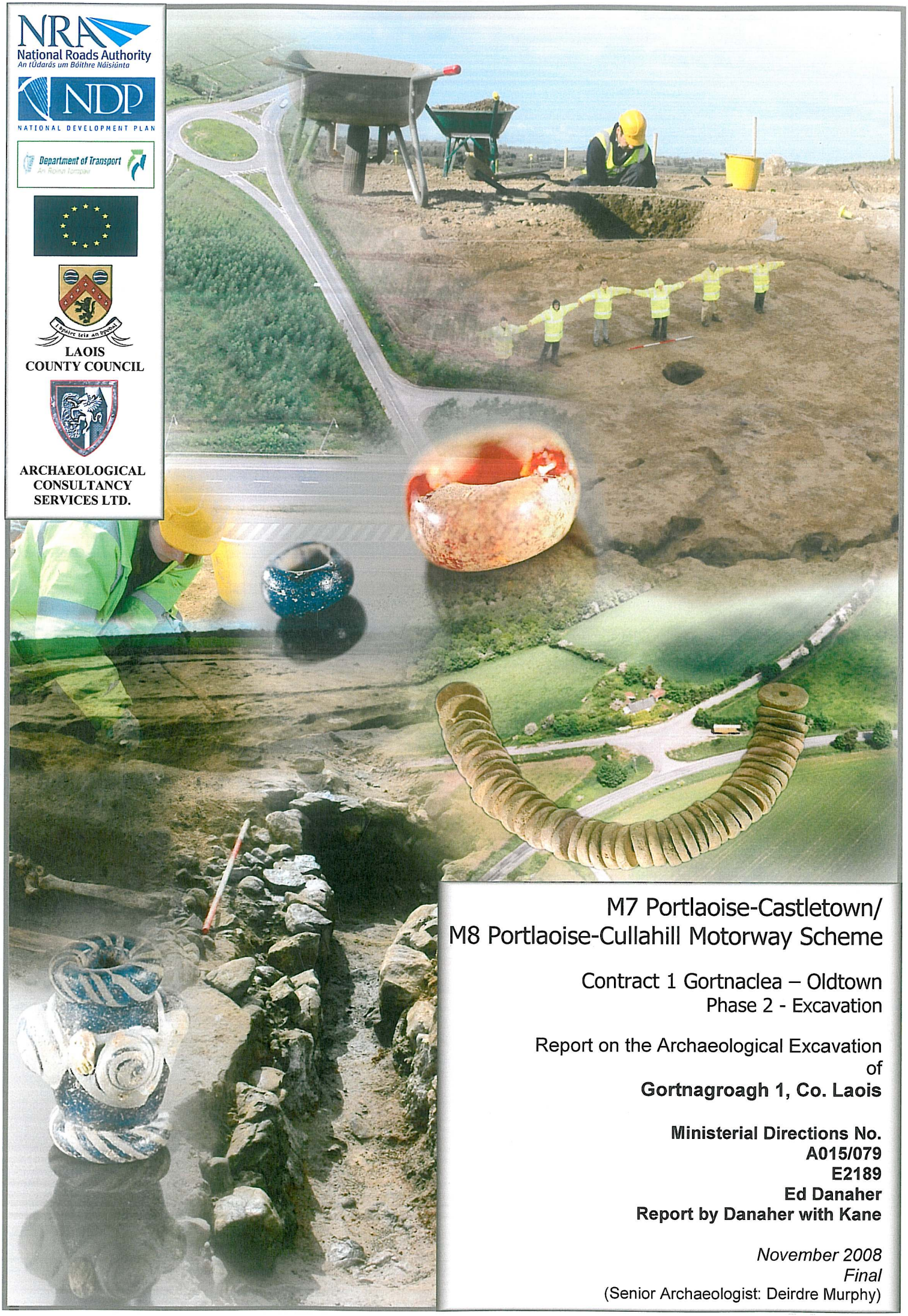

National Roads Authority
An tÚdarás um Bóithre Náisiúnta

NDP
NATIONAL DEVELOPMENT PLAN

Department of Transport
An Roinn Iompair

LAOIS
COUNTY COUNCIL

ARCHAEOLOGICAL
CONSULTANCY
SERVICES LTD.

M7 Portlaoise-Castletown/ M8 Portlaoise-Cullahill Motorway Scheme

Contract 1 Gortnaclea – Oldtown
Phase 2 - Excavation

Report on the Archaeological Excavation
of
Gortnagroagh 1, Co. Laois

Ministerial Directions No.
A015/079
E2189
Ed Danaher
Report by Danaher with Kane

November 2008
Final
(Senior Archaeologist: Deirdre Murphy)

PROJECT DETAILS

Project	M7 Portlaoise to Castletown/ M8 Portlaoise to Cullahill Motorway Scheme
Client	Laois County Council, County Hall, Portlaoise, County Laois
Contract	Contract 1
Site Name	Gortnagroagh 1
Townland	Gortnagroagh
Nat. Grid Ref.	235043, 185939
OS Map Ref.	OS 6 inch sheet 29
Chainage	20500
Ministerial Direction No.	A015/079
Record No.	E2189
Archaeologist	Ed Danaher
Senior Archaeologist	Deirdre Murphy
Report Type	Final
Report Status	Final
Report by	Danaher with Kane
Date of Submission	November 2008
Distribution	Elspeth Logan & Mary Deevy

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

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Project Engineer – Mike Evans
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Archaeologist – Martin Reid

Irish Antiquities Division, National Museum Of Ireland

Keeper - Nessa O Connor
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NON TECHNICAL SUMMARY

The proposed M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme consists of approximately 41km of motorway and 11km of single dual carriageway commencing to the southwest of the existing Portlaoise Bypass and running in a southern direction tying into the existing N8 at Oldtown. A portion of the scheme runs to the west tying into the existing N7 near Borris-in-Ossory. The Archaeological Works contract is subdivided into three separate contracts. The following report describes the results of archaeological excavation along one section of the planned M8 Portlaoise to Cullahill Motorway Scheme, at Gortnagroagh, County Laois, Contract 1.

Contract 1 extends from the townland of Gortnaclea to Oldtown and consists of approximately 14km of motorway, which extends from Aghaboe to south of Cullahill through the townlands from Gortnaclea to Oldtown. The site was identified during archaeological testing carried out by Anne-Marie Lennon of Archaeological Consultancy Services Ltd in March 2005 under ministerial direction (A015/013) from The Minister of the Environment, Heritage and Local Government, issued in consultation with the National Museum of Ireland (NMI) issued under Section 14 of the National Monuments (Amendment) Act 2004. 13 trenches were excavated within this field and a number of pits were identified. The site was designated Gortnagroagh 1.

Archaeological resolution of Gortnagroagh 1 (A015/079) commenced on 14th November 2005 by Ed Danaher of Archaeological Consultancy Services Ltd. For recording purposes, the site was designated the scheme no A015/079 and record no. E2189. Topsoil stripping revealed late Middle Bronze Age burnt mound activity, which appeared to have been used for the production of cow horns alongside a series of linear drainage ditches, one of which was associated with this activity while four pertained to the post medieval period. Cattle horn cores, iron finds and post-medieval pottery were recorded on site.

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1. INTRODUCTION

1.1 Site Location

This report details the results of the archaeological excavation of a site on the M7 Portlaoise – Castletown/M8 Portlaoise-Cullahill Motorway Scheme at Gortnagroagh 1, Contract 1, County Laois (Ordnance Survey six-inch sheet 29, National Grid Co-ordinates 235043, 185939; Figures 1–7). The site at Gortnagroagh 1 was situated southwest of the monastic complex at Aghaboe and northwest of the townland of Dairyhill. It was located at Chainage 20500 of the proposed scheme, in the townland of Gortnagroagh and within the Parish of Aghaboe.

1.2 Scope of the Project

The purpose of the Archaeological Services Project was to conduct Archaeological Site Investigations within the lands made available for the scheme and to assess the nature and extent of any new potential archaeological sites uncovered (Phase 1). This phase of the project was carried out in March-June 2005 and throughout 2006 when access to land became available. The principal aim of this phase of the project was to test the known sites, including sites of potential identified in the EIS and through aerial photography. It sought to test for any previously unknown sites that may by virtue of their size or complexity lead to significant delays and costs if revealed during construction works. This phase of the project also tried to assess the archaeological risk across the scheme by examining the volume, range, complexity and distribution of archaeology identified during testing.

The second phase of the project involved the resolution of all archaeological sites identified within the proposed road corridor prior to commencement of the construction of the motorway (Phase 2). The aim of this phase of works was to clear the entire route of archaeology in order to avoid delays and costs during construction works. This phase of the project was carried out from July 2005-October 2006 and excavations were conducted by seven licensed directors under the management of a Senior Archaeologist, Deirdre Murphy. In total ninety-two sites were excavated during this phase of works and all excavations were given separate record numbers issued by The Department of the Environment, Heritage and Local Government.

Following completion of fieldwork a programme of post-excavation analysis was necessary as reports on the archaeological findings must be published. A dissemination strategy also forms a crucial part of this phase of the project. It is proposed that all final reports will be submitted to the relevant authorities by February 2009 and that publication and public

lectures/seminars will follow thereafter. Both the format and time-scale for publication and seminars will be decided in consultation with the Project Archaeologist.

1.3 Circumstances of Discovery

An archaeological assessment of this site was carried out in advance of the construction of the M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme, on behalf of Laois County Council by Anne Marie Lennon. The site was identified during archaeological testing carried out by Anne Marie Lennon of Archaeological Consultancy Services Ltd in March – May 2005 under ministerial direction number A015/013. 13 trenches were excavated within this field and some potential archaeology was identified. The site was designated Gortnagroagh 1.

1.4 Date and Duration of Excavation Works

Excavation of this site commenced on the 14th November 2005 and lasted nine days.

1.5 Size and Composition of the Excavation Team

The excavation team was composed of:

One director
Two archaeological assistants
Four general operatives

2. RECEIVING ENVIRONMENT

2.1 Detailed Overview of the receiving environment

2.1.1 Topographic

Gortnagroagh was located close to the existing R434 road running from Aghaboe to Ballacolla and *c.*2.3km to the north of Springfield 1. The site was located on the eastern side of this road in an area of relatively flat land. The ground slopes down to lower lying land past Coolfin and into Ballycuddahy and Cross where the tributary of the River Gully forks. The ground slopes down to a hill to the southeast at Dairyhill. The current landscape is characterised by rolling tracts of fertile land interspersed with pockets of less fertile and more low-lying, wetter and boggier areas. In prehistoric times, it is likely that this region was much more heavily wooded and probably less well drained than it is today. However, in the greater Springfield area grey-brown podzolic (medium textured, moderately deep) soils are prevalent (Feehan 1983, 90-3). The grey-brown podzolic soils are among the best soils in Ireland. The soils in this area are medium textured, well-drained, friable podzolics and are especially good for tillage farming, although these soils are also highly suitable for grass production and grazing (Feehan 1983, 92). Gortnagroagh 1 was located close to the Coolfin area, which had an undulating landscape and was also a haven for Bronze Age settlement in the past.

2.1.2 Archaeological

The earliest evidence for human occupation in county Laois consists of a small number (eight) of recorded megalithic tombs. One such possible tomb was recorded in the townland of Cuffsborough, close to Gortnagroagh, though no such monument was recorded in this townland. Graves (1852, 358) documented the discovery of a 'beehive-shaped chamber' beneath a mound of earth. The chamber measured *c.*1.50m in diameter and was reputedly built with large orthostats supporting tiers of corbelling and a roof stone *c.*1.05m high (Sweetman *et al* 1995, 1). The bones of two skeletons were found on the floor of the chamber. The location of this possible tomb was not properly documented or dated and no longer exists. It is possible that this tomb, like other chamber tombs recorded under mounds of earth in Leinster, could date to the Neolithic Period or early Bronze Age (Sweetman *et al* 1995, 1). The evidence for early Bronze Age activity consists of a documented cist burial, also located in the Cuffsborough area. A crouched inhumation accompanied by a pottery vessel was discovered within a short cist at this site (Sweetman *et al* 1995, 5). Although this find was documented, the original location of the cist burial was not properly recorded. In the townland of Kilminfoyle, southeast of Gortnagroagh, a *fulacht fiadh* was recorded (Candon 1987, 23).

Two further *fulachta fiadh* were recorded east in the townlands of Fearagh and Ballygeehin Lower. However, no visible surface traces of any are evident (Sweetman *et al* 1995, 12). In total, nineteen *fulachta fiadh* or burnt mound sites (including one possible site) were recorded in Co. Laois (Sweetman et al 1995, 12-3), prior to the M7 Portlaoise to Castletown/M8 Portlaoise to Culahill Motorway Scheme. While there is definite evidence for prehistoric settlement activity in the vicinity of Gortnagroagh prior to recent excavations we do not know the exact (scientific) nature of this activity or where it was located. A hillfort situated to the west of Gortnagroagh in the townland of Boley Upper comprised a circular enclosure on high ground commanding views of the entire surrounding area. It is defined by a bank of earth and stone and has an external fosse (Sweetman *et al* 1995, 17). No other diagnostic Neolithic, Bronze Age or Iron Age monuments occur within the vicinity besides that which was excavated during the M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme recently. While there is a dearth in the range and number of prehistoric monuments and sites in the surrounding area, the chance recovery of a number of diagnostic artefacts (e.g. two bronze axeheads were found at Aghaboe, to the west of Gortnagroagh) indicates that other activities took place in the region. A stray find of bog butter within a wooden vessel at Cuddagh may belong to the Iron Age, although these items can vastly range in date.

2.1.3 Historic

The famous 6th century foundation of St. Canice at Aghaboe is located *c.*1km to the west of Gortnagroagh, which became the most important monastery in the kingdom of Ossory. St. Canice also founded the ecclesiastical centre at Kilkenny ('The church of Canice') during this period. In Cross townland, a cross shaped depression in a field is recorded in the Archaeological Inventory. An altercation reputedly occurred between St. Canice's followers at Aghaboe and those at Kilkenny as they argued over which group would receive his remains for burial. While they argued, a stranger appeared with two coffins, so each group could take some of his remains. The cross in this townland supposedly marks the spot where this happened (Sweetman et al 1995, 92). Aghaboe was linked to the island retreat of Monahincha by a pilgrim road (Kennedy 2003, 9). The road reputedly passed though Lismore and Bushfield, where recent excavations have revealed a large early medieval enclosure with a cemetery and metalworking area. The monastery at Aghaboe was raided in 845 and 913 AD by Vikings, after which it was restored until 1116 AD, when it was almost burned to the ground. Becoming the Episcopal See of the Diocese of Ossory in the early 12th century, Aghaboe enjoyed power until the Normans took control at the end of the century in which Strongbow granted the monastic lands to Thomas de Hereford, one of his Norman Knights. A motte and bailey dating to the time of the Anglo-Norman occupation here has been recorded

(Sweetman et al 1995, 101). In 1234, the monastery was rebuilt as a priory church for the canons regular of St. Augustine. The church was attacked again in the 14th century by the MacGillapatricks during the Irish resurgence which saw the shrines, bones and reliquaries of St. Canice destroyed (O'Hanlon and O'Leary, vol I, 1907, 167). They took control of the area and in 1382 a Dominican Friary was established there by Florence MacGillapatrick, Lord of Ossory (Kennedy 2003, 12). The friary was suppressed in 1540 and was subject to unrest during the suppression of religious houses in the 16th and 17th centuries. In 1556, Laois and Offaly were renamed the Queen's County and the King's County respectively and the area was targeted for plantation. About one third of the marginal land in Laois was granted back to the O'Connors and the O'Moores on the condition that they were loyal to the crown and they abandoned their Gaelic ways. The rest of the county was colonised by English settlers and plantation towns were established (Kennedy 2003, 13). Several sites dating to the Post-Medieval period have been excavated recently in advance of the M7 Portlaoise to Castletown/M8 Portlaoise to Culahill Motorway Scheme. These include a smithy/forge at Cuffsborough 5, an industrial site at Gortnagroagh 1, a possible Post-Medieval well at Cuffsborough 3 and a Post-Medieval trackway with wheel ruts at Cuffsborough 4. A protestant parish church was also built there in 1818 (Kennedy 2003, 14).

3. RESEARCH FRAMEWORK

The research framework for Gortnagroagh 1 will address the following topics:

(i) The extent of the archaeological site/activity

(ii) The nature and composition of the archaeological finds, features, layers and deposits on site.

(iii) The phases of activity on site

(iv) Why the site location would have been chosen

(v) The function of the site and its likely interrelationships with the contemporary social, economic, cultural and natural environment.

(vi) The longevity of the site, its success (or otherwise) and the reasons for the site being abandoned.

4. EXCAVATION RESULTS

4.1 Excavation Methodology

Excavation began on 14th November 2005 under Ministerial Direction Number A015/079. Topsoil stripping on this site was carried out by means of a twenty tonne mechanical excavator equipped with a grading bucket. Spoil was managed by a dumper and was stored on archaeologically sterile areas within the limits of the site. The recording techniques employed were based on a recording system that best suits a rural environment. All potential archaeological features exposed were cleaned, recorded (by plan, photographs, levels, feature sheets etc.) and removed by hand excavation. The site was recorded using multi-context planning of all features exposed. An appropriate sampling strategy was employed. Any finds were washed (where appropriate), treated and catalogued on site and left ready for any further post excavation analysis deemed necessary. They were numbered according to the requirements of the National Museum of Ireland from 1 to 99 according to record number and feature number, i.e. E2189:3:1 represents find number 1 within feature number 3 in Gortnagroagh 1, which was excavated under record number E2189. Unless otherwise stated, the features have been measured length-width-depth. All measurements are in metres. Upon completion of excavation all cuttings were surveyed using GPS equipment and only areas within the CPO were resolved.

4.2 Full Stratigraphic Report

4.2.1 List of Features

F001 Fill of F002

F002 Cut of linear drainage ditch filled with F001

F003 Topsoil

F004 Natural subsoil

F005 Cut of large pit/cistern filled with F014, F006

F006 Secondary fill of F005

F007 Secondary fill of F008

F008 Cut of rectangular trough filled with F009, F007

F009 Primary fill of F008

F010 Cut and fill of modern linear drainage ditch (E-W)

F011 Cut and fill of linear drainage ditch (N-S)

F012 Cut and fill of three interconnecting narrow modern linear drainage ditches (N-S)

F013 Cut and fill of modern linear drainage ditch (E-W)

F014 Primary fill of F005

4.2.2 Stratigraphic Matrix

Natural Deposit

F003	Topsoil: Consisted of mid brown, silty clay. No finds recorded.
F004	Natural subsoil: Consisted of mottled orange, sandy clay.

Fulacht/Burnt mound activity-Bronze Age period (Figure 8)

Large Pit/Trough (Plates 3, 5 & 7)

F005	Cut of large sub-circular pit/cistern. Measured 4m x 3.20m x 1.42m. Orientated north-south. Had a sharp break of slope at top, vertical sides leading to an uneven base. Largest pit on site, which may have had a clay lining along the base suggesting that this was an attempt to enable this pit to become a water container/cistern. Filled with F014, F006 and F001. Appears to have been associated with F001 & F002. Above F004, below F014, F6, F2 and F3
F014	Primary fill of F005, with moderately compacted, grey, silty clay. Frequent charcoal and heat shattered stones included. Measured 4m x 3.20m x 1.05m. Cattle horn cores were the only find/sample taken. Above F005, below F006.
F006	Secondary fill of F005, with moderately compacted, dark grey-black, silty clay. Occasional heat shattered stones and charcoal included. Measured 4m x 3.20m x 0.10-0.50m. One charcoal sample taken. This deposit was sealed by F001. Above F014, below F001. Contained an iron fragment and an iron bar (E2189:6:3-4), probably modern in date, which are more than likely to be contaminants relating to the more recent phases of activity on site.
F001	See F002 below

Pit/Trough (Plates 4 & 5)

F008	Cut of rectangular pit/trough, with rounded corners. Measured 2.40m x 1.20m x 0.18-0.27m. Orientated east-west. Had a sharp break of slope, vertical sides, and a sharp break of slope leading to a flat base. Located adjacent to F002 on its northern side. Filled with F009, F007. Above F004, below F009.

F009	Primary fill of F008, with loosely compacted, black, silty clay. Occasional heat shattered stones and cow horns included. A bulk sample was taken form this deposit but this did not produce any material suitable for dating. Measured 1-1.10m x 1.04m x 0.06m. No other finds or samples taken. Above F008, below F007.
F007	Secondary fill of F008, with loosely compacted, dark brown-black, silty clay. Occasional heat shattered sandstones included. Measured 2.40m x 1.20m x 0.12m. No finds or samples taken. This deposit was similar to F001. Above F009, below F003.

Linear drainage ditch (Plates 1, 2, 3 & 4)

F002	Cut of linear ditch. Measured >12.60m x 1.50-2.10m x 0.11-0.30m.Orientated east-west this ditch extending beyond the western site limit. Had a gradual break of slope at top, steeply sloping sides that lead to a flat base with a 'V' shaped channel running along its northern and southern sides. However, while the southern channel extended to pit F005 the northern channel petered out before it reached rectangular pit F008 (Figure 8). These channels resembled wheel ruts but are likely to have functioned as water channels. Filled with F001. This feature terminated at pit F005 slightly cutting its western extent. It would appear that it was associated with this pit, possibly functioning as a water channel supplying water to this latter feature. The fact that it silted up after it was abandoned may add credence to this proposal. Above F004, F005 and F006 below F001.
F001	Fill of F002, with loosely compacted, mid brown, silty clay. Occasional small pebbles and stones included. Measured 12.60m x 1.50-2.10m x 0.11-0.30m. No finds or samples taken. This deposit was also the upper fill for a portion of F005. Above F006, below F003. Contained two modern iron objects (E2189:1:1-2), which are more than likely to be contaminants relating to the more recent phases of activity on site.

Post-Medieval/Modern period

Linear drainage ditch

F010	Cut and fill of linear drainage ditch. Measured 3.80m x 0.25m x 0.16m. Orientated east-west. Had a sharp break of slope at top, near vertical sides leading to a flat base. Similar to F013 (situated 5.30m to the northeast). Filled with loosely compacted, mid brown, silty clay. Sub-circular stones lined either side of the drain with a large

	boulder (0.60m x 0.58m: width x depth) at the western extent. This feature together with F011, F012 and F013 may have been associated with structures evident on the 1st Ed. OS map (1836).Above F004, below F003.

Linear drainage ditch (Plates 6 & 7)

F011	Cut and fill of linear drainage ditch. Measured 11.30m x 0.32-0.58m x 0.15-0.27m. Orientated north-south. Had a sharp break of slope at top, vertical sides leading to a flat base. Filled with loosely compacted, mid brown, silty clay. Frequent stones included. Above F004, below F003.

Linear drainage ditch (Plates 6 & 7)

F012	Cut and fill of linear drainage ditch. Measured 1.45-2.98m x 0.31-0.42m x 0.20m. Orientated north-south. Had a sharp break of slope at top, vertical sides, leading to a flat base. Filled with loosely compacted, mid brown, silty clay. Frequent stones included. Above F004, below F003.

Linear drainage ditch

F013	Cut and fill of linear drainage ditch. Measured 3.40m x 0.38-0.56m x 0.20m. Orientated east-west. Had a gradual break of slope at top, steep sloping sides leading to a flat base. Filled with loosely compacted, mid brown, silty clay. Frequent stones included. Above F004, below F003.

4.2.3 Stratigraphic Sequencing

Table … Stratigraphic Groups		
Site Name: Gortnagroagh 1		**Record No.: E2189 – Scheme No.: A015/079**
Period	**Phase**	**Composition**
I	1	Formation of subsoil
II	1	Initial clearance of site
	2	Middle Bronze Age: Cutting of pits and possibly F005
III	1	Post-Medieval/Modern period: Cutting of linear drainage ditches

This report details each unit in the stratigraphic sequence, starting with the earliest.

Period 2

Phase 2 Middle Bronze Age period

***Fulacht*/Burnt mound activity (Figure 8, Plates 1, 2, 3, 4, 5 & 7)**

Two pits interpreted as a circular cistern (F005, 4m x 3.2m x 1.42) and a rectangular trough (F008, 2.4m x 1.2m x 0.18m) were discovered to the southeast of the site following the removal of topsoil. They formed an area of burnt mound activity which may have had an industrial function; the processing of cattle horns (Figure 8). Burnt mound activity involved heating water through 'hot stone technology' within a pit/trough. Burnt mound material comprising heat shattered stones and charcoal was a by-product of this type of technology and will be referred to as such below.

Both pits, situated *c.*1m apart, comprised sharp breaks of slopes at top and vertical sides. F008 contained a flat base, whereas the base of F005 was uneven. Each feature was predominantly filled with two deposits of grey-black, silty clay and burnt mound material, though F001 partly sealed F005. Cow horn cores were recorded in the primary fills of both features F008 (F009) and F005 (F014). Charred ash/alder from the upper fill of F005 (F006) produced a radiocarbon date of Cal BC 1260-1010 (See Appendix 10.2). Linear ditch F002 would appear to have been directly associated with F005. This ditch terminated at the centre of F005 slightly cutting its western extent. This appears deliberate as no trace of it was evident to the east of this pit (F005). Following the abandonment of F005, its fills F014 & F006 may represent its last use or alternatively may have been deliberately dumped in after this feature was no longer in use. Either way the episode of deposition that filled F002 also accounted for the upper fill of F005. A product of natural silting, the fill (F001) of drainage ditch F002 overlay part of the upper fill of F005 (F006) on its southern side.

Period 3

Phase 1 Post Medieval/Modern period

Drainage ditches (Figure 8, Plates 1, 2, 3, 6 & 7)

Running perpendicular to one another meeting at F005, linear drainage ditches F002 (east-west) and F011 (north-south) (11.30-12.60m x 0.32-2.10m x 0.11-0.30m) were both revealed during topsoil stripping. During the early stages of excavation it appeared that these features (F005, F011 & F002) may have been related to each other with F002 possibly acting as a means of getting water to pit F005 and with F011 acting as a drain to remove any overflow from this pit. However, there was no stratigraphical relationship between F005 and F011. This latter feature was sited 0.5m northeast of F005 while there was no corresponding cut along the north-eastern edge of F005 to suggest an association. F011 is more likely to be associated with the three further linear drainage ditches, F010, F012, F013 (1.45-3.80m x 0.25-0.56m x 0.16-0.20m) situated to its east and northeast. These features were very similar in composition and contents with some containing occasional sherds of post-medieval pottery. Comprising mainly sharp breaks of slope, vertical sides and flat bases, they were each filled with one

deposit of loosely compacted, mid brown, silty clay which overlay deliberate stone arrangements inserted in their respective cuts, which would have aided drainage.

4.2.4 Stratigraphic Discussion

The excavations at Gortnagroagh 1 exposed the presence of burnt mound activity, dating to the Bronze Age (Cal BC 1260-1010) (See Appendix 10.2) and land drainage activity probably dating to the Post-medieval/Modern period (Figure 8; Plates 1-8). A technical description of all features and deposits can be found in the matrix and sequencing above. Gortnagroagh 1 consisted of a large sub-circular pit and a smaller sub-rectangular pit both containing cow horn cores and heat shattered stones. There were also a number of linear drainage ditches on the site, one (F002) of which appeared to have been associated with these features (Figure 8). Ditches F010-F013 were of different construction to F005 with each containing elaborate stone arrangements that would have aided drainage. Some post-medieval pottery sherds were associated with F011 and F013 suggesting that they may have dated to this period. It is possible that these features were associated with the buildings evident on the First Edition map (1836) for this area, which were not detected during the testing phase of this development.

During excavation, it was felt that many of the features on site were contemporary and may have related to post-medieval industrial activity associated with the processing of cattle horns. However, it became more apparent that the various features discovered on site could be divided into two distinct groups representing two unrelated phases of activity. This is supported by the discovery of sherds of post-medieval pottery from F011 and F013 and a late Middle Bronze Age date from F006 the upper fill of cistern F005. The large sub-circular pit (F005) measured 4m in length x 3.20m in width x 1.42m in depth. The basal fill was silty clay with some cow horn cores present and both fills contained frequent heat shattered stones and charcoal.

Another pit or trough (F008) was located immediately to the west of F005. This pit was rectangular in shape with rounded corners. It measured 2.40m in length x 1.20m in width x 0.18-0.27m in depth. The basal fill contained heat shattered stones and cow horn cores while the upper fill contained heat shattered sandstone. These features appear to represent a trough and cistern related to *fulacht fiadh* activity. The upper fill of F005 (F006) produced a radiocarbon date of Cal BC 1260-1010 placing it in the late Middle Bronze Age (See

Appendix 10.2). The basal fill of the large pit F005 consisted of compacted silty clay, which may have acted as a clay lining at the base of the trough. Interestingly, all of the cow horns present were in fact the inner cores of the horns, indicating that they were probably separated from their outer sheath for the manufacture of horn items. Unfortunately no analysis or dating was carried out on these horn cores, as they were mislaid during post-excavation works.

4.2.5 Stratigraphic Conclusion

Through the various stages of archaeological investigation burnt mound activity was recorded indicating Bronze Age industrial activity along with a number of predominantly sterile drains indicating Post-Medieval/Modern activity. Despite this, the marked scarcity of structures and material culture has made further analysis difficult. No comparison between archaeological sites within the townland of Gortnagroagh can be made as Gortnagroagh 1 was the only site identified.

4.3 Artefactual evidence

With the exception of some cattle horn cores, iron finds and post medieval pottery no other artefacts were discovered.

4.4 Environmental Evidence

4.4.1 Wood ID analysis

See Appendix 10.1

Site	E number	Feature type	Context	Sample no	Date	Identifications	Comment
Gortnagroagh 1	E2189	Slump fill	F006	1	1260BC -1010B LBA	Alder (0.05g, 1f) Oak (0.4g, 5f) Ash (0.05g, 3f)	

4.5 Dating Evidence

See Appendix 10.2

A single radiocarbon date was retrieved for this site placing the site into the late Middle Bronze Age period. From a sample of ash/alder, from the secondary fill of pit F005 a date of Cal BC 1260 to 1010 was returned.

5. DISCUSSION

Fulachta fiadh or burnt mounds have been identified throughout Ireland and are the most common prehistoric monument in the country. At present, over 4,600 have been recorded though this number will undoubtedly increase with further field survey and development led excavations. The largest concentrations of these sites are in Munster with over 2,500 examples alone in County Cork (Buckley 1990, 3), approximately one per 2.97 sq km. Power (1990) notes that in County Cork, as elsewhere in the country, the location of *fulachta fiadh* shows a preference towards streamside sites. They are also to be found close to other water sources such as lakes, rivers and marshes.

It is probably true to say that the basic function of a *fulacht fiadh* was to provide hot/boiling water. Once the trough had been constructed and filled with water, the primary function of the *fulacht fiadh* could begin. Although formal hearths have been identified at a number of sites, they are not extremely common. Most hearths would probably have been placed close to the trough to allow for the easy transportation of the heated stones. Although no traces of a hearth were present in association with this site, it may have been destroyed as a result of later activity.

The precise function of burnt mounds is as yet not fully clear, but it is generally regarded that *fulachta fiadh* were cooking sites where the process by which the meat was cooked involved the digging of a pit or trough that may have been lined with clay or timber (Buckley 1991, 88). This was filled with water while situated close by was a fire where stones were heated until red hot. These stones were then placed into the water bringing it to the boil. In 1952, Professor M.J. O'Kelly demonstrated this process when a 4.5kg leg of mutton wrapped in straw was cooked in three hours and forty minutes. After the meat was cooked, the burnt stones were removed from the trough and dumped on three sides of the hearth and trough, giving rise to the characteristic shape of the mound (Buckley 1991, 88).

Although the cooking hypothesis is the most widely accepted, it has come under increased scrutiny in more recent times due to the scarcity of food waste and artefacts associated with excavated *fulachta fiadh*. However, an increasing number of sites have produced animal bone such as Fahee South, Co Clare (O'Drisceoil 1988), and Curraheen 4, Co Cork (Russell 2004). Alternative suggestions that have been put forward regarding their function include brewing, textile-processing and leather working, while the evidence from Gortnagroagh 1 adds horn working to this list. However, Diarmuid O'Drisceoil is of the opinion that there is little sustainable supporting evidence for these suggestions (O'Drisceoil 1988, 671–80).

A strong case for the interpretation of burnt mounds as prehistoric saunas or bathing places has been put forward by Barfield and Hodder (1987, 370–79). Examination of numerous excavated burnt mounds led them to suggest that these sites were the remains of steam or sauna baths and they used ethnographical and historical evidence to support their argument. There are two main types of bath: dry-heat sweat baths and baths which use water to produce steam. The use of hot stones is the most common method of heat production in sweat baths. Stones heated in an open fire can be brought into simple tented structures with wooden tongs or can be simply rolled in. An alternative method is to light a fire, heat the stones, remove the ashes and then erect a structure covered with skins above the hot stones (Barfield and Hodder 1987). These steam or sweat baths were likely to have had a practical, ritual and social function. An examination of the archaeological, literary, experimental and ethnographical evidence for the possible uses of these sites would suggest that cooking was the primary function while bathing by immersion or sweating may have been a secondary activity. While this suggests that the sites were multi-functional, some may have had a single role, i.e. their use either as a sauna or for cooking.

The terms *fulacht fiadh* and *fulacht fian* may have been in use in Ireland for over a millennium (O'Drisceoil 1988, 671–80). When translated, the word *fulacht* originally meant recess or cavity but later came to mean cooking place. *Fiadh* can be translated as of the deer or of the wild while *fian* means of a roving band of hunters or warriors or also of the Fianna or Fionn Mac Cumhail, mythical figures of Irish folklore. The above terms are referred to in the literature of ancient Irish law tracts prior to AD 800. Of the many references, one in particular stands out. Geoffrey Keating in The History of Ireland, written in the early seventeenth century, refers to the Fianna thus:

> *And it was their custom to send their attendants about noon with whatever they had killed in the morning's hunt to an appointed hill…and to kindle raging fires thereon, and*

> *put into them a large number of emery stone; and to dig two pits in the yellow clay of the moorland, and put some of the meat on spits to roast before the fire; and to bind another portion of it with sugans in dry bundles, and to set it to boil in the larger of two pits, and keep plying them with the stones that were in the fire…until they were cooked. And these fires were so large that their sites are today in Ireland burnt to blackness, and these are now called Fulacht Fian by the peasantry.*
>
> *As to the Fian…each of them stripped off, and tied his shirt around his waist; and they ranged themselves around the second pit…bathing their hair and washing their limbs, and removing their sweat, and then exercising their joints and muscles, thus ridding themselves of their fatigue* (O'Drisceoil 1988).

Keating's description of the cooking pit and cooking process matches the archaeological evidence. From the text, it is clear that cooking is the primary function of the site but that bathing also occurs. This dual function is referred to in other Irish texts. Keating's account sees the site being used by hunters but the large number of these sites and the density of their distribution cannot be explained by hunting alone. This would give us an abundance of evidence for hunting with little evidence for more permanent settlement being present.

While *fulachta fiadh* cannot be described as settlement sites, they may indicate settlement patterns. A wider picture of settlement in the Bronze Age may be gleaned from the precise dating of settlement sites contemporary with the span of the *fulachta fiadh*/burnt mound radiocarbon dates as is the case with sites such as Curraghtoor and Ballyvealish in Co Tipperary, Carrigillihy in Co Cork and possibly Coolfin in Co. Laois. The suggestion that *fulachta fiadh* are evidence for transient settlement appears to be untenable (Buckley 1990, 7). Cooney and Grogan propose that these sites may be part of an integrated system including domestic and burial sites as is evident in south Limerick where "*a complex landscape organisation with extensive cemeteries, domestic sites and fulachta fiadh form an integrated pattern*" (Cooney and Grogan 1999, 141).

Though two pits containing burnt mound material were present at Gortnagroagh 1 it is important to point out that on the basis of these features alone this site cannot be interpreted as a *fulacht fiadh*. *Fulachta fiadh* are generally recognised through a number of consistent features: a mound of heat-fractured stones, a trough and traces of fires, sometimes represented

by a formal hearth. Other components, such as post-built structures and roasting-pits, can also be associated with these sites (Waddell 1998). Generally, for a site to be called a fulacht fiadh it should contain a spread of burnt mound material and an associated trough (see Brindley and Lanting 1990, 55). Owing to the nature of development-led archaeology, however, some sites are not fully exposed and important features such as troughs may lie outside the roadtake. Therefore spreads of burnt mound material discovered without an associated trough may originally have formed part of a fulacht fiadh; alternatively, portable troughs may have been used, leaving no trace in the archaeological record. Water may have been boiled in containers of wood, bronze or leather; the shallow circular pits associated with many burnt mound spreads may have acted as receptacles for these containers, likewise they may have been used for dry-roasting For the purposes of discussion, any site not containing these two elements (a spread of burnt mound material and a trough) will not be referred to as a fulacht fiadh but as either a spread of burnt mound material or pit(s) containing burnt mound material, depending on the nature of the evidence. This, however, does not imply that these sites did not originally function as fulachta fiadh. The evidence from Gortnagroagh 1 would suggest that the site did originally function as a fulacht fiadh but that the overlying burnt mound spread was removed through agricultural activities however Gortnagroagh 1 may have had a purely industrial function.

Horn working at burnt mound sites? By Amy McQuillan and Ed Danaher

Gortnagroagh 1 consisted of probable burnt mound industrial activity comprising a trough, cistern and associated ditch as well as some post-medieval or early modern field drains (Figure 8). A discussion of the burnt mound material is provided above. The following section will address the significance of the cattle horn cores found in both the trough and cistern, which could indicate that this burnt mound was used for horn working activities.

Cow horn cores were excavated from the basal fills of both the rectangular trough, F008 and sub-circular pit F005, at Gortnagroagh 1. When discovered on medieval sites, horn cores are usually interpreted as the waste from horn working. The presence of these cattle horn cores within features that are likely to be Middle Bronze Age in date is significant and as it appears that these cow horns are indeed contemporary with the pits it indicates that this burnt mound was used to process cow horns in the past. While there does not appear to be much evidence for this at other *fulachta fiadh*/burnt mounds, it may add another function to the list of possible uses for these enigmatic sites.

Cattle horns, in their unworked form, generally consist of the outer keratinous sheath which grows out from the skin. This sheath surrounds the bone core of the horn. The horn core is a

bone that projects from the frontal lobes of a skull which are covered by the keratinous sheath and are not branched like antlers (Reitz & Wing 1999, 76). The horn itself is dead but the enclosed bone core is supplied with blood and consists of living tissue (Davis 1987, 59). The horn core and the sheath grow throughout life and neither is shed. Bovine horns increase in size with age while their porous nature and toughness decrease. Males tend to have larger horns than females (Reitz & Wing 1999, 168). Horn is a relatively soft, fibrous and flexible material (Davis 1987, 59). In the manufacture of horn items, the bony core would not have been used, but only the outer keratinous sheath, or the true horn, which would have been removed from the core. The core is then of no further use and is often classified as debris from the manufacturing of horn items when found on archaeological sites (Chaplin 1971, 142). Unfortunately, horn, unlike the core, rarely survives on archaeological sites (Davis 1987, 59). A common method of separating the inner core from the sheath was to remove the sheath in cylindrical sections, either by cutting through the entire core before separating the sheath or by simply cutting the sheath and sliding the sheath from the core once the union between them had been broken (Mainman & Rogers 1999, 1916). Another way of severing the union between the inner bony core and the outer sheath was by softening the horn through soaking or boiling the horn in water. They were then separated simply by pulling the outer sheath away, leaving the core as refuse (Chaplin 1971, 142). It seems quite possible that the cow horns discovered at Gortnagroagh 1 were soaked, and probably boiled, in this trough (F008) through the addition of hot stones, in order to separate the inner core of the horn from the outer sheath so that the latter could be used in the manufacture of horn items.

Horn is a relatively soft material compared to substances such as ivory. If horn is soaked and then boiled in water, it can be readily split into thin translucent sheets. These sheets would have been used in the more recent past to make window panes or lanterns. Horn sheets can, at a higher temperature, be pressed into a die, although there is little evidence for the use of horn in this manner in the prehistoric period (Hodges 1989, 155). In the medieval period horn was an important commodity for making containers, combs, knife-handles and even the windows of lanterns (Davies 1987, 190). Evidence for this is rare in prehistoric contexts and it is unclear what procured horn may have been used for. We can guess that it was carved into handles, combs, containers and probably also into decorative and personal adornment items in the prehistoric period (Reitz & Wing 1999, 136). Interestingly, at the Late Bronze Age enclosure site of Kilsharvin 16, Co. Meath, a worked horn item with definite evidence for use wear was found in the ditch fill of a Bronze Age enclosure and was suggested to have been used as a punch in leather working (Russell & Corcoran 2002, 33).

Since the outer sheath of the horn rarely survives on archaeological sites, it is predominantly the presence of cores which indirectly indicate the working of horn on archaeological sites, although there is little evidence for this from prehistoric contexts in Ireland. While antler is occasionally found at *fulachta fiadh*/burnt mound sites, no other examples of horn cores at similar sites appear to have been recorded within the Irish archaeological record. It is quite possible that poor preservation can account for the paucity of horn working evidence in the Irish prehistoric archaeological record, although if horn working was a common craft in the prehistoric period then we could expect more cores from prehistoric contexts, as these would survive better than the outer sheath. The burnt mound activity at Gortnagroagh 1 tentatively provides evidence for horn working in late Middle Bronze Age Laois and expands the possible uses for hot stone technology during this period (unfortunately the horn cores were not dated as they were lost in transit during the post-excavation stage). Significantly it also enhances our understanding of the functions of burnt mound sites in Ireland.

6. INTERPRETATION AND RECONSTRUCTION

The trough, cistern and their respective fills clearly demonstrate that hot stone technology took place at this site. While the site does not conform to the definition of a *fulacht fiadh* outlined above it is nevertheless likely that it represents the truncated remains of a *fulacht fiadh*/burnt mound and that similar processes did occur at this site. Interestingly, in this instance these processes were industrial in nature providing the first direct evidence for cattle horn working on a Middle Bronze Age *fulacht fiadh*/burnt mound site.

7. ASSESSMENT OF ARCHAEOLOGICAL POTENTIAL AND SIGNIFICANCE

In order to assess the archaeological potential and significance of this site, it needs to be discussed in association with the other sites discovered in the area. The burnt mound activity at Gortnagroagh 1 was located *c.*200m to the northeast of Ballycuddahy 1, *c.*800m to the northeast of Cross 1 and just over 1km to the north of Springfield 3, all of which were burnt mound sites. Other burnt mounds were excavated to the west of Gortnagroagh at Boherard 1, 2 & 3; Corraun 1, 2 & 3. Coolfin 1 was located *c.*1km to the southwest of Gortnagroagh 1 and consisted of a roundhouse measuring 10m in diameter. Burnt mound activity was also discovered at Coolfin 2, 3 and 4. The structure at Coolfin 1 was dated to the Middle Bronze Age and is slightly earlier than Gortnagroagh 1. There is a mound at Farraneglish Glebe to the south of Gortnagroagh 1, which is recorded as being a large, tree covered, elongated earthen

mound with traces of cairn material measuring 17.5m east-west and 1.8m in height (Sweetman et al 1995, 11). Another mound is recorded at Gortnaclea to the southeast of Gortnagroagh 1, consists of a low circular mound measuring about 18m in diameter. The mound is defined by a scarp c.1m in height (Sweetman et al 1995, 11)

8. CONCLUSION

This site contained the remnants of a burnt mound comprising a trough, cistern and associated ditch. Charcoal from the trough returned a late Middle Bronze Age date. Both the trough and cistern contained a mix of burnt mound material and clay, while both contained a number of cattle horn cores. This site would appear to provide the first direct evidence for cattle horn working on a Middle Bronze Age burnt mound site and adds significantly to the corpus of knowledge on these types of site. In addition, the discovery of these features implies that this site formed a small component of a prehistoric landscape at this area of Co. Laois that spanned the late Neolithic to the Late Bronze Age. More recent activity was also encountered on site including drainage ditches containing sherds of post medieval pottery. At least four modern iron objects were also discovered on site with these being discovered within the upper fills of the middle Bronze Age features, suggesting that these items were accidently deposited into these contexts. This site has been adequately archaeologically assessed and resolved. There are no other archaeological features within the limits of the roadtake. Consequently no further work is required prior to the construction phase of the M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme.

9. BIBLIOGRAPHY

9.1 References

Barfield, L. and M. Hodder 1987, 'Burnt mounds as saunas, and the prehistory of bathing', *Antiquity*, 61, 370-379.

Brindley, A. L., et al. 1989-90, 'Radiocarbon dates from Irish fulachta fiadh and other burnt mounds', *JIA*, 5, 25-33.

Buckley, V. (1990), *Archaeological inventory of County Louth*, Dublin: Stationery Office

Buckley, V. (1991), (ed.) *Burnt offerings: International contributions to burnt mound archaeology*, Dublin: Wordwell

Candon, A. (1987) *Archaeological Survey of Upper Ossory, phase 2. The barony of Clarmallagh.* AnCo/ Roscrea Heritage Society report.

Chaplin, R.E. 1971, *The Study of Animal Bones from Archaeological Sites*, Seminar Press: London.

Cooney, G & Grogan, E (1999), *Irish prehistory: A social perspective*, Dublin: Wordwell

Davies, S.J.M., 1987, *The Archaeology of Animals*, Yale University Press: New Haven and London.

Feehan, J. (1983), *Laois: an environmental history*, Ballykilcavan Press: Stradbally

Graves, J. 1852, Proceedings, *Journal of the Royal Society of Antiquaries of Ireland* 2, 358

Hodges, H. 1989, Artefacts: An introduction to early materials and technology (2nd Ed). Duckworth: London.

Kennedy, J. (2003). *The Monastic Heritage & Folklore of County Laois*, Roscrea: Lisheen

Mainman, A.J. & Rogers, N.S.H., 1999, Craft and Industry, in MacGregor, A., Mainman, A.J. & Rogers, N.S.H., *The Archaeology of York, Volume 17: The Small Finds, Craft, Industry and Everyday Life* , The Council for British Archaeology: York, 1903-1922.

McQuillan, A (2007), *Research Report on recent archaeological excavations at Springfield 1 and Gortnagroagh1, M7M8 Co. Laois*, unpublished report prepared on behalf of ACS Ltd.

O' Drisceoil, D.A. (1988) 'Burnt mounds: cooking or bathing?', *Antiquity*, **62**, 671-80

O' Hanlon, J. & O' Leary, E. (1907) (Reprint 1981) *History of the Queen's county*, Vol. 1, Kilkenny: Roberts Books

Power, D. (1990) 'Fulachta fiadh in County Cork', in Buckley, V. (Ed.) *Burnt Offerings, international contributions to Burnt Mound Archaeology*, 13-17, Wordwell: Dublin

Reitz, E.J. & Wing, E.S., 1999, *Zooarchaeology*, Cambridge Manuals in Archaeology, Cambridge: University Press: Cambridge.

Russell, I. (2004). '*Excavation report at Curraheen 4, Co. Cork'*, unpublished research report for ACS Ltd

Russell, I. & Corcoran, E. 2002, Excavation of a possible Bronze Age enclosure at Kilsharvin townland, Co. Meath, *Ríocht Na Mídhe* 13, 32-4.

Sweetman, D. (1995) *Archaeological Inventory of County Laois*. Stationary Office. Dublin.

Waddell, J. 1998, *The Prehistoric Archaeology of Ireland*, Wordwell, Bray.

9.2 Other Sources

Environmental Impact Statement, M7 Portlaoise-Castletown & M8 Portlaoise-Cullahill Road Scheme, Volume 7, Appendix 3.5.1, Archaeology, Architecture and Cultural Heritage Report. Prepared by Margaret Gowen & Co

Record of Monuments and Places (RMP), The Department of the Environment, Heritage and Local Government, 7 Ely Place Upper, Dublin 2.

Topographical Files of the National Museum of Ireland, Kildare Street, Dublin 2.

9.3 Cartographic Sources

1839 1st edition Ordnance Survey Map

1891 2nd edition Ordnance Survey Map

1909 Ordnance Survey Revision edition RMP map

Signed:

Ed Danaher

Licensed Archaeologist

November 2008

10. APPENDICES

10.1 Appendix 1: Wood identification analysis report

Gortnagroagh 1, M7/M8 Motorway Project, Co Laois, Ireland

Species identification of charcoal samples

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Contents

1. Introduction

Two thousand seven hundred and ten charcoal fragments from sixty two contexts relating to twenty seven archaeological sites were analysed from excavations along the M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill road scheme, contract 1. Contract 1 covers a length of approx 31 km and includes numerous *fulacht fiadh* sites, iron working sites, enclosures, ditches, house and palisade structures, barrows, pits, postholes and one possible cow-horn processing site.

In recent years a considerable amount of structural as well as non-structural wood and charcoal has been recovered from archaeological deposits in Ireland. Wood was a vital and widely used raw material from prehistoric to medieval times although its importance is rarely reflected in the analysis of archaeological assemblages mainly due to its perishable nature. It is important to note that people in prehistoric, Early Christian and medieval communities were mainly dependant on woodland resources for the construction of buildings, for the manufacture of most implements and for fuel for wood-burning activities. The woods in a surrounding catchment area were exploited and often managed to provide an essential raw material for the community. A study of the range of species on an archaeological site offers an indication of the composition of local woodland in its period of use and any selection policies for particular species at any given time and place.

Large assemblages of wood and charcoal from the numerous road schemes currently under excavation, and subsequent analysis of the sampled wood and charcoal is currently on-going in Ireland. Although relatively little of the charcoal and wood analysis carried out from these analyses has been published, one recent publication includes the gas-pipe line to the west which is used for comparative purposes in this report (Grogan *et al*. 2007).

Analysis of timbers can also provide information on two different levels. These can be seen as the structural and constructional aspects gained from studying the timbers as ‘timber’ and also the environmental and dendrochronological aspects gained from a study of the timber as ‘wood’. From preliminary analysis of some of the work in progress on the wood assemblages it is clear that oak was the most common species used for wall-posts and planks, hazel was preferred for wattle structures and species such as pomoideae, ash, willow, alder, birch and holly were utilised for a variety of other structural requirements. Alder, ash and oak are the most frequent species used in the construction of plank-lined troughs while hazel and ash are selected for wattle posts also used in the construction of wattle troughs. The analysis

completed from the wood and charcoal excavated along the M7/M8 Cullahill to Cashel will add important information to the rapidly expanding database of environmental indicators particularly in relation to the Bronze Age and Medieval periods in the area. This area of work is especially important in Ireland where there are no written records up to the 18th century relating to the amount and type of woodland in Ireland (McCracken 1971, 15).

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

Results from the hundreds of *fulacht fiadh* which have been analysed throughout Ireland with regard to species selection for fuel have shown that a wide variety of taxa are identified from these assemblages, which may suggest that the inhabitants were selecting fuel from whatever trees and branches were closest to hand. Alder charcoal does sometimes dominate the *fulacht* assemblages but this is generally confined to the wetter areas of Ireland such as Mayo (O Carroll, N5, 2007) and the midlands area of Ireland (O Carroll, N6 KEK, 2008) highlighting the wetter environments in the particular areas of Ireland. Hazel was shown to be more frequently used at *fulacht* sites in Tipperary possibly highlighting the different terrain of more dryland areas and scrubland in the south of Ireland in the Bronze Age (O'Donnell, N8 2008).

The analysis presented here concentrates on species identification, species selection and the composition of the local woodland during the Bronze Age, at Aghmacart 1. Woodworking analysis was completed on timbers that contained evidence of tooling, which includes recording facets and jam curves and is sometimes a useful indicator of tool types being used on a given site at a given period. Split timber types, preserved point types, annual tree-ring counts and average growth rates of the trees that the wood was drawn from was also noted and recorded. Each piece of wood was also examined for blade signatures.

In general the charcoal analysed was quite fragmented and iron stained with few large brushwoods or roundwoods with pith to bark charcoal samples were encountered. As a consequence determining ring width growths and ring counts on the charcoal samples was not completed for the majority of the samples.

2. Methods

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

Wood

Thin slices were taken from the transversal, tangential and longitudinal sections of each piece of wood and sampled using a razor blade. These slices were then mounted on a slide and glycerine was painted onto the wood to aid identification and stop the wood section from drying out. Each slide was then examined under an E200 Nikon microscope at magnifications of 10x to 500x. By close examination of the microanatomical features of the samples the species were determined. The diagnostic features used for the identification of wood are micro-structural characteristics such as the vessels and their arrangement, the size and arrangement of rays, vessel pit arrangement and also the type of perforation plates.

All of the wood excavated on each site was sampled for identification and further analysis. The wood samples were firstly washed and recorded on wood working sheets and were then identified as to species.

Where appropriate, the samples were measured and described in terms of their function and wood technology. This included point types, split types and individual toolmarks such as facets and tool signatures.

The annual tree rings were counted partially under a microscope and partially by eye therefore it is only an approximate age. The annual tree ring counts for the split timbers do not give a real estimate of the age of the parent tree when it was cut down as splitting implies division and therefore only partial remains of the parent tree will survive. Average growth rates were also established. A fast growth rate is around 4mm per year. As different factors (weather and

soil conditions) determine growth rates of trees and growth rates vary across each sample average growth rates were calculated for each sample. The growth rates for some samples varied significantly therefore these samples were classified as slow to moderate, moderate to fast and so on.

Charcoal

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

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

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

There are inherent problems in re-constructing the environment at the time of use of the site due to the low quantity of samples and charcoal fragments identified from the assemblages. Keepax concludes that, when working in a temperate climate, at least fifty samples should be identified from an archaeological site, to make it a viable charcoal study, with a minimum of 25 samples (Keepax 1988). Notwithstanding the charcoal sample numbers, it is clear that the charcoal results coupled with the wood analysis throw up some interesting results and trends

in relation to wood selection and use and woodland cover in the Bronze, Iron and Medieval periods in Co. Laois.

A number of wood taxa cannot be identified to species or sub-species level anatomically. Sessile oak *(Quercus petraea)* and pedunculate oak *(Quercus robur)* are both native and common in Ireland and the wood of these species cannot be differentiated on the basis of their anatomic characteristics. English elm *(Ulmus procera)* and wych elm *(Ulmus glabra)* cannot be separated by their wood structure and identifications of elm are shown as *Ulmus* spp. There are also two species of birch (*Betula pendula* and *Betula pubescens*) and several species of willow therefore the identifications are given as *Betula* spp and *Salix* spp respectively. Within the family of Pomoideae it is impossible to distinguish between crab apple (*Malus sylvestris*), pear (*Pyrus communis*), hawthorn (*Crataegus* spp.) and mountain ash/rowan (*Sorbus aucuparia*).

3. Definitions of Element Types and woodworking terminology

Dates and timeframes

Early Bronze Age (EBA)	*c. 2500-1800BC*
Middle Bronze Age (MBA)	*1800-1000BC*
Late Bronze Age (LBA)	*1000-500BC*
Iron Age	*500BC-400AD*
Early Medieval	*400AD-1200AD*
High Medieval	*1200AD-1400AD*
Late Medieval	*1400AD-1600AD*
Post Medieval	*1600AD – 1900AD*

Constructional Elements

Brushwood: Stems or rods measuring 6 cm or less in diameter.

Roundwood: A piece of worked or unworked wood in the round and over 6 cm in diameter.

Vertical Stake/Post: Upright brushwood or roundwood driven vertically or at an angle into the ground. Sometimes but not always used for stabilization.

Horizontal: Brushwood or roundwood laid flat on the ground.

Twigs: Small shoots or branches measuring around 1 cm in diameter.

Split timber: Wood converted from the round including planks, half splits and split pegs.

Woodworking terms and definitions

Chisel point: The end of a piece of wood cut to a point on one single face.

Conversion: The way in which the primary trunk has been split into smaller elements.

Facet: The cut surface produced on a piece of wood by a tool blow. The blow can leave behind a particular signature if the cutting edge of the tool is flawed.

Facet junction: The nature of the junctions between each facet was also assessed as to whether they were clean, ragged or stepped

Jam curves: A complete toolmark on wood retaining the impression of the complete width of the blade used

Pencil point: The end of a piece of wood cut to a point on multiple faces.

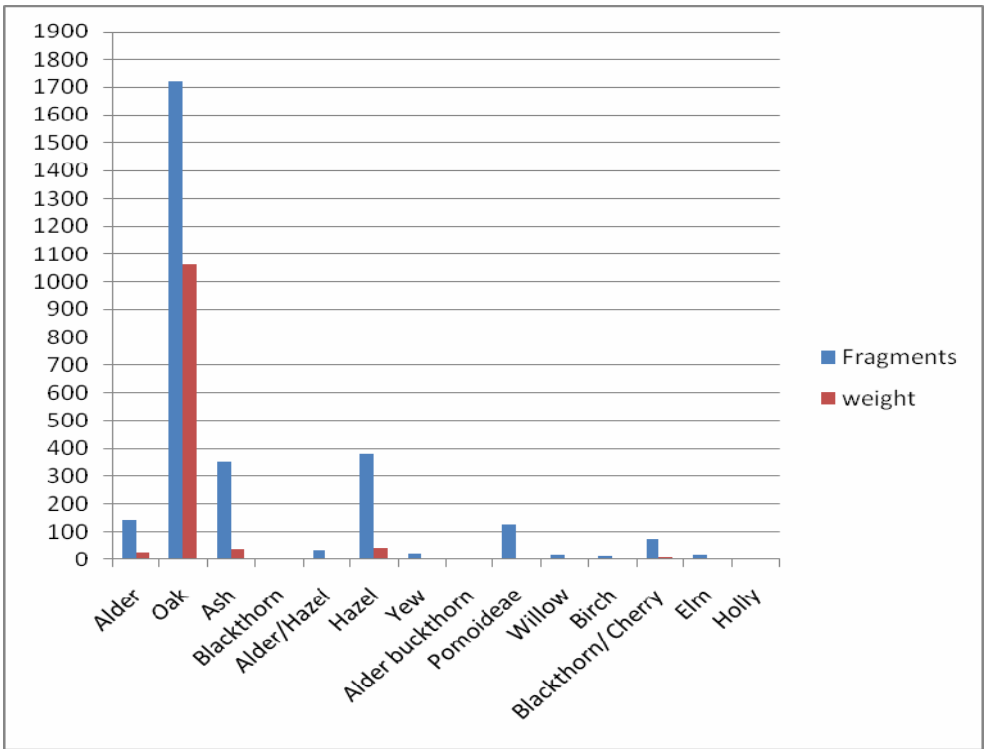
Signature: A signature is an imperfection in a woodcutter's blade which is transferred onto the timber when the wood is cut. A negative impression or a groove is created where a flange of metal extends beyond the axe blade where as a positive or raised signature is created by a gap in the blade edge.

Wedge point: The end of a piece of wood cut to a point on two faces.

4. Results & Analysis

Charcoal assemblage, all sites

Figure 1: All taxa identified from sites analyzed. Weight in grams



Charcoal assemblage results at Gortnagroagh 1

Gortnagroagh, fill of slump associated with burnt mound, Late Bronze Age

Table 1: Taxa identified from Gortnagroagh 1

Site	E number	Feature type	Context	Sample no	Date	Identifications	Comment
Gortnagroagh 1	E2189	Slump fill	F006	1	1260BC-1010B LBA	Alder (0.05g, 1f) Oak (0.4g, 5f) Ash (0.05g, 3f)	

Alder, oak and ash were identified from the fill of a Late Bronze Age slump associated with a burnt mound. Alder is generally associated with wetland areas while oak and ash are dryland taxa.

Results by feature/site types

***Fulacht fiadh* sites**

Twenty seven samples from features associated with *fulacht* sites were analyzed from Contract 1. These samples were retrieved from Addergoole 1 & 2, Aghmacart 1, Ballycuddahy 1, Cannonswood 2, Cuffsborough 1, 2 & 3, Curragh 1 & 2, Leap 2, Oldglass 2 & 3, Oldtown 1, Parknahown 5 and Tintore 1. Eleven taxa were identified and these were mainly represented by oak (*Quercus* spp), ash (*Fraxinus excelsior*) and hazel (*Corylus avellana*), dryland taxa. Smaller amounts of alder (*Alnus glutinosa*), pomoideae (apple type), holly (*Ilex aquifolium*), willow (*Salix* sp), birch (*Betula* sp), elm (*Ulmus* sp), blackthorn (*Prunus spinosa*) and cherry (*Prunus padus/avium)* were also identified.

When all the taxa are graphed in relation to feature types it is clear that there is very little difference in wood selection between different feature types excavated at these ubiquitous *fulacht* sites. Does this indicate that similar functions were being carried out at the pits and troughs and the burnt spreads are related to all burning activities at the site? Oak is more prevalent in the identifications from the postholes which may suggest that oak was being used as post material at these sites.

Figure 2: Wood taxa identified from features associated with *fulacht* sites

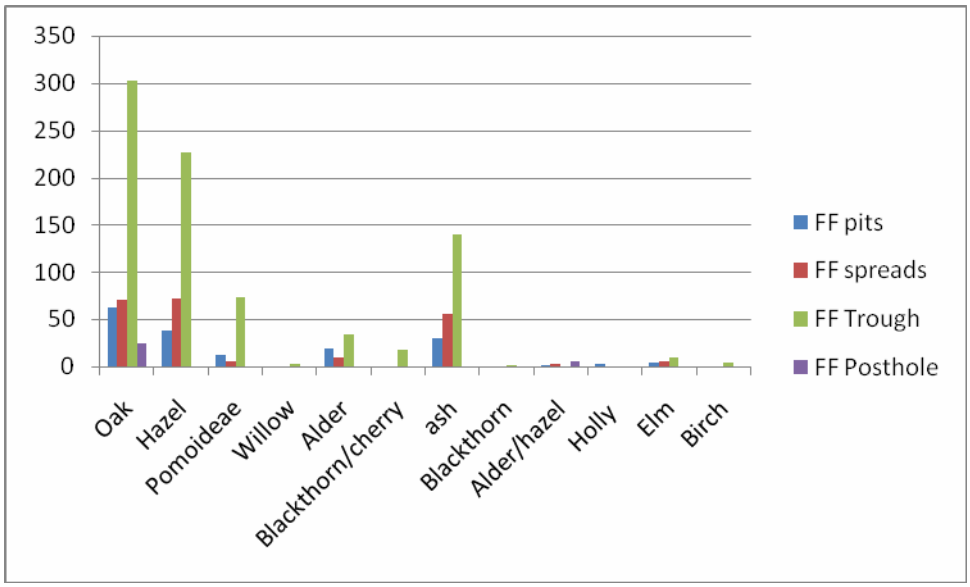
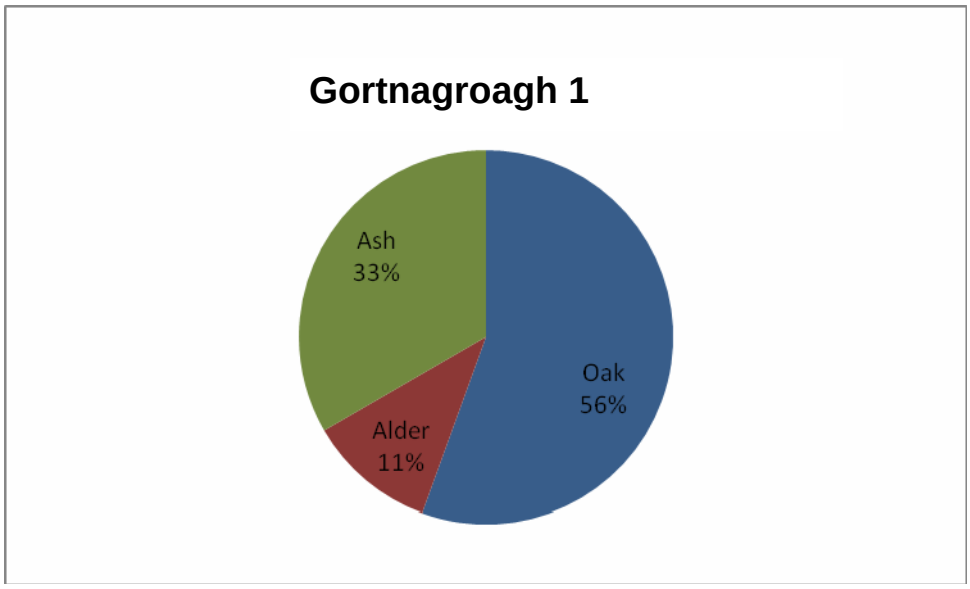
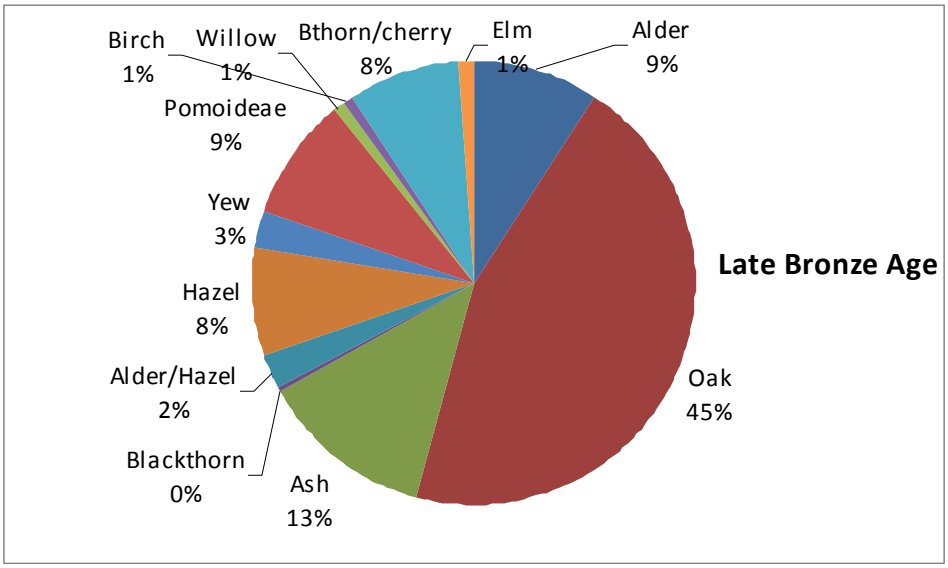


Figure 3: Wood taxa identified from the fill of a slump possibly associated with the processing of cow-horns, Gortnagroagh 1



Oak, ash and alder were identified from the fill of a slump possibly associated with a cow horning site. It is diffocult to attribute a function to the identified charcoal but it may have been used as firewood or kindle material at the site.

Figure 4: Wood taxa present at the Late Bronze Age sites excavated

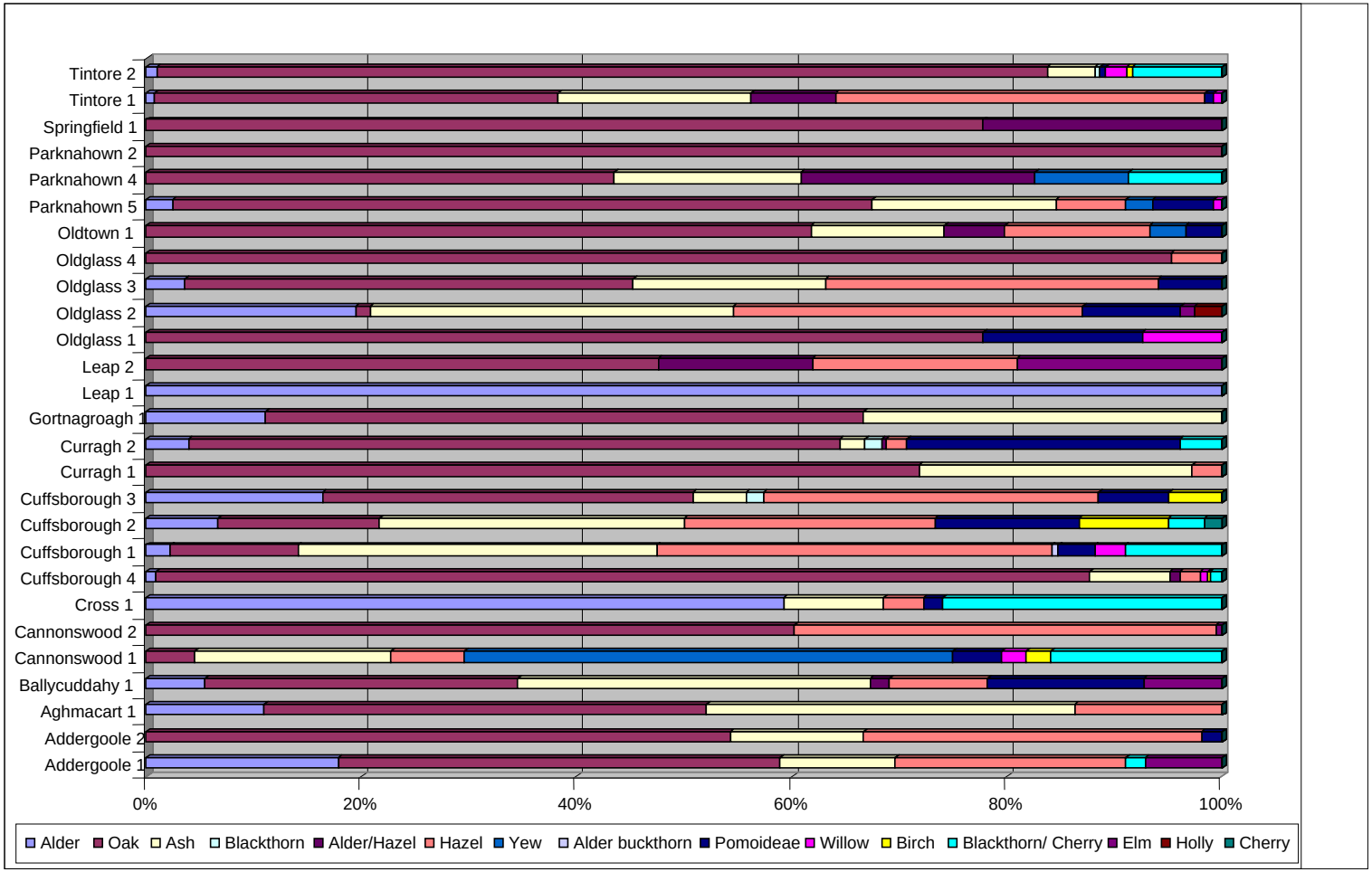


A total of thirteen features were analysed from the Late Bronze Age. These were from Addergoole 1 (trough), Cannonswood 1 (pit), Cross 1 (pit), Cuffsborough 1 (trough and kiln), Cuffsborough 2 and 3 (trough), Cuffsborough 4 (structural), Curragh 2 (trough and postholes), Gortnagroagh 1 (slump), Oldtown 1 (FF stakehole), Parknahown 4 (pit),

Springfield 1 (enclosure) and Tintore 2 (ditch, pit and postholes). Eleven taxa were identified from these features. These were oak, ash, alder, pomoideae, hazel, blackthorn/cherry, yew, willow, birch and elm. We see oak and ash occurring more frequently at the sites investigated in the Later Bronze Age. Oak does not recover to its higher levels as seen in the Early Bronze Age periods. Hazel is significantly less dominant during this period but it is difficult to understand why. Was the land being cleared for the large population expanse in the area during the Later Bronze Age? It is thought that hazel trees in Ireland were mainly scrubland trees rather than occurring within larger woodlands due to the large amount of pollen the tree is show to produce in pollen studies (Bettina *pers comm*.). There is also an increased use of alder trees which may suggest that the environment was getting increasingly wetter in the Bronze Age. This is a phenomenon recognised by archaeologists and palaeo environmentalists throughout Ireland.

5. Discussion of Charcoal and wood assemblage

Table 2: Wood taxa identified from each site excavated along Contract 1, M7/M8



Aims of the study

1. To determine the types of wood selected for use either as fuel or as structural wood.
2. To re-construct the environment that the charcoal and wood was selected from and the possible changes and differences in different time periods between woodland present in the areas during the Neolithic, Early, Middle and Late Bronze Age.
3. To highlight difference in wood selection policies between areas and time periods.

Wood types identified from charcoal and wood assemblages

Table 3: Taxa types identified from the charcoal and wood assemblage along Contract 1

Botanical name	**Species**
Corylus avellana	Hazel
Prunus spinosa	Blackthorn
Prunus avium/padus	Bird/Wild Cherry
Ulmus sp.	Elm
Pomoideae	Apple type
Quercus spp	Oak
Alnus glutinosa	Alder
Salix sp	Willow
Fraxinus excelsior	Ash
Cornus sanguinea	Dogwood
Betula sp	Birch
Taxus Baccata	Yew
Ulex europeas	Furze
Ilex acquilofium	Holly
Hedera helix	Ivy

Two thousand seven hundred and ten charcoal fragments from sixty three contexts related to twenty seven archaeological sites were analysed from excavations along the M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill, Contract 1. Thirteen wood samples from five sites were also identified from Contract 1. Contract 1 covers a length of approx 31 km and includes numerous *fulacht fiadh* sites, iron working sites, enclosures, house and palisade structures, barrows, pits, postholes and kilns.

Charcoal was identified from the fill of various troughs, the fill of pits, from burnt mound spreads and postholes/stakeholes associated with excavated *fulachta fiadh*. Ditch and enclosure fills examined were sampled from Parknahown 2, Tintore 2 and Curragh 2. The fill of a slump possibly associated with a cow horning site was analysed from Gortnagroagh 1 and charcoal from Barrow fills were identified from Oldglass 1 and 4.

There were fourteen taxa present in the charcoal and wood remains. Pine was present in the wood assemblage and not in the charcoal identifications while pomoideae, ash, blackthorn/cherry, yew, alder buckthorn, holly, elm, willow and birch were present in the charcoal assemblage and not in the wood samples.

Taxa identified from the assemblage were oak (*Quercus* sp), hazel (*Corylus avellana*), ash (*Fraxinus excelsior),* alder (*Alnus glutinosa),* Pomoideae (apple type), blackthorn/cherry (*Prunus* spp), yew (*Taxus baccata*), willow *(Salix* spp), birch (*Betula* sp), holly *(Ilex acquilofium*), elm (*Ulmus* sp), alder buckthorn *(Frangula alnus)* and pine (P*inus sylvestris*) in order of representation. The pine identified from the wood samples at Cuffsborough 1 is likely to be modern in date as it was hard and similar in nature and form to modern wood. The range of taxa identified from the features analysed includes large trees (elm, ash, yew, pine and oak), medium sized trees (alder and birch) and smaller scrub or hedgerow trees like blackthorn, blackthorn/cherry, willow, hazel, holly, pomoideae and alder buckthorn.

Comparative work carried out in other areas include Charlesland in Co. Wicklow where charcoal and wood were analysed from four *fulachta fiadh* by O' Donnell, dating from the Early to the Late Bronze Age. Troughs, hearths, mounds, and a burnt spread were analysed from these sites. The charcoal assemblage was dominated by ash, alder, willow and hazel. The wood from two of the *fulacht* sites was mainly alder along with some hazel. The absence of oak and the greater quantities of alder in this area compared favourably to analysis carried out along the N11 in Co. Wicklow (O Carroll, 2007, unpublished post excavation reports, NRA). This is in contrast to results from the south of Ireland and here along the M7/M8 where hazel, oak and ash dominate over any other taxa.

Work carried out along the gas pipeline to the west show that the main woods used for firewood at 44 analysed *fulacht fiadh* were alder, ash, oak and hazel (O' Donnell, 2007, 32). O' Donnell also notes that the values for ash are lower in the Late Bronze Age and attributes the decrease in ash charcoal from the Middle Bronze Age onwards to a period of land clearance prior to the Early Bronze Age which allowed ash to grow well in these clearings (O' Donnell 2007, 37). This is probably the same phenomenon that occurred her along the M7/M8

where the values for ash are lower, although not by a huge margin in the Later Bronze Age. The noticeable decrease in hazel along the M7/M8 may have been a product of deforestation. Can we then suggest an increase in population throughout the Bronze Age and widespread land clearance which is noticeable in the drop off of hazel and oak? The amount of *fulachts* excavated from the Late Bronze Age also points strongly to an increase in population in the Late Bronze Age in the study area.

Other patterns emerging from the analysis is that elm appears to occur more frequently in the Early Bronze Age sites as seen at Ballycuddahy and Oldglass 2. Elm is thought to have extensively died out with the occurrence of an elm disease epidemic in the Neolithic period. Yew, a much venerated and valued tree type, was identified from two un-diagnostic Late Bronze Age pits at Cannonswood 1 and Parknahown 4. The presence of yew at these pits does not occur at other sites along the scheme and may point to some ritual or unusual type of activity being undertaken at these pits.

When the charcoal is plotted against time periods we see a slight reduction in the presence of oak charcoal in the Middle Bronze Age and an increase in hazel wood. Does this suggest a clearance of oak trees in the early Bronze Age whereby they are not so prolific in the Middle Bronze Age? Hazel decreases notably in the Late Bronze Age which also may indicate a clearance of scrub for the inhabitants of the Late Bronze population expansion in the area. There are certainly more Late Bronze Age-dated sites excavated from the area than any other period of activity along the road scheme.

6. Conclusions on Wood and charcoal Assemblage

Two thousand seven hundred and ten charcoal fragments from sixty two contexts related to twenty seven archaeological sites were analysed from excavations along the M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill, contract 1. Thirteen wood samples including a hazel wooden artifact was also analysed from the assemblage. Fourteen taxa were identified from the charcoal and wood assemblage retrieved from the sites and features excavated along the routeway. These were oak (*Quercus* sp), hazel (*Corylus avellana*), ash (*Fraxinus excelsior),* alder (*Alnus glutinosa),* Pomoideae (apple type), blackthorn/cherry (*Prunus* spp), yew (*Taxus baccata*), willow *(Salix* spp), birch (*Betula* sp), holly *(Ilex aquilofium*), elm (*Ulmus* sp) and alder buckthorn *(Frangula alnus)* and pine (*Pinus sylvestris*) in order of representation. The charcoal is mainly representative of fuel collection policies at the Bronze Age *fulacht* sites although charcoal from structural features were identified from Cuffsborough 4 and posthole fills were analysed from Curragh 2, Parknahown 5 and Tintore 2 dating to the Middle & Late

Bronze Age and Medieval periods. The fills of the ditches (Curragh 2 & Tintore), enclosures (Parknahown 2 & Springfield 1) and barrow sites (Oldglass 1 & 4) are more difficult to attribute a function to. They are most likely related to various burning episodes on site and deposition through various formation processes on the site. Charcoal identified from bowl furnaces at Leap 1, slag pits at Parknahown 5 and charcoal production pits at Cannonswood 2 and Cuffsborough 4 are associated with fuel used for metalworking. The charcoal identified from the kilns are also more difficult to attribute a function to as the wood could have been used as firewood or structural features within the kiln site which later burnt down.

Oak along with ash and hazel dominate the charcoal assemblage while oak, hazel, alder, pine and yew in that order are present in the wood assemblage.

Oak is seen to dominate the charcoal assemblages in the all periods of use. Oak was specifically selected for most structural uses such as posts and planks in slot trenches, it was the preferred taxon for use at metalworking activities including charcoal production pits if you exclude the furnace at Leap 1 which was identified as alder wood. Oak was also very prevalent in the ditches and enclosure fills which may indicate that these features contained oak posts or planks. Oak was also the dominant taxon identified from the Barrow sites at Oldglass 1 and 4. Oak is generally the preferred taxon used for cremation deposits due to the high temperatures it can reach and its high calorific value. Ash posts may have been used at one site at Cuffsborough 4 in the Bronze Age.

A variety of taxa were also identified from the kilns although dryland taxa were more frequently identified such as hazel, oak and ash.

Oak, hazel and ash are the dominant taxa identified from the *fulacht* sites. These are all dryland type taxa. These results are in contrast to wood analysis carried out at Charlesland and the N11 in Co. Wicklow, the gas pipeline to the west the N6 KEK in the midlands and Charlestown in Co. Mayo where alder and oak appear to be more dominant. However recent results from the N8 Cashel to Mitchelstown have produced a similar array of taxa where oak, hazel and ash are more common than wetland taxa such as alder. With regard to other functions for the charcoal we can conclude that the activities carried out within the troughs were similar to that which was being carried out at the pits as the taxon identified from the *fulacht* pits mirrors those present in the troughs.

The archaeological evidence points to an increase in inhabitants in the Late Bronze Age as the quantity of *fulachts* in this period is greater than any other period in the area. The environmental evidence from the wood and charcoal may also point to an increase in population whereby hazel scrub is cleared in the earlier periods to open up areas for the inhabitants. Oak is more frequently identified from the sites dating to the Iron Age and Medieval periods. Oak was sourced for use in the metalworking activities and the charcoal production pits at these sites. In contrast alder was used at a bowl furnace site at Leap 1. Oak was again the more dominant taxon identified from the Medieval periods but this may be a reflection of wood usage related to structural timbers rather than the trees in the surrounding environment.

All of the wood taxa identified from the excavations were of native origin. The wood and charcoal assemblage analysed here is indicative of a more dryland environment. Wetland species identified in lower quantities were alder, birch and willow which are symptomatic of local wet condition along river banks or peat bogs.

It would be of great benefit to the project if the results were compared and contrasted with pollen analysis from the areas that underwent excavation.

Appendix 1

Description of wood types

Alnus glutinosa (Alder)

Alder is a widespread native tree and occupies wet habitats along stream and river banks. It is an easily worked and split timber and therefore quite commonly manufactured into planks.

Betula sp (Birch)

Hairy birch (*Betula pubescens Ehrh*) and silver birch (*Betula pendula Roth*) cannot be distinguished microscopically. Silver birch requires light and dry soil while hairy birch grows on wet-marginal areas. Birch more often occurs on wet marginal areas and is one of the first trees to establish itself on raised bogs. The wood from birch trees is strong but it rots quickly when exposed to outdoor conditions.

Corylus avellana (Hazel)

Hazel is a native species and was very common up to the end of the 17th century. McCracken (1971, 19) points out that "it was once widespread to a degree that is hard to imagine today". With the introduction of brick, steel and slate the crafts associated with hazel became obsolete, and today the woods that supplied hazel have diminished rapidly.

Hazel is normally about 3-5m in height and is often found as an understory tree in broadleaf woods dominated by oak. It also occurs as pure copses on shallow soils over limestone as seen today in The Burren in Co. Clare and survives for 30 to 50 years. Its main advantage is seen in the production of long flexible straight rods through the process known as coppicing. Hazel also makes good fuel.

Frangula alnus (Alder buckthorn) is a small deciduous shrub up to 4-5 m in height, with wide-spreading branches. It is found on moist acid soils along riversides and on peat.

Fraxinus excelsior (Ash)

Ash is a native species to Ireland preferring lime rich freely draining soils. It is not a very durable timber in waterlogged conditions but has a strong elastic nature and is easily worked. Ash appears to have colonised the open land after the first farmers removed much of the native

woodland therefore it is frequently used as structural timber in the Later Bronze Age periods. Ash is also abundant in native hedgerows and was quite common in the later historic period.

Ilex aquifolium (Holly),

Holly is a shrub found quite commonly in hedgerows alongside blackthorn and furze and in the understory of oak woods. The *Bretha Comaithchesa* (Laws of neighbourhood) which are listed in the ancient Irish law tracts records holly as one of the five nobles of the wood namely for its use in the construction of cart-shafts and its leaves were valuable as cattle fodder during the winter months (Nelson 1993, 43).

Pinus sylvestris (Scots Pine),

It was generally thought that although Scots pine became common throughout Ireland after the last glaciation, it had declined and was absent by the medieval period and not reintroduced until the late 17th century. Contrary to this, pollen evidence of former tree growth on Clonsast bog, Co. Offaly suggests that Scots pine may have survived in Ireland as a true native. Dr Neil Murray found a continuous record of pine pollen from the early post-glacial period right up to the modern era (Nelson 1994, 148).

The quality and texture of Scots pine depends on the rate of growth of each tree. Scots pine wood is not naturally durable and is no longer widely planted as a commercial forest species in Ireland.

Pomoideae, (Apple type)

Pomoideae includes apple, pear, hawthorn and mountain ash. It is impossible to distinguish these wood species anatomically but as wild pear is not native and crab apple is a rare native species in Ireland it is likely that the species identified from the site along the N5 are hawthorn or mountain ash (rowan) (Nelson 194-200, 1993). Hawthorn (*Crataegus monogyna*) is a native species, and is found in many hedgerows throughout Ireland. Mountain ash (*Sorbus aucuparia*) is also a common tree in Ireland growing particularly well in rocky and hilly mountainous places.

Prunus spinosa (Blackthorn)

It is difficult to differentiate between cherry and blackthorn particularly in relation to charcoal therefore the identified charcoal has been classified as *Prunus* spp which could be either blackthorn or cherry.

The sloe bush, as blackthorn is commonly referred to, is a very durable wood and is as strong as oak. It is a thorny shrub found in woods and scrubs on all soil types. In a woodland situation it is more likely to occur in clearings and at the woodland edges.

Prunus padus/Prunus avium (Bird /Wild cherry)

The genus *Prunus spp.* includes *Prunus spinosa* (Blackthorn), *Prunus avium* (Wild cherry) and *Prunus padus* (Bird cherry). Wood of the genus *Prunus* can be difficult to differentiate microscopically. Wild cherry and blackthorn are more common in Ireland than bird cherry. There is very little archaeological evidence for the use of cherry wood in Ireland although the wild cherry tree is commonly found in many hedgerows (Nelson 1993, 167). It is a very durable wood and is as strong as oak.

Quercus spp (Oak)

Sessile oak *(Quercus petraea)* and pedunculate oak *(Quercus robur)* are both native and common in Ireland and the wood of these species can not be differentiated on the basis of their anatomic characteristics. Pedunculate oak is found growing in areas of heavy clays and loams, particularly where the soil is alkaline. Sessile oak is found on acid soils and often in pure stands. Unlike pedunculate oak, it thrives on well-drained soils but is tolerant of flooding (Beckett 1979, 40-41). Both species of oak grow to be very large trees (30-40m high).

Oak was one of the most prevalent trees growing in Ireland throughout the medieval period. The anglicised form of the Irish name for oak (derry) is included in many townland names today. Out of 62,000 townlands in Ireland about 1,600 contain the word “derry” in one form or another, either as a prefix or suffix (Mc Cracken 1971, 23).

Oak is a dense wood and is very suitable for charcoal production. It also makes good firewood when dried and will grow in wetland areas when conditions are dry. Charcoal was important in pre-historic and Medieval Ireland as it burned hotter and cleaner than wood and was considered superior to wood in that respect. We know from historical sources that the charcoal maker, or collier, was an important figure in Early medieval Ireland.

Oak also has unique properties of great durability and strength and was frequently used in the manufacture of posts and wooden plank.

Salix sp (Willow),

The yew *(Taxus baccata L.)* is a slow-growing conifer, living as long as 1000 years and reaching 65 feet, they are known for their strength and resistance to the cold. It is much less common in recent times because of over-harvesting (its hard, springy wood was the source of English longbows). The evergreen needles are very broad, and the seeds are produced in red, berry-like cones. Yews are toxic; one of the toxic compounds, taxol, is an effective treatment for some cancers. Yew is used for the manufacture of wooden bows, spears and many staves were constructed from yew in the Early Medieval periods.

Willow is a very strong wood in tree form and is excellent for the use as posts. It is also a very flexible wood and was commonly used for the construction and weaving of baskets. It is a native species in Ireland and can be found in a tree and shrub form. According to Webb (1971, 160-2) thirteen species of willow are found growing wild in Ireland, of which eight are certainly native. The wood of *salix* trees and shrubs cannot be differentiated to species on the basis of anatomical features.

Taxus Bacatta (Yew)

The yew *(Taxus bacatta L.)* is a slow-growing conifer, living as long as 1000 years and reaching 65 feet, they are known for their strength and resistance to the cold. *Taxus bacatta* has a preference for well-drained lime rich soils. It is much less common in recent times because of over harvesting (its hard, springy wood was the source of English longbows). The evergreen needles are very broad, and the seeds are produced in red, berry-like cones. Yews are toxic; one of the toxic compounds, taxol, is an effective treatment for some cancers. Yew is used for the manufacture of wooden bows, spears and many staves were constructed from yew in the Early Medieval periods.

Ulmus spp (Elm)

A few fragments of elm charcoal were identified from the trough fill, the early burnt spreads and the early Neolithic hut sites.

English elm *(Ulmus procera)* and wych elm *(Ulmus glabra)* cannot be separated by their wood structure. As suggested by Mitchell (1986) elm declined (although would not have completely died out) with the advent of farming and possibly elm disease epidemic around 3700BC. It generally prefers damp woods particularly on limestone.

7. References

Beckett, J.K., 1979, *Planting Native Trees and Shrubs*. Jarrold and Sons Ltd; Norwich.

Eogan, G., 1983, *Hoards of the Irish Later Bronze Age*. University College Dublin

Edlin, HL, 1956. *Trees, wood and man*. Collins, London

Grogan, E, O Donnell, L, Johnston, P. 2007. *The Bronze Age Landscapes of the pipeline to the west.* Wordwell, Wicklow

Grogan, E., O'Donnell, L. & Johnston, P. (2007) *The Bronze Age landscapes of the Pipeline to the West: an integrated archaeological and environmental assessment*. Wordwell Ltd., Dublin.

Grogan, E. (2005) *The North Munster Project*. 2 Volumes. Wordwell Ltd., Dublin.

Heery, A. (1998) *The vegetation history of the Irish midlands: Palaeoecological reconstructions of two lake sites adjacent to eskers* PhD thesis, University of Dublin (Trinity College).

The Heritage Council (2007) *A review of research needs in Irish archaeology*. The Heritage Council of Ireland Series, Kilkenny.

Hall, V., 1995, "Woodland Depletion in Ireland over the last Millennium" in J.R. Pilcher and S. Mac An tSaoir (eds), *Wood, Trees and Forests in Ireland, 23-35.*

Hurley, M.F., 1982, "Wooden artefacts from the excavation of the medieval City of Cork" in S. McGrail, *Woodworking Techniques before A.D 1500,* B A R **129**, 301-311.

Hurley, M.F., 1986, *A study of Skeletal and Wooden Artefacts from Medieval Cork.* Unpublished M.A. Thesis, University College Cork.

Hurley, M. & Scully, O., 1997, *Late Viking Age and Medieval Waterford Excavations 1986-1992.* Waterford Corporation.

Kelly, F., 1988, *A Guide to Early Irish Law.* Institute for Advanced Studies, Dublin.

Keepax, C. A. (1988) *Charcoal analysis with particular reference to archaeological sites in Britain*. Ph.D. Dissertation, University of London.

McCracken, E., 1971, *The Irish Woods Since Tudor Times.* Institute of Irish Studies, Belfast.

Morgan, R., 1975, "The Selection and Sampling of Timber from Archaeological Sites for Identification and Tree-ring analysis", *Journal of Archaeological Science,* 2, 221-230.

Nelson E.C., 1993, *Trees of Ireland.* The Lilliput Press, Dublin.

Moloney et al, 1994) Excavations at Clonfinlough, Co. Offaly, Crannog Publications.

Mac Coitir, N., 2003, *Irish Trees, Myths, legends and Folklore*. The Collins Press

O Carroll, E., 1996, *The analysis of two wooden assemblages from Corlea Bog, Co. Longford and King John's Castle, Co. Limerick.* Unpublished M.A. Thesis, University College Cork.

O Carroll, E., 2004, The analysis of wood and charcoal from Monanny, Co. Monaghan, Unpublished report for IAC.

O Carroll, E., 2007, The analysis of wood and charcoal from Cashelduff, Co. Mayo, Unpublished report for Mayo County Council.

O Carroll, E., 2007, The analysis of wood and charcoal from the N11, Arklow to Rathnew, Co. Wicklow, Unpublished report for the NRA/Wicklow County Council.

O Carroll, E. 2004. *The analysis of charcoal remains from Ballybrowney Lower 1, Co. Cork.* Unpublished specialist report for ACS Ltd

O Carroll, E. 2000. *The analysis of charcoal remains from Bettystown, Co. Meath*. Unpublished specialist report for ADS Ltd.

O Carroll, E. 2002. *The analysis of charcoal remains from Hermitage, Co. Limerick.* Unpublished specialist report for Aegis.

O Carroll, E, 2007, Wood and Charcoal identifications from the N5, Charlestown by-pass, Mayo Co. Co./NRA

O Carroll, E, 2008, Wood and Charcoal identifications from the N6 KEK, VJ Keeley Ltd/NRA

O Donnell, L. 2005, *Wood and charcoal identifications from Charlesland, Co. Wicklow,* Unpublished specialist report for Margaret Gowen and Co.

O Donnell, L. 2005, *Wood and charcoal identifications from Ballynagran, Co. Wicklow,* Unpublished specialist report for Margaret Gowen and Co.

O Donnell, 2008, *Wood and charcoal identified from the N8 Cashel to Mitchesltown,* unpublished post excavation report for NRA/Margaret Gowen & Company

O' Sullivan, A., 1987, "Wood in Archaeology", *Archaeology Ireland 4***,** 69-73.

O' Sullivan, A., 1994, “The use of Trees and Woodland in early medieval Ireland”, *Irish Forestry* **51,** 80-94.

Rackham, O., 1976, *Trees and Woodlands in the British Landscape.* Weidenfeld & Nicholson, London.

Rackham, O., 1980, *Ancient Woodland: its history, vegetation and uses in England.* Edward Arnold, London.

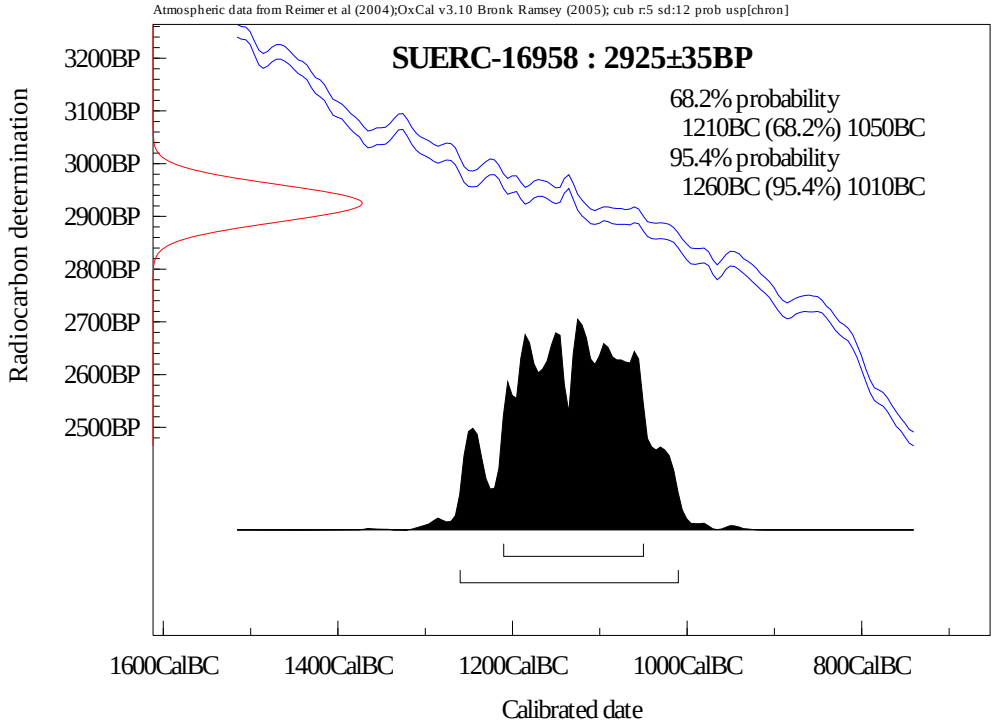
Schweingruber, F.H., 1990, (3rd edition) *Microscopic Wood Anatomy*. Birmensdorf: Swiss Federal Institute for Forest, Snow and Landscape Research.

Sands, R. 1997, *Pre-historic woodworking. The Analysis and Interpretation of Bronze and Iron Age toolmarks.* Institute of Archaeology, University of London

Webb, D.A., 1977, *An Irish Flora*. Dundalgan Press Ltd., Dundalk.

Western, C. A., 1970, "Wood and Charcoal in Archaeology", *Science in Archaeology,* 178-187.

10.2 Appendix 2: Radiocarbon dating analysis report



Reporting Number	Sample Type	Site	Sample Id	Species Dated	d13C	Age % Modern	Ageerror 1 sigma
SUERC-16958	Charcoal	Gortnagroagh 1	Gortnagroagh1:E2189:F6:S1	Ash/Alder	-25.9	2925	35

10.3 Appendix 3: Summary of Fulachta Fiadh on the M7 Portlaoise-Castletown/M8 Portlaoise-Cullahill Motorway Scheme

Townland	Contract No.	Site Type	Description	Provisional Date
Addergoole 1	1	Burnt mound	2 burnt spreads and several paleochannels.	Late Bronze Age
Addergoole 2	1	Burnt mound	Several burnt spreads, 2 troughs and other features	Late Bronze Age
Aghmacart 1	1	Burnt mound	3 burnt spreads	Early Bronze Age
Aghmacart 2	1	Burnt mound	1 burnt spread and 1 trough	Early Bronze Age
Ballycuddahy 1	1	Burnt Mound(s)	2 small burnt spreads, 2 troughs (1 oval and 1 rectangular) and 1 pit	Bronze Age
Ballyhinode 1	1	Burnt Mound	Remains of fulacht/burnt mound	-
Ballyhinode 2	1	Burnt Mound	Remains of fulacht/burnt mound	-
Boherard 1	2	Burnt Mound	Burnt Spread	Bronze Age
Boherard 2	2	Burnt Mound	Burnt Spread and associated pits	Bronze Age
Boherard 3	2	Burnt Mound	Burnt Spread and pit furnace	Bronze Age
Bushfield 1	2	Burnt Mound	Several burnt spreads and troughs	Bronze Age
Bushfield 4	2	Burnt Mound	Several burnt spreads and troughs	Bronze Age
Bushfield 5	2	Burnt Mound	Several burnt spreads and troughs	Early Medieval period
Cannonswood 2	1	Burnt Mound	Several burnt spreads and troughs	Bronze Age

Cappaloughlin 5	3	Burnt mound	Remains of three *fulacht*/burnt spreads and two pit-like troughs	Bronze Age
Cappaloughlin 6	3	Burnt mound	Remains of fulachta fiadh activity: 8 troughs and associated spreads	Bronze Age
Clonadacasey 3	3	Burnt mound	A small number of archaeological features including a trough and two *fulacht*/burnt spreads.	Bronze Age
Clonadacasey 4	3	Burnt mound	A small number of archaeological features including a number of *fulacht*/burnt spreads, stakeholes and troughs.	Bronze Age
Clonboyne 2	3	Burnt mound	Remains of a ploughed out *fulacht fiadh.* A possible flint plough pebble and hone stone were recorded	Bronze Age
Coolfin 2	2	Burnt Mound Activity	Four small pits containing heat shattered stone. The pits ranged from circular to sub-oval in shape and had an average diameter of less than a meter and depth of 200mm.	Bronze Age
Coolfin 3	2	Burnt Mound	Burnt spread (c.12m in length). A large sub-rectangular pit situated to the north of this feature was interpreted as a well (over 3m in length, 2m in width and a metre deep) and contained a timber walkway leading from outside the northern edge to its centre. The cut for this 'U' – shaped well was while a single timber plank supported by uprights provided access into it. A stream apparently truncated the spread in the past.	Bronze Age
Coolfin 4	2	Burnt Mound	Rectangular pit measuring 1.6m E-W and 1.05m N-S and a depth of 0.15m. The burnt mound material and the four corner postholes suggest that this feature probably held a trough. A north-south orientated stream was situated 8m to the west.	Bronze Age
Corraun 1	2	Burnt Mound	Burnt mound activity	Bronze Age

Corraun 2	2	Burnt Mound	Substantial burnt mound & associated pits, hearths & 3 troughs	Bronze Age
Corraun 3	2	Burnt Mound	Extensive burnt mound activity	Bronze Age
Cross 1	1	Burnt Mound	Burnt stone spread and an associated trough	Bronze Age
Cuffsbororough 1	1	Burnt Mound Site	Burnt stone spread, 3 sub-rectangular troughs, 1 sub-circular trough & 2 large pits. Linear ditches. Finds included pottery & deer antler.	Bronze Age
Cuffsborough 3	1	Burnt Mound Site Possible well	2 large deep pit features & 2 large shallow pit features (containing burnt stone), associated pits & ditches. Post-Medieval well?	Bronze Age Post-Medieval?
Curragh 1	1	Burnt mound	2 distinct fulachta fiadh	Early Bronze Age
Curragh 2	1	Burnt mound	1 fulacht fiadh and other post medieval features	Late Bronze Age/ Late Medieval period
Friarsland 1	2	Burnt Mound	Burnt spread (15 x 10m). This site very small and was completed during the testing phase.	Bronze Age
Friarsland 2	2	Burnt Mound	Burnt spread (5 x 2m)	Bronze Age
Gortnagroagh 1	1	Burnt Mound/ Industrial Activity	Drains, a large oval pit & a smaller rectangular pit all containing post-Medieval pottery while both pits contained heat shattered sandstone and dated to the Bronze Age. A number of cow-horns were also found on site	Bronze Age/Post-Medieval
Leap 2	1	Burnt Mound	Ploughed out remains of fulacht/burnt mound or spread	-

Oldglass 1	1	Burnt Mound	Remains of fulacht/burnt mound and a circular structure.	Iron Age
Oldglass 2	1	Burnt Mound	Remains of fulacht/burnt mound and associated pits	-
Oldglass 3	1	Burnt Mound	Remains of fulacht/burnt mound	Bronze Age
Shanboe 1	2	Burnt Mound	*Fulacht*/burnt mound spread, which covered a number of troughs and pits. One chert arrowhead was recovered.	Bronze Age
Shanboe 4	2	Burnt Mound	Ploughed out remains of a *fulacht fiadh*/burnt mound	Late Bronze Age
Shanboe 5	2	Burnt Mound	Ploughed out remains of a *fulacht*/burnt mound spread and associated pits	Early Medieval
Springfield 2	1	Burnt Mound	Troughs, pits, postholes and associated burnt mound activity	Bronze Age
Springfield 3	1	Burnt Mound	Burnt stone spread and a metalled surface	Bronze Age
Tintore 1	1	Burnt mound	2 fulachta fiadh and troughs	Bronze Age
Tintore 2	1	Burnt mound	Several fulachta fiadh spreads and associated pits	Late Bronze Age

10.4 Appendix 4: Archive Contents

Table …. Site Archive (Basic) Summary			
Site Name: Gortnagroagh 1		Record No.: E2189 – Scheme No.: A015/079	
Type	Description	Quantity	Notes
Contexts	Validated contexts from excavation	14	All contexts sheets have been checked and cross-referenced.
Plans	'A2' 1:50 (no. of sheets)	1	Post-ex plan.
Sections	'A2' 1:10 (no. of sheets)	0	
Photographs		26	Colour Prints
Registers	Plan Register Photographic Register Finds Register Sample Register	1 1 1 1	All Registers have been checked and cross-referenced.
Diaries	Director's Diary	1	All Diaries have been checked and cross-referenced.

Report on the Metal Artefacts from the M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme, Contract 1

For Archaeological Consultancy Services

By

Órla Scully, MA MIAI

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Introduction

There are metal finds from twelve excavation sites in contract one. These are; Addergoole 2 (E2213), Cannonswood 1 (E2200), Cannonswood 2 (E2201), Cuffsborough 1 (E2185), Cuffsborough 3 (E2198), Cuffsborough 4 (E2184), Cuffsborough 5 (E2199), Curragh 2 (E2249), Gortnagroagh 1 (E2189,) Parknahown 3, (E2186), Parknahown 5 (E2170), and Springfield 3 (E2192). In total there were 290 metal artefacts from contract one, (here fragments of a single are counted as one, if multiple numbers were issued it is indicated in the catalogue). Most were iron, 32 were copper alloy, one silver bank token and one unidentified- modern- alloy.

The results of the examination are given in the accompanying catalogue. The finds are listed according to their National Museum of Ireland registration no. The next listing is the site name, followed the feature from which the artefact was recovered; the finds no; what the object is, what metal type it is; its description; the dimensions and under what category it functioned as.

The measurements are all given as millimetres. The format of measurement is length by breadth by width. In the case of circular objects, the letter ‘d’ preceding a measurement indicates a diameter. When giving measurements of nails, the first measurement gives length, followed by the max width of the head, followed by the max width of the shaft. If an object is fragmented, the dimensions of the largest piece are given, with the prefix ‘max’.

The objects are assigned a function to facilitate discussion. The details of each artefact are given in the catalogue which follows the discussion. The finds from contract one are many and varied. They fall under several functional categories; coinage, domestic, dress, horse equipment, keys and locks, knives, miscellaneous, personal, structural, tools and weaponry. Where possible, a type and date range for an artefact is given.

Where comparative material from other site can be found it is also given, with full bibliographical references.

Coinage

There is only one item in this section and it came from Parknahown 5. This is a bank token (E2170:102:3), silver, with the obverse having the head of 'Georgius 111 Dei Gratia'. The reverse states that it is a 'Bank token 10 pence Irish 1803'. 'The first copper issue of George 111 was similar in style to that of the old-head coinage of his predecessor [George 11], but owing to a shortage of copper and its resulting high price, none was issued until 1770…From 1775 until 1797 there was no further minting of copper, and once again the lack of official small change prompted merchants, manufacturers, cities, and counties to issue their own tokens, occasionally in denominations as high as the half crown…It was not until 1806 that the Soho mint produced an Irish farthing [in the reign if George 111], one year after it had issued pennies and halfpennies'[1].

Domestic

Several fragments of sheet metal may derive from vessels. One of these is a rim of copper alloy from Curragh 2, (E2249:130:1) possibly from a plate or bowl or even the base of a candlestick. 'By the 1650's candlesticks of silver, pewter, or sheet brass were made with broad trumpet-like feet sweeping up into straight stems encircled by a drip tray at the midsection almost as broad as the foot'.[2] All other possible vessel fragments were iron. As their survival is fragmentary it must remain a tentative identification. What may be a part of an iron cauldron came from Cuffsborough 4, (E2184: 168:5). Two such pieces were also recovered from Parknahown, (E2170: 325:6 & 347:5). The latter has 4 iron studs. Repair of vessels is well attested to in the archaeological record. An iron pan from Anglo-Saxon levels in York has been repaired in a number of places, with patching plates riveted to the pan, and even used rivets to plug small holes.[3] Iron vessels of mid 9th- 11th century date are well known in Scandinavia, and continue right through to early modern times. 'The essential continuity of form and function is strikingly demonstrated by a series of Irish cooking pots from the round-bottomed Neolithic bole with its suspension holes to the present-

[1] Noël-Hume,1991,162-6
[2] Noël-Hume, (1991) 93

day globular iron pot with its twin lugs and its three stubby legs, a concession to a hard uneven floor. The three-legged pot is the countrywife's maid-of –all-work and it is only slowly giving way to flat-bottomed pans and kettles. [4] From the topsoil at Parknahown 5 an iron fragment of what may be a pot or pan handle was recovered (E2170:1:1). The object has tapered rectangular bar sloping to a fan shaped broken edge. It could equally represent part of the bowl and handle of an iron ladle. A handle of a different type from the same site (D2170:231:103) is a simple iron rod, bent somewhat in the centre, gently tapered on either side. It may have acted as a handle to a canister or bucket. From Gortnagroagh 1 a large hook most probably came from a domestic situation, large enough to have hung from a rafter, though the expanded terminal is not spiked. It could also have functioned as part of the suspension of a pot crane. A tack (E2170:104:2) is included as domestic, as it is made of copper alloy and would not have functioned in structural work. It has a small round head and sturdy almost straight shaft. These long shafted tacks 'would have been suitable for fine carpentry and may be seen on extant medieval objects attaching fabric, leather, and other decorative elements to caskets'[5], including coffins.

Dress

The most spectacular find from contract 1 came from Parknahown 5. This is the copper alloy penannular brooch (2170:179:1). This was recovered from a lens between the primary and secondary fill of the ditch inner enclosure. The brooch is likely to date from the seventh century. 'Irish metal work in the later Iron Age was characterised by a range of personal ornaments and horse fittings in plain cast bronze with engraved and cast curvilinear decoration. Through contact with late and post-Roman Britain in the fourth and fifth centuries, new techniques and forms were introduced. These included a range of new dress ornaments, in particular the penannular brooch - a ring brooch with a gap in the ring to enable a movable pin to be passed through it. The brooches were developed in the third and forth centuries by British metalworkers …spirals, stylised animal heads and other curvilinear motifs were derived from the repertoire of the late Iron Age metalworker. Archaeological finds indicated that this fusion [between Roman and British styles] took place first in south-western Britain and was later introduced to the east of Ireland- the area most

[3] Ottaway, (1992) 604
[4] Evans (1957) 76

prone to external influences and contacts. [6] A brooch from Lagore Crannog 'has terminals in the form of birds' heads, which originally had settings, perhaps of glass or amber to form the eyes. Hencken attributed the motif to Germanic brooches of the Migration Period, believing the technique of 'bird head as ornament for a brooch probably reached Ireland along with the Germanic animals of the Book of Durrow'[7] using a brooch from Antrim -very similar to the zoomorphic example from Parknahown 5 to illustrate the point.

A second copper alloy penannular brooch from Parknahown (E2170:237:1) is smaller without the zoomorphic terminals. It is an open sided brooch, with flattened, straight-edged terminals. It is decorated on one side only with vertical lines. The terminals are raised around circular sockets which may have contained enamel or glass beads. The pin is rolled over the frame of the brooch.

These bronze penannular brooches could have been worn by a man or a woman. They had a long span in Irish ornamental jewellery, the later examples of which became more stylised with lavish decoration, such as the Tara and Loughmoe-or 'Tipperary'-Brooches, quintessentially Irish in global iconography. In Britain the design lived on primarily in escutcheons on hanging bowls, often associated with Anglo-Saxon graves of the sixth and seventh centuries.

Four ring pins came from the same site. Three of these were copper alloy, and one made of iron. Similar iron examples were found in Feltrim Hill near Dublin.[8] From there came twenty three ring-headed iron examples. Among these several round-sectioned pins with a blunt point with the opposite end of the pin hammered flat and looped over to hold the ring were found. This compares with a find from Parknahown 5,((E2170:1:103). The finds from Feltrim Hill are from an Early Christian enclosure, a habitation site dated by associated finds to within the 8th and 10th century period.

The pin of one unstratified ring pin from Parknahown, with perforated head, had no ring attached, but was decorated with dot motif over most of its surface.

A cylindrical highly decorated bead (E2170:216:2) found in the primary fill of the inner ditch cut is beautifully preserved. The object is decorated with a variety of incised lines; perforated longitudinally, the central panel has a blackberry or raised

[5] Groves, 1990, 1102
[6] Ó Flóinn, (2001) 172
[7] Hencken, (1950) 64

[8] Hartnett & Eogan, (1964) 33

crosshatch motif. This panel is confined on both sides by 3 concentric lines. The terminals also have panels of 3 concentric lines and the interval between the centre and terminals is decorated with a herring bone design. The decoration is symmetrical from the central axis. This decoration compares extremely well with an object from Ballinderry crannóg. The object from the crannóg is 'a C-sectioned half cylinder of bronze decorated with alternating bands of cross-hatching, herringbone and parallel lines'. This is uncannily like the bead from Parknahown 5 In his re-interpretation of the evidence from the site, Newman notes the comparisons with the pattern on the hoop of the large zoomorphic brooch found in Ballinderry and also compares the design with the Sutton Hoo hanging-bowl escutcheon frames, claiming 'an emphatic endorsement of a later 6th century date'.[9]

A round-headed collared stick pin (E2170:122:1) from Parknahown is unusual. Stick pins follow on from ring pins in the archaeological record, atrophied versions of the ringed pin. This is most closely paralleled with round headed class of pin in O Rahilly's classification of the Dublin stick pins, a sub division of stud headed pins found from the 1100's onwards in Dublin City. Course loose weave woollen clothes of early medieval period were replaced with finer weaves, and this may have been a reason for the changes in the pin dress fasteners. Fragments of shafts of copper alloy pins could belong to either ring or stick pins, and are catalogued simply as pins.

Several parts of buckles were found in sites from contract 1. Some small flattened bars may represent buckle pins. The large cast copper alloy buckle (E2199:46:1) from Cuffsborough 5 is a late example, having perforations to accommodate a separate central bar. The same can be said of the buckle from Cuffsborough 4, (E2184; 303:1), also copper alloy and decorated with a grooved lines which mimic the outline of the frame. A B-shaped iron buckle (E2170:1003:1) from Parknahown is not a common type. In general, double frames become commoner from the mid 13th century.

A dress, or household pin (E2170:572:1), in this instance from a grave, would in the context from which it was recovered have held a shroud together. These pins were produced from the 13th century. 'Although often called 'sewing pins', they were also used for fixing women's head-dress and in general instead of buttons for fastening clothes'.[10] It is not possible to discern what type of head the pin from Parknahown 5

[9] Newman, (2002) 112
[10] Biddle & Barclay,(1990) 560

has, solid or wire bound, as it is now conserved and that detail is obscured. It appears to be solid.

Horse Equipment

The most frequent item from this category was horseshoe nails or fragments thereof. These have flattened rectangular heads and by and large come from the topsoil as would be expected in rural green field sites. Only one of the nails may be an early type. A fiddle- key shaped object (E2170:365:7) is probably a horseshoe nail. These were associated with countersunk holes in a shoe type formally called Norman, now Type 2 of Clarks typology of medieval horseshoes.[11]

The four shoes were fragmentary but did not display any early characteristics, such as a wavy outline. In the case of a small donkey or pony shoe from Parknahown 5 (E2170:800:2) the shoe had a fuller, (a groove running along the centre of the shoe in which the nail-head sits), a post-medieval innovation.[12]

Keys and Locks

A much corroded cylindrical object (E2170:348:6) from Parknahown 5 may represent the remains of a barrel padlock. Where the outer shell has fallen away in antiquity, some central striations are visible which may represent the internal spines and springs. 'Box padlocks with internal mechanisms incorporating leaf springs were in use until the eleventh century and barrel padlocks with similar mechanisms were in use at the same time and continued in use throughout and beyond the medieval period'.[13] A possible barrel padlock key (E2170234:1) was recovered from a different context on the same site. The top of the shank is looped over, a common terminal for barrel padlock keys, but here the bit is obscured by corrosion so classification is ruled out.

Knives

There were a total of twenty knives in the Contract 1 assemblage. All but two came from Parknahown 5. Nearly all of the knives were whittle-tanged. These have a simple extended tapering terminal to the blade to facilitate hafting by the insertion into the handle. Whittle-tanged knives pre-dated the scale-tanged variety (a flattened broad tang which is riveted to plated handles). The tang did not always survive, but

[11] Clark (1995) 86
[12] Clark (1986) 1

[13] Goodall, (1990) a, 1001

only one scale-tang knife (E2170:348:41) was identified from the contract 1 knives. Whittle-tanged knives are basically a derivative of the Saxon Scramasax knife, which had a characteristic angle halfway down the back of the blade. This form of knife is classed as Type A by Goodall.[14] It is known from tenth to thirteenth-century contexts in Britain. There are no examples from contract 1. Type B is characterised by a flat blade-back, which angles down to the tip, with a straight or curved cutting edge. This type is dated by Goodall from the ninth century to not later than the fourteenth century. There are two Type B knives from contract 1, (E2170:356:9 & 145:2). There are four Type C knives from the assemblage (E2170:324:6 & 33:2; E2184:2:3; E2198:64:3). This type is recorded prior to the tenth century and is found in limited numbers in late medieval contexts. Type D are knives in which the blade-back and cutting-edge both taper from the junction of the tang to the tip. There is only one from contract 1, (E2170:356:12). The final type in Goodall's typology is Type E, the most popular type in the collection from contract 1, totalling eight. This has a curved blade-back, with variously shaped cutting-edge. Its date range is also broad, from the tenth to the fifteenth century. Whilst such a typology is devised from a well stratified urban excavation, the caveat must be applied to more rural self sufficient sites, where smiths were reproducing tried and tested forms, which would have a long lifespan. Trends of guilds did not apply to the smithy of a rural enclosure. An example of a possible folding knife comes from Parknahown 5 (E2170:356:4). The blade tip is incomplete but a pronounced arch at the junction between the tang and the blade is suggestive of the type. At a point near the tang, before the object arches upwards is a small indentation which may be the location of the pivotal rivet. The tang is flatter than normal whittle tangs.

Miscellaneous

This category contains the various bars, strips, slag and unidentified material which do not fit under any other functional category. Included here are some decorative mounts which may have been attached to coffins, (e.g. E2170:324:60). Some finds in this category may be modern, such as the copper alloy bottle rim (E2199:46:2) form Cuffsborough 5. A thin cone of iron (E2170:342:7), though flattened, may have

[14] Goodall, (1990) b, 838

functioned as a chape or ferrule. An unusual item is the clasp (?) from Parknahown 5, (E2170:348:2). This small band of copper alloy is decorated with incised lines and the ring terminates in two small perforated right angled projections. Perhaps a rivet passed through the apertures tightening the band around some cloth or ribbon.

Personal

Included here are some mounts and what may have functioned as a clasp, (E2170:1:314). The small rectangular copper alloy piece is doubled over and secured by a tiny rivet. It may also have functioned as a belt chape but more likely was used to fasten a small purse, or binding strap of a prayer book may have used such a terminal to assist closing.

A copper alloy mount or binding strip (E2170:348:1) may have been mounted on a book. The flat shaped strip has three small apertures for rivets. Another small mount is iron, tapered with an expanded bi-lobed head. Each lobe has a perforation, both decorative and presumably functional for attachment.

Finally, a beautiful 3-sided copper alloy mount from Parknahown 5 (E2170:237:1) completes this category. The face of the enamelled mount has a cross as its central motif. The outline of the cross is done in a darker material, possibly niello. 'Niello is a mixture of sulphides, usually of copper, lead and silver. It has been used as a black 'ground' since the Roman period and probably shows up best in Anglo-Saxon metalwork where it is used extensively as a black matrix to contrast with silver and copper-base metals'.[15] The background to the cross is infilled with light green coloured enamel. There are two projecting sides, with small perforations in each, and the front top and bottom are expanded in semi circular panels, also filled with enamel. It may have functioned as a 'slider', a medieval strap attachment. A similar type of object from Ballynahone Beg, Co Armagh is dated from the 8th to the 10th century.[16]

Structural

The majority of the finds from contract 1 fall under this category. Of the 290 objects examined, 105 of them were nails; 5 were rivets- one with the rove still attached and 2 roves alone. The distinction between nails and rivets when the rove is absent is often a matter of thickness and size, rivets being more sturdy and robust. Spikes are very large nails, of which there were two examples, (E2199:83:1 & E2249:16:1). Rivets were used to fit heavy timbers together. They are often referred to as clench bolts and

[15] Tylecote, (1990) 132

are very often found in association with boats in Viking and medieval contexts. A rivet consis ts of a 'nail which, once passed through the timbers to be joined, had a small pierced plated, the rove, set over its tip. The tip was then burred or hammered over [clenched] to hold the bolt in position'. [17] Two examples of large timber connecting spikes were identified. These are rarely pristine and- corrosion aside, are usually twisted, bent or otherwise incomplete. Nearly all nails are rectangular-sectioned, round headed and tapered to a point. There is very little difference in nail shape from the Iron Age to the early modern period. Nails from the Iron Age site at Freestone Hill in Co. Kilkenny, or the Early Christian levels at Garryduff Ringfort, Ballinderry Crannog or throughout medieval levels in Irish cities are remarkably similar. As such they are fairly ubiquitous, but not a good aid for dating due to the continuity of type when hand manufactured. It was not until the late 18th century that nails were manufactured by machine, but they continued to be hand wrought, especially in rural areas.

Tools

The long tapered bar (E2189:1:4) with angled point from Cuffsborough 5 is likely to have been used as a stone punch. It resembles a medieval example found in Kings Lynn, Norfolk. [18] As builders' tools, they have a long span of use, but are normally found in later medieval or post medieval contexts, as early houses were mostly constructed of wood. Two other punches from Parknahown are from the same context, (215). They are long and possibly used by a mason. Other tools include what may have functioned as a chisel; (E2170:342:4). It is similar in form to a slightly smaller find from late fourth or early fifth century at Shakenoak in England[19]. Another partly socketed object (E2170:348:4) with a flat rounded head may be a socketed gouge, known from Roman carpenters' tools.[20] A tanged spoon bit auger (E2170:224: 5) from Parknahown 5 would have also been used in woodwork. These iron bits would have been 'set in transverse wooden handles [and] were used to drill holes in wood'.[21] A large iron needle (E2170:341:1) is large enough for a sacking needle. The object is broken where the bifurcation for the eye begins. It is rounded near the eye,

[16] Bourke, (2003)92
[17] Ottaway, (1992)615
[18] Goodall, 1981 53
[19] Brodrib et al (1968) 102
[20] Aldred, (1956) 231

and becomes rectangular as it tapers down the shank. Towards the point, the axis of the rectangular section is turned, forming a triangular sectioned point. At the point of the change of axis, the object is gently curved. Large curved needles were used for sewing leather and course fabrics. Iron needles were found in Iron Age habitation levels at Freestone Hill,[22] and on several medieval urban sites in Ireland. The length of the artefact from Parknahown is comparable to one from Winchester[23] which is 18th century in date. Three awls all came from Parknahown. Two (E2170:325:3 & 224:4)are classic examples, double-pointed tapered from the centre such as those found in the early medieval levels at Castle Acre Castle in England.[24] The third (E2170:388:1) is a socketed spike, which may have been used as an awl or small punch. Three small wedges from Parknahown (E2170: 1: 13; 341: 3 & 342:12) would have been used in wood chopping. This type of object is unchanged in type almost to modern times. A possible fish hook from Cuffsborough 4, (E2184: 303:3), is similar to the smaller examples form Waterford City[25], though without a barb, the Cuffsborough example is a tentative identification. The long bar with blade on one side (E2199:6:1)though slender, is most likely to be part of a shears.

Weaponry

The artefacts categorised as weapons are tentatively classified as such. Three of the objects are small links, which it is suggested only, may have been part of mail. This would have been worn to deter arrow heads or even sword wounds and was widespread before the fourteenth century. The links (E2170:192:6, 743:1 & 1300:1) are 9mm long, and are similar in appearance and size to the links of a piece of mail found in medieval levels of a graveyard in Waterford.[26] Mail armour was basically of a form that had remained in use since it had been adapted in the Later Roman Empire. During the fourteenth century the overall trench was for a transition from mail to plate armour.

The other possible weapon is a blunt-ended possible hunting arrow (E2170:324:12). This is a rectangular sectioned leaf shaped object, but it must be stressed it is not flat and as such is suggested as a type of weapon used to stun or kill feathered or furred animals without penetrating the skin in the latter or in the former, when the bird was

[21] Goodall, op cit
[22] Raftery, (1968) 73
[23] Biddle & Elmhirst (1990) 813
[24] Goodall, (1982) 229
[25] Scully, (1997) 463

to kept alive. Wooden and antler artefacts identified as such were found in Novgorod, and Waterford. [27]A metal type, with blunt point, found in Hiberno-Norse levels in Waterford was suggested as such a weapon.[28]

[26] Scully (1997) b 449
[27] Hurley, (1997) 667
[28] Halpin (1997) 541

Bibliography

Aldred, C. (1956) 'Furniture to the end of the Roman Empire' in 'A History of Technology' edited by C. Singer et al.

Biddle M and L. Elmhirst, (1990) 'Sewing Equipment' in M. Biddle 'Object and Economy in Medieval Winchester', vol 7 ii ii

Biddle M and K. Barclay (1990) 'Sewing pins and wire' in M. Biddle 'Object and Economy in Medieval Winchester', vol 7 ii ii

Bourke, C. (2003) 'Three Early Medieval Mounts From Co. Armagh' in Ulster Journal of Archaeology, Vol 62.

Brodribb, A, A. Hands & D. Walker, (1968) 'Excavations at Shakenoak Farm, Near Wilcote, Oxfordshire, Part 1: sites A & D

Clark, J. (1986) 'Medieval Horseshoes, datasheet 4, Finds Research Group 700-1700',- consolidated reprint of datasheets issued by the Finds Research Group between 1985 and 1998'

Clark, J. (1995) 'The Medieval Horse and its Equipment', Medieval Finds From Excavations In London'.

Evans, E. E. (1957) 'Irish Folk Ways'

Goodall, I. H. (1981) 'The medieval blacksmith and his products' in D. W. Crossley, Medieval Industry, CBA no. 40

Goodall, I. H. (1982) The Iron Objects in J. Coad & A. Streeten 'Excavations at Castle Acre Castle, Norfolk. Archaeological Journal, 139

Goodall, I. H. (1990) a 'Locks and Keys' M. Biddle, Object and Economy in Medieval Winchester, vol 7 ii ii

Goodall, I.H. (1990) b 'Knives and Spoons' in M. Biddle, Object and Economy in Medieval Winchester, vol 7 ii ii

Groves, M, (1990) 'Silver and Copper Tacks' in M. Biddle 'Object and Economy in Medieval Winchester', vol 7 ii ii

Halpin, A. (1997) 'Archery Material' in M. Hurley & Ó. Scully, Late Viking Age and Medieval Waterford, Excavations 1986 – 1992

Hartnett, P.J & G. Eogan, (1964) 'Feltrim Hill, Co. Dublin; a Neolithic and Early Christian Site' in Journal of the Royal Society of Antiquities of Ireland, 94.

Hencken, H. O'N, (1950) Lagore Crannóg: an Irish Royal residence of the 7th to the 10th century A.D.' in Proceedings of the Royal Irish Academy 53C.

Hurley, M. F. (1997) 'Artefacts of Skeletal Material' in M. Hurley & Ó. Scully, Late Viking Age and Medieval Waterford, Excavations 1986 – 1992

Newman, C., (2002), 'Ballinderry Crannóg No. 2, Co Offaly: Pre- Crannóg Early Medieval Horizon' in Journal of Irish Archaeology, x1

Noël-Hume, I (1991) 'A Guide to Artifacts of Colonial America'

Ó Flóinn, (2001), 'Treasures of the National Museum of Ireland'

Ottaway, P. (1992) 'The Anglo-Saxon metalwork from Coppergate, York.

Raftery, B. 'Freestone Hill, Co. Kilkenny: An Iron Age Hillfort and Bronze Age Cairn' in Proceedings of the Royal Irish academy, Vol 68, C.

Scully, Ó (1997) 'Metal Artefacts' in M. Hurley & Ó. Scully, Late Viking Age and Medieval Waterford, Excavations 1986 – 1992

Tylecote, R. F. (1990) 'Scientific Examination and Analysis of Objects of Copper-Base Alloy'

In M. Biddle, Object and Economy in Medieval Winchester, vol 7 ii i

Catalogue of Metal Artefacts
From the M7Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme, for A.C.S. Ltd.

museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2170	Parknahown 5	0001	001	iron	nail	round head, shaft sheared diagonally and only partial remains	27 x 16 x 10mm	structural
E2170	Parknahown 5	0001	013	iron	wedge	thick short tapered bar	66 x 13 x 11mm	tools
E2170	Parknahown 5	0001	018	iron	nail	fragment of rectangular tapered shaft only	19 x 4 x 3mm	structural
E2170	Parknahown 5	0001	026	iron	horseshoe nail	rectangular head and expansion of the tapered flattened rectangular shaft, point missing	23 x 8 x 6mm	horse equipment
E2170	Parknahown 5	0001	028	iron	nail	rectangular tapered shaft only	40 x 7 x 5mm	structural
E2170	Parknahown 5	0001	038	iron	nail	round head, rectangular shaft, adhesions	68 x 19 x 10mm	structural
E2170	Parknahown 5	0001	039	iron	nail	vestige of head only, rectangular tapered shaft	48 x 9 x 8mm	structural
E2170	Parknahown 5	0001	040	iron	buckle	part of D-shaped frame, rectangular section, incomplete, curved side slightly wider than straight side	27 x 23 x 5mm	dress
E2170	Parknahown 5	0001	045	iron	horseshoe nail	rectangular head, short tapered shaft	22 x 9 x 7mm	horse equipment
E2170	Parknahown 5	0001	046	iron	nail	head incomplete, at present rectangular, rectangular shaft	27 x 17 x 7mm	structural
E2170	Parknahown 5	0001	047	iron	nail	rectangular tapered shaft, round head, complete	65 x 19 x 8mm	structural
E2170	Parknahown 5	0001	048	iron	nail	large round head, tapered rectangular shaft which is missing end of shaft	37 x 21 x 6mm	structural

museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2170	Parknahown 5	0001	052	iron	strap hinge	triangular-shaped flat sheet, though no rivet holes apparent, most likely to have functioned as strap hinge	93 x 43 x 6mm	structural
E2170	Parknahown 5	0001	055	iron	nail	rectangular sectioned fragment of shaft	23 x 9 x 8mm	structural
E2170	Parknahown 5	0001	056	iron	horseshoe nail	point of nail, section is a flattened rectangle	26 x 7 x 5mm	horse equipment
E2170	Parknahown 5	0001	057	iron	nail	oval head, rectangular sectioned shaft, incomplete	28 x 15 x 7mm	structural
E2170	Parknahown 5	0001	058	iron	horseshoe nail	flattened rectangular head is an expansion of shaft	43 x 13 x 6mm	horse equipment
E2170	Parknahown 5	0001	059	iron	nail	oval head, rectangular shaft, tip of point missing	48 x 14 x 10mm	structural
E2170	Parknahown 5	0001	060	iron	nail	fragment of rectangular shaft	36 x 7 x 6mm	structural
E2170	Parknahown 5	0001	063	iron	nail	small round head, rectangular shaft, flaking	40 x 5 x 4mm	structural
E2170	Parknahown 5	0001	064	iron	nail	fragment of rectangular shaft	18 x 4 x 4mm	structural
E2170	Parknahown 5	0001	066	iron	nail	rectangular shaft, no head	52 x 8 x 7mm	structural
E2170	Parknahown 5	0001	074	iron	nail	rectangular shaft, no head	43 x 6 x 4mm	structural
E2170	Parknahown 5	0001	075	iron	bar	tapered rectangular sectioned bar, broken at wider end, poss tang for tool?	49 x 10 x 9mm	tools?

museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2170	Parknahown 5	0001	078	iron	horseshoe nail	flattened rectangular head is an expansion of shaft, shaft bent	24 x 11 x 5mm	horse equipment
E2170	Parknahown 5	0001	079	iron	nail	fragment of rectangular shaft	20 x 8 x 6mm	structural
E2170	Parknahown 5	0001	087	iron	nail	rectangular shaft, no head	26 x 6 x 5mm	structural
E2170	Parknahown 5	0001	088	iron	nail	rectangular shaft, no head	49 x 8 x 7mm	structural
E2170	Parknahown 5	0001	089	iron	nail	head sub round, damaged, rectangular shaft,	39 x 11 x 8mm	structural
E2170	Parknahown 5	0001	092	iron	nail	head sub round, damaged, rectangular shaft, bent	32 x 7 x 3mm	structural
E2170	Parknahown 5	0001	093	iron	nail	head sub round, damaged, rectangular shaft, flaking	21 x 8 x 6mm	structural
E2170	Parknahown 5	0001	094	iron	nail	rectangular shaft, fragment, no head	23 x 6 x 6m	structural
E2170	Parknahown 5	0001	095	iron	tang?	tapered rectangular bar, slightly flattened at one end into blunt rounded point, poss tang of knife or tool	56 x 8 x 6mm	tools?
E2170	Parknahown 5	0001	102	iron	nail	circular sectioned short pointed shaft, modern nail	19 x d 3mm	structural
E2170	Parknahown 5	0001	105	iron	nail	square head, slender tapered rectangular shaft, complete	28 x 10 x 4mm	structural
E2170	Parknahown 5	0001	106	iron	unident	piece of stone with corrosion products adhering or high haematite content	n/a	misc

museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2170	Parknahown 5	0001	109	iron	nail	head incomplete, at present rectangular, rectangular shaft	32 x 14 x 6mm	structural
E2170	Parknahown 5	0001	114	iron	nail	sub round large head, rectangular shaft	52 x 21 x 8mm	structural
E2170	Parknahown 5	0001	117	iron	nail	vestige only of head, tapered partial remains of rectangular shaft	19 x 10 x 7mm	structural
E2170	Parknahown 5	0001	120	iron	nail	rectangular tapered shaft only	60 x 7 x 6mm	structural
E2170	Parknahown 5	0001	122	iron	nail	sub round head, rectangular shaft point missing	26 x 16 x 9mm	structural
E2170	Parknahown 5	0001	126	iron	buckle pin?	rectangular sectioned short bar with flattened tip, and opposite end slightly bent, poss. for attachment to buckle frame	25 x 6 x 4mm	dress?
E2170	Parknahown 5	0001	136	iron	nail	head incomplete, at present rectangular, rectangular shaft	31 x 14 x 6mm	structural
E2170	Parknahown 5	0001	137	iron	unident	section of rolled over sheet metal, poss. rim of box or flattened tube	53 x 12 x 8mm	misc
E2170	Parknahown 5	0001	138	iron	unident	flattish scrap of metal, un-diagnostic	24 x 14 x 6mm	misc
E2170	Parknahown 5	0001	139	iron	nail	rectangular tapered shaft only	67 x 9 x 8mm	structural
E2170	Parknahown 5	0001	140	iron	nail	sub round head, rectangular shaft	76 x 15 x 8mm	structural
E2170	Parknahown 5	0001	142	iron	chain link	oval shaped link, small opening, sub-rectangular in section	56 x 28 x 7mm	misc

museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2170	Parknahown 5	0001	143	iron	nail	small, corroded, round head and rectangular shaft	29 x 10 x 6mm	structural
E2170	Parknahown 5	0001	144	iron	nail	rectangular tapered shaft only	76 x 9 x 8mm	structural
E2170	Parknahown 5	0001	157	iron	nail	round head, tapered rectangular shaft	65 x 10 x 8mm	structural
E2170	Parknahown 5	0001	229	iron	knife	tip of blade triangular section, rounded tip	28 x 15 x 4mm	knives
E2170	Parknahown 5	0001	314	cu alloy	clasp	rectangular flat strip doubled over and secured by tiny rivet. Like a belt chape, but may be part of purse clasp	15 x 10 x 2mm	personal
E2170	Parknahown 5	0026	001	iron	eyed hinge	tapered rectangle which has an open, eyed head, which is a flattened band.	49 x 21 x 18.5mm	structural
E2170	Parknahown 5	0029	001	iron	nail	fragment of rectangular shaft	26 x 9 x 7mm	structural
E2170	Parknahown 5	0029	002	iron	nail	fragment of rectangular shaft	30 x 9.5 x 8mm	structural
E2170	Parknahown 5	0029	003	iron	nail	shaft only, corroded, rectangular, tapered	34 x 11 x10mm	structural
E2170	Parknahown 5	0029	004	iron	nail	round head, detached, rectangular shaft, section only	a; 18 x 12 x 8mm, b;21 x 9 x 7mm	structural
E2170	Parknahown 5	0029	005	iron	nail	shaft only, corroded, rectangular, tapered	35 x 11 x 9mm	structural
E2170	Parknahown 5	0029	006	iron	nail	corroded rectangular sectioned piece of shaft	39 x 13.5 x 13mm	structural

museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2170	Parknahown 5	0032	001	iron	knife	fragment of triangular-sectioned blade, non diagnostic	37 x 11 x 3mm	knives
E2170	Parknahown 5	0034	003	iron	unident	two straight-sided flat bars, rectangular in section, originally one object? One narrow, like tang. Not a knife as section not triangular, possibly a file? Some smaller fragments do not aid identification	a; 60 x 11 x 4mm b; 65 x 13 x 3mm	misc
E2170	Parknahown 5	0036	003	iron	knife	blade back and edge curved , blade may be worn in this way, tip of blade edge straight, type E	62 x 13 x 4mm	knives
E2170	Parknahown 5	0037	001	cu alloy	binding strip/mou	broken into 3 parts, flat strap with rounded terminals, 2 rivets survive near each end. 2 small holes or eyelets at one end, and short bifurcation at opposite end	53 x 8.5 x 3.5mm	misc
E2170	Parknahown 5	0100	004	iron	staple	rectangular sectioned bar, slightly expanded in the centre, turned down at right angles to two short arms which are tapered to points	51.5 x 9 x 8mm	structural
E2170	Parknahown 5	0102	003	silver	coin token	obverse;'Georgious III Dei Gratia', reverse;'Bank Token 10 pence Irish 1803'	d 23 x 1.3mm	coinage
E2170	Parknahown 5	0102	004	iron	tang?	rectangular tapered bar, which thickens at the wider end, where it is broken, poss tang for tool, bend upwards at wider end	85 x 15 x 11mm	tools?
E2170	Parknahown 5	0104	001	cu alloy	pin	tip of tapered pin, circular in section, of stick or ring pin?	25 x d 2.5mm	dress
E2170	Parknahown 5	0104	002	cu alloy	tack?	short rectangular sectioned bar, pointed, with small barely differentiated round head	23 x 3 x 2.5mm	domestic?
E2170	Parknahown 5	0105	001	iron	unident	small corroded lump	15 x 10 x 9mm	misc
E2170	Parknahown 5	0109	001	iron	tang?	sturdy rectangular bar, tapered to a flat blunt point, tentative i.d. (not a nail, as not pointed) tentive i.d.	75 x 10 x 9mm	structural
E2170	Parknahown 5	0122	002	iron	nail	no head, long tapered rectangular shaft	87 x 7 x 6mm	structural

museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2170	Parknahown 5	0122	007	iron	nail	partial remains of shaft, no head	25 x 9 x 7mm	structural
E2170	Parknahown 5	0122	008	iron	tang	tapered rectangular sectioned bar, whittle tang	32 x 8 x 4mm	knives
E2170	Parknahown 5	0122	010	iron	nail	corroded rectangular sectioned tapered shaft	86 x 11 x 9mm	structural
E2170	Parknahown 5	0132	004	iron	scrap	irregularly shaped piece of sheet metal, possibly part of vessel, but no clean edges	54 x 40 x 8	misc
E2170	Parknahown 5	0142	001	iron	buckle pin?	circular-sectioned tapered bar, ends in neat point. The 'head' is corroded, and flattened into roughly circular flat disc, with break at top, possibly the point of attachment to frame.Large, ergo poss used in	66 x 12 x 8mm	horse equipment
E2170	Parknahown 5	0145	002	iron	knife	straight blade edge, blade back straight and drops to point, tang missing, type B	74 x 14 x 3mm	knives
E2170	Parknahown 5	0149	002	iron	strap	rectangular strip with 3 rivet holes along its length, the central rivet still in place, wider at one end, rounded terminals	112 x 19 x 11mm	misc
E2170	Parknahown 5	0149	003	iron	hinge	tapered point perforates shaped object, rectangualr where pierced, then narrows, before expanding again to oval shape, which is also pierced, though only part of second point survives, window furniture	45 x 37 x 15.5mm	structural
E2170	Parknahown 5	0149	010	iron	tethering ring	large circular closed ring, rectangular in section	d88, (int 73) x 8mm	tools
E2170	Parknahown 5	0154	001	iron	knife	gently curved blade back, blade edge straight, whittle tang set low, complete, type E	86 x 16 x 5mm	knives
E2170	Parknahown 5	0161	003	iron	nail	damaged, originally round head,short tapered rectangular shaft	21 x 9 x 8mm	structural
E2170	Parknahown 5	0161	004	iron	nail	rectangular shaft tapered to a point, head missing, corroded	73 x 13 x 10mm	structural

museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2170	Parknahown 5	0192	006	cu alloy	link frag	circular-sectioned semi-circular piece, possibly part of mail	9 x 3 x d 2mm	weaponry?
E2170	Parknahown 5	0194	003	iron	slag	shiny bubbled elongated lump	41 x 18 x 7mm	misc
E2170	Parknahown 5	0194	007	iron	nail	small rectangular sectioned shaft adhering to stone. Measurement nail only	26 x 8x5mm	structural
E2170	Parknahown 5	0216	001	iron	rove	head incomplete, at present rectangular, rectangular shaft	47 x 17 x 4mm	structural
E2170	Parknahown 5	0216	003	iron	nail	round head, rectangualr tapered long shaft	64 x 15 x 9mm	structural
E2170	Parknahown 5	0216	004	iron	nail	rectangular shaft, some mortar adhering	37 x 9 x 8mm	structural
E2170	Parknahown 5	0216	005	iron	buckle pin?	neat short tapered bar with point intact. Opposite end penetrates a small oval piece. Possible buckle pin.	34 x 8 x 3mm	dress?
E2170	Parknahown 5	0216	006	iron	knife	blade back gently curved, blade edge is straight, point missing. Tang is long and straight and set centrally.Type E	92 x 12 x 3mm	knives
E2170	Parknahown 5	0216	007	iron	slag	small globular piece with some bubbling on surface	16 x 8 x 7mm	misc
E2170	Parknahown 5	0224	006	iron	strap	irregularly shaped flat piece of sheet metal	31 x 27 x 3mm	misc
E2170	Parknahown 5	0224	007	iron	unident	corroded with adhesions, semi-circular in shape, some stones in corrosions products, possible hook	56 x 43 x 24mm	misc
E2170	Parknahown 5	0231	103	iron	handle?	circular-sectioned bar, bent c 45 degrees near centre, tapered at both ends to blunt points, poss bucket or canister handle	218 x d 11mm	domestic

museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2170	Parknahown 5	0234	001	iron	b.p. key?	rectangular sectioned bar, in 3 pieces, possible barrel padlock key, one end is folded over on itself, the opposite end is thickened with corrosion products, not classifiable, tentative i.d. Measurements of	75 x 7 x 6mm	keys and locks?
E2170	Parknahown 5	0246	001	iron	nail	round head, long rectangular tapered shaft	97 x 16 x 9mm	structural
E2170	Parknahown 5	0314	002	iron	knife	socketed implement, hollow tube, flattened at one end, blunt ends, flattened end is triangular in section, incomplete.	91 x 19 x 15mm	knives
E2170	Parknahown 5	0317	002	iron	horseshoe nail	tapered short flattened rectangular bar	40 x 8 x 6mm	horse equipment
E2170	Parknahown 5	0317	003	iron	horseshoe nail	tapered short flattened rectangular bar	29 x 11 x 8mm	horse equipment
E2170	Parknahown 5	0324	001	iron	horseshoe	tapered rectangular bar, slightly curved, along its length, poss. Heel of a small horse or pony shoe	54 x 15 x 11mm	horse equipment
E2170	Parknahown 5	0324	006	iron	knife	blade back and edge parallel, tip missing, whittle tang incomplete, curved projection between tang and blade edge Type C	67 x 15 x 4mm	knives
E2170	Parknahown 5	0324	008	iron	nail	in two pieces, very corroded rectangular shaft	a;44 x 11 x 10mm b; 28 x 9 x 7mm	structural
E2170	Parknahown 5	0324	009	iron	unident	small rectangular piece,un-diagnostic	26 x 11 x 4mm	misc
E2170	Parknahown 5	0324	010	iron	horseshoe nail	flattened rectangular sectioned tapered shaft	38 x 10 x 4mm	horse equipment
E2170	Parknahown 5	0324	011	iron	nail	rectangular sectioned shaft, no head	62 x 10 x 8mm	structural
E2170	Parknahown 5	0324	012	iron	arrowhead?	rectangular tang which narrows before expanding to leaf-shaped rectangular-sectioned head, which is tapered to fairly blunt point, hunting arrow?	53 x 10 x 8mm	weaponry?

museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2170	Parknahown 5	0324	013	iron	nail	head damaged, tapered rectangular shaft is complete	83 x 15 x 9mm	structural
E2170	Parknahown 5	0324	016	iron	knife	blade back gently curved, blade edge is parallel until near point where it slopes upwards. Tang is short and straight and set centrally.Type E	70 x 12 x 3mm	knives
E2170	Parknahown 5	0324	017	iron	rivet	large circular head with stout tapered shaft	65 x 33 x 20mm	structural
E2170	Parknahown 5	0324	018	iron	off cut	elongated lozenge-shaped flat piece of sheet.	42 x 10 x 4mm	misc
E2170	Parknahown 5	0324	019	cu alloy	pin/b.p. key?	long circular-sectioned pin, tapered to sharp point, the wider end is flattened and starting to loop over, and tapers slightly before break, gently bent near centre	135 x 7 x 3mm	dress/keys and
E2170	Parknahown 5	0324	021	iron	strap hinge	flat rectangular, slightly tapered strip, now in 2 pieced, rivet intact at narrower end. Indent at wider end suggest broke at rivet hole. Measurements of combined pieces	71 x 25 x 11mm	structural
E2170	Parknahown 5	0324	021	iron	nail	round head, only part of rectangular shaft survives	54 x 19 x 10mm	structural
E2170	Parknahown 5	0324	022	iron	staple	or timber dog, rectangular bar with one end taperedto a sharp point, splayed at a obtuse angle, scar where return should be on other end	95 x 12 x 11mm	structural
E2170	Parknahown 5	0324	022	iron	strap	rectangular flat bar, in two pieces, non diagnostic. Measurements combined	74 x 12 x 8mm	misc
E2170	Parknahown 5	0324	023	iron	unident	folded piece of sheet, formerly wrapped around something, which is now gone,	18 x 17 x 7mm	misc
E2170	Parknahown 5	0324	024	iron	unident	amorphous lump of corrosion products, original object possibly removed altogether, small stones adhering, lumpy, possibly slag or soil associated with furnace	53 x 26 x 20mm	misc
E2170	Parknahown 5	0324	060	iron	escutcheon	Coffin mount, swag shaped mount with apertures at both sides for attachment.	86 x 21 x 6mm	misc

museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2170	Parknahown 5	0325	002	iron	bar	short robust corroded bar, undiagnostic	54 x 21 x 17mm	misc
E2170	Parknahown 5	0325	003	iron	awl	short squared sectioned bar which is tapered at both ends to blunt points, possible awl	57 x 9 x 8mm	tools
E2170	Parknahown 5	0325	006	iron	vessel frag?	one straight side, the other edges are irregular. Slightly curved. Suggestion of a rivet near smooth edge. Poss. fragment of iron pot	46 x 26 x 8mm	domestic
E2170	Parknahown 5	0325	007	iron	nail	round head, long tapered rectangular shaft	75 x 15 x 11mm	structural
E2170	Parknahown 5	0326	002	iron	tang	possible tang of knife or tool. Tapered flat rectangle	60 x 10 x 6mm	knives?
E2170	Parknahown 5	0341	001	iron	needle	long narrow flattened pointed rectangular strip, toward point the axis of the rectangle is opposed, or pinched. At this point the object curves gently.The wider end ends abruptly (broken), though a hint of	134 x 5 x 3	tools
E2170	Parknahown 5	0341	003	iron	wedge	short tapered wedge-shaped bar	50 x 20 x 14mm	tools
E2170	Parknahown 5	0341	004	iron	nail	thin corroded shaft	60 x 6 x 5mm	structural
E2170	Parknahown 5	0342	001	iron	nail	round headed with tapered shaft which is rectangular	35 x 20 x 10mm	structural
E2170	Parknahown 5	0342	005	iron	nail	tapered shaft, head obscured by corrosion	73 x 10 x 8mm	structural
E2170	Parknahown 5	0342	006	iron	nail	damaged,head, long tapered rectangular shaft. Wood appears to survive in corrosion products	91 x 14 x 12mm	structural
E2170	Parknahown 5	0342	007	iron	unident	cone-shaped hollow object, closed at wider end and point of cone truncated, appears slightly grooved along its length	40 x d 13mm	misc

museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2170	Parknahown 5	0342	008	iron	nail	part of shaft, recgtangular sectioned, tapered, point and head missing, stone adhering	41 x 10 x 8mm	structural
E2170	Parknahown 5	0342	009	iron	nail	fragment, rectangular outline discernible	11 x 10 x 7mm	structural
E2170	Parknahown 5	0342	012	iron	wedge	short tapered wedge-shaped bar	42 x 16 x 10mm	tools
E2170	Parknahown 5	0342	060	iron	rivet	large round head with tapered rectangular sectioned shaft	86 x 23 x 11mm	structural
E2170	Parknahown 5	0343	002	iron	strap hinge	central section of rectangular strap, rivet holes at both ends	79 x 45 x 5mm	structural
E2170	Parknahown 5	0347	002	iron	staple	rectangular sectioned bar, bent in two right angles, with side arms tapered	64 x 25 x 13mm	structural
E2170	Parknahown 5	0347	003	iron	nail	sub-circular domed head of nail	21 x 17 x 13mm	structural
E2170	Parknahown 5	0347	004	iron	nail	rectangular shaft tapered to a point, head missing	35 x 5 x 4mm	structural
E2170	Parknahown 5	0347	005	iron	vessel frag?	roughly rectangular piece of sheet metal with 4 studs, possible part of vessel, tentative i.d.	45 x 17 x 7mm	domestic?
E2170	Parknahown 5	0347	006	iron	buckle frag?	thin oval sectioned bar, which is turned at both ends. Vague indent in centre, possible part of buckle frame	33 x 9 x 3.5mm	dress
E2170	Parknahown 5	0347	007	iron	horseshoe nail	flattened rectangular sectioned tapered bar, head missing	22 x 7 x 5mm	horse equipment
E2170	Parknahown 5	0348	001	cu alloy	mount	possible book binding, flat strip has three apertures, one at either end, though one is incomplete. The object is flat at one end, narrrows, expands and tapers to rounded end which is damaged, where it once	39 x 8 x 3mm	personal

museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2170	Parknahown 5	0348	002	cu alloy	clasp	small looped band with short pieces at both ends turned out. The terminals are perforated, one bifurcated and broken, was originally perforated so both holes lined up to be fastened onto or around	11 x 8 x 3mm, int d 5mm	misc
E2170	Parknahown 5	0348	004	iron	gouge	semi-socketed object, flat body with straight end has raised sides along part of its length, expands to rounded terminal	55 x 17 x 10mm	tools
E2170	Parknahown 5	0348	005	iron	eyed hinge	tapered rectangle which has an open, eyed head, which is a flattened band.	84 x 18 x 13mm	structural
E2170	Parknahown 5	0348	006	iron	lock barrel	round ended cylindrical object, poss.barrel padlock. Much corrosion with stones accreted, Where object has flaked in antiquity there can be seen vertical striations which may represent the lock	62 x 37 x 25mm	keys and locks
E2170	Parknahown 5	0348	007	iron	nail	round head, tapered rectangular shaft	45 x 13 x 7mm	structural
E2170	Parknahown 5	0348	008	iron	nail	only a vestige of the head remains, rectangular tapered shaft	62 x 7 x 5mm	structural
E2170	Parknahown 5	0348	009	iron	staple	thin and narrow strip which is turned in at both ends, in two parts	max 23 x 5 x 4mm	misc
E2170	Parknahown 5	0348	010	iron	buckle?	5 pieces of one object, one of which is bent in a right angle, another is flat rectangular and other pieces rectangular, with one wider, possibly where pin rested. Tentative I.d..	max 33 x 10 x 7mm	dress?
E2170	Parknahown 5	0348	013	iron	nail	round head, twisted tapered rectangular shaft	29 x 12 x 5mm	structural
E2170	Parknahown 5	0348	015	iron	buckle pin?	flat rectangular sectioned bar, with short piece turned over on itself at one end, opposite end pointed, large pin, possibly for girdle of horse	68 x 6 x 3mm	horse equipment
E2170	Parknahown 5	0348	016	iron	mount	possible coffin fixture? Flat bar with one curved end, central expansion, and opposite end incomplete, decorational	62 x 14 x 4mm	misc
E2170	Parknahown 5	0348	017	iron	hinge pivot?	tapered flattened rectangular sectioned bar with evidence for a return at wider end	55 x 23 x 14mm	structural

museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2170	Parknahown 5	0348	018	iron	nail	round head, most of rectangular sectioned shaft missing	19 x 18 x 10mm	structural
E2170	Parknahown 5	0348	019	iron	nail	round headed with only partial remains of shaft which is rectangular	20 x 15 x 10mm	structural
E2170	Parknahown 5	0348	020	iron	buckle frag?	rectangular-sectioned bar, which is curved at one end. Possible part of buckle frame	insert this	dress?
E2170	Parknahown 5	0348	021	iron	buckle pin?	corroded flat rectangular tapered shaft, possibly a pin of buckle, thickens a little at one end, the opposite end pointed	39 x 6 x 5mm	dress
E2170	Parknahown 5	0348	022	iron	buckle?	flat thin rectangular-sectioned bar, turned at one end in right angle, incomplete, tentative id	22 x 7x x6mm	dress?
E2170	Parknahown 5	0348	023	iron	nail	rectangular corroded shaft	31 x 11 x 9mm	structural
E2170	Parknahown 5	0348	024-027	iron	unident	4 fragments, corroded non diagnostic	max 28 x 19 x 9mm	misc
E2170	Parknahown 5	0348	028-038	iron	unident	11 fragments of metal, one of which is like the tip of a knife, others are short bars, tapered	max 24 x 13 x 5mm	misc
E2170	Parknahown 5	0348	041	iron	knife	scale tanged knife, blade incomplete, flat rectangular tang with one rivet remaining, there is a curved projection at point where blade edge meets tang. Short shoulder between blade back and tang.	79 x 13 x 3mm	knives
E2170	Parknahown 5	0353	002	iron	horseshoe nail	thin rectangular shaft with rectangular small head	32 x 6 x 5mm	horse equipment
E2170	Parknahown 5	0356	001	iron	latch?	rectangular bar which has 2 rivets along its length, one end is curved into a loop. Terminal of loop is pointed, opposite terminal is expanded at point of break and beginning to turn in opposite direction of	49 x 21 x 9mm	structural
E2170	Parknahown 5	0356	003	iron	strap hinge?	flattened tapered elongated triangle which apperars to have wood in corrosion products	114 x 22 x 19mm	structural

museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2170	Parknahown 5	0356	004	iron	knife	flat rectangular tang rises to arch , blade dips down from this point. Poss. blade of folding knife	77 x 11 x 4mm	knives
E2170	Parknahown 5	0356	005	iron	rivet	circular head of rivet, scar of rectangular shaft visible	d 25 x 8mm	structural
E2170	Parknahown 5	0356	006	iron	unident	small rectangular piece, un-diagnostic	14 x 10 x 5mm	misc
E2170	Parknahown 5	0356	008	iron	buckle pin?	square short bar which is flattened along half its length, flat side ends in rounded point, no means of attachment remains, therefore tentative i.d.slightly bend at centre	37 x 7 x 6mm	dress
E2170	Parknahown 5	0356	012	iron	knife	blade back and edge slope gradually towards point, whittle tang set centrally, sloped shoulders Type D	102 x 17 x 4mm	knives
E2170	Parknahown 5	0365	002	iron	unident	triangular corroded bar, non diagnostic	37 x 13 x 11mm	misc
E2170	Parknahown 5	0376	001	cu alloy	pin	slender long pin tapered to a shaft point. Thicker end has no head, but is flattened and turned before point of break. Most likely to belong to ring pin	97 x 4 x 3mm	dress
E2170	Parknahown 5	0386	001	iron	mount	decorative mount, rectangular sectioned bar incomplete, one terminal expanded into double loop which has two apertures, possibly for attachment	37 x 13 x 3mm	personal
E2170	Parknahown 5	0421	002	iron	nail	head incomplete, at present rectangular, rectangular shaft	29 x 17 x 8mm	structural
E2170	Parknahown 5	0421	003	iron	nail	rectangular shaft	37 x 5 x 4mm	structural
E2170	Parknahown 5	0447	001	iron	rove	lozenge shaped, flat, with point of rivet protruding from one side	34 x 25 x 14mm	structural
E2170	Parknahown 5	0494	002	iron	strap	narrow strap wound into open loop	47 x 45 x 8mm	misc

museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2170	Parknahown 5	0572	001	cu alloy	dress pin	short pin tapered to a point , complete(from shroud), circular sectioned shank, detail of head obscured, (conserved), appears solid	21 x 2.2 x 1.2mm	dress
E2170	Parknahown 5	0602	001	iron	nail	damaged, barely surviving head, long tapered rectangular shaft	72 x 11 x 10mm	structural
E2170	Parknahown 5	0602	002	iron	tang?	flattened rectangular tapered bar, tentative i.d.	52 x 8 x 5mm	structural
E2170	Parknahown 5	0604	001	iron	nail	round head, rectangualr tapered long shaft, point missing	75 x 20 x 7mm	structural
E2170	Parknahown 5	0614	003	cu alloy &	tack	slightly domed, circular-headed copper alloy tack, or stud. The square shaft appears to be iron (post conservation), It is straight and comes to an abrupt end. Associated with burial, possibly with glass	18 x d9.5 x 4mm	dress
E2170	Parknahown 5	0717	002	iron	nail	small round head, tapered rectangular shaft, accreted	65 x 14 x 9mm	structural
E2170	Parknahown 5	0730	004	iron	nail	damaged, originally round head,short tapered rectangular shaft	35 x 11 x 7mm	structural
E2170	Parknahown 5	0743	001	cu alloy	link frag	circular-sectioned semi-circular piece, possibly part of mail	9 x 6.5 x d 2mm	weaponry?
E2170	Parknahown 5	0800	?	cu alloy	wire ring	circular-sectioned wire bent into circle, not completely closed	d 14 x 2	misc
E2170	Parknahown 5	0800	001	iron	nail	damaged, originally round head,short tapered rectangular shaft	26 x 11 x 8mm	structural
E2170	Parknahown 5	0800	002	iron	pony shoe	arched part of shoe with 2 rectangular holes, fullered, post medieval	65 x 11 x 4mm	horse equipment
E2170	Parknahown 5	0800	005	iron	nail	round head, long tapered rectangular shaft	74 x 15 x 7mm	structural

museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2170	Parknahown 5	0800	006	iron	nail	incomplete round head, short tapered rectangular shaft	31 x 17 x 10mm	structural
E2170	Parknahown 5	0800	007	iron	nail	round head, tapered rectangular shaft	40 x 17 x 9mm	structural
E2170	Parknahown 5	0800	008	iron	nail	round head, tapered incomplete rectangular shaft	34 x 14 x 7mm	structural
E2170	Parknahown 5	0800	009	iron	nail	rectangular shaft tapered to a point, head missing	51 x 8 x 7mm	structural
E2170	Parknahown 5	0800	010	alloy?	strip	grey, light object, like lead came, but too light to be lead, not malleable. Modern? Slag?	51 x 19 x 21mm	misc
E2170	Parknahown 5	0800	032	cu alloy	pin	piece of shaft of stick or pin, almost imperceptibly tapered, probably from near point	18.3 x 2mm	dress
E2170	Parknahown 5	0800	033	iron	nail	round head, tapered short tapered rectangular shaft	38 x 16 x 7mm	structural
E2170	Parknahown 5	0800	034	cu alloy	fragments	very fragmented piece of sheet metal	max 10 x 8 x 1mm	misc
E2170	Parknahown 5	0800	037	iron	nail	damaged, originally round head, long tapered rectangular shaft	78 x 21 x 8mm	structural
E2170	Parknahown 5	0982	001	iron	nail	incomplete round head, tapered rectangular shaft	57 x 12 x 8mm	structural
E2170	Parknahown 5	1127	001	cu alloy	unident	flat chunk of corroded metal, roughly triangular outline, un-diagnostic	27 x 23 x 8mm	misc
E2170	Parknahown 5	1181	001	iron	nail	nail head, corroded, incomplete, sub round with little of shaft attached	13nxn12n xn11mm	structural

museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2170	Parknahown 5	1252	001	iron	nail	round head, tapered rectangular shaft	50 x 14 x 8mm	structural
E2170	Parknahown 5	1288	001	iron	nail	tapered rectangular shaft	52 x 8 x 7mm	structural
E2170	Parknahown 5	1300	001	cu alloy	link	small circular sectioned piece of chain link, not fully closed, poss from mail	9 x 7 x 1.5mm	weaponry?
E2170	Parknahown 5	1364	001	iron	unident	curved oval/sub rectangular= sectioned bar, gently tapered pinched at one end	43 x 11 x 8mm	misc
E2170	Parknahown 5	1430	001	iron	nail	incomplete round head, tapered rectangular shaft	40 x 12 x 7mm	structural
E2170*	Parknahown 5	0001	027	iron	socket	part of a socket, open-sided, a flat rectangular bar with raised curved sides at one end forming the socket, and opposite end a flattened rectangle. A small projection at one side of flat end, and	58 x 20 x 11mm	tools?
E2170*	Parknahown 5	0001	100	iron	handle?	gently tapered short rectangular bar, expands into sloped fan shape, spoon-like. Possible handle of cast iron pan	72 x 43 x 12mm	domestic
E2170*	Parknahown 5	0001	103	cu alloy	ring pin	complete ring pin, small and fully intact. The ring is plain, as is the head of the pin which is rolled over ring to form attachment. No decoration	81 x 17 x 4.5mm pin 69 x 3mm	dress
E2170*	Parknahown 5	0001	116	iron	horsesho e heel	elongated triangular fragment of horseshoe	56 x 16 x 5mm	horse equipment
E2170*	Parknahown 5	0032	001	iron	knife	small blade with blade back curved to meet point. Blade edge straight, short coil, sloped shoulder from back to tang, which is tapered and centrally placed. Type E	62 x 15 x 4mm	knives
E2170*	Parknahown 5	0033	002	iron	knife	straight blade back, damaged edge of blade, slight uplift at shoulder, (coil), whittle tang set low in line with blade edge, Type C	96 x 12 x 6mm	knives
E2170*	Parknahown 5	0034	002	cu alloy	unident	small thin rectangular flat scrap which is not diagnostic	10 x 8 x 1mm	misc

museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2170*	Parknahown 5	0100	001	iron	knife	curved blade back, blade edge almost parallel, tang set centrally, short shoulder Type E	101 x 15 x 4mm	knives
E2170*	Parknahown 5	0102	001	cu alloy	ring pin	delicate pin, with ring looped through aperture in pin head, and overlapped on itself. The pin head is plain and wrapped around to form the aperture, though well executed.	80 x 12 x 4mm d int ring d 8mm	dress
E2170*	Parknahown 5	0122	001	cu alloy	stick pin	stud-headed pin with domed head with has a collar, shank incomplete,	47 x d 7 x d3mm	dress
E2170*	Parknahown 5	0145	001	iron	knife	blade back curves to point, blade is straight, dips to curved projection between blade edge and tang which is whittle and placed low, in line with blade edge. Projection at back of blade back is possibly an	97 x 19 x 5mm	knives
E2170*	Parknahown 5	0179	001	cu alloy	penannular brooch	Open-sided sub circular brooch. Terminals are zoomorphic, bird-like heads facing each other. Pin rolled over, decorated by raised ridges infilled with diagonal raised ridges. Circular bosses form the eyes of	42 x 34 x 4mm pin 56 x 9 x 3.5mm,	dress
E2170*	Parknahown 5	0216	002	cu alloy	bead	Decorated cylinder, perforated longitudinally, Centre has raised crosshatch motif, outer edges and edges of central panel have 3 concentric lines. Interval of v-shaped lines between bands of raised lines	20.5 x d 9mm, int d 4.5mm	dress
E2170*	Parknahown 5	0224	004	iron	awl	short narrow bar, square in section, tapered at both ends	47 x 4.5 x 4.5mm	tools
E2170*	Parknahown 5	0224	005	iron	auger	tapered tang? with semi-circular open sided socket or spoon but at wider end. Straight edge to bit	79 x 8 x 5mm	tools
E2170*	Parknahown 5	0237	001	cu alloy	penannular brooch	open sided brooch, with flattened straight-edged terminals. Decorated on one side only with vertical lines. Terminals are raised around circular sockets which would have contained enamel or glass beads	33 x 30.5 x 7mm pin 49 x 7 x 6mm	dress
E2170*	Parknahown 5	0324	015	iron	punch	rectangular tapered bar, with wider end flattened	114 x 13 x 10mm	tools
E2170*	Parknahown 5	0324	015	iron	punch	rectangular bar with flattened head and point at opposite end, similar to #015 from same context	121 x 14 x 11mm	tools
E2170*	Parknahown 5	0342	004	iron	chisel	rectangular-sectioned bar with flattened roughly circular head, tapers to rectangular terminal with straight edge	224 x 24 x 13mm	tools

museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2170*	Parknahown 5	0348	003	iron	spatula?	spoon-like object, circular slightly dished bowl with short tapered projection. Small V-shaped piece missing from one side	51 x 27 x 7mm	domestic?
E2170*	Parknahown 5	0348	012	iron	ring pin	circular shaft which seems to be looped over the ring. Detail is obscured by corrosion, ring is circular sectioned, and plain	103 x 26 x 11mm	dress
E2170*	Parknahown 5	0348	014	cu alloy	buckle pin?	short pointed bar, looped into circular opening which is closed by the shorter side of the bar. Possible functioned with buckle	27 x 8 x 4mm	dress
E2170*	Parknahown 5	0356	009	iron	knife	small complete blade which has straight edge and blade back is parallel but curves to tip. Tang is set high on ling with the blade back Type B	58 x 15 x 4mm	knives
E2170*	Parknahown 5	0365	007	iron	horseshoe nail	fiddle-key shaped object, sub-round flattened head and tapered rectangular shaft, bar slightly convex near expanded head	48 x 18 x 5mm	horse equipment
E2170*	Parknahown 5	0388	001	iron	awl?	socketed spike, round by socket, tapers to a rectangular shaft ending in a point	119 x d 16mm	tools
E2170*	Parknahown 5	0800	011	cu alloy	mount	3-sided mount, face of which has a raised cross motif with the background infilled in green enamel. Cross is central to the front panel, which has semi-circular projections above and below, also with	19 x 11 x 9.5mm	personal
E2170*	Parknahown 5	0800	035	cu alloy	ferrule	possible lace point, fragmented pieces of a hollow cylinder	max 14 x 4 x 3mm	dress
E2170*	Parknahown 5	1003	001	iron	buckle	double buckle, one straight side, to which the buckle pin is attached, the other side is B-shaped, with the pin resting at the intersection of the curves.	47 x 27 x 8mm	dress
E2170*	Parknahown 5	1232	001	iron	unident	rectangular sectioned bar slightly curved longitudinally and pointed at both ends though not evenly	73 x 6 x 3mm	misc
E2170*	Parknahown 5	1386	001	iron	knife	blade back arched, blade edge curved from shoulder to tip. Whittle tang is tapered, set centrally. Complete, excellent condition. Type E	133.5 x 32 x 7mm	knives
E2170*	Parknahown 5	unstratified	031	cu alloy	ring pin shank	upper portion of shank, with perforated baluster head, slight collar, all facets of head decorated with simple dots. One side of shank is decorated with a line of dots.	54.5 x 5 x 4mm aperture 3mm	dress

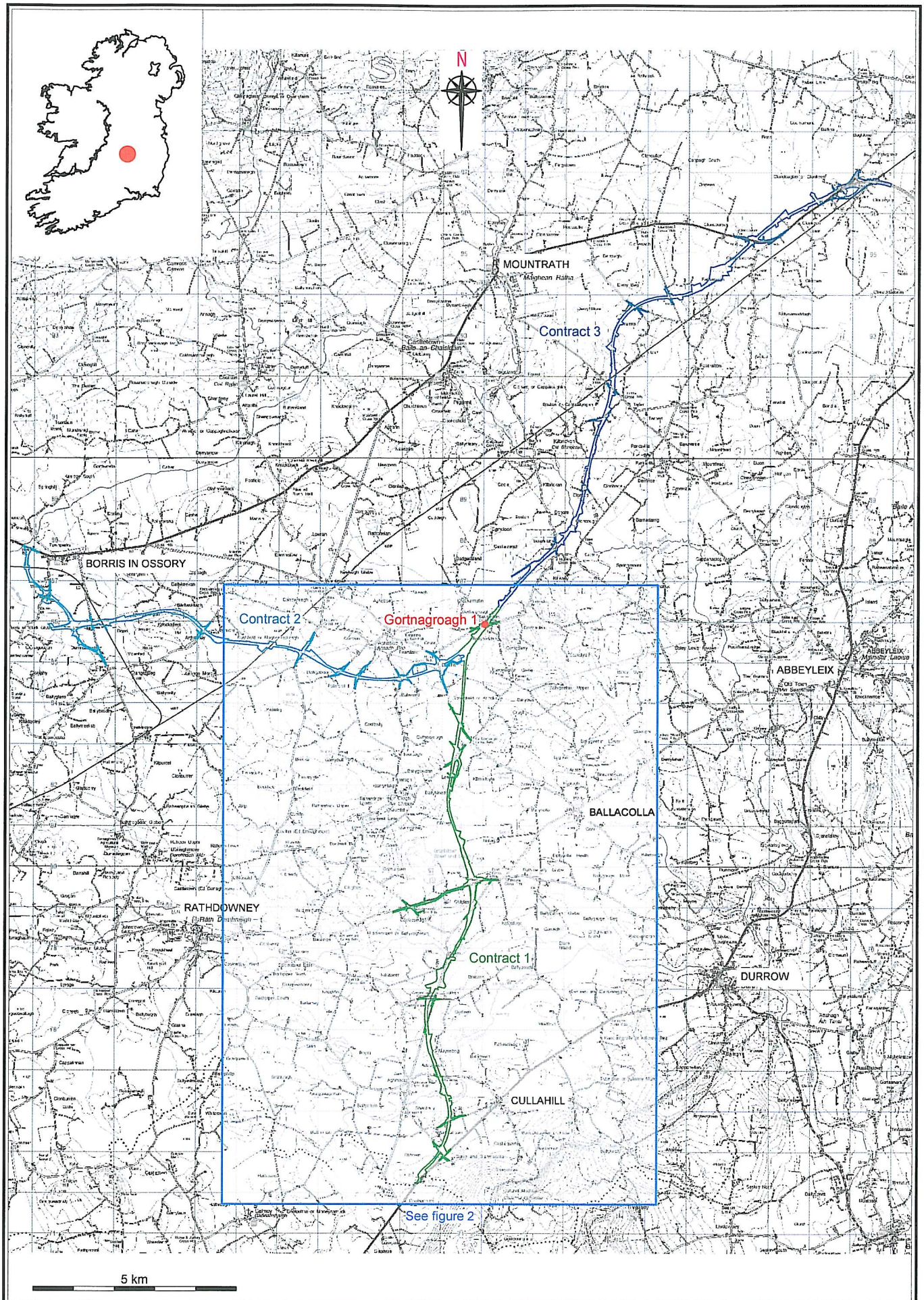
museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2184	Cuffsboroug h 4	0002	002	iron	washer	circular disc, corroded and flaking, central aperture apparent in corrosion products, modern	d27 x 9mm	misc
E2184	Cuffsboroug h 4	0002	003	iron	knife	whittle tang, blade back straight, continues in line with top tang, blade edge slopes from tang and continues parallel to back. Point missing. Type C	81 x 15 x 4mm	knives
E2184	Cuffsboroug h 4	0002	004	iron	unident	unfortunately too corroded for definite i.d. this has a rectangular section at one end. The main part of the bar is somewhat expanded but this may be as a result of corrosion. The opposite end is sloped	117 x 12 x 11mm	misc
E2184	Cuffsboroug h 4	0002	033	iron	trap	part of animal trap, single bar moulded into 3 sides of a rectangle. The termini are turned outwards for a short distance to articulate with the rest of the apparatus. The central section is serrated on one side	112 x 50 x 14mm	tools
E2184	Cuffsboroug h 4	0002	034	iron	nail	rectangular tapered shaft, no head	36 x 8 x 7mm	structural
E2184	Cuffsboroug h 4	0002	089	iron	rivet and rove	tapered shaft which has lozenge-shaped rove still in place, head missing. The tip of the rivet protrudes through the rove and is clenched off to one side.	38 x 23 x 7mm	structural
E2184	Cuffsboroug h 4	0002	090	iron	nail	rectangular tapered shaft, no head	45 x 10 x 8mm	structural
E2184	Cuffsboroug h 4	0148	001	iron	nail?	long tapered shaft coming to a sharp point. The section is a flattened rectangle, poss. horseshoe nail, or floor brad, no head	77 x 7 x 4mm	structural
E2184	Cuffsboroug h 4	0168	002	iron	nail	rectangular tapered shaft, no head, bent	58 x 27 x 6mm	structural
E2184	Cuffsboroug h 4	0168	003	iron	nail	corroded, round head, rectangular tapered shaft	39 x 9 x 4mm	structural
E2184	Cuffsboroug h 4	0168	004	iron	horsesho e nail	flattened rectangular section, shaft fragment only	25 x 8 x 7mm	horse equipment
E2184	Cuffsboroug h 4	0168	005	iron	vessel fragment?	one even-surfaced edge, the rest irregular, very slightly curved cast iron sheet from cauldron, tentative i.d. Corroded	54 x 40 x 16mm	domestic?

museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2184	Cuffsborough 4	0237	008	iron	nail	corroded rectangular tapered shaft	25 x 10 x 9mm	structural
E2184	Cuffsborough 4	0237	009	iron	nail	corroded rectangularshaft fragment	27 x 15 x 10mm	structural
E2184	Cuffsborough 4	0237	011	iron	horseshoe nail	fragmentary and flaking, flattened rectangular shaft, expanded, corroded head	21 x 19 x 3	horse equipment
E2184	Cuffsborough 4	0237	012	iron	nail	corroded rectangularshaft fragment, bent	27 x 17 x 13mm	structural
E2184	Cuffsborough 4	0303	001	cu alloy	buckle	3 sides of rectangular buckle, one side is simply decorated with grooved lines which follow the outline of the frame. The centre of the longest surviving side has an aperture (2mm) to accommodate the	42 x 33 x 4mm	dress
E2184	Cuffsborough 4	0303	002	iron	nail	rectangular tapered shaft, no head	42 x 9 x 8mm	structural
E2184	Cuffsborough 4	0303	003	iron	fish hook	circular-sectioned bar, pointed at one end and bent into U shape at the other end, no barb	48 x 14 x 4.5mm	tools
E2185	Cuffsborough 1	0001	001	iron	vessel fragment	rim of iron vessel, such as a cauldron or large pot, one part of original edge survives, other ends rough	73 x 35 x 18mm	domestic
E2186	Parknahown 3	0001	001	iron	horseshoe nail	flattened rectangular shaft which is curled back on itself, wider end of shaft forms flat rectangular head	16 x 8 x 3mm	horse equipment
E2186	Parknahown 3	0001	002	iron	rivet	large rectangular head, tapered robust shaft, point missing	54 x 25 x 10mm	structural
E2189	Gortnagroagh 1	0001	004	iron	stone punch	large gently tapered, sturdy bar withbluntly angled point end, opposite end obscured by corrosion products,,	236 x 24 x 18mm	tools
E2189	Gortnagroagh 1	0002	001	iron	hook	large hook, such as would have hung meat from rafters. Tapered rectangular bar bent into a U-shaped curve, closing in towards point. Head expanded, sub round	112 x 53 x 33mm	domestic

museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2189	Gortnagroagh 1	0006	003	iron	unident	hollow section of tubing, with bits of flat rectangular bar adhering, possibly modern, jubilee clip?	36 x 30 x 24mm	misc
E2189	Gortnagroagh 1	0006	004	iron	bicycle part?	semi-circular sectioned bar, which curves at one end, where it is broken. The opposite end has suggestion of serrated edge. Shape reminiscent of old bicycle brake mechanism, Tentative i.d.	78 x 43 x 14mm	misc
E2192	Springfield 3	0011	001	iron	vessel fragment	one evenly finished edge, the others edges broken, cast iron pot rim? Even thickness where corrosion products not adhering	47 x 29 x 7mm	domestic?
E2198	Cuffsborough 3	0064	001	iron	strap	possibly part of a strap hinge, flat rectangular thick sheet, incomplete	58 x 36 x 10mm	misc
E2198	Cuffsborough 3	0064	003	iron	knife	blade back and edge are parallel, tang set low in line with edge, sloped shoulder from back to top of tang. Tip missing. Type C	110 x 16 x 4mm	knives
E2199	Cuffsborough 5	0006	001	iron	shears blade	rectangular bar narrows somewhat before expanding on one side only to an elongated triangular shape, Rectangular in section, tapers to a point. Alternate suggestion a harpoon or fish spear	82 5 x 7 x 4.5mm	tools
E2199	Cuffsborough 5	0046	002	cu alloy	ferrule	circular rim/ ferrule, or binding with the one edge slightly folded in, very thin sheet, possible rim of bottle?	d 25 x 11 x 1mm	misc
E2199	Cuffsborough 5	0083	001	iron	spike	robust rectangular sectioned bar, expanded at one end, very corroded, flaking. Corrosion products adhering	105 x 25 x 22mm	structural
E2199	Cuffsborough 5	0085	001	iron	bracket	flattened rectangular-sectioned strap, which is gently tapered. It is curved into broad U-shape, terminal thicker but obscured by corrosion	90 x 31 x 23mm	structural
E2199	Cuffsborough 5	0091	001	iron	nail	rectangular tapered shaft, head obscured, coal and mortar in corrosion products	52 x 20 x 16mm	structural
E2199	Cuffsborough 5	0091	002	iron	nail	rectangular tapered shaft, head obscured by corrosion products	43 x 23 x 12mm	structural
E2199	Cuffsborough 5	0091	003	iron	nail	rectangular tapered shaft, head obscured by corrosion products	41 x 20 x 13mm	structural

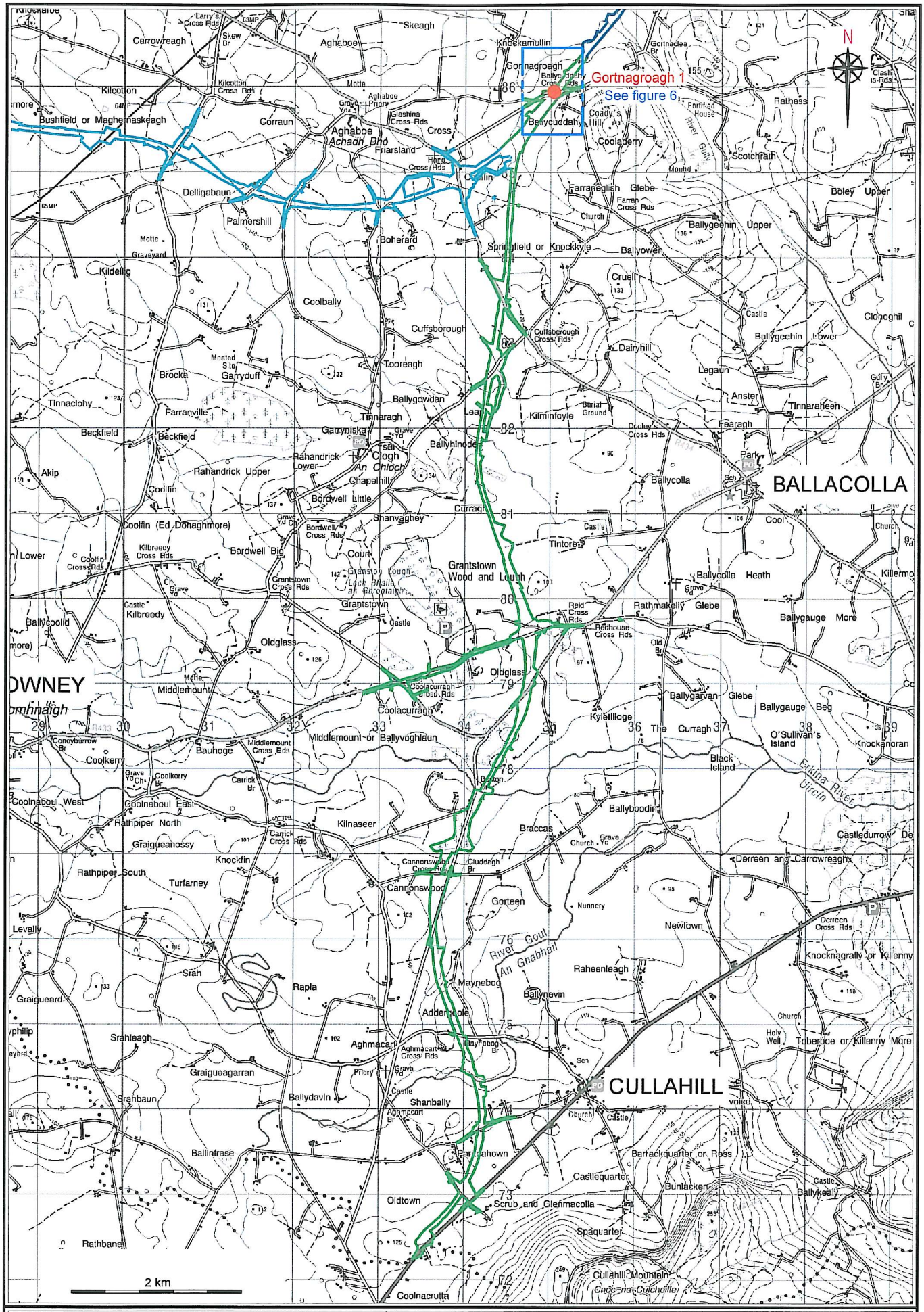
museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2199	Cuffsborough 5	0091	004	iron	nail	partial shaft, rectangular, head obscured by corrosion	30 x 20 x 17mm	structural
E2199	Cuffsborough 5	0093	001	iron	horseshoe nail	narrow rectangular tapered shaft, rectangular head	52 x 10 x 6mm	horse equipment
E2199*	Cuffsborough 5	0046	001	cu alloy	buckle	large rectangular buckle, raised at the centre of the frame, where it is expanded and pierced, (aperture 2mm) on both sides to accommodate the central bar, which is missing. One side wider where	61 x 48 x 8mm	dress
E2200	Cannonswood 1	0005	001	iron	nail	tip of tapered oval shaft	24 x 9 x 6mm	structural
E2200	Cannonswood 1	0005	002	charcoal?	-	-	-	N/A
E2200	Cannonswood 1	0005	003	iron	unident	4 small fragments largest is rectangular, curved, un-diagnostic	max 12 x 7 x 3mm	misc
E2200	Cannonswood 1	0005	004	iron	unident	shattered fragments	n/a	misc
E2201	Cannonswood 2	0025	001	iron	nail	rectangular tapered shaft, head missing, bent into curve	43 x 11 x 9mm	structural
E2201	Cannonswood 2	0025	002	iron	nail	rectangular tapered shaft, head missing	75 x 10 x 8mm	structural
E2201	Cannonswood 2	0093	001	iron	horseshoe	one half of shoe, arched profile, smooth outline, one nail in place, heel flat and rounded outline, front hoof	123 x 91 x 9mm	horse equipment
E2213	Addergoole 2	0001	001	iron	horseshoe	one half of shoe, arched profile, smooth outline, one nail in place, heel flat and straight edged, edge of arm damaged, terminal of heel may also be damaged.	93 x 66 x 21mm	horse equipment
E2249	Curragh 2	0016	001	iron	spike	robust tapered rectangular sectioned bar, with corrosion products adhering, measurements of bar where corrosion absent	141 x 7 x 6mm	structural

museum reg	site	feature	finds no	metal	object	description	dimensions	function
E2249	Curragh 2	0052	001	iron	hinge	flattened rectangular bar, bent, which expands into triangular shape, suggesting of bifurcation at broad end	58 x 22 x 9mm	structural
E2249	Curragh 2	0052	003	iron	horsehoe nail	thin, rectangular-sectioned ,tapered shaft, heavy square head	48 x 10 x 5	horse equipment
E2249	Curragh 2	0130	001	cu alloy	vessel fragment	flat strip, original edge on one long side, slightly curved, possibly rim of plate or platter	77 x 16 x 2mm	domestic



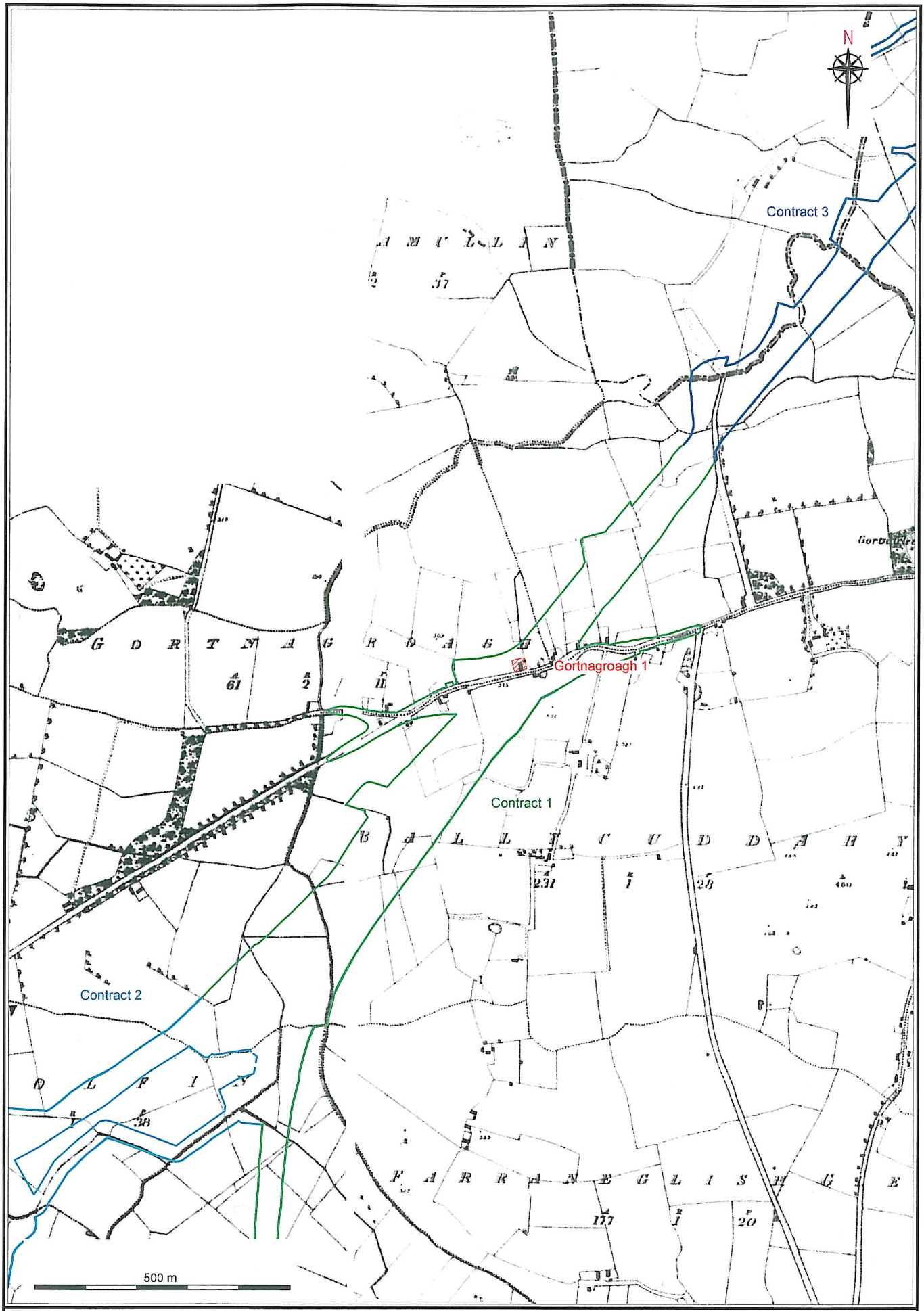
Archaeological Consultancy Services Ltd. *Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth*	Site: M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme, Co. Laois; Contract 1, Gortnagroagh 1	Scale: 1: 125,000 A4
		Date: Nov '08
	Issued for: Archaeological excavation report	Origin: ACS Ltd
	Client: Laois County Council	Drawing no.: 05_09_C7527

Figure 1: Location of M7/M8 Motorway Scheme showing location of Gortnagroagh 1



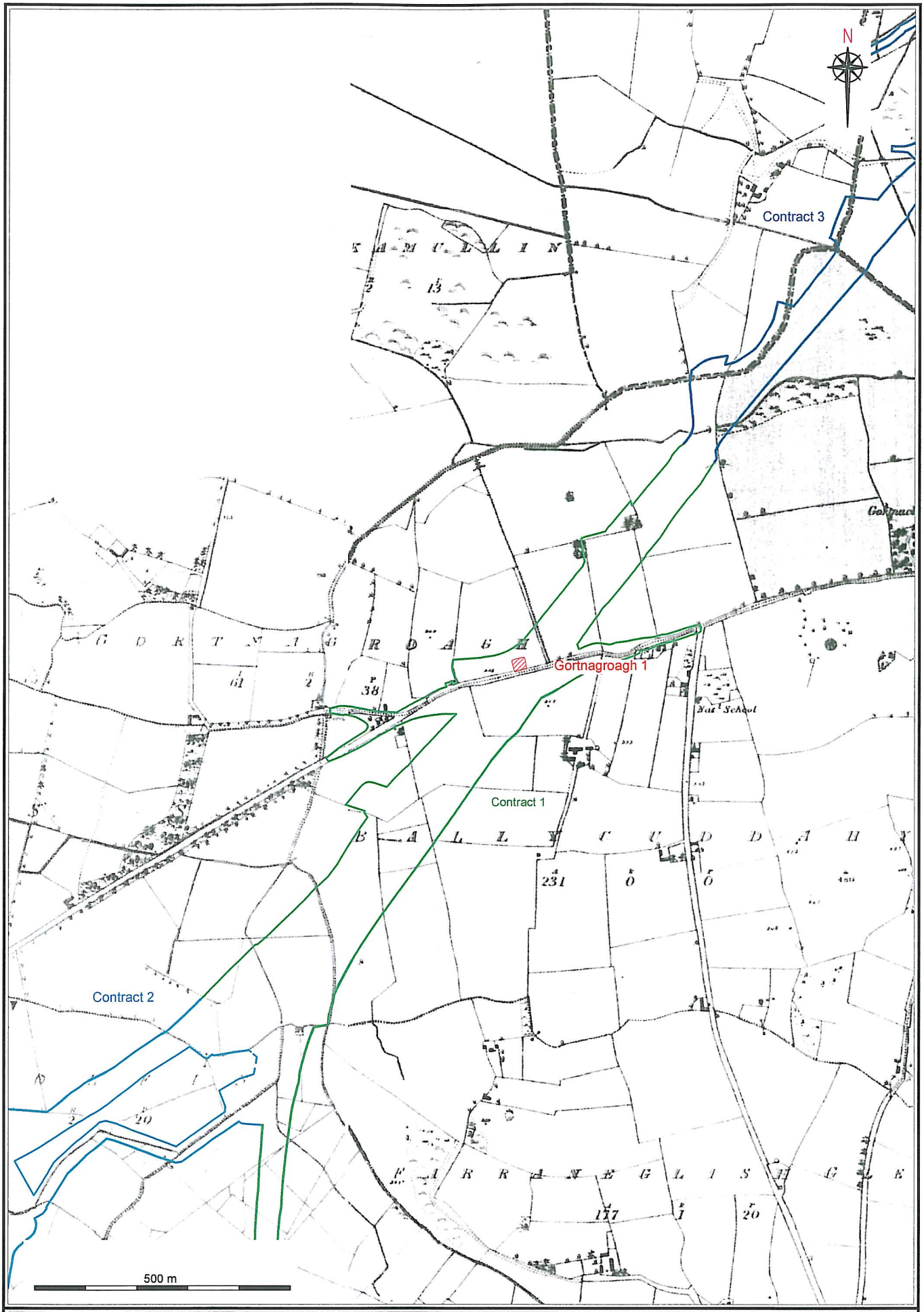
Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme, Co. Laois; Contract 1, Gortnagroagh 1	Scale: 1: 60,000 A4
		Date: Nov '08
	Issued for: Archaeological excavation report	Origin: ACS Ltd
	Client: Laois County Council	Drawing no.: 05_09_C7528

Figure 2: Location of Contract 1 showing Gortnagroagh 1



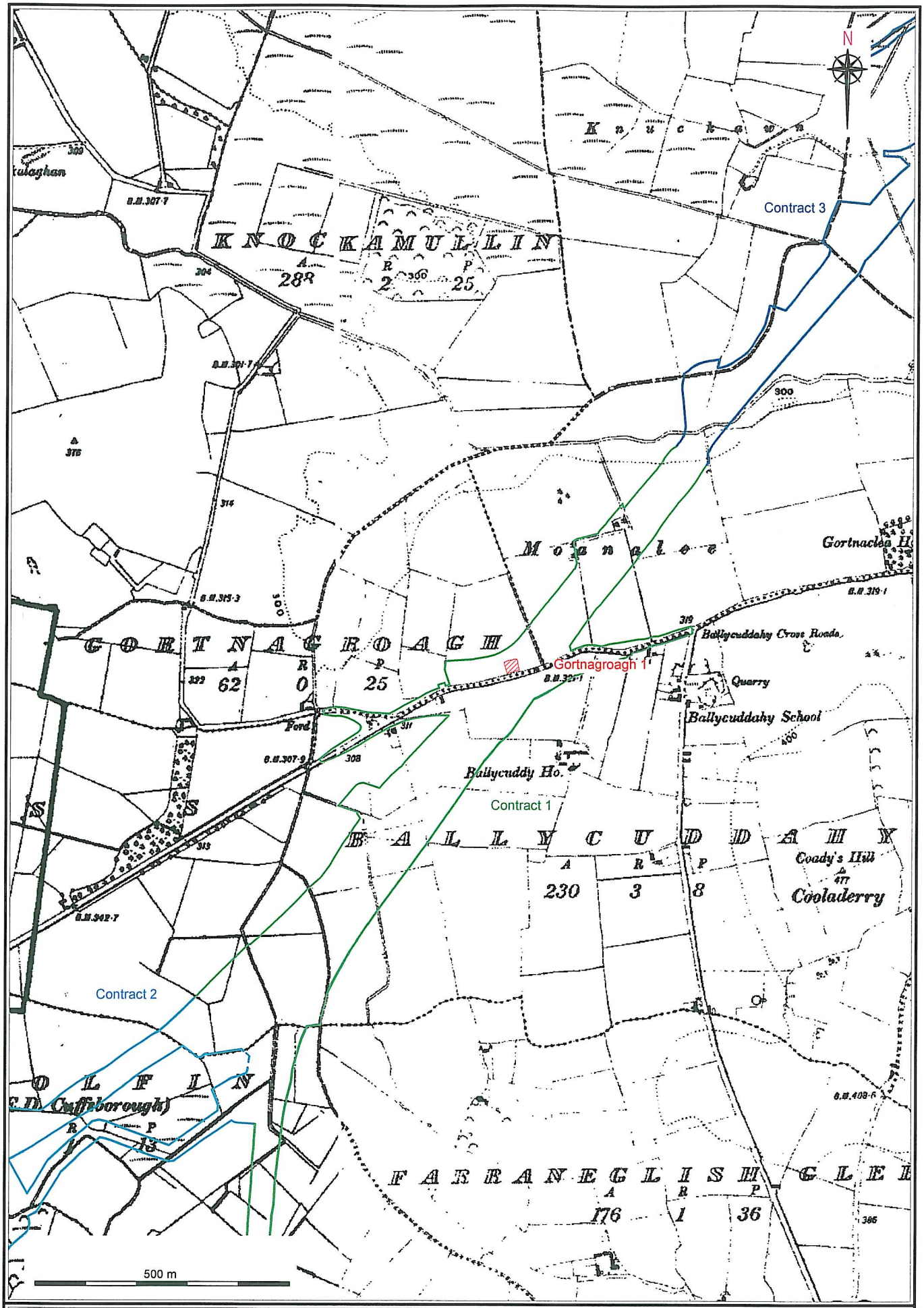
Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme, Co. Laois; Contract 1, Gortnagroagh 1	Scale: 1: 10,000 A4
		Date: Nov '08
	Issued for: Archaeological excavation report	Origin: OSi Laois 1st Ed. (1839)
	Client: Laois County Council	Drawing no.: 05_09_C7529

Figure 3: Plan showing Gortnagroagh 1 on OSi Laois 1st Ed. (1839) background



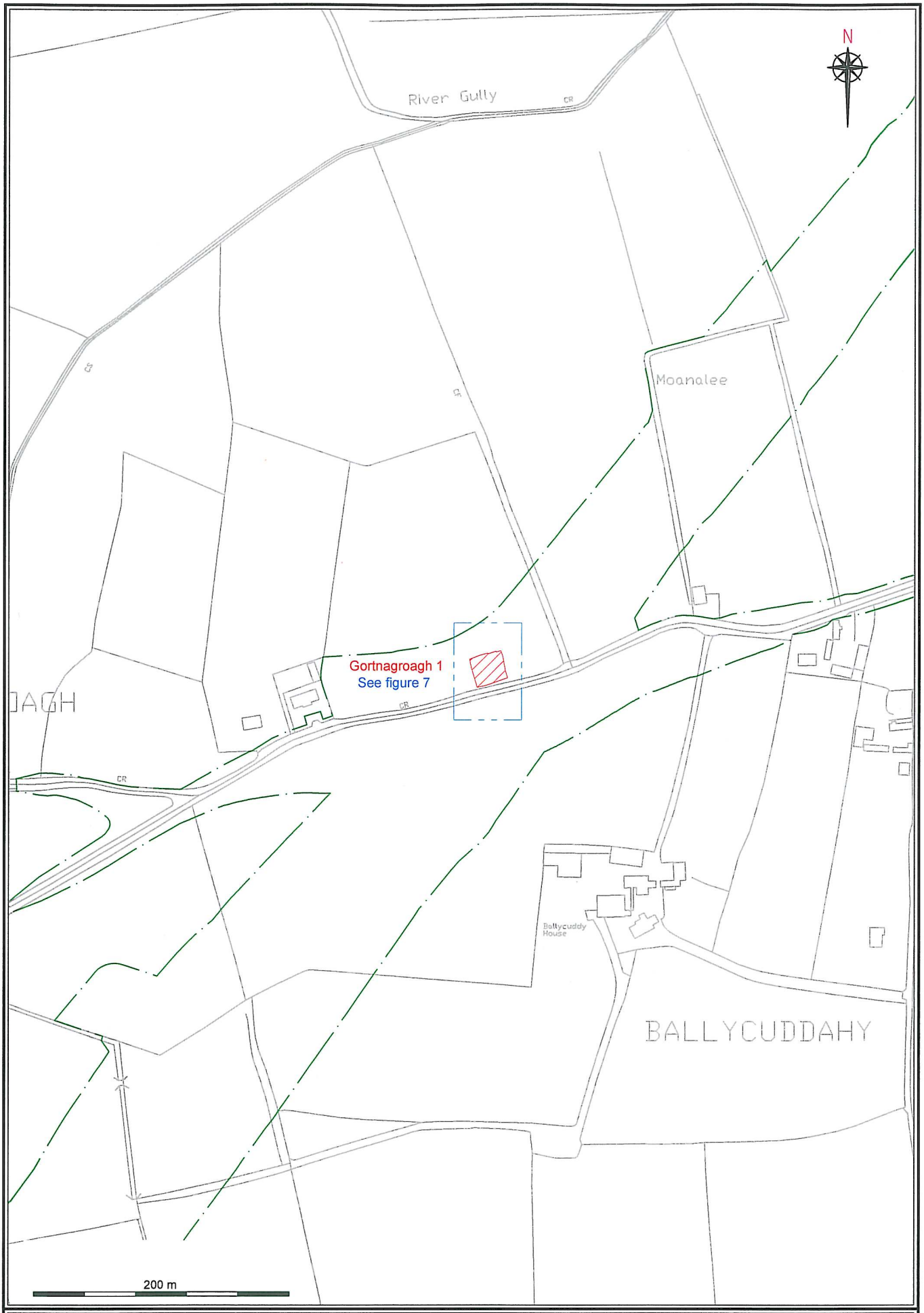
Archaeological Consultancy Services Ltd. *Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth*	Site: M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme, Co. Laois; Contract 1, Gortnagroagh 1	Scale: 1: 10,000 A4
		Date: Nov '08
	Issued for: Archaeological excavation report	Origin: OSi Laois 2nd Ed. (1889-91)
	Client: Laois County Council	Drawing no.: 05_09_C7530

Figure 4: Plan showing Gortnagroagh 1 on OSi Laois 2nd Ed. (1889-91) background



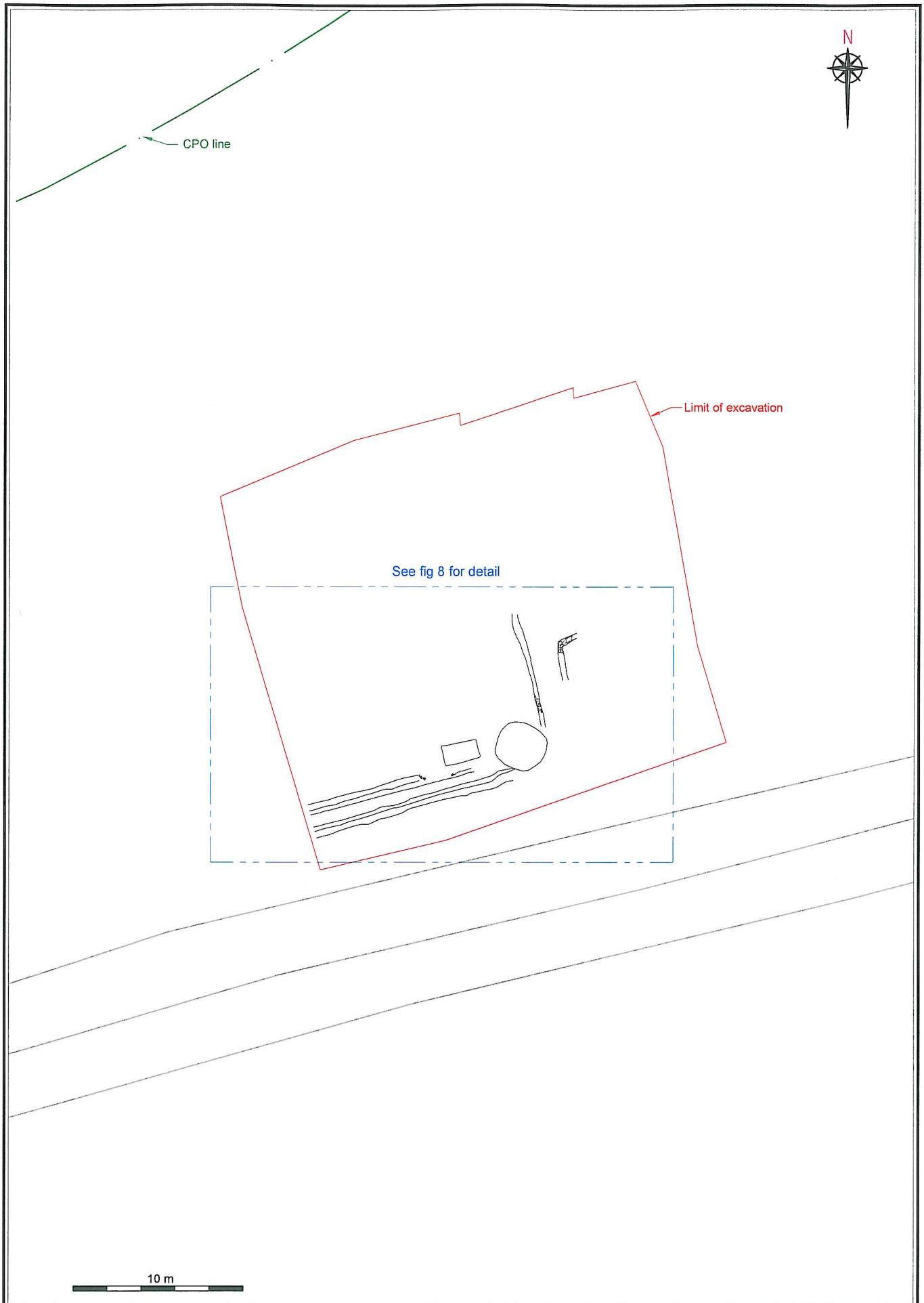
Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme, Co. Laois; Contract 1, Gortnagroagh 1	Scale: 1: 10,000 A4
		Date: Nov '08
	Issued for: Archaeological excavation report	Origin: OSi Laois SMR 1909
	Client: Laois County Council	Drawing no.: 05_09_C7531

Figure 5: Plan showing Gortnagroagh 1 on OSi Laois SMR 1909 background



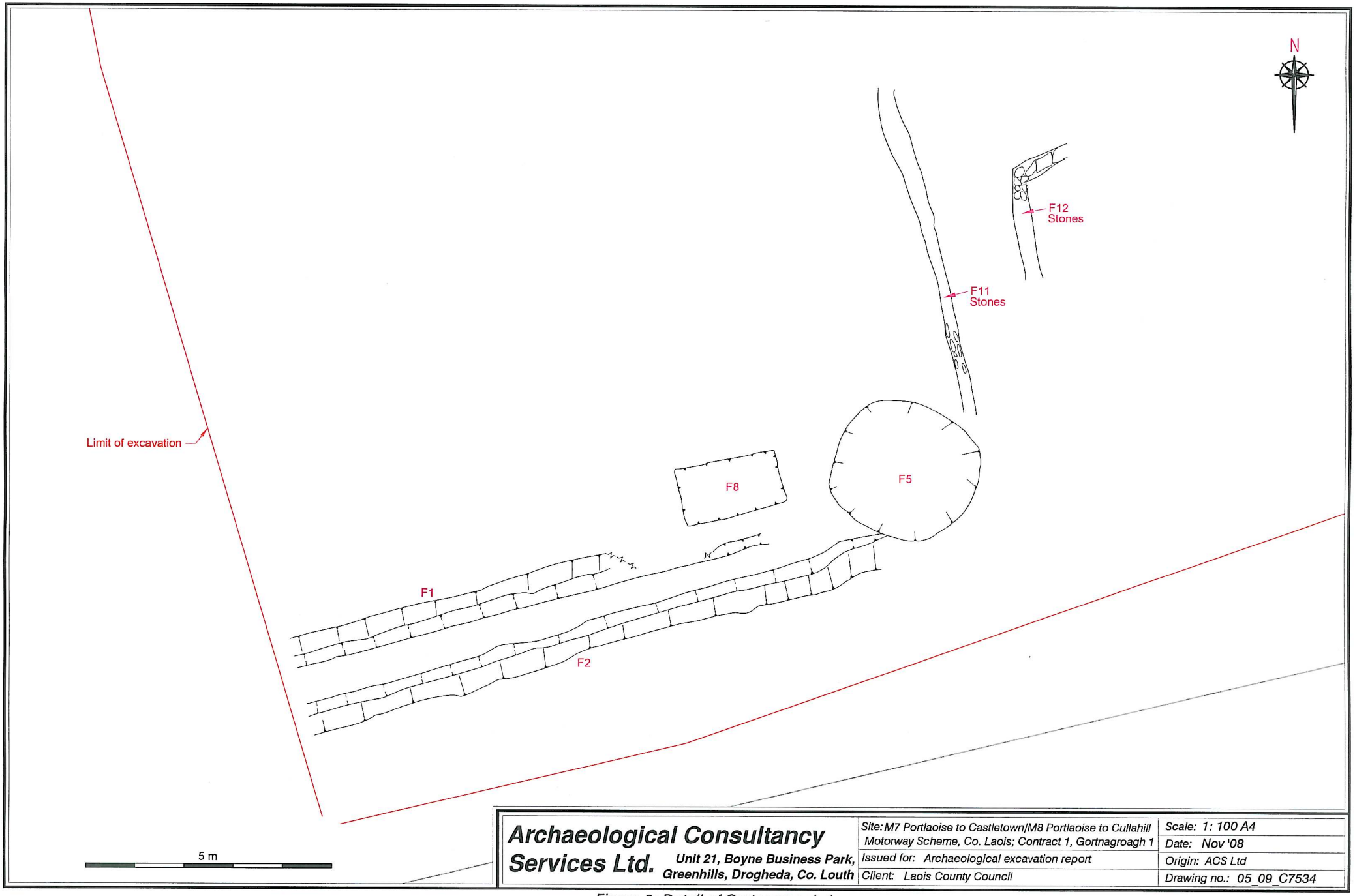
Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme, Co. Laois; Contract 1, Gortnagroagh 1	Scale: 1: 4,000 A4
		Date: Nov '08
	Issued for: Archaeological excavation report	Origin: ACS Ltd
	Client: Laois County Council	Drawing no.: 05_09_C7532

Figure 6: Location of Gortnagroagh 1



Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme, Co. Laois; Contract 1, Gortnagroagh 1	Scale: 1: 300 A4
		Date: Nov '08
	Issued for: Archaeological excavation report	Origin: ACS Ltd
	Client: Laois County Council	Drawing no.: 05_09_C7533

Figure 7: Extent of site



Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme, Co. Laois; Contract 1, Gortnagroagh 1	Scale: 1: 100 A4
		Date: Nov '08
	Issued for: Archaeological excavation report	Origin: ACS Ltd
	Client: Laois County Council	Drawing no.: 05_09_C7534

Figure 8: Detail of Gortnagroagh 1

Plate 1: Mid-excavation shot of F001 & F002 from west. (05_09_CP302_26)

Plate 2: Mid-excavation shot of F001 & F002 from west. (05_09_CP302_24)

Plate 3: Mid-excavation shot of F001 & F002 with F005, F006 & F014 to the forefront from east. (05_09_CP302_23)

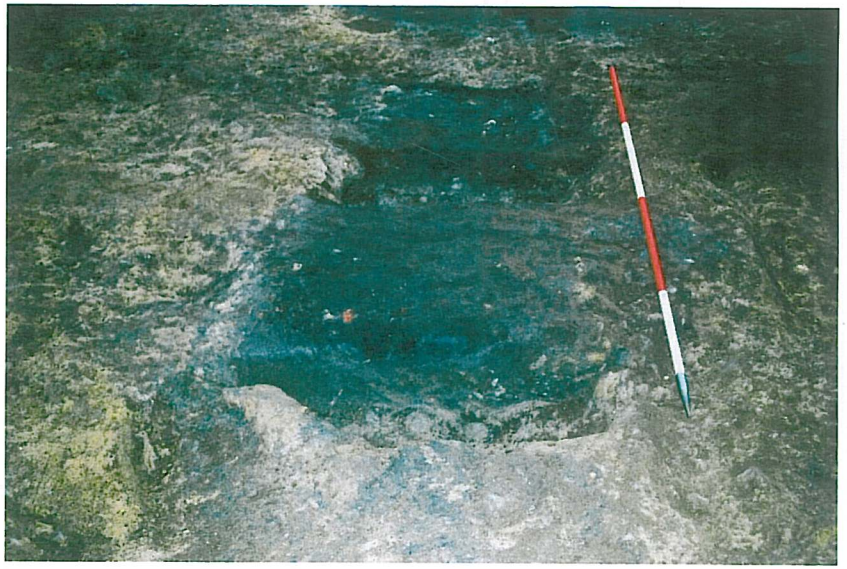


Plate 4: Mid-excavation shot of F007 F009 & F008 with F002 to the south from west. (05_09_CP302_20)

Plate 5: Section through F005, F006 & F014, excavated trough F008 is to the top left of photograph, from southeast. (05_09_CP302_10)

Plate 6: Drains F011 & F012 from south. (05_09_CP302_03)

Plate 7: Mid-excavation shot of F005, F011 & F012 from south. (05_09_CP302_02)

Plate 8: Mid-excavation shot of site from east. (05_09_CP302_01)