

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



**SITE A016/069; E2697: KILGARROAN 1**

**FINAL REPORT**

**ON BEHALF OF WESTMEATH COUNTY COUNCIL**

**7 AUGUST 2009**



## PROJECT DETAILS

|  |   |
|--|---|
|  |   |
| <b>Project Reference No.</b>               | WH/00/112   |
| <b>Project</b>                             | N6 Kinnegad–Athlone Road Scheme:<br>Phase 2, Kilbeggan–Athlone Dual<br>Carriageway    |
| <b>Ministerial Direction Reference No.</b> | A016/069  |
| <b>NMS Registration Number</b>             | E2697   |
|  |   |
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| <b>Client</b>                              | Westmeath County Council  |
|  |   |
| <b>Site Name</b>                           | Kilgaroan 1   |
| <b>Site Type</b>                           | Possible Bronze Age refuse pits and a<br>late medieval charcoal production kiln       |
| <b>Townland</b>                            | Kilgaroan   |
| <b>Parish</b>                              | Horseleap or Ardnurcher   |
| <b>County</b>                              | Westmeath   |
| <b>NGR (Easting)</b>                       | E 230750  |
| <b>NGR (Northing)</b>                      | N 235740  |
| <b>Chainage</b>                            | 26330–26370   |
| <b>Height m OD</b>                         | 73.6m OD  |
|  |   |
| <b>RMP No.</b>                             | N/A   |
|  |   |
| <b>Excavation Start Date</b>               | 27 March 2006   |
| <b>Excavation Duration</b>                 | 4 days  |
|  |   |
| <b>Report Type</b>                         | Final   |
| <b>Report Date</b>                         | 7 August 2009   |
| <b>Report By</b>                           | David Bayley  |

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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 Kilgaroan at the site of Kilgaroan 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 David Bayley under Ministerial Direction (A016/069) and NMS Registration Number E2697 issued by the DOEHLG in consultation with the National Museum of Ireland. The fieldwork took place between 27 and 30 March 2006.

The site at Kilgaroan 1 comprised a burnt spread and three pits, with two distinct phases of activity (early Bronze Age and late medieval). The first phase comprised two pits. AMS Radiocarbon dating of one of the pits produced a 2 Sigma calibrated date of 2115–1925 BC. The second phase comprised a large pit, possibly a charcoal production kiln, and a burnt spread. AMS Radiocarbon dating of charcoal from the kiln produced a 2 Sigma calibrated date of AD 1521–1656. The site is immediately adjacent to Kilgaroan 2, 3 and 4 which produced pits, charcoal production kilns and burnt spreads dating to the Bronze Age, early medieval and medieval period. No finds were recovered during the excavation.

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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 Kilgaroan 1 in the townland of Kilgaroan, Co. Westmeath (Figure 1 and 2) as part of an archaeological mitigation programme associated with the N6 Phase 2: Kilbeggan to Athlone Dual Carriageway Scheme. Archaeological fieldwork was carried out under ministerial direction by David Bayley of Irish Archaeological Consultancy Ltd (IAC Ltd) and was funded by Westmeath County Council and the National Roads Authority under the National Development Plan 2000–2006, 2007–2013 and the EU Structural fund.

Kilgaroan 1 was identified as the result of archaeological assessment undertaken by IAC Ltd. in August 2005 (Ministerial Direction No. A016/029; NMS Registration No. E3273). All features identified during the assessment phase (five sub-circular pits) were subsequently re-identified and the site was fully excavated during the excavation phase of the project which took place between 27 and 30 March 2006 with a team of 1 director, 1 supervisor and a maximum of 12 site assistants.

The site was located c. 100m from both the northern and eastern field boundaries in flat pastureland at a height of 73.6m OD c. 0.6km to the south of the current N6 and c. 2km south west of Kinnegad (Westmeath OS sheets 37). Kilgaroan 1 had not been previously identified and was not a recorded monument.

The site was assigned the following identification data:

Site Name: Kilgaroan 1; Ministerial Direction No.: A016/069; NMS Registration No.: E2697; Route Chainage (Ch): 26330–26370; NGR: 230750/235740.

### 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 1 m hard strips and a safety barrier. In addition to the mainline dual carriageway there is a further 0.3 km 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 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 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. 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

Two broad phases of archaeological activity were identified at Kilgaroan 1. Bronze Age activity (Phase 2) comprised two pits, while late medieval activity (Phase 3) comprised a possible charcoal production kiln and a spread. Detailed descriptions of 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 Kilgaroan 1 was uniform across the site and consisted of light brown medium sand.

### 2.2 Phase 2: Bronze Age Activity

The Phase 2 archaeology at Kilgaroan 1 comprised two pits. These are described below.

#### 2.2.1 Pit C3

| Context | Fill of | L(m) | W(m) | D(m) | Basic Description                   | Interpretation     |
|---------|---------|------|------|------|-------------------------------------|--------------------|
| C3      | N/A     | 1.4  | 1.4  | 0.3  | Circular cut with flat base         | Cut of shallow pit |
| C4      | C3      | 1.4  | 1.4  | 0.3  | Dark brown sandy clay with charcoal | Fill of pit        |

**Finds:** None

#### Interpretation:

Shallow circular pit C3 (Figure 4 and 5, Plate 2) appears to be a refuse pit. It was deliberately backfilled with C4. The fill contained moderate amounts of charcoal. There was no evidence for *in situ* burning (Plate 1). It is probably associated with similar pit C5, which was located 0.9m to the east.

#### 2.2.2 Pit C5

| Context | Fill of | L(m) | W(m) | D(m) | Basic Description                          | Interpretation |
|---------|---------|------|------|------|--|----------------|
| C5      | N/A     | 1.1  | 0.72 | 0.22 | Irregular cut with concave base            | Cut of pit     |
| C6      | C5      | 1.1  | 0.72 | 0.22 | Mid-dark grey silty clay, stone inclusions | Fill of pit    |

**Finds:** None

#### Interpretation:

The shallow, oblong but irregular pit C5 (Figure 4 and 5, Plate 3) was probably a refuse pit. It was deliberately filled with C6, which contained moderate amounts of charcoal. There was no evidence for *in situ* burning in the pit. A small piece of ash (*Fraxinus excelsior*) charcoal recovered from C6 was chosen for AMS dating (O'Carroll, Appendix 2.1). This sample returned a date of 3631 +/- 21 BP (UBA 9176) which gave a 2 Sigma calibrated result of 2115–1925 BC dating this feature to the early Bronze Age (QUB, Appendix 2.2).

### 2.3 Phase 3: Late Medieval/Post-Medieval Activity

The phase 3 archaeology at Kilgaroan 1 comprised a possible charcoal production kiln and a spread. These are described below.

#### 2.3.1 Pit C7

| Context | Fill of | L(m) | W(m) | D(m) | Basic Description                        | Interpretation |
|---------|---------|------|------|------|--|----------------|
| C7      | N/A     | 1.2  | 1.5  | 0.2  | Circular cut with flat base              | Cut of pit/CPK |
| C8      | C7      | 1.2  | 1.5  | 0.14 | Dark brown silty clay                    | Upper fill     |
| C19     | C7      | 1.11 | 1.21 | 0.1  | Dark brown silty clay, frequent charcoal | Basal fill     |

**Finds:** None

#### Interpretation:

This was the largest pit on site and appears to represent the remains of a probable charcoal production kiln (Figure 4 and 5, Plate 5). The edges of the cut C7 had been oxidised (Plate 4), indicating exposure to intense heat. The basal fill C19 contained frequent charcoal lump inclusions, while the upper fill C8 also contained charcoal inclusions. A small piece of oak twig charcoal (*Quercus* sp.) recovered from C19 (O'Carroll, Appendix 2.1) returned a date of 286 +/- 19 BP (UBA 9177). This gave a 2 Sigma calibrated result of AD 1521–1656, placing this feature in the late medieval/post-medieval date range (QUB, Appendix 2.2).

#### 2.3.2 Spread C11

| Context | Fill of | L(m) | W(m) | D(m) | Basic Description     | Interpretation |
|---------|---------|------|------|------|-----------------------|----------------|
| 11      | N/A     | 2    | 2    | 0.19 | Dark brown sandy clay | Spread         |

**Finds:** None

#### Interpretation:

The deposit C11 (Figure 5) represents a spread of material similar to the fills of the pits. It may represent material that had been dumped out of possible charcoal kiln C7, located c. 0.3m to the northeast and which accumulated in a natural depression.

### 2.4 Phase 4: Topsoil

#### 2.4.1 Topsoil

| Context | Fill of | L(m) | W(m) | D(m) | Basic Description    | Interpretation |
|---------|---------|------|------|------|----------------------|----------------|
| 1       | N/A     | Site | Site | 0.4  | Mid brown sandy clay | Topsoil        |

**Finds:** None

#### Interpretation:

Phase 3 represents the topsoil that sealed all of the archaeological deposits and features at Kilgaroan 1. The topsoil had a depth of c. 0.4m.

### 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 site at Kilgaroan 1 was located 2.5km west of Kilbeggan town in low-lying flat pasture (73.6m OD). The underlying geology of the area is carboniferous limestone, which is overlain with occasional small glacial hillocks, forming a gently undulating low-lying landscape. Soil cover in this area consists of grey brown podzolics of the Patrickswell series. On the 6" OS map (1834–1842) the area is marked as been marshy and rock outcrops were noted 300m south of the site. No rivers or streams noted nearby, however a spring/well was situated 200m north of the site (6" OS map 1834–1842) indicating that the area had a high water table.

#### 3.2 Archaeological Landscape (Bronze Age)

Apart from the publication of archaeological inventories in some midland counties, such as Offaly (O'Brien and Sweetman 1997), and peatland surveys by the Irish Archaeological Wetland Unit (Moloney *et al* 1993) our knowledge of the prehistoric archaeology of the midlands is minimal. We are reliant on data stored at the RMP and information from a limited number of excavations within Westmeath and Offaly, such as Hencken's (1942) excavations at Ballinderry crannog II in the barony of Kilcoursey, Co. Offaly, which revealed a Bronze Age settlement phase (also see Newman 2002 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 – similar to that of landscapes that have experienced more extensive attention, although in smaller quantities (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 later parts of the period.

The immediate surrounding area of 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 have 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 Derravarragh 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 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 at:

- 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 later 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 later Bronze Age. In Athlone, at the very west of the scheme and close to Creggan Lower, an assortment of high-status Bronze Age artefacts – mainly dating to the middle and later periods – are well represented including, for example, a gold lunulae, 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 (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 such.

### **Late Medieval**

Kilgaroan 1 was located c. 2.5km west of Kinnegad town. A Cistercian Abbey was established in Kilbeggan in the middle 12th century and came under Anglo Norman control in AD 1228 after decades of tension (Masterson 2004, 26). This did not last long however as Irish affiliation was restored to Kilbeggan when it was once again attached to Mellifont by the end of the 13th century (*ibid.* 27). A number of recorded RMP sites testify to early monastic activity in Kilbeggan and include an ecclesiastical site (WM038-017001), graveyard (WM038-017002) and church (WM038-017006). A recent geophysical survey has identified the footprint of the Cistercian monastery and excavations nearby have revealed a large cemetery (possibly of early medieval date) a cereal-drying kiln, pits and ditches (Hayden 2003; Sweetman 2004).

Approximately 3.5km to the northwest there is a medieval settlement at Horseleap/Ardnurcher. A castle was also built at Ardnurcher – the cantred was given to Meiler FitzHenry – a short distance north of Cappydonnell Big 1, in AD 1192, and houses and a market are recorded there from the beginnings of the 13th century

(Corcoran 2004, 11). A number of recorded monuments confirm the scale of the settlement including a motte-and bailey (WM031-099), a deserted settlement (WM031-104), a medieval house (WM031-105) and three town defences. A castle and substantial settlement is also recorded at Kinclare which is a townland within the parish of Ardnurcher (*ibid.*, 13). The enclosure at Cappydonnell Big 1 (Coughlan 2009a), identified in advance of the N6, immediately south of Horseleap, also has medieval phases of occupation contemporary with that of Kilgaroan 1.

Other recorded late medieval monuments, excluding those already mentioned, situated a close distance to the N6 include a motte-and-bailey at Moategranoge (WM030-111), tower houses at Coolalough (WM037-002), Correagh (WM037-007), Farnagh (WM030-103) and Carn Park (WM030-030) and a number of unclassified castles at Williamstown (WM030-091), Magheramore (WM030-099), Killogeenaghan (WM030-089), Coola (WM038-018) and Moycashel (WM037-011), most of which probably date to the later middle ages. A number of church sites are also recorded although it is difficult to establish if they originated during the early medieval period or after.

### **Early Bronze Age Kilgaroan 1**

The Bronze Age activity at Kilgaroan 1, comprising 2 probable refuse pits, is broadly contemporary with the burnt spread activity at Kilgaroan 4 c. 60m to the southeast (Bayley 2009a). This may be sporadic, contemporary, early Bronze Age activity associated with Bronze Age activity in the wider area. Contemporary early Bronze Age burnt mound sites were identified at Correagh 1 (Lynch 2009a) and Kilbeg 7 (McManus 2009) positioned c. 900m to the northwest. These two sites were part of a larger burnt mound complex including other examples further to the west at Kilbeg which are all evidence of extensive Bronze Age activity in the area.

### **Late Medieval Kilgaroan 1**

Excavations at Kilgaroan 1 revealed a charcoal production kiln and spread. The small circular kiln C7, 1.20m x 1.50m x 0.25m, had oxidised edges and frequent charcoal inclusions in both its primary and upper fills. Charcoal (oak twig) from its primary fill was dated between the middle 16th and middle 17th centuries (UBA 9177).

Charcoal production kilns are usually identified as earth-cut pits, containing charcoal rich fills, often with evidence for extensive *in-situ* burning along the base and sides (Carlin *et al* 2008, 101). The large rectangular-shaped kilns appear to represent the 'classic' type, as typified by those found on the M4 (Carlin *et al* 2008), but they can also be circular and oval-shaped (Kenny 2008). A number of other charcoal production kilns were excavated on the N6 Kilbeggan to Athlone road scheme notably at the eastern limit at Kilbeggan South 3 (Coughlan 2009b) and Ballinderry Big 3 (Lynch 2009b). At the former, a large rectangular kiln C12, measuring 2.97m x 1.85m x 0.3m, displayed evidence for a heat-scorched base and sides and contained a charcoal-rich primary fill with a number of large well preserved pieces of carbonised wood. A sample of charcoal from this fill returned 2 Sigma date of AD 1157–1251 (UBA 9188). The upper fill contained mixed clays which possibly represented the collapse of a superstructure after the functional phase of the kiln. An even larger oval-shaped charcoal production kiln C19, 3.3m x 1.96m x 0.05m, also produced a charcoal-rich primary fill with large well preserved pieces of carbonised wood and evidence for intense *in-situ* burning. A similar 2 Sigma date of AD 1052–1217 (UBA 9189) was obtained from charcoal (young oak) within the primary fill. A small oval-shaped example C24, which was dated to 2 Sigma AD 990–1146 (UBA 9190), also had evidence for *in-situ* burning and a charcoal-rich primary fill. At Ballinderry Big 3, the kiln measured 2.78m x 1.14m x 0.18m, displayed evidence for a scorched base and contained a primary fill consisting of over 50% charcoal inclusions. Charcoal

(oak branch) from this fill returned a 2 Sigma date of AD 896–1014 (UBA 9184). Another, large oval example C26, measuring 3.6m x 1.8m x 0.82m, was excavated at Cullenagower 1 (Whitty 2009). No date was established for this site.

Charcoal production kilns were also identified during the construction work associated with the N6 between Kinnegad and Kilbeggan. Two large sub-rectangular examples were excavated at Monganstown 1, between Kinnegad and Tyrellspass, which returned radiocarbon dates between the late ninth and early eleventh centuries (Lehane and Johnston 2007). At Stonehousefarm 3, between Tyrellspass and Kilbeggan, oval and rectangular kilns were uncovered. The primary fill of the latter was charcoal-rich and included large pieces of charred wood (McDermott 2004).

It appears that the majority of charcoal production kilns date to the latter part of the early medieval period into the early part of the later middle ages and the findings on the N6 broadly mirror the findings from other dated kilns (Carlin *et al* 2008; Kenny 2008). It is also apparent that these industrial features were located a safe distance away from settlement sites and in areas close to the required natural resources such as wood and bogland.

### 3.3 Archaeological Typology Background: (Charcoal Production Kilns)

Charcoal production kilns were essential to the ironworking process as charcoal was produced as a fuel in the smelting and forging stages. Very little was known about charcoal production more than 20 years ago Tylecote (1986, 225) and this has changed little since (O'Sullivan and Harney 2008, 198). However, there has been an ever increasing discovery of such sites during the boom in development-led archaeology and excavations of charcoal production kilns are beginning to feature in recent publications (Carlin *et al* 2008; Grogan *et al* 2007; Hull and Taylor 2006).

An unpublished paper by Niall Kenny (2008) has identified approximately 100 charcoal production kilns in Ireland that range in plan from rectangular, oval and circular, with sub-variations of these, and there is an approximate equal amount of each type. It appears, on current evidence, that the classic type are large and rectangular in plan such as Hardwood 3, Co. Meath for example, where long carbonised pieces of oak were found along the axis of the kiln that made up almost 100% of the deposit (Carlin *et al* 2008, 101; Illus. 5.8b, 102). The rectangular kilns tend to be larger than oval and circular types with an average length of 2.5m but they can also be as long as 4m (Kenny 2008, 14–5). The oval kilns tend to be shallower than the other types while the circular examples are usually smaller but deeper compared to rectangular and oval charcoal production kilns (*ibid.* 15).

Charcoal production kilns are identifiable archaeologically as earth-cut pits, with charcoal-rich fills, and evidence for extensive *in-situ* burning along the base and sides (Carlin *et al* 2008, 101; Kenny 2008, 15). Those discovered along the M4 were rectangular or sub-rectangular in plan (Carlin *et al* 2008), whereas Kenny (2008) has also identified circular and oval types. However, it is important to stress that charcoal production kilns, such as Hardwood 3 and Kilmaniheen West 10 and 12, Co. Kerry (Hull and Taylor 2006, 29–30), were recognisable because the carbonised wood had survived *in-situ* upon excavation. These kilns were abandoned possibly due to the charcoal becoming wet which left it useless as a fuel. Successful kilns would not leave abundant charcoal within their primary fills so would appear archaeologically as heat-scorched pits probably containing only moderate amounts of charcoal. This, therefore, conveys the problems positively identifying charcoal production kilns as many charcoal yields will have been previously removed.

The majority of charcoal production kilns are located away from settlements and close to resources required for the primary ironworking processes such as bog and woodlands. Large quantities of tress were required for charcoal production and, similarly, large quantities of iron ore – available within surrounding bogs (Mytum 1992, 230; Raftery 1994, 147) – were needed during the smelting process. Therefore, it made sense, logistically and for safety reasons, for charcoal production kilns to be situated a distance from dwellings and farms and close to available raw materials. Kenny's (2008, 20–2) research has also shown that the majority of kilns are located on sloping and agriculturally unproductive ground and drainage was probably an important factor because it was imperative to keep the charcoal dry.

Radiocarbon dates are beginning to emerge from a number of charcoal production kilns and possible examples. Of those dated, the majority appear to date to the latter part of the early medieval period. The kilns at Hardwood 3, Rossan 3, Ardnamullan and Newcastle 2, excavated along the M4, returned radiocarbon dates between the eighth and thirteenth centuries (Carlin *et al* 2008, 88). The dates appear to converge at a point between the eleventh and twelfth centuries. Kilns at Kilmaniheen West, Co. Kerry and Barefield, Co. Clare also returned radiocarbon dates spanning the latter part of the early medieval period (Hull and Taylor 2006). A circular kiln at Mondaniel 2, Co. Cork was dated to AD 1420–1640 (Kenny 2008, 18) but, on current evidence, charcoal production kilns generally date to the latter part of the early medieval period into the early years of the later middle ages. Therefore, it appears that charcoal production was at its most prolific during these years but dating of further features may alter this picture.

Charcoal is the material produced from the incomplete combustion of wood and was used as an effective fuel – much more so than wood or turf for example – during the smelting and forging stages of ironworking. It was produced through the placement of wood – mainly oak – against a vertical post in earth-cut pits that were covered by layers of straw or bracken and were then sealed by a layer of earth or turf. The post was removed and the kiln was subsequently ignited as the wood was roasted to produce the charcoal over a number of days (Carlin *et al* 2008, 89–91). This was a labour intensive process that required careful supervision and plentiful raw materials and the identification of increasing number of charcoal production kilns emphasises that it was a much more widespread industrial activity than previously considered and that it was an essential component of the iron production process.

### **3.4 Discussion**

#### **3.4.1 Phase 1: Natural Deposits**

This phase represents the natural subsoil, which was cut or sealed by all subsequent archaeological features. For the purposes of recording on site this phase of activity was allocated the context number C2. At the site of Kilgaroan 1 the subsoil was uniform throughout consisting of a yellowish brown sandy clay.

#### **3.4.2 Phase 2: Bronze Age Activity**

Phase 2 represents two pits, C3 and C5 which appear to have been deliberately backfilled. The fill material of both pits appeared to be fire debris. No artefacts were recovered from either of these features. AMS Radiocarbon dating of ash charcoal (*Fraxinus excelsior*) (O'Carroll, Appendix 2.1) recovered from C6, fill of pit C5, returned a 2 Sigma calibrated date of 2115–1925 BC, dating these features to the early Bronze Age period (QUB, Appendix 2.2).

The Bronze Age activity at Kilgaroan 1 is broadly contemporary with the burnt spread activity at Kilgaroan 4 c. 60m to the southeast (Bayley 2009a). This may be sporadic,



contemporary, early Bronze Age activity associated with Bronze Age activity in the wider area. The contemporary early Bronze Age burnt mound sites were identified at Correagh 1 (Lynch 2009a) and Kilbeg 7 (McManus 2009) c. 900m to the northwest and the Kilbeg burnt mound complex further to the west suggests that there was extensive Bronze Age activity in the area.

### **3.4.3 Phase 3: Late Medieval/Post-Medieval Activity**

Phase 3 represents a pit (C7) which appears to represent a charcoal production kiln and an associated spread C11 which probably represents waste material removed from C7. No artefacts were recovered from either of these features. AMS radiocarbon dating of oak charcoal (*Quercus* sp.) (O'Carroll, Appendix 2.1) recovered from C19, a fill of C7, returned a 2 Sigma calibrated date of AD 1521–1656 (QUB, Appendix 2.2), dating these features to the late medieval/post-medieval period.

### **Phase 2 and 3 Landscape**

Kilgaroan 1 is one of four sites that were located within c. 80m of each other. The Bronze Age activity at Kilgaroan 1 is broadly contemporary with the burnt spread activity at Kilgaroan 4 c. 60m to the southeast (Bayley 2009a). Similarly, the late medieval activity at Kilgaroan 1 could be considered to be broadly contemporary with activity at Kilgaroan 3, where a pit that was filled with debris believed to be related to hazelnut roasting also returned a late medieval date (Bayley 2009b).

The activity at Kilgaroan 2 (Bayley 2009c), a burnt spread and associated pits returned an early medieval date that was contemporary with an isolated pit at the eastern end of Kilgaroan 4 c. 65m to the southeast, suggesting an association between these sites.

The various sites in Kilgaroan townland, if taken on an individual basis, would not be particularly important, but collectively they show that the small scale sporadic archaeological activity was ongoing in the area from the Bronze Age through to late medieval/post-medieval times.

### **3.4.4 Phase 4: Topsoil**

This phase represents the topsoil that sealed all of the archaeological deposits and features on site. The topsoil was removed by mechanical excavator fitted with a toothless bucket under strict archaeological supervision.

## 4 CONCLUSIONS

The excavation at Kilgaroan 1 revealed two phases of activity at the site. The first phase comprised two pits, both of which were deliberately backfilled with fire debris. AMS Radiocarbon dating of charcoal recovered from C6, the fill of one of the pits returned a 2 Sigma calibrated date of 2115–1925 BC, dating this activity to the Bronze Age period.

The second phase of activity comprised a pit, possibly a charcoal production kiln, and a spread that was probably formed from waste material removed from the kiln. AMS Radiocarbon dating of charcoal recovered from C19, the fill of the charcoal production kiln returned a 2 Sigma calibrated date of AD 1521–1656, dating these features to the late medieval/post-medieval period.

Charcoal analysis shows alder dominated in the early Bronze Age although large fragment counts of ash were also present. The ash is a dryland tree which prefers to grow on lime rich soils while the alder trees are generally associated with a wetter environment. The oak identified in the pit dating to the late medieval period suggests that there was a supply of oak in the surrounding environment at this time. The oak was possibly selected from a coppiced wood.

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## PLATES



Plate 1: E2697: Northwest facing section of pit C3



Plate 2: E2697: Pit C3, post-excavation, facing west





Plate 3: E2697: Pit C5, post-excitation, facing east



Plate 4: E2697: Northwest-facing section of pit C7





Plate 5: E2697: Pit C7, post-excavation, facing west

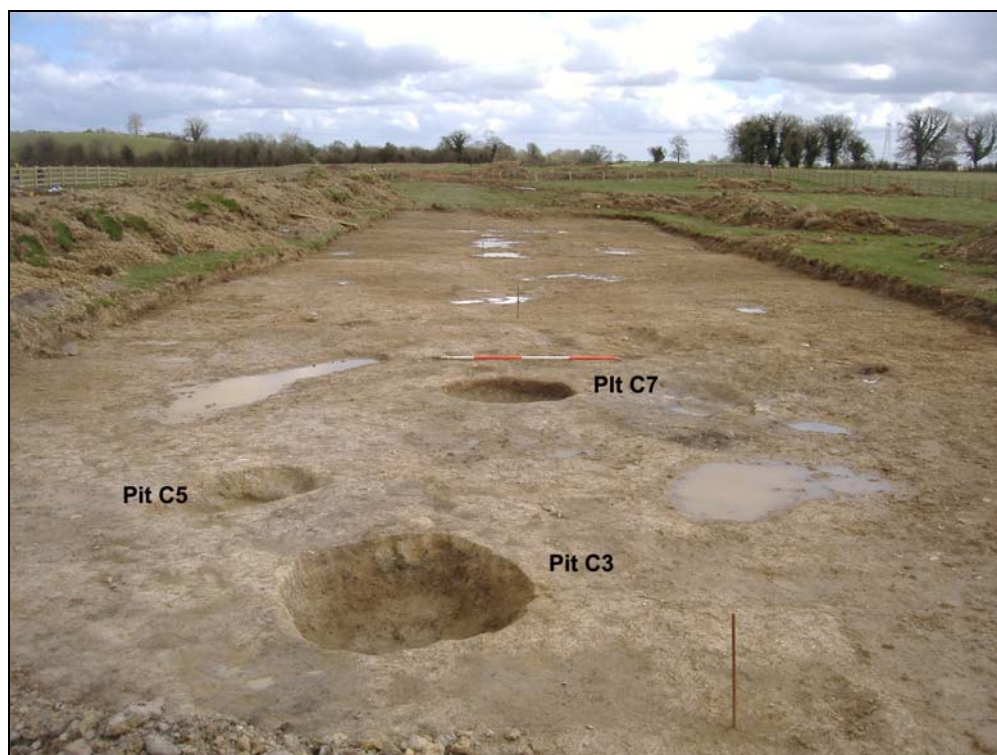


Plate 6: E2697: Post-excavation of site facing southeast



## 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     | N/A  | N/A  | 0.4  | Topsoil  | Mid brown sandy clay   | None  |
| 2       | N/A     | N/A  | N/A  | N/A  | Subsoil  | Light brown medium sand  | N/A   |
| 3       | N/A     | 1.4  | 1.4  | 0.3  | Cut of circular pit  | Circular cut, no orientation, sharp break of slope at top, steep sloping sides, gradual break of slope at base, onto flattish base   | None  |
| 4       | C3      | 1.4  | 1.4  | 0.3  | Fill of pit  | Dark brown/black sandy clay, moderate charcoal fleck inclusions, loose compaction  | None  |
| 5       | N/A     | 1.1  | 0.72 | 0.22 | Cut of pit   | Oblong irregular cut, NW–SE orientation, sharp break of slope at top, steep sloping sides, (break of slope on S side), gradual break of slope at base, irregular concave base. | None  |
| 6       | C5      | 1.1  | 0.72 | 0.2  | Fill of irregular shallow pit, possible dump from near-by burnt area                                     | Mid dark grey silty clay, moderate charcoal fleck inclusions (20%), occ small stone inclusions (10%), firm compaction  | None  |
| 7       | N/A     | 1.2  | 1.5  | 0.25 | Cut of charcoal burning pit, edges of this feature have been oxidised caused by exposure to intense heat | Circular cut, no orientation, sharp break of slope at top, vertical sides, gradual break of slope at base, onto flattish base  | None  |
| 8       | C7      | 1.2  | 1.5  | 0.14 | Top fill of pit (charcoal burning pit)   | Dark brown silty clay, moderate charcoal fleck inclusions (10%) medium compaction  | None  |
| 9       |         |      |      |      | Non-Archaeological   |  | None  |
| 10      |         |      |      |      | Non-Archaeological   |  | None  |
| 11      | N/A     | 2.00 | 2.00 | 0.19 | Spread of archaeological material, probably washed from another area into a natural depression           | Dark brown / black sandy clay, moderate charcoal fleck inclusions, loose compaction  | None  |
| 12      |         |      |      |      | Non-Archaeological   |  | None  |
| 13      |         |      |      |      | Non-Archaeological   |  | None  |
| 14      |         |      |      |      | Non-Archaeological   |  | None  |
| 15      |         |      |      |      | Non-Archaeological   |  | None  |
| 16      |         |      |      |      | Non-Archaeological   |  | None  |
| 17      |         |      |      |      | Non-Archaeological   |  | None  |
| 18      |         |      |      |      | Non-Archaeological   |  | None  |
| 19      | C7      | 1.11 | 1.21 | 0.1  | Basal fill of charcoal burning pit   | Dark black/brown silty clay, frequent charcoal fleck and lump inclusions, occ small stone inclusions medium/hard compaction  | None  |

## **Appendix 1.2 Catalogue of Artefacts**

There were no artefacts recovered from this site.


## Appendix 1.3 Catalogue of Ecofacts

A total of 6 bulk soil samples were taken during the course of excavation at this site. Of these, 2 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

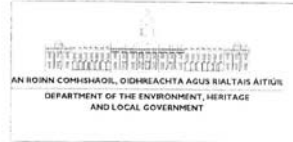
| Context number | Sample number | Feature          | Sample weight (g) |
|----------------|---------------|------------------|-------------------|
| C6             | 1             | Fill of C5       | 40.2g             |
| C19            | 6             | Basal fill of C7 | 33.1g             |

## Appendix 1.4 Archive Checklist

|   |  |                 |
|---|--|-----------------|
| <b>Project: N6 Kilbeggan – Athlone</b>                                    | <b>Irish Archaeological Consultancy Ltd</b>  |                 |
| <b>Site Name: Kilgaroan 1</b>   |  |                 |
| <b>NMS Registration Number: E2697</b>                                     |  |                 |
| <b>Ministerial Direction Number: A016/069</b>                             |  |                 |
| <b>Site Director: David Bayley</b>  |  |                 |
| <b>Date: 10 November 2008</b>   |  |                 |
| <b>Field Records</b>  | <b>Items (quantity)</b>  | <b>Comments</b> |
| Site drawings (plans)   | 2  |                 |
| 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)  | 6  |                 |
|   |  |                 |
| Survey/levels data (origin information)                                   | 30   |                 |
|   |  |                 |
| Context sheets  | 19   |                 |
| Wood Sheets   | 0  |                 |
| Skeleton Sheets   | 0  |                 |
| Worked stone sheets   | 0  |                 |
|   |  |                 |
| Digital photographs   | 23   |                 |
| Photographs (print)   | 0  |                 |
| Photographs (slide)   | 0  |                 |
|   |  |                 |
| <b>Finds and Environ. Archive</b>   |  |                 |
| 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)                                 | 6  |                 |
| 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



File:

Direction No. A16

**Registration Number: E2697**

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 Mr. David Bayley of Irish Archaeological Consultancy, 8 Dunngar Terrace,, Dun Laoghaire,, Co. Dublin.

For a registration number to record excavation at the site of Kilgaroan 069 being part of the townland of KILGARROAN 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 Bord 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 additional 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: A016/069  
NMS REGISTRATION NUMBER: E2697  
KILGARROAN 1

**Ellen O'Carroll MA DIP. EIA Mgt**  
**Archaeological Consultancy & Wood Specialist**  
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Mob: + 353 (0) 086 8241753  
Tel/Fax: + 353 (0)1 2360795  
Email: eocarroll@ireland.com

## 1. Introduction

Two samples were submitted for analysis. The charcoal was sent for species identification prior to  $^{14}\text{C}$  dating and also to give an indication of the range of tree species, which grew in the area at the time of use of the site. Charcoal analyses may provide information on the utilization of certain species for various functions. Wood used for fuel at pre-historic sites would generally have been collected at locations close to the site. Therefore charcoal identifications may, but do not necessarily, reflect the composition of the local woodlands. Larger pieces of charcoal, when identified, can provide information regarding the use of a species for certain structural requirements or particular functions.

This site is located in the townland of Kilgaroan, c. 2.5km west of Kilbeggan 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 site at Kilgaroan 1 comprised a series of possible pits and a spread. The largest single pit (dimensions 1.4m long x 1.4m wide and 0.3m deep), potentially functioned as a charcoal production kiln. The remaining pits may have contained dumps of material related to charcoal production. No finds were recovered during the excavation.

The samples analysed were retrieved from C6, the fill of a pit and dated to the early Bronze Age CAL 2115–1925 BC (2 Sigma) and the fill of a charcoal rich pit C19 dated to CAL AD 1521–1656 (2 Sigma). The dates and subsequent charcoal identifications indicate that these two features are not related to each other.

## 2. 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). 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 Nikon SMZ800 zoom stereomicroscope at magnifications x 10 – 190 and a transmitted light compound microscope at magnifications of x 10 – 400. By close examination of the microanatomical features of the samples the species were determined. The diagnostic features used for the identification of charcoal are micro-structural characteristics such as the vessels and their arrangement, the size and arrangement of rays, vessel pit arrangement and also the type of perforation plates. The charcoal samples were identified by weight and fragment count whereby each species was grouped together and a total weight and fragment count was obtained.

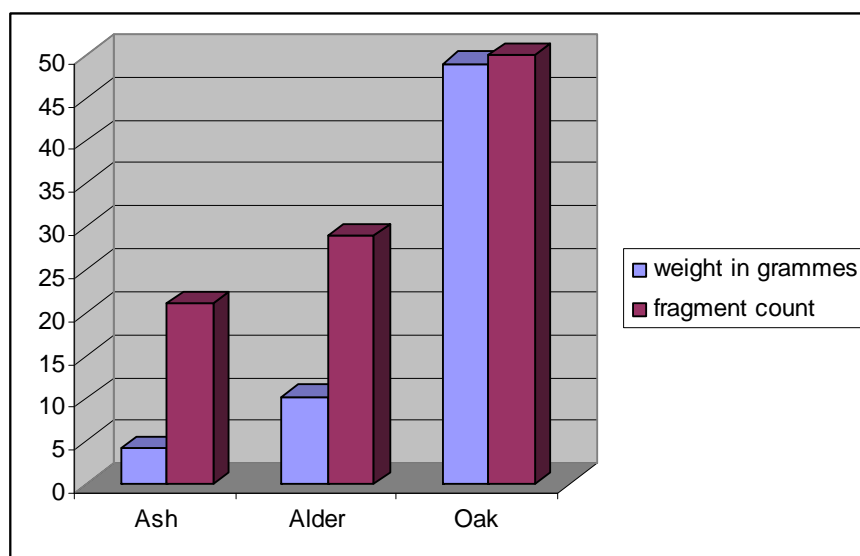
## 3. Results

Table 1: Results from charcoal identifications

| Site no. | Context no. & type | Sample no. | Species                               | Comment                            | Date             |
|----------|--------------------|------------|---------------------------------------|------------------------------------|------------------|
| A016/69  | C6, fill of pit    | 1          | alder (10.2g*, 29f*), ash (4.2g, 21f) | Iron stained and in poor condition | CAL 2115–1925BC  |
| A016/69  | C19, fill of pit   | 6          | All oak (49g, 50f)                    | Brushwood coppice-9–10yrs          | Cal AD 1521–1656 |

g\* = grammes f\* = fragment count

Table 2: Results from charcoal identifications



#### 4. Discussion & Conclusions

Oak, alder and ash in that order were identified from the pits.

Oak (*Quercus* sp) was the only taxon identified from the charcoal remains from the Medieval dated pit C19. The presence of such large quantities of oak, comprising mainly of brushwood of 9–10 years, may point towards an industrial function or a charcoal production pit. As there was only one taxon present in the pit the activities associated with that pit may represent a single episodic event.

Oak is a dense wood and is very suitable for charcoal production. It also makes good firewood when dried and will grow in wetland areas when conditions are dry. Oak also has unique properties of great durability and strength. Sessile oak (*Quercus petraea*) and pedunculate oak (*Quercus robur*) are both native to and common in Ireland. The wood of these species cannot be differentiated based on its microstructure. Pendunculate oak is found on heavy clays and loams particularly where the soil is of alkaline pH. Sessile oak is found on acid soils often in pure stands and although it thrives on well-drained soils it is also tolerant of flooding (Beckett 1979, 40–41). Both species of oak grow to be very large trees (30–40m) and can live to an age of about 400 years.

The oak identified suggests that there was a supply of oak in the surrounding environment in the early medieval period. The oak was possibly selected from a coppiced wood. A coppice tree is where the tree is cut down at its base and as a consequence several new shoots or straight growing trees will grow out of this one stump. The use of quickly renewable oak coppiced trees would have been the most efficient method of sustaining a continuous supply of fuel for use in these charcoal production pits.

Alder dominated at the early Bronze Age dated spread C6 although large fragment counts of ash were also present. A function for this pit is not determined as yet therefore it is also difficult to attribute a function to the identified charcoal from C6. The ash is a dryland tree which prefers to grow on lime rich soils while the alder trees are generally associated with a wetter environment.

It is clear from both the dating and charcoal results that the two pits have no relation to each other.

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.

## 5. References

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- Irish Archaeological Wetland Unit, 1993 *Excavations at Clonfinlough, County Offaly*. Transactions 2. Dublin.
- Nelson E C 1993 *Trees of Ireland*. The Lilliput Press, Dublin.
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- Webb, D A 1977 *An Irish Flora*. Dundalgan Press Ltd, Dundalk.

RADIOCARBON DATING RESULTS  
KILGARROAN 1

CHRONO LABORATORY, QUEENS UNIVERSITY BELFAST

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**14** CHRONO

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42 Fitzwilliam Street  
Belfast BT9 6AX  
Northern Ireland

## Radiocarbon Date Certificate

Laboratory Identification: UBA-9176  
Date of Measurement: 2008-05-26  
Site: A016/069 Kilgaran Co. Westmeath  
Sample ID: S1 C6  
Material Dated: Ash  
Pretreatment: AAA  
Submitted by: IAC

<sup>14</sup>C Date: 3631±21  
AMS δ<sup>13</sup>C: -23.9

### 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

S1 C6

UBA-9176

Radiocarbon Age BP 3631 +/- 21

Calibration data set: intcal04.14c

% area enclosed cal AD age ranges

# Reimer et al. 2004  
relative area under  
probability distribution

68.3 (1 sigma) cal BC 2025– 1963

1.000

95.4 (2 sigma) cal BC 2115– 2098

0.035

2038– 1925

0.965

#### 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-9177  
Date of Measurement: 2008-05-26  
Site: A016/069 Kilgaroan Co. Westmeath  
Sample ID: S6 C19  
Material Dated: Oak Twig  
Pretreatment: AAA  
Submitted by: IAC

<sup>14</sup>C Date: 286±19

AMS δ<sup>13</sup>C: -24.8

### 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

S6 C19  
UBA-9177

Radiocarbon Age BP 286 +/- 19

Calibration data set: intcal04.14c

% area enclosed cal AD age ranges

# Reimer et al. 2004  
relative area under  
probability distribution

|                |                   |
|----------------|-------------------|
| 68.3 (1 sigma) | cal AD 1528- 1552 |
|                | 1633- 1648        |
| 95.4 (2 sigma) | cal AD 1521- 1577 |
|                | 1582- 1591        |
|                | 1621- 1656        |

|       |
|-------|
| 0.554 |
| 0.446 |
| 0.566 |
| 0.021 |
| 0.413 |

#### 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.

**APPENDIX 3 LIST OF RMP SITES IN THE AREA**

| <b>RMP No</b> | <b>Description</b>     |
|---------------|------------------------|
| WM037-005     | Ringfort - Rath        |
| WM037-006     | Ringfort - Rath        |
| WM037-007     | Castle - Tower House   |
| WM037-008     | Ringfort (Rath/Cashel) |
| WM037-009     | Cist                   |
| WM037-010     | Cist                   |
| WM037-011     | Castle Site            |
| WM038-016     | Ringfort - Rath        |
| OF002-035     | Earthwork - possible   |
| OF002-036     | Ringfort (Rath/Cashel) |

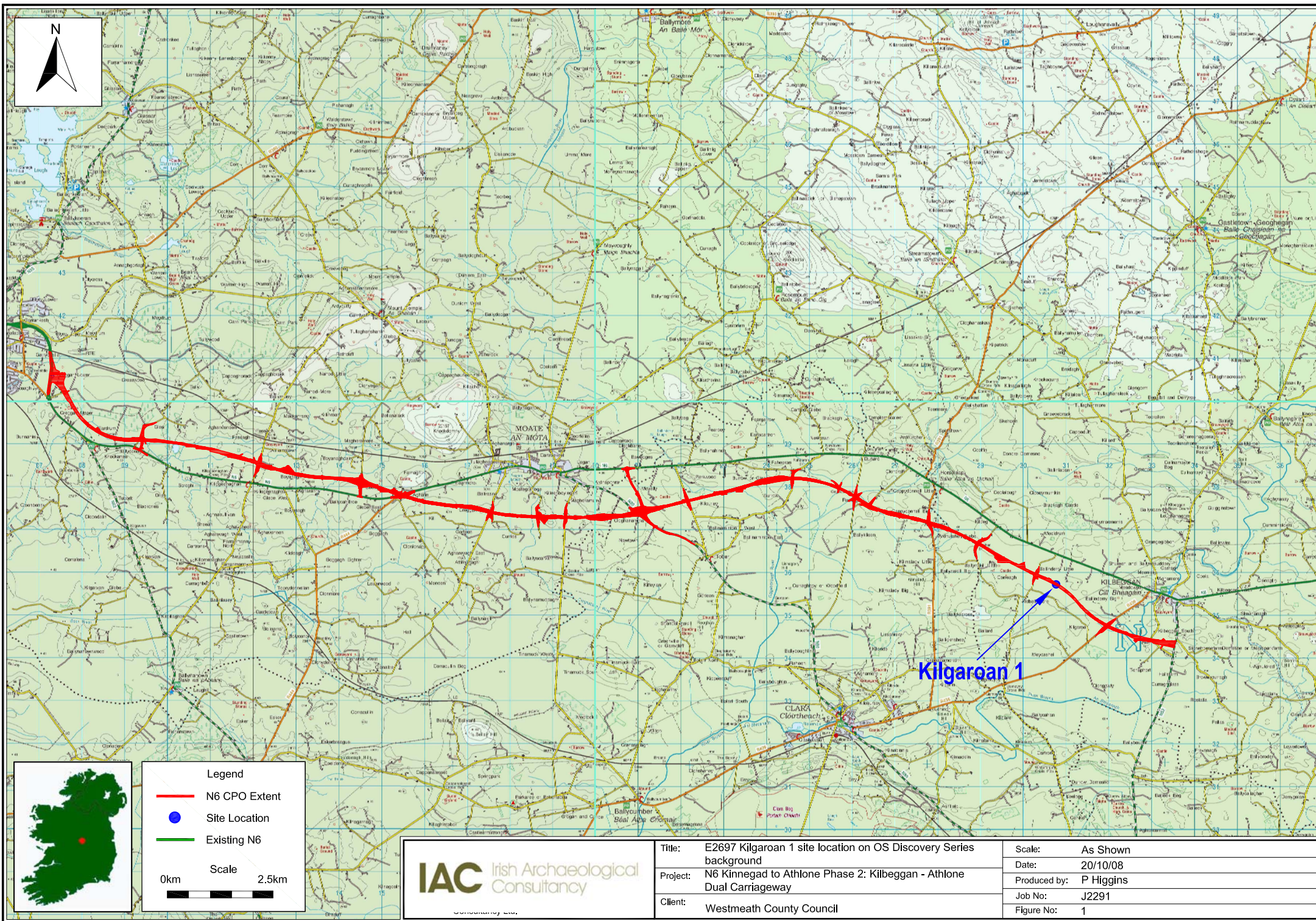
See Figure 2 for location

**APPENDIX 4 LIST OF N6 SCHEME SITE NAMES**

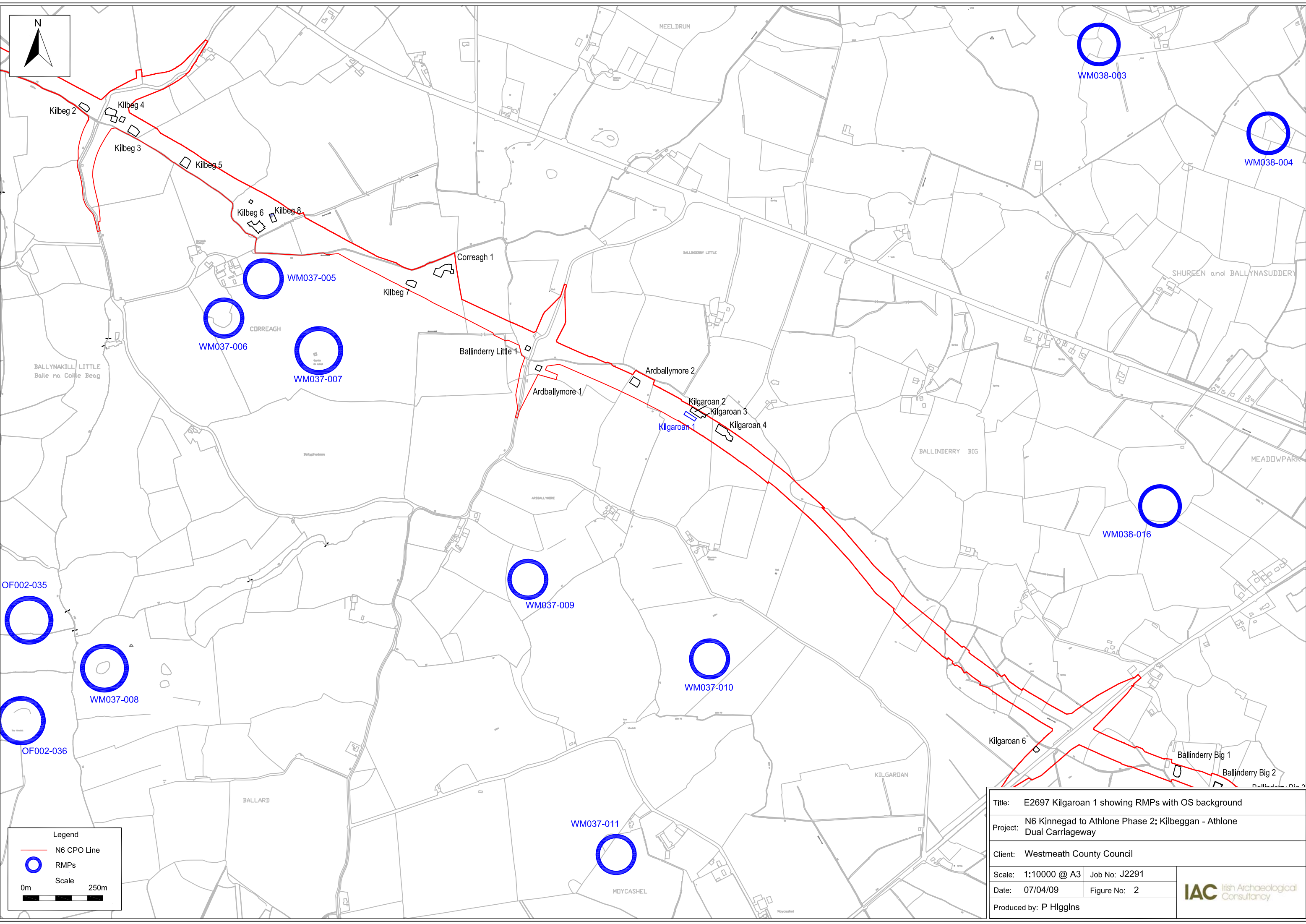
| Site Name                | Ministerial Direction No. | NMS Registration Number |
|--------------------------|---------------------------|-------------------------|
| Seeoge 2                 | A016/007                  | E2635                   |
| Moyally 7                | A016/015                  | 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                   |









Title: E2697 Kilgaroan 1 showing RMPs with OS background

Project: N6 Kinnegad to Athlone Phase 2: Kilbeggan - Athlone Dual Carriageway

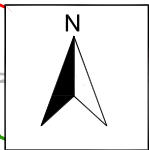
Client: Westmeath County Council

Scale: 1:10000 @ A3 Job No: J2291

Date: 07/04/09 Figure No: 2

Produced by: P Higgins

IAC Irish Archaeological Consultancy



26100.000

Ardballymore 2

26200.000

26300.000

Kilgaroan 1

Kilgaroan 2

Kilgaroan 3

26400.000

Kilgaroan 4

26500.000

26600.000

Legend

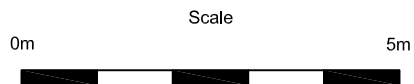
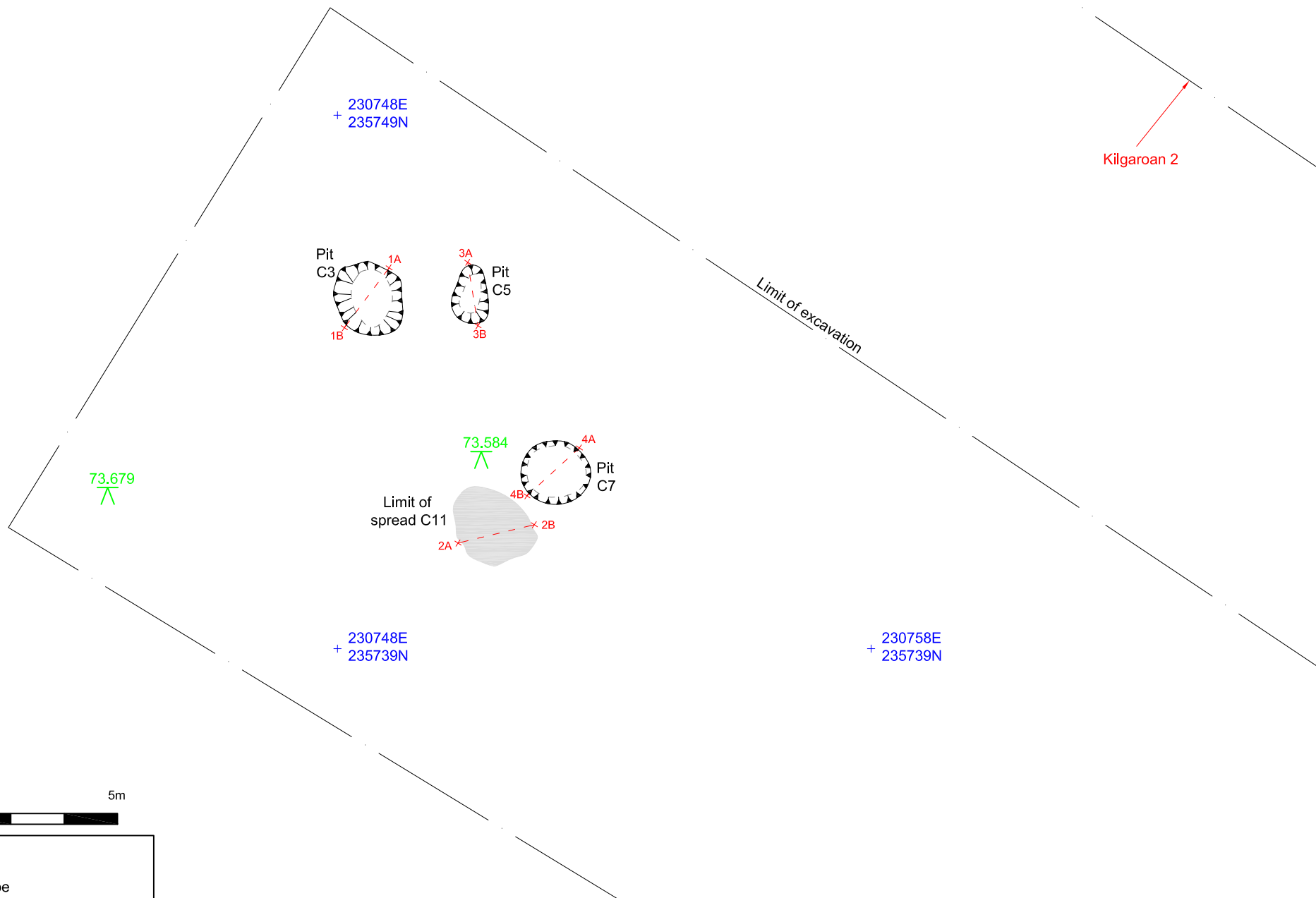
- N6 CPO Line
- Chainage
- Site Extents

Scale

0m 50m

**IAC** Irish Archaeological Consultancy

|          |  |              |             |
|----------|--|--------------|-------------|
| Title:   | E2697 Kilgaroan 1 location of site within development                | Scale:       | 1:2000 @ A4 |
| Project: | N6 Kinnegad to Athlone Phase 2: Kilbeggan - Athlone Dual Carriageway | Date:        | 07/04/09    |
| Client:  | Westmeath County Council   | Produced by: | P Higgins   |
|          |  | Job No:      | J2291       |
|          |  | Figure No:   | 3           |



#### Legend

- Break of slope
- - - Sections
- - - Limit of Excavation
- C## Cut numbers
- xx.xxx Reduced Levels

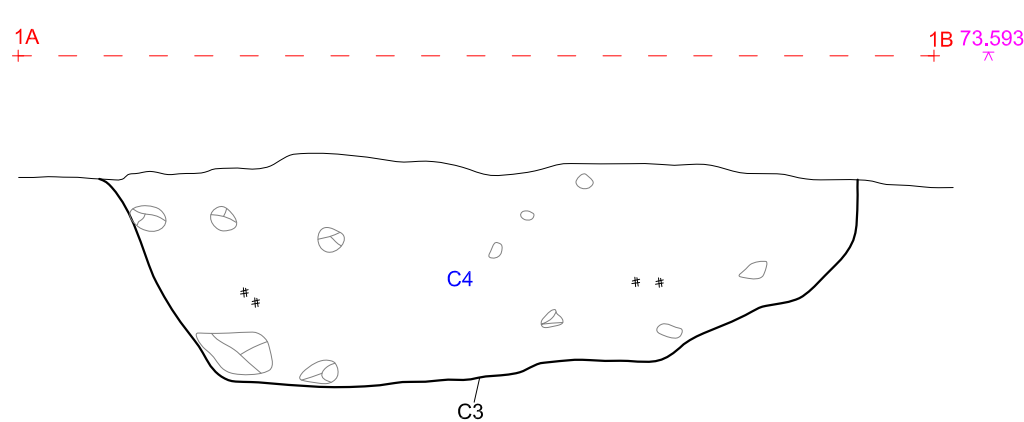
**IAC** Irish Archaeological  
Consultancy

Title: E2697 Kilgaroan 1 site plan  
Project: N6 Kinnegad to Athlone Phase 2: Kilbeggan - Athlone  
Dual Carriageway  
Client: Westmeath County Council

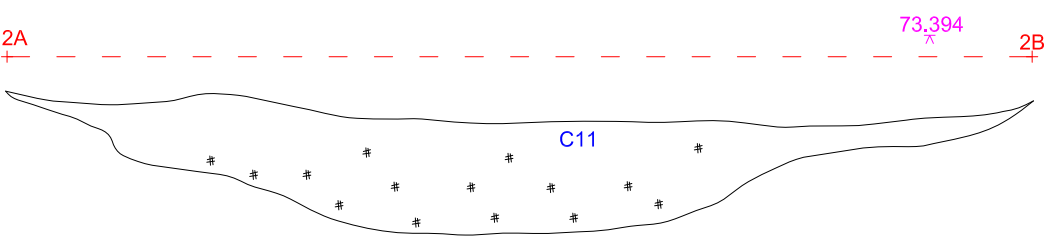
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Date: 07/04/09  
Produced by: G Kearney  
Job No: J2291  
Figure No: 4



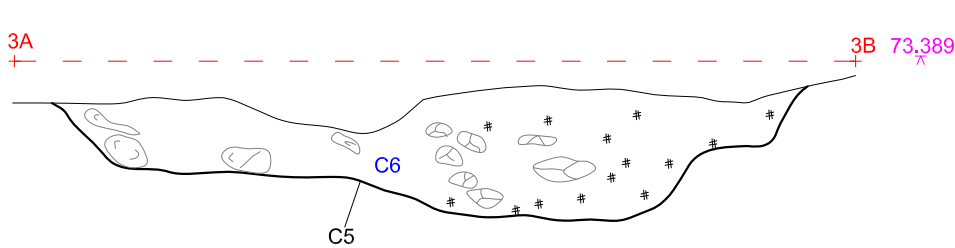
Kilgaroan 1  
Northwest facing section of C3



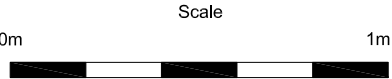
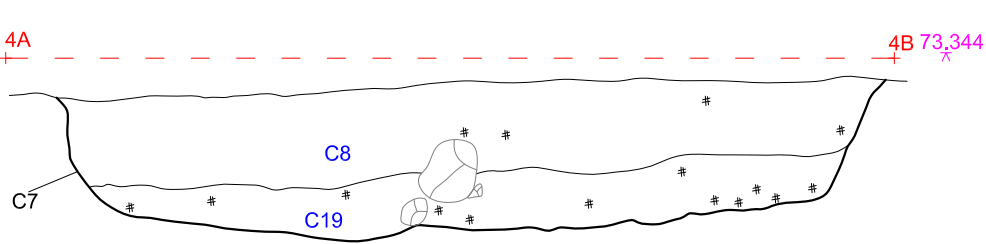
Kilgaroan 1  
Southeast facing section of C11



Kilgaroan 1  
West facing section of C5



Kilgaroan 1  
Northwest facing section of C7



Legend

- C## Cut numbers
- C## Fill Numbers
- Stone
- # Charcoal
- ###,## Reduced Levels

|  |          |  |              |           |
|--|----------|--|--------------|-----------|
|  | Title:   | E2697 Kilgaroan 1 sections   | Scale:       | 1:20 @ A4 |
|  | Project: | N6 Kinnegad to Athlone Phase 2: Kilbeggan - Athlone Dual Carriageway | Date:        | 07/04/09  |
|  | Client:  | Westmeath County Council   | Produced by: | G Kearney |
|  |          |  | Job No:      | J2291     |
|  |          |  | Figure No:   | 5         |

