

N18 Gort to Crusheen Road Scheme



Site Name: Derrygarriff 1

Ministerial Direction No.: 044
Excavation Registration No.: E3710

Burnt Mound

Final Report

On behalf of Galway County Council

Site Director: Joe Nunan
November 2009

IAC Irish Archaeological
Consultancy

PROJECT DETAILS

Project Reference No.	A044
Project	N18 Gort to Crusheen Road Scheme
Ministerial Direction Reference No.	A044
NMS Registration Number	E3710
Excavation Director	Joe Nunan
Senior Archaeologist	Shane Delaney
Consultant	Irish Archaeological Consultancy Ltd, 120b Greenpark Road, Bray, Co. Wicklow
Client	Galway County Council
Site Name	Derrygarriff 1
Site Type	Burnt Mound
Townland	Derrygarriff
Parish	Inchicronan
County	Clare
NGR (Easting)	140463
NGR (Northing)	191046
Chainage	14,990
Height m OD	24 m OD
RMP No.	N/A
Excavation Dates	24 – 29 January 2008
Excavation Duration	5 Days
Report Type	Final
Report Date	27 November 2009
Report By	IAC Ltd

ACKNOWLEDGEMENTS

The excavation was carried out in accordance with the Directions issued to Galway County Council by the Minister for Environment, Heritage and Local Government under Section 14A (2) of the National Monuments Acts 1930–2004 and the terms of the Contract between Galway County Council and Irish Archaeological Consultancy Ltd.

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ABSTRACT

Irish Archaeological Consultancy Ltd (IAC), funded by Galway County Council and the National Roads Authority (NRA), undertook the excavation of a burnt mound under Ministerial Directions at the site of Derrygarriff 1 along the proposed N18 Gort to Crusheen road scheme (Figure 1). The following report describes the results of archaeological fieldwork at that site. The area was fully excavated by Joe Nunan under Ministerial Directions A044 and Registration Number E3710 issued by the Department of Environment, Heritage and Local Government (DEHLG) in consultation with the National Museum of Ireland. The fieldwork took place between 24 and 29 January 2008.

A burnt spread was discovered on raised ground within a wetland area in Derrygarriff townland in north Co. Clare. The site was located at NGR 140463, 191046 and was situated at 24 m OD.

The site consisted of an irregular spread of compact, heat-fractured limestone within a charcoal/peat matrix. It measured 5 m north–south x 4 m and survived to a depth of 0.14 m. Under the heat-fractured limestone was a single small pit measuring 0.9 m east–west x 0.86 m x 0.11 m depth. The only artefact was part of a modern gun cartridge from the burnt spread which was the result of modern disturbance. The pit and spread returned 2 Sigma calibrated dates of AD 1326–1343 (543±21 BP: UBA 12714) and AD 1695–1955 (69±21 BP: UBA 12713) respectively.

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1 INTRODUCTION

1.1 General

This report describes the excavation of Derrygarriff 1 (Figures 1–3; Plate 1), in the townland of Derrygarriff, Co. Clare undertaken by Joe Nunan for IAC Ltd, on behalf of Galway County Council and the NRA. It was carried out as part of the archaeological mitigation programme of the N18 Gort to Crusheen road scheme. The excavation was undertaken to offset the adverse impact of road construction on known and potential subsoil archaeological remains in order to preserve the site by record.

The site was not a Recorded Monument but was first identified during testing carried out by James Kyle in summer 2007 (Ministerial Direction No. A044, NMS Licence. No. 07E0489). All features identified during the assessment phase were subsequently re-identified and excavated during the full excavation phase of the site which took place between 24 and 29 January 2008 with a team of 1 director and 4 assistant archaeologists.

The site was located approximately 3.5 km to the south of Tubber cross road (Clare OS sheet 18) and 250 m east of the Crusheen to Tubber road.

The site was assigned the following identification data:

Site Name: Derrygarriff 1; Ministerial Direction No.: A044; NMS Registration No.: E3710; Route Chainage (Ch): 14990; NGR: 140463/191046.

1.2 The Development

The N18 Gort to Crusheen scheme involves the construction of a total of 44 km of road to include mainline roadworks (22 km), associated side roads (10 km) and access tracks (12 km). The road will have twin 7 m carriageways, 2.5 m hard shoulders adjacent to the verges and a median with a minimum width of 2.6 m which includes two 1m hard strips. The selected route bypasses the town of Gort to the east and the village of Crusheen to the west.

1.3 Archaeological Requirements

The archaeological requirements for the N18 Gort to Crusheen road scheme, were defined in the Ministerial Directions issued to Galway County Council by the Minister for Environment, Heritage and Local Government under Section 14A (2) of the National Monuments Acts 1930–2004 and in the terms of the contract between Galway County Council and Irish Archaeological Consultancy Ltd. These instructions formed the basis of all archaeological works undertaken for this development. The archaeological excavation works under this contract were located between the townlands of Glenbrack, Co. Galway, and Carrowdotia, Co. Clare.

The proposed N18 was subjected to an Environmental Impact Assessment, the archaeology and cultural history section of which was carried out by Babtie Pettit Ltd in 2006. The Record of Monuments and Places, the Sites and Monuments Record, Topographical files of the National Museum of Ireland, aerial photography, and documentary sources were all consulted. Two phases of geophysical survey were conducted. The main phase was by RSKENSR (Bartlett 2004) during the preparation of the EIA (Babtie Pettit Ltd 2006). A supplementary survey was carried out in Ballyboy by Target Geophysics Ltd (Target Geophysics Ltd 2007). As a result of the paper survey, field inspections, geophysical survey, archaeological testing and archaeological monitoring, a total of 22 fully recorded manual excavations were carried out on this section of the overall route alignment. In some cases where a

number of sites of similar type were located together in a single townland, the sites were excavated under one excavation number.

Phase 1 archaeological testing was completed by IAC Ltd and Phase 2 excavation of the sites identified during testing was conducted by IAC Ltd on behalf of Galway County Council and the NRA.

1.4 Methodology

The presence of archaeological remains beneath the topsoil layer was confirmed by machine-cut test trenches. Following testing, the topsoil was reduced to the interface between topsoil and natural subsoil using a 20 tonne mechanical excavator equipped with a flat toothless bucket under strict archaeological supervision. The remaining topsoil was removed by the archaeological team with the use of shovels, hoes and trowels in order to expose and identify the archaeological remains. A site grid was set up at 10 m intervals and was subsequently calibrated to the national grid using GPS survey equipment.

All features were subsequently fully excavated by hand and recorded using the single context recording system with plans and sections being produced at a scale of 1:50, 1:20 or 1:10 as appropriate.

A complete photographic record was maintained throughout the excavation. Digital photographs were taken of all features and of work in progress.

An environmental strategy was devised at the beginning of the excavations. Features exhibiting large amounts of carbonised material were targeted. Animal bone, unburnt wood and stone samples were all retrieved through both hand and bulk collection and retained for specialist analysis wherever they were encountered during the excavations.

In the instances where artefacts were uncovered on site they were dealt with in accordance with guidelines issued by the National Museum of Ireland (NMI) and where warranted in consultation with the relevant specialists. All artefacts, ecofacts and paper archive are currently stored in IAC offices, Lismore, Co Waterford and will ultimately be deposited with the National Museum of Ireland.

Radiocarbon dating of the site was carried out by means of AMS (Accelerator Mass Spectrometry) dating of identified and recommended charcoal samples. All calibrated AMS dates in this report are quoted to 2 Sigma.

All excavation and post-excavation works were carried out in consultation and agreement with the Project Archaeologist, the National Monuments Section of the DEHLG and the National Museum of Ireland.

2 EXCAVATION RESULTS

The archaeological activity recorded at Derrygarriff 1 was a burnt mound.

Detailed descriptions of all excavated features and deposits are listed in Appendix 1.

2.1 Phase 1: Natural Drift Geology

Derrygarriff 1 was located on the west-facing slope of a low gravel ridge running through an area of bog. The hill to the north comprised limestone bedrock while the ridge to the south where the site was located was mainly gravels.

2.2 Phase 2: Medieval Activity

The site revealed a truncated burnt mound which was comprised of a pit that was sealed by a thin spread of heat shattered stone.

2.2.1 Pit

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
5	N/A	0.9	0.85	0.11	Sub circular cut, irregular sides	Cut of a shallow pit
4	C5	0.9	0.85	0.11	Dark brown black silt, charcoal, stones	Fill of a shallow pit

Finds: None

Interpretation

A single small pit measuring 0.9 m east to west x 0.86 m x 0.11 m depth was identified under the heat-fractured limestone; its function was unknown (Figures 3–4; Plate 3).

One AMS date was obtained from charcoal from the pit C4. A fragment (0.6 g) of black/common alder (*Alnus glutinosa*) charcoal was identified (Cobain, Appendix 2.2). This charcoal returned an AMS result of 543±21 BP (UBA 12714). The 2 Sigma calibrated result for this was AD 1326–43 (Appendix 2.1). Oak was the main charcoal recovered from the pit and is a long burning timber that gives off good heat. The remaining charcoal recorded consisted of alder and Maloideae species (hawthorn, rowan, crab apple). They were likely to be used as kindling and were collected in the immediate area.

2.3 Phase 3: Burnt Spread/Mound Material

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
3	N/A	5	4	0.14	Black gravelly silt, stones, charcoal	Stony black spread

Finds: None

Interpretation

A spread of burnt material including angular heat-shattered stones and charcoal, sealed the small pit (C5) and is presumably the remnant of a burnt mound (Figures 3–4; Plates 1–2). A shotgun cartridge recovered from the spread indicates the extent of its disturbance and suggests also that the disturbance may have been a modern event.

One AMS date was obtained from the spread of burnt material C3. A fragment (4.4 g) of hazel (*Corylus avellana*) charcoal was identified (Cobain, Appendix 2.2). This charcoal returned an AMS result of 69±21 BP (UBA 12713). The 2 Sigma calibrated

result for this was AD 1695–1955 (Appendix 2.1). This modern date may be from later disturbance as it is likely that the heat shattered stone is associated with the medieval pit. The burnt spread contained a variety of charcoal species including oak, ash, hazel and the Maloideae species (hawthorn/rowan/crab apple) as dominant fuels and wood such as willow, poplar, alder and birch, which is of a lower quality as possible kindling wood. It is likely that they were all gathered in the immediate area.

2.4 Phase 4: Topsoil

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
1	N/A	Site	Site	0.12	Mid brown peaty soil	Topsoil

Finds: None

Interpretation

The topsoil was a mid-brown peat varying in depth between 0.1 m and 0.12 m. It sealed all of the archaeological deposits at Derrygarriff 1.

3 SYNTHESIS AND DISCUSSION

3.1 Landscape Setting

Most of the low-lying areas along the route were associated with poorly drained bog and wet marshland which have developed within glacially formed depressions and seasonal lakes known as turloughs. The higher ground generally comprised well-drained, gently undulating pastureland with some uneven hummocky ridges, formed either of limestone epikarst or glacial features such as drumlins. The two dominant rock types of the region were Carboniferous Limestone, which underlay the entire length of the N18 Gort to Crusheen scheme, and the Devonian Old Red Sandstone, which formed the Slieve Aughty Mountains to the east of the project. The road alignment was predominantly underlain by either limestone and sand derived till deposited during the last glaciation or organic peat which has generally formed since then in the low-lying, poorly drained areas where standing water and slow percolation caused thin layers of peaty soil to accumulate.

The site at Derrygarriff 1 was located on the west facing slope of a low ridge within a wetland area of Derrygarriff townland in north Co. Clare. The site was located at NGR 140463/191046 and was situated at 24 m OD. A choked stream was located to the immediate north of the site while a flowing stream was located to the south (Derrygarriff Stream). The field was used as pasture. There are two cashels (CL018-021 and CL 018-018) located c. 80 m southeast and c. 420 m southwest of Derrygarriff 1.

3.2 Burnt Mounds in the Archaeological Landscape

Following the test excavation phase of the project it was apparent that most of the archaeological sites identified were located to the south of the scheme in County Clare. This trend appears to have resulted from landscape management in the recent past where the better drained lands to the north have been improved and the fields enlarged which would have had a negative effect on any buried archaeological sites. However, the area to the south, which coincides with crossing the county border, was of more marginal land prone to flooding and in this area the route of the new road tended to follow wet valley floors and steep valley slopes. The landscape encountered in County Clare was much the same as it was depicted on the first edition Ordnance Survey maps (1842).

The most widespread domestic sites identified on the scheme were burnt mounds (also known as *fulacht fiadh*). They survive as low mounds of charcoal-rich soil mixed with heat-shattered stones. They are usually horseshoe-shaped, located in low-lying areas near a water source and are often found in clusters. While it is generally thought that they were probably used as cooking places (Ó Drisceóil 1988), finds from excavated examples where there is a noteworthy absence of animal bone does not easily support this theory. Lucas (1965) suggested that burnt mounds might have been used for processes such as bulk washing, dyeing and leather working while Barfield and Hodder (1987) have suggested that such sites were covered by light structures and used as sweat houses. Radiocarbon dates for this monument type have generally placed them in the Bronze Age (Brindley et al. 1990, 55) though evidence from early Irish texts (Ó Drisceóil 1988) suggests use of this type of site up until the 16th century AD.

Burnt mounds make up a significant number of the Recorded Monuments within the immediate vicinity of the Gort to Crusheen road scheme and following examination of a one kilometre wide corridor, using the road as the centreline, of the scheme, these classic elements of the Bronze Age landscape became apparent. Within this defined corridor there were no recorded burnt mounds in south County Galway, whereas

north County Clare was rich in the monument-type (RMP sites CL018-069, CL018-071, CL018-072, CL018-077, CL018-084, CL018-082, CL018-083, CL018-086, CL026-143, CL026-130, CL026-131, CL026-136, CL026-138, CL026-137, CL026-134, CL026-135, 02E1284 partly excavated as part of the Bord Gáis Éireann pipeline to the west at Bearnafunshin (Dennehy 2002), 02E0342 excavated as part of Bord Gáis Éireann's pipeline to the west at Bearnafunshin (Halpin 2002), CL026-149, CL026-150, CL026-151, CL026-156, CL026-157, CL026-158, CL026-165, CL026-164, and Site AR25 Carrowdotia (Taylor 2006). There appeared to be a tendency in the sites identified for clustering, often within 100 m or less of each other.

The site at Derrygarriff 1 consisted of a spread of heat shattered stone which sealed an unlined trough. It was located on the west facing slope of low gravel ridge surrounded by wetland with the Derrygarriff stream to the south. This site returned a 2 sigma date range of 1326–1343 BC (Appendix 2.1).

Similar parallels in terms of morphology but dating to the Bronze Age period were identified and excavated across the project. The sites excavated across the scheme were generally identified as simple spreads or mounds of burnt and heat-shattered stone, while some of these like the one at Drumminacloghaun 1 (McNamara 2009a) had evidence for a simple earth cut trough, other sites such as those at Gortavoher 1 (Delaney 2009b) and Caheraphuca 10 (Bayley 2009c) were represented simply by spreads of heat shattered stone.

Isolated burnt mounds sites identified along the project were Rathwilladoon 4 (Lyne 2009), Drumminacloghaun 1 (McNamara 2009a) and Clooneen 1 (Bayley 2009a). As the route travelled further south it tended to follow marginal wetland and stream valleys and the burnt mounds appeared to become more clustered. This clustering of sites was identified at Curtaun 1 and 2 (Delaney 2009a), Gortavoher/Monreagh (Delaney 2009b and McNamara 2009b), Derrygarriff (Nunan 2009c), Sranagalloon/Gortaficka (Nunan 2009c and 2009d and 2009e), Caheraphuca (Bayley 2009b and 2009c) and Ballyline (McNamara 2009c). A similar pattern of clustered burnt mounds to the south in county Clare and a paucity of examples of burnt mounds in county Galway was also encountered during the construction of Bord Gáis Éireann's pipeline (Grogan et al. 2007). The AMS dating indicates however that the sites were not necessarily contemporary but rather spanned the entire Bronze Age period and extended into the Iron Age (with the example at Derrygarriff 1 indicated a medieval date for use) illustrating how this pyrolithic technology remained the same across thousands of years.

More elaborate examples of troughs and pits from across the project (though serving the same function) displayed evidence for timber lining with the identification of stakeholes for upright supports at Curtaun (Delaney 2009a), Caheraphuca 1 (Bayley 2009b) and Gortaficka 1 and 2 (Nunan 2009e) and in some cases the actual remains of timber lining as at Clooneen 1 (Bayley 2009a), Caheraphuca 4 (Bayley 2009c) and Sranagalloon 3 (Nunan 2009d). Although the primary function of these sites was to heat water through the use of hot stones the actual purpose remains unknown. The sites at Caheraphuca 1 and Gortaficka 2 both displayed evidence for numerous troughs, drains, hearths and possibly preparation areas with stake-lined pits suggesting that they may have been used for some more formal industrial function than the other sites.

Derrygarriff 1 (though completely unrelated) was located approximately 1.8 km to the south of the (Bronze Age) burnt mounds at Monreagh (Delaney 2009c and McNamara 2009b) and was located approximately 550 m north of the Bronze Age burnt mound at Derrygarriff 3 (Nunan 2009b).

3.3 Typology of Burnt Mounds

Burnt mound sites (also commonly referred to as *fulachta fiadh*) are one of the most common field monuments found in the Irish landscape. The last published survey (Power et al. 1997), carried out over a decade ago, recorded over 7,000 burnt mound sites and in excess of 1,000 sites have been excavated in recent years through development led archaeological investigations. In spite of this no clear understanding of the precise function of these sites has been forthcoming.

Burnt mound sites are typically located in areas where there is a readily available water source, often in proximity to a river or stream or in places with a high water table. In the field burnt mounds may be identified as charcoal-rich mounds or spreads of heat-shattered stones however, in many cases the sites have been disturbed by later agricultural activity and are no longer visible on the field surface. Nevertheless even disturbed spreads of burnt mound material often preserves the underlying associated features, such as troughs, pits and gullies, intact.

Ó Néill (2003–2004, 82) has aptly identified these sites as the apparatus and by-product of pyrolithic technology. This technology involved the heating or boiling of water by placing fire-heated stones into troughs of water. Small shallow round-bottomed pits, generally referred to as pot boiler pits or roasting pits, are often associated with burnt mound sites. The purpose of these pits remains unclear. Occasionally large pits are also identified and may have acted as wells or cisterns. Linear gullies may extend across the site, often linked to troughs and pits, and demonstrate a concern with onsite water management. Post and stakeholes are often found on burnt mound sites and these may represent the remains of small structures or wind breakers.

Burnt mound sites are principally Bronze Age monuments and reach their pinnacle of use in the middle/late Bronze Age (Brindley et al. 1989–90; Corlett 1997). Earlier sites, such as Enniscoffey Co. Westmeath (Grogan et al. 2007, 96), have been dated to the Neolithic and later sites, such as Peter Street, Co. Waterford (Walsh 1990, 47) and Ballymount Great, Co. Dublin (Stout 1982, 217–218) have been dated to the medieval period. Thus although burnt mound sites generally form a components of the Bronze Age landscape, the use of pyrolithic technology has a long history in Ireland.

Although there is a general consensus that burnt mound sites are the result of pyrolithic technology for the heating or boiling of water, the precise function of these sites has, to date, not been agreed upon. Several theories have been proposed but no single theory has received unanimous support. The most enduring theory is that burnt mounds sites were used as cooking sites. O'Kelly (1954) and Lawless (1990) have demonstrated how joints of meat could be efficiently cooked in trough of boiling water. The use of burnt mound sites for bathing or as saunas has been suggested as an alternative function (Lucas 1965, Barfield and Hodder 1987, Ó Drisceóil 1988). This proposal is largely influenced by references in the early Irish literature to sites of a similar character and is very difficult to prove, or disprove. Others, such as Jeffrey (1991), argue that they may have been centres of textile production for the fulling or dyeing of cloth. More recent demonstrations by Quinn and Moore (2007) have shown that troughs could have been used for brewing, however, this theory has been criticised by specialist environmentalists due to the absence of cereal remains from most burnt mound sites (McClatchie et al. 2007).

3.4 Discussion

3.4.1 Phase 1: Natural Drift Geology

This phase represents the natural subsoil, which was cut or sealed by all subsequent archaeological features. The natural geology on site consisted of limestone bedrock and gravel across the site. The site was located on the west-facing slope of a low gravel ridge running through an area of bog.

3.4.2 Phase 2: Medieval Activity

The earliest feature at the site was a pit or trough which measured 0.9 m by 0.86 m with a depth of 0.11 m. It contained oak charcoal and charcoal from Maloideae species (hawthorn, rowan, crab apple). The oak was the main fuel burnt and the other species would have been burnt as kindling.

This feature returned a date of AD 1326–1343 (543±21 BP, UBA 12714). As the pit was sealed and the sample was taken from a secure context the evidence suggests that this is the trough of a medieval burnt mound.

Lab code	Context / sample	Sample material	Years BP	1 sigma	2 sigma
UBA 12714	C4 / S2	Charcoal Alder	543±21	Cal AD 1402–1425	Cal AD 1326–1343

3.4.3 Phase 3: Burnt Spread/Mound Material

A spread of heat-shattered stone sealed the pit. This was a disturbed context and contained a fragment of a twentieth-century shotgun cartridge. The burnt spread contained a variety of charcoal species including oak, ash, hazel and the Maloideae species (hawthorn/rowan/crab apple) as dominant fuels and wood such as willow, poplar, alder and birch, which is of a lower quality and was possibly used as kindling. It is likely that they were all gathered in the immediate area.

Charcoal dated from this feature returned a 2 Sigma calibrated date of AD 1695–1955. This date represents a later disturbance of the site through a burning event. The dated charcoal may represent material burnt deliberately on the site perhaps in a camp fire, as the site was located on dry ground surrounded by an area of wetland, or simply represents charcoal that may have resulted from burning scrub or hedge clearance. A later field boundary wall lined with mixed vegetation was situated running along the northeast side of the site.

Lab code	Context / sample	Sample material	Years BP	1 sigma	2 sigma
UBA 12713	C3 / S1	Charcoal Hazel	69±21	Cal AD 1706–1954	Cal AD 1695–1955

3.4.4 Phase 4: Topsoil

The topsoil was a mid-brown peat varying in depth between 0.1 m and 0.12 m. It sealed all of the archaeological deposits at Derrygarriff 1.

4 CONCLUSIONS

Derrygarriff 1 was located on a dry west-facing slope in an area prone to flooding. The site consisted of a single small pit measuring 0.9 m east to west by 0.6 m and 0.11 m deep. It was sealed by an irregular spread of compact, heat-fractured limestone within a charcoal/peat matrix. It measured 5 m by 4 m north to south and survived to a depth of 0.14 m.

The presence of a pit and an associated spread of heat shattered stone is reminiscent of a burnt mound site, however, the site actually dates to the medieval period and along with sites like Peter Street, Co. Waterford (Walsh 1990, 47) and Ballymount Great, Co. Dublin (Stout 1982, 217–218), which have both been dated to the medieval period, adds to the small number of medieval burnt mounds so far identified nationally. Charcoal from the pit was dated to AD 1326–1343 (UBA 12714). Analysis of the charcoal indicated that oak was the main fuel burnt but that hedgerow and understory species were used as kindling.

The spread of heat-shattered material appeared to have been disturbed quite recently and a fragment of a twentieth-century shotgun cartridge was recovered from within it. Charcoal from the spread of heat-shattered material returned a date of AD 1695–1955 (UBA 12714); this date, however, should not be trusted as the mound had been disturbed. The dated charcoal may represent material burnt deliberately on the site at a later date perhaps in a camp fire, as the site was located on dry ground surrounded by an area of wetland, or simply represents charcoal that may have resulted from burning scrub or hedge clearance close by. A later field boundary wall lined with mixed vegetation was situated running along the northeast side of the site.

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PLATES



Plate 1 Pre-excavation view of the site, looking northwest



Plate 2 Mid-excavation view of the burnt spread C3, looking northeast



Plate 3 Mid-excavation view of the pit C5, looking northeast

APPENDIX 1 CATALOGUE OF PRIMARY DATA

Appendix 1.1 Context Register

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation	Description	Finds	Context Above	Context Below
1	N/A	Site	Site	0.13	Mid brown peaty soil	Topsoil	Mid brown peaty soil	N/A		
2	N/A	Site	Site		Grey gravel	Subsoil	Grey gravel	N/A		
3	N/A	5	4	0.14	Black gravelly silt, stones, charcoal.	Stony black spread	Compact black gravelly silt. 50% stones and a small amount of charcoal inclusions. Likely to be modern due to the find, however the area may have been disturbed.	1 shotgun cartridge end.	C1	C2, C5
4	C5	0.9	0.85	0.11	Dark brown black silt with charcoal and stones.	Fill of a shallow pit	Loose dark brown black silt. Charcoal and stone inclusions.	N/A	C3	C5
5	N/A	0.9	0.85	0.11	Irregular cut, irregular sides.	Cut of a shallow pit	Irregular in plan. Long axis running east to west. No corners. Gradual break of slope at top. Irregular sides. Gradual break of slope at base. Irregular base.	N/A	C4	C2

Appendix 1.2 Catalogue of Artefacts

Registration Number	Context	Item No.	Simple Name	Full Name	Material	No. of Parts	Description
E3710:3:1	3	1	Shotgun cartridge	Shogun cartridge	Plastic and copper	1	Fragment of a shotgun cartridge

Appendix 1.3 Catalogue of Ecofacts

These results relate to the processed samples taken at the excavation. A full list of these samples was supplied with the preliminary reports lodged with Galway NRDO. A total of two bulk soil samples were taken during the course of excavation at this site. All of these were processed by means of flotation and sieving through a 250/300µm mesh. The resulting retrieved samples of this process are listed below.

1.3.1 Charcoal

Two charcoal samples were recovered following flotation.

Context number	Sample number	Feature	Sample weight (g)
3	1	Spread	373.9g
4	2	Pit	20.5g

Appendix 1.4 Archive Checklist

Project:	N18 Gort to Crusheen	Irish Archaeological Consultancy Ltd	
Site Name:	Derrygarriff 1		
NMS Number:	E3710		
Site director:	Joe Nunan		
Date:	15/02/08		
Field Records		Items (quantity)	Comments
Site drawings (plans)		1	All on the same sheet
Site sections, profiles, elevations		1	
Other plans, sketches, etc.		0	
Timber drawings		0	
Stone structural drawings		0	
Site diary/note books		0	
Site registers (folders)		1	
Survey/levels data (origin information)		0	
Context sheets		5	
Wood Sheets		0	
Skeleton Sheets		0	
Worked stone sheets		0	
Digital photographs		16	
Photographs (print)		0	
Photographs (slide)		0	
Finds and Environ. Archive			
Flint/chert		0	
Stone artefacts		0	
Pottery (specify periods/typology)		0	
Ceramic Building Material (specify types eg daub, tile)		0	
Metal artefacts (specify types - bronze, iron)		0	
Glass		0	
Other find types or special finds (specify)		1	Shotgun cartridge
Human bone (specify type eg cremated, skeleton, disarticulated)		0	
Animal bone		0	
Metallurgical waste		0	
Enviro bulk soil (specify no. of samples)		2	3 Buckets
Enviro monolith (specify number of samples and number of tins per sample)		0	
Security copy of archive		Yes	IAC Digital

APPENDIX 2 SPECIALIST REPORTS

Appendix 2.1 Radiocarbon Dating Results – QUB Laboratory

Appendix 2.2 Charcoal Remains – Sarah Cobain

RADIOCARBON DATING RESULTS
DERRYGARRIFF 1, CO. CLARE, E3710

CHRONO LABORATORY, QUEENS UNIVERSITY BELFAST

Colette Rynhart
Irish Archaeological
Consultancy Ltd
120b Greenpark Road
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VAT No. IE8288812U



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

Radiocarbon Date Certificate

Laboratory Identification: UBA-12713
Date of Measurement: 2009-10-16
Site: E3710 Derrygarriff 1
Sample ID: C3S1
Material Dated: charcoal
Pretreatment: AAA
Submitted by: IAC

¹⁴C Date: 69±21
AMS δ¹³C: -30.0

Information about radiocarbon calibration

RADIOCARBON CALIBRATION PROGRAM*
CALIB REV5.0.2

Copyright 1986-2005 M Stuiver and PJ Reimer

*To be used in conjunction with:

Stuiver, M., and Reimer, P.J., 1993, Radiocarbon, 35, 215-230.

Annotated results (text) - -

Export file - c14res.csv

C3S1		UBA-12713	
Radiocarbon Age BP		69 +/- 21	
Calibration data set: intcal04.14c		# Reimer et al. 2004	
% area enclosed	cal AD age ranges	relative area under probability distribution	
68.3 (1 sigma)	cal AD 1706- 1719	0.197	
	1820- 1823	0.031	
	1825- 1832	0.097	
	1884- 1913	0.643	
	1952- 1954	0.032	
95.4 (2 sigma)	cal AD 1695- 1726	0.237	
	1813- 1838	0.170	
	1842- 1853	0.034	
	1868- 1918	0.536	
	1952- 1955*	0.023	

References for calibration datasets:

PJ Reimer, MGL Baillie, E Bard, A Bayliss, JW Beck, C Bertrand, PG Blackwell, CE Buck, G Burr, KB Cutler, PE Damon, RL Edwards, RG Fairbanks, M Friedrich, TP Guilderson, KA Hughen, B Kromer, FG McCormac, S Manning, C Bronk Ramsey, RW Reimer, S Remmele, JR Southon, M Stuiver, S Talamo, FW Taylor, J van der Plicht, and CE Weyhenmeyer (2004), Radiocarbon 46:1029-1058.

Comments:

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

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

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Northern Ireland

Radiocarbon Date Certificate

Laboratory Identification: UBA-12714
Date of Measurement: 2009-10-16
Site: E3710 Derrygarriff 1
Sample ID: C4S2
Material Dated: charcoal
Pretreatment: AAA
Submitted by: IAC

¹⁴C Date: 534±21
AMS δ¹³C: -28.4

Information about radiocarbon calibration

RADIOCARBON CALIBRATION PROGRAM*
CALIB REV5.0.2
Copyright 1986-2005 M Stuiver and PJ Reimer
*To be used in conjunction with:
Stuiver, M., and Reimer, P.J., 1993, Radiocarbon, 35, 215-230.
Annotated results (text) - -
Export file - cl4res.csv

C4S2		
UBA-12714		
Radiocarbon Age BP	534 +/- 21	
Calibration data set:	intcal04.14c	# Reimer et al. 2004
% area enclosed	cal AD age ranges	relative area under probability distribution
68.3 (1 sigma)	cal AD 1402- 1425	1.000
95.4 (2 sigma)	cal AD 1326- 1343	0.119

References for calibration datasets:

PJ Reimer, MGL Baillie, E Bard, A Bayliss, JW Beck, C Bertrand, PG Blackwell, CE Buck, G Burr, KB Cutler, PE Damon, RL Edwards, RG Fairbanks, M Friedrich, TP Guilderson, KA Hughen, B Kromer, FG McCormac, S Manning, C Bronk Ramsey, RW Reimer, S Rennele, JR Southon, M Stuiver, S Talamo, FW Taylor, J van der Plicht, and CE Weyhenmeyer (2004), Radiocarbon 46:1029-1058.

Comments:

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

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

THE CHARCOAL REMAINS
DERRYGARRIFF 1, CO. CLARE, E3710

SARAH COBAIN

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Introduction

The survival of plant macrofossils from dryland archaeology sites is usually dependant on the water table being high enough to keep the archaeological features in damp/wet and anoxic conditions. This does not usually occur on archaeological sites in Ireland, unless they are located on riverine flood plains or close to lakes. Wood is however preserved abundantly in the form of charcoal as a result of burning activities in features such as hearths, kilns, furnaces, burnt structures and as waste material disposed in ditches and pits.

The site at Derrygarriff 1, Co. Clare consisted of a medieval pit (C5) and a burnt spread (C3) which has been dated to the post-medieval period. Charcoal remains provide valuable information to determine industrial and socio-economic activity on archaeology sites. It is the aim of this report to identify the charcoal species recovered from the site at Derrygarriff 1 and to use this information to:

- 1) provide additional information regarding the function of features sampled
- 2) interpret socio-economic and industrial activities on the site
- 3) infer the composition of the local woodland

Methodology

There were 2 samples to be analysed for charcoal remains from Derrygarriff 1. The following methodology was used to identify the charcoal species.

Charcoal

The number of charcoal fragments to be identified is dependent on the diversity of the flora. A study by Keepax (1988:120–124) has indicated that depending on the location of the archaeology site, 100–400 fragments of charcoal would need to be identified in order to obtain a full range of species diversity. As Britain and Ireland have a narrow flora diversity in comparison to that of mainland Europe, an identification limit of 100 fragments has been deemed sufficient for samples from either of these two countries (Keepax, 1988; cited in Austin, 2005:1). As the majority of the samples contained more than 100 fragments, in accordance with Keepax (1998), a maximum of 100 fragments were identified. Of the samples which contained greater than 100 fragments these were sieved through a 10 mm, 4 mm and 2mm sieve and an equal proportion of each sieve were identified. This was to prevent any bias that might have occurred if only larger pieces were identified (thereby ensuring any potential smaller species are equally represented).

Each charcoal fragment was fractured by hand to reveal the wood anatomy on radial, tangential and transverse planes. The pieces were then supported in a sand bath and identified under an epi-illuminating microscope (Brunel SP400) at magnifications from x40 to x400. The sand bath allowed the charcoal pieces to be manipulated into the flattest possible position to aid identification. As fragments less than 2 mm in size cannot be accurately identified (it is not possible to get a wide enough field of vision to encompass the necessary anatomical features for identification) only fragments above this size were examined. During identification, any notable growth-ring characteristics, evidence of thermal and biological degradation and any other unusual microscopic features were recorded. Identifications were carried out with reference to images and descriptions by Cutler and Gale (2000) and Heller et al. (2004) and Wheeler et al. (1989). Nomenclature of species follows Stace (1997).

Results

The charcoal results are fully tabulated in Figure 1 in the Appendix at the end of the report.

Charcoal identification notes

The anatomical similarities between (a) sessile/pedunculate oak (b) Maloideae species (hawthorn/rowan/crab apple) (c) Poplar/willow mean that these taxa cannot be identified to species level (Cutler and Gale 2000).

Sample 1 was retrieved from burnt spread deposit C3 and contained alder, hazel, birch, oak, ash, Maloideae species (hawthorn/rowan/crab apple), cf hawthorn and poplar/willow charcoal inclusions. Pit C5 contained the primary and only fill (C4). This fill included alder, oak and Maloideae species (hawthorn/rowan/crab apple) charcoal fragments.

Discussion

Wood selection and fuel use is affected by two variables. The first being the availability of wood nearby (type of woodland) and the second being the requirements of the community and the types of activities that were being undertaken (Asouti and Austin 2005). Using the samples from Derrygarriff 1, it was possible to draw inferences of the composition of local woodland vegetation and to discuss the reasons for fuel selection on the site.

Function of Features

Medieval Activity

Pit C5 had frequent charcoal inclusions, however as it did not exhibit any *in-situ* burning around the edges of the cut, it is most likely that this pit functioned as a waste pit to dispose of firing debris from a furnace/hearth. As there were no finds or other palaeoenvironmental remains recovered from this pit, it is not possible to conclude the reason for this burning activity.

Post-medieval Activity

Deposit C3 was a spread containing heat affected stone and frequent charcoal inclusions. There is no evidence within the excavated area for a hearth/furnace and there is no indication as to a reason for the burning as a result no further conclusions as to the function of this spread can be deduced.

Social, economic and industrial activity on site including the selection/avoidance of wood for fuel

As there were no significant finds or plant macrofossil evidence recovered from pit C5 or burnt spread C3 at Derrygarriff 1, it was not possible to provide any further information as to the function of these features other than they are both indicative of deliberately deposited firing debris from hearth/furnaces. The charcoal recovered from both features can however give an indication as to the fuel used for burning activities.

Medieval Activity

The main fuel used within pit C5 was oak as it dominated the charcoal assemblage and none of the recovered fragments exhibited any obvious curved growth rings. This suggests that large branches or stem (trunk) wood were being used, which would have been deliberately cut with the intention of burning (rather than opportunistic gathering of brushwood). Oak would have been chosen as a dominant fuel as it has dense heartwood, and if dried properly, is a long lasting effective fuel (Cutler and Gale 2000, 205). The remaining charcoal recorded consisted of alder and Maloideae species (hawthorn, rowan, crab apple). These were both very small fragments, so it was not possible to assess whether they originated from smaller round wood lateral branches or stem/trunk wood. It is therefore most likely that these

originated from branches/brushwood to use as kindling for the fire. Alder is an excellent species to use for kindling as it is anatomically less dense than for example, oak and burns quickly at relatively high temperatures (Cutler and Gale 2000, 34). This is ideal for use as kindling as it would encourage the oak to start to burn. The hazel and Maloideae species (hawthorn, rowan and crab apple) have a closer grain anatomical structure, as a result make excellent firewood (Stuijts 2005, 144), however as only one fragment of this species was recovered, it is most likely that it was used as kindling to ignite the oak.

Post-medieval Activity

The charcoal assemblage recovered from burnt spread C3 consisted of a relatively wide variety of species. The majority of the charcoal fragments recovered from burnt spread C3 exhibited curved growth rings indicating that the wood derived from small roundwood branches or twigs. This indicates that wood was gathered as deadwood or from branches cut from trees rather than using stem/trunk wood. Ash and Oak would both have provided excellent fuel wood. They both have dense heartwood, and if dried properly, are long lasting effective fuels (Cutler and Gale 2000, 120, 205). The Maloideae species (hawthorn, rowan and crab apple) and hazel also have a close-grain anatomical structure and as a result make good firewood (Stuijts, 2005, 139-144). It is therefore most likely that the ash, oak, *Maloideae* species and hazel would have been used as the main fuels for burning activities associated with this burnt spread. Alder, poplar, willow and birch are all species that are ideal to use for kindling. They are all anatomically less dense than, for example oak and ash, and burn quickly at relatively high temperatures (Cutler and Gale 2000, 34, 236-41). This property makes them good to use as kindling, as the high temperatures produced by all these species would encourage the oak and ash to start to burn.

Present day Ecological setting

The archaeological site at Derrygarriff 1, was located the west facing slope of a gravel ridge which ran through an low lying area of poorly drain bog and marsh (Nunan 2009, 3).

Composition of local woodlands

As asserted by Scholtz (1986) cited in Prins and Shackleton (1992, 632), the "Principle of Least Effort" suggests that communities of the past collected firewood from the closest possible available wooded area. If this theory were to be used it would assume that the woodland surrounding the site would consist of an oak-ash climax community on drier land up slope away from the site and an area of alder-carr fen in wetland areas surrounding the site. Whilst this can be used as the basic theory, other variables affecting wood collection must be taken into account (Prins and Shackleton, 1992, 632). These include:

1) Selection of particular species in favour of others within the woodland

Oak was likely to have been selected for use within the hearth/furnace that produce the waste material within pit C5 as it dominated the charcoal assemblage for this feature so it is likely it was preferentially harvested/purchased and may have a higher percentage representation within the charcoal assemblage.

2) Differential preservation of charcoal/non-uniform survival of charcoal over time

Preservation rate of charcoal can be affected by a number of variables, for example a) preservation conditions – mechanical abrasion on a site with stony subsoil may cause the charcoal fragments to be broken into smaller unidentifiable fragments, b) two identical pieces of wood may fragment into different numbers of charcoal fragments when burnt. Some, all or none of these may be recovered from the

archaeological record which would affect possible woodland reconstructions and c) the overall heat of the fire may cause the wood to turn to ash and not be represented at all in the archaeological record (Asouti and Austin 2005, 1-5).

3) *Deforestation during the medieval period and the influence of trade*

The medieval period also saw a huge increase in the deforestation of natural woodland throughout Ireland, for example a pollen diagram from Derragh Bog, Central Ireland shows a decrease in percentage of tree pollen from approximately 50% to 10% from AD 1032–AD 1760 (Brown et al. 2005, 88). This occurred due to the intensification of both arable and pastoral agriculture and would have made wood for fuel harder to obtain. As asserted by Comber (2001, 73-74) trade networks had also hugely increased by the early medieval period so wood such as oak and ash could easily have been brought in from elsewhere and purchased or have been available as waste wood from wood working in towns. It is however likely that the kindling wood (alder, birch, poplar/willow) would have been obtained from close by to the site as it would not be worth wasting money/tradable items on essentially 'waste' wood that could be collected from the local environment.

As a result of these variables it is not possible to use the fragment counts obtained to infer the percentages/numbers of each of these species within the local environment. In particular as the fuel within pit C5 consisted dominantly of oak, it is not possible to deduce woodland composition during the medieval period. However as the post-medieval charcoal assemblage consisted of a wider range of species with a relatively high proportion of brushwood, it is possible to apply Scholtz's (1986) theory that communities will collect wood from the closest possible source. As a result this suggests that the local woodlands during the post-medieval period consisted of alder-carr fen (alder, birch, willow/poplar) in marshy/waterlogged areas close to the site and oak-ash woodland (oak, ash, Maloideae species – hawthorn/rowan/crab apple, hazel) in drier upland areas.

Conclusion

The samples retrieved from Derrygarriff 1 did not provide any definitive interpretation as to the function of the medieval pit C5 or post-medieval burnt spread C3; however they have allowed an interesting insight into the use of fuel during these time periods. The charcoal remains identified from medieval pit C5 indicate that oak was the dominate fuel used suggesting a function that requires a long lasting effective fuel. The post-medieval burnt spread C3 contained a variety of species including oak, ash, hazel and the Maloideae species (hawthorn/rowan/crab apple) as dominant fuels and wood such as willow, poplar, alder and birch, which is of a lower quality as possible kindling wood.

The reconstruction of local woodlands is difficult to assess using this charcoal assemblage as there are several variables that need to be taken into account, for example the selection of particular species in favour of others within the woodland, differential preservation of charcoal/non-uniform survival of charcoal over time and deforestation during the medieval period and the influence of trade. It was not possible to deduce the composition of woodlands during the medieval period due to the narrow species assemblage recovered. However the wider range of species identified from the post-medieval burnt spread (C3) assemblage indicates an oak-ash woodland in drier areas close to the site and alder-carr fen most likely situated close to the present day wetland/bog areas.

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Appendix

Figure 1: Table to show charcoal species identification for N18 Gort to Crusheen: A044 E3710 Derrygarriff 1, Co Galway.

Sample Number			1	2
Fill Number			C3	C4
Cut Number			N/A	C5
Family	Species	Common Name		
Betulaceae	<i>Alnus glutinosa</i>	Black/common alder	4	3
	<i>Corylus avellana</i>	Hazel	31	
Fagaceae	<i>Betula</i> spp	Birch	13	
	<i>Quercus robur/ petraea</i>	Pedunculate/sessile oak	3	78
Oleaceae	<i>Fraxinus excelsior</i>	Common/European Ash	22	
Roseaceae	<i>Maloideae</i> spp (<i>Crateagus monogyna/Sorbus</i> spp/ <i>Malus sylvestris</i>)	Hawthorn/rowan/ crab apple	12	1
	cf <i>Crateagus monogyna</i>	cf hawthorn	11	
Salicaceae	<i>Populus</i> spp/ <i>Salix</i> spp	Poplar/Willow	4	
		Indeterminate	2	0
Total fragments identified:			100	82

APPENDIX 3 LIST OF RMP SITES IN AREA

RMP No	Description
CL018-006001	Bridge
CL018-006002	Water Mill
CL018-018001	Ringfort Cashel
CL018-018002	House – undetermined date
CL018-019	Enclosure
CL018-021	Ringfort Cashel
CL018-069	Redundant Record
CL018-071	Redundant Record
CL018-072	Redundant Record

See Figure 2 for location.

APPENDIX 4 LIST OF N18 GORT TO CRUSHEEN SCHEME SITE NAMES

Site Name	Ministerial Direction No.	NMS Registration Number	Site Type
Drumminacloghaun 1	A044	E3720	Burnt mound
Ballyboy 1	A044	E3719	Ringditch
Ballyboy 2	A044	E3718	Ringditch
Curtaun	A044	E3721	Burnt mounds and early medieval cereal kilns
Rathwilladoon 2 & 3	A044	E3656	Prehistoric settlement
Rathwilladoon 4	A044	E3655	Burnt mound
Rathwilladoon 5	A044	E3657	Charcoal production kiln
Gortavoher 1	A044	E3904	Burnt mound
Monreagh 1 & 2	A044	E3712	Burnt mound
Monreagh 3	A044	E4037	Burnt mounds
Derrygarriff 1	A044	E3716	Burnt mound
Derrygarriff 2	A044	E3711	Metal production site
Derrygarriff 3	A044	E3710	Burnt mound
Sranagalloon 1	A044	E3713	Burnt mound
Sranagalloon 2/Site 146	A044	E3714	Enclosure
Sranagalloon 3	A044	E3897	Burnt mound
Gortaficka 1 & 2	A044	E3898	Burnt mounds
Clooneen 1	A044	E3722	Burnt mound
Caheraphuca 1	A044	E3654	Burnt mound
Caheraphuca 3 - 12	A044	E3653	Burnt mounds
Ballyline 1 & 2	A044	E3717	Burnt mounds
Ballyline 3	A044	E3715	Prehistoric pit



CL018-006

Derrygarriff 2

Derrygarriff 1

CL018-021

CL018-018

Derrygarriff 3

CL018-069

Legend

- N18 CPO Line
- Townland boundaries
- RMPs

Scale

0m 250m

Title: E3710 Derrygarriff 1 showing Recorded Monuments with OSI background

Project: N18 Gort to Crusheen

Client: Galway County Council

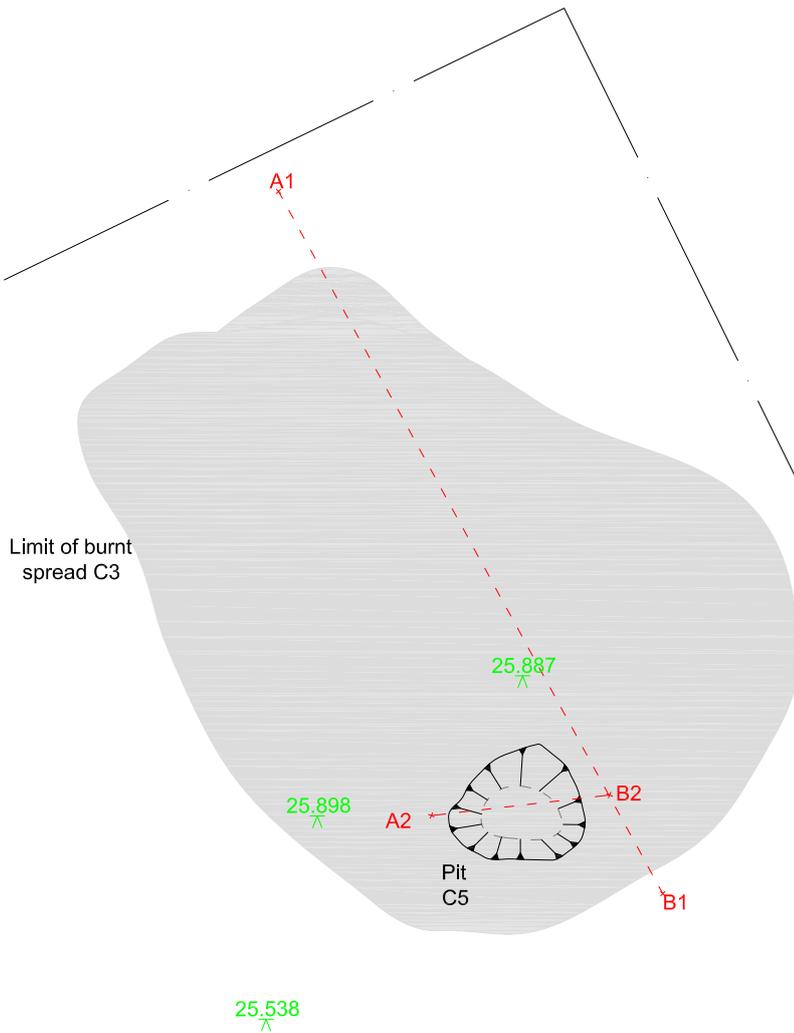
Scale: 1:10,000 @ A4

Date: 18/11/09

Produced by: G Kearney

Job No: J2440

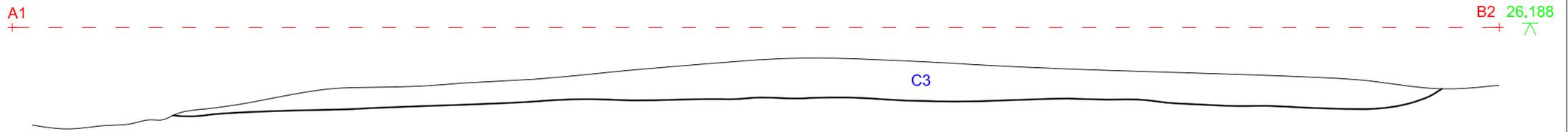
Figure No: 2



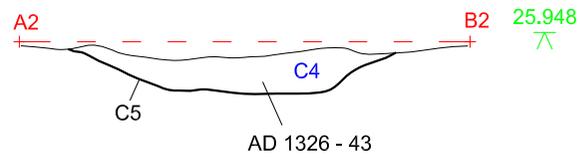
Scale
0m 2.5m

Legend	
---	Break of slope
- - -	Sections
Cxx	Cut numbers
■	Burnt mound deposits
xx.xx ^	Levels - metres OD

Southwest facing section of burnt spread C3



South facing section of pit C5



Legend	
Cxx	Cut numbers
Cxx	Fill numbers
	Stone
#	Charcoal
xx.xx	Levels - metres OD

IAC Irish Archaeological Consultancy

Title:	E3710 Derrygarriff 1 sections	Scale:	1:20 @ A4
Project:	N18 Gort to Crusheen	Date:	23/02/09
Client:	Galway County Council	Produced by:	G Kearney
		Job No:	J2440
		Figure No:	4