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N22 Tralee Bypass/Tralee to Bealagrellagh, Co. Kerry. Archaeological Services Contract, Stage (iii) – Excavation.
Final Excavation Report for Lismore 2 in the townland of Lismore, Co. Kerry.

Ministerial Directions Number: A56
Excavation Registration Number: E4291
Townland Name: Lismore, Co. Kerry
Site Type: *Fulacht fia*
National Grid Reference: 087244/118217
O.D. Height: 113.9260 m to 115.6580 m (SW-NE)
Archaeological Consultant: Rubicon Heritage Services Ltd
Director: Tony Bartlett
Report Author: Carmelita Troy

RUBICON HERITAGE

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EXECUTIVE SUMMARY

This report presents the final results of an archaeological excavation undertaken at Lismore 2, Co. Kerry, on behalf of Kerry County Council. The works were undertaken as part of Stage (iii) of the Archaeological Services Contract prior to the commencement of construction of the N22 Tralee Bypass/Tralee to Bealagrellagh, Co. Kerry, which extends from Lissatanvally townland to Flemby townland in Co. Kerry. The Minister of the Environment, Heritage and Local Government, following consultation with the National Museum of Ireland, issued Directions to Kerry County Council for archaeological works relating to the road development (Ministerial Directions No. A56). The registration number, E4291, was allocated by the National Monument Service for archaeological excavations at Lismore 2 under the direction of Tony Bartlett of Rubicon Heritage Services Ltd (formerly Headland Archaeology (Ireland) Ltd).

Following a route constraints study, and a route appraisal and selection report, an Environmental Impact Study was carried out on the preferred route, including a chapter on archaeology and cultural heritage (Atkins 2008). A number of archaeological and architectural heritage constraints were identified along the route of the road and a number of recommendations were set out for the treatment of the sites and potential sites identified. Included in these recommendations were geophysical survey, test-excavations of the entire route, survey of the townland boundaries, underwater surveys and survey of architectural/built heritage sites, which were completed as part of Stage (i) archaeological work on the scheme (Bartlett *et al.* 2010a; Harrison 2010; Kieran and Hayden 2010; Long 2010 a-e).

Archaeological test trenching along the entire route (including Wetland Test Excavation) was carried out by Rubicon Heritage Services Ltd on behalf of Kerry County Council between 9 August 2010 and 3 September 2010 under Excavation Registration Number E4149. Additional testing was undertaken in wetland areas between 22 September and 1 October 2010 under the same licence number. Due to the number and size of powerline exclusion zones test trenching was undertaken in exclusion zones between 29 September and 15 October 2010. The test excavations at Lismore 2 identified a deposit of heat-shattered stones and charcoal-enriched soil measuring 13.70 m by 5.60 m, two possible pits and a number of modern linear drainage features (Bartlett *et al.* 2010a).

Stage (ii) stripping, cleaning and mapping of all areas of archaeological potential identified during test trenching was carried out by Rubicon Heritage Services Ltd on behalf of Kerry County Council between 30 August and 13 October 2010 (Bartlett *et al.* 2010b). Stage (ii) works at Lismore 2 confirmed the presence of a *fulacht fia*.

Full archaeological excavation was undertaken at the site between 7 and 11 March 2011; a preliminary report on the results of the excavation was submitted in July 2011 (Clark 2011).

The area of excavation measured 634 m² revealing two phases of activity dating to the Late Bronze Age and post-medieval period. The archaeological features identified included a *fulacht fia* comprising a burnt mound and pit, as well as a small burnt spread and a small cluster of stake-holes. Agricultural practices such as ploughing and land drainage was also identified at the site

Features
Phase I: In the south-southeast of the excavation area was a small spread of burnt material which was truncated by a Phase II plough furrow.

An oval pit was situated approximately 0.50 m to the southeast of the small spread and measured 1.25 m in length, 0.94 m in width and 0.40 m in depth. It was filled by grey clayey silt, which had a moderate compaction.

A sub-oval pit measured 1.24 m long by 0.70 m wide by 0.14 m deep and was located approximately 3 m to the south-southwest of the oval pit. Its fill comprised moderately compacted, mid-grey silty clay, which contained very frequent heat-shattered stones and moderate charcoal inclusions.

A large sub-rectangular pit was situated approximately 0.10 m to the southeast of sub-oval pit. This feature measured 3.35 m in length, 2.45 m in width and 0.90 m in depth. The pit contained six fills consisting of silty clays with varying amounts of heat-shattered stone and charcoal.

A rectangular trough was located approximately 0.35 m to the southeast of the large sub-rectangular pit and measured 2.05 m (northwest/southeast) by 1.47 m by 0.70 m deep. A possible silty clay lining was identified along the northern and south-eastern sides of the trough. Six stake-holes truncated the base and sides of this feature. The earliest fill within trough mid-greyish black silty clay, which contained frequent heat-shattered stones and occasional charcoal inclusions. This was situated beneath black, charcoal-rich silty clay.

An area of intensely oxidised silty clay was located at the southeast end of the trough. This oxidised area measured 1.58 m in length and 0.72 m in width and was truncated by a total of six stake-holes. It is likely to represent a hearth area.

A further 12 stake-holes and three post-holes were identified to the northeast and southwest of the trough; however, no visible pattern or alignment could be discerned that would indicate the function of these features. Overlying the stake-holes, post-holes and trough was the main burnt mound deposit. Directly to the west of trough were two small distinct spreads of burnt material.

Approximately 1 m to the southwest of the spreads was an isolated post-hole. This feature measured 0.25 m by 0.24 m by 0.24 m deep and was filled by loosely compacted, mid-greyish brown silty clay, which contained small to medium-sized stone inclusions.

Phase II: The second phase of activity at the site was post-medieval in date and related to agricultural practices such as ploughing and land drainage.

Samples
A total of 14 soil samples were retained from the excavation. The soil samples were processed for environmental data. Charcoal fragments identified were both oak and non-oak species including hazel and alder, which suggests that a diverse range of both wetland and dryland taxa were being utilised from the local woodland, these would have been the fuel resource for the *fulacht fia* activity.

Dating
A total of two radiocarbon dates were obtained from the site excavated at Lismore 2. These indicate that the activity took place during the Late Bronze Age (*c*. 970–797 BC) (Appendix 8).

1 INTRODUCTION

This report presents the Final results of archaeological excavations carried out at Lismore 2 in advance of the proposed N22 Tralee Bypass/ Tralee to Bealagrellagh road scheme.

The proposed scheme has two main components, the N22 Tralee Bypass and the N22 Tralee to Bealagrellagh Road (Figure 1). The N22 Tralee Bypass extends from the N69 National Secondary Route approximately 4km north of Tralee town to the N70 National Secondary Route approximately 500 metres south of the town. It passes east of the town via the N21 National Primary Route and the proposed intersection with the N22 Tralee to Bealagrellagh Route (N22 Access Route). The N22 Tralee to Bealagrellagh road will provide a separate access route to Tralee from the N22 Killarney Road.

Kerry National Road Design Office (NRDO) initially prepared a Route Constraints Report for this scheme in January 2000 (Kerry NRDO 2000). Following the completion of this report, six route options were identified. An environmental assessment of the Route Options was undertaken by RPS-MCOS on behalf of Kerry NRDO and this formed part of the Route Selection Report in August 2002 (Kerry NRDO 2002).

The preferred route, determined in the Route Appraisal and Selection Report was a combination of two of the originally proposed route options. In 2007 Kerry NRDO developed a number of route options as alternatives to Section A of the Bypass, these linked to the improved section of the N69 at Leath Cross. In 2007, Atkins prepared An Environmental Constraints Report for the Proposed Scheme Extension to N69 to Leath on behalf of Kerry NRDO.

The Constraint Studies included archaeology and heritage and all identified issues and data in relation to this was used in the identification of route options in the Route Selection Report. Following route selection an Environmental Impact Statement (EIS) was carried out on the entire length of the proposed road (Atkins 2008). The scheme was approved by An Bord Pleanála (Ref. PL08 .HA0016) in September 2009.

The project is funded by the Department of Transport under the National Development Plan 2007-2013 and the Transport 21 programme. The total archaeological cost is administered by the National Roads Authority through Kerry County Council.

Rubicon Heritage Ltd. was formerly known as Headland Archaeology (Ireland) Ltd. The company underwent a rebranding in December 2011. Reports written by the company prior to this date are referenced to Headland Archaeology (Ireland) Ltd in the bibliography, though for consistency the company is referred to as Rubicon Heritage Ltd. throughout this report.

Archaeological test excavations (including wetland test excavation and targeted test excavation), a townland boundary survey, targeted geophysical survey, an underwater survey and an architectural/built heritage survey were undertaken along the entire route of the scheme Rubicon Heritage Services Ltd under Stage (i) of the Archaeological Services Contract (Bartlett *et al.* 2010a; Harrison 2010; Kieran and Hayden 2010; Long 2010 a-e). A total of 41 areas of archaeological potential were identified.

Stage (ii) works on the scheme involved the mechanical stripping of topsoil, hand cleaning of exposed surfaces and mapping of features identified at each site of archaeological potential. This was carried out by Rubicon Heritage Services Ltd between 30 August and 13 October 2010 (Bartlett *et al.* 2010b). Following Stage (ii) investigations a total of 38 archaeological sites discovered during the course of works by Rubicon Heritage Services Ltd were recommended for Stage (iii) excavations in advance of

construction works. An additional site in the townland of Camp was identified during works by the NRA project archaeologist during additional testing in wetland areas, bringing the total number of sites to 39.

Archaeological excavations were then undertaken by Rubicon Heritage Services Ltd at 35 of these sites between Monday the 24th January and Friday the 1st April 2011 under Stage (iii) of the Archaeological Services Contract.

Post-excavation assessment reports were completed by August 2011 and a program of specialist analysis and dating was then undertaken. This report presents the final excavation results including the result of all specialist analysis and radiocarbon dating.

2 SITE BACKGROUND AND LOCATION

2.1 Site location

Lismore 2 was situated in the townland of Lismore, parish of Ratass, barony of Trughanacmy and was located 2.5 km northeast of Tralee town at National Grid Reference: 087244/118217 (Figure 1). The site itself was situated to the north of a modern boundary in a grass pasture field, which gently sloped from north to south towards a small stream. However, no remains were found to the south of the boundary and no trace of the *fulacht fia* was visible within the boundary itself.

A summary of the soils and geology of the area was included in the Geology and Hydrogeology chapter of the EIS (Atkins 2008). There is little detailed regional information of the superficial geology of the area, but the Route Appraisal and Selection Report indicates that the majority of the site is directly underlain by Boulder Clay. However, the section of the preferred route which crosses the floodplain of the River Lee (i.e. west of Curraghleha) is described to be underlain by Alluvium.

The majority of rock formations encountered in and around Tralee are Lower Carboniferous (Dinantian) and Middle Carboniferous (Namurian) in age. The main formations underlying the greatest distances of the preferred route, from north to south, include the following: Numarian (undifferentiated) (NUM), comprised of black shales and sandstone; Cracoean Reef facies (CLcr) (eastern transgression of the Cloonagh Limestone (CL) Formation) comprised of unbedded pale grey limestone; Waulsortian Formation (WA), comprised of massive limestones; and Ballysteen Formation (BA), comprised of dark grey limestone and black mudstone.

The superficial geology in the area of Lismore 2 is boulder clay while the underlying bedrock geology is Numarian (undifferentiated).

2.2 General background

No previously recorded archaeological remains are located within 300 m of Lismore 2. The EIS did note a cropmark (ARCH 22) within the townland, 180 m north of Lismore 2 but test trenching in the area found no archaeological remains. Lismore House and related post-medieval structures were located 30 m to the northwest at Lismore 1.

Within the wider area (1 km) there are a range of recorded monuments:

SMR No	Class	Townland
KE029-042003-	Burial	Ballynabrennagh upper
KE029-042001-	Church	Ballynabrennagh upper
KE029-033001-	Church	Lismore
KE029-248----	Enclosure	Lismore, Lissatanvally
KE029-225----	Enclosure	Lissatanvally
KE029-042002-	Enclosure	Ballynabrennagh upper
KE029-224----	Enclosure	Lissatanvally
KE029-033003-	Graveyard	Lismore
KE029-036----	Ringfort - rath	Lismore
KE029-037----	Ringfort - rath	Ballintobeenig

KE029-034----	Ringfort - rath	Lismore
KE029-043----	Ringfort - rath	Ballynabrennagh upper
KE029-099----	Ringfort - rath	Ballynabrennagh lower
KE029-040----	Ringfort - rath	Ballynabrennagh upper
KE029-041----	Ringfort - rath	Ballynabrennagh upper
KE029-034001-	Souterrain	Lismore
KE029-034002-	Delisted	Lismore

These remains point to high levels of activity in the area during the early medieval period though there is the possibility that some of the enclosures may be earlier in date. In general, prior to the current scheme there was little in the way of prehistoric archaeology known in the vicinity of Lismore 2. Even within 2 km of Lismore 2 there is only one other monument of probable prehistoric date know, that being a *fulacht fia* at Dromthacker (KE029-232).

2.3 Recent excavations

The Archaeological Excavations Bulletin was checked for a record of any licensed archaeological investigations carried out in the townland of Lismore since 1970, however none were recorded.

Archaeological investigations undertaken as part of Stage (iii) of the Archaeological Services Contract in advance of the N22 Tralee Bypass identified post-medieval building remains at Lismore 1 approximately 30 m to the north (Troy 2012a). Excavations carried out 750 m to the south at Ballynabrennagh Lower 1 revealed an Early Bronze Age house and some Developed Iron Age activity (Hourihan 2012).

Lismore 1 is a further indication of the post-medieval activity represented by the remains of structures associated with Lismore House. The excavation at Ballynabrennagh Lower suggests there was activity in the general area from at least the Early Bronze Age.

3 OBJECTIVES AND METHODOLOGY

3.1 Objectives

The objective of the work was the preservation-by-record through appropriate rescue excavation of any significant archaeological features or deposits, which have been identified within the land take of the proposed development, in advance of the road construction programme, so as to mitigate the impact of the road development on this archaeological material.

3.2 Methodology

Full archaeological excavation was undertaken at Lismore 2 between 7 and 11 March 2011. The crew for the excavation consisted of 1 director, 1 supervisor and 5 site assistants.

Topsoil stripping of the site was conducted using a 360° tracked machine fitted with a 1.8 -2 m wide ditching (toothless) bucket under constant archaeological supervision. A total area of 634 m² was exposed. The resulting surface was cleaned and all potential features investigated by hand. Archaeological contexts were recorded by photograph and on pro forma record sheets. Plans and sections were drawn at scales of 1:10 and 1:20. Registers are provided in the appendices (Appendices 1-5). Ordnance Datum levels and feature locations were recorded using Penmap and a total station theodolite.

Environmental samples were taken from any deposits suitable for analysis or dating as per Rubicon Heritage Services Ltd environmental guidelines and following consultation with environmental archaeologist and archaeobotanist Dr. Scott Timpany.

As part of Stage (iv) post-excavation services environmental samples were analysed by the appropriate specialist and a report produced on the findings; this report has been incorporated into this final report (see appendices).

4 THE RESULTS

A total area of 634 m² was exposed at Lismore 2 (Figure 4; Plate 5), revealing two phases of activity. The Phase I features seem to have been related to a Late Bronze Age *fulacht fia*, while Phase II was associated with post-medieval agricultural activities.

The topsoil at the site (001) was a maximum of 0.35 m deep and comprised dark brown silty clay. Natural geological strata (002) consisted of mottled mid-orangey grey silty clay.

4.1 Phase I

The remains of the *fulacht fia* represent the earliest activity at the site.

In the south-central area of the site was a regular rectangular pit (017) interpreted as a trough. It had rounded corners, gradual breaks of slope, near vertical sides and a flat base. It measured 2.05 m (northwest/southeast) by 1.47 m by 0.70 m deep (Figures 5 and 6; Plate 2, 3 and 6). Six stake-holes ((048), (062), (064), (076), (078), and (080)) were cut at the base and sides of this feature. For ease of presentation the description of these features has been entered into a table (Table 1).

Context number	Corner:	Description	Length (m)	Width (m)	Depth (m)	Filled by:	Description
(048)	South	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a pointed base	0.06	0.06	0.15	(047)	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions
(062)	South	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a pointed base	0.12	0.09	0.14	(061)	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions
(064)	East	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a pointed base	0.08	0.08	0.18	(063)	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions
(076)	West	Circular feature with gradual breaks of slope and near vertical sides that tapered to a rounded base	0.04	0.04	0.06	(075)	Moderately compacted, dark grey silty clay with moderate charcoal fleck inclusions
(078)	North	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a	0.15	0.10	0.17	(077)	Moderately compacted, dark grey silty clay with moderate charcoal fleck inclusions

Context number	Corner:	Description	Length (m)	Width (m)	Depth (m)	Filled by:	Description
		rounded base					
(080)	North	Sub-circular feature with sharp breaks of slope and near vertical sides that tapered to a rounded base	0.07	0.07	0.18	(079)	Moderately compacted, dark grey silty clay with moderate charcoal fleck inclusions

Table 1 – Description of stake-holes truncating trough (017)

Four stake-holes (076), (078), (064) and (062) were set into the four corners of the trough in a rectangular arrangement. It is common in trough with wooden lining for corner stakes to be employed to keep the structure in place. While no other evidence of a wooden lining was present these stake-holes do raise the possibility that one may have existed. Other stakeholes (080), (054) and (048) formed no obvious pattern but were generally set in the corner areas and may have been used in conjunction with the corner stakes is a wooden lining was in place. Alternatively all the stakeholes may have supported a light superstructure. A possible silty clay lining (091) was identified along the northern and south-eastern sides of the trough. This material was light bluish grey in colour, with a moderate compaction, possibly indicating a second clay lining for additional reinforcement.

Stake-hole fill (063) contained small numbers of oak and non-oak charcoal fragments. A rare incidence of metalworking debris was also discovered during environmental analysis, which upon specialist examination was deemed non-archaeological (Appendix 9).

The earliest fill within the trough (017) was moderately compacted, mid-greyish black silty clay (024), which contained frequent heat-shattered stones and occasional charcoal inclusions (Figure 5). Charcoal remains were identified to be both oak and non-oak species. These indicate a variety of taxa from the local environment were being utilized as fuel. A sample of hazel charcoal from this context returned a date of 971–809 cal. BC (2σ) (SUERC-37298). Hazel is a common component of the charcoal assemblage from *fulacht fia* features and has been found at numerous such sites across Ireland (Appendix 7).

This basal fill of the trough was situated beneath black, charcoal-rich silty clay (023), which was 0.27 m in depth and had a moderate compaction and frequent heat-shattered stones.

An area of intensely oxidised light pinkish-red silty clay (028) was located to the southeast end of the trough, representing a hearth where the stones would have been heated prior to their submersion into the trough water (Figure 6; Plate 2 and 7). The hearth was the only one found at Lismore 2 but was very substantial and directly adjacent to the trough for ease of use. The hearth (orientated SW-NE) measured 1.58 m in length and 0.72 m in width; it was truncated by a total of eight stake-holes all located at the northern end ((036), (040), (042), (044), (046), (050), (056) and (059)) (Table 2).

Context number	Description	Length (m)	Width (m)	Depth (m)	Filled by:	Description
(036)	Sub-circular feature with gradual breaks of slope and near vertical sides that tapered to a pointed base	0.10	0.08	0.12	(035)	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions

Context number	Description	Length (m)	Width (m)	Depth (m)	Filled by:	Description
(040)	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a pointed base	0.05	0.04	0.08	(039)	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions
(042)	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a pointed base	0.05	0.04	0.05	(041)	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions
(044)	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a pointed base	0.04	0.03	0.07	(043)	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions
(046)	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a pointed base	0.08	0.05	0.08	(045)	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions
(050)	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a pointed base	0.04	0.03	0.06	(049)	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions
(059)	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a pointed base	0.07	0.06	0.17	(058)	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions
(056)	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a pointed base	0.10	0.06	0.20	(055)	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions

Table 2 – Description of stake-holes truncating oxidised deposit (028)

Stake-hole fill (035) contained small numbers of charcoal fragments that were a maximum size of 0.5cm and could not be identified by eye to species level (Appendix 7).

Further stake-holes (054), (052), (070), (072), (074), (082), (084), (086), (088) and (090)) and post-holes ((026), (019) and (066)) were identified to the northeast and southwest of the trough (017) (Table 3).

While no visible pattern or alignment could be discerned it is likely that these features in conjunction with the stakeholes truncating the hearth would have supported a light superstructure such as a windbreak. Alternatively they may have functioned to suspend ceramics or foodstuffs over the trough.

Context number	Description	Length (m)	Width (m)	Depth (m)	Filled by:	Description
(052)	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a pointed base	0.06	0.06	0.10	(051)	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions
(070)	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a rounded base	0.11	0.09	0.12	(069)	Moderately compacted, dark greyish brown silty clay with frequent charcoal fleck inclusions
(072)	Sub-circular feature with sharp breaks of slope and near vertical sides that tapered to a rounded base	0.07	0.07	0.13	(071)	Moderately compacted, dark greyish brown silty clay with frequent charcoal fleck inclusions
(074)	Sub-circular feature with sharp breaks of slope and near vertical sides that tapered to a rounded base	0.08	0.04	0.06	(073)	Moderately compacted, dark greyish brown silty clay with frequent charcoal fleck inclusions
(082)	Sub-oval feature with sharp breaks of slope and near vertical sides that tapered to a rounded base	0.10	0.09	0.11	(081)	Moderately compacted, dark greyish brown silty clay with occasional charcoal fleck inclusions
(084)	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a rounded base	0.05	0.04	0.08	(083)	Moderately compacted, dark greyish brown silty clay with occasional charcoal fleck inclusions
(086)	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a rounded base	0.05	0.04	0.10	(085)	Moderately compacted, dark greyish brown silty clay with occasional charcoal fleck inclusions

Context number	Description	Length (m)	Width (m)	Depth (m)	Filled by:	Description
(088)	Circular feature with gradual breaks of slope and near vertical sides that tapered to a rounded base	0.07	0.07	0.08	(087)	Moderately compacted, dark greyish brown silty clay with occasional charcoal fleck inclusions
(090)	Sub-oval feature with sharp breaks of slope and near vertical sides that tapered to a rounded base	0.14	0.10	0.23	(089)	Moderately compacted, dark greyish brown silty clay with occasional charcoal fleck inclusions
(026)	Sub-circular feature with a sharp break of slope at the top, near vertical sides, a gradual break of slope at the bottom and a rounded base	0.25	0.20	0.16	(027)	Moderately compacted, light brownish grey clayey silt with occasional charcoal fleck inclusions
					(022)	Moderately compacted, black, charcoal-rich silty clay
(019)	Sub-circular feature with sharp to gradual breaks of slope, concave sides and a concave base	0.35	0.28	0.28	(021)	Moderately compacted, black silty charcoal-rich silt with heat-shattered stone inclusions
					(020)	Moderately compacted, light brownish grey clayey silt with occasional charcoal fleck inclusions
					(018)	Moderately compacted, black charcoal-rich silt
(066)	Sub-circular feature with imperceptible breaks of slope, concave sides and a concave base	0.26	0.24	0.06	(065)	Moderately compacted, dark greyish brown silty clay with frequent charcoal fleck inclusions
(054)	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a pointed base	0.11	0.09	0.17	(053)	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions

Table 3 – Description of stake-holes and post-hole surrounding trough (017)

A large irregular sub-rectangular pit (025) was situated approximately 0.45 m to the northeast of trough (017). This feature measured 3.35 m in length, 2.45 m in width and 0.90 m in depth and had rounded corners, sharp to gradual breaks of slope, near vertical sides and a flat base (Figure 8; Plate 2). The basal fill within this feature consisted of light greyish white, loosely compacted clayey silt (037). This was situated beneath loosely compacted, dark greyish black clayey silt (034), which contained frequent heat-shattered stones and charcoal inclusions. The charcoal was found to be both oak and non-oak species (Appendix 7). The abundant charcoal remains and shattered stones within the pit suggest it was used for the disposal of burnt mound waste, although it is most likely not its initial function. It is possible that it was also being used as a trough, though the pit seems too irregular in its morphology to be so. Alder charcoal from this feature provided a Late Bronze Age date of 900-797 cal. BC, 2σ (SUERC-37294) and suggests the utilisation of wet woodland for fuel. Alder is commonly utilised on *fulacht fia* sites due to the fact that it grows in marginal, wetland areas (Appendix 7). A marshy area is depicted on the 1st edition OS map to the south-east (Figure 2).

Overlying (034) in the western part of the pit was light to mid-grey silty clay (033), which had a loose compaction. The fourth fill within this part of the pit comprised mid-grey, moderately compacted silty clay (032). This contained occasional inclusions of charcoal and moderate heat- shattered stones. Overlying this deposit in the eastern part of the pit was the main burnt mound deposit (003) which is discussed in more detail below. This appears to have slumped into the pit while it was partially filled. The fifth fill within the pit was loosely compacted, light grey silty clay with occasional charcoal fleck inclusions (031/015). It also extends beyond the cut of the pit to the southeast and into trough (017) described below. This was situated beneath mid-grey silty clay (030), which was loosely compacted, containing occasional charcoal and moderate heat-shattered stone inclusions. The upper fill of this pit consisted of mottled light grey, loosely compacted silty clay with occasional charcoal inclusions (029).

Overlying the aforementioned stake-holes, post-holes, pit and trough (017) was the main burnt mound deposit (003) (Figures 6 and 7; Plates 4 and 5). This measured 11.50 m long, 5.40 m wide and 0.17 m deep and consisted of moderately compacted, mid-brownish black silt with frequent inclusions of heat-shattered stone and charcoal; it had been truncated by drain (068). The burnt mound (003) contained large numbers of charcoal fragments of both oak and non-oak species. These fragments represent the fuel which was used in heating the stones at the site (Appendix 7). It was situated beneath a smaller deposit of dark greyish brown, loosely compacted clayey silt (038), which contained moderate heat-shattered stones and charcoal. This measured 1.90 m in length and was 0.04 m deep. A loosely compacted, light grey silty clay (031/015) also overlay (003) and was a fill of both trough (017) and pit (025) as mentioned above. The deposit was originally given separate context numbers but upon further investigation was found to the same deposit within both cuts, most likely from the period when both features went out of use.

Directly to the west of trough (017) were two small distinct spreads of burnt material (007) and (009), although it is possible that they were part of the main mound (003) and due to agricultural truncation were separated. Spread (007), orientated northeast-southwest, consisted of blackish brown sandy silt with frequent stone and charcoal inclusions. Upon analysis the charcoal were found to be oak and non-oak charcoal (Appendix 7). It had a moderate compaction and measured 1.25 m by 1 m by 0.12 m deep. It had been truncated by the Phase II plough furrow (010). Moderately compacted, mid-greyish black sandy silt (009) measured 3.30 m east-west, 3 m in width and 0.17 m in depth. It contained frequent inclusions of heat-shattered stone and charcoal and had been truncated by the Phase II plough furrows (010) and (011).

Approximately 2.80 m to the south-southeast of the northern limit of excavation was a small spread of burnt material (004). This consisted of moderately compacted, blackish brown silty clay with frequent

stones and charcoal inclusions. Orientated east-west it had maximum dimensions of 3 m by 2.50 m by 0.06 m deep and was truncated by a Phase II plough furrow (011).

Approximately 1 m to the southwest of deposit (009) was an isolated post-hole (012). This feature was circular in plan, measuring 0.25 m by 0.24 m by 0.24 m deep, with a sharp break of slope at the top of the cut, near vertical sides, an imperceptible break of slope at the bottom of the cut and a concave base. It was filled by loosely compacted, mid-greyish brown silty clay (016), which contained small to medium-sized stone inclusions. Post-hole fill (016) contained rare instances of wood charcoal which were too fragmentary to identify to species level. No other palaeoenvironmental remains were identified which may suggest the charcoal fragments entered the pit feature by secondary deposition (Appendix 7).

An oval pit (006) was situated approximately 0.50 m to the southeast of spread (004). This feature had sharp breaks of slope, near vertical sides and a concave base and measured 1.25 m north-south, 0.94 m in width and 0.40 m in depth (Figure 8b; Plate 1). It was filled by grey clayey silt (005), which had a moderate compaction and contained occasional amounts of wood charcoal; these were identified to be both oak and non-oak species. These small amounts of charcoal may have become incorporated into the pit from the nearby burnt mound (Appendix 7).

A pit (060) located adjacent to pit (025) was sub-oval in plan, with sharp to gradual breaks of slope, irregular sides and a near flat base (Figure 8a). It measured 1.24 m east-west by 0.70 m wide by 0.14 m deep and was located approximately 3 m to the south-southwest of pit (006). Its fill comprised moderately compacted, mid-grey silty clay (057), which contained very frequent heat-shattered stones and moderate charcoal inclusions consisting of oak and non-oak species (Appendix 7).

4.2 Phase II

The second phase of activity at the site was post-medieval in date and related to agricultural practices such as ploughing and land drainage. These features may be associated with the post-medieval settlement identified at Lismore 1 but are more likely to be later, as remains on Lismore 1 were also truncated by later agricultural activity (Troy 2012a).

Truncating the Phase I spreads (007) and (009) was plough furrow (010). This was linear in plan, orientated in a north/south direction, measuring 4.18 m in length, 0.51 m in width and 0.18 m in depth. It had sharp breaks of slope, concave sides and a near flat base and was filled by moderately compacted, mid-grey clayey silt (013).

Linear plough furrow (011) also had sharp breaks of slope, concave sides and a near flat base. It measured 3.60 m long (north/south), 0.40 m wide and 0.18 m deep and truncated the Phase I spreads (004) and (009). Its fill consisted of mid-grey clayey silt (014), which had a moderate compaction.

Drain (068) truncated the Phase I post-hole (066) and burnt spread (003). It was orientated in a northeast/southwest direction, measuring 20.30 m by 1.30 m by 0.10 m deep, and was linear in plan with gradual breaks of slope, gently sloping sides and a flat base. It was filled by light brownish grey, loosely compacted silt (067).

4.3 The finds and samples

A total of 14 samples were retrieved during the investigations at Lismore 2.

Analysis of the samples
A total of 14 soil samples were retained from the excavation.

The soil samples were processed for environmental data and in consultation with a specialist a total of 14 (dry) samples were selected for detailed specialist analysis. Identification of oak, hazel and alder suggest the use of mixed woodland sources. The presence of oak and hazel generally represent the exploitation of dryland oak-hazel woodland (Rackham, 2003) and the presence of alder, a species which thrives in wetland circumstances, suggests that nearby wetland woodland resources were also exploited. Oak, alder and hazel are commonly identified on *fulacht fia* sites (see Appendix 7).

5 DISCUSSION

A *fulacht fia* was the main feature identified at Lismore 2. A second phase of activity in the form of post-medieval agricultural activity was also identified but as this was of limited value to the archaeological record is it not discussed further in this report.

5.1 Phasing and Chronology

The earliest activity – Phase I – can be dated to the Late Bronze Age, on the basis of the results of radiocarbon dates (900-797 cal. BC, 2σ (SUERC-37294) and 971–809 cal. BC (2σ) (SUERC-37298)) obtained from the large sub-rectangular pit (025) and the trough (017)respectively (Appendix 8).

Fulachtaí fia, which are the most prevalent examples of the use of pyrolithic technology, have been found to have a very broad date range with a small number of sites dating from the Late Neolithic and occasional examples producing dates from the Iron Age or later. However, sites that have been radiocarbon dated show a marked concentration of sites in the Middle Bronze Age, while there is a smaller but significant group indicating use in the Late Bronze Age (Brindley and Lanting 1990). More recent dating programs have generally corroborated the findings of Brindley and Lanting. Burnt mounds excavated in advance of the gas pipeline to the west, for example, had a high concentration of dates in the 2500-1700 BC period (Grogan et al. 2007, 96), but the majority of sites were within the 1700-1000 BC period (*ibid.)*.

The *fulacht fia* at Lismore 2 therefore seems fall into the later date range for *fulachaí fia,* with the two dates coming from the Late Bronze Age. 15 other site with burnt mound activity were identified on the scheme with dates ranging from the Late Neolithic to the Early Iron Age, with the dates peaking in the Early Bronze Age and Middle to Late Bronze Age period (Chart 1).

Similar Late Bronze Age dates were obtained from four other sites on the scheme:

E-number	Site name	NGR	Report Author
E4293	Knockawaddra West 1	086857/116343	Hourihan 2012a
E4308	Camp 2	085259/112908	Hourihan 2012b
E4311	Camp 1	850545/112898	Hourihan 2012c
E4318	Camp 5	085493/112536	Hourihan 2012d

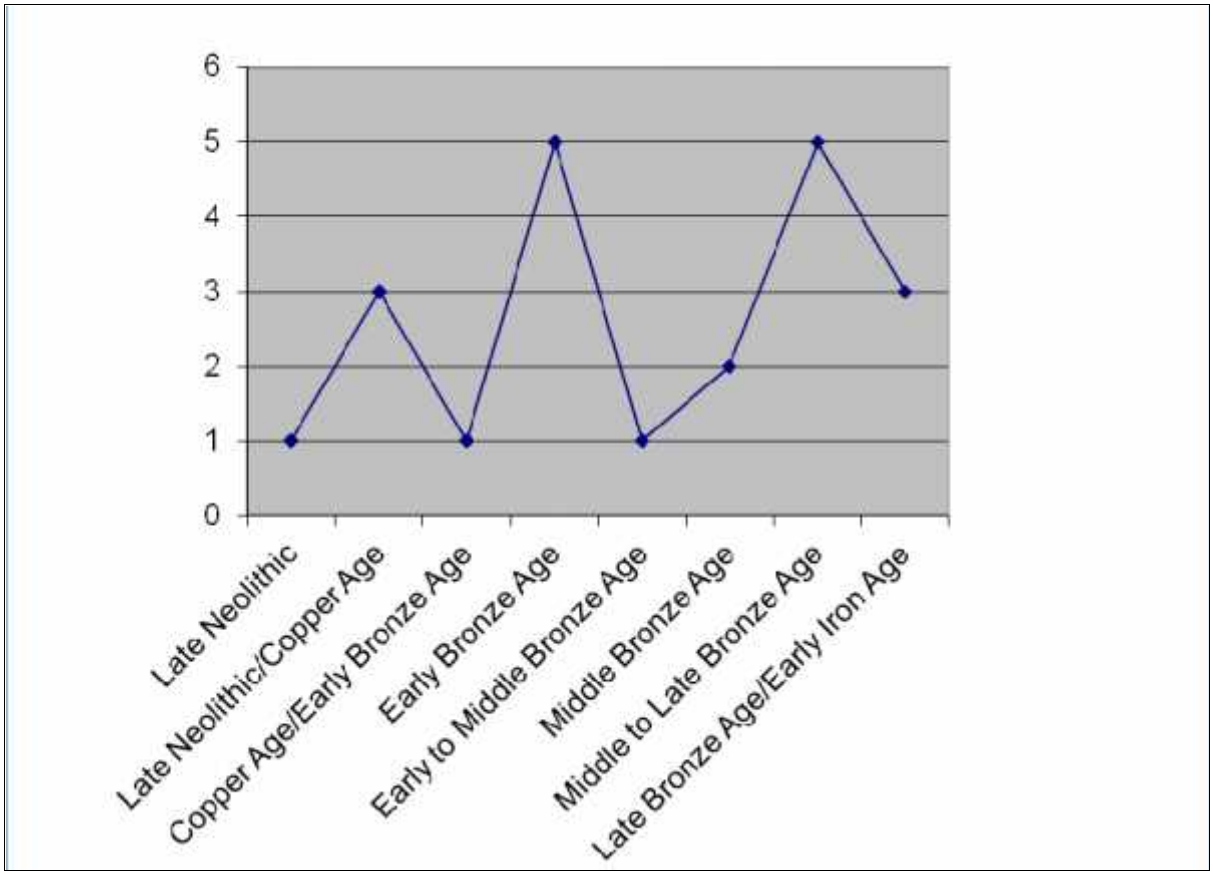

Chart 1: ***Number of burnt mounds per period on the N22 Tralee By-Pass***

5.2 Siting and morphology of fulacht fia features

Burnt mounds have been identified in almost every part of the country and are the most common prehistoric monument in Ireland (Waddell 2000, 174). Large infrastructural projects have consistently identified large numbers of these sites, with a total of 15 out of the 35 archaeological sites excavated on the N22 Tralee Bypass including burnt mound remains. The total number of individual burnt mounds was 21 as some sites contained more than one burnt mound.

Other recent infrastructural projects in Co. Kerry have also identified a number of *fulachtaí fia*. On the Castleisland bypass, for example, a Middle Bronze Age example was excavated in Clashganniv, Co. Kerry (Tierney 2010). Three examples were recorded along the N22 Gortatlea to Farranfore road scheme and they were found to range from Middle to Late Bronze Age. Two of these were in the townland of Garraundarragh- 04E0646 (O'Callaghan 2004 b) and 04E0647 (Kiely 2004) and the third in the townlands of Gortatlea-Inchinveema -04E1155 (Dunne 2004). Remains of a *fulacht fia* were also identified on the N22 Bealagrellagh to Gortatlea scheme (S. Joubert pers. comm.). Lismore 2 is therefore one of a large number of newly discovered *fulachtaí fia* sites in the area demonstrating that the popularity of these monuments in Co. Kerry is on a par with levels observed nationally.

The siting of this monument type is noteworthy as they are almost invariably located close to a water source (e.g. O'Neill 2000). This was well demonstrated during the North Munster Project (Grogan 2005), where the burnt mounds identified were located along the margins of wetland, small lakes, turloughs, bog and marsh, as well as the edges of river estuaries and on the banks of rivers and streams. Lismore 2 was not an exception as it is located on the northern bank of a small stream. The stream seems to have been culverted into a field boundary in more recent times but it would have provided an ideal water source for the *fulacht fia*.

It has also been well documented that burnt mounds can be densely concentrated in areas that were suitable for their construction and Ó Drisceoil (1988, 676) describes how they 'are frequently found together in groups of up to ten or more'. The elevated ground in which Lismore 2 was situated is not typical for *fulachtaí fia* and the absence of other such sites in the vicinity attests to this.

The closest examples along the scheme were a Late Bronze Age *fulacht fia* recorded approximately 2.5 km to the southwest at Knockawaddra West 1 (Hourihan 2012a); and an Early Bronze Age *fulacht fia* recorded at Dromthacker 1 approximately 3 km to the southwest (Troy 2012b).

Classic burnt mounds appear in the landscape as low grassy mounds of crescent or U-shaped plan (Waddell 2000, 174), though excavation has shown that in many cases the mound can be ploughed out, as is the case with Lismore 2, or indeed may never have been on such a scale as to remain identifiable above ground. Excavated burnt mounds usually consist of a mound or spread of burnt stones and firing debris and a trough or troughs. Frequently, associated features such as hearths, pits, stake-holes and post-holes are also identified but there is a great deal of variation in the morphology of excavated site types. Lismore 2 is typical of *fulachtaí fia* sites due to the presence of a trough and other associated pits, stake-holes and post-holes found under and around the burnt mounds. The remains of the mound are slightly crescent shaped (and probably would be more so if not for the agricultural truncation present at the site) showing the typical morphology of burnt mounds discovered in Ireland.

A trough is generally defined as a lined or unlined pit normally rectangular in plan, and the term is used in the context of boiling water in association with a *fulacht fia* (Grogan *et al*. 2007, 82). In the majority of cases where the troughs are lined, a great deal of pre-planned effort has gone into their construction. In the case of wood-lined troughs, planks may have tenons for better support and fitting; others have corner posts to support the frame (Dennehy 2008). There were traces of possible clay lining in the trough at Lismore 2 but this clay material only survived in some part of the feature and so its interpretation as a lining remains tentative. There was no direct evidence of a wooden lining but the presence of stake-holes in the four corners of the base can be an indication that a wooden lining was once present.

On sites where definitive hearths have been identified they can occur in two basic forms, either as an informal hearth placed directly on to the ground surface and identified by the presence of heat-altered clay, or placed in a defined area delineated by a setting of stones (Dennehy 2008). The hearth identified at Lismore 2 is typical of the former informal type with an area of oxidized natural located adjacent to the trough. The heated stones could easily have been pushed into the trough from that location with minimal effort or loss of heat during transfer.

A number of pits, post-holes and stake-holes were identified in association with the trough and hearth. Though no clear pattern was evident the most likely function of these features was to support light structures such as windbreaks to protect the working area from the elements. It is possible that not all these features were in use at the one time and that several windbreaks are represented. Though there is no definitive proof other scenarios should also be considered. For example post-holes (026) and (066) are located on either side of the trough, close to the hearth and these may have functioned in the suspension of something over the trough or hearth.

The peripheral pits at Lismore 2 (060) and (006) are typical of what has been found on a number of *fulacht fia* sites throughout the country. Several excavations have identified the presence of pits (roasting pits) containing burnt mound material in the vicinity of larger troughs. Ó' Drisceoil (1987, 51) has suggested that these pits and other small, unlined troughs had a temporary nature in

instances where they occur in the vicinity of larger and more sophisticated troughs. He suggests that the pits may have been used on a temporary basis until such time as the construction of the trough proper had been completed, or they may have been used to test the suitability of the underlying ground for the construction of a *fulacht fia*. As more and more roasting pits are being excavated, their number, size and location in proximity to the main trough suggests they may have formed a distinct function, possibly to heat pots or roast food in tandem with the use of the *fulacht fia.* These pits are generally smaller and shallower than troughs and would have reached optimum heat in a much shorter time. In the case of *fulachtaí fia* used for alternate purposes such as textile production, these features may have been used to produce the dyes while the fleece was prepared in the trough(s) (Dennehy 2008).

The function of the large irregular pit (025) is difficult to determine. While it is large in size its irregular shape precludes interpretation as a trough. It may simply have dug to contain the waste material from the adjacent trough, or it may have been an earlier unsuccessful attempt at constructing a trough. Alternatively it may have been related to water collection at the site which was located in a relatively well drained area.

5.3 Burnt mound function

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

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

Cooking

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

surface of the water, an activity for which burnt mound troughs are ideally suited (Monk 2007, 23). The presence of fats in the water of these features is also supported with the literary evidence in the story of Mis and Dubh Ruis, which records the cooking of a deer in water heated by hot stones, with the water subsequently being used for bathing (O'Neill 2004, 80). There was no evidence at Lismore 2 to suggest that the area was utilised for cooking; however, as outlined above, food refuse is rarely recovered from these site types.

Bathing

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

Monk (2007, 24) has also hypothesised that burnt mound sites may have been associated with soap production, as all three primary ingredients are present (wood-ash, water and animal fats). Ó Drisceoil (1988; 1990) has shown that bathing in the burnt mound trough had possible ritual connections (either with mythical people or with magically curative properties as with Mis and Dubh Ruis), and Barfield and Hodder (1987, 373) show that individual or communal sweating also has frequent ritual associations. Barfield and Hodder do not limit the uses of sweathouses to ritual activity however, and they point out that their use is an easy method of bathing. Trough (017) was of a size that would have been conducive for bathing so it is possible that this activity was carried out at Lismore 2. Also the presence of stake-holes within and around the trough could indicate the presence of some type of super-structure which could have been associated with bathing.

Brewing

A newer theory as to the uses of burnt mound sites comes from Moore and Quinn (2007), who have suggested brewing as a primary function. They maintain that the requirement for large quantities of heated water and a lack of suitable material to produce large basins in which to heat the water, would have led to the use of pits or troughs in which hot stones could be dropped to produce the required heat (Moore and Quinn (2007). They also state that quern stones found in association with burnt mound sites indicate grain processing nearby. They provide ethnographic evidence for this type of brewing, as well as tracing the practice back 500 years. Although this evidence is considerably later than the general date range for burnt mound sites, it provides evidence that the practice has been used throughout Europe over a considerable length of time. Their experiment conclusively proved that troughs could easily have been used to produce very drinkable ale (Moore and Quinn 2007). However, the Irish Archaeobotany Discussion Group has refuted the idea that the primary function of burnt mound sites was for brewing. This is, in part, due to the lack of botanical remains associated with brewing found at the sites (McClatchie *et al.* 2007). Based on this theory and the lack of palaeoenvironmental remains, it is unlikely that the trough from Lismore 2 was utilised for brewing.

The analysis of environmental material recovered from the soil samples provided no evidence for the exact function of the *fulacht fia* excavated at Lismore 2. The morphology of the site does not have any unique features which would point to function and no artefacts were recovered. Due to the lack of conclusive evidence none of the possible functions outlined above can be ruled in or out.

5.4 Conclusions

A *fulacht fia* consisting of a trough, pits post-holes, stake-holes and several deposits of burnt mound material was excavated at Lismore 2. The features were found to date to the Late Bronze Age and are similar in date to four similar sites excavated on the Tralee Bypass Scheme.

The evidence for prehistoric activity in the general area of Lismore is very limited and so the excavated of the *fulacht fia* is an important contribution to our knowledge of prehistoric, and specifically Bronze Age, activity to the northeast of Tralee.

6 ARCHIVE QUANTITIES

The site archive is comprised of the following materials:

Item	Quantity
Context Sheets	91
Plans	1
Sections	22
Photographs	124
Registers	12
Notebooks	0

The archive material is contained within one box.

Storage of the archive in a suitable format and location is required in order to provide for any future archaeological research. It is proposed that in addition to the paper archive a digital copy is prepared. The archive is currently stored in the offices of Rubicon Heritage Services Ltd, Unit 1, Wallingstown Business Park, Little Island, Co. Cork. It is proposed that following completion of post-excavation the archive will be deposited with the National Monuments Service, Department of the Environment, Heritage and Local Government, or the National Museum of Ireland, or such other repository as may be directed by the Client's Representative and the Project Archaeologist.

7 DISSEMINATION

The preliminary results of the excavations on the scheme have been outlined in the NRA Seanda magazine (Long 2011).

It is anticipated that the final results of this excavation will be included in a monograph publication dedicated to the results of the excavations on the N22 scheme. This publication is to be completed as part of the Stage (iii) and (iv) archaeological services contract.

Articles relating to the scheme are also planned for inclusion in journal publications.

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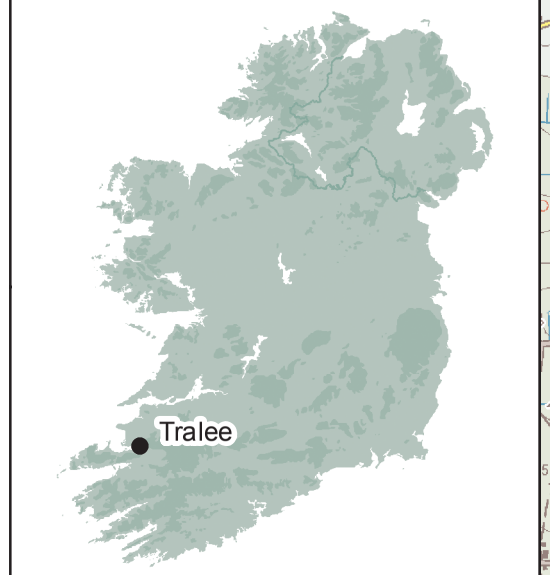
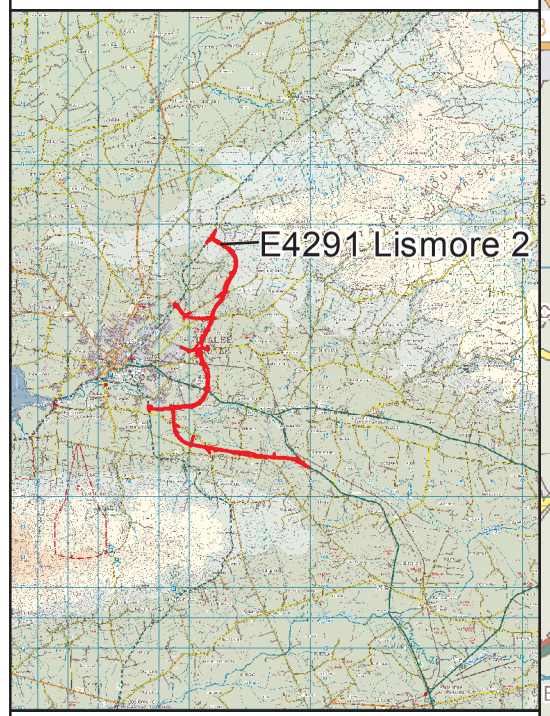




KEY

CPO

Excavated Sites

E4290 Lismore 1
E4291 Lismore 2
E4297 Ballynabrennagh Lower 1
E4294 Knockawaddra Middle 1
E4293 Knockawaddra West 1
E4295 Knockawaddra Middle 2
E4292 Knockawaddra West 2a
E4292 Knockawaddra West 2b
E4299 Dromthacker 2
E4298 Dromthacker 1
E4307 Ballinorig West 1
E4305 Ballinorig West 4
E4306 Ballinorig West 2
E4317 Ballinorig West 3
E4304 Ballinorig South 1
E4303 Ballinorig South 2
E4288 Ballingowan 1a
E4288 Ballingowan 1b
E4288 Ballingowan 1c
E4323 Manor East 1
E4322 Manor East 2
E4321 Manor East 3
E4311 Camp 1
E4318 Camp 5
E4308 Camp 2
E4313 Camp 4
E4309 Caherleheen 1
E4310 Caherleheen 2
E4320 Poulawaddra 1
E4319 Poulawaddra 3
E4289 Clashedmond 1
E4314 Dromavally 1a
E4314 Dromavally 1b
E4296 Ballindooganig 1
E4300 Gortbrack East 1
E4301 Gortbrack East 2
E4302 Gortbrack East 3
E4315 Dromavally 2
E4316 Ballindooganig 2

Department of Transport An Roinn Iompair

transport21 progress in motion

NDP NATIONAL DEVELOPMENT PLAN

NRA National Roads Authority An tÚdarás um Bóithre Náisiúnta

N

Project Name: N22 Tralee Bypass/ Tralee to Bealagrellagh

Scale: 1:33,000@A3

Project Code: TBED10

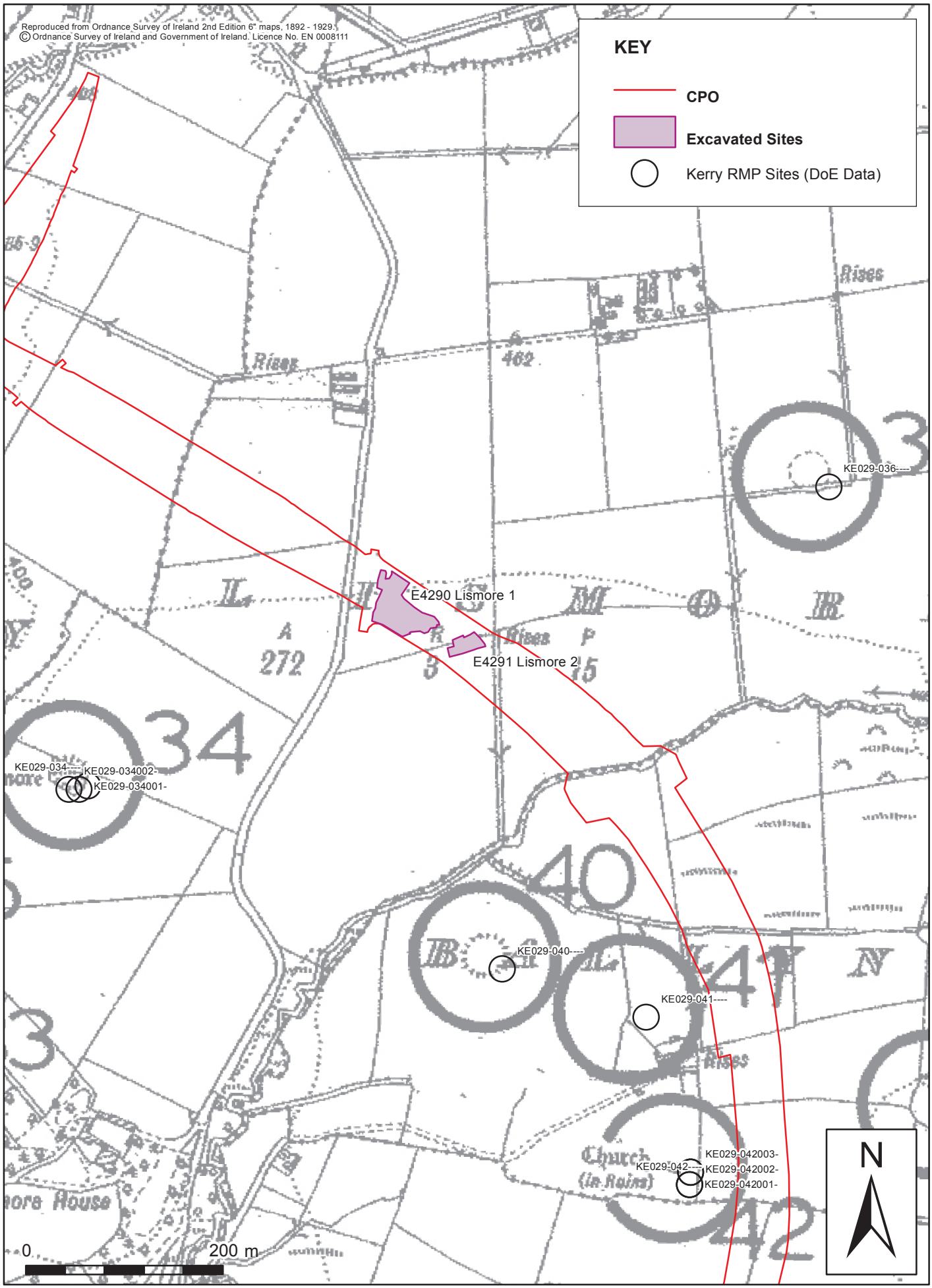
0 1,250 m

Kerry NRDO National Road Design Office Oifig Deartha um Bhoithre Naisiunta Chiarrai

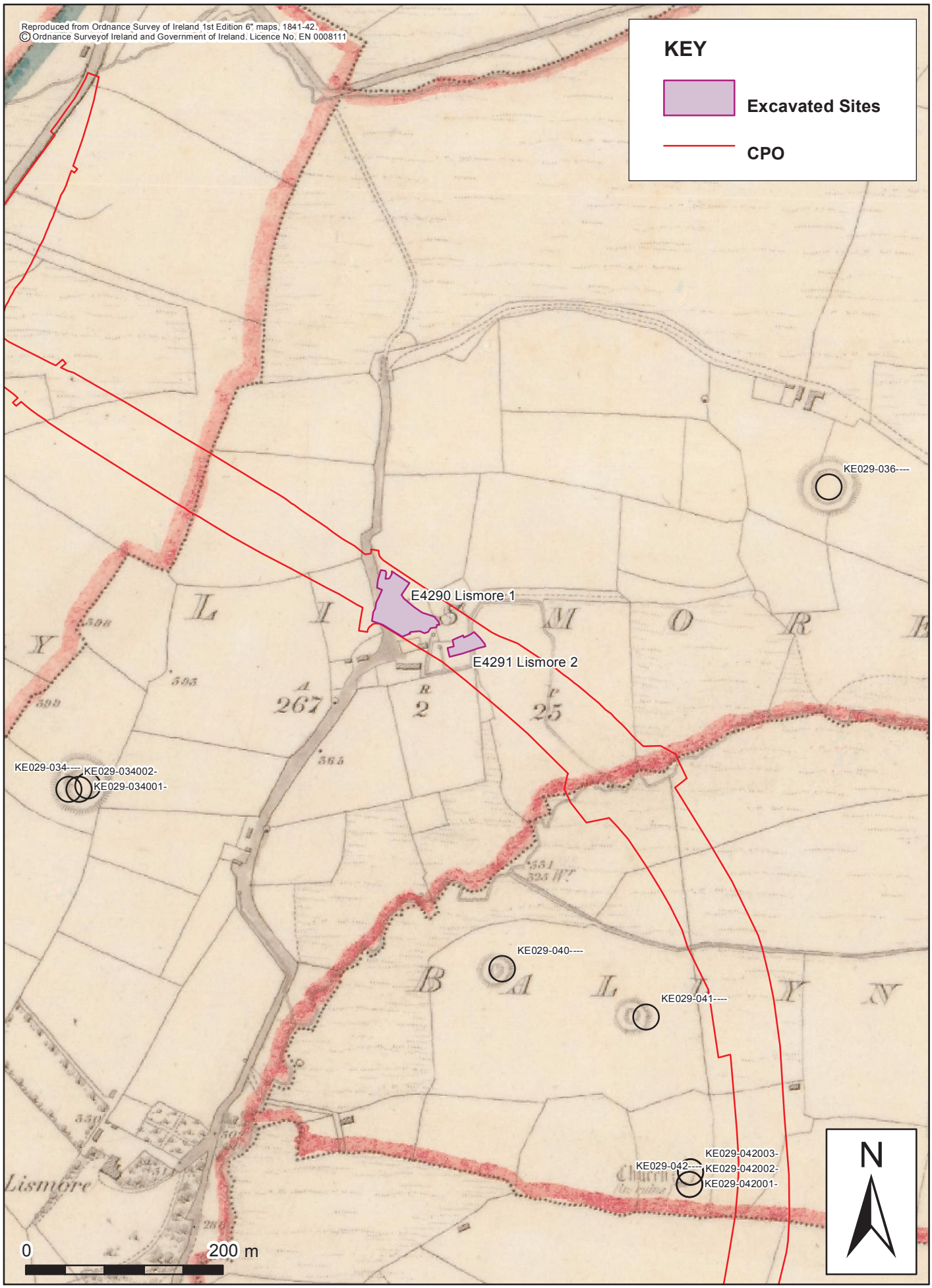
N22 Tralee Bypass/ Tralee to Bealagrellagh: Archaeological Works- Contract 1.
Figure 1 - Location of scheme

Drawn by: JMM April 2011	1st edit by: SN May 2011
2nd edit by: JMM Feb 2012	Signed off: PL Feb 2012

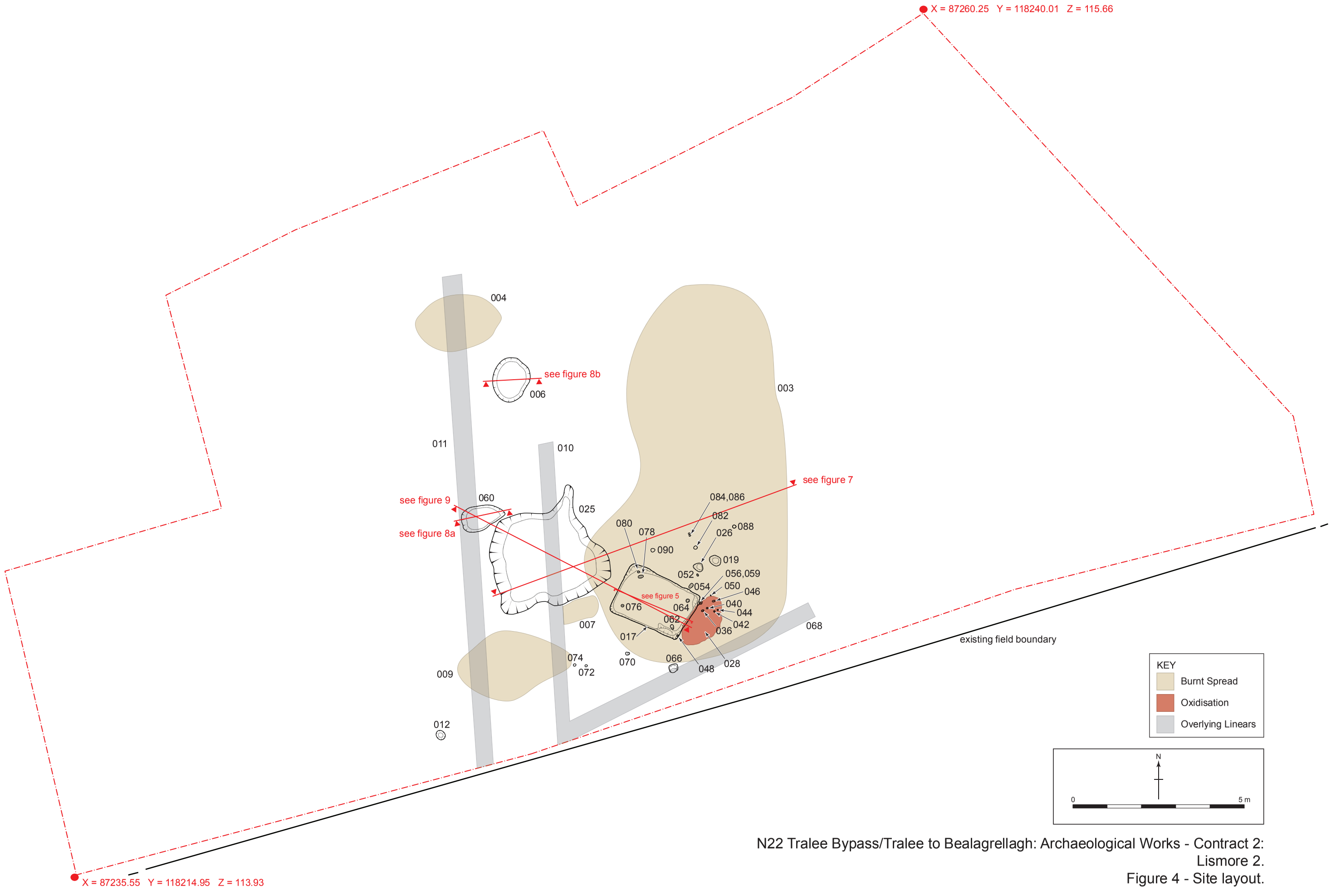
RUBICON HERITAGE



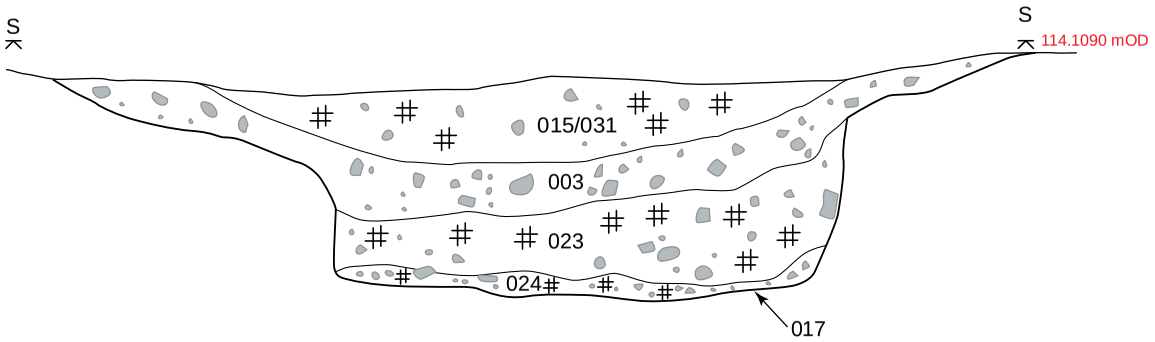
N22 Tralee Bypass/ Tralee to Bealagrellagh: Archaeological Works- Contract 1.
Lismore 2.
Figure 2 - Location of site with RMP sites.

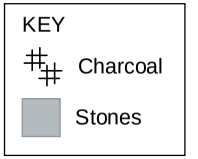


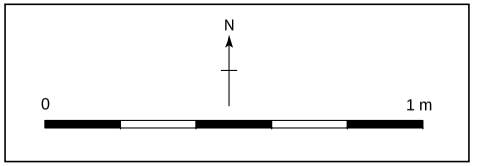
N22 Tralee Bypass/ Tralee to Bealagrellagh: Archaeological Works- Contract 1.
Lismore 2.
Figure 3 - Location of site on 1st Edition OS mapping.



N22 Tralee Bypass/Tralee to Bealagrellagh: Archaeological Works - Contract 2: Lismore 2.
Figure 4 - Site layout.

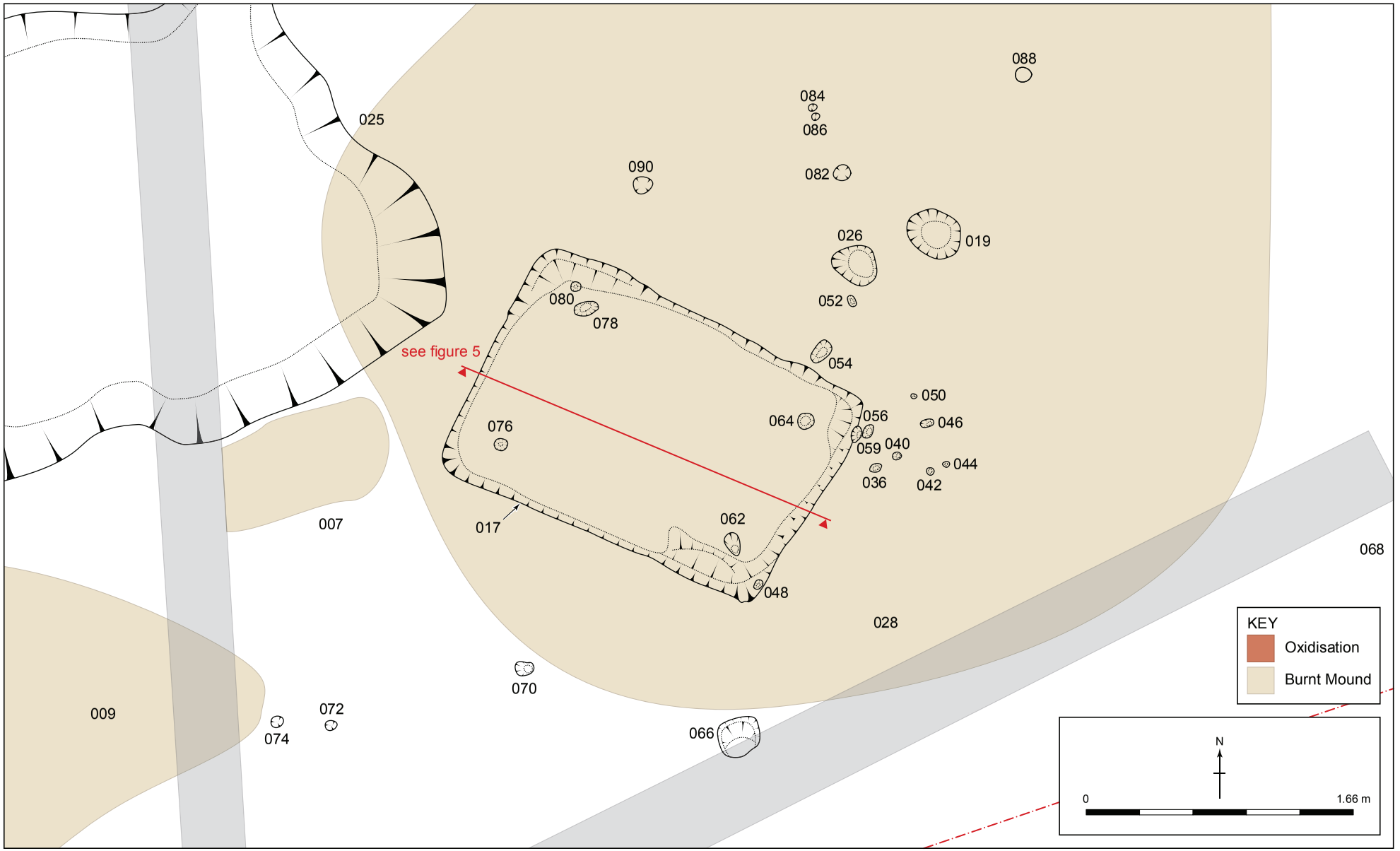






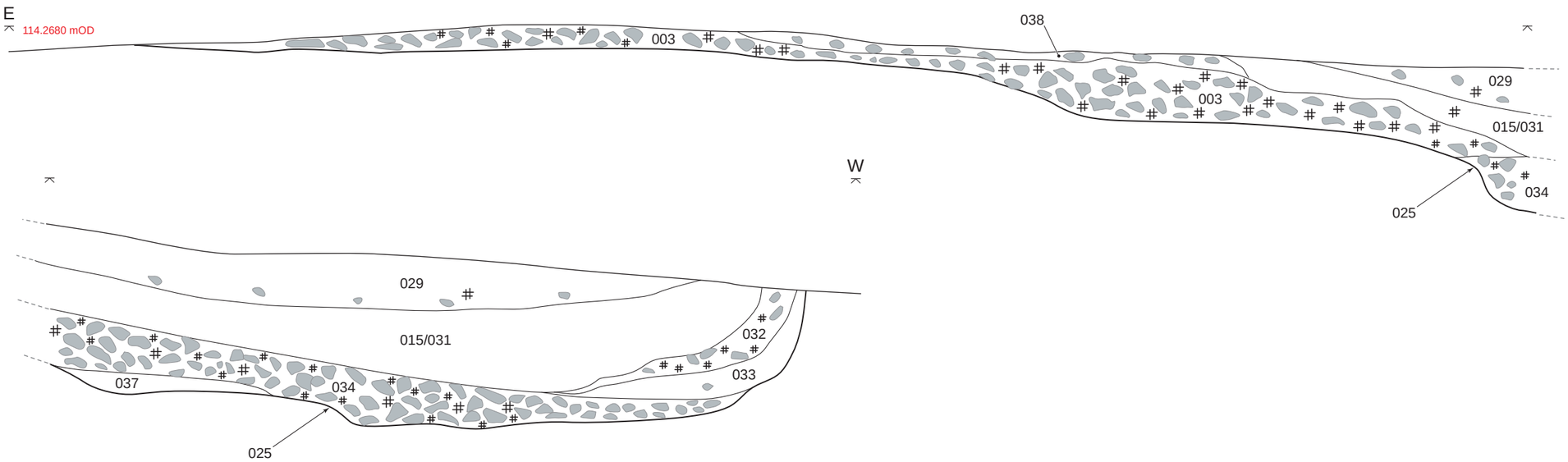
N22 Tralee Bypass/Tralee to Bealagrellagh: Archaeological Works - Contract 2: Lismore 2.

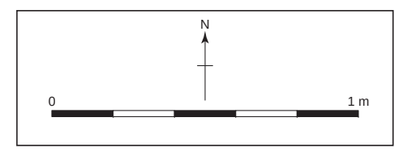
Figure 5 - Southwest-facing section of trough (017).



N22 Tralee Bypass/Tralee to Bealagrellagh: Archaeological Works - Contract 2: Lismore 2.

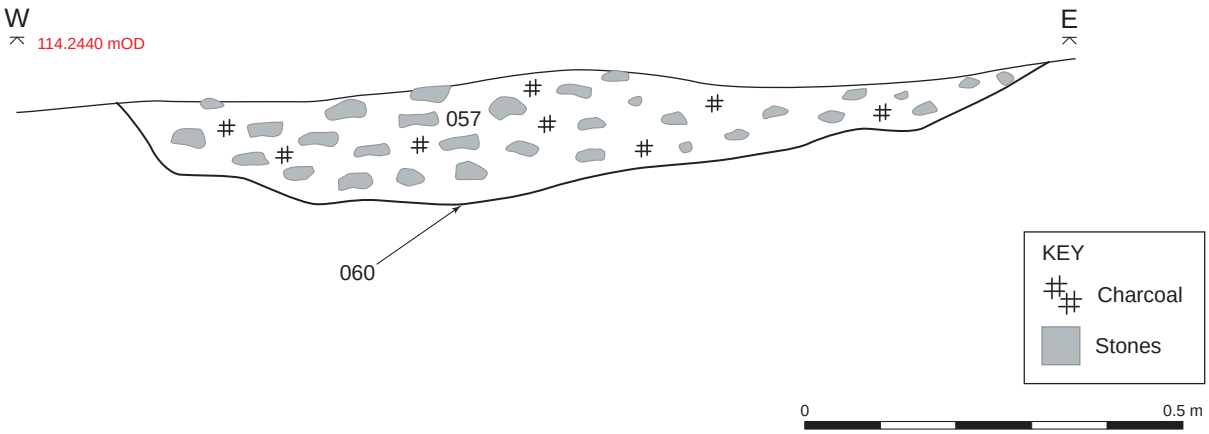
Figure 6 - Post-excavation plan of trough (017) and hearth (028).



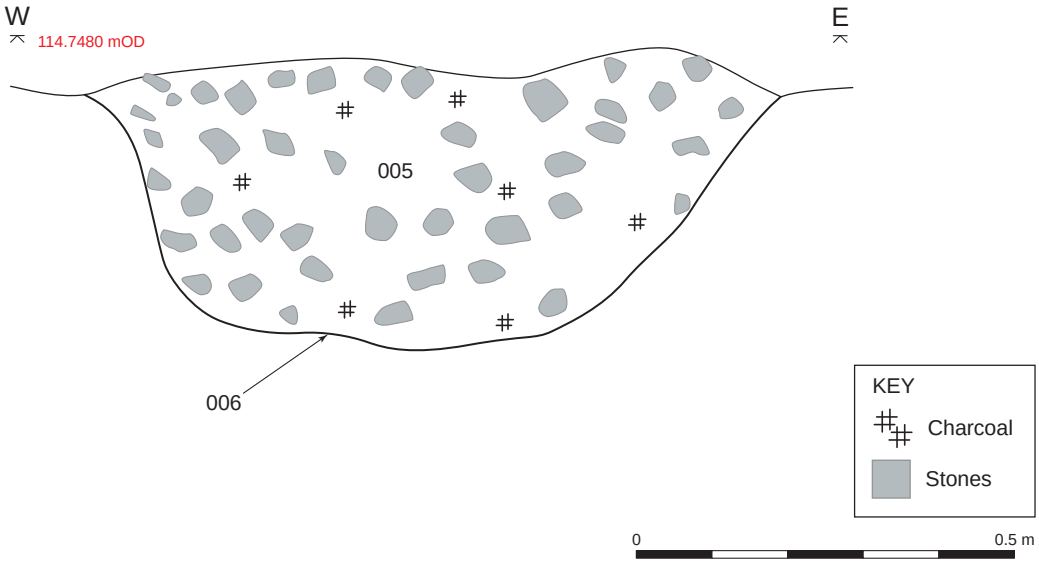


N22 Tralee Bypass/Tralee to Bealagrellagh: Archaeological Works - Contract 2: Lismore 2.

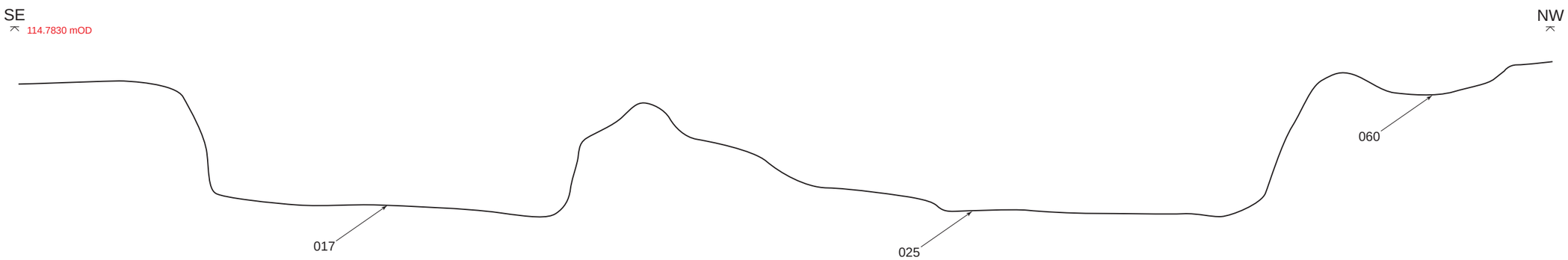
Figure 7 - North-facing section of pit (025) and mound (003).



N22 Tralee Bypass/Tralee to Bealagrellagh: Archaeological Works - Contract 2: Lismore 2.
Figure 8a - South-facing section of pit (060).



N22 Tralee Bypass/Tralee to Bealagrellagh: Archaeological Works - Contract 2: Lismore 2.
Figure 8b - South-facing section of pit (006).



N22 Tralee Bypass/Tralee to Bealagrellagh: Archaeological Works - Contract 2: Lismore 2.

Figure 9 - Northwest-Southeast profile of pit (025), through (017) and pit (060).

Plate 1 - Post-excavation view of pit (006), facing north.

Plate 2 - Post-excavation view of trough (017) and pit (025) showing in-situ burning (028), facing northwest.

Plate 3 - Mid-excavation view of trough (017), facing west-northwest.

Plate 4 - Mid-excavation view of burnt mound (003), facing north-northeast.

Plate 5 - Pre-excavation view of site, facing north-east.

Plate 6 - Post-excavation view of trough (017) showing stake-holes and hearth.

Plate 7 - View of hearth (028), facing north-west.

Appendix 1 – Context Register for Lismore 2

Context no.	Type	Fill of:	Filled by:	Length (m)	Width (m)	Depth (m)	Description	Interpretation
001	Deposit	-	-	-	-	0.35	Dark brown silty clay.	Topsoil
002	Deposit	-	-	-	-	-	Mottled mid-orangey grey silty clay.	Natural
003	Deposit	-	-	11.50	5.40	0.17	Moderately compacted, mid-brownish black silt with frequent heat-shattered stones and charcoal inclusions. Truncated by (068).	Burnt mound
004	Deposit	-	-	3.00	2.50	0.06	Moderately compacted, blackish brown silty clay with frequent sub-angular stones and charcoal inclusions. Truncated by (011).	Burnt Spread
005	Deposit	(006)	-	1.25	0.94	0.40	Moderately compacted, grey clayey silt.	Fill of pit (006)
006	Cut	-	(005)	1.25	0.94	0.40	Oval feature with sharp breaks of slope, near vertical sides and a concave base.	Cut of a pit
007	Deposit	-	-	1.25	1.00	0.12	Moderately compacted, blackish brown sandy silt with frequent sub-angular stones and charcoal inclusions. Truncated by (010).	Burnt Spread
008	Void	Void	Void	Void	Void	Void	Void	Void
009	Deposit	-	-	3.30	3.00	0.17	Moderately compacted, mid-greyish black sandy silt with frequent heat-shattered stones and charcoal inclusions. Truncated by (010) and (011).	Burnt spread
010	Cut	-	(013)	4.18	0.51	0.18	Linear feature with sharp breaks of slope, concave sides and a near flat base. Truncated (007) and (009).	Cut of a plough furrow
011	Cut	-	(014)	3.60	0.40	0.18	Linear feature with sharp breaks of slope, concave sides, and a near flat base. Truncated (004) and (009).	Cut of a plough furrow

Context no.	Type	Fill of:	Filled by:	Length (m)	Width (m)	Depth (m)	Description	Interpretation
012	Cut	-	(016)	0.25	0.24	0.24	Circular feature with a sharp break of slope at the top, near vertical sides, an imperceptible break of slope at the bottom and a concave base.	Cut of a post-hole
013	Deposit	(010)	-	4.18	0.51	0.18	Moderately compacted, mid-grey clayey silt.	Fill of plough furrow (010)
014	Deposit	(011)	-	3.60	0.40	0.18	Moderately compacted, mid-grey clayey silt.	Fill of plough furrow (011)
015	Deposit	-	-	4.0	2.10	0.34	Loosely compacted, light grey silty clay.	Fill of pit (025) and trough (017) - same as (031)
016	Deposit	(012)	-	0.25	0.24	0.24	Loosely compacted, mid-greyish brown silty clay with small to medium-sized angular stones.	Fill of post-hole (012)
017	Cut	-	(024) (023)	2.05	1.47	0.70	Rectangular feature with rounded corners, gradual breaks of slope, near vertical sides and a flat base.	Cut of a trough
018	Deposit	(019)	-	0.35	0.28	0.10	Moderately compacted, black charcoal-rich silt.	Fill of post-hole (019)
019	Cut	-	(018) (020) (021)	0.35	0.28	0.28	Sub-circular feature with sharp to gradual breaks of slope, concave sides and a concave base.	Cut of a post-hole
020	Deposit	(019)	-	0.28	-	0.14	Moderately compacted, light brownish grey clayey silt with occasional charcoal fleck inclusions.	Secondary fill of post-hole (019)
021	Deposit	(019)	-	0.20	-	0.04	Moderately compacted, black silty charcoal-rich silt with heat-shattered stone inclusions.	Basal fill of post-hole (019)
022	Deposit	(026)	-	0.24	0.20	0.12	Moderately compacted, black, charcoal-rich silty clay.	Upper fill of post-hole (026)
023	Deposit	(017)	-	2.20	1.53	0.27	Loosely compacted, whitish grey silty clay.	Upper fill of trough (017)

Context no.	Type	Fill of:	Filled by:	Length (m)	Width (m)	Depth (m)	Description	Interpretation
024	Deposit	(017)	-	2.20	1.53	0.06	Moderately compacted, mid-greyish black silty clay with frequent heat-shattered stones and occasional charcoal inclusions.	Basal fill of trough (017)
025	Cut	-	(029)-(034) (037)	3.35	2.45	0.90	Sub-rectangular feature with rounded corners, sharp to gradual breaks of slope, near vertical sides and a flat base.	Cut of a pit
026	Cut	-	(022), (027)	0.25	0.20	0.16	Sub-circular feature with a sharp break of slope at the top, near vertical sides, a gradual break of slope at the bottom and a rounded base.	Cut of a post-hole
027	Deposit	(026)	-	-	-	0.04	Moderately compacted, light brownish grey clayey silt with occasional charcoal fleck inclusions.	Fill of post-hole (026)
028	Deposit	-	-	1.58	0.72	-	Light pinkish red oxidised silty clay.	Oxidised subsoil
029	Deposit	(025)	-	3.40	2.30	0.28	Loosely compacted, mottled light grey silty clay with occasional charcoal inclusions.	Upper fill of pit (025)
030	Deposit	(025)	-	1.30	0.50	0.15	Loosely compacted, mid-grey silty clay with occasional charcoal and heat-shattered stone inclusions.	Sixth fill of pit (025)
031	Deposit	(025)	-	4.0	2.10	0.34	Loosely compacted, light grey silty clay with occasional charcoal fleck inclusions.	Fill of pit (025) and trough (017) - same as (015)
032	Deposit	(025)	-	2.0	0.18	0.42	Moderately compacted, mid-grey silty clay with occasional charcoal and moderate heat-shattered stone inclusions.	Fourth fill of pit (025)
033	Deposit	(025)	-	2.0	1.0	0.42	Loosely compacted, light to mid-grey silty clay.	Tertiary fill of pit (025)
034	Deposit	(025)	-	3.60	3.20	0.34	Loosely compacted, dark greyish black clayey silt with frequent heat-shattered stones and charcoal inclusions.	Secondary fill of pit (025)

Context no.	Type	Fill of:	Filled by:	Length (m)	Width (m)	Depth (m)	Description	Interpretation
035	Deposit	(036)	-	0.10	0.08	0.12	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions.	Fill of stake-hole (036)
036	Cut	-	(035)	0.10	0.08	0.12	Sub-circular feature with gradual breaks of slope and near vertical sides that tapered to a pointed base.	Cut of a stake-hole
037	Deposit	(025)	-	1.60	0.90	0.10	Loosely compacted, light greyish white clayey silt.	Basal fill of pit (025)
038	Deposit	-	-	1.90	-	0.04	Loosely compacted, dark greyish brown clayey silt with moderate heat-shattered stone and charcoal.	Deposit of mixed topsoil and burnt mound material
039	Deposit	(040)	-	0.05	0.04	0.08	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions.	Fill of stake-hole (040)
040	Cut	-	(039)	0.05	0.04	0.08	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a pointed base.	Cut of a stake-hole
041	Deposit	(042)	-	0.05	0.04	0.05	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions.	Fill of stake-hole (042)
042	Cut	-	(041)	0.05	0.04	0.05	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a pointed base.	Cut of a stake-hole
043	Deposit	(044)	-	0.04	0.03	0.07	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions.	Fill of stake-hole (044)
044	Cut	-	(043)	0.04	0.03	0.07	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a pointed base.	Cut of a stake-hole

Context no.	Type	Fill of:	Filled by:	Length (m)	Width (m)	Depth (m)	Description	Interpretation
045	Deposit	(046)	-	0.08	0.05	0.08	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions.	Fill of stake-hole (046)
046	Cut	-	(045)	0.08	0.05	0.08	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a pointed base.	Cut of a stake-hole
047	Deposit	(048)	-	0.06	0.06	0.15	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions.	Fill of stake-hole (048)
048	Cut	-	(047)	0.06	0.06	0.15	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a pointed base.	Cut of a stake-hole
049	Deposit	(050)	-	0.04	0.03	0.06	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions.	Fill of stake-hole (050)
050	Cut	-	(049)	0.04	0.03	0.06	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a pointed base.	Cut of a stake-hole
051	Deposit	(052)	-	0.06	0.06	0.10	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions.	Fill of stake-hole (052)
052	Cut	-	(051)	0.06	0.06	0.10	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a pointed base.	Cut of a stake-hole
053	Deposit	(054)	-	0.11	0.09	0.17	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions.	Fill of stake-hole (054)
054	Cut	-	(053)	0.11	0.09	0.17	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a pointed base.	Cut of a stake-hole

Context no.	Type	Fill of:	Filled by:	Length (m)	Width (m)	Depth (m)	Description	Interpretation
055	Deposit	(056)	-	0.10	0.06	0.20	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions.	Fill of stake-hole (056)
056	Cut	-	(055)	0.10	0.06	0.20	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a pointed base.	Cut of a stake-hole
057	Deposit	(060)	-	1.24	0.70	0.17	Moderately compacted, mid-grey silty clay with very frequent heat-shattered stones and moderate charcoal inclusions.	Fill of pit (060)
058	Deposit	(059)	-	0.07	0.06	0.17	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions.	Fill of stake-hole (058)
059	Cut	-	(058)	0.07	0.06	0.17	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a pointed base.	Cut of a stake-hole
060	Cut	-	(057)	1.24	0.70	0.14	Sub-oval feature with sharp to gradual breaks of slope, irregular sides and a near flat base.	Cut of a shallow pit
061	Deposit	(062)	-	0.12	0.09	0.14	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions.	Fill of stake-hole (062)
062	Cut	-	(061)	0.12	0.09	0.14	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a pointed base.	Cut of a stake-hole
063	Deposit	(064)	-	0.08	0.08	0.18	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions.	Fill of stake-hole (064)
064	Cut	-	(063)	0.08	0.08	0.18	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a pointed base.	Cut of a stake-hole

Context no.	Type	Fill of:	Filled by:	Length (m)	Width (m)	Depth (m)	Description	Interpretation
065	Deposit	(066)	-	0.26	0.24	0.06	Moderately compacted, dark greyish brown silty clay with frequent charcoal fleck inclusions.	Fill of post-hole (066)
066	Cut	-	(065)	0.26	0.24	0.06	Sub-circular feature with imperceptible breaks of slope, concave sides and a concave base. Truncated by (068).	Cut of a truncated post-hole
067	Deposit	(068)	-	20.30	1.30	0.10	Loosely compacted, light brownish grey silt.	Fill of drain (068)
068	Cut	-	(067)	20.30	1.30	0.10	Linear feature with gradual breaks of slope, gently sloping sides and a flat base. Truncated (003) and (066).	Cut of a drain
069	Deposit	(070)	-	0.11	0.09	0.12	Moderately compacted, dark greyish brown silty clay with frequent charcoal fleck inclusions.	Fill of stake-hole (070)
070	Cut	-	(069)	0.11	0.09	0.12	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a rounded base.	Cut of a stake-hole
071	Deposit	(072)	-	0.07	0.07	0.13	Moderately compacted, dark greyish brown silty clay with frequent charcoal fleck inclusions.	Fill of stake-hole (072)
072	Cut	-	(071)	0.07	0.07	0.13	Sub-circular feature with sharp breaks of slope and near vertical sides that tapered to a rounded base.	Cut of a stake-hole
073	Deposit	(074)	-	0.08	0.04	0.06	Moderately compacted, dark greyish brown silty clay with frequent charcoal fleck inclusions.	Fill of stake-hole (074)
074	Cut	-	(073)	0.08	0.04	0.06	Sub-circular feature with sharp breaks of slope and near vertical sides that tapered to a rounded base.	Cut of a stake-hole

Context no.	Type	Fill of:	Filled by:	Length (m)	Width (m)	Depth (m)	Description	Interpretation
075	Deposit	(076)	-	0.04	0.04	0.06	Moderately compacted, dark grey silty clay with moderate charcoal fleck inclusions.	Fill of stake-hole (076)
076	Cut	-	(075)	0.04	0.04	0.06	Circular feature with gradual breaks of slope and near vertical sides that tapered to a rounded base.	Cut of a stake-hole
077	Deposit	(078)	-	0.15	0.10	0.17	Moderately compacted, dark grey silty clay with moderate charcoal fleck inclusions.	Fill of stake-hole (078)
078	Cut	-	(077)	0.15	0.10	0.17	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a rounded base.	Cut of a stake-hole
079	Deposit	(080)	-	0.07	0.07	0.18	Moderately compacted, dark grey silty clay with moderate charcoal fleck inclusions.	Fill of stake-hole (080)
080	Cut	-	(079)	0.07	0.07	0.18	Sub-circular feature with sharp breaks of slope and near vertical sides that tapered to a rounded base.	Cut of a stake-hole
081	Deposit	(082)	-	0.10	0.09	0.11	Moderately compacted, dark greyish brown silty clay with occasional charcoal fleck inclusions.	Fill of stake-hole (082)
082	Cut	-	(081)	0.10	0.09	0.11	Sub-oval feature with sharp breaks of slope and near vertical sides that tapered to a rounded base.	Cut of a stake-hole
083	Deposit	(084)	-	0.05	0.04	0.08	Moderately compacted, dark greyish brown silty clay with occasional charcoal fleck inclusions.	Fill of stake-hole 084)
084	Cut	-	(083)	0.05	0.04	0.08	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a rounded base.	Cut of a stake-hole
085	Deposit	(086)	-	0.05	0.04	0.10	Moderately compacted, dark greyish brown silty clay with occasional charcoal fleck inclusions.	Fill of stake-hole (086)

Context no.	Type	Fill of:	Filled by:	Length (m)	Width (m)	Depth (m)	Description	Interpretation
086	Cut	-	(085)	0.05	0.04	0.10	Sub-oval feature with gradual breaks of slope and near vertical sides that tapered to a rounded base.	Cut of a stake-hole
087	Deposit	(088)	-	0.07	0.07	0.08	Moderately compacted, dark greyish brown silty clay with occasional charcoal fleck inclusions.	Fill of stake-hole (088)
088	Cut	-	(087)	0.07	0.07	0.08	Circular feature with gradual breaks of slope and near vertical sides that tapered to a rounded base.	Cut of a stake-hole
089	Deposit	(090)	-	0.14	0.10	0.23	Moderately compacted, dark greyish brown silty clay with occasional charcoal fleck inclusions.	Fill of stake-hole (090)
090	Cut	-	(089)	0.14	0.10	0.23	Sub-oval feature with sharp breaks of slope and near vertical sides that tapered to a rounded base.	Cut of a stake-hole
091	Deposit	(017)	-	1.0	0.40	0.65	Moderately compacted, light bluish grey silty clay.	Fill of trough (017)

Appendix 2 – Finds Register for Lismore 2

No finds recovered

Appendix 3 – Sample Registers for Lismore 2

Soil Samples

Sample No.	Context No.	Description
1	(003)	Moderately compacted, mid-brownish black silt with frequent heat-shattered stones and charcoal inclusions
2	(005)	Moderately compacted, grey clayey silt
3	(004)	Moderately compacted, blackish brown silty clay with frequent sub-angular stones and charcoal inclusions
4	(007)	Moderately compacted, blackish brown sandy silt with frequent sub-angular stones and charcoal inclusions
5	(009)	Moderately compacted, mid-greyish black sandy silt with frequent heat-shattered stones and charcoal inclusions
6	(016)	Loosely compacted, mid-greyish brown silty clay with small to medium-sized angular stones
7	(018)	Moderately compacted, black charcoal-rich silt
8	(021)	Moderately compacted, black silty charcoal-rich silt with heat-shattered stone inclusions
9	(024)	Moderately compacted, mid-greyish black silty clay with frequent heat-shattered stones and occasional charcoal inclusions
10	(027)	Moderately compacted, light brownish grey clayey silt with occasional charcoal fleck inclusions
11	(035)	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions
12	(057)	Moderately compacted, mid-grey silty clay with very frequent heat-shattered stones and moderate charcoal inclusions
13	(034)	Loosely compacted, dark greyish black clayey silt with frequent heat-shattered stones and charcoal inclusions
14	(063)	Moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions

Appendix 4 – Drawing Register for Lismore 2

Drawing No.	Sheet No.	Scale	Type	Description
1	1	01:10	Section	Section of pit (005)
2	2	01:20	Section	E-facing section of fulacht (003)
3	2	01:10	Section	N-facing section of (004) and (011)
4	2	01:20	Section	S-facing section of (009), (013) (014), (010) and (011)
5	2	01:20	Section	S-facing section of (007), (010) and (013)
6	3	01:20	Section	S-facing section of (003)
7	2	01:10	Section	SSE-facing section of (012) and (016)
8	2	01:10	Profile	Profile of (006)
9	3	01:10	Section	SE-facing section of trough (017)
10	2	01:10	Section	SSE-facing section of (018 to 021)
11	3	01:20	Section	S-facing section of (022), (026) and (027)
12	4	01:20	Section	W-facing section of (025)
13	4	01:20	Section	N-facing section of (025)
14	3	01:10	Section	S-facing section of pit (060)
15	4	01:10	Profile	Profile of (060)
16	4	01:10	Profile	Profile of (066)
17	5	01:20	Profile	Profile of (025)
18	5	01:20	Profile	Profile of (025)
19	6	01:20	Profile	Profile of (017)
20	6	01:20	Profile	Profile of (076), (017) and (080)
21	6	01:20	Profile	Profile of (017), (064) and (062)
22	6	01:20	Profile	Profile of (017) and (025)
23	7	01:20	Plan	Post excavation plan of site

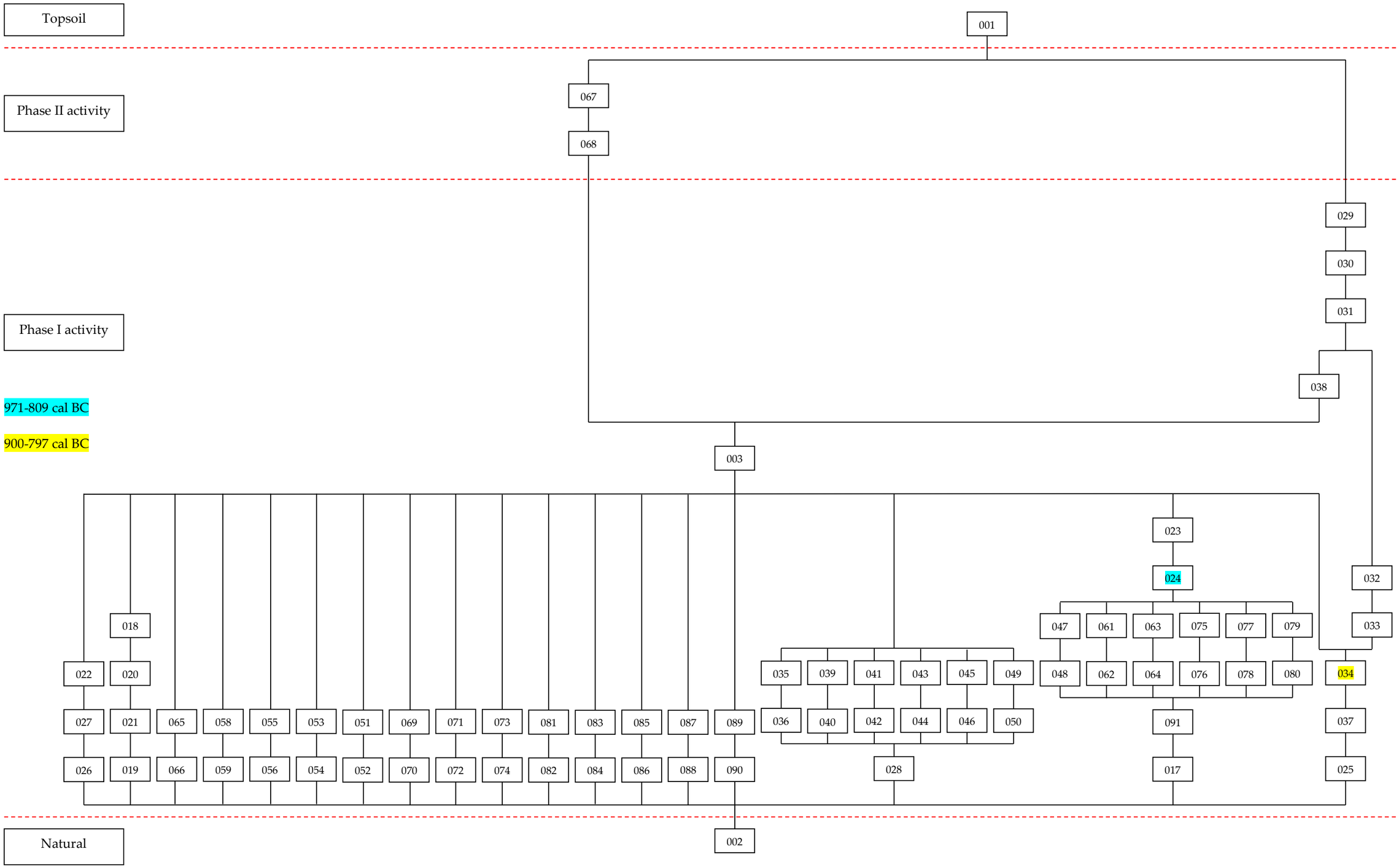
Appendix 5 – Photo Register for Lismore 2

Camera No.	Photo No.	Direction Facing	Description
Casio 19	E4291:001	W	Working Shot
Casio 19	E4291:002	W	Pre-excavation view of (007) and (010)
Casio 19	E4291:003	W	Pre-excavation view of (007) and (010)
Casio 19	E4291:004	NE	Pre-excavation view of (009)
Casio 19	E4291:005	SW	Pre-excavation view of (009)
Casio 19	E4291:006	SW	Pre-excavation view of (009)
Casio 19	E4291:007	W	Mid-excavation view of (003)
Casio 19	E4291:008	W	Mid-excavation view of (003)
Casio 19	E4291:009	S	Mid-excavation view of (004) and (011)
Casio 19	E4291:010	S	Mid-excavation view of (004) and (011)
Casio 19	E4291:011	N	Mid-excavation view of (007) and (006)
Casio 19	E4291:012	N	Mid-excavation view of spread (009)
Casio 19	E4291:013	N	Mid-excavation view of spread (009)
Casio 19	E4291:014	N	Mid-excavation view of spread (007)
Casio 19	E4291:015	N	Mid-excavation view of spread (007)
Casio 19	E4291:016	N	Mid-excavation view of (003)
Casio 19	E4291:017	N	Mid-excavation view of (003)
Casio 19	E4291:018		Void
Casio 19	E4291:019	S	View of (004) and (011)
Casio 19	E4291:020	N	Post-excavation view of trough (005)
Casio 19	E4291:021	N	Post-excavation view of pit (005)
Casio 19	E4291:022	N	Pre-excavation view of post-hole (012)
Casio 19	E4291:023	N	Pre-excavation view of post-hole (012)
Casio 19	E4291:024	N	Working shot showing (015)
Casio 19	E4291:025	N	Working shot showing (015)
Casio 19	E4291:026	NNW	Void
Casio 19	E4291:027	NNW	Void
Casio 19	E4291:028	NNW	Mid-excavation view of post-hole (012)
Casio 19	E4291:029	NNW	Mid-excavation view of post-hole (012)
Casio 19	E4291:030	N	Post-excavation view of post-hole (012)
Casio 19	E4291:031	N	Post-excavation view of post-hole (012) and (016)
Casio 19	E4291:032	N	Post-excavation view of post-hole (012) and (016)
Casio 19	E4291:033	N	Post-excavation view of post-hole (012)
Casio 19	E4291:034	N	Post-excavation view of post-hole (012)
Casio 19	E4291:035	NNE	Mid-excavation view/working shot of trough (017)
Casio 19	E4291:036	NNE	Mid-excavation view/working shot of trough (017)
Casio 19	E4291:037	NNE	Mid-excavation view/working shot of trough (017)
Casio 19	E4291:038	NNE	Mid-excavation view/working shot of trough (017)
Casio 19	E4291:039	NNE	Mid-excavation view/working shot of trough (017)
Casio 19	E4291:040	N	Post-excavation view of (006)
Casio 19	E4291:041	N	Post-excavation view of (006)
Casio 19	E4291:042	N	Pre-excavation view of (018)
Casio 19	E4291:043	WNW	Mid-excavation view of trough (017)
Casio 19	E4291:044	NW	Mid-excavation view of trough (017)
Casio 19	E4291:045	NNW	Mid-excavation view of (019)

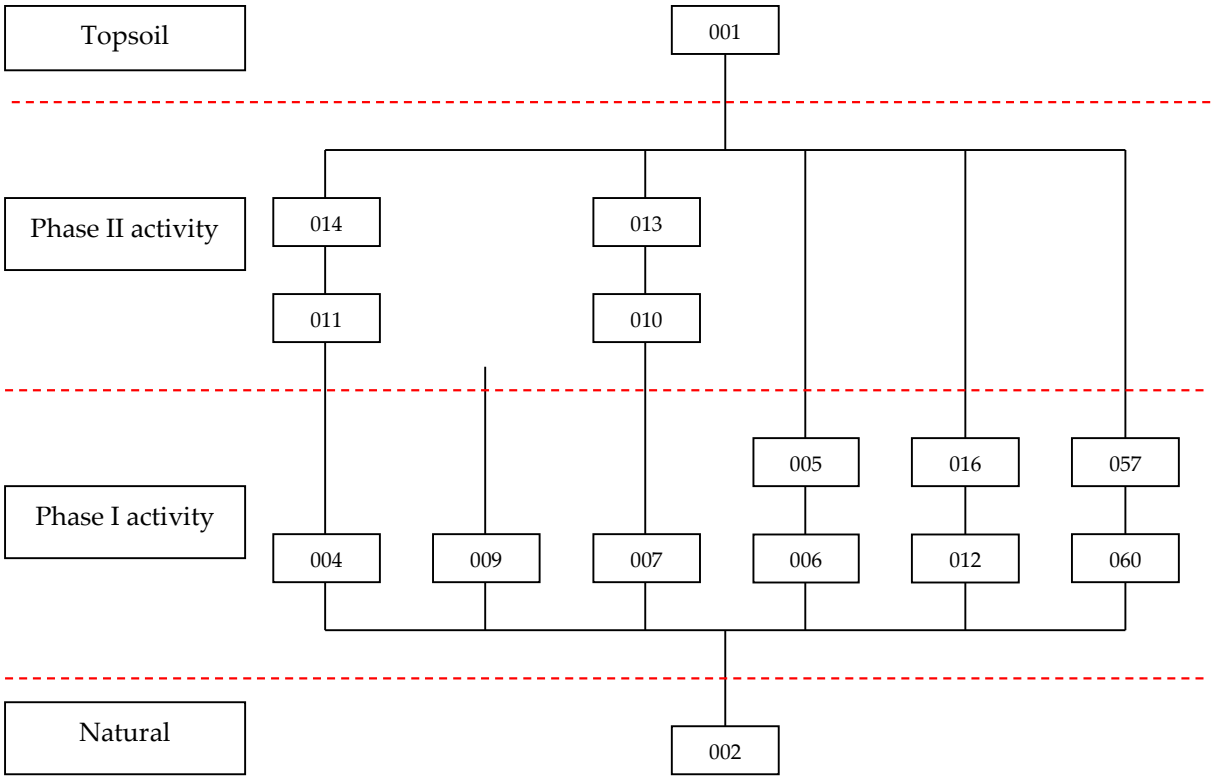
Camera No.	Photo No.	Direction Facing	Description
Casio 19	E4291:046	NNE	Working shot showing (003)
Casio 19	E4291:047	NNE	Working shot showing (003)
Casio 19	E4291:048	NNE	Working shot showing (003)
Casio 19	E4291:049	S	Working shot showing (003)
Casio 19	E4291:050	W	Working shot showing (003)
Casio 19	E4291:051	W	Working shot showing (003)
Casio 19	E4291:052	NW	Working shot showing (017)
Casio 19	E4291:053	NW	Working shot showing (017)
Casio 19	E4291:054	SW	Working shot showing (017)
Casio 19	E4291:055	SW	Working shot showing (017)
Casio 19	E4291:056	SE	Working shot showing (017)
Casio 19	E4291:057	E	Working shot showing (017)
Casio 19	E4291:058	E	Working shot showing (017)
Casio 19	E4291:059	NW	Overall of hearth (028) and associated stake-holes
Casio 19	E4291:060	NW	Overall of hearth (028) and associated stake-holes
Casio 19	E4291:061	N	Post-excavation view of (026)
Casio 19	E4291:062	SE	Pre-excavation view of (057)
Casio 19	E4291:063	N	Mid-excavation view of (060) and (057)
Casio 19	E4291:064	N	Mid-excavation view of (060) and (057)
Casio 19	E4291:065		Working Shot
Casio 19	E4291:066	N	Post-excavation view of (060)
Casio 19	E4291:067	SE	Overall of hearth (028) and associated stake-holes
Casio 19	E4291:068	SE	Overall of hearth (028) and associated stake-holes
Casio 19	E4291:069	SE	Post-excavation view of pit (025)
Casio 19	E4291:070	SE	Post-excavation view of pit (025)
Casio 19	E4291:071	ESE	Post-excavation view of pit (025)
Casio 19	E4291:072	ESE	Post-excavation view of pit (025)
Casio 19	E4291:073	NW	Post-excavation view of pit (025)
Casio 19	E4291:074	N	Post-excavation view of post-hole (066)
Casio 19	E4291:075	E	Post-excavation view of stake-holes (059) and (056)
Casio 19	E4291:076	E	Post-excavation view of stake-holes (059) and (056)
Casio 19	E4291:077	E	Post-excavation view of stake-holes (054),(059) and (056)
Casio 19	E4291:078	E	Post-excavation view of stake-holes (054),(059) and (056)
Casio 19	E4291:079	E	Post-excavation view of stake-holes (054),(059) and (056)
Casio 19	E4291:080	SE	Overall of hearth (028) and associated stake-holes
Casio 19	E4291:081	ESE	Overall of hearth (028) and associated stake-holes
Casio 19	E4291:082	ESE	Overall of hearth (028) and associated stake-holes
Casio 19	E4291:083	SE	Post-excavation view of stake-hole (064)
Casio 19	E4291:084	SE	Post-excavation view of stake-hole (064)
Casio 19	E4291:085	SW	Post-excavation view of stake-hole (062)
Casio 19	E4291:086	SW	Post-excavation view of stake-hole (062)
Casio 19	E4291:087	WSW	Post-excavation view of stake-hole (076)
Casio 19	E4291:088	E	Post-excavation view of stake-holes (078) and (080)
Casio 19	E4291:089	ESE	Post-excavation view of stake-holes (078) and (080)
Casio 19	E4291:090	NE	Post-excavation view of stake-holes (078) and (080)
Casio 19	E4291:091	NE	Post-excavation view of stake-holes (078) and (080)
Casio 19	E4291:092	NE	Post-excavation view of trough (017)

Camera No.	Photo No.	Direction Facing	Description
Casio 19	E4291:093	NE	Post-excavation view of trough (017)
Casio 19	E4291:094	NW	Post-excavation view of trough (017)
Casio 19	E4291:095	SSE	Post-excavation view of trough (017)
Casio 19	E4291:096	SSE	Post-excavation view of trough (017)
Casio 19	E4291:097	SSE	Post-excavation view of trough (017)
Casio 19	E4291:098	E	Mid-excavation view of linear (068)
Casio 19	E4291:099	E	Mid-excavation view of linear (068)
Casio 19	E4291:100	N	Post-excavation view of stake-holes (074), (072) and (070)
Casio 19	E4291:101	N	Post-excavation view of stake-holes (074), (072) and (070)
Casio 19	E4291:102	W	Post-excavation view of pit (025)
Casio 19	E4291:103	W	Post-excavation view of pit (025)
Casio 19	E4291:104	SW	Post-excavation view of site
Casio 19	E4291:105	SE	Post-excavation view of site
Casio 19	E4291:106	SE	Post-excavation view of site
Casio 19	E4291:107	SE	Post-excavation view of site
Casio 19	E4291:108	SE	Post-excavation view of site
Casio 19	E4291:109	E	Post-excavation view of site
Casio 19	E4291:110	E	Post-excavation view of site
Casio 19	E4291:111	NE	View of hearth (028) associated with trough (017)
Casio 19	E4291:112	NE	View of hearth (028) associated with trough (017)
Casio 19	E4291:113	NE	Post-excavation view of trough (017)
Casio 19	E4291:114	SE	Post-excavation view of trough (017) and pit (025)
Casio 19	E4291:115	SE	Post-excavation view of trough (017) and pit (025)
Casio 19	E4291:116	SE	Post-excavation view of trough (017) and pit (025)
Casio 19	E4291:117	ENE	Post-excavation view of trough (017)
Casio 19	E4291:118	ENE	Post-excavation view of trough (017)
Casio 19	E4291:119	ENE	Post-excavation view of trough (017)
Casio 19	E4291:120	NW	Post-excavation view of trough (017) and pit (025)
Casio 19	E4291:121	NW	Post-excavation view of trough (017)
Casio 19	E4291:122	NW	Post-excavation view of trough (017)
Casio 19	E4291:123	W	Post-excavation view of trough (017)
Casio 19	E4291:124	W	Post-excavation view of trough (017)
OLM 6	E4291:100-066	S	Post-excavation view of (019)
OLM 6	E4291:100-067	S	Mid-excavation view of (025)
OLM 6	E4291:100-068	S	Mid-excavation view of (025)
OLM 6	E4291:100-069	E	Mid-excavation view of (025)
OLM 6	E4291:100-070	E	Mid-excavation view of (025)
OLM 6	E4291:100-071	WSW	Pre-excavation view of (022)
OLM 6	E4291:100-072	N	Mid-excavation view of (026)

Appendix 6 – Site Matrix for Lismore 2



Site Matrix for Lismore 2 continued



Appendix 7 – The charred plant remains from Site E4291, Lismore 2, Tralee, Co. Kerry.
By Abby Mynett and Laura Scott

Abstract

Samples were assessed from a Late Bronze Age site containing a burnt mound and associated pits and post-holes. The site was located in the townland of Lismore, parish of Ratass, barony of Trughanacmy and was located 2.5 km northeast of Tralee town. Charcoal fragments were the only palaeoenvironmental remains recovered from the site.

Introduction

Nine environmental samples were processed from the excavation at Lismore 2, Tralee, Co. Kerry, a site consisting of burnt mound deposits and associated features, such as a trough, pits, post-holes and stake-holes. All samples were processed in order to retrieve any palaeoenvironmental material that could be used as radiocarbon dating material as well as site interpretation.

Methodology

Samples of between 2 and 10L were taken on site from archaeologically significant features and deposits. Samples were chosen for processing by the Site Director in order to answer research questions set during excavation. Samples were processed in laboratory conditions using a standard flotation method (cf. Kenward *et al.*, 1980). The floating debris (flot) was collected in a 250 μm sieve and, once dry, scanned using a binocular microscope. Any material remaining in the flotation tank (retent) was wet-sieved through a 1mm mesh and air-dried. This was then sorted by eye and any material of archaeological significance removed. All samples were assessed using a low power binocular microscope with x10 and x40 magnifications. Samples of particular interest were then taken forward to analysis level for either plant macrofossil and/or charcoal analysis.

Results

The results of the radiocarbon dating are provided in Table 1. The assessment results of the samples are provided in Tables 2 (composition of retents) and 3 (Composition of flots). All material was preserved through charring.

Radiocarbon dating
Two Late Bronze Age radiocarbon dates have been obtained for Lismore 2 (E4299) from trough and pit fills. Alder (*Alnus glutinosa*) charcoal from the secondary fill (034) of pit (025) produced a date of 900-797 cal BC (SUERC-37294; 2675±35 BP) while hazel (*Corylus avellana*) charcoal selected from the fill (024) of trough (017) produced a date of 971-809 cal. BC (SUERC- 37298; 2730±35 BP). Full radiocarbon results are provided in Table 1.

Wood charcoal
Charcoal fragments were identified in all nine of the samples assessed and were the only charred plant remains recovered from the samples (see Tables 2 and 3). Fragment quantity ranged from rare to abundant, with the highest concentrations found within the mound/spread, pit and trough deposits. Charcoal fragment size ranged from 0.5cm to a maximum of 2cm with the smallest fragments concentrated in the post-hole and stake-hole features. Charcoal fragments were identified by eye and showed both oak and non-oak species which included hazel, birch and Alder (O'Carroll 2013) to be present.

Other remains
A small amount of metalwork debris (MWD) was identified in Sample 014, which came from the fill (063) of stake-hole (064). This was found to be non-archaeological in nature.

Discussion

Pit (006)
Pit (006) had sharp breaks of slope, near vertical sides and a concave base with dimensions of 1.25m length, 0.94m width and 0.40m depth (Clark, 2011). It had a single fill that was comprised of grey clayey silt (005). Sample 002 contained occasional amounts of wood charcoal up to a maximum size of 1cm; these were identified to be both oak and non-oak species. These small amounts of charcoal may have become incorporated into the pit from the nearby burnt mound.

Pit (060)
Pit (060) was sub-oval in plan, with sharp to gradual breaks of slope, irregular sides and a near flat base. It had dimensions of 1.24 m long by 0.70 m wide by 0.14 m deep and was located approximately 3 m to the south-southwest of pit (006) (Clark, 2011). Single fill (057) was comprised of mid-grey silty clay with frequent heat-shattered stones and moderate charcoal inclusions. Sample 012 from fill (057) contained occasional amounts of charcoal measuring up to 1cm and consisting of oak and non-oak species.

Pit 025 - 900-797 *cal BC*
Pit (025) was sub-rectangular in shape situated approximately 0.10 m to the southeast of pit (060) with dimensions of 3.35m length, 2.45m width and a maximum depth of 0.90m. Secondary fill (034) contained loosely compacted, dark greyish black clayey silt which contained frequent heat-shattered stones and charcoal inclusions (Clark, 2011). Sample 013 contained abundant amounts of wood charcoal which were identified to be both oak and non-oak species. The abundant charcoal remains and stones indicate the pit was used for burnt mound waste. Alder charcoal from this feature has provided a late Bronze Age date of 900-797 cal. BC and suggests the utilisation of wet woodland for fuel. Alder charcoal is commonly utilised on burnt mound sites due to their growth in marginal, wetland areas (Scott, 2009).

Trough (017); 971-809 cal. BC
Trough (017) was rectangular in plan with rounded corners, gradual breaks of slope and near vertical sides and flat base. The feature had dimensions of 2.05m length, 1.47m width and 0.70m depth. The basal fill (024) in the trough was comprised of moderately compacted, mid-greyish black silty clay, which contained frequent heat-shattered stones and occasional charcoal inclusions. Sample 009 from this fill contained common numbers of charcoal remains identified to be both oak and non-oak species. These indicate a variety of taxa were being utilised from the local environment for the burnt mound feature. Hazel charcoal has been identified for radiocarbon dating purposes from this trough fill and indicates this taxon was used as a fuel for burnt mound activities. Hazel is a common part of the charcoal assemblage from burnt mound features and has been found at numerous such sites across Ireland (e.g. O'Donnell, 2009).

Stake-hole (064)
Stake-hole (064) was part of a number of stake-holes that truncated trough (017) in the base and sides of the feature. This was sub-oval shaped with gradual breaks of slope and near vertical sides with a pointed base with dimensions of 0.08m length and width and 0.18m depth. Its fill (063) comprised moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions. Stake-hole fill (063) contained small numbers of oak and non-oak charcoal fragments and a rare incidence of

metalworking debris. These remains may have come from the trough features fills when the stake-hole was constructed.

Stake-hole (036)
Stake-hole (036) again was part of a group of stake-holes that truncated the trough (017) feature at the southeast end. This was sub-circular in shape with gradual breaks of slope that tapered to a pointed base. The stake-hole had dimensions of 0.10m length, 0.08m width and a maximum depth of 0.12m. Stake-hole fill (035) was composed of moderately compacted, dark greyish black silty clay with occasional charcoal fleck inclusions (Clark, 2011), which could not be identified by eye to species level. The remains may have again come from its relationship with the trough feature and are thus likely to relate to the deposition of burnt mound material.

Burnt mound deposit (003)
The burnt mound deposit had dimensions of 11.50m length, 5.40m width and a maximum depth of 0.17m and consisted of moderately compacted, mid-brownish black silt with frequent inclusions of heat-shattered stone and charcoal (Clark, 2011). This feature was overlying the trough and stake-hole features. The burnt spread (003) contained large numbers of charcoal fragments of both oak and non-oak species in Sample 001. These fragments are likely part of the burnt mound burning episodes.

Burnt spread (007)
Burnt spread (007) was located to the west of trough (017) and consisted of blackish brown sandy silt with frequent stone and charcoal inclusions with moderate compaction and dimensions of 1.25 m by 1 m by 0.12 m deep. Common frequencies of oak and non-oak charcoal were identified in Sample 004 from the spread, likely resultant from the burning episode.

Post-hole (012)
Post-hole (012) was circular in plan with dimensions of 0.25 m length, 0.24 m width and a maximum depth of 0.24m. It was filled by loosely compacted, mid-greyish brown silty clay (016), which contained small to medium-sized stone inclusions (Clark, 2011). Sample (006) contained rare instances of wood charcoal which were too fragmentary to identify to species level. No other palaeoenvironmental remains were identified which may suggest the charcoal fragments entered the pit feature by secondary deposition.

The Late Bronze Age date for the burnt mounds is comparatively late in relation to other burnt mounds excavated on the road scheme, such as Ballinorig West 1 and Caherleheen (Mynett 2011a), which date to the late Neolithic period. However, a contemporary, mid to Late Bronze Age date, was returned for the burnt mounds at Knockawaddra West 1 (Mynett 2011b).

Identification of oak, hazel and alder suggest the use of mixed woodland sources. The presence of oak and hazel generally represent the exploitation of dryland oak-hazel woodland (Rackham, 2003) and the presence of alder, a species which thrives in wetland circumstances, suggests that nearby wetland woodland resources were also exploited. Oak, alder and hazel are commonly identified on burnt mound sites (O'Donnell, 2007; Scott, 2009).

Conclusions

- The main features on site were burnt mound spreads, a trough and associated pits and stake-holes all likely related to the burnt mound activity.
- Charcoal fragments were observed to be both oak and non-oak species including hazel and alder, which suggests that a diverse range of both wetland and dryland taxa were being

utilised from the local woodland, these would have been the fuel resource for the burnt mound activity.

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E-Number	Lab code	Sample ID	Material	σ13C	Radiocarbon age BP	Calibrated Age Ranges (1 σ)	Relative probability	Calibrated Age Ranges (2 σ)	Relative probability
E4291	SUERC-37294	Context 34, Sample 13	Charcoal-*Alnus glutinosa*	-27.5‰	2675±35	891-879 cal. BC	9.1%	900-797 cal BC	95.4%
						845-801 cal. BC	59.1%		
E4291	SUERC-37298	Context 24, Sample 9	Charcoal *Corylus avellana*	-25.2‰	2730±35	904-833 cal. BC	68.2%	971-960 cal. BC	2.2 %
								935-809 cal. BC	93.2%

Table 1- Radiocarbon dates for Lismore 2

Context Number	Sample Number	Feature	Sample Vol (l)	MWD	Charcoal quantity	Charcoal max size (cm)	Material available for AMS	Comments
Burnt mound and spread deposits								
3	1	Burnt mound deposit	5		+++	1.5	Charcoal	Oak and non-oak charcoal
7	4	Burnt spread deposit	5		+++	2	Charcoal	Oak and non-oak charcoal
Trough deposits								
024	9	Fill of trough (017)	5		+++	1.5	Charcoal	Oak and non-oak charcoal
Pit deposits								
5	2	Fill of pit (006)	5		++	1	Charcoal	Oak and non-oak charcoal
057	12	Fill of pit (060)	5		++	1	Charcoal	Oak and non-oak charcoal
034	13	Secondary fill of pit (025)	5		++++	2	Charcoal	Oak and non-oak charcoal
Post-hole deposits								
16	6	Fill of post-hole (012)	5		+	0.7		
Stake-hole deposits								
035	11	Fill of stake-hole (036)	5		+	0.5		
063	14	Fill of Stake-hole (064)	5	+	++	1	Charcoal	Oak and non-oak charcoal
Key: + = rare, ++ = occasional, +++ = common and ++++ = abundant **NB** charcoal over 1cm is suitable for identification and AMS dating								

Table 2 – Lismore 2, E4291, Retent Sample Results

Context Number	Sample Number	Feature	Total flot Vol (ml)	Charcoal Quantity	Charcoal Max size (cm)	Material available for AMS	Comments
Burnt mound and spread deposits							
003	1	Burnt mound deposit	70	++++	1.1	Charcoal +	Non-oak charcoal
007	4	Burnt spread deposit	10	+++	1.3	Charcoal +	Non-oak charcoal
Trough deposits							
024	9	Fill of trough (017)	70	+++	1.5	Charcoal +	Charcoal is non-oak, includes round woods
Pit deposits							
005	2	Fill of pit (006)	1				Archaeologically sterile
057	12	Fill of pit (060)	2				Archaeologically sterile
034	13	Secondary fill of pit (025)	4	+	<0.5		
Post-hole deposits							
016	6	Fill of post-hole (012)	10	+	<0.5		Oak and non-oak charcoal
Stake-hole deposits							
035	11	Fill of stake-hole (036)	4	+	<0.5		
063	14	Fill of Stake-hole (064)	4	+	0.5		
Key: + = rare, ++ = occasional, +++ = common and ++++ = abundant **NB** charcoal over 1cm is suitable for identification and AMS dating							

Table 3 – Lismore 2, E4291, Flotation Sample Results

Appendix 8 – Radiocarbon dates and certificates

E-Number	Lab-code	Sample ID	Material	δ13C	Radiocarbon age BP	Calibrated Age Ranges (1 σ)	Relative probability	Calibrated Age Ranges (2 σ)	Relative probability
E4291	SUERC-37294	context 34, sample 13	Charcoal Alnus Glutinosa	-27.5	2675±35	891 - 879 BC	9.1	900 - 797 BC	95.4
						845 - 801 BC	59.1		
E4291	SUERC-37298	context 24, sample 9	Charcoal Corylus Avellana	-25.2	2730±35	904 - 833 BC	68.2	971 - 960 BC	2.2
								935 – 809 BC	93.2

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RADIOCARBON DATING CERTIFICATE

05 December 2011

Laboratory Code	SUERC-37294 (GU25685)
Submitter	Trish Long Hourihan Headland Archaeology (Ireland) Ltd Unit 1, Wallingstown Business Park Little Island County Cork
Site Reference	Lismore 2 (E4291)
Context Reference	34
Sample Reference	13
Material	Charcoal : Alnus glutinosa (1.8g)
$\delta^{13}C$ relative to VPDB	-27.5 ‰
Radiocarbon Age BP	2675 ± 35

N.B. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

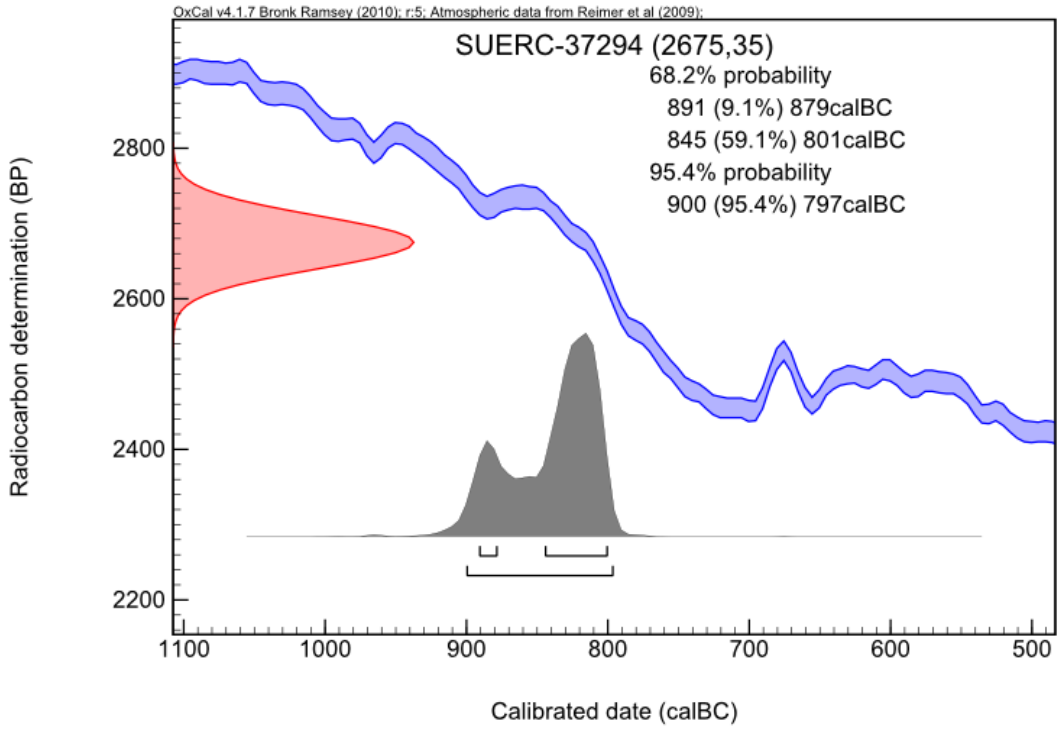
The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal4).

Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code. The contact details for the laboratory are email g.cook@suerc.gla.ac.uk or Telephone 01355 270136 direct line.

Conventional age and calibration age ranges calculated by :- Date :-

Checked and signed off by :- Date :-

Calibration Plot



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RADIOCARBON DATING CERTIFICATE

05 December 2011

Laboratory Code	SUERC-37298 (GU25686)
Submitter	Trish Long Hourihan Headland Archaeology (Ireland) Ltd Unit 1, Wallingstown Business Park Little Island County Cork
Site Reference	Lismore 2 (E4291)
Context Reference	24
Sample Reference	9
Material	Charcoal : Corylus avellana (0.6g)
$\delta^{13}C$ relative to VPDB	-25.2 ‰
Radiocarbon Age BP	2730 ± 35

N.B. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

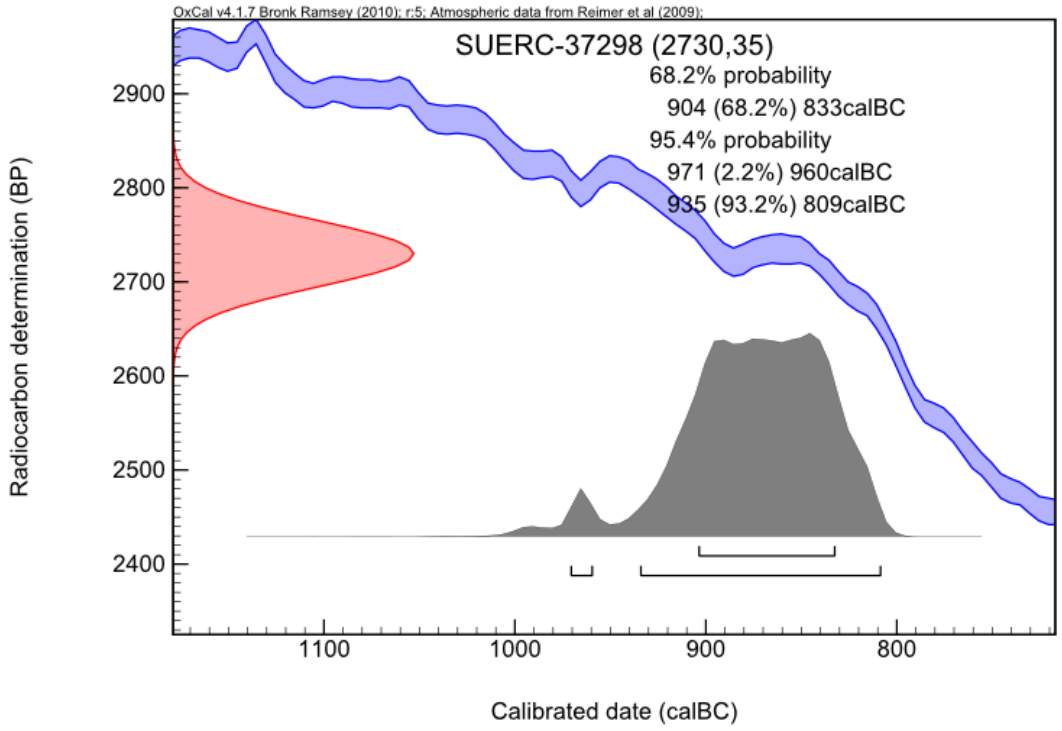
The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal4).

Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code. The contact details for the laboratory are email g.cook@suerc.gla.ac.uk or Telephone 01355 270136 direct line.

Conventional age and calibration age ranges calculated by :- Date :-

Checked and signed off by :- Date :-

Calibration Plot



Appendix 9 - Visual assessment of archaeometallurgical material

Visual assessment of archaeometallurgical material from E4291, Lismore 2, Co. Kerry

By: Barry Cosham

Client: Patricia Long on behalf of Headland Archaeology Ltd.

Date: November 2011

Introduction

Headland Archaeology Ltd. undertook archaeological investigations in the townland of Lismore, Co. Kerry in advance of development works for the N22 Tralee Bypass scheme by Kerry county council. The preliminary evaluation of the findings of the excavation revealed the existence of a probable Bronze Age burnt mound and post medieval agricultural features (Clark, 2011). During the course of the post excavation work a small quantity of possible metallurgical material or 'slag' was recovered. The aim of this report is to determine the nature and quantity of these residues and recommend what, if any, further analyses should be undertaken.

Methods

The assemblage was comprised of a single sample recovered during the processing of environmental soil samples. A visual examination of the assemblage was undertaken, utilising stereo zoom light microscopy as required. The remains were quantified and a detailed description compiled. This allowed categorisation and identification with reference to Bachmann (1982) and Bayley *et al.* (2001) to be completed. The results, discussion and conclusion of the assessment are presented below.

Results

The examined assemblage (appendix 1) had a total weight of less than 1 gram and was comprised of a tiny magnetic fragment that after microscopic examination were deemed to be non-metallurgical in origin.

Discussion

The material the single sample originated in a stake hole associated with the burnt mound which substantially reduces the likelihood that metalworking was the originating activity. The tiny magnetic fragments that comprised the assemblage are most likely the result of iron rich stones or even sand being heat affected and possibly partly reduced as part of the activities taking place at the burnt mound.

Conclusion

There is no evidence within the recovered assemblage for metalworking at Lismore 2 and none of the recorded features seem to have had a metallurgical function. As such it is evident that no metal working activity took place on the site.

Recommendations

It is recommended that no further analyses be undertaken on the material from Lismore 2 as it does not appear to be of metallurgical origin and there was no other evidence for metal working from the site.

Retention of material

There is no reason, from an archaeometallurgical perspective, why any of the assemblage from Lismore 2 should be retained. However, as the material was retrieved from the environmental samples it should be considered under guidance from the environmental archaeology specialist.

References

Bachmann, H.-G. (1982). *The Identification of Slags From Archaeological Sites.* London: Institute of Archaeology Occasional Publication No. 6. University of London.

Bayley, J., Dungworth, D., & Paynter, S. (2001). *Archaeometallurgy.* London: English Heritage Guidelines 2001/01.

Clark, L. (2011). *N22 Tralee Bypass/Tralee to Bealagrellagh, Co. Kerry. Archaeological Services Contract, Stage (iii) – Excavation. Post-excavation Assessment Report for Lismore 2 in the townland of Lismore, Co. Kerry.* Headland Archaeology (Ireland) Ltd.: Unpublished Report.

Appendix 1 – Sample Catalogue

Sample No.	Context No.	Weight (g)	No. of Frags.	Avg. Dia. (mm)	Min-max Dia.	Colour/s	Density	Characteristic morphological features	Notes/other features	Interpretation
14	63	0	1	1	0 - 1	Black	N/A	None	Tiny undiagnostic fragment, probably geological	Undiagnostic/ Non-metallurgical
	Total:	0								