N6 KINNEGAD – ATHLONE SCHEME PHASE 2: KILBEGGAN TO ATHLONE DUAL CARRIAGEWAY

SITE A016/035; E2663: BOYANAGHCALRY 1

FINAL REPORT

ON BEHALF OF WESTMEATH COUNTY COUNCIL

19 JUNE 2009

IAC Irish Archaeological Consultancy

PROJECT DETAILS

Project Reference No.	WH/00/112
Project	N6 Kinnegad – Athlone Road Scheme: Phase 2, Kilbeggan – Athlone Dual Carriageway
Ministerial Direction Reference No.	A016/035
NMS Registration Number	E2663
Excavation Director	Fintan Walsh
Senior Archaeologist	Shane Delaney
Consultant	Irish Archaeological Consultancy Ltd, 120b Greenpark Road, Bray, Co. Wicklow
Client	Westmeath County Council
Site Name	Boyanaghcalry 1
Site Type	Early/Middle Bronze Age Burnt Mound
Townland	Boyanaghcalry
Parish	Ballyloughloe
County	Westmeath
NGR (Easting)	E213780
NGR (Northing)	N238207
Chainage	8620
Height m OD	76m OD
RMP No.	N/A
Excavation Start Date	14 April 2006
Excavation Duration	4 days
Report Type	Final
Report Date	19 June 2009
Report By	Fintan Walsh

ACKNOWLEDGMENTS

This report has been prepared by Irish Archaeological Consultancy Ltd on behalf of Westmeath County Council and the National Roads Authority in advance of the construction of the N6 Phase 2: Kilbeggan to Athlone Dual Carriageway Scheme.

The excavation was carried out in accordance with the Directions of the Minister for the Environment, Heritage and Local Government (DOEHLG), in consultation with the National Museum of Ireland (NMI) issued under Section 14 of the National Monuments Acts 1930–2004.

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ABSTRACT

Irish Archaeological Consultancy Ltd (IAC), funded by Westmeath County Council (WCC) and the National Roads Authority (NRA), undertook an excavation in the townland of Boyanaghcalry at the site of Boyanaghcalry 1 in advance of the proposed N6 Phase 2: Kilbeggan to Athlone Dual Carriageway Scheme (Figure 1). The following report describes the final results of archaeological fieldwork at that site. The area was fully excavated by Fintan Walsh under Ministerial Direction (A016/035) and NMS Registration Number E2663 issued by the DOEHLG in consultation with the National Museum of Ireland. The fieldwork took place between 14 and 17 April 2006.

The site was located in bog-land, overlooked by drier, higher ground to the north and surrounded to the east, west and south by bog. An area 15m by 15m was stripped to reveal a burnt mound consisting of one trough filled with heat shattered stone and charcoal rich clay sealed by a burnt mound spread consisting of similar material.

The trough was a sub-circular cut (1.25m x 1.2m x 0.37m; capacity 550 litres). Ash charcoal from the main fill returned a 2 Sigma date of 1608–1451 BC. The disturbed burnt mound deposit of heat fractured stone and charcoal rich clay (6m x 6m x 0.2m) sealed the trough. Ash charcoal from this deposit returned an AMS date of 1605–1428 BC (2 Sigma). No finds were discovered in the course of the excavation.

This site was located within a relatively busy Bronze Age landscape. Two burnt mounds were uncovered to the west at Williamstown 2 (0.5km to the west) and Williamstown 1 (1km to the west).

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1 INTRODUCTION

1.1 General

This final archaeological report describes the results of the excavation carried out at the site of Boyanaghcalry 1 in the townland of Boyanaghcalry, Co. Westmeath (Figure 1 and 2) as part of an archaeological mitigation program associated with the N6 Phase 2: Kilbeggan to Athlone Dual Carriageway Scheme. Archaeological fieldwork was carried out under ministerial direction by Fintan Walsh of Irish Archaeological Consultancy Ltd (IAC Ltd) and was funded by WCC & NRA under the National Development Plan 2000–2006, 2007–2013 and the EU Structural fund.

Boyanaghcalry 1 was identified as a result of archaeological assessment undertaken by IAC Ltd. in August 2005 (Ministerial Direction No A016/029; NMS No. E3273). All features identified during the assessment phase (two areas of burnt mound material) were subsequently re-identified and all features uncovered were excavated during the full resolution phase of the project which took place between 14 and 17 April 2006 with a team of 1 director, 1 supervisor and 3 site assistants.

The site was located in pastureland at a height of 76m OD to the north of the existing N6, *c.* 3.5km west of Moate (Westmeath OS sheet 30). Boyanaghcalry 1 had not been previously identified and was not a recorded monument.

The site was assigned the following identification data:

Site Name: Boyanaghcalry 1; Ministerial Direction No.: A016/035; NMS Registration No.: E2663; Route Chainage (Ch): 8620; NGR 213780/238207.

1.2 Proposed Development

The proposed N6 Kinnegad–Athlone Scheme is to be constructed in two phases. The Phase 2 Kilbeggan–Athlone scheme will consist of a dual carriageway that will run for a distance of approximately 29km. The location of the route is predominantly to the south of the existing N6 and there will be access to the local road network through the seven grade separated junctions located at Athlone, Farnagh, Moate and Kilbeggan. The cross-section of the mainline consists of 2m wide verges, 2.5m wide hard shoulders, 7m wide two-lane carriageways and a 3m wide central reserve. This central reserve will accommodate 1m hard strips and a safety barrier. In addition to the mainline dual carriageway there is a further 0.3km of standard dual carriageway to the south of Athlone Interchange to connect to the existing N6 and 1.2km to the south of Kilbeggan Interchange to connect to the existing N52.

1.3 Archaeological Requirements

The archaeological requirements for the N6 Kilbeggan to Athlone Dual Carriageway Scheme, are outlined in the Ministerial Directions issued to Westmeath 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 Westmeath County Council and Irish Archaeological Consultancy Ltd. These instructions form the basis of all archaeological works undertaken for this development. The archaeological excavation works under this contract are located between the townlands of Kilbeggan South, Co. Westmeath and Creggan Lower, Co. Westmeath.

The proposed N6 was subjected to an Environmental Impact Assessment, the archaeology and cultural history section of which was carried out by Sheila Lane and Associates and presented in 2003. The Record of Monuments and Places, the Sites and Monuments Record, Topographical files, aerial photography, the Westmeath

Archaeological Urban Survey and literary sources were all consulted. One phase of geophysical survey was also conducted at selected sites along the proposed route by Target Archaeological Geophysics. As a result of the paper survey, field inspections and geophysical survey, a number of potential sites were recorded in proximity to this section of the overall route alignment.

Advance archaeological testing was completed by IAC Ltd and excavation of the sites identified during testing was conducted by IAC Ltd on behalf of Westmeath County Council.

1.4 Methodology

The topsoil was reduced to the interface between natural and topsoil 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 10m 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 excavation. Where relevant features exhibiting large amounts of carbonised material were the primary targets.

In the instances where artefacts were uncovered on site they were dealt with in accordance with the guidelines as issued by the 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 DOEHLG and the National Museum of Ireland.

2 EXCAVATION RESULTS

A single burnt mound with trough was identified at Boyanaghcalry 1 described as a single phase of archaeological activity (Phase 2). Phase 1 describes the subsoil, Phase 3 describes the topsoil. Detailed descriptions of the contexts are listed in Appendix 1. The site matrix is detailed in Figure 6.

2.1 Phase 1: Natural Drift Geology

The dominant bedrock geology identified along the corridor of the proposed route are Lower Carboniferous rocks, mainly limestone lithologies, which overlay Devonian Old Red Sandstone rocks. Carboniferous volcanic rocks were also identified as being present locally in the form of sills passing through the bedrock sequences (Riada Consult, 2003). The underlying geology of the area is overlain by occasional moraines and small glacial hillocks covered by grey brown podzolic soils.

The subsoil C2 above bedrock encountered at Boyanaghcalry 1 was uniform across the site and consisted of a compact sandy grey mottled clays with sandstone inclusions.

2.2 Phase 2: Bronze Age Activity (The Burnt Mound)

2.2.1 Trough C4

The burnt mound trough (C4) was the sole feature sealed by the burnt mound (Figures 4, 5, and 6; Plates 1–4). It was located towards the southeast corner of the burnt mound spread and contained three fills C5, C7 and C9.

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
4	N/A	1.25	1.2	0.37	Sub-rectangular cut, sloping sides, flat base	Cut of pit/trough
5	C4	1	0.73	0.15	Dark brown sandy peat	Upper fill of pit/trough
7	C4	1.25	1.2	0.25	Loose, black sandy clay, burnt stone	Main trough fill
9	C4	0.97	0.9	0.17	Loosely compacted, grey/yellow sandy clay	Primary fill of trough

Finds: None

Interpretation:
Trough C4 was sub-rectangular in plan with sloping sides and flat base (75.7m OD at base). The primary deposit within the trough (C9) was a derivative of the natural subsoil and possibly represents washed-in deposits or accumulated debris from repeated trough use. The main fill of the trough, fill C7, was similar to the overlying burnt mound (heat fractured stone and charcoal rich soils). The upper fill was C5, a peaty deposit which likely formed through natural processes following the abandonment of the site. Charcoal (8g) was retrieved from fill C7 during post-excavation soil flotation. This was subsequently identified to species. Fragments of oak charcoal (*Quercus* sp.), ash charcoal (*Fraxinus excelsior*), and hazel charcoal (*Corylus avellana*) were identified (O'Carroll, Appendix 2.1). A small fragment (1g) of ash was chosen for AMS dating and returned a result of 3248+/-27 BP (UBA 8588). The 2 Sigma calibrated result for this was 1608–1451 BC (Appendix 2.2) dating the abandonment of this feature to the middle Bronze Age. This trough was sealed by the overlying burnt mound spread described below.

2.2.2 Burnt Spread Deposits C6 and C8

The trough described above was sealed by a shallow deposit of heat fractured stone and charcoal rich clay. This is described below.

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
6	N/A	6	5.15	0.21	Dark brown/black sandy clay, burnt stone	Main deposit
8	N/A	2.95	1.75	0.04	Dark brown/black sandy clay, burnt stone	Same as C6

Finds: None

Interpretation:
These two deposits represented the residual burnt mound material identified at Boyanaghcalry 1 (Figures 4, 5, and 6; Plates 1 and 4). Both deposits both composed of heat fractured stone and charcoal rich clay (76.3m OD at top of mound deposit). Deposit C6 represented the main burnt mound material which had been spread across the site after the site was abandoned. This was overlain by deposit C8 which represented burnt mound material that had been further disturbed. Overall the spread was 6m north–south by c. 5.15m east–west by 0.21m deep. Charcoal (0.9g) was retrieved from deposit C6 during post-excavation soil flotation. This was subsequently identified to species. Fragments of oak charcoal (*Quercus* sp.), and ash charcoal (*Fraxinus excelsior*) were identified (Appendix 2.1). A small fragment (0.3g) of ash was chosen for AMS dating and returned a result of 3225+/-29 BP (UBA 8587). The 2 Sigma calibrated result for this was 1605–1428 BC (Appendix 2.2) contemporary with the date obtained from the trough (see above).

2.3 Phase 3: Modern Agricultural Activity

The site was abandoned in the middle Bronze Age. Post-abandonment it was sealed by spread C3.

2.3.1 Spread C3

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
3	N/A	2.12	N/A	0.3	Mid brown sandy clay with small stones	Modern spread

Finds: None

Interpretation:
This spread C3 lay over the main burnt mound material at the east side of the site (Figure 5). This was evidently a modern disturbance deposit.

2.4 Phase 4: Topsoil/Peat

2.4.1 Topsoil/Peat

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
1	N/A	Site	Site	0.3	Dark brown peaty clay	Topsoil

Finds: None

Interpretation:
Phase 4 represents the peat that sealed all of the archaeological deposits and features at Boyanaghcalry 1.

3 SYNTHESIS AND DISCUSSION

3.1 Landscape Setting

The new route of the N6 runs from south of Kilbeggan town to east of Athlone Co. Westmeath, crossing through the northern part of Co. Offaly for approximately 7.5km of its entire length. The landscape of this area is comprised of generally flat to undulating terrain. The underlying geology of the area is dominated by carboniferous limestone and is overlain by occasional glacial features such as moraines and eskers. The eskers dominate to the north and south of most of the route, with moraines featuring along parts of the western section toward Athlone. The soil cover varies considerably across the scheme, passing through soil complexes, grey brown podzols, boglands and alluvial deposits. The area is drained by the River Shannon through its tributaries, the Brosna, Boor, Cloghatanny and Gageborough rivers.

The Burnt Mound site at Boyanaghcalry 1 was located 3.5km west of the town of Moate, on flat boggy land (76m OD) in an area of gently undulating lowland. The underlying geology of the area is carboniferous limestone, which is overlain by occasional moraines and covered by soil complexes of the Patrickswell/Baggotsown soil series, thus consisting of fertile pasture interspersed with pockets of wetland. The site is situated in one of these pockets of wetland. Approximately 50m east is a small stream which joins up with the Boor River at Toorydonnellan. Almost 700m north of the site is a small bog located on the boundaries between the townlands of Boyanaghcalry, Williamstown, Magheramore, Killinroan and Mackanrany 700m to the northeast (6" OS map 1834–1842). Another small wetland area is situated 300m to the east in the townlands of Magheramore and Ballycahillroe (25" OS map 1887–1913).

3.2 Archaeological Landscape (The Bronze Age)

Apart from the publication of archaeological inventories in some midland counties such as Offaly (O'Brien and Sweetman 1999) (there is no archaeological inventory for Co. Westmeath) our knowledge of the prehistoric archaeology of the midlands is limited. We are reliant on data stored at the RMP (see Appendix 3), peatland surveys by the Irish Archaeological Wetland Unit (Moloney *et al*. 1993) and information from a limited number of excavations within Westmeath and Offaly. The most important of these is Hencken's (1942) investigation at Ballinderry crannog II in the barony of Kilcoursey, Co. Offaly, which revealed a late Bronze Age settlement phase (see also Newman 1997 for a reappraisal of the archaeological evidence).

However, this picture is quickly changing as a result of commercially-driven archaeology such as the gas pipeline to the west (Grogan *et al*. 2007) which runs mostly parallel a short distance to the north of the N6, and excavations in advance of this road scheme.

The gas pipeline has been extremely informative for revealing a range of archaeological sites in south Westmeath, a county that has traditionally witnessed only minor scholarly research (Grogan *et al*. 2007, 24). This is most apparent for the Bronze Age as both the gas pipeline and excavations along the N6 have identified a wealth of domestic and burial evidence covering the early, middle and late parts of the period.

The area immediately surrounding Kilbeggan contains direct evidence for a range of Bronze Age sites including barrows, cists and an early Bronze Age pit burial (Grogan *et al*. 2007, 138, fig. 6.6). The cists, at Ardballymore (WM037-009) and Kilgaroan (WM037-010), are located in close proximity to a number of sites impacted by the N6 including those in the townlands of (moving east to west) Kilbeggan South,

Tonaphort, Ballinderry Big, Kilgaroan, Ardballymore, Ballinderry Little, Correagh and Kilbeg. This is significant because sites within the majority of these townlands produced early to late Bronze Age evidence almost exclusively represented by burnt mounds or components of these.

Prior to the gas pipeline, a small number of excavations had occurred to the north and the northeast of the N6 including the cemetery sites at Knockast (Hencken and Movius 1934; Grogan 2004), Edmondstown (Mount and Hartnett 1993) and Ballybrennan, Barrettstown and Redmondstown (see Waddell 1990). Added to this is the crannog at Coolure, on Lough Derravaragh within the barony of Moycashel, which was the focus of archaeological survey, environmental investigation and artefactual and landscape research (O'Sullivan *et al*. 2007). The island was first occupied in c. 850 BC, during the late Bronze Age, and several late Bronze Age weapons and ornaments have been recovered nearby in the small bay (*ibid*.). The gas pipeline excavations have added considerably to our knowledge of the Bronze Age in this region and Grogan *et al*. (2007, 139) have identified three principal Bronze Age focal zones in –

- The valleys of the Brosna and Clodiagh rivers to the south and east of Kilbeggan.
- The hilly terrain around the Hill of Uisneach.
- The slightly elevated area around Edmondstown to the west of Killucan.

Before the gas pipeline and N6 excavations south Westmeath was considered a 'quiet' zone but a much more intensive Bronze Age landscape has emerged possibly related to the major Bronze Age centre at Knockast (*ibid*., 161). The pipeline revealed a dominance of Bronze Age archaeology mainly dating to the middle and late parts of the period. Settlement, for example, is indicated by the middle Bronze Age house at Knockdomny 3km northwest of Moate town (Hull 2006), and by a number of burnt mounds such as Ballynagarbry, directly to the west of Moate, and at Williamstown (Grogan *et al*. 2007, 139). The N6 traversed the latter townland and revealed a burnt spread dating to the late Bronze Age.

Important late Bronze Age settlements were uncovered in advance of the N6 including the possible house at Creggan Lower 1 and the house, boundary fences and pits at Tober 1. The large rectangular late Bronze Age house at Ballinderry crannog II (Newman 1997 has since argued for the presence of a second rectangular Bronze Age structure) was identified as a thin black deposit which contained occupational debris and fragments of timbers and brushwoods and produced many finds including pottery, knives, flesh-hooks, awls, rings, pins, beads and a variety of stone objects (Hencken 1942, 6–8). When added together these sites demonstrate that this was a well-settled and established region notably in the later part of the period. This interpretation is further reinforced by the large number of burnt mounds that were discovered along the N6 and some notable clusters within certain townlands, for example, at Cregganmacar, Burrow or Glennanummer and Kilbeg.

In Athlone, at the western edge of the scheme and close to Creggan Lower, an assortment of high-status Bronze Age artefacts, mainly dating to the middle and late periods, are well represented including, for example, a gold lunula, bronze flat axes and rapiers and later gold items such as bar torcs, penannular bracelets, dress fasteners and ring money (Murtagh 2000, 9). The distribution of further high-status artefacts including the hoards from Ballinderry, Killulagh, Brockagh and Enniscoffey provide further evidence of a well settled Bronze Age landscape in this region (Eogan 1983; Grogan *et al.* 2007, 161). Both the pipeline and N6 excavations have

demonstrated how quickly perceptions and knowledge of archaeological landscapes can change as new sites are revealed in areas previously thought to be mostly devoid of this activity.

Bronze Age Boyanaghcalry

Boyanaghcalry 1 was a small burnt mound site dating to the middle Bronze Age (1608–1428 BC). A contemporary burnt mound (1600–1420 BC) was located just 1.5km to the west at Williamstown 1 (Figure 2) and consisted of a large mound of burnt and heat-shattered stones that sealed two possible troughs (Lyne 2009a). Within the same townland, at Williamstown 2 (Figure 2), a spread of burnt stones and charcoal-rich soil also sealed two possible troughs (Lyne 2009b). The troughs produced 2 Sigma radiocarbon dates of 808–594 BC and 910–812 BC which means the site post-dates both Boyanaghcalry 1 and Williamstown 1 by many centuries. Excavations in advance of the gas pipeline to the west also traversed the townland of Williamstown and a burnt mound and a number of troughs (all undated) were revealed (Molloy 2007, 351–2).

Another contemporary burnt mound site at Seeoge 1 (Figure 2) was located just 1.5km to the east of Boyanaghcalry and was composed of two irregular burnt spreads (Lyne 2009c). No pits or troughs were found and the burnt spread was dated to 1616–1457 BC. Another burnt mound site (Seeoge 2) was excavated in the same townland (Lyne 2009d), consisting of a large burnt mound that overlay two troughs (one of which was dated to 764–416 BC) and a number of pits. An earlier large late Bronze Age rectangular structure was also uncovered adjacent to the burnt mound.

A complex of burnt mound sites within the townland of Cregganmacar were situated approximately 3km to the east of Boyanaghcalry. Cregganmacar 3 consisted of a burnt mound that sealed a potential trough with postholes within its base (Lynch 2009a). The mound was dated to the middle Bronze Age and was contemporary with Boyanaghcalry 1. At Cregganmacar 1, a layer of burnt mound material overlay a single pit containing four postholes and was dated to 399–235 BC (Lynch 2009b). At Cregganmacar 2, a burnt spread sealed one trough while another, to the northeast, contained four postholes (Lynch 2009c). A pit directly north of the burnt spread and with a similar fill, was dated to 912–822 BC placing it in the late Bronze Age. Another burnt mound site was excavated in the townland at Cregganmacar 4 although no trough was located. It was dated to the early Bronze Age (Lynch 2009d). Although the four burnt mound sites in Cregganmacar had many similar features none were in use at the same time.

Examples of other middle Bronze Age burnt mound sites discovered on the scheme include the complex of sites in the townlands of Burrow or Glennanummer (Coughlan 2009a, 2009b, 2009c) and Kilbeg (Walsh 2009a, 2009b, 2009c). The vast majority of burnt mound sites date to the Bronze Age and were most commonly utilised during the middle and later parts of the period (Brindley *et al* 1989−90; Corlett 1997), and the middle Bronze Age date at Boyanaghcalry 1 is consistent with this.

Excavations on other sections of the N6 have also uncovered various burnt mound sites, for example at Stonehousefarm 6.1 and 6.2 (McDermott 2004), while the gas pipeline to the west has similarly also revealed a number of examples in this region (Grogan *et al* 2007). The quantity of burnt mound sites testifies to an established and well-populated Bronze Age landscape.

3.3 Archaeological Typology Background (Burnt Mounds)

Burnt mound (also commonly referred to as *fulacht fiadh*) sites 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 being 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), 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, O' Drisceoil 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 leading Irish environmentalists due to the absence of cereal remains from most burnt mound sites (McClatchie *et al*. 2007).

3.4 Discussion

One main phase of archaeological activity was identified at Boyanaghcalry 1, a middle Bronze Age burnt mound. The specific archaeological context of the site and its phases are described in detail below.

3.4.1 Phase 1: Natural Deposits

This phase represents the natural subsoil, which was cut or sealed by all subsequent archaeological features. The subsoil above bedrock encountered at Boyanaghcalry 1 was uniform across the site and consisted of a compact sandy grey-mottled clay with sandstone inclusions.

3.4.2 Phase 2: Bronze Age Activity

The burnt mound was defined by a single trough and disturbed burnt mound spread. Trough C4 was sub-rectangular in plan (1.25m x 1.2m x 0.34m deep) with sloping sides and flat base (75.7m OD at base) (Figures 4, 5, 6; Plates 1–4). This was located towards the southeast corner of the burnt mound spread and contained three fills C5, C7 and C9. The main fill of the trough, fill C7, was similar to the overlying burnt mound (heat fractured stone and charcoal rich soils). The upper fill was C5, a peaty deposit which likely formed through natural processes following the abandonment of the site. Charcoal (8g) was retrieved from fill C7 during post-excavation soil flotation. This was subsequently identified to species. Fragments of oak charcoal (*Quercus* sp.), ash charcoal (*Fraxinus excelsior*), and hazel charcoal (*Corylus avellana*) were identified (Appendix 2.1). A small fragment (1g) of ash was chosen for AMS dating and returned a result of 3248+/-27 BP (UBA 8588). The 2 Sigma calibrated result for this was 1608–1451 BC (Appendix 2.2) dating the abandonment of this feature to the middle Bronze Age.

The overlying burnt mound spread (C6/C8) which was flattened (6m north–south by c. 5.15m east–west by 0.21m deep) comprised heat fractured stone and charcoal rich clay (76.3m OD at top of surviving mound). Charcoal (0.9g) was retrieved from deposit C6 during post-excavation soil flotation. This was subsequently identified to species. Fragments of oak charcoal (*Quercus* sp.), and ash charcoal (*Fraxinus excelsior*) were identified (Appendix 2.1). A small fragment (0.3g) of ash was chosen for AMS dating and returned a result of 3225+/-29 BP (UBA 8587). The 2 Sigma calibrated result for this was 1605–1428 BC (Appendix 2.2) contemporary with the date obtained from the trough (see above).

This burnt mound is located within a marginal landscape which is well populated with other contemporary burnt mound sites such as Williamstown 1 (1600–1420 BC) located just 1.5km to the west (Lyne 2009a), while excavations in advance of the gas pipeline to the west also identified (undated) burnt mounds in the townland of Williamstown slightly further to the north (Molloy 2007, 351–2). Approximately 1.5km to the east a burnt mound at Seeoge 1 returned a date of 1616–1457 BC (Lyne 2009c), while some earlier and later, late Bronze Age examples were excavated adjacent to the Seeoge 1 site and further to the east at Cregganmacar (Lynch 2009a, 2009b, 2009c, 2009d). A detailed discussion of the contemporary Bronze Age landscape is given in Section 3.2.

The environment

Two samples were processed from the trough fill (C7) and burnt mound spread C6. Sixty one fragments of charcoal were retrieved and identified to three taxa types. This included large trees (oak & ash), and smaller scrub or hedgerow trees (hazel). Ash dominated the assemblage (O'Carroll, Appendix 2.1). This suggests that there may have been ash-hazel woodlands surrounding the site during the middle Bronze Age. No wetland taxa were identified from the assemblage.

Function and form

Although many ideas for the function of burnt mounds have been proposed and debated (see O'Kelly 1954, Lawless 1990, Lucas 1965, Barfield and Hodder 1987, O' Drisceoil 1988, Jeffrey 1991, Quinn and Moore 2007 and McClatchie *et al*. 2007) it is

clear that 'hot stone technology' sites like this were probably used for a variety of reasons. This could include any process that would require the need for hot water, which is essentially what is produced. The distinct lack of any ecofacts (with the exception of the charcoal) and lack of petrological analysis of the heat fractured stones means that little can be said that would add to the arguments regarding the function of burnt mounds. However the environmental evidence from the trough, spread and the AMS dating will add significantly to the local and landscape wide archaeological data-set.

3.4.3 Phase 3: Modern Agricultural Activity

The site was abandoned in the middle Bronze Age. Post-abandonment it was sealed by spread C3. This spread C3 lay over the main burnt mound material at the east side of the site. This was evidently a modern disturbance deposit.

3.4.4 Phase 4: Topsoil

This phase represents the topsoil that sealed all of the archaeological deposits and features on site.

4 CONCLUSIONS

At Boyanaghcalry 1 a single middle Bronze Age burnt mound was uncovered within a marginal, bog-land landscape. This was defined by a sub-rectangular trough and small, shallow disturbed burnt mound spread. Oak, ash and hazel charcoal were identified from the trough fills and burnt mound spread. Two dates obtained from charcoal retrieved from the trough and spread returned 2 Sigma calibrated dates of 1608–1451 BC and 1605–1428 BC respectively. The environmental results suggest that there may have been ash-hazel woodlands surrounding the site during the middle Bronze Age.

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PLATES

Plate 1: E2663: Burnt mound C6/C8, mid-excavation, facing north

Plate 2: E2663: Trough C4, mid-excavation, facing south

Plate 3: E2663: Trough C4, post-excavation, facing east

Plate 4: E2663: Post-excavation of site, facing east

APPENDIX 1 CATALOGUE OF PRIMARY DATA

Appendix 1.1 Context Register

Context	Fill of	L(m)	W(m)	D(m)	Interpretation	Description	Finds
1	N/A	Site	Site	0.3	Topsoil	Dark brown peaty clay.	None
2	N/A	N/A	N/A	N/A	Subsoil	Compact sandy grey mottled clays with sandstone inclusions.	N/A
3	N/A	2.12	N/A	0.3	Modern spread	Loose compaction. Mid brown sandy clay. Small stone inclusions.	None
4	N/A	1.25	1.2	0.37	Cut of trough	Sub-rectangular cut in plan. Rounded corners. Sharp break of slope at top. Sloping sides. Gradual break of slope at base at west and not perceptible at east. Flat base.	N/A
5	C4	1	0.73	0.15	Upper fill of trough	Dark brown sandy peat.	None
6	N/A	6	5.15	0.21	Main deposit	Irregular shape in plan. Loose compaction. Dark brown/black sandy clay. Moderate inclusions of burnt stone.	None
7	C4	1.25	1.2	0.25	Main trough fill	Loose compaction. Black sandy clay. Burnt stone inclusions.	None
8	N/A	2.95	1.75	0.04	Same fill as C6	Irregular shape in plan. Loose compaction. Dark brown/black sandy clay with burnt stone inclusions.	None
9	C4	0.97	0.9	0.17	Primary fill of trough	Loose compaction. Grey/yellow sandy clay. Small stone inclusions.	None

Appendix 1.2 Catalogue of Artefacts

There were no artefacts recovered from this site.

Appendix 1.3 Catalogue of Ecofacts

A total of two soil samples were taken at Boyanaghcalry 1. Both were processed by means of floatation and sieving through a 250µm mesh. The resulting retrieved samples of this process are listed below.

1.3.1 Charcoal

Context number	Sample number	Feature	Sample weight (g)
6	1	Burnt Spread	5g
7	2	Fill of trough C4	15g

Appendix 1.4 Archive Checklist

Project: N6 Kilbeggan – Athlone	**Irish Archaeological Consultancy Ltd**	
Site Name: Boyanaghcalry 1		
NMS Reg. No.: E2663		
Ministerial Directive: A016/035		
Site director: Fintan Walsh		
Date: 05 November 2008		
Field Records	**Items (quantity)**	**Comments**
Site drawings (plans)	1	
Site sections, profiles, elevations	3	
Other plans, sketches, etc.	0	
Timber drawings	0	
Stone structural drawings	0	
Site diary/note books	1	
Site registers (folders)	1	
Survey/levels data (origin information)	18	
Context sheets	9	
Wood Sheets	0	
Skeleton Sheets	0	
Worked stone sheets	0	
Digital photographs	15	
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)	0	
Human bone (specify type eg cremated, skeleton, disarticulated)	0	
Animal bone	0	
Metallurgical waste	0	
Enviro bulk soil (specify no. of samples)	2	
Enviro monolith (specify number of samples and number of tins per sample)	0	
Security copy of archive	1	On IAC server

Appendix 1.5 Copy of Registration No. Document from DoEHLG

National Monuments
Acts (1930-2004)
Ministerial Directions
Record Number for
archaeological activity

AN ROINN COMHSHAOIL, OIDHREACHTA AGUS RIALTAIS ÁITIÚIL
DEPARTMENT OF THE ENVIRONMENT, HERITAGE
AND LOCAL GOVERNMENT

File: **Direction No. A16**

Registration Number: E2663

Directions have been issued to Murty Hanly on behalf of Westmeath County Council in order to regulate archaeological activities carried out on N6 Kilbeggan to Athlone (Phase 2).

Application having been duly made to me by Ed Lyne of 28 Whitethorn Walk, Lusk Village, Co. Dublin.

For a registration number to record excavation at the site of Boyanaghcalry Site being part of the townland of in the County of Westmeath.

This registration is not an archaeological licence or consent but it is issued solely for archive purposes and to allow for the material from the activity to be registered with the National Monuments Service and the National Museum.

Signed .....

31 October 2006

Appendix 1.6 Copy of Ministerial Direction Document

Section 14A(2) National Monuments Acts 1930-2004

Directions to Westmeath County Council for the carrying out of archaeological works on the N6 Kinnegad to Athlone dual carriageway road scheme (Phase 2 * Kilbeggan to Athlone).

1. Introduction

The project is an approved road development, having been approved by An Bórd Pleanála on 26th March 2004.

The development will consist of a dual carriageway that will run for a distance of approximately 57.5km.

In line with recommendations in the Environmental Impact Assessment for the scheme, archaeological investigations included site specific testing followed by a centreline test trench with staggered offsets. The request for directions has an attached strategy document that covers the proposed resolution works

These directions relate to Phase 2 works and are issued following the receipt by the Minister of reports on the testing work carried out in Phase 1.

2. Directions

All aspects of the archaeological works should be conducted in accordance with provisions of the policy and advice notes on archaeological excavations issued by the Department and in line with the provisions of the Code of Practice agreed with the National Roads Authority. Archaeological works shall be carried out in accordance with the Strategy for Proposed Works submitted with the application seeking Directions.

3. Project Archaeologist

The Project Archaeologist appointed for the road development should ensure that the archaeological works are carried out in accordance with the terms of the directions.
· Any changes to the agreed method statement for the excavations should be submitted to the National Monuments Section for approval.
· Any proposal to change any named director of a specific excavation should firstly be notified to the National Monuments Section for approval.

4. Conduct of Archaeological Excavations:

a) The archaeological excavations should be carried out in accordance with the specifications set out in the strategy document submitted to the Minister.
b) The National Monuments Section should be notified of the commencement date of the works on site.
c) The names of the archaeological consultants, including site directors should be submitted to the National Monuments Section in advance of the works commencing.

d) Where necessary the layout of the archaeological trenches should be adjusted to include additional archaeological features and deposits or areas of archaeological potential.
e) All archaeological objects recovered in the course of the test excavations should be treated and conserved in line with the advice notes and guidelines issued by the National Museum of Ireland.
f) A report on the progress of the archaeological works shall be submitted to the National Monuments Section every 4 weeks.

5. Record Number for the scheme:

The record number for the recording of archaeological works is A016/000. Sub-numbers may be allocated by the Project Archaeologist to the additonal works. These numbers should be notified to the National Monuments Section for agreement with full details of the archaeological works involved.

6. Detection Device:

Detection devices may be used as appropriate in the course of archaeological works to recover archaeological objects. Details of proposed methodologies should be notified to the National Monuments Section.

7. Reports:

1. A report on the results of the archaeological excavations should be submitted to the National Monuments Section within 4 weeks of the completion of the works on site. Should additional time be required to complete the report the National Monuments Section should be notified before the expiration of the 4-weeks period. A copy of the report should be sent to the National Museum of Ireland.
2. A summary of the excavation results for the site should be published in the Excavations Bulletin for the year when works are undertaken.

8. National Monuments (Subsection 14A(4)):

If during the carrying out of the archaeological excavations a site should prove to be a National Monument within the meaning of the National Monuments Acts (1930-2004) all works should stop and the National Monuments Section should be informed immediately.

9. Inspection of Works

Officers, servants or agents of the Minister may inspect the archaeological works at any time and full co-operation should be given to them in carrying out the inspections.

APPENDIX 2 SPECIALIST REPORTS

Appendix 2.1 Charcoal and Wood ID Report – Ellen O'Carroll

Appendix 2.2 Radiocarbon Dating Results – QUB Laboratory

CHARCOAL IDENTIFICATIONS

N6 KINNEGAD – ATHLONE SCHEME
PHASE 2: KILBEGGAN TO ATHLONE
DUAL CARRIAGEWAY

MINISTERIAL DIRECTION NUMBER: A016/033
NMS REGISTRATION NUMBER: E2663
BOYANAGHCALRY 1

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Introduction

Two charcoal samples were identified from excavations from burnt mound features dated to the middle Bronze Age and excavated at Boyanaghcalry, Co. Westmeath. This site is located in the townland of Boyanaghcalry, c. 3.5 km west of Moate town, Co. Westmeath. The archaeological excavation was carried out by Irish Archaeological Consultancy Ltd on behalf of Westmeath County Council and the National Roads Authority in advance of the construction of the N6 Phase 2: Kilbeggan to Athlone Dual Carriageway Scheme.

The analysis of charcoal can provide information on two different levels. Charcoal analysis is an important component of any post-excavation environmental work as it can help in re-constructing an environment hitherto lost to us, although this must be done with caution as sufficient sample numbers are required for a complete and full understanding of the immediate environment. Keepax suggest 50 samples in a European temperate climate. Charcoal is also analysed and identified to determine what species are used and selected for particular functions on site i.e. postholes, wall posts, burnt remains of wattle and so on.

Methods

The process for identifying wood, whether it is charred, dried or waterlogged is carried out by comparing the anatomical structure of wood samples with known comparative material or keys (Schweingruber 1990). A wood reference collection from the Botanical Gardens in Glasnevin, Dublin was also used.

Charcoal

The soil samples were processed on-site. The flots were sieved through a 250 micron or a 1mm sieve, while the retent was put through a 2mm or 4mm sieve. All of the charcoal remains from the soil samples were then bagged and labeled.

The identification of charcoal material involves breaking the charcoal piece along its three sections (transverse, tangential and radial) so clean sections of the wood pieces can be obtained. This charcoal is then identified to species under a universal compound microscope reflected and transmitted light sources at magnifications x 10 – 400. By close examination of the microanatomical features of the samples the charcoal species are determined.

The purpose of the charcoal identifications was two-fold. In some cases the identifications were carried out prior to C14 dating in order to select specific species for dating and in other cases the charcoal was analysed for fuel selection policies and selection of wood types for structural use. Each species was identified, bagged together and then weighed. Insect channels were noted on the charcoal fragments identified as this may indicate the use of dead or rotting wood used for fuel or other such functions. The distinction can sometimes be made between trunks, branches and twigs if the charcoal samples are large enough. This was noted where possible. When charcoal samples showed indications of fast or slow growth this was also recorded. The samples identified for environmental reconstruction and wood usage were counted per fragment and then weighed. The smaller sample amounts with less than 50 fragments were all identified while 50 fragments were identified from the larger samples. In general the fragment count for charcoal was low from these features.

There are inherent problems in re-constructing the environment at the time of use of the site due to the low quantity of samples and charcoal fragments identified from the assemblages. Keepax concludes that, when working in a temperate climate, at least fifty samples should be identified from an archaeological site, to make it a viable

charcoal study, with a minimum of 25 samples (Keepax 1988). Notwithstanding the charcoal sample numbers, it is clear that the charcoal results coupled with the wood analysis throw up some interesting results and trends in relation to wood selection and use and woodland cover in the Bronze periods in Co. Westmeath.

A number of wood taxa cannot be identified to species or sub-species level anatomically. Sessile oak *(Quercus petraea)* and pedunculate oak *(Quercus robur)* are both native and common in Ireland and the wood of these species cannot be differentiated on the basis of their anatomic characteristics. English elm *(Ulmus procera)* and wych elm *(Ulmus glabra)* cannot be separated by their wood structure and identifications of elm are shown as *Ulmus* spp. There are also two species of birch (*Betula pendula* and *Betula pubescens*) and several species of willow therefore the identifications are given as *Betula* spp and *Salix* spp respectively. *Prunus* includes blackthorn (*Prunus spinosa*) and cherry (*Prunus padus/avium*) and sometimes it is difficult to differentiate between the different species of *Prunus* spp.

Descriptions of types of features

The site at Boyanaghcalry 1 consisted of a burnt mound spread and a trough. The trough was 1.25m long, 1.20m wide and 0.37m deep. The burnt mound deposit of heat fractured stone and charcoal rich clay sealed the trough. This deposit was 6.00m diameter. No finds were discovered in the course of the excavation.

Results

Sixty one fragments were identified from two samples submitted for dating and environmental re-construction and woodland use. The charcoal is related to burnt mound spread (**C6**) and the fill of a trough (**C7**). The fragment count of each taxon represented in the samples is given below in Figure 1 and Table 1.

Figure 1: All taxa identified from the charcoal samples analysed

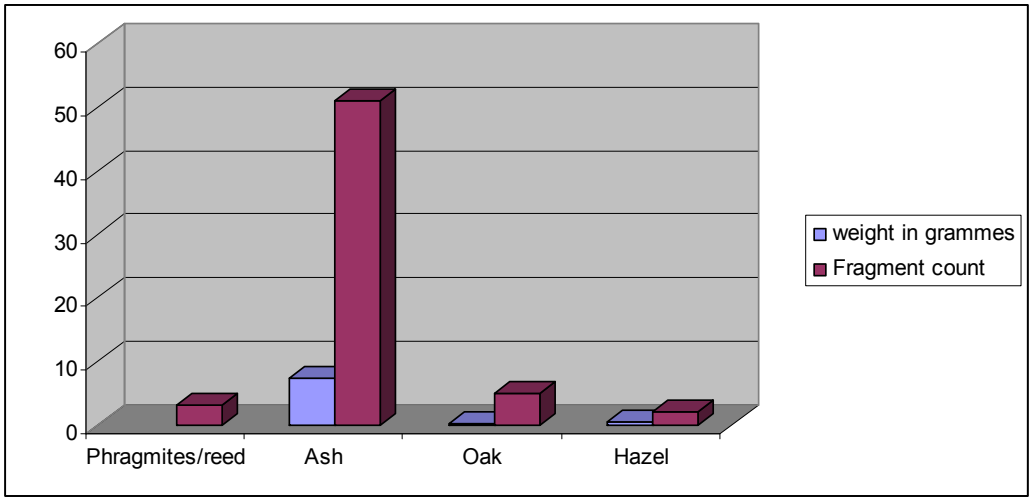

Table 1: Identifications from Boyanaghcalry

Site no.	Context no.	Context type	Sample no.	Species	Date
A016-35	6	Burnt spread	1	Reeds/Phragmites. Ash (0.3g*, 5f*) & oak (0.6g, 5f).	1605–1428 BC
A016-35	7	Trough fill	2	Oak (0.4g, 2f), Ash (7g, 46f), Hazel (0.6g,2 f)	1608–1451BC

*g = grammes
* f = fragment count

Discussion and conclusions of charcoal assemblage

Wood types identified the assemblages
There were three taxa types present in the charcoal remains. The range of taxa identified from the features analysed includes large trees (oak & ash), and smaller scrub or hedgerow trees (hazel). The identifications are related to wood selection in relation to firewood used at the site rather than structural wood use.

The results suggest that there may have been ash-hazel woodlands surrounding the sites during the middle Bronze Age period at Boyanaghcalry. Other dryland primary woodland trees present in the area were oak. Interestingly there were no wetland taxa identified from the assemblage. *Phragmites*, a reed which grows in a fenland area was identified from the burnt mound spread. The *Phragmites* reeds probably grew in the area after the burnt mound went out of use and the site then became inundated with water and fen reeds.

Further analysis, discussions and comparisons of results will form part of a final integrated charcoal and pollen study of the sites and the surrounding environment on this scheme which is being undertaken as part of the authors PHD thesis. These results will be published accordingly.

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RADIOCARBON DATING RESULTS
BOYANAGHCALRY 1

CHRONO LABORATORY, QUEENS UNIVERSITY BELFAST

Colette Rynhart
Irish Archaeological Consultancy Ltd
120b Greenpark Road
Bray
Co. Wiklow, Ireland
Rep. of Ireland
VAT No. IE8288812U

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

Radiocarbon Date Certificate

Laboratory Identification: UBA-8587
Date of Measurement: 2008-03-13
Site: A016/35 Boynaghclary
Sample ID: S1 C6
Material Dated: Ash
Pretreatment: AAA
Submitted by: IAC

^{14}C Date: 3225±29
AMS δ^{13}C: -28.7

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
```

```
S1 C6
UBA-8587
Radiocarbon Age BP   3225 +/-   29
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 BC 1517- 1453                       1.000
  95.4 (2 sigma)     cal BC 1605- 1578                       0.044
                           1536- 1428                        0.956
```

```
 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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^{14}CHRONO

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

Radiocarbon Date Certificate

Laboratory Identification: UBA-8588
Date of Measurement: 2008-03-13
Site: A016/35 Boynaghclary
Sample ID: S2 C7
Material Dated: Ash
Pretreatment: AAA
Submitted by: IAC

^{14}C Date: 3248±27
AMS δ^{13}C: -29.7

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
```

```
S2 C7
UBA-8588
Radiocarbon Age BP    3248 +/-    27
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 BC 1602- 1590                      0.118
                             1533- 1492                      0.706
                             1477- 1459                      0.177
  95.4 (2 sigma)      cal BC 1608- 1568                      0.183
                             1563- 1451                      0.817
```

```
 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.

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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.
```

APPENDIX 3 LIST OF RMP SITES IN AREA

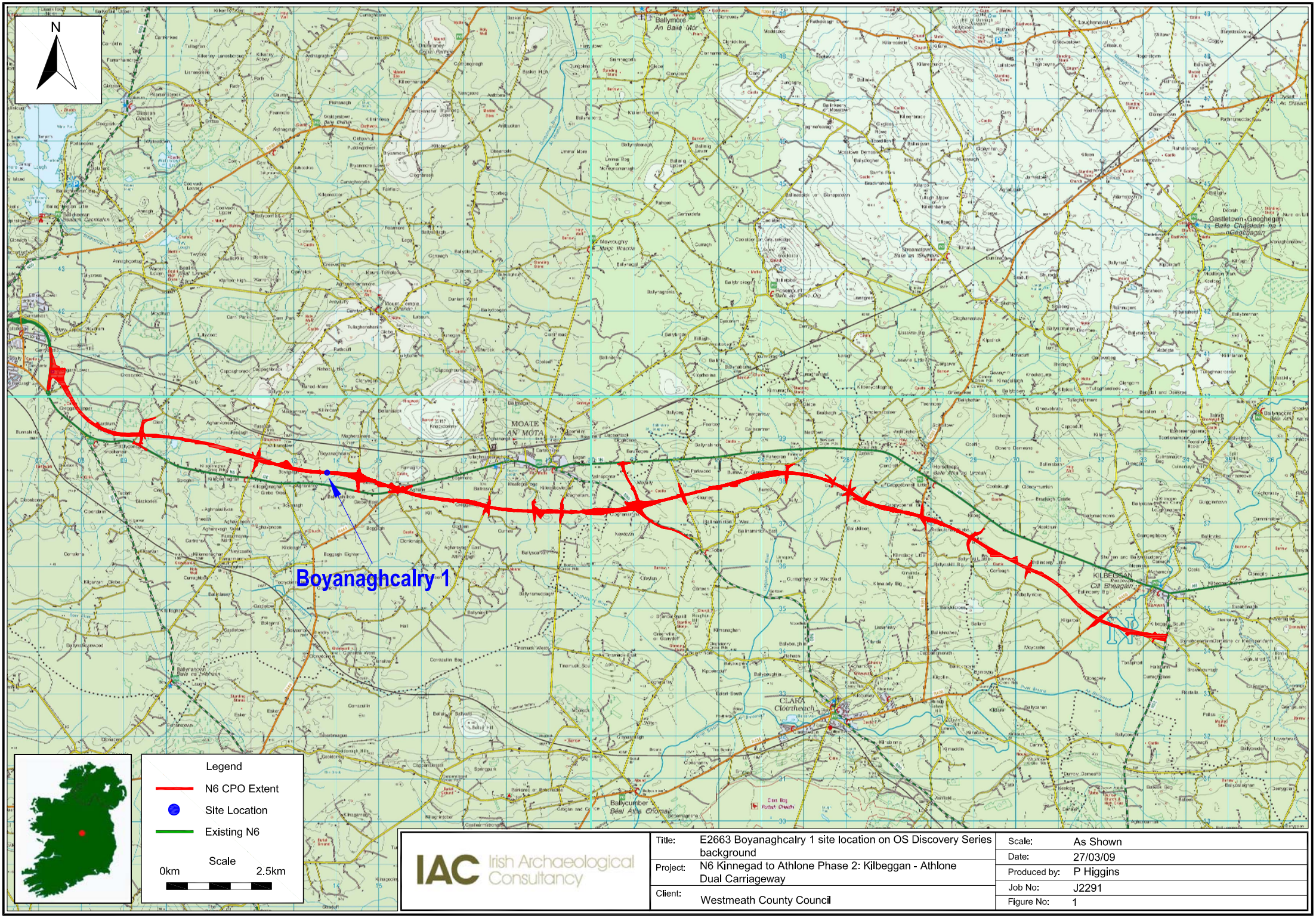
RMP No	Description
WM030-087	Graveyard
WM030-088	Ringfort
WM030-089	Castle site
WM030-090	Ringfort
WM030-091	Castle
WM030-092	Ringfort
WM030-093	Ringfort
WM030-094	Earthwork
WM030-095	Ringfort
WM030-098	Ringfort
WM030-099	Castle site
WM030-100	Ringfort
WM030-101	Ringfort
WM030-102	Earthwork
WM030-119	Architectural fragment
WM036-001	Ringfort
WM036-002	Ringfort
WM036-00301	Ringfort
WM036-00302	Souterrain
WM036-004	Ringfort
WM036-005	Ringfort
WM036-006	Earthwork
WM036-007	Ringfort
WM036-009	Church
WM036-012	Well
WM036-01301	Castle
WM036-01302	Church site
WM036-014	Earthwork site

See Figure 2 for location.

APPENDIX 4 LIST OF N6 SCHEME SITE NAMES

Site Name	Ministerial Direction No.	NMS Registration Number
Seeoge 2	A016/007	E2635
Moyally 7	A016/015	E2643
Kilcurley 1	A016/019	E2647
Cappydonnell Big 1	A016/025	E2653
Ardballymore 2	A016/028	E2656
Creggan lower 1	A016/030	E2658
Creggan lower 2	A016/031	E2659
Williamstown 1	A016/032	E2660
Williamstown 3	A016/033	E2661
Williamstown 4	A016/034	E2662
Boyanaghcalry 1	A016/035	E2663
Seeoge 1	A016/036	E2664
Aghafin 1	A016/037	E2665
Cregganmacar 1	A016/038	E2666
Cregganmacar 2	A016/039	E2667
Cregganmacar 3	A016/040	E2668
Curries 1	A016/041	E2669
Curries 2	A016/042	E2670
Culleenagower 1	A016/043	E2671
Moyally 2	A016/044	E2672
Moyally 1	A016/046	E3274
Moyally 3	A016/047	E2674
Moyally 5	A016/048	E2675
Moyally 6	A016/049	E2676
Tober 1	A016/051	E2677
Burrow or Glennanummer 1	A016/052	E2678
Burrow or Glennanummer 2	A016/053	E2679
Burrow or Glennanummer 3	A016/054	E2680
Russagh 4	A016/055	E2681
Russagh 1	A016/056	E2682
Russagh 2	A016/057	E2683
Russagh 3	A016/058	E2684
Kilbeg 1	A016/059	E2688
Kilbeg 2	A016/060	E2689
Kilbeg 4	A016/062	E2691
Kilbeg 5	A016/063	E2692
Kilbeg 6	A016/064	E2693
Kilbeg 7	A016/065	E2694
Correagh 1	A016/066	E3374
Ballinderry Little 1	A016/067	E2695
Ardballymore 1	A016/068	E2696
Kilgaroan 1	A016/069	E2697
Kilgaroan 2	A016/070	E2698
Kilgaroan 3	A016/071	E2699
Kilgaroan 4	A016/072	E2700
Kilgaroan 6	A016/074	E2702
Ballinderry Big 1	A016/076	E3275
Ballinderry Big 2	A016/077	E3276
Ballinderry Big 3	A016/078	E3277
Tonaphort 1	A016/079	E3278
Tonaphort 2	A016/080	E3279
Tonaphort 3	A016/081	E3280

Site Name	Ministerial Direction No.	NMS Registration Number
Kilbeggan South 1	A016/082	E3281
Kilbeggan South 2	A016/083	E3282
Kilbeggan South 3	A016/084	E3283
Cregganmacar 4	A016/085	E2703
Williamstown 2	A016/086	E2704
Kilbeg 8	A016/087	E3966



IAC Irish Archaeological Consultancy

Title:	E2663 Boyanaghcalry 1 site location on OS Discovery Series background
Project:	N6 Kinnegad to Athlone Phase 2: Kilbeggan - Athlone Dual Carriageway
Client:	Westmeath County Council

Scale:	As Shown
Date:	27/03/09
Produced by:	P Higgins
Job No:	J2291
Figure No:	1

N

FASSAGH

WILLIAMSTOWN

BOYANAGHCALRY

MAGHERAMORE

KNOCKDOMNY

FARNAGH

BOYANAGH EARL

AGHARANNY

GLEBE WEST

BOYANAGH (MALONE)

AGHAVONEEN

BALLYCAHILLROE

SEEDGE

GLEBE EAST

BOGGAGH (EIGHTER)

WM030-087

WM030-094

WM030-095

WM030-119

WM030-091

WM030-099

WM030-100

WM030-098

WM30-089

WM030-088

WM030-090

Williamstown 1

WM030-092

Williamstown 2

Williamstown 3

Williamstown 4

Boyanaghcalry 1

WM030-093

WM30-101

Seeoge 1

WM30-102

Seeoge 2

WM036-001

WM036-002

WM036-003

WM036-004

WM036-007

WM036-006

WM036-005

WM036-009

WM036-012

WM036-013

WM036-014

Legend

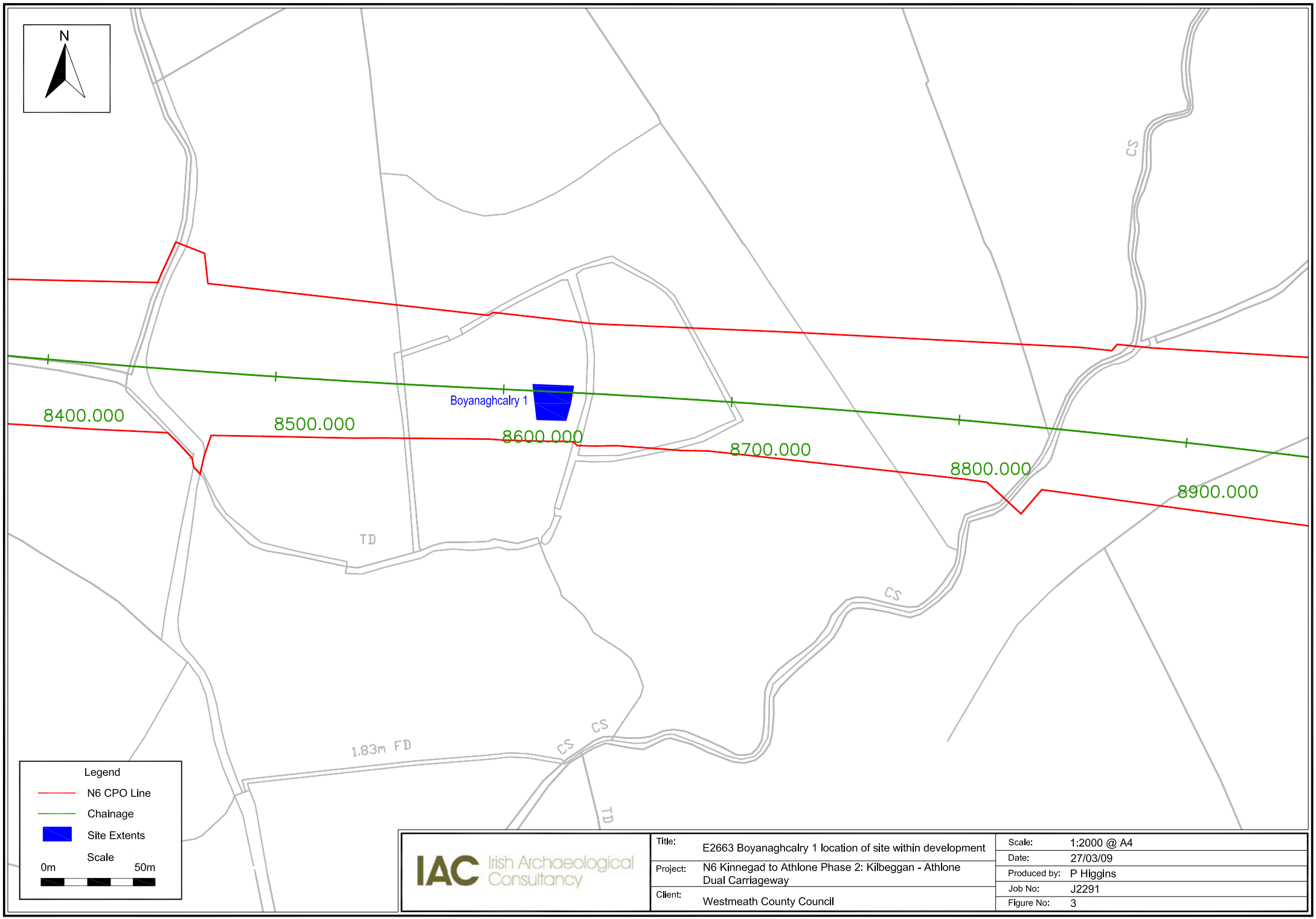
N6 CPO Line

RMPs

Scale

0m 250m

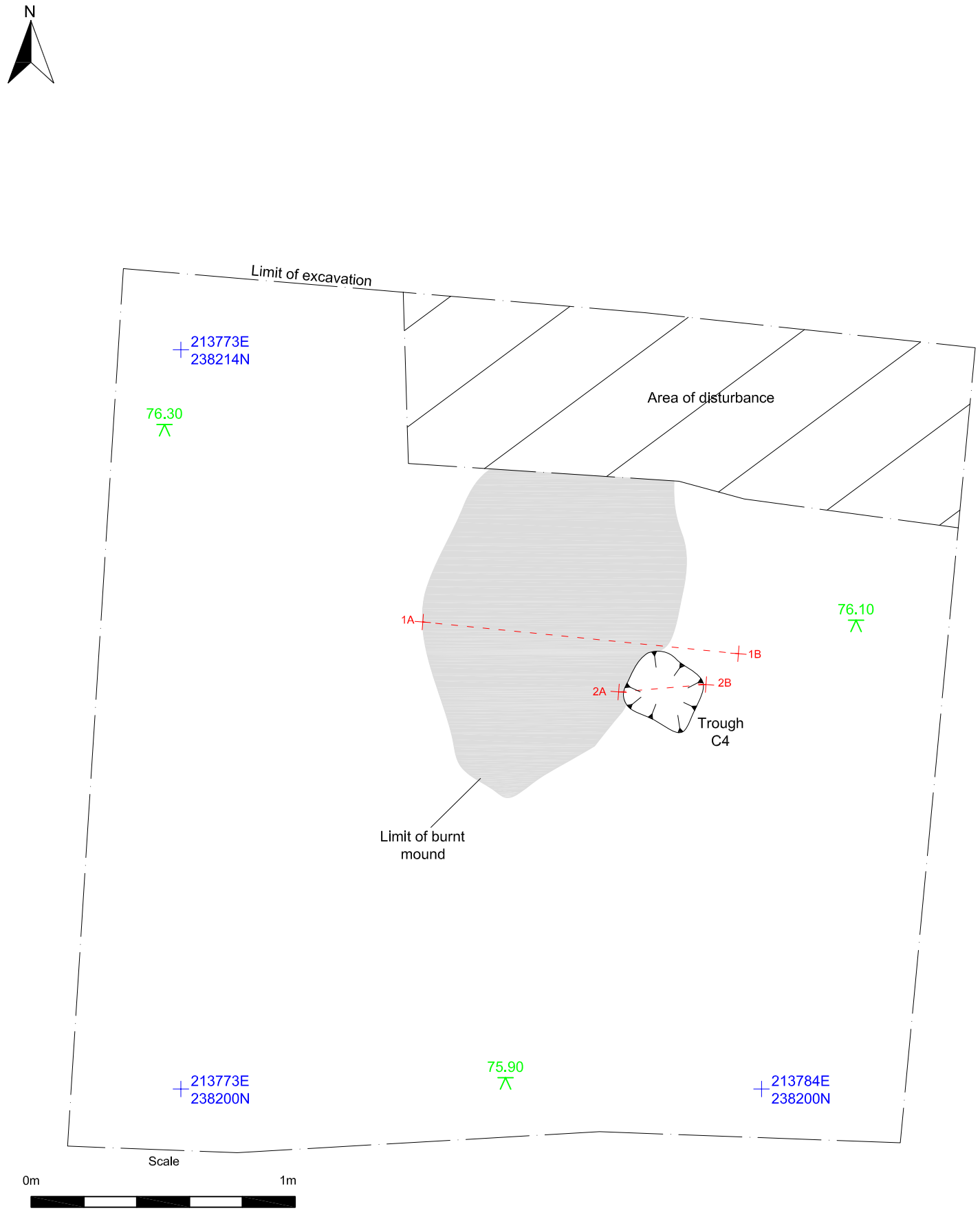
Title:	E2663Boyanaghcalry 1 showing RMPs with OS background		
Project:	N6 Kinnegad to Athlone Phase 2: Kilbeggan - Athlone Dual Carriageway		
Client:	Westmeath County Council		
Scale:	1:10000 @ A3	Job No: J2291	IAC Irish Archaeological Consultancy
Date:	27/03/09	Figure No: 2	
Produced by:	P Higgins		



IAC Irish Archaeological Consultancy

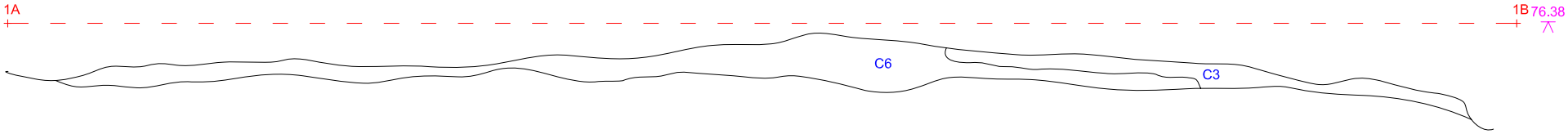
Title:	E2663 Boyanaghcalry 1 location of site within development
Project:	N6 Kinnegad to Athlone Phase 2: Kilbeggan - Athlone Dual Carriageway
Client:	Westmeath County Council

Scale:	1:2000 @ A4
Date:	27/03/09
Produced by:	P Higgins
Job No:	J2291
Figure No:	3

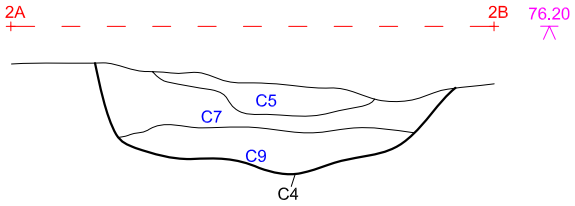


IAC Irish Archaeological Consultancy	Title:	E2663 Boyanaghcalry 1 site plan	Scale: 1:100 @ A4
	Project:	N6 Kinnegad to Athlone Phase 2: Kilbeggan - Athlone Dual Carriageway	Date: 27/03/09
	Client:	Westmeath County Council	Produced by: G Kearney
			Job No: J2291
			Figure No: 4

Boyanaghcalry 1
South facing section of C6



Boyanaghcalry 1
South facing section of trough C4



Scale

0m 1m

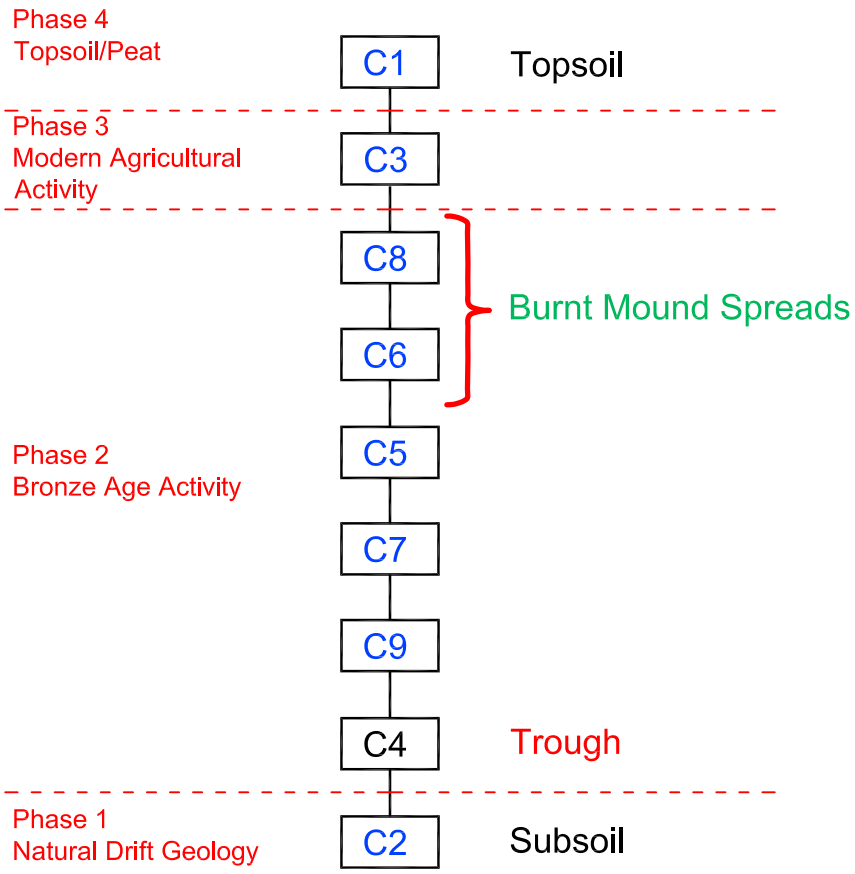
Legend

C##	Cut numbers
C##	Fill Numbers
	Stone
76.20	Reduced Levels

IAC Irish Archaeological Consultancy

Title:	E2663 Boyanaghcalry 1 sections
Project:	N6 Kinnegad to Athlone Phase 2: Kilbeggan - Athlone Dual Carriageway
Client:	Westmeath County Council

Scale:	1:25 @ A4
Date:	27/03/09
Produced by:	G Kearney
Job No:	J2291
Figure No:	5



CXXX = SPREADS AND FILL CONTEXTS
CXXX = CUT CONTEXTS

IAC Irish Archaeological Consultancy	Title: E2663 Boyanaghcalry 1 matrix	Scale:	N/A
	Project: N6 Kinnegad to Athlone Phase 2: Kilbeggan - Athlone Dual Carriageway	Date:	19/06/09
		Produced by:	G Kearney
	Client: Westmeath County Council	Job No:	J2291
		Figure No:	6