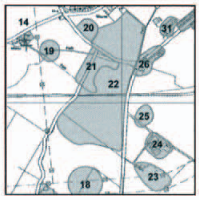





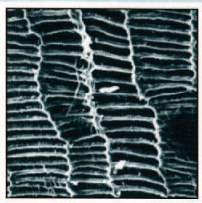


transport21 progress in motion

NDP National Development Plan 2007 - 2013

Department of Transport An Roinn Iompair

NRA National Roads Authority An tÚdarás um Bóithre Náisiúnta

Date: October 2009
Client: Offaly County Council
Project code: NTB06

N52 Tullamore Bypass: Final Report on archaeological excavations at Ardan 1, E2847, in the townland of Ardan, Co. Offaly

By: John Twomey
Ministerial Direction No: A033
National Monuments Section Registration No: E2847
Director: Linda Hegarty
Chainage: 11990 - 12010
NGR: 34500/27050

ESTO FIDELIS

HEADLAND ARCHAEOLOGY Ltd

Date: October 2009
Client: Offaly County Council
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1 Summary

This report presents the results of archaeological investigations carried out on behalf of Offaly County Council as part of the Advance Archaeological Works Contract for the N52 Tullamore Bypass. It was one of eleven sites excavated on this scheme (Appendix 12). The work was undertaken under Ministerial Direction A033 and under National Monuments Section Registration Number E2847 in the townland of Ardan Co. Offaly. The Minister for the Environment, Heritage & Local Government, following consultation with the National Museum of Ireland, directed that Linda Hegarty of Headland Archaeology Ltd should proceed with archaeological resolution.

Archaeological testing carried out under Ministerial Direction Number A033/000 on this site in August and September 2006 identified a deposit of heat shattered stone within a matrix of firmly compacted, dark greyish-black sandy silty clay suggesting a fulacht fiadh, a post-medieval field boundary, and a feature identified as a possible figure-of-eight shaped kiln.

Full archaeological resolution was conducted on this site between 8 and 22 January 2007**.** This revealed a shallow mound of heat shattered stone in a matrix of firmly compacted, mid-dark greyish-black sandy silty clay at the southern end of the site, four troughs, two linear features orientated north-south and east-west across the extent of the site, and four pits.

2 Introduction

The scheme involves the proposed construction of the N52 Tullamore Bypass, between the townlands of Cloghanbane and Ardan in Co. Offaly. The proposed scheme will consist of the construction of a bypass around the town of Tullamore. It is to consist of 11.5 km of standard single carriageway and 2.5 km of wide single carriageway road. It will also involve the construction of seven at-grade roundabout junctions, priority junctions and seven new major structures, including four river crossings, one canal crossing and one railway crossing. The project is funded by the Irish Government and the European Union, through Offaly County Council/National Roads Authority and under the National Development Plan 2000-2006. Headland Archaeology Ltd. was commissioned by Offaly County Council to undertake the works.

An Environmental Impact Statement was prepared in 2004, with the Cultural Heritage Assessment for the route contained within Section 3.8. The EIS was prepared by Babtie Pettit.

3 Site Description and Historical Background (Figure 1)

Site E2847 was located approximately 0.5 km north of Tullamore town, in the townland of Ardan, at National Grid Reference: 34500/27050. Located one kilometre to the north was a section of the prominent Esker Riada chain running east–west, while the surrounding land was generally low-lying, gently undulating, and under pasture at the time of excavation. The site itself was located towards the southeastern corner of a modern field division on a gentle south-facing slope. At the time of excavation the eastern and southeastern part of site was flooded due to the presence of a number of natural springs and the low lying nature of the site, and had to be pumped daily.

The Ordnance Survey Name Books list the following alternate spellings and names for Ardan: Arden, Ardin, Ardenmore and Raheen, Ardamore and Raheens, Ardamore and Raheers, Ardenbegg, and Ardenmore and Rahin. It lists Ardan as *Ardán* in Irish, translating it as "a hillock". The townland is described as being located on a crossroad from Tullamore to the parish of Durrow south of the Silver River (which forms the northern boundary) and a small bog (which forms the southern border), which lies beside the road from Tullamore to Tyrelspass. The land use at the time of the survey was chiefly arable and it contained some brushwood and coarse pasture. Gormagh Bridge crosses the Silver River on the boundary with Durrow Parish. The townland is completely within the Parish of Kilbride in the Barony of Ballycowan.

Ardan townland contains one known RMP site (OF017-002), a rath, which is also listed in the Archaeological Inventory of County Offaly (entry 112, OS 17:1:6). The rath is described as situated on a small hillock south of Ardan House in undulating country side (Archaeological Inventory of Co. Offaly, 24). It is a bivallate rath with a central platform measuring approximately 28 m in diameter on the east-west axis (ibid.). A poorly preserved internal bank, with a width of 1 m and a height of 0.2 m, is visible in the north only (ibid.). A fosse with a width of 3 m and an external bank are visible to the south (ibid.).

The first edition Ordnance Survey map shows Ardan to be primarily fields with an area of forest at the northern end. It clearly shows the rath, as well as smaller areas of trees and hedges. A small road runs through the townland in an east-west direction and a larger road runs north-south. Several buildings are depicted on the map, clustered predominantly around the crossroads. Griffith's Valuation of 1848-1864, lists the total area of Ardan as 749 acres 1 R 3 P and a total annual value of £448 18 s.

4 Aims and methodology

The objective of the work was the preservation by record of any archaeological features or deposits in advance of the proposed road's construction.

Topsoil stripping of the site was conducted using a 360° tracked machine fitted with a 1.9 m wide ditching (toothless) bucket under archaeological supervision. A total area of 900 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 an appropriate scale. Registers are provided in the Appendix. 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.

5 Excavation results

An area measuring 30 m x 30 m (900 m²) was stripped of topsoil in preparation for the excavation of the features uncovered in testing and any adjacent features. This uncovered a shallow mound of heat shattered stone in a matrix of firmly compacted, mid-dark greyish-black sandy silty clay at the southern end of the site, two linear features orientated north-south and east-west across the extent of the site, two pits, and the feature previously identified in testing as a possible kiln.

Burnt Mound
The burnt mound (12) was located at the southern end of the site and was truncated on its southern side by a modern field boundary. Test trenching on the southern side of this boundary had identified no archaeological deposits. The mound was irregular in plan and extended 7.7 m northwest – southeast, 4.5 m northeast – southwest, and had a maximum depth of 0.15 m. It consisted of a substantial amount of heat shattered stone in a matrix of firmly compacted, mid-dark greyish-black sandy silty clay, with frequent inclusions of charcoal. Upon excavation three troughs and one small pit were revealed under the mound.

Troughs
Trough (20) was situated towards the southeastern edge of the burnt mound (12). It was oval in plan and orientated northwest-southeast, having a length of 1.96 m, a width of 1.7 m, and a maximum depth of 0.3 m. Its sides were gradually sloped, while its breaks of slope were sharp at the top and gradual at the base (Plate 1).

Its basal fill (23) was a firmly compacted black sandy clay, containing large amounts of heat shattered stone and frequent inclusions of charcoal reaching a depth of 0.14 m. Above this was (24), a deposit of firmly compacted dark grey sandy clay, containing large amounts of heat shattered stone and moderate amounts of charcoal which was 0.16 m deep. A sample suitable for radiocarbon dating was recovered from the environmental sample of (24). UB-8275 gave a dating range at two sigma of 1634-1444 cal BC.

Located 1.6 m north of trough (20) was a smaller trough (13). This pit was sub-oval in plan with a northeast-southwest orientation, measuring 1.94 x 1.43 m with a maximum depth of 0.3 m. Its sides were vertical to the east and west, undercut to the north, and moderate to the south. At the top and base the breaks of slope were sharp and it had an irregularly shaped flat base (Plates 2 and 3). Its basal fill (14) was a firmly compacted mid-brownish-grey clayey sand, with frequent inclusions of heat shattered stone and charcoal flecks, and moderate fine-

medium pebbles which reached a depth of 0.07 m. Directly above this was a fill of firmly compacted mid-dark greyish-black sandy silty clay, containing a large amount of heat shattered stone, with frequent inclusions of charcoal flecks and roots. This was 0.23 m deep and identified as being consistent with the spread (12).

At a distance of 1.3 m northwest of trough (13) was a further small trough (15). This was sub-oval in plan, and orientated east-west, with a length of 1.5 m, a width of 1.16 m, and a depth varying from 0.37 m-0.41 m. Its sides were gradual and convex except at the southeast where it was undercut, and to the south and east which were vertical. It had sharp breaks of slope with a sub-oval base. This was filled with (12), a firmly compacted mid-dark greyish-black sandy silty clay containing a large amount of heat shattered stone and frequent inclusions of charcoal roots, and was consistent with the deposit of the burnt mound. A sample suitable for radiocarbon dating was recovered from the environmental sample of the upper fill (12). UB-8274 gave a dating range at two sigma of 1613-1429 cal BC.

The large pit located towards the west of the site was also a trough (6). It was located 13.5 m north of the burnt mound, and was sub-rectangular in plan with rounded corners and a northwest-southeast orientation. It had vertical to near vertical sides, sharp breaks of slope and a sub-rectangular base. Trough (6) was orientated northwest-southeast with a length of 2 m, a width of 1.6 m and a depth of 0.32 m (Plate 4).

It contained a basal fill of (7), firmly compacted dark greyish-black silty clay, with frequent inclusions of heat shattered stones, moderate inclusions of charcoal, occasional burnt bone and quartz debris, and a minute amount of burnt human bone. It was similar in composition to (12), the deposit of the burnt mound. Above this was a deposit identified as (1), a mid-brown loamy clay with occasional stone inclusions.

Pits

A small pit (25) was truncating the east edge of trough (20). This was circular in plan with concave sides, gradual breaks of slope and a rounded base. It had a diameter of 0.6 m and a depth of 0.12 m. It contained a single fill (26), a loosely compacted black peat with frequent inclusions of heat shattered stone and moderate charcoal flecks.

Northwest of trough (13) by 2.5 m was a small pit (21) which was circular in plan, had convex sides, sharp breaks of slope, and a sub-oval base with a tapered blunt point. This measured 0.55 m north-south, 0.52 m east-west, and had a depth of 0.18 m. It contained (22), a loosely compacted dark brown sandy clay, with inclusions of small stones and charcoal.

The feature identified in testing as a possible kiln emerged upon excavation to be two truncating pits, (10) and (11) (Plate 5). The sub-oval pit (10) was slightly the larger of these, measuring 2 m northwest-southeast, with a width of 1.7 m northeast-southwest and a depth of 0.47 m. It had gradual concave sides with sharp breaks of slope and a rounded base. Its basal fill was (16) a firmly compacted mid-brownish-grey silty clay with frequent inclusions of pebbles and occasional charcoal flecks, burnt and unburnt bone, chert debris, and large stones. This had a length of 1.30 m northwest-southeast, a width of 0.90 m northeast-southwest, and a depth of 0.2 m. Above this was (17), a firmly compacted mid-greyish-brown clayey silt, with occasional inclusions of small pebbles and burnt human bone. It measured 1.80 m northwest-southeast, 1.60 northeast-southwest, and was 0.12 m deep. Fills (16) and (17) were situated below (19), a firmly compacted dark brown loam, with occasional inclusions of small pebbles, roots and chert debris, having a depth of 0.15 m. A natural spring

was located in the base of (10). This resulted in the pits (10) and (11) and their surrounding area being waterlogged.

A sub rectangular pit (11) truncated pit (10) at the eastern edge. This was orientated north-south and had a length of 2.1 m, a width of 1.5 m, and a depth of 0.34 m. The corners of (11) were rounded, its sides were steep and concave, and it had sharp breaks of slope with a flat base. Its basal fill (18) was a firmly compacted mid-greyish-brown clayey silt, with occasional inclusions of small pebbles, charcoal flecks, burnt bone and chert debris. This had a length of 1.80 m, a width of 1.15 m, and a depth of 0.19 m. It was situated below (19) a firmly compacted dark brown loam, with occasional inclusions of charcoal flecks, small pebbles, roots and chert debris, measuring 4.30 m northwest-southeast, 2.10 m northeast-southwest, and had a depth of 0.15 m. This was also the top fill of the adjoining pit (10).

Linear features

Orientated in a north-south direction along the western side of the site, 3.5 m north of the burnt mound (12) was a post-medieval field boundary (3) (Plate 7). This was truncated at its southern end by the modern field boundary and extended north for a distance of 23.1 m, having a maximum width of 1.3 m and a depth of 0.36 m. The sides were concave and the base was flat at its southern end, becoming rounded and deeper progressing north. Its cut became shallower and less distinct over the last 5 m at the north. It was primarily filled by (4), a moderate-firmly compacted mid-greyish-brown silty clay, with frequent inclusions of pebbles and tree roots, and occasional charcoal flecks, animal bones and mollusc shells. For the northern most 4.8 m of (3), (4) was located above (5), a firmly compacted mid-greyish-brown silty clay, with frequent inclusions of large rocks and pebbles which had a width of 1.3 m, and a maximum depth of 0.36 m.

Another post-medieval field boundary (8) was located perpendicular to (3) (Plate 6). This terminated at the west end of (3), 1.52 m from its northern terminus and extended eastwards across the site and beyond the CPO. It had a maximum width of 1.25 m and a depth of 0.32 m. The sides of (8) were concave to the south and stepped to the north, it had a flat base and sharp breaks of slope. It was filled by (9), a moderate-firmly compacted mid-greyish-brown silty clay, with occasional inclusions of large stones, pebbles and charcoal flecks. This was very similar in composition to (4), the primary fill of field boundary (3).

6 Discussion

The shallow burnt mound (12) and the presence of four troughs (6), (13), (15) and (20) indicate that the site E2847 represents the remains of a fulacht fiadh. The burnt and heat-shattered stone within a charcoal-rich silty matrix is typical of the composition of a burnt mound or fulacht fiadh. Similar sites have returned dates ranging from the Bronze Age to the late medieval period. However the majority of such sites are Bronze Age in date (Waddell 2000). Two dates were retrieved from the troughs (13) and (20) at E2847; both single entity AMS two sigma dates of 1613-1429 cal BC and 1634-1444 cal BC, placing this fulacht fiadh at the interface between the Early and Middle Bronze Age (Appendix 4).

The shape of burnt mounds often varies from the 'classic' crescent/kidney shape to completely irregular. Often it depends on the features underneath as the debris from the burning process would initially be dumped away from the features. This would invariably form up as an arc or crescent to one side of the main trough or pit. The size of a mound is often taken as an indicator of the number of uses or length of occupation. Modern farming practises and field clearance often remove all or part of mounds and all that is left is a few burnt stone spreads and a series of pits or troughs. The burnt mound material from (12) is spread out across the site, suggesting it had been partially leveled and dispersed, presumably as a result of ploughing of the field. This material would have accumulated gradually as a result of dumping. The extent of the mound in relation to the volume of the troughs would point to their being re-used on a number of occasions. However individual tip-lines were not visible within this particular mound.

There are a number of theories with regards to the function of fulacht fiadh/burnt mound monuments. These include cooking, sweathouses, bathing, ritual and industrial uses such as dying or fulling (Grogan *et al* 2007: 99-100). Other uses have also been put forward such as brewing (Moore & Quinn 2007: 8-9). There is even the possibility that these sites were used in the processing of metal ore (O'Brien 1999: 290-1). It is generally accepted that the function of fulacht fiadh troughs was to boil water, but how this water was subsequently utilised is notoriously difficult to ascertain. So far no specific evidence has been identified from the troughs to indicate how the hot water was used, and none of the possibilities i.e. cooking, washing, tanning, brewing etc. can be ruled out. A nearby water source would have been required in order to fill the troughs for boiling episodes. A number of natural springs such as that found in the base of pit (10) may have accounted for this water supply.

Troughs were often, though not always, lined with some impervious material such as clay, wood, stone or leather. At the site of Clashroe in County Cork, a partially destroyed wood lined trough was uncovered (Hurley 1987: 97). This trough was constructed utilizing part of a hollowed out tree trunk to form the base and part of the sides of the trough. The remaining end of the trunk had had a groove/slot cut into it so that a plank of wood would be able to be slotted in to the trunk. The other end would presumably have had a similar slot, though that was destroyed by water erosion. Other sites such as Ballyclogh in Co. Cork (Lehane 1988: 85) had troughs constructed out of flat planks which were set into a large pit. The shape of the wooden part of the trough would have been held in place at the corners by stakes. The space between the wooden part of the trough and the pit cut would then be filled by clay and stone packing material. Often the only trace visible of a trough with wooden lining would be a series of stake or postholes visible at the edges of the trough's base. Unlined troughs are known from such sites as Commons, Co. Limerick (Taylor and Bartlett 2002: 314-15) where a sub-oval trough was found under a burnt mound. The excavators thought that this trough

would have naturally filled with and retained water due to the water table and the natural sub-soil making the lining of it unnecessary.

The isolated position of trough (10), 13.5 meters northwest of the burnt mound spread raises a number of possibilities. It may be that this trough was indeed related to the burnt mound, and that, when being emptied after use, the heat shattered stones were carried to, and deposited on, the nearby mound. Alternatively, this feature may be entirely independent of the burnt mound. It may instead represent the remains of a pot boiler. Such features were independent troughs which would have been used only occasionally or even for a single episode. Experiments have shown a trough would be filled with stone to about 70% of its capacity to boil a joint of meat in such a feature (Brindley, Lanting and Mook 1989-90). This is remarkably similar to the percentage of trough (6) filled with heat shattered stone, and the topsoil nature of the remaining upper fill of this feature may indicate natural infilling, post-use. The sub-rectangular shape of trough (6) also differentiates it from the other sub-oval troughs on site.

Other features are often found associated with burnt stone mounds such as pits, postholes, stakeholes, track-ways and platforms. Pits serve a number uses within the context of a burnt stone mound. They can be used as rubbish pits, roasting/cooking pits or wells. At Kilfinning, County Limerick (Dennehy 2002: 325-26), a number of 'pot boilers' were identified beneath a burnt stone mound. These features consist of pits containing burnt stone and their function seemed to be cooking hobs on which ceramic vessels could be placed. The difficulty with these pit types would be to tell them apart from roasting pits found in similar sites such as at Roberts town, County Limerick (Dennehy 2002: 343-45). Postholes and stakeholes are often present either in the form of simple structures such as wind breaks or huts or associated with pits and troughs where they are part of a lining or racks close by.

There are over 4500 burnt stone mounds/fulacht fiadh to be found in Ireland, with an ever increasing number of new sites being identified due to the increase in infrastructural projects throughout the country. The period from 1974-2002 saw over 300 fulachta fiadh excavations, the only reported one in Offaly being a possible fulacht fiadh in Moneygall. Another fulacht fiadh, E2846, 50 m to the south in an adjoining field, highlights the longevity and usefulness of these monuments. This site returned radiocarbon dates of 2141-1944 cal BC, and 1834-1664 cal BC, placing it firmly in the Early Bronze Age. This again shows the attraction of this area over a relatively long timescale, and would suggest the possibility of further fulachta fiadh existing in the surrounding locality.

The term 'fulacht fiadh' was first used in the 9th century AD in such sources as *The Lives of Saints* and taken to mean the cooking sites which utilised heated stones for cooking. A '*fulacht*' is referred to as a spit in the Yellow Book of Lecan, however, evidence for a spit would be unlikely to survive (O'Sullivan *et al* 2004). The only likely recoverable physical evidence on the sites ('fulachta fiadh') would be the by-products of the process, consisting mainly of heat-shattered stone and charcoal and commonly a hole in the natural subsoil for obtaining fresh water (ibid.).

Recent excavation and survey evidence indicates that these burnt mounds occur not as isolated monuments in the landscape but as important indicators of Bronze Age settlement (Brindley, Lanting and Mook 1989-90). Many contemporaneous sites have been identified and recorded in the archaeological inventory for County Offaly and a number in the landscape surrounding Ardan. Situated 1.5 km north of the fulacht fiadh excavated at Ardan, in the

townland of Lug, is a Bronze Age cemetrey site 0F009-036. This consisted of an embanked cairn measuring 19.8 m in diametre and with a height of 1.2 m. Excavation in 1935 by Duignan uncovered seven cists and two pits containing a mix of inhumated and cremated burials. Within a central cist a female inhumation was accompanied by an upright food vessel, while another cist contained a second food vessel which had been crushed. Further pottery was found in another cist while the pits contained cremated bone and charcoal. South of this cemetrey a disturbed cist OF009-039 was uncovered by a local farmer circa 1950.

The majority of known fulachta fiadh are located in counties Cork (over 2000), Waterford, Kilkenny and Tipperary. Fourteen such fulachta fiadh are noted in the Archaeological Inventory of County Offaly, published in 1997, including a group of five at Garr in the extreme northeast of the county. This number did not include E2847, or E2846 situated 30 m to its south and excavated in tandem with this site. Indeed no similar features had previously recorded within a 15 km radius of this site. This however does not necessarily denote a lack of similar features in the surrounding country side. The relatively small number of these features in county Offaly may be a result of "the dominance of limestone in the underlying geology of the county as it can turn to lime when fired or turn to calcium hydroxide when heated stones are placed in the water" (McDermott 1998: 15). The shallow nature of the mounds at Ardan meant they had no recognisable surface features, as is the case with many fulachta fiadh, such as many of those uncovered in County Wicklow. None of the other known Offaly examples have been excavated, making any comparative analysis difficult. However the vast majority (10 of 14) of these are located at OD 65-100 m, as are the two at Ardan.

The only recorded site in the locality of the fulacht fiadh at Ardan is a bivallate ringfort OF017-002. This is recorded in the Archaeological Inventory of County Offaly as "comprising a central platform enclosed by a poorly preserved internal bank visible at north only, with a fosse and external bank visible at south", and is situated 500 m northwest of the fulachta fiadh sites.

Another 1.5 km north of this cemetery site is the standing stone at Ballynamona. Such stones range in date from the Bronze Age up until relatively modern times but were not all necessarily erected for the same purpose. The example at Ballynamona had an adjacent area excavated to its west by Duignan, also in 1935, uncovering a number of disarticulated human bones. 1.5 km west of here, 3 km north-west of the fulachta fiadh at Ardan, was a ring-barrow in the townland of Balleek Beg. It was recorded by Davies in 1942 as part of an ITA Survey as, a "conical mound (H 0.91 m) enclosed by an inner fosse (Wth 1.82 m) and external bank (H 0.6 m)" (O'Brien *et al* 1997); no visible remains are extant today.

The local evidence for Bronze Age activity in Offaly in general is somewhat minimal, although recorded Bronze Age sites can be found in the vicinity of the site including Bronze Age cremations to the north (O'Brien *et al* 1997). Bronze Age evidence is also visible in the form of earthworks to the southwest and several other fulachta fiadh in the area. The area is gently sloping and generally low lying, as would be expected to provide the water necessary for use with the fulacht fiadh.

The truncating pits (9) and (10) were the most ambiguous features on site. Though they both contain only small amounts of charcoal, they also contain burnt and unburnt bone and lithic debris (Appendix 2). This points to their use as domestic waste pits, though their substantial

size in relation to the quantities of material retrieved may suggest a previous use for which no evidence remained.

There is no clear relationship between the burnt mound and the linear field boundaries (3) and (8), which are probably of a post-medieval date, pre-existing the existing field division. A lack of diagnostic materials meant no definite date could be secured but they are not depicted on the first edition Ordinance Survey 6" maps or any later series. The presence of animal bone and mollusc shell would appear to be coincidental rather than the result of deliberate human deposition (Appendix 2).

The majority of fulachta fiadh have not contained artifacts, though those containing material can usually be placed in the Bronze Age. Others, like E2847 have contained flint flakes and artifacts.

This fulacht fiadh is quite typical of this type of monument. Its location, morphology and associated features are all common among fulacht fiadh. Despite the presence of several troughs, this fulacht fiadh gives no indication of its former use aside from likely being used to boil water for some purpose. Lithic material was found in the trough. Two pit features are interpreted as likely waste disposal pits. The fulacht fiadh is located in an area with little other Bronze Age evidence, however, another fulacht fiadh was excavated on the same scheme just to the south.

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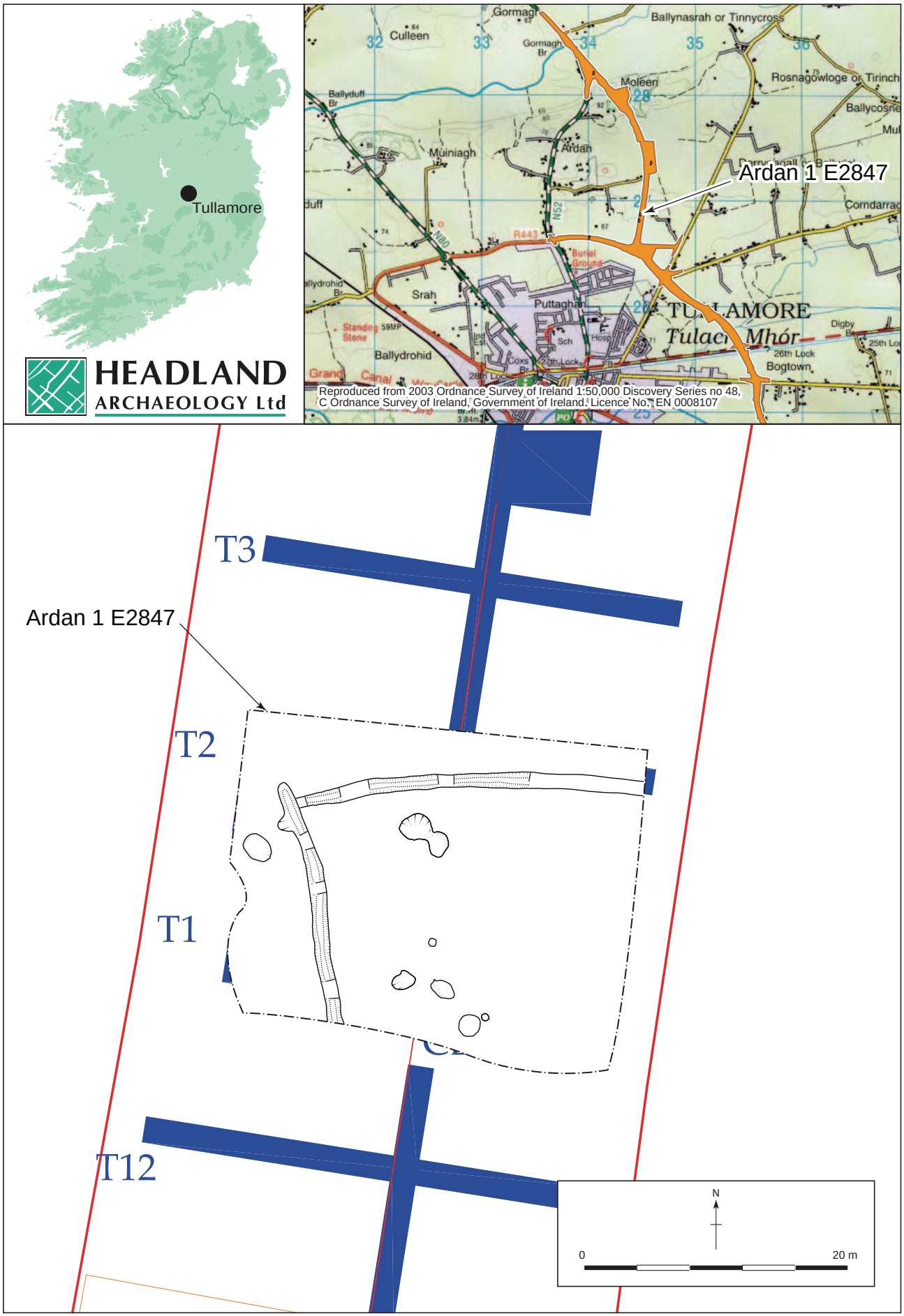


Figure 1 - N52 Tullamore Bypass: E2847 Ardan 1, Site location

Bypass route is shown broken due to warp of scanned RMP's, this represents a best-fit.

Figure 2 - N52 Tullamore Bypass: E2847 Ardan 1, RMP extract

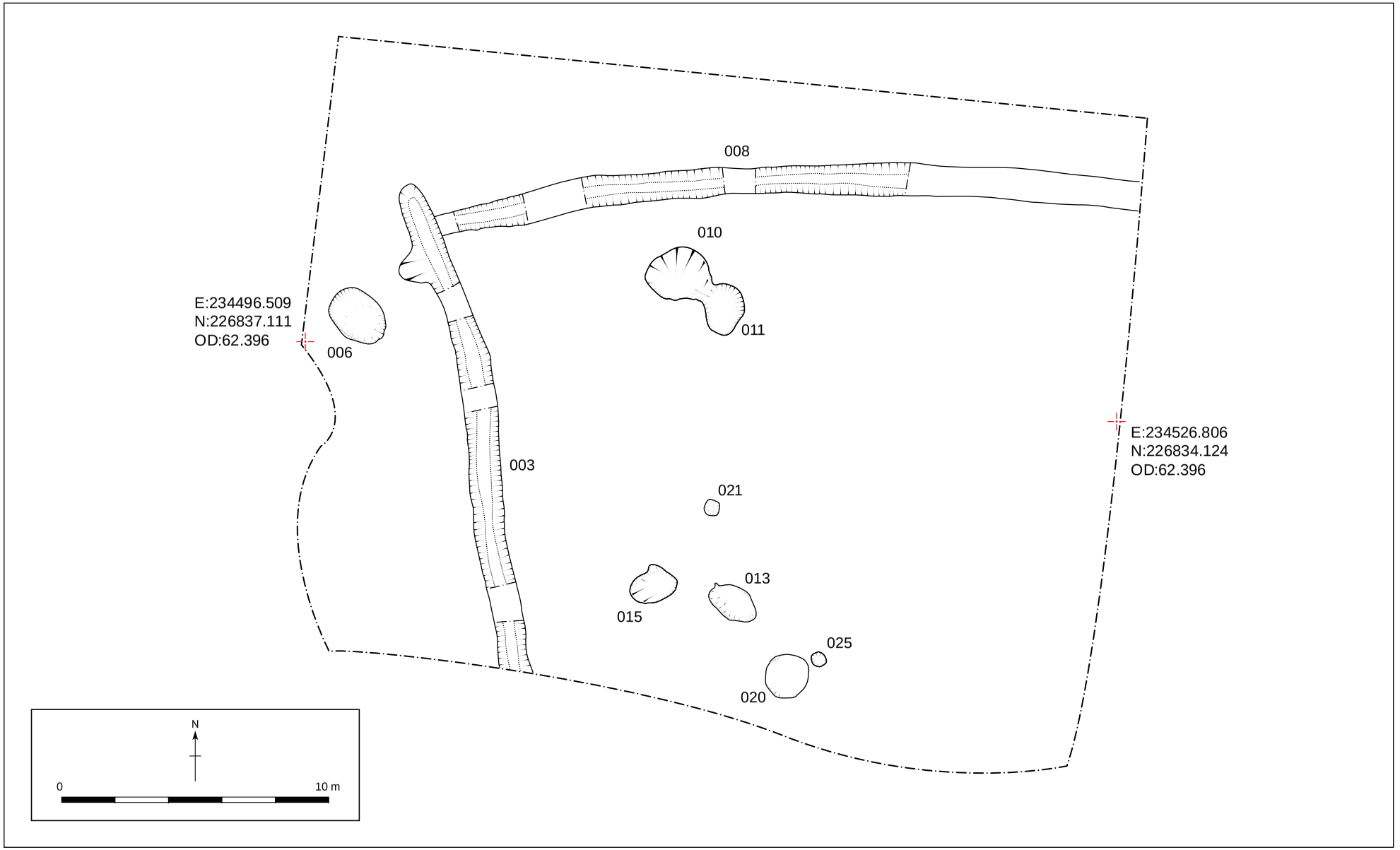


Figure 3 - N52 Tullamore Bypass: E2847, Ardan 1: Site plan

Plate 1. Mid - excavation of Trough (20) and Pit (25)

Plate 2. Mid - excavation of Trough (13)

Plate 3. Post - excavation of Trough (13)

Plate 4. Mid - excavation of Trough (6)

Plate 5. Post - excavation of Pits (10) and (11)

Plate 6. Mid - excavation of Field Boundary (8) showing flooding

Plate 7. Mid - excavation of Field boundary (3)

Appendix 1: Context Register

C	Type	Fill Of	Filled By	D (m)	W (m)	L (m)	Description	Interpretation
1	Deposit	n/a	n/a	0.30-0.40	Site wide	Site wide	Mid-brown loamy clay with occasional stone inclusions	Topsoil
2	Deposit	n/a	1,3	n/a	Site wide	Site wide		Natural
3	Cut	n/a	4,5	0.36	1.3 E-W	23.1 N-S	Linear truncated at southern end by extant field boundary. Had concave sides and a base which were flat at south but became rounded and deeper progressing north. Cut becomes shallower and less distinct over last 5m to the north.	Field boundary
4	Deposit	3	n/a	0.3	1.3 E-W	23.1 N-S	Moderate-firmly compacted mid-greyish brown silty clay, with frequent inclusions of pebbles and tree roots, and occasional charcoal flecks. Situated over (5) at the north end of (3). Similar to (9), fill of linear (8).	Primary fill of field boundary (3).
5	Deposit	3	n/a	0.25 max	0.8	4.8	Firmly compacted mid-greyish brown silty clay, with frequent inclusions of large rocks and pebbles. Situated under (4) at the north end of (3).	Lower fill at N end of linear (3).
6	Cut	n/a	1,7	0.32	1.60 NE-SW	2.00 NW-SE	Sub-rectangular pit with rounded corners, vertical/ near vertical sides, sharp breaks of slope and a sub-rectangular base.	Cut of trough

C	Type	Fill Of	Filled By	D (m)	W (m)	L (m)	Description	Interpretation
7	Deposit	6	n/a	0.18 min 0.25 max	1.60 NE-SW	2.00 NW-SE	Firmly compacted black/ greyish black silty clay, with frequent inclusions of heat shattered stone. Similar composition to nearby burnt mound (12).	Basal fill of (6)
8	Cut	n/a	9	0.32		26.00 E-W	Linear truncated to west by linear (3) and running under baulk to the east. Steep concave sides. Sharp breaks of slope, concave side to the south, stepped to the north, and had a flat base.	Field boundary
9	Deposit	8	n/a	0.32	1.25 N-S	26.00 E-W	Moderate-firmly compacted mid-greyish brown silty clay, with occasional inclusions of large stones, pebbles and charcoal flecks. Similar to (4), fill of linear (3).	Fill of field boundary (8)
10	Cut	n/a	16, 17, 19	0.47	1.70 NE-SW	2.00 NW-SE	Oval shaped pit slightly truncated by pit (11) at its southeast. Gradual concave sides with sharp breaks of slope and a rounded base.	Large pit
11	Cut	n/a	18,19	0.34	1.5 E-W	2.1 N-S	Sub-rectangular pit with rounded corners, steep concave sides, sharp breaks of slope and a flat base. Truncates pit (10) at its northwest corner.	Large pit

C	Type	Fill Of	Filled By	D (m)	W (m)	L (m)	Description	Interpretation
12	Deposit	13, 15, 20	n/a	0.15	4.5 NE-SW	7.70 NW-SE	Firmly compacted mid-dark greyish black sandy silty clay, containing a large amount of heat shattered stone. Frequent inclusions of charcoal flecks and roots. Irregular/ kidney shaped in plan, truncated by field boundary to south.	Burnt spread
13	Cut	n/a	12, 14	0.3	1.43 NE-SW	1.94 NW-SE	Sub-oval pit with vertical sides to the east and west, undercut to the north, and moderate convex to the south. Sharp breaks of slope and an irregular shaped flat base. Situated below (12)	Trough
14	Deposit	13	n/a	0.07	1.20 NE-SW	1.60 NW-SE	Firmly compacted mid-brownish grey clayey sand, with frequent inclusions of heat shattered stone and charcoal flecks, and moderate inclusions of fine-medium pebbles. Situated below (12)	Basal fill of trough (13)
15	Cut	n/a	12	0.37 min 0.41 max	1.16 N-S	1.50 E-W	Sub-oval pit with gradual convex sides except for the southeast which is undercut and the south and east which are vertical. Sharp breaks of slope with a sub-oval base.	Trough
16	Deposit	10	n/a	0.2	0.90 NE-SW	1.30 NW-SE	Firmly compacted mid-brownish grey silty clay, with frequent inclusions of pebbles and	Basal fill of pit (10)

C	Type	Fill Of	Filled By	D (m)	W (m)	L (m)	Description	Interpretation
							occasional large stones. Situated below (17) and (19).	
17	Deposit	10	n/a	0.12	1.60 NE-SW	1.80 NW-SE	Firmly compacted mid-greyish brown clayey silt, with occasional inclusions of small pebbles. Situated below (19) and above (16). Similar to (18) basal fill of pit (11).	Fill of pit (10)
18	Deposit	11	n/a	0.19	1.15 E-W	1.80 N-S	Firmly compacted mid-greyish brown clayey silt, with occasional inclusions of small pebbles and charcoal. Situated below (19). Similar to fill (18) in pit (10)	Basal fill of pit (11)
19	Deposit	10, 11	n/a	0.15	2.10 NE-SW	4.30 NW-SE	Firmly compacted dark brown loam, with occasional inclusions of small pebbles, roots and chert debris. Top fill of {10} and (11). Situated above (16), (17) and (18).	Top fill of pits (10) and (11)
20	Cut	n/a	23, 24	0.3	1.70 NE-SW	1.96 NW-SE	Oval shaped pit with gradual sides. Sharp breaks of slope at top and gradual at base. Situated under (12).	Trough
21	Cut	n/a	22	0.18	0.52 E-W	0.55 N-S	Small circular shaped pit with convex sides, sharp breaks of slope and a sub-oval base with a tapered blunt point.	Small pit
22	Deposit	21	n/a	0.18	0.52 E-W	0.55 N-S	Loosely compacted dark brown sandy clay, with inclusions of small stones and charcoal.	Fill of (21)

C	Type	Fill Of	Filled By	D (m)	W (m)	L (m)	Description	Interpretation
23	Deposit	20	n/a	0.14	1.66 NE-SW	1.90 NW-SE	Firmly compacted black sandy clay, with large amounts of heat shattered stone and frequent inclusions of charcoal. Situated below (12) and (24).	Basal fill of trough (20)
24	Deposit	20	n/a	0.16	1.70 NE-SW	1.90 NW-SE	Firmly compacted dark grey sandy clay, with large amounts of heat shattered stone and moderate inclusions of charcoal. Situated below (12) and above (23).Similar to Burnt spread (12).	Top fill of trough (20)
25	Cut	n/a	26	0.12	0.60 NE-SW	0.60 NW-SE	Small circular pit with concave sides, gradual breaks of slope and a rounded base. Truncates the east edge of trough (20).	Small pit
26	Deposit	25	n/a	0.12	0.60 NE-SW	0.60 NW-SE	Loosely compacted black peat with frequent inclusions of heat shattered stone and moderate charcoal. Situated under Burnt spread (12).	Fill of pit (25)

Appendix 2: Sample Register

Sample	Context	Description
1	4	Mid-greyish brown silty clay, fill of linear (3) containing animal bones
2	7	Black silty clay with heat shattered stone, fill of trough (6)
3	12	Mid-greyish black sandy clay with heat shattered stone, fill of trough (13)
4	12	Mid-greyish black sandy clay with heat shattered stone, fill of trough (15)
5	14	Mid-brownish grey clayey sand, basal fill of trough (13)
6	19	Dark brown loam, top fill of pits (10) and (11)
7	18	Greyish brown clayey silt, basal fill of pit (11)
8	17	Mid-greyish brown clayey silt, fill of (10)
9	16	Mid-brownish grey silty clay, basal fill of pit (10)
10	22	Dark brown sandy clay, fill of pit (21)
11	26	Black peaty fill of pit (25)
12	24	Dark grey sandy clay with heat shattered stone, top fill of trough (20)
13	23	Black sandy clay with heat shattered stone, basal fill of trough (20)

Appendix 3: Palaeoenvironmental Sample Assessment Report

Karen Stewart, Headland Archaeology

Introduction

Thirteen samples were taken during excavation on Site E2847. Of these, ten were processed and assessed for environmental material.

Methods

Samples of approximately 10L 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 1 mm 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

Results are presented below in Tables 1 (Retents) and 2 (Flotation).

Table 1: Composition of retents

Sample number	Context number	Retent vol. (L)	Wood charcoal		Mammal bone		Marine shell	Chert debris	Quartz
			Qty	AMS	Burnt	Unburnt			
1	4	1l				+	+		
2	7	1.5l	++		+			+	+
3	12	0.2l	+++	*					
6	19	1l	+	*				+	+
7	18	1l	+	*	+		+	+	
8	17	1l	+		+	+		+	+
9	16	2l	+		+	+		+	
10	22	0.2l	++						
11	26	1l	++++	*					
12	24	2l	++++	*					

Key: += rare, ++= occasional, +++= common and ++++= abundant

AMS= Accelerator Mass Spectrometry

*= sufficient for AMS dating

Table 2: Composition of flots

Sample Number	Context Number	Total flot Vol. (ml)	Other plant remains	Charcoal Quantity	AMS	Comments
1	4	30				Mollusc shell +
2	7	5		+		
3	12	1		+		
6	19	50		+		Chert +
7	18	20		+		
8	17	30				Archaeologically sterile
9	16	15		+		
10	22	1				Archaeologically sterile
10	22	5		++++	*	
11	26	50	*Chenopodium album* +	++++	*	
12	24	5		+++		

Key: + = rare, ++ = occasional, +++ = common and ++++ = abundant

AMS= Accelerator Mass Spectrometry

* = sufficient sized charcoal for identification and AMS dating

Plant remains

Charcoal was present in all of the processed samples. Sample 11 also contained a charred seed of Fat Hen (*Chenopodium album*), a weed of waste places and cultivated land. Charcoal fragments were most abundant in Samples 3, 10, 11 and 12.

Other finds

Lithics were present in a number of samples including chert and quartz (see Table 1).

Radiocarbon dates

Radiocarbon dating was undertaken by Stephen Hoper at Queens University Belfast, after Stuiver, M. *et al*.

Context Number	Lab Number	Description	Radiocarbon Date BP	Calibrated range (2 sigma) calendar yrs
12	UB-8274	*Prunus avium* charcoal	3273 +/- 43	1613- 1429 BC
24	UB-8275	*Alnus glutinosa* charcoal	3268 +/- 40	1634- 1444 BC

For calibration data see Appendix 4.

Discussion

Samples 8 and 9 are perhaps the most interesting with regard to environmental remains. They represent (17) and (16) respectively, fills of a pit (10). Though they both contain only small amounts of charcoal, they also contain burnt and unburnt bone and lithic debris. It seems likely then that (17) and (16) represent domestic waste, and pit (10) a domestic rubbish pit.

Pit (11) is found next to pit (10), and they share a top fill, (19), represented by Sample 6. The lower fill of pit (11), (18) is represented by Sample 7. Fill (18), like the basal fill of the pit next to it, contains low levels of charcoal, but also burnt bone and chert debris, and probably also represents domestic waste. Fill (19) contains charcoal and chert, but no burnt bone. Though it

is possible that the use of the pit had changed by this point, it is also likely that (19) represents domestic waste as well, though in this case without bone remains.

Sample 1 is devoid of charcoal, and while it contains some bone and shell, it is likely that these are naturally occurring.

Sample 2 was taken from (7) and represents the basal fill of a trough (6). It contained little charcoal, but some burnt bone and lithic remains. It is possible that these represent domestic waste.

Sample 3 is taken from burnt spread (12) the charcoal recovered returned a radiocarbon date of 1613- 1429 cal BC.

Sample 10 and 11 are taken from pits (21) and (25) respectively. Both were small pits possibly associated with troughs interpreted as *fulachta fiadh*. Both contain charcoal suitable for AMS dating, which will possibly more firmly establish whether or not they are contemporary with the troughs.

Charcoal from Sample 12, (24) was identified to species and dated, returning a date of 1634-1444 cal BC.

The results from the two features dated would seem to make them contemporaneous.

References

Cappers R.T.J., Bekker R.M. and Jans J.E.A (2206) *Digital seed atlas of the Netherlands* (Barkhuis Publishing and Groningen University Library, Groningen).

Kenward, H.K., Hall, A.R. and Jones, A.K.G (1980). A tested set of techniques for the extraction of plant and animal macrofossils from archaeological deposits. *Science and Archaeology* 22, 3-15.

Stuiver, M & Reimer P J 1993 'Extended 14C data base and revised CALIB 3.0 14C Age calibration program' *Radiocarbon* 35(1):215-230.

Appendix 4: Calibration data for C14 dates

Context Number	Lab Number	Radiocarbon Date BP	68.30% (1-sigma) calendar yrs	95.40% (2-sigma) calendar yrs AD	Relative area of 2-sigma under probability distribution	Calibrated range (2 sigma) calendar yrs
12	UB-8274	3273 +/- 43	1533 - 1445 BC	1613 - 1429BC	1	1613- 1429 BC
24	UB-8275	3268 +/- 40	1541- 1499 BC	1634- 1444 BC	1	1634- 1444 BC

Appendix 5: Photographic Register

Shot	Type	Facing	Description
1	Pre-ex	E	Trough (6)
2	Pre-ex	N	Trough (6)
3	Pre-ex	S	Field boundary (3)
4	Pre-ex	N	Field boundary (3)
5	Pre-ex	N	Field boundary (3)
6	Section	N	Field boundary (3), Section 2
7	Section	S	Field boundary (3), Section 3
8	Working	n/a	Foggy Sun
9	Section	S	Field boundary (3), Section 4
10	Section	NE	Trough (6), Section 5
11	Section	NE	Trough (6), Section 5
12	Post ex	W	N terminus of linear (3)
13	Working	E	E-W linear (8)
14	Working	NW	Field boundary (3)
15	Pre-ex	SW	Pre ex of burnt mound
16	Pre-ex	SE	Pre ex of burnt mound
17	Pre-ex	E	Pre ex of burnt mound
18	Pre-ex	W	Pre ex of burnt mound
19	Section	NE	Pit (11), Section 7
20	Section	NE	Intersection of pits (10) and (11), Section 7
21	Section	NE	Pit (10), Section 7
22	Section	NE	NW side of pit (10), Section 7
23	Section	NE	SE side of pit (10), Section 7
24	Section	NE	Pits (10) and (11), Section 7
25	Pre-ex	W	Pit (21)
26	Pre-ex	W	Trough (13)
27	Pre-ex	SW	Trough (13)
28	Pre-ex	SW	Trough (13)
29	Pre-ex	SE	Trough (15)
30	Section	SE	Trough (15), Section 8
31	Section	SE	Trough (15), Section 8
32	Post ex	SW	Trough (6), Plan 15
33	Post ex	NE	Trough (6), Plan 15
34	Post ex	NE	Trough (6), Plan 15
35	Section	SW	Trough (13), Section 6
36	Section	SW	Trough (13), Section 6
37	Pre-ex	S	Trough (20)
38	Pre-ex	N	Trough (20)
39	Post ex	SW	Trough (13), Plan 17
40	Post ex	NE	Trough (13), Plan 17
41	Pre-ex	NE	Trough (20) and pit (25)
42	Post ex	SE	Trough (15), Plan16

Shot	Type	Facing	Description
43	Post ex	NW	Trough (15), Plan16
44	Section	E	Pit (21), Section 9
45	Post ex	NE	Pit (21), Plan 18
46	Post ex	E	Pits (10) and (11), *unbailed*
47	Post ex	S	Pits (10) and (11), *unbailed*
48	Post ex	E	Pit (10), Plan 19
49	Post ex	E	Pit (11), Plan 19
50	Post ex	S	Pits (10) and (11), Plan 19
51	Post ex	N	Pits (10) and (11), Plan 19
52	Section	SW	Trough (20) and pit (25), Section 12
53	Section	NW	Fulacht spread (12), Section 11
54	Section	SE	Fulacht spread (12), Section 10
55	Section	E	Linear (8)
56	Post ex	SW	Trough (20) and pit (25), Plan 20
57	Working	n/a	Working shot
58	Pre-ex	SE	Pre ex of pits (10) and (11)
59	Pre-ex	NW	Pre ex of pits (10) and (11)
60	Pre-ex	SE	Pre ex of pits (10) and (11)
61	Pre-ex	SE	Pre ex of pits (10) and (11)
62	Pre-ex	SE	Pre ex of pits (10) and (11)

Appendix 6: Drawing Register

Dwg	Type	Scale	Description
1	Plan	1:50	Pre ex plan of Ardan 1, Sheets 1-4
2	Section	1:10	S facing section of field boundary (3), (4), Sheet 5
3	Section	1:10	N facing section of field boundary (3), (4), Sheet 5
4	Section	1:10	N facing section of field boundary (3), (4), Sheet 5
5	Section	1:10	SW facing section of trough (6), (7), Sheet 5
6	Section	1:10	NE facing section of trough (13), Sheet 6
7	Section	1:10	SW facing section of pits (10) and (11), Sheet 7
8	Section	1:10	NW facing section of pit (15), Sheet 6
9	Section	1:10	E facing section of pit (21), Sheet 6
10	Section	1:10	W facing section of fulacht spread (12), Sheet 7
11	Section	1:10	E facing section of fulacht spread (12), Sheet 8
12	Section	1:10	NW facing section of trough (20) and pit (25), Sheet 8
13	Section	1:10	W facing profile of ditch (8), Sheet 8
14	Plan	1:50	Post ex plan of Ardan 1, Sheets 9-12
15	Plan	1:20	Post ex plan of trough (6), Sheet 13
16	Plan	1:20	Post ex plan of poss. Trough (15), Sheet 13
17	Plan	1:20	Post ex plan of trough (13), Sheet 13
18	Plan	1:20	Post ex plan of pit (21), Sheet 13
19	Plan	1:20	Post ex plan of pits (10) and (11), Sheet 14
20	Plan	1:20	Post ex plan of trough (20) and pit (25), Sheet 14

Appendix 7: Osteological Analysis

Carmelita Troy, Headland Archaeology

There was a minute amount of burnt bone in each sample (0.1 g) from Ardan 1, E2847. Therefore it is not creditable to include this information in an osteological report. The burnt bone was probably deposited in the respective features by natural processes or activity on the site. A table of the findings is included below.

Cut	Fill	Sample	Description	Total Weight (g)	Colour %	Fraction
006	007	02	Fill of trough	0.1	White 100%	2 mm
010	016	09	Basal fill of large pit	0.1	White 100%	2 mm
010	017	08	Fill of large pit	0.1	White 100%	2 mm
011	018	07	Basal fill of large	0.1	White 100%	2 mm

Table Osteological Analysis from Ardan 1, E2847

Appendix 8: Faunal Remains Report

Auli Tourunen, Headland Archaeology

A total of two specimens of cattle bone were recovered from Ardan 1, Co. Offaly. Full archaeological resolution was conducted on this site in January 2007**.** This revealed a shallow mound of heat shattered stone in a matrix of firmly compacted, dark greyish-black silty clay at the southern end of the site, four troughs, two linear features orientated north-south and east-west across the extent of the site, and four pits. The bones derived from a primary fill of field boundary (c.4).

Due to the physically small size of the material, no detailed analysis was possible. However, it was determined that the mandible derives from an adult animal (over 2 years old).

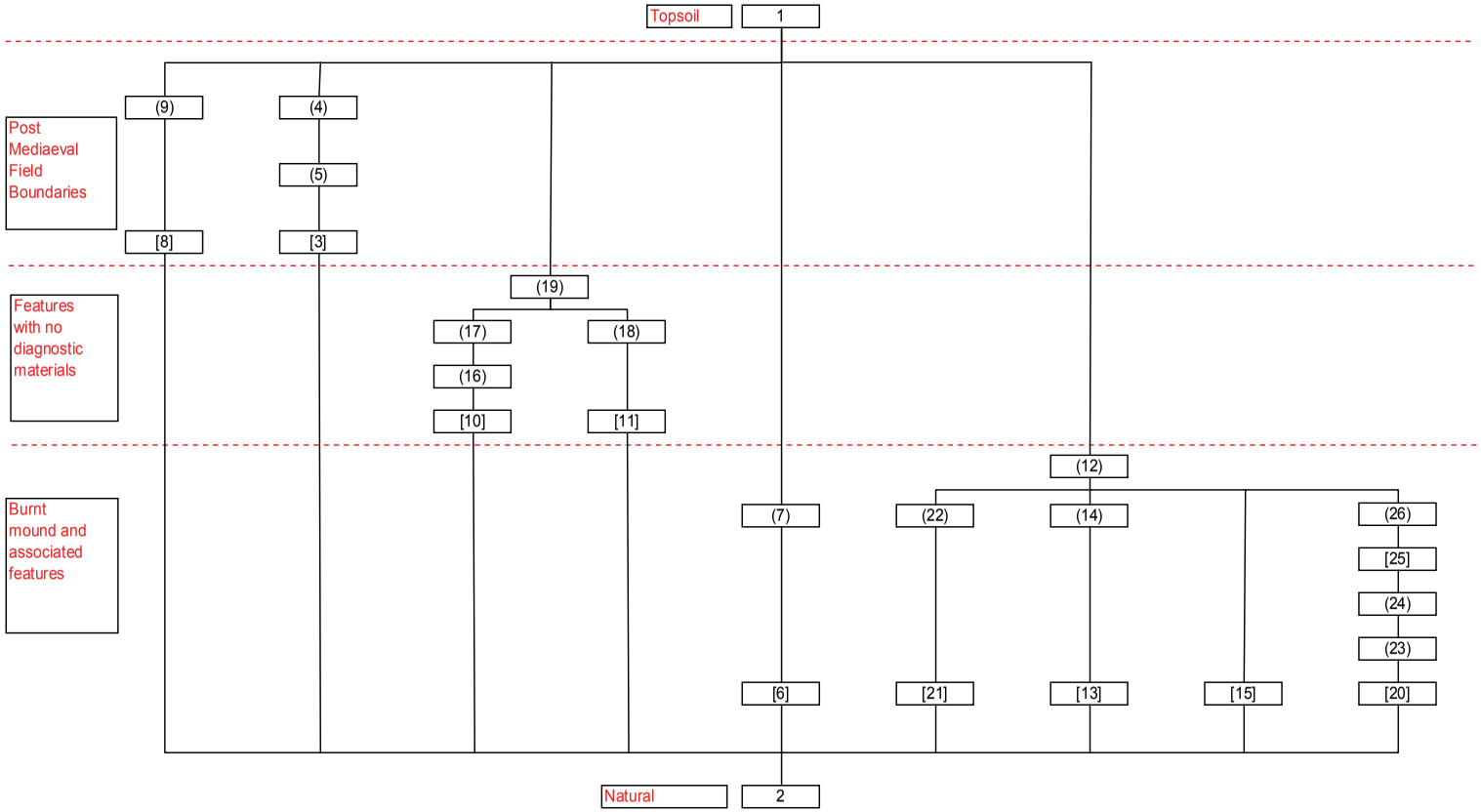
Context	Species	Element	NISP
4	Cattle	Mandible	1 (in 11 pieces)
4	Cattle	Tibia	1
Total			2

Table 1. Species and anatomical representation of sample (NISP).

Appendix 9: Charcoal Species Identification

Context Number	Sample Number	Material	*Taxon*	Common Name	Weight (g)
12	3	Charcoal	*Prunus avium*	wild cherry	0.4
16	9	Charcoal	*Pomoideaea sp.*	apple/pear/hawthorn	0.2
18	7	Charcoal	*Pomoideaea sp.*	apple/pear/hawthorn	0.2
19	6	Charcoal	*Quercus sp.*	oak	0.1
22	10	Charcoal	*Quercus sp.*	oak	0.1
24	12	Charcoal	*Alnus glutinosa*	alder	1.2
26	11	Charcoal	*Corylus avellana*	hazel	0.6

Appendix 10: Site Matrix



Appendix 11: All sites on road scheme

Ardan 1	E2847
Ardan 2	E2846
Ardan 3	E2493*
Ballynasrah	E2493*
Cloncollog 1	E2849
Cloncollog 2	E2850
Clonminch	E2851
Mucklagh 1	E2845
Mucklagh 2	E2844
Puttaghan	E2493*
Screggan 2	E2848

*Fully excavated during Centreline Testing under Ministerial Direction A033 and NMS Registration No. E2493