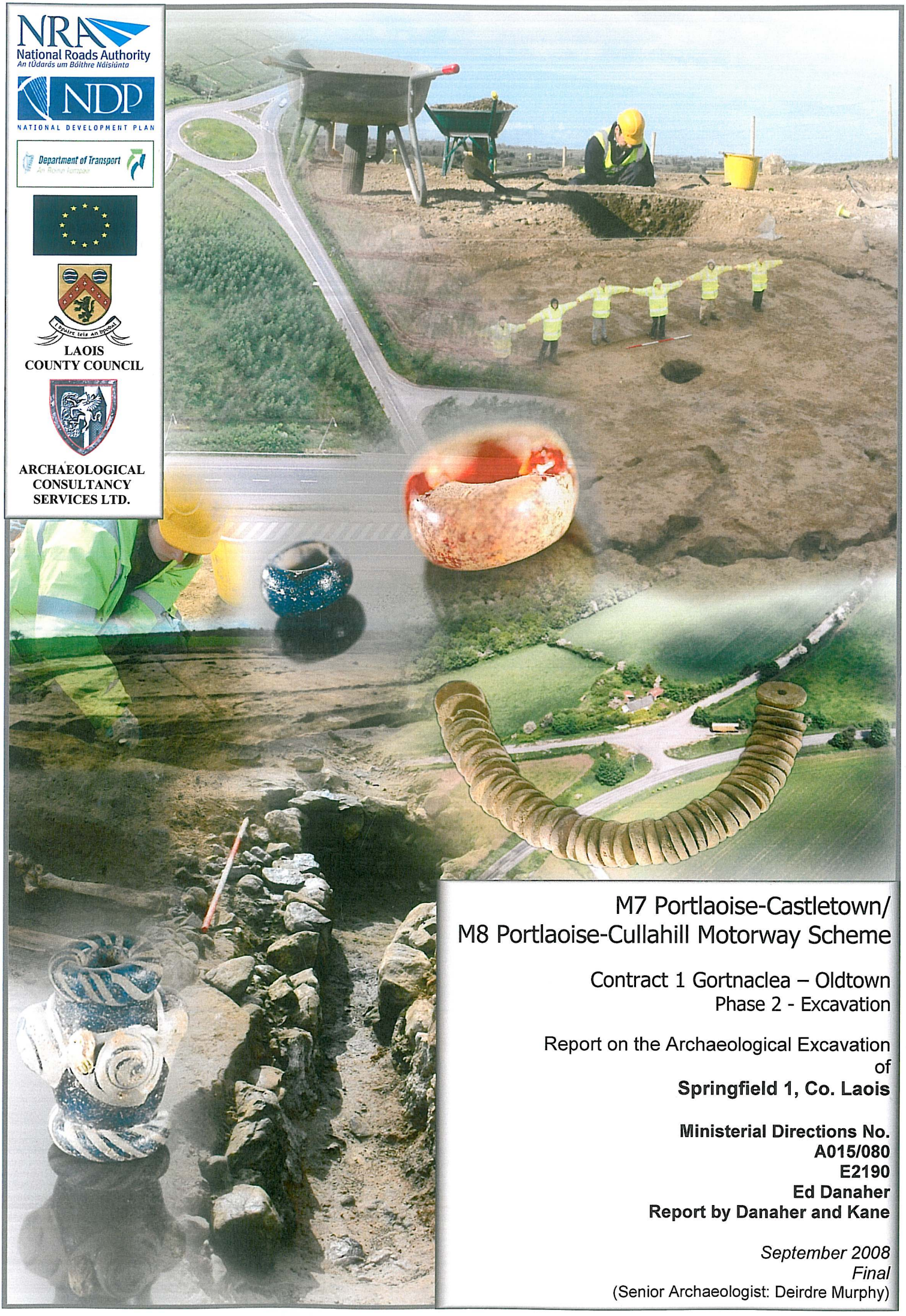

National Roads Authority
An tÚdarás um Bóithre Náisiúnta

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
Springfield 1, Co. Laois

Ministerial Directions No.
A015/080
E2190
Ed Danaher
Report by Danaher and Kane

September 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	Springfield 1
Townland	Springfield
Nat. Grid Ref.	234388, 183687
OS Map Ref.	OS 6 inch sheet 29
Chainage	21800
Scheme No.	A015/080
Record No.	E2190
Archaeologist	Ed Danaher
Senior Archaeologist	Deirdre Murphy
Report Type	Final
Report Status	Final
Report by	Danaher with Kane & McQuillan
Date of Submission	September 2008
Distribution	Elspeth Logan & Mary Deevy

ACKNOWLEDGEMENTS

This report has been prepared by Archaeological Consultancy Services Ltd on behalf of Laois County Council, Kildare National Roads Design Office (NRDO), and the National Roads Authority (NRA).

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.

Consulting Engineers – ARUP Consulting Engineers

Project Engineer – Mike Evans
Engineer – Gráinne Wolfe

Kildare County Council, National Roads Design Office

Senior Executive Engineer – Adrian King
Project Archaeologist – Sylvia Desmond
Engineer – Damian McGinnity

Laois County Council

Executive Engineer-Brenda Cuddy
Liaison – Sarah Dunne

National Monuments, Department of the Environment, Heritage and Local Government

Chief Archaeologist – Brian Duffy
Archaeologist – Martin Reid

Irish Antiquities Division, National Museum Of Ireland

Keeper - Nessa O Connor
Assistant Keeper – Isabella Mulhall

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 Springfield, 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. 20 trenches were excavated within this field and a number of pits and linear features were identified. The site was designated Springfield 1.

Archaeological resolution of Springfield 1 (A015/080) was carried out on 3rd December 2005 by Ed Danaher of Archaeological Consultancy Services Ltd. For recording purposes, the site was designated the scheme no A015/080 and record no. E2190. Topsoil stripping revealed a hearth dating to the Late Neolithic period and the partial remains of a possible palisade enclosure of Late Bronze Age date, part of which truncated a section of a circular hut. A number of probable early modern cultivation furrows were also identified. No artefacts were recovered.

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10. Appendices

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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 Springfield 1, Contract 1, County Laois (Ordnance Survey six-inch sheet 29, National Grid Co-ordinates 234388, 183687; Figures 1–2). Springfield 1 was located at Chainage 21800 adjacent to the existing R434 road running from Aghaboe to Ballacolla and *c.*2.3km to the south of Gortnagroagh 1. The site was located on the eastern side of this road in an area of relatively flat land. The ground slopes to a hill to the southeast of the site at Dairyhill. To the north of the site, the ground slopes down to lower lying land past Coolfin and into Ballycuddahy and Cross where the tributary of the River Gully forks. One of these forks runs past Springfield *c.*250m to the northeast.

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 2005 under ministerial direction number A015/013. 20 trenches were excavated within this field and some potential archaeology was identified. The site was designated Springfield 1.

1.4 Date and Duration of Excavation Works

Topsoil stripping of the site began on the 25th November 2005, excavation commenced 3rd December 2005 and all site works were completed by 16th December 2005.

1.5 Size and Composition of the Excavation Team

The excavation team was composed of:

One director
One supervisor
Two archaeological assistants
Five general operatives

2. RECEIVING ENVIRONMENT

2.1 Detailed Overview of the receiving environment (Information provided by Amy McQuillan)

2.1.1 Topographic

Springfield was located adjacent to the existing R434 road running from Aghaboe to Ballacolla and *c.*2.3km to the south of Gortnagroagh 1. The site was located on the eastern side of this road in an area of relatively flat land. The ground slopes to a hill to the southeast of the site at Dairyhill. To the north of the site, the ground slopes down to lower lying land past Coolfin and into Ballycuddahy and Cross where the tributary of the River Gully forks. One of these forks runs past Springfield *c.*250m to the northeast. 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). Springfield 1 was located close to the Cuffsborough 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, adjacent to Springfield, 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, to the southeast of Springfield, 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 Springfield prior to recent excavations we do not know the exact (scientific) nature of this activity or where it was located. A hillfort situated *c.*3.5km to the northeast of Springfield 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, *c.*1.5km to the north of Springfield) 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 to the north of Springfield, 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 Springfield 1 will address the following topics:

(i) The absolute/relative chronology of site use in terms of periods, levels, phases, sequences and events
(ii) The extent of the archaeological site/activity
(iii) The location and distribution of known contemporary sites in the local, regional and national (and international, if appropriate) context.
(iv) The nature and composition of the archaeological finds, features, layers and deposits on site.
(v) The phases of activity on site

(vi) The nature and phases of construction, use, repair and abandonment of the site.

(vii) Why the site location would have been chosen

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

(ix) 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 3rd December 2005 under Ministerial Direction Number A015/080. 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. E2190:3:1 represents find number 1 within feature number 3 in Springfield 1, which was excavated under record number E2190. 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 Topsoil

F002 Natural Subsoil

F003 Fill of F004

F004 Cut of curvilinear slot trench/ditch filled with F003, associated with F010& F014. Truncated F028

F005 Fill of F006

F006 Cut of cultivation furrow filled with F005

F007 Fill of F008

F008 Cut of possible field drain filled with F007

F009 Fill of F010

F010 Cut of curvilinear slot trench/ditch filled with F009, associated with F004 & F014.

F011 Non archaeological

F012 Non archaeological

F013 Fill of F014

F014 Cut of curvilinear slot trench filled with F013, probably associated with F004 & F010

F015 Fill of F016

F016 Cut of cultivation furrow filled with F015

F017 Fill of F018

F018 Cut of cultivation furrow filled with F017

F019 Fill of F020

F020 Cut of cultivation furrow filled with F019

F021 Fill of F022

F022 Cut of cultivation furrow filled with F021

F023 Fill of F024

F024 Cut of cultivation furrow filled with F023

F025 Fill of F026

F026 Cut of cultivation furrow filled with F025

F027 Fill of F028

F028 Cut of pen-annular structure/slot trench filled with F027, truncated by F004

F029 Primary fill of F030

F030 Cut of hearth filled with F029, F033

F031 Fill of F032

F032 Cut of cultivation furrow filled with F031

F033 Secondary fill of F030

4.2.2 Stratigraphic Matrix

Natural Deposit

F001	Topsoil: Consisted of brown, silty clay. No finds recorded.
F002	Natural subsoil: Consisted of mottled orange, sandy clay.

Late Neolithic period

Hearth (See Fig. 8)

F030	Cut of sub-oval possible hearth pit. Measured 1.25m x 0.80m x 0.19m. Orientated east-west. Had a gradual break of slope, concave sides, and a gradual break of slope leading to an undulating base. Filled with F029, F033. Above F002, below F029.
F029	Primary fill of F030, with firm, dark greyish-brown, sandy clay. Frequent charcoal and occasional small burnt stones included. Radiocarbon date: Cal BC 2870-2570 (See Section 4.5). Measured 0.94m x 0.60m x 0.11m. One soil sample taken (1). Above F030, below F033.
F033	Secondary fill of F030, with soft, light grey-brown, clayey sand. Recorded as a grey ashy layer. Occasional charcoal included. Measured 0.50m x 0.65m x 0.09m. No finds or samples taken. Above F029, below F001.

Date undetermined; but dates to or before the late Bronze Age

Pen-annular structure/Slot trench (See Fig.8)

F028	Cut of pen-annular structure/slot trench. Measured *c.*3m (diameter) x 0.10m x 0.11m. Orientated north-south. Had a sharp break of slope at top, near vertical sides that tapered to a V-shaped/pointed base. Truncated by F004. Possible circular hut denoted by a relatively deep narrow slot trench that may have housed a wattle/wicker panel(s) which would have supported the main structural wall of this structure. Filled with F027. Truncated by F004. Above F003, below F027.
F027	Fill of F028, with loose, mid-dark brown, silty clay. Occasional decayed stones and animal bone (Cattle cranium and teeth) included (see Appendix 10.2). Measured *c.*3m

	(diameter) x 0.10m x 0.11m. Similar fill to F003, F009, F013. No finds recorded. One soil and animal bone sample taken (4). Above F028, below F004, F003 and F001.

Late Bronze Age

Curvilinear slot trench/Possible enclosing feature (See Fig.8)

F004	Cut of curvilinear feature/ditch. Measured *c.*8.10m x 0.42m x 0.21m. Orientated north-south. Had a sharp break of slope at top, vertical sides that tapered to a moderately V-shaped base. Possible support for split plank palisade or may have acted as a defining boundary ditch that did not contain any timbers. Interestingly, if this did act as a bedding trench for a timber palisade few if any packing stones were evident suggesting that they were removed either deliberately or through agricultural processes; alternatively, and most plausibly, packing stones were never present. This feature was heavily truncated by agricultural activities. Associated with F010 and possibly F014. Filled with F003. Truncated F27 & F028. Above F027, F028 and F002, below F003.
F003	Fill of F004, with moderately compacted, dark brown-black, silty clay. Frequent charcoal flecks, and occasional medium-large sized and decayed stone included. Measured *c.*8.10m x 0.42m x 0.21m. Similar fill to F009, F013, F027. No finds recorded. One soil and charcoal sample taken (2). Above F004, F27 and F028.

Curvilinear slot trench/Possible enclosing feature (See Fig.8)

F010	Cut of curvilinear feature/ditch. Measured 5.50m x 0.40m x 0.24m. Orientated northeast-southwest. Had a sharp break of slope at top, concave to vertical sides that tapered to a rounded base. Possible support for split plank palisade or may have acted as a defining boundary ditch that did not contain any timbers. Interestingly, if this did act as a bedding trench for a timber palisade few if any packing stones were evident suggesting that they were removed either deliberately or through agricultural processes; alternatively, and most plausibly, packing stones were never present. This feature was heavily truncated by agricultural activities. Associated with F004 and possibly F014. Filled with F009. Above F002, below F009.
F009	Fill of F010, with loose, dark brown-black, silty clay. A moderate amount of charcoal (Oak and Alder/Hazel) and medium-large sized stones included (See Appendix 10.1).

	Radiocarbon date: Cal BC 1130-910 (See Appendix 10.3). Measured 5.50m x 0.40m x 0.24m. Similar fill to F003, F013, F027. No finds recorded. One soil and charcoal sample taken (3). Above F010, below F001.

Curvilinear feature (See Fig.8)

F014	Cut of curvilinear feature/ditch. Measured 2.42m x 0.32m x 0.12m. Orientated northeast-southwest. Had a sharp break of slope at top, concave sides, and a gradual break of slope at base leading to an uneven base. This trench segment was narrower than both F010 and F004, while it was located within the space that these latter features enclosed. Unfortunately only a small segment of this feature was exposed, while it may have performed a different function to F010 and F004, rather than being the bedding trench for a timber fence this feature may be the remains of a foundation trench of a building, though from the evidence at hand this is difficult to ascertain. Unfortunately as with other features on site F014 was heavily truncated by agricultural activities, particularly to the south where the slot trench was completely destroyed. Possibly associated with F004 and F010, Filled with F013. Above F002, below F013.
F013	Fill of F014, with firm, mid-brown, clayey silt. Occasional charcoal and small stones included. Measured 2.42m x 0.32m x 0.12m. Similar fill to F003, F009, F027. No finds or samples taken. Above F014, below F001.

Modern period

Possible field drain (See Fig.8)

F008	Cut of possible linear field drain. Measured *c.*2m x 0.40m x 0.09m. Orientated northeast-southwest. Had a gradual break of slope at top, gently sloping sides leading to a rounded base. Perpendicular to all other recorded furrows. Alternatively if this feature is not the remains of a field drain it may be evidence of a second ploughing regime in this area, though no other furrows/features with the same alignment were discovered to support this. Filled with F007. Above F002, below F007.
F007	Fill of F008, with loose, dark brown, silty clay. Occasional charcoal and small-medium sized stones included. Measured *c.*2m x 0.40m x 0.09m. No finds or samples taken. Above F008, below F001.

Cultivation furrow 1 (See Fig.8)

F006	Cut of linear furrow. Measured *c.*14m x 0.28m x 0.15m. Orientated northwest-southeast. Had a moderate to sharp break of slope at top, concave sides that lead to a rounded base. Filled with F005. Above F002, below F005.
F005	Fill of F006, with soft, dark brown, silty sand (very sterile fill). Occasional small stones included. Measured *c.*14m x 0.28m x 0.15m. No finds or samples taken. Above F006, below F001.

Cultivation furrow 2 (See Fig.8)

F016	Cut of linear furrow. Measured 8m (min.) x 0.52m x 0.12m. Orientated northwest-southeast. Had a gradual break of slope at top, concave sides that lead to a rounded base. Filled with F015. Above F002, below F015.
F015	Fill of F016, with soft, mid- dark brown, silty sand. Occasional small stones and animal bone (Dog teeth) included (See Appendix 10.2). Measured 8m (min.) x 0.52m x 0.12m. No finds recorded. One animal bone sample taken. Above F016, below F001.

Cultivation furrow 3 (See Fig.8)

F018	Cut of linear furrow. Measured 11m (min.) x 0.42m x 0.11m. Orientated northwest-southeast. Had a gradual break of slope, concave sides that lead to a rounded base. Filled with F017. Above F002, below F017.
F017	Fill of F003, with soft, dark brown, silty clay (very sterile fill). Occasional small stones included. Measured 11m (min.) x 0.42m x 0.11m. No finds or samples taken. Above F018, below F001.

Cultivation furrow 4 (See Fig.8)

F020	Cut of linear furrow. Measured 22m (min. with a small gap in the middle) x 0.40m x 0.035m. Orientated northwest-southeast. Had a gradual break of slope at top, concave sides that lead to a rounded base. Filled with F019. Above F002, below F019.
F019	Fill of F020, with soft, mid-dark brown, silty sand. Occasional small stones included.

	Measured 22m (min. with a small gap in the middle) x 0.40m x 0.035m. No finds or samples taken. Above F020, below F001.

Cultivation furrow 5 (See Fig.8)

F022	Cut of linear furrow. Measured 12m x 0.57m x 0.13m. Orientated northwest-southeast. Had a gradual break of slope at top, concave sides that lead to a rounded base. Filled with F021. Above F002, below F021.
F021	Fill of F022, with soft, dark brown, silty sand. Occasional small stones included. Measured 12m x 0.57m x 0.13m. No finds or samples taken. Above F022, below F001.

Cultivation furrow 6 (See Fig.8)

F024	Cut of linear furrow. Measured 12m x 0.49m x 0.11m. Orientated northwest-southeast. Had a gradual break of slope at top, concave sides that lead to a rounded base. Filled with F023. Above F002, below F023.
F023	Fill of F024, with soft, mid-dark brown, silty clay. Occasional stones included. Measured 12m x 0.49m x 0.11m. No finds or samples taken. Above F024, below F001.

Cultivation furrow 7 (See Fig.8)

F026	Cut of linear furrow. Measured 19m x 0.50m x 0.10m. Orientated northwest-southeast. Had a gradual break of slope at top, concave sides that lead to a rounded base. Filled with F025. Above F002, below F025.
F025	Fill of F026, with soft, mid-dark brown, silty sand. Occasional small decayed stones included. Measured 19m x 0.50m x 0.10m. No finds or samples taken. Above F026, below F001.

Cultivation furrow 8 (See Fig.8)

F032	Cut of linear furrow. Measured 12m x 0.56m x 0.10m. Orientated northwest-southeast. Had a gradual break of slope at top, concave sides that lead to a rounded base. Filled with F031. Above F002, below F031.

F031	Fill of F032, with soft, mid-dark brown, silty sand. Occasional small stones included. Measured 12m x 0.56m x 0.10m. No finds or samples taken. Above F032, below F001.

4.2.3 Stratigraphic Sequencing

Table … Stratigraphic Groups		
Site Name: Springfield 1		**Record No.:E2290**
Period	**Phase**	**Composition**
I	1	Formation of subsoil
II	1	Late Neolithic period: Hearth F030
III	1	Bronze Age: Construction of structure F028
IV	1	Late Bronze Age: Construction of palisade trench
V	1	Early modern period: cultivation features
V	2	Modern period: Formation of current topsoil

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

Period 1

Formation of subsoil

Period 2 Late Neolithic period

Phase 1 (See Fig.8)

A sub-oval shaped hearth, F030 (1.25m x 0.80m x 0.20m) was situated *c.*0.50m east of curvilinear trench F010 and *c.*11m south of circular structure F028. It comprised a bowl shaped cut filled with two deposits (F029, F033) of greyish-brown, sand and clay containing charcoal and burnt stones (particularly in the primary fill), it also included a large, half-rounded stone comprising a flat top at its western edge. A grey, ashy layer was also recorded in the secondary fill, indicating burning activity. Interestingly, the base did not appear to have been oxidised. Charcoal from the primary fill F029 returned a date of Cal BC 2870-2570 (Beta 218629) (See Section 4.5).

Period 3 Date undetermined; but either pertains to or before the late Bronze Age

Phase 1 (See Fig.8)

A circular hut, the remains of which consisted of a pen-annular slot trench F028 measured *c.*3m (diameter) x 0.10m x 0.11m. This structure was truncated by possible palisade trench F004 along its western extent. A probable entrance was located to the southwest of this structure and

comprised an un-dug causeway of *c.*0.90m within the slot trench. This slot trench would have housed the main structural walls of this building, which were likely to consist of panels of wicker work or wattle and daub. These walls were also likely to have supported a light/flimsy roof that would have also been constructed of organic material. The fill of this slot trench was a very sterile deposit consisting of mid-dark brown silty clay (F027), which contained only occasional decayed stones. Cattle cranium and teeth were recovered from this deposit (See Appendix 10.2). No datable or diagnostic material was recovered from this structure.

Period 4 Late Bronze Age: Construction of palisade trench

Phase 1 (See Fig.8)

Removal of the topsoil at this location revealed what may have been the remains of a sub-rectangular/oval enclosure. This consisted of three curvilinear slot trenches/ditches F004, F010 and F014 (2.42-8.10m x 0.32-0.42m x 0.12-0.24m). The former two may have delineated sections of the outer boundary of this enclosure while F014 may represent the part remains of an internal building or an internal division. A radiocarbon date from a sample of Oak and Alder/Hazel charcoal of Cal BC 1130-910 was recovered from the fill of F010 (F009) (See Appendices 10.1 & 10.3). An un-dug causeway of *c.*3m separated F004 and F010. Heavy truncation to the west and southwest of the site would have destroyed any associated features, while it also makes the interpretation of the identified features more difficult. The identified trenches varied in length and depth with profiles varying from 'U' to 'V' shaped, while each was filled with deposits of mid-dark brown silt and clay, they also contained varying amounts of charcoal and moderate quantities of stones.

As mentioned above, both F004 and F010 may have been the remains of bedding trenches for a timber palisade/fence or alternatively may have acted as a defining boundary ditch that did not contain any timbers. Interestingly, if both of these features did function as bedding trenches for a timber palisade, few if any packing stones were evident. Using the recorded depths of the bedding trenches, this would suggest that the structure would have been quite flimsy, alternatively, and more likely, it may also indicate that for the timber palisade to be more robust the bedding trenches would originally have been much deeper and what was identified on site was a much truncated version of the original trenches.

Period 5 Early Modern period

Phase 1

Agricultural features (Fig. 8)

Prior to the excavation of the site, this field was used for tillage. Eight parallel-running

cultivation/plough furrows, F005, F015-F026, F032 (8-12m x 0.28-0.57m x 0.035-0.15m) and one possible field drain, F008 (*c.*2m x 0.40m x 0.09m) were revealed following the removal of topsoil. Each sterile deposit comprised brown, silty sand or clay.

4.2.4 Stratigraphic Discussion

The excavations at Springfield 1 exposed the presence of at least three and potentially four phases of activity, the Late Neolithic, the late Bronze Age and early modern periods. These were represented by a hearth, a small circular hut truncated by a palisaded enclosure, and early modern cultivation furrows (See Fig.8). A technical description of each feature can be found in the matrix and sequencing above. The Late Neolithic period is indicated by a single hearth/pit F030 which was situated to the south of the site, *c.*0.50m east of F010 (See Fig.8). This shallow pit contained two deposits of grey-brown, sand and clay with varying amounts of charcoal. The primary fill, F029 also included burnt stones but had no evidence of oxidised clay (the presence of which is consistently recorded in hearth-like features). Charcoal from this fill returned a date of Cal BC 2870-2570 (Beta 218629) (See Section 4.5). A grey ash layer was recorded however in the secondary fill, F033 indicating some form of burning activity. This hearth provides evidence of domestic occupation but with the lack of further recordable evidence, it is difficult to determine the full extent of this activity. With no date being provided for the circular hut F028, it is feasible that these features may have been related, bearing in mind that this latter feature predated the palisade trench F004.

F028 is likely to be the remains of a small circular hut with an internal diameter of *c.*3m. A pen-annular narrow slot trench with a V-shaped profile denoted the outer wall and with no internal posts identified would suggest that if this hut was roofed than this outer wall would also have to be load bearing. A *c.*0.90m gap within the slot trench signified the entranceway (See Fig.8). With such a small internal space, this structure was unlikely to have functioned as a permanent dwelling but would have been suitable as a temporary/seasonal hut/shelter. It may have also functioned as a store or agricultural outhouse, the main dwelling occurring outside the lands made available (LMA). There are numerous manifestations of this type of ephemeral structure evident throughout the Irish archaeological record, some of which will be outlined below.

The partial remains of a sub-rectangular/oval shaped enclosure, originally defined by a timber palisade/fence, were also discovered at this location. This consisted of three curvilinear slot trenches/ditches F004, F010 and F014 (2.42-8.10m x 0.32-0.42m x 0.12-0.24m). The former two segments may have delineated sections of the outer boundary of this enclosure while F014 may

represent the part remains of an internal building or alternatively an internal division. Oak and Alder/Hazel was recorded from a sample of charcoal within the fill of F010 (F009) (See Appendix 10.1). A radiocarbon date of Cal BC 1130-910 was also retrieved from this sample (See Appendix 10.3). An un-dug causeway of *c.*3m separated palisaded trench segments F004 and F010. Heavy truncation to the west and southwest of the site destroyed any associated features, investigation of similar features at other sites suggest that these features may have been associated with domestic activity. This will be explored in greater detail below.

4.2.5 Stratigraphic Conclusion

Through the various stages of archaeological investigation a large fenced enclosure, a smaller structure, a single hearth and a group of cultivation furrows were all recorded highlighting possible periodic domestic and agricultural activity at this location, spanning the late Neolithic through to the late Bronze age to the early modern period. The possible hearth, the small circular hut and the potential palisaded enclosure all suggest sporadic prehistoric domesticity. Despite this evidence, there is a marked scarcity of material culture and further structural evidence limiting our understanding of the site.

4.3 Artefactual evidence

4.3.1

No artefacts were recovered.

4.4 Environmental Evidence

4.4.1 Wood identification/Charcoal analysis

See Appendix 10.1

Table: Charcoal sampled for Wood identification					
Site Name: Springfield 1				Record No.: 05E2190 - A015/080	
Context number	Sample number	Feature type	Date obtained	Sample type	Analysis results
F009	1	Enclosure fill	Cal BC 1130-910 LBA	Charcoal	Oak and Alder/Hazel,

4.4.2 Animal bone analysis

See Appendix 10.2

Table: Animal bone samples sent for analysis					
Site Name: Springfield 1				Record No.: 05E2190 - A015/080	
Context number	Sample number	Feature type	Sample vol (litres)	Sample type	Analysis results
F027	4	Pen-annular slot trench	-	Bone and teeth	Cattle
F015	1	Cultivation furrow	-	Bone	Dog

4.5 Dating Evidence

Two radiocarbon dates were retrieved for this site suggesting that it was a multi-period site. The earlier date pertained to the Late Neolithic period while the second derived from the late Bronze Age. Charcoal from F029, the primary fill of hearth F030, produced a date of Cal BC 2870-2570 (BETA 218629). Charcoal from F009, the fill of slot trench F010, produced a date of Cal BC 1130-910 ((SUERC 17594): Appendix 10.3) from a sample of Oak and Alder/Hazel.

5. DISCUSSION (Information by Ed Danaher and Amy McQuillan)

The late Neolithic hearth pit: A small shallow pit tentatively interpreted as a hearth represents the late Neolithic activity on site. This feature contained the residual ash which was generated by fire. Despite this, an unusual aspect of this hearth was the absence of oxidation due to burning. This may be attributed to the general geology of the area and the predominantly sandy substrata on top of which the hearth would have been constructed. While this appears to be an isolated feature it may well have been associated with the circular hut located close by.

The circular structure: The narrow pen-annular slot trench F028, which was cut by possible palisade segment F004, appears to have held a light wall of wickerwork, wattle or planking. In order to support a roof, these would need to have been load bearing as no internal roof supports were present. Structures consisting of single pen-annular slot trenches with no internal roof supports are becoming increasingly numerous in the Irish archaeological record (Doody 2000 & 2007). The exact nature of the roofing of these structures is unclear though a few hypotheses have been offered which will be outlined below. Small pen-annular slot trenched structures of a similar

size and shape to F028 at Springfield 1 have been excavated in Ireland. At Lahesseragh Co. Tipperary, the excavation of a small pen-annular foundation trench measuring 3.3m x 3.7m in diameter was interpreted as the slot trench of a Bronze Age house. This slot trench ranged in depth from 0.05-0.20m and an entrance was detected to the northeast (O'Brien 1998). This is similar in dimensions and form to F028 at Springfield 1; however, unlike Springfield 1 some sporadically placed postholes were excavated under a habitation later in the interior of the Lahesseragh structure and these may represent roof supports. Small slot trench structures were excavated at Curraghatoor, Co. Tipperary. Hut 3 at this site was similar to F028 from Springfield 1 as it consisted of a penannular slot trench measuring 3m in diameter. The slot trench comprising Hut 3 measured 0.3m in width and 0.2m in depth. This structure differed from F028 in that there were four irregularly placed postholes within the slot trench. There was no evidence for the placement of posts within the narrow trench at Springfield 1, although it is possible that narrow stakes were used and that they left no trace. The others huts at this site had postholes in the slot trenches and Hut 2 even had a central posthole (Doody 2007, 21).

A narrow, shallow slot trench defined an oval shaped structure within enclosure 1 at Ballybrowney 1 Co. Cork. This structure was located within a palisaded enclosure (discussed below) while three other structures of different morphology were located externally to these enclosures. This structure was, however, larger than F028 and it also exhibited evidence for two central postholes (Cotter 2005, 40). At Colp West, Co. Meath, a small circular slot trench measuring 3m x 3.8m with vertical sides and a flat base was excavated. This feature was dated to the Middle Bronze Age and was interpreted as a possible hut. It was noted however, that the lack of internal features could indicate that it was not a domestic dwelling (Murphy & Clarke 2001). This structure was very similar in form and size to F028 at Springfield 1 and was also lacking postholes in the slot trench or in the interior. However, the slot trench at Colp West measured c. 0.4m in average width, while the structure at Springfield 1 measured only 0.1m in width. There was also no discernable entrance gap in the Colp West trench in contrast to the southwest facing entrance to F028. Iron Age examples are known from both Magheraboy, Co. Sligo and Ballinaspig More 5, Co. Cork. At Magheraboy a small circular building, *c.*4m in diameter, defined by a pen-annular foundation trench with a possible north-eastern entrance was discovered in 2001. The base of the trench was lined with charred split oak planks; radiocarbon analysis of charcoal from one of these returned a date of 370–30 Cal BC (Beta-186485) but there were no associated finds. While its function is uncertain, it is likely that it would have comprised a light timber frame covered either by hides or thatch. This building would have been adequate as a store, shelter or hut. At Ballinaspig More 5, Ballincollig, Co. Cork, structure 3 was roughly circular with a diameter of less than 3.5m. The foundations were defined by a small slot-trench that held split oak

planks and four, possibly associated, post-holes. Radiocarbon analysis of a sample of the oak plank returned a date of 790–390 Cal BC (Danaher 2007). In terms of morphology, comparisons can be made with these two sites and hut structures of the late Bronze Age, many of which contained footing trenches and were of similar dimensions (Doody 2000).

Based on the above examples, it seems plausible, that the slot trench F028 once held a small roofed structure. A light covering may have been placed over the upright palisaded wall and the building may have served as a temporary hut or a storage building associated with agricultural activity. The roof may have resembled an upturned basket, achieved when the uprights supporting the wicker walls were bent at the top and tied into a basket like formation. This would have an appearance similar to Doody's reconstruction of structure 10 at Chancellorsland, Co. Tipperary. While the Chancellorsland structure had a central post, such anchorage may not have been required if the structure was only 3m in diameter (Doody 2000). Considering the diameter of the Springfield structure and nature of the slot trenches, deep and narrow, the lack of postholes or stakeholes in either the slot trench or in the interior of the structure should in no way preclude the interpretation of this structure as a roofed hut. If the structure was unroofed it is difficult to see how it would have functioned, its use as an animal pit would have been limited by its small size and possibly un-gated entrance, while it is somewhat elaborate to be a wind shelter.

The Late Bronze Age enclosure: The excavations at Springfield 1 revealed the truncated remains of what was once possibly a sub-rectangular enclosure, two segments of this outer palisade survived while a segment of an internal slot trench of unknown function was also discovered. These truncated slot trenches appear to have acted as trenches for narrow palisade fences. The lack of any cultural remains or diagnostic features from this site makes interpretation difficult, but it is likely that this area was probably enclosed with a sub-rectangular palisade fence in the Late Bronze Age. It has been noted that in Late Bronze Age Ireland, there was an organised and more permanent expansion in the farmed landscape with a possible emphasis on cattle (Cooney & Grogan 1999, 155). This is indicated by pollen data; evidence for long term land clearance and also by the establishment of Late Bronze Age field walls for the control of animals at places like Valentia Island, Co. Kerry (ibid). The segregation and enclosure of land for agricultural purposes probably became more common during the Late Bronze Age, coinciding with the increase in more permanent farming practices, as may be evident at Springfield 1. Palisaded enclosures were most likely not defensive features, as can be sometimes argued of extensive ditches surrounding sites. They most likely functioned as tools for the management of space, either in relation to the control and management of domestic animals or crops, or as a display of land ownership to others in surrounding areas. Erecting a palisade around an area would

have implied a restriction of access and a control of the enclosure by a particular person or group. Therefore, the creation of a palisaded enclosure at Springfield 1 could have both practical and social implications.

Palisaded enclosures were often used to define space at Bronze Age settlement sites and have been excavated at Cullyhanna Lough, Co. Armagh (Hodges 1958) and Clonfinlough, Co. Offaly (Moloney et al 1993), both of which revealed lakeside settlements consisting of roundhouse remains enclosed within a palisade. Three roundhouses were excavated in the interior of the enclosure at Clonfinlough, while only one structure and a windbreak screen were noted within the palisade at Cullyhanna Lough. Excavations at Curraghatoor, Co. Tipperary revealed a series of Bronze Age structures representing multi-phase domestic activity dating from the Neolithic to the end of the Bronze Age. A narrow palisade trench dating to the Late Bronze Age suggested that the site may have been enclosed during this time. Postholes and stakeholes in the base of the trench indicated that it probably held a post and wattle wall (Doody 2007, 34-35). While these examples were clearly settlement sites and not animal pens, they demonstrate the use of narrow palisaded walls to enclose space during the Bronze Age. Narrow slot trenched enclosures occurred at the Bronze Age settlement site of Ballybrowney Lower, Co. Cork. At this site, excavations revealed four enclosures and three external roundhouse structures. While enclosure 4 may date to the medieval period, the other enclosures were confidently assigned to the Bronze Age. Enclosure 2 was large in diameter and defined by a substantial ditch but enclosures 1 and 3 were smaller and were defined by narrow slot trenches thought to have held palisades of upright planks (Cotter 2005). Enclosure 2 was large in diameter and defined by a substantial ditch but enclosures 1 and 3 were smaller and were defined by narrow slot trenches thought to have held palisades of upright planks (Cotter 2005). Enclosure 1 was defined by a narrow trench measuring 0.35m wide and 0.3m depth and was hexagonal in shape. This enclosure had an oval structure at its centre.

Enclosure 3 was almost identical to enclosure 1 (Cotter 2005, 40). It is possible that these palisaded enclosures, particularly enclosure 3 which revealed no internal structures, acted as animal pens or crop enclosures (Cotter 2005, 43) and it is possible that the features excavated at Springfield 1 represent the remains of similar Bronze Age land enclosure. Another interesting comparison dating to the prehistoric period was excavated at Ballynattin, Co. Wicklow. Here, excavations revealed a rectangular enclosure measuring *c.*14m east-west x 8m. The enclosing slot trench measured from 0.34m to 0.44m in width and from 0.04m to 0.2m in depth. The enclosing slot trench measured from 0.34m to 0.44m in width and from 0.04m to 0.2m in depth. Fragments of wood in the ditch fill suggest that it may have held a post and wattle fence. Pottery and flint finds indicate a possible Bronze Age date (Cotter 1998). The enclosing elements at Ballynattin

were similar in form and dimensions to the possible rectangular enclosure at Springfield. The Ballynattin enclosure revealed no internal features or postholes. While the digging of enclosing ditches was a common method of land segregation in the Bronze Age, it appears that palisade fences were frequently used in the Bronze Age to enclose both settlement sites and agricultural land. At Caltragh Co. Sligo (McCabe 2005) a number of linear slot trenches were interpreted as plot divisions associated with three round houses of middle Bronze Age date. Like the trenches at Springfield these contained little or no stone packing within their fills. Recent excavations at Danesfort, Co. Kilkenny revealed that a probable Middle Bronze Age house was enclosed by a combination of a large curving section of ditch and a slot trench. These combined to form a pen-annular enclosure measuring 39m east–west by 32m north–south. The ditch enclosed the western, southern and northern sides while the slot-trench, 18.7m by 0.3m by 0.31m deep, completed the sub-circular enclosure on its eastern side and would have contained a wooden fence or palisade (Emma Devine pers. Comm.).

The lack of any internal features, with the exception of a small segment of slot trench which may represent an internal division rather than a house foundation, or cultural artefacts from Springfield 1 would suggest that the palisade here did not surround a settlement site, but a small animal enclosure or pen similar to enclosure 3 at Ballybrowney and the enclosure at Ballynattin. However, with only traces of this original site exposed and much of this heavily truncated by agricultural activities it is difficult to make this assertion with any degree of certainty. As mentioned above the remnants of one internal feature did survive though its original function is difficult to ascertain.

6. INTERPRETATION AND RECONSTRUCTION

At Springfield 1, periodic activity either domestic and/or agricultural took place from at least the late Neolithic to the early modern period. An isolated hearth pit may account for the earliest activity on site but it may also have been associated with a nearby circular, though undated, hut. In the late Bronze Age, the remains of foundation trenches for a timber fence may attest to the presence of a large animal enclosure. Likewise, these trenches may have enclosed a house, with any remnants of this latter feature long being destroyed. Following the decay/abandonment of these features, it is likely that this land was given over to agriculture and was most recently used for tillage. A tradition of tillage at this location is implied by the presence of cultivation furrows which probably date to the early modern period.

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 at both Springfield and Cuffsborough. Testing and subsequent excavation in this townland revealed three distinct areas of archaeological potential within relatively close proximity to one other. These comprised the remnants of a possible palisade enclosure along with a small pen-annular structure, a small hearth and a number of cultivation furrows (Springfield 1), a shallow pit filled with burnt mound material (Springfield 2) and six pits containing burnt mound material (Springfield 3).

The neighbouring townland of Cuffsborough was also an archaeologically rich area. Cuffsborough 2 was located 300-400m to the south of Springfield 1 and consisted of possible Bronze Age settlement and cremation activity. Further south, Cuffsborough 1 and 3 revealed burnt mound activity. The settlement at Cuffsborough 4 consisted of an Early-Middle Bronze Age 17m ring of large posts, which were interconnected by a narrow slot trench. These remains may represent different phases of activity and may actually have functioned as a timber ceremonial enclosure. Also present at this site was: an oval structure; a horse-shoe shaped structure and a C-shaped structure. There are records of a cist containing an Early Bronze Age crouched inhumation with a food vessel at Cuffsborough that has since been destroyed (Sweetman et al 1995, 5). Most of the archaeology recently excavated in this general area dates to the Bronze Age and it appears that this area was subject to continuous settlement and use during this period.

At Springfield 1, at least four phases of activity were uncovered, two of them dated through C14 analysis. The hearth would appear to be much earlier in date, Cal BC 2870 to 2570 (BETA 218629), than the surrounding palisade, Cal BC 1130 to 910 (SUERC 17594). It is evident from on-site stratigraphic associations that the small pen-annular structure truncated the palisade and is therefore more recent in date, but to what period it originated remains unknown. At Springfield 2, charcoal from the isolated pit was dated to Cal BC 1690 to 1510 (BETA 218616) while charcoal from one of six pits discovered at Springfield 3 returned a date of Cal BC 2870 to 2800 and Cal BC 2770 to 2460 (BETA 218622). As this was similar to the date of the hearth at Springfield 1, it would suggest that these two sites may have been contemporary.

8. CONCLUSION

This site contained the remnants of periodic domestic and agricultural activity spanning over four millennia, but with a number of these phases of activity being ephemeral in nature. It could be argued that neither the isolated hearth nor circular hut represents permanent settlement, while it can also be assumed that the palisaded enclosure is a more sedentary feature this may have lasted only a few generations. The discovery of these features implies that this site formed a small component of a larger prehistoric landscape at Springfield and Cuffsborough that spanned the late Neolithic to the Late Bronze Age. 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

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

Clarke, L. & Murphy, D. 2001a, *Excavation of a Multi-period Settlement site at Colp West, Co. Meath*, Unpublished Final Report.

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

Cotter, E. 1998, Ballynattin, Co. Wicklow, Prehistoric enclosure: http://www.excavations.ie/Pages/Details.php?Year=&County=Wicklow&id=1614

Cotter, E., 2005, Bronze Age Ballybrowney, Co. Cork, in O'Sullivan, J. and Stanley, M. *Recent Archaeological Discoveries on National Road Schemes 2004*, National Roads Authority, Dublin, 37-43

Danaher, E. (2007) *Monumental beginnings, the archaeology of the N4 Sligo Inner Relief Road*. NRA

Doody, M. 2000, Bronze Age houses in Ireland, in A. Desmond et al (Eds), *New Agendas in Irish Prehistory*. Bray, 135-60.

Doody, M. 2007a, The Excavation, in Doody, M. *Excavations at Curraghatoor, Co. Tipperary*, UCC (University College Cork), 9-35, Department of Archaeology Archaeological Monograph 2007, University College Cork, 9-35.

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.W.M., 1958, A Hunting Camp at Cullyhanna Lough, Near Newtown Hamilton, County Armagh, *Ulster journal of Archaeology* 21, 7-13.

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

McCabe, S. (2005) *Three middle Bronze Age round houses and associated features at Caltragh Co. Sligo*. Unpublished report prepared by ACS Ltd for the Department of the Environment Heritage and Local Government.

McQuillan, A. (2007), *Research report on recent archaeological excavations at Springfield 1 and Gortnagroagh 1, M7/M8, Co. Laois*, unpublished report prepared by ACS Ltd.

Moloney, A., Jennings, D., Keane, M. & MacDermott, C. 1993, *Excavations at Clonfinlough, Co.Offaly*, Irish Archaeological Wetland Unit Transactions 2, Dublin

O'Brien, R. 1998, Lahesseragh, Co. Tipperary (Site C), Prehistoric house: http://ww.excavations.ie/Pages/Details.php?Year=&County=Tipperary&id=1538

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

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

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

September 2008

10. APPENDICES

10.1 Appendix 1: Wood identification/Charcoal analysis report

Springfield 1, M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme, 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.

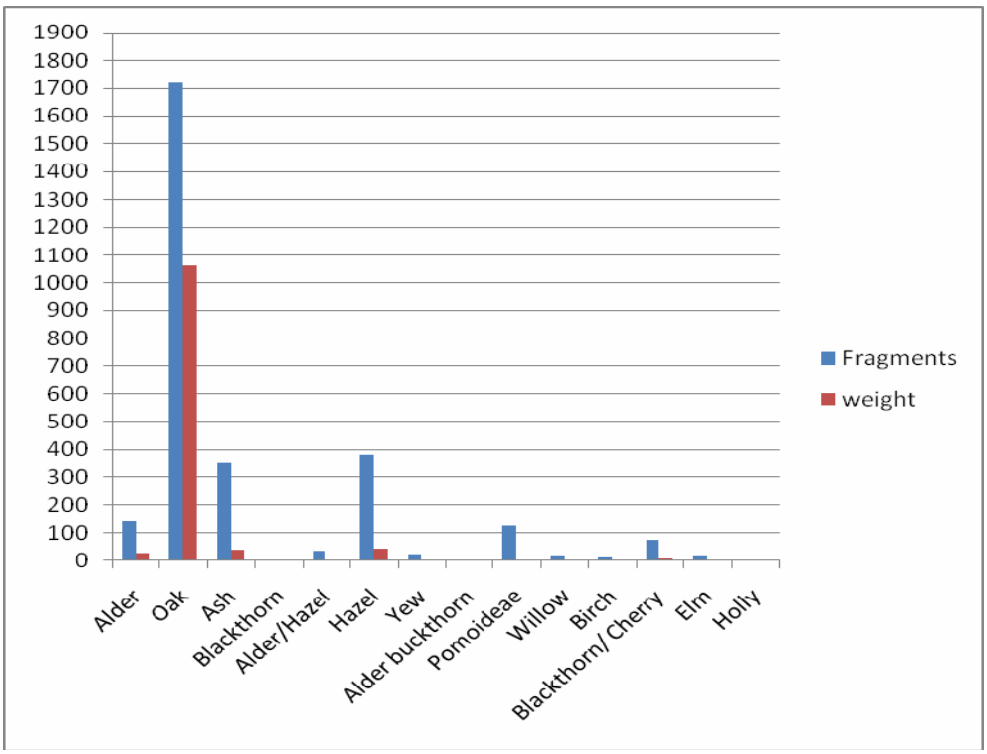
Woodworking terms and definitions

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 Springfield 1

Springfield 1, Fill of enclosure, Late Bronze Age

Table 1: Taxa present at Springfield 1

Site	E number	Feature type	Context	Sample no	Date	Identifications	Comment
Springfield 1	E2190	Enclosure fill	F009	3	1130BC-910BC LBA	Oak (0.9g, 35 f) Alder/Hazel (0.5g, 10f)	Tiny fragments

Oak and alder/hazel were identified from the fill of the enclosure dating to the Late Bronze Age.

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

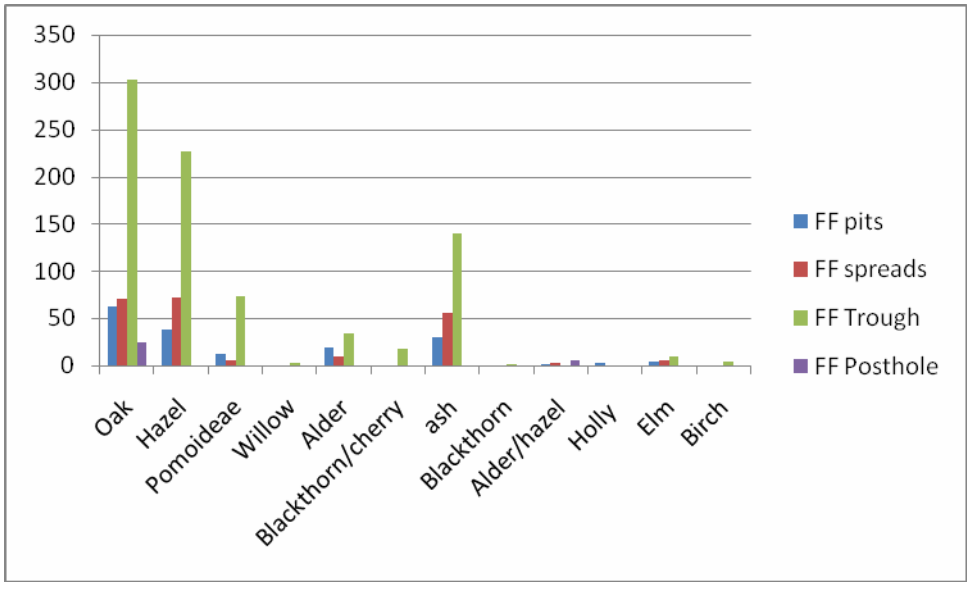
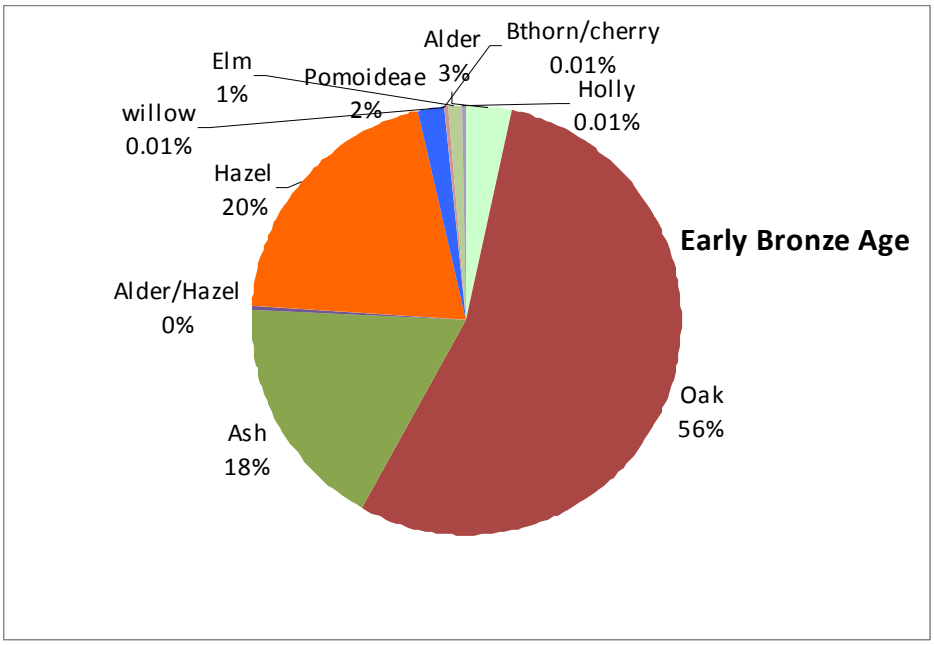


Figure 3: Taxa present in charcoal from the Early Bronze Age sites investigated



A total of thirteen sites were analysed which dated to the Early Bronze Age. These were Addergoole 1 and 2, Aghmacart 1. Ballycuddahy 1, Cannonswood 2, Cuffsborough 2 and 4, Curragh 1 and 2, Leap 2, Oldglass 2 and 3 and Tintore 1. These excavated sites were all related to *Fulacht* activity except **F169** from Cuffsborough 4 which is associated with a slot trench.

A total of ten taxa were identified from the Early Bronze Age sites. Oak, hazel and ash trees were present in most quantities from the samples analysed while lesser quantities of alder, pomoideae, elm, blackthorn/cherry, holly and willow were also present. The information indicates access to primary woodland areas which contained oak, ash and possible hazel scrub. The environment surrounding the sites in the Early Bronze Age appeared to be relatively dry as the main taxa identified are symptomatic of dryland conditions. Willow and alder, wetland taxa, were present in low quantities.

5. Summary and 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 analyzed 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.

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.

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.

All of the wood taxa identified from the excavations were of native origin. The wood and charcoal assemblage analyzed 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.

6. References

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.

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.

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

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

10.2 Appendix 2: Animal bone analysis report

05_09
M7 Portlaoise to Castletown /
M8 Portlaoise to Cullahill Motorway Scheme Project

Animal Bone Analysis Report from Springfield 1, Co. Laois

(A015/080, E2190)

July 2008

By Claudia Tommasino

1. Introduction

Springfield 1 was excavated as part of the M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme Project, taking place in November and December 2005 and revealing the presence of the slot foundation of an undefined circular structure of approximately 3m of diameter. The structure could have been light and fragile and appeared to be truncating a curvilinear slot trench. This last slot trench could have been the foundations of a palisaded enclosure, although no internal features were identified.

Radiocarbon dating taken from alder produced dates from 1130 to 910 BC (Oxcal Calibrated Dates. Suerc Laboratory. Glasgow, Scotland), placing the occupation of this site during the Bronze Age.

The animal bone assemblage from Springfield 1 included only two species cattle (*Bos Taurus*) and dog (*Canis familiaris*).

2. Methodology and analyses

2.1 Identification and quantification

The general methodology applied for the recording and analysis of this assemblage followed the one described by McCormick and Murray (2007). It seeks to prevent the overestimation of the assemblage proportion through a selective approach that would produce NISP (Number of Identifiable Specimens). Therefore, fragments were divided into three categories: 'countable', 'low grade' and 'non-countable'. Fragments where at least 50% of the diagnostic area is present would be countable. The criteria for countable fragments are as follows:

- Long bones and metapodials with one or both epiphyses or metaphyses present in at least 50%.
- Mandible if at least one of the teeth or alveolus of the dp4-P4/M3 row is present.
- Scapula whenever the glenoid articulation is present.
- Ulna if the olecranon process is present.
- Astragalus if the distal end is present.
- Calcaneum whenever the sustentaculum is present.

- Pelvis whenever the ischial or illial section of the acetablulum are present.
- Cranium only if the zygomatic arch or three or more teeth or alveolus of the dp4-P4/M3 row are present.
- Every loose tooth if occlussal surface is present.
- Axial carcass only axis and atlas (whenever more than 50% is present).
- Horn cores and antler if a complete transverse section is present.

On the other hand, 'non countable' elements are those which could provide some kind of important information relating pathology, taphonomy or bone work (like pig fibula) but less than 50% of the diagnostic zone is present. Ribs and vertebrae were considered as non countable, to keep track of the usage or waste patterns in the site, but were not included in the TNF or analyses.

Finally, fragments that did not fit into the aforementioned criteria were considered as 'low grade'. This also included pig and horse lateral metapodials, and carpals and tarsals (except carpal 3 and the scafocuboid).

'Countable' and 'non-countable' fragments were recorded in two different forms in one electronic database (in Microsoft Office Access 2003) including information such as: context, species, skeletal element, side, condition, state of fusion, taphonomy, pathology, measurements, ageing, dental wear and observations. The 'non-countable' form emphasized aspects including taphonomy, pathology and observations.

Skeletal element, species and laterality were assessed for 'countable' and 'non-countable' fragments according to the criteria reported by Schmidt (1972), Cornwall (1974), Hillson (1995), and Davis (1987). Skeletal elements are expressed in tables and figures by their abbreviation or codes, shown in Appendix table 1.

The TNF (Total Number of Fragments that encompass the assemblage) was quantified by NISP (Number of Identifiable Specimen) and MNI (Minimum Number of Individuals). The first was calculated as the total of fragments attributed to a specific taxon (Grayson, 1984; O'Connor, 2004; Reitz and Wing, 1999). MNI was calculated dividing each element found in pairs in the animal carcass by its laterality, not taking into account loose teeth. Then, MNI is the higher count of one of the elements, either the right or the left side (Grayson, 1984; O'Connor, 2004). NISP and MNI are calculated only with countable fragments.

2.2 Ageing

The age of the individuals were established by the epiphysial fusion and the dental development or wear stage.

The epiphysial fusion assessment was done using the categories of fused, unfused or fusing for metaphyses, epiphyses or metaphyses and epiphyses. Later on, Silver (1969) and Reitz and Wing (1999) provided the information for assigning chronological age to these individuals.

The eruption and tooth wear were recorded using the method described by Grant (1982) for cattle and pigs and Payne (1973; 1987) for sheep. Consequently, Higham wear stages were assigned only for mandibles and mandibular loose M3 (except when in eruption or not in wear) (Higham, 1967).

2.3 Sex determination

One method for assessing sex was considered for one species. The measurement of the distal breath of metacarpals was used for cattle following the criteria explained by McCormick (1997).

2.4 Taphonomy

The recognition of any taphonomic factors such as gnawing, burning and butchery marks in the bones was dealt with mostly according to Lyman (1994).

Gnawing was classified according to the agent that produced it: carnivore, rodent or/and insect. Burning was assessed by three categories: singed or partially burnt, calcined and burnt/blackened (whenever 90-100% of the bone was affected). Finally, butchery marks were assessed as: sawn, chopped and/or cut.

2.5 Pathology

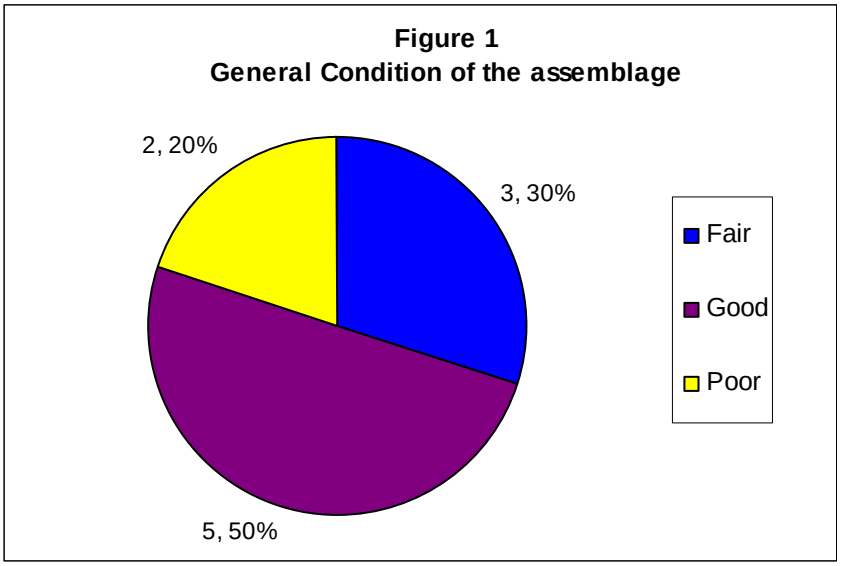
If observed, pathological modifications were recorded in detail and assessed by their effects on the bones, using the criteria of Baker and Brothwell (1980), Fox (1939), Baker (1970) and Siegel (1976).

2.6 Measurements and osteometry

Whenever possible, fused specimens were measured following Von Den Driesch (1976), Payne and Bull (1988) and Davis (1992).

3. Analyses and results

3.1 Summary of findings: Assemblage Overview



Although only integrated by 10 TNF, most fragments of animal bone were found in good condition.

Only two features from Springfield 1 contained animal bone remains with representation of just two species: cattle and dog. Table 1 details the quantification of the TNF from this animal bone assemblage.

Quantification	Cattle	Dog
TNF	7	3
NISP	4	3
MNI	1	1

Table 1. Quantification of animal bones found in Springfield 1 by TNF, NISP and MNI

3.2 Cattle

The cattle assemblage was found in F27 and was encompassed by 7 fragments that constituted 4 NISP and 1 MNI. Only one postcranial element is present in the cattle assemblage, while 6 of the TNF are teeth. Table 2 details the cattle elements that constitute this assemblage.

Species	Element	Side	Specimen
Cattle	LMT	L	1
	LMT	L	1
	LMT	R	1
	LMT	R	
	MN	R	
	RA	L	1

Table 2. TNF and NISP of cattle from Springfield 1.

Three teeth were identified as belonging to the same specimen allowing the assessment of the mandible wear stage according to Higham (1967). This specimen was determined to be over 50 months of age.

Element	Tooth	P4	M1	M3	Higham MWS	Estimated age in months
LMT	Canine	-	-	-	-	-
LMT	Premolar 3	-	-	-	-	-
LMT	Molar 3	-	-	j		-
LMT	Molar 2	-	K	-	23	Over 50 months
LMT	Premolar 4	g	-	-		-

Table 3. Details of Tooth Wear Stages (Grant, 1982) and Mandible Wear Stages (Higham, 1967) for cattle specimen from F27.

Sex could not be determined from any fragment of cattle from this assemblage. Furthermore, no taphonomic or pathological modifications were observable in any of these fragments.

Only two measurements could be taken from the radius specimen of cattle from the assemblage found in F27.

Element	Bp	BpP
RA	66.4	64.4

Table 4. Details of measurements (in mm.) by skeletal elements for cattle following Von Den Driesch (1976), Payne and Bull (1988).

3.3 Dog

Three fragments of dog were found in F15 and none of them could be identified as belonging to the same specimen. Therefore, the dog assemblage is quantified as 3 NISP and 1 MNI. Table 5 shows the elements and laterality of these dog specimens.

Species	Element	Side	NISP
Dog	LMT	R	1
	MPU	U	1
	RA	L	1

Table 5. NISP of dog from Springfield 1.

The assessment of the fusion stages of postcranial elements in dogs suggests that one specimen is at least 8-10 months of age, while the second specimen possibly died before its 11-12 months of age (Silver, 1969).

Fusion in Dog	Skeletal Elements/Zones	Age in months	No. Fused	No. Unfused
Early Fusing	MP distal	8-10 months	1	0
	Total Early Fusing		**1**	**0**
Middle Fusing	RA prox	11-12 months	0	1
	Total Early Fusing		**0**	**1**

Table 6. NISP of fused (fused and fusing) and unfused dog classified under early, middle or late-fusing stages following Silver (1969).

No assessment of sex can be carried out in the dog assemblage. No taphonomic modifications were observable in any dog remains from Springfield 1, while no pathologies seem to have affected any of the specimens. No measurements could be taken in any of the dog specimens found in F15 from Springfield 1.

4. Comparisons

Due to the small size of the animal assemblage from Springfield 1 no major comparisons could be done with other Bronze Age sites. Nonetheless, the presence of cattle and dog in Bronze Age Ireland is reported by McCormick and Murray (2007) with the first species being dominant over any other species, used probably for a varied range of uses such as milk, meat and labour. Dogs are found frequently although their role in the animal husbandry does not seem to be relevant and evident suggest were only rarely consumed (McCormick and Murray, 2007).

5. Conclusions

The small size of the assemblage did not allow the identification of a definite husbandry pattern in Springfield 1 or any major comparisons with other Bronze Age archaeological sites from Ireland. Nonetheless, it seems possible to suggest that cattle were probably exploited for secondary uses mainly, due to the advanced age of the specimen found in F27. Maybe milk consumption and the use of cattle for labour were more important than the consumption of its meat. The role of dog is also extremely difficult to assess but it seems that dog meat was not consumed at Springfield 1.

6. Recommendations

Further archaeological studies with contextual approaches could complement the few interpretations drawn from the animal bone assemblage from Springfield 1.

Therefore, the author as the bone specialist suggests that countable and non-countable animal bones should be kept in case more contextual information is obtained for the site, allowing further analyses. The assemblage should be stored under methods approved by National Museum of Ireland that would guarantee low-acid conditions to ensure its preservation. The ‘low grade’ fragments could be discarded. Nevertheless, the

final decision should be made by the National Museum of Ireland in agreement with the licence holder.

Bibliography

1. Baker, J. R. 1970. The differential diagnosis of bone disease. In: **Research problems in zooarchaeology**. D. R. Brothwell, K. D. Thomas and J. Clutlon-Brook (eds.). London: Institute of Archaeology.
2. Baker, J. R. and D. Brothwell. 1980. **Animal Diseases in Archaeology**. New York: Academic Press.
3. Cornwall, I. W. 1974. **Bones for the archaeologists**. London: JM Dent & Sons LTD.
4. Davis, S. 1987. **The archaeology of animals**. London: BT Batsford LTD.
5. Davis, S. 1992. A rapid method for recording information about mammal bones from archaeological sites. In: **Ancient Monuments Laboratory Research Report 19/92**. London: English Heritage.
6. Fox, H. 1939. Chronic arthritis in wild mammals. In **Transactions of the American Philosophical Society**. XXXI, part II. Philadelphia: The American Philosophical Society.
7. Grant, A. 1982. The use of tooth wear as a guide to the age of domestic ungulates. In **Ageing and sexing animal bones from archaeological sites**, Wilson, B; C. Grigson and S. Payne (eds.), pp. 91-108. Oxford: British Series 109.
8. Grayson, D. 1984. **Quantitative Zooarchaeology.** Washington: Academic Press Inc.
9. Higham, C. 1967. Stockrearing as a cultural factor in prehistoric Europe. In: **Proceedings of the prehistoric society**. 33, pp. 84-106.
10. Hillson, S. 1995. **Mammal bones and teeth**. London: UCL.
11. Lyman, R. 1994 **Vertebrate Taphonomy**. Cambridge: Cambridge Manuals in Archaeology.
12. McCormick, F. 1992. Early Faunal Evidence for Dairying. In: **Oxford Journal of Archaeology**. 11 (2), pp. 201-210.
13. McCormick, F. 1997. The animal bones. In: **Late Viking Age and Medieval Waterford Excavations 1986-1992**, Hurley, M.; O. Scully and S. McCutcheon (eds.), 819-853. Waterford: Waterford Corporation.
14. McCormick, F. and E. Murray. 2007. **Knowth and the Zooarchaeology of Early Christian Ireland**. Dublin: Royal Irish Academy.

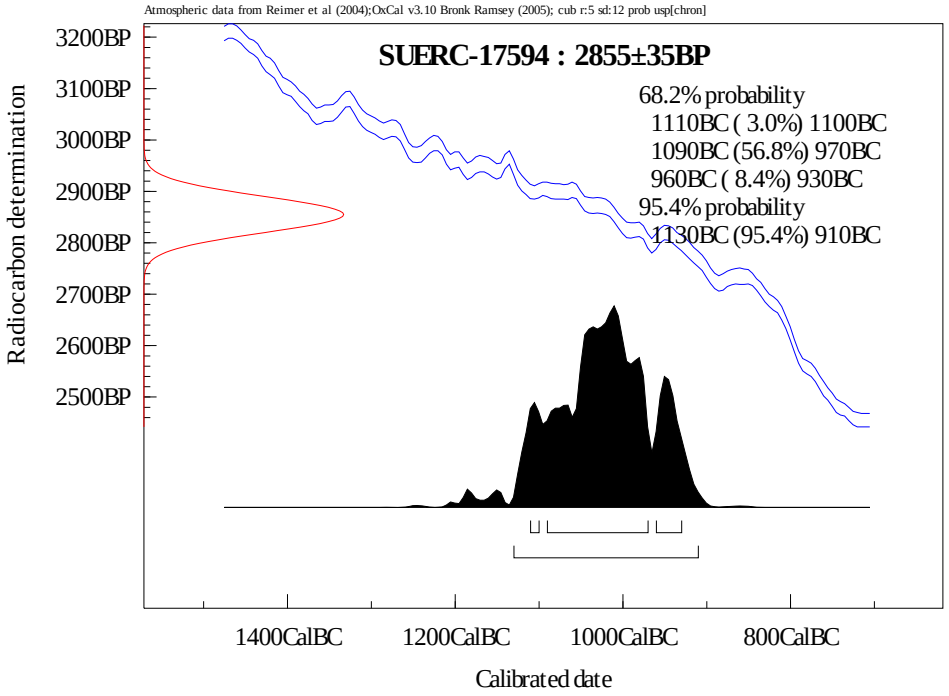
15. O'Connor, T. 2004. **The archaeology of animal bones**. Great Britain: Sutton Publishing Limited.
16. Payne, S. 1973. Kill off patterns in sheep and goats: the mandible from Asvan Kale. In: **Anatolian Studies**. 23, pp. 281-303.
17. Payne, S. 1987. Reference codes for wear states in the mandibular cheek teeth of sheep and goats. In: **Journal of Archaeological Science**. 14, pp. 609-614.
18. Payne, S. and G. Bull. 1988. Components of variation in measurements to distinguish wild from domestic pig remains. In: **Archaeozoologica**. II (1-2), pp. 27-66.
19. Reitz, E. and E. Wing. 1999. **Zooarchaeology**. Cambridge: Cambridge University Press.
20. Schmidt, E. 1972. **Atlas of animal bones**. London: Elsevier Publishing Company.
21. Siegel, J. 1976. Animal Paleopathology: possibilities and problems. **Journal of Archaeological Science**. 3, pp. 349-384.
22. Silver, I. 1969. The aging of domestic animals. In **Science in Archaeology**, D. R. Brothwell and E. S. Higgs (eds.), pp. 283-302. London: Thames & Hudson.
23. Von Den Driesch, A. 1976. **A guide to the measurements of animal bones from archaeological sites**. USA: Peabody Museum Bulletins, Harvard University, Peabody Museum of Archaeology and Ethnology.

Appendix

Appendix Table 1. Skeletal elements and their abbreviation

Abbreviation	Element
AN	Antler
AS	Astragalus
CA	Calcaneus
CR	Cranium
FE	Femur
HC	Horn Core
HU	Humerus
LMT	Loose Mandibular Tooth
LT	Loose tooth
LXT	Loose Maxillary Tooth
MC1	Metacarpal 1
MC2	Metacarpal 2
MC3	Metacarpal 3
MC4	Metacarpal 4
MC5	Metacarpal 5
MCU	Metacarpal Unidentified
MN	Mandible
MPU	Metapodial Unidentified
MT1	Metatarsal 1
MT2	Metatarsal 2
MT3	Metatarsal 3
MT4	Metatarsal 4
MT5	Metatarsal 5
MTU	Metatarsal Unidentified
NC	Coracoid
PA	Patella
PE	Pelvis
PH1	Phalange 1
PH2	Phalange 2
PH3	Phalange 3
RA	Radius
SC	Scapula
SCU	Scafocuboid
TI	Tibia
UL	Ulna
VC1	Atlas
VC2	Axis

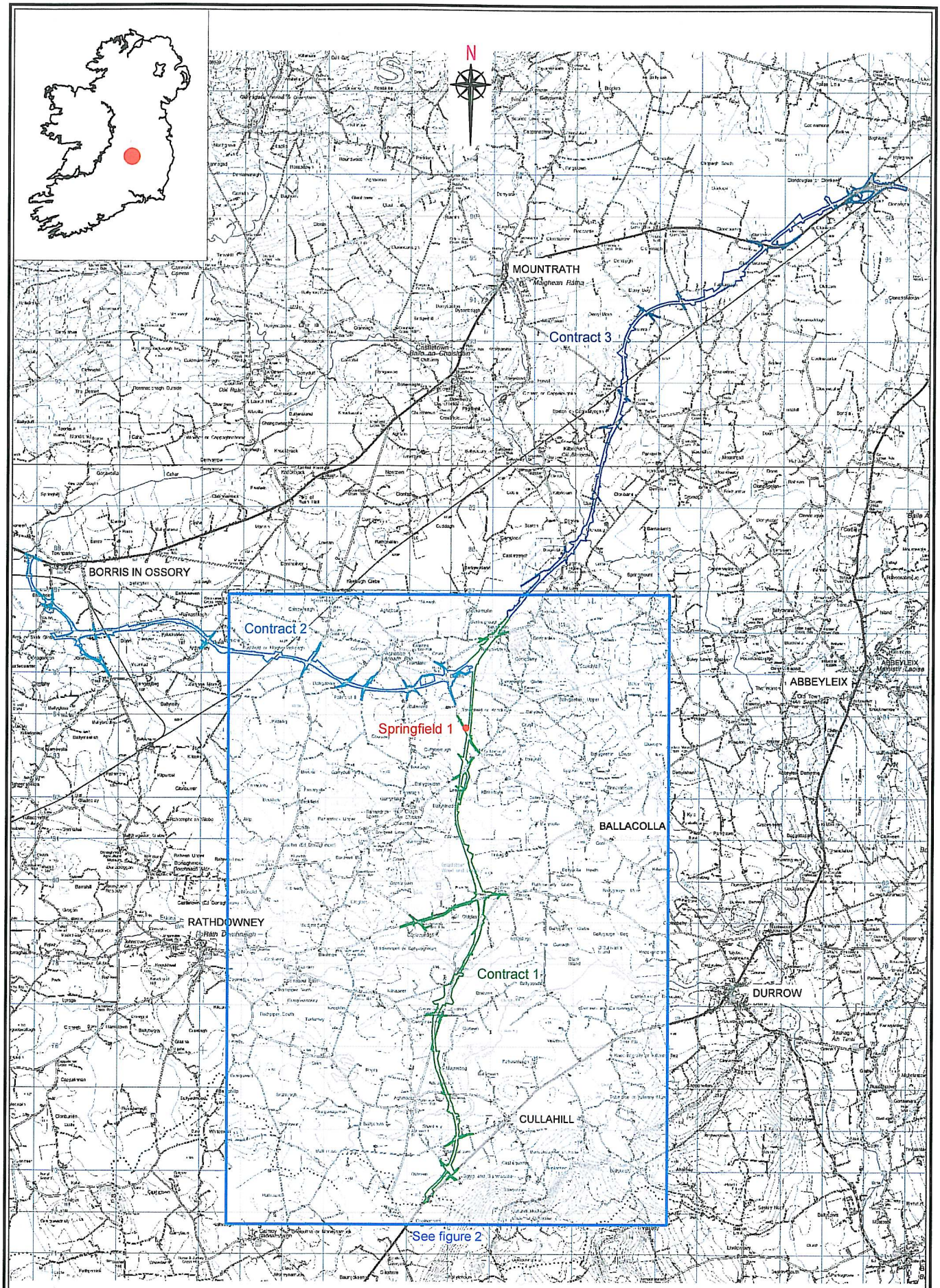
10.3 Appendix 3: Radiocarbon dating analysis report



GU No.	Reporting Number	Sample Type	Site	Sample Id	Species Dated	d13C	Age % Modern	Ageerror 1 sigma
16158	17594	Charcoal	Springfield 1	Springfield 1:E2190:F9:S3	Alder	-26.3	2855	35

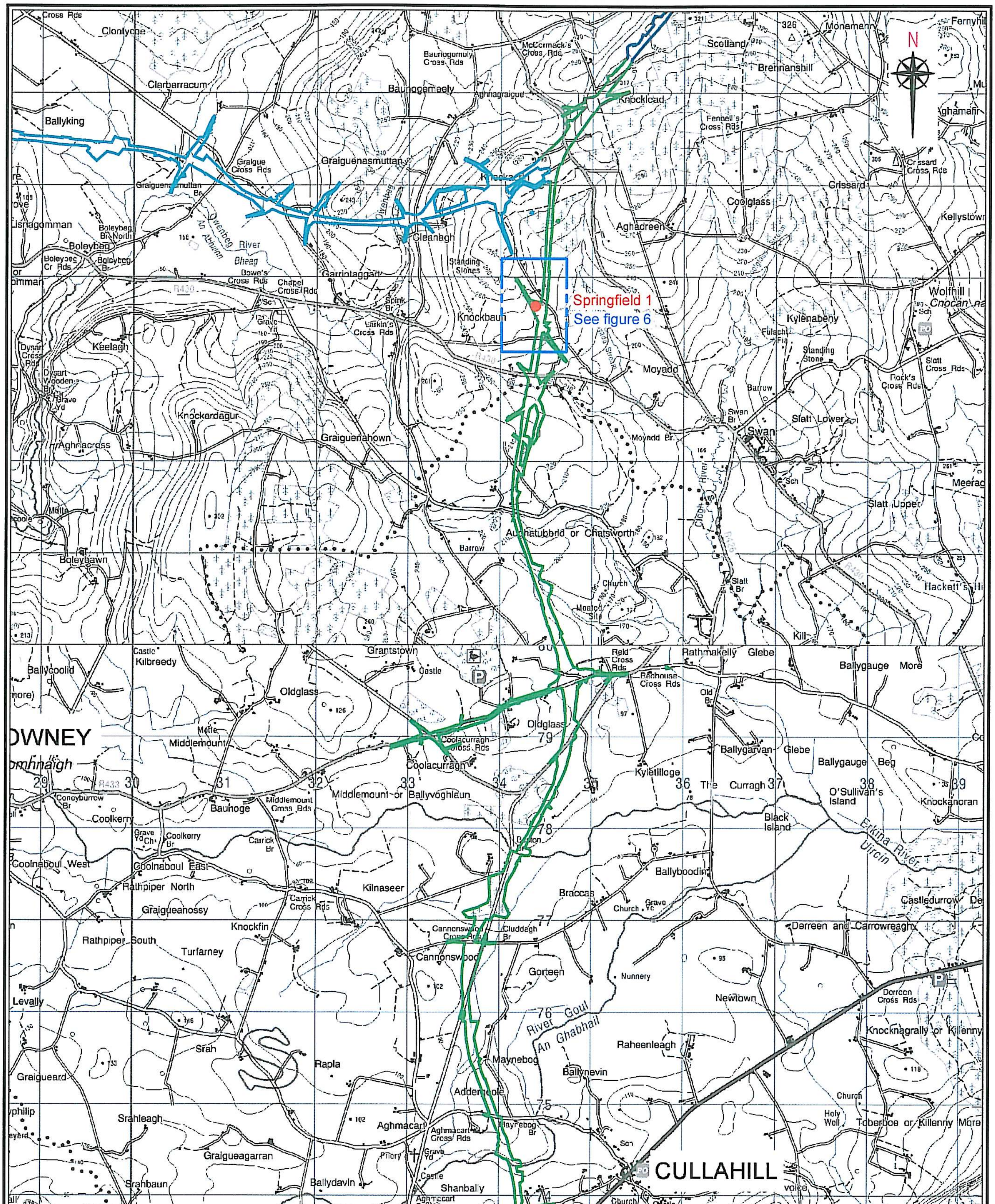
10.4 Appendix 4: Archive contents

Table …. Site Archive (Basic) Summary			
Site Name: Springfield 1		Record No.: E2190	
Type	Description	Quantity	Notes
Contexts	Validated contexts from excavation	33	All contexts sheets have been checked and cross-referenced.
Plans	'A2' 1:50 (no. of sheets)	9	Pre-ex plan, post-ex plan.
Sections	'A2' 1:10 (no. of sheets)	6	Including profiles
Photographs		46	Colour Print film x 2
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.



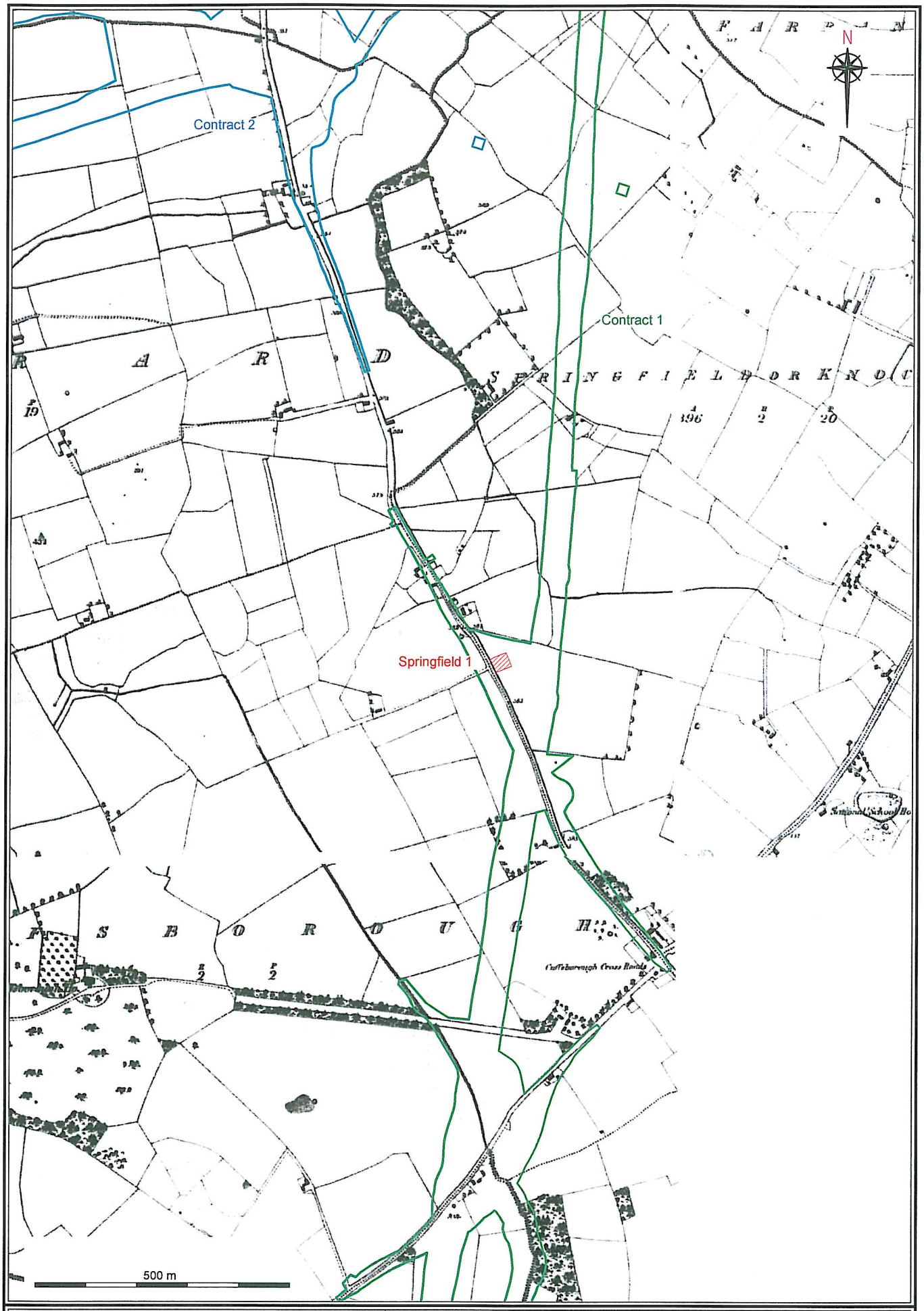
Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme, Co. Laois; Contract 1, Springfield 1	Scale: 1: 125,000 A4
		Date: Sept '08
	Issued for: Archaeological excavation report	Origin: ACS Ltd
	Client: Laois County Council	Drawing no.: 05_09_C7629

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



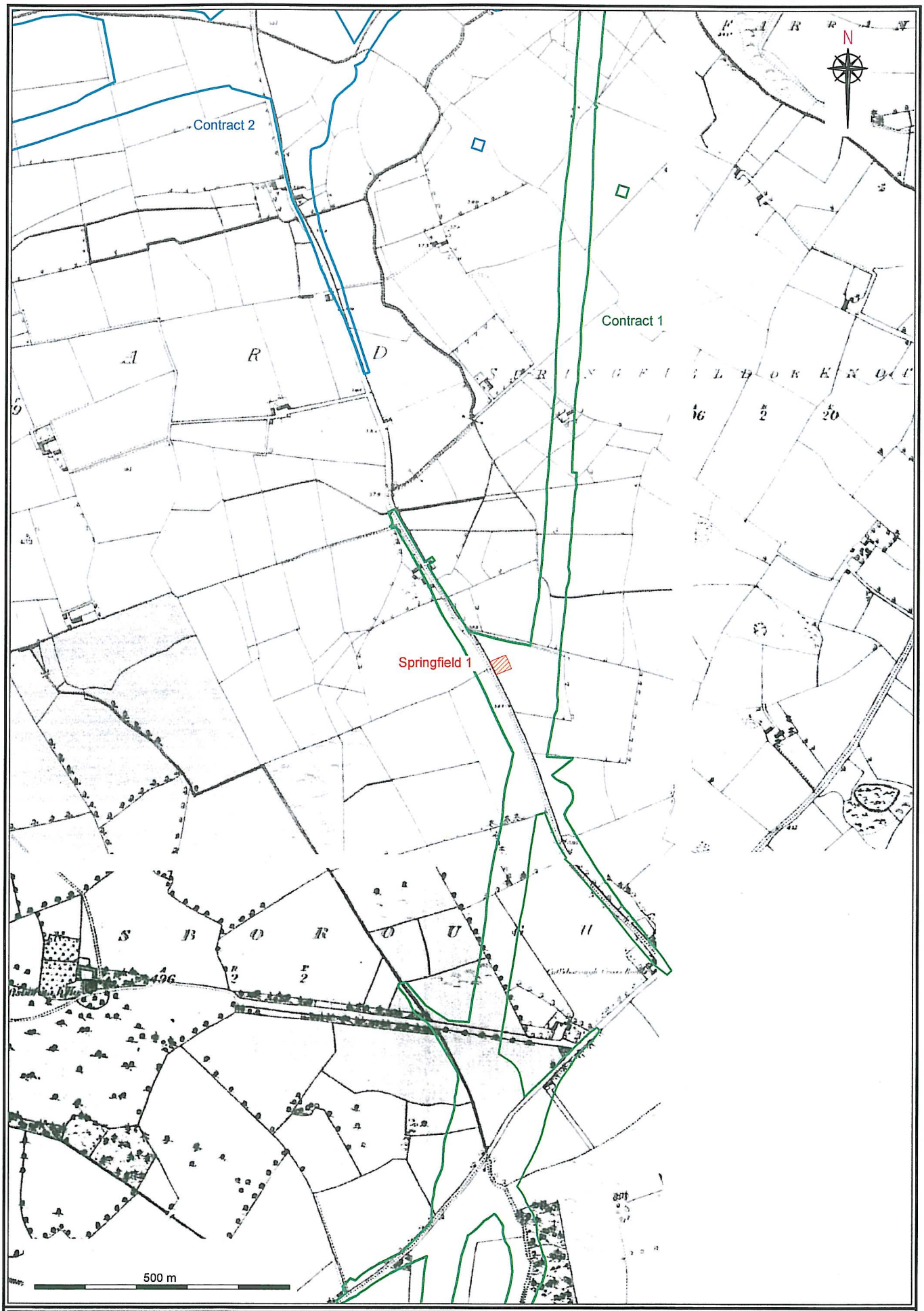
Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme, Co. Laois; Contract 1, Springfield 1	Scale: 1: 60,000 A4
		Date: Sept '08
	Issued for: Archaeological excavation report	Origin: ACS Ltd
	Client: Laois County Council	Drawing no.: 05_09_C7630

Figure 2: Location of Contract 1 showing Springfield 1



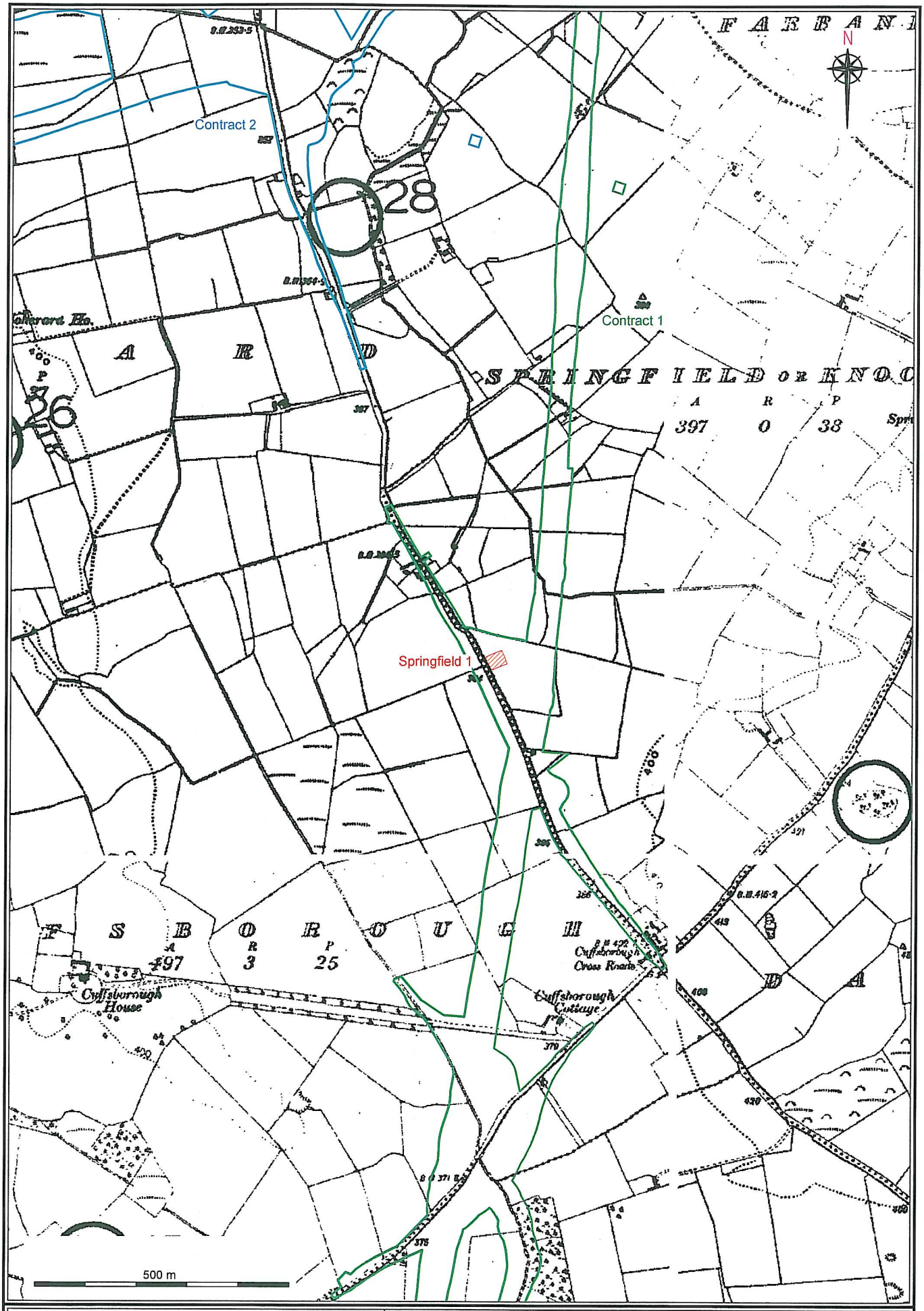
Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme, Co. Laois; Contract 1, Springfield 1	Scale: 1: 10,000 A4
		Date: Sept '08
	Issued for: Archaeological excavation report	Origin: OSi Laois 1st Ed. (1839)
	Client: Laois County Council	Drawing no.: 05_09_C7631

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



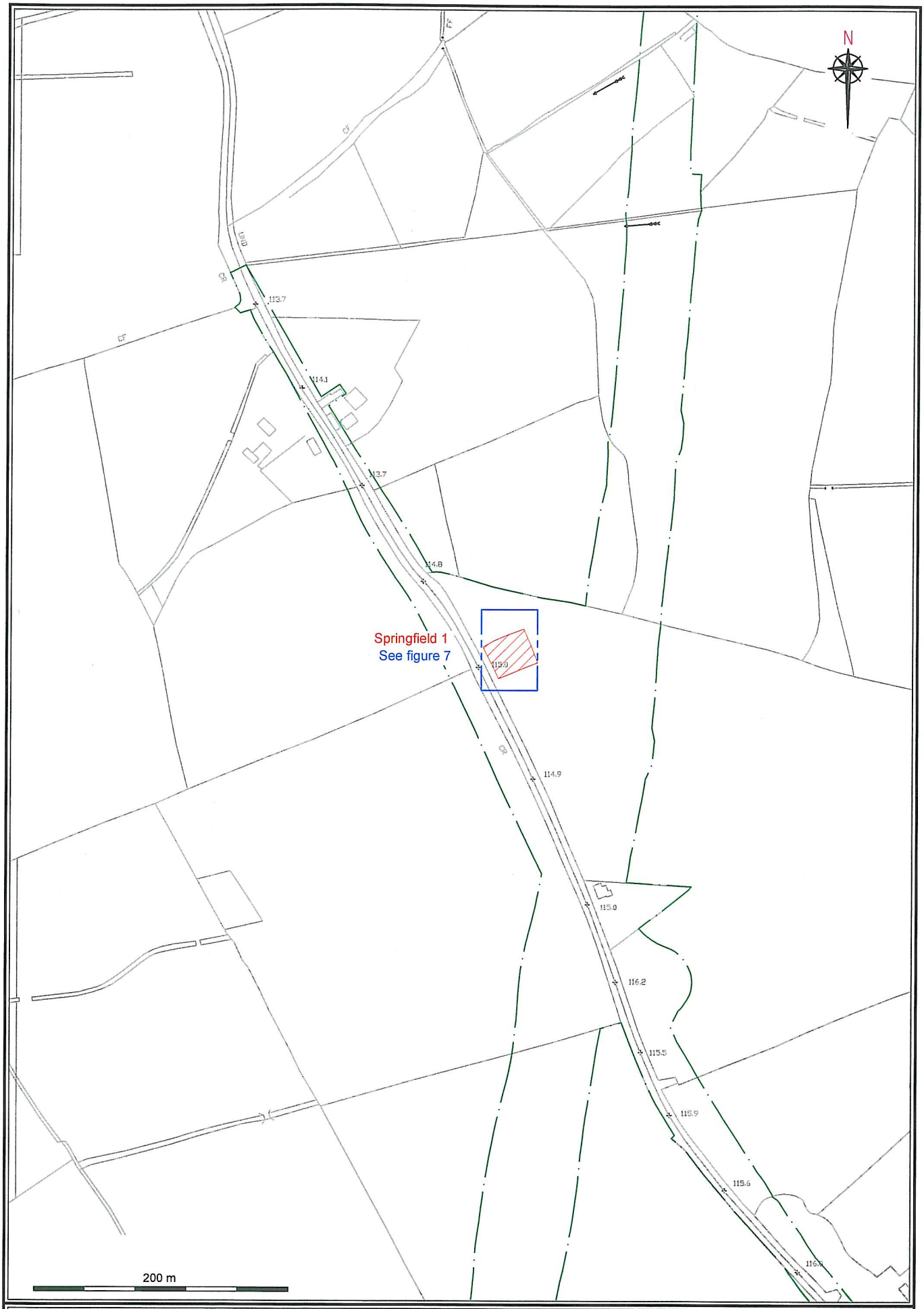
Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme, Co. Laois; Contract 1, Springfield 1	Scale: 1: 10,000 A4
		Date: Sept '08
	Issued for: Archaeological excavation report	Origin: OSi Laois 2nd Ed. (1889-91)
	Client: Laois County Council	Drawing no.: 05_09_C7632

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



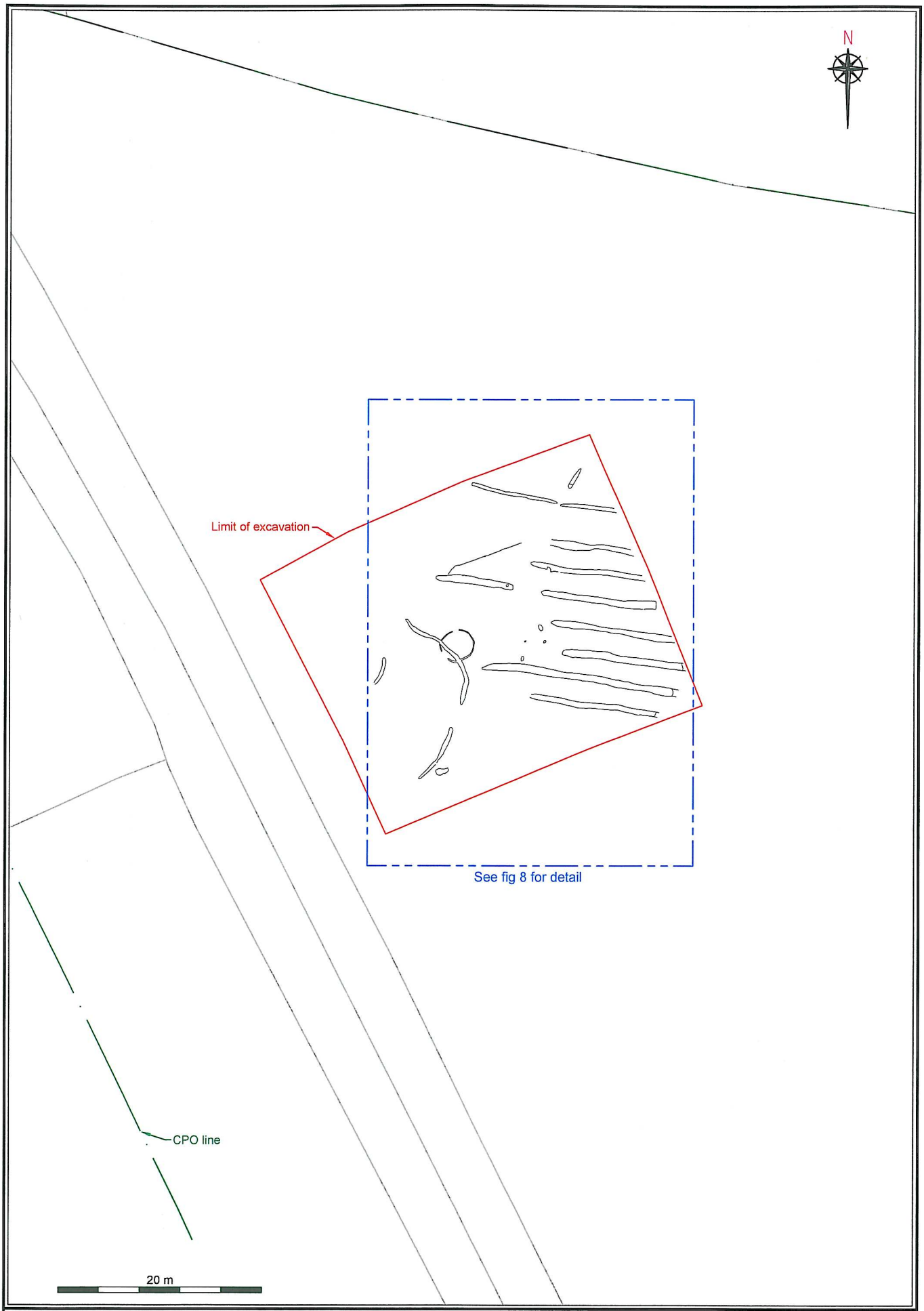
Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme, Co. Laois; Contract 1, Springfield 1	Scale: 1: 10,000 A4
		Date: Sept '08
	Issued for: Archaeological excavation report	Origin: OSi Laois SMR 1909
	Client: Laois County Council	Drawing no.: 05_09_C7633

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



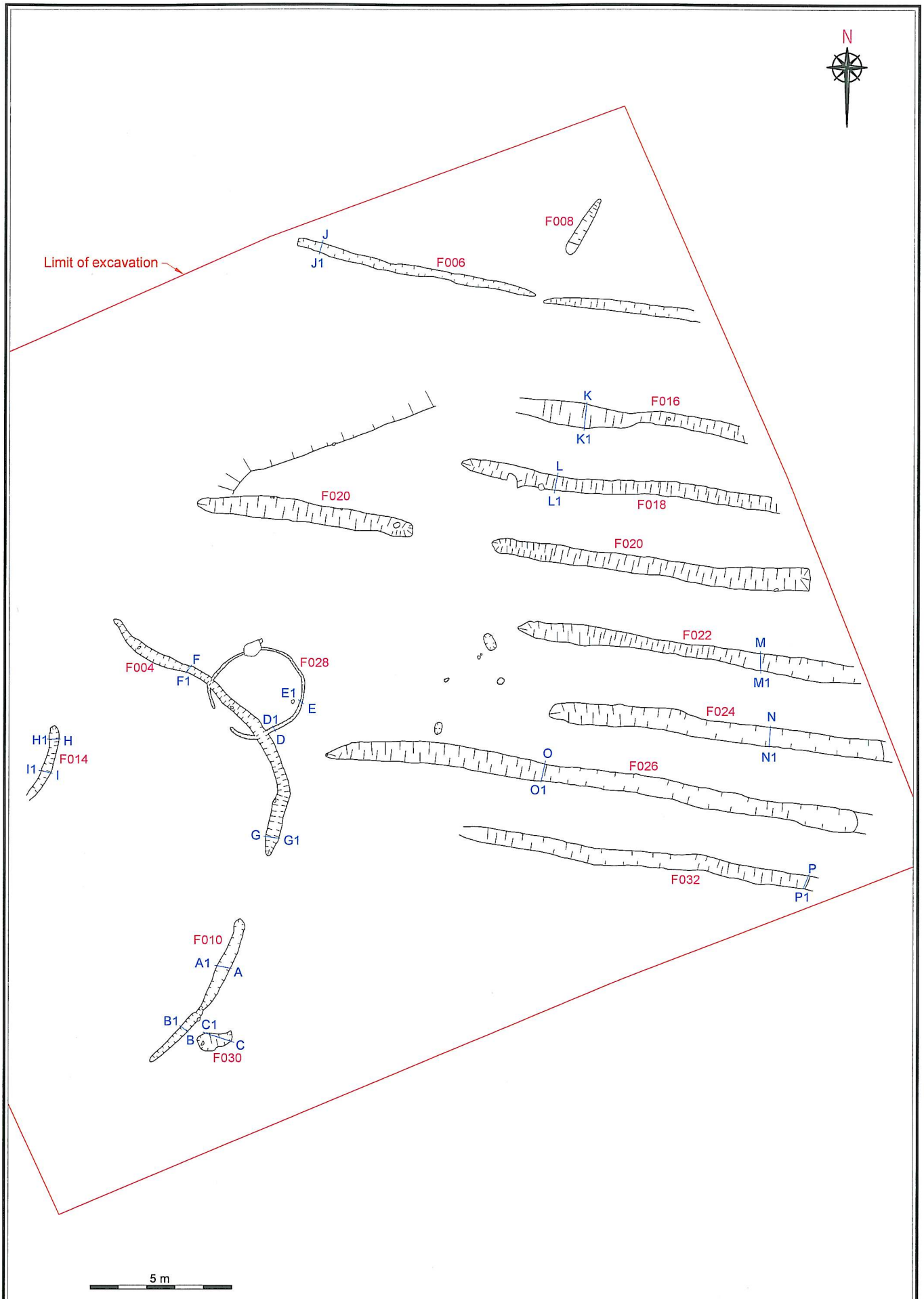
Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme, Co. Laois; Contract 1, Springfield 1	Scale: 1: 4,000 A4
		Date: Sept '08
	Issued for: Archaeological excavation report	Origin: ACS Ltd
	Client: Laois County Council	Drawing no.: 05_09_C7634

Figure 6: Location of Springfield 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, Springfield 1	Scale: 1: 500 A4
		Date: Sept '08
	Issued for: Archaeological excavation report	Origin: ACS Ltd
	Client: Laois County Council	Drawing no.: 05_09_C7635

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, Springfield 1	Scale: 1: 180 A4
		Date: September '08
	Issued for: Archaeological excavation report	Origin: ACS Ltd
	Client: Laois County Council	Drawing no.: 05_09_C7636

Figure 8: Post-ex plan of Springfield 1

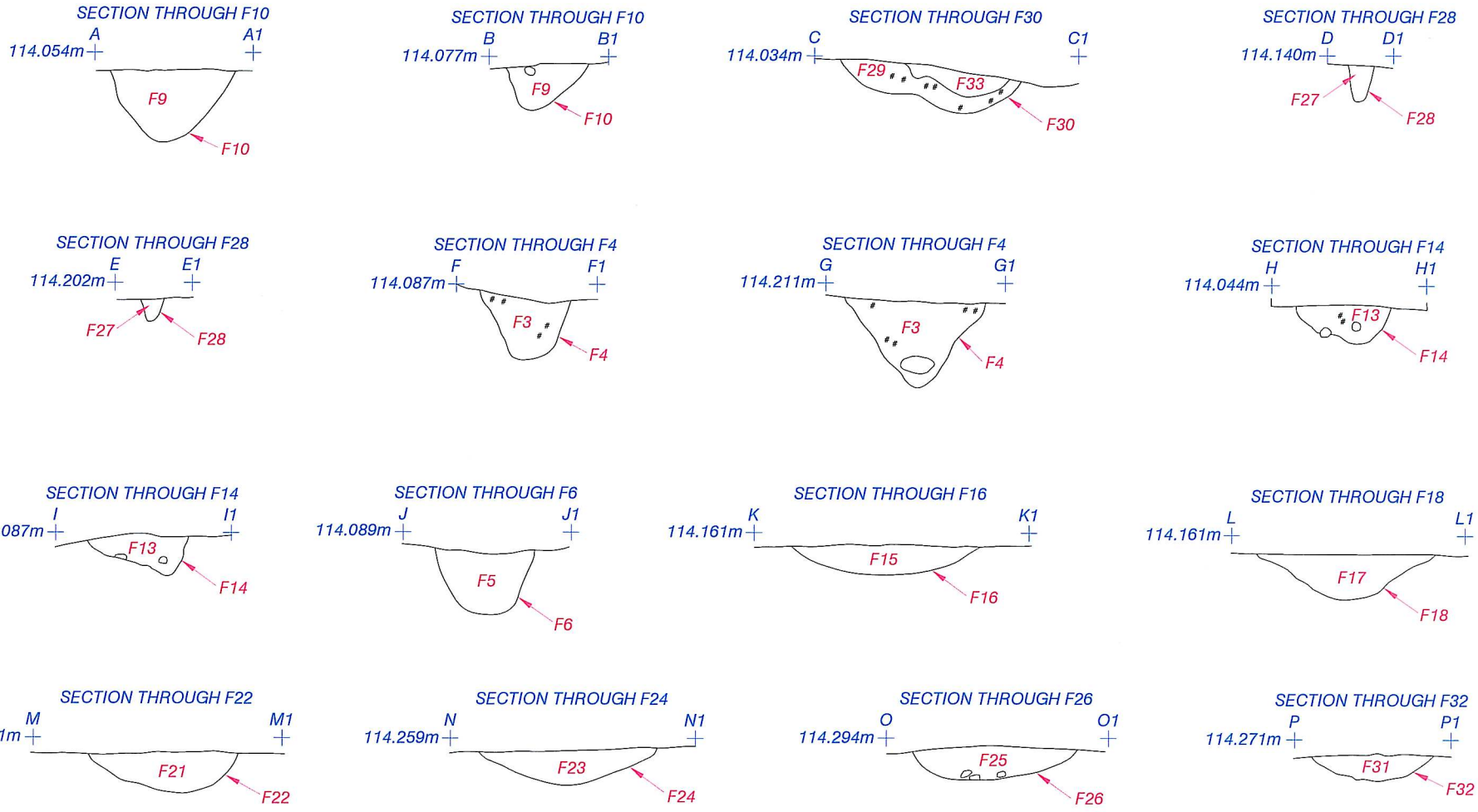


Figure 9: Sections

Plate 1: Post-excavation shot of F004 and F028 from west (05_09_CP301_05)

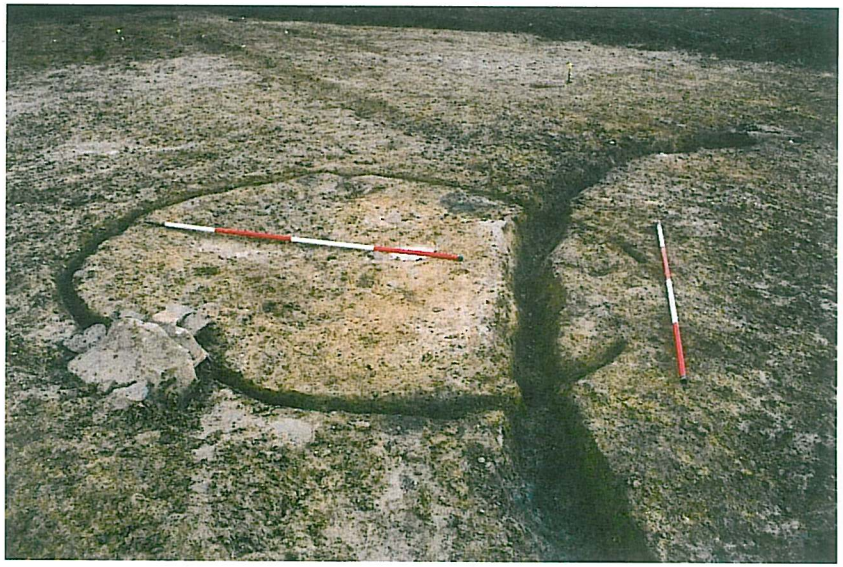


Plate 2: Post-excavation shot of F028 and F004 from west (05_09_CP301_07)

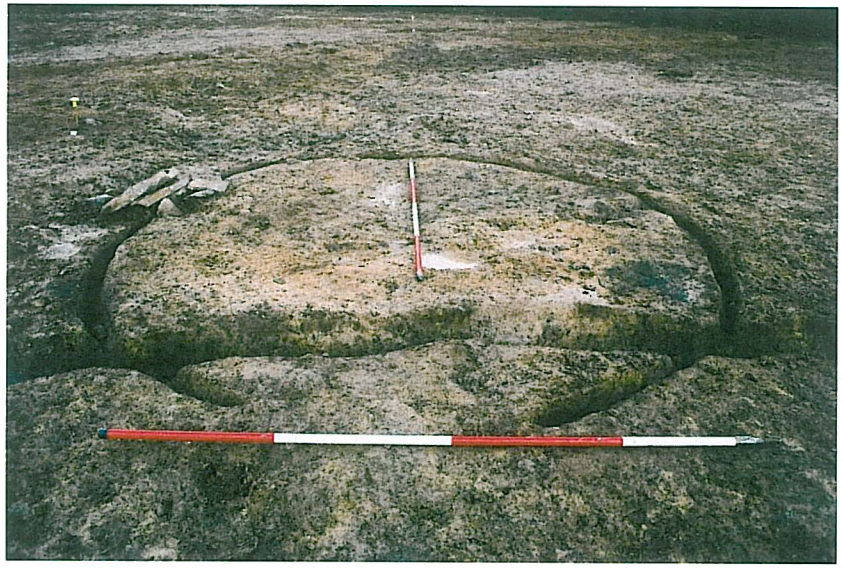


Plate 3: Post-excavation shot of F028 from southwest (05_09_CP301_08)

Plate 4: Post-excavation shot of F010 from northwest (05_09_CP301_11)

Plate 5: Post-excavation shot of F010, F004 and F028 from south (05_09_CP301_12)

Plate 6: Post-excavation shot of furrows from east (05_09_CP301_13)

Plate 7: Post-excavation shot of F010, F004 and F028 from west (05_09_CP301_15)