N7 Nenagh to Limerick High Quality Dual Carriageway.
Archaeological Resolution Project.
Tullahedy Site 2, E3401, Final Excavation Report

Author: John Twomey and Lisa Doyle
Director: Lisa Doyle

Site	Chainage	Ordnance Datum	NGR
Tullahedy Site 2	27625	50.024	183178/177392

Date: December 2009
Client: Limerick County Council
Headland Project Code: NNL06
Townland: Tullahedy
Parish: Kilmore
Barony: Upper Ormond
OS 6″ Sheet No: TN-020
Report Status: Approved

HEADLAND ARCHAEOLOGY Ltd

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Executive Summary

This report presents the results of archaeological investigations carried out on behalf of Limerick County Council as part of the N7 Nenagh - Limerick Archaeological Resolution Contract. Phase 1 test trenching of the route was carried out by Judith Carroll and Company Ltd and Aegis Archaeology Ltd between January and March 2006, under Ministerial Direction Number A026. Three sites of archaeological potential were identified in the townland of Tullahedy including the one which is the subject of this report, which during testing was assigned the sub-scheme number A026/442. For the purposes of excavation this site was given the registration number E3401 and named Tullahedy Site 2. The Minister for the Environment, Heritage & Local Government, following consultation with the National Museum of Ireland, directed that Phase 2 Archaeological Resolution should proceed.

Archaeological testing carried out by Judith Carroll and Company on this site in 2006 identified a spread of dark black–brown sandy silt with heat shattered stones and frequent charcoal inclusions (Halpin 2006).

Full archaeological resolution was conducted on this site between 13 and 16 March 2007. This revealed a deposit of heat-shattered stones within a matrix of moderately compacted sandy-silt with frequent inclusions of charcoal (Plate 1). A Summary Report of works on the site was completed by Headland Archaeology in April 2007 and a preliminary report was completed and submitted in December 2008.

1 Introduction

The scheme consists of 35.7 km of High Quality Dual Carriageway (HQDC). It starts at the existing Newport Junction in the townlands of Carrowkeel and Mountshannon and runs north-eastwards towards Nenagh (Carrigatogher), excluding two areas of bog in Lisnagry (Drominboy) and in Gooig (Annaholty) and continues to Ballintotty at the end of the Nenagh Bypass, which will be widened. The work described here was undertaken under the N7 Nenagh- Limerick Archaeological Resolution Contract. The project is funded by the Irish Government and the European Union, through Limerick County Council/ National Roads Authority and under the National Development Plan 2000- 2006. Headland Archaeology Ltd. was commissioned by Limerick County Council to undertake the works.

An Environmental Impact Statement (EIS) was prepared in 2003, with Margaret Gowen & Co. compiling the Architectural and Cultural Heritage Assessment for the route. This formed Section 5.12 of the EIS produced as a joint venture by RPS MCOS Scetauroute.

2 Site description and location (Figure 1)

Tullahedy Site 2 was located approximately 3.5 km southwest of Nenagh town, in the townland of Tullahedy, at National Grid Reference: 183178/177392, Chainage 27625. It was located towards the centre of a modern field northeast of the Carrigatogher roundabout, on the southeast side of the N52 Link road. It was an area of much disturbance with a modern bank built up around the perimeter of the field on its south and southwest sides. The surrounding land was dry, relatively flat and low lying. Much of this was under pasture at the time of excavation, while a site compound was situated to the southeast.

3 Historical and archaeological background (Figure 2)

The townland name probably derives from *Tullach Íde*, meaning the hill or mound of *Íde*. This description no doubt refers to the glacial ridge or mound exploited during prehistory and later for gravel extraction.

Archaeological sites dating from the prehistoric to early modern periods are recorded for the landscape surrounding Tullahedy in The Record of Monuments and Places (RMP). Within the townland itself nine sites had previously been identified prior to excavation:

TN020-074; a poorly preserved tower house marked as Tullahedy Castle in the 6 inch OS maps. TN020-075; an impressively defended motte and bailey.

TN020-076; the poorly preserved remains of a rectangular Post Medieval house marked Shanarlagh in the 6 inch OS maps.

TN020-077; a uni-vallate ringfort.

TN020-079; an enclosed Neolithic settlement site radiocarbon dated to the period 3700-3390 BC. Two seasons of excavation were carried out on this site (97E0472); firstly in advance of the N7 By-Pass under the directorship of Cia McConway, ADS and most recently by Hillary Kelleher, UCC, as part of the current Neanagh to Limerick HQDC scheme. This natural glacial mound was semi-enclosed by a palisade on the northwest and western sides. A large hollow had been cut into the south-eastern slope, within which the remains of two Neolithic structures, dated to approximately 3650 BC, were uncovered. A radiocarbon date range of 3637-3534 cal BC from the palisade shows that it was contemporary with the settlement. A radiocarbon date range of 3693-3641 cal BC was returned from the layers used to seal the abandoned settlement. The mound was later significantly altered by the introduction of extensive layers of glacial till. The finds suggest the infilling of the lower slope dates from the mid-Neolithic through to the Early Bronze Age. Finds included 139 polished stone axeheads (some fragmented), chert arrowheads, scrapers and early Neolithic pottery sherds. These finds indicate that there may have been a manufacturing or ritual element to the site.

TN020-08001; a pre 1700 house marked as Tullahedy Old Ho. in the 6 inch OS maps. Partially excavated in advance of the construction of the existing N7 Nenagh by-pass: 96E0317

TN020-08002; recorded as 'enclosure', but not present in the Archaeological Inventory.

TN020-114; recorded as 'earthwork'. Fully excavated in advance of the construction of the existing Nenagh by-pass but not confirmed to be of archaeological significance.

TN020-119; recorded as 'field system pre-bog'.

A centre of burnt mound activity was located less than 2 km to the east (Tullahedy Site 3, E3403).

Excavations carried out by ACS Ltd on the N52 Link road, at its junction with the old N7 road uncovered two large burnt mounds associated with pits and stakeholes as well as a ringfort with an internal souterrain (Excavation Bulletin 2000:0969; 00E0222; 00E0223; 00E0224; 00E0226).

A number of sites within other townlands were located within 1 km of Tullahedy Site 2:

TN020-072; a ringwork with a D-shaped platform with an external bank and fosse in the townland of Clareen.

TN020-073; recorded as 'enclosure' but not present in the Archaeological Inventory, in the townland of Clareen.

TN020-113; recorded as 'settlement' but not present in the Archaeological Inventory, in the townland of Carrigatogher.

TN020-117; recorded as 'field system pre bog', but not present in the Archaeological Inventory, in the townland of Ballycahill.

TN020-118; recorded as 'mound', but not present in the Archaeological Inventory, in the townland of Ballycahill.

4 Aims and methodology

The objective of the work was the preservation by record of the archaeological features and deposits that had been preserved *in situ* but following road redesign, continued preservation *in situ* was no longer an option.

Stripping of the back-filled soils covering the site was conducted using a 360° tracked machine fitted with a 1.9m wide ditching (toothless) bucket under constant archaeological supervision. A total area of 549.057 m² was exposed.

The resulting surfaces were 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 an appropriate scale. Registers are provided in the Appendices (1-6). Ordnance Datum levels and feature locations were recorded using Penmap and an EDM.

Environmental samples were taken on any deposits suitable for analysis or dating as per Headland Archaeology (Ireland) Ltd environmental guidelines and following consultation with environmental archaeologist and archaeobotanist Karen Stewart of Headland Archaeology (Ireland) Ltd. A total of five samples were taken, four of which were selected for environmental analysis (Appendix 5). Charcoal fragments from two sub-samples were submitted for radiocarbon dating (Appendices 5 and 6).

5 Summary of excavation results

Pits

Two pits appear to represent the primary activity on this site. The larger of the two (012) had an irregular double-lobe plan with sharp breaks of slope (Plate 3). This pit had gently sloped sides and a concave base. The eastern edge was almost vertical where it was truncated by drain (008). The southwestern edge was also damaged by modern disturbance. It had a maximum length of 1.67 m northeast/southwest, a width of 0.88 m, and a maximum depth of

0.39 m. It contained a single fill composed of loose black sandy-silt (011) with moderate inclusions of heat shattered stone and occasional charcoal.

A sub-oval pit (010) was located 4.57 m northeast of the larger pit (012). It had concave sides and a bluntly tapered base. It measured 0.64 m northwest/southeast, by 0.36 m, and had a maximum depth of 0.15 m. Its fill (009) comprised loose mid-brown sandy-clay with inclusions of small heat shattered stones.

Both of these features were sealed by lower burnt spread deposit (004).

Clay Deposits

Two concentrations of a moderately compact mid-brownish-grey silty-clay (005) were identified to the northeast and southeast of the double-lobed pit (012). The north-eastern clay deposit had maximum dimensions of 4.4 m northeast/southwest, by 2.5 m, with a depth of 0.04 m. While the spread (005) to the southeast measured 3.3 m northeast/southwest by 1.8 m, with a maximum depth of 0.03 m. They were overlain by burnt spread deposits (004) and (003).

A charcoal-stained clay deposit (006) was also recorded just north of the larger pit (012). This clay was composed of mid-blackish-grey moderately compact clay, with frequent charcoal flecking. It had dimensions of 3 m east/west by 2 m, with a depth of 0.03 m. A fragment of Pomoideae charcoal recovered from this deposit was radiocarbon dated to 1445 – 1299 cal BC (2σ) (UBA-12809: Appendix 5 and 6). It was stratified below burnt spread material (003) (Figure 4).

Both clay deposits (005) and (006) probably formed under the same processes. The difference between them was largely due to colouration derived from charcoal staining.

The Burnt Spread

The basal horizon (004) of the burnt spread was composed of loosely compacted mid-greyish-brown sandy-silt, with moderately frequent inclusions of heat shattered stone and occasional charcoal. This layer had a maximum length of 7.1 m east/west, a width of 4.6 m north/south, and a maximum depth of 0.15 m.

The upper layer of the burnt spread (003) was irregular in shape. It consisted of moderately compact, dark blackish brown sandy-silt with frequent inclusions of heat shattered stone and charcoal. It had a maximum length of 6.8 m east/west, a width of 3.75 m north/south, and a maximum depth of 0.21 m. This horizon was concentrated over the northern end of the basal burnt spread material (004) and extended beyond its northern limit, where it (003) directly overlay the trampled clay deposits (005) and (006). A fragment of charcoal retrieved from this upper burnt spread deposit (003) was radiocarbon dated to 1411 – 1219 cal BC (2σ) (UBA-12808: Appendix 5 and 6).

Modern features

A linear field drain (008), with sharp breaks of slope, vertical sides and a flat base truncated these spreads. This drain was orientated northwest/southeast and extended beyond the site boundary in both directions. It had a width of 0.25 m and a depth of 0.46 m and was filled by loosely compacted dark greyish brown silty clay, with frequent inclusions of sub angular stones (007). Similar modern field drains were located at approximately 6 m intervals across the site.

No diagnostic finds were recovered during the excavation.

6 Discussion

The irregular shape of the pit (012) suggested that it may have been a pre-existing hollow or stone hole which may have been opportunistically exploited. As no *in situ* scorching or burning was evident in association with this pit, it is unlikely to have served as a fire pit or have had heated stones regularly placed along its base for roasting. Given the damp conditions and frequency of ground fed springs in the immediate vicinity the pit (012) probably naturally filled with water and could have been exploited as a source of water. The presence of dock seeds within the overlying burnt spread material (004) and the abraded condition of the charcoal recovered are also consistent with damp conditions (Appendix 5).

The location of this type of site close to water and along the margins of wetland areas such as lakes, bogs, marshes, rivers is well attested (Feehan 1991, O'Neill 2000, Grogan 2005). The Archaeological Inventory of North Tipperary (Farrelly and O'Brien 2002, 38) also acknowledges the link between these site types and water sources and the excavations in advance of the N7 Nenagh to Limerick HQDC has served to reinforce this evidence. Within this townland the palaeo lake basin to the east and north of the Tullahedy glacial ridge exploited during the Neolithic is noteworthy.

The associated burnt stone and charcoal rich material (004) and (003), would suggest that this water may have been boiled by introducing hot stones until the required temperature was reached. The selection of Pomoideae charcoal may have been deliberate as it is known to produce good fire wood giving off considerable heat (Appendix 5). The water temperature could have been maintained by regularly adding further hot stones and removing those which had already transferred their heat and cooled. The discarding of the stones after use resulted in the readily recognisable burnt spread material.

This method of heating water was used throughout Ireland during both prehistoric and medieval times. A variety of functions for this type of site have been forwarded such as cooking, bathing, tanning and more recently brewing (O'Kelly 1954; Ó Drisceoil 1988; Allen 1994; O'Neill 2004; Moore and Quinn 2007). Boiling meat allows the fat to accumulate at the surface where it can be collected and used in food preservation (Monk 2007, 23) or combined with wood ash for the production of soap.

The moderately compacted clay layers (005) and (006) are interpreted here as trample zones associated with the initial burnt spread activity. They are therefore thought to be broadly contemporary with the earliest spread deposits. Their location to the north and east of pit (012) would suggest that human traffic was more frequent along the eastern edge with the primary dumping episodes, represented by burnt spread material (004) concentrated to the south and west of it. The formation of a trample zone associated with the pit (012) would imply that it was used more than once and may have been regularly exploited.

The clay deposits were later covered by the upper burnt spread material (003). This may have resulted from a slumping of the later burnt spread material, although it cannot be established whether this occurred during the exploitation of the site or after it had gone out of use. The accumulation of the burnt stone and charcoal rich horizons (004) and (003) also indicates repeated use of the site. It has been suggested that similar sites were probably used multiple times with an extended, if periodic, use history (Grogan *et al*. 2007, 91). The predominant

exploitation of sandstone at Tullahedy Site 2 is also consistent with the findings of the south midlands study (Feehan 1991, 203).

The exact function of sub-oval pit (010) is unclear. It was relatively isolated and did not display any diagnostic features indicative of any particular activity. No associated structural elements were discernable. No other cut features were identified to the south, east or west of the burnt spread limits. It is possible however, that additional features and further burnt spread deposits were originally present to the north as this edge of the site was in close proximity to the existing Limerick N7 road.

Feehan has shown that the majority of dated burnt mound sites in the south midlands were in use from the Early Bronze Age to the Iron Age, with a noted concentration within the latter part of the second millennium BC (1991, 202). Similarly the findings of those *fulachtaí fia* excavated in advance of the gas pipeline to the west showed that although a concentration was identified within the 2500 – 1700 BC date bracket, the majority fell within the 1700 – 1000 BC date range (Grogan *et al*. 2007, 96). The dates returned from this site, spanning 1445 – 1219 cal BC (Appendix 5 and 6), fit this pattern well.

Several other burnt mound related sites were also excavated during this road scheme. Of these Tournockane Site 1 E2309 (O'Neill 2009a), Annaholty Site 2 E2313 (O'Neill 2009b), Annaholty Site 3 E2314 (O'Neill 2009c), Richhill Site 1 E2329 (O'Connell 2009a) and Gortybrigane Site 1, E2487 (O'Connell 2009b) share some temporal overlap with this site. Within the townland, the upper burnt mound deposit (008) from Tullahedy Site 3, E3403 Area B was found to be broadly contemporary 1504 – 1316 cal BC (2σ) (UBA-12803; Doyle 2009) with the activity on Tullahedy Site 2 E3401.

The grouping of burnt mound sites has been documented (O'Drisceoil 1988, 676). It may be the case that Tullahedy Sites 2 and 3, comprising several distinct burnt mounds, may have served a single community over an extended period of time. The dating evidence would suggest that they might have operated on a rotational basis. This may have been done in the interests of maintaining sanitary conditions or have been influenced by fluctuations in the water table.

The earlier deposits were latterly truncated by the modern field drain (008), one of a number of such features which represented recent land improvement measures.

Conclusion

The limited evidence from Tullahedy Site 2 and the lack of diagnostic features restricts its functional interpretation. Rather than considering this site as indicative of a specific activity, it may be more appropriate to view it as another example of one where a specific hot-stone technology was implemented to achieve a variety of purposes.

7 Archive quantities

The site archive is comprised of the following materials:

Type of Record	Quantity
Context Sheets	12
Plans	1
Sections	3
Photographs	13
Registers	4

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

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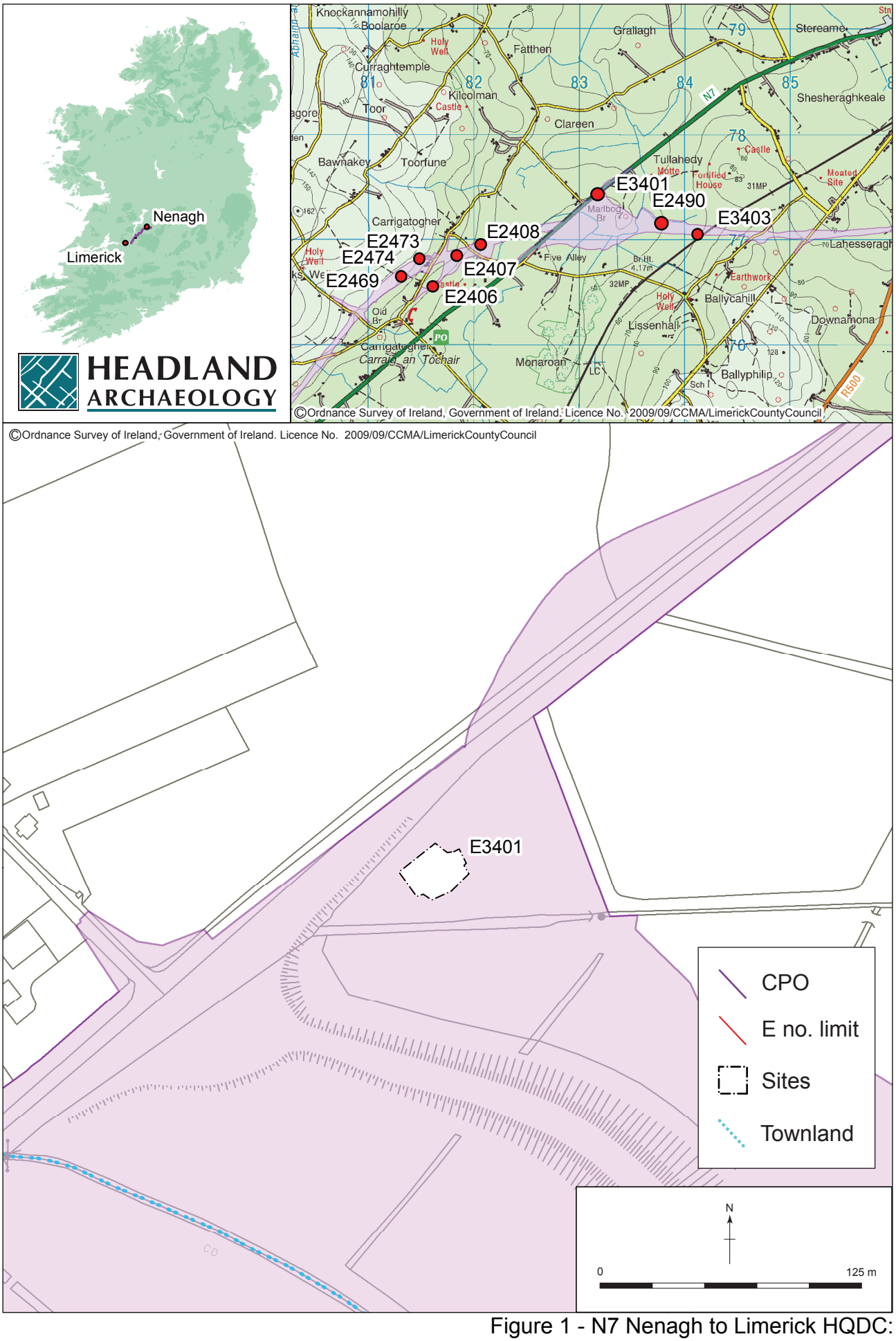

Figure 1 - N7 Nenagh to Limerick HQDC: Location of E3401, Tullahedy Site 2.

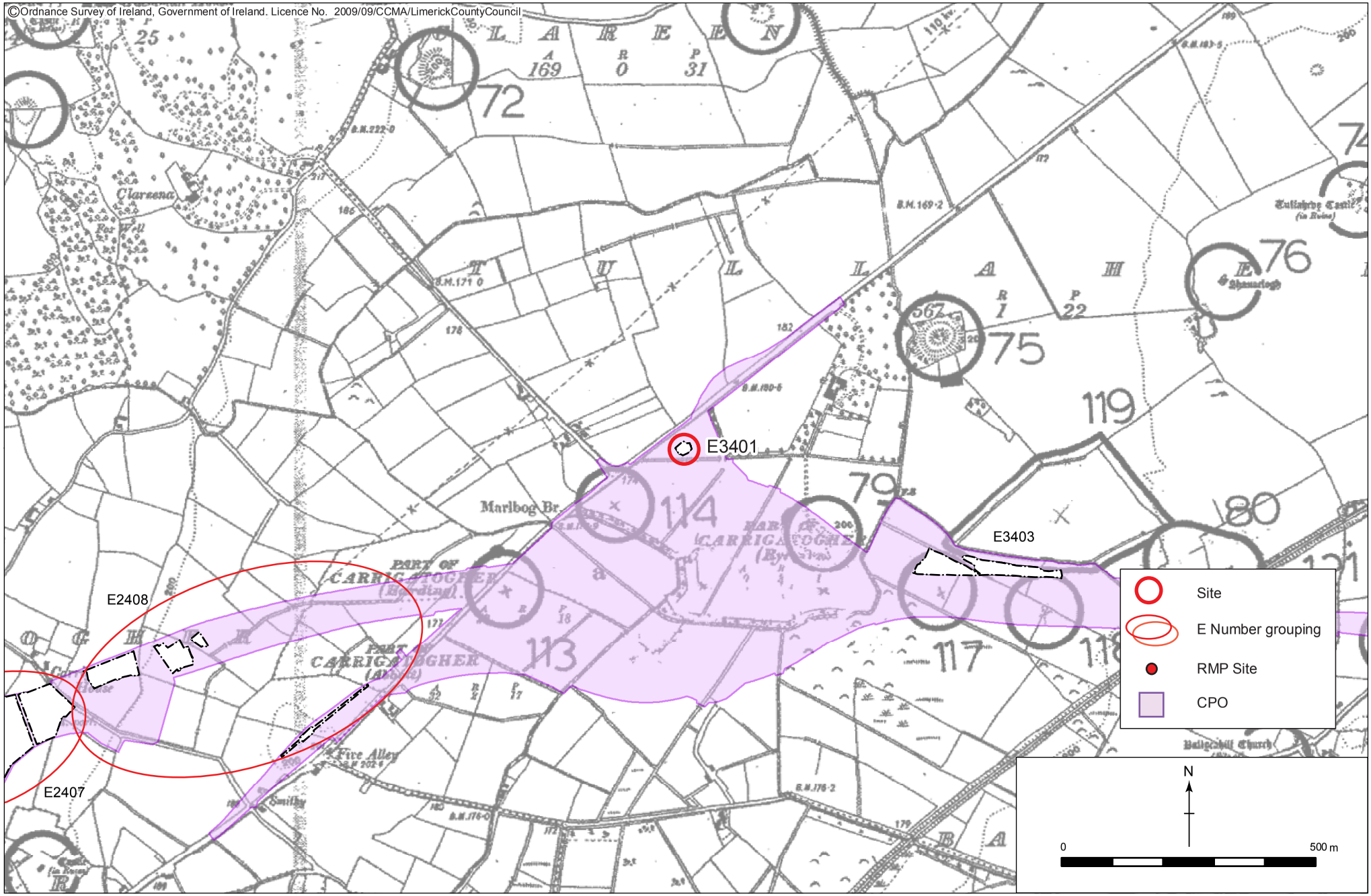

Figure 2 - N7 Nenagh to Limerick HQDC:
Location of E3401, Tullahedy Site 2, with extract from RMP.

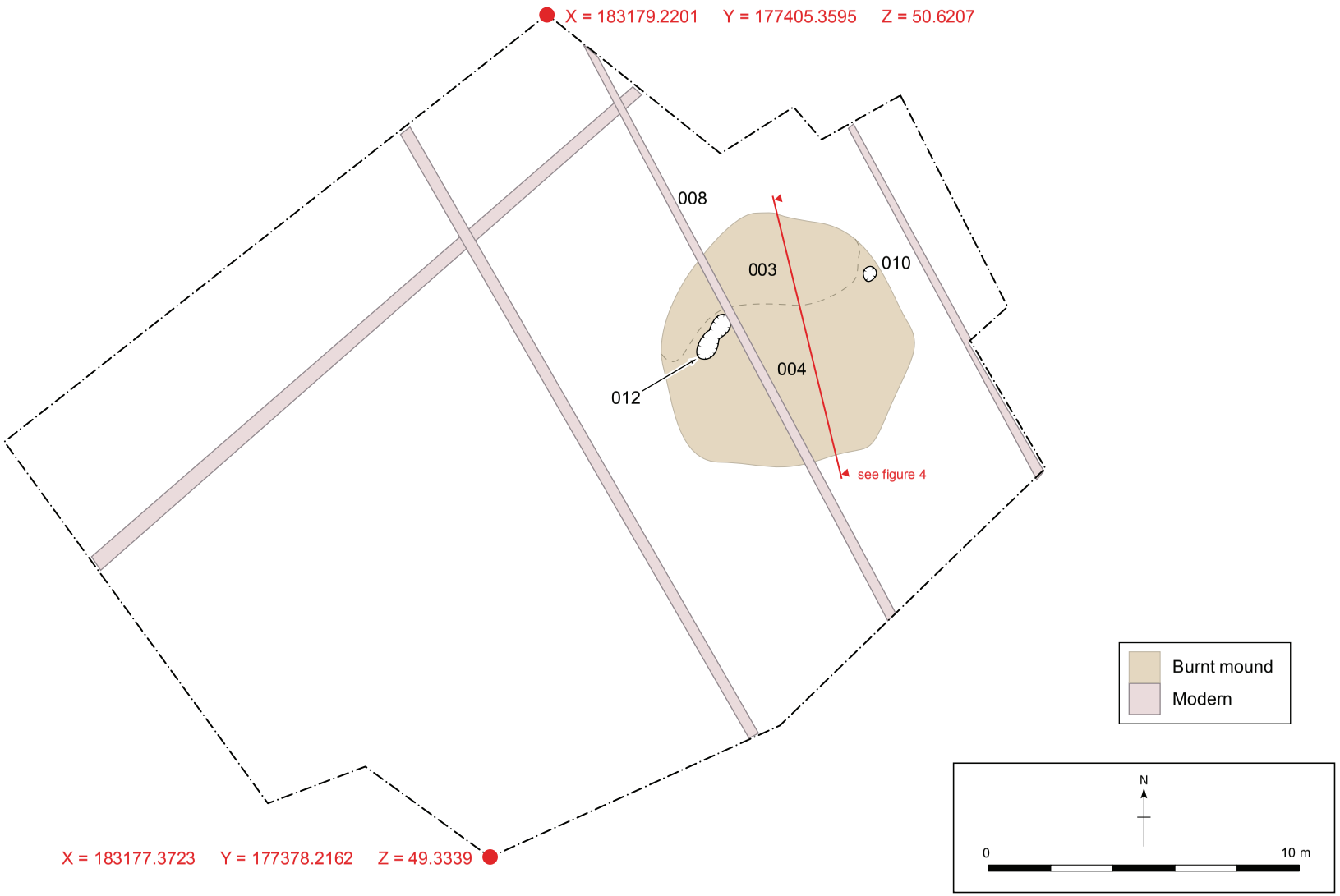

Figure 3 - N7 Nenagh to Limerick HQDC: Tullahedy Site 2, E3401 site layout.

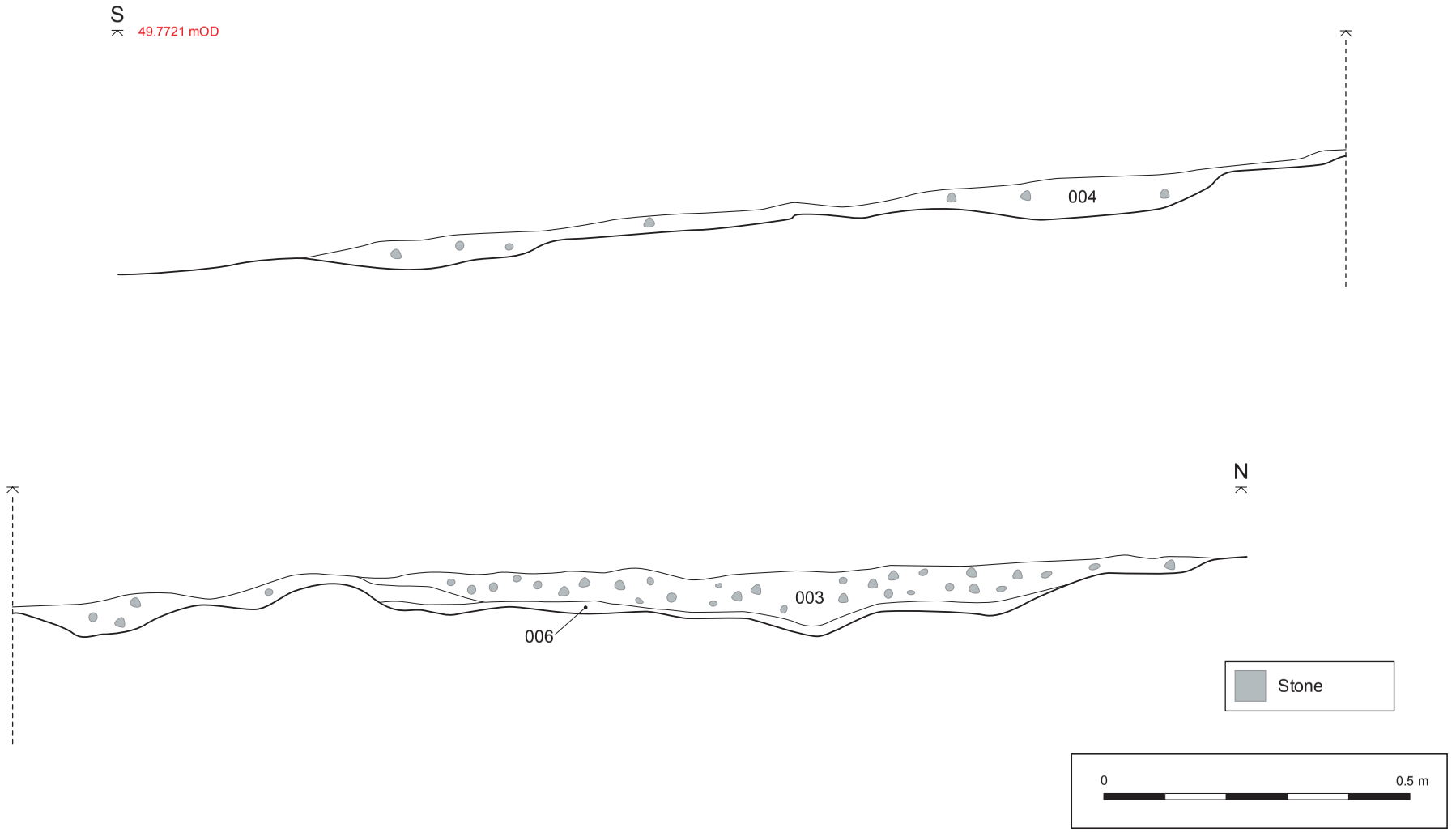

Figure 4 - N7 Nenagh to Limerick HQDC: Tullahedy Site 2, E3401 east-facing section of burnt mound spread.

Plate 1 - Pre-excavation view of burnt spread, looking southwest.

Plate 2 - Mid excavation view of burnt spread, facing west.

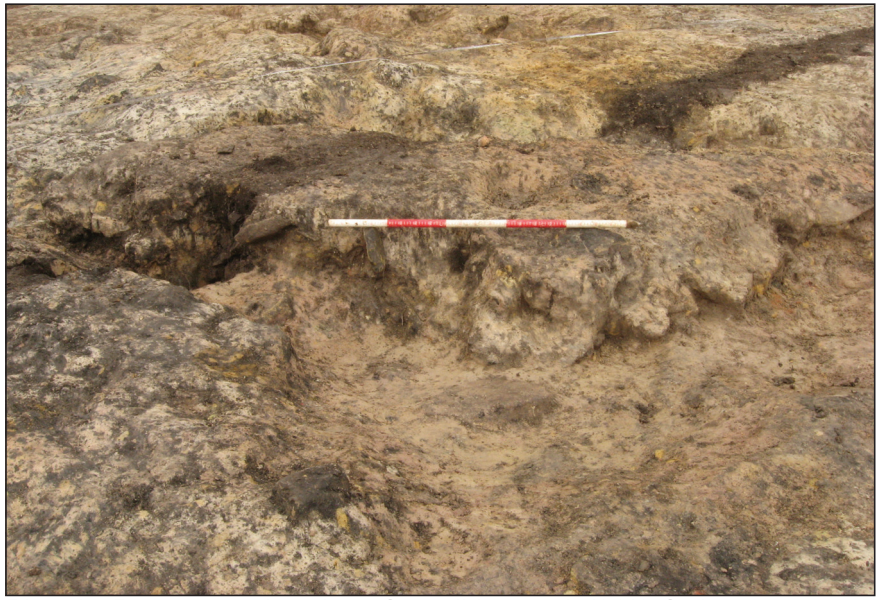

Plate 3 - Post excavation view of possible trough (012), facing west.

O'Neill, N. 2009c *N7 Nenagh to Limerick High Quality Dual Carriageway Archaeological Resolution Project: Annaholty Site 3, E2314, Co. Tipperary Final Excavation Report.* Unpublished report by Headland Archaeology (Ireland) Ltd for Limerick County Council.

11 Acknowledgements

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- Post-excavation managers Patricia Long and Asa Carlsson,
- Graphics department, Headland Archaeology Ltd.
- John Twomey, Site Supervisor, Headland Archaeology Ltd.
- The excavation team.
- Donald Murphy and Linda Clarke, ACS for allowing me to refer to their unpublished excavation report

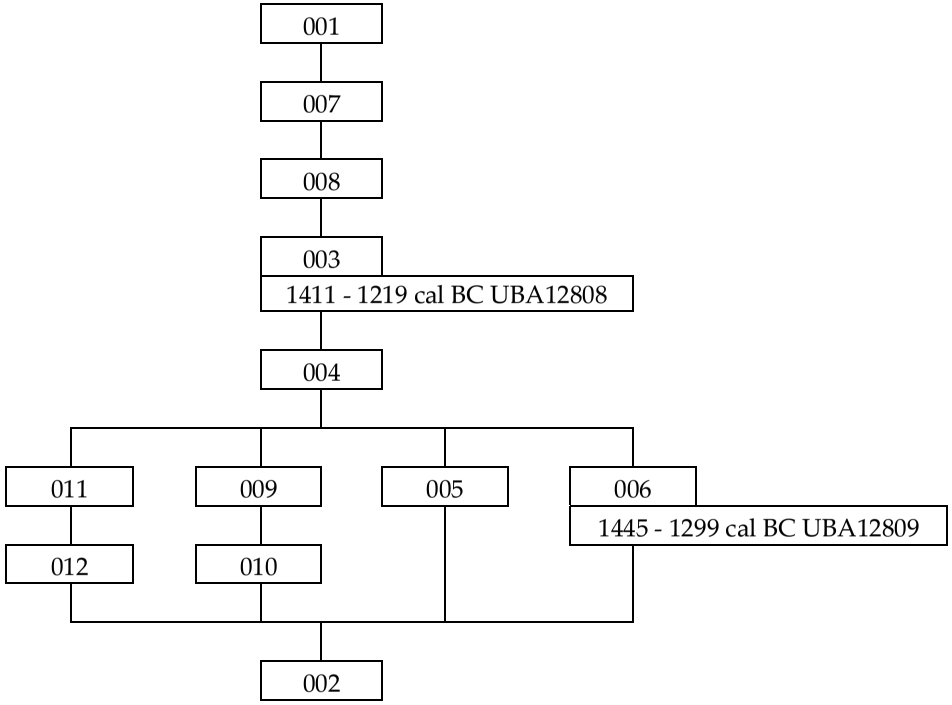
Appendix 1:

Context Register and matrix Tullahedy Site 2 E3401

Context no.	Type	Fill of:	Filled by:	D (m)	W (m)	L (m)	Description	Interpretation
001	Deposit	n/a	n/a	0.4	n/a	n/a	Dark brown silty clay	Topsoil
002	Deposit	n/a	n/a	n/a	n/a	n/a	Yellowish cream clayey sand	Natural
003	Deposit	n/a	n/a	0.21	3.75 N/S	6.8 E/W	Dark blackish brown, moderately compact, sandy silt with frequent inclusions of heat shattered stone and charcoal	Surviving upper burnt spread deposit
004	Deposit	n/a	n/a	0.04 - 0.15	4.6 N/S	7.1 E/W	Mid greyish-brown, loose, sandy silt with a moderate amount of heat shattered stone (20%) and occasional charcoal (5%) inclusions	Lower burnt spread deposit
005	Deposit	n/a	n/a	0.04 - 0.01	Patchy 2.5 - 1.8 NW-SE	Patchy 4.4 - 3.3 NE-SW	Mid brownish-grey, moderately compacted silty clay	Clay layer at edges of burnt spread deposit
006	Deposit	n/a	n/a	0.03	2.0 E-W	3.0 N-S	Mid blackish-grey, moderately compacted clay, with frequent charcoal inclusions	Clay layer underlying burnt spread
007	Deposit	008	n/a	0.46	0.25 N/S	site-wide	Dark greyish-brown, loosely compacted, silty clay with frequent medium sub angular stone inclusions	Single fill of modern drain
008	Cut	n/a	007	0.46	0.25 N/S	site-wide	Rectilinear in plan with sharp breaks of slope, vertical sides, and a flat base. Orientated NW/SE and ran beyond the CPO in both directions	Cut of modern, possibly machine cut, drain
009	Deposit	010	n/a	0.15	0.36 E-W	0.64 N-S	Mid brown, loose sandy clay, with small heat shattered stone inclusions	Single fill of sub-oval pit

Context no.	Type	Fill of:	Filled by:	D (m)	W (m)	L (m)	Description	Interpretation
010	Cut	n/a	009	0.15	0.36 E-W	0.64 N-S	Sub-oval possible pit with concave sides and a bluntly tapered base	Pit
011	Deposit	012	n/a	0.39	0.88 N-S	1.67 E-W	Black, loose sandy silt with moderate heat shattered stone and occasional charcoal inclusions	Single fill of irregular pit
012	Cut	n/a	011	0.39	0.88 N-S	1.67 E-W	Irregular, double lobed possible pit, with sharp breaks of slope, concave sides on the western side, near vertical to the east and a concave base. Truncated by drain 008 on its eastern edge	Irregular pit, possibly a re-used hollow or stone hole.

Matrix **Tullahedy Site 2 E3401**



Appendix 2:

Soil Sample Register Tullahedy Site 2 E3401

Sample no.	Context no.	Description
001	003	Dark blackish brown, moderately compact, sandy silt with frequent inclusions of heat shattered stone and charcoal
002	004	Mid greyish-brown, loose, sandy silt with a moderate amount of heat shattered stone (20%) and occasional charcoal (5%) inclusions
003	005	Mid brownish-grey, moderately compacted silty clay
004	006	Mid blackish-grey, moderately compacted clay, with frequent charcoal inclusions
005	011	Black, loose sandy silt with moderate heat shattered stone and occasional charcoal inclusions

Appendix 3:

Photographic Register Tullahedy Site 2 E3401

Photo no.	Direction Facing	Description
1	Southwest	Pre-excavation view of burnt spread
2	Southwest	Pre-excavation view of burnt spread
3	Northwest	Pre-excavation view of burnt spread
4	Northeast	Pre-excavation view of burnt spread
5	West	Mid-excavation view of burnt spread
6	West	Mid-excavation view of burnt spread
7	West	Mid-excavation view of burnt spread
8	West	Mid-excavation view of pit (010)
9	East	Post-excavation view of site
10	East	Post -excavation view of site
11	Southeast	Post -excavation view of site
12	West	Post -excavation of pit (012)
13	West	Post -excavation of pit (012)

Appendix 4:

Drawing Register Tullahedy Site2 E3401

Drawing no.	Type	Scale	Description
1	Section	1:20	East-facing section through spread of burnt spread
2	Section	1:10	East-facing section of pit (010)
3	Section	1:10	North-facing profile of pit (012)
4	Plan	1:50	Post excavation plan of area covered by burnt spread

Appendix 5:

Palaeoenvironmental samples assessment for Tullahedy Site 2, E3401
Project: NNL06
By: Karen Stewart

Introduction
Five samples were taken on site during the excavation of E3401, a site consisting of a burnt spread, a possible trough and a pit. Of these, four sub-samples were processed in order to retrieve any palaeoenvironmental material that may aid in the interpretation of the site. Though they were processed as waterlogged samples, little of the typical evidence that survives in waterlogged conditions was recovered, and it is likely that these contexts were not truly waterlogged.

Methodology
Samples of approximately 10 L were taken on site under the direction of environmental archaeologist Susan Lyons. 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 remaining material 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 plant macrofossil samples were analysed using a stereomicroscope at magnifications of x10 and up to x100 where necessary to aid identification. Identifications were confirmed using modern reference material and seed atlases including Cappers *et al* (2006).

Results

Radiocarbon Dates:
To place this site within a chronological framework two sub-samples were submitted for radiocarbon dating. The sub-samples were identified to species in advance of submission. Radiocarbon dating was undertaken by Stephen Hoper at Queen's University Belfast, after Reimer *et al* (2004). Calibrated age ranges were calculated using radiocarbon calibration program CALIB REV5.0.2. The results are presented in table 1.

E-Number	Lab code	Sample ID	Material	ä13C	Radiocarbon age BP	Calibrated Age Ranges (1 ó)	Relative probability	Calibrated Age Ranges (2 ó)	Relative probability
E3401	UBA-12808	context 003, sample 001	charcoal	-25.4	3054 +/- 31	cal BC 1387 - 1296	1	cal BC 1411 - 1259	0.981
								cal BC 1231 - 1219	0.019
E3401	UBA-12809	context 006, sample 004	Pomoideae charcoal	-27.6	3107 +/- 32	cal BC 1426 - 1376	0.772	cal BC 1445 - 1299	1
						cal BC 1338 - 1320	0.228		

Table 1: Radiocarbon Dates

Environmental Evidence:
The results are summarised below in Tables 2 (flot assessment). All plant remains are preserved through charring and waterlogging.

Wood charcoal
Wood charcoal was recovered from both samples in low concentrations. The charcoal present was in very small pieces and very abraded. Two non-oak charcoal fragments, taken from samples E3401:001 and E3401:004, were submitted for radiocarbon dating.

Weed seeds
Very low concentrations of dock (*Rumex* sp.) seeds were noted in sample 2.

Discussion
The fragmented and abraded nature of the charcoal may indicate that it was exposed on the surface for some time before deposition. This suggests that the charcoal may have been exposed on the surface for some time, or transported from elsewhere to be deposited, both of which can cause the breaking down and abrasion of charcoal. The typical location of burnt mounds next to water sources can also contribute to the abrasion of the charcoal present as the rising and lowering of the water table over time may abrade even buried charcoal.

The charcoal submitted for radiocarbon dating was identified as Pomoideae. The Pomoideae (Maloideae) group is a sub-set of the Rosaceae family comprising the genera *Malus* (apple), *Pyrus* (pear), *Sorbus* (rowan or whitebeam) and *Crataegus* (hawthorn) which are difficult to distinguish to species by microscopy (Stuijts 2005, 138). The variety of species within this sub-family group, and their European distribution, is detailed by Hather (2000, 88-92). There is some debate regarding the native or alien status of the wild pear, although it is regarded as introduced by the Botanic Gardens (Alien plants in Ireland 2008). The charred wood discussed in this report thus probably derived from one of the other species.

This species may have been specifically targeted as Pomoideae species generally provide good fire wood. Dried crab apple wood makes superior fuel (Stuijts 2005, 142) and hawthorn, in particular , is known to produce more heat than oak and its charcoal can produce sufficient temperatures to melt pig iron (Plants for a future 2008).

Unfortunately the dock seeds could not be identified to species, and there are numerous species native to Ireland, which tend to a variety of habitats. It is likely that, given the present conditions, these seeds represent a water-loving species of dock. The low variety of species identified from the site is consistent with the findings from many similar sites (O'Neill 2009).

Sample number	Context number	Total flot vol. (ml)	Other plant remains	Charcoal			Comments
				Quantity	Max size (cm)	AMS	
001	003			+++	<1	*	
002	004	-	+ *Rumex sp.*	++	<1	*	++ fungal spores
004	006			+++	<1	*	
005	011	-		+	<1		
Key: + = rare, ++ = occasional, +++ = common and ++++ = abundant * = sufficient sized charcoal for identification and AMS dating							

Table 2: Composition of flot material

References

Cappers, R., Bekker, R. and Jans, J. 2006 *Digital seed atlas of the Netherlands.* Barkhuis Publishing and Groningen University Library, Groningen.

Hather, J. 2000 *The Identification of the Northern European Woods: A guide for archaeologists and conservators*. Archetype Publications Ltd, London.

Kenward, H., Hall, A. and Jones, A. 1980 'A tested set of techniques for the extraction of plant and animal macrofossils from archaeological deposits', *Science and Archaeology* Vol 2, 3-15.

O'Neill, J. 2000 'Just another *fulacht fiadh* story', *Archaeology Ireland,* Vol. 14, No. 2.

RADIOCARBON CALIBRATION PROGRAM* CALIB REV5.0.2 Copyright 1986-2005 M Stuiver and PJ Reimer. *To be used in conjunction with Stuiver, M., and Reimer, P. 1993 *Radiocarbon* Vol. 35, 215-230.

Reimer P., Baillie M. *et al* 2004 *Radiocarbon* Vol. 46, 1029-1058.

Pilcher, J. and Hall, V. 2001 *Flora Hibernica; The wild flowers, plants and trees of Ireland*. Collins Press, Cork.

Stuijts, I. 2005 'Wood and charcoal identification', in M. Gowen, J. O'Neill and M. Philips (eds.) *The Lisheen Mine Archaeological Project 1996-8*. Worldwell, Bray. 137-185.

Web References:

Plants for a future (2008):
http://www.pfaf.org/database/plants.php?Crataegus+laevigata

Appendix 6:

Radiocarbon dating information

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
E3401	UBA-12808	context 003, sample 001	charcoal	-25.4	3054 +/- 31	cal BC 1387 - 1296	1	cal BC 1411 - 1259	0.981
								cal BC 1231 - 1219	0.019
E3401	UBA-12809	context 006, sample 004	Pomoideae charcoal	-27.6	3107 +/- 32	cal BC 1426 - 1376	0.772	cal BC 1445 - 1299	1
						cal BC 1338 - 1320	0.228		