment remains from the submitted 'subsample')

Moist, very dark grey to black, stiff to sticky (working soft and sticky), very stony (stones of 6 to 60 mm were abundant), slightly sandy clay silt, with ?modern rootlets. When broken, lumps of sediment released a slight sulphide odour indicative of decaying organic matter.

The small washover (125 ml) consisted almost entirely of root/rootlet, with some unidentified charcoal (to 10 mm) and a few earthworm egg capsules. In addition, a single waterlogged seed of elder (*Sambucus nigra* L.) was noted.

The large residue (dry weight 1.72 kg) consisted largely of stones (to 49 mm), with some sand and traces of unidentified charcoal (to 9 mm; 2 g).

Context 158 [lower burnt mound deposit]
Sample 5/T (1.8 kg/1.5 litres sieved to 300 microns with washover; no unprocessed sediment remains from this 'subsample')

Moist, very dark grey to black, crumbly to slightly sticky (working soft), moderately stony (stones of 6 to 60 mm were common), very ?ashy, slightly sandy, slightly clay silt, with ?modern rootlets.

The small washover (125 ml) was mostly of root/rootlet and fragile unidentified charcoal (to 10 mm). No identifiable plant or invertebrate macrofossils were seen.

The medium-sized residue (dry weight 0.75 kg) was mostly stones (to 44 mm), with some sand, traces of wood (to 6 mm; 1 g) and rootlets (to 32 mm; <1 g), and fragments of unidentified charcoal (to 16 mm; 2 g).

TROUGH

Context 128 [upper fill of trough]
Sample 8/T (2.1 kg/2 litres sieved to 300 microns with washover and paraffin flotation; no unprocessed sediment remains from the submitted 'subsample')

Just moist, dark brown to dark grey-brown, unconsolidated to crumbly, moderately humic, slightly sandy silt, with stones (2 to 60 mm) and modern rootlets.

The medium-sized washover (300 ml) consisted mainly of organic material (decayed root/rootlet and unidentified plant fibres, with some twig fragments of alder – *Alnus*), with some undisaggregated sediment lumps and charcoal (to 15 mm). Some of the larger pieces of charcoal could be identified as alder/hazel (*Alnus/Corylus*). However, there was also a wide range of waterlogged seeds and fruits all showing some degree of decay (slightly orange coloured). Overall, plant taxa typical of both continuously and intermittently (perhaps seasonally) wet soils were the most frequently recorded and included rush (*Juncus*), floating

sweet-grass (*Glyceria fluitans* (L.) R. Br.), gypsywort (*Lycopus europaeus* L.), lesser spearwort (*Ranunculus flammula* L.), mint (*Mentha*) and water-pepper (*Persicaria hydropiper* (L.) Spach). In addition, several twig fragments, with a few nuts and male catkins, of alder (*Alnus glutinosa* (L.) Gaertn.) indicated areas of wet woodland (alder carr) and there were also small quantities of remains of aquatic taxa such as duckweed (*Lemna*) and pondweed (*Potamogeton*). Numerous fruit stones and prickles of blackberry/raspberry (*Rubus fruticosus* L. agg./*R. idaeus* L.) and raspberry (*Rubus idaeus* L.) suggested hedgerow nearby. Other wild plant species, such as dock (*Rumex*), large-flowered/common hemp-nettle (*Galeopsis speciosa* Mill./*G. tetrahit* L.), mayweed (*Tripleurospermum*), meadow/creeping buttercup (*Ranunculus acris* L./*R. repens* L.), nipplewort (*Lapsana communis* L.) derived from drier areas of waste/open ground in the surrounding area.

The medium-sized flot (45 ml) was mostly of plant detritus, with numerous seeds and fruits (as described above) and quite large numbers of invertebrate remains. Many of the last were poorly preserved being both heavily fragmented and strongly chemically eroded (individual fragments being pale/translucent). However, there were occasional much better preserved remains, typically of adult beetle sclerites. Several staphylinid species were represented (including ?*Gyrohypnus* sp.) and there were a few weevil (Cuculionidae) elytra (perhaps an *Otiorhynchus* species) and *Helophorus* sp. remains; most of the members of this last genus live beside stagnant water. Some of the unidentified beetle remains were almost certainly of aquatic taxa. Larval insect remains were relatively numerous and there were also a few mites (Acari).

The small residue (125 ml) was mostly of stones (to 45 mm) and sand, with some sediment lumps, decayed root/rootlet and charcoal (to 11 mm). A few of the larger pieces of charcoal could again be identified as alder/hazel.

Context 130 [basal layer in trough]
Sample 6/T (2.1 kg/2 litres sieved to 300 microns with washover and paraffin flotation; no unprocessed sediment remains from the submitted 'subsample')

Moist, dark grey-brown to dark grey, soft and slightly sticky to crumbly and fibrous in places (working soft), slightly sandy clay silt, with stones (20 to 60 mm), plant remains and modern rootlets. When broken, lumps of sediment released a slight sulphide odour indicative of decaying organic matter.

The medium-sized washover (250 ml) was mostly organic material including decayed root/rootlet and unidentifiable plant fibres, with some deformed unidentified charcoal (to 17 mm) and invertebrate remains that had failed to separate into the flot (see below). Overall, the plant assemblage was dominated by small numbers of rather well preserved waterlogged seeds and fruits of wild species. Again, the identifiable component was principally of species of wet places, including gypsywort, lesser spearwort, rush and water-pepper, with a minor component of plant taxa growing in waste ground (e.g. common nettle – *Urtica dioica* L., dock – *Rumex*, knotweed – *Persicaria*, large-flowered/common hemp-nettle,), and a few records of raspberry which probably indicated hedgerow nearby. In addition, there was a single charred grain of barley (*Hordeum distichon* L./*H. vulgare* L.).

The medium-sized flot (45 ml) was, again, mostly of plant detritus, with rather smaller quantities of seeds and fruits (as described above) than were recovered from the sample from the upper fill of the trough (Context 128). Numerous invertebrate remains were present (roughly equivalent to the numbers seen from the previous sample) but here the preservation was, subjectively, rather better; both less fragmented and showing a lesser degree of chemical erosion, particularly for the adult beetle sclerites present. Several species of staphylinid were, again, represented, including *Stenus* sp. (the majority of this genus living in waterside

situations or wet places such as marshes) and *Omalium* ?*rivulare* (Paykull) which lives on decaying organic matter. There were also a few weevil elytra (perhaps *Otiorhynchus* sp. as also seen from the upper fill of the trough) and some unidentified sclerites which were almost certainly from aquatic beetle taxa. Larval insect remains were present and there were also many remains of mites and ants (Formicidae). Other identifiable invertebrate remains included moderate numbers of *Daphnia* ephippia ('resting eggs') indicative of standing water subject to variations in quantity and/or quality.

The small residue (dry weight 0.54 kg) consisted of stones (to 42 mm) and sand, with traces of wood (to 10 mm; <1 g), rootlet (to 15 mm; <1 g) and charcoal (to 15 mm; 12 g). The wood fragments included a few waterlogged twig fragments of alder and a single fruit stone of blackberry/raspberry was also noted. A few of the larger pieces of charcoal could be partially identified as alder/birch/hazel (*Alnus*/*Betula*/*Corylus*).

Discussion and statement of potential

Ancient biological remains recovered from the two subsamples from the upper and lower layers of the burnt mount (Contexts 106 and 158, respectively) were largely restricted to charcoal fragments most of which were too small to be identified; some larger fragments were identified as alder/birch/hazel or alder/hazel. Of more interest were the two organic-rich deposits from the timber-lined trough (Contexts 128 and 130 – upper and basal layer, respectively), which gave interpretatively useful assemblages of waterlogged plant and invertebrate remains.

The plant assemblage from Context 128 (the upper fill of the trough) contained a few seeds of duckweed and pondweed – these are plants that float on or under the surface of water-filled features such as ponds, ditches, canals, or slowly-flowing streams. Their presence implies standing water at the time of the formation of this fill and, together with the other wetland taxa (e.g. rush, floating sweet-grass, gypsywort, lesser spearwort, mint and water-pepper) from both of the trough deposits, that the feature was situated within an area of marsh or swamp. Remains of alder including fruits, twig fragments and male catkin fragments were also recorded (particularly from the upper trough fill) and indicated that this was the dominant canopy species throughout the period. Evidence for other trees and shrubs included remains of blackberry/raspberry and raspberry, showing that these species were growing together with the alder or perhaps in areas of hedgerow. Remains of plants of drier waste ground were recorded, including common nettle, large-flowered/common hemp-nettle, mayweed and nipplewort, but only in relatively small numbers.

Invertebrate remains recovered from the assessment subsamples from the trough fills (Contexts 128 and 130) accorded well with plant assemblages implying standing water (perhaps temporary at the time of formation of the basal fill) and wet ground, with decaying organic matter.

Overall, the plant and invertebrate assemblages were of essentially 'natural' character and seemed to reflect infilling of the trough once it had fallen into disuse. A single charred barley grain was recovered from the basal fill (Context 130) and probably derived from previous domestic activity in the vicinity, but this was of no interpretative value in isolation. A comparison of the assemblages from the upper (Context 128) and lower (Context 130) fills suggested that standing water within the trough became more permanent with time (perhaps reflecting a general increase in the wetness of the area) and that the more substantial elements of the local vegetation (e.g. alder, hedgerow species) were reasserting themselves in the immediate vicinity, presumably reflecting abandonment of the site and the corresponding cessation of management and clearance by humans.

A previous assessment of plant remains from a single bulk sample associated with the burnt mount was carried out by Caseldine and Griffiths (see results in Smith 2008). This sample yielded charcoal and small quantities of charred cereal remains, principally chaff of barley and wheat, together with an assemblage of waterlogged remains very similar in character to that recorded from the lower trough fill (Context 130, above); some *Daphnia* ephippia were also noted. This sample was of rather poor provenance, given that it was from sediment that had collapsed from the eroding cliff (George Smith pers. comm.), with the remains indicating the same local environment as that suggested by those from the basal trough fill, but with the addition of the charred component clearly derived from human activity. The latter may well relate to the last use of the burnt mound and/or trough and if would be of considerable value to obtain a more securely stratified sample of similar material for study – such assemblages being rare.

The waterlogged seeds and fruits recovered from Contexts 128 and 130, together with the cereal grain (Context 130) and alder/hazel charcoal (Context 128), would provide suitable material for radiocarbon dating (via AMS), if required.

Recommendations

The plant macrofossil assemblages recovered were small and/or the identifiable remains too restricted in range to warrant any further study. Detailed analysis of the invertebrate assemblages from larger subsamples (of, say, 10 kg – if available) from the fills of the trough would probably allow some refinement of the reconstruction of ecological conditions within and around this feature, however.

Dating of the organic-rich natural deposits from Contexts 128 and 130 should be attempted (employing AMS dating of waterlogged seeds and fruits) to determine the date at which the timber-lined trough went out of use. It would also be of interest to date some of the alder/hazel charcoal from Context 128 and the single charred barley grain from Context 130 to determine if these were contemporary with the formation of the fills. As noted above, ideally an additional sample of sediment from the deposit from which the material reported by Caseldine and Griffiths would be recovered for study but if this is not possible then the extant remains should be radiocarbon dated – again, elements from both the waterlogged and charred components should be dated.

This assessment has demonstrated that at least some deposits at this site contain interpretatively valuable assemblages of waterlogged plant and invertebrate remains and it is clear that useful (and unusual) assemblages of charred plant remains may also be present. Any future interventions in the area should allow for the possibility of encountering other deposits with good organic preservation and for their systematic sampling and assessment and, if appropriate, analysis of assemblages of recovered organic remains.

Retention and disposal

Any remaining sediment samples and the macrofossils recovered from the processed subsamples should be retained for the present.

Archive

All material is currently stored by Palaeoecology Research Services (Unit 8, Dabble Duck Industrial Estate, Shildon, County Durham), along with paper and electronic records pertaining to the work described here.

Acknowledgements

The authors are grateful to George Smith, of Gwynedd Archaeological Trust, for providing the material and the archaeological information.

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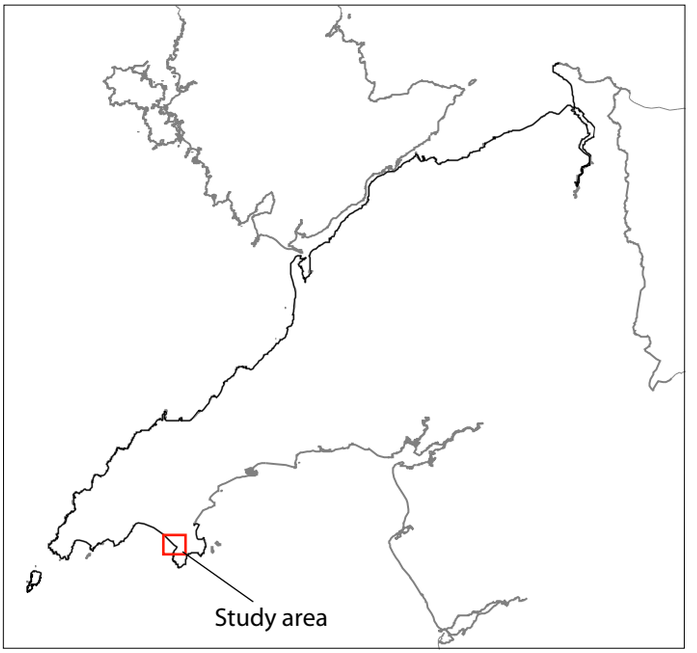
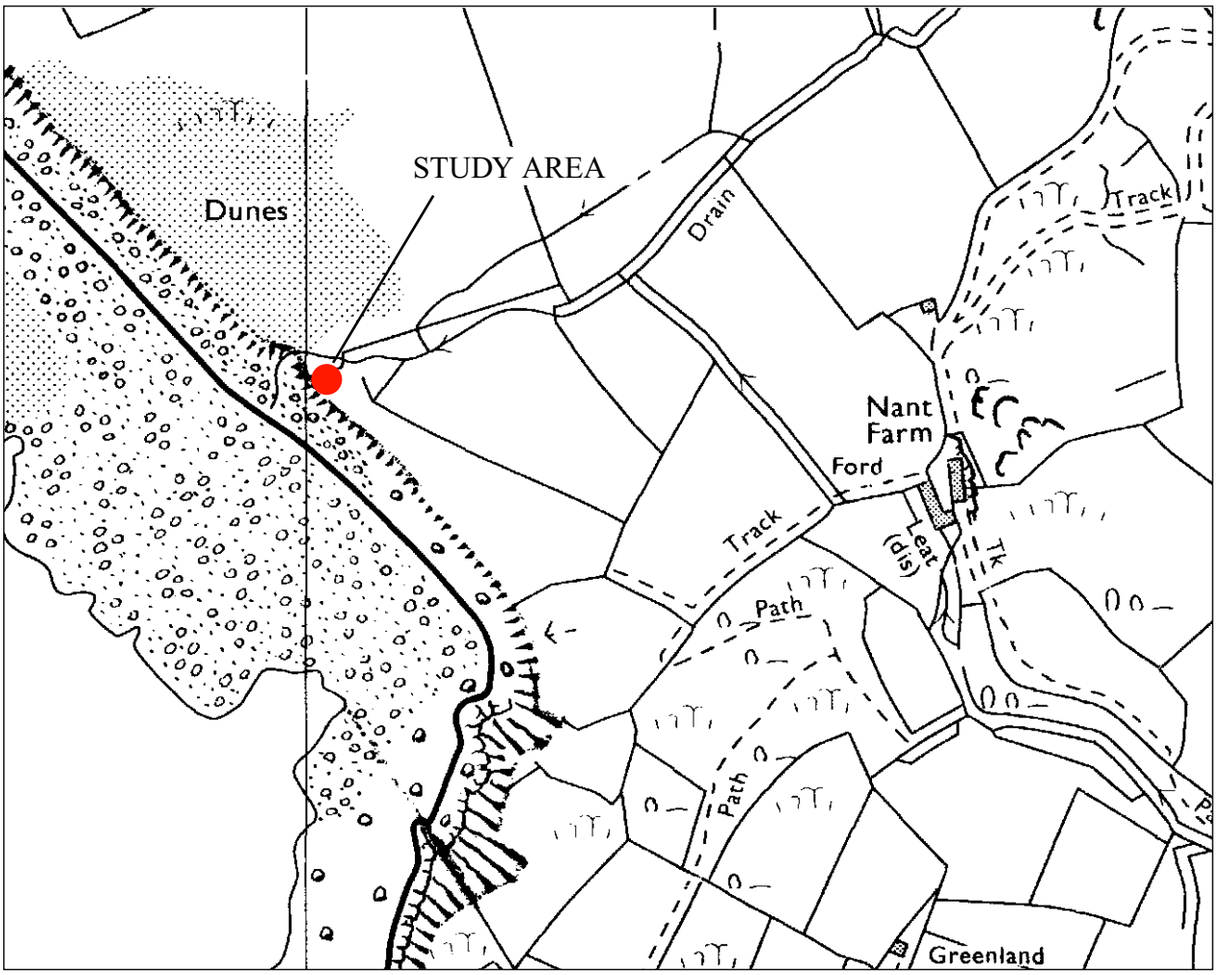
APPENDIX 4

SAMPLE LIST

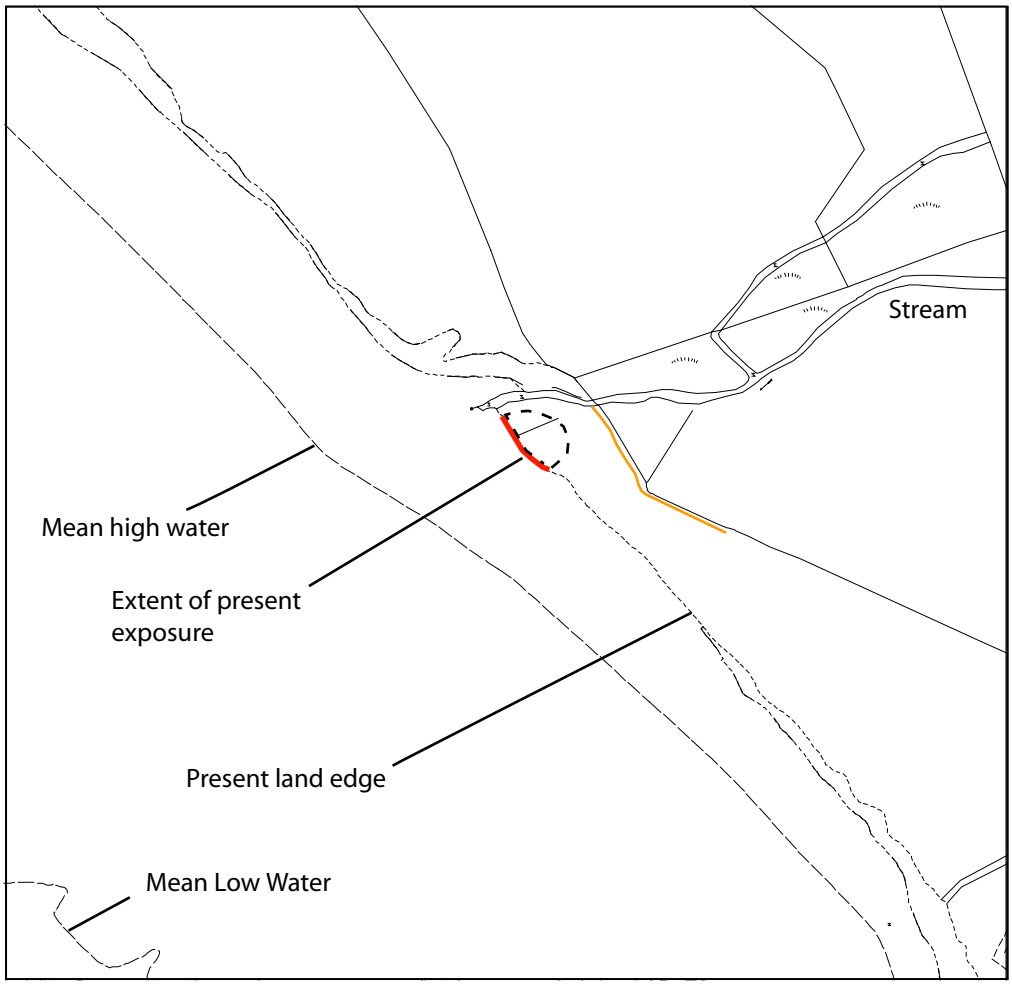
G2010 NANT FARM SAMPLE INDEX

Sample No.	Context No.	Sample Type	Description & Purpose of sample	Quantity	Sent to/date
1	12	Soil	Collapsed burnt mound material with burnt stones and carbonized macrobot material for assessment	2 bags	AC
2	12	Soil	Ditto	1 sack	
3	121, 122, 102	Column	Column through layers 121, 122 and 102	1 tin	
4	103, 108, 125	Column	Column through layers 103, 108 and 125	1 tin	
5	158	Soil	From lower burnt mound for macrobot assess	1 sack	1l sub-sample sent to Palaeocol Servs
6	130B	Soil	From basal fill of trough SE end.	1 sack	Ditto
7	130A	Soil	From basal fill of trough, NW end	1 30cm bag	
8	128A	Soil	Upper fill of trough for macrobot assess NW end	2 sacks	1l sub-sample sent to Palaeocol Servs
9	128B	Soil	Upper fill of trough for macrobot assess SE end	5 blue sacks	
10	111	Soil	Fill of pit 112 for macrobot assess	3 sacks	
11	103	Soil	Possible cleaning dump from trough for macrobot assess	1 sack	
12	106	Soil	Upper burnt mound for macrobot assess	1 sack	1l sub-sample sent to Palaeocol Servs
13	117	Soil	Fill of trough for macrobot assess	2 2l bags	
14	161	Soil	Clay deposit underlying burnt mound for macrobot assess	1 sack	
15	123	Sand	Small patch of coarse sand by lower end of launder [107]	1 20cm bag	

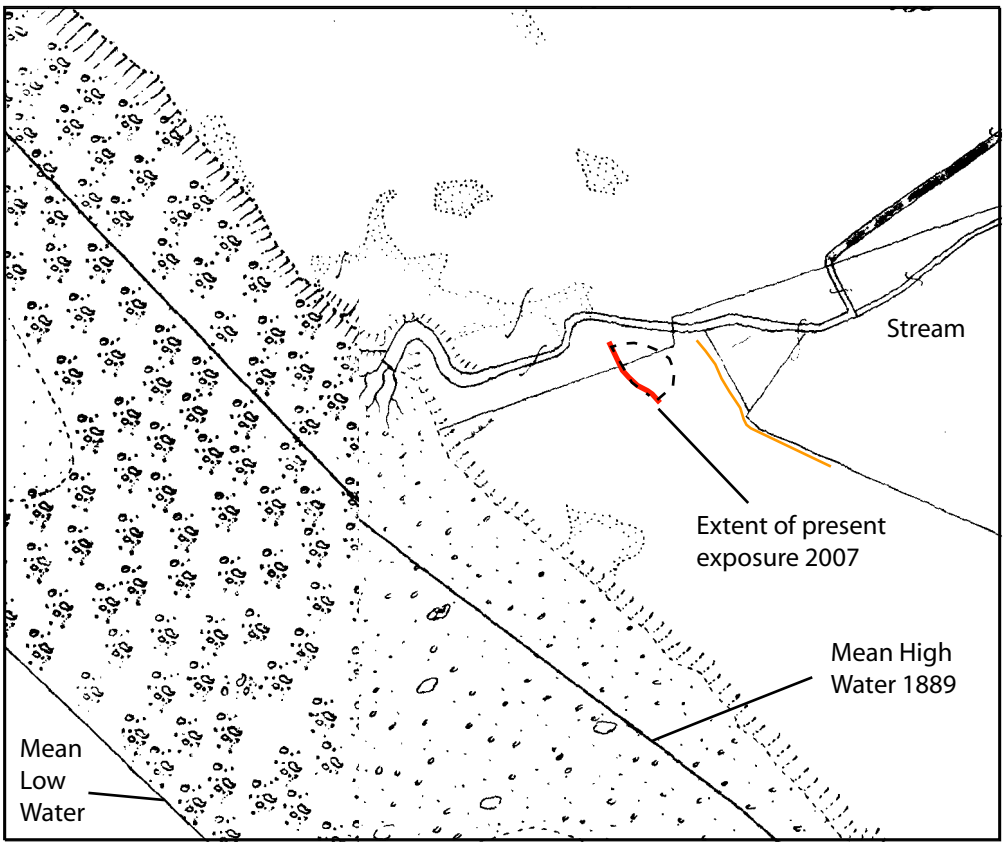




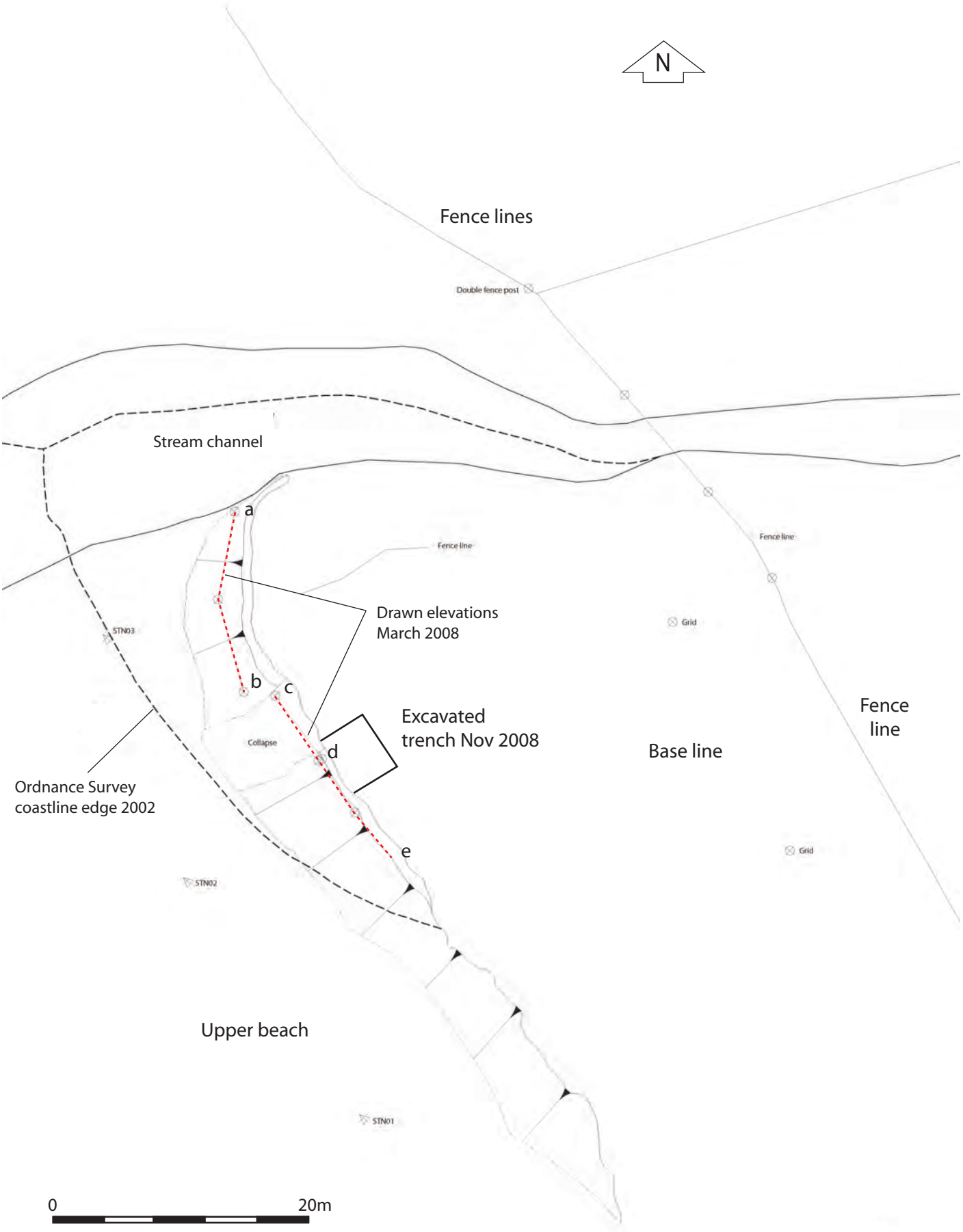
Nant Farm Fig. 1 Location map. Scale 1:5000



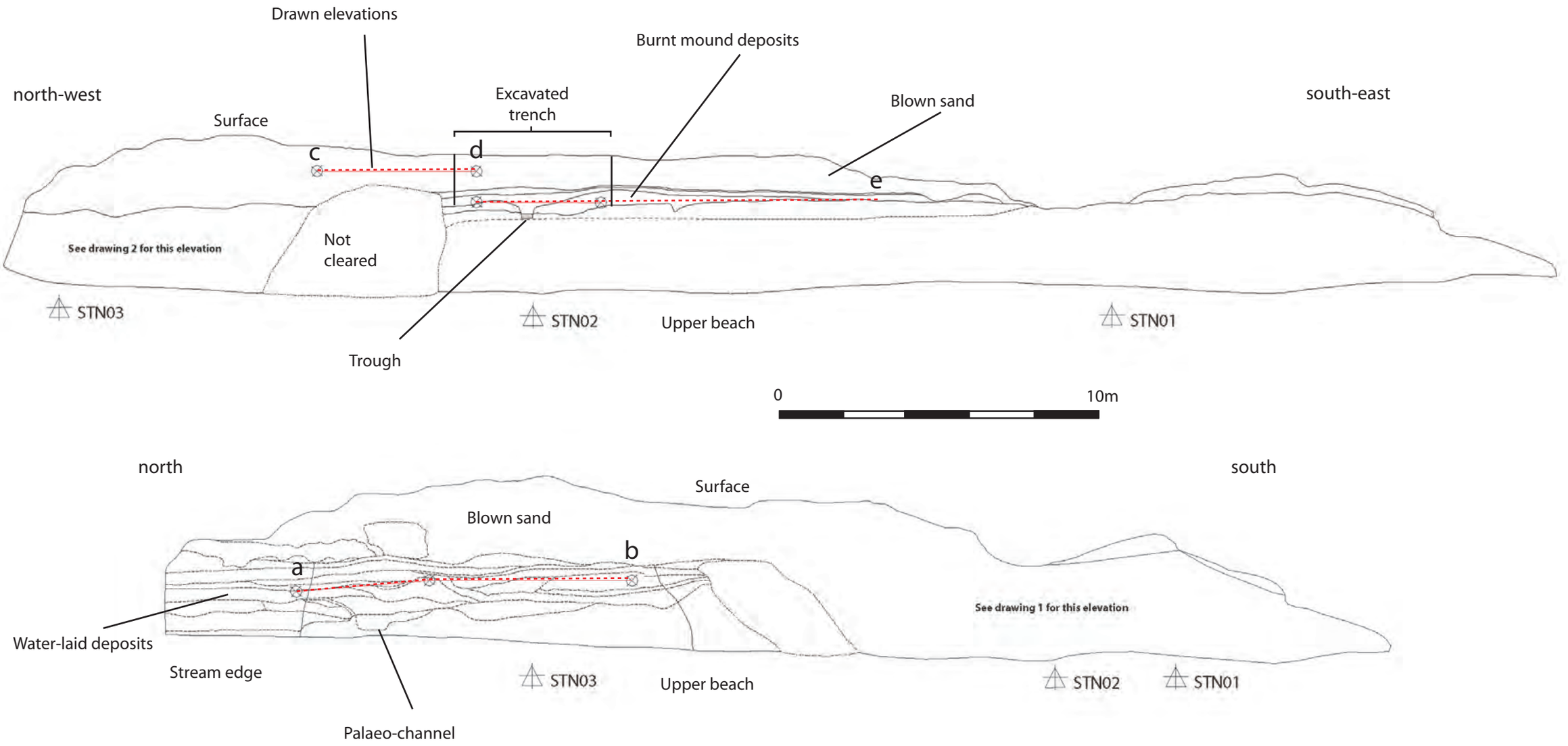
Nant Farm Fig. 2 The location of the site in 2007. Ordnance Survey 1:2500



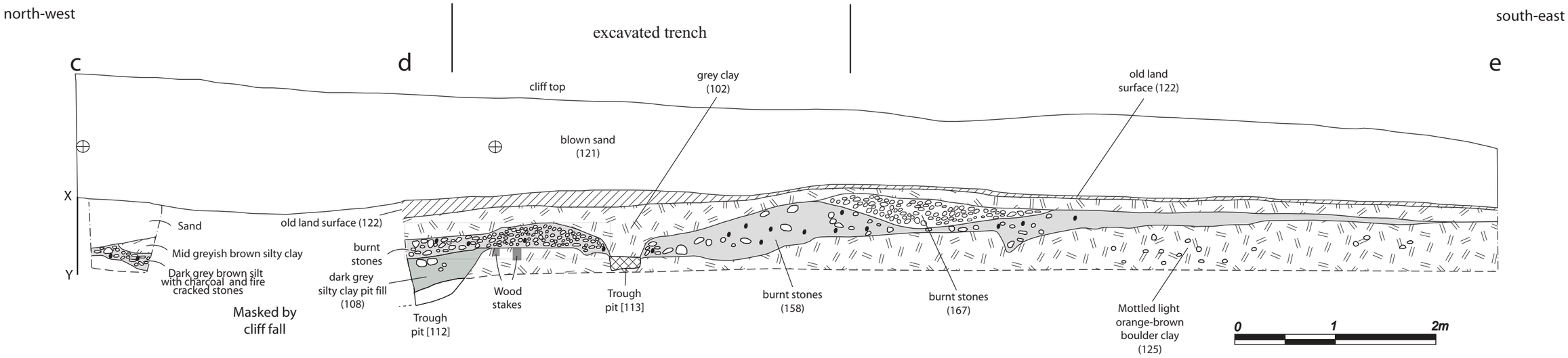
Nant Farm Fig. 3 The location of the site in 1889. Ordnance Survey 1:2500

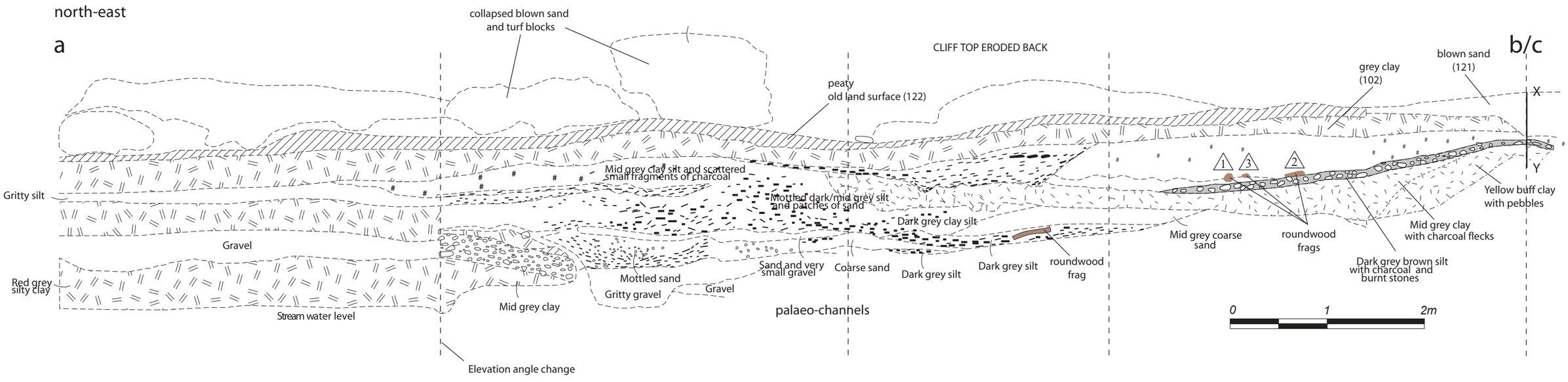


Nant Farm Fig. 4 EDM survey of the study area showing the location of drawn elevations and of the excavated trench. Scale 1:400

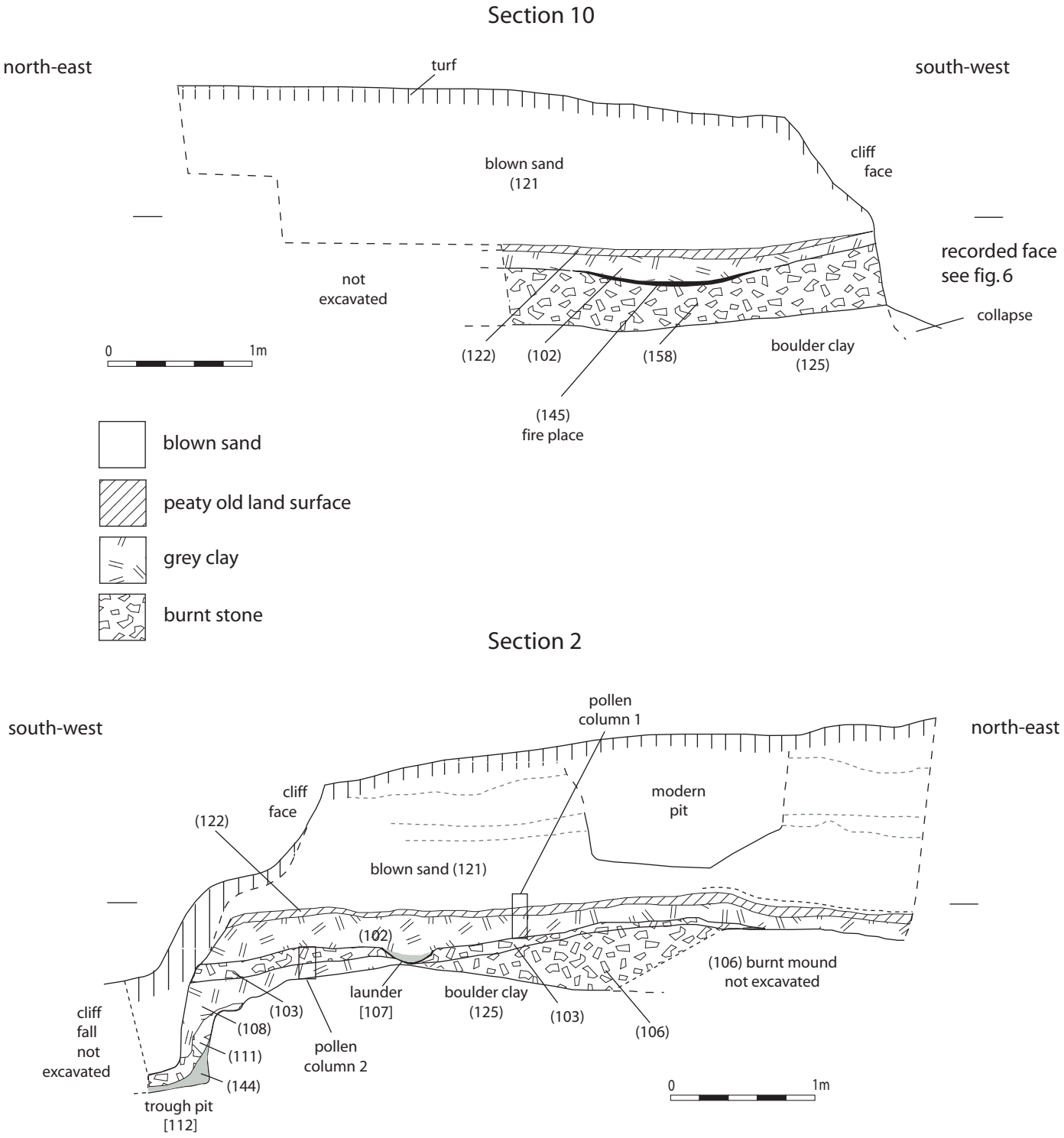


Nant Farm Fig. 5 EDM elevations of cleaned cliff face showing the location of the detailed section face drawing

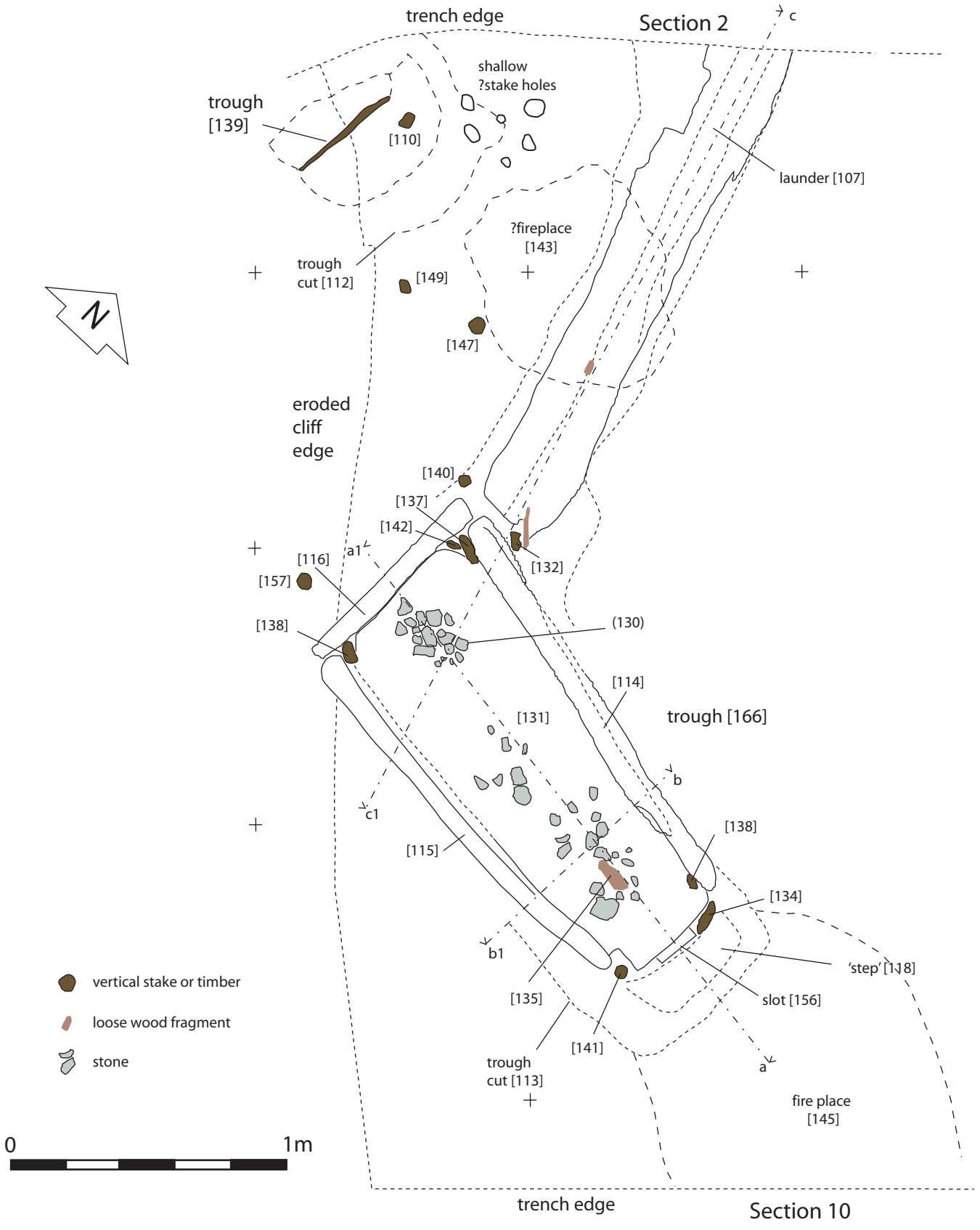




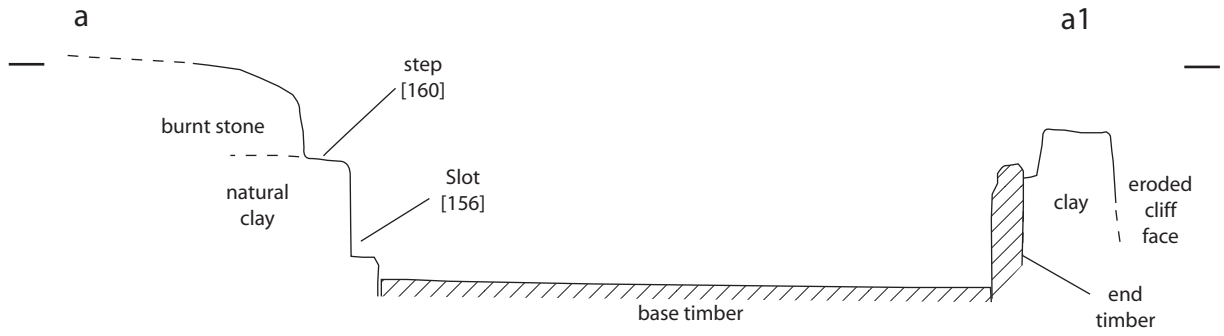
Nant Farm Fig. 6 Upper cliff face drawn record. For location see Fig. 4. Scale 1:40



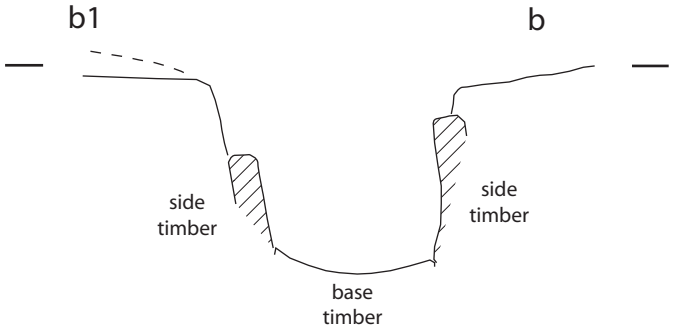
Nant Farm Fig. 7 south section(top) and north section (lower). Scale 1:40



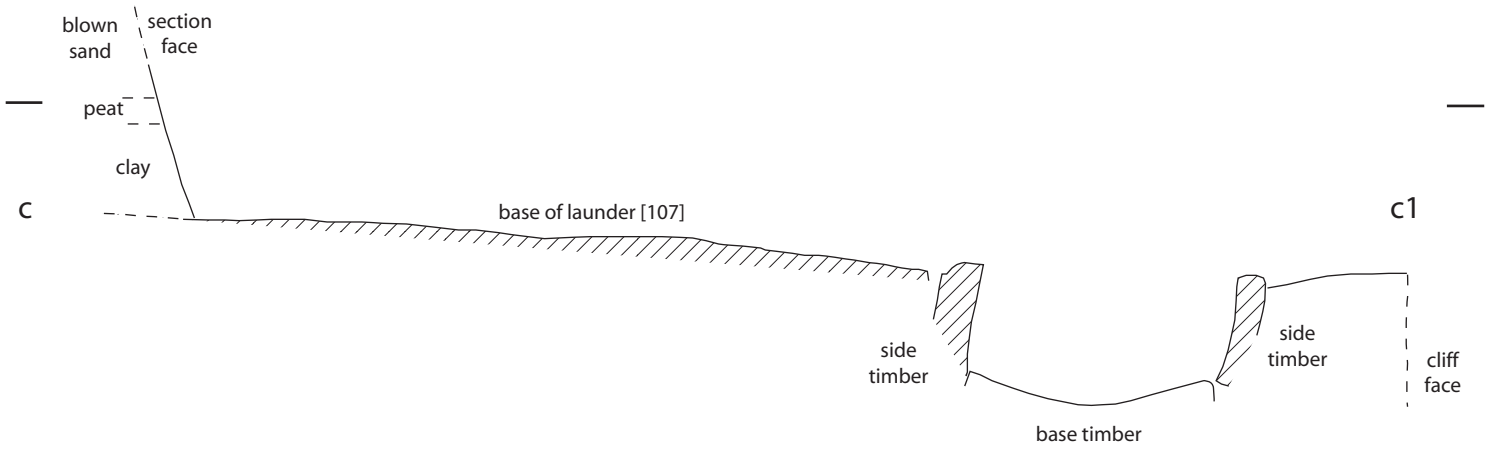
Nant Farm Fig. 8 Plan of trench showing main excavated features. Scale 1:20



trough [166]



trough [166]



trough [166]

Nant Farm Fig. 9 Trough [166] and launder [107] profiles. Scale 1:20

Nant Farm Fig. 10 View of the cliff exposure showing the burnt stone horizon. 1m scale

Nant Farm Fig. 11 View of the the stream-side cliff exposure showing the clay flood deposit over the series of palaeo-channels. 1m scale

Nant Farm Fig. 12 View of the trench north section face after excavation as far as the top of the burnt mound. 1m scales

Nant Farm Fig. 13 View of the excavated trench showing the trough [166] and launder [107]. 1m and 30cm scales

Nant Farm Fig. 14 Detail of the east end of the pit for trough [166] after removal of the trough timbers showing the remnant timber on the step [118]. 1m scale

Nant Farm Fig. 15 Detail of stake [138] after lifting, showing axe trimming marks. 30cm scale

Nant Farm Fig. 16 The earlier trough [139] with timber in situ in base of pit and small holes in pit side. 50cm scale

Nant Farm Fig. 17 General view of the north trench section through the main stratigraphic deposits to the top of the natural clay subsoil, showing the location of the soil column samples. 30cm scale

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