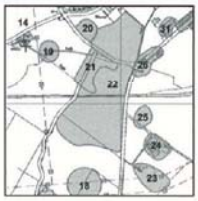






Date: February 2010
Client: Kildare County Council
Project code: KCK06

N9/N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow. Archaeological Services Contract No. 5 – Resolution, Kilcullen to Moone and Athy Link Road.

Final Report on archaeological investigations at Site E2888, in the townland of Yellowbog Common, Co. Kildare.

By: T.J. O' Connell
National Monuments Section Registration Number: E2888
Director: Lydia Cagney
NGR: 283806/207264

Report Status: Final

HEADLAND ARCHAEOLOGY Ltd

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Executive Summary

This final report presents the results of the archaeological resolution works carried out on behalf of Kildare County Council and the National Roads Authority as part of the Archaeological Services Contract No. 5 - Resolution, Kilcullen to Moone and Athy Link Road. The works were undertaken prior to the commencement of construction of the N9/N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow. The Minister of the Environment, Heritage & Local Government, following consultation with the National Museum of Ireland, issued Directions to Kildare County Council on 8 March 2007 for archaeological resolution works relating to the road development. The registration number, E2888, was allocated by the Department for the excavation of the present site in Old Kilcullen townland under the directorship of Caitriona Gleeson of Headland Archaeology (Ireland) Ltd. Responsibility was later transferred to Lydia Cagney of Headland Archaeology (Ireland) Ltd., who carried out the archaeological excavations. The report was written by T.J. O' Connell, as Ms Cagney was no longer employed by Headland Archaeology (Ireland) Ltd during the post-excavation phase of the project.

An Environmental Impact Assessment was published in 2003 for the Kilcullen to Powerstown Scheme, with Valerie J Keeley Ltd preparing the Archaeological, Architectural and Cultural Heritage Assessment. This formed Chapter 10 of the EIS produced by the Roughan and O'Donovan - Faber Maunsell Alliance. Geophysical prospection was carried out on certain areas of high archaeological potential by Bartlett-Clark Consultancy as part of the Environmental Impact Assessment, on behalf of Valerie J. Keeley Ltd/Kildare County Council.

Aerial photography was undertaken along the entire route selection as part of the non-invasive assessment after the EIA stage. This work was carried out in April 2004 by Markus Casey.

Archaeological testing was carried out by IAC Ltd under N9/N10 Kilcullen to Waterford Scheme: Kilcullen to Powerstown under Archaeological Services Contract No. 1 – Test Excavations, Kilcullen to Mullamast under Ministerial Direction Number A021/101 on this site between 10 October and 19 November 2005 identified a burnt mound type spread measuring 6 m by 3.20 m and 0.15 m in depth (Bailey 2006).

Full archaeological resolution was conducted on this site between 19 and 22 of September 2007**.** It revealed the remains of three possible pits, a linear ditch and a burnt mound which was dated to the Early Bronze Age.

A Preliminary Report of works on the site was completed by Headland Archaeology (Ireland) Ltd in January 2009.

1 Introduction

The N9/N10 Kilcullen to Waterford Road Scheme, of which the Kilcullen to Powerstown Scheme forms part, was proposed as a High Quality Dual Carriageway/Motorway, forming the Major Inter Urban route between Dublin and Waterford. The Kilcullen to Powerstown Scheme was advanced as a single entity up to the Compulsory Purchase Order/Environmental Impact Statement and was subsequently divided into two separate construction contracts: the Carlow By-pass (Phase 1) and the Kilcullen to Carlow Scheme (Phase 3). Kildare County Council, National Roads Design Office, has responsibility for overseeing the project management of these two schemes. The entire road scheme from Kilcullen to Waterford has now been designated as Motorway.

An Environmental Impact Assessment was published in 2003 for the Kilcullen to Powerstown Scheme, with Valerie J Keeley Ltd preparing the Archaeological, Architectural and Cultural Heritage Assessment. This formed Chapter 10 of the EIS produced by the Roughan and O'Donovan - Faber Maunsell Alliance. Geophysical prospection was carried out on certain areas of high archaeological potential by Bartlett-Clark Consultancy as part of the Environmental Impact Assessment, on behalf of Valerie J. Keeley Ltd/Kildare County Council.

Aerial photography was undertaken along the entire route selection as part of the non-invasive assessment after the EIA stage. This work was carried out in April 2004 by Markus Casey.

Construction commenced on Phase 1, the Carlow By-pass, in January 2006 and the road was completed and opened in May 2008. Construction of Phase 3, the Kilcullen to Carlow Scheme, which also includes a new single carriage link road to Athy town, commenced in January 2008.

Archaeological test-trenching was undertaken in advance of Phase 1, the Carlow By-pass, by Headland Archaeology (Ireland) Ltd between June and August 2005 (Archaeological Services Contract No. 3). This work identified 64 archaeological sites, which required archaeological excavation in advance of road construction. The resolution works for these sites were undertaken by Headland Archaeology (Ireland) Ltd between January and August 2006 (Archaeological Services Contract No. 4).

Archaeological test-trenching was undertaken in advance of the construction of Phase 3, the Kilcullen to Carlow Scheme, by IAC Ltd and CRDS Ltd, between October to November 2005 and May to August 2006 (Archaeological Services Contracts No. 1 and No. 2, respectively). This work resulted in the identification of 102 archaeological sites, which required resolution in advance of construction. The resolution works for these sites were undertaken by Headland Archaeology (Ireland) Ltd between March and December 2007 (Archaeological Services Contracts No. 5 and No. 6). This report details the results of one of those excavations, undertaken under NMSR Number E2888.

The project was funded by the Irish Government and the European Union through Kildare County Council/National Roads Authority, under the National Development Plan 2000-2006 and 2007-2013.

Construction Phases 2 and 4 relate to the section of road between Powerstown, Co. Carlow and the Waterford city By-pass and are project managed by Waterford County Council, National Roads Design Office.

2 Site description and location

Site E2888 was situated in the townland of Yellowbog Common which is located in both the parish and the barony of Kilcullen and was *c*. 1.8 km south of Kilcullen town at National Grid Reference: 283806/207264 (Figure 1).

The townland of Yellowbog Common is narrow and rectilinear, with a sub-rectangular protrusion at the midpoint of its western side where its boundary extends into that of Old Kilcullen. It was within this extended area that the site E2888 was located. This townland, combined with that of Gilltown Common to its immediate north and Cartersbog to its south, seems to define a wetland area which forms part of the eastern boundary of both the parish and barony of Old Kilcullen. The land in which it was situated was being used for pastoral purposes at the time of excavation. It had a gently undulating topography with surface vegetation such as rushes and reeds overlaying a marshy wetland; this kind of topography was particularly evident to the southwest of the site, where the townland of Yellowbog Common merged with the southern side of Old Kilcullen (Plate 1). Yellowbog Common probably represents a former region of boggy wasteland, which was excluded from the more fertile lands surrounding it, prior to modern land reclamation. In this respect it is interesting to note that no monuments are recorded in this townland apart from Yellowbog Church, visible on the 1st edition Ordnance Survey map (Sheet No.:KE028, 1839), and that the abundance of monuments recorded in neighbouring townlands is in direct contrast with the scarcity of monuments in the present study area (Figure 2).

A number of recorded monuments are known from this general area. Located *c*. 1.8 km to the northwest of the site, in the townlands of Knockaulin and Glebe North, is the site of Dun Ailline the 'Royal' hillfort (KD028-037, KD028-038). Located *c*. 800 m to the west of the present site is a deserted medieval settlement (KD028:049), and an ecclesiastical site (KD028:049001 – 049013) which comprises thirteen monuments, most of which are in ruins, including a round tower, a church and graveyard, three high crosses and three unclassified castles, all of which are located in the townland of Kilcullen (Figure 2).

Archaeological investigations undertaken as part of Archaeological Services Contract No. 5 on the road scheme identified three sites in proximity to the present site and all in the townland of Old Kilcullen. A small burnt spread dated to the Early Bronze Age was excavated on a site (E2887) (O'Connell 2010a) *c.* 780 m to the southwest of the present site. An undated, isolated fire-spot was excavated on a site (E2889) (O'Connell 2010b) just over *c*. 300 m to the NNW of the present site. Two possible pits and two possible features were identified on a site (E2890) *c*. 500 m to the NNW of the present site. One of these features was dated to the Late Bronze Age/Early Iron Age transitional period (O'Connell 2010c) (Figure 2).

3 Aims and methodology

The objective of the work was the preservation by record of any archaeological features that would be impacted by the proposed development, in advance of the road construction programme.

Topsoil stripping of the site was conducted using a 360° tracked machine fitted with a 1.9 m wide ditching (toothless) bucket under constant archaeological supervision. A total area of 775 m² was exposed. The resulting surface was cleaned and all potential features investigated by hand. Archaeological contexts were recorded by photograph and on *pro forma* record sheets. Plans and sections were drawn at scales of 1:10, 1:20 and 1:50. Registers are provided in the appendices

(Appendices 1-5). Ordnance Datum levels and feature locations were recorded using Penmap and a total station theodolite.

A total of seventeen environmental samples were taken on any deposits suitable for analysis or dating as per Headland Archaeology (Ireland) Ltd environmental guidelines and following consultation with environmental archaeologist and archaeobotanist Karen Stewart. Fifteen of the soil samples taken during the excavation underwent processing and environmental assessment/analysis (Appendix 7).

Full archaeological resolution was conducted on this site between 19 and 25 September 2007. The crew on site E2890 consisted of 1 director, 1 deputy site manager and between 2 and 4 assistants.

Following excavation, the samples, retrieved wood, lithics and potential metallurgical remains were analysed by the appropriate specialists and reports produced on the findings for incorporation into this report (see appendices).

4 Excavation results (Figure 3, Plates 1, 2 and 3)

The principal components of archaeological interest on this site were three possible features classed as pit/depressions, a linear ditch and a burnt mound. The three pit/depressions were found underlying the burnt mound and the stratigraphic evidence suggested that the linear ditch was also below this layer. Charred hazel nutshell recovered from the burnt mound was radiocarbon dated to 2350–2030 cal BC (2σ) (SUERC-25849) placing the burnt mound activity in the Early Bronze Age period (Appendix 7 and 10).

Natural Geology
The underlying natural on this site consisted of gravel and loose grey silt-clay (003). Overlying this was loose, yellowish grey coarse grained silty sand subsoil (002) that measured 0.04 m thick. The topsoil was composed of loose mid dark brown clayey silt with occasional inclusion of small stones and fibrous roots that measured between 0.12 m and 0.23 m thick (001).

Pit/Depressions: A pit/depression (017) (Figure 4, Plate 4) was the most the southwesterly feature on site. It had a key-hole shape in plan measuring was 1.90 m long, 1.30 m wide and 0.3 m deep with irregular sides and an uneven base. It appeared to be composed of two parts with a deeper sub-oval northern portion and a shallower sub-rectangular shaped southerly portion. A medium sized sub-rounded stone was located along its north eastern edge. The feature was filled by a deposit of charcoal and heat-shattered stones (018) which also overlaid the fill (027) of pit/depression (026). The inclusion of a piece of wood/bark (019) was noted during the excavation of the deposit. Of the three pit/depressions that were excavated on this site pit/depression (017) is the most likely feature to have functioned as a trough.

A small pit/depression (026) (Figure 4, Plate 4) was located adjacent to pit/depression (017) to its northern side. It had an irregular shape in plan measuring 0.40 m long, 0.32 m wide and 0.30 m deep with sharply sloping sides except on the north and east which was more stepped and a flat base. It was filled by dark grey silty clay with occasional charcoal fleck inclusions (027). The lack of any peat horizons within the feature and its shape suggests it is a pit or even it could have originally functioned as a posthole.

The most easterly pit/depression (006) (Figure 5, Plate 5, 6 and 7) was *c*. 3 m to the northeast of pit/depression (017). It had an irregular shape in plan measuring 3.90 m long, 0.90 m wide and 0.07 m

deep with irregular shaped sides and base. The earliest deposit contained within this potential feature consisted of loose dark grey clay with peat and charcoal fleck inclusions (034). Next in sequence was a deposit of compact, light grey clay with occasional peat and charcoal fleck inclusions (029). Two flint artefacts (E2888:029:001 and E2888:029:002) (Plate 10) were recovered from this deposit. These are classed as a minimally retouched artefact (E2888:029:001) and a possible utilised flake (E2888:029:002) respectively. The possible utilised flake had been subject to thermal action (Appendix 11). The secondary deposit was overlain by a deposit of moderately compact dark brown black silty clayey peat, with occasional small wood inclusions (011). A fragment of a possible wooden plank (025) was discovered at the bottom of this deposit. It presented as a poorly preserved, horizontally orientated timber measuring 1.2 m long, 0.23 m wide and 0.01 m thick. No tool marks, joints or fixing were visible on it. The wood type was identified as alder (Appendix 8). The shape of this possible feature and the peat deposits contained within it would suggest that it is a natural depression that filled up with peat deposits that formed over the site indicating a wet environment before the formation of the burnt mound though the inclusion of the two lithic artefacts and the possible wooden plank suggest anthropogenic factors at play in its formation.

Linear ditch (Figure 7, Plate 8)
A shallow, linear ditch (023) entered the site from the northwest corner and ran in a southeast direction for *c*. 16.5 m where it terminated. Its width and depth varied in size but measured a maximum of 1.58 m wide and 0.48 m deep with steeply sloping sides and a flat base. It was widest where it entered the site and got shallower as it moved south eastward. The earliest fill of the northwest portion of the ditch was loose grey clay (028) that had undergone a gleying process due to the level of the old water table. This was below a deposit of greyish to dark brown clayey silt with occasional fine sand and fibrous root inclusions, frequent decayed wood fragments and occasional gravel inclusions (024). This context also became gleyed due to its partial immersion within the ground water table. This process was particularly evident throughout the lower part of the deposit, while its surface was devoid of any signs of it and retained its dark brown colour. The earliest deposit in the southeast portion of the ditch where it underlay the burnt mound consisted of a loose organic deposit with frequent inclusion of burnt and cracked stones (014).This was below a deposit of loose dark blackish brown clayey, slightly sandy peat with occasional angular stones, small roots and fine hair roots inclusions (031). Next in sequence was a lens of heat shattered stone (032). There is no conclusive evidence to suggest the original function of this feature. It may have been constructed to act as a drainage ditch to allow for the run off water from the site. The stratigraphic evidence indicated this was an earlier feature to the burnt mound.

Early Bronze Age Burnt Mound (Figure 6, Plates 1, 2 and 3)
The burnt mound (005) overlaid the three pit/depressions and appeared to overlie the linear feature already described. It had an irregular shape in plan measuring 13 m (north/south) by 12 m (east/west) and 0.18 m deep. It was composed of loose dark black brown sandy silty peat with frequent inclusions of charcoal flecks and heat-shattered stones. Charred hazel nutshell recovered from a sample taken from this deposit was radiocarbon dated to 2350–2030 cal BC (2σ) (SUERC-25849) dating the burnt mound to the Early Bronze Age (Appendix 7 and 10). Sedge nutlets and bramble fruits were also recovered from soil samples taken from this deposit as was a small fragment of burnt bone (Appendix 7). The burnt bone was unidentifiable to element though specialist analysis indicated that given the context of its recovery it is likely animal (Appendix 9). Two tiny ferrous fragments were also recovered from samples taken from the burnt mound. These have been interpreted as naturally occurring iron rich stone (Appendix 12).

Natural Peat Horizon
Two patches of peat (016), (010) were recorded overlying the burnt mound and peat deposit (010) partially infilled a portion of the linear ditch indicating the site remained a wet environment after the creation of the linear ditch and burnt mound. Sedge nutlets were recovered from soil samples taken from both of these deposits. Bramble seeds and probable modern land snails were also obtained from the sample taken from deposit (016) (Appendix 7).

Modern Activity
Intermittent patches of re-deposited subsoil (007), (008) and (009) appeared at regular intervals across the burnt mound and the overlying patches of peat. Probable modern land snails were present in soil samples taken from deposits (007) and (009) and coal and cinders were present in the sample taken from deposit (007) (Appendix 7 and 12). Compact yellow boulder clay (012) partially overlaid the south edge of the burnt mound and the west and south of the site. This deposit would have to have been introduced from elsewhere. Both the deposition of the redeposited subsoil and the imported material are events that may possibly have occurred during recent water-main improvement scheme that occurred in the area (Cagney and Kozlowska 2009).

5 Discussion

The results of the excavation at Site E2888 are discussed here following stratigraphic, environmental, dating and artefactual analysis. The site is then discussed on a local level and related to other sites known in the vicinity (including those discovered on the current scheme). Finally the site is discussed on a national level in an attempt to place it in context and assess how it contributes to the archaeological record in general.

While it is possible that the three pit/depressions and the linear feature date to an earlier phase of the sites use it is likely that they represent contemporary activity to the burnt mound which overlaid them. Considering that the site was a wetter environment in earlier times the desirability of such a location for activity other than burnt mound activity is questionable and given the association of these features with the burnt mound it would seem likely that all they all belong to one phase of activity. Analysis of the lithics that were recovered from the deposit (029) within pit/depression (006) indicted that the two artefacts were manufactured on broad flake blanks which were most likely obtained by platform reduction technique which is usually associated with early prehistoric lithic assemblages though it does feature in the Late Neolithic/Early Bronze Age period but becomes less common during this time (Appendix 11)..

Early Bronze Age Burnt Mound
The burnt mound on the present site, consisting of heat-shattered stones within a matrix of loose dark black brown sandy silty peat with frequent inclusions of charcoal flecks, is material typical of burnt mounds or *fulachtaí fia.*

Distribution and morphology
Burnt mounds or *fulachtaí fia* have been identified in almost every part of the country and are the most common prehistoric monument in Ireland (Waddell 2000, 174). Large infrastructural projects have consistently identified large numbers of these sites; for example *fulachtaí fia* and related site types such as burnt mounds and spreads formed the bulk of the recorded archaeology in advance of the gas pipeline to the west (Grogan *et al.* 2007, 81).

Classic *fulachtaí fia* appear in the landscape as low grassy mounds of crescent or u-shaped plan (Waddell 2000, 174), though excavation has shown that in many cases the mound can be ploughed

out or indeed may never have been on such a scale as to remain identifiable above ground. The burnt mound on the present site was only revealed during the testing works associated with the road scheme and was not known to exist prior to the testing phase. Excavated *fulachtaí fia* usually consist of a mound or spread of burnt stones and firing debris and a trough or troughs. Frequently, associated features such as hearths, pits, stakeholes and postholes are also identified. In the case of the present site the burnt mound was found in association with three pit/depressions and a linear ditch. While the presence of a trough not identified on site pit/depression (017) is the most likely feature to have functioned as one.

The number of identifed *fulachtaí fia* in the country is constantly increasing and there are at least 7,000 currently known (Grogan *et al.* 2007, 81).

Siting

The siting of this monument type elsewhere is noteworthy as they are almost invariably located close to a water source (e.g. Ó Neill 2000). This was well demonstrated during the North Munster Project (Grogan 2005) where the *fulachtaí fia* identified were located along the margins of wetland, small lakes, turloughs, bog and marsh as well as the edges of river estuaries and on the banks of rivers and streams.

The location of the present site is consistent with this trend. The site was clearly a wetland environment in antiquity and quite possibly up to recent times. The townland of Yellowbog Common combined with that of Gilltown Common to its immediate north and Cartersbog to its south, seems to define a wetland area which forms part of the eastern boundary of both the parish and barony of Old Kilcullen. The land in which the site was situated was being used for pastoral purposes at the time of excavation. It had a gently undulating topography with surface vegetation such as rushes and reeds overlaying a marshy wetland; this kind of topography was particularly evident to the southwest of the site, where the townland of Yellowbog Common merged with the southern side of Old Kilcullen (Plate 1). Yellowbog Common probably represents a former region of boggy wasteland, which was excluded from the more fertile lands surrounding it, prior to modern land reclamation. Two patches of peat were recorded overlying the burnt mound and partially infilling a portion of the linear ditch indicating the site remained a wet environment after the creation of the linear ditch and burnt mound. It has been well documented that *fulachtaí fia* can be densely concentrated in areas that were suitable for their construction. Ó Drisceoil (1988, 676) describes how they 'are frequently found together in groups of up to ten or more'. As noted earlier a small burnt spread dated to the Early Bronze Age was excavated on a site (E2887) (O'Connell, 2010a) *c.* 780 m to the southwest of the present site and it is possible that additional burnt mounds are located in proximity to the present site though beyond the way leave of the new road.

Historic tradition of fulachtaí fia

The term '*fulacht fia*' itself is composed of two Irish words. The first means 'recess' or 'cavity' and by extension came to be associated with pits, pits specifically used for cooking, the act of cooking and sometimes even the food itself (Ó Drisceoil 1988, 673; Ó Drisceoil 1990, 158)). The second word has two possible interpretations: *fiadh*, of the deer or of the wild, and *fian*, a roving band of hunters or warriors, occasionally 'of the *Fianna* or Fionn Mac Cumhail' in reference to a mystical army who hunted and lived outdoors (Ó Drisceoil 1988, 673).

Although references to '*fulacht*' occur as early as the ninth century AD, the term '*fulacht fiadh*' itself is only formally linked to the archaeological monument type in the nineteenth century (Ó Drisceoil 1990, 158). Besides the use of the term '*fulacht*' a number of documentary references from Ireland include explicit descriptions of the process of boiling liquid using heated stones for both cooking and bathing purposes (O'Neill 2004, 79).

The earliest recorded reference to the term '*fulacht*' occurred in *Cormac's Glossary* from approximately 900 AD (Ó Drisceoil 1988, 673), however many of the sources in which the term is found have their roots in the oral tradition making the term difficult to accurately date (Ó Drisceoil 1990, 157). A text from the 12th century (*Agallamh beg*) describes how a site located on the bank of a stream is regarded as both a cooking place and ancient (Ó Drisceoil 1988, 673). It has been suggested by Brindley and Lanting that the use of the term *fulacht fia* should only be used in reference to sites with troughs and mounds of burnt stone (Brindley and Lanting 1990, 56), a criterion the present site does not fulfill.

The earliest description of burnt stone technology, where a basin of gruel is cooked with fire-heated stones, is from the medieval 'Latin Life of St. Munnu' and dates to before the 15th century (O'Neill 2004, 79*)*. Chronologically the next account is contained in Geoffrey Keating's early seventeenth century *The History of Ireland* (*Foras Feasa ar Éirinn*). In it Keating refers to a '*fulacht fian'* and a lot of detail is given about how the '*Fian*' would cook their quarry over pits of hot stones and in water-filled pits heated by hot stones. In this account the hunters would use a second pit of boiling water to bathe (*ibid*., 80). The Romance of Mis and Dubh Ruis is another well known account of a deer being boiled in water heated by hot stones and the water subsequently being used for bathing (*ibid*.).

Function
The technology of *fulachtaí fia* is well known. Stones were heated in a nearby fire and placed in a water-filled trough – sometimes lined with timber, stones, clay or reed matting – the heat from the stones would then bring the water to boil. Once cool the stones were removed from the trough and discarded, creating a characteristic burnt mound or spread of heat-shattered stones. How the boiled water was subsequently utilised, however, is more difficult to ascertain.

The traditional interpretation of these monuments is that they were cooking sites, a view supported both by the early texts, folk memory (Ó Drisceoil 1988; Ó Neill 2004) and experimentation (O'Kelly 1954; Allen 1994). The texts frequently give a dual function of cooking and bathing for the sites. However, other theories about their use have also been put forward, these include: fulling, brewing, leather working, and use as sweathouses or as multifunctional sites. It is most likely that *fulachtaí fia* were multifunctional or that different sites were used for different purposes. Determining which each site was used for is difficult in large part because of the lack of definitive evidence and recovered finds.

The theory with the most corroborating evidence is the use of the sites for cooking. Experimental work by O' Kelly demonstrated that a joint of meat could be cooked in three to four hours using hot stones to boil water in a trough (O' Kelly 1954), while Allen describes an experiment in which the meat was cooked in two hours (1994, 9). It has been noted that a distinct lack of food refuse such as animal bones is characteristic of scientifically excavated burnt mound sites. However the relative absence of animal bone refuse on sites could be because that the cooking of joints of meat was subject to various sorts of ritual or hygiene controls and that any food remains were carefully disposed of (Waddell 2000, 177). Monk has recently shown, however, that although many bones are likely lost to acidic soil, an increasing number of sites are now producing preserved bone (2007, 22). A recent preliminary study undertaken by Auli Tourunen and Karen Stewart on the pH levels of *fulachtaí fia* showed that there was no correlation between the pH value of a site and bone preservation (Tourunen and Stewart 2008). They caution, however, that this information is preliminary and that a wide range of factors may have contributed to bone preservation or the lack of bone and that the use of animal products at sites can not be ruled out (*ibid*.). Additional support is provided for the cooking hypothesis by detailing the importance of meat fat in food preservation (Monk 2007, 23). Without cooking trays, he notes, gathering the fat would have been problematic (*ibid.*). One solution, however, is to boil the meat and collect the fat from the surface of the water, an activity for which *fulachtaí fia*

are ideally suited (*ibid*.). The presence of fats in the water of *fulachtaí fia* is also supported with the literary evidence in the story of Mis and Dubh Ruis.

The association between *fulachtaí fia* and highly mobile groups such as the *fian* has been long debated. The use of *fulachtaí fia* for cooking is much more time intensive than roasting meat over a fire and would point to a more sedentary group but few settlements are found in the area immediately surrounding them. Recently the general picture that has been emerging indicates that while they may not be immediately adjacent to settlement sites they often clustered in areas where other potentially contemporary sites such as standing stones, habitation enclosures and hilltop enclosures occur (Grogan 2005, Vol. 1, 41). This would imply that they were part of a wider cultural landscape and could have been used by a largely sedentary society.

The bathing hypothesis is supported by ethnographic work carried out by Barfield and Hodder (1987) who claim that those who used the burnt mounds may well have covered them in some way and used them for sweating as well as increasing archaeological evidence as more of these sites are excavated. Irish sweathouses used medicinally are recorded from the modern period in which a fire would be lit inside a stone hut until the walls were hot, the embers rakes out and the patient sealed inside, sometimes with herbs placed on the hot stones (Barfield and Hodder 1987, 373). Recent excavations have been producing convincing evidence that at least some *fulachtaí fia* represent this kind of activity for example sites at Rathpatrick (04E0318) on the N25 Waterford Bypass (Gleeson and Breen 2006) and Ballyburn Lower, Co. Kildare (E2566) (Hackett 2009).

Monk (2007, 24) has also hypothesized that *fulachtaí fia* may have been associated with soap production as all three primary ingredients are present (wood-ash, water and animal fats). Ó Drisceoil (1988; 1990) has shown that the bathing in the *fulachtaí fia* had possible ritual connections (either with mythical people or with magically curative properties as with Mis and Dubh Ruis), and Barfield and Hodder (1987, 373) show that individual or communal sweating also has frequent ritual associations. Barfield and Hodder do not limit the uses of sweathouses to ritual activity however and they point out that their use is an easy method of bathing.

A newer theory as to the uses of *fulachtaí fia* comes from Moore and Quinn (2007) who have suggested brewing as a primary function of the sites. They maintain that the requirement for large quantities of heated water and a lack of suitable material to produce large basins in which to heat the water would have lead to the use of pits or troughs in which hot stones could be dropped to produce the required heat (*ibid*.). They also state that quernstones found in association with *fulachtaí fia* indicate grain processing nearby. They provide ethnographic evidence for this type of brewing as well as tracing the practice back 500 years. Although this is considerably later than the date range for *fulachtaí fia*, it provides evidence that the practice has been used throughout Europe over a considerable length of time. Their experiment conclusively proved that *fulachtaí fia* could easily have been used to produce very drinkable ale (Moore and Quinn 2007). The Irish Archaeobotany Discussion Group, however, has refuted the idea of the primary function of *fulachtaí fia* being for brewing in part due to the lack of botanical remains associated with brewing found at the sites and the periodic associated finds of quern stones as possibly ritual depositions near the feature (McClatchie *et al*. 2008).

Chronology

Fulachtaí fia have been found to have a very broad date range with a small number of sites dating from the Late Neolithic and occasional examples producing dates from the Iron Age or later. However, *fulachtaí fia* that have been radiocarbon dated show a marked concentration of sites in the Middle Bronze Age, while there is a smaller but significant group indicating use in the Late Bronze Age (Brindley and Lanting 1990). A recent dating program has generally corroborated the findings of Brindley and Lanting. Though *fulachtaí fia* excavated in advance of the gas pipeline to the west had a

high concentration of dates to the 2500-1700 BC period (Grogan et al. 2007, 96), the majority of sites were within the 1700-1000 BC period (*ibid.)*. Baillie (1990, 167) has made the suggestion that *fulachtaí fia* could have been used for the most part before the eruption of Mount Heckla in 1159 BC, while the environmental changes brought about by the volcano heralded a reduction in their use in the first millennium BC.

Radiocarbon dates returned from 11 of a total of 16 sites that contained burnt mounds and/or spreads of burnt mound material or related components such as a trough from Phase 1 (The Carlow by-pass) of the current road scheme and located in Counties Kildare and Carlow suggested a slightly different chronology with the majority of dates returned from those sites indicating their use in the Final Neolithic/Early Bronze Age and the Early Bronze Age as outlined in Table 1.

NMSR No.	Calibrated Age Ranges (2 σ)	Dating Framework	Reference
E2563	cal BC 2131-1907	Early Bronze Age	(Hackett, 2008a)
	cal BC 2111-1900		
	cal BC 2023-1889		
E2565	cal BC 1900-1700	Early Bronze Age	(Hackett, 2008b)
	cal BC 1884-1746		
	cal BC 2008-1772		
E2567	cal BC 509-261	Early Iron Age	(Stephenson, 2008)
E2575	cal BC 2199-1924	Early Bronze Age	(Hegarty and O' Connell, 2008)
	cal BC 2549-2308	Final Neolithic-Early Bronze Age	
E2583	cal BC 994-815	Late Bronze Age	(Breen and Richardson, 2008a)
E2584	cal BC 1016-850	Middle Bronze Age-Late Bronze Age	(Breen and Richardson, 2008b)
	cal BC 1384-1212	Middle Bronze Age	
	cal BC 751-406	Late Bronze Age-Early Iron Age	
E2586	cal BC 1115-934	Middle Bronze Age-Late Bronze Age	(Breen and Richardson, 2008c)
	cal BC 1108-922		
E2592	cal BC 2031-1770	Early Bronze Age	(Doyle, 2008)
E2618	cal BC 1529-1388	Early Bronze Age-Middle Bronze Age	(Hackett, 2008c)
	cal BC 1117-935	Middle Bronze Age-Late Bronze Age	
	cal BC 341-46	Iron Age	
E2624	cal BC 2458-2137	Final Neolithic-Early Bronze Age	(Hackett, 2008c)
	cal BC 2467-2210		
	cal BC 2474-2291		
E2566	cal BC778-416	Late Bronze Age-Early Iron Age	(Hackett, 2009d)
	cal BC1259-1016	Middle Bronze Age	
	cal BC1112-898	Middle Bronze Age	

Table 1 – Range of radiocarbon dates returned from sites with Burnt Mounds and/or spreads of burnt mound material or related components such as a trough; Contract 4, N9/N10 Kilcullen to Waterford Scheme

As noted the date produced from the burnt spread on site (E2887) *c.* 780 m to the southwest of the present site to cal. BC 2210 - 1930 (2σ) (O'Connell 2010) indicates that burnt mound activity was also occurring there during the same chronological framework as that of the present site.

Dating and Conclusion
The archaeological material uncovered at site E2888 appears to be wholely associated with burnt mound activity. The radiocarbon date range obtained from the burnt mound at the site, 2350–2030 cal BC (2σ) (SUERC-25849), indicates that the burnt mound activity here belongs to one of the earliest chronological ranges for such site types i.e. the Early Bronze Age.

6 Archive quantities

The site archive is comprised of the following materials:

Item	Quantity
Context Sheets	26
Plans	5
Sections	13
Photographs	155
Registers	4
Notebooks	1

The archive material is contained within 1 box.

Storage of the archive in a suitable format and location is required in order to provide for any future archaeological research. It is proposed that in addition to the paper archive a digital copy is prepared. The archive is currently stored in the offices of Headland Archaeology (Ireland) Ltd., Unit 1, Wallingstown Business Park, Little Island, Co. Cork. It is proposed that the archive is appropriately deposited in consultation with the National Museum of Ireland.

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- Graphics department, Headland Archaeology (Ireland) Ltd.
- Dorota Kozlowska, Site Supervisor, Headland Archaeology (Ireland) Ltd.
- The excavation team

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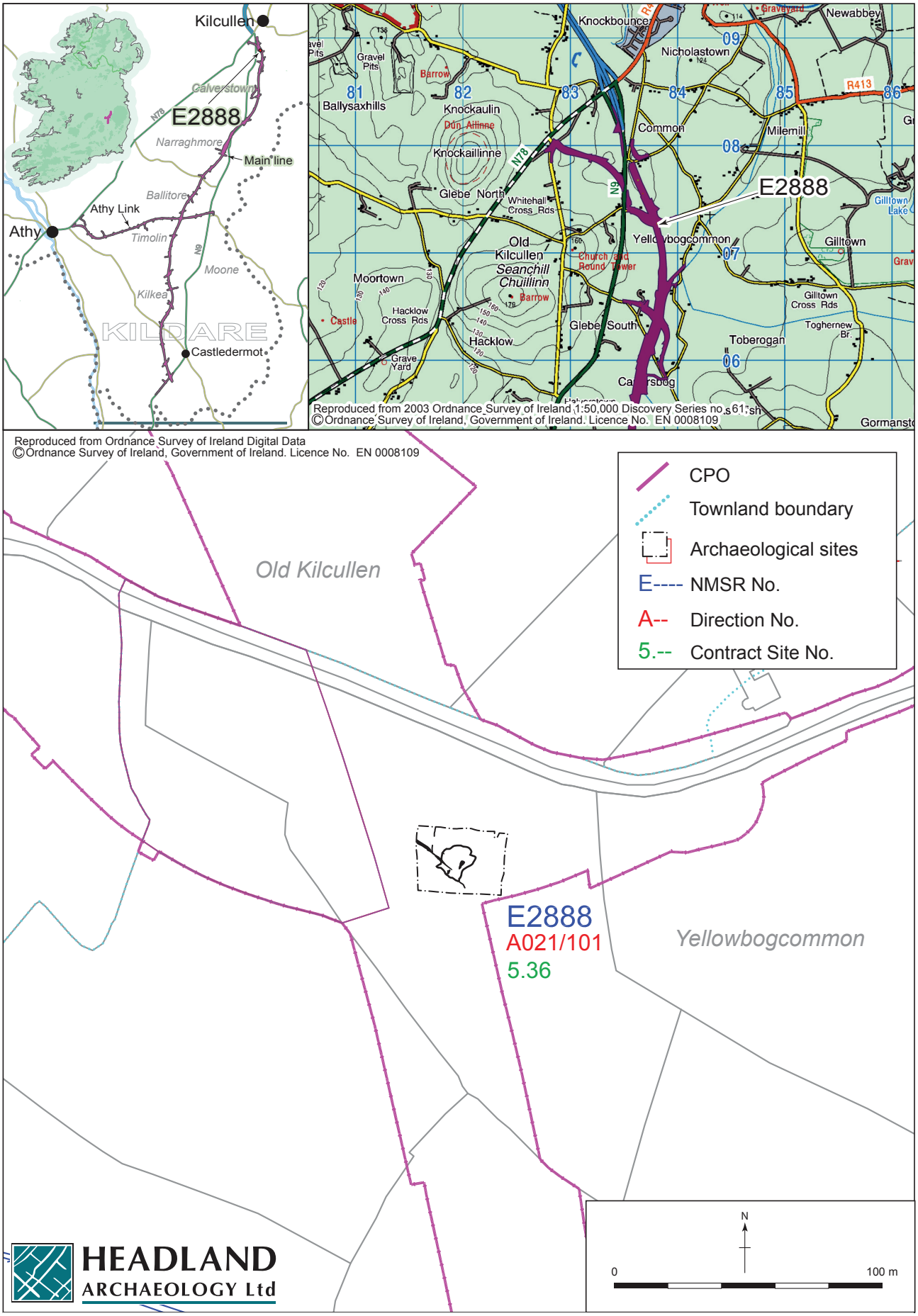


Figure 1 - N9/N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow. Archaeological Services Contract No. 5 - Resolution, Kilcullen to Moone and Athy Link Road. E2888, Site location.

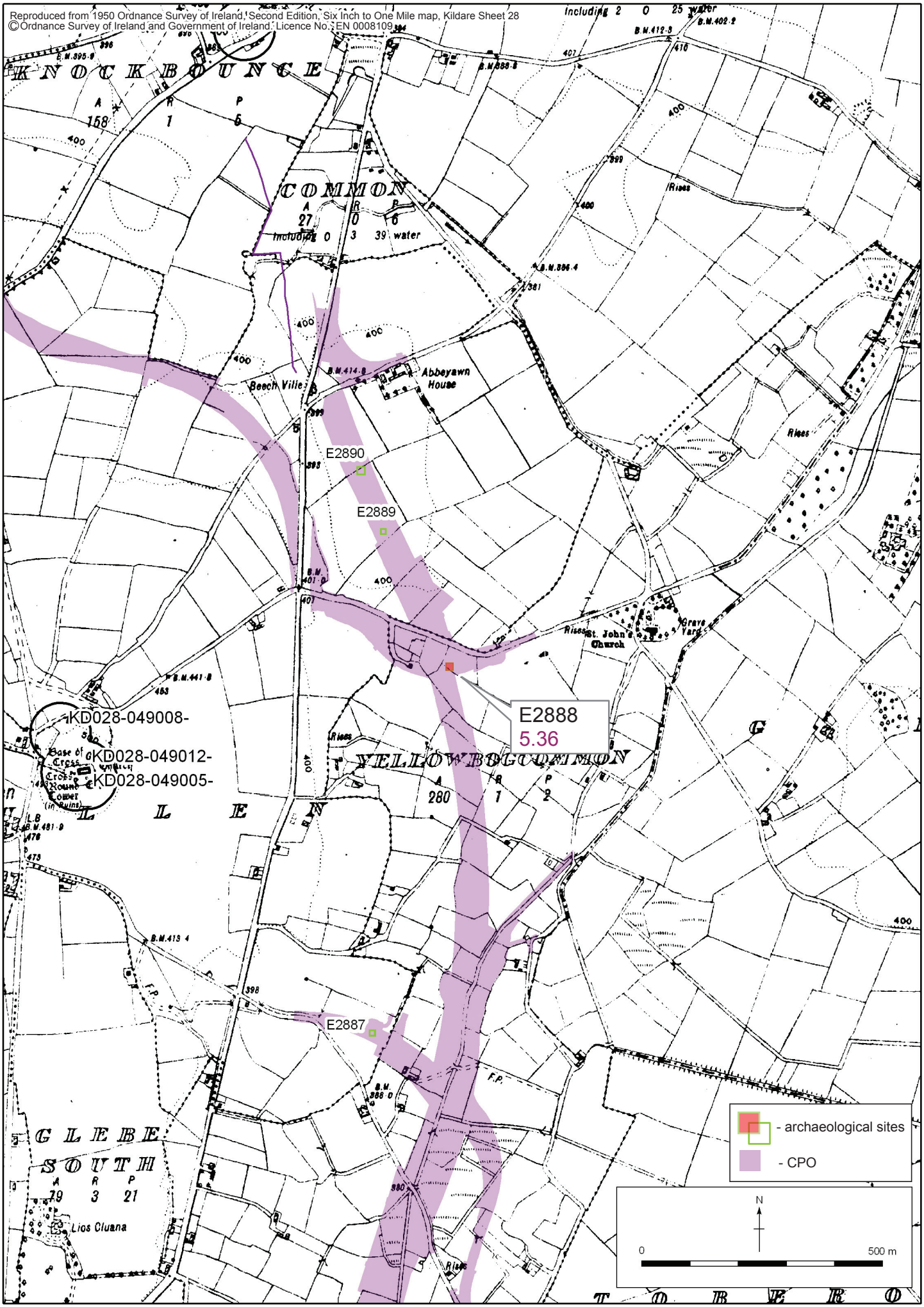


Figure 2 - N9/N10 Kilcullen to Waterford Scheme; Phase 3: Kilcullen to Carlow. Archaeological Services Contract No. 5 - Resolution, Kilcullen to Moone and Athy Link Road: E2888, Extract from RMP.

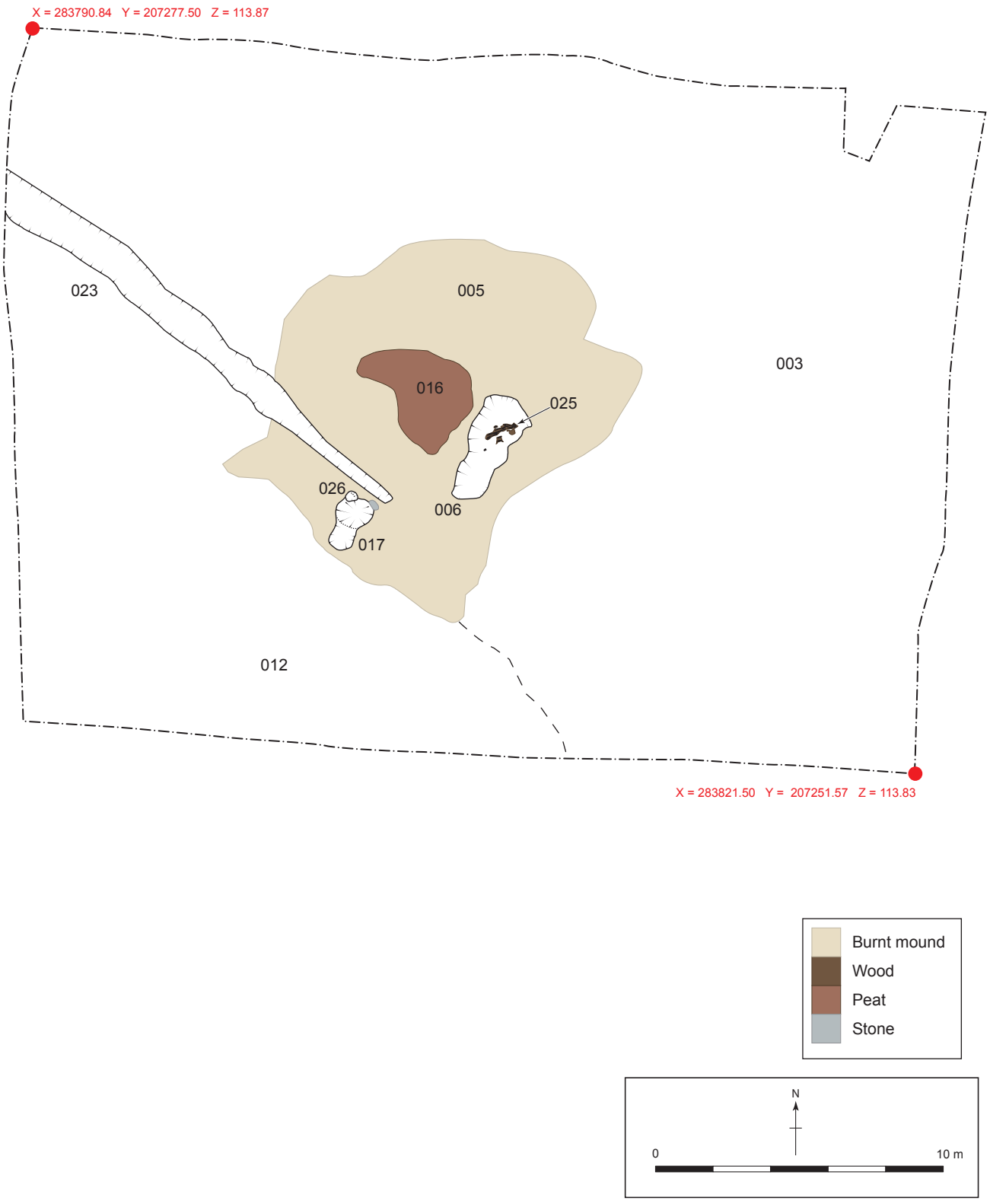


Figure 3 - N9/N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow. Archaeological Services Contract No. 5 - Resolution, Kilcullen to Moone and Athy Link Road. E2888, Site layout.

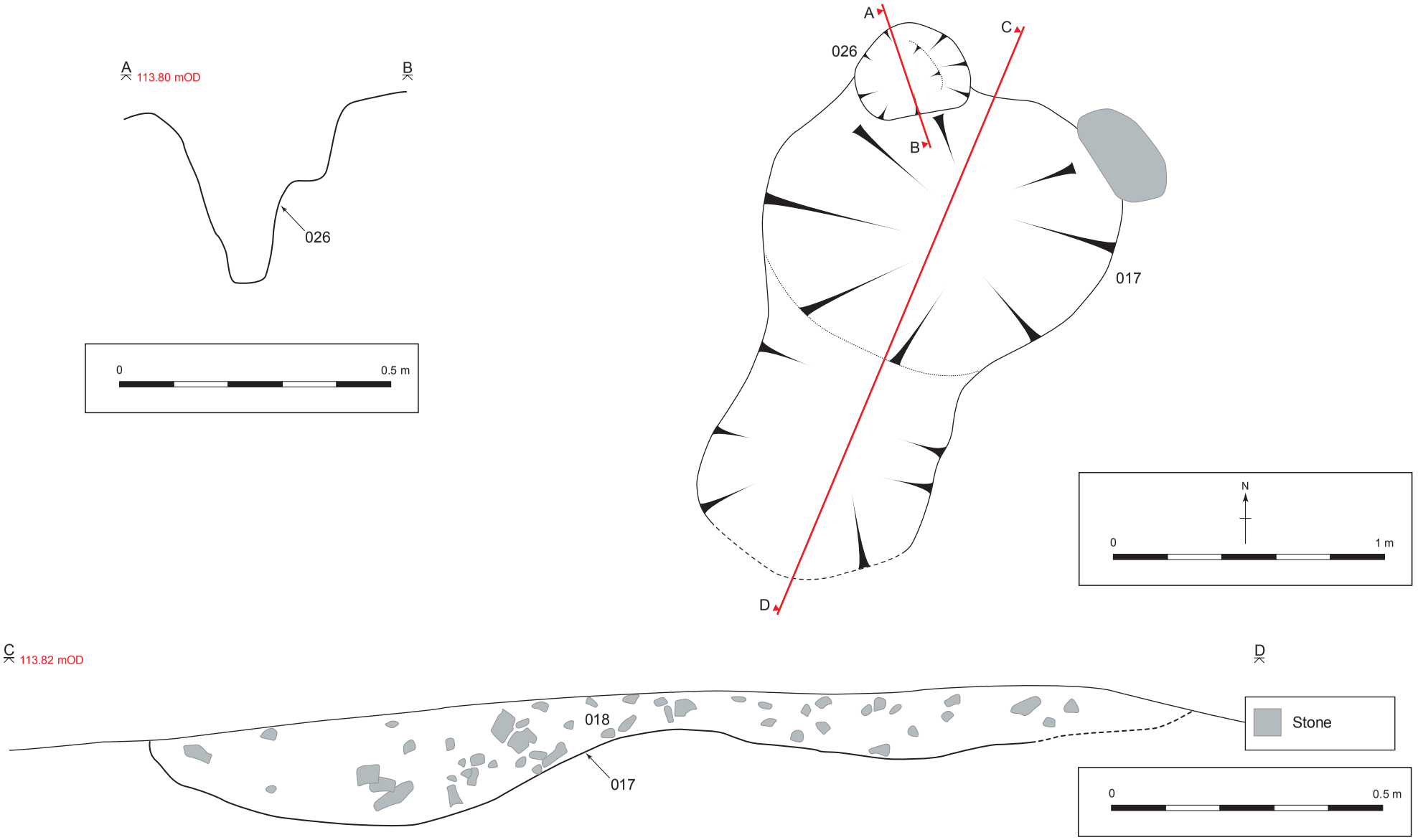


Figure 4 - N9/N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow.
Archaeological Services Contract No. 5 - Resolution, Kilcullen to Moone and Athy Link Road.
E2888, Plan and profile of pit/depression (026) and section of pit/depression (017).

016

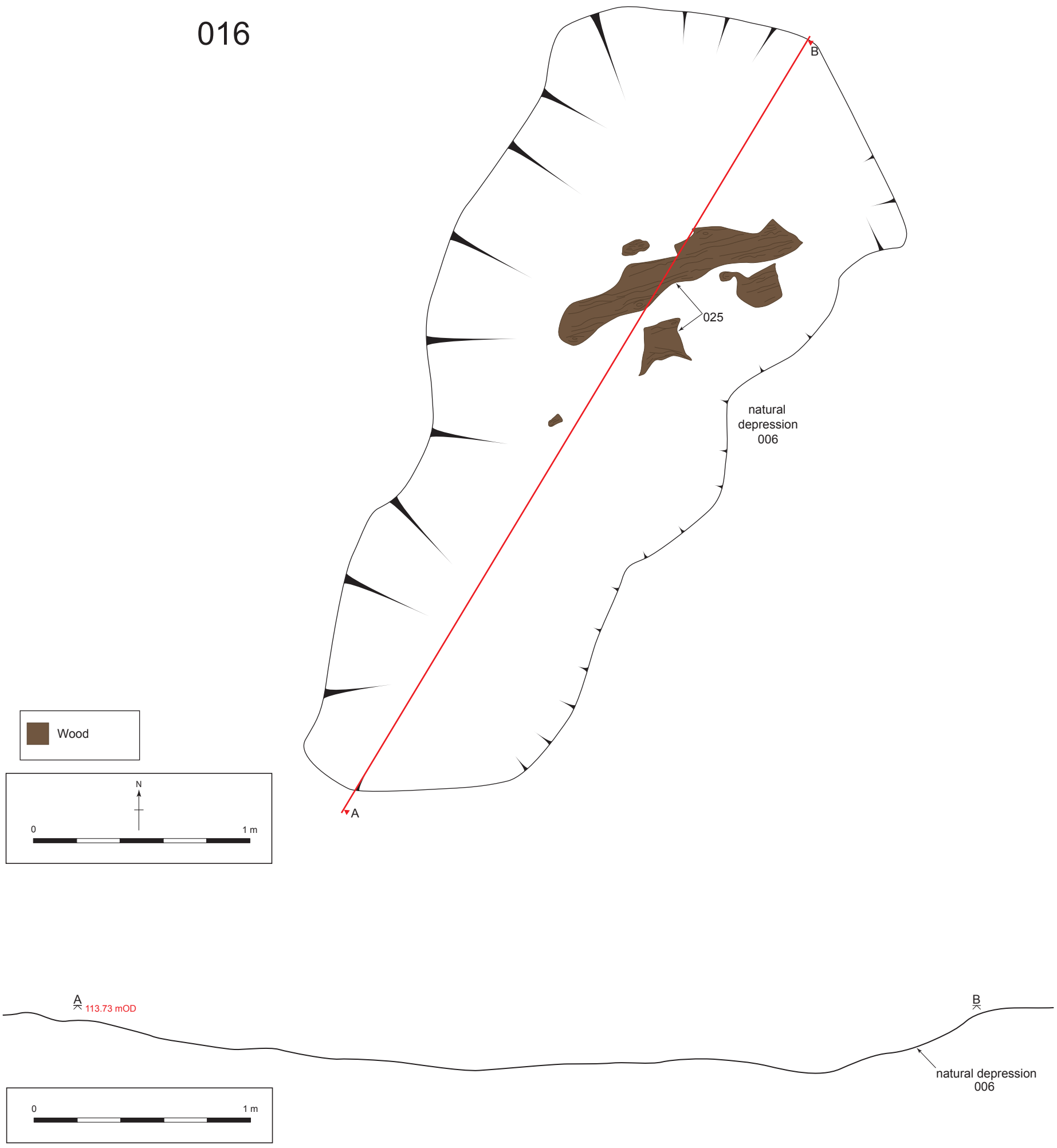
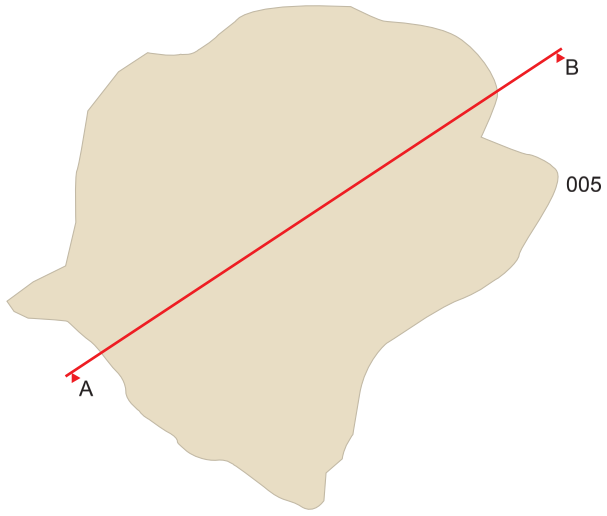
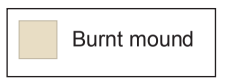
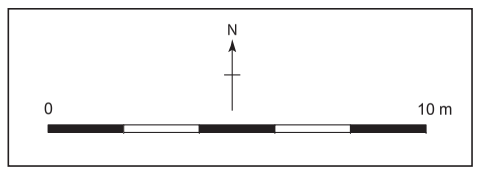
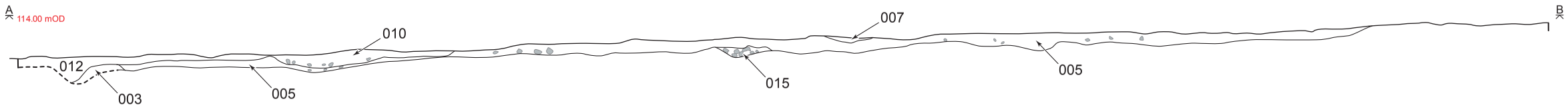


Figure 5 - N9/N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow.
Archaeological Services Contract No. 5 - Resolution, Kilcullen to Moone and Athy Link Road.
E2888, Plan and profile of pit/depression (006) with possible timber plank (025).









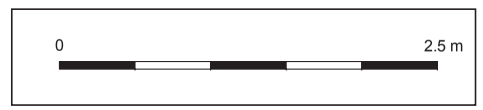


Figure 6 - N9/N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow.
Archaeological Services Contract No. 5 - Resolution, Kilcullen to Moone and Athy Link Road.
E2888, Section through burnt mound (005).

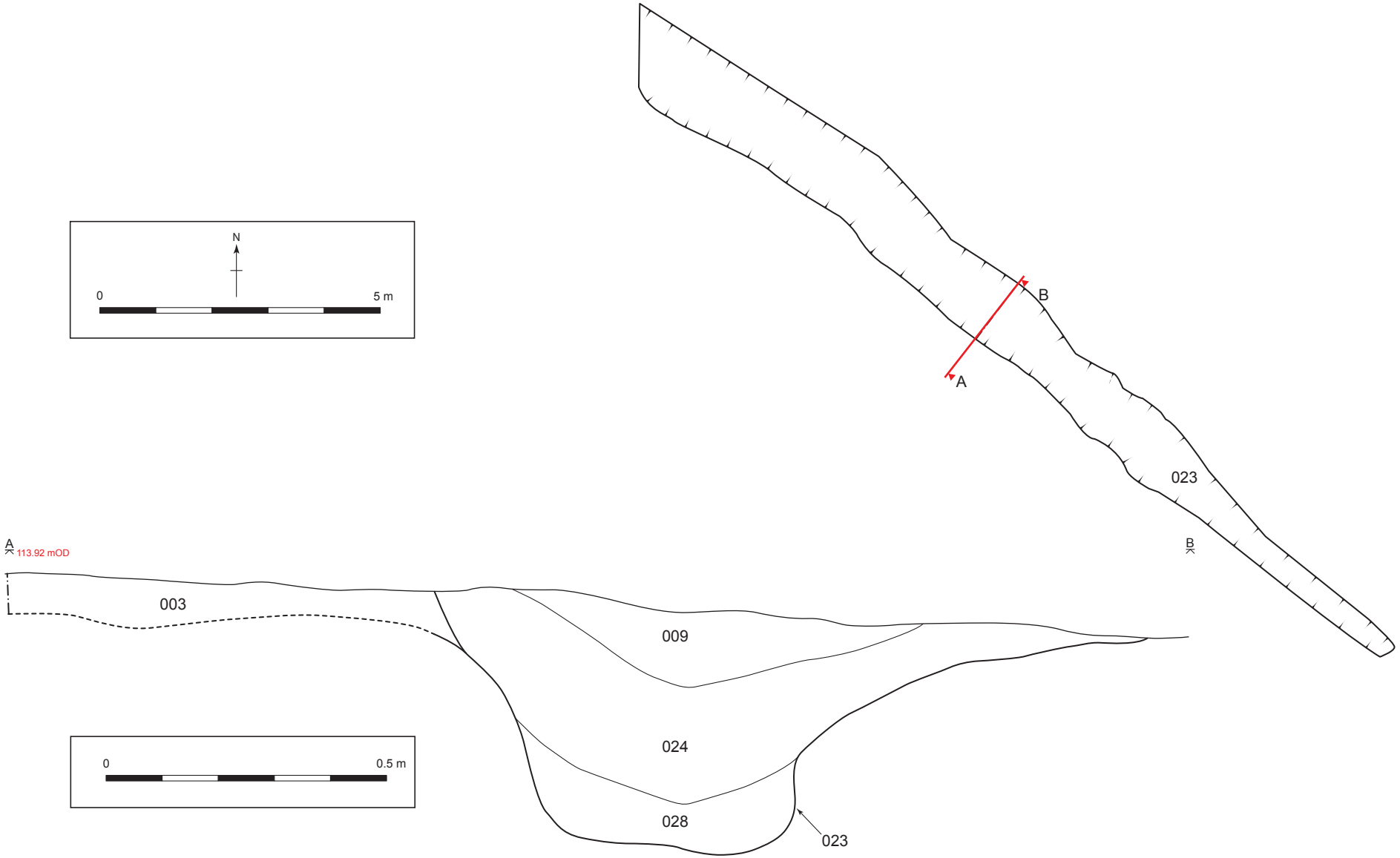


Figure 7 - N9/N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow.
Archaeological Services Contract No. 5 - Resolution, Kilcullen to Moone and Athy Link Road.
E2888, Plan and section through ditch (023).

Plate 1 - Pre-excavation shot of site with burnt mound, facing southeast.

Plate 2 - Mid-excavation shot of the burnt mound, facing northeast.

Plate 3 - Mid-excavation shot of burnt mound, facing southwest.

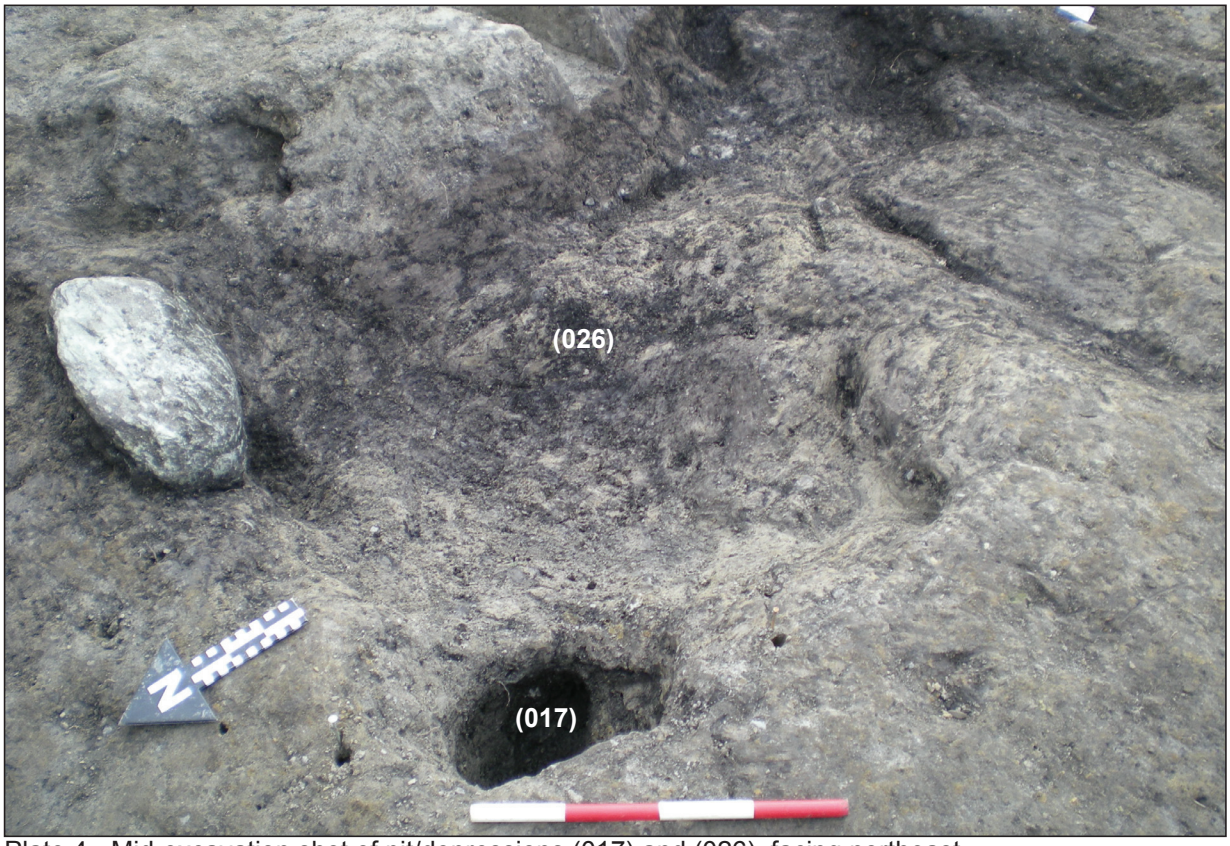


Plate 4 - Mid-excavation shot of pit/depressions (017) and (026), facing northeast.

Plate 5 - Mid-excavation shot of pit/depression (006) with deposit (011) in-situ, facing northwest.

Plate 6 - Mid-excavation shot of pit/depression (006) with possible timber plank (025) in-situ, facing southeast.

Plate 7 - Mid-excavation shot of pit/depression (006) with possible timber plank (025) in-situ, facing northeast.

Plate 8 - Mid-excavation shot of ditch (023), facing southeast.

Plate 9 - Post-ex shot of the site, facing southeast.

Plate 10 - Flint artefacts (E2888:029:001) and (E2888:029:002).

Appendix 1 – Context Register for Site E2888

Context no.	Type	Fill of:	Filled by:	Length (m)	Width (m)	Depth (m)	Description	Interpretation
001	Deposit	-	-	-	-	0.12 – 0.23	Loose mid dark brown clayey silt with occasional inclusion of small stones and fibrous roots	Topsoil
002	Deposit	-	-	-	-	-	Loose, yellowish grey coarse grained silty sand	Subsoil
003	Deposit	-	-	-	-	-	Gravel and loose grey silt-clay	Natural
004								Void
005	Deposit	-	-	13	12	0.18	Irregular shape in consisting of loose dark black brown sandy silty peat with frequent inclusions of heat shattered stones	Burnt mound
006	Possible cut	-	(034) (029) (011) (025)	3.90	0.90	0.07	Irregular shape in plan with irregular shaped sides and base.	Pit/possible pit
007	Deposit	-	-	1.7	0.50	0.06	Loose yellowish brown silty sand with occasional inclusion of yellow silty sandstones	Re-deposited subsoil
008	Deposit	-	-	3.2	2.6	0.06	Loose yellow silty sand	Re-deposited subsoil
009	Cut	-	(010)	15.5	0.70	0.24	Loose light yellowish brown clayey fine grained sand with occasional small and medium sized pebbles inclusions	Re-deposited subsoil
010	Deposit	-	-	7	1.6	0.20	Loose dark grey black clayey peat	Peat Horizon
011	Deposit	(006)	-	3.85	0.90	0.06	Moderately compact dark brown black silty clayey peat, with occasional small wood inclusions .	Fill of pit/depression
012	Deposit	-	-	-	-	-	Compact yellow boulder clay	Re-deposited boulder clay
013								Void
014	Deposit	(023)	-	-	0.4	0.2	Loose organic deposit with frequent inclusion of burnt and cracked stones	Fill of ditch
015								Void
016	Deposit	(005)	-	2.5	1.5	0.10	Loose dark reddish brown, sandy silty peat with occasional gravel inclusion.	Peat Horizon

Context no.	Type	Fill of:	Filled by:	Length (m)	Width (m)	Depth (m)	Description	Interpretation
017	Possible Cut		(018)	1.76	1.12	0.30	Key-hole shape in plan with irregular sides and an uneven base. It appeared to be composed of two parts with a deeper sub-oval northern portion and a shallower sub-rectangular shaped southerly portion	Pit/depression
018	Deposit	(017)	-	1.76	1.12	0.30	Charcoal and heat-shattered stones with a piece of wood/bark inclusion	Fill of pit/depression
019								Void
020			-					Void
021								Void
022								Void
023	Cut	-	(028) (024) (014) (031) (032)	17.1	1.58	0.48	A shallow, linear features with steeply sloping sides and a flat base	Ditch
024	Deposit	(023)	-	11.10	0.75	0.45	Greyish to dark brown clayey silt with occasional fine sand and fibrous root inclusions, frequent decayed wood fragments and occasional small rounded gravel inclusions	Fill of ditch
025	Cut	-	(006)	1.2	0.23	0.01	A possible wooden plank, poorly preserved, horizontally, orientated timber measuring 1.2 m long, 0.23 m wide and 0.01 m thick. No tool marks, joints or fixing were visible.	Possible wooden plank
026	Possible cut	-	(027)	0.40	0.32	0.30	Irregular shape in plan with sharply sloping sides except on the north and east which was more stepped and a flat base	Pit/depression
027	Deposit	(027)	-	0.34	0.24	0.30	Dark grey silty clay with occasional charcoal fleck inclusions.	Fill of pit/depression
028	Deposit	(023)	-	-	0.51	0.16	Loose grey clay	Fill of ditch
029	Deposit	(006)	-	3.4	0.8	0.05	Compact light grey clay with occasional peat and charcoal fleck inclusions.	Fill of pit/depression
030								Void

Context no.	Type	Fill of:	Filled by:	Length (m)	Width (m)	Depth (m)	Description	Interpretation
031	Deposit	(023)	-	-	0.5	0.12	Loose dark blackish brown clayey, slightly sandy peat with occasional angular stones, small roots and fine hair roots inclusions	Fill of ditch
032	Deposit	-	(032)	1	0.60	0.02	Lens of heat shattered stone	Fill of ditch
033	Deposit	(005)	-	0.5	0.3	0.10	Loose, dark-brown, sandy silt with occasional charcoal and small stone inclusions that were heat affected.	
034	Deposit	(006)	-	2.4	0.80	0.05	Loose dark grey clay with peat and charcoal fleck inclusions	Fill of pit/depression

Appendix 2 – Finds Register for Site E2888

Find no.	Material	Type	Identification	Description
E2888:029:001	Lithic	Debitage	Unknown	Debitage, not worked
E2888:029:002	Lithic	Debitage	Unknown	Flake, partly covered by cortex

Appendix 3 – Sample Register for Site E2888

Sample No.	Context No.	Description
E2888:001	007	Upper deposit of burnt mound
E2888:002	016	Upper deposit of burnt mound
E2888:003	016	Upper deposit of burnt mound/ block sample
E2888:004	005	Burnt mound
E2888:005	015	Stone rich deposit of burnt mound
E2888:006		void
E2888:007	005	Burnt mound
E2888:008	011	Peaty deposit, containing wood
E2888:009	018	Mail fill of cut (017)
E2888:010	027	Main fill of (026)
E2888:011	025	Wood present in context (011)
E2888:012	005	Burnt mound
E2888:013	009	Upper fill of a ditch (023)
E2888:014	010	Peaty fill of a ditch (023)
E2888:015	032	Secondary fill of a ditch (023)
E2888:016	029	Secondary deposit related to the burnt mound
E2888:017	034	Primary deposit related to the burnt mound

Appendix 4 – Photo Register for Site E2888

Shot No.	Direction Facing	Description
E2888:010:76	SE	Pre-ex of the site
E2888:010:77	SE	Pre-ex of the site
E2888:010:78	SE	Pre-ex of the site
E2888:010:79	SE	Pre-ex of the site
E2888:010:80	SE	Pre-ex of the site
E2888:010:81	SE	Pre-ex of the site
E2888:010:82	SE	Pre-ex of the site
E2888:010:83	SE	Pre-ex of the site
E2888:010:84	SE	Pre-ex of the site
E2888:010:85	SE	Pre-ex of the site
E2888:010:86	SE	Pre-ex of the site
E2888:010:108	NE	Mid-ex of (011)
E2888:10 :109	NE	Mid-ex section F-G of burnt mound, Quad. III
E2888:10:110	SW	Mid-ex section A-B of burnt mound, Quad. III
E2888:10:111	W	Mid-ex section of burnt mound, Quad. I
E2888:10:112	S	Mid-ex section of burnt mound, Quad. I
E2888:10:113	S	Mid-ex section of burnt mound, Quad. II
E2888:10:114	S	Mid-ex section of burnt mound, Quad. II
E2888:10:115	S	Mid-ex section of burnt mound, Quad. II
E2888:10:116	S	Mid-ex section of burnt mound, Quad. II
E2888:10:117	S	Mid-ex section of burnt mound, Quad. II
E2888:10:118	S	Mid-ex section of burnt mound, Quad. II
E2888:10:119	S	Mid-ex section of burnt mound, Quad. II
E2888:10:120	S	Mid-ex section of burnt mound, Quad. II
E2888:10:126	W	Over all shot of burnt mound
E2888:10:127	W	Mid-section of burnt mound, Quad. II
E2888:10:128	W	Mid-section of burnt mound, Quad. II
E2888:10:129	W	Mid-section of burnt mound, Quad. II
E2888:10:130	W	Mid-section of burnt mound, Quad. I
E2888:10:131	W	Mid-section of burnt mound, Quad. I
E2888:10:132	W	Mid-section of burnt mound, Quad. I
E2888:11:077	E	Pre-ex of (017)
E2888:11:078	E	Pre-ex of (017)
E2888:11:079	W	Pre-ex of (017)
E2888:11:080	N	Pre-ex of (017)
E2888:11:081	N	Close-up of (019)
E2888:11:082	NE	Pre-ex of (017)
E2888:11:083	NE	Mid-section A-B of burnt mound, Quad. IV
E2888:11:084	NE	Mid-section A-B of burnt mound, Quad. IV
E2888:11:085	NE	Mid-section A-B of burnt mound, Quad. IV
E2888:11.086	N	Mid-section A-B of burnt mound, Quad. IV
E2888:11:087	E	Mid-section G-H of burnt mound, Quad. IV
E2888:11:088	E	Mid-section G-H of burnt mound, Quad. IV
E2888:11:089	SEE	Mid-section G-H of burnt mound, Quad. IV
E2888:11:091	S	Mid-ex shot of burnt mound

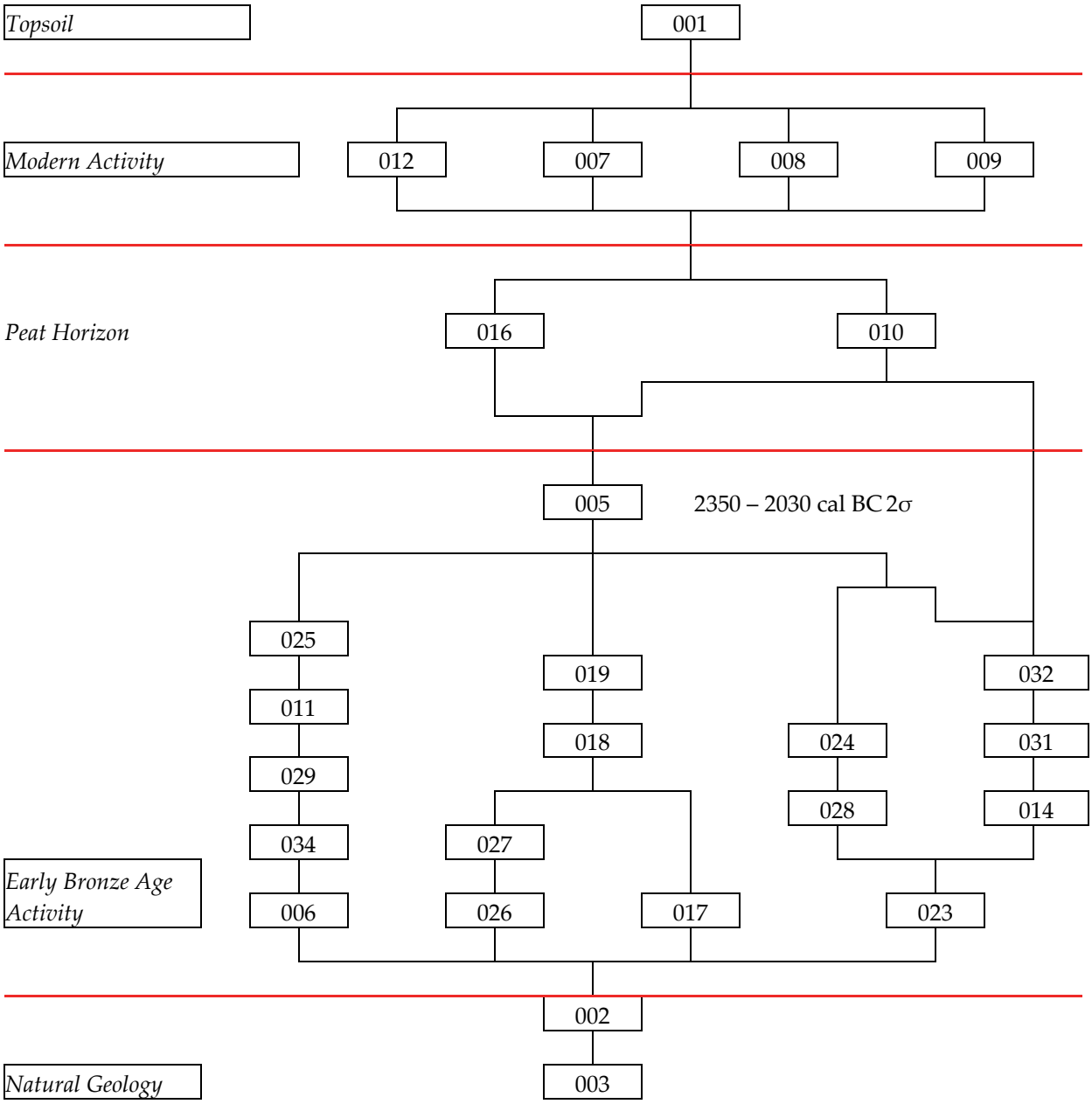
Shot No.	Direction Facing	Description
E2888:11:092	NE	Mid-ex shot of burnt mound
E2888:11:093	NE	Mid-ex shot of burnt mound
E2888:11:094	SE	Mid-ex shot of burnt mound
E2888:11:095	NNE	Mid-ex shot of burnt mound
E2888:11:096	N	Mid-ex shot of burnt mound
E2888:011:097	SW	Mid-excavation shot of burnt mound
E2888:011:098	SW	Mid- excavation shot of burnt mound
E2888:011:099	SW	Mid- excavation shot of burnt mound
E2888:011:100	SW	Mid- excavation shot of burnt mound
E2888:011:101	SSE	Landscape shot
E2888::011:102	SSW	Landscape shot
E2888:011:103		Working shot
E2888:011.104		Working shot
E2888:011:105		Working shot
E2888:011:106	NE	Mid- excavation shot of (005)
E2888:011:107	SW	Mid- excavation shot of (005)
E2888:011:108	E	Mid- excavation shot of section G-H of burnt mound (where the baulk was present)
E2888:011:109	E	Mid-excavation section G-H of burnt mound (where the baulk was present)
E2888:011:110	NE	Mid- excavation shot of (020)
E2888:011:111	SE	Mid- excavation shot of (015)
E2888:011:112	NW	Mid- excavation shot of (015)
E2888:011:113	NE	Mid- excavation shot of (015)
E2888:011.114	NW	Pre- excavation shot of (011)
E2888:011:115	W	Pre- excavation shot of (011)
E2888:011:116	W	Shot showing the relationship between (021) and (003)
E2888:011:117	W	Shot showing the relationship between (021) and (003)
E2888:011:118	SE	Shot showing (003) truncated by (012)
E2888:011:119	SE	Shot showing (003) truncated by (012)
E2888:011:120	SE	Shot showing (003) truncated by (012)
E2888:011:121	SE	Mid-excavation shot of section of (023), slot 1
E2888:011:122	SE	Mid- excavation shot of section of (023), slot 1
E2888:011:123	NW	Mid- excavation shot of section of (023), slot 1
E2888:011:124	SE	Mid- excavation shot of (025)
E2888:011:125	NE	Mid- excavation shot of (025)
E2888:011:126	NE	Mid- excavation shot of (025)
E2888:011:134	E	Mid- excavation shot of section of (017)
E2888:011:135	E	Mid- excavation shot of section of (017) and (026)
E2888:011:157	NW	Pre- excavation shot of (030)
E2888:011:158		Working shot after heavy rain
E2888:011:159		Working shot after heavy rain
E2888:011:160		Working shot after heavy rain
E2888:011:161		Working shot after heavy rain
E2888:011:162		Working shot after heavy rain
E2888:011:163		Working shot after heavy rain
E2888:011:164		Working shot after heavy rain

Shot No.	Direction Facing	Description
E2888:011:165		Section from testing through redeposit (012)
E2888:011:166		Section from testing through redeposit (012)
E2888:011:167		Section from testing through redeposit (012)
E2888:011:168	N	Section from testing: (001), (012), (033), (003)
E2888:011:169	N	Section from testing: (001), (012), (033), (003)
E2888:011:170	SE	Mid-excavation shot of section of (023), slot 4, not complete
E2888:011:171	NW	Mid- excavation shot of section of (023), slot 4, not complete
E2888:011:172	S	Post- excavation shot of the site
E2888:011:173	S	Post- excavation shot of the site
E2888:011:174	S	Post- excavation shot of the site
E2888:011:176	SE	Post- excavation shot of the site
E2888:011:177	SE	Post- excavation shot of the site
E2888:011:178	S	Post- excavation shot of the site
E2888:011:179	SE	Post- excavation shot of the site
E2888:011:180	SW	Post- excavation shot of the site
E2888:011:181	W	Post- excavation shot of the site
E2888:011:182	NNW	Post- excavation shot of the site
E2888:011:183	NNW	Post- excavation shot of the site
E2888:011:184	W	Post- excavation shot of the site
E2888:011:185	NE	Post- excavation shot of the site
E2888:011:186	NE	Post- excavation shot of the site
E2888:011:187	NE	Post- excavation shot of the site
E2888:011:188	SE	Post- excavation shot of the site
E2888:012:001	NE	Post- excavation shot of (017) and (026)
E2888:012:002		Working shot
E2888:012:003	NW	Mid- excavation shot of section of (023), slot 3
E2888:012:004	S	Mid- excavation shot of section of (023), slot 3
E2888:012:005	N	Mid- excavation shot of section of (023), slot 3
E2888:012:006	N	Mid- excavation shot of section of (023), slot 3
E2888:012:007	E	Mid- excavation shot of section of (023), slot 3
E2888:012:008	E	Mid- excavation shot of section of (023), slot 3
E2888:012:009	N	Pre-excavation shot of (017), in SW limit of the burnt mound
E2888:012:010	N	Pre- excavation shot of (017), in SW limit of the burnt mound
E2888:012:011	SW	Mid- excavation shot of section of (023), slot 2
E2888:012:012	SW	Mid- excavation shot of section of (023), slot 2
E2888:012:013	NE	Mid- excavation shot of section of (023), slot 2
E2888:012:014	NE	Mid- excavation shot of section of (023), slot 2
E2888:012:015	S	Mid- excavation shot of section of (023), slot 4
E2888:012:016	S	Mid- excavation shot of section of (023), slot 4
E2888:012:017	SE	Mid- excavation shot of section of (023), slot 5

Appendix 5 – Drawing Register for Site E2888

Drawing No.	Sheet No.	Section	Plan	Scale	Description
E2888:001	1, 2, 18-21	N/A	+	1:50	Pre-excavation plan of entire site
E2888:002	5-12	N/A	+	1:20	Mid- excavation plan of burnt mound
E2888:003	3	A-B	N/A	1:20	Mid- excavation section of burnt mound, west facing
E2888:004	3	C-D	N/A	1:20	Mid- excavation section of burnt mound, east facing
E2888:005	4	E-F	N/A	1:20	Mid- excavation section of burnt mound, south facing
E2888:006	4	G-H	N/A	1:20	Mid- excavation section of burnt mound, north facing
E2888:007	13	A-B	N/A	1:10	Mid- excavation section of (020), south-east facing
E2888:008	13	M-B	N/A	1:10	Mid- excavation section of (027), south-east facing
E2888:009	31	N/A	+	1:20	Mid- excavation plan of burnt mound
E2888:010	15	A-B	N/A	1:20	Profile of depression in the middle of burnt mound
E2888:011	15	A-B	N/A	1:10	Mid- excavation section of (017), west facing
E2888:012	16	N/A	+	1:10	Mid- excavation plan of (011) and (025)
E2888:013	15	A-B	N/A	1:10	Profile of (026)
E2888:014	13	A-B	N/A	1:10	Mid- excavation section of (023), west facing
E2888:015	13	A-B	N/A	1:10	Mid- excavation section of (023), east facing
E2888:016	17	A-B	N/A	1:20	Mid- excavation section of (023) north-east facing
E2888:017	17	A-B	N/A	1:20	Mid- excavation section of (023), south-west facing
E2888:018	22-30	N/A	+	1:20	Post- excavation of burnt mound and ditch (023)

Appendix 6 – Site Matrix for Site E2888



Appendix 7 – Palaeoenvironmental sample assessment for E2888
By: D. Masson and Scott Timpany

Introduction

Fifteen environmental samples were taken during the excavation at site E2888, Yellowbog Common, Co. Kildare; a site consisting of a burnt mound, three pit/depressions and a linear ditch. All of the samples were processed in order to retrieve any palaeoenvironmental material that may aid in the interpretation of the site.

Methodology

All samples were processed in laboratory conditions using a standard flotation method (cf. Kenward *et al.*, 1980). This was then sorted by eye and any material of archaeological significance removed. All plant macrofossil samples were analysed using a stereomicroscope at magnifications of x10 and up to x100 where necessary to aid identification. Identifications were confirmed using modern reference material and seed atlases including Cappers *et al.* (2006).

Radiocarbon dating was undertaken at Scottish Universities Environmental Research Centre (SUERC), after Reimer *et al* (2004). Calibrated age ranges were calculated using radiocarbon calibration program CALIB REV5.0.2. All results quoted in the text are taken from the 2 σ calibrated age range.

Results

The results are summarised below in Table 1 (Radiocarbon dating results), Table 2 (composition of retents) and Table 3 (composition of flots). All plant material was preserved by charring.

Results of radiocarbon dating
One radiocarbon date has been made available for the site, showing a phase of Early Bronze Age activity from charred hazel (*Corylus avellana*) nutshell, producing a date of 2350-2030 cal BC (SUERC-25849; 3770±50 BP) (see Table 1).

Charred plant remains
The only charred plant remains recovered were sedges (*Carex* sp.) and brambles (*Rubus* sp.). Sedge nutlets were present in four samples (002, 004, 012 and 014), while bramble fruits were found in two samples (002 and 012). A small quantity of charred hazel nutshell was recovered in retent samples (014) and (017).

Wood charcoal
Wood charcoal was present in all but one sample (015), with quantities varying from rare to abundant (see Tables 2 and 3). Only five samples (LIST) contained charcoal of a size suitable for identification and Accelerated Mass Spectrometry (AMS) dating (see Tables 2 and 3).

Other finds
Burnt bone was found in sample (004). Probable modern land snails were present in three samples (001, 002 and 013), while coal and cinders were also recorded from one sample (001) (see Tables 2 and 3).

Discussion

The discussion below addresses the palaeoenvironmental evidence from the burnt mound of Site E2888.

The burnt mound; 2350 - 2030 cal BC
The only palaeoenvironmental evidence found from the burnt mound was sedge nutlets and bramble fruits. It is likely these wetland taxa were accidentally burnt during the burnt mound activities taking place on site. They may have been accidentally collected with fuel wood from wetland areas and thus burnt with the wood. The presence of bramble may also indicate the consumption of wild foodstuffs at the site, along with the charred hazel nutshell; which has provided a date of 2350-2030 cal BC (SUERC-25849; 3770±50 BP). The presence of burnt bone in sample (004) may also point to the consumption of food on site. The majority of samples contained charcoal fragments, which are likely to relate to the spread of charcoal used during the burnt mound activity.

Linear ditch
One sample (014) was taken from a fill (010) of the linear ditch. This sample again contained charcoal fragments of small size, together with sedge nutlets and hazelnut shell fragments. The small size of the material within this sample indicates it could have been washed or blown into the ditch.

Conclusions

- The material present in the samples is largely charcoal fragments, which are likely to relate to the burnt mound activity.
- The presence of charred nutshell and bramble fruits, together with burnt bone suggests food consumption.
- The presence of charred sedge nutlets is likely to relate to accidental inclusion of sedge during gathering of fuel wood from wetland environments.

References

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E-Number	Lab code	Sample ID	Material	δ13C	Radiocarbon age BP	Calibrated Age Ranges (1 σ)	Relative probability	Calibrated Age Ranges (2 σ)	Relative probability
E2888	SUERC-25849	sample 17, context 034	hazel charcoal	-26.8	3770 +/- 50	2290 - 2130 cal BC	64.1	2350 - 2030 cal BC	95.4
						2080 - 2060 cal BC	4.1		

Table 1 – Results of radiocarbon dating

Context number	Sample number	Sample vol (L)	Context/ Sample description	Wood charcoal		Mammal bone		Plant		Shell	Dry Organic	Nutshell	Coal & Cinders	Glass	Metallic	Comments
				Qty	AMS	Burnt	Unburnt	Burnt	Unburnt							
7	1	2	Loose yellowish brown silty sand with occasional inclusion of yellow silty sandstones	+									+			Whole Retent Bagged - Seed in Flot
16	2	10	Loose dark reddish brown, sandy silty peat with occasional gravel inclusion	+							+ Seed					Whole Retent Bagged - Seed in Flot
5	4	10	Burnt mound deposit	++		+										Whole Retent Bagged - Seed in Flot
15	5	10	Burnt mound deposit	+												
5	7	4	Burnt mound deposit	++							+ Insect Eggs	+			+	Whole Retent Bagged - Seed in Flot

Context number	Sample number	Sample vol (L)	Context/ Sample	Wood charcoal		Mammal bone		Plant		Shell	Dry Organ	Nutshell	Coal & Cinder	Glass	Metallic	Comments
11	8	20	Moderately compact dark brown black silty clayey peat, with occasional small wood inclusions, fill of pit/depression (011)	+++												30% Charcoal
18	9	2	Charcoal and heat-shattered stones with a piece of wood/bark inclusion, fill of pit/depression (017)	+++					+							Whole Retent Bagged - 50% Charcoal
27	10	1	Dark grey silty clay with occasional charcoal fleck inclusions, fill of pit/depression (026)	+												
25	11	15	Wood present in (011)	+					+							

Context number	Sample number	Sample vol (L)	Context/ Sample	Wood charcoal		Mammal bone		Plant		Shell	Dry Organ	Nutshell	Coal & Cinder	Glass	Metallic	Comments
5	12	2	Burnt mound deposit	+++												Whole Retent Bagged - 50% Charcoal
9	13	2	Loose light yellowish brown clayey fine grained sand with occasional small and medium sized pebbles inclusions													Archaeologically Sterile
10	14	2	Loose dark grey black clayey peat	+					+			+				
31	15	2	Loose dark blackish brown clayey, slightly sandy peat with occasional angular stones, small roots and fine hair roots inclusions, fill of ditch	+												Whole Retent Bagged - Seed in Flot

Context number	Sample number	Sample vol (L)	Context/ Sample	Wood charcoal		Mammal bone		Plant		Shell	Dry Organ	Nutshell	Coal & Cinder	Glass	Metallic	Comments
29	16	10	Compact light grey clay with occasional peat and charcoal fleck inclusions, fill of pit/depression (006)	+												
34	17	10	Loose dark grey clay with peat and charcoal fleck inclusions, fill of pit/depression (006)	++				+								

Table 2 – Composition of retents

Context number	Sample number	Total flot vol. (ml)	Other plant remains	Burnt bone	Charcoal			Comments
					Quantity	Max size (cm^3)	AMS	
007	1	30			+	<1		Contained land snail
016	2	250	Rubus sp +, Carex sp.++		+++	<1		Contained land snail
005	4	150	Carex sp. +		++	<1		
015	5	30			++++	<1		
005	7	150			+++	<1		
011	8	300			++++	<1		
018	9	150			++++	<1		
027	10	20			+	<1		
025	11	500			++++	1.5	*	
5	12	75	Carex sp.+, Rubus sp.+		++++	2	*	
009	13	30			++	<1		Contained land snail
010	14	50	Carex sp. ++++		++++	<1		
031	15	20						
029	16	150			+++	<1		
034	17	200			+	<1		

Key: + = rare, ++ = occasional, +++ = common and ++++ = abundant

* = sufficient sized charcoal for identification and AMS dating

Table 3 – Composition of flots

.

Appendix 8 – Waterlogged Wood, Yellowbog Common, E2888, County Kildare
By: Simon Gannon

Introduction

The wood comprised a single sample from a context excavated from a burnt mound site at Yellowbog Common, E2888, Co. Kildare. Analysis took place after removal from the site and a period in storage. The sample was examined for any evidence of wood working and identification of species.

Identification of species
The results are summarized in Table 1.

Methodology

Slices were removed from the wood sample to reveal the transverse, radial longitudinal and tangential longitudinal plains. Identification was made by microscopic examination of between x10 and x400. The maturity of the sample was also assessed. Reference material comprised samples of wood taxa from the National Botanic Gardens, Glasnevin and reference publications (Schweingruber 1990; Hather 2000).

Identification

The results are summarized in Table 1. Classification of the taxa follows that of *Flora Europaea* (Tutin *et al.* 1964-80). The identification is consistent with the following group of taxa.

Broadleaf taxa
Betulaceae. *Alnus* spp., alders.

The inferred possible native species is common alder, *Alnus glutinosa*, fearnóg

Taxa in site context
Sample (011) comprised degraded small fragments of alder (*Alnus*), discovered at the bottom of context (011), and which may have been part of a possible plank (025).

Discussion

The site record indicates that (025) may have been of substantial size and possibly of plank type shape originally. However, the wood survived as a sample of small disaggregated fragments and as such contained no evidence for wood working. Alder has native distribution throughout Ireland and is broadly soil tolerant although requiring a water course for growth. It produces a hardwood suitable for a variety of artefacts and smaller structural timber, especially where in contact with water and often found in wetland sites and *fulachta fiadh*. It is typically used in whole or halved roundwood form, occurring more rarely as oblong planking. Alder was frequently used in trackway construction, as at Mountdillon Bogs, Co. Longford (Raftery 1996). At sites along the N9-N10 road scheme, Johnstown, E2586, Co. Carlow, alder occurred as timber and at Johnstown, E2575, Co. Carlow, alder was used as trough lining in a *fulachta fiadh*

Sample number	**Context number**	*Alnus*
011	011	1

Table 1 – E2888 Waterlogged Wood: Identification of Species

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Tutin, T. *et al*. 1964-1980 *Flora Europaea.* Vols.1-5. Cambridge University Press. Cambridge.

Appendix 9 – Final report on the faunal remains from Yellowbog Common (E2888), Co. Kildare
By: Albína Hulda Pálsdóttir MA

Introduction

This report discusses the results of the animal bone analysis from Yellowbog Common, Co. Kildare (E2888). The archaeological remains uncovered represented the remnants of a burnt mound. The animal bone specimen was recovered from a soil sample by sieving. The bone analysed for this report derives from the main deposit (005) of the burnt mound.

Methodology

During the analysis each specimen was identified and recorded according to species, skeletal element, age and sex where possible. The animal bone reference collection located in Headland Archaeology (Ireland) Ltd, Unit 1 Wallingstown Business Park, Little Island, Co. Cork was utilised. The York System bone database program was used for recording (Harland et al. 2003). The material was quantified by using the number of identified specimens (NISP). During the analysis pathological changes, carnivore and rodent gnawing, signs of burning and butchery marks were recorded. All data is stored in digital and written form in Headland Archaeology (Ireland) Ltd, Unit 1 Wallingstown Business Park, Little Island, Co. Cork.

Results

A total of one burnt bone from deposits (005) of the Early Bronze Age burnt mound was analysed from the site (Table 1).

Context	*Sample*	*Species*	*Element*	**NISP**
005	004	Unidentified	Unidentified	1

Table 1 – Species representation of sample (NISP)

Discussion

The bone material from Yellowbog Common, Co Kildare is too small for conclusive comparison against other assemblages. It is possible that the one burnt bone recovered is human but as it comes from the main deposit of a burnt mound it is much more likely that it is an animal bone. The animal bone samples from burnt mound sites are usually relatively small. In a previous study it was found that the animal bones recovered from burnt mound sites have been connected especially with slaughter, primary butchery and meat preparation (Tourunen 2008, 40). In burnt mounds excavated in the Carlow/Kildare area such as Ballybar Lower Co. Carlow (E2618), Busherstown Co. Carlow (E2584) and Johnstown Co. Carlow (E2586), cattle dominate the samples followed by horse, deer, pig and sheep or goat (Tourunen 2008). The material from Ballygawley (Site 1), Co. Tyrone is also dominated by cattle bones, however no horse bones were found in the identifiable portion of the assemblage and the proportion of pig and sheep or goat bones is higher than in the samples from Carlow and Kildare (Tourunen 2009). Possible local variation across Ireland has not been fully investigated. For example, in five burnt mound sites excavated in Co. Tipperary the only identified animal was sheep or goat (Stevens 2005, 326).

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Appendix 10 – Radiocarbon Date Table and Certificate for Site E2888

E-Number	Lab code	Sample ID	Material	δ13C	Radiocarbon age BP	Calibrated Age Ranges (1 σ)	Relative probability	Calibrated Age Ranges (2 σ)	Relative probability
E2888	SUERC-25849	sample 17, context 034	hazel charcoal	-26.8	3770 +/- 50	2290 - 2130 cal BC	64.1	2350 - 2030 cal BC	95.4
						2080 - 2060 cal BC	4.1		

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RADIOCARBON DATING CERTIFICATE

20 October 2009

Laboratory Code	SUERC-25849 (GU-19517)
Submitter	Karen Stewart Headland Archaeology (Ireland) Ltd. Unit 1 Wallingstown Business Park Little Island Co. Cork, Ireland.
Site Reference	KCK06 E2888
Context Reference	34
Sample Reference	17
Material	charcoal : hazel
$\delta^{13}C$ relative to VPDB	-26.8 ‰
Radiocarbon Age BP	3770 ± 50

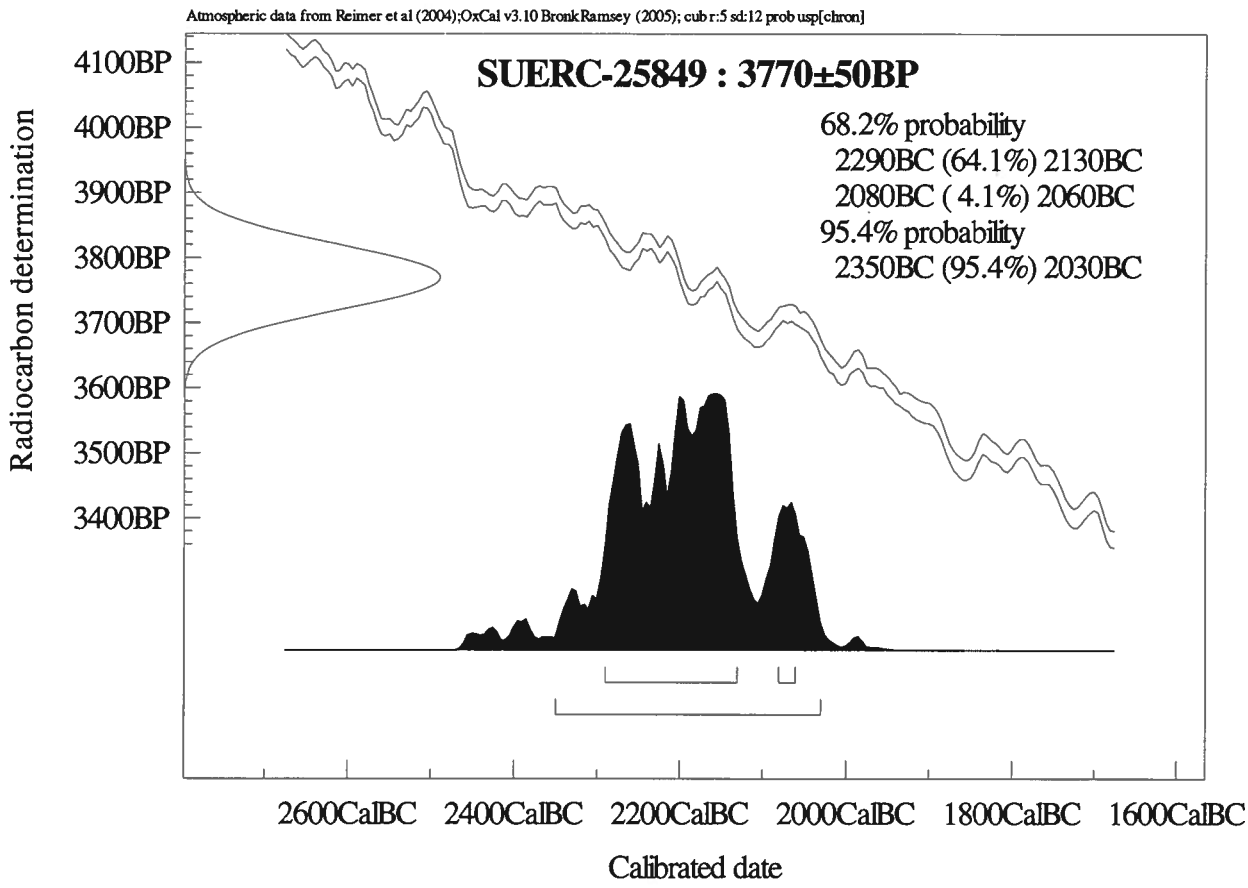
N.B.

1. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.
2. The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal3).
3. Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code. The contact details for the laboratory are email g.cook@suerc.gla.ac.uk or Telephone 01355 270136 direct line.

Conventional age and calibration age ranges calculated by :- R. Anderson Date :- 20-10-09

Checked and signed off by :- E. Dunbar Date :- 20/10/09

Calibration Plot



Appendix 11 –The lithic assemblage from Yellowbog Common, Co. Kildare (E2888)
By: Maria Soledad Mallia-Guest

Introduction

Two lithic finds were recovered following archaeological resolution of site E2888 in the townland of Yellowbog Common, Co. Kildare. The site consisted on the remains of a burnt mound and associated deposits with a rather low number of cut features (Cagney and Koslowska 2009).

Methodology

A macroscopic analysis of the components was carried out based upon a techno-typological approach following categories developed by Inizan *et al.* (1999). Further contextual background is provided by Woodman *et al*. (2006).

The artefacts were visually examined with the aid of an 8x hand lens, recorded and catalogued using Microsoft Excel 2003. No minimum size criterion was applied for artefact discard; therefore, any other lithic material that may have been retrieved during sample processing was incorporated to contribute to the assemblage integrity. The variables recorded include overall metric attributes (length, width and thickness), type of raw material, fragmentation, and artefact condition to determine if post-depositional, manufacture or use-damage was present.

In addition, when macroscopic evidence of use-wear was present, subsequent basic high-power micro-wear analysis was carried out using a reflective microscope at 200x magnification. The presence/absence of use traces such as micro-polish, motion striation and edge-scarring/rounding were also recorded.

The Assemblage

Two flint artefacts (E2888:029:001 and E2888:029:002) were recovered from an undisturbed light grey clay deposit with peat and charcoal inclusions (029) associated with burnt mound activity. The finds which can be classified as a minimally retouched artefact (E2888:029:001) and a possible utilised flake (E2888:029:002) appear to have been detached from the same greyish buff flint. They measure over 29 mm in length and are both in fair condition, with patinated and discoloured surfaces (Table 1). Both artefacts appear to have been obtained through the application of platform technique and direct percussion.

Retouched Artefact
Find E2888:029:001 is unifacially retouched presenting a short series of marginal inverse retouch at its distal end. The edge is rather abrupt, presenting a working angle of 84º which also exhibits sparsely distributed half-moon fractures. The artefact is manufactured on a broad inner angular flake exhibiting a plain unprepared platform and pronounced bulb and ripples of percussion. The artefact measures 34.2 mm in length, 37 .1 mm in width with a thickness of 15.4 and a weight of 21.3 g.

Utilised blank (natural edge with use damage)
The utilised flake (E2888:029:002) is similar in dimensions and morphology to artefact E2888:029:001 and appears to be not only patinated but also slightly discoloured by thermal action. It is manufactured on an inner angular flake with a step termination and displays a series of micro-retouch defining an abrupt lateral edge (90°). The artefact measures less than 30 mm in length with a minimum width of 40 mm and weighs 11.7 g (Table 1).

This working edge extends along most of the lateral edge and is convex in frontal view presenting a straight profile in median view displaying micro-retouch by use. A possible lateral left edge has also been identified.

Discussion

The lithic assemblage recovered at site E2888 (Yellowbog Common, Co. Kildare) comprises two artefacts manufactured on broad flake blanks which were most likely obtained by platform reduction technique. This technique is usually associated with early prehistoric lithic assemblages and appears to become less common from the Late Neolithic/Early Bronze Age, when the obtention of blanks through the application of bipolar technique becomes dominant (O'Hare 2005; Woodman *et al.* 2006). Nevertheless, there are a number of factors influencing the preference for one knapping technique over the other, including the size and quality of the raw materials.

A secondary source of flint is represented by the local glacial till, which incorporates weathered nodules of small size and poor quality which would have more efficiently reduced by bipolar technique. Additionally, flint can also be obtained from coastal localities as rolled beach pebbles (Woodman *et al.* 2006). Raw material provenance is therefore evident when observing the quality of the cortex remnant on the artefact surfaces. In this case, the luster, rolling and weathering of the cortex clearly contrasts with the 'chalky' accretions of those blanks derived from a primary source such as the Irish Northeast.

Lithic assemblages associated with burnt mound activities are known for being poorly diagnostic in terms of function as well as undersized (Woodman *et al.* 2006; Sternke 2008). It is plausible that this assemblage reflects an expedient lithic strategy given the scarce investment recorded on the manufacture of the working edges. It is also possible that the material was originally involved in the processing activities related to the burnt mound. This may partially explain the nature of its thermal damage – mostly consisting of a slight surface discolouration and sugary texture which suggests an exposure most likely to constant low temperatures or by contact with heat-affected material. Broad flakes as the ones here discussed, have been identified as a thicker and possibly functionally diverse variety of non-concave/hollow scrapers. (Woodman *et al.* 2006). Therefore, these may represent atypical forms emerging sometime after the Middle-Neolithic, likely less standardised, hand held pieces with less investment observed in their manufacturing, following a trend to minimalist retouch methods after this period as observed by Nelis (2004) after this period.

A number of burnt mounds have been recently excavated along the N9/N10 road scheme, most of them yielding a very limited number of lithic artefacts or types that are usually associated with earlier technologies. These include a number of Late Mesolithic butt-trimmed forms recovered at sites E2869 and also E2575 in Johnstown, Co. Carlow (Sternke 2008). These artefacts are usually assumed to represent examples of reclamation of earlier material into later contexts of use. When artefacts are present, it would

seem that utilised blanks and minimally retouched examples as the ones recovered at Yellowbog, Common (Co. Kildare), rather than more elaborated retouched forms, is a frequent occurrence in association with burnt mound deposits. Similar assemblages dominated by utilised flakes were recovered at Sites E2872 and E2874 in Ballymount, Co. Kildare (Mallia-Guest 2009) with the former returning a Late Neolithic date for the burnt mound activity.

References

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NMI No.	Raw Material	Type	Category	Length (mm)	Width (mm)	Thickness (mm)	State	Condition	Others	Cortex	Blank	Position of Retouch	Type of Retouch	Extension of Retouch	Type of use damage	Type of Platform	Bulb	Ripples	Erailleur scar	Lip
E2888: 029:001	Flint	Unifacially retouched broad flake	Retouched Artefact	34.2	37.1	15.4	F	Fair	Wt and Ct, Lt and disc.	10%	Inner angular flake	UI	Ab. 84º marginal	Fronto-lateral Short	Half-moon fractures	Plain	P	P	No	Yes
E2888: 029:002	Flint	?Utilised flake	Natural edge with use-damage	29.3	39.2	7.7	C	Fair	Pt Lt, iron stained and disc. by thermal alteration	No	Inner angular flake				Frontal and lateral Mr, frontal is continuous and rather abrupt (90º), while lateral right Mr is present on both dorsal and ventral	Plain	P	D	Yes	No

Key: C: complete; P: pronounced; D: diffuse, Pt: patinated; Lt: lustered; Disc: discoloured;Wt: Weathered; UI: unifacial Inverse; Mr: micro-retouch;

Table 1 – Lithic assemblage from Yellowbog Common, Co. Kildare (E2888)

Appendix 12 – Assessment of metallurgical remains from E2888 based on visual examination
By Barry Cosham

Introduction

E2888 has been provisionally interpreted as burnt mound site (Cagney and Kozlowska 2009). A small quantity of possible metallurgical waste residues was recovered from environmental samples during post excavation work. The aim of this report is to determine the nature and quantity of these residues and recommend what, if any, further analyses should be undertaken.

Methods

Two samples were recovered during the processing of environmental samples. The remains were quantified and a detailed description compiled, allowing categorisation and identification with reference to Bachmann (1982) and Bayley *et al* (2001). The results and discussion are presented below.

Results

The following table presents the results of the visual assessment.

Sample no.	Context no.	Weight (g)	Description	Interpretation
1	7	<1	Several tiny fragments of possible coal/cinders	Undiagnostic
7	5	<1	Two tiny ferrous fragments, probably naturally occurring	Undiagnostic

The fragments of material were so tiny that accurate identification was difficult, even with the aid of a low powered light mircroscope. Nevertheless it is certain that both samples are not true slags, and as such the assemblage from E2888 probably does not relate to metalworking.

Discussion

The assemblage from E2888 is comprised of a mixture of possible coal/cinders and naturally occurring iron rich stone. It is unlikely that either of these materials relate to metalworking activity on the site. Both samples could be purely geological in origin and therefore be entirely unrelated to any anthropogenic activity on the site.

Recommendations

It is recommended that no further analyses be undertaken on the material from this site as it is unlikely to be of metallurgical origin.

References

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