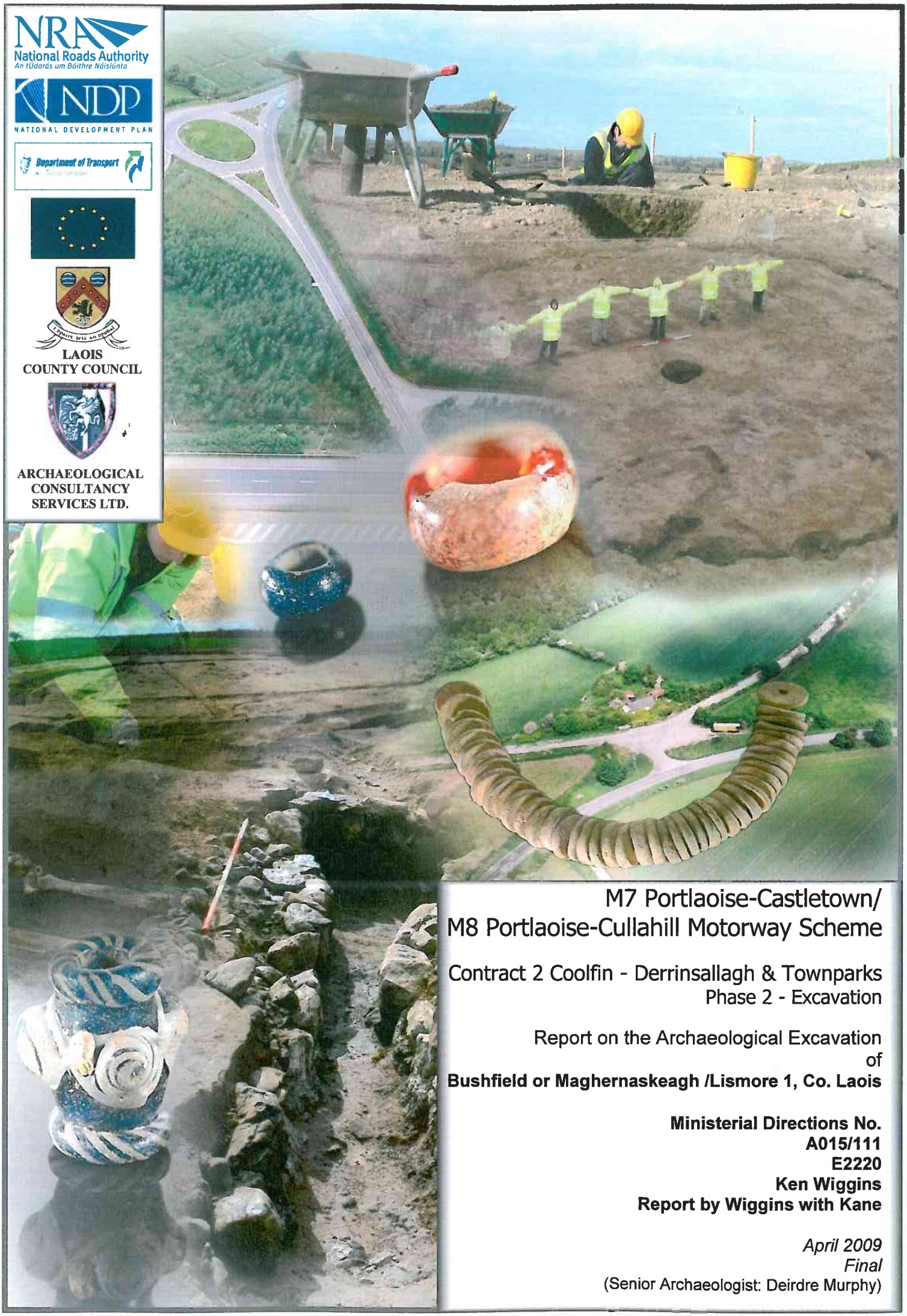

National Roads Authority
An tÚdarás um Bóithre Náisiúnta

NDP
NATIONAL DEVELOPMENT PLAN

Department of Transport

LAOIS
COUNTY COUNCIL

ARCHAEOLOGICAL
CONSULTANCY
SERVICES LTD.

M7 Portlaoise-Castletown/ M8 Portlaoise-Cullahill Motorway Scheme

Contract 2 Coolfin - Derrinsallagh & Townparks
Phase 2 - Excavation

Report on the Archaeological Excavation
of
Bushfield or Maghernaskeagh /Lismore 1, Co. Laois

Ministerial Directions No.
A015/111
E2220
Ken Wiggins
Report by Wiggins with Kane

April 2009
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 2
Site Name	Bushfield or Maghernaskeagh/ Lismore 1, Co. Laois
Townland	Bushfield or Maghernaskeagh/Lismore
Nat. Grid Ref.	228765, 185508
OD Height	140.554m
OS Map Ref.	OS 6 inch sheet 16-22
Chainage	13500 - 13640
Ministerial Directions No.	A015/111
Record No.	E2220
Archaeologist	Ken Wiggins
Senior Archaeologist	Deirdre Mu rphy
Report Type	Final
Report Status	Final
Report by	Ken Wiggins with Kane
Date of Submission	April 2009
Distribution	Elspeth Logan & Mary Deevy

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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

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

Chief Archaeologist – Brian Duffy
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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. Contract 2 consists of approximately 11km of motorway, which extends east/west from Aghaboe to west of Borris-in-Ossory through the townlands from Coolfin to Townparks and Derrinsallagh. The following report describes the results of archaeological excavation along one section of the planned M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme, at Bushfield or Maghernaskeagh/Lismore, County Laois, Contract 2.

A programme of advanced archaeological investigation (Phase 1) was undertaken in March-April 2005 by Lydia Cagney under ministerial direction (A015/034 & A015/035) 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. Phase 1 assessment identified a number of archaeological deposits and features on either side of the townland boundary separating Lismore and Bushfield or Maghernaskeagh. Archaeological excavations (Phase 2) directed by Ken Wiggins took place on the Lismore side of the townland boundary (Zones A and B) between 11th October and 2nd December 2005, and established that the features were contained by a curvilinear ditch, comprising the western extent of a large enclosure continuing into the adjoining townland of Bushfield or Maghernaskeagh. A cluster of slagpit furnaces was excavated on the Lismore side adjacent to the north-facing entrance to the enclosure in February 2006. The excavation of the Bushfield or Maghernaskeagh part of the site (Zones C, D and E) took place between 9th June and 6th October 2006. The continuation of the enclosure ditch was excavated, along with a cemetery containing 60 individuals, clusters of pits, many containing fragments of burnt bone, and a network of linear features. In February 2007, a series of burnt spreads and associated troughs was excavated external to the enclosure on the Lismore side (Zone F).

The enclosure at Bushfield or Maghernaskeagh/Lismore 1 is D-shaped in plan, with external dimensions of 95m (east-west) by an estimated 85m (north-south). The western extent, on the Lismore side of the townland boundary, was fully excavated, but excavation on the Bushfield or Maghernaskeagh side was limited (north-south) to the width of the roadtake (*c*. 57m). Part of the northern extent of the enclosure ditch, measuring just over 30m long, and a more substantial area of the southern extent of enclosure, measuring approximately 70m (east-west) by 20m (north-

south), lay outside the roadtake limits and was not excavated. Geophysical survey was conducted on these two areas after Phase 2 excavations were completed. The survey revealed a continuing ditch delimiting the southwest quadrant of the enclosure as well as a possible second entranceway to the southeast, denoted by a large gap in the ditch. Numerous pits were also detected both within and outside of the enclosure, many containing ferrous material. Finds from the site included a copper alloy blade, a copper alloy tweezers, an iron buckle, an iron knife, an iron ring, a lignite stylus, a quernstone fragment, a whetstone, a glass ring, a glass bead and a stone pin sharpener.

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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 Bushfield or Maghernaskeagh/Lismore 1, Contract 2, County Laois (Ordnance Survey six-inch sheet 16-22, National Grid Co-ordinates 228765, 185508; Figures 1–6). The site at Bushfield or Maghernaskeagh/Lismore 1 was situated to the west of the townland of Kilcotton, which lies just west of the boundary between the baronies of Clondonagh and Clarmallagh in the diocese of Ossory. It was also situated *c.* 4km southeast of Borris-in-Ossory and *c.* 11km southwest of Mountrath, Co. Laois. It was located between Chainage 13500 and 13640 of the proposed scheme, in the townland of Bushfield or Maghernaskeagh and Lismore and within the Parish of Aghaboe.

1.2 Scope of the Project

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

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

Following completion of fieldwork a programme of post-excavation analysis was necessary, as reports on the archaeological findings must be published. A dissemination strategy also forms a crucial part of this phase of the project. It is proposed that all final reports will be submitted to the relevant authorities by March 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 Lydia Cagney. The site was identified during archaeological testing carried out by Lydia Cagney of Archaeological Consultancy Services Ltd in March–May 2005. A total of 26 trenches were excavated within this field and a number of potential archaeological features were identified. The site was divided into two and designated Lismore 1 and Bushfield or Maghernaskeagh 1.

1.4 Date and Duration of Excavation Works

Excavation on the Lismore (western) side of the site (Zones A and B) was carried out from 11th October until 28th November 2005. Zone A along the northern margin of the Lismore side was extended in February 2006. Excavation on the Bushfield or Maghernaskeagh (eastern) side of the townland boundary (Zones C, D, and E) took place between 9th June and 6th October 2006. Finally, an area external to the enclosure on the Lismore side was excavated in February 2007 (Zone F).

1.5 Size and Composition of the Excavation Team

The excavation team varied considerably over the course of the different phases of the excavation, but peaked in July 2006 at one director, two supervisors, sixteen assistants and sixteen general operatives.

2. RECEIVING ENVIRONMENT

2.1 Detailed Overview of the receiving environment

2.1.1 Topographic

The enclosure itself is located in relatively low-lying land. Most early Medieval enclosures are on slightly higher ground than the surrounding landscape (Edwards 1990, 105). A prominent location in the landscape would seem to have been a natural choice for a settlement. In this case, there was more prominent ground to the east at Knockseera Hill and to the north on the smaller hill at Knockaroe. The site is not located near any major rivers or lakes and the location does not seem to have been dictated by a need for a wide view, a prominent position or proximity to a major water source. The nearest part of the River Nore is *c.*3.5km to the NW and some narrow tributaries of the Quinn River run to the SW. The enclosure at Bushfield or Maghernaskeagh/Lismore 1 was not near a major river, but was located adjacent to the site of a recorded routeway that connected the monasteries of Aghaboe and Monahincha. This may have been the deciding factor in the location of the site. Another deciding factor may have been the location very close to the border between the baronies of Clondonagh and Clarmallagh, which may have formed the boundaries between ancient political territories.

2.1.2 Archaeological

Prior to the M7 Portlaoise to Castletown/M8 Portlaoise to Culahill Motorway Scheme, the prehistoric period was generally under-represented in relation to the later medieval periods, perhaps a reflection on the problems inherent in identifying prehistoric sites in the modern landscape than an actual archaeological truth. It is also an expression of how the physical geography of the region since the last glacial period has affected human settlement within the county when later communities settled and developed sites that may have previously been settled by prehistoric groups with the earlier archaeological sites being effectively removed by later domestic, industrial or agricultural activity, from the medieval period to the present. The Mesolithic period was unrecorded in Laois, but it is unlikely that early hunter-gatherers didn't utilise the rich post-glacial environment as they did at Lough Boora, County Offaly.

As the transition from a subsistence economy to cereal cultivation and livestock rearing was made during the fourth millennium BC, large tracts of forest cover were cleared, permanent settlements were established, pottery was first used, and elaborate burial rites were developed. The numerous eskers, which cross the county, provided well drained, easily worked soils for agricultural purposes. However, the widespread clearance of the woodland cover coupled with

a climatic deterioration, led to a prolonged period of bog growth that covered much of Slieve Bloom. Neolithic ritual sites in the form of megalithic tombs and artefacts are known from the county (Sweetman *et al* 1995) however, settlement sites had yet to be identified prior to the M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme. A similar situation exists for the Bronze Age whereby certain types of sites are known but actual settlement evidence is less common. A number of prehistoric sites including two standings stones, a megalithic structure, an urn burial and a henge monument were recorded in the townland of Newtown or Skirk, south of the river Quinn flood plain and close to Bushfield or Maghernaskeagh.

Fulachta fiadh/burnt mound sites were a more common Bronze Age archaeological feature recorded in Co. Laois (although they also date to the Medieval period). Nineteen (including one possible site) were noted in the county (Sweetman et al 1995, 12-3), prior to the M7 Portlaoise to Castletown/M8 Portlaoise to Culahill Motorway Scheme. Of these, 13 (68%) have been completely ploughed out and levelled; through various agricultural practices such as ploughing and land reclamation. One of the remaining recorded sites was fully excavated; another was revealed through ploughing and is still reasonably intact, while four still survive as upstanding mounds (Sweetman *et al* 1995). Four were recorded by Candon in his 1986 Archaeological Survey of the barony of Clandonagh to the southwest of Bushfield or Maghernaskeagh. No surface remains or traces of these monuments exist today (Sweetman *et al* 1995, 12), indicating the high destruction rate in the locality. All of these recorded sites occur in the southern parts of the county and eight of the 19 *fulachta fiadh* sites in Laois were recorded by Candon (1986; 1987) in separate archaeological surveys of the baronies of Clandonagh and Clarmallagh. The excavations on the M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme uncovered in excess of 40 *fulachta fiadh*/burnt mound/spread sites and so these discoveries have great potential to add to our very limited knowledge and understanding of hot stone technology and associated *fulachta fiadh*/burnt mound activity in Bronze Age Laois.

The distribution and number of *fulachta fiadh* and associated sites in Co. Laois is certainly not representative of what was the original picture. Our current distribution and known corpus of *fulachta fiadh* sites in Laois has been obtained (mainly) through sporadic recording; two intensive archaeological surveys in two distinct geographical areas in the southwest of the county; and also through development led archaeology in more recent years (most notably the current M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme). The fact that there are no visible surface traces or remains at most of the recorded *fulachta fiadh* sites

in the county informs us that a significant amount of other sites (which were never recorded) may have been completely levelled and destroyed. The recent excavations on this motorway scheme are a veritable cross section of the landscape of Laois and they seem to indicate a more real and widespread distribution of *fulachta fiadh* sites (i.e. not just sporadic distribution in the southern part of the county). Many of the recently discovered sites have been badly truncated and ploughed out just like the previously recorded examples.

Stray finds can also provide an indicator of Bronze Age activity where an absence of archaeological monuments occurs. This can be seen at Aghaboe with the recovery of two bronze axeheads, one broad flat and one flanged, indicating such activity existed, prior to the motorway scheme. Very little archaeology in Laois was dated to the Iron Age prior to this motorway scheme. Sites excavated at Shanboe 6 and in the townlands of Derrinsallagh and Derryvorrigan will further our understanding of this period in the county.

There are several recorded monuments in the townlands of Bushfield or Maghernaskeagh and Lismore, adjacent to the townland of Bushfield or Maghernaskeagh. In Lismore, the remains of a medieval church were recorded. It has been suggested that this church was a later edition to a possibly earlier ecclesiastical site. This church was dedicated to St. Canice and was known as 'Cill Cainneach Beg' or 'Kilkennybeg' meaning 'the little church of Canice', obviously in relation to the saints more important churches at Aghaboe and Kilkenny. The name Kilkennybeg is still attached to the field adjoining the church on the south and is separated from it by a modern fence. The field in which the church is located is called 'the lawn' or sometimes 'the church field'. The only inscribed monuments are two or three engraved grave stones from the 18th century (Carrigan, 1905, 131-2). A tower house is indicated in Lismore on the down survey parish maps (1654-6). The two structures indicated on the equivalent barony maps most likely represent the tower house and the church (Courtney, 2005, 107).

In Grangemore townland, close to Bushfield or Maghernaskeagh is a 17th century castle (Inventory No. 1028), once owned by the Phelans. According to Carrigan, the walls are 3ft thick, the doors are defended by port-holes, the chimney stacks are lozenge-shaped (1905, 132). Also in this townland are the remains of a rectangular stone built house (Inventory No. 1035). There is also a rectangular earthwork, or possible moated site, in this townland, which may represent an Anglo-Norman presence in the area (Inventory No. 927). There are two circular enclosures (Inventory No. 423, 424) in this townland (Sweetman et al 1995, 127, 60, 47). It is impossible to speculate the origin of these enclosures, as they may represent prehistoric or early medieval enclosures. At Knockseera, close to Bushfield or

Maghernaskeagh, are the remains of a church and graveyard (Inventory No. 722). These remains are associated with St. Kiernan of Ossory (Sweetman et al 1995, 85).

2.1.3 Historic

In the beginnings of the early Christian period in the 5th century AD, the site lay in the territory of the Kingdom of Osraige. To the east and northeast was the kingdom of the Laigin. To the west was Mumu and to the North was Mide (Smyth 1982, 144). The territory of the Osraige later became the medieval diocese of Ossory (Smyth 1982, 146). Aengus Osrithe was the founder and first ruler. The ancient kingdom of Ossory has been now broken up into 14 baronies. Three of these baronies lie in Co. Laois and the rest lie in Co. Kilkenny. The three in Co. Laois are Upperwoods, Clarmallagh and Clandonagh. Clandonagh can be translated as the territory of the Clan or children of Donnagh. These were recognised as territorial divisions by 1657 when the civil survey referred to them as cantreds or hundreds. They only became baronies in the legal sense 200 years later (Carrigan 1905, 21).

The Osriage were close neighbours of the Làigis and were located in the marshes of Muma and Laigin. From an early period, they had appropriated what is now part of south Co. Laois. They had a strong association with St. Canice, who was their most famous patron saint. They appear to have been one of the early groups of Èrainn tribes in the south of Ireland and their territory was regarded as part of Munster rather than Leinster. A connection between the Osraige and another group, the Corco Laìgde has been commented upon. The Corcu Laìgde probably originated in Cork. The fragmentary Annals states that the 7 kings of the Corco Laìgde ruled Osraige and the 7 kings of the Osraige took control of Corco Laìgde. The Osraige seem to have re-asserted their independence from the Corco Laìgde by the mid-7th century but there are a few records of battles between the Osraige and their western neighbours before the late 10th century. They were also engaging in disputes with the Laigin to the east.

Numerous battles had weakened the Laìgis, and this was noticed by Cathal mac Finguin, King of Munster, who took advantage of this by invading the Laigin and demanding their hostages in 738. He was avenging an incident that had occurred three years previously at Fèile where his ally, Cellach, King of Osraige, had been slain (Ò Muirchadha 1999, 48). Cathal died in 742, but in the same year the Osraige penetrated as far as Westmeath, devastating both Cenèl Fiachach and Delbna.

Cerbhall mac Dùnlainge was the most famous king of Osriage. He is known for his successes against the Vikings, his military power and political capabilities. It has been suggested that his success was due to his ability to adapt to changing political situations and his tendency to ally himself with those he feared most as an enemy (Downham 2004, 17). During his career, between 842-888 AD, he turned Ossory from a kingdom of relative obscurity into a major player in early medieval politics (Downham 2004, 1). He became a formidable force against the Vikings after he succeeded his father, Dùngal, in 842. He defeated the Norsemen at Cuil-moine in 844 and in the following year, killed 1200 of the Vikings at Dublin (Carrigan 1905, 37).

Until the late 850's, there were no further dealings between Cerbhall and the Vikings. In 852, Cerbhall joined forces with the Vikings and the Munstermen to fight against the Lochlanns of Co. Tipperary. In 859, a great army was lead by Cerbhall and his Viking ally Amhlaeibh, into Meath, which they spoiled for three months. Peace was restored when Cerbhall submitted to the Bishop of Armagh, successor to St. Patrick, at the Synod of Rath-Hugh and thus made alliance with the north. After the synod, Cerbhall severed his alliance with his Viking allies and was engaged in conflicts with them in the following year when he slew the people of the Viking king Rodolph (Downham 2001, 13; Carrigan 1991, 38). He spent his time thereafter leading campaigns against his neighbours in Leinster, Munster and also by participating in two campaigns against Connacht. He had managed, by the end of his career, to establish Ossory as an independent power in southern Ireland (Downham 2004, 7).

It is generally agreed that between 795 and 837 the Vikings began sporadic attacks in Ireland. Leinster was vulnerable to attacks coming from Dublin, Wexford and Waterford. Laois escaped attacks for the first 45 years due to its inland location. In 825, the Vikings began to intimidate the Osraige and two years later captured an encampment of the Laigin and killed many. Between 837 and 876, large Viking fleets began to arrive at the mouth of the Boyne and the Liffey whereby the Vikings could carry out intensive raiding while constructing semi-permanent settlements for the winter.

Laois was protected to the north and east by the kingdom of Leinster and to the south by the kingdom of Ossory. The first recorded raid in Laois was in 841, just after the Viking foundation of Dublin and Annaghassan. Leinster and the Southern Ui Neill were plundered as far as the Slieve Bloom, which was on the border of the territory between the Ui Neill and Laois. The Dublin garrison then attacked the monastery of Clonenagh and after that, the monastery of Killeigh in Co. Offaly. In 843, large campaigns saw the establishment of a new base on Lough Ree and in 845, the castle of Dunmaise in Laois was attacked and plundered.

In the same year, the Irish conducted a series of successful counter attacks on the Vikings. The first occurred in Ossory where a Viking fleet is said to have arrived up the River Nore and plundered Coolcashin in Kilkenny. In the late 860's and 870's, the Viking threat to the Osraige lessened somewhat. From 876-916, the raiding calmed. This period has been often called the '40 years rest'. From 916 to 937, the activities of the Vikings can no longer be referred to as raids, as they were intertwined with the political issues among the Irish (Doherty 1998, 295).

The landscape around this part of Laois was probably rampant with political strife and upheaval in the early Christian period. This would have been as a result of both conflict with the Vikings and also conflict between the indigenous tribes of the area as they clashed over land, power and wealth. It is important that the early medieval enclosure of Bushfield or Maghernaskeagh/Lismore 1 be examined within its historical context. The site may not have been inhabited for very long and this may well have been a result of political conflicts in the area, particularly considering the location of this site along an important communication route and near to the boundaries between the baronies of Clandonagh and Clarmallagh.

3. RESEARCH FRAMEWORK

The research framework for Bushfield or Maghernaskeagh/Lismore 1 will address the following topics:

(i) The construction date or date of initial site occupation/use
(ii) The absolute/relative chronology of site use in terms of periods, levels, phases, sequences and events
(iii) The date of site abandonment
(iv) The extent of the archaeological site/activity
(v) The location and distribution of known contemporary sites in the local, regional and national (and international, if appropriate) context.
(vi) The extent of the viable (local/regional) economic catchment area, i.e. the nearest viable contemporary sources of water, food, raw materials, centres of trade, transportation routes, etc.
(vii) The nature and composition of the archaeological finds, features, layers and deposits on site.
(viii) The phases of activity on site
(ix) The nature and phases of construction, use, repair and abandonment of the site.

(x) What cultural group/unit would have occupied the site

(xi) What their material culture would have been

(xii) Why the site location would have been chosen

(xiii) How the site would have been constructed and what activities would have taken place at and within the site

(xiv) How may people would have been required to build the site and what size population would the site have supported

(xv) The likely social status of the builders/occupiers of the site

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

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

4. EXCAVATION RESULTS

4.1 Excavation methodology

Excavations were carried out at Lismore townland between 11th October and 28th November 2005, and at Bushfield or Maghernaskeagh 1 between 9th June and 6th October 2006 under ministerial direction number A015/111. Topsoil (001) 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 excavated accordingly by hand using the single context method. Each feature was assigned a context number. 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 and find number, i.e. E2220:3:1. This represents find number 1 within feature number 3 in Bushfield or Maghernaskeagh/Lismore 1 (record number E2220). 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. No specialist reports or dates have yet been completed. These will be included in the final report.

4.2 Full Stratigraphic Report

4.2.1 List of features

F001 Topsoil

F002 Natural Subsoil

F003 Cut of enclosure ditch: Zones A, B, C and E (Figs. 7, 8, 13, 18, 59) (Plates 2, 3, 5, 11, 12, 13)

F004 Fill of enclosure ditch F003: Zones A and B (Figs. 10 and 14)

F005 Fill of enclosure ditch F003, under F004: Zones A and B (Figs. 10 and 14)

F006 Fill of drain F007: Zones A and B (Figs. 9 and 17)

F007 Cut of linear drain, filled with F006: Zones A and B (Figs. 8, 9, 13, 17)

F008 Cut of linear ditch, filled with F009: Zones A and B (Fig. 7, 8, 13, 14)

F009 Fill of ditch F008: Zones A and B (Fig. 14)

F010 Non-archaeological

F011 Deposit along inside edge of ditch F003: Zone B

F012 Primary fill of pit F054: Zone B (Fig. 17)

F013 Non-archaeological

F014 Cut of pit, filled with F015: Zone A (Figs. 8 and 11)

F015 Fill of pit F014: Zone A (Fig. 11)

F016 Primary fill of ditch F003: Zone A (Fig. 10)

F017 Re-cut of drain F053, filled with F042: Zone A (Figs. 8 and 11)

F018 Cut of pit, filled with F070, F019: Zone A (Figs. 8 and 11)

F019 Upper fill of pit F018: Zone A (Fig. 11)

F020 Cut of stake-hole, filled with F041: Zone B (Fig. 13)

F021 Middle fill of pit F058: Zone A (Fig. 11)

F022 Cut of pit, filled with F023: Zone B (Fig. 13)

F023 Fill of pit F022: Zone B

F024 Cut of pit, filled with F025: Zone B (Figs. 13 and 16)

F025 Fill of pit F024: Zone B (Fig. 16)

F026 Cut of large stake-hole, filled with F027: Zone B (Figs. 13 and 16)

F027 Fill of large stake-hole F026: Zone B (Fig. 16)

F028 Middle fill of pit F058: Zone A (Fig. 11)

F029 Primary fill of pit F058: Zone A (Fig. 11)

F030 Cut of pit, filled with F031: Zone B (Figs. 13 and 16)

F031 Fill of pit F030: Zone B (Fig. 16)

F032 Cut of pit, filled with F033: Zone A (Figs. 8 and 11)

F033 Fill of pit F032: Zone A (Fig. 11)

F034 Cut of linear ditch, filled with F043, F035: Zone B (Figs. 13 and 17)

F035 Upper fill of ditch F034: Zone B (Fig. 17)

F036 Cut of pit, filled with F037: Zone B (Figs. 13 and 16)

F037 Fill of pit F036: Zone B (Fig. 16)

F038 Cut of pit, filled with F039: Zone B (Figs. 13 and 16)

F039 Fill of pit F038: Zone B (Fig. 16)

F040 Cut of pit, filled with F041: Zone B (Figs. 13 and 16)

F041 Fill of pit F020, F040, F044, F045: Zone B (Fig. 16)

F042 Fill of drain F017: Zone A (Fig. 11)

F043 Primary fill of ditch F034: Zone B (Fig. 17)

F044 Cut of stake-hole, filled with F041: Zone B (Fig. 13)

F045 Cut of stake-hole, filled with F041: Zone B (Fig. 13)

F046 Non-archaeological

F047 Deposit above spread F071: Zone B (Fig. 16)

F048−F049 Non-archaeological

F050 Cut of large pit, filled with F072, F074, F069, F068, C067, F065, F064, F051: Zone B (Figs. 13 and 15) (Plates 8, 9, 10)

F051 Upper fill of large pit F050: Zone B (Fig. 15)

F052 Fill of drain F053: Zone A (Fig. 11)

F053 Cut of linear drain, filled with F052: Zone A (Fig. 11)

F054 Cut of pit filled with F012, F055: Zone B (Figs. 13 and 17)

F055 Upper fill of pit F054: Zone B (Fig. 17)

F056−F057 Non-archaeological

F058 Cut of pit, filled with F029, F028, F021, F059: Zone A (Figs. 8 and 11)

F059 Upper fill of pit F058: Zone A (Fig. 11)

F060 Non-archaeological

F061 Cut of townland boundary ditch: Zones A and B (Figs. 7, 8 and 13)

F062 Upper fill of ditch F061: Zones A and B

F063 Primary fill of ditch F061: Zones A and B

F064 Fill of large pit F050: Zone B (Fig. 15)

F065 Fill of large pit F050: Zone B (Fig. 15)

F066 Non-archaeological

F067 Fill of large pit F050: Zone B (Fig. 15)

F068 Fill of large pit F050: Zone B (Fig. 15)

F069 Fill of large pit F050: Zone B (Fig. 15)

F070 Primary fill of pit F018: Zone A (Fig. 11)

F071 Spread under deposit F047: Zone B (Fig. 16)

F072 Primary fill of large pit F050: Zone B (Fig. 15)

F073 Non-archaeological

F074 Fill of large pit F050: Zone B (Fig. 15)

F075–F082 Non-archaeological

F083 Cut containing deposits F109 and F094: Zone A (Fig. 12)

F084–F085 Non-archaeological

F086 Cut of slagpit furnace, filled with F097, F087: Zone A (Figs. 8, 9 and 12) (Plates 6, 7)

F087 Upper fill of slagpit furnace F086: Zone A (Fig. 12)

F088 Cut of slagpit furnace, filled with F107, F106 and F089: Zone A (Figs. 8, 9 and 12) (Plates 6, 7)

F089 Upper fill of slagpit furnace F088: Zone A (Fig. 12)

F090 Cut of slagpit furnace, filled with F101, F102, F100, F091: Zone A (Figs. 8, 9 and 12) (Plates 6, 7)

F091 Upper fill of slagpit furnace F090: Zone A (Fig. 12)

F092 Cut of slagpit furnace, filled with F105, F104, F093: Zone A (Figs. 8, 9 and 12) (Plates 6, 7)

F093 Upper fill of slagpit furnace F092: Zone A (Fig. 12)

F094 Fill of pit F083 adjacent to slagpit furnace F088: Zone A (Fig.12)

F095 Cut of slagpit furnace, filled with F099, F098, F096, F103: Zone A (Figs. 8, 9 and 12) (Plates 6, 7)

F096 Fill of slagpit furnace F095: Zone A (Fig. 12)

F097 Fill of slagpit furnace F086: Zone A (Fig. 12)

F098 Fill of slagpit furnace F095: Zone A (Fig. 12)

F099 Primary fill of slagpit furnace F095: Zone A (Fig. 12)

F100 Fill of slagpit furnace F090: Zone A (Fig. 12)

F101 Primary fill of slagpit furnace F090: Zone A (Fig. 12)

F102 Fill of slagpit furnace F090: Zone A (Fig. 12)

F103 Upper fill of slagpit furnace F095: Zone A (Fig. 12)

F104 Middle fill of slagpit furnace F092: Zone A (Fig. 12)

F105 Primary fill of slagpit furnace F092: Zone A (Fig. 12)

F106 Fill of slagpit furnace F088: Zone A (Fig. 12)

F107 Primary fill of slagpit furnace F088: Zone A (Fig. 12)

F108 Spread between slagpit furnaces F092 and F095: Zone A

F109 Lower fill of pit F083 adjacent to slagpit furnace F088: Zone A (Figs. 8, 9 and 12)

F110 Cut of post-hole, filled by F111: Zone D (Figs. 52, 56)

F111 Fill of post-hole F110: Zone D (Fig. 56)

F112 Cut of stake-hole, filled with F113: Zone D (Figs. 52, 56)

F113 Fill of stake-hole F112: Zone D (Fig. 56)

F114 Cut of charcoal-rich pit, filled with F115: Zone D (Figs. 52, 56)

F115 Fill of pit F114: Zone D (Fig. 56)

F116 Cut of charcoal-rich pit, filled with F117: Zone D (Figs. 52, 56)

F117 Fill of pit F116: Zone D (Fig. 56)

F118 Cut of charcoal-rich pit, filled with F119: Zone D (Figs. 52, 56)

F119 Fill of pit F118: Zone D (Figs. 56)

F120 Cut of charcoal-rich pit, filled with F121: Zone D (Figs. 52, 53) (Plate 30)

F121 Fill of pit F120: Zone D (Fig. 53)

F122 Cut of charcoal-rich pit, filled with F123: Zone D (Figs. 52, 53)

F123 Fill of pit F122: Zone D (Fig. 53)

F124 Cut of charcoal-rich pit, filled with F125: Zone D (Figs. 52, 54) (Plate 31)

F125 Fill of pit F124: Zone D (Fig. 54)

F126 Cut of charcoal-rich pit, filled with F127: Zone D (Figs. 52, 53)

F127 Fill of pit F126: Zone D (Fig. 53)

F128 Cut of charcoal-rich pit, filled with F129: Zone D (Figs. 52, 54)

F129 Fill of pit F128: Zone D (Fig. 54)

F130 Cut of charcoal-rich pit, filled with F131: Zone D (Figs. 52, 54)

F131 Fill of pit F130: Zone D (Fig. 54)

F132 Cut of charcoal-rich pit, filled with F133: Zone D (Figs. 52, 54)

F133 Fill of pit F132: Zone D (Fig. 54)

F134 Cut of charcoal-rich pit, filled with F135: Zone D (Figs. 52, 54)

F135 Fill of pit F134: Zone D (Fig. 54)

F136 Cut of charcoal-rich pit, filled with F137: Zone D (Figs. 52, 54)

F137 Fill of pit F136: Zone D (Fig. 54)

F138 Cut of charcoal-rich pit, filled with F161: Zone D (Figs. 52, 53)

F139 Cut of charcoal-rich pit, filled with F140: Zone D (Figs. 52, 54)

F140 Fill of pit F139: Zone D (Fig. 54)

F141 Cut of charcoal-rich pit, filled with F142: Zone D (Figs. 52, 55)

F142 Fill of pit F141: Zone D (Fig. 55)

F143 Cut of charcoal-rich pit, filled with F144: Zone D (Figs. 52, 54)

F144 Fill of pit F143: Zone D (Fig. 54)

F145 Cut of charcoal-rich pit, filled with F146: Zone D (Figs. 52, 54)

F146 Fill of pit F145: Zone D (Fig. 54)

F147 Cut of charcoal-rich pit, filled with F148: Zone D (Figs. 52, 54)

F148 Fill of pit F147: Zone D (Fig. 54)

F149 Cut of charcoal-rich pit, filled with F150: Zone D (Figs. 52, 55)

F150 Fill of pit F149: Zone D (Fig. 55)

F151 Cut of charcoal-rich pit, filled with F152: Zone D (Figs. 52, 55)

F152 Fill of pit F151: Zone D (Fig. 55)

F153 Cut of charcoal-rich pit, filled with F154: Zone D (Figs. 52, 55) (Plate 32)

F154 Fill of pit F153: Zone D (Fig. 55)

F155 Cut of charcoal-rich pit, filled with F156: Zone D (Figs. 52, 56)

F156 Fill of pit F155: Zone D (Fig. 56)

F157 Cut of charcoal-rich pit, filled with F158: Zone D (Figs. 52, 55)

F158 Fill of pit F157: Zone D (Fig. 55)

F159 Cut of charcoal-rich pit, filled with F160: Zone D (Figs. 52, 58)

F160 Fill of pit F159: Zone D (Fig. 58)

F161 Fill of pit F138: Zone D (Fig. 53)

F162 General number for modern plough/cultivation furrows

F163 Cut of ring-gully, filled by F164: Zone D (Figs. 52, 57) (Plate 34)

F164 Fill of ring-gully F163: Zone D (Fig. 57)

F165−F166 Non-archaeological

F167 Fill of pit F168: Zone E (Fig. 63)

F168 Cut of charcoal-rich pit, filled with F167: Zone E (Figs. 59, 63) (Plate 38)

F169 Non-archaeological spread above spread F272: Zone C

F170−F173 Non-archaeological

F174 Fill of pit F175: Zone C (Figs. 47)

F175 Cut of charcoal-rich pit, filled with F174: Zone C, pit group 2 (Fig. 18, 32, 47) (Plate 26)

F176−F179 Non-archaeological

F180 Fill of pit F181: Zone C (Fig. 46)

F181 Cut of pit, filled with F180: Zone C, pit group 1 (Figs. 18, 32, 46)

F182 Upper fill of pit F183: Zone C (Fig. 46)

F183 Cut of pit, filled with F548, F547, F182: Zone C, pit group 1 (Figs. 18, 32, 46)

F184 Fill of pit F185: Zone C (Fig. 46)

F185 Cut of refuse pit, filled with F184: Zone C, pit group 1 (Figs. 18, 32, 46)

F186 Fill of pit F187: Zone C (Fig. 46)

F187 Cut of pit, filled with F186: Zone C, pit group 1 (Figs. 18, 32, 46) (Plate 24)

F188-F193: Not used

F194 Fill of pit F195: Zone C (Fig. 49)

F195 Cut of charcoal-rich pit, filled with F194: Zone C (Figs. 18, 33, 49)

F196−F197 Non-archaeological

F198 Upper fill of pit F199: Zone C (Fig. 47)

F199 Cut of pit filled with F537, F198: Zone C, pit group 1 (Figs. 18, 32, 47)

F200 Upper fill of pit F201: Zone C (Fig. 47)

F201 Cut of charcoal-rich pit, filled with F616, F200: Zone C, pit group 2 (Figs. 18, 32, 47) (Plate 27)

F202 Fill of pit F203: Zone D (Fig. 55)

F203 Cut of pit, filled with F202: Zone D (Figs. 52, 55)

F204 Fill of pit F205: Zone D (Fig. 55)

F205 Cut of pit, filled with F204: Zone D (Figs. 52, 55)

F206 Fill of pit F207: Zone D (Fig. 56)

F207 Cut of charcoal-rich pit, filled with F206: Zone D (Figs. 52, 56)

F208–F209 Non-archaeological

F210 Fill of pit F211: Zone D (Fig. 56)

F211 Cut of pit, filled with F210: Zone D (Figs. 52, 56)

F212 Fill of pit F213: Zone D (Fig. 56)

F213 Cut of charcoal-rich pit, filled with F212: Zone D (Figs. 52, 56)

F214 Fill of pit F215: Zone D (Fig. 57)

F215 Cut of charcoal-rich pit, filled with F214: Zone D (Figs. 52, 57)

F216 Fill of pit F217: Zone D (Fig. 55)

F217 Cut of charcoal-rich pit, filled with F216: Zone D (Figs. 52, 55)

F218 Fill of pit F219: Zone D (Fig. 57)

F219 Cut of charcoal-rich pit, filled with F218: Zone D (Figs. 52, 57)

F220 Fill of pit F221: Zone D (Fig. 57)

F221 Cut of charcoal-rich pit, filled with F220: Zone D (Figs. 52, 57)

F222 Fill of pit F223: Zone D (Fig. 55)

F223 Cut of charcoal-rich pit, filled with F222: Zone D (Figs. 52, 55)

F224 Fill of pit F225: Zone D (Fig. 58)

F225 Cut of charcoal-rich pit, filled with F224: Zone D (Figs. 52, 58)

F226 Fill of pit F227: Zone D (Fig. 57)

F227 Cut of refuse pit, filled with F226: Zone D (Figs. 52, 57)

F228 Fill of stake-hole F229: Zone D (Fig. 57)

F229 Cut of stake-hole, filled with F228: Zone D (Figs. 52, 57)

F230 Fill of pit F231: Zone D (Fig. 53)

F231 Cut of charcoal-rich pit, filled with F230: Zone D (Figs. 52, 53)

F232 Fill of pit F233: Zone D (Fig. 53)

F233 Cut of pit, filled with F232: Zone D (Figs. 52, 53)

F234 Fill of pit F235: Zone C (Fig. 47)

F235 Cut of charcoal-rich pit, filled with F234: Zone C, pit group 2 (Figs. 18, 32, 47)

F236 Primary fill of pit F237: Zone C (Fig. 46)

F237 Cut of pit, filled with F236, F549: Zone C, pit group 1 (Figs. 18, 32, 46)

F238 Fill of pit F239: Zone C (Fig. 46)

F239 Cut of pit, filled with F238: Zone C, pit group 1 (Figs. 18, 32, 46) (Plate 25)

F240 Upper fill of pit F241: Zone C (Fig. 46)

F241 Cut of pit, filled with F536, F535, F240: Zone C, pit group 1 (Figs. 18, 32, 46)

F242 Upper fill of pit F243: Zone C (Fig. 47)

F243 Cut of pit/hearth, filled with F530, F242: Zone C, pit group 2 (Figs. 18, 32, 47)

F244 Fill of pit F245: Zone C (Fig. 47)

F245 Cut of pit, filled with F244: Zone C, pit group 2 (Figs. 18, 32 and 47)

F246–F249 Non-archaeological

F250 Primary fill of pit F251: Zone C (Fig. 47)

F251 Cut of pit, filled with F250: Zone C, pit group 2 (Figs. 18, 32 and 47)

F252–F257 Non-archaeological

F258 Upper fill of pit F259: Zone D (Fig. 58)

F259 Cut of charcoal-rich pit, filled with F640, F258: Zone D (Figs. 52, 58) (Plate 33)

F260–F263 Non-archaeological

F264 Fill of pit F265: Zone C (Fig. 46)

F265 Cut of pit, filled with F264: Zone C, pit group 1 (Figs. 18, 32, 46)

F266–F271 Non-archaeological

F272 Spread under deposit F169: Zone C

F273–F281 Non-archaeological

F282 Spread: Zone C

F283 Fill of grave F284 (DSK21): Zone C

F284 Cut of grave (Group 1), filled with F283: Zone C (Figs. 20, 22)

F285 Fill of pit F286: Zone C (Fig. 48)

F286 Cut of pit, filled with F285: Zone C (Figs. 18, 33, 48)

F287 Fill of grave F288 (DSK22 and SK26): Zone C (Fig. 19, 21)

F288 Cut of grave (Group 1), filled with F287: Zone C (Figs. 19, 20, 21, 22, 35)

F289–F290 Non-archaeological

F291 Fill of grave F292 (SK25): Zone C (Figs. 19, 21)

F292 Cut of grave (Group 1), filled with F291: Zone C (Figs. 19, 20, 21, 22, 35)

F293–F294 Non-archaeological

F295 Fill of grave F296 (SK23): Zone C (Fig. 19, 21)

F296 Cut of grave (Group 1), filled with F295: Zone C (Figs. 19, 20, 21, 22, 35)

F297–F304 Non-archaeological

F305 Fill of grave F306 (SK32): Zone C (Figs. 19, 25)

F306 Cut of grave (Group 3), filled with F305: Zone C (Figs. 19, 20, 25, 26, 43)

F307–F308 Non-archaeological

F309 Fill of grave F310 (SK36 and SK38): Zone C (Fig. 19, 23)

F310 Cut of grave (Group 2), filled with F309: Zone C (Figs. 19, 20, 23, 24, 40)

F311 Fill of pit F312: Zone C (Fig. 49)

F312 Cut of pit, filled with F311: Zone C (Figs. 18, 33, 49)

F313–F318 Non-archaeological

F319 Upper fill of field ditch F359: Zone C (Fig. 34)

F320 Secondary fill of ditch F359: Zone C

F321 Upper fill of enclosure ditch F003: Zone C (Fig. 34)

F322 Fill of ditch F003 under F321: Zone C (Fig. 34)

F323 Fill of ditch F003 under F322: Zone C (Fig. 34)

F324 Fill of ditch F003 under F323: Zone C (Fig. 34)

F325 Fill of ditch F003 under F324: Zone C

F326 Fill of ditch F003 under F325: Zone C (Fig. 34)

F327 Primary fill of ditch F003 under F326: Zone C (Fig. 34)

F328 Fill of grave F329 (SK41): Zone C (Fig. 19, 23)

F329 Cut of grave (Group 2), filled with F328: Zone C (Figs. 19, 20, 23, 24, 40)

F330 Same as F725, fill of linear feature

F331 Same as F726, cut of linear feature

F332 Fill of grave F333 (SK52): Zone C (Fig. 19, 23)

F333 Cut of grave (Group 2), filled with F332: Zone C (Figs. 19, 20, 23, 24, 40)

F334 Fill of grave F335 (SK33): Zone C (Fig. 19, 23)

F335 Cut of grave (Group 2), filled with F334: Zone C (Figs. 19, 20, 23, 24, 40)

F336 Fill of grave F337 (SK53): Zone C (Fig. 31)

F337 Cut of grave (Group 2, Level 2), filled with F336: Zone C (Figs. 31, 45)

F338 Primary fill of field ditch F359: Zone C (Fig. 34)

F339 Fill of post-hole F340: Zone C (Fig. 50)

F340 Cut of post-hole, filled with F339: Zone C (Figs. 18, 33, 50)

F341–F342 Non-archaeological

F343 Fill of grave F344 (SK6 and SK7): Zone C (Fig. 19, 23)

F344 Cut of grave (Group 2), filled with F343: Zone C (Figs. 19, 20, 23, 24, 41)

F345–F348 Non-archaeological

F349 Fill of grave F350 (SK54, SK59, SK60 and SK61): Zone C (Fig. 19, 23)

F350 Cut of grave (Group 2), filled with F349: Zone C (Figs. 19, 20, 23, 24, 41)

F351 Fill of grave F352 (SK63): Zone C (Fig. 19, 23)

F352 Cut of grave (Group 2), filled with F351: Zone C (Figs. 19, 20, 23, 24, 41)

F353–F354 Non-archaeological

F355 Fill of pit F356: Zone C (Fig. 49)

F356 Cut of pit, filled with F355: Zone C (Figs. 18, 33, 49)

F357−F358 Non-archaeological

F359 Cut of modern boundary, filled with F338, F320, F319: Zone C (Figs. 7, 18, 33, 34)

F360 Fill of linear feature F361: Zone C (Fig. 51)

F361 Cut of linear feature, filled with F360: Zone C (Figs. 18, 33, 51)

F362 Fill of post-hole F363: Zone C (Fig. 50)

F363 Cut of post-hole, filled with F362: Zone C (Figs. 18, 33, 50)

F364−F367 Non-archaeological

F368 Fill of grave F369 (SK16): Zone C (Fig. 19, 21)

F369 Cut of grave (Group 1), filled with F368: Zone C (Fig. 19, 20, 21, 22, 35)

F370 Fill of grave F371 (SK2 and SK4): Zone C (Fig. 19, 21)

F371 Cut of grave (Group 1), filled with F370: Zone C (Figs. 19, 20, 21, 22, 36)

F372 Fill of grave F373 (SK13, DSK14 and SK17): Zone C (Figs. 19, 21)

F373 Cut of grave (Group 1), filled with F372: Zone C (Figs. 19, 20, 21, 22)

F374 Fill of grave F375 (SK11): Zone C (Figs. 19, 21)

F375 Cut of grave (Group 1), filled with F374: Zone C (Figs. 19, 20, 21, 22, 36)

F376 Same as F760, cut of grave

F377 Same as F761, fill of grave

F378−F379 Non-archaeological

F380 Fill of grave F381 (SK3): Zone C (Figs. 19, 21)

F381 Cut of grave (Group 1), filled with F380: Zone C (Figs. 19, 20, 21, 22, 36)

F382−F387 Non-archaeological

F388 Fill of pit F389: Zone C (Fig. 48)

F389 Cut of pit, filled with F388: Zone C (Figs. 18, 32, 48)

F390−F393 Non-archaeological

F394 Fill of post-hole F395: Zone C (Fig. 50)

F395 Cut of post-hole, filled with F394: Zone C (Figs. 18, 33, 50)

F396−F397 Non-archaeological

F398 Fill of pit F399: Zone C (Fig. 48)

F399 Cut of pit, filled with F398: Zone C (Figs. 18, 33, 48) (Plate 28)

F400 Fill of grave F401 (SK15): Zone C (Figs. 19, 21)

F401 Cut of grave (Group 1), filled with F400: Zone C (Fig. 19, 20, 21, 22, 36)

F402 Fill of F403 (SK44 and DSK48): Zone C (Figs. 19, 21)

F403 Cut of grave (Group 1), filled with F402: Zone C (Fig. 19, 20, 21, 22, 37)

F404 Fill of pit F405: Zone C (Fig. 48)

F405 Cut of pit, filled with F404: Zone C (Figs. 18, 32, 48)

F406 Fill of grave F407 (SK8): Zone C (Figs. 19, 21)

F407 Cut of grave (Group 1), filled with F406: Zone C (Figs. 19, 20, 21, 22, 37)

F408 Fill of grave F409 (SK5): Zone C (Figs. 19, 21)

F409 Cut of grave (Group 1), filled with F408: Zone C (Figs. 19, 20, 21, 22, 37) (Plate 14)

F410−F411 Non-archaeological

F412 Fill of linear pit F413: Zone C (Fig. 48)

F413 Cut of linear pit, filled with F412: Zone C (Figs. 18, 32, 48)

F414−F417 Non-archaeological

F418 Fill of pit F419: Zone C

F419 Cut of pit, filled with F418: Zone C (Fig. 18, 33)

F420 Fill of pit F421: Zone C

F421 Cut of pit, filled with F420: Zone C (Fig. 18, 33)

F422−F423 Non-archaeological

F424 Upper fill of pit F425: Zone C (Fig. 47)

F425 Cut of pit, filled with F615, F424: Zone C, pit group 2 (Figs. 18, 32, 47)

F426−F427 Non-archaeological

F428 Fill of grave F429 (SK12): Zone C (Figs. 19, 25)

F429 Cut of grave (Group 3), filled with F428: Zone C (Figs. 19, 20, 25, 26)

F430−F433 Non-archaeological

F434 Fill of post-hole F435: Zone C (Fig. 50)

F435 Cut of post-hole, filled with F434: Zone C (Figs. 18, 33, 50)

F436 Fill of post-hole F437: Zone C (Fig. 50)

F437 Cut of post-hole, filled with F436: Zone C (Figs. 18, 33, 50)

F438 Fill of grave F439 (SK29): Zone C (Figs. 19, 25)

F439 Cut of grave (Group 3), filled with F438: Zone C (Fig. 19, 20, 25, 26, 43)

F440−F443 Non-archaeological

F444 Fill of pit F445: Zone C (Fig. 49)

F445 Cut of pit, filled by F807, F444: Zone C (Figs. 18, 33, 49)

F446−F447 Non-archaeological

F448 Upper fill of post-hole F449: Zone C (Fig. 50)

F449 Cut of post-hole, filled with F723, F448: Zone C (Figs. 18, 33, 50) (Plate 29)

F450−F453 Non-archaeological

F454 Fill of grave F455 (DSK43): Zone C (Figs. 19, 25)

F455 Cut of grave (Group 3), filled with F454: Zone C (Figs. 19, 20, 25, 26, 43)

F456−F459 Non-archaeological

F460 Fill of grave F461 (SK47): Zone C (Figs. 19, 25)

F461 Cut of grave (Group 3), filled with F460: Zone C (Fig. 19, 20, 25, 26, 43) (Plate 19)

F462 Fill of post-hole F562: Zone C (Fig. 50)

F463 Cut of post-hole, filled with F464: Zone C (Figs. 18, 33, 50)

F464 Fill of post-hole F463: Zone C (Fig. 50)

F465 Non-archaeological

F466 Fill of post-hole F467: Zone C (Fig. 50)

F467 Cut of post-hole, filled with F466: Zone C (Figs. 18, 33, 50)

F468 Fill of post-hole F469: Zone C (Fig. 50)

F469 Cut of post-hole, filled with F468: Zone C (Figs. 18, 33, 50)

F470–F473 Non-archaeological

F474 Same as F725, fill of linear feature

F475 Same as F726, cut of linear feature

F476 Fill of pit F477: Zone C (Fig. 48)

F477 Cut of charcoal-rich pit, filled with F476: Zone C (Figs. 18, 32, 48)

F478–F483 Non-archaeological

F484 Cut of boundary ditch, filled with F638, F637, F636, F635: Zones C, D (Figs. 7 & 70)

F485 Fill of pit F486: Zone D (Fig. 58)

F486 Cut of charcoal-rich pit, filled with F485: Zone D (Figs. 52, 58)

F487 Fill of pit F488: Zone D (Fig. 56)

F488 Cut of charcoal-rich pit, filled with F487: Zone D (Figs. 52, 56)

F489 Fill of field ditch F490: Zones C and E (Fig. 61)

F490 Cut of modern boundary, filled with F489: Zones C and E (Figs. 7, 33, 61)

F491 Fill of field drain F492: Zone C and E (Fig. 61)

F492 Cut of modern drain, filled with F491: Zones C and E (Fig. 61)

F493 Fill of enclosure ditch F003: Zone E (Fig. 61)

F494 Fill of enclosure ditch F003: Zone E (Fig. 61)

F495 Fill of enclosure ditch F003: Zone E (Fig. 61)

F496 Upper fill of pit F497: Zone D (Fig. 55)

F497 Cut of pit, filled with F540, F496: Zone D (Fig. 52, 55)

F498 Fill of pit F499: Zone D (Fig. 55)

F499 Cut of pit, filled with F498: Zone D (Fig. 52, 55)

F500 Fill of pit F501: Zone C (Fig. 49)

F501 Cut of pit, filled with F500: Zone C (Figs. 18, 33, 49)

F502–F505 Non-archaeological

F506 Same as F725, fill of linear feature

F507 Same as F726, cut of linear feature

F508–F515 Non-archaeological

F516 Fill of linear feature F517: Zone C (Fig. 46)

F517 Cut of linear feature, filled with F516: Zone C (Figs. 18, 32, 46)

F518–F519 Non-archaeological

F520 Fill of post-hole F521: Zone E (Fig. 63)

F521 Cut of post-hole, filled with F520: Zone E (Figs. 59, 63) (Plate 37)

F522 Fill of pit F523: Zone E (Fig. 63)

F523 Cut of pit, filled with F522 (Figs. 59, 63)

F524 Fill of pit F525: Zone E (Fig. 63)

F525 Cut of pit, filled with F524: Zone E (Figs. 59, 63)

F526 Fill of pit F527: Zone D (Fig. 58)

F527 Cut of charcoal-pit pit, filled with F526: Zone D (Fig. 52, 58)

F528 Fill of pit F529: Zone E (Fig. 63)

F529 Cut of pit, filled with F528: Zone E (Figs. 59, 63)

F530 Primary fill of pit F243: Zone C (Fig. 47)

F531 Fill of post-hole F532: Zone D (Fig. 53)

F532 Cut of post-hole, filled with F531: Zone D (Figs. 52, 53)

F533−F534 Non-archaeological

F535 Secondary fill of pit F241: Zone C (Fig. 46)

F536 Primary fill of pit F241: Zone C (Figs. 46)

F537 Primary fill of pit F199: Zone C (Fig. 47)

F538 Fill of pit F539: Zone D (Fig. 58)

F539 Cut of pit, filled with F538: Zone D (Figs. 52, 58)

F540 Primary fill of pit F497: Zone D (Fig. 55)

F541 Cut of charcoal-rich pit, filled with F542: Zone D (Figs. 52, 54)

F542 Fill of pit F541: Zone D (Fig. 54)

F543 Cut of charcoal-rich pit, filled with F544: Zone D (Figs. 52, 55)

F544 Fill of pit F543: Zone D (Fig. 55)

F545 Cut of charcoal-rich pit, filled with F546: Zone D (Fig. 52, 57)

F546 Fill of pit F545: Zone D (Fig. 57)

F547 Secondary fill of pit F183: Zone C (Fig. 46)

F548 Primary fill of pit F183: Zone C (Fig. 46)

F549 Upper fill of pit F237: Zone C (Fig. 46)

F550 Fill of stake-hole F551: Zone E (Fig. 63)

F551 Cut of stake-hole, filled with F550: Zone E (Figs. 59, 63)

F552 Cut of pit, filled with F553: Zone D (Figs. 52, 54)

F553 Fill of pit F552: Zone D (Fig. 54)

F554 Non-archaeological

F555 Cut of charcoal-rich pit, filled with F557, F556: Zone D (Figs. 52, 55)

F556 Upper fill of pit F555: Zone D (Fig. 55)

F557 Primary fill of pit F555: Zone D (Fig. 55)

F558 Cut of small conical pit filled with F559: Zone D (Figs. 52, 55)

F559 Fill of small pit F558: Zone D (Fig. 55)

F560 Fill of pit F561: Zone C (Fig. 48)

F561 Cut of pit, filled with F560: Zone C (Figs. 18, 32, 48)

F562 Cut of post-hole, filled with F462: Zone C (Figs. 18, 33, 50)

F563-F599: Not used

F600 Cut of pit, filled with F601: Zone D (Figs. 52, 55)

F601 Fill of pit F600: Zone D (Fig. 55)

F602 Cut of charcoal-rich/refuse pit, filled with F603: Zone D (Figs. 52, 57)

F603 Fill of pit F602: Zone D (Fig. 57)

F604 Fill of enclosure ditch F003: Zone C (Fig. 34)

F605 Fill of enclosure ditch F003: Zone C (Fig. 34)

F606 Upper fill of ditch F641: Zone E (Fig. 66)

F607 Non-archaeological

F608 Upper fill of enclosure ditch F003: Zone C

F609 Fill of ditch F003 under F608: Zone C

F610 Fill of ditch F003 under F611: Zone C

F611 Fill of ditch F003 under F609: Zone C

F612 Fill of ditch F003 under F327: Zone C

F613 Fill of ditch F003 under F610: Zone C

F614 Primary fill of ditch F003: Zone C

F615 Primary fill of pit F425: Zone C (Fig.

F616 Primary fill of pit F201: Zone C (Fig.

F617 Cut of pit, filled with F618: Zone C, pit group 2 (Figs. 18, 32, 47)

F618 Fill of pit F617: Zone C (Fig. 47)

F619 Fill of enclosure ditch F003 under F609: Zone C

F620 Fill of ditch F003: Zone C

F621 Fill of pit F622: Zone D (Fig. 58)

F622 Cut of charcoal-rich pit, filled with F621: Zone D (Figs. 52, 58)

F623 Cut of pit, filled with F625, F624: Zone C, pit group 2 (Figs. 18, 32, 47)

F624 Upper fill of pit F623: Zone C (Fig. 47)

F625 Primary fill of pit F623: Zone C (Fig. 47)

F626 Upper fill of enclosure ditch F003: Zone C (Fig. 34)

F627 Fill of ditch F003 under F626: Zone C (Fig. 34)

F628 Fill of ditch F003 under F627: Zone C (Fig. 34)

F629 Fill of ditch F003 under F628: Zone C (Fig. 34)

F630 Fill of ditch F003 under F629: Zone C (Fig. 34)

F631 Fill of ditch F003 under F630: Zone C (Fig. 34)

F632 Fill of ditch F003 under F631: Zone C (Fig. 34)

F633 Fill of ditch F003 under F632: Zone C

F634 Fill of ditch F003 under F633: Zone C (Fig. 34)

F635 Upper fill of townland boundary ditch F484: Zone C (Fig. 70)

F636 Fill of ditch F484: Zone C (Fig. 70)

F637 Fill of ditch F484: Zone C (Fig. 70)

F638 Primary fill of townland boundary ditch F484: Zone C (Fig. 70)

F639 Clay embankment of townland boundary beside ditch F484: Zone C (Fig. 70)

F640 Primary fill of pit F259: Zone D (Fig. 58)

F641 Cut of linear ditch filled with F642, F643, F743, F742, F606: Zone E (Figs. 60, 66)

F642 Main fill of ditch F641: Zone E (Fig. 66)

F643 Primary fill of ditch F641: Zone E

F644 Fill of pit F645: Zone D (Fig. 53)

F645 Cut of pit, filled with F644: Zone D (Figs. 52, 53)

F646 Cut of grave (Group 1), filled with F647: Zone C (Figs. 20 and 22)

F647 Fill of grave F646 (SK1): Zone C

F648–F649 Non-archaeological

F650 Fill of enclosure ditch F003 under F652: Zone E

F651 Fill of ditch F003 under F650: Zone E

F652 Fill of ditch F003 under F493: Zone E

F653 Cut of charcoal-rich pit, filled with F654: Zone C (Figs. 18, 33, 49)

F654 Fill of pit F653: Zone C (Fig. 49)

F655 Cut of charcoal-rich pit, filled with F656: Zone C (Figs. 18, 32, 49)

F656 Fill of pit F655: Zone C (Fig. 49)

F657 Cut of linear feature, filled with F658: Zone E (Figs. 59, 65)

F658 Fill of linear feature F657: Zone E (Fig. 65)

F659 Cut of linear feature, filled with F660: Zone E (Fig. 59, 65)

F660 Fill of linear feature F659: Zone E (Fig. 65)

F661 Cut of linear feature, filled with F662: Zone E (Figs. 59, 64) (Plate 40)

F662 Fill of linear feature F661: Zone E (Fig. 64)

F663 Upper fill of pit F711: Zone E (Fig. 62)

F664 Secondary fill of pit F711: Zone E (Fig. 62)

F665 Cut of linear feature, filled with F666: Zone E (Figs. 59, 64) (Plates 40, 41)

F666 Fill of linear feature F665: Zone E (Fig. 64)

F667 Spread: Zone E

F668 Cut of very shallow remains of pit, filled with F669: Zone E (Figs. 59, 62)

F669 Fill of pit F668: Zone E (Fig. 62)

F670-F699: Not used

F700 Cut of charcoal-rich pit, filled with F719, F718, F701: Zone E (Figs. 59, 62) (Plate 35)

F701 Upper fill of pit F700: Zone E (Fig. 62)

F702 Cut of charcoal-rich pit, filled with F703: Zone C (Figs. 18, 33, 49)

F703 Fill of pit F702: Zone C (Fig. 49)

F704 Cut of pit, filled with F705: Zone C (Figs. 18, 33, 49)

F705 Fill of pit F704: Zone C (Fig. 49)

F706 Cut of linear feature, filled with F707: Zone E (Figs. 59, 65)

F707 Fill of linear feature F706: Zone E (Fig. 65)

F708 Cut of charcoal-rich pit, filled with F709: Zone E (Figs. 59, 63)

F709 Fill of pit F708: Zone E (Fig. 63)

F710 Fill of enclosure ditch F003 under F494: Zone E

F711 Cut of charcoal-rich pit, filled with F720, F664, F663: Zone E (Figs. 59, 62) (Plate 36)

F712 Fill of enclosure ditch F003 under F494: Zone E

F713 Fill of ditch F003 under F493: Zone E

F714 Fill of ditch F003 under F493: Zone E (Fig. 61)

F715 Fill of ditch F003 under F714: Zone E (Fig. 61)

F716 Fill of ditch F003 under F714: Zone E

F717 Fill of ditch F003 under F495: Zone E

F718 Middle fill of pit F700: Zone E (Fig. 62)

F719 Primary fill of pit F700: Zone E (Fig. 62)

F720 Primary fill of pit F711: Zone E (Fig. 62)

F721 Cut of charcoal-rich pit, filled with F722, F736: Zone E (Figs. 59, 62)

F722 Primary fill of pit F721: Zone E (Fig. 62)

F723 Primary fill of post-hole F449: Zone C (Fig. 50)

F724 Non-archaeological

F725 Fill of linear feature F726: Zones C and E (Figs. 51, 64)

F726 Cut of linear feature, filled with F725: Zones C and E (Figs. 18, 33, 51, 59, 64) (Plate 41)

F727 Non-archaeological

F728 Fill of linear feature F729: Zone E (Fig. 65)

F729 Cut of linear feature, filled with F728: Zone E (Figs. 59, 65)

F730 Fill of linear feature F731: Zone E (Fig. 65)

F731 Cut of linear feature, filled with F730: Zone E (Figs. 59, 65)

F732 Fill of linear feature F733: Zone E (Fig. 65)

F733 Cut of linear feature, filled with F732: Zone E (Figs. 59, 65) (Plate 40)

F734 Fill of linear feature F735: Zone E (Fig. 65)

F735 Cut of linear feature, filled with F734: Zone E (Figs. 59, 65) (Plate 40)

F736 Upper fill of pit F721: Zone E (Fig. 62)

F737 Fill of linear feature F738: Zone E (Fig. 64)

F738 Cut of linear feature, filled with F737: Zone E (Figs. 59, 64) (Plate 41)

F739 Cut of charcoal-rich pit, filled with C740: Zone E (Figs. 59, 63, 64)

F740 Fill of pit F739: Zone E (Figs. 63, 64)

F741 Non-archaeological

F742 Fill of ditch F641: Zone E (Fig. 66)

F743 Fill of ditch F641: Zone E (Fig. 66)

F744 Cut of linear feature, filled with F745: Zone E (Figs. 59, 64) (Plate 41)

F745 Fill of linear feature F744: Zone E (Fig. 64)

F746 Cut of linear feature, filled with F747: Zone E (Fig. 59, 64) (Plate 41)

F747 Fill of F746: Zone E (Fig. 64)

F748 Cut of linear feature, filled with F749: Zone E (Figs. 59, 65)

F749 Fill of linear feature F748: Zone E (Fig. 65)

F750 Cut of linear feature, filled with F751: Zone E (Fig. 59) (Plate 41)

F751 Fill of linear feature F750: Zone E

F752 Cut of linear feature, filled with F753: Zone E (Figs. 59, 64) (Plate 41)

F753 Fill of linear feature F752: Zone E (Fig. 64)

F754 Cut of linear feature, filled with F755: Zone E (Figs. 59, 65)

F755 Fill of linear feature F754: Zone E (Fig. 65)

F756–F759 Non-archaeological

F760 Cut of grave (Group 1), filled with F761, F762: Zone C (Figs. 19, 20, 21, 22, 37)

F761 Primary fill of grave F760 (SK9 and DSK10): Zone C (Fig. 19, 21)

F762 Upper fill of grave F760: Zone C

F763 Cut of grave (Group 1), filled with F764: Zone C (Figs. 19, 20, 21, 22)

F764 Fill of grave F763 (SK27): Zone C (Fig. 19, 21)

F765 Cut of grave (Group 1), filled with F766: Zone C (Figs. 20, 22)

F766 Fill of grave F765 (DSK18): Zone C

F767 Cut of grave (Group 1), filled with F768: Zone C (Figs. 19, 20, 21, 22, 38)

F768 Fill of grave F767 (SK20): Zone C (Fig. 19, 21)

F769 Cut of grave (Group 1), filled with F770: Zone C (Figs. 19, 20, 21, 22, 38)

F770 Fill of grave F769 (SK19): Zone C (Fig. 19, 21)

F771 Cut of grave (Group 1), filled with F772: Zone C (Figs. 19, 20, 21, 22, 38) (Plate 15)

F772 Fill of grave F771 (SK24): Zone C (Fig. 19, 21)

F773–F784 Non-archaeological

F785 Cut of grave (Group 1), filled with F786: Zone C (Figs. 19, 20, 21, 22)

F786 Fill of grave F785 (SK30): Zone C (Fig. 19, 22)

F787 Cut of charcoal-rich pit, filled with F788: Zone C (Figs. 18, 33, 48)

F788 Fill of pit F787: Zone C (Fig. 48)

F789 Cut of charcoal-rich pit, filled with F790: Zone C (Figs. 18, 33, 48)

F790 Fill of pit F789: Zone C (Fig. 48)

F791–F794 Non-archaeological

F795 Cut of linear feature, filled with F796: Zone C (Figs. 18, 33, 51)

F796 Fill of linear feature F795: Zone C (Fig. 51)

F797 Cut of rubbish pit, filled with F798: Zone C (Figs. 18, 33, 48)

F798 Fill of pit F797: Zone C (Fig. 48)

F799 Cut of grave (Group 2), filled with F800: Zone C (Figs. 19, 20, 23, 24, 41)

F800 Fill of grave F799 (SK34): Zone C (Fig. 19, 23)

F801–F802 Non-archaeological

F803 Cut of grave (Group 1), filled with F804: Zone C (Figs. 19, 21)

F804 Fill of grave F803 (SK35): Zone C (Fig. 19, 21)

F805–F806 Non-archaeological

F807 Primary fill of pit F445: Zone C (Fig. 49)

F808 Fill of grave F809 (SK42): Zone C (Fig. 19, 23)

F809 Cut of grave (Group 2), filled with F808: Zone C (Figs. 19, 20, 23, 24) (Plate 16)

F810 Cut of grave (Group 1), filled with F811: Zone C (Figs. 19, 20, 21, 22)

F811 Fill of grave F810 (SK39): Zone C (Fig. 19, 21)

F812 Cut of grave (Group 2), filled with F813: Zone C (Figs. 19, 20, 23, 24, 42)

F813 Fill of grave F812 (SK40): Zone C (Fig. 19, 23)

F814–F815 Non-archaeological

F816 Cut of grave (Group 1), filled with F817: Zone C (Figs. 19, 20, 21, 22, 38)

F817 Fill of grave F816 (DSK45 and SK46): Zone C (Figs. 19, 21)

F818 Cut of grave (Group 3), filled with F819: Zone C (Figs. 19, 20, 25, 26, 44)

F819 Fill of grave F818 (SK49 and DSK57): Zone C (Figs. 19, 25)

F820 Cut of grave (Group 2, Level 2), filled with F821: Zone C (Figs. 30, 45) (Plate 22)

F821 Fill of grave F820 (SK50 and DSK51): Zone C (Fig. 30)

F822 Cut of grave (Group 2), filled with F823: Zone C (Figs. 19, 20, 23, 24, 42) (Plate 17)

F823 Fill of grave F822 (SK58): Zone C (Figs. 19, 23)

F824 Cut of grave (Group 1), filled with F825: Zone C

F825 Fill of grave F824 (SK62): Zone C (Figs. 19, 21)

F826 Fill of grave F827 (SK64): Zone C (Figs. 19, 21)

F827 Cut of grave (Group 1), filled with F826: Zone C (Figs. 19, 20, 21, 22, 39)

F828 Cut of grave (Group 1, Level 2), filled with F829: Zone C (Figs. 29, 45) (Plate 21)

F829 Fill of grave F828 (SK65): Zone C (Fig. 29)

F830−F831 Non-archaeological

F832 Cut of grave (Group 2), filled by F833, F834: Zone C (Figs. 19, 20, 23, 24, 32) (Plate 18)

F833 Fill of grave F832 (SK66): Zone C (Figs. 19, 23)

F834 Stone layer in grave F832: Zone C

F835 Cut of grave (Group 1), filled with F836: Zone C

F836 Fill of grave F835 (SK67): Zone C (Figs. 19, 21)

F837 Fill of grave F838 (SK69, DSK70, SK71 and DSK 76): Zone C (Fig. 19, 21)

F838 Cut of grave (Group 1), filled with F837: Zone C (Figs. 19, 20, 21, 22, 39)

F839 Fill of grave F840 (SK72): Zone C (Figs. 19, 27)

F840 Cut of grave (Group 4), filled with F839: Zone C (Figs. 19, 20, 27, 28, 44) (Plate 20)

F841 Fill of grave F842 (SK73, SK74 and DSK75): Zone C (Figs. 19, 23)

F842 Cut of grave (Group 2), filled with F841: Zone C (Figs. 19, 20, 23, 24, 42)

F843 Cut of grave (Group 1), filled with F844: Zone C (Figs. 19, 20, 21, 22, 39)

F844 Fill of grave F843 (SK77): Zone C (Figs. 19, 21)

F845 Fill of grave F846 (SK78): Zone C (Figs. 19, 21)

F846 Cut of grave (Group 1), filled with F845: Zone C (Figs. 19, 20, 21, 22, 39)

F847 Cut of grave (Group 4), filled with F848: Zone C (Figs. 19, 20, 27, 28, 44)

F848 Fill of grave F847 (SK79): Zone C (Figs. 19, 27)

F849 Cut of grave (Group 2), filled with F850: Zone C (Figs. 19, 23)

F850 Fill of grave F849 (SK80): Zone C (Figs. 19, 23)

F851 Cut of grave (Group 4), filled with F852: Zone C (Figs. 19, 20, 27, 28, 44)

F852 Fill of grave F851 (SK81): Zone C (Figs. 19, 27)

F853 Cut containing burnt spread F854: Zone F (Fig. 68)

F854 Burnt spread contained by cut F853: Zone F (Figs. 67 and 68)

F855 Cut containing burnt spread F856: Zone F (Fig. 68)

F856 Burnt spread contained by cut F855: Zone F (Figs. 67 and 68)

F857 Cut containing burnt spread F858: Zone F (Fig. 68)

F858 Burnt spread contained by cut F857: Zone F (Figs. 67 and 68) (Plate 42)

F859 Burnt spread: Zone F

F860 Cut of trough, filled with C861: Zone F (Figs. 67 and 69)

F861 Fill of trough F860: Zone F (Fig. 69)

F862 Cut of possible trough, filled with C863: Zone F (Figs. 67 and 69)

F863 Fill of possible trough F862: Zone F (Fig. 69)

F864 Cut of trough, filled with C865: Zone F (Figs. 67 and 69)

F865 Fill of trough F864: Zone F (Fig. 69)

4.2.2 Stratigraphic Matrix

Natural deposits

F001	Topsoil. Soft, grey-brown, silty clay, generally 0.30m deep. Finds included a tapered, D-sectioned, ground stone implement (E2220:1:7), pieces of iron slag (E2220:1:8), two iron nail fragments (E2220:1:9, E2220:1:14), a clay pipe (E2220:1:10), two iron blade fragments (E2220:1:11, E2220:1:13), and a piece of post-medieval pottery (E2220:1:12).
F002	Subsoil. Varied from light to grey, silty clay with stones, to orange-yellow silty sand.

Enclosure ditch (Zones A, B, C, D)

Enclosure ditch F003 (Figs. 7, 8, 13, 18, 59) (Plates 2, 3, 5, 11, 12, 13)

F003	Cut of ovoid enclosure ditch with a 5m break for a north-facing entrance. The ditch had an excavated length on the Lismore side (Zones A and B) of 78m, west of the entrance causeway, and a further 3.5m on the east side of the entrance. On the Bushfield side (Zones C, D and E), the ditch had an excavated length of 67m. A limited section of its northern extent, around 31m long, continued outside the northern CPO fence and was not excavated. A more substantial section, with an estimated length of 87m, lay outside the southern CPO fence. This means that the excavated extent of the ditch represents roughly 79% of the total. The enclosure, as delimited by ditch F003, had overall external dimensions of 98m (NW/SE) by an estimated 80m (NE/SW). The ditch measured 4.37m x 0.90-1.10m (max. width x depth). It had a gradual break of slope at the top, concave sides, and a sharp break of slope leading to a rounded base. It was truncated by drain F007, field ditches F008, F359 and F492, and townland boundary ditch F062. The ditch contained 43 fills−twelve lower: F016, F326, F327, F495, F612, F614, F633, F634, F651, F715, F716, F717; twenty-six middle: F005, F322, F323, F324, F325, F494, F604, F605, F609, F610, F611, F613, F619, F620, F627, F628, F629, F630, F631, F632, F650, F652, F710, F712, F713, F714; five upper: F004, F321, F493, F608, F626. Above subsoil F002, below lower fills.

Enclosure ditch fills

ZONE A and B: F003 Fills (Figs. 10, 14)

Fills F004, F005, F016

F016	Primary fill of ditch F003, with firm blue-grey clay. Occasional rounded stones, pebbles, and animal bone included. Measured 0.52m x 0.32m (width x depth). One piece of flint found (E2220:16:1). One soil sample taken (15), and one bag of animal bones taken. Above F003, below F005.
F005	Middle fill of ditch F003, with moderately compact, blue-grey, silty sand. A moderate amount of sandstones, animal bone and charcoal included. Measured 2.40m x 0.36m (width x depth). One glass ring-bead, a piece of slag, a crucible and one fragment of a quernstone found (E2220:5:1, E2220:5:2, E2220:5:3). One soil sample (1), and 12 bags of animal bones taken. Above F016, below F004.
F004	Upper fill of ditch F003, with moderately compact, grey-brownish, silty clay. Occasional small and large stones and animal bone included. Measured 4.36m x 0.18m (max. width x depth). Two pieces of slag (E2220:4:1, E2220:4:2), and a copper-alloy blade found (E2220:4:3; Plate 46). One soil sample (12), and one bag of animal bones taken. Above F005, below topsoil F001.

ZONE C & E: Lower fills (Figs. 34, 61)

F003 enclosure ditch, lower fills, Zone C

F326	Lower fill of ditch F003, with friable, dark grey-brown, sandy clay. Frequent small sandstones, and occasional large charcoal flecks, shell and bone included. Measured 0.55m x 0.08m (width x depth). One oblong stone object found (E2220:326:1). Two soil samples taken (65-66). Above F327, below F323. (Zone C. Fig. 34)
F327	Lower fill of ditch F003, with very compact, light grey, silty sand. Frequent small and medium-sized stones included. Measured 1.40m x 0.20m (width x depth). One piece of bone found. One soil sample taken (69). Above subsoil F002, below F326. (Zone C. Fig. 34)
F612	Lower fill of ditch F003, with compact, light grey-orange, silty sand. Frequent small stones included. Measured 0.30m x 0.10m (width x depth). Similar to fill F619. One soil sample taken (172). Above F614, below F620. (Zone C)
F614	Primary fill of ditch F003, with hard, grey-orange, silty sand. Frequent small stones

	included. Measured 0.17m x 0.10m (width x depth). One soil sample taken (173). Above subsoil F002, below F612. (Zone C)
F633	Lower fill of ditch F003, with compact, light brown-greyish, silty sand. Occasional small stones included. Measured 0.66m x 0.08m (width x depth). One soil sample taken (259). Above F634, below F631. (Zone C)
F634	Lower fill of ditch F003, with very hard, light brown-grey, clayey sand. Frequent stones, and occasional charcoal and shell included. Measured 0.53m x 0.13m (width x depth). One soil sample taken (260). Above F326, below F633. (Zone C. Fig. 34)

F003 enclosure ditch, Zone E, lower fills

F495	Lower fill of ditch F003, with compact, bluish-grey, silty sand. Frequent pebbles and animal bone, and occasional burnt bones included. Measured 2.50m x 0.27m (width x depth). Four soil samples (189, 205, 208, 225) and four bags of animal bone were taken. Above edge of ditch F003, below F494. (Zone E. Fig. 61)
F651	Primary fill of ditch F003, with cemented, yellowish-grey, sandy clay. Frequent stones and pebbles included. Measured 1.00m x 0.28m (width x depth). One soil sample taken (188). Above edge of ditch F003, below F495. (Zone E)
F715	Lower fill of ditch F003, with compact, yellowish-light grey, clay. A moderate amount of large stones, and occasional animal bone included. Measured 2.23m x 0.10m (width x depth). Two soil samples (209, 251), and one bag of animal bone taken. Possibly same fill as F716. Above F495, below F714. (Zone E. Fig. 61)
F716	Lower fill of ditch F003, with compact, grey, sandy clay. Occasional small stones included. Measured 2.86m x 0.23m (width x depth). No samples taken. Possibly same fill as F715. Above F495, below F714. (Zone E)
F717	Primary fill of ditch F003, with strongly cemented, grey, clay. Frequent charcoal and a moderate amount of stones and animal bones included. Measured 1.02m x 0.31m (width x depth). One soil sample (210) and one bag of animal bone taken. Above edge of ditch F003, below F495. (Zone E)

ZONE C and E fills: Middle (Figs. 34, 61)

Enclosure ditch F003, Zone C, middle fills

F322	Middle fill of ditch F003, with friable, light brown, greyish-orange, silty sand. Frequent large and small stones included. Measured 2.15m x 0.39m (width x depth). One soil sample taken (68). Above F604, below F321. (Fig. 34)

F323	Middle fill of ditch F003, with friable, light brown-greyish, silty sand. Frequent small and large stones and pebbles included. Measured 0.65m x 0.16m (width x depth). One soil sample taken (61). Above F326, below F324. (Fig. 34)
F324	Middle fill of ditch F003, with friable, light grey brown to orange, silty sand. Frequent small stones included. Measured 0.90m x 0.16m (width x depth). One soil sample taken (67). Above F323, below F605. (Fig. 34)
F325	Middle fill of ditch F003, with friable, very light brown to yellow-orange, silty sand. Frequent large sandstones, small stones and animal bone included. Measured 1.55m x 0.90m (width x depth). One soil sample (63) and one or two bags of animal bone taken. Above F326, below F324.
F604	Middle fill of ditch F003, with compact, light grey-yellowish, silty sand. Occasional small stones included. Measured 0.35m x 0.10m (width x depth). One soil sample taken (186). Above F605, below F322. (Fig. 34)
F605	Middle fill of ditch F003, with friable, yellow-light brown, silty sand. Occasional small stones included. Measured 0.66m x 0.15m (width x depth). One soil sample taken (185). Above F324, below F604. (Fig. 34)
F609	Middle fill of ditch F003, with friable, brown-orange to greyish, coarse sand. Occasional small stones included. Measured 1.60m x 0.39m (width x depth). One soil sample taken (180). Above F619, below F608.
F610	Middle fill of ditch F003, with compact, dark grey-light brown, silty sand. Frequent stones and bones included. Measured 1.20m x 0.22m (width x depth). Similar to lower fill F327. One soil sample taken (183). Above F605, below F619.
F611	Middle fill of ditch F003, with soft, brown-orange, silty sand. Occasional small stones included. Measured 0.45m x 0.19m (width x depth). One soil sample taken (184). Above F610, below F609.
F613	Middle fill of ditch F003, with soft-firm, grey-brown, silty sand. Occasional small stones included. Measured 0.38m x 0.20m (width x depth). One soil sample taken (175). Above F327, below F610.
F619	Middle fill of ditch F003, with compact, light grey-yellowish, silty sand. Occasional small stones included. Measured 0.73m x 0.15m (width x depth). One soil sample taken (187). Similar to lower fill F612. Above F610, below F609.
F620	Deposit recorded along the external edge of ditch F003, with friable, light brown-orange, silty sand. Frequent small stones included. Measured 0.50m x 0.10m (width x depth). One soil sample taken (174). Possibly a pocket of non-ditch material located behind/associated with a natural boulder exposed fairly high up the edge of the ditch.

F627	Middle fill of ditch F003, with compact patches of dark grey-light brown, silty sand. Frequent large, irregular stones included. Measured 1.30m x 0.19m (width x depth). One soil sample taken (253). Above F629, below F626. (Fig. 34)
F628	Middle fill of ditch F003, compact, light brown-light grey, silty sand. Frequent small stones included. Measured 0.90m x 0.09m (width x depth). One soil sample taken (254). Above F630/F632, below F629. (Fig. 34)
F629	Middle fill of ditch F003, with soft-firm, dark orange-brown, silty sand. Frequent small stones included. Measured 0.60m x 0.20m (width x depth). One soil sample taken (255). Above F628, below F627. (Fig. 34)
F630	Middle fill of ditch F003, with very hard, grey, silty sand. Frequent small stones included. Measured 0.84m x 0.08m (width x depth). One soil sample taken (256). Above F631, below F628. (Fig. 34)
F631	Middle fill of F003, with very hard, dark grey-orange, silty sand. Frequent charcoal and bones included. Measured 0.56m x 0.17m (width x depth). One soil sample taken (257). Above F633, below F630 and C632. (Fig. 34)
F632	Middle fill of ditch F003, with friable, light brown-grey, silty sand. Frequent stones and charcoal included. Measured 0.84m x 0.09m (width x depth). One soil sample taken (258). Above F631, below F628. (Fig. 34)

Enclosure ditch F003, Zone E, middle fills

F494	Middle fill of ditch F003, with compact, bluish-grey, clayey sand. A moderate amount of animal bone, and occasional charcoal and small stones included. Measured 1.68m x 0.23 (width x max. depth). Five soil samples (54, 159, 191, 204, 223), and one bag of animal bone taken. Above lower fill F495, below F493. (Fig. 61)
F650	Middle fill of ditch F003, with cemented, dark greyish-black, sandy clay. Frequent charcoal, and occasional stones included. Measured 1.08m x 0.10m (width x depth). One soil sample taken (181). Above lower fill F495, below F652.
F652	Middle fill of ditch F003, with strongly cemented, orangish-yellowish, clay. Occasional charcoal and pebbles included. Measured 0.68m x 0.27m (width x depth). One soil sample taken (190). Above F650, below F494.
F710	Middle fill of ditch F003, with compact, black clay. Frequent charcoal and a moderate amount of burnt bone included. Measured 1.00m x 0.20 (width x depth). Two soil samples taken (206, 274). Above lower fill F495, below F494.
F712	Middle fill of ditch F003, with compact, brown, clayey sand. Frequent stones

	included. Measured 1.10m x 0.34m (width x depth). One soil sample taken (222). Above lower fill F495, below F494.
F713	Middle fill of ditch F003, with compact, brownish-grey, sandy clay. Frequent charcoal and stones included. Measured 1.03m x 0.18m (width x depth). One soil sample taken (224). Above F494, below F493.
F714	Middle fill of ditch F003, with compact, brownish-grey, sandy clay. A moderate amount of stones included. Measured 4.23m x 0.40m (width x depth). One soil sample taken (211). Above F715, below F493. (Fig. 61)

ZONE C and E fills: Upper

Enclosure ditch F003, Zone C, upper fills

F321	Upper fill of ditch F003, with friable, light brown-grey, silty sand. Occasional stones and charcoal included. Measured 1.65m x 0.24m (section 2) (width x depth). One soil sample taken (64). Above F322, below/truncated by field ditch F359. (Fig. 34)
F608	Upper fill of ditch F003, with hard, brown-greyish, silty sand. A moderate amount of small stones included. Measured 1.25-1.45m x 0.08-0.12m (width x depth). Very mixed deposit (topsoil, stones and roots). One soil sample taken (182). Above F609, below topsoil F001.
F626	Upper fill of ditch F003, with friable, dark brown, silty sand. Frequent medium-sized stones included Measured 0.90m x 0.15m (width x depth). One soil sample taken (252). Above F627, below topsoil F001. (Fig. 34)

Enclosure ditch F003, Zone E, upper fill

F493	Upper fill of ditch F003, with compact, mid-brown, sandy clay. Occasional small stones included. Measured 2.22m x 0.26m (width x depth). Four soil samples taken (53, 158, 193 & 207). Above F494, below/truncated by field ditch F492. (Fig. 61)

Zone A

Topsoil and Subsoil

Natural deposits

F001	Topsoil consisted of grey-brown, silty clay. Finds included a tapered, D-sectioned, ground stone implement (E2220:1:7), pieces of iron slag (E2220:1:8), two iron nail fragments (E2220:1:9, E2220:1:14), a clay pipe (E2220:1:10), two iron blade fragments (E2220:1:11, E2220:1:13), and a piece of post-medieval pottery (E2220:1:12).
F002	Subsoil varied from light grey-brown, silty clay to orange-yellow sand, with a variable frequency of stones.

Pits inside enclosure

Pit F058 (Figs. 8 and 11)

F058	Cut of circular pit. Measured 1.65m x 0.75m x 0.60m. Ovoid in plan, but the southeast end was heavily disturbed by root activity. Orientated north-west/south-east. Filled with F029, F028, F021 & F059. Above subsoil F002, below F029.
F029	Primary fill of pit F058, with dark greyish, silty sand. Frequent charcoal included. Measured 1.65m x 0.75m x 0.60m (max.). No finds or samples taken. Above edge of pit F058, below F028.
F028	Middle fill of pit F058, with soft, dark grey, silty sand. Occasional charcoal included. Measured 1.65m x 0.50m x 0.30m (max.). No finds or samples taken. Above F029, below F021.
F021	Middle fill of pit F058, with dark brown-greyish, silty sand. Frequent charcoal and small stones included. Measured 1.65m x 0.65m x 0.60m. One soil and charcoal sample taken (13). Above F028, below F059.
F059	Upper fill of pit F058, with soft, brownish with orange flecks, silt. Moderate charcoal included. Measured 1.65m x 0.65m x 0.60m. Two soil and charcoal samples taken (2, 8) and one bag of animal bone. Above F021, below topsoil F001.

Pit F014 (Figs. 8 and 11)

F014	Cut of circular pit. Measured 0.63m x 0.64m x 0.22m. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to an uneven base.

	Located close to smaller pit F018. Filled with F015. Above subsoil F002, below F015.
F015	Fill of pit F014, with firm, light grey, clay with brown spotting. Occasional small stones, and moderate charcoal included. Measured 0.63m x 0.64m x 0.22m. No finds or samples taken. Above F014, below topsoil F001.

Pit F018 (Figs. 8 and 11)

F018	Cut of circular pit. Measured 0.46m x 0.40m x 0.13m. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a flat base. Located northwest of pit F014. Filled with F070, F019. Above subsoil F002, below F070.
F070	Primary (Lower) fill of pit F018, with firm, dark yellow, silty sand. Frequent charcoal included. Measured 0.46m x 0.40m x 0.10m. No finds or samples taken. Above F018, below F019.
F019	Upper fill of pit F018, with firm, dark grey-black, silty sand. Frequent charcoal included. Measured 0.46m x 0.40m x 0.085m. No finds or samples taken. Above F070, below topsoil F001.

Pit F032 (Figs. 8 and 11)

F032	Cut of sub-circular pit. Measured 0.71m x 0.53m x 0.08m. Orientated north-south. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to an uneven base. Located close to the inner edge of ditch F003. Filled with F033. Above subsoil F002, below F033.
F033	Fill of pit F032, with soft, black sandy silt. Occasional stones included. Measured 0.71m x 0.53m x 0.08m. No finds or samples taken. Above F032, below topsoil F001.

Features outside enclosure

Slagpit furnace 1 (Figs. 8, 9, and 12; Plates 6, 7)

F086	Cut of circular slagpit furnace, located outside enclosure ditch. Measured 0.52m x 0.50m x 0.12m. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to an uneven base. Associated with four other slagpit furnaces F088, F090, F092 & F095. Filled with F097, F087. Above subsoil F002,

	below F097.
F097	Primary fill of slagpit furnace F086, with hard, red oxidised clay. No inclusions. Measured 0.52m x 0.50m x 0.11m. One soil sample taken (19). Above F086, below F087.
F087	Secondary (Upper) fill of F086, with firm, dark brown-black, clayey sand. Frequent charcoal included. Measured 0.44m x 0.38m x 0.06m. One soil and one charcoal sample taken (17, 23). Above F097, below topsoil F001.

Slagpit furnace 2 (Figs. 8, 9 and 12; Plates 6, 7)

F088	Cut of circular slagpit furnace, located outside enclosure ditch. Measured 0.68m x 0.65m x 0.22m. It had a sharp-gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Associated with other slagpit furnaces F086, F090, F092 & F095. Filled with F107, F106 & F089. Above subsoil F002, below F107.
F107	Primary fill of slagpit furnace F088, with hard, reddish-brown, oxidised clay. No inclusions. Measured 0.68m x 0.60m x 0.10m. One soil sample taken (28). Above F088, below F106.
F106	Middle fill of slagpit furnace F088, with stiff, dark brown-black, clayey sand. Frequent charcoal included. Measured 0.27m x 0.16m x 0.04m. One soil sample taken (16). Above F107, below F089.
F089	Upper fill of slagpit furnace F088, with firm, yellowish brown, clayey sand. Frequent burnt clay and iron slag included. Measured 0.50m x 0.45m x 0.18m. One soil sample taken (22). Above F106, below topsoil F001.

Slagpit furnace 3 (Figs. 8, 9 and 12;Plates 6, 7)

F090	Cut of circular slagpit furnace, located outside enclosure ditch. Measured 0.66m x 0.54m x 0.22m. It had a sharp break of slope at the top, concave sides and a gradual break of slope leading to a rounded base. Associated with other slagpit furnaces F086, F088, F092 & F095. Truncated by slagpit furnace F095. Filled with F101, F102, F100 & F091. Above subsoil F002, below F101.
F101	Primary fill of slagpit furnace F090, with hard, red oxidised clay. No inclusions. Measured 0.61m x 0.61m x 0.06m. One soil sample taken (29). Above F090, below F102.
F102	Middle fill of slagpit furnace F090, with friable, dark brown, clayey sand. Frequent

	charcoal included. Measured 0.42m x 0.38m x 0.04m. No finds or samples taken. Above F101, below F100.
F100	Middle fill of slagpit furnace F090, with firm, light brown, clayey sand with red spotting. Occasional burnt stones included. Measured 0.62m x 0.48m x 0.06m. No finds or samples taken. Above F102, below F091.
F091	Upper fill of slagpit furnace F090, with firm, light brown, clayey sand. Frequent charcoal included. Measured 0.50m x 0.41m x 0.13m. One soil sample taken (26). Above F100, below topsoil F001.

Slagpit furnace 4 (Figs. 8, 9 and 12; Plates 6, 7)

F092	Cut of circular slagpit furnace, located outside enclosure ditch. Measured 0.70m x 0.65m x 0.25m. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Associated with other slagpit furnaces F086, F088, F090, F095. Filled with F105, F104, F093. Above subsoil F002, below F105.
F105	Primary fill of slagpit furnace F092, with hard, reddish-brown, oxidised clay. No inclusions. Measured 0.66m x 0.60m x 0.07m. One soil sample taken (25). Above F092, below F104.
F104	Middle fill of slagpit furnace F092, with friable, black-brown, clayey sand. Frequent charcoal included. Measured 0.60m x 0.49m x 0.10m. One charcoal and one soil sample taken (20-21). Above F105, below F093.
F093	Upper fill of slagpit furnace F092, with friable, reddish-brown, clayey sand. Occasional charcoal included. Measured 0.58m x 0.46m x 0.16m. One soil sample taken (30). Above F104, below topsoil F001.

Slagpit furnace 5 (Figs. 8, 9 and 12; Plates 6, 7)

C095	Cut of circular slagpit furnace, located outside enclosure ditch. Measured 0.70m x 0.66m x 0.23m. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Associated with other slagpit furnaces F086, F088, F090, F092. It cut slagpit furnace F090. Filled with F099, F098, F096, F103. Above subsoil F002, below F099.
C099	Primary fill of slagpit furnace F095, with stiff, reddish brown, oxidised clayey sand. No inclusions. Measured 0.70m x 0.65m x 0.05m. One soil sample taken (31). Above edge of slagpit furnace F095, below F098.
C098	Middle fill of slagpit furnace F095, with firm, black-brown, clayey sand. No

	inclusions. Measured 0.54m x 0.50m x 0.07m. One soil sample taken (24). Above F099, below F096.
C096	Middle fill of slagpit furnace F095, with friable, reddish-brown, clayey sand with red spotting. No inclusions. Measured 0.35m x 0.30m x 0.15m. One soil sample taken (27). Above F098, below F103.
C103	Upper deposit of slagpit furnace F095, with firm, light brown, clayey sand. Occasional charcoal included. Measured 0.31m x 0.25m x 0.09m. No finds or samples taken. Above F096, below topsoil C001.

Pit (Figs. 8, 9 and 12; Plates 6, 7)

F083	Cut of irregular pit next to slagpit furnaces. Measured 0.70m x 0.40m x 0.11m. Located adjacent to slagpit furnace F088. Filled with F094 and F109. Above subsoil F002, below F109.
F109	Lower fill of pit F083, with friable, grey-brown, silty sand. No inclusions. Measured 0.60m x 0.47m x 0.05m. No finds or samples taken. Above F083, below F094.
F094	Upper fill of pit F083. Irregular spread with firm, dark brown, clayey sand. Measured 0.25m x 0.10m x 0.07m. Orientated north-south. Located close to slagpit furnaces F086, F088, F090, F092, F095. No finds or samples taken. Above F109, below F001.

Shallow channel (Figs. 8 and 9)

F080	Cut of shallow channel, extending between slagpit furnaces F092 and F095. Measured 0.60m x 0.35m x 0.08m. Filled with F108. Above subsoil F002, below F108.
F108	Irregular spread with friable, greyish-brown, clayey sand. Measured 0.40m x 0.33m x 0.13m. Orientated northeast-southwest. Extends between slagpit furnaces F092 and F095. One soil sample taken (18). Above subsoil F002, below topsoil F001.

Post-medieval linear features

Linear field drain F007 (Zones A and B; Figs. 8, 9, 13 and 17)

F007	Cut of linear drain. Measured 8m x 6m x 0.25m. Orientated north-west. It had a gradual break of slope at the top, concave sides, and a gradual break of slope

	leading to a rounded base. Cuts enclosure ditch F003. Filled with F006. Above subsoil F002, below F006.
F006	Fill of drain F007, with friable, brown-yellow, sandy silt. Occasional small, round stones and slag included. Measured 8m x 6m x 0.25m. Above F007, below topsoil F001.

Linear field ditch F008 (Zones A and B; Figs. 7, 8, 13 and 14)

F008	Cut of linear ditch. Measured c. 76m x 2.20m x 0.33m. Orientated north-south. Had a gradual break of slope at the top, concave-vertical sides, and a gradual break of slope leading to a rounded base. Truncated enclosure ditch F003 at two points, traversing interior of enclosure. Filled with F009. Above subsoil F002, below F009.
F009	Fill of field ditch F008, with moderately compact, grey-brown, silty sand. Occasional small and round stones included. Measured 2.20m x 0.33m (width x depth). No finds or samples taken. Above F008, below topsoil F001.

Linear field ditch (F053/F017) Zone A (Figs. 8 and 11)

F053	Cut of linear ditch. Measured c. 11m x 1.06m x 0.15m. Orientated north-west/south-east. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to an uneven base. Truncated enclosure ditch F003. Truncated by re-cut F017. Filled with F052. Above subsoil C002, below F052. Slot-sectioned only.
F052	Fill of field ditch/drain F053, with soft, grey-blue, medium sand. No inclusions. Measured 0.84m x 1.06m x 0.15m. No finds or samples taken. Truncated by re-cut F017. Above F053, below F017.
F017	Linear re-cut of field ditch F053. Measured c. 11m x 1.06m x 0.16m. It had a gradual break of slope at the top and base, with concave sides and an uneven base. It cut enclosure ditch F003. Filled with F042. Above F052, below F042. Slot-sectioned only.
F042	Fill of ditch re-cut F017, with soft, orange-brown, medium sand. No inclusions. Measured 0.80m x 1.06m x 0.16m. No finds or samples taken. Above F017, below topsoil F001.

Townland boundary ditch (Lismore side) F061 Zones A and B (Figs. 7, 8, 13)

F061	Cut of linear ditch. Measured c. 70m x 1.30m x 0.38m. Orientated north-east/south-west. It had a sharp break of slope at the top, concave sides, and a sharp break of slope leading to an uneven base. It truncated enclosure ditch F003, traversing the interior of the enclosure. Located along the western side of clay embankment F639 (Zones C, D; Fig. 70), it formed the Bushfield or Maghernaskeagh/Lismore townland boundary. Filled with F063, F062. Above subsoil F002, below F063. Excavation was limited to the two points where it impacted ditch F003.
F063	Primary fill of ditch F061, with moderately compact, grey, coarse sand. Occasional small stones, pebbles and animal bone included. Measured 1.30m x 0.16m (width x depth). One bag of animal bone taken. Above F061, below F062.
F062	Upper fill of ditch F061, with moderately compact, yellow-brown, sandy silt. Occasional small stones, pebbles and animal bone included. Measured 1.30m x 0.23m (width x depth). Two pieces of glass and a worked stone found (E2220:62:1, E2220:62:3). Two bags of animal bone taken. Above F063, below topsoil F001.

Zone B

Shallow pits

Pit F022 (Fig. 13)

F022	Cut of circular pit. Measured 0.38m x 0.36m x 0.04m. It had a gradual break of slope at the top, concave sides, and a non-perceptible break of slope leading to a rounded base. Slightly north of a group of three pits F024, F026, F030. Filled with F023. Above subsoil F002, below F023.
F023	Fill of pit F022, with firm, light grey, silty sand. Frequent charcoal included. Measured 0.38m x 0.36m x 0.04m. No finds or samples taken. Above F022, below topsoil F001.

Pit F024 (Figs. 13 and 16)

F024	Cut of sub-circular pit. Measured 0.42m x 0.40m x 0.08m. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading a rounded base. Part of a small group of pits with F026 and F030, a little south of pit F22. Filled with F025. Above subsoil F002, below F025.
F025	Fill of pit F024, with firm, light grey, silty sand. Frequent charcoal included.

	Measured 0.42m x 0.40m x 0.08m. No finds or samples taken. Above F024, below topsoil F001.

Pit F026 (Figs. 13 and 16)

F026	Cut of circular pit. Measured 0.20m x 0.20m x 0.25m. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to a conical base. Formed a small group of pits with F024 and F030, a little to the south of pit F022. Filled with F027. Above subsoil F002, below F027.
F027	Fill of pit F026, with firm, dark grey-black, clayey silt. Frequent charcoal, and a moderate amount of slag included. Measured 0.20m x 0.20m x 0.25m. Above F026, below topsoil F001.

Pit F030 (Figs. 13 and 16)

F030	Cut of sub-circular pit. Measured 0.29m x 0.21m x 0.16m. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to an uneven base. Formed a small group with pits F024 and F026, a little to the south of pit F022. Filled with F031. Above subsoil F002, below F031.
F031	Fill of pit F030, with firm, black, clayey sand. Frequent slag and charcoal, and occasional big stones included. Measured 0.29m x 0.21m x 0.16m (length x width x depth). Above F030, below topsoil F001.

Pit F036 (Figs. 13 and 16)

F036	Cut of sub-circular pit. Measured 0.40m x 0.25m x 0.16m. It had a gradual break of slope at the top, vertical-stepped sides, and a gradual break of slope leading to a rounded base. Formed a small group of pits with F038 and F040. Filled with F037. Above subsoil F002, below F037.
F037	Fill of pit F036, with stiff, light grey with orange, clayey silt. Occasional charcoal included. Measured 0.40m x 0.25m x 0.16m. No finds or samples taken. Above F036, below topsoil F001.

Pit F038 (Figs. 13 and 16)

F038	Cut of sub-circular pit. Measured 0.47m x 0.40m x 0.08m. It had a gradual break of slope at the top, concave-stepped sides, and a gradual break of slope leading to an uneven base. Part of a group of three with pits F040 and F036. Filled with F039. Above subsoil F002, below F039.
F039	Fill of pit F038, with soft, light grey, silty clay with orange flecks. A moderate amount of stones and charcoal included. Measured 0.47m x 0.40m x 0.08m. No finds or samples taken. Above F038, below topsoil F001.

Pit F040 (Figs. 13 and 16)

F040	Cut of sub-circular pit. Measured 0.70m x 0.60m x 0.12m. It had a non-perceptible break of slope at the top and base, stepped-concave sides and an uneven base. Formed a group of three pits with pits F036 and F038. The edge was cut by three stake-holes C020, C044, C045. Filled with F041. Above subsoil F002, below F041.
F041	Fill of pit F040, with firm, light grey, clayey silt. Moderate charcoal included. Measured 0.70m x 0.60m x 0.12m. No finds or samples taken. Above F040, below topsoil F001.

Stake-holes

Stake-hole F020 (Fig. 13)

F020	Cut of circular stake-hole. Measured 0.06m x 0.06m x 0.11m. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a flat base. Cut into the edge of shallow pit F040, associated with stake-holes F044 and F045. The fill was identical to deposit F041 mentioned above, the fill of pit F040, F044 & F045. Filled with F041. Above subsoil F002, below F041.

Stake-hole F044 (Fig. 13)

F044	Cut of oval stake-hole. Measured 0.14m x 0.065m x 0.32m. It had a sharp break of slope at the top and base with stepped-vertical sides and an uneven base. It was cut into the edge of pit F040, associated with stake-holes F020 and F045. The fill was identical to deposit F041 mentioned above, the fill of pit F020, F040 & F045. Filled with F041. Above subsoil F002, below F041.

Stake-hole F045 (Fig. 13)

F045	Cut of circular stake-hole. Measured 0.06m x 0.06m x 0.12m. It had a sharp break of slope at the top and base with vertical sides and a flat base. It was cut into the edge of pit F040, associated with stake-holes F020 and F044. The fill was identical to deposit F041 mentioned above, the fill of pit F020, F040 & F044. Filled with F041. Above subsoil F002, below F041.

Industrial pit

Industrial pit F50 (Figs. 13 and 15) (Plates 8, 9, 10)

F050	Cut of large irregular pit. Measured 5.96m x 3.56m x 0.96m. Orientated north-south. It had a gradual break of slope at the top, concave sides, and a sharp break of slope leading to an uneven base. Filled with F072, F069, F074, F067, F065, F068, F064, F051. Above subsoil F002, below F072.
F072	Primary fill of pit F050, with firm, light grey, silty sand. A moderate amount of animal bone, charcoal and 'macrofossils' included. Measured 2.20m x 0.70m x 0.20m. One sharpening stone, one 'pin-sharpener' stone and pieces of iron slag found (1-3). One soil sample (11) and three bags of animal bone taken. Above F050, below F069.
F069	Lower fill of pit F050, with friable, light brownish-yellow, silty clay. A moderate amount of animal bone and stones included. Measured 2.21m x 0.10m x 0.18m. One soil sample (6) and two bags of animal bone taken. Above F072, below F067 & F065.
F074	Lower fill of pit F050. Same as fill F069. Occasional animal bone included. One piece of slag found (1). One bag of animal bone taken. Above edge of pit F050 & F072, below F067 & F065.
F067	Middle fill of pit F050, with friable, blue-pale grey, sandy clay. Occasional sandstones, animal bone, slag pieces, and charcoal included. Measured 5.60m x 0.80m x 0.19m. One soil sample (10), six bags of animal bone and one bag of burnt bone taken. Above F074 and F069, below F065.
F065	Middle fill of large pit F050, with firm, dark greyish-black, clay. Frequent charcoal, animal bone, and four pieces of slag included. Measured 3.20m x 2.80m x 0.24m. One soil sample (4), four bags of animal bone and two bags of burnt bone taken. Above F067, F069 and F074, below F068 and F064.

F068	Middle fill of pit F050, with firm, dark grey, clay. A moderate amount of charcoal, and animal and burnt bone, and occasional slag included. Measured 2.60m x 1.60m x 0.16m. Two pieces of metal (brooch and blade) found (E2220:68:1, E2220:68:2). One soil and charcoal sample (5), six bags of animal bone and three burnt bone samples taken. Above F065, below F051.
F064	Middle fill of pit F050, with friable, mid greyish-brown, silty sand. A moderate amount of charcoal, slag, animal and burnt bone, and small stones included. Measured 4.60m x 0.60m x 0.15m. One soil and charcoal sample (3), five bags of animal bone and one bag of burnt bone taken. Above F065, below F051.
F051	Upper fill of pit F050, with friable, light grey, silty sand. Occasional sandstone, animal bone and burnt bone, and charcoal included. Measured 4.50m x 2.20m x 0.40m. One pin found, possibly part of a pair of tweezers (E2220:51:1). One soil sample (9), four bags of animal bone and two bags of cremated bone taken. Above F064 and F068, below topsoil F001.

Spreads

Spreads F047 and F071 Zone B (Fig. 16)

F047	Irregular spread, to west of large pit F050, with soft, dark grey, clayey sand. Occasional charcoal included. Measured 0.64m x 1.10m x 0.10m. Located south of pit group F036, F040 and F036. There was no visible cut for the material. One crucible fragment found (E2220:47:1). One soil sample taken (7). Above spread F071, below topsoil F001.
F071	Irregular spread, with soft, light grey, clayey sand with orange flecks. Occasional small stones included. Measured 8m x 3.38m x 0.12m. One flint scraper found (E2220:71:1). Located to west of large pit F050, to south of pit group F036, F038, F040. Above subsoil F002, below spread F047.

Redeposited spread

Redeposited spread F11

F011	Spread, with very soft, light brown-yellow, flecks silty sand. Occasional small stones and iron slag, and moderate burnt bones included. Measured 1.60m x 0.80m x 0.08m. Above subsoil F002, below topsoil F001. May have been redeposited by the digging of drain F007.

Pit external to enclosure

Pit F054 (Figs. 13 and 17)

F054	Cut of sub-ovoid pit. Measured 0.90m x 0.50m x 0.24m. Orientated north-south. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to an uneven base. Located on the west side of field ditch F034. Filled with F012, F055. Above subsoil F002.
F012	Primary fill of pit F054, with compact, dark grey, silty sand. Occasional small stones and charcoal included. Measured 0.90m x 0.50m x 0.24m. No finds or samples taken. Above F054, below F055.
F055	Upper fill of pit F054, with dark brown, silty sand. Occasional charcoal included. Measured 0.90m x 0.50m x 0.24m. One iron nail found (E2220:55:1). Above F012, below topsoil F001.

Post-medieval linear feature, external to enclosure

Linear ditch F034 (Figs. 13 and 17)

F034	Cut of linear ditch. Measured c. 19m x 0.15m x 0.35m. Orientated north-east/south-west. Had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Probably contemporary with field ditch F017/F053 in Zone A. Filled with F043, F035. Above subsoil F002, below F043. Slot-sectioned only.
F043	Primary fill of ditch F034, with friable, light grey-yellowish, silty sand. Occasional stones, glass and bone included. Measured 1.20m x 0.15m x 0.35m. No finds or samples taken. Above F034, below fill F035.
F035	Upper fill of ditch F034, with friable, dark brown, silty sand with reddish flecks. Occasional stones and animal bone included. Measured 1.20m x 0.15m x 0.35m. One stone pin (E2220:35:1), and one piece of glass (E2220:35:2) found. One bag of animal bone taken. Above F043, below topsoil F001.

Zone C

Group 1 graves (Plate 23)

Grave F284 (Group 1) (Figs. 20, 22)

F284	Cut of sub-rectangular grave with rounded corners. Measured 1.80m x 0.82m x 0.35m. Orientated east-west. It had a sharp-gradual break of slope at the top, vertical-concave sides, and a gradual break of slope leading to a flat base (with stones). Truncated by furrow F162. Filled with F283. Above subsoil F002, below F283.
F283	Fill of grave F284, with firm, light brown, silty clay. Occasional charcoal and small pebbles included. Contained burial remains DSK21, a disarticulated skeleton. Measured 1.80m x 0.82m x 0.35m. One soil sample taken (309). Above C284, below spread F272.

Grave F288 (Group 1) (Figs. 19, 20, 21, 22, 35)

F288	Cut of rectangular grave with rounded corners. Measured 2.00m x 0.51m x 0.37m. Orientated east-west. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Filled with F287. Above subsoil F002, below F287.
F287	Fill of grave F288, with firm, yellowish-brown, clayey sand. No inclusions. Contained burial remains SK26 and DSK22, an articulated and disarticulated skeleton. Measured 2.00m x 0.51m x 0.37m. One skull (318), and one pelvic (319) sample taken. Above F288, below topsoil F001.

Grave F292 (Group 1) (Figs. 19, 20, 21, 22, 35)

F292	Cut of sub-rectangular grave with rounded corners. Measured 2.12m x 0.90m x 0.50m. Orientated east-west. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading a flat base. Filled with F291. Above subsoil F002, below F291.
F291	Fill of grave F292, with soft, dark grey-brown, sandy clay. Occasional pebbles, and a stone base included. Contained burial remains SK25, an articulated skeleton. Measured 2.12m x 0.90m x 0.50m. One skull (320) and one pelvic (321) sample taken. Above F292, below spread F272.

Grave F296 (Group 1) (Figs. 19, 20, 21, 22, 35)

F296	Cut of sub-rectangular grave with rounded corners. Measured 2.43m x 0.84m x 0.60m. Orientated east-west. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a flat base. Filled with F295. Above subsoil F002, below F295.
F295	Fill of grave F296, with strongly cemented, dark greyish-brown, sandy clay. Occasional pebbles included. Contained burial remains SK23, an articulated skeleton. Measured 2.43m x 0.84m x 0.60m. One skull/soil and one pelvic sample taken (312-313). Above F296, below spread F272.

Grave F369 (Group 1) (Figs. 19, 20, 21, 22, 35)

F369	Cut of sub-rectangular grave with rounded corners. Measured 1.40m x 0.50m x 0.30m. Orientated east-west. It had a gradual break of slope at the top, concave-convex sides, and a gradual break of slope leading to a flat base. Filled with F368. Above subsoil F002, below F369.
F368	Fill of grave F369, with strongly cemented, greyish-brown, clayey sand. A moderate amount of pebbles included. Contained burial remains SK16, an articulated skeleton (badly preserved). Measured 1.40m x 0.50m x 0.30m. One skull and soil sample taken (301). Above F369, below spread F272.

Grave F371 (Group 1) (Figs. 19, 20, 21, 22, 36)

F371	Cut of sub-rectangular double-burial grave with rounded corners. Measured 2.60m x 1.16m x 0.25m (length x width x depth). Orientated east-west. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a flat base. Filled with F370. Above subsoil F002, below F370.
F370	Fill of grave F371, with compact, mid-brown, sandy clay. Occasional angular stones and small pebbles included. Contained burial remains SK2, SK4, two articulated skeletons (badly preserved). Measured 2.60m x 1.16m x 0.25m (length x width x depth). One skull and soil each from SK2 and SK4 taken (280, 284). Above F371, below spread F272.

Grave F373 (Group 1) (Figs. 19, 20, 21, 22)

F373	Limits of possible oval, double-burial grave. No visible cut. Orientated east-west. Filled with F372. Above subsoil F002, below F372.
F372	Fill of grave F373, with moderately compact, brown, silty clay. Occasional small sub-angular and angular stones included. Contained burial remains SK13, DSK14, SK17, two articulated, and one disarticulated skeletons. Measured c.1.05m x. 0.40m. One soil sample taken (314). Above F373, below topsoil F001.

Grave F375 (Group 1) (Figs. 19, 20, 21, 22, 36)

F375	Cut of sub-rectangular grave with rounded corners. Measured 2.06m x 0.76m x 0.39m. Orientated east-west. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a flat base. Filled with F374. Above subsoil F002, below F374.
F374	Fill of grave F375, with compact, mid brown, sandy clay. A moderate amount of coarse pebbles (20-60mm), and occasional charcoal included. Contained burial remains SK11, an articulated skeleton (badly preserved). Measured 2.06m x 0.76m x 0.39m. Two skull/soil, and one pelvic/soil samples taken (294-296). Above F375, below spread F272.

Grave F381 (Group 1) (Figs. 19, 20, 21, 22, 36)

F381	Cut of sub-rectangular grave with rounded corners. Measured 2.08m 0.80m x 0.24m. Orientated east-west. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Truncated by furrow F162. Filled with F380. Above subsoil F002, below F380.
F380	Fill of grave F381, with hard, brownish-grey, clayey sand. Occasional pebbles included. Contained burial remains SK3, an articulated skeleton. Measured 2.08m x 0.80m x 0.24m. Two skull/soil, and one pelvic/soil samples taken (281-283). Above F381, below spread F272.

Grave F401 (Group 1) (Figs. 19, 20, 21, 22, 36)

F401	Cut of sub-rectangular grave with rounded corners. Measured 1.85m x 0.60m x 0.36m (length x width x depth). Orientated east-west. It had a gradual break of slope at the top, vertical-concave sides, and a sharp break of slope leading to an

	uneven base. Filled with F400. Above subsoil F002, below F400.
F400	Fill of grave F401, with firm, light-dark brown, silty clay. Occasional pebbles included. Contained burial remains SK15, an articulated skeleton. Measured 1.85m x 0.60m (length x width). One soil, and one pelvic and soil sample taken (299-300). Above F401, below spread F272.

Grave F403 (Group 1) (Figs. 19, 20, 21, 22, 37)

F403	Cut of sub-rectangular grave with rounded corners. Measured 1.85m x 0.38m x 0.40m. Orientated east-west. It had a gradual break of slope at the top, vertical sides, and a sharp break of slope leading to a flat base. Filled with F402. Above subsoil F002, below F402.
F402	Fill of grave F403, with firm, brownish-yellow, clayey sand. Occasional charcoal included. Contained burial remains SK44, DSK48, an articulated, and a disarticulated skeleton (badly preserved). Measured 1.85m x 0.38m x 0.40m. One pelvic/soil, one skull/soil, and one grave soil sample taken (354-356). Above F403, below topsoil F001.

Grave F407 (Group 1) (Figs. 19, 20, 21, 22, 37)

F407	Cut of sub-oval grave with no corners. Measured 1.60m x 0.54m x 0.37m. Orientated east-west. It had a gradual-sharp break of slope at the top, concave sides, and a gradual-sharp break of slope leading to a flat base. Filled with F406. Above subsoil F002, below F406.
F406	Fill of grave F407, with firm, mid brown, clayey sand. No inclusions. Contained burial remains SK8, an articulated skeleton (badly preserved). Measured 1.60m x 0.54m x 0.37m. Three skull and soil samples taken (291-293). Above F407, below topsoil F001.

Grave F409 (Group 1) (Figs. 19, 20, 21, 22, 37) (Plate 14)

F409	Cut of sub-rectangular grave with rounded corners. Measured 2.18m x 0.90m x 0.35m. Orientated east-west. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a flat base. Stone-lined. Filled with F408. Above subsoil F002, below F408.
F408	Fill of grave F409, with hard, yellow-brownish grey, clayey sand. Occasional pebbles included. Contained burial remains SK5, an articulated skeleton. Measured

	2.18m x 0.90m x 0.35m. Two skull/soil, and one pelvic/soil samples taken (285-287). Above F409, below spread F272.

Grave F646 (Group 1) (Figs. 20, 22)

F646	Cut of oval grave with rounded corners. Measured 0.93m x 0.65m x 0.13m. Orientated east-west. It had a sharp break of slope at the top, vertical-concave sides, and a gradual break of slope leading to an uneven base. Filled with F647. Above subsoil F002, below F647.
F647	Fill of grave F646, with soft, dark brown, silty sand. Occasional decayed stones included. Contained burial remains SK1, consisting of teeth only. Measured 0.93m x 0.65m x 0.13m. The most westerly burial on the site. One soil sample taken (160). Above F646, below topsoil F001.

Grave F760 (Group 1) (Figs. 19, 20, 21, 22, 37)

F760	Cut of oval grave with no corners. Measured 2.04m x 0.62m x 0.49m. Orientated east-west. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a flat-irregular base. Filled with F761, F762. Above subsoil F002, below F761.
F761	Primary fill of grave F760, with loose, brown-grey, silty clay. Occasional small and large sub-angular stones included. Contained burial remains SK9-DSK10, an articulated and a disarticulated skeleton. Measured 2.04m x 0.62m x 0.49m. One pelvic/soil, and one grave soil sample taken (303-304). Above F760, below F762.
F762	Upper Fill of grave F760, with very compact, yellow, silty clay. A moderate amount of small angular stones included. Measured 2.04m x 0.62m x 0.49m. One soil sample taken (305). Above F761, below spread F272.

Grave F763 (Group 1) (Figs. 19, 20, 21, 22)

F763	Cut of oval grave with no corners. Measured 1.90m x 0.50m x 0.17m (length x width x depth). Orientated east-west. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a flat base with stones. Filled with F764. Above subsoil F002, below F764.
F764	Fill of grave F763, with densely compacted, light brown, silty clay. Occasional small stones included. Contained burial remains SK27, an articulated skeleton (very

	badly preserved). Measured 1.90m x 0.50m x 0.17m (length x width x depth). One grave soil, and one skull/soil sample taken (315-316). One possible bone bead found (E2220:764:16). Above F763, below topsoil F001.

Grave F765 (Group 1) (Figs. 20, 22)

F765	Cut of oval grave with square corners. Measured 2.15m x 0.63m x 0.37m. Orientated east-west. It had a sharp break of slope at the top, vertical sides, and a gradual break of slope leading to an irregular base. Filled with F766. Above subsoil F002, below F766.
F766	Fill of grave F765, with firm, yellowish brown, clayey sand. Occasional charcoal and burnt bone included. Contained burial remains DSK18, and fragments of burnt bones. Measured 2.15m x 0.63m x 0.37m (length x width x depth). One cremated bone sample taken. Above F765, below topsoil F001.

Grave F767 (Group 1) (Figs. 19, 20, 21, 22, 38)

F767	Cut of rectangular grave with rounded corners. Measured 1.79m x 0.51m x 0.32m. Orientated northeast-southwest. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a flat base with stones. Filled with F768. Above subsoil F002, below F768.
F768	Fill of grave F767, with compact, brown, sandy clay. Occasional charcoal and small stones included. Contained burial remains SK20, an articulated skeleton (badly preserved). Measured 1.79m x 0.51m x 0.32m. One soil sample taken (308). Above F767, below spread F272.

Grave F769 (Group 1) (Figs. 19, 20, 21, 22, 38)

F769	Cut of oval grave with rounded corners. Measured 2.00m x 1.06m x 0.40m. Orientated northwest-southeast. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to an uneven base. Truncated by furrow F162. Filled with F770. Above subsoil F002, below F770.
F770	Fill of grave F769, with firm, greyish brown, clayey sand. A moderate amount of stones included. Contained burial deposits SK19, an articulated skeleton (very badly preserved). Measured 2.00m x 1.06m x 0.40m. One grave soil, and one

	skull/soil sample taken (306-307). Above F769, below spread F272.

Grave F771 (Group 1) (Figs. 19, 20, 21, 22, 38) (Plate 15)

F771	Cut of oval grave with rounded corners. Measured 1.84m x 0.58m x 0.32m. Orientated northeast-southwest. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to an uneven base. Filled with F772. Above subsoil F002, below F772.
F772	Fill of grave F771, with firm, greyish brown, clayey silt. A moderate amount of stones included. Contained burial remains SK24, an articulated skeleton (very badly preserved). Measured 1.84m x 0.58m x 0.32m. One pelvic/soil, and one grave soil sample taken (310-311). Above F771, below spread F272.

Grave F785 (Group 1) (Figs. 19, 21)

F785	Limits of oval grave. No visible cut. Orientated east-west. Filled with deposit F786. Above subsoil F002, below F786.
F786	Fill of grave F785, with compact, brown, silty clay. A moderate amount of angular/sub-angular small stones included. Contained burial remains SK30-DSK31, an articulated, and a disarticulated skeleton. Measured 1.60m x 0.44m (length x width). One pelvic/soil, one skull/soil, and one grave soil sample taken (325-327). Above F785, below topsoil F001.

Grave F803 (Group 1) (Figs. 19, 21)

F803	Limits of oval grave. No visible cut. Orientated east-west. Filled with deposit F804. Above subsoil F002, below F804.
F804	Fill of grave F803, with compact, light brown, silty clay. Occasional stones included. Contained burial remains SK35, an articulated skeleton. Measured 1.46m x 0.35m (length x width). One skull soil sample and one grave soil sample taken (337-338). Above F803, below topsoil F001.

Grave F810 (Group 1) (Figs. 19, 20, 21, 22)

F810	Cut of oval grave with no corners. Measured 1.48m x 0.46m x 0.28m. Orientated

	east-west. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to an irregular base. Majority of cut not visible. Filled with F811. Above subsoil F002, below F811.
F811	Fill of grave F810, with compact, brown, silty clay. A moderate amount of small and large stones included. Contained burial remains SK39, fragments of a skull only. Measured 1.48m x 0.46m x 0.28m. One skull and soil sample taken (344). Above F810, below topsoil F001.

Grave F816 (Group 1) (Figs. 19, 20, 21, 22, 38)

F816	Cut of sub-rectangular grave with no corners. Measured 2.00m x 0.40m x 0.20-0.40m (length x width x depth). Orientated east-west. It had a gradual break of slope at the top, stepped sides, and a gradual break of slope leading to an uneven base. Truncated by furrow F162. Filled with F817. Above subsoil F002, below F817.
F817	Fill of grave F816, with loose, dark brown, silty clay. A moderate amount of irregular-shaped stones and decayed stones included. Contained burial remains SK46-DSK45, an articulated and a disarticulated skeleton. Measured 2.00m x 0.40m x 0.20-0.40m. One soil sample taken (232). Above F816, below topsoil F001.

Grave F824 (Group 1) (Figs. 19, 21)

F824	Limits of grave. No visible cut. Measured 0.30m x 0.20m (length x width). Orientated east-west. Filled with F825. Above subsoil F002, below F825.
F825	Fill of grave F824, with loose, dark brown, clayey silt. Occasional of stones and pebbles included. Contained burial remains SK62, fragments of bones. Measured 0.30m x 0.20m (length x width). No sample taken. Above F824, below topsoil F001.

Grave F827 (Group 1) (Figs. 19, 20, 21, 22, 39)

F827	Cut of oblong grave with no corners. Measured 1.2m x 0.63m x 0.1m (length x width x depth). Vertical to smoothly tapered sides, with a relatively flat base. East end truncated by furrow F162. Filled with F826. Above subsoil F002, below F826.
F826	Fill of grave F827, with moderately compact, light-dark, silty clay. Occasional

	small angular stones included. Contained burial remains SK64, an articulated skeleton (badly preserved). One skull/soil, and one grave soil sample taken (378-379). Above F827, below topsoil F001.

Grave F835 (Group 1) (Figs. 19, 21)

F835	Limits of oval grave with rounded corners. Measured 0.24m x 0.43m (length x width). Orientated east-west. No visible cut. Comprised skull remains SK67 located adjacent to west end of level 2 burial SK65 of grave F828. Filled with F836. Above subsoil F002, below F836.
F836	Fill of grave F835, with loose, mid-dark brown, silty clay. A moderate amount of small angular stones and decayed stones included. Contained burial remains SK67, of fragmented skull only. Measured 0.24m x 0.43m (length x width). One skull/soil and one soil sample taken (382, 385). Above F835, below topsoil F001.

Grave F838 (Group 1) (Figs. 19, 20, 21, 22, 39)

F838	Cut of oblong, multiple-burial grave with no corners. Measured 2.02m x 0.60m x 0.15m (length x width x depth). Orientated east-west. It had a sharp break of slope at the top, vertical sides, and a gradual break of slope leading to a flat base with some stones. Truncated by furrow F162. Filled with F837. Above subsoil F002, below F837.
F837	Fill of grave F838, with moderately compacted, dark brown, silty clay. Occasional small stones and charcoal included. Contained burial remains SK69 (above), SK71 (below), and DSK70 and DSK76, two articulated and two disarticulated skeletons. Measured 2.02m x 0.60m (length x width) (depth undeterminable). One pelvic/soil and one grave soil sample taken for SK71 (392-393). One grave soil and one skull/soil sample taken for SK69 (394-395). Above F838, below topsoil F001.

Grave F843 (Group 1) (Figs. 19, 20, 21, 22, 39)

F843	Cut of oblong grave with no corners. Measured 2.02m x 0.36m x 0.2m (length x width x depth). Orientated east-west. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to an uneven base. Located beneath level 2 burial F828 (SK 65); truncated by furrow F162. Filled with F844. Above subsoil F002, below F844.
F844	Fill of grave F843, with loose, mid brown, silty clay. Occasional sub-angular stones

	and decayed stones included. Contained burial remains SK77, an articulated skeleton (badly preserved). Measured 2.02m x 0.36m x 0.2m. One pelvic/soil and one grave soil sample taken (390-391). Above subsoil F002, below grave F828.

Grave F846 (Group 1) (Figs. 19, 20, 21, 22, 39)

F846	Cut of oblong grave with no corners. Measured 1.60m x 0.53m x 0.23m. Orientated east-west. It had a sharp break of slope at the top, concave-vertical sides, and a sharp break of slope leading to an uneven base. Filled with F845. Above subsoil F002, below F845.
F845	Fill of grave F846, with loose, light brown, silty clay. Occasional small-medium stones and decayed stones included. Contains burial remains SK78, an articulated skeleton (very badly preserved). Measured 1.60m x 0.53m x 0.23m. One skull/soil and one grave soil sample taken (396-397). Above F846, below topsoil F001.

Group 2 graves

Grave F310 (Group 2) (Figs. 19, 20, 23, 24, 40)

F310	Cut of rectangular/oblong grave with no corners. Measured 2.15m x 0.25m x 0.14m. Orientated east-west. It had a sharp break of slope at the top, concave-vertical sides, and a gradual-sharp break of slope leading to an uneven base. Truncated by furrow F162. Filled with F309. Above subsoil F002, below F309.
F309	Fill of grave F310, with loose, mid brown, silty clay. Frequent small-larger stones included. Contained burial remains SK36 and DSK38, an articulated and a disarticulated skeleton. Measured 2.15m x 0.25m x 0.14m. One soil/skull and one soil/pelvic sample taken (342-343). Above F310, below topsoil F001.

Grave F329 (Group 2) (Figs. 19, 20, 23, 24, 40)

F329	Cut of sub-rectangular grave with rounded corners. Measured 2.10m x 0.74m x 0.52m. Orientated east-west. It had a sharp-gradual break of slope at the top, vertical-concave sides, and a gradual break of slope leading to a flat base. Truncated by furrow F162. Filled with F328. Above subsoil F002, below F328.
F328	Fill of grave F329, with firm, greyish-brown, clayey silt. A moderate amount of charcoal and stones included. Contained burial remains SK41, an articulated

	skeleton. Measured 2.10m x 0.74m x 0.52m. One pelvic and one skull sample taken (347-348). Above F329, below topsoil F001.

Grave F333 (Group 2) (Figs. 19, 20, 23, 24, 40)

F333	Cut of sub-rectangular grave with rounded corners. Measured 2.05m x 0.66m x 0.31m. Orientated east-west. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Truncated by furrow F162 and linear feature F726. Filled with F332. Above subsoil F002, below F332.
F332	Fill of grave F333, with hard, mid greyish-brown, silty clay. A moderate amount of charcoal and pebbles included. Contained burial remains SK52, comprising skull fragments only, and one animal bone. Measured 2.05m x 0.66m x 0.31m. One skull/soil and one grave soil sample taken (358-360). Above F333, below topsoil F001.

Grave F335 (Group 2) (Figs. 19, 20, 23, 24, 40)

F335	Cut of sub-oval grave with rounded corners. Measured 2.60m x 1.50m x 0.46m. Orientated north-east/south-west. It had a sharp break of slope at the top, concave-stepped sides, and a sharp break of slope leading to an uneven base. Filled with F334. Above subsoil F002, below F334.
F334	Fill of grave F335, with hard, mid reddish-grey, clayey silt. A moderate amount of charcoal and stones included. Contained burial remains SK33, skull fragments only. Measured 2.60m x 1.50m x 0.46m. Two soil/skull samples taken (335-336). Above F335, below topsoil F001.

Grave F344 (Group 2) (Figs. 19, 20, 23, 24, 41)

F344	Cut of a sub-oval double-burial grave with rounded corners. Measured 2.44m x 1.64m x 0.28m. Orientated east-west. It had a sharp-gradual break of slope at the top, vertical-concave sides, and a sharp-gradual break of slope leading to a flat base. Truncated by furrow F162. Filled with F343. Above subsoil F002, below F343.
F343	Fill of grave F344, with hard, yellow-brownish grey, clayey sand. A moderate amount of charcoal, and occasional pebbles included. Contained burial remains SK6-7, articulated skeletons (badly preserved). Measured 2.44m x 1.64m x 0.28m. One SK6 sample (soil/skull), and two SK7 samples taken (soil/pelvic and soil/skull) (288-290). Above F344, below spread F169.

Grave F350 (Group 2) (Figs. 19, 20, 23, 24, 41)

F350	Cut of oval multiple-burial grave with rounded corners. Measured 2.34m x 0.89m x 0.42m. Orientated east-west. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded-pointed base. Truncated by furrow F162. Filled with F349. Above subsoil F002, below F349.
F349	Fill of grave F350, with firm, greyish-brown, clayey silt. Occasional charcoal and stones included. Contained burial remains SK54, SK59, SK60 and SK61, two articulated skeletons and two skulls. Measured 2.34m x 0.89m x 0.42m. Samples were taken for SK54 (pelvic), SK59 (skull), SK60 (skull), and SK61 (skull/pelvic) (367-371). Above F350, below topsoil F001.

Grave F352 (Group 2) (Figs. 19, 20, 23, 24, 41)

F352	Cut of sub-rectangular grave with rounded corners. Measured 2.10m x 0.70m x 0.40m. Orientated north-east/south-west. It had a sharp break of slope at the top, vertical side, and a gradual-sharp break of slope leading to a flat base. Truncated by furrow F162. Filled with F351. Above subsoil F002, below F351,
F351	Fill of grave F352, with soft, greyish-brown, sandy clay. Occasional charcoal and stones included. Contained burial remains SK63, an articulated skeleton. Measured 2.10m x 0.70m x 0.40m. One soil, one skull/soil, and one pelvic/soil sample taken (375-377). Above F352, below topsoil F001.

Grave F799 (Group 2) (Figs. 19, 20, 23, 24, 41)

F799	Cut of oval grave with rounded corners. Measured 2.00m x 0.80m x 0.34m. Orientated east-west. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Truncated by furrow F162. Filled with F800. Above subsoil F002, below F800.
F800	Fill of grave F799, with firm, greyish brown, clayey silt. A moderate amount of stones included. Contained burial remains SK34, an articulated skeleton (very badly preserved) and some animal bone. Measured 2.00m x 0.80m x 0.34m. One skull/soil and one pelvic/soil sample taken (331-332). Above F799, below topsoil F001.

Grave F809 (Group 2) (Figs. 19, 20, 23, 24) (Plate 16)

F809	Cut of sub-rectangular grave with no corners. Measured 2.90m x 0.80m x 0.29m. Orientated east-west. It had a sharp-gradual break of slope at the top, vertical sides, and a sharp break of slope leading to a flat base. Truncated by furrow F162. Unusual length suggests two grave cuts intersecting end-to-end. Filled with F808. Above subsoil F002, below F808.
F808	Fill of grave F809, with densely compacted, brown-yellow, silty clay. Occasional small stones and charcoal included. Contained burial remains SK42, a fragment of skull only. Measured 2.90m x 0.80m x 0.29m. One skull/soil sample taken (357). Above F809, below spread F272.

Grave F812 (Group 2) (Figs. 19, 20, 23, 24, 42)

F812	Cut of sub-rectangular grave with rounded corners. Measured 1.90m x 0.56m x 0.38m. Orientated east-west. It had a sharp break of slope at the top, vertical sides and a sharp break of slope leading to a flat base. Truncated by furrow F162. Filled with F813. Above subsoil F002, below F813.
F813	Fill of grave F812, with compact, brown, sandy clay. Occasional charcoal included. Contained burial remains SK40, an articulated skeleton (very badly preserved). Measured 1.90m x 0.56m x 0.38m. One skull/soil, and one grave soil sample taken (345-346). Above F812, below spread F272.

Grave F822 (Group 2) (Figs. 19, 20, 23, 24, 42) (Plate 17)

F822	Cut of sub-rectangular grave with rounded corners. Measured 1.76m x 0.46m x 0.22m. Orientated north-east/south-west. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a flat base. Southwest corner truncated by level 2 grave F820. Filled with F823. Above subsoil F002, below F823.
F823	Fill of grave F822, with soft, greyish-brown, clayey sand with some clay. Occasional small pebbles and charcoal included. Contained burial remains SK58, an articulated skeleton (badly preserved) and some animal bone. Measured 1.76m x 0.46m x 0.22m. Soil, skull/soil, and pelvic/soil samples taken (372-374). Above F822, below topsoil F001.

Grave F832 (Group 2) (Figs. 19, 20, 23, 24, 32) (Plate 18)

F832	Cut of rectangular grave with rounded corners. Measured 1.60m x 0.42m x 0.32m. Orientated north-east/south-west. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a flat base. Filled with F834 and F833. Above subsoil F002, below F834.
F834	Stones lining the perimeter of grave cut F832. Above F832, below fill F833.
F833	Fill of grave F832, with firm, yellowish-brown, clayey sand. Occasional charcoal included. Contained burial remains SK66, an articulated skeleton. Measured 1.60m x 0.42m x 0.32m. One pelvic/soil, and one skull/soil sample taken (383-384). Above F834, below topsoil F001.

Grave F842 (Group 2) (Figs. 19, 20, 23, 24, 42)

F842	Cut of a rectangular multiple-burial grave with rounded corners. Measured 1.82m x 0.42m x 0.13m. Orientated east-west. It had a sharp break of slope at the top, vertical sides, and a gradual break of slope leading to a flat base. Truncated by furrow F162. Filled with F841. Above subsoil F002, below F841.
F841	Fill of grave F842, with firm, yellowish-brown, clayey sand. Occasional charcoal included. Contained burial remains SK73-74 and DSK75, two articulated, and one disarticulated skeletons (badly preserved). Measured 1.82m x 0.42m x 0.13m. Samples taken for SK74 (skull/soil:387), and SK73 (pelvic/soil), (one skull/soil:388-389). Above F842, below spread F272.

Grave F849 (Group 2) (Figs. 19, 23)

F849	Limits of grave. Disturbed burial. No visible cut. Measured 1.35m x 0.33−0.52m (length x width). Orientated east-west. Filled with F850. Above subsoil F002, below F850.
F850	Fill of grave F849, with firm, yellow-brown, clay. Frequent small and medium stones included. Measured 1.35m x 0.33−0.52m (length x width). Contained burial remains SK80, an articulated skeleton (badly preserved). One grave soil, and one skull/soil sample taken (400-401). Above F849, below topsoil F001.

Group 3 graves

Grave F306 (Group 3) (Figs. 19, 20, 25, 26, 43)

F306	Cut of oblong-oval grave with no definite corners. Measured 1.85m x 0.65m x 0.33m. Orientated east-west. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a flat base. Truncated slightly by furrow F162. Filled with F305. Above subsoil F002, below F305.
F305	Fill of grave F306, with strongly cemented, speckled orange-brown, silty clay. Occasional small pebbles included. Contained burial remains SK32, an articulated skeleton. Measured 1.85m x 0.65m x 0.33m. One skull and one grave soil sample taken (232-233). Above F306, below spread F272.

Grave F429 (Group 3) (Figs. 19, 20, 25, 26)

F429	Cut of oblong grave with no corners. Measured 1.60m x 0.56m x 0.26m. Orientated east-west. It had a sharp break of slope at the top, vertical sides, and a sharp-non perceptible break of slope leading to an uneven base. Frequent stones on the base. Filled with F428. Above subsoil F002, below F428.
F428	Fill of grave F429, with very compact, light-dark brown, silty clay (similar to natural soil). Occasional sub-angular and decayed stones included. Contained burial remains SK12, an articulated skeleton (very badly preserved). Measured 1.60m x 0.56m x 0.26m. Three soil (278-279, 298), and one skull/soil (297) samples taken. One possible bone bead found (E2220:428:1). Above F429, below spread F272.

Grave F439 (Group 3) (Figs. 19, 20, 25, 26, 43)

F439	Cut of sub-rectangular grave with no corners. Measured 1.90m x 0.40-0.55m x 0.12-0.30m. Orientated east-west. It had a sharp break of slope at the top, stepped-vertical sides, and a sharp break of slope leading to a flat base. Filled with F438. Above subsoil F002, below F438.
F438	Fill of grave F439, with loose-compact, light brown, silty clay. Frequent decayed stones, a moderate amount of charcoal, and occasional small angular/sub-angular stones included. Contained burial remains SK29, an articulated skeleton (very badly preserved). Measured 1.90m x 0.40-0.55m x 0.12-0.30m. Skull/soil and soil samples taken (323-324). Above F439, below topsoil F001.

Grave F455 (Group 3) (Figs. 19, 20, 25, 26, 43)

F455	Cut of oval double-burial grave with rounded corners. Measured 2.08m x 0.80m x 0.45m. Orientated east-west. It had a sharp break of slope at the top, vertical-concave sides, and a sharp break of slope leading to a flat base. Heavily truncated by furrow F162. Filled with F454. Above subsoil F002, below F454.
F454	Fill of grave F455, with hard, mid reddish-brown, clayey silt. Occasional charcoal and gravel included. Contained burial remains DSK43, disarticulated bone including skull fragments. Measured 2.08m x 0.80m x 0.45m. One skull/soil and one soil sample taken (352-353). Above F455, below topsoil F001.

Grave F461 (Group 3) (Figs. 19, 20, 25, 26, 43) (Plate 19)

F461	Cut of sub-rectangular grave with rounded corners. Measured 1.67m x 0.62m x 0.38m. Orientated east-west. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a flat base. Truncated by furrow F162. Filled with F460. Above subsoil F002, below F460.
F460	Fill of grave F461, with greyish brown, silty sand. A moderate amount of charcoal, and occasional pebbles included. Contained burial remains SK47, an articulated skeleton (badly preserved). Measured 1.67m x 0.62m x 0.38m. Grave soil, pelvic/soil and skull/soil samples taken (349-351). Above F461, below topsoil F001.

Grave F818 (Group 3) (Figs. 19, 20, 25, 26, 44)

F818	Cut of oval grave with no corners. Measured 1.68m x 0.52m x 0.34m. Orientated east-west. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to an irregular base. Truncated by furrow F162. Filled with F819. Above subsoil F002, F819.
F819	Fill of grave F818, with compact, brown, silty clay. Occasional small and large stones included. Contained burial remains SK49 and DSK57, articulated and disarticulated skeletons. Measured 1.68m x 0.52m x 0.34m. Grave soil and skull/soil samples taken (365-366). Above F818, below topsoil F001.

Group 4 graves

Grave F840 (Group 4) (Figs. 19, 20, 27, 28, 44) (Plate 20)

F840	Cut of sub-oval grave with rounded corners. Measured 1.82m x 0.82m x 0.15m. Orientated north-east/south-west. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a flat base. Filled with F839. Above subsoil F002, below F839.
F839	Fill of grave F840, with stiff, mid reddish-brown, clayey silt. Occasional gravel included. Contained burial remains SK72, an articulated skeleton. Measured 1.82m x 0.82m x 0.15m. One pelvic/soil sample taken (386). Above F840, below topsoil F001.

Grave F847 (Group 4) (Figs. 19, 20, 27, 28, 44)

F847	Cut of oval grave with rounded corners. Measured 1.73m x 0.56m x 0.10m. No dimensions recorded. Orientated north-east/south-west. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a flat base. Filled with F848. Above subsoil F002, below F848.
F848	Fill of grave F847, with firm, mid brown, clayey silt. Occasional charcoal and small stones included. Contained burial remains SK79, an articulated skeleton. Measured 1.73m x 0.56m x 0.10m. One pelvic/soil and one skull/soil sample taken (398-399). Above F847, below topsoil F001.

Grave F851 (Group 4) (Figs. 19, 20, 27, 28, 44)

F851	Cut of oval grave with rounded corners. Measured 1.80m x 0.60m x 0.16m. Orientated north-east/south-west. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a flat base. Filled with F852. Above subsoil F002, below F852.
F852	Fill of grave F851, with firm, mid reddish-brown, clayey silt. Occasional charcoal and gravel included. Contained burial remains SK81, an articulated skeleton; there were also cremated bone fragments on top of the fill. Measured 1.80m x 0.60m x 0.16m. Skull/soil and pelvic/soil samples taken (402-403). Above F851, below topsoil F001.

Level 2 graves

Grave F828 (Group 1, Level 2) (Figs. 29, 45) (Plate 21)

F828	Cut of sub-rectangular grave with no corners. Measured 2.00m x 0.43m x 0.17-0.25m. Orientated east-west. It had a sharp break of slope at the top, vertical-concave sides, and a gradual break of slope leading to an uneven base. The west edge of the grave abutted skull remains SK67 (grave F835), and directly overlay remains of grave F843, containing burial SK77 (SK67 and SK77 may be the same individual). Filled with F829. Above grave cut F843 and fill F844, below F829.
F829	Fill of grave F828, with loose, mid dark brown, silty clay. Frequent small angular and decayed stones included. Contained burial remains SK65, an articulated skeleton. Measured 2.00m x 0.43m x 0.17-0.25m. Soil and pelvic/soil samples taken (380-381). Above F828, below topsoil F001.

Grave F337 (Group 2, Level 2) (Figs. 31, 45)

F337	Cut of rectangular grave with rounded corners. Measured 1.70m x 0.46m x 0.36m. Orientated east-west. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a flat base. Truncated by furrow F162. Filled with F336. Above spread F272—this grave overlapped the south-east corner of grave F842, which was stratified below spread F272, below F336.
F336	Fill of grave F337, with friable, yellowish-brown, clayey sand. Occasional charcoal included. Contained burial remains SK53, an articulated skeleton (badly preserved). Measured 1.70m x 0.46m x 0.36m. Two soil/skull samples taken (363-364). Above F337, below topsoil F001.

Grave F820 (Group 2, Level 2) (Figs. 30, 45) (Plate 22)

F820	Cut of rectangular grave with square corners. Measured 1.94m x 0.29m x 0.26m. Orientated north-east/south-west. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a flat base. The east end of the cut truncated the south-west end of grave F822. Truncated by furrow F162. Filled with F821. Above subsoil F002, below F821.
F821	Fill of grave F820, with firm, greyish-brown, sandy clay. Occasional charcoal included. Contained burial remains SK50-DSK51, an articulated and a disarticulated skeleton. There was also some animal bone. Measured 1.94m x 0.29m x 0.26m. Skull/soil and pelvic/soil samples taken (361-362). Above F820, below topsoil

	F001.

Zone C non-burial features

Pit Group 1

Pit F181 Zone C (Figs. 18, 32, 46) Pit group 1

F181	Cut of circular pit. Measured 0.23m x 0.25m x 0.05m. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Filled with F180. Above spread F272, below F180.
F180	Fill of pit F181, with firm, yellowish-brown, silty sand. A moderate amount of charcoal and bone (burnt bone also) included. Measured 0.23m x 0.25m x 0.05m. Soil and charcoal samples taken (99-100). Above F181, below spread F169.

Charcoal-rich pit F183 Zone C (Figs. 18, 32, 46) Pit group 1

F183	Cut of oval charcoal-rich pit. Measured 0.60m x 0.64m x 0.25m. It had a gradual break of slope at the top, concave-stepped sides, and a gradual break of slope leading to a rounded base. Truncated by furrow F162. Filled with F548, F547, F182. Above spread F272, below F548.
F548	Primary fill of pit F183, with loose, light brown, sandy silt. Occasional charcoal included. Measured 0.50m x 0.44m x 0.16m. One soil sample taken (103). Above F183, below F547.
F547	Secondary fill of pit F183, with friable, light yellowish-brown, clayey-sand. Occasional charcoal included. Measured 0.46m x 0.22m x 0.09m. One soil sample taken (105). Above F548, below F182.
F182	Upper fill of pit F183, with soft, mid brown, silty sand. A moderate amount of charcoal, and occasional burnt bone included. Measured 0.60m x 0.55m x 0.16m. One soil, one charcoal, (104-106), and one cremated bone sample taken. Above C547, below C169.

Refuse Pit F185 Zone C (Figs. 18, 32, 46) Pit group 1

F185	Cut of oval refuse pit. Measured 0.53m x 0.45m x 0.17m. Orientated north-west/south-east. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Filled with F184. Above spread F272, below F184.

F184	Fill of pit F185, with firm, greyish-brown, silty sand. A moderate amount of charcoal, animal bone and burnt bone included. Measured 0.53m x 0.45m x 0.17m (length x width x max. depth). One soil and charcoal sample taken (58). Above F185, below spread F169.

Pit F187 Zone C (Figs. 18, 32, 46) (Plate 24) Pit group 1

F187	Cut of small pit. Measured 0.40m x 0.30m x 0.24m. Orientated north-south. It had a gradual break of slope at the top, concave sides, and a gradual-sharp break of slope leading to a flat base. Filled with F186. Above spread F272, below F186.
F186	Fill of pit F187, with soft, mid brown, sand. Frequent charcoal included. Measured 0.40m x 0.30m x 0.24m. One soil sample taken (70). One iron pin found (E2220:186:1). Above F187, below spread F169.

Pit F237 Zone C (Figs. 18, 32, 46) Pit group 1

F237	Cut of circular pit. Measured 0.31m x 0.20m x 0.13m. It had a gradual break of slope at the top, concave-convex sides, and a gradual break of slope leading to a rounded base. Filled with F236, F549. Above spread F272, below F236.
F236	Primary fill of pit F237, with soft, dark brown, silty sand. Occasional charcoal and gravel included. Measured 0.20m x 0.20m x 0.13m. One soil sample taken (95). Above F237, below F549.
F549	Secondary fill of pit F237, with soft, mid brown, silty sand. Occasional charcoal and gravel included. Measured 0.20m x 0.15m x 0.11m. No finds or samples taken. Above fill F236, below spread F169.

Pit F239 Zone C (Figs. 18, 32, 46) (Plate 25) Pit group 1

F239	Cut of circular pit. Measured 0.58m x 0.55 x 0.34m. It had a gradual break of slope at the top, convex-vertical sides, and a sharp break of slope leading to a rounded-point base. Filled with F238. Above spread F272, below F238.
F238	Fill of pit F239, with soft, dark brown, clayey sand. Occasional charcoal and pebbles included. Measured 0.58m x 0.55m x 0.34m. One soil sample taken (62). Above F239, below spread F169.

Pit F241 Zone C (Figs. 18, 32, 46) Pit group 1

F241	Cut of oval pit. Measured 0.40m x 0.38m x 0.35m. It had a sharp break of slope at the top, concave sides, and a sharp break of slope leading to a rounded base. Truncated by furrow F162. Filled with F536, F535, F240. Above subsoil F002, below F536.
F536	Primary fill of pit F241, with compact, mid brown, sandy clay. Frequent charcoal and fine pebbles included. Measured 0.34m x 0.38m x 0.17m. One soil sample taken (79). Above F241, below F535.
F535	Secondary fill of pit F241, with firm, light brown, silty sand. Occasional charcoal flecks and fine pebbles included. Measured 0.36m x 0.38m x 0.09m. One soil sample taken (78). Above F536, below F240.
F240	Upper fill of pit F241, with firm, mid brown, silty sand. Occasional charcoal included. Measured 0.37m x 0.38m x 0.08m. One soil sample taken (77). Above F535, below spread F169.

Pit F265 Zone C (Figs. 18, 32, 46) Pit group 1

F265	Cut of sub-circular pit. Measured 0.36m x 0.52m x 0.19m. Orientated south-west/north-east. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Filled with F264. Above spread F272, below F264.
F264	Fill of pit F265, with soft, mid brown silty sand. A moderate amount of charcoal included. Measured 0.36m x 0.52m x 0.19m. One soil sample taken (96). Above F265, below spread F169.

Pit group 2

Charcoal-rich pit F175 Zone C (Figs. 18, 32, 47) (Plate 26) Pit group 2

F175	Cut of circular charcoal-rich pit. Measured 0.65m x 0.56m x 0.27m. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a pointed-rounded base. Truncated by furrow F162. Filled with F174. Above spread F272, below F174.
F174	Fill of pit F175, with firm, brownish-grey, clayish silt. A moderate amount of charcoal and burnt bone included. Measured 0.65m x 0.56m x 0.27m. Medium-sized stones external to the feature. Two soil and charcoal samples (73-75), and one bag of burnt bone taken. One iron nail found (E2220:174:1). Above F175, below spread F169.

Pit F199 Zone C (Figs. 18, 32, 47) Pit group 2

F199	Cut of circular pit. Measured 0.35m x 0.33m x 0.21m deep. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Filled with F537, F198. Above spread F272, below F537.
F537	Primary fill of pit F199, with firm, light brown, clayey silt. A moderate amount of charcoal and pebbles included. Measured 0.35m x 0.33m x 0.21m. One soil sample taken (71). Above F199, below F198.
F198	Upper fill of pit F199, with firm, brownish-grey, clayey silt. A moderate amount of charcoal and burnt bone included. Measured 0.27m x 0.13m (length x depth). Similar to deposits F242 (fill of pit F243) and F244 (fill of pit F245). Soil and charcoal samples taken (72-74), and one bag of burnt bone. Above F537, below spread F169.

Charcoal-rich pit F201 Zone C (Figs. 18, 32, 47) (Plate 27) Pit group 2

F201	Cut of sub-circular charcoal-rich pit. Measured 0.87m x 0.65m 0.36m. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. One flat piece of sandstone lay against the edge of the cut to the north. Truncated by furrow F162. Filled with F616, F200. Above subsoil F002, below F616.
F616	Primary fill of pit F201, with soft, dark grey, clayey silt. A moderate amount of charcoal and burnt sandstone included. Measured 0.72m x 0.65m x 0.27m. Two soil and charcoal samples taken (147, 148). Above F201, below F200.
F200	Upper fill of pit F201, with soft, dark brown, sandy clay. A moderate amount of charcoal and burnt sandstone included. Measured 0.87m x 0.65m x 0.20m. One soil sample taken (146). Above F616, below topsoil F001.

Charcoal-rich pit F235 Zone C (Figs. 18, 32, 47) Pit group 2

F235	Cut of oval charcoal-rich pit. Measured 0.43m x 0.13m x 0.04m. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Western side of feature heavily truncated. Filled with F234. Above spread F272, below F234.
F234	Fill of pit F235, with firm, greyish-brown with orange flecks, silty sand. A moderate amount of charcoal, and burnt bone and burnt clay included. Measured 0.43m x 0.13m x 0.04m. One soil sample (49), and one bag of burnt bone taken. Above F235, below topsoil F001.

Charcoal-rich pit/hearth F243 Zone C (Figs. 18, 32, 47) Pit group 2

F243	Cut of oval charcoal-rich pit. Measured 0.77m x 0.66m x 0.13m. Orientated east-west. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Filled with F530, F242. Above spread F272, below F530.
F530	Primary fill of pit F243, with soft, reddish-grey, clay. Frequent burnt clay and stones included. Measured 0.63m x 0.66m x 0.06m. One soil sample taken (59). Below fill F242.
F242	Secondary fill of pit F243, with firm brownish-grey, sandy silt. A moderate amount of charcoal, and occasional bone and small stones included. Measured 0.77m x 0.66m x 0.07m. Two soil and charcoal samples (47, 60), and one bag of burnt bone taken. Above F530, below spread F169.

Pit F245 Zone C (Figs. 18, 32, 47) Pit group 2

F245	Cut of ovoid pit. Measured 0.37m x 0.24m x 0.14m. Orientated east-west. It had a sharp-gradual break of slope at the top, concave-stepped sides, and a gradual break of slope leading to a flat base. Filled with F244. Above spread F272, below F244.
F244	Fill of pit F245, with loose, mid brown, medium sand. Contained a metal object (possible blade, E2220:244:1). No sample taken. Measured 0.37m x 0.24m x 0.14m. Above F245, below spread F169.

Pit F251 Zone C (Figs. 18, 32, 47) Pit group 2

F251	Cut of oval pit. Measured 0.41m x 0.30m x 0.13m. Orientated east-west. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to a rounded-point base. Truncated by furrow F162. Filled with F250. Above spread F272, below F250.
F250	Fill of pit F251, with soft, dark reddish-brown, silty sand. Occasional gravel included. Measured 0.41m x 0.30m x 0.13m. One soil sample taken (48). Above F251, below spread F169.

Pit F425 Zone C (Figs. 18, 32, 47) Pit group 2

F425	Cut of sub-circular pit. Measured 0.50m x 0.35m x 0.06m. Orientated east-west. It had a gradual break of slope at the top, concave sides, and a gradual break of slope

	leading to a rounded base. Filled with F615, F424. Above spread F272, below F615.
F615	Primary fill of pit F425, with hard, mid brown, clayey sand. Occasional charcoal included. Measured 0.50m x 0.16m x 0.06m. One soil sample (144). Above F425, below F424.
F424	Upper fill of pit F425, with friable, dark brown, silty sand. Occasional charcoal included. Measured 0.50m x 0.19m x 0.06m. One soil sample taken (143). Above F615, below spread F169.

Pit F617 Zone C (Figs. 18, 32, 47) Pit group 2

F617	Cut of ovoid pit. Measured 0.22m x 0.20mx 0.07m. Orientated north-south. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Filled with F618. Above subsoil F002, below F618.
F618	Fill of pit F617, with light brownish, silty sand. No inclusions. Measured 0.22m x 0.20m x 0.07m. One soil sample taken (145). Above F617, below topsoil F001.

Pit F623 Zone C (Figs. 18, 32, 47) Pit group 2

F623	Cut of sub-rectangular pit. Measured 0.65m x 0.58m x 0.30m. Oriented north-west/south-east. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Filled with F625, F624. Above subsoil F002, below F625.
F625	Primary fill of pit F623, with soft, mid brown, silty sand. Occasional charcoal and stones included. Measured 0.65m x 0.50m x 0.22m. One soil sample taken (150). Above F623, below F624.
F624	Upper fill of pit F623, with soft greyish-brown, silty sand. Occasional stones included. Measured 0.65m x 0.58m x 0.08m. One soil sample taken (149). Above F625, below topsoil F001.

Linear gully near pit group 1

Linear gully F517 Zone C (Figs. 18, 32, 46) Near Pit group 1

F517	Cut of linear feature. Measured 3.20m x 0.18-0.25m x 0.06m. Orientated north-

	west/south-east. It had a non-perceptible break of slope at the top, concave sides, and a non-perceptible break of slope leading to an uneven base. Filled with F516. Above subsoil F002, below F516.
F516	Fill of linear cut F517, with firm, mid brown, silty sand. Occasional charcoal and fine pebbles included. Measured 3.20m x 0.18-0.25m x 0.06m. Two soil samples taken (101-102). Above F517, below spread F169.

Pit group 3

Pit F286 Zone C (Figs. 18, 33, 48) Pit group 3

F286	Cut of oval pit. Measured 0.75m x 0.40m x 0.10m. Orientated north-east/south-west. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Located between two group 1 graves, F284 and F288. Filled with F285. Above subsoil F002, below F285.
F285	Fill of pit F286, with firm, yellowish-brown clayey sand. Occasional pebbles included. Measured 0.75m x 0.40m x 0.10m. No samples taken. Above F286, below topsoil F001.

Pit F399 Zone C (Figs. 18, 32, 48) (Plate 28) Pit group 3

F399	Cut of oval pit. Measured 0.44m x 0.20m x 0.20m. Orientated east-west. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Located between two group 1 graves, F401 and F771. Filled with F398. Above subsoil F002, below F398.
F398	Fill of pit F399, with firm, greyish-brown, clayey silt. A moderate amount of stone included. Measured 0.44m x 0.20m x 0.20m. One soil sample taken (317). Above F399, below topsoil F001.

Pit F405 Zone C (Figs. 18, 32, 48) Pit group 3

F405	Cut of oval pit. Measured 0.48m x 0.34m x 0.12m. Orientated north-east/south-west. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Located between two group 1 graves, F401 and F409. Filled with F404. Above spread F272, below F404.
F404	Fill of pit F405, with hard, mid brown, clayey sand. No inclusions found. Measured

	0.48m x 0.34m x 0.12m. One soil sample taken (242). Above F405, below spread F169.

Pit F561 Zone C (Figs. 18, 32, 48) Pit Group 3

F561	Cut of circular pit. Measured 0.26m x 0.26m x 0.06m. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a flat base. Filled with F560. Above subsoil F002, below F560.
F560	Fill of pit F561, with firm, dark brown, silty sand. Occasional small pebbles included. Measured 0.26m x 0.26m x 0.06m. One soil sample taken (236). Above F561, below topsoil F001.

Pit group 4

Pit F312 Zone C (Figs. 18, 33, 49) Pit group 4

F312	Cut of irregular pit. Measured 0.90m x 0.55m x 0.18m. Orientated north-south. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a flat-uneven base. Filled with F311. Above subsoil F002, below F311.
F311	Fill of pit F312, with loose, mid greyish brown, silty sand. Occasional charcoal included. Measured 0.90m x 0.55m x 0.18m. No finds or samples taken. Above F312, below topsoil F001.

Charcoal-rich pit F653 Zone C (Figs. 18, 33, 49) Pit group 4

F653	Cut of sub-circular charcoal-rich pit. Measured 0.39m x 0.30m x 0.13m. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to a flat base. Formed a small cluster of pits with F312, F655 and F702. Filled with F654. Above subsoil F002, below F654.
F654	Fill of pit F653, with compact, dark brownish-grey, clayey sand. Frequent charcoal, and occasional burnt bones and stones included. Measured 0.39m x 0.30m x 0.13m. One soil and burnt bone sample taken (162). Above F653, below topsoil F001.

Charcoal-rich pit F655 Zone C (Figs. 18, 32, 49) Pit group 4

F655	Cut of sub-circular charcoal-rich pit. Measured 0.60m x 0.52m x 0.19m. It had a

	sharp break of slope at the top, concave-vertical sides, and a sharp break of slope leading to an uneven base with stones. Formed a small cluster with pits F312, F653 and F702. Filled with F656. Above subsoil F002, below F656.
F656	Fill of pit F655, with compact, dark brownish-grey, clayey sand. A moderate amount of charcoal and burnt bone, and occasional stones included. Measured 0.60m x 0.52m x 0.19m. One soil and burnt bone sample taken (163). Above F655, below topsoil F001.

Charcoal-rich pit F702 Zone C (Figs. 18, 33, 49) Pit group 4

F702	Cut of sub-oval charcoal-rich pit. Measured 0.45m x 0.37m x 0.06m. Orientated east-west. It had a sharp break of slope at the top, vertical-concave sides, and a sharp break of slope leading to an uneven base. Filled with F703. Above subsoil F002, below F703.
F703	Fill of pit F702, with compact, greyish-brown, clayey sand. Inclusions of charcoal are occasional. Measured 0.45m x 0.37m x 0.06m. No finds or samples taken. Above F702, below topsoil F001.

Charcoal-rich pit F787 Zone C (Figs. 18, 33, 48) Pit group 4

F787	Cut of oval charcoal-rich pit. Measured 1.00m x 0.40m x 0.18m. Orientated north-south. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Truncated by furrow F162. Filled with F788. Above subsoil F002, below F788.
F788	Fill of pit F787, with friable to soft greyish-brown, clayey sand. Occasional charcoal included. Measured 1.00m x 0.40m x 0.18m. One soil sample taken (330). Above F787, below spread F272.

Charcoal-rich pit F789 Zone C (Figs. 18, 33, 48) Pit group 4

F789	Cut of oval charcoal-rich pit. Measured 0.65m (surviving length) x 0.55m x 0.14m. Orientated north-south. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Northern half truncated by furrow F162. Filled with F790. Above subsoil F002, below F790.
F790	Fill of pit F789, with friable to soft greyish brown, clayey sand. Occasional charcoal included. Measured 0.65m (surviving length) x 0.55m x 0.14m. One soil

	sample taken (329). Above F789, below spread F272.

Pit F704 Zone C (Figs. 18, 33, 49) Pit Group 4

F704	Cut of circular pit. Measured 0.35m x 0.21m x 0.14m. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a rounded base. Filled with F705. Above subsoil F002, below F705.
F705	Fill of pit F704, with compact, greyish-brown, clayey sand. Occasional charcoal included. Measured 0.35m x 0.21m x 0.14m. One soil sample taken (164). Above F704, below topsoil F001.

Pit F797 Zone C (Figs. 18, 33, 49) Pit Group 4

F797	Cut of oval pit. Measured 0.39m x 0.37m x 0.39m. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to an uneven base. Filled with F798. Above subsoil F002, below F798.
F798	Fill of pit F797, with hard, mid grey, silty clay. Occasional angular stones and charcoal included. Measured 0.39m x 0.37m x 0.39m. One soil sample taken (339). Above F797, below topsoil F001.

Linear gully within Pit group 4

Linear feature/palisade slot F795 Zone C (Figs. 18, 33, 51) Within Pit Group 4

F795	Cut of linear feature. Measured 2.60m x 0.15m x 0.18m. Slightly curved in plan, orientated north-north-west/south-south-east. It had a gradual break of slope at the top, stepped sides, and a gradual break of slope leading to a rounded base. Pits F787 and F789 located at southern end of the feature, which was truncated by furrow F162. Filled with F796. Above subsoil F002, below F796.
F796	Fill of linear feature F795, with firm, brownish-grey, clayey sand. Occasional charcoal included. Measured 2.60m x 0.15m x 0.18m. One soil sample taken (328). Above F795, below topsoil F001.

Post-hole Group 1

Post-hole F467 Zone C (Figs. 18, 33, 50) Post-hole group 1

F467	Cut of sub-circular post-hole. Measured 0.48m x 0.47m x 0.56m. It had a sharp break of slope at the top, vertical sides, and a gradual break of slope leading to a rounded base. Adjacent to post-hole F469. Filled with F466. Above subsoil F002, below F466.
F466	Fill of post-hole F467, with soft, brown, silty sand. Occasional charcoal included. Measured 0.48m x 0.47m x 0.56m. No finds or samples taken. Above F467, below topsoil F001.

Post-hole F469 Zone C (Figs. 18, 33, 50) Post-hole group 1

F469	Cut of sub-circular post-hole. Measured 0.35m x 0.26m x 0.22m. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a flat base. Adjacent to post-hole F467. Filled with F468. Above subsoil F002, below F468.
F468	Fill of post-hole F469, with firm, yellowish-brown, clayey sand. Measured 0.35m x 0.26m x 0.22m. No finds or samples taken. Above F469, below topsoil F001.

Post-hole F562 Zone C (Figs. 18, 33, 50) Post-hole group 1

F562	Cut of oval post-hole. Measured 0.52m x 0.48m x 0.32m. It had a sharp break of slope at the top, convex sides, and a sharp break of slope leading to a flat base. Adjacent to post-hole F463. Filled with F462. Above subsoil F002, below F462.
F462	Fill of post-hole F562, with compact, greyish-brown, clayey sand. Occasional charcoal included. Measured 0.52m x 0.48m x 0.32m. One soil sample taken (333). Above F562, below spread F272.

Post-hole F463 Zone C (Figs. 18, 33, 50) Post-hole Group 1

F463	Cut of oval post-hole. Measured 0.37m x 0.35m x 0.14m. It had a gradual break of slope at the top, vertical sides, and a gradual break of slope leading to a flat base. Adjacent to post-hole F562. Filled with F464. Above subsoil F002, below C464.
F464	Fill of C463, with compact, greyish-brown, clayey sand. Occasional charcoal

	included. Measured 0.37m x 0.35m x 0.14m. One soil sample taken (334). Above F463, below deposit F272.

Post-hole Group 2

Post-hole F395 Zone C (Figs. 18, 33, 50) Post-hole group 2

F395	Cut of sub-oval post-hole. Measured 0.34m x 0.27m x 0.20m. Orientated east-west. It had a sharp break of slope at the top, vertical sides, and a gradual break of slope leading to a flat base. Filled by F394. Above subsoil F002, below F394.
F394	Fill of post-hole F395, with hard, mid greyish-brown, clayey sand. Occasional charcoal and pebbles included. Measured 0.34m x 0.27m x 0.20m. One soil and charcoal sample taken (277). Above F395, below spread F169.

Post-hole F435 Zone C (Figs. 18, 33, 50) Post-hole group 2

F435	Cut of circular post-hole. Measured 0.42m x 0.42m x 0.30m. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to a sloped base. Adjacent to post-hole F437. Filled with F434. Above subsoil F002, below F434.
F434	Fill of post-hole F435, with friable, dark brown, silty sand. Occasional charcoal and stones included. Measured 0.42m x 0.42m x 0.30m. One soil and charcoal sample taken (161). Above F435, below spread F272.

Post-hole F437 Zone C (Figs. 18, 33, 50) Post-hole group 2

F437	Cut of circular post-hole. Measured 0.26m x 0.26m x 0.22m. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a flat base. Adjacent to post-hole F435. Filled with F436. Above subsoil F002, below F436.
F436	Fill of post-hole F437, friable, mid brown, clayey sand. Occasional charcoal included. Measured 0.26m x 0.26m x 0.22m. One soil and charcoal sample taken (226). Above F437, below spread F272.

Post-hole F449 Zone C (Figs. 18, 33, 50) (Plate 29) Post-hole group 2

F449	Cut of sub-circular post-hole. Measured 0.40m x 0.27m x 0.35m. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a flat base. Filled with F723, F448. Above subsoil F002, below F723.
F723	Primary fill of post-hole F449, with friable, grey-yellowish, sandy clay. Occasional charcoal included. Measured 0.40m x 0.27m x 0.15m. One soil and charcoal sample taken (240). Above F449, below F448.
F448	Upper fill of post-hole F449, with friable, dark brown, silty sand. Occasional charcoal is included. Measured 0.40m x 0.27m x 0.20m. One soil and charcoal sample taken (239). Above F723, below spread F272.

Post-hole Group 3

Post-hole F340 Zone C (Figs. 18, 33, 50) Post-hole Group 3

F340	Cut of oval post-hole. Measured 0.65m x 0.26m x 0.29m. Orientated north-east/south-west. It had a gradual-sharp break of slope at the top, convex-concave sides, and a gradual break of slope leading to a rounded base. Filled with F339. Above subsoil F002, below F339.
F339	Fill of post-hole F340, with soft, dark brown, silty sand. Frequent charcoal included. Measured 0.65m x 0.26m x 0.29m. One soil sample taken (168). Above F340, below spread F169.

Post-hole F363 Zone C (Figs. 18, 33, 50) Post-hole Group 3

F363	Cut of oval post-hole. Measured 0.39m x 0.29m x 0.36m. Orientated east-west. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a flat base. Located 2m from inner edge of enclosure ditch F003. Filled with F362. Above subsoil F002, below F362.
F362	Fill of post-hole F363, with soft, dark brown, silty sand. Occasional charcoal included. Measured 0.39m x 0.29m x 0.36m. One soil sample taken (169). Above F363, below topsoil F001.

Pit adjacent to Post-hole Group 2

Pit F389 Zone C (Figs. 18, 33, 48) Pit adjacent to Post-hole Group 2

F389	Cut of oval pit. Measured 0.40m x 0.20m x 0.12m. Orientated east-west. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to a sloping-uneven base. Filled with F388. Above spread F272, below F388.
F388	Fill of pit F389, with soft, dark greyish brown, silty sand. Occasional gravel included. Measured 0.40m x 0.20m x 0.12m. No samples taken. Above F389, below spread F169.

Pits adjacent to Post-hole Group 1

Pit F419 Zone C (Figs. 18, 33) Pit adjacent to Post-hole Group 1

F419	Cut of sub-rectangular pit. Measured 1.30m x 0.75m x 0.30m. Orientated east-west. It had a sharp break of slope at the top, concave sides, and a sharp break of slope leading to an uneven base. Adjacent to pit F421. Filled with F418. Above subsoil F002, below F418.
F418	Fill of pit F419, with firm, greyish-brown, silty sand. A moderate amount of charcoal included. Measured 1.30m x 0.75m x 0.30m. No finds or samples taken. Above F419, below topsoil F001.

Pit F421 Zone C (Figs. 18, 33) Pit adjacent to Post-hole Group 1

F421	Cut of sub-rectangular pit. Measured 0.75m x 0.60m x 0.25m. Orientated east-west. It had a sharp-moderate break of slope at the top, vertical-concave sides, and a gradual break of slope leading to an uneven base. Adjacent to pit F419. Filled with F420. Above subsoil F002, below F420.
F420	Fill of pit F421, with firm, greyish-brown, silty sand. A moderate amount of charcoal included. Measured 0.75m x 0.60m x 0.25m. No finds or samples taken. Above F421, below topsoil F001.

Pit within Post-hole Group 2

Pit F445 Zone C (Figs. 18, 33, 49) Pit within Post-hole Group 2

F445	Cut of irregular pit. Measured 0.42m x 0.37m x 0.12m. It had a gradual-sharp break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Truncated by furrow F162. Filled with F807, F444. Above subsoil F002, below F807.
F807	Primary fill of pit F445, with firm, yellowish-brown, clayey sand. No inclusions. Measured 0.35m x 0.31m x 0.09m. One soil sample taken (341). Above F445, below F444.
F444	Upper fill of pit F445, with soft, mid brown, silty sand. No inclusions. Measured 0.42m x 0.37m x 0.06m. One soil sample taken (340). Above F807, below topsoil F001.

Linear group

Linear feature F361 Zone C (Figs. 18, 33, 51) Linear group

F361	Cut of discontinuous linear feature, parallel to inner edge of enclosure ditch F003. Measured 21.10m x 0.07-0.18m x 0.04-0.20m. Orientated north-west/south-east. Located 1.75–3.60m from edge of ditch F003. It had a sharp break of slope at the top, concave -vertical sides, and a gradual break of slope leading to a rounded/flat base. Truncated at two separate points by F162 furrows. Filled with F360. Above subsoil F002, below F360.
F360	Fill of linear feature F361, with soft, dark brown, silty sand. Occasional pebbles included. Measured 21.10m x 0.07-0.18m x 0.04-0.20m. Four soil samples taken (167, 268-270). Above F361, below topsoil F001.

Linear feature F726 Zones C and E (Figs. 18, 33, 51, 59, 64) Linear group

F726	Cut of discontinuous linear feature. Measured 19m x 0.50m x 0.15m. One of the closely spaced linear features in Zone E was given the same context number, although there was a gap of 5.9m between the two, with a separate length of 14.4m. After another gap of 5.3m, the line of the feature continued again for another 2.3m, truncated at both ends by F162 cultivation furrows. Orientated northwest/south-east in Zone C, curving to north-south in Zone E. The feature as a whole respected the

	curved line of the enclosure ditch F003, located between 5.2–8.8m from the inner edge of ditch F003 in Zone C, increasing to a maximum distance of 10.4m in Zone E. It had a gradual break of slope at the top, vertical sides, and a sharp break of slope leading to an irregular base. Forty-four shallow depressions were noted along the extent of the cut in Zone E (0.07-0.21m x 0.06-0.19m x 0.02-0.12m). Filled with F725. Truncated by several F162 cultivation furrows. The Zone E extent of the feature intersected with a series of WNW/ESE linear features, F729, F731, F733, F735. Above subsoil F002, below F725.
F725	Fill of linear feature F726, with compact, grey, clay. Occasional charcoal included. Measured 51m x 0.50m x 0.15m. Eight soil samples taken (243-248, 267, 271). Above F726, below topsoil F001.

Dispersed pits

Pit F356 Zone C (Figs. 18, 33, 49) Dispersed pits

F356	Cut of oval pit. Measured 0.45m x 0.30m x 0.16m. Orientated north-west/south-east. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Filled with F355. Above subsoil F002, below F355.
F355	Fill of pit F356, with soft dark brown, silty sand. A moderate amount of charcoal included. Measured 0.45m x 0.30m x 0.16m. One soil sample taken (166). Above F356, below topsoil F001.

Linear pit F413 Zone C (Figs. 18, 32, 48)

F413	Cut of linear feature. Measured 2.52m x 0.50m x 0.19m. Orientated north-west/south-east. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Located northwest of group 1 grave F409. Filled with F412. Above spread F272, below F412.
F412	Fill of linear pit F413, with hard, mid reddish-brown, clayey silt. A moderate amount of pebbles and larger stones included. Measured 2.52m x 0.50m x 0.19m. One soil sample taken (241). Above F413, below spread F169.

Charcoal-rich pit F477 Zone C (Figs. 18, 32, 48)

F477	Cut of oval charcoal-rich pit. Measured 0.60m x 0.50m x 0.06m. Orientated north-west/south-east. It had a gradual break of slope at the top, concave sides, and a non-perceptible break of slope leading to an uneven base. Truncated by furrow F162. Filled with F476. Above spread F272, below F477.
F476	Fill of pit F477, with strongly cemented, mid brown-reddish, clay. Occasional charcoal included. Measured 0.60m x 0.50m x 0.06m. One soil sample taken (124). Above F477, below spread F169.

Charcoal-rich pit F195 Zone C (Figs. 18, 33, 49)

F195	Cut of sub-circular charcoal-rich pit. Measured 0.87m x 0.80m x 0.03-0.10m. It had a gradual break of slope at the top, stepped-concave sides, and a gradual break of slope leading to an uneven base. Truncated by furrow F162. Filled with F194. Above subsoil F002, below F194.
F194	Fill of pit F194, with soft to firm, mid brown, sandy clay with orange, yellow, red and black flecking. Frequent charcoal, and occasional small pebbles included. Measured 0.87m x 0.80m x 0.03-0.10m. One soil sample taken (46). Above F195, below furrow F162.

Pit F501 Zone C (Figs. 18, 33, 49)

F501	Cut of oval pit. Measured 0.50m x 0.40m x 0.18m. Orientated east-west. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Filled with F500. Above subsoil F002, below F500.
F500	Fill of pit F501, with soft, mid reddish-brown, silty sand. Occasional pebbles and charcoal included. Measured 0.50m x 0.40m x 0.18m. One soil sample taken (116). Above F501, below spread F272.

Zone D features

Pit group 1

Charcoal-rich pit F120 Zone D (Figs. 52, 53) (Plate 30) Pit group 1

F120	Cut of oval charcoal-rich pit. Measured 0.75m x 0.56m x 0.12m. Orientated north-

	south. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Filled with F121. Above subsoil F002, below F121.
F121	Fill of pit F120, with dark grey, silty sand. Occasional charcoal and burnt bone included. Measured 0.70m x 0.50m x 0.12m. One soil, charcoal and burnt bone sample taken (51). Above F120, below topsoil F001.

Charcoal-rich pit F122 **Zone D (Figs. 52, 53)** **Pit group 1**

F122	Cut of oval charcoal-rich pit. Measured 0.62m x 0.45m x 0.14m. Orientated north-east/south-west. It had a non-perceptible break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Truncated to the south by furrow F162. Filled with F123. Above subsoil F002, below F123.
F123	Fill of pit F122, with compact, greyish-brown, silty sand. Occasional charcoal included. Measured 0.62m x 0.45m x 0.12m. Two charcoal and soil samples taken (52, 55). Above F122, below topsoil F001.

Charcoal-rich pit F126 **Zone D (Figs. 52, 53)** **Pit group 1**

F126	Cut of oval charcoal-rich pit/hearth. Measured 0.60m x 0.50m x 0.10m. Orientated north-east/south-west. It had a non-perceptible break of slope at the top, concave sides, and a gradual break of slope leading a rounded base. Filled with F127. Above subsoil F002, below F127.
F127	Fill of pit F126, with compact, reddish-brown, clay. A moderate amount of burnt material included. Measured 0.60m x 0.50m x 0.10m. One soil sample taken (76). Above F126, below topsoil F001

Charcoal-rich pit F138 **Zone D (Figs. 52, 53)** **Pit group 1**

F138	Cut of circular charcoal-rich pit. Measured 0.34m x 0.24m x 0.15m. It had a sharp break of slope, vertical-concave sides, and a gradual break of slope leading to a flat base. Filled with F161. Above subsoil F002, below F161.
F161	Fill of pit F138, with compact, brownish-grey, silty sand. A moderate amount of charcoal included. Measured 0.34m x 0.24m x 0.15m. One soil sample taken (56). Above F138, below topsoil F001.

Charcoal-rich pit F231 Zone D (Figs. 52, 53) Pit group 1

F231	Cut of sub-circular charcoal-rich pit. Measured 0.57m x 0.40m x 0.11m. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Filled with F230. Above subsoil F002, below F230.
F230	Fill of pit F231, with compact, dark brownish-grey, silty sand. A moderate amount of charcoal included. Measured 0.57m x 0.40m x 0.11m. One soil sample taken (81). Above F231, below topsoil F001.

Pit F233 Zone D (Figs. 52, 53) Pit group 1

F233	Cut of sub-circular pit. Measured 0.30m x 0.30m x 0.16m. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a flat-pointed base. Filled with F232. Above subsoil F002, below F232.
F232	Fill of pit F233, with firm, greyish-brown, sandy clay. Occasional charcoal included. Measured 0.30m x 0.30m x 0.16m. One soil sample taken (80). Above F233, below topsoil F001.

Isolated post-hole near Pit Group 1

Post-hole F532 Zone D (Figs. 52, 53) Adjacent to Pit Group 1

F532	Cut of sub-circular post-hole. Measured 0.40m x 0.31m x 0.30m. Located at the west limit of features in Zone D. It had a sharp break of slope at the top, vertical sides and a sharp break of slope leading to a rounded base. Filled with F531. Above subsoil F002, below F531.
F531	Fill of post-hole F532, with stiff, dark grey, silty sand. Occasional charcoal included. Measured 0.40m x 0.31m x 0.30m. One soil sample taken (82). Above F532, below topsoil F001.

Pit Group 2

Charcoal-rich pit F124 Zone D (Figs. 52, 54) (Plate 31) Pit group 2

F124	Cut of circular charcoal-rich pit. Measured 0.77m x 0.87m x 0.30m. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. North-east extent truncated by furrow F162. Filled with F125. Above

	subsoil F002, below F125.
F125	Fill of pit F124, with compact, mid brown-greyish, silty sand. A moderate amount of charcoal included. Measured 0.77m x 0.87m x 0.30m. One soil sample taken (50). Above F124, below topsoil F001.

Charcoal-rich pit F128 **Zone D (Figs. 52, 54)** **Pit group 2**

F128	Cut of sub-circular charcoal-rich pit. Measured 0.73m x 0.45m x 0.11m. It had a non-perceptible break of slope at the top, concave sides, and a gradual break of slope leading to an uneven base. Filled with F129. Above subsoil F002, below F129.
F129	Fill of pit F128, with compact, greyish brown, silty sand. A moderate amount of charcoal included. Measured 0.73m x 0.45m x 0.11m. One soil sample taken (57). Above F128, below topsoil F001.

Charcoal-rich pit F130 **Zone D (Figs. 52, 54)** **Pit group 2**

F130	Cut of circular charcoal-rich pit. Measured 0.30m x 0.26m x 0.13m. It had a sharp break of slope at the top, vertical-convex sides, and a gradual break of slope leading to a rounded base. Filled with F131. Above subsoil F002, below F131.
F131	Fill of pit F130, with loose, greyish brown, silty sand. A moderate amount of charcoal, and occasional stones included. Measured 0.30m x 0.26m x 0.13m. One soil sample taken (129). Above F130, below topsoil F001.

Charcoal-rich pit F132 **Zone D (Figs. 52, 54)** **Pit group 2**

F132	Cut of circular charcoal-rich pit. Measured 0.21m x 0.21m x 0.11m. It had a sharp break of slope at the top, vertical-convex sides, and a gradual break of slope leading to a rounded base. Filled with F133. Above subsoil F002, below F133.
F133	Fill of pit F132, with compact, brown, silty sand. Occasional charcoal and burnt bone included. Measured 0.21m x 0.21m x 0.11m. One soil sample taken (128). Above F132, below topsoil F001.

Charcoal-rich pit F134 Zone D (Figs. 52, 54) Pit group 2

F134	Cut of circular charcoal-rich pit. Measured 0.50m x 0.36m x 0.22m. It had a sharp break of slope at the top, vertical sides, and a gradual break of slope leading to a flat base. Filled with F135. Above subsoil F002, below F135.
F135	Fill of pit F134, with loose, dark, brownish-grey, silty sand. Frequent charcoal, and occasional large stones and burnt bone included. Measured 0.50m x 0.36m x 0.22m. One soil and burnt bone sample taken (127), remaining burnt bone bagged separately. Above F134, below F001.

Charcoal-rich pit F136 Zone D (Figs. 52, 54) Pit group 2

F136	Cut of irregular charcoal-rich pit. Measured 0.30m x 0.20m x 0.04m. It had a gradual break of slope at the top, convex-vertical sides, and a gradual break of slope leading to a rounded-flat base. Part of a small cluster with pits F130, F132 and F134. Filled with F137. Above subsoil F002, below F137.
F137	Fill of pit F136, with compact, brown, silty sand. Occasional charcoal included. Measured 0.30m x 0.20m x 0.04m. Two soil samples taken (124, 153). Above F136, below topsoil F001.

Charcoal-rich pit F139 Zone D (Figs. 52, 54) Pit group 2

F139	Cut of oval charcoal-rich pit. Measured 0.50m x 0.40m x 0.05m. Orientated north-east/south-west. It had a gradual break of slope at the top, concave sides and a gradual break of slope leading to an uneven base. Filled with F140. Above subsoil F002, below F140.
F140	Fill of pit F139, with loose, mid brown, silty sand. Frequent charcoal and burnt bones included. Measured 0.50m x 0.40m x 0.05m. One soil sample taken (131). Above F139, below topsoil F001.

Charcoal-rich pit F141 Zone D (Figs. 52, 55) Pit Group 2

F141	Cut of relatively large sub-circular charcoal-rich pit. Measured 0.85m x 0.99m x 0.06m. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading an uneven base. Northern extent of edge truncated by furrow F162. Filled with F142. Above subsoil F002, below F142.
F142	Fill of pit F141, with compact, dark brown, sandy clay. Frequent charcoal and

	occasional burnt bone included. Measured 0.85m x 0.99m x 0.06m. Very disturbed deposit. One soil sample taken (132). Above F141, below topsoil F001.

Charcoal-rich pit F143 **Zone D (Figs. 52, 54)** **Pit group 2**

F143	Cut of circular charcoal-rich pit. Measured 0.35m x 0.33m x 0.18m. It had a sharp break of slope at the top, concave sides, and a sharp break of slope leading to a non-perceptible base. Filled with F144. Above subsoil F002, below F144.
F144	Fill of pit F143, with loose, brownish-grey, clayey sand. A moderate amount of charcoal and occasional burnt bones included. Measured 0.35m x 0.33m x 0.18m. Similar deposit F148, fill of larger adjacent pit F147. One soil and burnt bone sample taken (112). Above F143, below topsoil F001.

Charcoal-rich pit F145 **Zone D (Figs. 52, 54)** **Pit group 2**

F145	Cut of oval charcoal-rich pit. Measured 0.56m x 0.54m x 0.05m. Orientated east-west. It had a non-perceptible break of slope at the top, non-perceptible sides, and a gradual break of slope leading to a flat base. Adjacent to smaller pit F143. Filled with F146. Above subsoil F002, below F146.
F146	Fill of pit F145, with compact, brownish-grey, silty sand. A moderate amount of charcoal, and occasional burnt bone included. Measured 0.56m x 0.54m x 0.05m. One soil sample taken (130). Above F145, below topsoil F001.

Charcoal-rich pit F147 **Zone D (Figs. 52, 54)** **Pit Group 2**

F147	Cut of relatively large, oval charcoal-rich pit. Measured 1.10m x 0.77m x 0.20m. Orientated north-south. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to an uneven base. Adjacent to smaller pits F143 and F145. Filled with F148. Above subsoil F002, below F148.
F148	Fill of pit F147, with compact, brownish-grey, clayey sand. A moderate amount of charcoal, burnt bone and stones included. Measured 1.10m x 0.77m x 0.20m. Top of deposit disturbed. Similar to deposit F144, fill of adjacent smaller pit F143. Four iron nail fragments found (E2220:148:1). One soil sample taken (111); cremated bone bagged separately. Above F147, below topsoil F001.

Charcoal-rich pit F151 **Zone D (Figs. 52, 55)** **Pit Group 2**

F151	Cut of sub-circular charcoal-rich pit. Measured 0.65m x 0.48m x 0.08m. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to an uneven base. Filled with F152. Above subsoil F002, below F152.
F152	Fill of pit F151, with compact, mid brownish-grey, clayey sand. A moderate amount of charcoal, and occasional fragments of burnt bone. Measured 0.65m x 0.48m x 0.08. Soil and burnt bone sampled (134). Above F151, below topsoil F001.

Charcoal-rich pit F157 **Zone D (Figs. 52, 55)** **Pit Group 2**

F157	Cut of sub-ovoid charcoal-rich pit. Measured 0.80m x 0.58m x 0.25m. Orientated north-west/south-east. It had a sharp break of slope at the top, concave-convex sides, and a gradual break of slope leading to a flat base. Filled with F158. Above subsoil F002, below F158.
F158	Fill of pit F157, with compact, mid brown-orange, silty sand. Occasional charcoal included. Measured 0.80m x 0.58m x 0.25m. Two soil samples taken (133). Above F157, below topsoil F001.

Charcoal-rich pit F217 **Zone D (Figs. 52, 55)** **Pit Group 2**

F217	Cut of circular charcoal-rich pit. Measured 0.76m x 0.74m x 0.08m. It had a gradual break of slope at the top, concave sides, and a non-perceptible break of slope leading to an uneven base. Southern extent truncated by furrow F162. Filled with F216. Above subsoil F002, below F216.
F216	Fill of pit F217, with firm, dark brownish grey, silty sand. A moderate amount of charcoal included. Measured 0.76m x 0.74m x 0.08m. One soil sample taken (135). Above F217, below topsoil F001.

Charcoal-rich pit F541 **Zone D (Figs. 52, 54)** **Pit Group 2**

F541	Cut of sub-circular charcoal-rich pit. Measured 0.90m x 0.65m x 0.25m. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. North-east extent truncated by furrow F162. Filled with F542. Above subsoil F002, below F542.

F542	Fill of pit F541, with compact, dark brown, silty sand. A moderate amount of charcoal and stones included. Measured 0.90m x 0.65m x 0.25m. One worked sandstone fragment found (E2220:542:1). Two soil and charcoal samples taken (93-94). Above F541, below topsoil F001.

Charcoal-rich pit F543 Zone D (Figs. 52, 55) Pit Group 2

F543	Cut of sub-circular charcoal-rich pit. Measured 0.73m x 0.54m x 0.19m. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. North-east extent truncated by furrow F162. Filled with F544. Above subsoil F002, below F544.
F544	Fill of pit F543, with firm, brownish-grey, silty sand. A moderate amount of charcoal and fragmented burnt bone included. Measured 0.73m 0.54m x 0.19m. One soil and burnt bone sample taken (125). Above F543, below topsoil F001.

Pit F552 Zone D (Figs. 52, 54) Pit Group 2

F552	Cut of oval pit. Measured 0.32m x 0.30m x 0.20m. It had a gradual break of slope at the top, vertical sides, and a gradual break of slope leading to a rounded base. Filled with F553. Above subsoil F002, below F553.
F553	Fill of pit F552, with compact, greyish-brown, silty sand. No inclusions. Measured 0.32m x 0.30m x 0.20m. One soil sample taken (126). Above F552, below topsoil F001.

Isolated pit to the north of Pit Group 2

Pit F645 Zone D (Figs. 52, 53) pit to north of Pit Group 2

F645	Cut of oval pit. Measured 0.63m x 0.41m 0.09m. Orientated north-south. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a flat-rounded base. Heavily truncated feature. Filled with F644. Above subsoil F002, below F644.
F644	Fill of pit F645, with compact, dark brown, sandy clay. Occasional charcoal and pebbles included. Measured 0.63m x 0.41m x 0.09m. One soil sample taken (154). Above F645, below topsoil F001.

Pit Group 3

Pit F110 Zone D (Figs. 52, 56) Pit Group 3

F110	Cut of small oval pit. Measured 0.25m x 0.20m x 0.14m. It had a gradual-sharp break of slope at the top, concave-vertical sides, and a gradual break of slope leading to a rounded-point base. Much of the feature was truncated by furrow F162. Formed part of a cluster with pits F118, F112, F211, F114, F488 and F207. Filled with F111. Above subsoil F002, below F111.
F111	Fill of pit F110, with compact, dark grey, sandy clay. Frequent charcoal included. Measured 0.25m x 0.20m x 0.14m. One soil and charcoal sample taken (120). Above F110, below topsoil F001.

Charcoal-rich pit F114 Zone D (Figs. 52, 56) Pit Group 3

F114	Cut of sub-circular charcoal-rich pit. Measured 0.56m x 0.60m x 0.07m. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a flat base. Filled with F115. Above subsoil F002, below F115.
F115	Fill of pit F114, with compact, greyish-brown, sandy clay. Frequent charcoal and burnt bone included. Measured 0.56m x 0.60m x 0.07m. One soil sample taken (89), and burnt bone bagged separately. Above F114, below topsoil F001.

Charcoal-rich pit F116 Zone D (Figs. 52, 56) Pit Group 3

F116	Cut of irregular charcoal-rich pit. Measured 0.43m x 0.40m x 0.16m. It had a sharp break of slope at the top, convex sides, and a non-perceptible break of slope leading to an uneven base. Filled with F117. Above subsoil F002, below F117.
F117	Fill of pit F116, with loose, black, sandy clay with brown and yellow flecking. Frequent charcoal, and occasional burnt bone included. Measured 0.43m x 0.40m x 0.16m. Deposit disturbed by root activity. One bag of burnt bone fragments taken. Above F116, below topsoil F001.

Charcoal-rich pit F118 Zone D (Figs. 52, 56) Pit Group 3

F118	Cut of relatively large irregular-oval charcoal-rich pit. Measured 1.37m x 0.70m x 0.15m. Orientated north-east/south-west. Forms the largest element of a cluster

	with pits F155, F116, F114, F213, F110, F112, F488, F207. It had a gradual break of slope at the top, convex sides, and a gradual break of slope leading to a stepped-flat base. Filled with deposit F119. Above subsoil F002, below F119.
F119	Fill of pit F118, with compact, dark brown, silty sand. A moderate amount of charcoal, and occasional stones included. Measured 1.37m x 0.70m x 0.15m. One soil sample taken (142). Above F118, below topsoil F001.

Charcoal-rich pit F149 **Zone D (Figs. 52, 55)** **Pit Group 3**

F149	Cut of relatively large, irregular charcoal-rich pit. Measured 1.37m x 0.70m x 0.15m. Orientated east-west. It had a gradual-sharp break of slope at the top, convex-concave sides, and a gradual break of slope leading to an uneven base. Filled with F150. Above subsoil F002, below F150.
F150	Fill of pit F149, with compact, blackish-grey, sandy clay. A moderate amount of charcoal and small fragments of bone included. Measured 1.37m x 0.70m x 0.15m. One perforated stone object found. One soil and burnt bone sample taken (140). Above F149, below topsoil F001.

Charcoal-rich pit F153 **Zone D (Figs. 52, 55) (Plate 32)** **Pit Group 3**

F153	Cut of circular charcoal-rich pit. Measured 0.36m x 0.34m x 0.14m. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Adjacent to pits F149 and F223. Filled with F154. Above subsoil F002, below F154.
F154	Fill of pit F153, with compact, greyish-brown, silty sand. A moderate amount of charcoal and fragmented burnt bone included. Measured 0.36m x 0.34m x 0.14m. One soil sample taken (137). Above F153, below topsoil F001.

Charcoal-rich pit F155 **Zone D (Figs. 52, 56)** **Pit Group 3**

F155	Cut of sub-circular charcoal-rich pit. Measured 0.26m x 0.22m x 0.09m. It had a sharp break of slope at the top, concave sides, and a gradual break slope leading to a rounded base. Filled with F156. Above subsoil F002, below F156.
F156	Fill of pit F156, with compact, brownish-grey, silty sand. A moderate amount of charcoal included. Measured 0.26m x 0.22m x 0.09m. One soil sample taken (136).

	Above F155, below topsoil F001.

Charcoal-rich pit F159 **Zone D (Figs. 52, 58)** **Pit Group 3**

F159	Cut of sub-circular charcoal-rich pit. Measured 0.80m x 0.58m x 0.25m. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Formed part of a cluster with pits F225, F259, F622 and F484. Filled with F160. Above subsoil F002, below F160.
F160	Fill of pit F159, with compact, greyish-brown, silty sand. A moderate amount of charcoal, occasional pebbles included. Measured 0.80m x 0.58m x 0.25m. One soil sample taken (139). Above F159, below topsoil F001.

Pit F203 **Zone D (Figs. 52, 55)** **Pit Group 3**

F203	Cut of circular pit. Measured 0.30m x 0.29m x 0.08m. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Located adjacent to similar pits F205 and F499. Filled with F202. Above subsoil F002, below F202.
F202	Fill of pit F203, with firm, dark brownish-grey, silty-sand. Frequent charcoal included. Measured 0.30m x 0.29m x 0.08m. One soil sample taken (86). Above F203, below topsoil F001.

Pit F205 **Zone D (Figs. 52, 55)** **Pit Group 3**

F205	Cut of sub-circular pit. Measured 0.28m x 0.20m 0.09m. It had a sharp break of slope at the top, concave-vertical sides, and a gradual break of slope leading to a rounded point base. Adjacent to similar pits F203 and F499. Filled with F204. Above subsoil F002, below F204.
F204	Fill of pit F205, with firm, dark brownish grey, sandy clay. Frequent charcoal included. Measured 0.28m x 0.20 x 0.09m. One soil sample taken (85). Above F205, below topsoil F001.

Charcoal-rich pit F207 **Zone D (Figs. 52, 56)** **Pit Group 3**

F207	Cut of circular charcoal-rich pit. Measured 0.65m x 0.64m x 0.06m. It had a sharp

	break of slope at the top, concave-vertical sides, and a gradual break of slope leading to an uneven base. Part of a cluster with pits F488, F110, F112, F114, F116, F118, F211, F213, F155. Filled with F206. Above subsoil F002, below F206.
F206	Fill of pit F207, with loose, brownish-grey, sandy clay. Frequent burnt bone and charcoal and a moderate amount of stones included. Measured 0.65m x 0.64m x 0.06m. One soil sample taken (88), and burnt bone bagged separately. Above F207, below topsoil F001.

Pit F211 Zone D (Figs. 52, 56) Pit Group 3

F211	Cut of sub-circular pit. Measured 0.25m x 0.20m x 0.05m. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Southern extent truncated by furrow F162. Filled with F210. Above subsoil F002, below F210.
F210	Fill of pit F211, with compact, dark grey, sand. Occasional charcoal and burnt bone included. Measured 0.25m x 0.20m x 0.05m. One soil sample taken (151) and burnt bone bagged separately. Above F211, below topsoil F001.

Charcoal-rich pit F213 Zone D (Figs. 52, 56) Pit Group 3

F213	Cut of circular charcoal-rich pit. Measured 0.50m x 0.47m x 0.05m. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to a flat base. Southern extent of edge truncated by pit F162. Filled with F212. Above subsoil F002, below F212.
F212	Fill of pit F213, with firm, greyish-brown, silty sand. A moderate amount of charcoal included. Measured 0.50m x 0.47m x 0.05m. One soil sample taken (91). Above F213, below topsoil F001.

Charcoal-rich pit F215 Zone D (Figs. 52, 57) Pit Group 3

F215	Cut of sub-circular charcoal-rich pit. Measured 0.31m x 0.25m x 0.09m. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a flat-round base. Filled with F214. Above subsoil F002, below F214.
F214	Fill of pit F215, with compact, greyish-brown, silty sand. Flecks of charcoal included. Possibly non-archaeological. Measured 0.31m x 0.25m x 0.09m. One soil

	sample taken (108). Above F215, below topsoil F001.

Charcoal-rich pit F219 Zone D (Figs. 52, 57) Pit Group 3

F219	Cut of sub-circular charcoal-rich pit. Measured 0.28m x 0.20m x 0.05m. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Formed part of a cluster with pits F215, F221, F227, F229, F545. Filled with F218. Above subsoil F002, below F218.
F218	Fill of pit F219, with compact, grey sand. Occasional charcoal included. Measured 0.28m x 0.20m x 0.05m. One soil and charcoal sample taken (110). Above F219, below topsoil F001.

Charcoal-rich pit F221 Zone D (Figs. 52, 57) Pit Group 3

F221	Cut of circular charcoal-rich pit. Measured 0.38m x 0.37m x 0.17m. It had a gradual break of slope, concave sides, and a gradual break of slope leading to a flat base. Filled with F220. Above subsoil F002, below F220.
F220	Fill of pit F221, with loose, grey silty sand. Occasional charcoal, small stones and small pieces of burnt bone included. Measured 0.38m x 0.37m x 0.17m. One soil sample taken (109), and burnt bone bagged separately. Above F221, below topsoil F001.

Charcoal-rich pit F223 Zone D (Figs. 52, 55) Pit Group 3

F223	Cut of oval charcoal-rich pit. Measured 0.40m x 0.35m x 0.07m. Orientated north-west/south-east. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to an uneven base. Adjacent to pits F153, F149. Filled with F222. Above subsoil F002, below F222.
F222	Fill of pit F223, with mid-compact, dark greyish-brown, silty sand. A moderate amount of charcoal included. Measured 0.40m x 0.35m x 0.07m. One soil sample taken (138). Above F223, below topsoil F001.

Charcoal-rich pit F225 Zone D (Figs. 52, 58) Pit Group 3

F225	Cut of figure-of-eight charcoal-rich pit. Measured 0.95m x 0.65m x 0.20m.

	Orientated north-east/south-west. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to an uneven base. Filled with F224. Above subsoil F002, below F224.
F224	Fill of pit F225, with mid-compact, dark brownish-grey, silty sand. Occasional charcoal and burnt bone included. Measured 0.95m x 0.65m x 0.20m. One soil sample taken (141), and burnt bone bagged separately. Above F225, below topsoil F001.

Charcoal-rich/Refuse pit F227 Zone D (Figs. 52, 57) Pit Group 3

F227	Cut of sub-circular charcoal-rich/refuse pit. Measured 0.24m x 0.20m x 0.06m. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Filled with F226. Above subsoil F002, below F226.
F226	Fill of pit F227, with compact, light brownish-grey, sandy silt. Occasional charcoal included. Measured 0.24m x 0.20m x 0.06m. One soil sample taken (114). Above F227, below topsoil F001.

Pit F229 Zone D (Figs. 52, 57) Pit Group 3

F229	Cut of sub-circular pit. Measured 0.18m x 0.15m x 0.12m. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a pointed base. Filled with F228. Above subsoil F002, below F228.
F228	Fill of pit F229, with compact, light grey, sand. Occasional charcoal included. Measured 0.18m x 0.15m x 0.12m. One soil sample taken (115). Above F229, below topsoil F001.

Charcoal-rich pit F259 Zone D (Figs. 52, 58) (Plate 33) Pit Group 3

F259	Cut of sub-circular charcoal-rich pit. Measured 0.63m x 0.46m x 0.28m. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a flat base. Filled with F640, F258. Above subsoil F002, below F640.
F640	Primary fill of pit F259, with compact, greyish-yellowish, brown clay. Occasional charcoal and small stones included. Measured 0.63m x 0.46m x 0.28m. No finds or samples taken. Above F259, below F258.
F258	Secondary fill of pit F259, with hard, dark grey-brown, sandy silt. Occasional

	charcoal and burnt bone included. Measured 0.37m x 0.46mx 0.14m. One soil sample taken (157), and burnt bone bagged separately. Above F640, below topsoil F001.

Charcoal-rich pit F486 Zone D (Figs. 52, 58) Pit Group 3

F486	Cut of sub-circular charcoal-rich pit. Measured 0.45m x 0.35m x 0.07m. It had a gradual-sharp break of slope at the top, concave-vertical sides, and a gradual-sharp break of slope leading to a flat base. Truncated by furrow F162. Filled with F485. Above subsoil F002, below F485.
F485	Fill of pit F486, with compact, dark brown, silty sand. Frequent charcoal and burnt bone included. Measured 0.45m x 0.35m x 0.07m. One soil sample taken (113), and cremated bone bagged separately. Above F486, below furrow F162.

Charcoal-rich pit F488 Zone D (Figs. 52, 56) Pit Group 3

F488	Cut of elongated charcoal-rich pit. Measured 0.70m x 0.20m x 0.07m. Orientated north-west/south-east. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to an uneven base. Truncated by furrow F162. Filled with F487. Above subsoil F002, below F487.
F487	Fill of pit F488, with compact, brown, silty sand. Frequent charcoal and occasional burnt bones included. Measured 0.70m x 0.20m x 0.07m. One soil, charcoal and burnt bone sample taken (152). Above F488, below furrow F162.

Pit F497 Zone D (Figs. 52, 55) Pit Group 3

F497	Cut of circular pit. Measured 0.85m x 0.85m x 0.46m. It had a gradual break of slope at the top, vertical-stepped sides, and a gradual break of slope leading to an uneven base. South-west extent truncated by furrow F162. Filled with F540, F496. Above subsoil F002, below F540.
F540	Primary fill of pit F497, with compact, grey, silty sand. Frequent small stones, and occasional charcoal included. Measured 0.85m x 0.85m x 0.30m. One soil sample taken (84). Above F497, below F496.
F496	Upper fill of pit F497, with compact, brown, silty sand. Frequent small stones included. Measured 0.85m x 0.85m x 0.16m. One soil sample taken (83). Above

	F540, below topsoil F001.

Pit F499 Zone D (Figs. 52, 55) Pit Group 3

F499	Cut of oval pit. Measured 0.30m x 0.20m x 0.07m. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a flat base. Adjacent to small pits F203 and F205. Filled with F498. Above subsoil F002, below F498.
F498	Fill of pit F499, with compact, yellowish-brown, silty sand. Small flecks of charcoal and burnt bone included. Measured 0.30m x 0.20m x 0.07m. One soil sample taken (87). Above F499, below topsoil F001.

Charcoal-rich pit F545 Zone D (Figs. 52, 57) Pit Group 3

F545	Cut of sub-circular charcoal-rich pit. Measured 0.50m x 0.48m x 0.16m. Orientated north-east/south-west. It had a sharp break of slope at the top, concave-vertical sides, and a gradual break of slope leading to a rounded base. Filled with F546. Above subsoil F002, below F546.
F546	Fill of pit F545, with loose, brownish-grey, sand. Occasional charcoal and small stones included. Measured 0.50m x 0.48m x 0.16m. One soil sample taken (107). Above F545, below topsoil F001.

Charcoal-rich/refuse pit F555 Zone D (Figs. 52, 55) Pit Group 3

F555	Cut of sub-oval charcoal-rich/refuse pit. Measured 0.83m x 0.60m x 0.20m. Orientated east-west. It had a sharp break of slope at the top, vertical sides, and a gradual break of slope leading to an uneven base. Heavily truncated by furrow F162. Filled with F557, F556. Above subsoil F002, below F557.
F557	Primary fill of pit F555, with stiff, brown, silty sand. A moderate amount of stones, and occasional charcoal included. Measured 0.69m x 0.60m x 0.10m. One soil sample taken (122). Above F555, below F556.
F556	Upper fill of pit F555, with stiff, brownish-grey, silty sand. A moderate amount of charcoal and occasional burnt bones included. Measured 0.83m x 0.60m x 0.16m. One soil sample taken (117), and fragments of burnt bone bagged separately. Above F557, below topsoil F001.

Pit F558 Zone D (Figs. 52, 55) Pit Group 3

F558	Cut of circular pit. Measured 0.25m x 0.25m x 0.15m. It had a sharp break of slope at the top, vertical-sloped sides, and a sharp break of slope leading to a tapered pointed base. Cut into the eastern side of pit F600. Filled with F559. Above subsoil F002, below F559.
F559	Fill of pit F558, with firm, grey, medium sand. Occasional charcoal included. Measured 0.25m x 0.25m x 0.15m. One soil sample taken (118), and burnt bone bagged separately. Above F558, below topsoil F001.

Pit F600 Zone D (Figs. 52, 55) Pit Group 3

F600	Cut of oval pit. Measured 0.60m x 0.23m x 0.17m. Orientated north-south. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to an uneven base. Eastern extent truncated by smaller pit F558. Filled with F601. Above subsoil F002, below F601.
F601	Fill of pit F600, with compact, brownish grey, silty sand. Occasional charcoal included. Measured 0.60m x 0.23m x 0.17m. One soil sample taken (119). Below F600, topsoil F001.

Charcoal-rich/refuse pit F602 Zone D (Figs. 52, 57) Pit Group 3

F602	Cut of oval charcoal-rich/refuse pit. Measured 0.79m x 0.60m x 0.18m. Orientated north-west/south-east. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to an uneven base. Filled with F603. Above subsoil F002, below F603.
F603	Fill of pit F602, with compact, grey silty sand. Occasional charcoal and medium stones included. Measured 0.79m x 0.60m x 0.18m. One soil and charcoal sample taken (123). Above F602, below topsoil F001.

Charcoal-rich pit F622 Zone D (Figs. 52, 58) Pit Group 3

F622	Cut of relatively large sub-rectangular charcoal-rich pit. Measured 1.76m x 0.81m x 0.08m. Orientated north-east/south-west. It had a sharp break of slope, concave sides, and a gradual break of slope leading to an uneven base. Filled with F621.

	Northeast extent truncated by furrow F162. Above subsoil F002, below F621.
F621	Fill of pit F622, with compact, greyish-brown, sandy clay. Frequent charcoal, and occasional burnt bone, small stones and gravel included. Measured 1.76m x 0.81m x 0.08m. Two charcoal and soil samples taken (155-156), and burnt bone bagged separately taken. Above F622, below topsoil F001.

Isolated features south of Pit Group 3

Charcoal-rich pit F527 Zone D (Figs. 52, 58) South of Pit Group 3

F527	Cut of circular charcoal-rich pit. Measured 0.97m x 0.50m x 0.05m. It had a gradual break of slope at the top, concave sides, and a non-perceptible break of slope leading to a flat base. Southern half of feature truncated by furrow F162. Located at southern limit of excavated site, adjacent to small pit F539. Filled with F526. Above subsoil F002, below F526.
F526	Fill of pit F527, with compact, brownish-grey, sandy clay. Frequent charcoal, and occasional burnt bone, stones and gravel included. Measured 0.97m x 0.50m x 0.05m. Two soil samples taken (97-98). Above F527, below topsoil F001.

Pit F539 Zone D (Figs. 52, 58) South of Pit Group 3

F539	Cut of small circular pit. Measured 0.20m x 0.22m x 0.21m. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Truncated by furrow F162. Adjacent to larger pit F527 near the southern limit of excavation. Filled with F538. Above subsoil F002, below F538.
F538	Fill of pit F539, with compact, greyish-brown, sandy clay. Occasional charcoal included. Measured 0.20m x 0.22m x 0.21m. One soil sample taken (90). Above F539, below topsoil F001.

Zone D Stake-hole within Pit Group 3

Stake-hole F112 Zone D (Figs. 52, 56)

F112	Cut of circular stake-hole. Measured 0.12m x 0.12m x 0.21m. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a tapered, blunt-pointed base. Filled with F113. Above subsoil F002, below F113.

F113	Fill of stake-hole F112, with compact, grey, silty clay. Occasional charcoal included. Measured 0.12m x 0.12m x 0.21m. One soil sample taken (121). Above F112, below topsoil F001.

Ring-gully within Pit Group 3

Ring-gully F163 Zone D (Figs. 52, 57) (Plate 34) Within Pit Group 3

F163	Cut of curvilinear feature. Measured 2.85m x 0.23m x 0.08m. Orientated north-south. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Truncated at both ends by F162 furrows. Filled with F164. Above subsoil F002, below F164.
F164	Fill of ring-gully F163, with compact, greyish-brown, sandy clay. A moderate amount of charcoal, and occasional burnt bone included. Measured 2.85m x 0.23m x 0.08m. One soil sample taken (92), and burnt bone bagged separately. Above F163, below topsoil F001.

Zone E features (Plate 39)

Large pits

Charcoal-rich pit F668 Zone E (Figs. 59, 62)

F668	Cut of oval charcoal-rich pit, in grid B12. Measured 1.95m x 0.85m x 0.06m. Orientated north-east/south-west. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a slightly rounded base. Largely destroyed feature. Although the surface area was relatively large, the feature's depth was negligible. Edge of feature truncated to the northeast by pit F700. Filled with F669. Above subsoil F002, below F669.
F669	Fill of pit F668, with compact, grey, sandy clay. Occasional charcoal and burnt bone included. Measured 1.95m x 0.85m x 0.09m. One charcoal and soil sample taken (196, 197); burnt bone bagged separately. Above F668, below topsoil F001.

Charcoal-rich pit F700 Zone E (Figs. 59, 62) (Plate 35)

F700	Cut of sub-oval charcoal-rich pit. Measured 1.65m x 1.20m x 0.65m. Orientated north-east/south-west. It had a sharp break of slope at the top, concave sides, and a

	gradual break of slope leading to a rounded base. Located 3m from inner edge of enclosure ditch F003. Truncated northeast extent of adjacent shallow pit F668. Filled with F719, F718, F701. Above subsoil F002, below F719.
F719	Primary fill of pit F700, with compact, brownish-grey, sandy clay. A moderate amount of charcoal and medium-sized and large stones, and occasional animal bones included. Measured 1.40m x 1.00m x 0.25m. One soil, and one charcoal sample taken (202-03), and one bag of animal bones taken. Above F700, below F718.
F718	Middle fill of pit F700, with compact, brownish-grey, sandy clay. Frequent charcoal, and occasional animal bones, burnt bones and stones included. Measured 1.28m x 0.90m x 0.19m. One soil, and one charcoal sampled (200-01), and one bag each of animal bone and burnt bone taken. One smooth stone fragment found (E2220:718:1). Above F719, below F701.
F701	Upper fill of pit F700, with compact, brownish-grey, sandy clay. A moderate amount of charcoal, and occasional stones, gravel and burnt bone included. Measured 1.65m x 1.20m x 0.21m. One soil, and one charcoal sampled (198-9), and burnt bone bagged separately. Above F718, below topsoil F001.

Charcoal-rich pit F711 **Zone E (Figs. 59, 62) (Plate 36)**

F711	Cut of oval charcoal-rich pit. Measured 1.30m x 1.20m x 0.47m. Orientated north-east/south-west. It had a sharp break of slope at the top, concave sides, and a sharp break of slope leading to a flat base. Truncated to the west by linear feature F661, and to the north by furrow F162. Filled with F720, F664, F663. Above subsoil F002, below F720.
F720	Primary fill of pit F711, with loose, black sand. Frequent charcoal and burnt bones included. Measured 0.90m x 1.00m x 0.20m. Five soil and charcoal samples taken (213, 215-16, 218-19), along with two bags of animal bone and four small bags of cremated bone. Above F711, below F664.
F664	Secondary fill of pit F711, with compact, light grey, sandy clay. Occasional charcoal included. Measured 1.30m x 1.10m x 0.20m. Two soil samples taken (217, 220), and burnt bone bagged separately. Above F720, below F663.
F663	Upper fill of pit F711, with compact, brown sandy clay. Occasional charcoal included. Measured 1.20m x 1.00m x 0.09m. Two soil samples taken (214, 221). Above F664, below topsoil F001.

Charcoal-rich pit F721 Zone E (Figs. 59, 62)

F721	Cut of relatively large, sub-oval charcoal-rich pit. Measured 3.20m x 1.70m x 0.30m. Orientated north-west/south-east. It had an irregular break of slope at the top and at the base, with irregular sides and base. Truncated to the south by furrow F162. Filled with F722, F736. Above spread F667, below F722.
F722	Primary fill of pit F721, with compact, brownish-grey, sandy clay. Occasional charcoal included. Measured 2.30m x 1.70m x 0.30m. One soil sample taken (272). Above F721, below F736.
F736	Upper fill of pit F721, with compact, greyish-brown, sandy clay. No inclusions. Measured 1.80m x 1.70m x 0.09m. One soil sample taken (273). Above F722, below topsoil F001.

Pits

Charcoal-rich pit F168 Zone E (Figs. 59, 63) (Plate 38)

F168	Cut of sub-circular charcoal-rich pit. Measured 0.47m x 0.45m x 0.10m. It had a sharp break of slope, concave sides, and a gradual break of slope leading to a rounded-uneven base. Filled with F167. Above subsoil F002, below F167.
F167	Fill of pit F168, with compact, black clay. Frequent charcoal and burnt bone included. Measured 0.47m x 0.45m x 0.10m. One soil, charcoal and burnt bone sample taken (165). Above F168, below topsoil F001.

Post-hole F521 Zone E (Figs. 59, 63) (Plate 37)

F521	Cut of circular post-hole. Measured 0.30m x 0.27m x 0.27m. It had a sharp break of slope at the top, vertical sides, and a gradual break of slope leading to a tapered rounded-point base. Adjacent to small cuts F523, F525. Filled with F520. Above subsoil F002, below F520.
F520	Fill of pit F521, with compact, greyish-brown, sandy clay. Occasional charcoal and small stones included. Measured 0.30m x 0.27m x 0.27m. No finds or samples taken. Above F521, below topsoil F001.

Pit F523 Zone E (Figs. 59, 63)

F523	Cut of small oval pit. Measured 0.31m x 0.19m x 0.08m. It had a sharp break of slope at the top, vertical sides, and a gradual break of slope leading to a flat base. Adjacent to small pits F521, F525. Filled with F522. Above subsoil F002, below F522.
F522	Fill of pit F523, with compact, greyish-brown, sandy clay. No inclusions. Measured 0.31m x 0.19m x 0.08m. No finds or samples taken. Above F523, below topsoil F001.

Pit F525 Zone E (Figs. 59, 63)

F525	Cut of small sub-circular pit. Measured 0.22m x 0.15m x 0.06m. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to an uneven base. Filled with F524. Above subsoil F002, below F524.
F524	Fill of pit F525, with compact, greyish-brown, sandy clay. Occasional small stones included. Measured 0.22m x 0.15m x 0.06m. No finds or samples taken. Above F525, below topsoil F001.

Pit F529 Zone E (Figs. 59, 63)

F529	Cut of small circular pit. Measured 0.28m x 0.25m x 0.09m. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Located 2.2m north of small pit F525. Filled with F528. Above subsoil F002, below F528.
F528	Fill of pit F529, with compact, brownish-grey, sandy clay. Occasional charcoal included. Measured 0.28m x 0.25m x 0.08m. No finds or samples taken. Above F529, below topsoil F001.

Charcoal-rich pit F708 Zone E (Figs. 59, 63)

F708	Cut of circular charcoal-rich pit. Measured 0.30m x 0.32m x 0.04-0.05m. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Filled with F709. Above subsoil F002, below F709.
F709	Fill of pit F708, with compact, grey, sandy clay. A moderate amount of charcoal included. Measured 0.30m x 0.32m x 0.04-0.05m. One soil and charcoal sample

	taken (227). Above F708, below topsoil F001.

Charcoal-rich pit F739 Zone E (Figs. 59, 63, 64)

F739	Cut of irregular charcoal-rich pit. Measured 0.90m x 0.90m x 0.125m. It had a gradual/non-perceptible break of slope at the top, concave sides, and a non-perceptible leading to an irregular base. Southern edge truncated by furrow F162. Filled with F740. Above subsoil F002, below F740.
F740	Fill of pit F739, with soft, dark grey, sandy clay. Frequent charcoal included. Measured 0.90m x 0.90m x 0.125m. One soil and charcoal sample taken (237-8). Above F739, below spread F667.

Stake-hole

Stake-hole F551 Zone E (Figs. 59, 63)

F551	Cut of circular stake-hole. Measured 0.11m x 0.09m x 0.14m. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a tapered, pointed base. An isolated feature. Filled with F550. Above subsoil F002, below F550.
F550	Fill of deposit F551, with loose, black silty sand. Occasional charcoal included. Measured 0.11m x 0.09m 0.14m. No finds or samples taken. Above F551, below topsoil F001.

Linear features respecting axis of enclosure ditch

Linear feature F661 Zone E (Figs. 59, 64) (Plate 40)

F661	Cut of discontinuous linear feature. Measured 26m x 0.60m x 0.16m. Orientated north-south. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to an irregular base containing ninety stake-hole-like depressions. Intersected three parallel cuts aligned wnw/ese, F731, F733, F735. Included with a number of closely spaced linear features that respected the curving line of enclosure ditch F003: F665, C726, F752. Truncated by a number of F162 cultivation furrows. Filled with F662. Above subsoil F002, below F662.
F662	Fill of linear feature F661, with compact, grey sandy clay. Occasional charcoal and burnt bone included. Measured 26m x 0.60m x 0.16m. One soil and charcoal

	sample taken (231), and burnt bone bagged separately. Above F661, below topsoil F001.

Linear feature F665 Zone E (Figs. 59, 64) (Plates 40, 41)

F665	Cut of linear feature. Measured 40m x 0.40m x 0.20m. Orientated north-south. It had a sharp break of slope at the top, concave sides, and a non-perceptible break of slope leading to an uneven base. Fifty-nine stake-hole-like depressions were noted along the base of the cut (0.08-0.25m length x 0.05-0.16m width x 0.02-0.18m depth). Parallel to and 0.5m west of linear feature F661. Truncated by nine F162 cultivation furrows. Intersected linear features F729, F733, F735. Filled with F666. Above subsoil F002, below F666.
F666	Fill of linear feature F665, with compact, grey sandy clay. Occasional charcoal and burnt bone included. Measured 40m x 0.40m x 0.20m. One soil and charcoal sample taken (228-229), and burnt bone bagged separately. Above F665, below topsoil F001.

Linear feature F738 Zone E (Figs. 59, 64) (Plate 41)

F738	Cut of linear feature. Measured 5.20m x 0.40m x 0.10m. Orientated north-east/south-west. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Thirty-two stake-hole-like depressions were noted along the base of the cut (0.05-0.22m x 0.04-0.14m x 0.03-0.10m). Located between parallel linear features F744 and F726. Truncated by three F162 furrows. Filled with F737. Above subsoil F002, below F737.
F737	Fill of linear feature F738, with compact, grey sandy clay. Occasional charcoal included. Measured 5.20m x 0.40m x 0.10m. One soil sample taken (264); burnt bone bagged separately. Above F738, below spread F667.

Linear feature F744 Zone E (Figs. 59, 64) (Plate 41)

F744	Cut of linear feature. Measured 6.15m x 0.40m x 0.10m. Orientated north-east/south-west. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to an irregular base. Approx thirty stake-hole-like depressions were present on the base of the cut (0.06-0.14m x 0.05-0.16m x 0.03-0.10m). Located between parallel linear features F746 and F738. Truncated by four

	F162 furrows. Filled with F745. Above subsoil F002, below F745.
F745	Fill of linear feature F744, with compact, grey clay. Occasional charcoal included. Measured 6.15m x 0.40m x 0.10m. One soil sample taken (263). Above F744, below spread F667.

Linear feature F746 Zone E (Figs. 59, 64) (Plate 41)

F746	Cut of linear feature. Measured 4.00m x 0.30m x 0.10m. Orientated north-east/south-west. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Roughly twenty-two stake-hole-like depressions were present on the base of the cut (0.06-0.17m x 0.05-0.14m x 0.03-0.08m). The most westerly of a closely spaced formation of nine parallel linear features, overall width span 7.5m, commencing 4m from the inner edge of the enclosure ditch F003, the group comprising linear features F744, F738, F726, F752, F750, F661, F659, F657. Truncated by three F162 furrows. Filled with F747. Above subsoil F002, below F747.
F747	Fill of linear feature F746, with compact, grey clay. Occasional charcoal included. Measured 4.00m x 0.30m x 0.10m. One soil sample taken (262). Above F746, below spread F667.

Linear feature F750 Zone E (Fig. 59) (Plate 41)

F750	Cut of linear feature. Southern continuation of linear feature F665. Measured 2.15m x 0.50m x 0.045m. Orientated north-east/south-west. It had a gradual break of slope at the top, irregular sides, and a gradual break of slope leading to an irregular base. Eighteen stake-hole-like depressions were present along the base of the cut (0.04-0.08m x 0.04-0.08m x 0.005-0.0037m). Truncated at both ends by F162 furrows. Filled with F751. Above subsoil F002, below F751.
F751	Fill of linear feature F750, with compact, grey clay. Occasional charcoal included. Measured 2.15m x 0.50m x 0.045m. Similar to fills of adjacent linear features F752, F661, F726, F738. No finds or samples taken. Above F750, below topsoil F001.

Linear feature F752 Zone E (Figs. 59, 64) (Plate 41)

F752	Cut of discontinuous linear feature. Measured 18m x 0.40m x 0.20m. Overall length included two breaks, of 1.9m and 2m each. Orientated north-east/south-west. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to an irregular base. Fifty-six stake-hole-like depressions were present along the base of the cut (0.05-0.30m x 0.04-0.17m x 0.02-0.12m). Located between parallel linear features F726 and F665. Feature appeared to merge with cut of linear feature F726 to the north. Truncated by six F162 furrows, and intersected with three linear features aligned wnw/ese, F729, F733 and F735. Filled with F753. Above subsoil F002, below F753.
F753	Fill of linear feature F752, with compact, grey clay. Occasional charcoal included. Measured 14.10m x 0.40m x 0.20m. Two soil samples taken (265, 275). Above F752, below topsoil F001.

Linear feature F657 Zone E (Figs. 59, 65)

F657	Cut of linear feature. Measured 5.80m x 0.34m x 0.14m. Orientated north-east/south-west. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to an uneven base. Twenty-three stake-hole-like depressions were present along the base of the cut (0.05-0.14m length x 0.04-0.11m x width x 0.005-0.13m depth). It was the eastern-most of a series of nine parallel linear features respecting the line of enclosure ditch F003, located 3.3m from the inner edge of the ditch. The others in the series, progressing east to west, were F659, F661, F665, F752, F726, F738, F744 and F746. Truncated by two F162 furrows. Filled with F658. Above subsoil F002, below F658.
F658	Fill of linear feature F657, with compact, grey, sandy clay. Frequent charcoal and occasional burnt bone included. Measured 5.80m x 0.34m x 0.14m. One soil and charcoal sample taken (177, 179) and burnt bone bagged separately. Above F657, below topsoil F001.

Linear feature F659 Zone E (Figs. 59, 65)

F659	Cut of linear feature. Measured 6.50m x 0.50m x 0.10m. Length included a 0.50m break near the northern limit. Orientated north-east/south-west. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to an uneven base. Four stake-hole-like depressions were present at the base of the cut

	(0.05-0.10m diameter x 0.015-0.03m depth). Truncated by three F162 furrows. Located between parallel linear features F657 and F661. Filled with F660. Above subsoil F002, below F660.
F660	Fill of linear feature F659, with compact, grey sandy clay. A moderate amount of charcoal, and occasional burnt bone included. Measured 8.20m x 0.50m x 0.10m. One soil sample taken (176). Above F659, below topsoil F001.

Linear feature F706 Zone E (Figs. 59, 65)

F706	Cut of linear feature. Measured 1.75m x 0.20m x 0.14m. Orientated north-south. It had a sharp break of slope at the top, vertical sides, and a gradual break of slope leading to a flat base. Two stake-hole-like depressions were present (0.05-0.065m diameter x 0.025-0.04m depth). Located c. 3m from the inner edge of enclosure ditch F003, and c. 3.7m east of a series of closely-spaced linear features, F661, F665, F752, F726, also respecting the axis of the ditch. Located 5.75m north of linear feature F657, which was a similar distance from the F003 ditch. Badly preserved. Filled with F707. Above subsoil F002, below F707.
F707	Fill of linear feature F706, with compact, dark grey, sandy clay. Frequent charcoal and occasional burnt bone included. Measured 1.75m x 0.20m x 0.14m. One soil sample taken (178); burnt bone bagged separately. Above F706, below topsoil F001.

Linear feature F748 Zone E (Figs. 59, 65)

F748	Cut of linear feature. Measured 2.00m x 0.35m x 0.10m. Orientated north-south. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Located 2.80m west of linear feature F744. Filled with F749. Above subsoil F002, below F749.
F749	Fill of linear feature F748, with compact, grey clay. Occasional charcoal included. Measured 2.00m x 0.35m x 0.10m. One soil sample taken (261). Above F748, below spread F667.

Linear features perpendicular to enclosure ditch F003

Linear feature F729 Zone E (Figs. 59, 65)

F729	Cut of linear feature. Measured 4.50m x 0.35m x 0.15m. Orientated north-west/south-east. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a flat base. Seven stake-hole-like depressions were present along the base of the cut (0.05-0.15m x 0.035-0.14m x 0.005-0.045m). Intersected three linear features respecting the axis of enclosure ditch F003: F726/F752 and F665. Filled with F728. Above subsoil F002, below F728.
F728	Fill of linear feature F729, with compact, grey sandy clay. Occasional charcoal and small stones included. Measured 4.50m x 0.35m x 0.15m. One soil and charcoal sample taken (276). Above F729, below topsoil F001.

Linear feature F731 Zone E (Figs. 59, 65)

F731	Cut of linear feature. Measured 5.70m x 0.22m x 0.065m. Orientated west-north-west/east-south-east. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to a flat base. Five stake-hole-like depressions were present at the base of the cut (0.10-0.18m x 0.08-0.15m x 0.02-0.07m). Located 1m north of parallel linear feature F729. Intersected three linear features respecting the axis of enclosure ditch F003: F726/F752 and F665. Northern side of the feature was truncated by furrow F162. Filled with F730. Above subsoil F002, below F730.
F730	Fill of linear feature F731, with compact, grey clay. Occasional charcoal and burnt bone included. Measured 5.70m x 0.22m x 0.065m. One soil sample taken (266). Above F731, below topsoil F001.

Linear feature F733 Zone E (Figs. 59, 65) (Plate 40)

F733	Cut of linear feature. Measured 4.30m x 0.40m x 0.105m. Orientated west-north-west/east-south-east. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to an irregular base. Eight stake-hole-like depressions were present (0.10-0.30m x 0.08-0.18m x 0.05-0.15m). Located between parallel linear features F735 and F731. Intersected four closely spaced linear features respecting the axis of enclosure ditch F003: F661, F665, F726, F752. Filled with F732. Above subsoil F002, below F732.

F732	Fill of linear feature F733, with compact, grey clay. Occasional charcoal and burnt bone included. Measured 4.30mx 0.40m 0.105m. No finds or samples taken. Above F733, below topsoil F001.

Linear feature F735 Zone E (Figs. 59, 65) (Plate 40)

F735	Cut of linear feature. Measured 5.15m x 0.40m x 0.17m. Orientated west-north-west/east-south-east. It had a sharp break of slope at the top, almost vertical sides, and a sharp break of slope leading to an irregular base. Five stake-hole-like depressions were present (0.06-0.12m x 0.035-0.12m x 0.015-0.07m). The northernmost of a series of four linear features perpendicular to the enclosure ditch F003, spread over a distance of c. 4.20m, and intersecting a series of four linear features parallel to the enclosure ditch, F726/F752, F665 and F661. The eastern end of the feature was truncated by furrow F162. Filled with F734. Above subsoil F002, below F734.
F734	Fill of linear feature F735, with compact, grey sandy clay. Occasional small stones and charcoal included. Measured 5.15m x 0.40m x 0.17m. No finds or samples taken. Above F735, below topsoil F001.

Linear feature F754 Zone E (Figs. 59, 65)

F754	Cut of linear feature. Measured 1.30m x 0.24m x 0.08m. Orientated east-west. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Six stake-hole-like depressions were present (0.045-0.06m x 0.042-0.06m x 0.01-0.035m). Located 3.80m south of linear feature F729. Eastern end of the feature truncated by furrow F162. Filled with F755. Above subsoil F002, below F755.
F755	Fill of linear feature F754, with compact, grey clay. Occasional charcoal and burnt bone included. Measured 1.30m x 0.24m x 0.08m. No finds or samples taken. Above F754, below topsoil F001.

Spread

Spread F667 Zone E

F667	Irregular spread. Deposit of compact, grey sandy clay. A moderate amount of charcoal and burnt bone included. Measured 14.80m x 5.70m x 0.12m (length x width x max. depth). Truncated by several F162 furrows. One soil sample taken (235) and burnt bone bagged separately. Above subsoil F002, below topsoil F001.

Field ditches

Linear field ditch F641 Zone E (Figs. 60, 66)

F641	Cut of linear feature. Measured 25.50m x 1.00-1.85m x 0.35-0.40m (excavated length x width x depth). Orientated west-north-west/east-south-east. It had a sharp-gradual break of slope at the top, concave-stepped sides, and a gradual break of slope leading to a flat-rounded base. Truncated outer edge of enclosure ditch F003. Filled with F743, F742, F643, F642, F606. Above subsoil F002, below F743.
F743	Primary fill of ditch F641, with compact, bluish-brownish, sandy clay. Occasional medium-sized pebbles included. Measured 0.85m x 0.08m (width x depth). No finds or samples taken. Above F641, below F742.
F742	Middle fill of ditch F641, with compact, orange-brownish to blue-brownish, sandy clay. Occasional large and medium-sized stones included. Measured 0.60m x 0.18m (width x depth). No finds or samples taken. Above F743, below F642.
F643	Primary fill of C641, with weakly cemented, grey clay. Occasional charcoal and stones included. Measured 1.27m x 0.17m (width x depth). One soil sample taken (195). Above subsoil F002, below F642.
F642	Main fill of ditch F641, with hard, dark bluish-brownish, sandy clay. Occasional irregular stones included. Measured 1.00-1.20m x 0.30-0.40m (width x depth). Three soil samples taken (194, 249-50), together with one wood fragment (230), and one bag of animal bone. Above F643 and F742, below F606 and topsoil F001.
F606	Upper fill of ditch F641, loose, bluish-dark brown silty sand. No inclusions. Measured 1.37m x 0.11m (width x depth). No finds or samples taken. Two sherds of creamware pottery found (1). Above F642, below topsoil F001.

Field boundary ditch F490 Zones C and E (Figs. 7, 33, 61)

F490	Cut of linear modern field boundary. Measured 25.50m x 3.15m x 0.30m (excavated length x width x depth). Orientated north-east/south-west. It had a sharp break of slope at the top, concave sides, and a gradual break of slope leading to a rounded base. Truncated enclosure ditch F003 and field drain F492. Filled with F489. Above F493 and F714, below F489.
F489	Fill of ditch F490, with firm, bluish-dark brown, silty sand. Measured 3.15m x 0.30m (width x depth). One soil sample taken (212). Above F490, below topsoil F001.

Field drain

Linear field drain F492 Zones C and E (Fig. 61)

F492	Cut of linear modern field drain. Measured 8m x 0.45m x 0.82m (excavated length x width x depth). Orientated north-east/south-west. It had a sharp break of slope at the top, vertical sides, and a sharp break of slope leading to a flat base. Truncated fills of enclosure ditch F003. Truncated by field ditch F489. Filled with F491. Above F493, F494, F495, F650, F651, F652, below F491.
F491	Fill of drain F492, with loose, yellowish-grey, silty sand. Frequent stones and pebbles included. Measured 0.45m x 0.82m (width x depth). One soil sample taken (192). One rim sherd of pearlware pottery found (E2220:491:1). Above F492, below F490.

Zone F (Figs. 7 and 67)

Burnt spreads and troughs outside enclosure

Burnt spread & Trough (Figs. 67, 68, 69)

F853	Shallow sub-circular cut. Measured 7.05m x 7m (north-south x east-west). It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to an uneven base. Truncated trough F860. Filled with burnt spread F854. Above F861, below F854.
F854	Burnt spread overlying sub-circular cut F853, with loose, grey-black silty clay. Frequent heat shattered stones and charcoal included. Measured 7.05m x 7m x 0.10-0.40m (north-south x east-west x depth). Soil sample taken (407). No finds recorded. Above F853, below topsoil F001.

F860	Rectangular shallow trough, under cut F853. Measured 2.30m x 1.50m x 0.10-0.30m (north-south x east-west x depth). Orientated east-west. It had a gradual break of slope at the top, concave sides, and an imperceptible break of slope leading to an uneven base. Filled with F861. Above subsoil F002, below F861.
F861	Fill of trough F860, with loose, grey-black silty clay. Frequent heat shattered stones and charcoal included. Measured 2.30m x 1.50m x 0.35m (north-south x east-west x depth). One soil sample taken (405). No finds recorded. Above F860, below F853.

Burnt spread & Trough (Figs. 67, 68, 69)

F855	Kidney/crescent shaped cut. Measured 13m x 12m (north-south x east-west). Orientated north-south. It had a gradual break of slope at the top, concave sides, and a gradual break of slope leading to an uneven base. Truncated trough F862. Filled with burnt spread F856. Above F863, below F856.
F856	Burnt spread overlying cut F855, with loose, grey-black silty clay. Frequent heat shattered stones and charcoal included. Measured 13m x 12m x 0.07-0.15m (north-south x east-west x depth). One soil sample taken (404). No finds recorded. Above F855, below topsoil F001.
F862	Cut of sub-square trough. Measured 4m x 4m x 0.43m (north-south x east-west x depth). It had a gradual break of slope at the top, concave sides, and an imperceptible break of slope leading to an uneven base. Filled with F863. Above subsoil F002, below F863.
F863	Fill of trough F862, loose, grey-black silty clay. Frequent heat shattered stones and charcoal included. Measured 4m x 4m x 0.43m (north-south x east-west x depth). No finds or sample recorded. Above F862, below F855.

Burnt spread & Trough (Figs. 67, 69) (Plate 42)

F857	Irregular-shaped cut. Measured 19m x 13.40m x 0.02m (length x width x depth). Orientated north-south. Truncated trough F864. Filled with burnt spread F858. Above F865, below F858.
F858	Burnt spread overlying cut F857, with loose, grey-black, silty clay. Frequent heat shattered stones and charcoal included. Measured 27m x 14m x 0.02m (north-south x east-west x depth). No finds or sample recorded. Above F857, below topsoil F001.

F864	Cut of rectangular trough. Measured 2.70m x 2m x 0.40m (north-south x east-west x depth). Orientated north-south. It had a gradual break of slope at the top, concave sides, and an imperceptible break of slope leading to an uneven base. Filled with F865. Above subsoil F002, below F865.
F865	Fill of trough F864, with loose, grey-black, silty clay. Frequent heat shattered stones and charcoal included. Measured 2.70m x 2m x 0.40m (north-south x east-west x depth). Soil sample taken (406). No finds recorded. Above F864, below F858.

Burnt spread

F859	Western extent of burnt spread F856, with loose, grey-black, silty clay. Frequent heat shattered stones and charcoal included. Irregular-shaped burnt spread, located to the west of cut F855. Measured 9.30m x 5m x 0.05m (north-south x east-west x depth). Deposited directly on the subsoil, no recorded cut. Same as burnt spread F856. No finds or samples taken. Above subsoil F002, below topsoil F001.

4.2.3 Stratigraphic Sequencing

Table … Stratigraphic Groups		
Site Name: Bushfield or Maghernaskeagh 1/Lismore 1		**Record No.: E2220 – Scheme No.: A015/111**
Period	**Phase**	**Composition**
I	1	Early Bronze Age: burnt spreads (Zone F)
II	1	Iron Age metalworking activity
III	1	Early Medieval period: enclosed settlement, metalworking, burial
	2	Early Medieval period: development of south-east quadrant (Zone E)
IV	1	Post-Medieval period: pre-levelling of monument.
	2	Post-Medieval period: post-levelling of monument.

The following analysis and interpretation of the archaeological features, from the earliest remains to the most recent evidence, is provisional in nature, and conclusions drawn are likely to be revised when specialist reports on finds and samples and radiocarbon dating results become available in due course.

Period 1: Early Bronze Age

Phase 1

Radiocarbon dating results confirm the burnt mound activity recorded in Zone F, an area of limited excavation located to the northwest of the enclosure at Bushfield or Maghernaskeagh-Lismore 1, to date from the early Bronze Age. A sample of hazel charcoal from fill F865 of trough F864 (Figs. 67 and 69) returned a calibrated dating range of 2350–2130 BC (88.5% probability; Appendix 8.2, SUERC-18002). This dating confirms that the activity recorded in Zone F was not contemporary with the occupation of the adjacent enclosure, which dates from the early medieval period.

The archaeological material recorded in Zone F, which effectively constitutes a separate archaeological site, was contained within an area measuring roughly 49m (east-west) by 28m (north-south). This zone was located *c*. 60m northwest of the enclosure. A reasonably sizeable burnt spread, F858 (See plate 42), occupied the western half of this area, and three similar deposits, F854, F856 and F859, linking up to form a single amorphous burnt spread, extended over much of the eastern half. The shallow remains of three sub-rectangular boiling pits, or troughs, were revealed below the burnt spreads. Trough F860, below burnt spread F854, was located 13.50m southeast of trough F862, below burnt spread F856. The third trough, F864, below burnt spread F858, was located 24m west of trough F862.

Burnt spreads and associated troughs of this type have been found with ever increasing frequency in the course of archaeological investigations carried out in the preliminary stages of large infrastructural projects. The term *fulacht fiadh* is often applied to sites where the defining elements comprise an irregular/crescent-shaped burnt mound, pit-like troughs that held large volumes of water and, in some cases, the presence of a hearth and other pits (Brindley et al. 1989–90, 25). The first such site to be excavated, at Ballyvourney, Co. Cork, by Professor M. J. O'Kelly in 1950, was termed a *fulacht fiadh*, based on an account of hunting and cooking in a 17th-century text. The processes at work during the operation of a burnt mound site involved bringing water in a trough to the boil by adding to it stones heated in an adjacent hearth. Prolonged activity/reuse of the site generated substantial debris, on the one hand ash and charcoal rake-out from the hearth, on the other waste from the trough, as repeated heating and quenching caused the stones to shatter into reddened fragments. The accumulation of this mix of fragmented stone, ash and charred wood could result in the formation of a semi-circular ridge around the site of the hearth and trough, hence the descriptive term 'burnt mound' is applied to the better preserved examples.

There were different purposes for which the hot water generated by such methods may have been used, but the cooking of a joint of meat wrapped in straw is one that Professor O'Kelly himself demonstrated to be feasible by means of practical experimentation. As a consequence the term *fulacht fiadh* has often been seen as synonymous with 'ancient cooking site'. However, it has been convincingly argued that excavated evidence for pyrolithic ('hot stone') technology should not be confused with early written use of the term *fulacht*, which should be applied strictly to cooking by means of a spit suspended over an open fire (Ó Néill 2003-04). Hence these highly characteristic sites are increasingly classified under the more neutral heading 'burnt mound', if they are well enough preserved to show some surface expression, or termed burnt spreads, if they have been sufficiently levelled by agricultural processes not to be visible until the overlying topsoil has been completely stripped. They are often sited close to streams or springs which would have provided the water necessary to sustain this particular type of activity, and in many cases, low lying ground was preferred, as a trough dug to a level below the local water table could be replenished by natural means. A burnt spread typically consists of burnt and heat-shattered stones and charcoal. The trough underlying or adjacent to this material can be of varying size, either unlined or lined with timber planks or stone slabs. The infilling deposits are usually similar deposits of burnt and heat-shattered stones and charcoal. The majority found in Ireland have been attributed to the Bronze Age (Brindley et al, 1989-90, 25; Corlett 1997; Russell 2001; Waddell 1998, 177). Three adjacent burnt spreads were identified at Bushfield or Maghernaskeagh/Lismore 1; spread F858 to the west, and spreads F856/F859 and F854 to the east, each associated with a trough.

Burnt spreads (Figs. 67, 68; Plate 42)

A total of three burnt spreads were recorded, **F854**, **F856/F859 and F858,** located *c*.60m northwest of the enclosure at Bushfield or Maghernaskeagh/Lismore 1. Each was irregular in plan, and consisted of a single deposit of heat-shattered stones and charcoal-enriched clay. The deposits were largely contained by irregular shallow cuts made in the surface of the subsoil. These cuts were **F854** at the eastern limit of Zone, cut **F855**, located 6.30m northwest of cut **F853**, and cut **F857**, located 12m west of cut **F855**. The cuts measured between 7.05-13m x 7-12m x 0.07-0.15m. The burnt spreads were deposited over the three troughs that were located at off-centre points within each of the cuts. No finds were recorded. Because the three burnt spread cuts are widely separated, it is not possible in stratigraphic terms to determine the order in which they were established during the operational life of the site.

Troughs (Figs. 67, 69)

Three sub-rectangular unlined troughs were recorded in the subsoil below the burnt spreads. Trough **F860** was located within the limits of cut **F853** below burnt spread **F854** at the eastern limit of Zone F. Trough **F862** was located 13.50m northwest of trough **F854**, within the limits of cut **F855**, below burnt spread **F856**. Trough **F864** was located near the western limit of Zone F, 24m west of trough **F862**, within the limits of cut **F857**, below burnt spread **F858**. Each trough contained loose, grey-black, silty clay with heat-shattered stones and charcoal, similar to the overlying burnt spread material. The troughs measured between 2.30-4m x 1.50-4m x 0.10-0.43m. Although the trough dimensions conform to expectations in terms of length and width, they do appear rather shallower than average, and the gradual breaks of slope, concave sides and uneven bases is unusual for sub-rectangular troughs. No finds were recorded. Since there is no obvious water source close to the troughs, it seems likely that they were filled and replenished by naturally rising groundwater from below the surface of the subsoil.

Period 2: Iron Age activity

Phase 1

Radiocarbon dating evidence

Radiocarbon dating results confirmed the presence of a period of activity dating from the Iron Age at Bushfield or Maghernaskeagh/Lismore 1 that was not suspected during the course of the excavation. It was presumed that all the features recorded within the limits of the enclosure were contemporary with its occupation. However, a sample of alder and hazel charcoal from fill F194 of pit F195 in Zone C (Figs. 33 and 49) produced a calibrated date range of 260–50 BC (69.8% probability, Appendix 8.2, SUERC-18001). This result confirms

that although the majority of the excavated features within the limits of the enclosure are likely to be of early medieval date, an unknown number relate to a period of activity on the site that dates from the Iron Age, well before the large enclosure was constructed.

Further evidence for a period of Iron Age activity is supplied by another of the radiocarbon dating results. Although the cluster of slagpit furnaces excavated in Zone A were located just outside the entrance to the enclosure, it was nevertheless presumed that the features were contemporary with the period of enclosed settlement at the site. However, a sample of alder charcoal from fill F091 of slagpit furnace F090 (Figs. 8, 9 and 12), returned a calibrated dating range of 90 BC–AD 80 (95.4% probability, Appendix 8.2, SUERC 17999), which confirms that this cluster of metalworking features was not contemporary with the enclosure. Analysis of the metalworking waste material obtained from these features confirms that iron smelting work was in operation in what should be termed 'low-shaft slagpit' furnaces rather than 'bowl' furnaces, and that in terms of dimensions the cluster of furnaces in Zone A are consistent with other furnaces dated to the earlier part of the Iron Age, i.e. between the 1st and 4th centuries BC (Young, Appendix 8.8).

In situ metal-working (Zone A) (See Figs. 8, 9, 12; Plates 6, 7)

A number of slagpit furnaces were located in Zone A, 13m northwest of the enclosure entrance. They were grouped together in a 3 x 3m area forming a sub-circular shape. The slagpit furnace was used for smelting metal ore (Raftery 1994, 148). A total of five features were noted (**F086**, **F088**, **F090, F092, F095**: measured between 0.52-70m x 0.50-0.66m x 0.12-0.25m) (more may exist outside the proposed landtake). Their gradual break of slopes, concave sides and rounded bases produced bowl shaped pits. The fills recorded were also consistent with this type of activity. Each slagpit furnace was filled with more than one deposit. The primary fill of each furnace comprised oxidised (burnt) clay, which consequently may have formed an air-tight seal at the bottom of each feature. This type of clay is consistent with generating high furnace temperatures to smelt metal. This fill was followed by charcoal-enriched clay, and/or burnt stones and further burnt soil. Charcoal was an essential element in both the iron reduction and smelting processes (Carlin & Kinsella 2006, 3). Only one fill, **F089** within **F088**, however, included small deposits of slag, more typically common of the smelting rather than the smiting process. No other finds were recorded. Four slagpit furnaces cut directly into the subsoil, while the fifth, **F095** truncated **F090.**

Period 3: Early Medieval period

For ease of reference, the enclosure is divided into five separate zones. The first two, Zones A and B, lie on the Lismore, i.e. the western side of the townland boundary, covering the northwest quadrant (Zone A) and the southwest quadrant (Zone B). The excavated extent of the enclosure was substantially greater on the Bushfield or Maghernaskeagh, i.e. the eastern side of the townland boundary, and this area is divided into three zones, Zones C–E. Zone C covers the northeast quadrant, including the remains of a cemetery. Zone D covers an area south of the mid point of the enclosure, comprising clusters of charcoal-rich pits of varying size. Zone E encompasses the southeast quadrant, and is characterised by a formation of linear features respecting the line of the enclosure ditch.

The majority of the archaeological features recorded at Bushfield or Maghernaskeagh/Lismore 1 were contained by the limits of a relatively large early medieval ditched enclosure. The features located outside the limits of the ditch comprise the early Bronze Age burnt spreads of Zone F, described above, a cluster of slagpit furnaces (Zone A), located 10.10m north of the enclosure, dating roughly from a mid point of the Iron Age, a number of much later linear field drains and ditches, some of which pre-date the levelling of the monument, others clearly post-dating this event. There was also a pit, F054 (Zone B), located 26m west of the enclosure, of unknown date. The majority of features excavated within the limits of the enclosure are presumed to be contemporary with the occupation of the site. However, the radiocarbon dating of pit F195 (Zone C) to the middle of the Iron Age, i.e. broadly contemporary with the Zone A slagpit furnaces, is an indicator that an unknown number of features within the enclosed limits may actually pre-date the construction date of the enclosure, and could perhaps be contemporary with the burnt mound activity revealed in Zone F (early Bronze Age) or the iron smelting work in Zone A (mid Iron Age). The parallel ditches and associated embankment comprising the Bushfield or Maghernaskeagh/Lismore townland boundary clearly post-date the levelling of the monument, and this is the case for the numerous, regularly spaced cultivation furrows revealed on the Bushfield or Maghernaskeagh side of that boundary. The most contentious group of features encountered on the site, an intriguing formation of closely spaced linear features established in the southeast quadrant of the enclosure (Zone E), are placed for the purposes of this report into Phase 2 occupation of the site in the early medieval period.

Phase 1

Dating results

The dating of the early medieval settlement at Bushfield or Maghernaskeagh-Lismore 1 is based on a number of radiocarbon determination obtained mainly from samples of charcoal (Appendix 8.2). The calibrated date ranges have an overall span from the early 5th to the early 8th centuries, and on balance suggest that the foundation of the enclosure may have occurred in the middle of the 6th century, with settlement discontinued at some point around the middle of the 7th century.

Enclosure ditch F003 (Figs. 7, 8, 13, 18, 59; Plates 2, 3, 5, 11, 12, 13)

The **F003** ditch outline was ovoid in plan and was continuous within the excavation limits except for a 5m-wide, north-facing entrance. The ditch had an excavated length on the Lismore side (Zones A and B) of 78m, west of the entrance causeway, and a further 3.5m on the east side of the entrance. On the Bushfield or Maghernaskeagh side (Zones C, D and E), the ditch had an excavated length of 67m. A limited section of its northern extent, around 31m long, continued outside the northern CPO fence and was not excavated. A more substantial section, with an estimated length of 87m, lay outside the southern CPO fence. This means that the excavated extent of the ditch represents roughly 79% of the total. The enclosure, as delimited by ditch **F003**, had overall external dimensions of 98m (northwest/southeast) by an estimated 80m (northeast/southwest). The ditch measured 2-3.5m x 0.90-1.10m (width x depth). It had a gradual break of slope at the top, concave sides, and a sharp break of slope leading to a rounded base. It was truncated by drain **F007**, field ditches **F008**, **F359** and **F492**, and a pair of townland boundary ditches, **F062** and **F484**. The ditch contained 43 individually numbered infilling deposits. There is no radiocarbon dating for any of the ditch deposits.

The enclosure can be regarded as the remains of a univallate ringfort, dating from the early Medieval Period (Edwards 1990, 14; Stout 1997, 17). This type of monument comprised a circular space surrounded by an embankment or rampart made with clay derived from the digging of an external ditch. No evidence for the bank survived at Bushfield or Maghernaskeagh/Lismore 1, which would have been levelled in the course of land improvement work at some point before the publication of the first edition OS map in 1839. Assuming a typical bank width of 3m when the monument was originally established, the enclosed area of the site would have measured 85.50m (west-northwest/east-southeast) by an estimated 70m (north-northeast/south-southwest). The external dimensions are 97.50m (west-north-west/east-south-east) by an estimated 81m (north-northeast/south-southwest), putting the site at the upper end of the scale in terms of the size range for the Irish ringfort. The ditch

itself measured between 2m and 3.5m wide by up to 1.10m deep. A 5m-wide causeway of undisturbed natural clay interrupted the ditch circuit at a north-north-west point in its circumference, denoting the entrance to the enclosed space.

A total of 43 fills were noted, 12 of which were primary fills: **F016** (Zones A and B), **F326, F327, F612, F614, F633, F614** (Zone C) and **F495, F651, F715, F716, F717** (Zone E). These generally consisted of silty sand, sandy clay or clayey sand with occasional charcoal and bone. A piece of flint (E2220:16:1) was discovered in deposit **F016**. The secondary fill in Zones A and B, **F005**, which consisted of silty sand, sandstone, bones and charcoal, contained a large quernstone fragment (E2220:5:3; Fig. 71; Plate 43), a glass ring-bead (E2220:5:1), a concavo-convex piece of slag, initially considered to be a possible crucible fragment (E2220:5:2; Young, Appendix 8.8) and another piece of slag. The upper fill in the same part of the ditch, **F004**, contained two pieces of slag and a copper-alloy blade (F2220:4:1; Plate 46; Figure 74). The ditch did not truncate any pre-existing features, but was itself truncated by a variety of modern features, including field ditches **F359** and **F489** in Zones C and E, a curving field ditch and parallel field drain **F007** and **F008** in Zones A and B, as well as twin townland boundary ditches **F061** and **F484**.

The Cemetery (Figs. 19–31; Plates 14-23)

One of the most significant elements of the archaeological record within the Bushfield or Maghernaskeagh/Lismore 1 enclosure is the evidence for a cemetery in the northeast quadrant (Zone C). The graves were contained within an area measuring *c*.27m (east-west) by 17m (north-south) and can be compared with other burials of this period (O'Brien 2003, 67). The most easterly grave, **F344**, was located 5m from the edge of ditch **F003**, and must therefore have been placed within 2m or so of the now levelled enclosure bank. The enclosure inhabitants do not seem to have dug a separate circular ditch around the burial ground, as was common practice at the time. The remains of 56 graves were discovered, the majority of which were orientated broadly east-west. A number were orientated northeast/southwest, and at least one west-northwest/east-southeast. The 56 graves contained the remains of 60 individuals (Keating, Appendix 8.11). The majority, 42 graves, each contained the remains of a single individual. Another eleven graves contained the remains of two individuals, and it is presumed that the bones of the original occupant were disturbed when a second interment was made. One grave, **F842**, contained the remains of three individuals, and another two, **F350** and **F838**, produced evidence for four individuals in each. In these cases, it is presumed that the practice of returning to and re-opening an existing grave was repeated, resulting in what are effectively multiple burials.

The population comprised the remains of 57 adults and three non-adults. Of the 57 adults, sex could be determined for just 12 (six male and six female). Where age could be determined, it was found that the majority of the adult deaths occurred in the 'early middle adult' stage, i.e. between 26 and 35 years (Keating, Appendix 8.11). Of the non-adults, SK1 was a child of *c.*3 years; SK39 was between 5½ and 7½ years; and SK16 was an adolescent of *c.*15 years.

Bone preservation in most cases was poor, and only moderate in some instances (Keating, Appendix 8.11); the surviving bone of SK30, in grave **F785**, was the sole example where the preservation may be described as good. The poor condition of the material may be put down to the effects of agricultural practices and/or generally unfavourable soil conditions. Those recordable were found to be fully extended, supine skeletons with tapered ends and leg bones observed slightly apart, evidence that funerary garments, i.e. shrouds, were worn during burial (O'Brien 2003, 67). Most of the graves at Bushfield or Maghernaskeagh/Lismore 1 were shallow unlined pits. Occasional graves could be regarded as loosely stone-lined, and the inclusion of distinctive 'ear-muff' stones was noted in some cases. For the purposes of this report, the feature number will be used to denote each grave.

Analysis of the distribution of the burials within the cemetery area of Zone C indicates four broad groupings, described in more detail below. The majority of the graves, 31, have been included in Group 1. Another formation of 16 graves, comprising the eastern extent of the cemetery, is classified as Group 2. A total of six graves occupy the middle ground between the two main groups, and comprises Group 3. Three graves detached to the northwest from Group 2 are dealt with as Group 4.

In stratigraphical terms, there is no evidence that the digging of the graves truncated any pre-existing features. The majority of non-burial features contained in Zone C of the site, mostly pits and post-holes, were located outside the limits of the cemetery, particularly to the north, and it is presumed that these are broadly contemporaneous with the progress of the burial activity carried out nearby. A few features were located very close to or between burials, such as pit **F286**, between graves **F284** and **F288**, and small pit **F399**, between graves **F401** and **F771**. It is possible that these are pre-existing features that narrowly escaped truncation when the graves were dug. Alternatively, they may be contemporary with the digging of an adjacent grave, possibly related to some form of activity that was associated with the burial event. A number of the burials were truncated by cultivation furrows of probable late 18th-century date, but in addition some of the Group 2 graves were disturbed by a linear feature, **F726**, of uncertain date, which was itself truncated by the same furrows.

Group 1 (Figs. 19–22)

The burials of Group 1 occupied a sub-circular area measuring *c*.11m (east-west) by 9m (north-south). 31 graves were identified in all. For the most part, the graves appeared well-ordered in rows of two or three, suggesting that grave markers were erected, which made the re-opening of a grave possible if a second individual was to be accommodated, and indicated spaces where a completely fresh plot could be placed.

The majority of the graves in this group, 23, were cuts containing the remains of a single individual. Another six burials contained the remains of two individuals. These graves were **F371** (SK2/SK4), **F760** (SK9/DSK10), **F288** (SK26/DSK22), **F785** (SK30/DSK31), **F816** (SK46/DSK45) and **F403** (SK44/DSK48). Cut **F373** contained the remains of three individuals (SK13/SK17/DSK14). Grave **F838**, located towards the southwest limit of the group, between single burials **F765** (DSK18) and **F767** (SK20), was a multiple burial with the remains of four individuals (SK69/SK71/DSK70/DSK76).

In one instance, the re-opening of an existing burial produced clear, recordable evidence for a later (Level 2) grave cut. Burial **F843**, containing the remains of a single individual, SK77, was supplanted by grave **F828**, containing the remains of one individual, SK65. A left leg fragment from SK77, an adult of unknown sex and age, (Figs. 19 and 21) returned a calibrated radiocarbon determination of 550–650 (SUERC-21339, 95.4% probability; Appendix 8.2). A left leg fragment from Level 2 burial SK65,a young adult of 18–25 years, sex unknown (Fig. 29), produced a calibrated radiocarbon determination of 550–670 (SUERC-21666, 95.4% probability; Appendix 8.2).

Another two grave cuts, F803 (SK35) and F810 (SK39) impinged each other, but it was not possible to discern which was the earlier of the two.

The grave cuts measured, on average, 2m x 0.65m x 0.50m and cut directly into the subsoil. The grave fills varied considerably in this area from silty sand, to clayey sand, sandy clay and silty clay. They also contained occasional charcoal and small pebbles. Grave **F763** contained a single individual (SK27) and was located along the southern limit of the group.

Group 2 (Figs. 19, 20, 23, 24; Plates 16, 17, 21, 22)

The Group 2 burials were located to the east of the Group 1 features, a short distance from the curving line of the enclosure ditch, **F003**. They were arranged over an area measuring *c*.11m (north-south) by 6m (east-west). The graves were arranged, in general, in rows of two on a discernible north-south axis. The group comprised 16 distinct graves in total. The majority, 11

in all, were cuts each containing the remains of a single individual. Another three graves each contained the remains of two individuals: **F344** (SK6/SK7), **F310** (SK36/DSK38) and **F820** (SK50/DSK51). The remains of three individuals were recovered from grave **F842** (SK73/SK74/DSK75), and grave **F350** produced evidence for four individuals (SK54/SK59/SK60/SK61).

Two of the graves had qualities marking them out from the rest. Grave **F344** was a cut of unusually large size, and it accommodated two articulated burials (SK6 and SK7) lying side by side. A left leg fragment from SK7 (Figs. 19 and 23), an 'early middle adult' of 26–35 years, sex unknown, returned a calibrated radiocarbon determination of 580–660 (SUERC-21337, 95.4% probability; Appendix 8.2). Grave **F350**, directly north of grave **F344** contained an articulated burial (SK61) overlying the disarticulated remains of three earlier individuals, SK54, SK59 and SK60.

The only Level 2 burial of Group 2, **F337** (SK53), truncated the southeast corner of grave **F842**, a triple burial containing the remains of three individuals (SK73/SK74/DSK75) (Figure 31).

The graves measured, on average, 1.95m x 0.76m x 0.40m and all cut directly into the subsoil. The grave fills generally consisted of silty clay, and clayey sand with inclusions of small pebbles, and occasional charcoal. A number of the graves, **F474**, **F842**, **F809** and **F799**, pre-dated a linear feature, **F726**, aligned northwest/southeast.

Group 3 (Figs. 19, 20, 25, 26; Plate 19)

Group 3 refers to the area located between the Groups 1 and 2, which contained a limited number of burials that were clearly detached from the two largest groupings of the cemetery. The graves were spread over a distance measuring *c*.8.50m (east-west) by 7m (north-south). The group comprised three widely separated graves located east of Group 1 (**F306**, **F429** and **F818**) and a cluster of three graves to the west of Group 2 (**F439**, **F455** and **F461**). Grave **F818** contained the remains of two individuals (SK49 and DSK57). The other graves produced evidence for one individual in each case: SK12 (**F429**), SK32 (**F306**), SK29 (**F439**), SK43 (**F455**) and SK47 (**F461**).

The distribution of graves in this group highlights interesting gaps between the burials, which suggest the possible existence of pathways that may have facilitated access through the cemetery area of the site. One pathway may have been aligned on a northwest/southeast axis between graves **F818** and **F439**. Another could have been established on a

northeast/southwest axis between graves **F429** and **F306** and might well have curved somewhat to the northeast, taking it between Groups 2 and 4 of the cemetery (Figure 20).

Group 4 (Figs. 19, 20, 27, 28; Plate 20)

The final burial group of the cemetery comprised three graves, each with the remains of a single individual, lying at detached points to the north of Group 2. These were graves **F840** (SK72), **F847** (SK79) and **F851** (SK81). They measured on average 1.80m x 0.70m x 0.15m and cut directly into the natural. They contained clayey silt, and charcoal. No grave goods were recorded. A right leg fragment from SK79 (Figs. 19 and 27) returned a calibrated radiocarbon determination of 540–645 (SUERC-21340, 95.4% probability; Appendix 8.2). This individual was an old male adult, aged 45 years or more (Keating, Appendix 8.11, 82).

Large pit F050 (Zone B) (See Figs 13, 15; Plate 8)

By far the largest single feature within the enclosed area was a very substantial pit, **F050,** located in the southwest quadrant (Zone B), about 5.80m north of the enclosure ditch. The irregular-shaped pit measured *c*.6m x 2m x 1.4m. A total of eight fills were noted, all of which consisted of either clay or sand. No evidence of burning was present. Each of the fills included burnt bone, animal bone, charcoal, and a large amount of slag. The primary fill, **F072** consisted of grey, silty sand and included a sharpening stone (E2220:72:1; Fig. 72, Plate 44; Appendix 8.4), and a highly polished stone pin-sharpener (E2220:72:2; Fig. 72, Plate 45; Appendix 8.4). The other fills varied but predominantly consisted of clay. The sixth fill, **F068** contained two metal finds, an iron ring (E2220:68:1; Plate 49; Figure 74) and an iron blade (E2220:68:2; Plate 48; Figure 74), the seventh fill, **F064** contained worked bone (E2220:64:1), and the upper fill, **F051** contained a copper-alloy tweezers fragment (E2220:51:1; Plate 47; Figure 74). Some of the burnt bone fragments from the fill of the pit could be identified as faunal (Appendix 8.3). A Mesolithic date was obtained for a charcoal sample from the basal fill, **F072**. Such an early date can probably be viewed as an extreme example of the 'old wood' effect, which could have come about if ancient wood from a bog was brought into the enclosure and used for fuel. A sample of animal bone from the same context returned a calibrated radiocarbon determination of AD 590–720, which is the most recent of all the radiocarbon dating results obtained for the site (SUERC-15852, 91.5% probability; Appendix 8.2).

Zone B features (Fig. 13, 16)

A total of three shallow pits were situated in the western quadrant of the enclosure, northwest of **F050**. These included **F010**, **F018** and **F032** (measured between 0.20-1.60m x 0.20-0.80m x 0.04-0.13m) which all cut directly into the subsoil. Their proximity and similarities in fill to

the large pit would suggest a probable link with **F050.** They comprised mainly of silty sand. They also contained charcoal, occasional deposits of burnt bone, and significant deposits of slag consistent with that found in **F050**. A group of four pits **F022**, **F024**, **F026** and **F030** (measuring between 0.20-0.42m x 0.02-0.40m x 0.04-0.25m) were also located in this area. They consisted of clayey or silty sand and contained some charcoal and a moderate amount of slag consistent with that found in **F050**. No burning, smelting or smiting was evident in either group of pits, thus suggesting a role of depositing metallurgical waste rather than actively partaking in metal production. A further three pits and three stakeholes were situated in this zone, located north of **F050** and therefore, may have had some connection to the large pit. These included **F036**, **F038**, **F040** (Pits: measured 0.40-0.70m x 0.25-0.60m x 0.08-0.16m), and **F020**, **F044**, and **F045** (Stake-holes: measured 0.06-0.14m x 0.06-0.065m x 0.11-0.32m). Each cut directly into the subsoil. **F040** and the three stakeholes consisted of one shared spread of clayey silt, **F041** with inclusions of charcoal. Pits **F036** and **F038** were filled with light grey, silt and clay with patches of orange. Both contained charcoal. No finds were recorded.

Clustered or dispersed pits (Zones C, D and E; Figs. 32, 33, 52 and 59; Plates 24-41)

The majority of features excavated were charcoal-rich pits, other pits, postholes, and linear features. Despite this, no coherent arrangement could be easily identified as structural, industrial or ritual. Features have been grouped together because of their relative proximity and type. They will be discussed in individual sections based on their location within the enclosure. The generic term 'charcoal-rich pit' has been given to all features that were identified as pits, and which contained a large deposit of charcoal and a small deposit of burnt bone.

Zone C Pit Group 1 (Fig. 18, 32)

In the western half of Zone C (Figure 32), two pit groups have been identified. A total of eight features were noted in Pit Group 1. They formed a sub-circular shape but as they have not been deemed structural features, they were used for a separate function. The pits included **F181**, **F185**, **F187**, **F237**, **F239**, **F241**, **F265** (measuring between 0.23-0.58m x 0.20-0.55m x 0.05-0.35m). Their fills varied from silty sand to silty clay, and all contained charcoal, occasional stones, and bone. One iron pin was found the fill of **F187**, **F186** (E2220:186:1). A sample of ash charcoal from fill F186 (pit F187) returned a calibrated radiocarbon determination of 570–665 (SUERC-17005, 95.4% probability; Appendix 8.2). Also included was **F183** (measuring 0.60m x 0.64m x 0.25m), which has been identified as a charcoal-rich pit. It was filled with silty and clayey sand, and contained charcoal and burnt bone. All features cut directly into the natural. Cultivation furrows **F162** truncated through this group

and may have disturbed further archaeological evidence. Close to this group of pits (to its southeast) was linear gully, **F517 (**measuring 3.20m x 0.18-0.25m x 0.06m), which consisted of a single fill, with silty sand, fine pebbles and charcoal (Figure 32).

Zone C Pit Group 2 (Fig. 32)

Located to the southwest of Pit Group 1 was Pit Group 2. A total of ten features were noted in Pit Group 2. They formed a sub-oval shape but as they have not been deemed structural features, they were used for a separate function. The pits included **F175**, **F199**, **F201**, **F235**, **F243**, **F245**, **F251**, **F425**, **F617**, **F623**. A total of four were identified as charcoal-rich pits. These included **F175**, **F201**, **F235**, **F243** (measuring between 0.43-0.87m x 0.13-0.66m x 0.04-0.36m). Their fills varied from silty sand, to sandy silt and clayey silt. All included charcoal and burnt bone, and burnt clay (**F243).** One iron nail was found (E2220:174:1) in **F175**. A sample of hazel charcoal from fill F174 (pit F175) returned a calibrated radiocarbon determination of 420–590 (SUERC-18000, 95.4% probability; Appendix 8.2). The other six pits, **F199**, **F245**, **F251**, **F425**, **F617**, **F623** (measuring between 0.22-0.65m x 0.20-0.58m x 0.06-0.30m) consisted of mainly silty sand and charcoal. **F245** also contained a small metal blade-like object (E2220:244:1). All features cut directly into the natural. Cultivation furrows **F162** truncated through this group and may have disturbed further archaeological evidence.

Zone C Pit Group 3 (Fig. 32)

A number of pits were situated among the Group 1 burials, **F286**, **F399**, **F405** and **F561**. Whatever function they may have had, it seems probable they were connected to the burial ground and therefore form a collection of pits known as Pit Group 3. **F286** was situated between **F284** and **F288, F399** was situated between **F381** and **F401**, and **F405** was situated between graves **F401** and **F409**. **F561** was located close to the burial ground. They measured between 0.44-0.75m x 0.34-0.40m x 0.10-0.20m and were filled with various deposits including silty sand, clayey silt and clayey sand, and contained charcoal and occasional pebbles.

Zone C Pit Group 4 (Fig. 33)

In the eastern half of Zone C (Fig. 33), a number of pits were located to the south of the cemetery. Four of these formed a distinct cluster, **F312**, **F653**, **F655** and **F702**, located at the southern limit of the Group 2 burials. Another pit, **F704**, lay 2.75m further east. Another two pits, **F787** and **F789**, associated with a linear feature aligned north-south, **F795**, were located 3.9m to the west-southwest. Pit **F797** was an isolated feature at the western limit of the group. A total of five were identified as charcoal-rich pits. They pits included **F653**, **F655**, **F702**, **F787**, **F789** (measuring between 0.45-1.00m x 0.30-0.55m x 0.06-0.19m) and were filled with

greyish-brown, clayey sand. All included charcoal with some also containing burnt bone. **F312** (measuring 0.90m x 0.55m x 0.18m) was the only pit identified, which contained silty sand and charcoal. No finds were recorded. All features cut directly into the natural. Cultivation furrow **F162** truncated pits **F787** and **F789** and the southern limit of linear feature **F795**. The linear gully, **F795 (**measuring 2.60m x 0.15m x 0.18m), was filled with firm brownish-grey, clayey sand and charcoal (Fig. 33).

Zone C Post-hole Group 1 (Fig. 33)

A total of 12 post-holes were identified in the eastern half of Zone C. Four of these comprised an east-west formation located to the north of the Group 3 burials, **F562**, **F463**, **F467** and **F468**. The post-holes (measuring between 0.26-0.52m x 0.26-0.48m x 0.14-0.56m) were filled with mainly brown, clayey sand and occasional silty sand, with inclusions of charcoal. The features extended over a distance of 3.20m. Two pits, **F421** and **F419**, were located to the south-west of the post-holes.

Zone C Post-hole Group 2 (Fig. 33)

A total of four post-holes were located among the Group 3 burials, *c*.4m south of the Group 1 post-holes. These features were **F395**, **F435**, **F437** and **F449**. The post-holes were distributed over a distance of 6.5m (east-west). A bowl-shaped pit, **F445**, was located between post-holes **F395** and **F437** (Figs. 33 and 49). Another pit, **F389**, was located 1.8m west-southwest of post-hole **F395**.

Zone C Post-hole Group 3 (Fig. 33)

The two remaining post-holes, **F340** and **F363**, were located to the east of the Group 2 burials. Post-hole **F363** was located 3.5m northeast of post-hole **F340**. It was located only 2m from the edge of the **F003** enclosure ditch, which places it within the area that would have been occupied by the enclosure's internal embankment. This suggests that the post-hole could be considered a feature pre-dating the enclosure, although it may have been contemporary with the construction of the embankment.

Zone C Dispersed pits (Figs 32 and 33)

A number of dispersed pits were noted across Zone C (Figs. 32, 33). They did not form part of any of the above groups and appear to have been placed randomly across the site. These included **F413**, **F477**, **F195**, **F501** (measuring between 0.26-2.52m x 0.26-0.80m x 0.03-0.39m). Each had their own type of fill including silty clay and silty sand but the majority included a certain amount of charcoal. No finds were recorded in any feature across this dispersed group. **F413** and **F477** were located in the western section of Zone C. **F413** was a

linear pit situated between Pit Group 2 and Pit Group 3. **F477** was a solitary pit situated in the most westerly part of this section, 6m east of the F484 townland boundary ditch. Pits **F195** and **F501** were situated to the north of Post-hole Group 1. Another pit, **F356**, was adjacent to Group 2 burial **F822** (SK58), at a point 3m from the edge of enclosure ditch **F003**, placing it close to where the internal limit of the enclosure embankment must have been located.

Zone D

Zone D Pit Group 1 (Figs 52, 53)

A total of six features were noted in the western section of Zone D (Fig. 52). As these features were identified as pits, they do not form a structural arrangement. It is difficult to determine any coherent arrangement in this group. They were situated in a haphazard manner and were grouped together because of their proximity to one another in this section of Zone D. These included five charcoal-rich pits, **F120**, **F122**, **F126**, **F138**, **F231** (measuring between 0.34-0.75m x 0.24-0.56m x 0.10-0.15m), and pit **F233** (measuring between 0.30-0.63m x 0.30-0.41m x 0.09-0.16m). Each fill of the charcoal-rich pits consisted of grey-brown, silty sand except for **F126**, (which consisted of red burnt clay, and was possibly a hearth/fire pit). Also included was charcoal, occasional burnt bone, and burnt material. The other pits were filled with brown, sandy clay and charcoal. No finds were recorded. All features cut directly into the natural. Cultivation furrows **F162** heavily truncated this group and may have disturbed further archaeological evidence.

An isolated post-hole, **F532**, was located 3m southwest of pit **F231** (measuring 0.40m x 0.31m x 0.30m). The post-hole was filled with grey, silty sand and charcoal.

Zone D Pit Group 2 (Figs 52, 54, 55)

A total of 17 features were noted in this section of Zone D (Fig. 52). Included were **F124**, **F128**, **F130**, **F132**, **F134**, **F136**, **F139**, **F141**, **F143**, **F145**, **F147**, **F151**, **F157**, **F217**, **F541**, **F543**, **F552** (measuring between 0.21-1.10m x 0.20-0.99m x 0.04-0.25m). As these features were identified as pits, they do not form a structural arrangement. It is difficult to determine any coherent arrangement in this group. Two sub groups of two pairs with an adjacent fifth, larger pit can be seen (Fig. 52). The two sub-groups included **F134**, **F145**, **F147**, **F541** and **F124**, and **F151**, **F157**, **F217**, **F543** and **F141**. However, this may be a subjective appearance and could therefore be dismissed. The majority of pits were filled with silty sand. The occasional fill contained clayey sand. Mainly all included charcoal with occasional burnt bone and stones. Four iron nail fragments were found in **F147** (E2220:148:1) and one worked sandstone fragment was found in **F541** (E2220:542:1). All features cut directly into the natural. Cultivation furrows **F162** heavily truncated this group and may have disturbed further

archaeological evidence. Another pit, **F645**, was detached from Pit Group 2, located 4.7m north of pit **F552**.

Zone D Pit Group 3 (Figs 52, 55, 56, 57, 58)

A total of 31 pits were noted in this section of Zone D (See Fig. 52). It is difficult to determine any coherent arrangement in this group as the large number of pits was tightly packed together in a small area. These included **F110**, **F114, F116, F118**, **F149**, **F153**, **F155**, **F159**, **F203, F205, F207**, **F211, F213, F215**, **F219, F221, F223, F225, F227, F229**, **F259**, **F486**, **F488**, **F497**, **F499**, **F545**, **F555**, **F558**, **F600**, **F602**, **F622** (measuring between 0.18-1.76m x 0.15-0.85m x 0.05-0.46m), the majority of which were charcoal-rich pits containing burnt bone as well as charcoal. Each pit was filled with either sandy clay or silty sand and included charcoal and burnt bone. No finds were recorded. Despite such a large concentration of pits in a small area, only one pit truncated another (**F558** cut into **F600**). All other pits cut directly into the natural. Cultivation furrows **F162** heavily truncated this group and may have disturbed further archaeological evidence. A sample of Pomoideae charcoal from fill F154 (pit F153) returned a calibrated radiocarbon determination of 420–600 (SUERC-17001, 95.4% probability; Appendix 8.2).

Also within this group but not identified as pits were **F112** and **F163**. The former was a stake-hole (measuring 0.12m x 0.12m x 0.21m) situated between **F110** and **F118**. It was filled with compact, grey, silty clay and occasional charcoal. The latter, **F163** (measuring 2.85m x 0.23m x 0.08m) was a ring-gully situated to the east of the group and truncated at both ends by cultivation furrows, **F162**. It was filled with compact, greyish-brown, sandy clay and a moderate amount of charcoal, and occasional burnt bone. Its function may be more structural, i.e. the foundation trench for a circular building, but the remains were heavily truncated, and form only part of the western extent of what may have been a fully circular outline. Alternatively, the feature may relate to some form of non-dwelling shelter that may have been no more than semi-circular in outline. A sample of ash charcoal from fill F164 (ring-gully F163) returned a calibrated radiocarbon determination of 420–600 (SUERC-18466, 95.4% probability; Appendix 8.2).

Two features were located in a detached location to the south-southeast of Pit Group 3. These were a small scoop, **F539**, and the shallow remnants of a pit, **F527**. The pair was located 7.2m south-southeast of pit **F602**. The features were truncated by the northern edge of a post-medieval cultivation furrow.

Zone E

The archaeology of Zone E includes a number of dispersed charcoal-rich pits, which can be considered broadly contemporary with features of a similar nature described in Zones C and D, but the dominant elements are a network of linear features, some respecting the curving line of the enclosure ditch, others perpendicular to it. These linear features are considered somewhat later in date than the charcoal-rich pits, and are detailed below in Phase 2 of the early medieval period.

Large pits (Figs. 59, 62)

There were three fairly substantial pits in Zone E, **F700**, **F721** and **F711**. Pit **F700** was located 3.2m from the edge of the enclosure ditch (**F003**), where it is likely to have cut into the base of the inner slope of the embankment contemporary with the ditch. Another feature, **F668**, abutted pit **F700** from the south. Although this feature was relatively large in plan, its depth was minimal, and it may have been cut to a shallow level for a purpose related to activity associated with pit **F700**. A sample of ash charcoal from fill F719 (pit F700) returned a calibrated radiocarbon determination of 540–650 (SUERC-18552, 95.4% probability; Appendix 8.2).

Pit F711 was located 5.3m southwest of pit F700. The northern edge of this feature was truncated by a post-medieval cultivation furrow. Pit F700 was also the only Phase 1 early medieval feature to be truncated by one of the Phase 2 linear features (F661). Pit F721 was located 7.2m northwest of pit F700.

Other Phase 1 features (Figs. 59 and 63)

There were only eight other early medieval Phase 1 features identified in Zone E. These included a grouping of four cuts located at the south-west limit of Zone E, **F521**, **F525**, **F523**, **F529**. Cut **F521** was a reasonably substantial conical pit, but the others were little more than shallow scoops. An isolated stake-hole, **F551**, was located 9m northeast of pit **F521**. An irregular pit, **F739**, was located 2m east of the stake-hole. A shallow scoop, **F708**, was located 0.5m north of large pit **F711**. The final feature, **F168**, the shallow remains of a pit, was located 16.75m north of large pit **F700**.

Archaeological spreads (Zones A–E)

A total of seven archaeological spreads were noted. These were **F047**, **F71**, **F094**, **F108**, **F272**, **F282**, and **F667**, and they contained clayey sand or sandy clay. Deposit **F047** lay on top of spread **F071** midway between the enclosure ditch and large pit **F050** in Zone B (Fig. 16). Spreads **F094** and **F108** were associated with the group of slagpit furnaces on the outside

of the enclosure entrance in Zone A. Spreads **F272** and **F282** were located in Zones C and E respectively. They lay on top of most archaeological features. Spread **F667**, which contained charcoal and burnt bone, was located in Zone E. Spread **F047** contained charcoal and a concavo-convex piece of slag, originally considered to be a crucible fragment (E2220:47:1; Young, Appendix 8.8), spread **F071** contained a flint flake (E2220:71:1; O'Hare, Appendix 8.5), spread **F272** contained a metal brooch pin (E2220:272:1).

Phase 2

Organised linear features (Figs. 59, 64, 65; Plates 39–41)

The most significant features in Zone E appear to be the remains of a number of linear features. One of these, **F661**, can be shown to post-date early medieval Phase 1 pit **F711** (Fig. 62). Another, **F726**, continued on a southeast/northwest axis across the eastern side of Zone C, where it can be shown to post-date early medieval Phase 1 burial **F809** (Plate 16). However, the majority respect the curving line of the enclosure ditch, suggesting that the features date from a time when the enclosure was still inhabited.

In total, 11 of the linear features respected the curve of the enclosure ditch. These were **F661**, **F665**, **F738**, **F744**, **F746**, **F750**, **F752**, **F657**, **F659**, **F706**, and **F748**. Nine of these were in parallel formation at the southern limit of excavation, spanning a distance across of 6.75m. Phase 1 pit **F711** lay between linear features **F661** and **F659** at this point. The most easterly of the group, **F657**, was located less than 4m from the enclosure ditch, and must have been cut very close to the base of the inner slope of the embankment contemporary with the ditch.

Another four linear features comprised a parallel formation perpendicular to the line of the enclosure ditch. These were **F729**, **F731**, **F733**, and **F735**. The formation had an overall span, north-south, of 5m. These features intersected several of the longer north-south linear features, but it was not possible to determine from the infilling deposits which sequence was the older.

In general the linear features appear to have had some structural function. Linear **F657** may have been related to the revetting of the inner limit of the enclosure embankment, but it is the only one close enough to the enclosure ditch to possibly have been related to such a purpose. The geophysical survey of the unexcavated extent of the site to the south of the landtake suggests the possible presence of a second entrance to the enclosure, facing southeast (Fig. 72). It is possible that the linear features represent the footprints of screens that were

established, and perhaps periodically moved back or reinforced with secondary screens that channelled or controlled access to the interior of the enclosure from this south-east entrance.

Period 4: Post-Medieval period

Phase 1

Stratigraphical distinctions can be made between post-medieval features, i.e. field systems that were established after the main activity of the enclosure was abandoned but before it was levelled in the 18th Century. These include, on the Lismore side, linear ditches **F034** and **F053**, and on the Bushfield or Maghernaskeagh side, ditches and drains **F359**, **F489**, **F492** and **F641**. Linear ditch **F034** (measured *c.* 19m x 0.15m x 0.35m) was aligned northeast/southwest in Zone B. It was filled with friable, light grey-yellowish, silty sand, **F043**, and with friable, dark brown, silty sand with reddish flecks, **F035**. Occasional stone, glass and animal bone were also included. One lignite stylus (E2220:35:1; Fig. 73), and one piece of glass (E2220:35:2) was found. Linear ditch **F053** and its re-cut **F017** (measured c. 11m x 1.06m x 0.15m) were probably contemporary with **F034** and were aligned north-west/south-east in Zone A. **F053** truncated enclosure ditch **F003** and was re-cut by **F017**. It was filled with soft, grey-blue, medium sand, **F052** and re-cut **F017** was filled with soft, orange-brown, medium sand, **F042**. No inclusions or finds were recorded.

Field boundary ditch **F359** (measured 20m (excavated length) x 2.05-2.20m x 0.30-0.50m) was aligned north-west/south-east in Zone C and truncated the external side of enclosure ditch **F003** over a distance of 14.6m. It was filled with moderately compact, dark brown, silty sand, (**F338**), with friable, dark brown-black, silty sand, (**F320**) and with friable, dark brown-grey silty sand, (**F319**). An iron strap hinge (E2220:320:1; Scully, Appendix 8.7), an iron nail (E2220:320:2; Scully, Appendix 8.7), and one clay pipe stem were found (E2220:319:1). Field boundary ditch **F490** (measured 25.50m (excavated length) x 3.15m x 0.30m) was aligned north-east/south-west in Zone C and E, and truncated enclosure ditch **F003** and field drain **F492**. It was filled with firm, bluish-dark brown, silty sand, **F489**. Field drain **F492** (measured 8m (excavated length) x 0.45m x 0.82m) was aligned north-east/south-west in Zone C and E, and was truncated by field ditch **F490**. It was filled with loose, yellowish-grey, silty sand, **F491**. Frequent stones and pebbles were included. One rim sherd of Pearlware pottery was found (E2220:491:1). Linear field ditch **F641** (measured 25.50m (excavated length) x 1.00-1.85m x 0.35-0.40m) was aligned west-northwest/east-southeast in Zone E. It was filled with compact, bluish-brownish, sandy clay, (**F743**), with compact, orange-brownish to blue-brownish, sandy clay, (**F742**), with weakly cemented, grey clay, (**F643**),

with hard, dark bluish-brownish, sandy clay, (**F642**) and with loose, bluish-dark brown silty sand, (**F606**). No finds were recorded.

Phase 2

At some point, most likely in the second half of the 18th century, the monument was levelled, and several features post-date this event: parallel ditch and drain **F007** and **F008** on the Lismore side, the twin townland boundary ditches **F061** and **F484**, and the cultivation furrows on the Bushfield or Maghernaskeagh side. Linear drain **F007** (measured 8m x 6m x 0.25m) was aligned north-south and truncated the enclosure ditch **F003** in Zone A. It was filled with friable, brown-yellow, sandy silt, **F006**, and included occasional small, round stones and slag. Parallel to this was linear ditch **F008** (measured c. 76m x 2.20m x 0.33m) in Zone A. It truncated enclosure ditch **F003** at two points, traversing the interior of the enclosure itself. It was filled with moderately compact, grey-brown, silty sand, **F009** and included occasional small and round stones. No finds were recorded in either feature.

Townland boundary ditch, **F061** (measured c. 70m x 1.30m x 0.38m) was aligned northeast/southwest. It was located along the western side of clay embankment **F639** (Zones C, D; Fig. 70), and it formed the Bushfield or Maghernaskeagh/Lismore townland boundary. It was filled with moderately compact, grey, coarse sand, (**F063**) and with moderately compact, yellow-brown, sandy silt, (**F062**). Both included occasional small stones, pebbles and animal bone. Two pieces of glass and a worked stone found (E2220:62:1, E2220:62:3). Its twin townland boundary ditch, **F484** (measured 58m (excavated length) x 2.24m x 0.60m) was aligned northeast/southwest, extending beyond the landtake limits to the north and south. It was filled with firm, greyish-orange, sandy clay, (**F638**), with compact, grey, sandy clay, (**F637**), with compact, dark grey, sandy clay, (**F636**), and with compact, yellowish-greyish, sandy clay, (**F635**). No finds were recorded in this feature.

Cultivation/ploughs furrows were found extensively across the site. They were given one collective number, **F162** and truncated many features across much of Zone C, D and E. They were aligned northwest/southeast and were spaced about 2m apart. They were located exclusively on the Bushfield or Maghernaskeagh side of the townland boundary traversing the interior of the enclosure. A clay pipe stem fragment was found (E2220:162:1).

4.2.4 Stratigraphical discussion

Fulacht fiadh is the term given to the association of irregular/crescent-shaped spreads of burnt stone and charcoal on top of or adjacent to, large pit-like troughs and, in some cases, abut hearths and other smaller pits (Brindley et al. 1989–90, 25). Many suggestions have been made as to their function including cooking places, and other domestic activities (Barfield and Hodder, 1987, 371; O' Drisceoil 1991). Water would have been heated in the trough by immersing hot stones into it, shattering the stones as a result. This is commonly known as 'hot-stone technology' (Brindley et al. 1989–90, 25). The stones were then discarded close to the trough forming a crescent-shaped burnt spread around the trough area. Each rectangular/square-shaped trough was found under the burnt spread deposits except F859 (See Fig. 67).

The three rectangular-shaped troughs excavated in Zone F at Bushfield or Maghernaskeagh/Lismore 1 (F860, F862 and F864) contained a deposit of heat shattered stones and charcoal. This may have been the result of natural or agricultural activity and subsidence of burnt spread material, consistent with troughs identified on other sites (See Fig. 69). The depth of the pits (on average 0.35-0.40m) would also suggest that they were used as troughs (O'Connor 2007, 13). No burnt clay or burning *in situ* was noted within the features. This is also consistent with the typically identified trough. No lining was recorded. This may suggest the use of a high water table in the vicinity, allowing the trough to naturally rather than manually fill with water. The four burnt spreads found outside of the main enclosure (F853, F855, F857 and F859) were consistent with those identified as *fulacht* spreads (See Fig. 68; Plate 42). Each contained a spread of material consisting of deposits of heat shattered stones and charcoal. The activity is dated to the early Bronze Age, based on a sample of hazel charcoal from deposit F865, which returned a calibrated radiocarbon determination of 2350–2130 BC (SUERC-18002, 88.5% probability; Appendix 8.2). The burnt mound evidence recorded in Zone F significantly pre-dated the formation of the early medieval enclosure at Bushfield or Maghernaskeagh/Lismore 1.

The large, ovoid, single enclosure ditch, F003 with an external diameter of 98m (northwest/southeast) by an estimated 80m (northeast/southwest) was an early medieval univallate ringfort (See Fig. 7; Plates 2, 3, 5, 11, 12, 13). This type of monument comprised a circular space surrounded by an embankment or rampart made with clay derived from the digging of an external ditch. No evidence for the bank survived at Bushfield or Maghernaskeagh/Lismore 1, which would have been levelled in the course of land improvement work at some point before the publication of the first edition OS map in 1839. A number of medieval dated finds were recorded. These included, for example, a large

quernstone fragment (E2220:5:3; Fig. 71, Plate 43; Mandal, Appendix 8.4), a glass ring-bead (E2220:5:1), a concavo-convex piece of slag, originally considered a possible crucible fragment (E2220:5:2; Young, Appendix 8.8), a piece of slag, and a bronze blade (F2220:4:1). The ringfort was a relatively large enclosure compared to other ringforts found in Ireland (Jonathan Kinsella pers comm.). The average Irish medieval ringfort was *c.*45m in diameter. The ditch itself measured between 2m and 3.5m wide by up to 1.10m deep in places, which is relatively wide and shallow for this type of ringfort (Jonathan Kinsella pers comm.). A gap of 5m in the northwest of the ditch provided the only excavated entrance (See Fig. 8), which is unusual for an early medieval ringfort as they are generally located to the south or southeast. However, one third of the site was not excavated. Geophysical survey was conducted (Earthsound, Appendix 8.10), which revealed findings of a possible second, more common entranceway to the southeast (5). The ringfort siting, which is overlooked by higher ground is not an uncommon characteristic (Edwards 1990, 20). The ten early medieval radiocarbon dates that have been obtained for features in the enclosed area, including four of the burials, suggest that the enclosure was most likely established around the middle of the 6th century, but the settlement may have been abandoned by the middle of the 7th century (Appendix 8.2).

One of the most significant elements of the archaeological record within the Bushfield or Maghernaskeagh/Lismore 1 enclosure is the evidence for a cemetery in the northeast quadrant (Zone C). The graves were contained within an area measuring *c*. 27m (east-west) by 17m (north-south) and can be compared with other burials of this period (O'Brien 2003, 67). Radiocarbon dating results confirm that the cemetery was in use from the second half of the 6th century into the first half of the 7th century (Appendix 8.2). It contained 60 inhumation burials (57 adults and three non-adults; Keating, Appendix 8.11) that were mainly orientated east-west, with the skulls placed on the west side of the grave looking east. The majority of relatively preserved skeletons lay in an extended position, and were mainly buried in simple earth-cut, unlined graves, which tapered at the end and with leg bones observed slightly apart, evidence that funerary garments, i.e. shrouds, were worn during burial (O'Brien 2003, 67). Some graves were loosely lined with stones, which may have represented grave markers. This also included an 'ear muff' grave, which had stones lining the skull. Along with the general simplicity of the grave construction, there was also a lack of grave goods uncovered. The majority were single burial graves. Despite this, 13 were identified as double and multiple burials. This type of burial and cemetery was commonplace by the 7-9th centuries AD (O'Brien 2003, 67; Charles-Edwards 2000, 75; Edwards 1990, 130; Mytum 1992, 94).

The majority of features excavated were pits, postholes, charcoal-rich pits, and linear features. The majority were located in the southeast quadrant of the enclosure, removed from the

cemetery and metal production area. Despite this, no coherent structural (domestic or otherwise), industrial or ritual arrangement could be easily identified. Possible structures have been discussed within the sequencing section, however, many of the features involved were non-structural and therefore cannot be identified as buildings. One group of postholes in Zone C was identified as a possible structure (See Fig. 33). No finds were recorded in this group to suggest what type of structure it was. The lack of structural evidence in general presents a problem for identifying any settlement dwellings or outbuildings. The limited nature of the finds assemblage from Bushfield or Maghernaskeagh/Lismore 1 makes the nature of domestic settlement within the enclosure more difficult to interpret. Artefacts were confined to a few included brooch pins, metal blades, a quernstone fragment and so on. Another type of non-structural pit was recorded at Bushfield or Maghernaskeagh/Lismore 1. This was the 'charcoal-rich pit', a generic term given to all features that were identified as pits containing a large quantity of charcoal and a small quantity of burnt bone. The fragmented nature of the burnt bone remains makes the material difficult to analyse, but those pieces that can be identified are faunal (Archaeological Services, Appendix 8.3), and there appears to be no reason to consider any of the features to be related to prehistoric cremation burial practices. An alternative explanation for the frequent occurrence of burnt bone in charcoal-rich pits could be in relation to metal production activity. It is considered that animal bone was used in the early medieval period to regulate the temperature in hearths and furnaces during the smelting or smithing process of metal production (pers. comm. Eoin Grogan). The discovery of smithing hearth cakes (SHCs) or fragments thereof in features contemporary with the enclosure is considered to be indicative of a secondary metalworking process known as bloom refining, or bloom smithing. The iron-working residues consistent with bloom refining are contemporary with the occupation of the enclosure, and strongly contrast with the smelting residues associated with the Zone A slagpit furnaces, which pre-date the enclosure by several centuries (Young, Appendix 8.8). Since it is established that bloom refining work was practised at Bushfield or Maghernaskeagh/Lismore 1, the association of related residues with fragments of burnt bone, eg in pit F050 (Zone B) supports the opinion that the burnt bone discovered on the site was connected with the iron-working activity.

Five slagpit furnaces (F086-095) were located in Zone A, which are confirmed on morphological grounds and by radiocarbon dating to pre-date the enclosure by several centuries (Young, Appendix 8.8). They were clustered together in a 3 x 3m area forming a sub-circular shape (Fig. 8, 9; Plates 6, 7). Their function was to smelt metal ore. The shape of cut (gradual break of slopes, concave sides and rounded bases) produced bowl-shaped pits, which along with their inclusions of charcoal, burnt clay and slag suggest this type of activity (Fig. 12). The occurrence of a relatively large amount of oxidised/burnt clay may be the result

of possible clay shafts been broken to retrieve the smelted metal, and therefore exposing the hot furnace to air and oxidising the clay. Charcoal was an essential element in the iron reduction and smelting process (Carlin & Kinsella 2006, 3). Why the smithing activity was carried out at this location is a mystery. A contemporary settlement was presumably located somewhere in the vicinity, and indeed at least one other recorded feature, pit F195 (Zone C), is confirmed by radiocarbon dating to be Iron Age in date. The small number of slagpit furnaces in the group suggests the smelting activity occurred on a domestic basis, serving the needs of a small community.

The metal-working residues from Bushfield or Maghernaskeagh/Lismore 1 are significant in the sense that they represent distinct iron smelting and iron-working (bloom refining) operations that were not contemporaneous. Of equal significance is the fact that the early medieval slag assemblage does not appear to contain smithing residues. In other words, the iron that was produced from secondary bloom refining was not being used on site (Young, Appendix 8.8). This suggests that iron artefacts found in the enclosure were not made there. Two items originally thought to be crucible fragments, and therefore related to copper-alloy production, were misidentifications. One of these (E2220:5:2) was a concavo-convex piece of slag; the other (E2220:47:1) was clay-based, but more likely from the vitrified tip of a tuyère (Young, Appendix 8.8).

The purpose behind the digging of the largest pit on site, F050 in Zone B (Fig. 13; Plates 8, 9, 10), is unknown. It measured *c*. 6m x 2m x 1.4m. No evidence of *in situ* burning was present, but it is clear from the nature of the infilled deposits that the pit was eventually used for the dumping of discarded material from around the site. This material included burnt bone (some of which is identified as faunal (Archaeological Services, Appendix 8.3), uncharred animal bone (Sloane, Appendix 8.6), charcoal, and a large amount of slag (Young, Appendix 8.8). An initial radiocarbon determination for a sample of charcoal from fill F072 unexpectedly returned a calibrated date range in the Mesolithic period (6400–6210 BC; Beta-218634, 95% probability; Appendix 8.2). This result can probably be viewed as an extreme example of the 'old wood' effect, which could have come about if ancient wood from a bog was brought into the enclosure and used for fuel. A follow-up determination for a sample of animal bone from the same context returned a date range in the early medieval period, as expected (AD 590–720; SUERC-15852, 91.5% probability; Appendix 8.2. A number of finds were also recovered from the pit, including a sharpening stone (E2220:72:1; Fig. 72 and Plate 44; Mandal, Appendix 8.4), a highly polished stone pin-sharpener (E2220:72:2; Fig. 72 and Plate 45; Mandal, Appendix 8.4), a brooch (E2220:68:2), part of a copper alloy tweezers (E2220:68:3) and a piece of worked bone (E2220:64:6).

4.2.5 Stratigraphic conclusion

Through the various stages of archaeological investigation a large number of features were revealed. The prehistoric record comprised burnt mound remains from the early Bronze Age, and iron smelting activity from the middle of the Iron Age. The bulk of the evidence related to a large non-ringfort early medieval enclosure with burials. The enclosure contained little structural evidence for settlement, but there was strong evidence for a secondary iron-working process known as bloom refining. However, the most compelling evidence related to a cemetery in the north-eastern quadrant, which contained the skeletal remains of sixty individuals. The early medieval site may have represented a family-owned farmstead, although its relatively large scale and distinctive D-shaped plan set it apart from the smaller, more circular ringfort-type enclosed settlement of the period. Although the enclosure contained a small cemetery, this was not an ecclesiastical centre. It seems likely that the north-eastern quadrant served as a familial burial ground. The absence of well-defined dwelling footprints in the record, with the possible exception of ring-gully fragment F163 in Zone D, is a surprise given the number of pits, linear features, grave cuts and so on that survived in the subsoil, albeit in severely truncated form. It must be presumed that the dwelling structures that existed in the enclosure had relatively light foundations, which made little or no impact on the subsoil and consequently left no trace in the archaeological record. A reasonably large area at the southern limit of the enclosure was outside the limit of excavation, and it is possible that some evidence for a large dwelling or group of dwellings remains preserved *in situ* there. The radiocarbon dating results support the view that the enclosure was established before the year AD 600, and a suggested foundation date in the mid 6th century seems reasonable. The early medieval determinations produced by samples of charcoal, animal and human bone are remarkably consistent, and in general the dating is very sharply focussed between the 6th and 7th centuries. The dating indicators support the view that enclosed settlement at Bushfield or Maghernaskeagh-Lismore 1 was relatively short-lived, and it is not unreasonable to suggest that the site may have been abandoned sometime around the middle of the 7th century. This means that the enclosed settlement may only have been in existence for a term of 100 years or thereabouts. Given the ambitious limits of the enclosed area, and the fact that the community buried its dead on site, actions consistent with stability and permanence, it is all the more remarkable that the endeavour somehow failed to prosper and resulted in what must be regarded as premature abandonment. The reasons why the population based here decided to move on, and indeed what became of them afterwards, must remain a matter of speculation.

4.3 Artefactual Material

4.3.1 Pottery archive

Pottery					
Report: Context: Find number	**Period**	**Completeness**	**Artefact type**	**Condition**	**Comments (decoration etc)**
E2220:1:3		Sherd			
E2220:11:1	Post medieval	Rim Sherd	Earthernware		
E2220:169:1	Post medieval	Sherd	Earthernware		Brown-glaze
E2220:169:2	Post medieval.	Rim body sherd	Earthernware		Brown-glaze
E2220:491:1	Post medieval.	Rim sherd	Pearlware		
E2220:606:1	Post medieval.	Sherd	Creamware		
E2220:606:2	Post medieval.	Sherd	Creamware		

4.3.2 Metal finds archive

See Appendix 8.7

Metal Objects					
Report: Context: Find number	**Period**	**Completeness**	**Artefact type**	**Condition**	**Comments (decoration etc)**
E2220:1:1			Iron nail		
E2220:1:2		Broken shaft	Iron nail		
E2220:1:9		Fragment	Iron nail		
E2220:1:11		Fragment	Iron blade		
E2220:1:13		Fragment	Iron scrap		
E2220:1:14		Fragment	Iron staple		
E2220:4:1			Bronze blade		
E2220:51:1		Single pin	Metal tweezers		
E2220:55:1			Iron nail		
E2220:68:1			Metal brooch		
E2220:68:2			Metal knife		
E2220:148:1		Fragment	Iron pin/blade		
E2220:174:1		Very corroded	Unidentified iron		
E2220:186:1		Fragment	Iron buckle pin		
E2220:244:1		Fragment	Iron knife		
E2220:272:1		Pin only	Iron nail/brooch pin		
E2220:320:1		Fragments	Iron strap hinge		

E2220:320:2		Fragment	Iron nail		
E2220:820:1			Iron buckle		

4.3.3 Stone Objects archive

See Appendix 8.4

Stone Objects Archive					
Report: Context: Find number	**Period**	**Completeness**	**Artefact type**	**Condition**	**Comments (decoration etc)**
E2220:1:7			Tapered D-section stone implement		
E2220:5:3		Fragment	Quernstone		
E2220:35:1			Lignite stylus		
E2220:62:3			Stone object		
E2220:72:1			Sharpening stone		
E2220:72:2			Ornamental stone		
E2220:150:1		Fragment	Perforated stone		
E2220:326:1			Oblong stone object		
E2220:542:1		Fragment	Worked stone		
E2220:718:1		Fragment	Smooth stone		

4.3.4 Lithics archive

See Appendix 8.5

Lithics					
Report: Context: Find number	**Period**	**Completeness**	**Artefact type**	**Condition**	**Comments (decoration etc)**
E2220:16:1		Fragment	Flint		
E2220:71:1			Flint Scraper		

4.3.5 Glass archive

Glass					
Report: Context: Find number	**Period**	**Completeness**	**Artefact type**	**Condition**	**Comments (decoration etc)**
E2220:1:6		fragment	Glass		
E2220:5:1			Ring-bead		Green
E2220:35:1		fragment	Glass		
E2220:35:2		fragment	Glass		
E2220:62:1		fragment	Glass		
E2220:62:2		fragment	Glass		
E2220:148:2		fragment	Annular opaque glass bead	Undergoing loss of glassy state	Blue: D:11mm. PD: 3mm. H: 3.5mm
E2220:638:1		Bottle fragment	Glass		

4.3.6 Worked bone archive

Bone					
Report: Context: Find number	**Period**	**Completeness**	**Artefact type**	**Condition**	**Comments (decoration etc)**
E2220:64:1			Worked bone		

4.3.7 Other finds archive

Other finds					
Report: Context: Find number	**Period**	**Completeness**	**Artefact type**	**Condition**	**Comments (decoration etc)**
E2220:1:4			Daub		
E2220:1:5			Brick/Daub		
E2220:1:9		Stem fragment	Clay pipe		
E2220:5:2			slag		See Young, Appendix 8.8
E2220:47:1			ceramic		See Young, Appendix 8.8
E2220:63:1			Worked hone		
E2220:162:1		Stem fragment	Clay pipe		
E2220:319:1		Stem fragment	Clay pipe		

4.4 Environmental Evidence

4.4.1 Animal Bone Archive

See Appendix 8.6

Bone archive (Lismore 1)					
Sample	**Box no.**	**Record no.**	**Scheme no.**	**Feature**	**Bag no.**
-	40	E2220	A015/011	F1	1 of 1
-	40	E2220	A015/011	F3	1 of 1
-	40	E2220	A015/011	F4	1 of 1
-	40	E2220	A015/011	F5	1of 13
-	40	E2220	A015/011	F5	2 of 13
-	40	E2220	A015/011	F5	3 of 13
-	40	E2220	A015/011	F5	4 of 13
-	40	E2220	A015/011	F5	5 of 13
-	40	E2220	A015/011	F5	6 of 13

-	40	E2220	A015/011	F5	7 of 13
-	40	E2220	A015/011	F5	8 of 13
-	40	E2220	A015/011	F5	9 of 13
-	40	E2220	A015/011	F5	10 of 13
-	40	E2220	A015/011	F5	11 of 13
-	40	E2220	A015/011	F5	12 of 13
Bone fragment from flot	40	E2220	A015/011	F5	13 of 13
-	40	E2220	A015/011	F9	1 of 1
-	40	E2220	A015/011	F16	1 of 2
-	40	E2220	A015/011	F16	2 of 2
-	40	E2220	A015/011	F35	1 of 1
-	40	E2220	A015/011	F51	1 of 4
-	40	E2220	A015/011	F51	2 of 4
-	40	E2220	A015/011	F51	3 of 4
Bone fragment from flot	40	E2220	A015/011	F51	4 of 4
-	40	E2220	A015/011	F54	1 of 1
-	40	E2220	A015/011	F58	1 of 1
-	40	E2220	A015/011	F62	1 of 2
-	40	E2220	A015/011	F62	2 of 2
-	40	E2220	A015/011	F63	1 of 1
-	40	E2220	A015/011	F64	1 of 5
-	40	E2220	A015/011	F64	2 of 5
-	40	E2220	A015/011	F64	3 of 5
-	40	E2220	A015/011	F64	4 of 5
Bone fragment from flot	40	E2220	A015/011	F64	5 of 5
-	40	E2220	A015/011	F65	1 of 6
-	40	E2220	A015/011	F65	2 of 6

-	40	E2220	A015/011	F65	3 of 6
-	40	E2220	A015/011	F65	4 of 6
-	40	E2220	A015/011	F65	5 of 6
-	40	E2220	A015/011	F65	6 of 6
-	40	E2220	A015/011	F66	1 of 2
-	40	E2220	A015/011	F66	2 of 2
-	40	E2220	A015/011	F67	1 of 5
-	40	E2220	A015/011	F67	2 of 5
-	40	E2220	A015/011	F67	3 of 5
-	40	E2220	A015/011	F67	4 of 5
Bone fragment from flot	40	E2220	A015/011	F67	5 of 5
-	40	E2220	A015/011	F68	1 of 5
-	40	E2220	A015/011	F68	2 of 5
-	40	E2220	A015/011	F68	3 of 5
-	40	E2220	A015/011	F68	4 of 5
-	40	E2220	A015/011	F68	5 of 5
-	40	E2220	A015/011	F69	1 of 3
-	40	E2220	A015/011	F69	2 of 3
Bone fragment from flot	40	E2220	A015/011	F69	3 of 3
-	40	E2220	A015/011	F72	1 of 7
-	40	E2220	A015/011	F72	2 of 7
-	40	E2220	A015/011	F72	3 of 7
-	40	E2220	A015/011	F72	4 of 7
-	40	E2220	A015/011	F72	5 of 7
-	40	E2220	A015/011	F72	6 of 7
-	40	E2220	A015/011	F72	7 of 7
-	40	E2220	A015/011	F74	1 of 1

Bone archive (Bushfield or Maghernaskeagh 1)					
Sample	**Box no.**	**Record no.**	**Scheme no.**	**Feature**	**Bag no.**
Bone fragment from flot	39	E2220	A015/011	F323	1 of 1
Bone fragment from flot	39	E2220	A015/011	F324	1 of 1
-	39	E2220	A015/011	F325	1 of 2
-	39	E2220	A015/011	F325	2of 2
-	39	E2220	A015/011	F326	1 of 5
-	39	E2220	A015/011	F326	2 of 5
-	39	E2220	A015/011	F326	3 of 5
Bone fragment from flot	39	E2220	A015/011	F326	4 of 5
Bone fragment from flot	39	E2220	A015/011	F326	5 of 5
-	39	E2220	A015/011	F327	1 of 5
-	39	E2220	A015/011	F327	2 of 5
-	39	E2220	A015/011	F327	3 of 5
-	39	E2220	A015/011	F327	4 of 5
Bone fragment from flot	39	E2220	A015/011	F327	5 of 5
Bone fragment from flot	39	E2220	A015/011	F332	1 of 1
Bone fragment from flot	39	E2220	A015/011	F491	1 of 1
-	39	E2220	A015/011	F494	1 of 2
Bone fragment from flot	39	E2220	A015/011	F494	2 of 2
-	39	E2220	A015/011	F495	1 of 6
-	39	E2220	A015/011	F495	2 of 6
-	39	E2220	A015/011	F495	3 of 6
-	39	E2220	A015/011	F495	4 of 6
-	39	E2220	A015/011	F495	5 of 6
-	39	E2220	A015/011	F495	6 of 6
-	39	E2220	A015/011	F610	1 of 2

-	39	E2220	A015/011	F610	2 of 2
-	39	E2220	A015/011	F614	1 of 4
-	39	E2220	A015/011	F614	2 of 4
-	39	E2220	A015/011	F614	3 of 4
Bone fragment from flot	39	E2220	A015/011	F614	4 of 4
-	39	E2220	A015/011	F642	1 of 1
Bone fragment from flot	39	E2220	A015/011	F650	1 of 1
-	39	E2220	A015/011	F715	1 of 1
-	39	E2220	A015/011	F717	1 of 2
Bone fragment from flot	39	E2220	A015/011	F717	2 of 2
-	39	E2220	A015/011	F718	1 of 1
-	39	E2220	A015/011	F719	1 of 1
-	39	E2220	A015/011	F720	1 of 2
-	39	E2220	A015/011	F720	2 of 2

4.4.2 Slag Archive

See Appendix 8.8

Slag archive					
Site	**Box no.**	**Record no.**	**Scheme no.**	**Feature**	**Sample no.**
Bushfield or Maghernaskeagh/Lismore 1	1	E2220	A015/011	F4	408
Bushfield or Maghernaskeagh/Lismore 1	1	E2220	A015/011	F5	409
Bushfield or Maghernaskeagh/Lismore 1	1	E2220	A015/011	F6	410
Bushfield or Maghernaskeagh/Lismore 1	1	E2220	A015/011	F11	411
Bushfield or Maghernaskeagh/Lismore 1	1	E2220	A015/011	F26	412
Bushfield or Maghernaskeagh/Lismore 1	1	E2220	A015/011	F31	413
Bushfield or Maghernaskeagh/Lismore 1	1	E2220	A015/011	F50	414
Bushfield or Maghernaskeagh/Lismore 1	1	E2220	A015/011	F64	415
Bushfield or Maghernaskeagh/Lismore 1	1	E2220	A015/011	F64	416
Bushfield or Maghernaskeagh/Lismore 1	1	E2220	A015/011	F64	417
Bushfield or Maghernaskeagh/Lismore 1	1	E2220	A015/011	F64	418
Bushfield or Maghernaskeagh/Lismore 1	1	E2220	A015/011	F64	419
Bushfield or Maghernaskeagh/Lismore 1	1	E2220	A015/011	F65	420
Bushfield or Maghernaskeagh/Lismore 1	1	E2220	A015/011	F65	421
Bushfield or Maghernaskeagh/Lismore 1	1	E2220	A015/011	F65	422
Bushfield or Maghernaskeagh/Lismore 1	1	E2220	A015/011	F4	423
Bushfield or Maghernaskeagh/Lismore 1	1	E2220	A015/011	F67	424
Bushfield or Maghernaskeagh/Lismore 1	1	E2220	A015/011	F68	425
Bushfield or Maghernaskeagh/Lismore 1	1	E2220	A015/011	F72	426

Slag archive					
Site	**Box no.**	**Record no.**	**Scheme no.**	**Feature**	**Sample no.**
Bushfield or Maghernaskeagh/Lismore 1	2	E2220	A015/011	F74	428
Bushfield or Maghernaskeagh/Lismore 1	2	E2220	A015/011	F87	429
Bushfield or Maghernaskeagh/Lismore 1	2	E2220	A015/011	F87	430
Bushfield or Maghernaskeagh/Lismore 1	2	E2220	A015/011	F89	431
Bushfield or Maghernaskeagh/Lismore 1	2	E2220	A015/011	F89	432
Bushfield or Maghernaskeagh/Lismore 1	2	E2220	A015/011	F89	433
Bushfield or Maghernaskeagh/Lismore 1	2	E2220	A015/011	F89	434
Bushfield or Maghernaskeagh/Lismore 1	2	E2220	A015/011	F91	435
Bushfield or Maghernaskeagh/Lismore 1	2	E2220	A015/011	F91	436
Bushfield or Maghernaskeagh/Lismore 1	2	E2220	A015/011	F93	437
Bushfield or Maghernaskeagh/Lismore 1	2	E2220	A015/011	F96	438
Bushfield or Maghernaskeagh/Lismore 1	2	E2220	A015/011	F98	439
Bushfield or Maghernaskeagh/Lismore 1	3	E2220	A015/011	F104	440
Bushfield or Maghernaskeagh/Lismore 1	3	E2220	A015/011	F104	441
Bushfield or Maghernaskeagh/Lismore 1	3	E2220	A015/011	F106	442
Bushfield or Maghernaskeagh/Lismore 1	3	E2220	A015/011	F106	443
Bushfield or Maghernaskeagh/Lismore 1	3	E2220	A015/011	F108	444
Site	**Box no.**	**Record no.**	**Scheme no.**	**Feature**	**Sample no.**
Bushfield or Maghernaskeagh/Lismore 1	4	E2220	A015/011	F1	455

4.4.3 Botanic

See Appendix 8.3

Soil Flotation Results					
Context	**Sample**	**Soil Weight (g/kg)** ***Pre-sieve***	**Residue Weight (g/kg)**	**Flot Weight (g/kg)**	**Comments**
111	120	0.835kg	0.141kg	0.012kg	Flot: charcoal. Residue contains frag. of cremated bone.
113	121	0.755kg	0.066kg	0.014kg(char) <0.001kg(bone)	Flot: charcoal and frag. Of cremated bone.
115	89	3.500kg	0.343kg	0.005kg	Flot: charcoal/ plant material. Residue contains frag. of cremated bone.
119	142	3.900kg	0.307kg	0.042kg	Flot: charcoal. Residue contains frag. of cremated bone.
121	51	(11 bags) 34.000kg	3.000kg	0.318kg	Flot: charcoal. Residue contains poss. slag and frag. of cremated bone.
123	55	3.700kg	0.254kg	0.055kg	Flot: charcoal. .
125	50	(2 bags) 6.500kg	0.347kg	0.026kg	Flot: charcoal. Residue contains frag. of cremated bone.
127	76	3.500kg	0.202kg	-	Nothing in residue.
129	57	2.500kg	0.227kg	0.003kg	Flot: charcoal.
130	129	0.563kg	0.055kg	0.004kg	Flot: charcoal.
133	128	0.476kg	0.044kg	-	Nothing in residue.
135	127	(3 bags) 10.000kg	0.713kg	0.007kg	Flot: charcoal. Residue contains frag. of cremated bone.
137	153	1.327kg	0.166kg	0.001kg	Flot: charcoal/ plant material.
140	131	4.000kg	0.411kg	0.004kg(char) 0.002kg(bone)	Flot: Charcoal and frag. Of cremated bone.
142	132	3.900kg	0.671kg	0.026kg	Flot: charcoal. Residue contains frag. of cremated bone.
144	112	(4 bags) 10.000kg	0.818kg	0.024kg	Flot: Charcoal. Residue contains frag. of cremated bone.
146	130	1.651kg	0.230kg	0.003kg	Flot: charcoal/ plant material. Residue contains frag. of cremated bone.
148	111	3.000kg	0.235kg	0.015kg(char) 0.016kg(bone)	Flot: charcoal, and charcoal, and ½ blue glass bead.
150	140	(3 bags) 7.000kg	0.364kg	0.110kg	Flot: charcoal. Residue contains frag. of cremated bone.
152	134	(2 bags) 7.500kg	0.671kg	0.057kg	Flot: charcoal. Residue contains frag. of cremated bone.
154	137	(2 bags) 7.000kg	0.760kg	0.022kg	Flot: charcoal. Residue contains poss. slag and frag. of cremated bone.
156	136	3.300kg	0.320kg	0.007kg	Flot? Charcoal/ plant material.
158	133	(2 bags) 6.000kg	0.857kg	0.022kg	Flot: charcoal.
160	139	3.800kg	0.354kg	0.003kg	Flot: charcoal/ plant material.
161	56	3.100kg	0.277kg	0.017kg	Flot: charcoal/ plant material.
164	92	3.000kg	0.100kg	0.061kg	Flot: charcoal.
167	165	(3 bags) 10.000kg	0.546kg	0.004kg	Flot: charcoal/ plant material. Residue contains frag. of cremated bone.
174	73	1.608kg	0.057kg	0.005kg	Flot: charcoal.
180	99	0.986kg	0.101kg	0.002kg	Flot: charcoal/ plant material.
182	104	2.700kg	0.086kg	0.008kg	Flot: charcoal/ plant material.
184	58	0.265kg	0.011kg	0.001kg	Flot: charcoal.
186	70	3.000kg	0.934kg	0.007kg	Flot: charcoal/ plant material.
194	46	1.416kg	0.206kg	0.008kg	Flot: charcoal. Residue contains

					frag. of cremated bone.
198	72	0.390kg	0.030kg	0.001kg	Flot: charcoal.
200	278	0.525kg	0.015kg	0.002kg	Flot: charcoal.
202	86	3.700kg	0.564kg	0.036kg(char) 0.005kg(bone)	Flot: charcoal and frag. of bone.
204	85	4.000kg	0.458kg	0.019kg	Flot: charcoal.
206	88	3.500kg	0.427kg	0.015kg(char) <0.001kg(a seed)	Flot: charcoal and a seed.
210	151	1.593kg	0.313kg	0.012kg	Flot: charcoal.
212	91	(2 bags) 7.000kg	0.709kg	0.016kg	Flot: charcoal/ plant material.
214	108	3.400kg	0.323kg	0.003kg	Flot; charcoal. Residue contains poss. slag?
216	135	4.000kg	0.250kg	0.010kg	Flot: charcoal.
218	110	1.549kg	0.223kg	0.007kg	Flot: charcoal.
222	138	1.391kg	0.293kg	0.001kg	Flot: small charcoal/ plant material.
224	141	2.700kg	0.311kg	0.006kg(char) 0.002kg(bone)	Flot: charcoal and frag. of cremated bone.
226	114	1.089kg	0.198kg	-	Nothing in residue.
226	109	3.000kg	0.302kg	0.006kg	Flot: charcoal. Residue contains frag. of cremated bone and poss. slag.
228	115	1.028kg	0.170kg	0.005kg	Flot: charcoal. Residue contains frag. of cremated bone.
230	81	3.800kg	0.528kg	0.004kg	Flot: charcoal/ plant material.
232	80	3.000kg	0.243kg	0.006kg	Flot: charcoal.
236	95	0.778kg	0.070kg	<0.001kg	Flot: small charcoal/ plant material.
238	62	2.200kg	0.048kg	0.002kg	Flot: charcoal/ plant material.
240	77	1.406kg	0.107kg	0.002kg	Flot: charcoal.
242	47	2.500kg	0.124kg	-	Nothing in residue.
250	48	1.576kg	0.183kg	-	Residue mixed with poss. anomite.
256	97	3.500kg	0.232kg	0.111kg	Flot: charcoal. Residue contains poss. slag?
256	98	3.000kg	0.206kg	0.029kg	Flot: charcoal. Residue contains frag. of cremated bone.
258	157	3.000kg	0.468kg	0.009kg	Flot: charcoal.
264	96	1.803kg	0.078kg	0.002kg	Flot: charcoal/ plant material.
319	170	2.500kg	0.028kg	0.002kg	Flot: frag. of wood/ plant material.
321	64	(2 bags) 7.000kg	0.559kg	0.002kg	Flot: plant material.
322	68	(2 bags) 7.000kg	0.286kg	0.004kg	Flot: charcoal/ twigs.
323	61	(2 bags) 7.500kg	0.878kg	0.121kg	Flot: frag. of bone.
324	67	3.400kg	0.280kg	0.054kg(bone) 0.002kg(roots /roots)	Flot: frag. of bone, and roots/ roots.
324	67	3.600kg	0.091kg	-	Residue contains frag. of bone.
325	63	3.800kg	0.516kg	-	Nothing in residue.
326	Cut 3, bones	0.245kg	0.105kg	-	Flot: plant material.
326	65	3.500kg	0.368kg	0.016kg	Flot: charcoal. Residue contains frag. of bone.
326	66	(3 bags) 11.500kg	1.622kg	0.009kg	Flot: charcoal/ shells. Residue contains frag. of bone.
327	69	(5 bags) 18.000kg	2.200kg	0.004kg(char) 0.047kg(bone)	Flot: charcoal and frag. of bone.
338	171	3.700kg	0.234kg	0.004kg	Flot: plant material/ twigs.
345	280	1.370kg	0.170kg	0.003kg	Flot: charcoal.

355	166	1.142kg	0.112kg	0.004kg	Flot: charcoal/ plant material.
360	251	1.005kg	0.086kg	0.001kg	Flot: plant material.
360	167	2.900kg	0.147kg	<0.001kg	Flot: charcoal/ plant material.
361	250	1.422kg	0.119kg	0.001kg	Flot: charcoal/ plant material.
362	169	1.256kg	0.156kg	0.002kg	Flot: charcoal/ plant material.
394	277	2.000kg	0.165kg	0.002kg	Flot: charcoal/ plant material.
399	168	1.253kg	0.052kg	0.003kg	Flot: charcoal.
402	236	1.572kg	0.193kg	0.001kg	Flot: small charcoal/ plant material.
404	242	1.346kg	0.185kg	0.001kg	Flot: plant material.
412	241	2.300kg	0.089kg	<0.001kg	Flot: a seed.
424	143	0.482kg	0.026kg	0.001kg	Flot: charcoal.
434	161	3.000kg	0.120kg	0.002kg	Flot: charcoal.
436	226	2.200kg	0.134kg	0.002kg	Flot: charcoal.
448	239	3.200kg	0.155kg	0.001kg	Flot: charcoal/ plant material.
476	124	3.000kg	0.277kg	0.001kg	Flot: plant material.
485	113	4.000kg	0.347kg	0.005kg	Flot: charcoal.
487	152	0.708kg	0.198kg	0.002kg	Flot: frag. of cremated one.
489	212	3.000kg	0.181kg	0.001kg(char) <0.001kg(a seed)	Flot: small charcoal/ plant material, and a seed.
491	192	3.500kg	0.708kg	0.002kg	Flot: charcoal. Residue contains frag .of bone.
493	53	3.500kg	0.296kg	-	Nothing in residue.
493	193	3.900kg	0.084kg	-	Nothing in residue.
493	158	(2 bags) 10.000kg	3.000kg	-	Nothing in residue.
493	207	4.000kg	0.600kg	-	Nothing in residue.
494	54	4.000kg	0.230kg	-	Nothing in residue.
494	204	4.000kg	0.242kg	0.001kg	Flot: charcoal.
494	159	(2 bags) 7.500kg	1.921kg	-	No flot. Residue contains frag. of bone.
494	191	3.800kg	0.175kg	-	Nothing in residue.
494	223	4.000kg	0.754kg	-	Nothing in residue.
495	205	3.700kg	0.250kg	<0.001kg	Flot: charcoal/ plant material.
495	208	(5 bags) 17.000kg	2.900kg	0.012kg	Flot: charcoal/ shells.
495	189	3.500kg	0.792kg	0.002kg	Flot: charcoal. Residue contains frag. of bone.
495	225	4.000kg	1.282kg	-	Nothing in residue.
496	83	3.000kg	0.508kg	0.002kg	Flot: charcoal.
498	87	3.100kg	0.313kg	0.004kg	Flot: charcoal. Residue contains frag. of cremated bone.
500	116	2.500kg	0.273kg	<0.001kg	Flot: small charcoal/ plant material.
516	101	2.000kg	0.116kg	0.001kg	Flot: charcoal.
516	102	1.710kg	0.155kg	0.003kg	Flot: charcoal/ plant material.
530	59	1.539kg	0.084kg	<0.001kg	Flot: small charcoal/ plant material. Residue contains frag. of cremated bone.
531	82	(2 bags) 7.000kg	0.147kg	0.006kg	Flot: charcoal.
535	78	0.917kg	0.064kg	0.001kg	Flot: charcoal.
536	79	1.367kg	0.092kg	0.002kg	Flot: charcoal.
537	71	0.467kg	0.050kg	0.001kg	Flot: charcoal/ plant material.
538	90	0.439kg	0.087kg	0.001kg	Flot: charcoal. Residue contains poss. slag?
540	84	3.700kg	0.550kg	0.011kg	Flot: charcoal. Residue contains poss. slag?
542	93	3.000kg	0.279kg	0.003kg(char) 0.003kg(bone)	Flot: frag. of cremated bone, and charcoal/ plant material.

542	93	3.500kg	0.279kg	0.003kg(char) 0.003kg(bone	Flot: charcoal and frag. of cremated bone.
544	125	(3 bags) 9.500kg	0.934kg	0.025kg	Flot: charcoal. Residue contains frag. of cremated bone.
546	107	3.000kg	0.578kg	0.005kg	Flot: charcoal.
547	105	0.818kg	0.087kg	0.003kg	Flot: charcoal. Residue contains frag. of cremated bone.
548	103	2.500kg	0.157kg	0.002kg	Flot: charcoal/ plant material. Residue contains frag. of cremated bone.
553	126	2.400kg	0.198kg	0.001kg	Flot: small charcoal/ plant material.
556	117	4.100kg	0.537kg	0.008kg	Flot: charcoal. Residue contains poss. slag?
557	122	3.000kg	0.283kg	0.002kg	Flot: charcoal.
559	118	2.800kg	0.139kg	0.020kg	Flot: charcoal. Residue contains small slag?
601	119	1.228kg	0.195kg	0.003kg	Flot: charcoal.
603	123	3.900kg	0.528kg	0.008kg	Flot: charcoal/ plant material. Residue contains poss. slag?
604	186	3.700kg	0.073kg	-	Nothing in residue.
605	185	(2 bags) 6.000kg	0.572kg	0.001kg	Flot: small charcoal/ plant material.
608	182	(2 bags) 7.000kg	0.470kg	<0.001kg	Flot: plant material.
609	180	(2 bags) 7.000kg	0.439kg	0.011kg	Flot: charcoal/ plant material.
610	183	(2 bags) 8.000kg	0.447kg	0.002kg	Flot: charcoal.
611	184	3.200kg	0.160kg	0.001kg	Flot: twigs.
612	172	(2 bags) 6.500kg	1.086kg	-	No flot. Residue contains frag. of bone.
613	175	2.600kg	0.103kg	-	Nothing in residue.
614	173	3.300kg	0.363kg	-	Nothing in residue.
614	173	3.300kg	0.352kg	0.016kg(bone) 0.002kg(char)	Flot: charcoal and frag. of bone.
615	144	0.560kg	0.079kg	<0.001kg	Flot: small charcoal/ plant material.
616	279	0.418kg	0.020kg	0.003kg	Flot: charcoal.
618	145	0.271kg	0.030kg	-	Nothing in residue.
619	187	3.700kg	0.111kg	0.075kg	Flot: charcoal.
620	174	3.500kg	0.386kg	0.001kg	Flot: charcoal/ plant material.
621	156	(26 bags) 78.000kg	8.000kg	0.828kg	Flot: charcoal. Residue contains poss. slag, and frag of cremated bone.
624	149	2.000kg	0.146kg	-	Nothing in residue.
625	150	1.786kg	0.179kg	0.001kg	Flot: plant material.
626	252	3.300kg	0.724kg	0.001kg	Flot: plant material.
627	253	4.000kg	0.320kg	0.001kg	Flot: small charcoal/ plant material.
628	254	3.900kg	0.515kg	0.001kg	Flot: charcoal.
629	255	4.000kg	0.697kg	<0.001kg	Flot: plant material.
630	256	4.000kg	0.344kg	-	Nothing in residue.
631	257	3.800kg	0.329kg	0.001kg	Flot: charcoal/ plant material.
632	258	4.100kg	1.138kg	-	Nothing in residue.
633	259	3.400kg	0.401kg	0.002kg	Flot: charcoal.
634	260	3.700kg	0.796kg	0.002kg	Flot: shells/ small charcoal.
642	250	(2 bags) 8.000kg	0.897kg	0.001kg	Flot: plant material/ small charcoal.
642	249	(3 bags) 11.000kg	0.790kg	0.001kg	Flot: charcoal.
642	194	(4 bags) 13.500kg	2.200kg	0.002kg	Flot: plant material.
643	195	(3 bags) 9.500kg	0.658kg	-	Nothing in residue.

644	154	3.200kg	0.226kg	0.003kg	Flot: charcoal/ plant material.
647	160	1.258kg	0.211kg	0.001kg	Flot: small charcoal/ plant material.
650	181	3.900kg	0.253kg	0.033kg	Flot: charcoal. Residue contains frag. of bone.
651	188	3.600kg	0.266kg	0.016kg	Flot: charcoal. Residue contains frag. of bone.
652	190	3.700kg	0.174kg	-	Nothing in residue.
654	162	(3 bags) 9.00kg	0.584kg	0.024kg	Flot: charcoal/ plant material. Residue contains frag. of cremated bone and a frag. of glass.
656	163	3.500kg	0.188kg	0.006kg	Flot: charcoal/ plant material.
658	177	2.500kg	0.235kg	0.001kg	Flot: charcoal. Residue contains poss. slag?
660	176	3.600kg	0.228kg	0.012kg(char) 0.001kg(bone	Flot: charcoal and frag. of bone.
662	231	3.700kg	1.091kg	-	Residue contains poss. slag?. No flot.
662	232	4.200kg	0.933kg	0.008kg	Flot: charcoal/ plant material. Residue contains poss. slag?
662	233	3.800kg	0.742kg	0.001kg	Flot: charcoal/ plant material/ shell. Residue contains poss. slag?
662	234	0.835kg	0.129kg	0.001kg	Flot: charcoal/ plant material.
663	221	3.000kg	0.277kg	0.004kg(char) 0.001kg(seed)	Flot: charcoal and seeds.
663	214	4.000kg	0.606kg	0.002kg	Flot: charcoal/ plant material. Residue contains poss. slag?
664	220	4.000kg	0.938kg	-	No flot. Residue contains poss. slag?
664	217	3.300kg	0.612kg	0.007kg	Flot: charcoal. Residue contains poss. slag?
666	228	3.500kg	0.547kg	0.002kg	Flot: charcoal.
666	229	3.900kg	0.695kg	0.002kg	Flot: charcoal/ plant material. Residue contains poss. slag?
667	235	(3 bags) 12.000kg	2.100kg	0.017kg	Flot: charcoal. Residue contains poss. slag?
669	197	3.000kg	0.187kg	0.048kg	Flot: charcoal. Residue contains poss. slag?
701	198	3.200kg	0.370kg	0.005kg(char) 0.001kg(bone)	Flot: charcoal and frag. of cremated bone.
703	164	2.700kg	0.144kg	0.001kg	Flot: small charcoal/ plant material.
707	178	3.700kg	0.281kg	0.002kg	Flot: charcoal/ plant material. Residue contains frag. of bone.
709	227	3.500kg	0.238kg	0.023kg	Flot: charcoal. Residue contains poss. slag?
710	274	(2 bags) 3.200kg	0.343kg	0.123kg	Flot: charcoal.
712	222	4.500kg	1.239kg	-	Nothing in residue.
713	224	4.000kg	0.30kg	-	Nothing in residue.
714	211	4.000kg	1.162kg	-	Nothing in residue.
715	209	(2 bags) 6.000kg	1.546kg	0.002kg	Flot: charcoal/ burnt grains/ plant material.
715	251	3.800kg	0.446kg	<0.001kg	Flot: charcoal/ plant material.
716	206	3.500kg	0.064kg	0.011kg	Flot: charcoal.
717	210	(3 bags) 11.000kg	3.500kg	0.004kg	Flot: charcoal/ shells. Residue contains frag. of bone.
718	200	3.100kg	0.022kg	0.004kg	Flot: charcoal.
719	202	4.000kg	0.255kg	0.004kg(char) 0.002kg(bone)	Flot: charcoal and frag. of cremated bone.
720	219	2.000kg	-	0.181kg	Flot: charcoal. No residue.
720	219	1.748kg	-	0.181kg	Flot: charcoal. No residue.
720	215	3.900kg	0.171kg	0.003kg(bone 0.221kg(char)	Flot: charcoal and frag. of bone.
720	218	2.500kg	-	0.182kg	Flot: charcoal. No residue.
720	216	3.200kg	1.888kg	0.234kg	Flot: charcoal. Residue contains frag. of cremated bone.

720	213	3.500kg	0.115kg	0.235kg	Flot: charcoal. Residue contains frag. of cremated bone.
722	272	3.500kg	0.365kg	0.027kg	Flot: charcoal. Residue contains poss. slag?
723	240	3.000kg	0.149kg	0.002kg(char) <0.001kg(copper)	Flot: charcoal and copper.
725	243	1.361kg	0.137kg	0.001kg	Flot: charcoal/ plant material.
725	244	1.332kg	0.145kg	0.002kg	Flot: charcoal/ plant material.
725	247	1.167kg	0.111kg	-	Nothing in residue.
725	246	1.467kg	0.172kg	0.001kg	Flot: charcoal/ plant material.
725	248	1.371kg	0.202kg	0.001kg	Flot: small charcoal/ plant material.
725	267	4.000kg	0.485kg	0.003kg	Flot: charcoal/ plant material. Residue contains poss. slag?
725	245	2.700kg	0.153kg	0.003kg	Flot: charcoal/ plant material.
725	271	2.300kg	0.158kg	0.001kg	Flot: charcoal.
728	276	3.700kg	0.320kg	0.001kg	Flot: charcoal. Residue contains poss. slag?
730	266	3.500kg	0.278kg	0.002kg	Flot: charcoal.
736	273	3.500kg	0.270kg	-	Residue contains poss. slag? No flot.
737	264	4.000kg	0.636kg	-	Residue contains poss. slag?
740	237	1.626kg	0.168kg	0.040kg	Flot: charcoal.
745	263	2.900kg	0.303kg	0.015kg	Flot: charcoal. Residue contains poss. slag?
747	262	0.978kg	0.135kg	0.001kg	Flot: charcoal/ plant material.
749	261	3.900kg	0.606kg	-	Residue contains poss. slag? No flot.
752	275	1.780kg	0.299kg	0.003kg	Flot: charcoal. Residue contains poss. slag?
752	265	1.857kg	0.354kg	-	Residue contains poss. slag?

4.4.4 Wood ID analysis

See Appendix 8.1

Site	E number	Feature type	Context	Sample no	Date	Identification	Comment
Lismore/ Bushfield or Maghernaskeagh 1	E2220	Slagpit furnace	F91	26	90BC-80AD Iron Age	Oak (23.5g, 50f) Hazel (1.6g, 5f)	Hazel and oak brushwood
Lismore/ Bushfield or Maghernaskeagh 1	E2220	Ring gully	F164	92	420AD-600AD Early Medieval	Ash (1g, 5f)	Really distorted charcoal. Covered in iron staining
Lismore/ Bushfield or Maghernaskeagh 1	E2220	Pit	F174	7	420AD-590AD Early Medieval	Alder (0.8g, 8f), Oak (2.3g, 13f), Hazel (1.9g, 19f), Pomoideae (3.7g, 8f) Birch (0.05g, 1f), b/c (0.05g, 1f) elm (2.8g, 9f)	
Lismore/ Bushfield or Maghernaskeagh 1	E2220	Pit	F194	46	260BC-50BC Iron Age	Hazel (5g, 45f) Pomoideae (0.05g, 1f)	Hazel nut shells?
Lismore/ Bushfield or Maghernaskeagh 1	E2220	Trough	F865	405	2350BC-2130BC EBA	Alder (0.1g, 1f) Oak (0.6g, 25f) Ash (0.35g, 12f) Hazel (0.1g, 12f) Pomoideae (0.2g, 5f)	
Lismore/ Bushfield or Maghernaskeagh 1	E2220	Trough	F865	406	2350BC-2130BC EBA	Oak (0.5g, 7f) Ash (0.5g, 7f) Hazel (1g, 5f) Willow (0.05g, 1f) Birch (0.05g, 1f) elm (0.9g, 14f) Holly (0.1g, 2f)	6yrs

4.5 Dating Evidence

See Appendix 8.2

There are 14 radiocarbon determinations for samples of charcoal, animal bone and human bone. The results provide date ranges in the Mesolithic period (1), the early Bronze Age (1), the Iron Age (2) and the early Medieval Period (10).

A sample of charcoal from basal fill F072 of large pit F050 (Zone B), returned a calibrated determination of 6400–6210 BC (Beta-218634), confirming that the wood dated from the Mesolithic period. This remarkably old result can be explained if ancient wood from a bog was brought into the enclosure and used for fuel. A sample of animal bone from the same context produced a calibrated determination of AD 590–720 (SUERC-15852), which places the context firmly in the early Medieval Period, and is marginally the most recent of all the radiocarbon dates obtained for the site.

The early Bronze Age result was obtained for a sample of hazel charcoal from trough fill F865 in the burnt mound area (Zone F). The calibrated range was 2350–2130 BC (SUERC-18002).

An Iron Age result came from alder charcoal in fill F091, of slagpit furnace F090 (Zone A), external to the enclosure. The calibrated range was 90 BC–80 AD (SUERC-17999). A pit within the enclosure (Zone C) was also dated to the Iron Age. Alder and hazel charcoal from fill F194 of pit F195 produced a calibrated range of 360–280 BC/260–50BC (SUERC-18001).

The early medieval determinations are remarkably consistent, and highlight the possibility that enclosed settlement at Bushfield or Maghernaskeagh-Lismore 1 was relatively short-lived. Hazel charcoal from fill F174 in pit F175 (Zone C) was calibrated to AD 420–590 (SUERC-18000). Another Zone C pit, F187, is dated to 570–665 (calibrated) from ash charcoal in fill F186 (SUERC-17005). Pomoideae charcoal from the fill of pit F153 (F154) in Zone D produced a calibrated range of 420–600 (SUERC-17001). The ring-gully feature F165 in Zone D, perhaps the only indicator of a structure in the enclosure, is dated to 420–600 (calibrated) from a sample of ash charcoal from fill F164 (SUERC-18466). One of the pits in Zone E (F700) is dated to 540–650 (calibrated) from ash charcoal in fill F719 (SUERC-18552).

Four of the human burials from the Zone C cemetery are dated, again with remarkable consistency in the results. In each case leg bone fragments were submitted. Group 1 burial SK77 is calibrated to AD 550–650 (SUERC-21339). A Level 2 burial in Group 1, SK65 produced a calibrated determination of 550–670 (SUERC-21666). A Group 2 burial SK07 is calibrated to 580–660 (SUERC-21337), and a Group 4 burial SK79 produced a calibrated determination of 540–645 (SUERC-21340).

5. DISCUSSION

Bushfield or Maghernaskeagh is a literal translation of Magher na Skeagh or Maghernaskeagh. The word is commonly anglicised as Maghera and is the beginning of nearly 200 places in Ireland. The word signifies a plain (Joyce, 1972, 426). Skeagh, comes from the Irish sceach, meaning the 'white thorn or haw tree'. Skeagh can mean thorn bush, or commonly white thorn bush. Maghernaskeagh has been translated as 'the field of the white thorn bushes' (Joyce, 1972, 517-518). The townland of Lismore can be translated as 'big fort' or 'great enclosure' (Joyce, 1972, 271) which may be a reference to the early medieval enclosure at Bushfield or Maghernaskeagh/Lismore 1. If that is the case, there must have been some fluctuation in property divisions through the years, as the modern townland boundaries place most of the site in the Bushfield or Maghernaskeagh townland. 'Lis' or 'lios' elements in a placename often refer to the interior of the enclosed site, as opposed to the enclosing element (Limbert 1996, 270). The existence of human activity prior to the early Medieval Period has been identified. This evidence came in the form of burnt mound activity dating from the early Bronze Age (Zone F) and iron smelting work of Iron Age date in Zone A.

Burnt mounds are the most common features found in the Irish archaeological landscape with over 7,000 sites discovered to date (Power et al, 1997). There were *c*.40 (at least containing a burnt spread/mound) found on the M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill motorway scheme. Three were found at Bushfield or Maghernaskeagh/Lismore 1, all of which were located outside of the main enclosure (Fig. 67; Plate 42). Zone F comprised four burnt spreads overlaying three rectangular/sub-square troughs. Hazel charcoal from fill F865 (trough F864) returned a calibrated radiocarbon determination of 2350–2130 BC, dating the burnt mound activity to the early Bronze Age (SUERC-18002; Appendix 8.2). A typical *fulacht fiadh* comprised a crescent-shaped mound or spread of burnt stone and charcoal on top of or adjacent to a pit-like trough (Brindley, et al. 1989-90, 25). They were usually, though not exclusively, found close to water, often a stream, lake, river or marsh. Many suggestions have been made as to their function. These include cooking places, bathing and saunas, metal production, boat building and other domestic activities (Barfield and Hodder, 1987, 371; O' Drisceoil 1991). It is generally accepted that the primary role of burnt mound sites was for boiling water (Brindley, et al. 1989-90, 25). Water was heated in the pit-like trough by immersing hot stones into it, shattering the stones as a result. This method is commonly known as 'hot-stone technology' (Ibid, 25). The stones would be heated at a nearby hearth. The boiling water would then be used for whatever function necessary, such as cooking (food possibly being wrapped in straw to prevent contact with the dirty water). Once this was completed, the stones were discarded close to the trough forming a crescent-shaped burnt

mound around the trough area. The same process would result in a collection of stones forming a large burnt spread or mound close to the trough. These practical devices ranged in date from the late Neolithic Period to the early Medieval Period, but are most commonly attributed to the Bronze Age (Ibid, 25; Corlett, 1997; Russell 2001; Waddell, 1998, 177). The analysis of charcoal from fill F865 gives an interesting insight into what type of local wood was gathered in the vicinity and used as fuel in the 'hot-stone' process in the early Bronze Age. Oak, hazel, ash, birch, pomoideae (apple, pear, hawthorn and mountain ash), willow, alder, elm and holly were all identified (O'Carroll, Appendix 8.1). It is considered that primary woodlands of oak, ash and elm were present in the environs, 'with the possibility of a hazel and holly understorey'. Birch, alder and willow would have been drawn from local wetland areas, those species thrive in the wetter environment (O'Carroll, Appendix 8.1).

The most significant period of activity is related to the construction and occupation of a large ditched enclosure of early medieval date (Fig. 7; Plates 2, 3, 5, 11, 12, 13). The enclosure has many affinities with the widely distributed 'ringfort' class of monument of the period, farming settlements enclosed by circular bank-and-ditch defences. The settlement at Bushfield or Maghernaskeagh/Lismore 1, although delimited by a ditch that most likely was associated with an embankment along its internal edge, is much too large to be categorised as a ringfort, and in plan is D-shaped rather than circular. The ringfort-type monument is now believed to have been used for several functions, including cattle pens, and small homesteads, which were able to defend themselves against small scale attacks, such as those from robbers, and wild animals (Edwards 1990, 12-22; Charles-Edwards 2000, 149). Early medieval Ireland was a highly stratified society, and along with settlement and demarcating ownership, the main function of these enclosures was to display power, wealth and status (Edwards 1990, 22; Charles-Edwards 2000, 149). The type of activity within the site varied but was consistent with family-based daily life (Edwards 1990, 33). The presence of a cemetery at Lismore/Bushfield or Maghernaskeagh 1 is another feature that sets the site apart from the typical ringfort of the period. The enclosure may have provided a burial place for familial or communal groups, while also claiming ownership of land using an ancestral marker (Charles-Edwards 1976; 1992).

It was a common practice in the early Medieval Period for communities to use secular spaces to bury their dead, and for many of these to be familial and ancestral cemeteries (O'Brien 2003, 67; Charles-Edwards 2000, 75-79). Ringforts were used as a vessel to augment the owner's status, and the presence of a burial place within an enclosure may have contributed to this. Bushfield or Maghernaskeagh/Lismore 1 is one such example of this activity (Fig. 18, 19, 20; Plates 14-23). The remains of 60 Christian-style inhumations were excavated, with an

additional 21 collections of disarticulated human remains (Keating, Appendix 8.11). Grave goods were rare. A small D-shaped iron/copper alloy buckle with attached plate was found with Group 2, Level 2 burial SK50 (E2220:820:1; Fig. 73). However, this type of buckle is likely to date from the 11th to the 14th centuries, and it cannot be considered contemporary with the burial. The artefact could have become mixed with the grave fill at a much later time as a result of ground disturbance activity, such as ploughing (Scully, Appendix 8.7). The small size of the cemetery suggests a familial burial ground. The majority of graves excavated were single burials. However, there were a number of double or multiple burials. Were these burials treated differently for a reason? Were they associated with immediate family members—mother, father, and children? The re-use of these graves for multiple burials may indicate the need or desire to bury immediate family members together. Due to the poor preservation of the bulk of the remains, gender identification was particularly difficult with this assemblage. Sex was determinable for just 12 adult individuals—six male and six female (Keating, Appendix 8.11).

Comparisons with other medieval settlement sites highlight the commonality of cemetery activity within early medieval enclosures. Settlement and burial activity located within the same enclosure was not an unusual occurrence for the period. It was common on many sites, for example, Johnstown, Co. Meath, for the living and the dead to co-exist in close proximity. The early medieval settlement site at Dooey in Co. Donegal contained 101 Christian inhumation graves (O'Brien 1999, 180). Also on the M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme were two medieval settlement sites at Parknahown 5[1] and Killeany 1[2], Co. Laois, which had at least 600 Christian inhumation graves and 60 Christian inhumation graves respectively (only one-third of the latter cemetery was excavated and many more graves may exist) (O'Neill 2006, 32; Keating 2007, 52; Wiggins 2006, 34). Johnstown, in Co. Meath was another similar medieval settlement site that accommodated both a settlement and a cemetery site with *c.*398 Christian inhumation graves (Clarke & Carlin 2008). In general, the burials on all sites were orientated east-west, contained simple, earth-cut, unlined graves and were a mixture of single and multiple burials (Keating, 2007; Clarke & Carlin 2008; O'Neill 2006, 32). Although the burial rite was similar in all four sites, the small nature of the cemetery at Bushfield or Maghernaskeagh/Lismore 1 further suggests a possible familial burial ground, which on the basis of radiocarbon dating was of relatively short duration.

[1] Killeany 1, Co. Laois, Excavation Record no. E2171, Ministerial Scheme no. A015/063

[2] Parknahown 5, Co. Laois, Excavation Record no. E2170, Ministerial Scheme no. A015/060

Along with the cemetery, Bushfield or Maghernaskeagh/Lismore 1 contained a large number of charcoal-rich pits, many of which were associated with fragments of burnt bone. These were particular concentrated around the centre of the enclosure in Zone D. It is clear that the majority were contemporary with the occupation of the enclosure in the 6th and 7th centuries. Only a limited amount of the burnt bone could be identified, but where identification was possible it was evident in each case that the bone was faunal, and there is no reason to consider that any burnt bone of human origin was found on the site (Archaeological Services, Appendix 8.3; Keating, Appendix 8.11, 50). It has been suggested that since animal bone and charcoal were used in the Medieval Period to regulate the temperature in hearths and furnaces during the smelting or smithing process of metal production that the pits are related to such activity (pers. comm. Eoin Grogan). Analysis of slag material found on the site has confirmed that iron smelting took place in a grouping of slagpit furnaces excavated external to the northwest quadrant of the enclosure (Zone A). However, radiocarbon dating establishes that this activity took place in the Iron Age, several centuries prior to the construction of the enclosure (SUERC-17999, Appendix 8.2; Young, Appendix 8.8). However, other metal residues, mostly recovered from the south-western quadrant of the enclosure (Zone B) are considered to relate to secondary bloom refining work that was contemporary with the enclosure. The pits concentrated in Zone D of the enclosure, an area roughly central to the overall enclosed space, can only be linked to metal-working activity if they contained at least some evidence in the form of waste residues. This unfortunately was not the case, as no slag was reported during the excavation of any of the features. However, it was noted during the flotation of soil samples from a number of Zone D contexts that 'possible slag' was present in the residues, including the fills of pits F555 and F622, both of which contained fragments of burnt bone. On balance, despite the absence of slag material in Zone D in comparison to the quantity recovered from Zone B, it could be tentatively suggested that Zone D was an area of the enclosure that was dedicated to some type of metal production work, although this activity produced little or no waste material and was clearly detached from the bloom refining activity that on the basis of the distribution of associated slag residues was confined to Zone B.

There was an apparent lack of settlement evidence at Bushfield or Maghernaskeagh/Lismore 1. This is a common occurrence with ringforts as they were usually located in areas of good farming land (Edwards 1990, 11). Their over-grown banks were partially protected by local farmers over the generations because of their superstitious nature (Ibid, 11). The interiors, in many cases, did not have the same importance, and were ploughed and cultivated, resulting in their archaeological destruction (Ibid, 11; Charles-Edwards 2000, 151). This practice can be seen at Bushfield or Maghernaskeagh/Lismore 1, which has abundant evidence of ploughing activity and lacks structural evidence for large-scale dwellings, outbuildings, souterrains, or

corn-drying kilns, the main features associated with settlement activity. Notwithstanding the destructive affects of agricultural processes, a great many cuts for pits, post-holes, graves and linear features did survive at Bushfield or Maghernaskeagh/Lismore 1, albeit in truncated form, and it may well be the case that the inhabitants found the means of constructing dwellings in the enclosure with relatively light foundations that consequently have left little or no trace in the archaeological record.

The most compelling evidence for the construction techniques of early medieval houses comes from exceptional sites such as Deer Park farms, Co. Antrim (a mound-like early medieval settlement known as a raised rath), where unusual waterlogged conditions resulted in the remarkable preservation of much structural timber (Edwards 1990, 22-23). The strongest candidate for the footprint of a dwelling at Bushfield or Maghernaskeagh/Lismore 1 is the curvilinear ring-gully fragment F163 in Zone D (Fig. 52), which could potentially represent the partial outline of a hut-like structure with a diameter of *c*.4.5m. However, the feature appears to be part of the putative metal-working activity that constitutes this particular zone, and it is unlikely that a dwelling would be constructed close to activity that involved the generation of intense heat, due to the risk of accidental damage by fire. The fill of the ring-gully, F164, contained fragments of burnt bone, and radiocarbon dating confirms that the feature was contemporary with the occupation of the enclosure, with a calibrated determination of AD 420–600 for a sample of ash charcoal (SUERC-18466; Appendix 8.2).

Leaving aside the scant structural indicators in the archaeological record, the best evidence that people were actually living at Bushfield or Maghernaskeagh/Lismore 1 comes from the analysis of food waste, specifically the animal bone assemblage (Tommasino, Appendix 8.6). The analysis of the assemblage identified the remains of cattle, pig, sheep and deer that would have constituted a significant proportion of the dietary requirements of the population, as well as some remains of horse, dog and cat. It is considered that the percentage of cattle in the assemblage is unusually high at Bushfield or Maghernaskeagh/Lismore 1. Animal husbandry at this site has much in common with practices noted in regard to similar contemporary settlements, i.e. it was related to local consumption of meat or secondary products, such as milk and so on. This element of the economy would have been complemented by the growing of cereals for the production of bread and so forth. Unfortunately, there were no waterlogged deposits on site that would have contained preserved cereal grain remains, and somewhat unusually the excavation did not uncover remains of a cereal-drying kiln. The only charred cereal grain recovered from the site came from a sample of fill F715 of the enclosure ditch in Zone E, the southwest quadrant (Fig. 61). These were wheat and barley and indeterminate grains (Archaeological Services, Appendix 8.3). The presence of some charred grain in the

ditch at this point suggests that a cereal-drying kiln was located nearby, to the south or southwest, outside the limit of the excavation, from where some grain accidentally damaged by fire during the drying process was carried by the wind to become trapped in the lower level of the enclosure ditch. The discovery of a large fragment from a rotary quernstone (E2220:5:4; Fig. 71, Plate 43; Mandal, Appendix 8.4), confirms that cereal production and the consumption of cereal products was a part of the daily lives of the community at Bushfield or Maghernaskeagh/Lismore 1.

Finds assemblages from ringfort-type excavations are frequently rather poor and Bushfield or Maghernaskeagh/Lismore 1 is no exception. Some items stand out, such as a fine glass ring-bead (E2220:5:1) from the fill of the enclosure ditch in Zone B, the south-western quadrant. Another interesting artefact is the iron shank of a ringed pin (E2220:148:1) found in the fill of pit F147 in Zone D. This dates from the early Medieval Period (Scully, Appendix 8.7). The discovery of two sharpening stones from large Zone B pit F050 (E2220:72:1 and E2220:72:2; Fig. 72, Plates 44 and 45; Mandal, Appendix 8.4) is an indicator that edged or pointed metal tools, if not produced on site, were certainly imported and used there. An iron knife blade was found in the fill of Zone C pit F245 (E2220:244:1; Scully, Appendix 8.7).

Metalworking of some type was common at enclosed sites and can be seen, along with settlement and burial activities, at such locations as Dooey, Co. Donegal, Grace Dieu, and Mount Offaly, Co. Dublin, (Edwards 1990, 32; O'Rìordàin and Rynne, 1961, 58-64; Conway, 1999; Conway, 1998). There are a number of processes involved in the production of iron objects and tools, including initial smelting of iron, bloom smithing and blacksmithing (Crew 1991; Mytum 1992; Scott 1990). The smelting activity at Bushfield or Maghernaskeagh/ Lismore 1 is notable in that it dates from the Iron Age, several centuries before the enclosure was established. The slagpit furnaces grouped together in Zone A at Bushfield or Maghernaskeagh/Lismore 1 were used to smelt iron (Young, Appendix 8.8; Scott 1994, 148) (Figs. 8, 9; Plates 6, 7). Smelting required clay shafts or chimneys (no *in situ* evidence for which survived) to generate the high temperatures needed to separate the ore (Mytum 1992, 231). The oxidised clay found in the slagpit furnaces suggests they were exposed to air during the smelting process, after the clay shafts were broken open to retrieve the raw blooms (Carlin & Kinsella 2006, 7) (Fig. 12). Oak was found to comprise the bulk of the charcoal identified in a sample from fill F091 from slagpit F090. Oak burns to a high temperature and would have been the preferred fuel gathered by those engaged in the iron smelting work (O'Carroll, Appendix 8.1). Hazel is also considered a good fuel, and was also identified in the same sample. Hazel also comprised the bulk of the charcoal analysed from Zone C pit F195, which

was contemporary with the Iron Age smelting pits. This suggests that in the Iron Age at any rate, plentiful supplies of oak and hazel wood existed in the vicinity of the site.

It is considered that no smelting contemporary with the enclosure took place at Bushfield or Maghernaskeagh/Lismore 1 (Young, Appendix 8.8). However, a secondary process known as bloom refining did occur after the enclosure was established, and based on the distribution of the relevant slag assemblage, this was confined to Zone B, the southwest quadrant. Such small-scale metalworking is regarded as fairly common in early medieval farmsteads (Edwards 1990, 86; Mytum 1992, 235). The early medieval assemblage at Bushfield or Maghernaskeagh/Lismore 1 is considered to be of particular significance in that it comprises bloom-smithing residues but with a marked absence of any clear signs of black-smithing residues (Young, Appendix 8.8). Analysis of the assemblage gives rise to the conclusion that 'the site may have specialised in bloom refining and that there may have been no 'end-user' blacksmithing on the site at all' (Young, Appendix 8.8).

As mentioned above, the excavation only covered a possible two-thirds of the site. The other one-third was external to the landtake and therefore, not archaeologically assessed. Geophysical survey was conducted in November 2006 on behalf of ACS Ltd. by Earthsound archaeological geophysics on the final one third of the enclosure, completed in two stages (See Appendix 8.10). The first was to the north of the enclosure (1-2) while the second was to the south (3-8).

The bulk of the unexcavated extent of the enclosure comprises much of the southwest and southeast quadrants. Only a very marginal area about the northern limit of the enclosure lay outside the limits of excavation. The geophysical survey was able to trace the continuation of the enclosure ditch in the southwest quadrant, but the line of the ditch did not emerge in the southeast quadrant (Earthsound, Appendix 8.10). A line of pits was detected along part of the projected circumference of the enclosure, as well as an interesting double line of pits (7) external to the enclosure. It is tempting to suggest that a gap in the responses in the southeast quadrant (5) may relate to the provision of a southeast facing entrance to the enclosure, complementing the northwest facing entranceway revealed in Zone A. Dipolar anomalies related to the detection of ferrous material (4) (8) indicate that the southern limits of the site, both within and without the curve of the enclosure ditch, are very active archaeologically, and potentially much that would enhance our understanding of the enclosure would be revealed by continued excavation in this direction.

6. CONCLUSION

This site has been adequately archaeologically assessed and resolved. The final phase of excavation at the site, carried out in February 2007 in regard to burnt mound remains located *c.* 50m northwest of the main enclosure ditch (Zone F), was resolved within a few days. No other archaeological features exist 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.

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7.2 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
- ACS Unpublished Testing, Progress and Preliminary reports on the findings in the townland of Bushfield or Maghernaskeagh/Lismore (1) (Ken Wiggins)
- ACS Unpublished Testing, Progress and Preliminary reports on the findings in the townland of Bushfield or Maghernaskeagh (2-5) (Ian Russell)
- ACS Unpublished Testing, Progress and Preliminary reports on the findings in the townland of Killeany (Ken Wiggins)

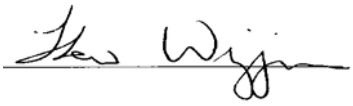
7.3 Cartographic Sources

1839 1st edition Ordnance Survey Map

1891 2nd edition Ordnance Survey Map

1909 Ordnance Survey Revision edition RMP map

Signed:



Ken Wiggins

Licensed Archaeologist

April 2009

8. APPENDICES

8.1 Appendix 1: Wood Identification analysis report

Lismore/Bushfield or Maghernaskeagh 1, M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme, Co Laois, Ireland

Species identification of charcoal samples

September 2008

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Contents

1. Introduction

Three thousand eight hundred and ninety seven charcoal fragments from one hundred and four contexts relating to twenty seven archaeological sites were analyzed from excavations along the M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill motorway scheme, contract 2. Thirty four wood samples from Middle and Late Bronze Age *fulacht* sites and wooden troughs were also analyzed within the framework of these studies. Contract 2 covers a length of approx 13 km and includes numerous *fulacht fiadh* sites, charcoal production pits, bowl furnaces, cremation pit, linear feature, hearths, burnt spread, wells, kilns, pits, postholes and one ring gully.

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 purposed in this report (Grogan *et al*. 2007).

Analysis of timbers can 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 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme will add important information to the rapidly expanding database of environmental indicators particularly in relation to the Neolithic, 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 and fragments counts are required for a complete and full understanding of the immediate environment. Keepax suggests 50 samples in a European temperate climate. Charcoal is also analyzed 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 forth. 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 analyzed 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 firewood 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 KTK, 2008) highlighting the wetter environments in these particular areas of Ireland particularly during the Bronze Age. Oak and 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 wood and charcoal assemblage analysed in this report covers both the Prehistoric and Medieval periods. Charcoal was analysed from a Neolithic pit at Derrinsallagh 3, numerous Bronze Age *fulacht* sites, early and Late Medieval charcoal production pits, a Late Bronze Age cremation pit from Derrinsallagh 3, the fill of an Iron Age well excavated at Bushfield or Maghernaskeagh 4, a Bronze Age fire hearth from Boherard 2, early medieval and high medieval kilns from Derrinsallagh 3, several un-diagnostic pits dating to the Bronze Age, Iron Age and Medieval periods, Middle and Late Bronze Age postholes and an early Medieval ring gully from Lismore/Bushfield or Maghernaskeagh 1.

The analysis presented here concentrates on species identification, species selection and the composition of the local woodland during the Neolithic, Bronze Age, Iron Age and Medieval periods along the route of Contract 2, M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme. 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 felled from was also noted and recorded. Each piece of wood was also examined for blade signatures.

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.

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 analyzed 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 Neolithic, 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

Neolithic	*4000-2500BC*
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, plank 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.

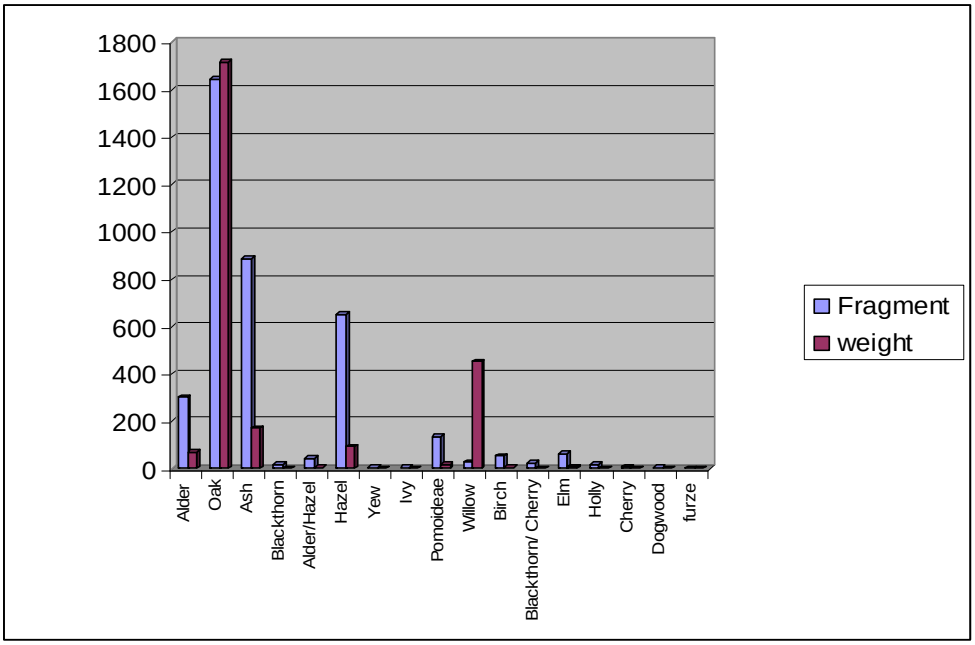
Signature: A signature is an imperfection in a woodcutter's blade which is transferred onto the timber when the wood is cut. A negative impression or a groove is created where a flange of metal extends beyond the axe blade where as a positive or raised signature is created by a gap in the blade edge.

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 Lismore/Bushfield or Maghernaskeagh 1

Bushfield or Maghernaskeagh/Lismore 1, Iron Age bowl furnace & pits, Early Medieval pits & Early Bronze Age troughs

Table 1: Taxa identified from Lismore/Bushfield or Maghernaskeagh 1

Site	E number	Feature type	Context	Sample no	Date	Identification	Comment
Lismore/ Bushfield or Maghernaskeagh 1	E2220	Bowl furnace	F91	26	90BC-80AD Iron Age	Oak (23.5g, 50f) Hazel (1.6g, 5f)	Hazel and oak brushwood
Lismore/ Bushfield or Maghernaskeagh 1	E2220	Ring gully	F164	92	420AD-600AD Early Medieval	Ash (1g, 5f)	Really distorted charcoal. Covered in iron staining
Lismore/ Bushfield or Maghernaskeagh 1	E2220	Pit	F174	7	420AD-590AD Early Medieval	Alder (0.8g, 8f), Oak (2.3g, 13f), Hazel (1.9g, 19f), Pomoideae (3.7g, 8f) Birch (0.05g, 1f), b/c (0.05g, 1f) elm (2.8g, 9f)	
Lismore/ Bushfield or Maghernaskeagh 1	E2220	Pit	F194	46	260BC-50BC Iron Age	Hazel (5g, 45f) Pomoideae (0.05g, 1f)	Hazel nut shells?
Lismore/ Bushfield or Maghernaskeagh 1	E2220	Trough	F865	405	2350BC-2130BC EBA	Alder (0.1g, 1f) Oak (0.6g, 25f) Ash (0.35g, 12f) Hazel (0.1g, 12f) Pomoideae (0.2g, 5f)	
Lismore/ Bushfield or Maghernaskeagh 1	E2220	Trough	F865	406	2350BC-2130BC EBA	Oak (0.5g, 7f) Ash (0.5g, 7f) Hazel (1g, 5f) Willow (0.05g, 1f) Birch (0.05g, 1f) elm (0.9g, 14f) Holly (0.1g, 2f)	6yrs

Oak, hazel, ash, birch, pomoideae, willow, alder, elm and holly were identified from the fill of the early Bronze Age trough. These taxa represent a mosaic of environments which includes primary woodlands such as oak, ash and elm with the possibility of a hazel and holly understory. Pomoideae is also a scrub like taxon which may have proliferated at the edge of the woodlands. Birch, alder and willow are mainly representative of wetland areas.

Oak and hazel brushwood, possibly from a coppiced source, were identified from the bowl furnace and hazel as well as hazelnut shells were identified from an Iron Age pit. The pit may have been used for the storage of hazelnuts.

A few fragments of ash were identified from the ring gully. The ash charcoal was very iron stained and there was only a few fragments in the sample.

Alder, oak, hazel, pomoideae, birch, blackthorn/cherry and elm were identified from the early Medieval pit of unknown function. Hazel dominates which indicates that hazel was prolific around the site at the time of its use. The charcoal from this pit most likely represents the remains of firewood used at the site.

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

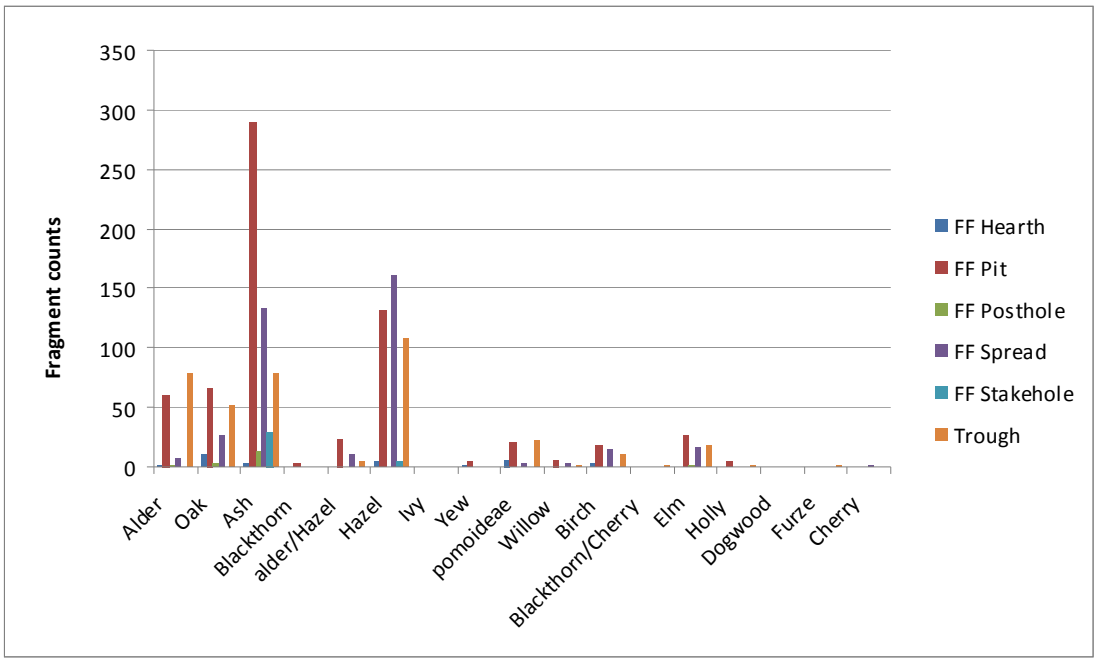
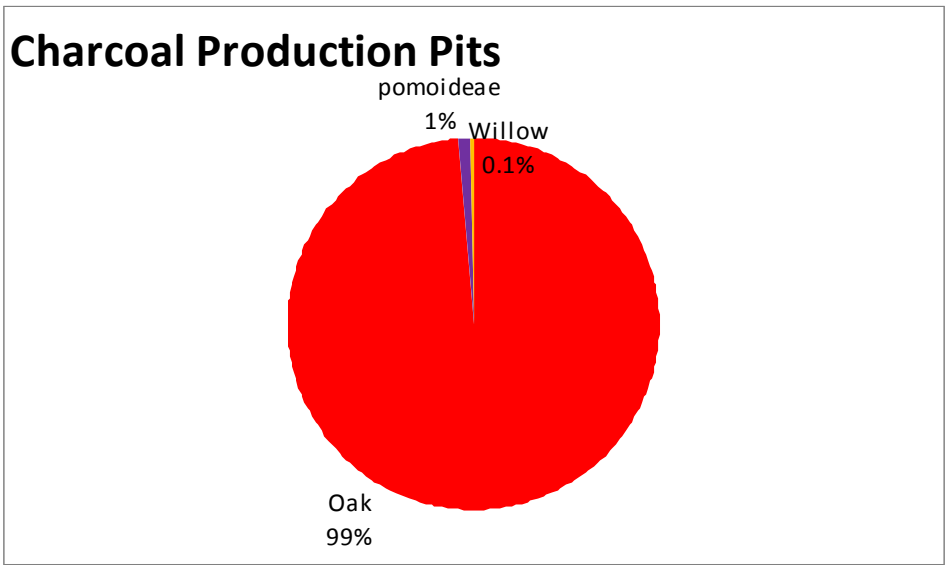


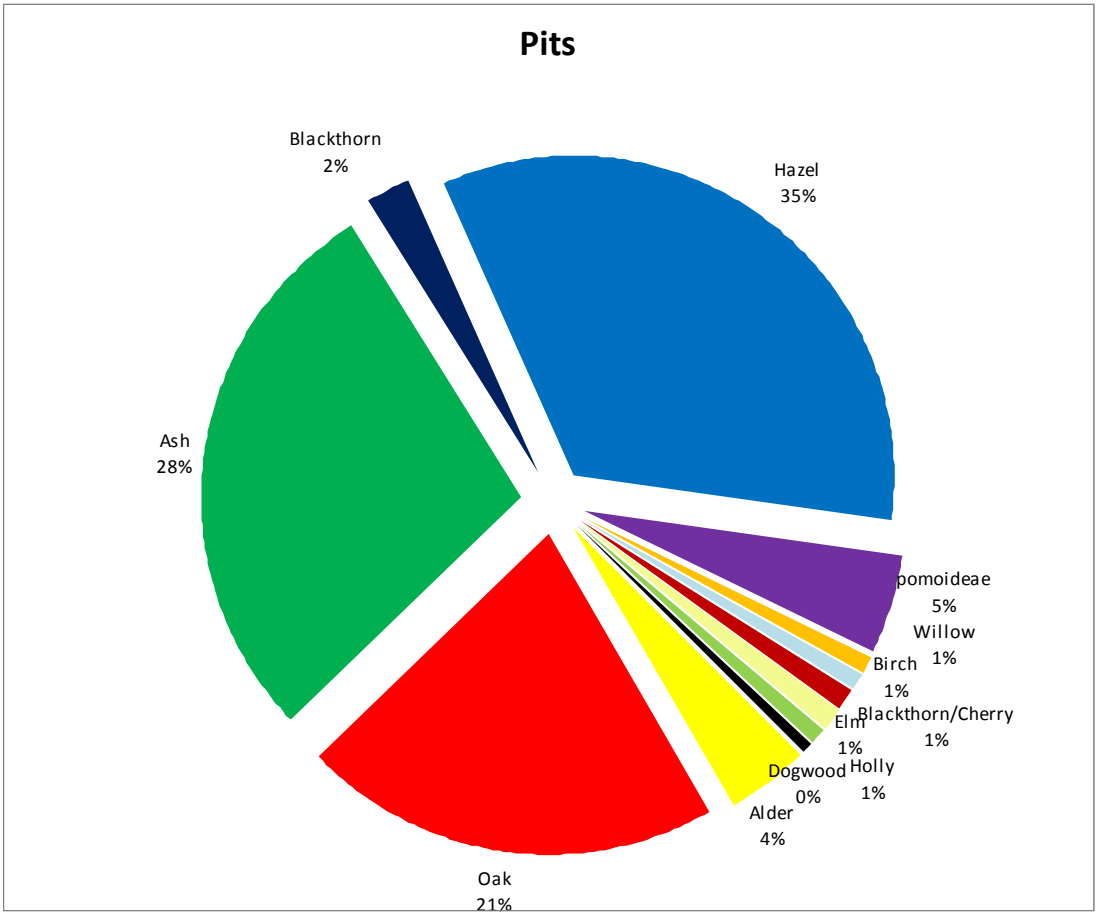
Figure 3: Wood taxa identified from Charcoal production pits



Oak was the preferred taxa for use within the charcoal pits at Barnasallagh 3, Delligabaun 1, Derrinsallagh 2, Kilcotton 1 & 2. Other taxa present were pomoideae and willow.

Oak is a dense wood and is very suitable for charcoal production and by inference metal working activities as seen at excavated bowl furnace sites at Derrinsallagh 5, Derryvorrigan 1, and Bushfield or Maghernaskeagh/Lismore 1 as well as charcoal production sites at Barnasallagh 3, Kilcotton 1 & 2 and Delligabaun 1. Oak also makes good firewood when dried and will grow in wetter areas when other conditions such as climate are favourable. Oak has unique properties of great durability and strength. The oak identified suggests that there was a supply of oak in the surrounding environment during the medieval periods. The oak was possibly selected from a coppiced area. A coppice tree is where the tree is cut down at its base and as a consequence several new shoots or straight growing trees will grow out of this one stump. The use of quickly renewable oak coppiced trees would have been the most efficient method of sustaining a continuous supply of fuel for use in these charcoal production pits.

Figure 4: Wood taxa identified from pits excavated along Contract 2

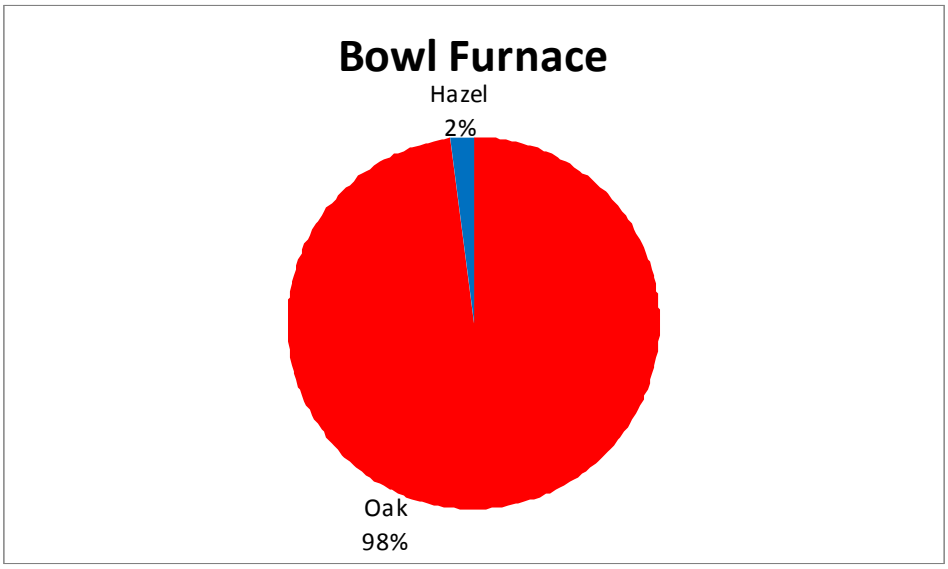


A variety of wood taxa were identified from the analysed pits excavated at Derrinsallagh 1, 2, 3 & 5, Derryvorrigan 1, Barnasallagh 1, Lismore/Bushfield or Maghernaskeagh 1, Bushfield or Maghernaskeagh 5, Shanboe 5 and Palmershill 1.

These pits are not associated with *fulacht fiadh* sites and are for the most part undiagnostic pits. The fact that oak does not dominate at these pits indicates that they were probably not single episodic events or used either as cremation pits or as charcoal production pits. The variety of taxa indicates that a range of wood taxa from a range of environments were being used at these pits although dryland taxa which includes hazel, ash and oak are present in the samples most frequently. The alder, willow and birch are wetland type trees while the ash, elm, yew and oak are normally associated with primary woodlands and the scrub material is derived from pomoideae, holly, dogwood, hazel and blackthorn/cherry. The charcoal is reminiscent of hearth/firewood material where a variety of taxa are collected from twigs and branches from near to the site.

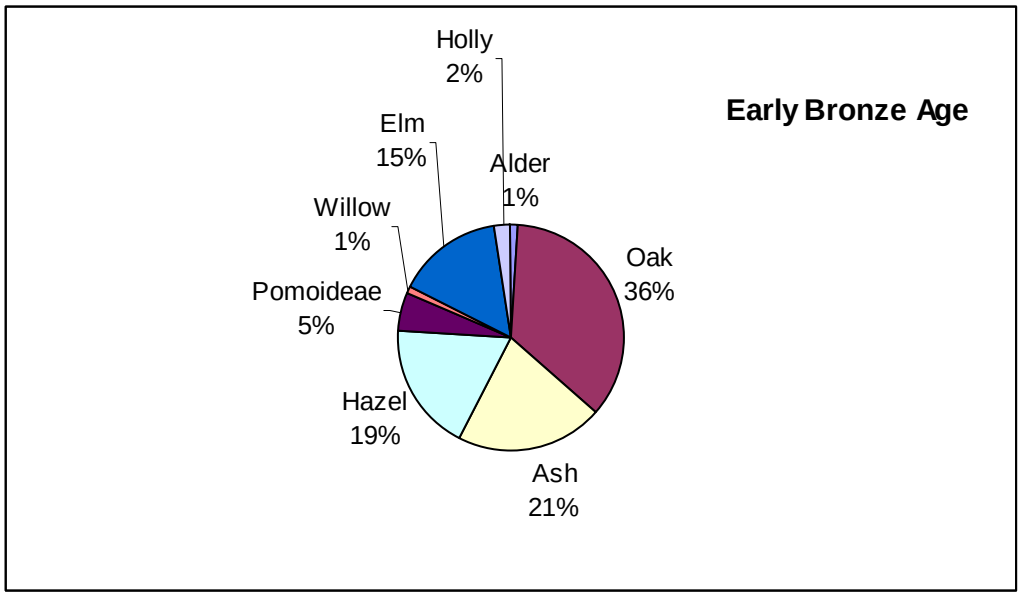
Large fragment counts of hazel as well as frequent amounts of hazel nut shells were noted in the Iron Age pits at Derrinsallagh 5, Derryvorrigan 1 and Lismore/Bushfield or Maghernaskeagh 1. This may indicate a function for the pits as storage receptacles for foodstuffs or nuts to use when supplies of other food types and resources were low.

Figure 5: Wood taxa identified from bowl furnaces



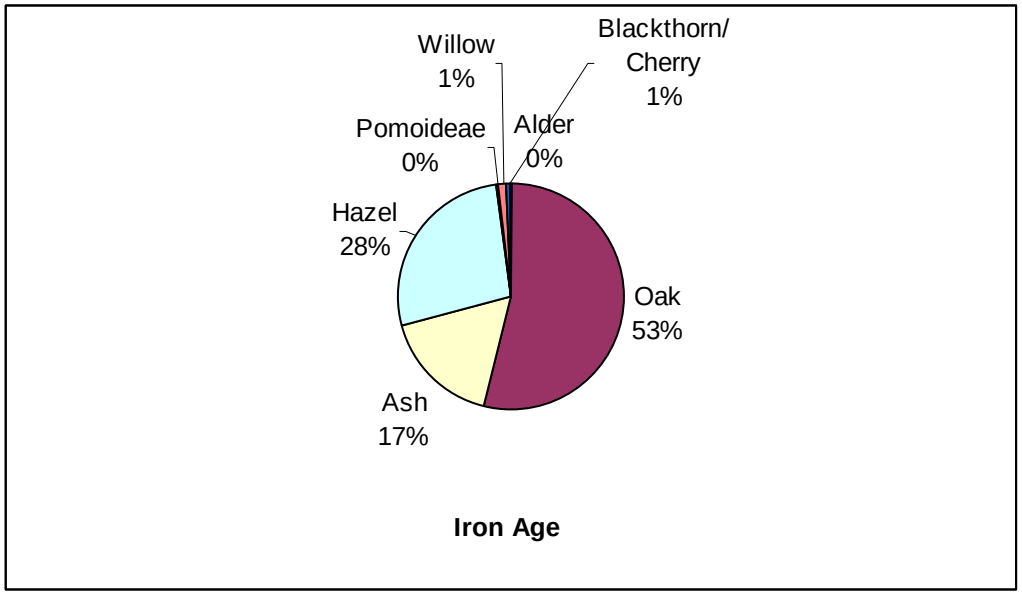
Oak was the main taxon identified from the bowl furnaces at Derrinsallagh 5, Derryvorrigan 1 and Bushfield or Maghernaskeagh/Lismore 1. They are all dated to Iron Age activity in the area. Both oak and hazel brushwood, possibly coppiced material, was identified from Bushfield or Maghernaskeagh/Lismore 1. Oak has been the foremost taxon type identified from these features in previous studies. Its charcoal has a high calorific value and has an ability to burn to higher temperatures over any other taxon types. High temperatures are required in the smelting of iron and other metal working activities.

Figure 6: Taxa present in the Early Bronze Age charcoal



Two samples were identified from the Early Bronze Age site. The site (Bushfield or Maghernaskeagh/Lismore 1) is related to *fulacht fiadh* activity and the feature analysed was charcoal extracted from a trough. Oak, ash and hazel were the dominant taxa. Other taxa present were elm, holly, pomoideae, willow and alder.

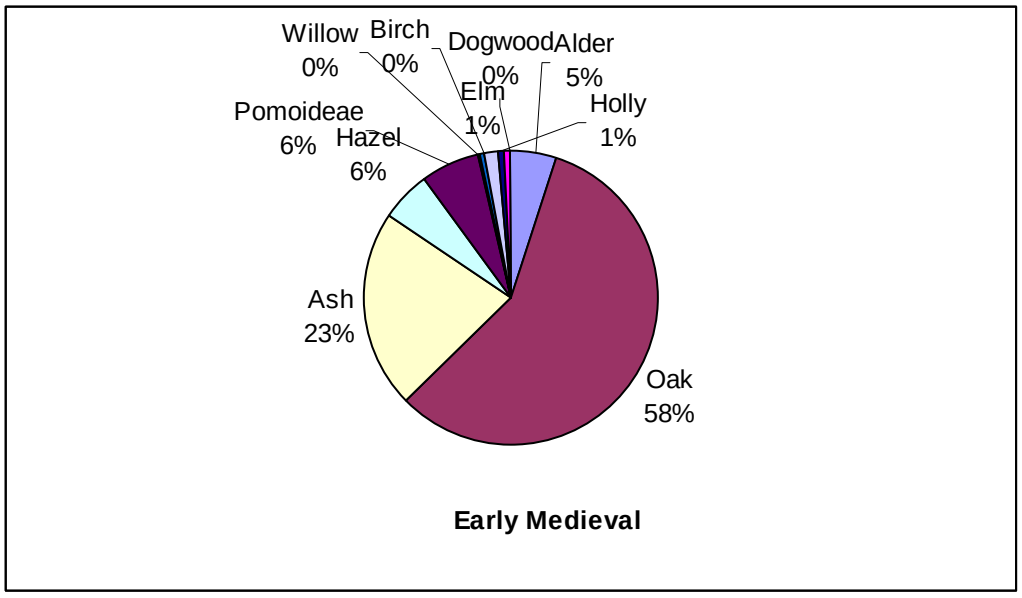
Figure 7: Taxa present in the Iron Age



Oak, ash, hazel, willow, alder, pomoideae, blackthorn/cherry identified from 8 samples associated with five archaeological excavations along this section of the road and all dating to the Iron Age. The sites examined were Derrinsallagh 5 (pit & bowl furnace), Derryvorrigan 1 (pit & bowl furnace), Barnasallagh 1 (pit), Lismore/Bushfield or Maghernaskeagh 1 (pit and bowl furnace) and Bushfield or Maghernaskeagh 4 (well).

Oak is the most dominant taxa present from the analysis which is related to the amount of bowl furnaces and features associated with iron working activities. Ash and hazel were also present in frequent quantities from the identified charcoal.

Figure 8: Wood taxa identified from the early Medieval periods



Twelve samples from eight sites produced charcoal from the early Medieval periods. These were Derrinsallagh 2 & 3 (pits & kilns), Bushfield or Maghernaskeagh / Lismore 1 (pit), Bushfield or Maghernaskeagh 5 (pit), Shanboe 5 (pit), Kilcotton 2 (charcoal production pit), Delligabaun 1 (charcoal production pit) and Barnasallagh 3 (pit). Oak dominates the assemblage here while ash, hazel, alder and pomoideae were also present in significant quantities. Lesser quantities of elm, birch, willow, dogwood and holly

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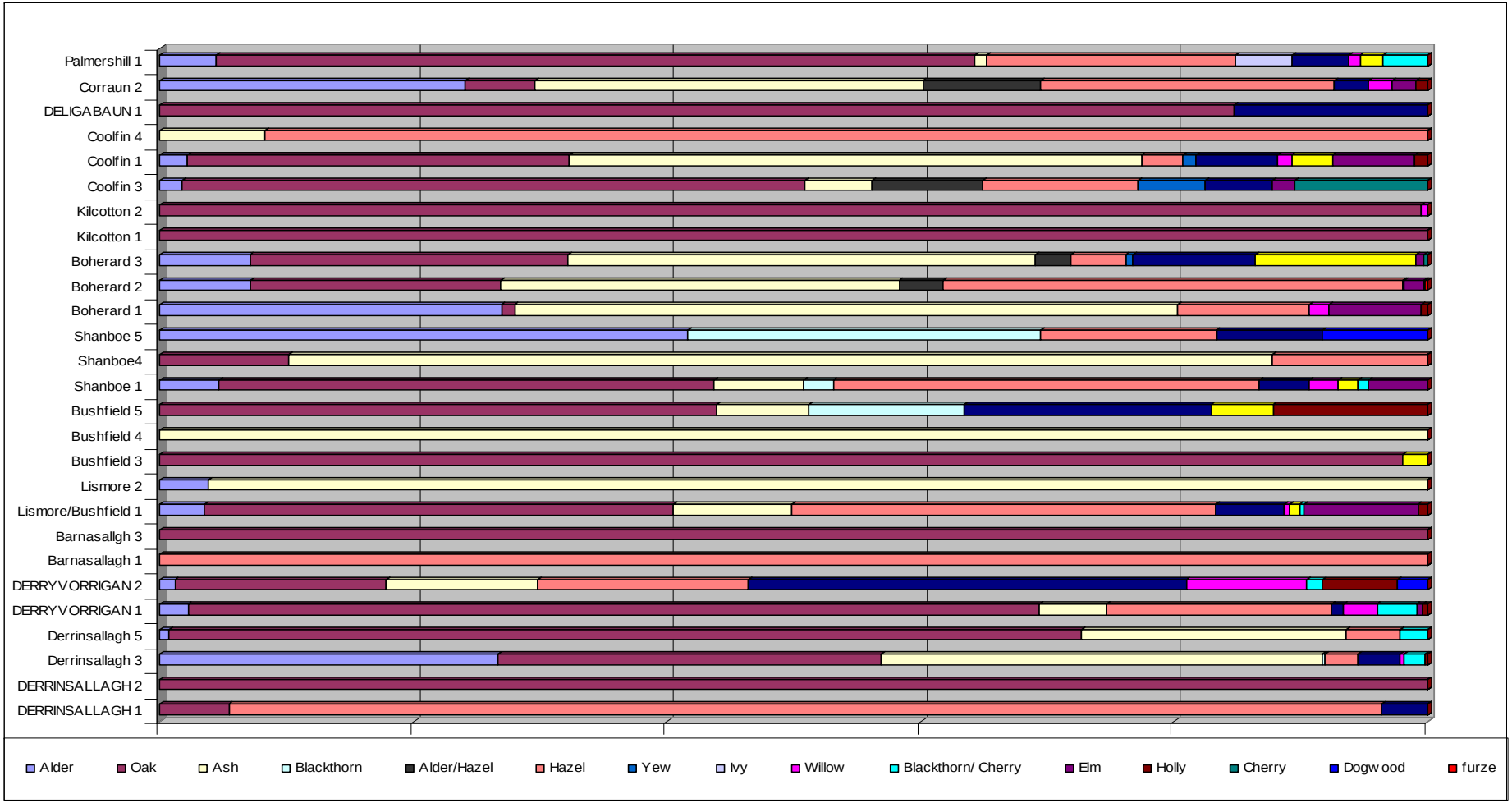
5. Discussion of Charcoal and wood assemblage

Table 2: Wood taxa identified from each site excavated along Contract 2, M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme



Aims of the study

1. To determine the types of wood selected for use either as fuel or as structural wood.

2. To re-construct the environment that the charcoal and wood was selected from and the possible changes and differences in different time periods between woodland present in the areas during the Neolithic, Early, Middle and Late Bronze Age, Iron Age and Medieval periods.

3. To determine use and function of particular features and their associated charcoal through the identification of taxa types

Wood types identified from charcoal and wood assemblages

Table 3: Taxa types identified from the charcoal and wood assemblage along Contract 2

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

Three thousand eight hundred and ninety seven charcoal fragments from one hundred and four contexts relating to twenty seven archaeological sites were analyzed from excavations along the M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway scheme, contract 2. Thirty four wood samples from a Middle Bronze Age walkway and Late Bronze Age *fulacht* sites were also analyzed within the framework of these studies. Contract 2 covers a length of approx 13 km and includes numerous *fulacht fiadh* sites,

charcoal production pits, cremation pit, a well, kilns, bowl furnaces, a linear feature, pits, postholes and one ring gully.

Charcoal was identified from the fill of various troughs, the fill of pits, from burnt mound spreads and hearths associated with excavated *fulachta fiadh*. These were from Boherard 1, 2 and 3, Coolfin 1, 3 and 4, Shanboe 1 and 4, Corraun 2 and Bushfield or Maghernaskeagh/Lismore 1. Charcoal analysed from charcoal production pits dated mainly to the Medieval periods and bowl furnaces dating to the Iron Age and related to metalworking activities were identified from Derrinsallagh 5, Derryvorrigan 1, Bushfield or Maghernaskeagh/Lismore 1, Barnasallagh 1, Kilcotton 1 and Delligabaun 1. Charcoal analysed from kilns dating to the Medieval periods were sampled from Derrinsallagh 3. Charcoal from pits excavated at Palmershill 1, Derrinsallagh 1, 2, 3 and 4, Derryvorrigan 1, Barnasallagh 1, Bushfield or Maghernaskeagh/Lismore 1, Bushfield or Maghernaskeagh 5 and Shanboe 5 were also identified to determine possible function and fuel type used at the pits. Possible structural wood used at the site were analysed from charcoal associated with postholes/stakeholes at Derrinsallagh 2, Derryvorrigan 2, Lismore 2 and Palmershill 1. One sample from a cremation pit at Derrinsallagh 3 and a sample from the fill of wells at Bushfield or Maghernaskeagh 4 and Coolfin 1 were also identified. Finally charcoal from a linear feature at Coolfin 3 and a ring gully at Bushfield or Maghernaskeagh/Lismore 1 was also analysed. Wood timbers were identified from a walkway at Coolfin 3, and the remains of wooden troughs at Corraun 2, Derrinsallagh 4 and Shanboe 1.

There were fifteen taxa present in the charcoal and wood remains. Taxa identified from the assemblage were oak (*Quercus* sp), hazel (*Corylus avellana*), ash (*Fraxinus excelsior)*, alder (*Alnus glutinosa)*, Pomoideae (apple type), elm (*Ulmus* sp), birch (*Betula* sp), blackthorn/cherry (*Prunus* spp), holly *(Ilex acquilofium*), willow *(Salix* spp), yew (*Taxus baccata*), ivy *(Hedera helix)*, dogwood *(Cornus sanguinea)* and *Ulex europeas* (Furze) in order of representation. The range of taxa identified from the features analysed includes large trees (elm, ash, yew and oak), medium sized trees (alder and birch) and smaller scrub or hedgerow trees like blackthorn, blackthorn/cherry, willow, dogwood, hazel, holly, furze, and pomoideae. Ivy is classed as a woody stem creeper and was very abundant on trees, walls and rocks (Webb 1953, 73).

The results from the wood analysis reflect to a certain extent surrounding treeland cover and selection of such trees for use at the Bronze Age sites. The identifications show that

alder and oak wood were the main taxa used for planks and horizontals at these sites. Hazel appears to have been used as post and wattle lining in Shanboe 2 and was also selected for posts at Corraun 2 and Derrinsallagh 4. One fragment of ash may have been used to line the trough at **F25**, Corraun 2. Willow was also present at Coolfin 3 and natural birch wood was identified from Shanboe 1 **F9**.

The oak and ash may have been selected from woodlands within the area of Coolfin and Corraun while hazel coppice of a particular size may have been drawfelled from areas of hazel coppice for the construction of the wattle lined trough at Shanboe 1. Any further analysis on the hazel wattle was impossible due to the degraded state of the wood. Wetland species identified were alder, birch and willow which are symptomatic of local wet condition along river banks or peat bogs. These wetland taxa may have been growing in close proximity to the *fulacht* sites as these site types are generally found in wetter areas.

The charcoal is mainly representative of fuel collection policies at the site although charcoal from structural features was identified from posthole and stakehole features excavated at Derrinsallagh 3, Derryvorrigan 2, Lismore 2, Corraun 2 and Palmershill 1. It is difficult to determine from the analysis of charcoal samples whether the identified taxa type is related to wood selected for posts or stakes. This can only be done if the actual post is burnt *in-situ*. Notwithstanding the above facts one can postulate at to the type of wood used as post or stake material if there is only one taxon type identified from the feature. Oak was nearly exclusively identified from the Late Bronze Age dated postholes at Derrinsallagh 3 **F585** while ash was similarly identified within the Middle and Late Bronze Age stakehole **F195 & F251** material at Lismore 2 and the stakehole associated with the *fulacht* at Corraun 2. The remaining taxa, if not associated with the post or stake material may have fallen into the hole after it went out of use. Either scenario is possible.

Alder is more frequently identified along this stretch of the scheme as opposed to the analysis completed along the route of Contract 1 and 3. This may be related to the fact there were more *fulacht fiadh* samples analysed from this stretch of the roadway and also the environment may have been wetter along the areas under discussion during the Pre-historic periods.

Alder was also identified from the cremation pit at Derrinsallagh 3 as well as the kiln from the same townland. Alder wood or charcoal is rarely found in association with

cremation burials and is also infrequently identified from kiln sites. Oak is the preferred taxon identified from cremation sites due to its ability to reach high temperatures for the cremation of human bodies as well as possible structural aspects associated with the ritual rite of burning human remains. Therefore the identification of alder is very unusual and may indicate that this feature was not indeed a cremation pit. There was some cremated bone noted in the charcoal sample but this bone may have been associated with animal rather than human bone. It would be worthwhile to compare these results with the osteological reports completed for Derrinsallagh 3. The alder from the kiln also from Derrinsallagh 3 was large brushwood fragments and may have been sourced from a coppiced wood. Alder has been coppiced in the past, possibly when hazel wood was in short supply, to provide a steady source of fuel for various functions. Other taxa present at the kilns examined from Derrinsallagh 3 are oak, ash, blackthorn, willow and cherry.

The main fuel used and collected at the *fulacht* sites consisted of ash, hazel, alder and oak in that order. This is in contrast to the findings along the route of Contract 1 and 3 where dryland taxa are more dominant and alder plays a less significant role in the identifications. The higher percentages of alder along this stretch of the road particularly in relation to the *fulacht* sites may suggest that the environment of the Bronze Age peoples was wetter and access to primary woodland areas such as oak was more difficult along this stretch of the road. Due to the nature of *fulacht* sites there location is normally accessible to a water source and as such within easy reach of alder trees. Alder trees are normally associated with riversides, lake shores and damp woods (Webb, 1953, 151).

The use of higher quantities of alder at the *fulacht* sites along this stretch of the M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme compares favourably to analysis carried out in Mayo (Charlestown by-pass) and the midlands area of Ireland (N6-KEK) by the author where alder was more apparent at these sites. The presence of similar taxa within the pits and the trough suggest that similar functions were being carried out at these sites. Another observation from the analysis is that there was a lot more hazel and ash identified from the *fulacht* spreads as opposed to any other tax and alder was not as significant when compares with the troughs and pit fills. This trend should be studied further at other sites that are examined in such detail to determine if it is of any significance in the dynamics and uses of the ubiquitous *fulacht* sites.

Comparative work carried out in other areas include Charlesland in Co. Wicklow where charcoal and wood were analysed from four *fulachta fiadh* by O' Donnell, dating from

the Early to the Late Bronze Age. Troughs, hearths, mounds, and a burnt spread were analysed from these sites. The charcoal assemblage was dominated by ash, alder, willow and hazel. The wood from two of the *fulacht* sites was mainly alder along with some hazel. The absence of oak and the greater quantities of alder in this area compared favourably to analysis carried out along the N11 in Co. Wicklow (O Carroll, 2007, unpublished post excavation reports, NRA). This is in contrast to results obtained from Contract 1 and 3 along the M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme and the M8 Mitchelstown to Fermoy where hazel, oak and ash dominate over any other taxa. Work carried out along the gas pipeline to the west show that the main woods used for firewood at 44 analysed *fulacht fiadh* were alder, ash, oak and hazel (O' Donnell, 2007, 32).

Not surprisingly oak was also more prevalent at the medieval dated charcoal production sites as well as the bowl furnaces used for metalworking activities. The pattern of oak use at these sites is repeated elsewhere across the country where oak was exclusively collected for charcoal production. Oak is a dense wood and is very suitable for charcoal production and associated metalworking activities. It also makes good firewood when dried and will grow in wetland areas when conditions are dry. The oak identified suggests that there was a supply of oak in the surrounding environment. The oak was possibly selected from a coppiced wood. A coppice tree is where the tree is cut down at its base and as a consequence several new shots or straight growing trees will grow out of this one stump. The use of quickly renewable oak coppiced trees would have been the most efficient method of sustaining a continuous supply of fuel for use in these charcoal production pits.

The existence of these charcoal production pits conjures up many scenarios of an organized well-structured society which places our ancestors away from obvious settlement centres and refocuses attention into the broader landscape, in which so much of the medieval day would have been spent. The charcoal burner would have roamed around from place to place in order to access new areas of coppiced woodlands as previously coppiced areas regenerated. The area around Kilcotton may have been particularly rich in oak coppiced trees throughout the Medieval period.

Oak was also identified nearly exclusively from a Bronze Age hearth at Boherard 2 and a Middle Bronze Age dated Burnt spread at Palmershill 1. The use of one single taxon at

these features may signify single episodic events rather than a feature used continuously over a specific time period.

Ash was identified from a ring gully dated to the medieval period and a variety of taxa including a higher than normal fragment count of yew was identified from a linear feature at Coolfin 3. Yew is also present in larger quantities in one particular area of the road scheme which include the sites of Derrinsallagh 3 and 5 and Derryvorrigan 1. Does this indicate that yew stands were more accessible in these areas. Ash also occurs more frequently around the areas of Boherard, Corraun and Coolfin, Lismore/Bushfield or Maghernaskeagh and Shanboe 1. Ash and yew are sometimes associated with land clearance so could it be possible from these small sample numbers and identifications to infer that the areas surrounding Derrinsallagh/Derryvorrigan and Boherard/Corraun and Coolfin as well as Lismore/Bushfield or Maghernaskeagh and Shanboe 4 were more populated particularly in the Bronze Age.

It is difficult to attribute a function to the charcoal identified from the pits as the function of them, for the most part, is unknown. The high quantities of hazelnut shells within the Iron Age dated pits may suggest that they were used as storage pits. The other taxon identified from the pits include includes hazel, ash and oak which the most frequently identified species. The alder, willow and birch are wetland type trees while the ash, elm, yew and oak are normally associated with primary woodlands and the scrub material identified include pomoideae, holly, dogwood, hazel and blackthorn/cherry. The charcoal is reminiscent of hearth/firewood material where a variety of taxa are collected from twigs and branches from near to the site.

When the charcoal is plotted against time periods we see similar data sets for oak, hazel and ash in the early and middle Bronze Age and late Bronze Age with a notable increase in alder taxon in the Later Bronze Age.

Other patterns emerging from the analysis is that elm appears to occur more frequently in the Early Bronze Age sites as seen in similar analysis carried out along the route of Contract 1 and 3. Elm is thought to have extensively died out with the occurrence of an elm disease epidemic in the Neolithic period. From the very small sample set from the Neolithic period we see oak dominating along with smaller fragments of hazel and holly. This is similar to what is seen in pollen diagrams for the Neolithic periods of Ireland

where oak woodlands are seen to dominate in the early pre-historic periods to be replaced by ash in the woodland clearings created by the earlier inhabitants.

Oak dominates the charcoal assemblage from the Iron Age and Medieval periods. The high quantities of oak in these periods are mainly due to the features analysed which included numerous charcoal production pits and metal working bowl furnaces. The kilns from Derrinsallagh 3 produced a wider array of taxa from this period with alder being the main taxa selected for use in the kiln.

6. Conclusions on Wood and charcoal Assemblage

Three thousand eight hundred and ninety seven charcoal fragments from one hundred and four contexts relating to twenty seven archaeological sites were analyzed from excavations along the M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway scheme, contract 2. Thirty four wood samples from a Middle Bronze Age walkway and Late Bronze Age *fulacht* sites were also analyzed within the framework of these studies. Contract 2 covers a length of approx 13 km and includes numerous *fulacht fiadh* sites, charcoal production pits, cremation pit, wells, kilns, bowl furnaces, a linear feature, pits, postholes/stakeholes and one ring gully.

There were fifteen taxa present in the charcoal and wood remains. Taxa identified from the assemblage were oak (*Quercus* sp), hazel (*Corylus avellana*), ash (*Fraxinus excelsior),* alder (*Alnus glutinosa),* pomoideae (apple type), elm (*Ulmus* sp), birch (*Betula* sp), blackthorn/cherry (*Prunus* spp), holly *(Ilex acquilofium*), willow *(Salix* spp), yew (*Taxus baccata*), ivy *(Hedera helix),* dogwood *(Cornus sanguinea)* and *Ulex europeas* (Furze) in order of representation. The range of taxa identified from the features analysed includes large trees (elm, ash, yew and oak), medium sized trees (alder and birch) and smaller scrub or hedgerow trees like blackthorn, blackthorn/cherry, willow, dogwood, hazel, holly, furze, and pomoideae. Ivy is classed as a woody stem creeper and was very abundant on trees, walls and rocks (Webb 1953, 73).

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

Oak may have been used as post material at Derrinsallagh 3 and was the preferred taxon for use at metalworking activities including Medieval charcoal production pits and Iron

age dated bowl furnaces. Ash stakes may have been used at Lismore 2 and ash was also quite prevalent at the features analysed from Boherard and the fill of a well at Bushfield or Maghernaskeagh 4.

Alder brushwood was also identified from a Medieval kiln at Derrinsallagh 3 and a possible cremation pit from the same townland. Here again the higher quantities of alder is more representative of wetland environments rather than dryland forested areas. Chaff was also present in one of the samples from the kilns at Derrinsallagh which may indicate that remains from the wheat and barley grasses were being used as firewood within the kilns.

Other trends recorded from the analysis shows that yew was identified in more frequent amounts from the townland areas of Derrinsallagh and Derryvorrigan.

All of the wood taxa identified from the excavations were of native origin. The inhabitants of the sites along the route of Contract 2 had access to a mosaic of environment types which included oak in the Neolithic periods, primary woodland trees and many varieties of smaller and scrubland trees in the Bronze Age and Iron Age and then larger fragment counts of oak in the Medieval periods. Alder plays a more significant role in the sites analysed along this stretch of the routeway.

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

Appendix 1:

Description of wood types

Alnus glutinosa (Alder)

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

Betula sp (Birch)

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

Corylus avellana (hazel)

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

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

Fraxinus excelsior (ash)

Ash is a native species to Ireland preferring lime rich freely draining soils. It is not a very durable timber in waterlogged conditions but has a strong elastic nature and is easily worked. Ash appears to have colonised the open land after the first farmers removed much of the native woodland therefore it is frequently used as structural timber in the Later Bronze Age periods as seen at Clonfinlough in Co. Offaly. Ash is also abundant in native hedgerows and was quite common in the later historic period.

Ilex aquifolium (Holly),

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

Pomoideae, apple type

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

Prunus spinosa Blackthorn

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

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

Prunus padus/Prunus avium (Bird /Wild cherry)

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

Quercus spp (Oak)

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

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

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

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

Salix sp **(**Willow),

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

Taxus Bacatta (yew)

The yew *(Taxus bacatta L.)* is a slow-growing conifer, living as long as 1000 years and reaching 65 feet, they are known for their strength and resistance to the cold. *Taxus*

bacatta has a preference for well-drained lime rich soils. It is much less common in recent times because of over harvesting (its hard, springy wood was the source of English longbows). The evergreen needles are very broad, and the seeds are produced in red, berry-like cones. Yews are toxic; one of the toxic compounds, taxol, is an effective treatment for some cancers. Yew is used for the manufacture of wooden bows, spears and many staves were constructed from yew in the Early Medieval periods.

Ulmus spp (Elm)

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

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

Cornus Sanguinea (Dogwood)

A medium sized shrub with reddish twigs. It is found in thickets and rocky places and is more commonly found along the western seaboards and parts of central Ireland.

Ulex europeas (Furze, Gorse or Whin)

A bushy shrub with green thorny branchlets. The furze shrub reaches a height of 2-5 feet and contains bright yellow flowers. Furze or gorse is commonly found on heaths, pastures and stony places.

Hedera Ilex (Ivy)

Ivy is a woody creeper and climbs by clinging roots. It is a native taxa and is abundantly found on trees, walls and rocks.

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8.2 Appendix 2: Radiocarbon dating results

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-26.9:lab. mult=1)

Laboratory number: **Beta-218634**

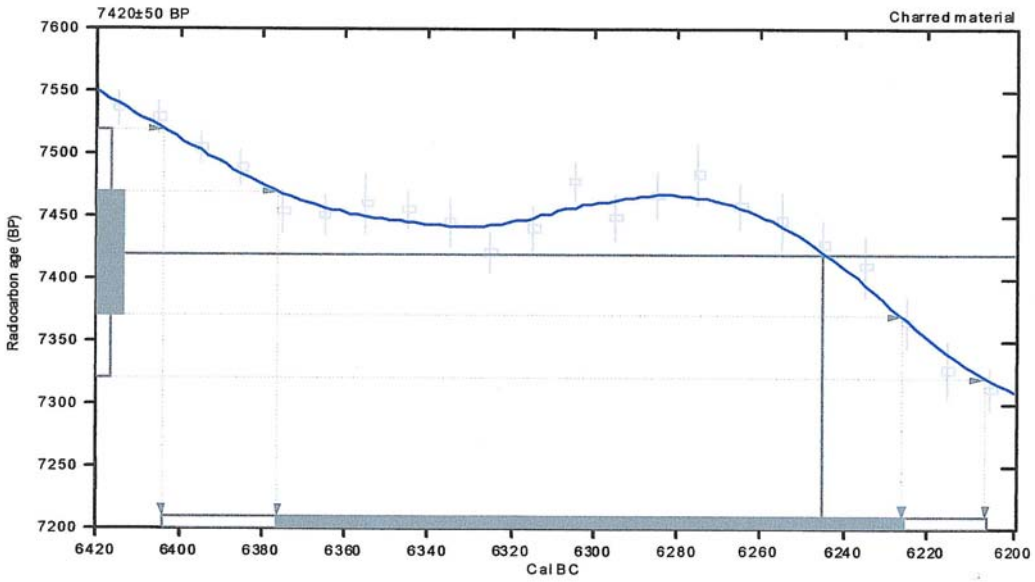
Conventional radiocarbon age: **7420±50 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 6400 to 6210 (Cal BP 8350 to 8160)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 6240 (Cal BP 8200)

1 Sigma calibrated result: (68% probability) Cal BC 6380 to 6230 (Cal BP 8330 to 8180)



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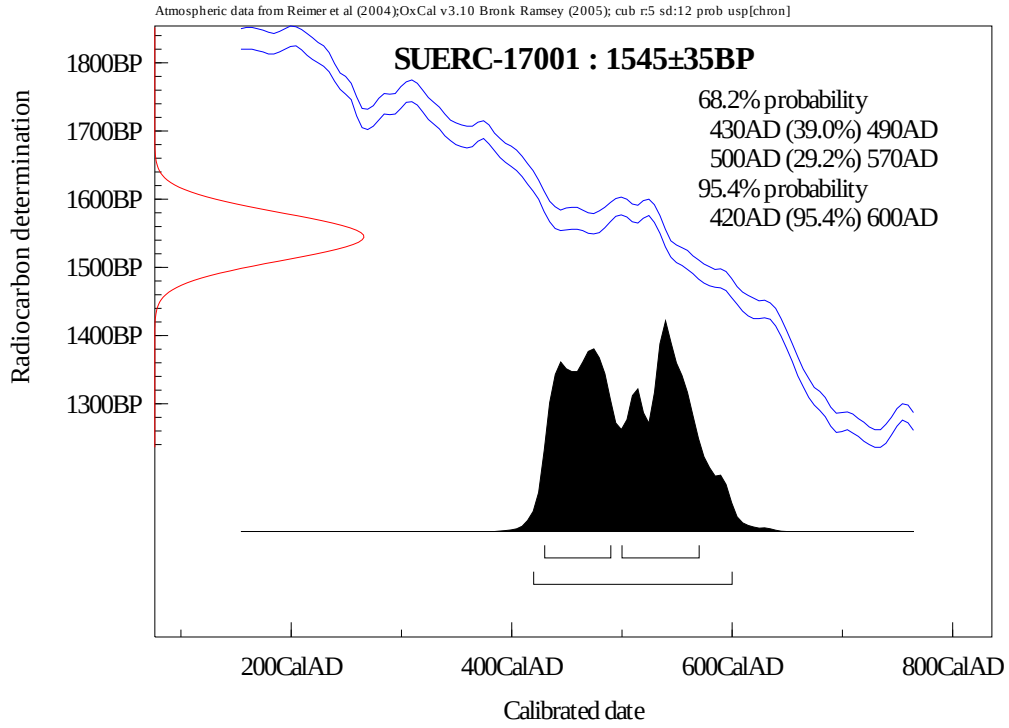
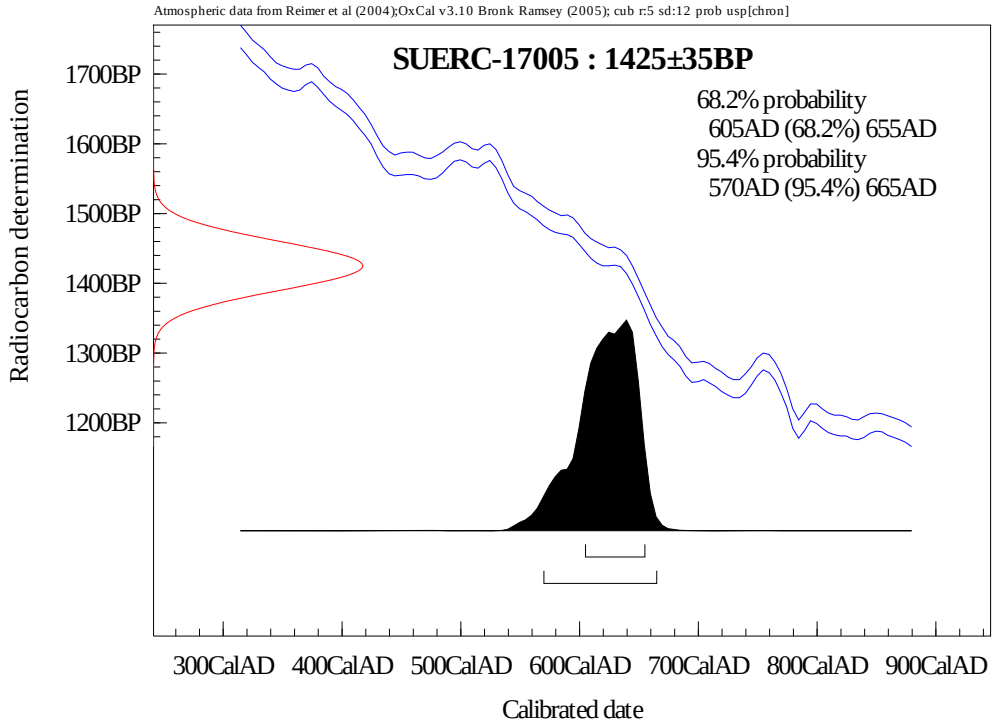
Mathematics
A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

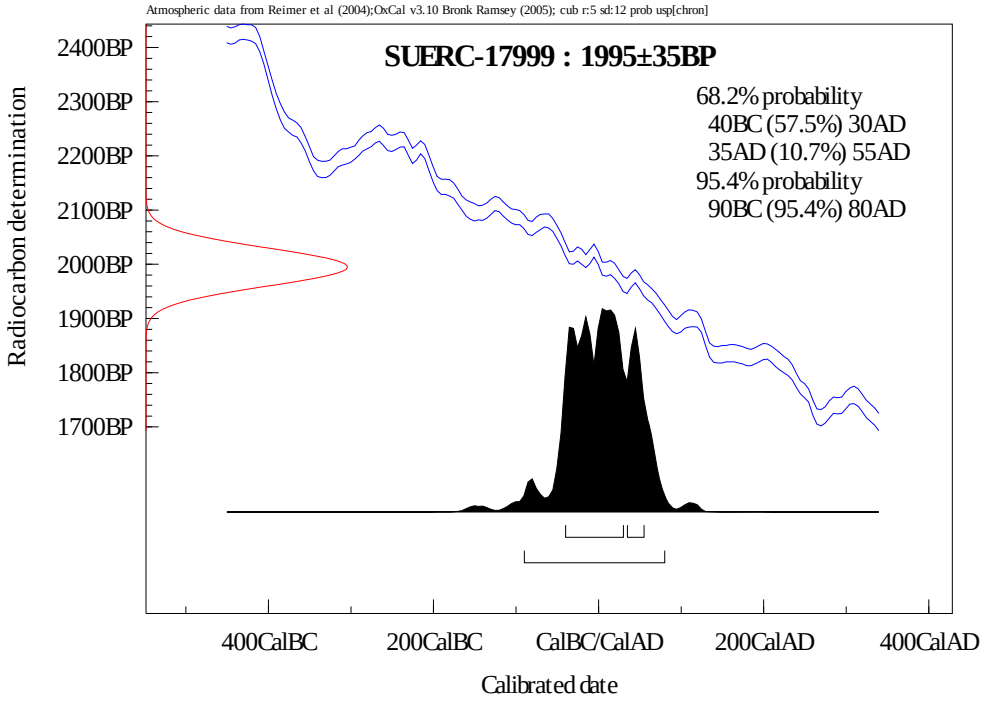
Beta Analytic Radiocarbon Dating Laboratory
4985 S.W. 74th Court, Miami, Florida 33155 • Tel: (305)667-5167 • Fax: (305)663-0964 • E-Mail: beta@radiocarbon.com



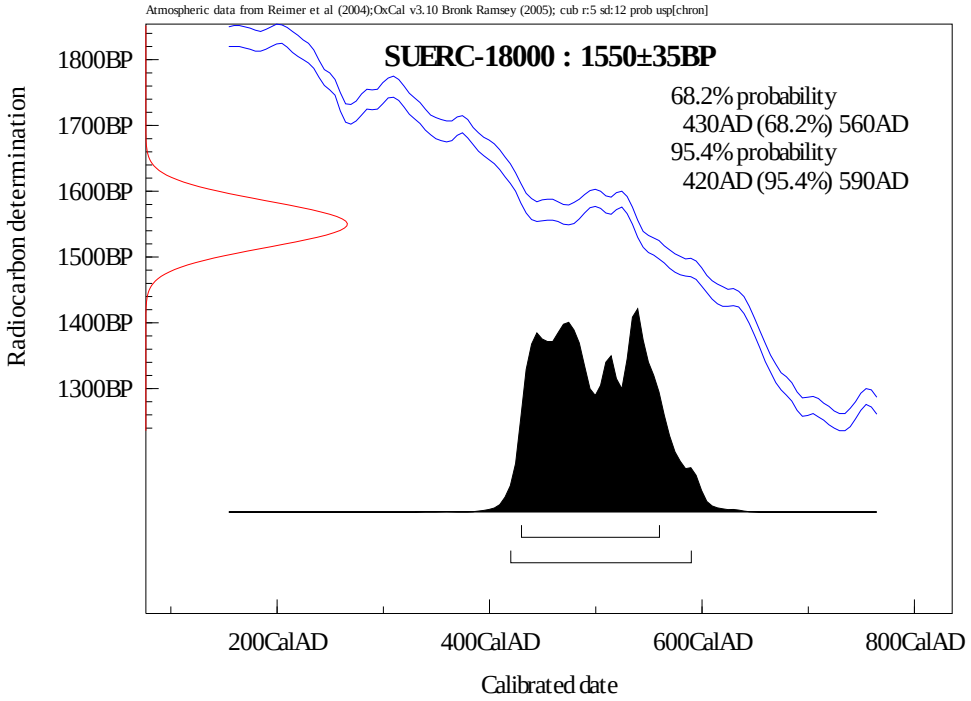
GU No.	Reporting Number	Sample Type	Site	Sample Id	Species Dated	d13C	Age % Modern	Ageerror 1 sigma
16356	SUERC-17001	Charcoal	Lismore/ Bushfield or Maghernaskeagh 1	05_09:E2220:F154:S137	Pomoideae	-25.7	1545	35



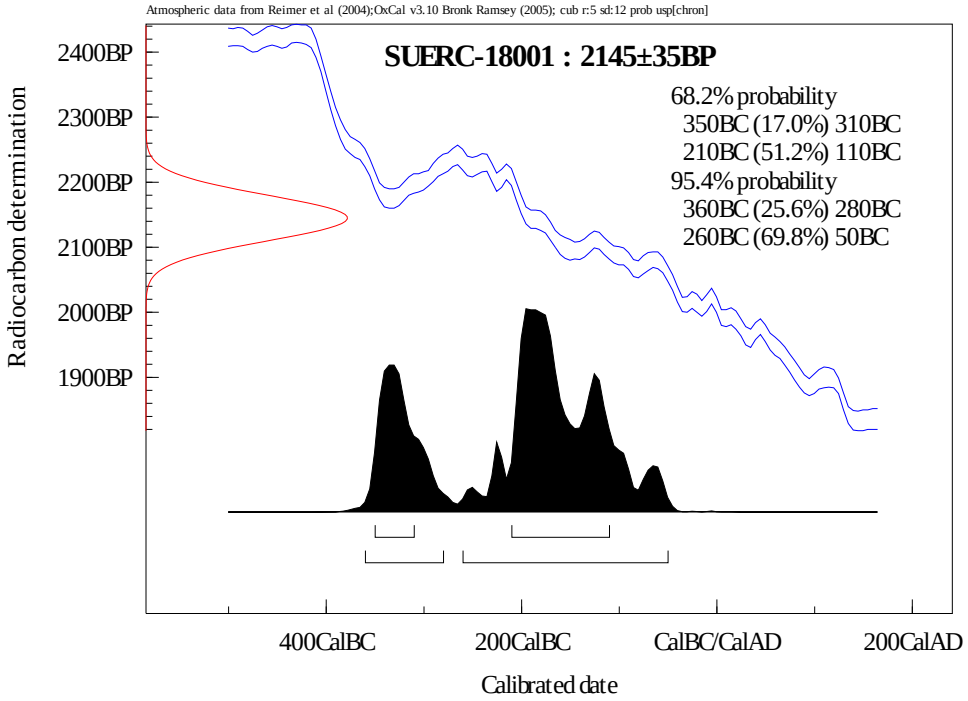
GU No.	Reporting Number	Sample Type	Site	Sample Id	Species Dated	d13C	Age % Modern	Ageerror 1 sigma
16357	SUERC-17005	Charcoal	Lismore/ Bushfield or Maghernaskeagh 1	05_09:E2220:F186:S70	Ash	-25.2	1425	35



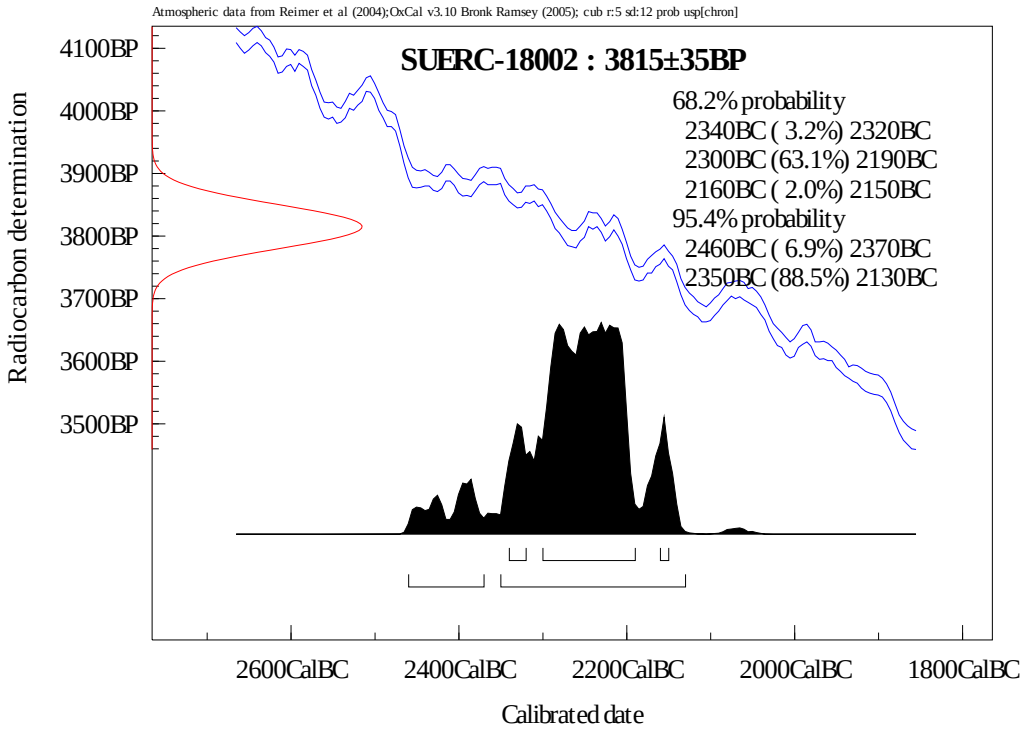
GU No.	Reporting Number	Sample Type	Site	Sample Id	Species Dated	d13C	Age % Modern	Ageerror 1 sigma
16196	17999	Charcoal	Lismore/Bushfield or Maghernaskeagh 1	Lismore/Bushfield or Maghernaskeagh 1:E2220:F91:S26	Alder	-25.6	1995	35



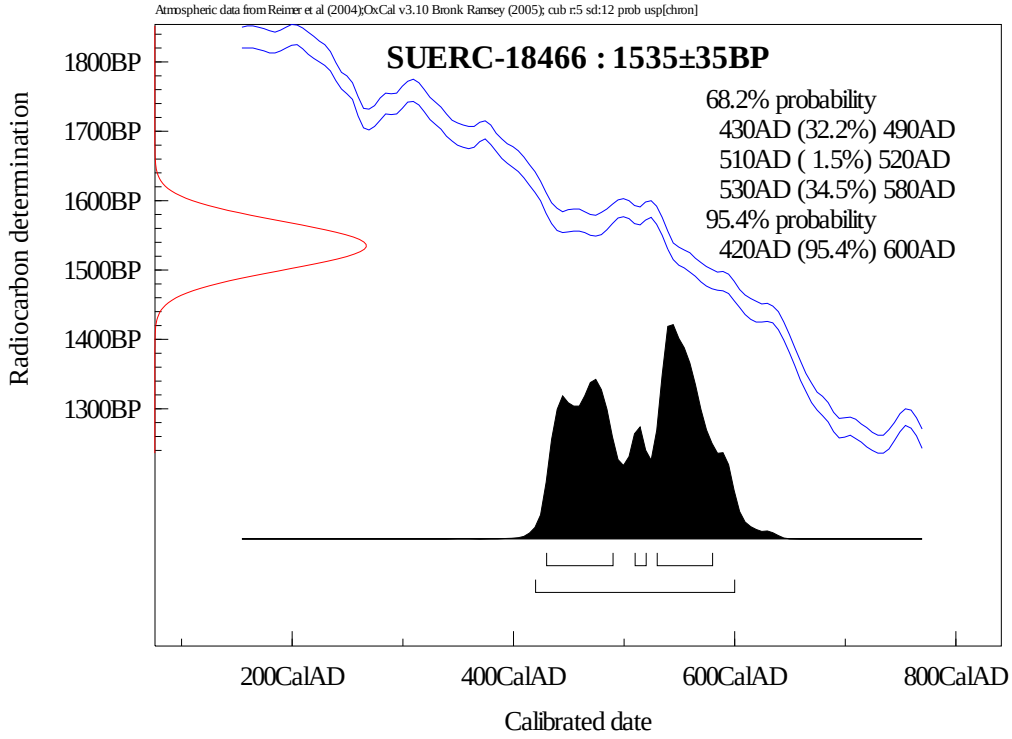
GU No.	Reporting Number	Sample Type	Site	Sample Id	Species Dated	d13C	Age % Modern	Ageerror 1 sigma
16198	18000	Charcoal	Lismore/Bushfield or Maghernaskeagh 1	Lismore/Bushfield or Maghernaskeagh 1:E2220:F174:S7	Hazel	-25.5	1550	35



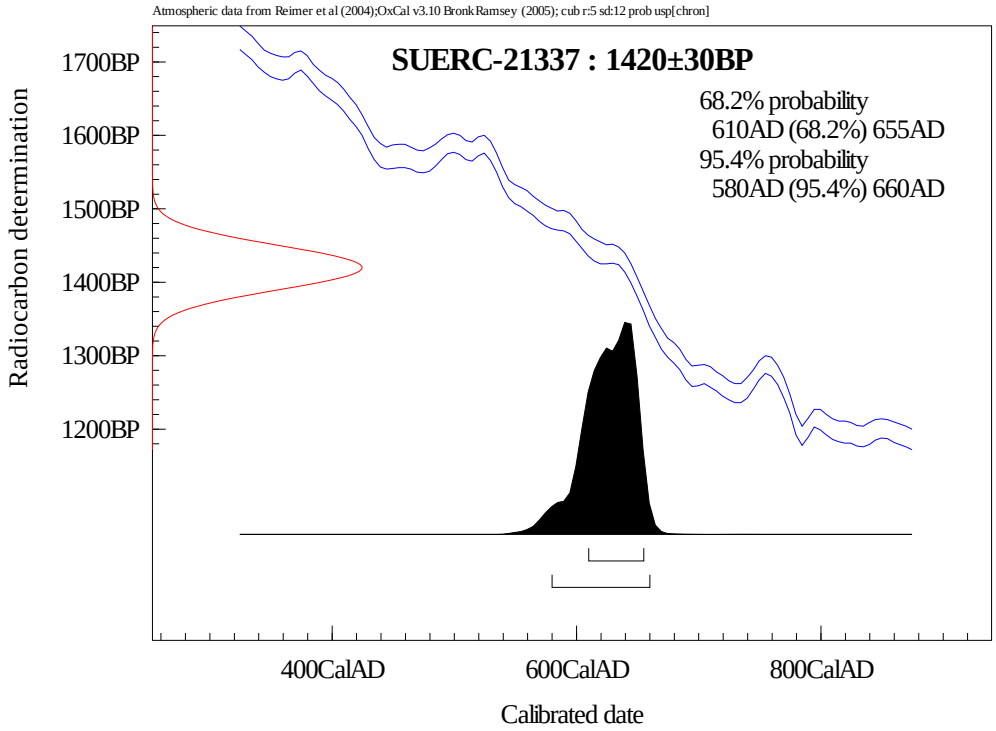
GU No.	Reporting Number	Sample Type	Site	Sample Id	Species Dated	d13C	Age % Modern	Ageerror 1 sigma
16199	18001	Charcoal	Lismore/Bushfield or Maghernaskeagh 1	Lismore/Bushfield or Maghernaskeagh 1:E2220:F194:S46	Alder and Hazel	-25.6	2145	35



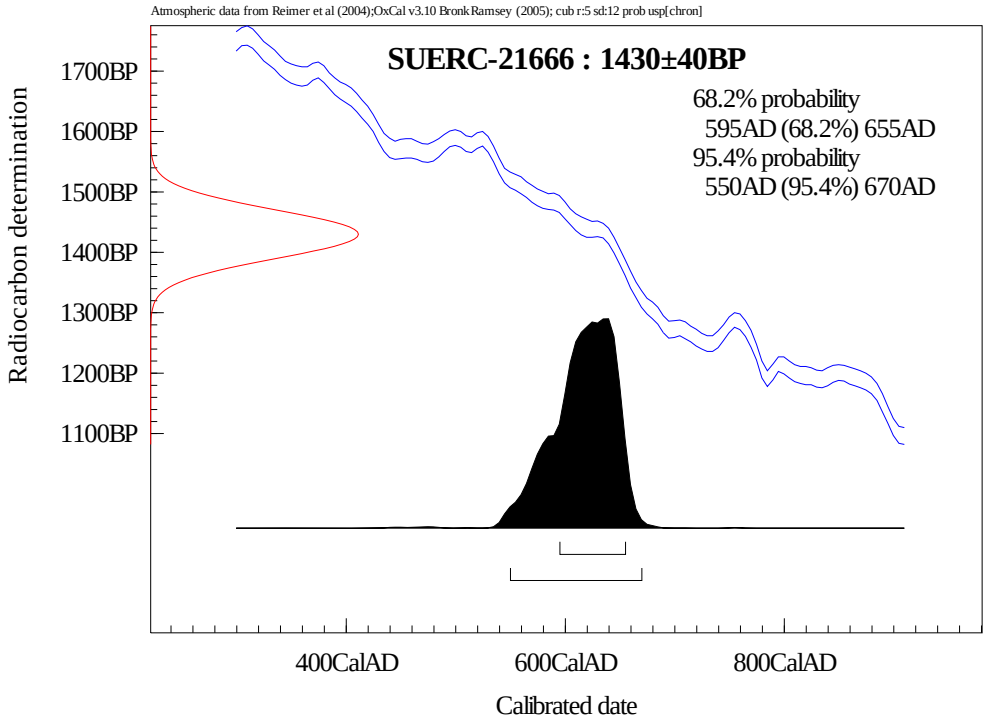
GU No.	Reporting Number	Sample Type	Site	Sample Id	Species Dated	d13C	Age % Modern	Ageerror 1 sigma
16200	18002	Charcoal	Lismore/Bushfield or Maghernaskeagh 1	Lismore/Bushfield or Maghernaskeagh 1:E2220:F865:S406	Hazel	-25.8	3815	35



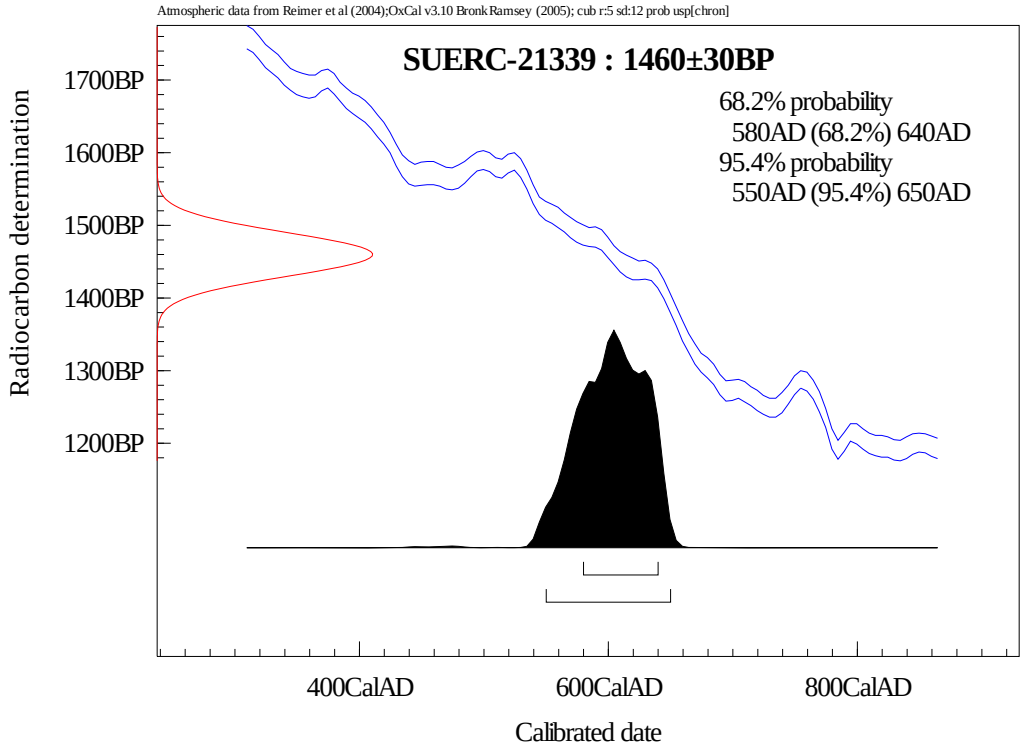
GU No.	Reporting Number	Sample Type	Site	Sample Id	Species Dated	d13C	Age % Modern	Ageerror 1 sigma
16197	18466	Charcoal	Lismore/Bushfield or Maghernaskeagh 1	Lismore/Bushfield or Maghernaskeagh 1:E2220:F164:S92	Ash	-23.8	1535	35



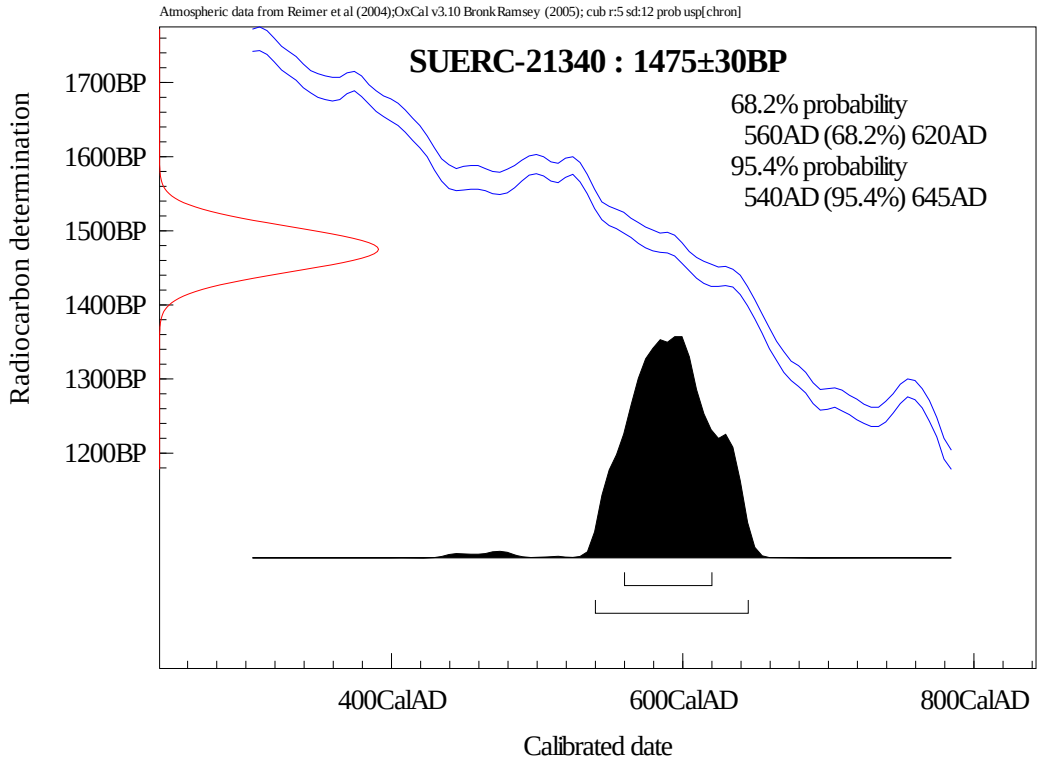
GU No.	Reporting Number	Sample Type	Site	Sample Id	Species Dated	d13C	Age % Modern	Ageerror 1 sigma
17727	21337	Human Bone: Left Leg fragment	Lismore/Bushfield or Maghernaskeagh 1	Lismore/Bushfield or Maghernaskeagh 1: E2220:SK7:S1	Human Bone	-21.8	1420	30



GU No.	Reporting Number	Sample Type	Site	Sample Id	Species Dated	d13C	Age % Modern	Ageerror 1 sigma
17730	21666	Human Bone: Left leg fragment	Lismore/Bushfield or Maghernaskeagh 1	Lismore/Bushfield or Maghernaskeagh 1: E2220:SK65:S1	Human Bone	-21.5	1430	40



GU No.	Reporting Number	Sample Type	Site	Sample Id	Species Dated	d13C	Age % Modern	Ageerror 1 sigma
17731	21339	Human Bone: Left leg fragment	Lismore/Bushfield or Maghernaskeagh 1	Lismore/Bushfield or Maghernaskeagh 1: E2220:SK77:S1	Human Bone	-21.0	1460	30



GU No.	Reporting Number	Sample Type	Site	Sample Id	Species Dated	d13C	Age % Modern	Ageerror 1 sigma
17732	21340	Human Bone: Right leg fragment	Lismore/Bushfield or Maghernaskeagh 1	Lismore/Bushfield or Maghernaskeagh 1: E2220:SK79:S1	Human Bone	-20.9	1475	30

:

SUERC

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RADIOCARBON DATING CERTIFICATE

28 May 2008

Laboratory Code	SUERC-18552 (GU-16627)
Submitter	Joanne O'Meadhra ACS Ltd 21 Boyne BusinessPark Greenhills, Drogheda Co. Louth, Ireland
Site Reference	Lismore-Bushfield 1
Sample Reference	05_09:LB1:E2220:F719:202
Material	Charcoal : Ash
$\delta^{13}C$ relative to VPDB	-26.5 ‰
Radiocarbon Age BP	1465 ± 35

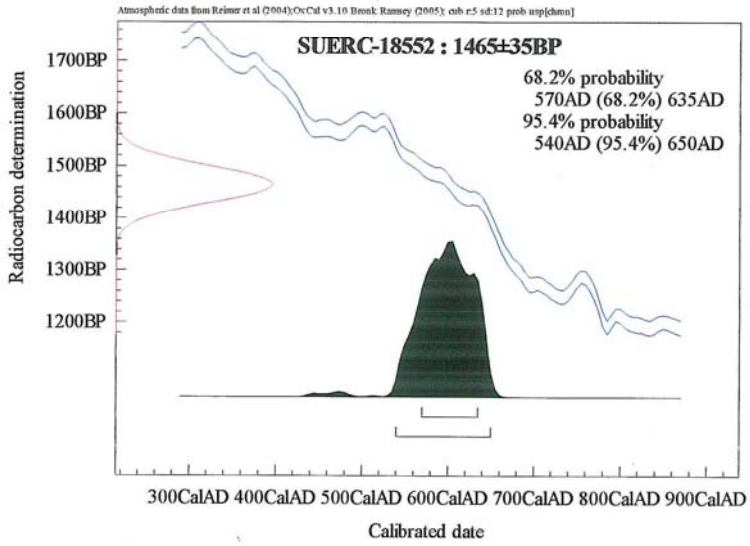
N.B.

1. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.
2. The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal3).
3. Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code.

Conventional age and calibration age ranges calculated by :- Elaine Dunbar Date :- 28/05/08

Checked and signed off by :- P. Naysmith Date :- 28/5/08

Calibration Plot



8.3 Appendix 3: Environmental analysis report

Lismore/Bushfield or Maghernaskeagh 1, M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme, Co Laois, Ireland

Environmental Analysis

on behalf of

Archaeological Consultancy Services Ltd

Report 1882
April 2008

archaeological.services@durham.ac.uk
www.durham.ac.uk/archaeological.services

Contents

1. Summary

The project

1.1 An excavation was undertaken by Archaeological Consultancy Services Ltd at Lismore/Bushfield or Maghernaskeagh 1, Co Laois, Ireland. The site represents the remains of an early medieval enclosed secular cemetery. This report presents the results of plant macrofossil and cremated bone analysis of the fills of pits, a ditch and a burnt spread.

Results

Plant macrofossil analysis

1.2 The charred plant remains from the main enclosure ditch indicate that barley and wheat were used at Lismore/Bushfield or Maghernaskeagh 1. These may be the remains of ritual feasting in association with burial activity.

Cremated bone analysis

1.3 The majority of the contexts contained small amounts of cremated bone. In many cases no bone fragments could be identified, and it could not be determined whether the bone was animal or human. 12 contexts contained definite fragments of animal bone including cattle, sheep, pig and cf. horse. Most bone in most contexts was a pale grey to white colour, suggesting the bone was burnt at high temperatures (*c.* 600ºC+) in an oxidising environment.

2. Project background

Location and background

2.1 An excavation was undertaken by Archaeological Consultancy Services Ltd at Lismore/Bushfield or Maghernaskeagh 1, Co Laois, Ireland. The site represents the remains of an early medieval enclosed secular cemetery, consisting of an oval-shaped univallate enclosure measuring *c*.93m x 75m. Approximately 80 individuals were excavated from the north-eastern quadrant of the enclosure. Finds included a broken quern stone from the enclosure ditch, sharpening stones, a brooch, a blade, worked bone, a metal pin, an iron knife, and an iron ring. There is little evidence for domestic settlement at the site and no significant evidence for any ecclesiastical association. This report presents the results of plant macrofossil and cremated bone analysis of the fills of pits, a ditch and a burnt spread.

Objective

2.2 The objective was to further our understanding of the nature of secular cemeteries and early medieval burial practices in Co Laois.

Dates

2.3 Samples were received by Archaeological Services Durham University in October 2007. Analysis and report preparation was conducted between October 2007 - April 2008.

Personnel

2.4 Sample processing was undertaken by Archaeological Consultancy Services Ltd. Report preparation and plant macrofossil analysis was carried out by Dr Charlotte O'Brien. Cremated bone analysis was by Dr Anwen Caffell, with faunal identifications by Ms Louisa Gidney.

Archive

2.5 The record number is A015/111 (E2220). The samples are currently at the Environmental Laboratory at Archaeological Services Durham University awaiting collection or return.

3. Plant macrofossil analysis

Method

3.1 Plant macrofossil analysis was undertaken on 7 flots. These were scanned at up to x60 magnification using a Leica MZ6 stereomicroscope and plant remains were identified by comparison with modern reference material held in the Environmental Laboratory at Archaeological Services Durham University. Plant taxonomic nomenclature follows Stace (1997).

Results

3.2 Charcoal was present in enclosure ditch fill (715) and the burnt spreads (854) and (856). The only flot which contained charred cereal remains was (715). These consisted of barley, wheat and indeterminate grains. All of the grains were in a very poor condition.

3.3 Insect egg cases, snails, roots and an uncharred hawthorn fruitstone were recorded, but the non-waterlogged nature of the deposits suggests that these are later intrusive material. The results are presented in Table 3.1.

Table 3.1: Plant macrofossils from Lismore/Bushfield or Maghernaskeagh 1

Context		206	412	489	663	715	854	856
Sample		88	241	212	221	209	407	404
Fill type		Pit	Pit	Ditch	Pit	Ditch	Spread	Spread
Material available for C14 dating		-	-	-	-	✓	✓	✓
Volume of flot (ml)		<1	<1	<1	<1	1	10	100
Flot matrix (relative abundance)								
Charcoal		-	-	-	-	1	2	3
Insect (egg cases)		1	1	1	2	-	-	-
Molluscs (terrestrial)		-	-	-	-	-	-	1
Roots (modern)		-	-	-	-	1	2	2
Charred remains (total number)								
(c) *Hordeum* spp (Barley species)	grain	-	-	-	-	15	-	-

(c) *Triticum* spp (Wheat species)	grain	-	-	-	-	3	-	-
(c) Cerealia indeterminate	grain	-	-	-	-	31	-	-
Uncharred remains (total number)								
(t) *Crataegus mongyna* (Hawthorn)	fruitstone	-	-	-	-	-	1	-

(c: cultivated; t: woodland). Relative abundance is based on a scale from 1 (lowest) to 5 (highest)

Discussion

3.4 The charred plant remains from the main enclosure ditch indicate that barley and wheat were used at Lismore/Bushfield or Maghernaskeagh 1. Barley was widely cultivated in Ireland during the early medieval period, while wheat increased in use later in the medieval (Monk 1986). As there is little evidence of settlement at the site, these cereals may be the remains of ritual feasting in association with burial activity. A few barley and wheat grains also occurred in the enclosure ditch at Parknahown 5, another early medieval, secular, enclosed cemetery excavated along the route of the M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme (Archaeological Services 2008).

4. Cremated bone analysis

Method

4.1 111 samples from 78 contexts were presented for analysis, with a total weight of 491.3g. Each sample of cremated remains was divided into fragments above 10mm, between 5-10mm, and between 2-5mm in size (McKinley 2004). Each fraction was weighed and the largest fragment of bone was measured.

Results and interpretation

4.2 Summary data for each context is presented in Appendix 1.1, the fraction weights and fragment size data for each individual sample are given in Appendix 1.2, with the combined weights per context given in Appendix 1.3. Identifiable fragments of animal bone are presented in Table 4.1.

4.3 The amount of cremated bone recovered from the majority of contexts was small: 67 of the 78 contexts weighed <10g (85.9%), with 32 of these weighing <1g and 27 weighing between 1-5g. None of the remaining contexts weighed over 100g, with the heaviest (65) weighing 88.7g . Fragment size ranged from 4.8mm to 61.4mm, the latter in context (184), but the mean fragment size was fairly small, at 17.3mm. This general small size of the fragments was reflected in the sieved fraction weights (Appendix 1.2), with just over half the contexts (43) having the largest proportion of material in the smallest fraction, and with 20 of these having all their material in this fraction. In contrast, only 14 contexts (17.9%) contained the bulk of their material in the largest (10mm+) fraction.

4.4 The bone from the majority of the contexts was white to pale grey in colour (Appendix 1.1), suggesting that these bones had been exposed to temperatures in excess of *c.* 600ºC and had achieved full oxidation (McKinley 2004). A further eleven contexts had predominantly white bone with some fragments or parts of fragments darkening to greys and blacks, perhaps indicative of slightly cooler temperatures, uneven temperature distribution or a lack of oxygen preventing full oxidation. The remaining contexts demonstrated a spectrum of colours, from beige, brown and black (indicating burning at low temperatures of *c.* 300ºC), through dark and mid greys (suggesting partial oxidation at temperatures between 300-600ºC or lack of sufficient oxygen), to pale greys and whites.

Table 4.1: Identifiable animal bone

Context	Description
58	Cattle jaw fragment; young animal; unburnt
64	cf Cattle radius; (calcined) Fragments of tooth enamel cf sheep
65	Cattle-size long bone fragments; calcined Sheep-size long bone fragments; calcined Cattle maxillary tooth; burnt Sheep maxillary tooth cf pig first or second phalanx Distal sesamoid; sheep
68	Cattle malleolus; unburnt Cattle scapula fragment; unburnt Cattle tooth fragment; burnt

	Cattle tibia; unfused; calcined
184	cf horse tooth fragments
242	Cattle-size astragalus; calcined
621	Cattle-size jaw fragment; calcined
658	Fragments of tooth enamel cf cattle-size
666	Pig tooth fragment
669	cf sheep tooth enamel
707	Sheep tooth enamel; unburnt
720	Fragment of cf cattle-size jaw; calcined Cattle radius fragment; calcined Rib fragments cf cattle-size; calcined Tooth enamel cf sheep Cattle size long bone fragment; calcined

4.5 All fragments were examined with a view to identification, but given the small fragment sizes and general lack of distinctive features common in most contexts, identification was impossible in most cases. 12 contexts contained definite fragments of animal bone which included cattle, sheep, pig and cf. horse (Table 4.1). In the remaining contexts it was not possible to determine whether the bone was human or animal.

5. Sources

Archaeological Services 2008, *Parknahown 5, Co Laois, Ireland; environmental analysis*, unpublished report **1879**, for Archaeological Consultancy Services Ltd, Archaeological Services Durham University

McKinley, J I, 2004, Compiling a Skeletal Inventory: Cremated Human Bone, in M Brickley & J I McKinley (eds) *Guidelines to the Standards for Recording Human Remains*, 9-13, Southampton and Reading

Monk, MA, 1986, Evidence from macroscopic plant remains for crop husbandry in prehistoric and early historic Ireland, *Journal of Irish Archaeology*, **3**, 31-36

Stace, C, 1997, *New Flora of the British Isles*, 2nd Edition, Cambridge

Context	Bone Colour	Species	Weight (g)
5	White	Unknown	8.4
47	Beige/brown, some black, a few white	Unknown	2.3
51	Blue grey to white	Unknown	8.7
58	Beige/brown to black, a few white	Animal	11.1
64	Beige/brown, grey/white	Animal	48.5
65	Brown/black, some grey/white	Animal	88.7
67	White/ pale grey, some black	Unknown	14.1
68	Brown/black, some grey/white	Animal	64.6
111	White	Unknown	0.7
113	White	Unknown	0.2
115	White/ pale grey	Unknown	2.6
117	White	Unknown	3.7
119	White	Unknown	3.9
121	White/ pale grey	Unknown	16.0
125	White/ pale grey	Unknown	1.7
135	White	Unknown	0.7
140	White	Unknown	1.2
142	White, some brown	Unknown	1.1
144	White/ pale grey	Unknown	6.1
146	White	Unknown	0.2
148	White/ pale grey	Unknown	13.7
150	White/ pale grey	Unknown	7.0
152	White	Unknown	2.5
154	Grey to white	Unknown	12.9
164	White	Unknown	0.4
167	White/ pale grey	Unknown	4.9
169	White	Unknown	0.6
174	White/ pale grey	Unknown	0.9
182	White	Unknown	1.4
184	Buff/white	Animal	5.3
189	Dark grey to white	Unknown	0.2
194	White	Unknown	0.4
202	White/ pale grey	Unknown	2.9
206	White/ pale grey	Unknown	2.3
210	White	Unknown	0.2
214	White	Unknown	0.2
220	White	Unknown	1.2
224	White	Unknown	0.7
228	White	Unknown	0.2
234	White	Unknown	0.6
242	White/ pale grey	Animal	3.3
256	Dark grey to white	Unknown	2.4
258	White	Unknown	0.5
326	Brown/black to pale grey/ white	Unknown	4.4
327	White/ pale grey, some black	Unknown	6.4
485	White	Unknown	0.7
487	White	Unknown	0.2
498	White	Unknown	0.3
530	Buff/white	Unknown	0.8
540	White	Unknown	0.3
542	Light brown, black flecks, some pale grey/ white	Unknown	15.4
544	White/ pale grey	Unknown	7.0
547	White	Unknown	0.3
548	White	Unknown	0.2
556	White	Unknown	1.3
559	White/ pale grey	Unknown	0.5
612	Beige	Animal?	8.3
621	White/ pale grey, some black	Animal	26.8
650	White	Unknown	0.3

651	White/ pale grey	Unknown	0.9
654	White, black flecks	Unknown	2.8
658	Light brown/ black	Animal	0.7
660	Brown/black, some white	Unknown	0.1
662	White	Unknown	1.5
664	White/ pale grey	Unknown	2.6
666	White/ pale grey	Animal	1.7
667	White/ pale grey	Unknown	3.5
669	Buff/white/ pale grey	Animal?	1.2
701	White, some dark grey	Unknown	4.0
707	White	Animal	1.8
718	White, some black	Unknown	0.8
719	Pale blue/ white	Unknown	1.1
720	Brown/ black, dark to mid grey, to white	Animal	43.5
721	White	Unknown	0.2
726	White	Unknown	0.2
728	White	Unknown	0.1
737	White	Unknown	1.5
752	Pale grey	Unknown	0.8

Appendix 1.1: Summary of cremated remains

Context	Sample	Total Weight	Fraction Weights						Max. Frag Size
			>10mm		5-10mm		2-5mm		
		g	g	%	g	%	g	%	mm
5	1	8.4	8.3	98.8	0.0	0.0	0.1	1.2	31.2
47	1	2.3	0.0	0.0	1.0	43.5	1.3	56.5	19.4
51	1	4.1	1.1	26.8	3.0	73.2	0.0	0.0	25.5
51	2	4.6	4.1	89.1	0.3	6.5	0.2	4.3	23.7
58	1	11.1	4.3	38.7	3.0	27.0	3.8	34.2	36.4
64	1	31.7	3.0	9.5	8.8	27.8	19.9	62.8	25.7
64	2	16.8	16.0	95.2	0.8	4.8	0.0	0.0	50.1
65	1	57.9	34.9	60.3	10.0	17.3	13.0	22.5	44.4
65	2	21.6	18.4	85.2	3.1	14.4	0.1	0.5	47.6
65	3	9.2	7.8	84.8	1.4	15.2	0.0	0.0	29.0
67	1	2.2	0.0	0.0	0.6	27.3	1.6	72.7	13.6
67	2	11.9	11.8	99.6	0.0	0.0	0.1	0.4	42.2
68	1	44.5	19.3	43.4	12.3	27.6	12.9	29.0	46.0
68	2	14.7	14.7	100.0	0.0	0.0	0.0	0.0	52.2
68	3	5.0	4.2	84.0	0.8	16.0	0.0	0.0	28.2
68	4	0.4	0.0	0.0	0.2	50.0	0.2	50.0	9.3
111	1	0.7	0.4	57.1	0.0	0.0	0.3	42.9	12.4
113	1	0.2	0.0	0.0	0.0	0.0	0.2	100.0	8.2
115	1	2.7	0.0	0.0	0.1	1.9	2.6	98.1	12.6
117	1	3.7	0.8	21.6	2.4	64.9	0.5	13.5	21.0
119	1	3.9	0.0	0.0	3.2	82.1	0.7	17.9	12.5
121	1	12.8	1.2	9.4	1.9	14.8	9.7	75.8	18.4
121	2	3.2	0.0	0.0	0.5	15.6	2.7	84.4	11.4
125	1	1.7	0.0	0.0	0.6	35.3	1.1	64.7	20.9
135	1	0.7	0.0	0.0	0.0	0.0	0.7	100.0	8.1
140	1	1.2	0.0	0.0	0.3	25.0	0.9	75.0	11.9
142	1	1.1	0.0	0.0	0.5	45.5	0.6	54.5	11.5
144	1	6.1	0.7	11.5	0.7	11.5	4.7	77.0	13.2
146	1	0.2	0.0	0.0	0.0	0.0	0.2	100.0	8.7
148	1	13.7	0.6	4.4	5.2	38.0	7.9	57.7	16.6
150	1	7.0	0.0	0.0	3.4	48.6	3.6	51.4	14.7
152	1	2.5	0.0	0.0	0.0	0.0	2.5	100.0	10.3
154	1	11.8	2.6	22.0	3.7	31.4	5.5	46.6	23.2
154	2	1.1	0.0	0.0	0.4	36.4	0.7	63.6	9.7
164	1	0.4	0.0	0.0	0.0	0.0	0.4	100.0	8.8
167	1	4.9	0.0	0.0	1.3	26.5	3.6	73.5	22.1
169	1	0.6	0.0	0.0	0.6	100.0	0.0	0.0	23.7
174	1	0.9	0.7	77.8	0.1	11.1	0.1	11.1	14.2
182	1	1.4	0.0	0.0	1.0	71.4	0.4	28.6	13.8
184	1	5.3	4.0	75.5	0.5	9.4	0.8	15.1	61.4
189	1	0.2	0.0	0.0	0.2	100.0	0.0	0.0	13.1
194	1	0.4	0.0	0.0	0.0	0.0	0.4	100.0	8.0
202	1	2.9	0.0	0.0	0.7	24.1	2.2	75.9	16.0
206	1	2.3	0.7	30.4	1.3	56.5	0.3	13.0	16.8

210	1	0.2	0.0	0.0	0.1	50.0	0.1	50.0	10.8
214	1	0.2	0.0	0.0	0.0	0.0	0.2	100.0	4.8
220	1	0.3	0.0	0.0	0.0	0.0	0.3	100.0	8.6
220	2	0.9	0.0	0.0	0.6	66.7	0.3	33.3	11.5
224	1	0.7	0.0	0.0	0.2	28.6	0.5	71.4	12.1
228	1	0.2	0.0	0.0	0.0	0.0	0.2	100.0	7.6
234	1	0.4	0.0	0.0	0.3	85.7	0.1	14.3	13.0
234	2	0.2	0.0	0.0	0.0	0.0	0.2	100.0	7.8
242	1	3.3	1.8	54.5	1.5	45.5	0.0	0.0	16.9
256	1	0.4	0.0	0.0	0.3	85.7	0.1	14.3	14.2
256	2	2.0	0.0	0.0	2.0	100.0	0.0	0.0	17.4
258	1	0.5	0.0	0.0	0.0	0.0	0.5	100.0	9.5
326	1	1.1	0.0	0.0	0.3	27.3	0.8	72.7	10.0
326	2	2.3	1.5	65.2	0.4	17.4	0.4	17.4	14.0
326	3	1.0	0.0	0.0	0.6	60.0	0.4	40.0	13.3
327	1	6.4	2.1	32.8	2.9	45.3	1.4	21.9	27.4
485	1	0.7	0.0	0.0	0.7	100.0	0.0	0.0	11.7
487	1	0.2	0.0	0.0	0.0	0.0	0.2	100.0	7.2
498	1	0.1	0.0	0.0	0.0	0.0	0.1	100.0	3.0
498	2	0.2	0.0	0.0	0.0	0.0	0.2	100.0	4.9
530	1	0.8	0.0	0.0	0.0	0.0	0.8	100.0	9.8
540	1	0.3	0.0	0.0	0.2	66.7	0.1	33.3	9.6
542	1	1.8	1.6	88.9	0.0	0.0	0.2	11.1	28.0
542	2	13.6	12.2	89.7	1.2	8.8	0.2	1.5	50.6
544	1	7.0	0.0	0.0	2.4	34.3	4.6	65.7	16.8
547	1	0.3	0.0	0.0	0.0	0.0	0.3	100.0	10.6
548	1	0.2	0.0	0.0	0.0	0.0	0.2	100.0	7.9
556	1	1.3	0.8	61.5	0.0	0.0	0.5	38.5	15.7
559	1	0.3	0.0	0.0	0.0	0.0	0.3	100.0	4.9
559	2	0.2	0.0	0.0	0.0	0.0	0.2	100.0	11.7
612	1	8.3	4.2	50.6	2.1	25.3	2.0	24.1	30.4
621	1	14.6	1.6	11.0	1.8	12.3	11.2	76.7	25.8
621	2	4.3	0.0	0.0	0.4	9.3	3.9	90.7	13.3
621	3	7.9	1.7	21.5	5.0	63.3	1.2	15.2	21.8
650	1	0.3	0.0	0.0	0.0	0.0	0.3	100.0	12.5
651	1	0.9	0.0	0.0	0.3	33.3	0.6	66.7	11.3
654	1	2.8	0.0	0.0	0.8	28.6	2.0	71.4	12.9
658	1	0.7	0.0	0.0	0.4	57.1	0.3	42.9	15.8
660	1	0.1	0.0	0.0	0.0	0.0	0.1	100.0	6.3
662	1	1.5	0.0	0.0	1.4	93.3	0.1	6.7	18.8
664	1	1.1	0.0	0.0	0.0	0.0	1.1	100.0	9.0
664	2	1.5	1.2	80.0	0.0	0.0	0.3	20.0	13.3
666	1	0.4	0.0	0.0	0.2	50.0	0.2	50.0	9.5
666	2	0.1	0.0	0.0	0.0	0.0	0.1	100.0	3.7
666	3	1.2	0.0	0.0	0.4	33.3	0.8	66.7	12.6
667	1	0.7	0.0	0.0	0.0	0.0	0.7	100.0	11.3
667	2	2.8	0.8	28.6	1.5	53.6	0.5	17.9	19.2
669	1	0.5	0.0	0.0	0.0	0.0	0.5	100.0	11.2
669	2	0.7	0.0	0.0	0.3	42.9	0.4	57.1	10.8
701	1	0.3	0.0	0.0	0.0	0.0	0.3	100.0	9.2
701	2	3.7	1.0	27.0	2.5	67.6	0.2	5.4	16.0
707	1	1.4	0.0	0.0	1.4	100.0	0.0	0.0	14.7
707	178	0.4	0.0	0.0	0.0	0.0	0.4	100.0	13.5
718	1	0.8	0.0	0.0	0.8	100.0	0.0	0.0	15.3
719	1	1.1	0.0	0.0	0.6	54.5	0.5	45.5	9.1
720	1	2.9	0.0	0.0	1.3	44.8	1.6	55.2	15.5
720	2	5.9	1.6	27.1	2.0	33.9	2.3	39.0	18.9
720	3	2.2	0.0	0.0	1.0	45.5	1.2	54.5	15.5
720	4	8.2	4.7	57.3	3.0	36.6	0.5	6.1	32.6
720	5	10.9	8.0	73.4	2.5	22.9	0.4	3.7	32.7
720	6	5.8	2.3	39.7	3.4	58.6	0.1	1.7	19.2
720	7	7.6	4.4	57.9	2.9	38.2	0.3	3.9	24.0
721	1	0.2	0.0	0.0	0.0	0.0	0.2	100.0	5.3
726	1	0.2	0.0	0.0	0.0	0.0	0.2	100.0	4.8
728	1	0.1	0.0	0.0	0.0	0.0	0.1	100.0	6.6
737	1	1.5	0.0	0.0	1.1	73.3	0.4	26.7	14.9
752	1	0.8	0.0	0.0	0.4	50.0	0.4	50.0	9.4

Appendix 1.2: Cremated bone – fraction weights and maximum fragment size per sample

Context	Sample	Total Weight	Fraction Weights						Max. Frag Size
			>10mm		5-10mm		2-5mm		
		g	g	%	g	%	g	%	mm
5	1	8.4	8.3	98.8	0.0	0.0	0.1	1.2	31.2
47	1	2.3	0.0	0.0	1.0	43.5	1.3	56.5	19.4
51	all	8.7	5.2	59.8	3.3	37.9	0.2	2.3	25.5
58	1	11.1	4.3	38.7	3.0	27.0	3.8	34.2	36.4
64	all	48.5	19.0	39.2	9.6	19.8	19.9	41.0	50.1
65	all	88.7	61.1	68.9	14.5	16.3	13.1	14.8	47.6
67	all	14.1	11.8	84.0	0.6	4.3	1.7	11.7	42.2
68	all	64.6	38.2	59.1	13.3	20.6	13.1	20.3	52.2
111	1	0.7	0.4	57.1	0.0	0.0	0.3	42.9	12.4
113	1	0.2	0.0	0.0	0.0	0.0	0.2	100.0	8.2
115	1	2.6	0.0	0.0	<0.1	1.9	2.6	98.1	12.6
117	1	3.7	0.8	21.6	2.4	64.9	0.5	13.5	21.0
119	1	3.9	0.0	0.0	3.2	82.1	0.7	17.9	12.5
121	all	16.0	1.2	7.5	2.4	15.0	12.4	77.5	18.4
125	1	1.7	0.0	0.0	0.6	35.3	1.1	64.7	20.9
135	1	0.7	0.0	0.0	0.0	0.0	0.7	100.0	8.1
140	1	1.2	0.0	0.0	0.3	25.0	0.9	75.0	11.9
142	1	1.1	0.0	0.0	0.5	45.5	0.6	54.5	11.5
144	1	6.1	0.7	11.5	0.7	11.5	4.7	77.0	13.2
146	1	0.2	0.0	0.0	0.0	0.0	0.2	100.0	8.7
148	1	13.7	0.6	4.4	5.2	38.0	7.9	57.7	16.6
150	1	7.0	0.0	0.0	3.4	48.6	3.6	51.4	14.7
152	1	2.5	0.0	0.0	0.0	0.0	2.5	100.0	10.3
154	all	12.9	2.6	20.2	4.1	31.8	6.2	48.1	23.2
164	1	0.4	0.0	0.0	0.0	0.0	0.4	100.0	8.8
167	1	4.9	0.0	0.0	1.3	26.5	3.6	73.5	22.1
169	1	0.6	0.0	0.0	0.6	100.0	0.0	0.0	23.7
174	1	0.9	0.7	77.8	0.1	11.1	0.1	11.1	14.2
182	1	1.4	0.0	0.0	1.0	71.4	0.4	28.6	13.8
184	1	5.3	4.0	75.5	0.5	9.4	0.8	15.1	61.4
189	1	0.2	0.0	0.0	0.2	100.0	0.0	0.0	13.1
194	1	0.4	0.0	0.0	0.0	0.0	0.4	100.0	8.0
202	1	2.9	0.0	0.0	0.7	24.1	2.2	75.9	16.0
206	1	2.3	0.7	30.4	1.3	56.5	0.3	13.0	16.8
210	1	0.2	0.0	0.0	0.1	50.0	0.1	50.0	10.8
214	1	0.2	0.0	0.0	0.0	0.0	0.2	100.0	4.8
220	all	1.2	0.0	0.0	0.6	50.0	0.6	50.0	11.5
224	1	0.7	0.0	0.0	0.2	28.6	0.5	71.4	12.1
228	1	0.2	0.0	0.0	0.0	0.0	0.2	100.0	7.6
234	all	0.6	0.0	0.0	0.3	54.5	0.3	45.5	13.0
242	1	3.3	1.8	54.5	1.5	45.5	0.0	0.0	16.9
256	all	2.4	0.0	0.0	2.3	97.9	0.1	2.1	17.4
258	1	0.5	0.0	0.0	0.0	0.0	0.5	100.0	9.5
326	all	4.4	1.5	34.1	1.3	29.5	1.6	36.4	14.0
327	1	6.4	2.1	32.8	2.9	45.3	1.4	21.9	27.4
485	1	0.7	0.0	0.0	0.7	100.0	0.0	0.0	11.7
487	1	0.2	0.0	0.0	0.0	0.0%	0.2	100.0	7.2
498	all	0.3	0.0	0.0	0.0	0.0	0.3	100.0	4.9
530	1	0.8	0.0	0.0	0.0	0.0	0.8	100.0	9.8
540	1	0.3	0.0	0.0	0.2	66.7	0.1	33.3	9.6
542	all	15.4	13.8	89.6	1.2	7.8	0.4	2.6	50.6
544	1	7.0	0.0	0.0	2.4	34.3	4.6	65.7	16.8
547	1	0.3	0.0	0.0	0.0	0.0	0.3	100.0	10.6
548	1	0.2	0.0	0.0	0.0	0.0	0.2	100.0	7.9
556	1	1.3	0.8	61.5	0.0	0.0	0.5	38.5	15.7
559	all	0.5	0.0	0.0	0.0	0.0	0.5	100.0	11.7
612	1	8.3	4.2	50.6	2.1	25.3	2.0	24.1	30.4
621	all	26.8	3.3	12.3	7.2	26.9	16.3	60.8	25.8

650	1	0.3	0.0	0.0	0.0	0.0	0.3	100.0	12.5
651	1	0.9	0.0	0.0	0.3	33.3	0.6	66.7	11.3
654	1	2.8	0.0	0.0	0.8	28.6	2.0	71.4	12.9
658	1	0.7	0.0	0.0	0.4	57.1	0.3	42.9	15.8
660	1	0.1	0.0	0.0	0.0	0.0	0.1	100.0	6.3
662	1	1.5	0.0	0.0	1.4	93.3	0.1	6.7	18.8
664	all	2.6	1.2	46.2	0.0	0.0	1.4	53.8	13.3
666	all	1.7	0.0	0.0	0.6	35.3	1.1	64.7	12.6
667	all	3.5	0.8	22.9	1.5	42.9	1.2	34.3	19.2
669	all	1.2	0.0	0.0	0.3	25.0	0.9	75.0	11.2
701	all	4.0	1.0	25.0	2.5	62.5	0.5	12.5	16.0
707	all	1.8	0.0	0.0	1.4	77.8	0.4	22.2	14.7
718	1	0.8	0.0	0.0	0.8	100.0	0.0	0.0	15.3
719	1	1.1	0.0	0.0	0.6	54.5	0.5	45.5	9.1
720	all	43.5	21.0	48.3	16.1	37.0	6.4	14.7	32.7
721	1	0.2	0.0	0.0	0.0	0.0	0.2	100.0	5.3
726	1	0.2	0.0	0.0	0.0	0.0	0.2	100.0	4.8
728	1	0.1	0.0	0.0	0.0	0.0	0.1	100.0	6.6
737	1	1.5	0.0	0.0	1.1	73.3	0.4	26.7	14.9
752	1	0.8	0.0	0.0	0.4	50.0	0.4	50.0	9.4

Appendix 1.3: Fraction weights and fragment size

8.4 Appendix 4: Petrographical analysis report

Petrographical Report on Stone Objects from Archaeological Excavations at Lismore 1/Bushfield or Maghernaskeagh 1, Contract 2

in advance of the

M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme Culahill, Co. Laois

Report Number E2220

on behalf of
Archaeological Consultancy Services Ltd.

by
EurGeol Dr Stephen Mandal MIAI PGeo

May 08
CRDS Ltd Ref: 1020P9

1. Introduction

This report is based on the macroscopic (hand specimen) examination of nine stone objects found as a result of archaeological excavations carried out at Lismore 1 in advance of the construction of the M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme (Record No. E2220). The objects consist of: one Quernstone; two Grinding stones; two Sharpening stones; one Perforated stone; and three natural unworked pebbles/ cobbles/ blocks.

The purpose of the study was to identify the rock types from which the stone objects were made, to highlight potential sources for them, and to comment on their possible function. It is important to note that macroscopic petrographical studies have been considered of limited value in comparison to microscopic (thin section and geochemical analysis) studies. On the other hand, macroscopic studies provide an excellent preliminary assessment tool and have proven to be of considerable value in petrographical studies (e.g. see Mandal 1997; Cooney and Mandal 1998).

2. Solid Geology and Soils of the Site

(see Figure 1 for a site location and geology (after Archer et al. 1996; Gatley et al. 2005))

The geology of the area is dominated by Carboniferous sediments, predominantly limestone, which form a stratigraphical succession generally younging to the southeast.

However, the oldest rocks in the area occur in the northwest of the area and are of Devonian Age, comprising the Cadamstown Formation (CW) of pale and red sandstone, grit and claystone and include the Clonaslee Member (CWcl), which consist of thick flaggy sandstone and thin siltstone.

The oldest rocks of the Carboniferous Period in the area belong to the Lower Limestone Shale (LLS), consisting of sandstone, limestone and mudstone. These unconformably overlie the Ballysteen Formation (BA); Courceyan Age fossiliferous dark grey muddy limestones which make up the majority of the area. Included in the Ballysteen Formation is the Lisduff

Oolite Member (BAld) of oolitic limestone. Overlying this is the Waulsortion Limestones, massive bedded limestones of Upper Courceyan Age.

Another unconformity separates the Waulsortion Limestones from the conformable Urlingford Succession of the Crosspatrick Formation (CS), pale-grey cherty crinoidal limestone; the Aghmacart Formation (AG), dark shaly micrite / peloidal limestone; the Durrow Formation (DW), shaly fossiliferous and oolitic limestone; and the Clogrenan Formation (CL), cherty bluish crinoidal limestone.

A further substantial unconformity separates this succession from the Killeshin Siltstone Formation (KN), Upper Namurian muddy siltstone and silty mudstone, in turn unconformably overlain by the Moyadd Coal Formation (MC), Lower Westphalian shale, siltstone and minor sandstone.

The bedrock at the site consists of the Ballysteen Formation (BA) of fossiliferous dark grey muddy limestones.

The geology of the area represents the period from the Devonian (*c*. 410 – 355 million years ago), when this part of Ireland was on the edge of a huge continent called Laurussia, formed by the collision of Laurentia and Avalonia – South America at the end of the Silurian. The rocks were derived from the Caledonian mountain uplift which occurred at e start of the Devonian, representing the final erosion of the mountain range prior to the inundation of the early Carboniferous sea. The Carboniferous sequence of rocks in the area is a result of shallow (sandstones and limestones) and deeper (shales and mudstones) period of deposition on the sea floor.

The area is part of a physical geographical region known as the Southern Hill and Vale Area (part of the Central Lowlands). The soil types are predominantly grey brown podzolics (see Aalen *et al*. 1997, ch. 1).

3. Results

The results of the macroscopic identification of the finds are given in Table 1 and are discussed below. Based on a preliminary assessment of the material, the assemblage includes six artefacts, all of which are sedimentary (four quartzite; one sandstone; and one vein quartz).

Quernstone

E2220:5:4 is a fragment of a rotary quernstone made from coarse grained yellow quartzite. Its lower face is a natural bedding plane.

Grinding stones

The assemblage includes two grinding stones. E2220:542:1 is a utilised very coarse grained yellow quartzite water rolled cobble. Its faces are ground, possibly indicating use as a grinding stone. E2220:326:1 is a fine grained brown fossiliferous sandstone cleaved block. One face has been ground smooth which may indicate possible use as grinding stone.

Sharpening stones

The assemblage also includes two sharpening stones. E2220:72:2 is a water rolled cobble of vein quartz. It has a natural circular circumference and flat faces. Both faces have distinct grooves consistent with use as sharpener. E2220:72:1 is a very fine grained grey quartzite block. Its face and side are grooved, consistent with use as sharpener.

Perforated stone

E2220:150:1 is a very fine grained water rolled quartzite cobble which has been broken and deliberately perforated. However, its function is unclear.

Other Stones

The three remaining stones in the assemblage are all natural and unworked. These include water rolled cobbles and pebbles and blocks. In terms of rock types, all are sedimentary (one quartzite; one sandstone; and one shale).

4. Potential Sources

It is likely that the sources for all of these objects are local. There are abundant sources for rocks of these types in the area (see Figure 1). It is, however, important to note that these objects did not arrive on site from bedrock, but from secondary sources, such as a water-rolled river cobbles / pebbles, or in the till.

5. Conclusions

It is not possible to determine a definitive source for these objects based on macroscopic examination alone. Furthermore detailed microscopic analysis would also be unlikely to identify exact sources. On the other hand, it can be stated that the materials from which these objects were manufactured are available locally in outcrop and within the glacial tills. Thus it is probable that these objects were derived from local sources.

6. Bibliography

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Table 1 – Results of petrographical assessment

Scheme#	Find #	Rock type	Description	Function	Description
AO15/111	E2220 : 0001:0007	Shale	light grey	Natural	water rolled cobble
AO15/111	E2220 : 0005:0004	Quartzite	coarse grained yellow	Quernstone	fragment of rotary quernstone; lower face is bedding plane
AO15/111	E2220 : 0062:0003	Quartzite	very coarse grained red	Natural	cleaved block
AO15/111	E2220 : 0072:0001	Quartzite	very fine grained grey	Sharpening stone	block; face and side grooved, consistent with use as sharpener
AO15/111	E2220 : 0072:0002	Quartz	vein, brown	Sharpening stone	made from water rolled cobble; circular circumference has flat faces; both have distinct groove consistent with use as sharpener
AO15/111	E2220 : 0150:0001	Quartzite	very fine grained	Perforated stone	water rolled cobble; broken and perforated; function unclear
AO15/111	E2220 : 0326:0001	Sandstone	fine grained brown fossiliferous	Grinding stone	cleaved block; one face ground smooth may indicate possible use as grinding stone
AO15/111	E2220 : 0542:0001	Quartzite	very coarse grained yellow	Grinding stone	water rolled bcobble; faces are ground, possibly indicating use
AO15/111	E2220 : 0718:0001	Sandstone	fine grained greywacke	Natural	water rolled cobble; broken

8.5 Appendix 5: Lithics report

Preliminary analysis of the lithic pieces from Lismore-Bushfield or Maghernaskeagh 1, M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme, Co. Laois

Archaeological Record No: E2220

Ministerial scheme no.: A015/111

by

Dr. MARIA B. O'HARE

Statement of Significance

Two lithic artefacts were recovered as part of excavations at Lismore-Bushfield or Maghernaskeagh, Co. Laois. These included a flint medial segment blade and a flake fragment. Although a refit was not possible the type, condition and colour of the flint is very similar in both pieces. It is very difficult to place this medial segment blade within any particular prehistoric period other than saying that it could belong to any period from the Neolithic through to the Bronze Age.

Introduction

Two lithic pieces derived from the Portlaoise to Castletown/Culahil, contract 2 of the M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme at Lismore-Bushfield or Maghernaskeagh 1, Co. Laois, excavation record number E2220, scheme A015/111. These lithic pieces have an individual entry and are listed within the database (Microsoft excel) for Contract 2, report number five and is accompanied by a glossary of terms corresponding to this database.

Description of artefacts

A flake fragment (E2220:016:001) was derived from feature (F16) and is made from a honey coloured piece of flint; which is relatively fresh and has >50% cortex remaining. It has surviving greatest dimensions of <20mm. A medial segment blade (E2220:071:001) was derived from feature (71). It has surviving dimensions of 24.6x20x3.5mm and the flint is very similar to the flake fragment described above.

Discussion

There is nothing particularly diagnostic of these two flint pieces, other than they represent some prehistoric activity within the Lismore-Bushfield or Maghernaskeagh site that may reveal more informative lithic material and features of the prehistoric period in the future.

8.6 Appendix 6: Animal bone analysis report

05_09 M7 Portlaoise to Castletown/

M8 Portlaoise to Cullahill Motorway Scheme Project

Animal Bone Analysis Report from Lismore 1/Bushfield or Maghernaskeagh 1, Co. Laois

(A015/111, E2220)

October 2008

By Claudia Tommasino

1. Introduction

Lismore and Bushfield or Maghernaskeagh make up a site excavated in two phases: Lismore 1 in October 2005 and Bushfield or Maghernaskeagh 1 in June 2006. The excavations of the site revealed an oval enclosure or ring fort. The ditch of the enclosure was truncated in some places by drainage pipes and field divisions and two finds were found in it: a glass ring and a quern stone placed during backfilling. The largest pit found on the site included charcoal and burnt stones and bones, an iron knife, ring and slag, a sharpening stone and a polished stone. Scattered postholes and pits were also found in the enclosure and the presence of bowl furnaces by the entrance (in the Lismore 1 side) suggests that metalworking was taken place in the site. In the Bushfield or Maghernaskeagh side a cemetery (including 82 burials) and some cremation pits were located, alongside with some finds such as a metal pin, a bone bead and a tip of a metal blade.

The characteristics of the site suggest an early medieval occupation, but radiocarbon dates indicate several occupations from the Bronze Age, Iron Age, Early Medieval and Post-medieval periods. Most animal bones found on the site come from features dated as Early Medieval, although some are from post-medieval times.

The analysis of the animal bones retrieved in Lismore 1/Bushfield or Maghernaskeagh 1 allowed the identification of 469 recordable fragments. The mammal assemblage incorporates cattle (*Bos Taurus*), pig (*Sus sp.*), sheep (*Ovis aries*), deer (*Cervus/Dama* and *Cervus elaphus*), horse (*Equus cabullus*), dog (*Canis familiaris*), and cat (*Felis catus*).

2. Methodology and analyses

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: ‘recordable’, ‘low grade’ and ‘non-countable’. Fragments where at least 50% of the diagnostic area is present would be recordable. The criteria for recordable fragments are as follows:

- Long bones and metapodials with one or both epiphyses 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). Ribs and vertebrae were recorded 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).

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

Skeletal element, species and laterality were assessed for 'recordable' and 'non-countable' fragments according to the criteria reported by Schmidt (1972), Cornwall (1974), Hillson (1995), and Davis (1987). The differentiation between sheep and goat was done using criteria mentioned in Boessneck (1969). But there were not identified any goat fragments in the assemblage. Skeletal elements are express in tables and figures by their abbreviation or codes, shown in Appendix table 1.

For analytical purposes, skeletal elements are divided in four parts of the skeleton: head (skull, mandible); axial carcass (vertebrae); meaty bones (scapulae, pelvis and its respective limb); and feet (metapodials, phalanges and carpals/tarsals). Due to their high preservation, teeth are excluded from this analysis to prevent the overrepresentation of head elements.

The TNF (Total Number of Fragments that composes 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 or specimen 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 recordable fragments.

Ageing

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

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). For horses, on the other hand, both upper and lower incisor rows were assessed as described in Shippen Huidekoper (1982). This analysis allowed the creation of mortality curves using the percentages of individuals that died at the same age stage (expressed in months) and plotting the data into a curve that would express the tendencies in killing patterns for each species.

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 Grigson (1982) provided the information for assigning chronological age to these individuals. Survival curves were done consequently using this data grouped into categories or age ranges. The percentage of fused epiphyses correspondent to each group was plotted to produce a curve that expresses the percentage of individuals that survived a given age in a given species.

It is relevant to mention that both survival and mortality curves could only be done in those species which presented a NISP that would ensure a certain degree of reliability of the analysis.

Sex determination

Two methods for assessing sex were applied for two species. The measurement of the distal breath of metacarpals was used for cattle following the criteria explained by McCormick (1997). Root morphology of canines was evaluated for pig sexing, according to Schmidt (1972) and McCormick (1997). The slenderness index method as described by McCormick (1992) could not be done due to lack of sufficient data.

2.4 Taphonomy

The recognition of any taphonomic factors such as gnawing, burning and butchery marks in the bones was dealt 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: signed 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

Pathological modifications were recorded in detail and assessed by their effects on the bones, using the criteria of Baker and Brothwell (1980) and Bartosiewicz, Van Neer and Lentacker (1997).

2.6 Measurements and osteometry

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

After measurements were taken in suitable fragments, withers heights were calculated for each species according to the factors found in Von Den Driesch and Boessneck (1979). Moreover, bivariate plots were made, whenever possible, using two variables of a same element for a certain species to show size variability within the assemblage. Finally, the log ratio method was used if possible to obtain an overview of the size of cattle population, using length measurements of long bones, following McCormick and Murray (2007).

3. Analyses and results

Summary of findings: Assemblage Overview

Identification and quantification

The animal assemblage from Lismore 1/Bushfield or Maghernaskeagh 1 is mostly good-fair preservation (figure 1).

Figure 1
General conditions of the animal assemblage from Lismore1/Bushfield 1

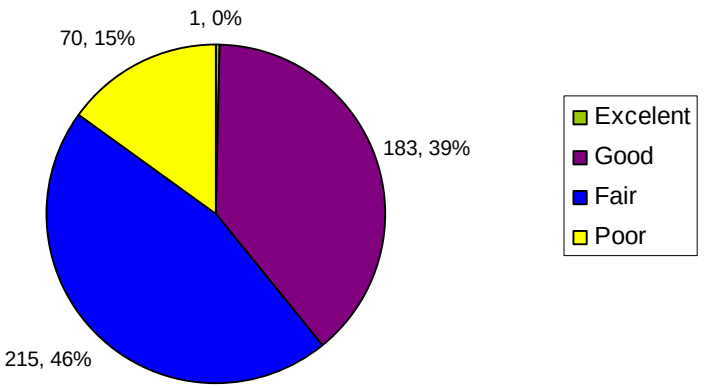


Table 1 shows the details of the assemblage including species, skeletal element and count (by TNF, NISP and MNI). Articulated or semi-articulated groups of bones could only be identified for two species: cattle and dog. Therefore, the TNF and the NISP is different for these two species. Cattle is by far the most common species found on the site with almost 74% of the total NISP and 56.7% of the total MNI. Regarding NISP count pig is the second most frequent species (8.5%) followed by sheep and deer (7% each). Horses make up 2.4% of the NISP count, while the rest of the species do not represent more than 1% of the NISP total. On the other hand, when taking into account the MNI values, sheep (16.7%) is more frequent than pig (10%), while all other species are only represented by one MNI each.

Element	Cattle	Pig	Sheep	Deer	Horse	Dog	Red Deer	Cat	Total
AN	-	-	-	22	-	-	2	-	24
AS	9	1	-	-	1	-	-	-	11
CA	6	2	-	-	1	1	-	-	10
CR	5	3	1	2	-	1	-	-	12
FE	13	2	-	-	1	-	-	-	16
HC	14	-	-	-	-	-	-	-	14
HU	22	1	7	-	-	2	-	1	33
LMT	79	12	5	3	4	1	-	-	104
LT	-	-	-	-	1	-	-	-	1
LXT	45	1	6	3	-	-	-	-	55
MC1	28	-	3	-	-	-	-	-	31
MC2	-	-	-	-	-	1	-	-	1
MC3	-	1	-	-	-	1	-	-	2
MN	17	3	1	-	-	1	-	-	22
MT1	12	-	-	-	-	-	-	-	12
PE	8	2	1	-	1	-	-	-	12
PH1	5	-	-	-	-	-	-	-	5
PH2	2	-	1	-	-	-	-	-	3
PH3	1	-	-	-	-	-	-	-	1
RA	17	1	3	-	1	1	-	-	23
SC	32	5	-	1	-	1	-	-	39
SCU	3	-	-	-	-	-	-	-	3
TI	10	3	4	1	1	1	-	-	20
UL	6	2	-	-	-	-	-	-	8
VC1	2	-	-	-	-	-	-	-	2
VC2	5	-	-	-	-	-	-	-	5
TNF	**341**	**39**	**32**	**32**	**11**	**11**	**2**	**1**	**469**
NISP	**340**	**39**	**32**	**32**	**11**	**3**	**2**	**1**	**460**
NISP %	**73.9**	**8.5**	**7**	**7**	**2.4**	**0.7**	**0.4**	**0.2**	**100**
MNI	**17**	**3**	**5**	**1**	**1**	**1**	**1**	**1**	**30**
MNI %	**56.7**	**10**	**16.7**	**3.3**	**3.3**	**3.3**	**3.3**	**3.3**	**100**

Table 1. TFN, NISP and MNI by species and skeletal elements for Lismore1/Bushfield or Maghernaskeagh 1.

Two archaeological phases were identified in the site associated with animal bones: Early Medieval and Post-Medieval (tables 2 and 23). The Early Medieval assemblage is by

far the most numerous totalling 431 TFN (91.9% of the TNF of the site), while Post-medieval features only contained 30 TNF (6.4% of the TNF of the site). Furthermore, 8 TNF (1.7% of the TNF of the site) were non-dated or came from non-archaeological features.

Early Medieval Assemblage

Element	Cattle	Pig	Deer	Sheep	Horse	Dog	Red Deer	Cat	Total
AN	-	-	19	-	-	-	2	-	21
AS	8	1	-	-	1	-	-	-	10
CA	6	2	-	-	1	1	-	-	10
CR	4	3	2	1	-	1	-	-	11
FE	13	2	-	-	1	-	-	-	16
HC	13	-	-	-	-	-	-	-	13
HU	22	1	-	6	-	2	-	1	32
LMT	72	12	3	5	3	1	-	-	96
LT	-	-	-	-	1	-	-	-	1
LXT	40	1	3	6	-	-	-	-	50
MC1	26	-	-	2	-	-	-	-	28
MC2	-	-	-	-	-	1	-	-	1
MC3	-	1	-	-	-	1	-	-	2
MN	14	3	-	1	-	1	-	-	19
MT1	11	-	-	-	-	-	-	-	11
PE	8	2	-	-	1	-	-	-	11
PH1	4	-	-	-	-	-	-	-	4
PH2	2	-	-	1	-	-	-	-	3
PH3	1	-	-	-	-	-	-	-	1
RA	15	-	-	2	1	1	-	-	19
SC	29	5	1	-	-	1	-	-	36
SCU	3	-	-	-	-	-	-	-	3
TI	9	3	1	3	1	1	-	-	18
UL	6	2	-	-	-	-	-	-	8
VC1	2	-	-	-	-	-	-	-	2
VC2	5	-	-	-	-	-	-	-	5
TNF	**313**	**38**	**29**	**27**	**10**	**11**	**2**	**1**	**431**
NISP	**312**	**38**	**29**	**27**	**10**	**3**	**2**	**1**	**422**
NISP %	**73.9**	**9**	**6.9**	**6.4**	**2.4**	**0.7**	**0.5**	**0.2**	**100**
MNI	**15**	**3**	**1**	**4**	**1**	**1**	**1**	**1**	**27**
MNI %	**55.6**	**11.1**	**3.7**	**14.8**	**3.7**	**3.7**	**3.7**	**3.7**	**100**

Table 2. TFN, NISP and MNI by species and skeletal elements for Early Medieval Lismore1/Bushfield or Maghernaskeagh 1.

Early Medieval Cattle

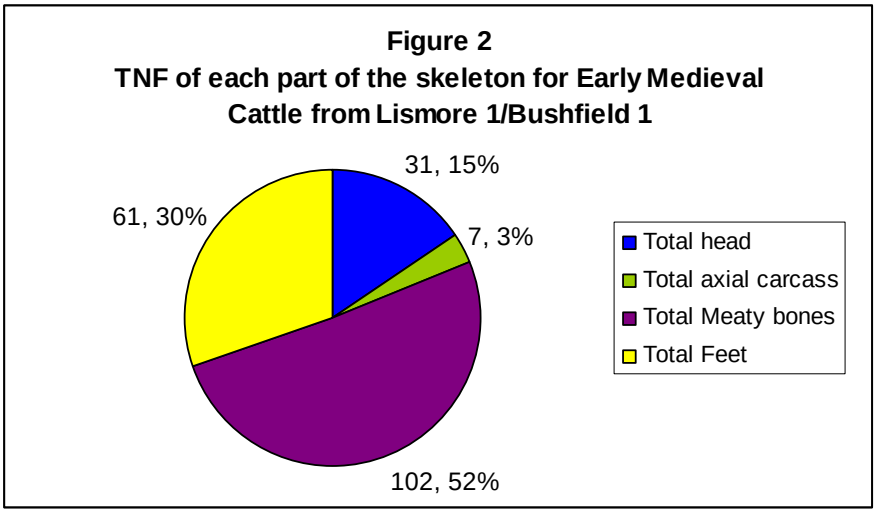
Identification and quantification

The cattle assemblage from Early Medieval features from Lismore 1/Bushfield or Maghernaskeagh 1 is made up by 313 fragments representing the most common species for this period (table 2). The identification of two elements from the same specimen reduced the NISP to 312 (73.9% of the total NISP of the Early Medieval phase) and the MNI to 15 specimens (55.6% of the total MNI from this period).

This high frequency of cattle might be closely related to the numerous uses and products they can provide, which make this species highly useful to be exploited, as meat, dairying, labour animals and/or leather.

The skeletal distribution of Early Medieval cattle shows an important predominance of meaty bones (52%), followed by feet (30%) and head elements (15%). Axial carcass elements are the least frequent but its presence is suggestive of the whole cattle carcass been used on the site.

Figure 2
TNF of each part of the skeleton for Early Medieval Cattle from Lismore 1/Bushfield 1



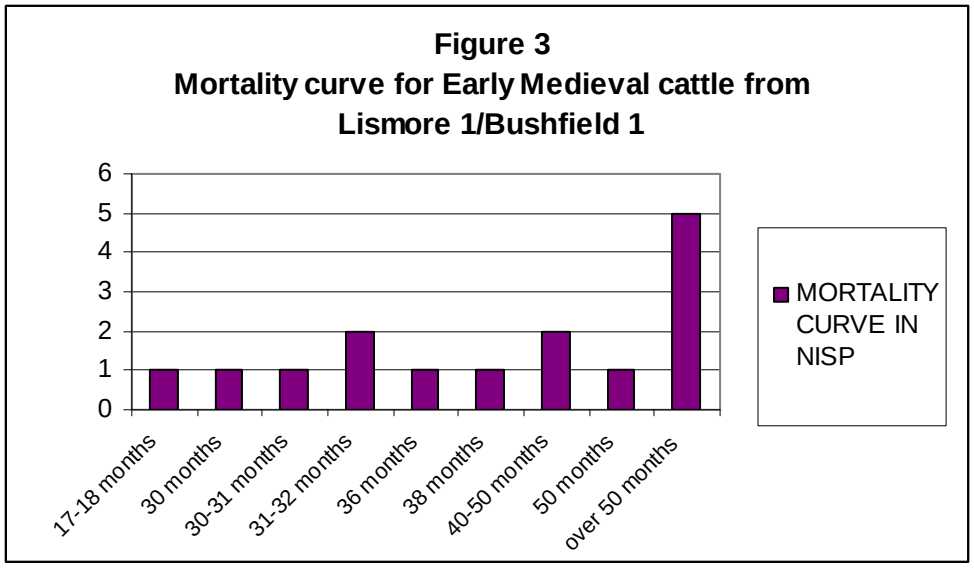
The higher frequency of meaty bones could be related to the use of cattle as meat providers, which seems to have been the main use. However, this distribution of skeletal elements could also suggest the exploitation of cattle for secondary products and uses. On the other hand, the important presence of elements from other parts of the animal carcass besides meaty bones suggests that specimens could have been slaughtered and consumed and bones discarded in the same area. The utilisation of cattle as meat providers can also be interpreted by the prevalence of unarticulated skeletal elements suggesting a high degree of dismemberment of cattle, practice required to facilitate the access to the meat.

Ageing

Table 3 shows the Tooth Wear Stages (Grant, 1982) in loose mandibular teeth and Mandible Wear Stages (Higham, 1967) while figure 3 shows the mortality curve produced from this data.

Species	Element	NISP	dp4	P4	M1	M2	M12	M3	Higham MWS	Estimated age in months
Cattle	LMT	4	-	-	-	-	a	-	-	-
	LMT	9	-	-	-	-	b	-	-	-
	LMT	7	-	-	-	-	c	-	-	-
	LMT	1	-	-	-	-	d	-	-	-
	LMT	2	-	-	-	-	e	-	-	-
	LMT	4	-	-	-	-	f	-	-	-
	LMT	4	-	-	-	-	g	-	-	-
	LMT	1	-	-	-	-	h	-	-	-
	LMT	2	-	-	-	-	j	-	-	-
	LMT	5	-	-	-	-	k	-	-	-
	LMT	1	-	-	-	-	l	-	-	-
	LMT	1	-	a	-	-	-	-	-	-
	LMT	1	-	c	-	-	-	-	-	-
	LMT	1	-	f	-	-	-	-	-	-
	LMT	1	-	g	-	-	-	-	-	-
	LMT	1	-	h	-	-	-	-	-	-
	LMT	1	f	-	-	-	-	-	-	-
	LMT	6	j	-	-	-	-	-	-	-
	LMT	1	k	-	-	-	-	-	-	-
	MN	1	k	-	-	-	-	-	-	-
	MN	1	j	-	f	a	-	-	10	**17-18**
	LMT	1	-	-	-	-	-	a	14	**30**
	LMT	1	-	-	-	-	-	a	15	**30-31**
	LMT	1	-	-	-	-	-	b	16	**31-32**
	LMT	1	-	-	-	-	-	b	16	**31-32**
	MN	1	-	-	k	j	-	d	18	**36**
	LMT	1	-	-	-	-	-	e	19	**38**
	LMT	1	-	-	-	-	-	g	21	**40-50**
	LMT	1	-	-	-	-	-	g	21	**40-50**
	LMT	1	-	f	-	-	-	-	22	**50**
	LMT	1	-	-	-	-	-	j	23	**over 50**
	LMT	1	-	-	-	-	-	k	23	**over 50**
	MN	1	-	-	-	-	-	l	23	**over 50**
	MN	1	-	-	l	m	-	k	23	**over 50**
	MN	1	-	h	m	l	-	l	23	**over 50**

Table 3. Tooth Wear Stages (Grant, 1982) in loose mandibular teeth and Mandible Wear Stages (Higham, 1967) for Early Medieval cattle.



Only one peak in cattle slaughtering was identified where an important number of specimen were killed older than 50 months of age. Nevertheless, a major number of specimens were killed between 17-40 months of age.

The epiphyseal fusion of postcranial bones (table 4) in the cattle assemblage demonstrates that some specimens (7% of the assemblage assessed) were killed or died between 6 and 18 months of age, while 93% survived this age. Regarding middle fusion only one specimen did not survive this period, dying before the 24-30 months of age. Finally, 22% of the specimens died before 42-48 months of age, suggesting that 78% of the specimens did survive this age stage and died over 50 months of age.

Both methods of assessing age demonstrates that most killings were practiced after the 50 months of age, implying an important number of cattle being kept until their productive life was over using them for secondary uses. Nevertheless, this peak is far from suggesting an exclusive use for cattle as secondary uses/products, due to the important amount of killings practice between 6 and 42 months of age. According to Hambleton (1999) 18-42 months of age is the optimum age to use cattle specimens as meat providers. Therefore, the database does not account for an exclusive practice carried out in Lismore 1/Bushfield or Maghernaskeagh 1 but a mixture of cattle been used for secondary uses (such as leather, milk, labour and breeding stock) and meat providers. The absence of calf mortality discards the idea of major practice of culling of immature cattle, and has been closely related to milking practices, which requires the presence of calves to ensure the production of milk. Therefore, calves are not killed until weaned, not before 6 months of age. Finally, the lack of calves in the archaeological record impedes to conclude if breeding of cattle was a practice on the site extent.

Fusion in Cattle	Skeletal Elements/Zones	Age in months	No. Fused	No. Unfused
Early Fusing	MC1 prox	before birth	16	0
	MT1 prox	before birth	11	0
	PH1 prox	before birth	4	0
	PH2 prox	before birth	2	0
	PE prox	6-10 months	7	1
	SC prox	7-10 months	25	4
	HU dist	12-18 months	17	1
	RA prox	12-18 months	10	1
	Total Early Fusing		**92**	**7**
	Total Early Fusing %		**93**	**7**
Middle Fusing	MC1 dist	24-30 months	10	0
	TI dist	24-30 months	5	1
	MT1 dist	33-36 months	1	0
	CA	36-42 months	1	0
	Total Early Fusing		**17**	**1**
	Total Early Fusing %		**94**	**6**
Late Fusing	HU prox	42-48 months	3	1
	RA dist	42 months	4	0
	FE prox	42-48 months	4	3
	FE dist	42-48 months	5	1
	TI prox	42-48 months	5	1
	Total Early Fusing		**21**	**6**
	Total Early Fusing %		**78**	**22**

Table 4. NISP of fused (fused and fusing) and unfused Early Medieval Cattle classified under early, middle or late-fusing stages following Reitz and Wing (1999).

Sexing

Table 5 expresses the data on breadth of distal metacarpals which were used for sexing cattle specimens. The results demonstrate a high prevalence of females over males (88.8% against 11.1%). These figures suggest that culling of males was practice for Early Medieval cattle which, associated with killing patterns previously mentioned, is closely related to the stock control with breeding and milking purposes.

Species	Element	NISP	Bd	Sex Assessment
Cattle	MC1	1	45.2	Female
	MC1	1	46.6	Female
	MC1	1	48.8	Female
	MC1	1	52.3	Female
	MC1	1	52.9	Female
	MC1	1	53.2	Female
	MC1	1	53.7	Female
	MC1	1	54.5	Female
	MC1	1	64.9	Male

Table 5. Measurements of Distal Breadth of Metacarpal 1 for Early Medieval Cattle with assessment of sex by McCormick (1997).

Taphonomy

12 cattle specimens presented taphonomic modifications, the majority (66.6%) been done by carnivore/rodent gnawing. 2 specimens showed signs of burning, while the same number of specimens presented cut marks of butchery.

This high frequency of gnawed bones suggests that the site was used as a disposal area for bone waste. Therefore, animals and especially carnivores had access to discarded bones. Regarding burning, only mandibles showed signs of this modification and it seems to be a consequence of the general disposal of waste bones (probably bones not suitable for meat consumption) discarded close to fires or used by fire fuel. Finally, the cut marks observable in the cattle specimens, although not abundant, are suggestive of two different butchery practices and two different uses of cattle. First, cut marks in an astragalus element indicate that skinning was practiced in the site. On the other hand, a scapula with evidence of butchery is more related to the consumption of meat by carrying out dismemberment and/or filleting of meaty bones.

Species	Element	NISP	Butchery	Burning	Gnawing
Cattle	AS	1	Cut	-	-
	CA	1	-	-	Carnivore
	FE	1	-	-	Carnivore
	HU	2	-	-	Carnivore
	MN	2	-	Signed	-
	MT1	1	-	-	Carnivore
	SC	1	Cut	-	-
	SC	1	-	-	Carnivore
	SC	1	-	-	Rodent
	UL	1	-	-	Carnivore

Table 6. Total NISP by element and taphonomic modification for Cattle from Early Medieval Lismore 1/Bushfield or Maghernaskeagh 1.

Pathology and non-pathological condition

Two pathological conditions were found in 4 specimens of cattle, while one non-pathological condition was identified in three different specimens.

The most common pathological condition is the presence of a circular wear (lytic activity) in the medial facet from the proximal articular surface. The other pathology is osteoarthritis, evidenced by some degree of eburnation in the head of a femur. Both this pathologies are close related to biomechanical stress and are widely spread in specimens use for hard work or in old specimens. This evidences coincide with the idea of cattle being kept until they are old, been used as labour animals (Bartosiewicz, Van Neer and Lentacker, 1997).

The non-pathological condition identified in the cattle assemblage from Lismore 1/Bushfield or Maghernaskeagh 1 was an unusual wear process, which produced V-shaped teeth in two molars and one premolar 4 (picture 1). It is difficult to establish the cause of this condition, but it could have been produced by human activity, like the recurrent application of bits used for traction work in the animals.

Picture 1: Cattle molars showing unusual V-shaped wear pattern (Lismore 1/Bushfield or Maghernaskeagh 1, Feature 58).

Therefore, all these pathologies and non-pathological conditions seem to be closely related to the use of cattle as working animals, probably until an advance age, which would coincide with other evidences reported so far for this assemblage.

Measurements and osteometry

60 cattle specimens were measured allowing 105 measurements to be taken. The details of these measurements are shown in table 7.

Estimated Withers Height (EWH) was calculated for 1 cattle specimen from Early Medieval features in Lismore 1/Bushfield or Maghernaskeagh 1, demonstrating that specimen's height was close to 112 cm.

No further analyses such as log ratios or bivariate plots could be carried out due to the lack of enough information to produce reliable results. Nevertheless, the measurements taken

show a high degree of similarities, which could be read as a relatively homogeneous population of cattle suggesting a unique origin of the cattle stock found on the site.

Element	Measurement	Min	Max	N	Mean
AS	GLl	60	60.4	2	60.2
	GLm	54.4	55.5	3	55.1
	Bd	39.8	40	2	39.9
	Ddm	30.8	31.5	3	30
	Ddl	35.3	35.4	2	35.4
CA	GL	116.4	122.3	2	119.3
HC	Wmin	31.5	34.1	6	32.8
	Wmax	41.3	49.1	4	44.2
HU	BT	54.4	66.1	3	61.8
	Bd	56.9	70.6	5	66.3
	HCT	27.4	29.4	5	28.4
MC1	SD	28.3	33.6	2	30.9
	Bp	45.1	63.9	9	53.2
	Bd	45.2	64.9	9	52.4
MT1	GL	206	206	1	206
	SD	22.8	22.8	1	22.8
	Bp	38.1	40.8	6	40.3
	Bd	49.4	49.4	1	49.4
PE	LA	44.1	44.1	1	44.1
RA	Bp	68.8	83.5	3	74.4
	Bd	61.9	63.9	3	62.8
	BPp	62.6	76	3	68.7
	BFd	53.1	53.1	1	53.1
SC	GLP	60.1	67.5	6	62.2
	SLC	36.9	48.8	5	44.1
TI	Bd	52.7	56.7	4	55.2
	GL	54.4	54.4	1	54.4
	Bp	24.4	32.1	3	27
PH1	Bd	28.8	29.1	2	28.9
	GL	35.9	52.1	2	44
	Bp	25.1	26.5	2	25.8
PH2	Bd	20.9	23.3	2	22.1

Table 7. Details of measurements (in mm.) by skeletal elements for Early Medieval cattle following Von Den Driesch (1976), Payne and Bull (1988) and Davis (1992).

Element	GL	EWH
MT1	206	112.2

Table 8. Calculations of Estimated Withers Heights (in cm.) by skeletal elements for Early Medieval cattle following Von Den Driesch and Boessneck (1979).

Livestock economy

The cattle assemblage from Early Medieval features from Lismore 1/Bushfield or Maghernaskeagh 1, by far (more than 65% more common than the second most frequent species) suggests that this species was the most important species on the site, contributing with a major amount of products and uses. Cattle might have been bred on the site, although it

is not possible to asseverate. Cattle were used for secondary uses, such as milk, leather and hard labour. Specimens that reached a good age for the consumption of meat (especially between 17-40 months old), most probably males, where slaughtered. The sex-based killings had the purpose of ensuring the stock control.

An important peak of age slaughtering could not be identified in the assemblage, suggesting that cattle killings for meat were not seasonal-based but more dependant on specimens. Therefore, cattle were not killed during a specific month but specimens were probably slaughtered in small quantities in monthly bases instead doing a great number of killings during a specific month.

The rest of the specimens kept, predominantly females were used as milk suppliers and labour animals until the end of their productive life (older than 50 months of age) when they would be slaughter and their meat consumed.

Killing, butchery and disposal of cattle were probably done in the same area. Therefore, most parts of the animal carcass are found in the site, encountering an assemblage with traits of dismemberment, filleting and skinning alongside signs of burning and animal gnawing.

Early Medieval Pig

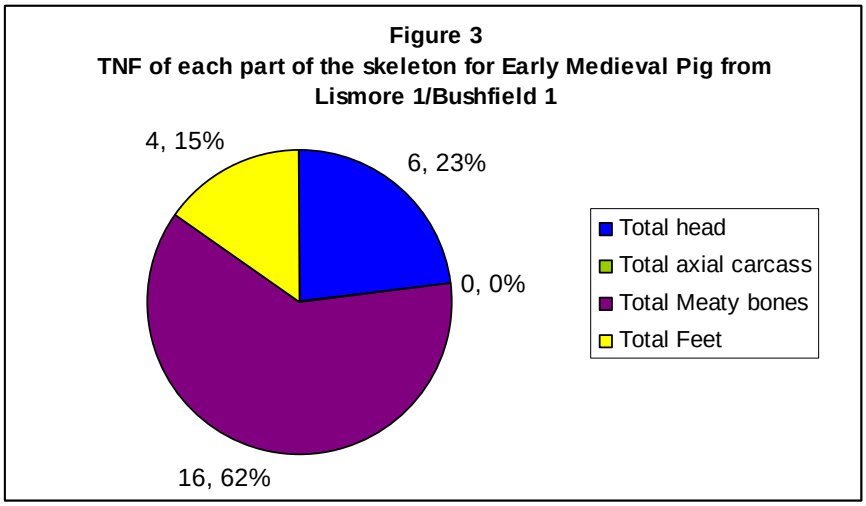
Identification and quantification

The second most important species in Early Medieval Lismore 1/Bushfield or Maghernaskeagh 1 is pig (Table 2), assemblage made up of 39 NISP (8.5% of the total NISP) and 3 MNI (or 10% of the total MNI). No articulated or semi-articulated groups of bones were identified in the pig assemblage.

The importance presence of this species in the site demonstrates that pigs were intensively exploited and consumed. Although much less represented than cattle in terms of NISP and MNI, pig is almost exclusively kept for meat and lard consumption and therefore the importance of its consumption is evident.

Pig skeletal distribution demonstrates an important predominance of meaty bones with more than 60% of the elements. Head and feet elements are also present with 23.1% and 15.4%, respectively. Axial carcass elements, on the other hand, are completely absent in the assemblage.

Figure 3
TNF of each part of the skeleton for Early Medieval Pig from Lismore 1/Bushfield 1



As mentioned before, the importance of pig is almost exclusively based on the consumption of meat and lard, which is reflected in the stated skeletal distribution where meaty bones are dominant. Head and feet elements are less appreciated for this purpose but still exploited to some degree. Axial carcass elements were used less as a meat source and probably were discarded in a separate area after butchery was practiced, producing their absence in the food waste area.

Ageing

12 specimens of pig were assessed using the Tooth Wear Stages (Grant, 1982) in loose mandibular teeth (Table 9).

7 of those specimens also allowed the assessment of Mandible Wear Stages (Higham, 1967) methods to establish their age. Although some specimens slaughtered between 7 and 8 months of age, most pigs were killed between 16 and 23 months of age (1.3 - 1.9 years old). Within this spam of time there is a peak of killings around 16-17 months old, which would represent an optimum age to benefit the most from pig specimens as meat suppliers. The variation observable (of pigs killed sooner or later) can be due to the specific rates of growth of each specimen or to the necessity to keep breeding stock for reproductive purposes.

Species	Element	NISP	P4	M1	M2	M12	M3	Higham MWS	Estimated age in months
Pig	LMT	1	-	-	-	b	-	-	-
	LMT	1	-	-	-	f	-	-	-
	LMT	1	-	-	-	g	-	-	-
	LMT	1	-	c	-	-	-	-	-
	LMT	1	e	-	-	-	-	-	-
	MN	1	-	b	-	-	-	9	7-8
	MN	1	-	c	a	-	-	9	7-8
	LMT	1	a	-	-	-	-	17	16-17
	LMT	1	b	-	-	-	-	17	16-17
	LMT	1	b	-	-	-	-	17	16-17
	MN	1	b	e	c	-	a	19	19-21
	LMT	1	-	-	-	-	a	20	21-23

Table 9. Tooth Wear Stages (Grant, 1982) in loose mandibular teeth and Mandible Wear Stages (Higham, 1967) for Early Medieval cattle.

Fusion in Pig	Skeletal Elements/Zones	Age in months	No. Fused	No. Unfused
Early Fusing	MC prox	before birth	1	0
	PE prox	12 months	2	0
	SC prox	12 months	2	2
	HU dist	12-18 months	1	0
	Total Early Fusing		6	2
	Total Early Fusing %		**75**	**25**
Middle Fusing	TI dist	24 months	2	0
	CA	24-30 months	0	2
	Total Middle Fusing		2	2
	Total Middle Fusing %		**50**	**50**
Late Fusing	FE dist	42 months	0	2
	TI prox	42 months	0	1
	Total Late Fusing		0	3
	Total Late Fusing %		**0**	**100**

Table 10. NISP of fused (fused and fusing) and unfused Early Medieval Pig classified under early, middle or late-fusing stages following Reitz and Wing (1999).

The epiphyseal fusion of long bones in pigs allows corroborating the age-killing practice mentioned before. Although hard to confirm, the data seems to be suggesting that some specimens did not survived the 12 months of age, while a good quantity of specimens were slaughtered between 18 and 30 months of age. Finally, no specimens seem to have reached or survived the late fusing stages (42 months of age).

Therefore, even if this last method does not allow determining the specimen's chronological age, the same trend showed by the tooth and mandible wear stages can be identified in the epiphyseal fusion assessment: the peak of killings is between 1.3 and 2.5

years old. Nevertheless, younger and some older animals were slaughtered, probably dependant on each specimen's characteristics and breeding stock requirements.

Sexing

Only one specimen of pig could be sexed using the morphology of a maxillary canine. This pig was a male, but no major interpretations from this particular specimen can be drawn.

Taphonomy

Three specimens of pig were modified by taphonomic effects. No butchery marks were observable, while 2 specimens were gnawed by carnivores and one meaty bone element was burnt.

Species	Element	NISP	Burning	Gnawing	Butchery
Pig	SC	1	-	Carnivore	-
	TI	1	Burning	-	-
	UL	1	-	Carnivore	-

Table 11. Total NISP by element and taphonomic modification for pig from Early Medieval Lismore 1/Bushfield or Maghernaskeagh 1.

The lack of butchered bones could seem to be highly contradictory with the idea of pigs exploited exclusively for meat (Hambleton, 1999). But this absence, together with the presence of burning in a meaty bone could be interpreted as a consequence of the size of pigs that does not call for the complete dismemberment of the specimens (like would be the case of cattle) and which meat could be eaten from the bones (Maltby, 1985).

The incidence of gnawed pig bones demonstrates that this area was used for food waste, as suggested before when analysing the occurrence of skeletal elements. Although difficult to confirm, burnt bones can also be a consequence of this way of discarding pig bones, which could have been used as fuel for fires.

Pathology and non-pathological condition

No pathological or non-pathological conditions were observable in any pig bones in the assemblage from Lismore 1/Bushfield or Maghernaskeagh 1.

Measurements and osteometry

5 skeletal elements of pigs were measured with an outcome of 10 different measurements been taken. The details of these measurements are shown in table 12.

Species	Element	NISP	GLl	GLm	Bd	HTC	Ddm	Ddl	SLC	LA/LAR
Pig	AS	1	37.9	34.6	21.6	-	19.9	20.3	-	-
	HU	1	-	-	38.5	20.5	-	-	-	-
	PE	1	-	-	-	-	-	-	-	30.5
	SC	1	-	-	-	-	-	-	22.2	-
	TI	1	-	-	28.9	-	-	-	-	-

Table 12. Details of measurements (in mm.) by skeletal elements for Early Medieval pig following Von Den Driesch (1976), Payne and Bull (1988) and Davis (1992).

Greatest lengths could not be taken from any pig specimens, impeding the calculation of Estimated Withers Heights (EWH). Furthermore, the lack of information did not allow carrying out log ratios or bivariate plots analyses.

Livestock economy

Pigs in Lismore 1/Bushfield or Maghernaskeagh 1 were important on site exclusively as meat suppliers and were probably bred on site, although this last point is difficult to sustain. It is difficult to also determine if sex-based culling of young animals was practice in Lismore 1/Bushfield or Maghernaskeagh 1's pigs.

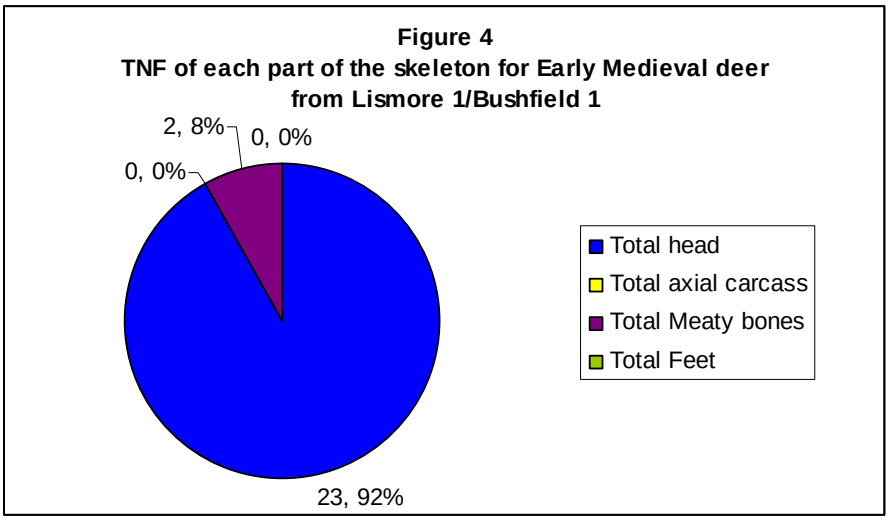
Pig specimens were killed at their perfect age to be a source of meat (16-30 months old), and probably cooked on the bone more than highly butchered. Meaty bones were highly exploited, consumed and discarded in the site. Feet and head elements were less appreciated, while axial carcass were hardly utilised and probably disposed somewhere different than the areas of consumption and food waste.

Early Medieval Deer

Identification and quantification

Deer representation in Lismore 1/Bushfield or Maghernaskeagh 1 is important and although 29 specimens could not be identified by species, 2 specimens were recognised as red deer. Therefore, deer is the third most frequent species on the site, making up more than 7% of the total NISP and MNI on the site (Table 2). There were no articulated or semi-articulated group of bones identified in the deer assemblage.

This distribution of skeletal elements makes obvious the importance of the use of antler as raw material for tools and objects (Figure 4). The presences of post-cranial elements can suggest that some deer hunting and venison consumption was carried out, but the fact that exclusively meaty bones are found on site proposes that the dismemberment of a complete deer carcass could have taken place close to the hunting area. Therefore, only cranial elements (to obtain antlers) and meaty bones (to consume their venison) were transported from the dismemberment area, producing the absence of feet and axial carcass elements. Nevertheless, the exploitation of deer meat could have been occasional and most antlers could have been shed.



Ageing

The only epiphyseal fusion assessed corresponds to a distal tibia epiphysis that fuses around 20-23 months of age. Hence, this specimen was older than this age, most probably an adult specimen, which would be expected when taking into account that antler is the most important deer element and therefore adults are the main target for chasing and/or hunting. Consumption of deer would have been more a consequence than a purpose, implying that adults were the specimens most required.

Sexing

Besides the general assumption that antlers belonged to male specimens, sexing of deer was not possible.

Taphonomy

The only taphonomic modification observable in deer specimens is related to butchery in antlers.

All these butchery marks are related to the antler working industry to reduce the size of antler to make it more manageable and easy to work with to produce objects and artefacts. The high incidence of butchered antlers demonstrates how important this industry was in Lismore 1/Bushfield or Maghernaskeagh 1.

Species	Element	NISP	Butchery
Deer	AN	2	Chopped
	AN	1	Chopped and Cut
	AN	1	Cut
Red Deer	AN	1	Chopped
	AN	1	Cut

Table 13. Total NISP by element and taphonomic modification for deer from Early Medieval Lismore 1/Bushfield or Maghernaskeagh 1.

Pathology and non-pathological condition

The deer assemblage from Lismore 1/Bushfield or Maghernaskeagh 1 did not present any pathology or non-pathological conditions.

Measurements and osteometry

Only on specimen could be measured in one skeletal zone. This measurement is shown in Table 14, but it did not provide enough information the carry out analyses as Estimated Withers Heights, bivariate plots or log ratios.

Species	Element	NISP	Bd
Deer	TI	1	53.5

Table 14. Details of measurements (in mm.) by skeletal elements for Early Medieval deer following Von Den Driesch (1976), Payne and Bull (1988) and Davis (1992).

Livestock economy

In Lismore 1/Bushfield or Maghernaskeagh 1 deer was almost exclusively exploited as a source of antler, product employed as raw material for tools and other objects. With this purpose, shed antlers were collected or maybe sometimes removed from the skull of adults after hunting. Afterwards, antlers were worked on using different butchery techniques for specific purposes.

Although primarily killed to obtain their antler, occasionally hunted specimens were dismembered and some skeletal parts of the specimens (specifically meaty bones) could have been sporadically brought to the site for its consumption.

Early Medieval Sheep

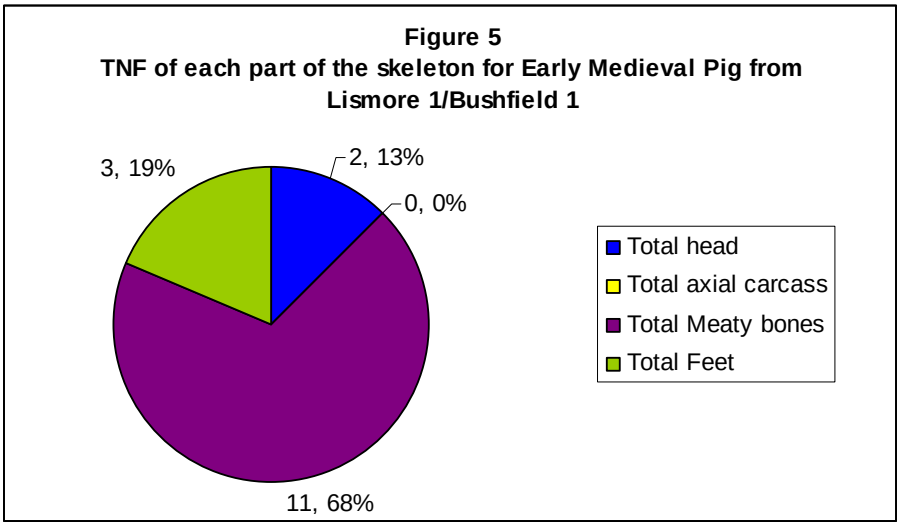
Identification and quantification

Sheep is the fourth most important and frequent species in Lismore 1/Bushfield or Maghernaskeagh 1 with 27 NISP (6.4%), although the MNI count (4 MNI, 14.8%) is higher than deer, representing in this sense the third most frequent species (Table 2). No articulated or semi-articulated groups of bones were identified in the sheep assemblage from this site.

This recurrence of sheep suggests that sheep was kept on the site, probably exploited for multiple uses (as suppliers of meat, wool, milk, skin, etc.) (Hambleton, 1999).

The skeletal distribution of sheep (Figure 5), nevertheless, proposes that meat was the most important of the products of sheep, where meaty bones are dominant, next to feet and head elements. Head and feet where less appreciated, as for pigs, while axial carcass bones are absence and suggest that probably some level of butchery was practiced in a different area of the site, apart from the food waste area.

Figure 5
TNF of each part of the skeleton for Early Medieval Pig from Lismore 1/Bushfield 1



Ageing

Table 15 shows the details of the assessment applied in the sheep assemblage of the Tooth Wear Stages (Payne, 1973; 1987) in loose mandibular teeth and Mandible Wear Stages for M3 (Higham, 1967). Only three specimen's chronological age could be determined, where no specimen seems to have died before 2 years of age.

Species	Element	P4	M1	M2	M12	M3	Higham MWS	Estimated age in months
Sheep	LMT	-	-	-	4A	-	-	-
	LMT	-	-	-	8A	-	-	-
	MN	8A	11A	10A	-	5A	14	25-26
	LMT	-	-	-	-	6G	15	26-28
	LMT	-	-	-	-	11G	16	Mature

Table 15. Tooth Wear Stages (Payne, 1973; 1987) in loose mandibular teeth and Mandible Wear Stages for M3 (Higham, 1967) for Early Medieval sheep.

Following what the tooth and mandible wear stages assessment shows, epiphyseal fusion of long bones for sheep shows that all specimens in the assemblage survived their first two years of age, but died probably before their third one.

Fusion in Sheep	Skeletal Elements/Zones	Age in months	No. Fused	No. Unfused
Early Fusing	MC prox	before birth	1	0
	PH2 prox	6-16 months	1	0
	HU dist	3-10 months	6	0
	RA prox	3-10 months	1	0
	Total Early Fusing		**9**	**0**
	Total Early Fusing %		**100**	**0**
Middle Fusing	MC dist	18-28 months	2	0
	TI dist	15-24 months	3	0
	Total Middle Fusing		**5**	**0**
	Total Middle Fusing %		**100**	**0**
Late Fusing	HU prox	36-42 months	0	2
	RA dist	36-42 months	0	2
	TI prox	36-42 months	0	2
	Total Late Fusing		**0**	**6**
	Total Late Fusing %		**0**	**100**

Table 16. NISP of fused (fused and fusing) and unfused Early Medieval sheep classified under early, middle or late-fusing stages following Reitz and Wing (1999).

According to Hambleton (1999) an economical system based on meat would reflect a high amount of individuals between 18 and 36 months old, while herds kept for wool would show a higher quantity of adults. At the same time, Payne (1973) suggests that sheep killed for meat would be slaughtered around their third year of age. Both these theories allow determining that sheep in Lismore 1/Bushfield or Maghernaskeagh 1 was mostly used as meat suppliers since they were killed exclusively between 2 and 3-3.5 years of age, according to the tooth and mandible wear stages and the epiphyseal fusion of long bones. No older specimens appear to be reflected in the assemblage, making it difficult to establish if some animals were kept for longer to provide secondary products such as milk or wool.

Sexing

No sex assessments could be done for sheep specimens.

Taphonomy

No taphonomic modifications were observable in any of the sheep specimens. As for pigs, this seems contradictory with the idea of meat supplier's species, but possibly these species did not call for a great amount of butchery to be consumed (Maltby, 1985).

Pathology and non-pathological condition

No pathological or non-pathological conditions were recognised in the sheep assemblage form Lismore 1/Bushfield or Maghernaskeagh 1.

Measurements and osteometry

Five specimens of sheep were measured and the details of the outcome are shown in table 17. No Estimated Withers Heights, bivariate plots or log ratio analyses could be carried out, due to lack of information.

Species	Element	SD	Bd	BT	HTC	BFdm	BFdl
Sheep	HU	-	26.7	25.8	12.9	-	-
	HU	-	26.9	24.9	12.1	-	-
	HU	-	27.8	26.9	12.6	-	-
	MC1	-	21.2	-	-	-	-
	MC1	12	21.4	-	-	10.1	9.6

Table 17. Details of measurements (in mm.) by skeletal elements for Early Medieval sheep following Von Den Driesch (1976), Payne and Bull (1988) and Davis (1992).

Livestock economy

The Early Medieval sheep assemblage from Lismore 1/Bushfield or Maghernaskeagh 1 displays characteristics that suggest that this species was kept on site and used mainly for meat. Therefore, most sheep were slaughter between their second and third year of age, a perfect stage to get the most out of each specimen without surpassing their breeding costs. No specimens seem to have been kept for longer, and the lack of neonatal does not allow the determination of whether sheep were bred on the site. Other uses for sheep could have been practiced as milk, although it is difficult to confirm with the analyses carried out for this assemblage.

Sheep could have been slaughtered, butchered, consumed and disposed in the site. As a consequence, the sheep carcass is present with a higher presence of meat-related bones, although axial carcass could suggest that less profitable parts of the skeleton were discarded somewhere else.

Early Medieval Horse

Identification and quantification

Horse is the fifth most common species in Lismore 1/Bushfield or Maghernaskeagh 1 with 10 NISP (2.4% of total NISP on the site) and 1 MNI (3.7% of the MNI from this site). No articulated groups of bones were found in the assemblage.

Horse, according to McCormick (2007), is a species mostly used and kept as working animals, whose meat is generally not consumed but maybe occasionally. Therefore, this

presence is important and would suggest a certain level of importance of horses within the site.

Only a few elements of the horse carcass were found in the waste food area that has already been identified on the site. Most of the elements are meaty bones, although some feet elements and teeth are present. But this distribution could not be reliably used to suggest a particular animal husbandry practice, due to the small size of the assemblage.

Ageing

No ageing assessment could be done in any horse specimen from Lismore 1/Bushfield or Maghernaskeagh 1.

Sexing

No sex assessments could be done for horse specimens.

Taphonomy

Only one specimen with taphonomic modifications was found in the horse assemblage. The bone modified presented signs of gnawing that confirms that horse bones were discarded in a way that carnivores had access to them to gnaw.

Pathology and non-pathological condition

No pathological or non-pathological conditions were found in any horse bones in Lismore 1/Bushfield or Maghernaskeagh 1.

Measurements and osteometry

Only one horse specimen could be measured (table 18), but this information did not permit any further analyses to be carried out.

Species	Element	NISP	Bp	BpP
Horse	RA	1	76.3	69.7

Table 18. Details of measurements (in mm.) by skeletal elements for Early Medieval horse following Von Den Driesch (1976), Payne and Bull (1988) and Davis (1992).

Livestock economy

The assemblage of horse is too small to allow a reliable interpretation of the husbandry practices related to this species. It seems more plausible to suggest that horses were used as labour animals more than meat providers.

Early Medieval Dog

Identification and quantification

11 fragments of dogs were found in the Lismore 1/Bushfield or Maghernaskeagh 1 animal assemblage. 9 of those fragments were identified as one semi-articulated group of bones or specimen, decreasing the NISP count to 3 (0.7%) and the MNI to 1 (3.7%). Table 19 shows the elements that make up the semi-articulated specimen.

Species	Element	Side
Dog	CA	L
	CR	R
	HU	L
	HU	R
	MC2	L
	MC3	L
	RA	R
	SC	R
	TI	L

Table 19. TFN for the dog semi-articulated specimen identified in Early Medieval Lismore1/Bushfield or Maghernaskeagh 1.

The presence of a semi-articulated group amongst food waste of other species proposes that dogs were not consumed but were not buried in separate areas either. Instead, they were completely disposed with any other waste and the usual post-depositional processes produced that some dog skeletal remains would remain articulated and some would become unarticulated.

Ageing

The epiphyseal fusion stages for the semi-articulated specimen from Lismore 1/Bushfield or Maghernaskeagh 1 show that this was an adult specimen, older than 18 months of age. This adult specimen probably died by natural causes.

Although only one dog specimen could be aged, its presence could suggest that no culling with any particular husbandry or economical purposes seems to be influencing the age of death of this species.

Fusion in Dog	Skeletal Elements/Zones	Age in months	No. Fused	No. Unfused
Early Fusing	MC prox	before birth	2	0
	SC prox	6-7 months	1	0
	HU dist	8-9 months	1	0
	Total Early Fusing		**4**	**0**
Middle Fusing	RA prox	11-12 months	1	0
	CA	15 months	1	0
	HU prox	15 months	1	0
	Total Early Fusing		**3**	**0**
Late Fusing	TI prox	18 months	1	0
	Total Early Fusing		**1**	**0**

Table 20. NISP of fused (fused and fusing) and unfused Early Medieval dog classified under early, middle or late-fusing stages following Silver (1969).

Sexing

No sexing for the dog specimens could be carried out.

Taphonomy

None of the three dog specimens from Lismore 1/Bushfield or Maghernaskeagh 1 presented taphonomic modifications, supporting the idea of dogs dying by natural causes and been buried without previous defleshing.

Pathology and non-pathological condition

No pathological or non-pathological modifications were observable in the bones from any of the three dog specimens from the Early Medieval phase from Lismore 1/Bushfield or Maghernaskeagh 1.

Measurements and osteometry

The bones that make up the semi-articulated specimen of dog permitted three measurements to be taken from 2 skeletal elements. The details of these measurements are shown in table 21, and they did not allow carrying out any further analyses such as Estimated Withers Heights, bivariate plots or log ratios.

Species	Element	NISP	Bd	HTC	GLP
Dog	HU	1	30.2	11.2	-
	SC		-	-	29.1

Table 21. Details of measurements (in mm.) by skeletal elements for Early Medieval dog following Von Den Driesch (1976), Payne and Bull (1988) and Davis (1992).

Livestock economy

Although hard to interpret with a high degree of reliability due to lack of data, dogs in Early Medieval Lismore 1/Bushfield or Maghernaskeagh 1 did not seem to have had a role in the subsistence of the site, dying mostly natural ones after they had reached adulthood. Dogs were then disposed of in the same areas used for food waste, being buried without being defleshed.

Early Medieval Cat

Identification and quantification

Only one fragment of cat was identified in the Lismore 1/Bushifeld 1 Early Medieval features. Therefore, only one NISP (0.2%) and MNI (3.7%) were identified for this species.

As for dogs, this data is too small to provide information to draw reliable interpretations regarding cats, but seems possible to suggest that this species did not play a major role in the animal husbandry of the site.

Ageing

The specimen of cat found in Lismore 1/Bushfield or Maghernaskeagh 1 died between the 8.5 and the 11.5-20 months of age. Unfortunately, this data does not provide much information to support any theory regarding the role of cat on the site during the Early Medieval phase.

Fusion in Cat	Skeletal Elements/Zones	Age in months	No. Fused	No. Unfused
Early Fusing	HU dist	8.5 months	1	0
	Total Early Fusing		**1**	**0**
Late Fusing	HU prox	11.5-20 months	0	1
	Total Early Fusing		**0**	**1**

Table 22. NISP of fused (fused and fusing) and unfused Early Medieval Cat classified under early, middle or late-fusing stages following Habermehl (1961) and Smith (1969).

Sexing

No sexing could be done on the cat specimen from this phase in Lismore 1/Bushfield or Maghernaskeagh 1.

Taphonomy

The specimen of cat found on the site did not present any taphonomic modification.

Pathology and non-pathological condition

No pathological or non-pathological conditions were observable in the cat humerus found in Lismore 1/Bushfield or Maghernaskeagh 1.

Measurements and osteometry

The humerus of cat found in this site could not be measured in any skeletal zone.

Livestock economy

Closely related to dogs, as mention before, cats did not seem to have a function in the economic sphere of Lismore 1/Bushfield or Maghernaskeagh 1. Culling of cats was most probably practiced; therefore most cats have died out of natural causes and were disposed in food waste areas without being previously defleshed.

Post Medieval Assemblage

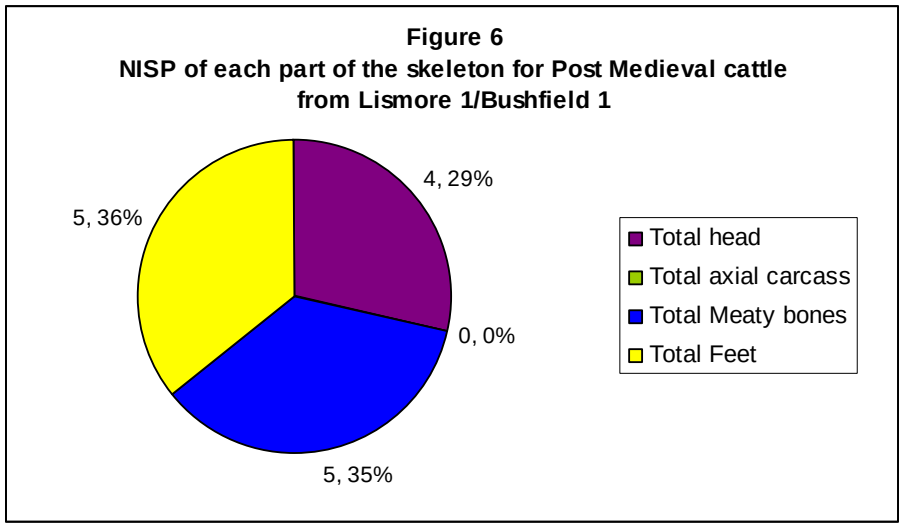
Element	Cattle	Sheep	Deer	Horse	Pig	Total
AN	-	-	3	-	-	3
AS	1	-	-	-	-	1
CR	1	-	-	-	-	1
HC	1	-	-	-	-	1
HU	-	1	-	-	-	1
LMT	4	-	-	1	-	5
LXT	3	-	-	-	-	3
MC1	2	1	-	-	-	3
MN	2	-	-	-	-	2
MT1	1	-	-	-	-	1
PE	-	1	-	-	-	1
PH1	1	-	-	-	-	1
RA	2	1	-	-	1	4
SC	2	-	-	-	-	2
TI	1	-	-	-	-	1
TNF	**21**	**4**	**3**	**1**	**1**	**30**
NISP	**21**	**4**	**3**	**1**	**1**	**30**
NISP %	**70**	**13.3**	**10**	**3.3**	**3.3**	**100**
MNI	**1**	**1**	**1**	**1**	**1**	**5**
MNI %	**20**	**20**	**20**	**20**	**20**	**100**

Table 23. TFN, NISP and MNI by species and skeletal elements for Post-Medieval Lismore1/Bushfield or Maghernaskeagh 1.

Post Medieval Cattle

Identification and quantification

Cattle is the most common species in the Post-Medieval period with 21 NISP (70% of the total NISP). As mentioned for the Early Medieval phase cattle is a highly valuable species since it can provides a great deal of uses and products.



The skeletal distribution (figure 6) is fairly equivalent for each part of skeleton, with the exception of the axial carcass which is absent from the assemblage. This distribution would account for complete use and disposal in the same area of the whole carcass of cattle. Possibly, this distribution could also be suggesting more a secondary use of cattle rather than a meat-based exploitation. But the size of the assemblage does not permit drawing reliable interpretations regarding the cattle husbandry practices.

Ageing

The method of ageing cattle using the tooth and mandible wear stages, detailed in table 24, shows that only the age for two specimens could be determined. One of the specimens was around 40 months of age (3.3 years of age) while the second one died older than 50 months of age.

Species	Element	NISP	dp4	P4	M1	M2	M12	M3	Higham MWS	Estimated age in months
Cattle	LMT	1	-	-	-	-	a	-	-	-
	LMT	2	-	-	-	-	f	-	-	-
	LMT	1	-	a	-	-	-	-	20	40
	MN	1	-	j	m	l	-	l	23	Over 50

Table 24. Tooth Wear Stages (Grant, 1982) in loose mandibular teeth and Mandible Wear Stages (Higham, 1967) for Post Medieval cattle.

Fusion in Cattle	Skeletal Elements/Zones	Age in months	No. Fused	No. Unfused
Early Fusing	MC1 prox	before birth	1	0
	PH1 prox	before birth	1	0
	SC prox	7-10 months	1	0
	RA prox	12-18 months	1	0
	Total Early Fusing		**4**	**0**
Middle Fusing	MC1 dist	24-30 months	1	1
	TI dist	24-30 months	1	0
	MT1 dist	33-36 months	0	1
	Total Early Fusing		**2**	**2**
Late Fusing	RA dist	42 months	0	1
	Total Early Fusing		**0**	**1**

Table 25. NISP of fused (fused and fusing) and unfused Post-medieval cattle classified under early, middle or late-fusing stages following Reitz and Wing (1999).

The epiphyseal fusion of long bones from the cattle assemblage from post-medieval times demonstrates that a similar number of specimens were killed and survived the 24 and 36 months of age, while another specimen did not survived the 42 months of age (table 25).

As seen previously, Hambleton (1999) states that cattle kept longer than 18-42 months old mainly exploited for secondary uses, since this spam of time represents the optimum age for cattle to be used as meat suppliers. Therefore, the incidence of killings between 24-42 months of age corresponds to cattle killed with meat-consumption purposes, while those kept for longer could have been used for milk, breeding stock and/or working animals.

Sexing

Only one metacarpal distal breadth could be measured. This measurement suggests that the specimen was a female, and although only one specimen could be sexed it could suggest the possible practice of sex-based killings to ensure breeding and milking stock.

Taphonomy

Two specimens of cattle presented taphonomic modifications: one burnt bone and one butchery mark. The presence of a burnt mandible appears to be a consequence of the disposal of waste bones close to fires or used to fire fuel.

The butchery marks present in Post-medieval Lismore 1/Bushfield or Maghernaskeagh 1 are associated with the use of horn core as a raw material, elements that were chopped and cut to separate them from the cranium of the specimen and to be worked on.

Pathology and non-pathological condition

No pathological or non-pathological modified cattle fragments were observable in Lismore 1/Bushfield or Maghernaskeagh 1's post-medieval phase.

Measurements and osteometry

Only two measurements were taken from the fragments that make up the cattle assemblage from this period (Table 26), but no analyses such as Estimated Withers Heights, bivariate plots and log ratios could be carried out from them.

Species	Element	NISP	Bd
Cattle	MC1	1	52.8
	TI	1	55.4

Table 26. Details of measurements (in mm.) by skeletal elements for Post Medieval cattle following Von Den Driesch (1976), Payne and Bull (1988) and Davis (1992).

Livestock economy

Cattle in the post-medieval phase in Lismore 1/Bushfield or Maghernaskeagh 1 seems to have been used for secondary uses, although meat was the primary product exploited. Cattle might have been bred on the site, although it is not possible to asseverate. A great deal of specimens died between 24 and 40 months of age, probably males, while females could have been kept for longer than 50 months of age to be used as secondary product providers and breeding stock.

The slaughtering, butchery and disposal of the cattle bones was mostly done in the same area. Horn cores could have been used as a raw material for artefacts and object production, while other bones less suitable for work could have been used as fuel for fires.

Post Medieval Sheep

Identification and quantification

The second most frequent species in Lismore 1/Bushfield or Maghernaskeagh 1 is sheep with 4 NISP (13.3% of total NISP is this phase) and 1 MNI (20%) (table 23). As mentioned before, sheep is an important species to be kept (although in lesser degree than cattle) due to the multiple uses and products that it provides such as meat, wool, milk, skin, etc. (Hambleton, 1999).

The size of the assemblage of sheep for the post-medieval phase of Lismore 1/Bushfield or Maghernaskeagh 1 is too small to account for a reliable skeletal distribution. But the predominance of meaty bones with a minor representation of feet bones could suggest that sheep were used mainly as meat providers.

Ageing

No assessment of tooth wear stages (Payne, 1973; 1987) or mandible wear stages (Higham, 1967) could be carried out in the post-medieval sheep assemblage. Furthermore, the epiphyseal fusion of long bones information does not give a reliable support to make interpretations, although it seems that some specimens were killed after 42 months of age and other before 36 months of age (Table 27).

Fusion in Sheep	Skeletal Elements/Zones	Age in months	No. Fused	No. Unfused
Early Fusing	MC prox	before birth	1	0
	PE	6-10 months	1	0
	RA prox	3-10 months	1	0
	Total Early Fusing		**3**	**0**
Late Fusing	HU prox	36-42 months	0	1
	RA dist	36-42 months	1	0
	Total Late Fusing		**1**	**1**

Table 27. NISP of fused (fused and fusing) and unfused Early Medieval sheep classified under early, middle or late-fusing stages following Reitz and Wing (1999).

As mentioned before, it is difficult to draw interpretations from this analysis due to lack of data. According to Hambleton (1999) sheep used as meat suppliers would be killed between 18 and 36 months old, something that is reflected in the data. On the other hand, specimens kept for longer would be more exploited for other products such as wool or milk, another trend found in this sheep assemblage. Therefore, it seems possible to propose that sheep was exploited with several uses, although it is hard to establish to what extent meat or secondary products were more appreciated than the other.

Sexing

No assessment of sheep sex could be done.

Taphonomy

No taphonomic modifications were observable in any of the sheep fragments from the post-medieval phase in Lismore 1/Bushfield or Maghernaskeagh 1.

Pathology and non-pathological condition

No pathological or non-pathological conditions were found in this sheep assemblage.

Measurements and osteometry

Only one sheep specimen could be measured in one skeletal zone (Table 28), impeding that any further analyses regarding measurements and size of the specimens could be carried out.

Species	Element	Bp
Sheep	MC1	19

Table 28. Details of measurements (in mm.) by skeletal elements for Post Medieval sheep following Von Den Driesch (1976), Payne and Bull (1988) and Davis (1992).

Livestock economy

The small number of sheep fragments that make up the post-medieval sheep assemblage in Lismore 1/Bushfield or Maghernaskeagh 1 do not provide enough data to give conclusive interpretations regarding the husbandry of this species. Nonetheless, it is possible to say that sheep were used for meat and secondary uses, although meat might have been more exploited than wool or milk.

Post Medieval Deer

Identification and quantification

3 NISP (10% of the total NISP for this phase) make up the deer assemblage found in Lismore 1/Bushfield or Maghernaskeagh 1's post-medieval features (table 23). All these specimens are antlers and demonstrate that this industry was important on the site, most probably to be used as raw material for objects and artefacts.

Ageing and sexing

The presence and characteristics of antlers suggest that these elements came from adult male specimens.

Taphonomy

No taphonomic modifications, particularly butchery, were found in any of the antlers found in Lismore 1/Bushfield or Maghernaskeagh 1. This absence might not be use, thought, to discard the idea of antler been used as raw material for producing artefacts and objects.

Pathology and non-pathological condition

Any of the antlers that came from the post-medieval features of Lismore 1/Bushfield or Maghernaskeagh 1 presented pathologies or non-pathological conditions.

Measurements and osteometry

No measurements were taken in any of the antlers found in this deer assemblage.

Livestock economy

The presence of deer antler, although not abundant compared with other species, shows that antler was appreciated and used in Lismore 1/Bushfield or Maghernaskeagh 1 as raw material. It is hard to establish to what extent it was used or if antler were obtained only by collecting shed antlers or hunting deer.

Post Medieval Horse

Identification and quantification

Only one fragment of horse was found in the post-medieval assemblage from Lismore 1/Bushfield or Maghernaskeagh 1. This specimen is represented by a mandibular molar or pre-molar. No major interpretations can be drawn from this element, besides the presence of horse in this phase of the site, probably as labour animals.

Ageing and sexing

No ageing or sexing analyses could be carried out in the horse specimen from post-medieval Lismore 1/Bushfield or Maghernaskeagh 1.

Taphonomy

This specimen of horse did not present any taphonomic modifications.

Pathology and non-pathological condition

The horse found in this assemblage did not show any pathological or non-pathological conditions.

Measurements and osteometry

This horse tooth was not measured.

Livestock economy

As previously mentioned, the fragment of horse found in this assemblage cannot be used to conclude any major interpretations, more than the possibility of horses been kept in post-medieval Lismore 1/Bushfield or Maghernaskeagh 1 as working beasts.

Post Medieval Pig

Identification and quantification

One radio of a pig was found in the post-medieval phase of Lismore 1/Bushfield or Maghernaskeagh 1. This meaty bone could suggest that pigs were exploited on the site as meat suppliers, although it is impossible to conclude to what extent.

Ageing and sexing

No ageing or sexing assessments could be done on this specimen.

Taphonomy

No taphonomical modifications were observable in this pig specimen.

Pathology and non-pathological condition

The pig specimen from the post-medieval phase was not affected by any pathological or non-pathological conditions.

Measurements and osteometry

The only pig specimen from post-medieval Lismore 1/Bushfield or Maghernaskeagh 1 could not be measured.

Livestock economy

As mentioned previously, the only interpretation that can be drawn form this pig element is the possibility of this species been kept on the site during this period, possibly to consume their meat and lard.

4. Comparisons

Early Medieval period comparisons

The Early Medieval period from Lismore 1/Bushfield or Maghernaskeagh 1 can be compared with other sites from the same phase in Ireland including Blanchfieldsland (Beglane, 2005), Sligo Inner Relief Road Site 2B (Beglane, 2007), Ballycasey (Boner, 2003b), Johnstown 1 (Boner, 2003a), Knowth (McCormick and Murray, 2007) and Parknahown 5 (Tommasino, 2008a).

Early Medieval Cattle

Lismore 1/Bushfield or Maghernaskeagh 1 shows an unusual percentage of cattle (73.9% of total NISP and 55.6% of total MNI for the Early Medieval phase), higher than in any other compared site from the same period in Ireland. Knowth and Parknahown 5 are the

two sites that present the higher amount of cattle, slightly superior than 50%, although the predominance of cattle is also recognised in Ballycasey, Blanchfieldsland, Sligo Inner Relief Road Site 2B and Johnstown 1. The interpretation of this prevalence in all sites is associated to the importance of cattle as multiple use species.

Knowth and Parknahown 5 also reflect a higher number of meaty bones over feet and head elements, trend that is interpreted in all sites as important exploitation of meat. However, all sites confirm the usage of cattle also for secondary products, especially due to the presence of other parts of the carcass as in Lismore 1/Bushfield or Maghernaskeagh 1.

This exploitation of cattle was also confirmed by the age profiles in Early Medieval Ireland. All sites show two peaks of slaughtering cattle, one in a perfect age to exploit meat and a second one that suggests old specimens kept as secondary products providers. Lismore 1/Bushfield or Maghernaskeagh 1 is the only site in which the meat-related peak is not as evident, while the peak for older specimens used for milk, labour or breeding stock is similar. This might suggest that Lismore 1/Bushfield or Maghernaskeagh 1 did not practice the same method of cattle killings as other sites, where seasonal killing might have been more popular than specimen-related slaughtering. Nevertheless, this is a difficult interpretation to be confirmed.

Female cattle are evidently dominant in Early Medieval sites from Ireland, especially in Ballycasey, Knowth and Parknahown 5. Therefore, it is agreed that the first peak of killings was applied mostly on males producing a record high frequency of old females.

Regarding butchery marks Parknahown 5 is the most similar site to Lismore 1/Bushfield or Maghernaskeagh 1, where signs of defleshing and dismemberment were evidenced by cut marks in meaty bones, while in Knowth butchery tended to be done by chopping instead of knives cutting as seen in Parknahown 5 and Lismore 1/Bushfield or Maghernaskeagh 1. The other sites present butchery practices absent in Lismore 1/Bushfield or Maghernaskeagh 1 as horn core removal, decapitation and split of the axial carcass.

Similar pathologies in cattle are reported for Blanchfieldsland, Knowth and Parknahown 5 most of them are related with biomechanical stress in working specimen. Furthermore, Parknahown 5, as Lismore 1/Bushfield or Maghernaskeagh 1, presents the same condition of V-shape wear of molars, also associated with bits for ploughs.

The EWH calculated for Lismore 1/Bushfield or Maghernaskeagh 1 fit perfectly in all the ranges of cattle stature identified in Ballycasey, Johnstown 1, Parknahown 5 and Knowth.

In general terms, Lismore 1/Bushfield or Maghernaskeagh 1 cattle husbandry practices fit an Early Medieval trend where cattle were used for meat but possibly even more for secondary uses. Nevertheless, important traits shows differences, especially in the killing patterns, since in Lismore 1/Bushfield or Maghernaskeagh 1 a meat consumption peak is hardly identified in a specific month as in other sites.

Early Medieval Pig

Although in most sites from Early Medieval Ireland pigs are the second most frequent species as in Lismore 1/Bushfield or Maghernaskeagh 1, but in our site the percentages are lower than in the other sites, where pig can represent between 11 and 17% of the total NISP.

The skeletal distribution of pigs with a higher presence of meaty bones is only recognised in Parknahown 5, since in Knowth head elements are predominant and Ballycasey demonstrates a fairly equitable distribution. In Parknahown 5 this distribution is interpreted as a consequence of the differential disposal of pig bones depending on their usage.

The peaks of killing in Early Medieval sites demonstrate differences, but Parknahown 5 and Knowth show close similarities with Lismore 1/Bushfield or Maghernaskeagh 1 with a higher amount of pig killings been done 17-29 months old. Younger killings were not as frequent but found in Lismore 1/Bushfield or Maghernaskeagh 1 are also reported for Ballycasey, Sligo Inner Relief Road Site 2B and Johnstown 1. This later pattern of not keeping pigs until optimum age to maximize the meat supply is associated to periods of food shortages.

Lismore 1/Bushfield or Maghernaskeagh 1 is characterised by the absence of pig butchery marks. This same trend was reported for Ballycasey, while in Knowth and Parknahown 5 some were identified, mostly related to defleshing of specimens. Therefore, a lack of butchery marks in pigs seems to be similar for all sites, probably related to the size of pigs and the ways of preparation. This could also be interpreted as a highly specialised butchery system in Early Medieval times.

Pig husbandry in the Early Medieval period seems to be fairly similar for most sites compared. However, major similarities are found between Lismore 1/Bushfield or Maghernaskeagh 1 and Parknahown 5 and Knowth.

Early Medieval Deer

In general terms, deer in Lismore 1/Bushfield or Maghernaskeagh 1 is more common than in any other Early Medieval site in Ireland. Most percentages in the sites compared are close to 3%, with the exception of Sligo Inner Relief Road Site 2B with almost 11% of deer elements.

In most sites it is evident that antlers are by far more common than post-cranial elements (with the exception of Johnstown 1 phase 1) as in Lismore 1/Bushfield or Maghernaskeagh 1. Nevertheless, Knowth, Johnstown 1 and Parknahown 5 reported that some hunting was practiced, suggesting the incidental consumption of venison although the exploitation of antlers was the main use for deer.

Early Medieval Sheep

Sheep is the second or third most important species in all sites compared with Lismore 1/Bushfield or Maghernaskeagh 1. This highly contrasts with the fact that in this site sheep is the fourth species present with NISP percentages much lower than in any other Early Medieval site in Ireland.

The distribution of skeletal elements is poorly reported in most sites compared with Lismore 1/Bushfield or Maghernaskeagh 1 but Knowth and Parknahown 5 shows a slight predominance of meaty bones but with presence of all parts of the skeleton. Lismore 1/Bushfield or Maghernaskeagh 1 also shows dominance of meaty bones and an important presence of feet and head elements, but a lack of axial carcass elements.

The data for ageing sheep is to some extent difficult to compare, but it seems that Johnstown 1 and Parknahown 5's age distribution is more bias towards the multiple uses of sheep (for milk or wool), with some specimens kept until their maturity and adulthood. Knowth, in contrast, presented a peak of killings much younger that Lismore 1/Bushfield or Maghernaskeagh 1 (between 12 and 28 months of age). Therefore, seems that out site is more similar to Knowth where sheep were exploited for their meat, although specimens were killed younger.

Knowth and Parknahown 5 are the two sites from Early Medieval Ireland that present more quantity of butchered or any other taphonomic modified bones. Therefore, the absence or lack of taphonomic modifications is not infrequent in Early Medieval sites.

The sheep husbandry in Lismore 1/Bushfield or Maghernaskeagh 1 shows that sheep were mostly kept to use them as meat providers trend seen in Blanchfieldsland, Johnstown 1, Knowth and Parknahown 5, although in this sites secondary products (especially in the later one) seem to have been much more appreciated than in Lismore 1/Bushfield or Maghernaskeagh 1.

Early Medieval Horse

The recurrence of horse elements in Parknahown 5 (4%) and Sligo Inner Relief Road Site 2B (3%) are, although slightly higher than in Lismore 1/Bushfield or Maghernaskeagh 1, very similar. Sites such as Ballycasey, Johnstown 1, Parknahown 5 and Knowth show an equitable distribution of elements, which is explicitly related to the presence of articulated or semi-articulated specimens. Unfortunately, the small size of the assemblage in Lismore 1/Bushfield or Maghernaskeagh 1 does not permit any reliable distribution of skeletal parts for the site, not permitting major interpretations regarding this aspect.

Therefore, although the data for horses is not abundant in Lismore 1/Bushfield or Maghernaskeagh 1 it seems to follow what all sites in Early Medieval Ireland assume, suggesting that horses were mainly kept as working animals.

Early Medieval Dog

Blanchfieldsland, Johnstown 1, Parknahown 5 and Knowth all report the presence of dogs, although percentages can vary from 1 to 16% of total NISP. Furthermore, all these sites (with the exception of Johnstown 1) demonstrate a highly equitable distribution of skeletal elements, which would correspond to the idea that dogs were buried without been defleshed as mentioned for Lismore 1/Bushfield or Maghernaskeagh 1.

Furthermore, Parknahown 5, Ballycasey, Johnstown 1 and Knowth show similar age profiles that the specimen of dog found in Lismore 1/Bushfield or Maghernaskeagh 1 where deaths of adult dogs were apparently by natural causes.

The lack of butchery marks is common to most sites, with the exception of Parknahown 5 and Johnstown 1. Therefore, Early Medieval sites do not report important economic roles for dogs, although in the later sites they could have been occasionally used for pelts.

Early Medieval Cat

The presence of cat in the archaeological assemblage is reported for Parknahown 5, Blanchfieldsland and Knowth, although percentages are quite varied. All sites also report that cats found correspond to adult specimens, suggesting that cats most probably died out of natural causes. In Knowth and Parknahown 5 cats pelts were occasionally extracted after their natural deaths, while in Johnstown 1 is reported that immature cats were killed for their pelts. This is not evident in Lismore 1/Bushfield or Maghernaskeagh 1, but seems that no role was played in the economic sphere by cats on the site.

Post Medieval period comparisons

The majority of post medieval sites in Ireland present small amounts of animal bones assemblages. Therefore, comparisons cannot be extensive but might help in inserting Lismore 1/Bushfield or Maghernaskeagh 1 in the economic sphere of this period. Comparisons were drawn with Trevet 1 (Sloane, 2008) and Deanery Orchard (Svensson, 2007), Curragh 2 (Tommasino, 2008b) and Bushfield or Maghernaskeagh 3 (Tommasino, 2008c).

Cattle is without a doubt the most common species in all post medieval sites compared, although Lismore 1/Bushfield or Maghernaskeagh 1 seems to be the site with higher percentage of cattle specimens. Furthermore, sheep is the second most important species in all of the sites, while pig is the third most frequent in all sites except in Bushfield or Maghernaskeagh 3, where this species is absent. In Lismore 1/Bushfield or Maghernaskeagh 1 pig is not the third most recurrent species, place taken by deer, a species that is also present only in Deanery Orchard. Horse remains are also found in all the sites, although the percentages are highly variable.

The age profile for cattle in Lismore 1/Bushfield or Maghernaskeagh 1 is not identified in any of the sites, since in Deanery Orchard, Curragh 2 and Bushfield or Maghernaskeagh 3 adult cattle are dominant, while in Trevet 1 the peak of deaths happens in younger specimens than in Lismore 1/Bushfield or Maghernaskeagh 1. Nevertheless, most sites suggest that a combination of meat and secondary products exploitation of cattle was carried out, especially in Curragh 2 and Bushfield or Maghernaskeagh 3. Regarding sheep, Trevet 1 reports the killings of mature specimens, which could be the case in Lismore 1/Bushfield or Maghernaskeagh 1, although it is impossible to assess with high reliability.

Deanery Orchard shows an important predominance of meaty bones in cattle and sheep, as in Lismore 1/Bushfield or Maghernaskeagh 1, suggesting important role of these species supplying meat. Moreover, all four sites are similar to Lismore 1/Bushfield or Maghernaskeagh 1 in the lack of butchery marks.

5. Conclusions

Lismore 1/Bushfield or Maghernaskeagh 1 shows similar trends in animal husbandry to other Early Medieval and Post Medieval sites from Ireland, and provides important interpretations of animal husbandries, especially for the first period.

In general terms, the Early Medieval phase of Lismore 1/Bushfield or Maghernaskeagh 1 shows a normal species distribution than the other sites compared with, although a higher amount of cattle and deer and a lower recurrence of sheep characterises this animal assemblage. Furthermore, the use of each species seems to be in accordance to the trend for the period, especially for pig, deer, sheep and horse.

Cattle, however, presents an important difference due to a possible lack of seasonal-based killings and an unusual high amount of cattle. This trend has not been identified in other sites in Early Medieval Ireland, impeding an important interpretation of this practice.

Pigs were almost exclusively used as meat suppliers; deer provide antler with an occasional contribution of venison; and horse provide labour as riding or ploughing. Sheep could have been used to provide milk and wool, but the data obtained from the archaeological assemblage only accounts for the important exploitation of lamb.

Therefore, Lismore 1/Bushfield or Maghernaskeagh 1 site shows distinctive features of ordinary waste of domestic food, except for horses, dogs and cats. No kitchen or specialized butchery areas were identified at the site and for some species as sheep and pig some skeletal elements less profitable were discarded somewhere else. This might indicate that butchery on our site was more restricted than in other sites and probably a great deal of butchery might have taken place in other areas.

The general characteristics of the animal archaeological assemblage indicate a rural site with no major signs of urban activity, where animal husbandry corresponded to local consumption of meat or secondary products and use of animals for labour. Cattle could be an exception to this trend, species that could haven been exported to other sites (taking into account slaughtering patterns and amount of specimens), but the lack of sustained comparisons and Irish references obstructs any reliable conclusion. On the other hand, cattle recurrence in Knowth is interpreted as consequence of the important role as currency and that the ownership of cattle could be an evidence of the high-status of the site. Nevertheless, even if the percentage of cattle found in Lismore 1/Bushfield or Maghernaskeagh 1 is atypical and higher than in Knowth (which might be due to the smaller size of the assemblage) it would be difficult to determine if the high number of cattle in Lismore 1/Bushfield or Maghernaskeagh 1 reflects a high status site, since the rest of the data does not seem to support this interpretation.

The Post-medieval animal husbandry, although only a small amount of data could be assessed, shows a general trend identified in Ireland, of a rural site represented by food waste of local consumption.

6. Recommendations

Further archaeological studies with contextual approaches would allow complementing and supporting the interpretations done about the nature and importance of Lismore 1/Bushfield or Maghernaskeagh 1, especially during the Early Medieval times.

Therefore, recordable and non-countable animal bones should be stored in the National Museum of Ireland under methods that would guarantee low-acid conditions to ensure the preservation of this assemblage.

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Appendix

Table 1. Skeletal elements and their abbreviation

Abbreviation	Element
AN	Antler
AS	Astragalus
CA	Calcaneus
CMC	Carpo-metacarpus
CO	Coracoid
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
SYN	Synsacrum
TI	Tibia
TMT	Tarso-metatarsus
TT	Tibio-tarsus
UL	Ulna
VC1	Atlas
VC2	Axis

8.7 Appendix 7: Metal artefacts report

Report on the Metal Artefacts from the M7 Portlaoise to Castletown/

M8 Portlaoise to Cullahill Motorway Scheme, Contract 2

For Archaeological Consultancy Services

By

Órla Scully, MA MIAI

Introduction

There were metal finds from seven excavations in contract 2. The sites are: Derrinsallagh 3 (E2179), Derrinsallagh 4 (E2180), Derrinsallagh 5 (E2181), Derryvorrigan 1 (E2193), Lismore/Bushfield or Maghernaskeagh 1 (E2220), Bushfield or Maghernaskeagh 3 (E2224) and Bushfield or Maghernaskeagh 6 (E2457). In total there were 50 metal artefacts from contract 2.

The results of the examination are given in the catalogue. The finds are listed according to their National Museum of Ireland registration no. The next listing is the site name, followed the feature from which the artefact was recovered, the finds no; what the object is, what metal type it is, its description; the dimensions and under what category it functioned as.
The measurements are all given as millimetres. The format of measurement is length by breadth by width. In the case of circular objects, the letter 'd' preceding a measurement indicates a diameter. When giving measurements of nails, the first measurement gives length, followed by the max width of the head, followed by the max width of the shaft. If an object is fragmented, the dimensions of the largest piece are given, with the prefix 'max'.
The objects are assigned a function to facilitate discussion. The details of each artefact are given in the catalogue which follows the discussion. The finds from contract 2 fall under several functional categories; coinage, domestic, dress, horse equipment, keys and locks, knives, miscellaneous, structural and tools. Where possible, a type and date range for an artefact is given. Where comparative material from other site can be found it is also given, with full bibliographical references.

Coinage

There were two coins from the Contract 2 assemblage. That from Derryvorrigan 1 (E2193:1:1) is a King George half penny. The date is not visible, but would be one of three possible reigns, spanning a date range from 1714 to 1830. The second coin from Bushfield or Maghernaskeagh 6 (E2457:6:15), is an 'old' penny. The surface detail is obscured, but the vague outline of a head would indicate an English penny, probably late 19th or early 20th century.

Domestic

This bowl approximates to a modern 'tablespoon' size. Medieval spoons tend to be spatulate in shape. The later medieval spoons have characteristic fig-shaped bowls.[1] The two spoons from Bushfield or Maghernaskeagh 6 (E2457:6:3 & 5) are early modern.

A copper alloy strip from Derrinsallagh 3 (E2179:279:1), with one of the long sides smooth, the other showing signs of being ripped from the original object may represent the rim of a platter or bowl. Both terminals have rivet holes at the point of the break. The strip may alternatively have formed the rim of a cauldron. The 'bronze' tripod cauldron seems 'first to have appeared on the Continent towards the end of the twelfth century and was used in England in the thirteenth and increasingly in the fourteenth an fifteenth centuries'. [2] Earlier vessels of course exist, such as the hanging lamp from Ballinderry Crannóg 1, believed to date to the 10th century. This had a strip of flat bronze, riveted onto the upper edge of the bowl to give additional strength to the bowl. It was secured by twelve rivets set at rather unequal intervals.' [3]

Dress

A button from Bushfield or Maghernaskeagh is a mass produced copper variety (E2457:6:1). Flat copper-alloy disks predominated in the second half of the eighteenth century[4] and continued in use especially in shirts, right through to the early 20th century.

Of greater antiquity is the shank of a ringed pin found in Lismore/Bushfield or Maghernaskeagh 1 (E2220: 148:1). A ringed pin consists of a pin with a loose swivel ring inserted through the head of the pin. Sometimes the head has faceted sides to accommodate the terminals of the pin, in other cases, such as the example from Lismore/Bushfield or Maghernaskeagh 1; the head is perforated to accept the ring. The ring in this case did not survive. The hole, (post conservation) is only 3mm. These functioned as dress or cloak fasteners and are Viking Age/Early Medieval in date. They are the forerunners of the medieval stick pin, which are plentiful in the Irish urban medieval record. The ringed pin form appears to 'have originated in Ireland sometime during the late fourth of early fifth century A.D.'[5] The type continued in use in Dublin until the end of the 11th century. A shank fragment from Derrinsallagh (E2179:450:3) may be part of a ringed pin.

Two buckles, form Lismore/Bushfield or Maghernaskeagh 1 (E2220:820:1) and Derrinsallagh 3 (E2179:449:1) are made of iron. They both have plates attached. The latter is an oval shape

[1] Brisbane, (1990) 832
[2] Biddle (1990)947
[3] O Neill Hencken (1936) 193
[4] Noël-Hume, I (1991) 88
[5] Fanning, (1994) 52

with the plate passing through the buckle and folded over and a gap at the point of the fold allowed the pin, or tongue to protrude. The Lismore/Bushfield or Maghernaskeagh buckle is a small D-shaped buckle with a little copper alloy detail riveted to one side. The plate is rolled over the straight side of the buckle. The leather or fabric would have been sandwiched between the plates. Small buckles like these could have had multiple uses. In London 'the relatively small number of iron frames [of buckles] from the earlier part of the sequence is striking'.[6] Buckles with plates attached enter the developmental sequence in London in the mid 14th century. Iron appears as a material for strap ends in the late 13th/early 14th century, (ibid).'The various D-shaped iron buckles are the most common individual form of buckle from Winchester, as from medieval contexts nationally, and their different shapes and sizes, many plain but some decorated, indicated that they were an all-purpose type'. [7] Medieval iron buckles from Winchester date from the 11th century. Larger iron buckles are usually associated with horse tack. These small buckles from Contract 2 are items of personal dress, most probably from belts.

Horse Equipment

The only artefact from this category is a horseshoe nail. The rectangular head is an expansion of the shaft. This type postdates the larger headed nails which were countersunk into the shoe. The new type of shoe which was characterised by nails tapering in profile appeared in England before the middle of the 14th century. [8]

Keys and Locks

A barrel padlock key from Derrinsallagh 3 is the only item in this functional group. The long narrow shank has a closed looped bow. The bit is simple; a curved terminal at right angles to the shank and may have suffered some damage. An example with a bifurcated bit from Anglo-Scandinavian levels at York 'would have released the lock springs with a levering, rather than sliding, motion.[9] 'Box padlocks with internal mechanisms incorporating leaf springs were in use until the eleventh century and barrel padlocks with similar mechanisms were in use at the same time and continued in use throughout and beyond the medieval period'.[10]

[6] Egan & Pritchard (1991)21
[7] Goodall, (1990) 526
[8] Clark, (1986) 3
[9] Ottaway, (1992) 675
[10] Goodall, (1990) a, 1001

Knives

There were four knives from Contract 2. Two from Derrinsallagh 3 most closely approximate to Goodall's Type B. (E2179:448:2 & 449:2). Type B is characterised by a flat blade-back, which angles down to the tip, with a straight or curved cutting edge. In the case of the Derrinsallagh artefacts, the blade back is straight, and the cutting edge slopes to meet it. This type is dated by Goodall from the ninth century to not later than the fourteenth century. The other knives from the assemblage (E2220:1:11 & 244:1) are Type C This type is recorded prior to the tenth century and is found in limited numbers in late medieval contexts. Type C has the cutting edge and the flat back parallel before both taper to the tip.

Miscellaneous

This encompasses all scrap and various bars, rings and straps which do not readily reveal their function, or indeed may be multifunctional. Included here is an early modern vessel (E2224:304:1 & 2) of unknown alloy. The flattened spherical vessel has an elongated neck, complete with screw cap. A piece of the same metal may be a stand. The spiral wound stopper is a modern invention and perhaps the object functioned as a bed warmer.

Structural

The majority of the artefacts in this section were nails and rivets. The nails were all rectangular sectioned with round heads where they survived. These nails are ubiquitous on medieval and earlier sites when nails were hand wrought. There is little difference between the medieval examples from Contract 2 and those recovered from the Iron Age site at Freestone Hill Co. Kilkenny. It was not until 'about 1790 the first cut nails were produced…sliced by machine from sheet iron'[11], though that did not preclude the continuing production by hand. Four rivets were identified. This distinction was really a matter of size and solidity. These objects could be called large nails but they were heavier and more bulky. Rivets are used to fit heavy timbers together- also known as clench bolts- they are often found in association with boats in Viking and medieval contexts. In essence a rivet 'consisted of a nail which, once passed through the timbers to be joined, had a small pierced plate, the rove, set over its tip. The tip was then burred or hammered over [clenched] to hold the bolt in position'[12]. Other structural artefacts include several examples of strap hinges, none complete. These would have attached to wooden doors, or large chests, and are eyed hinges are 'known from contexts of the tenth to fourteenth century.'[13] Several pieces of building ironwork were

[11] Noël Hume (1991), 253
[12] Ottaway, (1992), 615
[13] Goodall, (1990) b 331

recovered from the vernacular house in Bushfield or Maghernaskeagh 6. These quaint latches and window clasps are fast fading from memory. The acorn-shaped knob of the window latch (E2457:6:9) is in perfect condition. These can date from the late 18th century.

Tools

Finally, a bill hook or sickle from Bushfield or Maghernaskeagh 6 is a well preserved iron tool. This is a reaping tool, with a long tradition in the folk history of Ireland. 'The scythe and the iron hook have their origin in the Early Iron Age, and some methods of securing the crop can have changed little in two thousand years.[14]'

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[14] Evans (1958)95

Catalogue of Metal Artefacts Contract 2
From the M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme, for A.C.S. Ltd

museum	site	feature	finds no	object	metal	description	dimensions	function
E2179	Derrinsallagh 3	0001	006	nail	iron	rectangular shaft, shattered into fragments	max 18 x 9 x 8	structural
E2179	Derrinsallagh 3	0001	014	nail	iron	damaged head with rectangular shaft	70 x 13 x 9mm	structural
E2179	Derrinsallagh 3	0001	015	sheet metal	iron	irregularly shaped flat scrap with corrosion products	38 x 35 x 21mm	misc
E2179	Derrinsallagh 3	0001	016	bolt	iron	round headed with square sectioned shaft, penetrates a circular washer, modern	67 x d 23 x 12mm	misc
E2179	Derrinsallagh 3	0001	017	rivet	iron	damaged round head with robust tapered square to rectangular shaft	69 x 23 x 15mm	structural
E2179	Derrinsallagh 3	0109	001	rivet	iron	damaged round head with robust tapered rectangular shaft, which is incomplete	36 x 22 x 12mm	structural
E2179	Derrinsallagh 3	0205	001	strap	iron	flat strap with rectangular section, rounded at one end, broken and corroded at opposite end	56 x 13 x 11mm	misc
E2179	Derrinsallagh 3	0279	001	vessel rim	cu alloy	long fairly pliable strap with one of its long edges evenly finished, other long side torn from vessel, incomplete, rivet holes at both points of break	162 z 19 x 2mm	domestic
E2179	Derrinsallagh 3	0448	001	strap	iron	rectangular flat piece, function unknown	38 x 28 x 7mm	misc
E2179	Derrinsallagh 3	0448	003	nail	iron	large rectangular head has one rounded side indicating originally round headed, rectangular tapered shaft	42 x 22 x 7mm	structural
E2179	Derrinsallagh 3	0450	003	pin	iron	tapered long circular-sectioned pin, possibly of ring pin	111.5 x d 5.5 - d 4mm	dress?
E2179	Derrinsallagh 3	0451	001	barrel padlock key	iron	long narrow shank, rectangular, closed looped bow, bit is simple, shank curved at right angles into open loop	118 x 9 x 4mm	keys and locks
E2179*	Derrinsallagh 3	0448	002	knife	iron	blade back is straight, blade edge slopes up to meet tip. The tang is set centrally	97 x 24 x 5mm	knives
E2179*	Derrinsallagh 3	0449	002	knife	iron	blade back straight, The blade edge is also straight but inclines upwards to point. Tang (whittle) is set high, not quite in line with back, sloped shoulder above and below tang	129 x 17 x 10mm	knife

museum	site	feature	finds no	object	metal	description	dimensions	function
E2179*	Derrinsallagh 3	449	001	buckle	iron	small oval buckle with relatively long rectangular plate attached, Plate is folded through buckle, with gap at point of fold through which pin originally protruded. Pin has moved, but still intact. Rivet in plate	55 x 21 x 12mm	dress
E2180	Derrinsallagh 4	0001	001	rivet	iron	heavy rectangular head with part of rectangular shaft	27 x 18 x 14 mm	structural
E2181	Derrinsallagh 5	0003	001	nails	iron	2 nail shafts, tapered, rectangular in section	max 45 x 10 x 9	structural
E2193	Derryvorrigan 1	0001	001	coin	cu alloy	king george half penny, surface detail unclear but the word 'Georgius' is visible	d 28 x 2mm	coinage
E2193	Derryvorrigan 1	0144	001	bar	cu alloy	short slightly tapered incomplete bar, function unknown	19 x 5 x 3.5mm	misc
E2193*	Derryvorrigan 1	0159	001	ring	iron	not a finger ring, small circular band, rectangular cross-section	d 13.5 x 2mm- int d 8mm	misc
E2220	Lismore Bushfield 1	0001	009	nail	iron	corroded lump, with pointed tip emerging from corrosion products, poss nail shaft	29 x 17 x 13mm	structural
E2220	Lismore Bushfield 1	0001	011	blade	iron	corroded triangular-sectioned piece of blade, back and edge of blade parallel	34 x 20 x 9mm	knives
E2220	Lismore Bushfield 1	0001	013	scrap	iron	roughly triangular shaped flat piece, not a blade, even thickness	39 x 26 x 8mm	misc
E2220	Lismore Bushfield 1	0001	014	staple	iron	poor condition, rectangular sectioned shaft bent at both ends, one leg is detached- in two fragments	71 x 21 x 11	structural
E2220	Derrinsallagh 3	0001	018	strap hinge	iron	thick strap with rectangular rivet hole, one end tapered unevenly to snub point	63 x 33 x 6mm	structural
E2220	Lismore Bushfield 1	0148	001	ring pin	iron	small ringed pin, circular shaft in 3 pieces with small circular eyed head,, (aperture post conservation 3mm) measurement for combined pieces.	55 x 6 x 5mm	dress
E2220	Lismore Bushfield 1	0174	001	unident	iron	tapered, flattened rectangular- sectioned object, tentative i.d. curved, poss bent tang	36 x 9 x 5mm	misc
E2220	Lismore Bushfield 1	0186	001	buckle pin?	iron	short square-sectioned bar, tentative i.d.	27 x 3.5 x 3.5mm	dress?

museum	site	feature	finds no	object	metal	description	dimensions	function
E2220	Lismore Bushfield 1	0244	001	knife	iron	whittle-tanged blade, triangular in section, short tang set low in line with blade edge, blade edge and blade back are parallel, point missing	63 x 19 x 4mm	knives
E2220	Lismore Bushfield 1	0271	001	nail?/brooch pin?	iron	arched rectangular sectioned pin, with corroded neck, round head at right angles to shaft, this may be a corroded nail which gives the appearance of something more significant	57.5 x 8 x 7mm	dress?
E2220	Lismore Bushfield 1	0320	001	strap hinge	iron	flat long strap, with rivet holes on the centre line. Narrower end is rounded off, broken at broader end, in two pieces, measurement of entire object	190 x 30 x 3mm	structural
E2220	Lismore Bushfield 1	0320	002	nail	iron	corroded lump, with pointed tip emerging from corrosion products, poss nail shaft	27 x 14 x 11mm	structural
E2220*	Lismore Bushfield 1	820	001	buckle	iron	small D-shaped buckle with plate rolled over straight side of buckle. Lozenge shaped strip, (cu alloy) rivetted to one side, rivets pierce double thickness of plate, eyelet visible on reverse side of plate	22.5 x 22 x 9mm	dress
E2224	Bushfield 3	0302	001	nail	iron	tapered shaft, bent near point, head missing	44 x 11 x 9mm	structural
E2224	Bushfield 3	0304	001	vessel	alloy	hollow spherical object, composed of 2 cast hemispheres, uneven edged holes at either end, one at base appears damage related, the other opening accomodated the neck # 0304:002	d 176 x 109mm	misc
E2224	Bushfield 3	0304	002	vessel neck	alloy	neck of vessel # 0304:001, tapered cylinder, widened at one end where it was attached to main vessel, also a stopper, with circular top and spiral wound narrower cork to be inserted into neck	88 x 41 x 36mm	misc
E2224	Bushfield 3	0304	003	vessel base?	alloy	circular collar with central aperture, somewhat squashed, possible base of vessel 0304:001	114 x 54 x 40mm	misc
E2224	Bushfield 3	0309	001	rivet?	iron	sub-rectangular sectioned curved bar	61 x 18 x 16mm	structural?
E2224	Bushfield 3	0309	002	horseshoe nail	iron	rectangular head formed from expansion of rectangular shaft	43 x 12 x 11mm	horse equipment
E2224	Bushfield 3	0309	003	strap hinge?	iron	flat rectangular sectioned bar, which is slightly tapered, possible part of strap hinge, incomplete	54 x 34 x 11mm	structural
E2224	Lismore Bushfield 1	0309	005	strap	iron	folded over strap, rectangular in section, function unknown	48 x 30 x 12mm	misc
E2457	Bushfield 6	0006	001	button	cu alloy	cirular flat with indent at centre which has 2 holes for thread	d 16.5 x 2mm	dress

museum	site	feature	finds no	object	metal	description	dimensions	function
E2457	Bushfield 6	0006	003	spoon handle	iron	part of bowl of spoon, flat, rectangular-sectioned handle with terminal rounded off	135 x 26 x 5mm	domestic
E2457	Bushfield 6	0006	005	spoon	iron	elongated bowl, tablespoon sized, only a small stump of handle handle remains, some barbed wire associated	79 x 42 x 9mm	domestic
E2457	Bushfield 6	0006	013	strap	cu alloy	pliable flat strap expanded slightly in centre, terminates in thickened solid semi circle. Opposite end is a straight cut across. 3 perforations one small rivet	84 x 15 x 3mm	misc
E2457	Bushfield 6	0006	014	window lead	lead	strip of lead, does not have the H-frame of a came, but is grooved at either end, thickened in the middle,	98 x 9 x 8mm	structural
E2457	Bushfield 6	0006	015	coin	cu alloy	though poor surface detail, same size as old penny, albeit worn. Vague outline of head of monarch on one side probably indicates English penny	d 30 x 1.3mm	coinage
E2457*	Bushfield 6	006	006	door latch	iron	Rectangular bar with a semicircular projection above and below one facet. The first to provide a mechanism by which to lift the latch, the second forms loop to attach to pivot.	77 x 14 x 13mm	structural
E2457*	Bushfield 6	006	007	bill hook	iron	tanged implement with semi-circular blade, tip missing. Blade near tang is complete, but the working edge much abraded. Tang is tapered rectangular (whittle).	260 x 91 x 6mm	tools
E2457*	Bushfield 6	006	009	window latch	cu alloy	Acorn-shaped knob riveted through a perforated, round-ended bar which is rectangular with small semi-circular projection and raised ridge. Grooved underneath	40 x 33 x 17mm	structural

8.8 Appendix 8: Archaeometallurgical residues report

GeoArch

Report 2008/27

Evaluation of Archaeometallurgical residues from the M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme Contract 2: Lismore-Bushfield or Maghernaskeagh 1 (E2220)

Dr Tim Young

12th December 2008

Evaluation of Archaeometallurgical residues from the M7 Portlaoise to Castletown/M8 Portlaoise to Cullahill Motorway Scheme Contract 2: Lismore-Bushfield or Maghernaskeagh 1 (E2220)

Dr T.P. Young

Abstract

This site has produced strong evidence for both iron smelting and the subsequent stage of bloom refining. However, there is fairly good evidence that the two activities were not contemporary. Of the total slag assemblage of approximately80kg some 62% by weight is attributable to the smithing and 38% to the smelting.

The iron smelting was undertaken in a cluster of five slagpit furnaces which lay just outside the ringfort. They yielded good assemblages of iron smelting slags (approximately 35% of the total slag assemblage) typical of those produced in a low-shaft slagpit furnace. The furnaces appear to have been simple single furnaces, with no arch (at least no arch below ground level) and a rather large diameter slagpit. Pit sizes based on the quoted dimensions of the slag- and charcoal- rich fill are 0.44 x 0.38m, 0.50 x 0.45m, 0.62 x 0.48m, 0.60 x 0.49m and 0.54 x 0.50m for furnaces 1 to 5 respectively. Such dimensions fit well with a furnaces dated to the earlier part of the Iron Age (1st-4th centuries BC), a date supported by a 14C date on alder charcoal from furnace 3 of 90BC to AD80.

There is no evidence for later iron smelting contemporary with the ringfort, but the large size of some of the smithing slag cakes (SHCs) from a large pit in the fort interior and from the enclosure ditch suggests that primary bloomsmithing was likely to have been carried out on the site. The size of the large cakes may be indicative of the size of blooms being smithed. The SHC assemblage, although small, is remarkable for having a very narrow size range, suggesting that the site may have specialised in bloom refining and that there may have been no "end-user" blacksmithing on the site on all.

There was no evidence for non-ferrous metalworking on the site, with both items previously suggested to be crucibles proving to be misidentifications.

Contents

Methods

All investigated materials were examined visually, using a low-powered binocular microscope where necessary. All significant materials were summarily described and recorded to a database (Table 1). As an evaluation, the materials were not subjected to any high-magnification optical inspection, nor to any other form of instrumental analysis. The identifications of materials in this report are therefore necessarily limited and must be regarded as provisional.

Results

Iron smelting

Residues from iron smelting on this site are mainly flow slags, which are indicative of slag flow into the basal pit of a non-slag tapping low shaft slagpit furnace. Such furnaces are now widely recognised across Europe (Pleiner 2000) and provide a better model for the cut features than the older ideas of “bowl furnaces” (e.g. Scott 1990). These slags are formed of small prills and flows that have solidified within the fuel bed of the smelting furnace. The prills are of varying size from a few millimetres diameter up to flows of 20mm across. In general, within the slagpit the individual prills will be those that have penetrated

towards the base. All of the furnaces yielded these sorts of isolated prill.

At a higher level the small flows will be coalesced, and the block of amalgamated flow slag from just below the bloom may be known as a furnace bottom (C91 and C106) although this term may best be avoided because of its associations with dense slag cakes). The "furnace bottom" fragments from the current site are large pieces, but none the less small parts of the whole. The largest piece is a 4.3kg block from C106 and shows similar textures to complete blocks from Tullyallen (Young 2003b) and Adamstown (Young 2006c) which weighed 11 and 19kg respectively. In the Adamstown example almost all the residues in the slagpit were incorporated within the "furnace bottom", but at Tullyallen there was a further 6kg of slag pieces in the pit. This situation resembles the finds from Lismore-Bushfield or Maghernaskeagh 1, where several kilograms of smaller slag pieces occur in each furnace. Where this "furnace bottom" meets the furnace wall, just below the blowhole, the iron rich melt will react with the wall and erode it, creating a dense slag lump known as a burr (e.g. material from C093, C098 and C108). Larger volumes of slag flow on the blowing wall may result in larger slag flows then the small prills below the bloom. The large flows on the blowing wall often penetrate to the foot of the wall and may preserve moulds of the large wood pieces commonly used to pack the slagpit before the smelt (e.g. material from C91 and C98 which have large wood/charcoal moulds to at least 50mm). Flow slags of the various kinds comprise 33.4kg of the total assemblage (approximately

More distal parts of the base of the slagpit may receive rather lower volumes of melt, with the slag solidifying to form isolated blebs and spheroids (often dimpled from contact with the fuel to form a "coffee-bean" spheroid). Such assemblages are recorded from C91, C93, C96, C98 and C100. Such assemblages only comprise approximately 80g of the total collection.

Fines (including slag, but also ore dust and charcoal dust) may accumulate on the floor of the pit and become indurated to form a sinter-like material. This facies of residue has been recorded from C87, C91, C93, C96, C98, C104 and C108. Approximately 1kg of the assemblage was provided by sinter and associated materials.

The interpretation of the origin of the assemblages is less clear. The dominance of the fine grained slag material suggests that much of the slag in the assemblages may be more or less in-situ, being the slag fines in the base of the slagpit that were incompletely cleaned out. The presence, however, of large broken fragments of "furnace bottom" and burr is much more suggestive of pieces of slag being dumped back into a disused furnace pit. The

assemblages are likely therefore to be a blend of both taphonomic processes.

Iron working

The residues from iron working are mainly smithing hearth cakes (SHCs) and fragments thereof. Approximately 60% by weight of the total slag assemblage from the site was from SHCs. The assemblages containing the SHCs contained few other residues and an unusually low proportion of indeterminate slags; perhaps a reflection of a good state of preservation and a low degree of fragmentation of the SHCs.

The size distribution of the SHC assemblage is narrow (details are presented in table 2) ranging from 426g to 4390g for the 23 examples for which the original weight is known or can be estimated. The mean weight of the SHCs is thus very high, at 1737g.

The SHCs are generally dense and compact, with just a few examples showing evidence for deformation on removal from the hearth when hot. One example shows the possible limits of a 70mm diameter tuyère tip. The SHCs typically have dense bowl, with only a few examples with a thin crust. One small chip of vitrified ceramic, quite possibly from the tip of a tuyère, was recovered (but had been misidentified as crucible).

Distribution

The distribution of the residue types is given in Table 3. The distribution is remarkable for its marked dichotomy between the smelting slags in the furnaces and an adjacent gully on one hand, and the smithing slags in the pits inside the ringfort and in parts of the adjacent enclosure ditch. No smelting slags were recovered in deposits directly associated with the enclosure.

Non-ferrous metalworking

The stratigraphic report refers to finds of two crucible fragments: C5 #2 and C47 #1. Neither is in fact a crucible fragment. The piece from C5 is a somewhat curiously shaped, strongly concavo-convex small piece of slag, whereas the piece from C47 is ceramic, but is a mainly oxidised fragment of hearth ceramic, or more likely, a piece from the vitrified tip of a tuyère. There is no further evidence for non-ferrous metalworking on the site.

Interpretation

The smelting residues and structures on the site provide good evidence for iron smelting in slagpit furnaces. The details of the furnaces would be well worth revisiting in order to determine, if possible, the cut

dimensions and to confirm whether the pits were lined, or as more often seems to be the case, the apparent lining is actually the fired natural subsoil.

The nature of the "gully" lying between the furnaces is also worthy of further investigation as it might shed further light on the structure of the furnaces or their ancillary facilities.

At face value, however, the furnaces would appear to terminate in simple pits, with no evidence for furnace arches. The working volume of the pits (leaving aside the issue of whether or not the pit margin corresponds to the actual cut) can be determined through the dimensions of the fills arising from use of the furnaces. The dimensions are 0.44 x 0.38m, 0.50 x 0.45m, 0.62 x 0.48m, 0.60 x 0.49m and 0.54 x 0.50m for furnaces 1 to 5 respectively.

These dimensions are quite substantial for Irish slagpit furnaces, but there is a growing corpus of examples of a similar size. Of these, the best preserved examples are those with the complete slag cake left in-situ after smelting at Tullyallen, Co. Louth (Young 2003b) and Adamstown, Co Waterford (Young 2006c). Unfortunately, neither of these is dated. However, several others with equivalent dimensions are now dated:

- Carrickmines Great, Co. Dublin (Young 2003a): 360-110 cal. BC

- Cherryville, Co. Kildare (Young 2008a): 400-200 cal. BC.

- Cloncollig, Co. Offaly: very large (0.55x0.60m), 360-90 cal. BC (Young 2008c)

- Clonrud 4: 2 moderately large slagpit furnaces
(0.41m x 0.39m and 0.46m x 0.41m). 4th -1st century BC based on 14C date on willow charcoal (there is also an older date on oak charcoal; Young 2008f)

- Morrett D, N6 Co. Laois (Young 2005b): 170 cal. BC-30 cal AD and 770-410 cal. BC for charcoal pits, 370-110 cal BC and 400-200cal BC for ring-ditches.

- Newrath Site 35, N25 Co. Kilkenny (Eogan *pers. comm.* 2006): 400-200 cal. BC and 350-40 cal. BC

The Lismore-Bushfield or Maghernaskeagh 1 examples are dated by a
14C date on alder charcoal from furnace 3 of 90BC to AD80. This is apparently slightly younger than most of the examples of this size of slagpit, but is broadly similar.

It is suggested therefore that the iron smelting predates the enclosure by a considerable period, which explains why no smelting slag at all was recovered from contexts associated with the enclosure.

The iron-working residues in contrast, not only occur in large quantities in pits within the enclosure (pits which also contain medieval small finds), but also in small quantities in the enclosure ditch itself. This provides reasonable evidence for the iron working being much later (by many centuries), than the iron smelting. No actual smithing hearth was found in the area of the enclosure that was excavated. The process of dumping the slags into the pits may itself have introduced a size bias into the assemblage, which none the less has an extreme size distribution.

The SHC assemblage does not contain exceptionally large SHCs (although some fragments of large cakes were found), with a maximum recorded size of approximately 4.4kg. The mean weight is very high, at 1.7kg, and is thus the highest mean weight so far recorded for an SHC assemblage in Ireland. The proportions of the SHCs that were over 1kg and over 3kg are also the highest. The statistics for Lismore-Bushfield or Maghernaskeagh 1 need using with some caution, because only 23 SHCs were measurable. However, the distribution certainly appears to be different to that at other sites. The large SHCs are probably indicative of bloom smithing (bloom refining), with the narrow size range indicating that the same sort of process and size of bloom was being repeated, and also indicates that the iron was apparently not being used on site.

It has been argued (Young 2009h) that in some instances the refining of a single bloom may have resulted in the production of just a single SHC. In such circumstances the maximum size of the SHCs in an assemblage may give a clue as to the maximum size of the blooms being smithed. In this instance it would suggest raw blooms of 4-5kg.

It would appear that at two distinct periods this site was utilised by those engaged in the production of iron. In the Iron Age it was used for primary smelting and in the (probably) early medieval period the enclosure was used a place for the secondary process of bloom refining.

Evaluation of potential

Both phases of iron production on the site are significant and have well-preserved residues. Further analysis of representative suites of material would add significantly to current understanding.

For the smelting, the superficial similarity of the residues to the poorly dated assemblages at Tullyallen (Young 2003b) and Adamstown (Young 2006c) would make their analysis very useful. A similar style of smelting was being employed, but in a very different part of the country with possibly rather different resources.

For the bloomsmithing, analysis of a tight assemblage such as this (accumulation of a large assemblage in a single pit suggests a relatively short timespan too) would be useful in providing evidence for the process at this period (additional dating to clarify what that period was exactly would also be useful). Other early medieval assemblages which include probable bloomsmithing SHCs also contain smithing residues from other parts of the *chaîne operatoire*. This assemblage has the great advantage of possibly being involved with just a single activity.

In view of the significance of the site for further analysis it is recommended all residues be retained.

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F	find	sample	context wt	wt	no	Notes		
1		445	612	612	1	slab of dense crust, quite thin, from very large SHC		
4		408	1195	568	1	rounded irregular slag lump – probably a burr from a large cake which has been heavily reworked and eroded		
4		424	248	248	1	very weathered slab of SHC crust		
5		409	373	364	1	irregular? twisted vesicular slag mass - probably a smithing slag piece?		
5	2			9	1	Curiously-shaped bowl –like fragment of slag. Not a crucible.		
6		410	186	186	1	flow slag with large moulds		
11		411	788	788	1	highly weathered crust of SHC -possibly might be whole of original so tentatively given, 120x140x50 deeply hollow on top	1	788
26		412	314	314	21	small slag pieces embedded in ash - some may be flown. But most not obviously so.		
31		413	218	218	12	pieces of well-rotted probably low-density slags in concretionary ashy charcoal-rich matrix		
47		463	14	6	19	small ashy concretions, lots of charcoal , some slag films		
47	1			8	1	Vitrified ceramic, mainly oxidised fired in body, reduced just below dark green glaze, irregular face, hearth wall or tuyère face		
50		414	1190	1190	1	Highly-weathered triangular SHC - straight edge may be fracture or original attachment. 130x150x50, bowl 35	1	1190
64		415	1430	1430	1	conical SHC, 130x150x80, slightly straight on proximal side, plano-convex	1	1430
64		416	2615	2615	1	proximal part of large SHC, (130)x180x120 of which bowl 60 , dollop of material on top of neat plano-convex bowl at proximal end, crust to 15 in broken section, approx 80%	0.8	3269
64		417	459	459	1	irregular block of charcoal-rich slag		
64		418	1025	1025	1	slab of crust from v large SHC		
64		419	2236	778	1	130x110x50 of which bowl 30, transverse SHC with flat top and slab of lining slag above	1	778
64		419	2236	546	1	massive lump of amorphous fine SHC material - twisted?		
64		419	2236	348	1	massive lump of amorphous fine SHC material - twisted?		
64		419	2236	564	1	massive lump of amorphous fine SHC material - twisted?		
65		420	920	920	1	poorly compacted convex prilly SHC, has slab of lining material in upper part - a very odd cake - 120x130x100 of which bowl 50	1	920
65		421	2325	2325	1	part of large irregular SHC so hard to estimate size, crust thin bowl well formed in only small part of cake, upper part very fine grained hash of comminuted charcoal, 190x150x100	0.6	3875
65	3	422	22159	1505	1	majority (90%?) of SHC (145)x160x65 of which bowl 45. Crust 20 where seen.	0.9	1672
65	3	422	22159	2440	1	SHC, 160x180x130 of which bowl 65, lots of slag mounded on top so almost symmetrical, rather triangular in plan	1	2440
65	3	422	22159	558	1	90x100x70 skew shaped double layer SHC, bowl flat, 25mm deep	1	558
65	3	422	22159	256	1	elongate probable SHC fragment		
65	3	422	22159	458	1	(100)x(100)x40, 60% of flat SHC, bowl 25	0.6	763
65	3	422	22159	2780	1	210x140x90, flat topped probably transverse SHC	1	2780
65	3	422	22159	1235	1	amorphous rounded elongate block of smithing slag		
65	3	422	22159	1240	1	130x150x70 bowl 40, skewed double layer SHC	1	1240

65	3	422	22159	530	1	slab of crust from large SHC		
65	3	422	22159	386	1	tip of small SHC (100)x90x50, slightly curved on extraction- could be most of small cake		
65	3	422	22159	2010	1	block from a large complex SHC, possible with multiple bowls		
65	3	422	22159	2420	1	SHC, 120? X 180x 90 of which bowl 70. Double layer - lower rectangular, upper small, skewed to right	1	2420
65	3	422	22159	2800	1	170x180x70 largely complete flat topped SHC, minor bits missing on proximal side	1	2800
65	3	422	22159	1085	1	irregular block - probably about half an SHC with slag adhering to base - or pendent slag		
65	3	422	22159	426	1	80x130x50 possibly complete small transverse SHC	1	426
65	3	422	22159	186	1	irregular fragment		
65	3	422	22159	760	1	most (c80%?) of flat SHC, 110x150x50 bowl 20	0.8	950
65	3	422	22159	576	1	large SHC fragment		
65	3	422	22159	508	1	large SHC fragment		
65		423	1738	1660	1	neat plano-convex SHC, broken on probable proximal attachment, 130x150x70	1	1660
65		423	1738	78	1	burnt stone		
67		425	2055	2055	1	190x190x75 of which bowl 55, SHC with slight double bowl, but second extends out of preserved piece, rather square in plan. Top not well preserved and unclear if anything missing	1	2055
67		425	2120	2120	1	very oddly shaped SHC - good burr on one end (or maybe just sediment contact) 210x160x60, possible contact might be the tip of 70mm radius tuyère	1	2120
68		426	972	864	1	110x150x70, irregular SHC	1	864
68		426	972	108	1	vesicular slag fragment		
68		445	58	58	c100	concretions - mainly tubular in grey clay with charcoal		
72		427	664	552	1	130x140x40 plano-convex SHC	1	552
72		427	664	112	1	indeterminate lump of lobed slag		
74		428	4390	4390	2	210x250x90 somewhat weathered and slightly damaged SHC, base very neat, with possibly two bowls, top rather ridged - may be damage	1	4390
87		429	592	592	12	flow slags - mostly in complex massive aggregates		
87		430	550	550	30	flow slags		
87		446	78	64	49	flow slag		
87		446	78	10	15	ash etc		
87		446	78	1	1	Sinter		
87		454	24	23	c70	pieces of indurated ash fired clay		
87		454	24	1	1	dense slag fragment		
89		431	1124	182	5	flow slags		
89		431	1124	502	7	dense broken slag fragments		
89		431	1124	440	5	vitrified oxidised furnace wall (vertical grooves)		
89		433	2440	1025	8	flow slag		
89		433	2440	1165	30	more massive slags - related to wall and/or floor		
91		435	3610	1645	1	dense slag block - presumably from central part of cake, but needs cleaning to be certain. It is made up of small flow lobes - and could just be from near the wall		

91		435	3610	1965	49	flow slags in large pieces		
91		436	3500	3500	42	flow slag, including material with wood 50mm across, right up to top lip of cake		
91		459	306	220	c100	flow slag		
91		459	306	80	37	slaggy sinter (good)		
91		461	50	10	17	coffee bean spheroids and other flowed material		
91		461	50	38	84	dull slags grading into sinter		
93		437	1855	280	6	flow slag		
93		437	1855	1575	1	large block from burr area of "furnace bottom" with wall attached, small pendent prills below, massive dense slag makes up most of piece		
93		447	240	128	88	Sinter		
93		447	240	82	35	flow slag and coffee bean spheroids		
93		447	240	10	2	dull slags		
93		447	240	10	6	reduced fired clay or indurated ash		
93		447	240	1	1	oxidised fired lining with vitrified surface		
96		438	1885	1195	18	flow slags		
96		438	1885	690	26	ashy and/or sintery floor material		
96		448	112	112	c80	dull poorly flowed slags, with charcoal moulds, a few poorly developed coffee beans		
96		455	6	6	c50	small blebs, slag fragments, some sinter and some stones		
97		449	2	2	3	fragments of dense slag blebs		
98		434	4735	4020	1	large block from burr area of "furnace bottom" with wall attached, pendent prills below, large charcoal moulds on base		
98		434	4735	642	20	bits of above plus matrix		
98		439	768	68	1	vitrified oxidised furnace wall (vertical grooves)		
98		439	768	500	14	flow slags		
98		439	768	200	4	?slaggy sinter from floor		
98		450	98	42	c40	coffee bean spheroids, blebs and prills, dense		
98		450	98	18	5	indurated ash/clay		
98		450	98	38	15	slaggy sinter (good)		
98		456	94	93	c80	fired clay/ash with stones		
98		456	94	1	3	coffee bean spheroids		
100		457	32	4	12	coffee beans and other spheroids		
100		457	32	28		gravelly residue with small ash, fired clay and slag fragments		
104		440	872	784	19	flow slags in fairly large pieces		
104		440	872	92	6	Sinter		
104		441	418	226	4	flow slags in fairly large pieces		
104		441	418	192	6	ashy slaggy sinter		
104		451	288	186	63	dense flow slags		
104		451	288	80	40	dull slags and sinter		
104		451	288	22	2	oxidised lining with adhering slag - curved - possibly hood?		

104		460	210	46	83	good sinter of small rounded particles		
104		460	210	10	15	small prill fragments and coffee bean spheroids		
104		460	210	154	c150	mainly fired clay and indurated ash		
106		442	4310	4310		large block plus bits broken off - a good flow slag block similar to Adamstown or Tullyallen - needs washing		
106		443	1785	1785	42	flow slags in fairly large pieces		
108		444	558	444	1	burr with flows on lower edge		
108		444	558	114	2	flow slags in fairly large pieces		
108		452	6	6	c30	small blebby slag fragments with charcoal, some probable sinter		

Table 1: Summary catalogue by contest and sample

interval	Count
0-100	0
100-200	0
200-300	0
300-400	0
400-500	1
500-600	3
700-800	2
800-900	1
900-1000	2
1000-1100	0
1100-1200	1
1200-1300	1
1300-1400	0
1400-1500	1
1500-2000	2
2000-3000	4
2500-3000	2
3000-4000	2
4000-5000	1

Table 2: Count of SHCs for which the original weight is measurable or may be estimated, in weight intervals

N = 23, total weight = 39940g, mean = 1737g.
Minimum weight = 426g, maximum weight = 4390g

4% of SHCs are less than 500g
39% of SHCs are less than 1000g
13% of SHCs are of more than 3000g

	SHC	Flow slag	Indeterminate slag	lining	stone	concretion	ash	sinter	fines		***total***
Topsoil	***612***										***612***
deposits associated with F003	***1968***		***9***								***1977***
minor pits etc. Zone B			***538***	***8***							***546***
Pit F050, Zone B											
50	1190										
64	7306		459								
68	864		108			58					
65	26878		186		78						
67	4175										
74	4390										
72	552		112								
total	***45355***		***865***		***78***	***58***					***46356***
Furnace 1											
87		1206	1				33	1			
97			2								
total		***1206***	***3***				***33***	***1***			***1243***
Furnace 2											
89		2372	502	440							
106		6095									
total		***8467***	***502***	***440***							***9409***
Furnace 3											
91		7330						118	10		
100									4		
total		***7330***						***118***	***14***		***7462***

Furnace 4											
93		1937		21				128			
104		1196		22			154	410	10		
total		***3133***		***43***			***154***	***538***	***10***		***3878***
Furnace 5											
96		1307						696			
98		5162		68			111	238	43		
total		***6469***		***68***			***111***	***934***	***43***		***7625***
fill of channel f080		**558**							**6**		***564***
modern drain f007		***186***									***186***
total	***47935***	***27349***	***1917***	***559***	***78***	***58***	***298***	***1591***	***73***		***85313***

Table 3: Summary of distribution of residue type by feature (and by context within the major features)

	Mucklagh	Coolamurry	Navan	Moneygall	Carrigoran	Trumra 4	Clonmacnoise (NG)	Ballykilmore	Woodstown 6	Clonmacnoise (WWS)	Clonfad	Lismore/ Bushfield or Maghernaskeagh 1
date	C18/19	C10-12	E. Med.	E.Med-Med.	C10?	C5/6	C7-10	C15/17	C9-10	C10?	C7-9	
SHC count	66	41	17	22	18	57	117	43	140	38	513	23
SHC min. wt	98		60	114		92	100	80	68			426
SHC max. wt	1206	2588	2990	1800	3866	3163	7815	4033	6310	5540	11000	4390
SHC mean wt	373	386	507	527	553	727	843	898	1060	1087	1153	1737
% <500g	77%	83%	82%	55%	72%	47%	50%	51%	40%	39%	29%	4%
% <1000g	95%	95%	88%	95%	89%	75%	78%	74%	71%	68%	64%	39%
% >1000g	5%	5%	12%	5%	11%	25%	22%	26%	29%	32%	36%	61%
% >3000g	0%	0%	0%	0%	6%	2%	3%	7%	7%	8%	7%	13%
Modal 100g interval	100-200	100-200	100-200	200-300	100-200	100-300	400-500	300-400	200-300	300-400	300-400	500-600

Table 4: Comparison of the Lismore-Bushfield or Maghernaskeagh 1 SHC assemblage with other Irish smithing assemblages. Ordered by mean SHC weight

Mucklagh from Young 2008d; Moneygall from Young 2008e; Navan Site 1 from Young 2007; Carrigoran from Young , 2006d; Trumra 4 from Young 2008g; Coolamurry from Young, 2008b; Ballykilmore from Young 2006b;Clonfad from Young, 2006a; Clonmacnoise Waste Water Scheme from Young 2005a; Woodstown from Young, 2006c; Clonmacnoise New Graveyard site from the author's work in progress.

The assemblages from Mucklagh, Moneygall, Navan, Carrigoran and Coolamurray are interpreted as being dominantly blacksmithing residues. The assemblages from Ballykilmore, Clonfad, Clonmacnoise and Woodstown are interpreted as including bloomsmithing residues.

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8.9 Appendix 9: Site Archive

Bushfield or Maghernaskeagh/Lismore 1 Site Archive			
Type	**Description**	**Quantity**	**Notes**
Contexts	Validated contexts from excavation	850	
Plans	'A2' 1:20 (no. of sheets)	106	Pre and post excavation plans include section drawings.
Sections and profiles.	'A2' 1:10 (no. of sheets)	317	See above.
Matrices		1	Full site matrix (Paper copy only), checked and cross-referenced.
Photographs		Colour print (750)	All photographs have been checked and labelled.
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 Supervisor's Diary	1 1	All Diaries have been checked and cross-referenced.

Bushfield Or Maghernaskeagh / Lismore 1, M7 Portlaoise-Castletown / M8 Portlaoise-Cullahill, Contract 2, Coolfin To Townparks And Derrinsallagh

Archaeological Geophysical Survey

Direction No. A015
Registration No. R34
(Testing Area 7-8 A015/034-035)

Survey undertaken on behalf of

Archaeological Consultancy Services Limited

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EAG 92

18th December 2006

EARTHSOUND archaeological geophysics

PROSPECT HOUSE, DRUMAGH, CLAREMORRIS, COUNTY MAYO, IRELAND
WWW.EARTHSOUND.NET

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Summary of Results

Between the 20th and 23rd November 2006, a series of geophysical surveys funded by Archaeological Consultancy Services Limited *were conducted outside the compulsory purchase order boundary of the proposed M7 Portlaoise to Castletown / M8 Portlaoise to Cullahill Road Scheme, County Laois. The areas were investigated using a fluxgate gradiometer at a sampling resolution of 1 x 0.25 m.*

The survey was conducted upon bedrock geology of Ballysteen Formation of fossiliferous dark-grey muddy limestone shale. This type of geology is magnetically quiet and is unlikely to have caused problems for the geophysical survey. The survey areas were covered in short grass which was amenable for geophysical surveys.

A number of possible ditches were detected within the survey area. Some of these appear to represent a continuation of a large enclosure ditch which was identified within an earlier archaeological excavation in the adjacent Motorway corridor.

Statement of Indemnity

A geophysical survey is a scientific procedure that produces observations of results which are influenced by specific variables. The results and subsequent interpretation of the geophysical survey presented here should not be treated as an absolute representation of the underlying archaeological features, but as a hypothesis that must be proved or disproved. It is normally only possible to provide verification via intrusive means, such as Test Trench excavations.

1. Introduction

Earthsound Archaeological Geophysics were commissioned by Ms. D. Murphy of *Archaeological Consultancy Services Limited*, to execute a series of geophysical surveys adjacent to defined archaeological sites that had been identified within the proposed M7 Portlaoise to Castletown / M8 Portlaoise to Cullahill Road Scheme, County Laois.

Permissions to undertake the survey were obtained from the *Department of the Environment, Heritage and Local Government* (Licence Number A015/168-R34).

There are no Recorded Monuments present and the site is not the subject of any legal instruments under the National Monuments Act (1930-94). However LA022:018-01/02 a church (in ruins) lies 400 m to the northwest of the site and LA022:016 lies 600 m to the southwest.

The geophysical survey was requested to determine the presence/absence of unknown archaeological features associated with the results of archaeological test trenching.

1.1 Geography, Topography, Geology & Climate

Located within the townland of Bushfield or Maghernaskeagh / Lismore 1, the northwest corner of the site (Figure 1) lies at *Ordnance Survey of Ireland* Irish National Grid (ING) Reference E228807 N185583.

The site is situated *c*. 4 km southeast of Borris-in-Ossory and *c*. 11 km south-west of Mountrath, Co. Laois. The Dublin Railway line is situated 700 m to the southeast of the survey area and the site is accessed via a side road leading to Lismore House from the Borris-in-Ossory to Aghaboe road.

The survey area encompassed the southern half of a field located 200 m to the south of Bushfield House. The survey area is dissected by the current CPO boundary fenceline for the M7 Portlaoise to Castletown / M8 Portlaoise to Cullahill Motorway Scheme. The western side of the survey area is defined by a townland boundary, consisting of a hedge line incorporating some ash trees planted along an earthen embankment. The topography of the site is generally flat.

The bedrock geology comprises of Ballysteen Formation of fossiliferous dark-grey muddy limestone shale. This type of geology is magnetically quiet and is unlikely to have caused problems for the magnetic surveys.

In the week preceding the geophysical survey, the climatic conditions were mild and cold and this continued during the fieldwork. The weather is unlikely to have affected the survey.

1.2 Archaeological Background

The following test is a description of the site written by Archaeological Consultancy Services Ltd:

> *A large number of archaeological features and deposits have been recorded during the two separate phases of the excavation, including the remains of a large industrial pit in the south-west quadrant, and a concentration of bowl furnaces immediately north of the enclosure ditch, discovered during the Lismore 1 phase of the excavation. In the course of the ongoing excavation of the larger Bushfield or Maghernaskeagh area of the site, a concentration of features containing burnt bone, possibly cremation burials, have been excavated, and the presence of a large area containing inhumation burials has been confirmed. The majority of the finds are from the western (Lismore 1) end of the site, and include a large fragment of a disc quern, a green glass ring bead, a very fine polished stone pin sharpener, as well as iron and copper alloy artefacts. The finds appear broadly consistent with an early medieval date for the site.*
>
> *The townland name Lismore is translated as 'big fort' (from lios, or fort), and the discovery of the remains of an enclosure with an impressive diameter of 93m could mean that this is the site from which the townland takes its name. Hitherto, it was considered that the ringfort denoted by the townland name was superseded by a castle or fortified dwelling, as depicted on a Down Survey map from 1656. However, some account must be taken of the fact that two-thirds of the enclosure actually lie outside the present limits of Lismore townland, in the townland of Bushfield or Maghernaskeagh. The excavated lines of two post-medieval field boundary ditches impinging on the remains of the enclosure ditch demonstrate that for a time, perhaps in the late 18th century/early 19th century, the monument stood at the north-eastern corner of a large field. This field was most likely completely within the limits of the townland of Lismore. Subsequently, before the publication of the first edition OS map in 1837, the enclosure was levelled and the townland boundary was moved further west to its present location, extending across the interior of the site, which explains why most of the enclosure now lies on the Bushfield or Maghernaskeagh side of the boundary.*

1.3 Aims & Objectives

The aim of the geophysical survey was to determine the extent of the archaeological resource in advance of the proposed development scheme. Specific objectives were to:

- Determine the presence or absence of the suspected archaeology
- Assessment of the spatial extent of the enclosure and any associated archaeological features

2. Methodology

The fieldwork was carried out from 20th November 2006 by J. Bonsall and I. Murin of *Earthsound Archaeological Geophysics*.

The geophysical survey was carried out using two *Geoscan Research* FM256 fluxgate gradiometers.

The survey area covered a total of 1.5 hectares. A rectangular grid was laid out using a *Trimble* Pro-XRS Differential Global Positioning System (see Technical Appendix 2), and divided in to 40 × 40 m sub-grids for the gradiometer survey.

2.1 Magnetic Gradiometer Survey

The survey was undertaken along lines parallel to the sub-grid edges, walking approximately west to east, starting in the northwest corner of each grid. Subsequent lines were surveyed in alternate directions ('zigzag').

Data were recorded using an FM256 at a spatial resolution of 1 m intervals between traverses and 0.25 m intervals along those lines. The instrument was positioned facing north, parallel to the Earth's magnetic field, to allow increased geo-magnetic resolution.

The instrument was set to a recording sensitivity of 0.1 nT. Prior to the beginning of the survey and after the completion of every two sub-grids, the electronic and mechanical set-up of the instrument were examined and calibrated as necessary over a common reference point. The magnetic drift from zero was not logged.

Data were collected automatically using an internal sample trigger while the operator walked at a constant pace along the traverse. The data were stored in an internal data logger and downloaded to a field computer using the *Geoscan Research* Geoplot v.3.00a software.

2.1.1 *Data Processing*

2.1.1.1 Preliminary Data Treatment

The data were pre-processed in Geoplot 3.00.

Spurious high intensity anomalies, commonly statistical outliers, are referred to as geophysical 'spikes'. In magnetic data, an 'iron spike' is a response to a buried ferrous object, often in the topsoil. Iron spikes are generally not removed in geophysical data; although often modern in origin, they can be indicative of archaeological material.

The raw data contained some poorly matched sub-grids, caused by the internal drift of the fluxgate gradiometer and the gradual misalignment of the fluxgate sensors between calibration episodes. To compensate for this, a zero mean traverse (ZMT) function was employed. The use of ZMT alters data to adjust the mean of each traverse to zero by increasing or decreasing data as necessary. This alters the statistical properties of the data to give a uniformly bipolar background, centred around zero. Post-ZMT plots were compared with raw data to analyse the potential removal of geophysical anomalies along the line of a traverse.

2.1.1.2 Further Processing

No further processing functions were applied due to the high quality of the data collection.

A low pass Gaussian filter was applied, reducing the variability of the data whilst improving the visibility of weak archaeological features. This also had a smoothing effect on the data.

A sine wave interpolation function was applied to provide a smooth, aesthetically pleasing image for presentation. For a given point x, the contribution of adjacent readings to the interpolated point is given by the function sinc $(x) = \sin \pi x/\pi x$ (Scollar 1990). This function is used as a sliding window along each transect, resulting in an interpolated image, expanding the resolution of the data from 1 m x 0.25 m to 0.5 m x 0.125 m. This function was chosen as giving a clearer interpolated image than linear interpolation (which assumes a direct linear change between each point) or bicubic interpolation (taking the surrounding sixteen values into account).

2.1.2 *Graphical Display*

Pre-processed data are displayed in XY traceplot format in Figure 2. An XY traceplot presents the data logged on each traverse as a single line with each successive traverse incremented on the Y-axis to produce a stacked plot. The data have been clipped at –3 and +3 nT. The main advantage of this display option is that the full range of data can be viewed, dependent on the clip, so that the 'shape' of individual anomalies can be discerned and potentially archaeological anomalies differentiated from iron 'spikes'.

Processed data are shown in Greyscale format in Figure 3. The greyscale plot presents data as pixels on a linear grey shaded scale, increasing or decreasing dependent on the values of the maximum and minimum clip. The geophysical data in Figure 3 have been clipped at –2 (white) and +2 nT (black). Data values beyond the clip limits are shown as 'pure' black or white. The main advantage of this display option is that the data can be viewed as a base map.

An interpretation plot is presented in Figure 4.

2.2 Reporting, Mapping and Archiving

The geophysical survey and report follow the recommendations outlined in the *English Heritage Guidelines* (David 1995) and *IFA Paper No. 6* (Gaffney *et al.* 2002) as a minimum standard.

Geophysical data, figures and text are archived following the recommendations of the *Archaeology Data Service* (Schmidt 2001).

Field boundaries were mapped and drawn based upon data gathered by the DGPS. All figures reproduced from *Ordnance Survey Ireland* mapping are done so with permission from *OSI* copyright (Licence No. AR 0047306).

Technical information on the equi4pment used, data processing and methodology are given in Appendix 1. Appendix 2 details the survey geo-referencing information and Appendix 3 describes the composition and location of the archive.

3. Results & Discussion

The interpretation figures should not be looked at in isolation but in conjunction with the relevant discussion section and with the information contained in the Appendices. Features are numbered in Figure 4 and are described and interpreted within the text.

3.1 Magnetic Gradiometer Survey

Figure 3 – Magnetic Gradiometer Data

Figure 4 – Magnetic Gradiometer Interpretation

In magnetic data, a dipolar anomaly or 'iron spike' is a response to buried ferrous objects, often in the topsoil. Iron spikes generally are not removed in geophysical data, although often modern in origin, they can be indicative of archaeological material.

Anomaly **[1]** is a sub-circular highly magnetic anomaly which is located on the edge of the survey area. This represents the northern continuation of the Lismore enclosure ditch, identified within the archaeological testing. Its magnetic strength suggests it comprises of highly magnetic components such as charcoal or burnt debris. It is approximately 16 m in length and probably continues in to the adjacent field to the west.

Anomaly **[2]** is a linear potential ditch. Measuring 30 m in length its orientation suggests a close relationship to the enclosure ditch identified within the archaeological test trenching and potentially within anomaly 1.

Anomaly **[3]** is located on the northern edge of the southern survey area and is comprised of a right-angled ditch feature. Detected for a length of 23 m it may represent a continuation of the enclosure activity located to the north. A ditch protruding from the southeastern section of the enclosure ditch may be closely related to anomaly 3.

Anomaly **[4]** is a linear area of raised magnetism that is closely related to a number of ferrous responses. These responses appear to have collected along either side of this anomaly and suggest that it is the remains of a relict field boundary. Detected for a length of 80 m, this feature continues beyond the survey area.

Anomaly **[5]** represents a sub-circular ditch feature located in the centre of the survey area. Measuring 30 m in length its exact relationship to the enclosure ditch cannot be established from the geophysical data.

Anomaly **[6]** comprises linear ditch feature. The ditch runs on an east-west orientation for 50 m.

Anomaly **[7]** comprises of two linear highly magnetic features. These represent the southern extent of the Lismore enclosure. These anomalies differ from other possible archaeological signatures on the site due to the strength of their magnetic responses, which have a mean of 2 nT. Part of the ditches appear to be comprised of isolated strong anomalies which could suggest a palisade of large pits rather than a continuous ditch feature. To the east of the enclosure "ditch" a large number of pits, in two parallel rows can be seen; these could also represent a continuation of the enclosure remains. The enclosure ditch has a length of 36 m. The row of pits continues over a length of 38 m and may continue further NE for an additional 30 m.

Anomaly **[8]** is represented by a large number of linear features of low magnetism that are located on the southern edge of the survey area. Orientated on two different alignments these plough furrows represent former cultivation activity on the site.

4. Conclusions

4.1 Achievement of Objectives

The magnetic gradiometer survey conducted over this site has enabled the detection of a number of previously unidentified potential archaeological features. These appear to be closely related to the enclosure ditch identified within archaeological test trenching and therefore may represent an extension to the archaeological activity within the townlands of Bushfield or Maghernaskeagh and Lismore.

4.2 Summary of Results

A number of possible ditches were detected within the survey area. Some of these appear to represent a continuation of the Lismore enclosure ditch, although the main ditch appears to terminate within the survey area – the enclosure may continue as two rows of pits although this is not clear.

4.3 Dissemination

The results of this survey were submitted to *Archaeological Consultancy Services Limited*. *Earthsound* will ensure that copies will be forwarded to the *Department of the Environment, Heritage and Local Government* and the National Museum of Ireland in compliance with the Licence agreement.

5. Acknowledgements

Project Management: James Bonsall BA (Hons) MSc PIFA

Fieldwork: James Bonsall
Igor Murin

Report: Heather Gimson BA (Hons) MSc MIAI
James Bonsall
Suzanne Egar BA (Hons)

Graphics: Heather Gimson

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DAVID, A. 1995 *Geophysical Survey in Archaeological Field Evaluation: Research and Professional Services Guidelines*, No. 1. English Heritage

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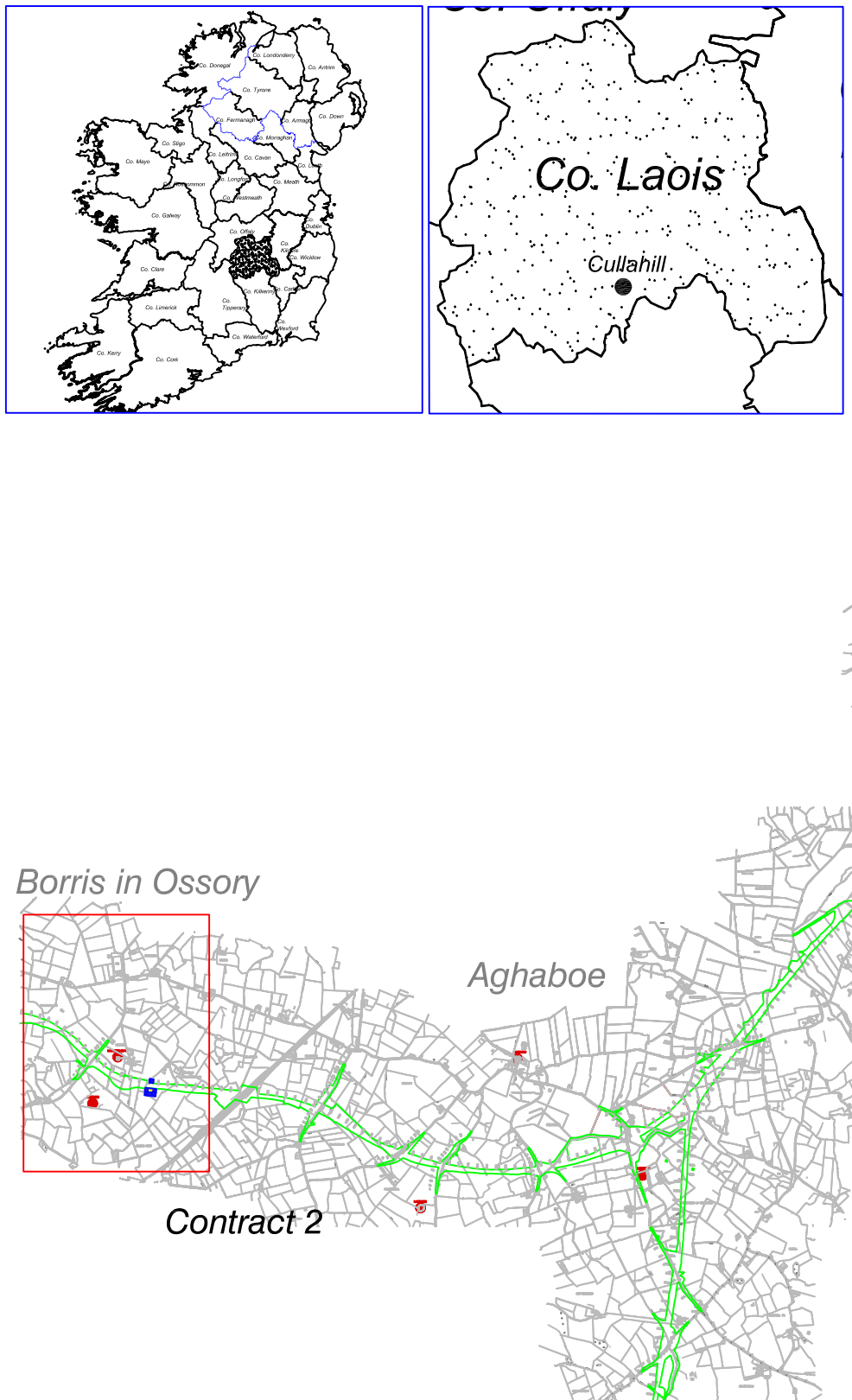
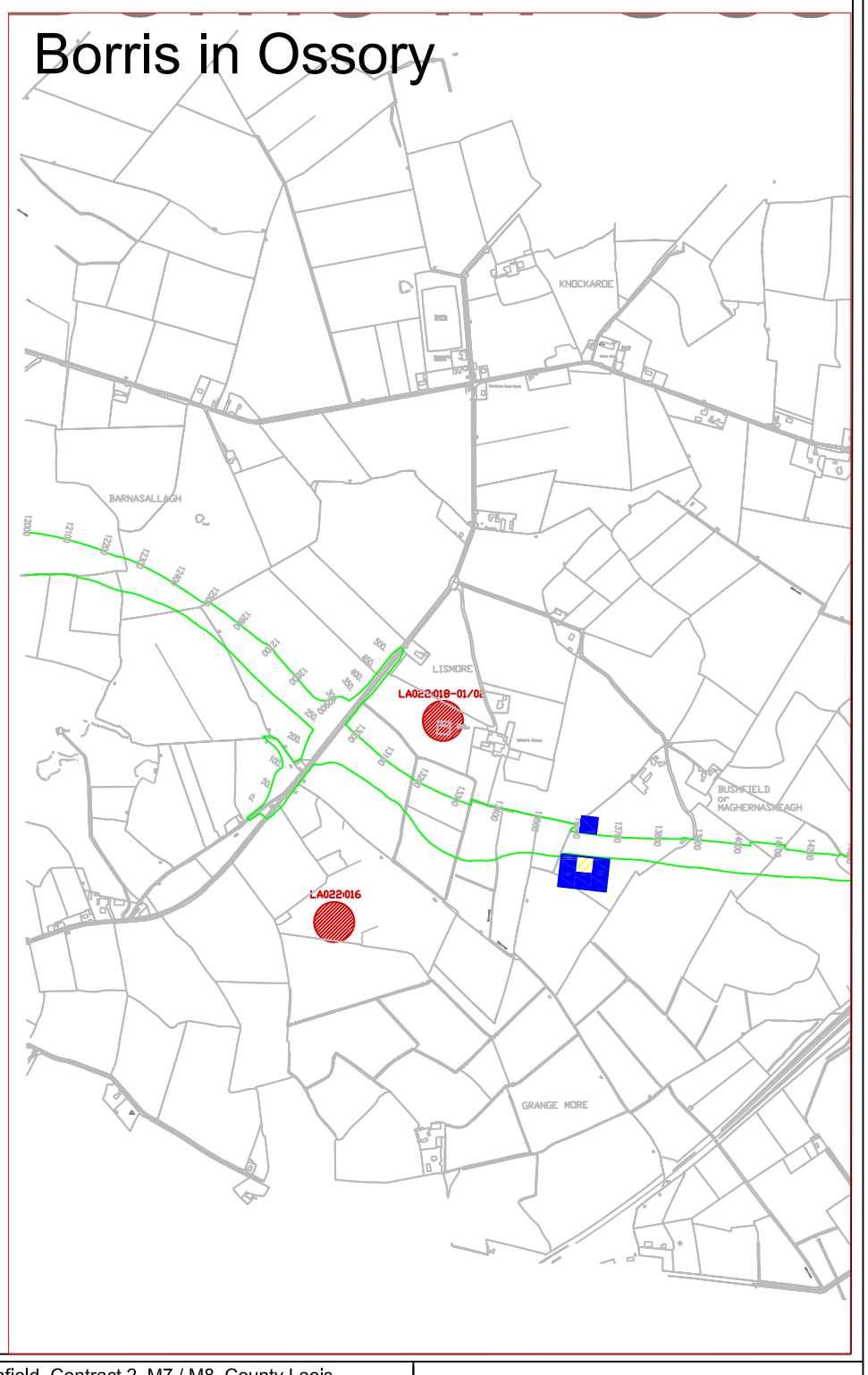
SCOLLAR, I., TABBAGH, A., HESSE, A. AND HERZOG, I. 1990 *Archaeological Prospecting and Remote Sensing*, Cambridge, Cambridge University Press. Topics in Remote Sensing Vol. 2

The following texts are referenced in the Technical Appendix:

WALKER, R. 2000 *Geoplot Version 3.00 for Windows, Instruction Manual, Version 1.2*, Clayton, West Yorkshire

7. Figures





Legend

- CPO line
- Basemap
- RMP Sites
- Geophysical survey area

Site Location: Bushfield, Contract 2, M7 / M8, County Laois

Client: Archaeological Consultancy Services Ltd.

Drawing Courtesy of:LCC	Date 08/12/06	Drawing No.: 06-35/01

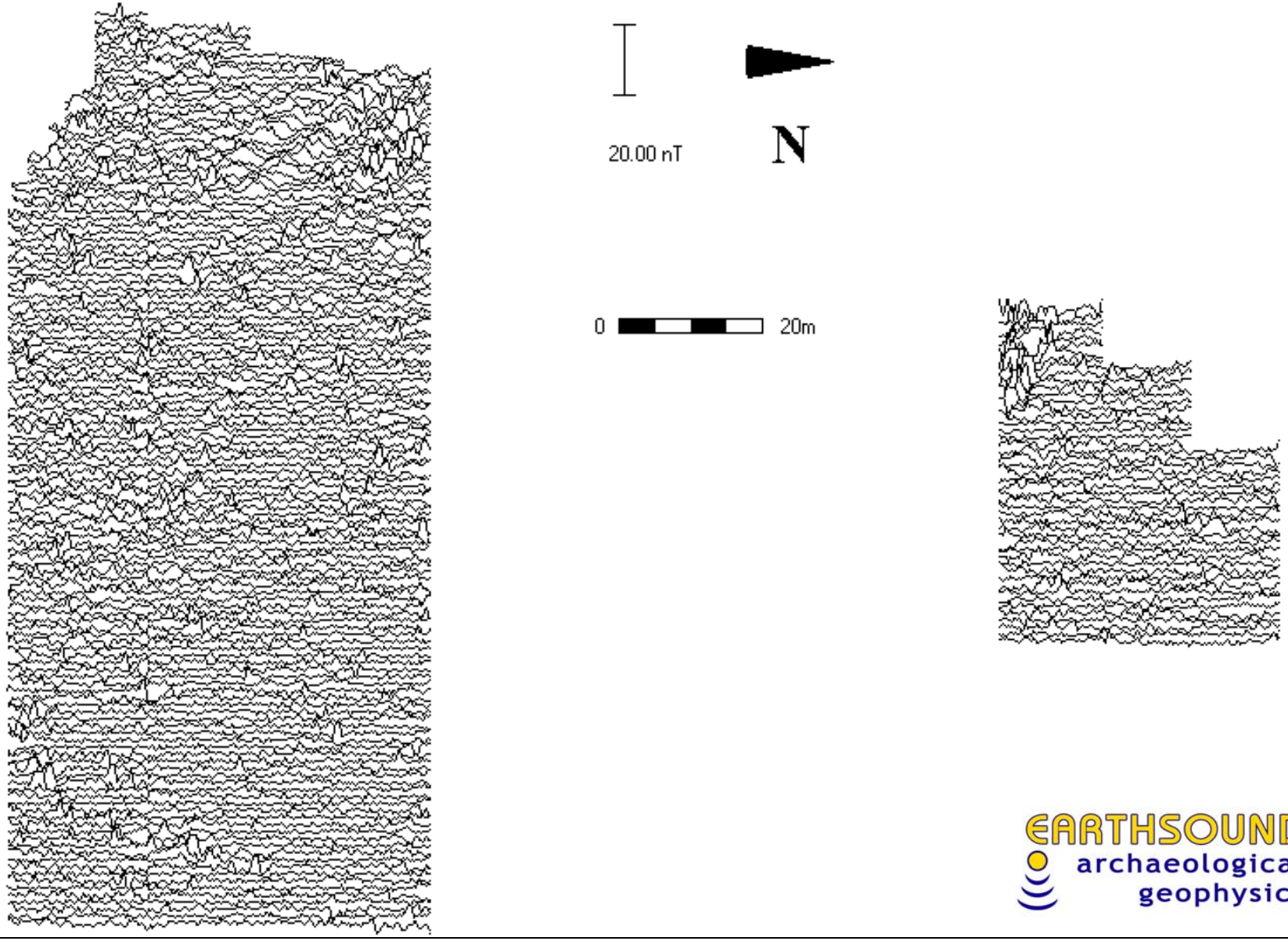
0m 2000m 4000m

Figure No. 1 Location map

EARTHSOUND archaeological geophysics

Bushfield, Contract 2, M7 / M8, County Laois

Figure 2: Pre-processed Fluxgate Gradiometer XY Traceplot



EARTHSOUND archaeological geophysics

Resolution 0.5nT, **Data Clipped to ± 3nT,** **1m x 0.25m Sample Interval** Drawing No.: 06_35/02

Lismore House

BUSHFIELD

or

MAGHERNASKEAGH

cf

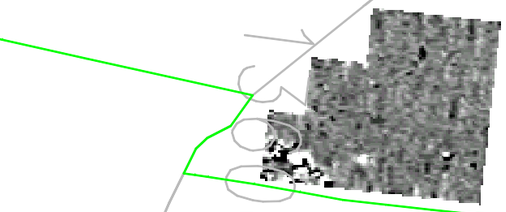
13400

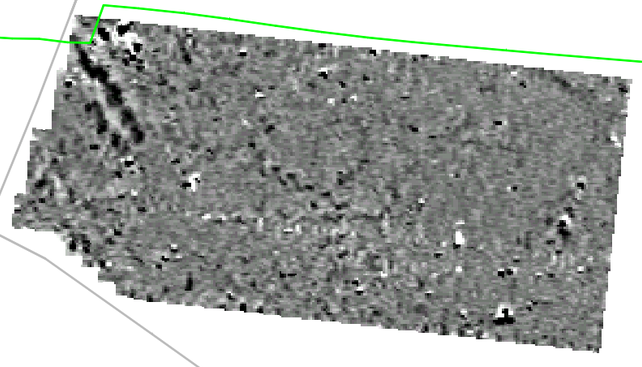
13500

13600

13700

13800





Legend

CPO boundary

Basemap

nT

-2 2

Site Location: Bushfield, Contract 2, M7 / M8, County Laois

Client: Archaeological Consultancy Services Ltd.

Drawing Courtesy of:LCC | Date 08/12/06 | Drawing No.: 06-35/03

0m 50m 100m

Figure No. 3 Magnetic Gradiometer data

EARTHSOUND archaeological geophysics

Lismore House

BUSHFIELD

or

MAGHERNASKEAGH

cf

13400

13500

13600

13700

13800

[1]

[2]

[3]

[4]

[5]

[6]

[7]

[8]

[8]

Legend

- CPO boundary
- Basemap
- Geophysical survey area
- Suggested line of enclosure ditch as detected within archaeological testing
- Enclosure Ditch
- Possible Ditch
- Possible Plough Furrows
- Possible Pits
- Postulated Boundary Feature
- Dipolar Anomalies (Ferrous material)

N

Site Location: Bushfield, Contract 2, M7 / M8, County Laois

Client: Archaeological Consultancy Services Ltd.

Drawing Courtesy of:LCC	Date 08/12/06	Drawing No.: 06-35/03

0m 50m 100m

Figure No. 3 Magnetic Gradiometer data

EARTHSOUND archaeological geophysics

Technical Appendix

Appendix 1

1. Magnetic Survey: Technical Information

1.1 Magnetic Susceptibility and Soil Magnetism

The Earth is comprised of approximately 6% iron. Via geological and pedological processes iron is present in soils and rocks as three main minerals; haematite, magnetite and maghaemite. Haematite is a very common mineral in archaeological soils and is largely responsible for most of the red colouration in the environment. Magnetite is a common mineral found in all igneous rocks, most sedimentary rocks and nearly all soils. These minerals have a weak, measurable magnetic property.

The magnetism observed in a rock is made up of remanent and induced components. In the weak magnetic field due to the earth, the induced component is proportional to the earth's field. The constant of proportionality is called the magnetic susceptibility. The susceptibility of a rock is controlled by the amount of ferrimagnetic material contained in them, their grain size, and mode of distribution.

An enhancement of ferrimagnetic minerals is responsible for the formation of magnetic anomalies in soils at archaeological sites. Magnetic Susceptibility (MS) measures how susceptible a material is to becoming magnetized. A MS survey can identify and classify different types of iron bearing materials in a safe, fast and non-destructive manner either in a laboratory or as a fieldwork component, complementing other archaeological analyses.

Anthropogenic activities can redistribute these minerals and alter others into more magnetic forms by a process of enhancement, such as burning, industrial activity, fermentation and manuring. MS enhancement of antiferromagnetic haematite in the topsoil is caused by the Le Borgne effect of domestic fires on soils and vegetational matter:

> *The burning of organic matter and the heating of non-organic matter above 200°C, allows electrons to be gained through a process of reduction, creating ferrimagnetic magnetite. As the matter cools, or in the case of organic matter, is combusted, electrons are lost through a process of re-oxidation, creating ferrimagnetic maghaemite.*

The decay of organic material associated with areas of human occupation or settlement can be identified by measuring the MS of the topsoil and noting the degree of enhancement. If the enhanced material subsequently comes to fill features, such as ditches or pits, localised isolated and linear magnetic anomalies can result whose presence can be detected by a magnetometer (fluxgate gradiometer).

There are five different types of magnetic behaviour found in Magnetic Susceptibility surveys, dependent upon the sub-atomic properties of the samples:

- *Ferromagnetism*
- *Ferrimagnetism*
- *Antiferromagnetism*
- *Antiferromagnetism*
- *Paramagnetism*
- *Diamagnetism*

Strongest

Weakest

Magnetic susceptibility is a value defined by a combination of all of the above types of magnetic behaviour, so that weaker paramagnetism and diamagnetism will be masked if other, *stronger*, magnetic properties are present. For example, a topsoil magnetic susceptibility survey will introduce additional contributions from colluvial/alluvial covering or a disturbed Ap horizon (cultivation/pasturing disturbance *etc*.) that may mask an archaeologically derived response.

1.2 Types of Magnetic Anomaly

Magnetic anomalies are either are termed **'negative'** or **'positive'** referring to their magnetic properties relative to the bipolar background (theoretically, 'zero').

The types of response mentioned above can be divided into five main categories which are used in the graphical interpretation of the gradiometer data:

Areas of positive/negative enhancement

These responses can be quite widespread, and often caused by rubble or foundations, burning, agricultural disturbance and general occupational induced enhancement.

Linear and curvilinear anomalies

Such anomalies have a variety of origins. They may be caused by agricultural practice (recent ploughing trends, earlier ridge and furrow regimes or land drains), natural geomorphological features such as palaeochannels or by in-filled archaeological ditches or walls.

Isolated positive/negative anomalies

These generally represent small areas of enhancement. They may be caused by exotic geology or by in-filled archaeological pits.

Isolated Ferrous anomalies

Theses are very strong magnetic responses caused by ferrous (iron) debris, often found scattered in fields. These are usually modern in origin, although may represent archaeological material such as coffin nails.

Areas of Disturbance

These are mostly modern in origin, causing widespread magnetic interference, often masking all other magnetic features within the vicinity. These can be caused by nearby structures, metallic fences, road traffic and metallic pipelines.

1.3 Methodology

1.3.1. *Magnetic Susceptibility Survey*

The magnetic susceptibility meter displays the MS value of material when they are brought within the influence of the sensor, such as the field search loop. An oscillator circuit within the *Bartington* MS2 meter generates a low alternating magnetic field. Any material brought within the influence of the field (in the case of the search loop, the field of influence is between 0-18cm beneath the loop, i.e. generally the topsoil), will bring about a change in the oscillator frequency. The frequency information is returned in pulse form to the MS2, where it is converted in to a value of magnetic susceptibility, κ, in SI units.

A topsoil MS survey assumes that the sample size is infinite, as the precise mass of each sample point cannot be calculated in the field. Calibration therefore, is best expressed in units of Volume Specific susceptibility. Repeatability of the survey is dependent upon the uniformity of the surface under investigation. Volume susceptibility is expressed as $\kappa \times 10^{-5}$ SI units.

1.3.2. *Fluxgate Gradiometer Survey*

A detailed survey requires a sample trigger to automatically take readings at predetermined points. These readings are stored in the memory of the instrument and are later dumped to computer for processing and interpretation. Detailed survey allows the visualisation of weaker anomalies that may not have been detected by magnetic scanning or magnetic susceptibility.

2. Earth Resistance: Technical Information

2.1 Earth Resistance and Soil Porosity

Earth resistance surveys involve passing an electric current through the ground between two electrodes (the 'current electrodes'). Two other electrodes (the 'potential electrodes') are used to measure the electrical potential between them and hence allow to evaluate the earth resistance (R=V/I). This earth resistance mainly depends on the moisture of investigated ground and therefore on the overall soil moisture and the porosity of buried features. Areas of low porosity, such as masonry and buried stonework, have a lower moisture content, and therefore a higher resistance. Areas of high porosity, such as ditch fills and pits, have a higher moisture content, and therefore a lower resistance.

2.2 Types of Earth Resistance Anomaly

Geophysical anomalies are either termed **'high resistance'** or **'low resistance'** referring to the electrical conductivity of an anomaly relative to the background.

It should be noted that the local and recent climate can severely affect earth resistance data. Surveys conducted during the winter will generally have a lower mean resistance than those conducted during the summer. A dry masonry feature will appear as a high resistance anomaly given a 'normal' climate. However, during a wet climate, water may lie on the masonry allowing the electrical current to pass with very low resistance. Similarly, ditches, usually low resistance anomalies, may bake hard during hot climates and cause a high resistance anomaly.

The types of response mentioned above can be divided into two main categories, which are used in the graphical interpretation of the earth resistance data:

Areas of high/low resistance

These responses can be quite widespread, and often caused by rubble or foundations, or in low resistance cases by large excavations or dew ponds.

Linear and curvilinear anomalies

Such anomalies have a variety of origins. They may be caused by agricultural practice (recent ploughing trends, earlier ridge and furrow regimes or land drains), natural geomorphological features such as palaeochannels or by in-filled archaeological ditches or walls.

2.3 Methodology

The twin probe array was developed for shallow depth investigations (Clark 1996.44), and involves one current and one potential electrode fixed in the ground (the 'remote probes'), and one current and one potential electrode mounted on a moveable frame (the 'mobile probes'). Provided the remote probes are far enough away (i.e. greater than 30 times the mobile probe spacing), variations in the distance between the two pairs of electrodes has no significant effect on the readings (for a fuller discussion of the technical aspects involved, see Scollar *et al.* 1990.pp 307-372).

A detailed resistance survey employs the use of a sample trigger to automatically take readings as the mobile probes are inserted in to the ground at predetermined points. These readings are stored in the memory of the instrument and are later dumped to computer for processing and interpretation.

3. Data Processing and Presentation

3.1 Interpolation

Interpolation can be defined as the estimation of a value between known values. The data magnetometer data displayed in this project have been interpolated using the sin *x*/*x* function in *Geoplot* 3.0 (Walker 2000).

Gridding methods produce a regularly spaced, rectangular array of Z values from irregularly spaced XYZ data. The term "irregularly spaced" means that the points follow no particular pattern over the extent of the map, so there are many "holes" where data are missing. Gridding fills in these holes by extrapolating or interpolating Z values at those locations where no data exists.

A grid is a rectangular region comprised of evenly spaced rows and columns. The intersection of a row and column is called a grid node. Rows contain grid nodes with the same Y co-ordinate, and columns contain grid nodes with the same X co-ordinate. Gridding generates a Z value at each grid node by interpolating or extrapolating the data values. The *Kriging* gridding method produces visually appealing maps from irregularly spaced data. *Kriging* is a geostatistical gridding method that has proven useful and popular in many fields. *Kriging* attempts to express trends suggested in the data so that, for example, high points might be connected along a ridge rather than isolated by bull's-eye type contours.

Appendix 2

Survey Grid Re-location

1. Each survey grid was laid out using a *Trimble* Pro-XRS Differential Global Positioning System (DGPS), to an accuracy of ±50cm.
2. There was a good correlation between the geophysical survey data and the digital map base and it is estimated that the average 'best fit' error is lower than ±0.25m. It is important to note that local grid north (27/08/03) varies slightly from *Ordnance Survey* north, with an annual decrease of 0.9°3'.

Appendix 3

Geophysical Archive

Earthsound Archaeological Geophysics takes its archiving responsibilities very seriously. Archiving is a necessary measure to maintain a complete record of past research, prevent unnecessary duplication and allow the re-use and re-interpretation of geophysical data as analytical techniques evolve.

The geophysical archive comprises:-

- an archive CD-ROM containing files of the raw data (Geoplot 3.00a, MS-Excel), report text (Word 2000 9.0), and graphics files (AutoCAD 2000).
- a hard (paper) copy of the report

At present, two copies of the archive are held by *Earthsound Archaeological Geophysics*, at separate locations to ensure preservation against accidental damage or theft. The Client, *Archaeological Consultancy Services Limited*, holds one further copy of the archive. Additional paper copies intended for ultimate deposition with the *Department of the Environment, Heritage and Local Government* are in the guardianship, and are the responsibility of, *Earthsound Archaeological Geophysics*.

An Analysis
of the
Human Skeletal Remains
from
Bushfield/Lismore 1, Co. Laois (A015/111)

Denise B. Keating BA, MSc (MIAPO, MIAI). Osteoarchaeologist
For: ACS Ltd

1 Materials & Methods

1.1 Materials

The graves of sixty individuals were excavated under licence number A015/111 and under the direction of Mr Kenneth Wiggins. The site of Bushfield was excavated in advance of works for the construction of the M7/M8 motorway. The cemetery area, which was unenclosed, was located within the northeastern quadrant of the Bushfield/Lismore 1 enclosure. The graves containing the human remains were typically simple earth-cut graves and were broadly oriented, in the Christian tradition, in an East – West direction.

Also analysed were twenty-one collections of disarticulated human remains, of which twelve were directly associated with a skeleton or skeletons. The remaining collections derived either from discrete archaeological contexts or from scatters distributed around the site. A 2m x 2m grid was established for the cemetery and the location of these scatters were identified by the grid square number in which they were found. A standard of three samples per grave was established where one from the skull area, one from the abdominal area and a final from the grave fill were taken. Human remains retrieved from the processing of these samples can be seen listed in section 6.14 (appendix).

A quantity of burnt bone was also collected from the site. Although not all fragments could be identified, it appeared that they were of faunal origin. Details of these finds and their find location can be found in section 6.12 in the appendix.

1.2 Methods

1.2.1 Recording the Remains

Standardised recording forms were used to record the remains ensuring that each individual was recorded in the same manner. The recording forms for adult, juvenile and infant remains devised by IAPO (Irish Association of Professional Osteoarchaeologists) were employed so as to ensure that results gleaned from the Parknahown remains can, in the future, be utilised by other osteoarchaeologists for comparative purposes.

Examination of the remains included completing firstly an inventory of each of the bones and teeth, detailing their completeness and secondly an accompanying visual inventory. The overall condition of a skeleton and an estimate of its percentage of completeness were detailed together with its relationship to other skeletons or archaeological features from the site. The type of grave and attitude or position of the skeleton within it was also recorded.

Each individual was then analysed for evidence of age at death, anatomical sex (in the case of adults), stature, non-metrical variation and the manifestation of pathological processes.

Finally, the presence or absence of any associated material; human, faunal or inorganic was also recorded and a minimum number of individuals (MNI) was calculated both for the group and for each discrete grave.

1.2.2 Preservation

The approximate percentage of completeness of the skeleton was first calculated by detailing the presence or absence of the constituent parts of the skeleton and their level of completeness.

Level of preservation was used to describe the condition of the bones regardless of completeness. It describes the effects of taphonomic conditions on the bones. Taphonomy deals with the processes that affect the skeleton after deposition and causes such things as chipping, flaking, abrasion or fragmentation of the bone. It also includes other exogenous factors such as animal activity (digging, gnawing etc). For the Bushfield population, the preservation of a skeleton was scored as either “poor”, “fair” or “good”.

1.2.3 Minimum number of individuals

MNI was calculated from the number of occurrences of each of sixteen different bones (detailed below in Table 1). The bones chosen for the MNI count were divided into male, female and non-adult categories. The most frequently occurring bone, either from the right or left side, was used to determine the minimum number of individuals from that group. MNI was based on all bone collected from the site of Bushfield: articulated and disarticulated. Disarticulated remains issued from three locations. These were firstly, those that were associated with the grave of an articulated skeleton, secondly, those that were related to an archaeological feature and thirdly those that were neither associated with any burial or feature and that were recorded by grid location. There were a minimum number of 39 individuals (38 adults and 1 non-adult).

	?Female	**Female**	**?Male**	**Male**	**Unsexed**	**Non-adult**
Frontal	2	1	2	1	8	0
L. Maxilla	1	2	1	1	3	0
R. Maxilla	1	1	0	1	3	0
L. Mandible	2	2	3	3	9	0
R. Mandible	3	2	2	3	13	**1**
Occipital	3	1	2	2	13	0
L. Petrous portion	3	2	3	3	**27**	0
R. Petrous portion	3	**2**	**3**	**3**	23	1
L. Medial clavicle	1	1	0	1	1	0
R. Medial clavicle	2	1	0	0	1	0
L. Lateral clavicle	1	2	1	1	3	0
R. Lateral clavicle	2	1	0	2	4	0
L. Glenoid	0	0	0	0	0	0
R. Glenoid	1	0	0	0	1	0
L. Prox humerus	0	0	1	0	2	0
R. Prox humerus	3	2	1	0	6	0
L. Dist humerus	2	1	2	3	12	0
R. Dist humerus	3	1	1	3	10	0
L. Prox radius	0	1	0	1	5	0
R. Prox radius	1	1	0	1	3	0
L. Dist radius	0	1	0	1	5	0
R. Dist radius	1	1	0	2	2	0
L. Prox ulna	1	1	2	1	7	0
R. Prox ulna	2	1	0	2	6	0
L. Dist Ulna	0	1	1	1	5	0
R. Dist ulna	1	1	0	1	2	0
L. Prox Femur	3	2	3	3	16	0
R. Prox Femur	**4**	2	1	3	17	0
L. Dist Femur	2	1	1	1	7	0
R. Dist Femur	2	1	1	2	9	0
L. Patella	0	0	0	0	1	0
R. Patella	0	0	0	0	1	0
L. Prox Tibia	3	1	1	1	6	0
R. Prox Tibia	2	1	1	1	8	0
L. Dist Tibia	2	1	1	0	1	0
R. Dist Tibia	1	1	1	1	1	0
L. Prox Fibula	2	1	1	1	0	0
R. Prox Fibula	0	0	1	1	1	0
L. Dist Fibula	0	0	1	1	0	0
R. Dist Fibula	0	0	1	1	0	0
L.Talus	0	0	0	0	1	0
R.Talus	0	0	0	0	0	0

	?Female	Female	?Male	Male	Unsexed	Non-adult
L. Calcaneus	0	0	0	0	0	0
R. Calcaneus	0	0	0	0	0	0

Table 1: Minimum number of individuals. Bold type indicates the most frequently occurring bone in each group.

It is clear that the calculation of minimum number underestimates the true number of individuals at Bushfield as represented by articulated burials and identified graves. This is a reflection of the poor preservation seen at the site.

1.2.4 Sex

Anatomical sex was determined in the case of individuals of full skeletal adulthood only. The lack of reliable sexually dimorphic traits prior to the completion of puberty makes the determination of sex in the juvenile skeleton inappropriate.

Sex was determined using a number of sexually dimorphic physiological traits of the pelvis (White, 2000; Schwartz, 1995; Rogers & Saunders, 1994; Iscan & Derrick, 1984) and cranium (White, 2000; Schwartz, 1995; Ubelaker, 1989; Angel, 1982; Meindl et al, 1985). Where preservation allowed, metric measurements were taken from a number of skeletal elements of the postcranial skeleton. In order to determine sex they were applied to standard measurements of known-sex individuals. (Brothwell, 1981; Bass, 1987; Sutherland & Suchey, 1991).

Sex determination resulted in a skeleton being placed in one of five categories. These were: male, female, indeterminate, ?male and ?female. The final two categories refer to individuals whose remains indicated the probability of sex, but, due either to poor preservation or simple individual dimorphism, could not be placed in either the male or female category.

1.2.5 Age

Recording forms for the Parknahown group included a number of techniques for estimation of age at death, all of which were based on diagnostic, age-related features of the cranial and post-cranial human skeleton.

These include the Lovejoy *et al* (1985) ageing technique from the auricular surface of the pelvis and the Brooks & Suchey (1990) pubic symphysis technique, also based on the pelvis. There was no instance in which these techniques could be used due to poor preservation of the related bones. The Brothwell (1981) technique for estimation of age from dental attrition was used, however. Epiphyseal fusion sites, which complete as late as 25-28 years, were also observed in order to estimate adult age.

Estimation of age in the adult skeleton resulted in each individual being placed in one of the categories listed below. Where an individual whose age range spanned two of these categories it was accounted for in both by scoring 0.5 in each. Where an age range could not be determined but the individual was judged to be skeletally adult, it has simply been referred to as "adult".

18 – 25	-	Young Adult (YA)
26 – 35	-	Early Middle Adult (EMA)
36 – 45	-	Late Middle Adult (LMA)
> 46	-	Older Adult (OA)

For estimation of age in non-adults, analysis of dental development (Moorreess, Fanning & Hunt, 1963; Ubelaker, 1989) and epiphyseal fusion (Scheuer & Black, 2004) was undertaken. Non-adults were assigned to age ranges and these can be seen listed below. Where an age range could not be determined but the individual was judged to be skeletally immature, it has simply been referred to as "non-adult".

~ 0	-	Neonate (0-27 days) (NEO)
< 1yr	-	Infant (INF)
1 – 4	-	Early Childhood (EC)
5 – 8	-	Middle Childhood (MC)
9 – 12	-	Late Childhood (LC)
13 – 17	-	Adolescence (ADO)

1.2.6 Stature

In order to determine the stature, or standing height, of skeletons, Trotter & Gleser's (1952) regression equations for the longbone lengths of white males and females would typically be used for a population such as Bushfield. However, preservation was too poor for estimations of stature to be attempted.

1.2.7 Non-Metrical Variation

Non-metrics were recorded as is standard (Turner & Scott, 1991), by noting them present, absent or unobservable. The latter denotes the absence or poor preservation of the bone on which the trait is sought. The results are tabulated in the appendix (sections 6.5 and 6.6) for each adult with details of the traits that were observable or unobservable expressed or absent. Nine traits were sought in the cranium and eleven in the postcranial skeleton.

1.2.8 Pathology

Pathologies were recorded for each individual and photographed, where possible. Detailed descriptions of location, severity and expression of the affected elements were made.

In recording dental calculus and periodontal disease, the Brothwell (1981) classification system was used in conjunction with the pictorial guides for description of severity. For dental enamel hypoplasia, the Lukacs (1989) system was used, and for dental attrition, the Smith (1984) system. Caries were recorded by their location and on a four point scale for cavity size: 1) Pinpoint, 2) Small, 3) Medium and 4) Large.

2 Results: Demography

2.1 Preservation

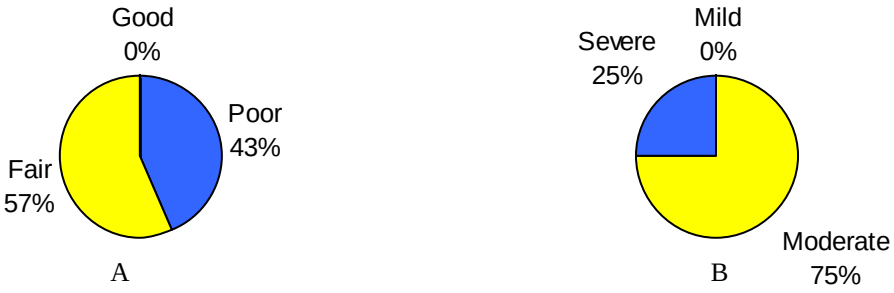


Figure 1: Percentage of articulated burials in each preservation (A) and fragmentation (B) category.

The level of preservation apparent at the site of Bushfield was, overall, rather poor (Figure 1A). The composition of the cemetery fills was unsuitable for the preservation of bone. The average percentage of representation of the skeleton was less than 12% per individual. The bones that tended to survive were those from the appendicular skeleton: longbones and the skull primarily. Tooth crowns, being composed of more robust enamel, also tended to experience more favourable survival. In all cases a degree of fragmentation had occurred within the skeletal remains (Figure 1B). The majority had sustained a moderate level of fragmentation. However there were also a number, almost a quarter of individuals, that exhibited severe fragmentation.

2.2 Sex

Of the fifty-seven adults present, sex was determinable for just twelve. There were an equal number of individuals of both sexes. There were 3 males, 3 ?males, 2 females and 4 ?females. The remaining individuals exhibited preservation that was too poor to allow sex determination.

A number of instances where clustering of burials of took place was noted no this site. No correlation between sex and group was apparent however. It would be inappropriate to attempt to compare the results of sex determination at Bushfield with other sites considering its small number of sexed individuals. Suffice to say that a ratio of approximately 1:1 has been found to be typical in sites of this period (Fibiger 2006a; Fibiger 2006b; Keating, 2007; Keating 2008).

2.3 Age

There were just three non-adults identified in the Bushfield population. SK1 was an early child of approximately 3 years, SK39 was a middle child of 5.8 – 7.6 years and SK16 was an adolescent of approximately 15 years.

Unfortunately, little inference can be drawn from these details. The results simply show that, as is typical in any archaeological and indeed modern population, a degree of child mortality existed at Bushfield. Typically, in the interpretation of a cemetery population, if non-adult individuals represent such a small percentage of the group, it would be suggested that either child mortality was unusually low or that non-adults had been buried elsewhere. However, preservation at Bushfield must be considered. While non-adults can survive as well as adults within a cemetery (Lewis, 2007), it is undoubted that the thinner bones and those composed of less cortical material survived worst at this site. The bones of relatively lower cortical thickness of non-adults would surely have been susceptible to the harsh conditions, which damaged so much of the bone at Bushfield.

Grave cut definition was very poor with very little surface change indicating the presence of a burial. Therefore, it is not possible to rely on grave shadows to determine if further individuals, adult or juvenile, had been buried there but had later succumbed to harsh taphonomic conditions.

Of the fifty-seven adults at Bushfield it was possible to estimate age in thirty-three. It was determined that the remaining twenty-four were simply anatomically adult. The majority of adult deaths (2 male, 3 female, 13 unsexed) had occurred in the early middle adult stage between the ages of 26 and 35 years (Figure 2). There were fewer deaths in the categories above and below this. In both the young adult and the late middle adult categories, one male and one female occurred as well as, in the former, five unsexed adults and, in the latter, four unsexed individuals. While only broad comparisons can be made due to the low number of accurately aged individuals at Bushfield, it can be noted that at both Parknahown 5 and Killeany, sites of comparable date from Co. Laois, most adult deaths occurred in the early and middle adult categories.

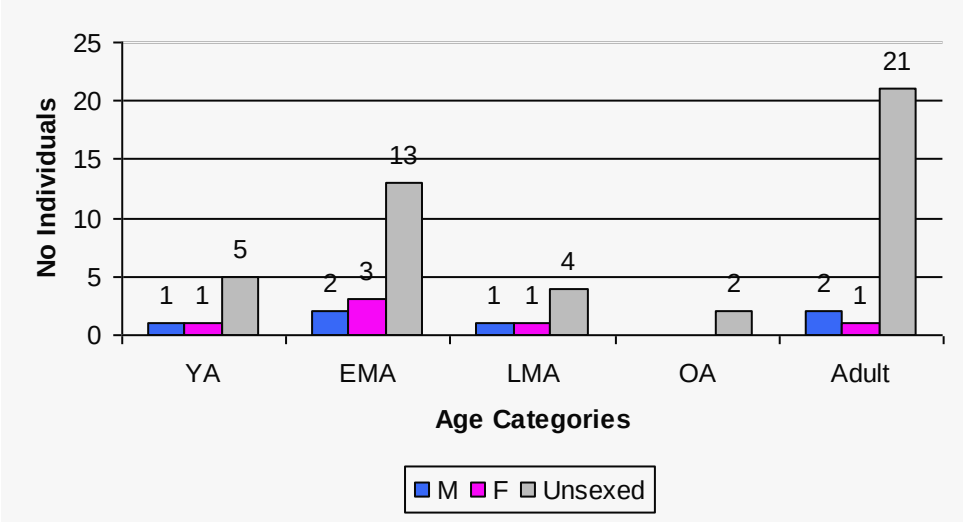


Figure 2: Number of males, females and unsexed adults in each of the adult age categories. YA: young adult, EMA: early middle adult, LMA: late middle adult, OA: older adult, Adult: age range not determined

2.4 Non-Metrical variation

There were seven adults in whom non-metric trait expression was observable. Traits were expressed in 2 females (1 female, 1 ?female), 4 males (2 male, 2 ?male) and 1 unsexed individual. The term non-metric trait refers to the morphological variance between individuals with regard to bone morphology. They are skeletal anomalies, which, as the name suggests, are "not normally recorded by measurement" (Mays, 1998:102).

Plate 1: Frontal bone of SK61 exhibiting persistence of the metopic suture.

Twenty traits were sought and three were expressed in Bushfield individuals. All were skull traits but this appeared to be more due to the problems associated with postcranial preservation rather than any true bias of expression. Only eight individuals presented any postcranial sites where a trait could be sought whereas twenty-nine individuals exhibited observable sites of the skull. The expressed traits are shown below (Table 2). Full details of non-metric trait expression can be found tabulated in section 6.5 in the appendix

SK	Sex	Age	Trait
SK19	M	Adult	Bilateral mandibular tori
SK25	M	LMA	Bilateral mandibular tori
SK36	?M	YA	R Ossicle in lambdoid suture
SK41	?	YA-EMA	R Mandibular torus
SK44	?M	EMA	R Mandibular torus
SK61	F	EMA	Metopic suture
SK63	?F	EMA	Bilateral mandibular tori

Table 2: Traits expressed in the Bushfield population. Where right side is indicated, left was not observable.

3 Results: Pathology

3.1 Dental Pathology

There were a number of dental pathologies noted among the Bushfield individuals. Some forty-seven of the fifty-one sets of dentition exhibited some form of dental pathology. The percentage of occurrence, where noted, is per observable tooth or, in the case of alveolar (jaw) pathologies, per location.

3.1.1 Calculus

Calculus is formed as a result of the mineralisation of dental plaque. Micro-organisms together with proteins in the saliva combine to create plaque deposits. Failure to remove these deposits through activities such as regular brushing, results in their eventual mineralisation and the subsequent build-up of calculus (Plate 2).

Plate 2: Right maxillary third molar of SK73 with significant calculus deposits. Distp-lingual aspect.

In the Bushfield population 68% of all observable adult teeth exhibited calculus deposits (44 individuals). Some 61.5% of the observable teeth in the male group (6 individuals) and 80.5% of the female (7 individuals) exhibited calculus proliferation as did 64.5% (31 individuals) of the unsexed group. A somewhat higher rate of calculus formation is more usually seen in the males. Males commonly show a greater number of calculus deposits, which are also heavier in nature than those of women (Hillson, 2002). This does not seem to have been the case at Bushfield. However, while calculus proliferation and the differences seen in its expression can be a reflection of the types of foods consumed during life, it would be inappropriate to suggest that the few individuals in whom sex was determinable at Bushfield indicate this.

	Male	Female	Unsexed	Total
Bushfield	61.5% (64/104)	80.5% (136/169)	64.5% (262/406)	68.0% (462/679)
Killeany	85.2% (224/263)	90.9% (318/350)	88.9% (40/45)	88.4% (582/658)
Parknahown	97.8% (709/725)	90.5% (1255/1386)	88.8% (395/445)	92.3% (2359/2556)

Table 3: Calculus. Percentage of affected teeth and, shown in brackets, number of teeth affected/total number of observable teeth.

Although a broadly similar number of teeth were observable in the Bushfield and Killeany populations (Table 3), Bushfield showed a somewhat lower level of calculus occurrence than Killeany or, indeed, Parknahown. This may possibly suggest a difference between the sites in the factors that lead to calculus initialisation. For instance the consumption of carbohydrates and the lack of good oral hygiene are known to increase calculus build-up (Hillson, 2002). However, it may also more simply be a reflection of the harsh taphonomic conditions at the site of Bushfield where fragmentation and subsequent loss of calculus deposits would be a factor.

3.1.2 Caries

"Dental caries is a disease process characterised by the progressive decalcification of enamel or dentine" (White, 2000:401). They are formed as a result of the fermentation of food sugars in the mouth by bacteria, and lesions most often appear in areas where food is allowed to build up such as between the teeth or in fissures between the cusps on occlusal (biting) surfaces.

	Male	Female	Unsexed	Total
Bushfield	6.7% (7/104)	2.9% (5/169)	5.2% (21/406)	4.6% (33/679)
Killeany	8.4% (22/263)	12.9% (45/350)	17.8% (8/45)	11.4% (75/658)
Parknahown	16.0% (116/725)	12.5 % (174/1387)	3.8% (17/447)	12.0% (307/2559)

Table 4:Caries. Percentage of affected teeth and, shown in brackets, number of teeth affected/total number of observable teeth.

A total of 4.6% of all adult teeth (18 individuals) exhibited caries formation. In 6.7% of observable male teeth (3 individuals) and in 2.9% of observable female teeth (4 individuals) carious cavities were present. A total of 5.2% of teeth of unsexed adults (11 individuals) were affected. The prevalence of caries at Bushfield was less than half that seen at either Killeany or Parknahown 5 (Table 4).

Foods that are high in starches or sucrose are known to be cariogenic (Hillson, 2002). The rates seen at Bushfield may reflect the consumption of less of these types of foods. Alternatively, the consumption of a rougher diet, possibly containing particles left over from food processing, may have spared the people of Bushfield somewhat. Eating food containing such particles as can be left behind through the processing of cereal on a stone quern for example, can have a diminishing affect on caries proliferation. The particles serve to slough off food debris and flatten out cusps where they might otherwise collect.

3.1.3 Periodontal Disease

Periodontia are tissues, including the periodontal ligament, the gingiva (gums) and the alveolus, that support the teeth. The alveolus, being the bony component, is the only structure available for inspection in the archaeological specimen, however.

The process of periodontitis begins with inflammation of the gingiva. This is usually caused by the proliferation of dental plaque. (Aufderheide & Rodriguez-Martin, 1998). The inflammation in the gingiva may then be transmitted to the alveolus and it is the subsequent resorption of the bone that can be seen in archaeological skeletons. In severe cases the resorption is so great that it results in tooth exfoliation.

	Male	Female	Unsexed	Total
Bushfield	90% (9/10)	70.8% (17/24)	46.1% (6/13)	68.7% (32/47)
Killeany	57.4% (66/115)	74.3% (78/105)	75% (3/4)	65.6% (147/224)
Parknahown	74.5% (286/384)	78.9% (508/644)	25.8% (56/217)	68.3% (850/1245)

Table 5: Periodontitis. Percentage of affected locations and, shown in brackets, number of locations affected/total number of observable locations.

A total of 68.1% of observable adult locations were affected by periodontitis (8 individuals). These included 90% of the male locations (2 individuals), 70.8% of the female (4 individuals) and 46.1% of the unsexed adults (2 individuals). These figures are based on the examination of few samples and may cause the rate to appear inflated. Table 5 is illustrative of how seldom the alveoli of Bushfield individuals could be examined due to the poor preservation that existed among the skeletons.

3.1.4 Abscesses

When bacteria, or the toxins related to them, enter the central pulp cavity of the tooth they cause localised inflammation. The pressure exerted by the inflamed tissues causes death of the pulp (the tooth's internal connective tissues) and subsequent pus production (Hillson, 2002). The structure of the tooth itself, proving an efficient conductor for the transmission of the pus, allows it to travel down the root canal, where it exits the foramen at the apex of the root and enters the bone of the jaw.

The subsequent build-up of pus within the alveolus causes pressure, which in turn causes pain that is only alleviated through the formation of a cloaca (a passage or opening). The cloaca is formed when the infected mass forces its way out of the confined space and through the bone, creating an outlet through which the pus can drain (Plate 3).

Plate 3: Abscess. Left maxilla of SK25. The 4.5mm diameter cloaca at the tip of the second maxillary molar root is indicated.

It is this outlet that is observable in skeletal remains. The presence of an abscess chamber is otherwise only determinable from the examination of X-rays. The proliferation of caries and the damage they cause to the tooth can allow the initial invasion of bacteria into the pulp chamber. Other factors are severe wear with subsequent exposure of the pulp and trauma that causes fracturing of the tooth crown

A total of 0.3% of all adult observable alveolus positions exhibited the presence of an abscess. Just one individual, a late middle adult male, exhibited an abscess.

3.1.5 Ante-Mortem Tooth Loss

It is not always clear what causes tooth loss. As noted above, periodontitis is one possible causal factor, as are the presence of carious cavities or dental abscesses. It was noted that teeth had been lost during life in 5.0% of the total observable adult jaw locations It occurred in 15.7% of male (4 individuals), 0.6% of female (1 individual) and 3.2% of unsexed adults' (3 individuals) tooth locations.

Plate 4: Mandible of SK7 where all observable teeth except the left canine had been lost ante mortem.

	Male	Female	Unsexed	Total
Bushfield	15.7% (23/146)	0.6% (1/171)	3.2% (14/439)	5.0% (38/756)
Killeany	4.4% (18/413)	4.6% (15/329)	0% (0/219)	3.4% (33/961)
Parknahown	8.8% (85/961)	8.6% (160/1859)	0.7% (4/536)	7.4% (249/3356)

Table 6: Ante-mortem tooth loss. Percentage of affected locations and, shown in brackets, number of locations affected/total number of observable locations.

As can be seen in Table 6 Bushfield falls roughly between the rates of ante mortem tooth loss seen at Killeany and Parknahown. There appeared to be no patterns active among the eight affected individuals at Bushfield with two of EMA age, two of LMA and one of OA stage. The remaining three could not be aged.

3.1.6 Dental Enamel Hypoplasia

Hypoplasias occur during youth when the teeth are still forming. When the individual experiences a period of developmental stress, the body lays down less of the protein matrix of which the tooth is composed, causing a narrowing of the tooth crown. When normal growth recommences, a depression can be seen where enamel deposits were lessened. Once formed, teeth, unlike bone, do not remodel and therefore the defect is preserved permanently.

Plate 5: SK32. DEH of the left maxillary second premolar (left) and molars

The precise cause of enamel hypoplasia is unknown. It is generally agreed that this signature of developmental stress can arise from a period of nutritional deficiency or a childhood illness. It cannot be stated which of these is the causative factor in any one individual. It can be said, however, that if an illness was the cause, it is likely to have been one such as measles, pneumonia, diarrhoea or gut parasites or, indeed, any condition which causes fever (Roberts & Manchester, 1999).

	Male	Female	Unsexed	Total
Bushfield	40.5% (32/79)	32.0% (50/156)	35.4% (135/381)	35.2% (217/616)
Killeany	12.7% (31/245)	18.9% (65/344)	11.1% (5/45)	15.9% (101/634)
Parknahown	51.2% (313/611)	43.1% (535/1241)	51.1% (216/423)	46.8% (1064/2275)

Table 7: Dental Enamel Hypoplasia. Percentage of affected teeth and, shown in brackets, number of teeth affected/total number of observable teeth.

The rate of occurrence of hypoplasias at Bushfield was greater than that seen at Killeany but less than that seen at Parknahown (Table 7). Around a third of (35.2%) all observable adult teeth in Bushfield displayed hypolasias. Whereas 40.5% of the male (5 individuals) teeth examined were affected, slightly less (32.0%) of the female (7 individuals) teeth displayed the defect. Some 35.4% of unsexed individuals (25 individuals) teeth were also affected.

3.1.7 Non-Adult Dental Pathology

Of the 35 non-adult teeth that were retrieved from Bushfield's three non-adults, eleven exhibited calculus proliferation all of which occurred in the two older individuals. There were just two non-adult carious cavities noted and both occurred in the middle child. Just one alveolar position, seen in the adolescent, was observable in the non-adults. No periodontitis was noted. Similarly, where abscess formation was sought, just two locations were observable. None occurred. Some 59 teeth, including unerrupted complete tooth crowns, were inspected for enamel hypoplasias. Twenty-one were affected. Twelve occurred in the middle child and nine in the adolescent.

3.1.8 Dental Anomalies

A total of 103 third molar positions were observable among thirty-seven adults and of these 6.8% of the third molars were congenitally absent.

3.2 Osteoarthritis & Degenerative Joint Disease (DJD)

Primary degenerative joint disease is a term used to describe a number of processes that can be seen at the joint surfaces. They occur through the wear and tear inflicted on the joints by a bipedal life. Secondary DJD refers to degenerative changes that occur subsequent to an independent causative factor such as trauma, infection or a congenital disorder. Primary DJD alone was apparent among the Bushfield individuals.

Degeneration begins when the synovial membrane, which in normal circumstances lines each facet of the joints, becomes worn. A number of processes develop subsequent to this. Only three however, are truly observable in the archaeological specimen. Firstly, osteophytes or bony excrescences can be observed at the margins of the joint surfaces, secondly, joint surfaces appear porous and thirdly they exhibit eburnation.

It was the presence of eburnation alone that was used to determine the presence of osteoarthritis in this population. Neither osteophytosis nor joint porosity truly proves the loss of cartilage that diagnoses osteoarthritis, whereas eburnation describes the marble-like, shiny and smooth surface of a joint that has experienced bone-to-bone contact.

3.2.1 Vertebral

Osteophytosis, porosity and eburnation were evident in a number of the spines of the individuals. There were 18 adults (4 male, 5 female and 9 unsexed) whose vertebrae could be examined for the presence of pathological processes. Five of the eighteen (2 male, 1 female and 2 unsexed) were affected by some form of spinal pathology.

Joint	Male	Female	Unsexed	Total
C1 Dens Articulation	3	2	2	7
C2 Dens Articulation	2	3	4	9
Cervical Discal Facets	2	5	0	7
Thoracic Discal Facets	0	0	0	0
Lumbar Discal Facets	0	0	0	0
S1 Discal Facets	0	0	0	0
Cervical Apophyseal Facets	19	21	31	71
Thoracic Apophyseal Facets	6	0	7	13
Lumbar Apophyseal Facets	2	4	17	23
S1 Apophyseal Facets	0	0	0	0

Table 8: Number of observable discal, apophyseal and atlanto-axis joint surfaces.

Joint	Male	Female	Unsexed	Total
C1 osteophytosis	1	0	1	2
C1 porosity	1	0	1	2
C1 eburnation	0	0	1	1
C2 osteophytosis	0	0	1	1
C2 porosity	0	0	1	1
C2 eburnation	0	0	1	1
Cervical facets osteophytosis	3	2	3	8
Cervical facets porosity	3	0	3	6
Cervical facets eburnation	1	0	0	1
Thoracic facets osteophytosis	0	0	1	1
Lumbar facets osteophytosis	0	0	1	1

Table 9: Number of articular surfaces affected by osteophytosis, porosity and eburnation in the cervical, thoracic and lumbar parts of the spine.

The identification of any patterns within the group or between sexes is problematic for a site such as Bushfield where the bones of the vertebral column survived so poorly. Fragments of the neural arch, only some of which retained the facets which articulate one vertebra to the next, tended to be the only surviving part of the vertebra. For this reason little data on centrum defects, apart from those of the cervical vertebrae where preservation was better, could be retrieved. The available data (Table 9) shows that normal wear and tear of the vertebral column, which occurs with age, was seen in the adults at Bushfield. The presence of eburnation in SK66, a ?male adult and SK79 an unsexed older adult (over 45 years) illustrates the occurrence of osteoarthritis in the group.

3.2.2 Extra-Spinal

There were 18 adults (5 male, 4 female and 9 unsexed) whose non-spinal joints could be examined for evidence of degeneration. One individual (SK66) a ?male exhibited porosity and eburnation of the right acromioclavicular joint illustrating the presence of osteoarthritis at the shoulder. No other joint surface exhibited pathology. The joints that were observable, although unaffected, are tabulated below (Table 10)

Joint	Male	Female	Unsexed	Total
L Tempero-mandibular	4	3	5	12
R Tempero-mandibular	3	2	6	11
L Gleno-humeral	0	1	0	1
R Gleno-humeral	0	1	1	2
R Acromio-clavicular	1	0	0	1

Table 10: Number of extraspinal joint surfaces observable. Left and right sides are combined.

3.3 Metabolic

3.3.1 Cribra Orbitalia

Cribra orbitalia is recognisable by small pinprick sized holes in the orbital roofs of the cranium. It has traditionally been thought to be the physical manifestation of iron deficiency anaemia (Wright & Chew, 1999). This theory arises from the fact that the porotic lesions are a result of increased activity in the bone marrow. This is thought to be the body's method of increasing bone marrow production and increasing iron levels.

One of the main hypotheses for the lack of iron is an insufficiency in the diet. However, it has also been suggested that disease and injury may play a role in that they inhibit the absorption of iron into the body. Another factor may involve parasitic infection as it can cause intestinal bleeding and subsequent loss of iron. It is not possible to tell which of these factors are involved in affected individuals. Indeed, it is now widely accepted that other pathological processes may too cause the defect. It is possible, however, to detect if a lesion was active or healing at the time of death.

There were seven left and five right orbits observable from ten adults (2 male, 3 female, 5 unsexed) in the Bushfield group. One of the right (SK60) and two of the left orbits (SK44, SK50) were affected by cribra orbitalia. Both SK44, a ?male of 26 – 35 years and SK60, an unsexed adult of unknown age exhibited mild expression of the defect while SK50, an unsexed late middle adult of 36 – 45 years exhibited evidence of healing in the defect.

4 Conclusion

The site of Bushfield yielded the burials of 6 males, 6 females, 45 unsexed adults and 3 non-adults. The skeletal remains were, overall, somewhat poorly preserved with almost half of the burials scoring "poor" on surface preservation. A high degree of fragmentation was also noted among the remains.

Most adults had died in the early middle adult or late middle adult stage between approximately 26 and 45 years. Numbers were not adequate to examine whether any difference between the sexes in age-at-death was active. There were few non adults identified at Bushfield. The paucity of non-adults, howver, seemed to be as a result of the harsh taphonomic conditions that prevailed.

Many of the typical range of pathologies, expected for a site of this period, were observed. The majority of people whose teeth were observable exhibited some form of dental pathology.

It was noted that calculus proliferation and caries formation exhibited a comparatively lower rate of expression than that seen at sites of contemporary date. Although periodontitis appeared to have a high rate of expression at Bushfield, this may not be a true reflection of the prevalence of the condition as, due to poor preservation, few alveoli were available for inspection. Similarly, just one case of abscess formation was noted in the extant alveoli but there may potentially have been more cases which remain unidentified. The rate of the loss of teeth during life in Bushfield individuals fell roughly between the rates seen at the contemporary sites of Parknahown and Killeany. So too did enamel hypoplasias which serve to illustrate the prevalence of childhood stress in the population.

Less than a third of observable adult spines exhibited degeneration of some sort. Preservation of the Bushfield vertebrae was generally poor however and the majority of joints that exhibited pathology were apophyseal. Data on centrum pathology was poor due to the large scale destruction of this part of the bone. Just twenty-seven extraspinal joints from the fifty-seven Bushfield adults were observable. There was one case of osteoarthritis. It occurred in the right acromioclavicular joint of an adult ?male.

Cribra orbitalia was apparent in three Bushfield adults. While two exhibited active lesions, one showed evidence of healing of the defect.

Bushfield represents a cemetery where the remains exhibited both poor bone surface preservation and high levels of bone fragmentation. Yet, osteoarchaeological analysis has served to reveal details of the population that had long since fallen from memory and, it is hoped, to set Bushfield in context among its contemporary sites in Co. Laois.

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6 Appendix

6.1 Key to Catalogue & Appendices

Where a skeleton record indicates that pathology or non-metric traits were present, details of such can be seen in the in the relevant appendix.

Where skeleton completeness is shown the figure is %.

Where stature is shown, the figure is cm.

Age	
lm	Lunar months
INF	Infant
EC	Early child
MC	Middle child
LC	Late child
ADO	Adolescent
YA	Young adult
EMA	Early middle adult
LMA	Late middle adult
OA	Older adult
Orientation	
S-I	Superior to Inferior
M-L	Medial to Lateral
A-P	Anterior to Posterior
R, L	Right, Left
Preservation	
1	Good
2	Fair
3	Poor
Fragmentation	
1	Mild
2	Moderate
3	Severe

Dentition	
*	Deciduous in use/Succeeded by permanent.
H	Dental enamel hypoplasia
- - -	Alveolus/jaw bone missing
-	Tooth missing
x	Tooth lost ante-mortem
/	Tooth lost post-mortem
UE	Unerrupted
E	Erupting
Dental Pathology	
dc	Distal caries
mc	Mesial caries
bc	Buccal caries
lc	Lingual
oc	Occlusal caries
obs.c	Caries origin obscured
Pd	Periodontal disease
Ab	Abscess
con	Congenital absence

6.2 Craniometrics

Figures are millimetres. *= Bone reconstructed. – = Unobservable

SK	SEX	Max Length	Max Breadth	Basion to Bregma	Bigoneal Width	Bicondylar Width	Left Minimum Ramus Breadth	Right Minimum Ramus Breadth
SK1	NA	–	–	–	–	–	–	–
SK2	?	–	–	–	–	–	–	–
SK3	?	–	–	–	–	–	–	–
SK4	?	–	–	–	–	–	–	–
SK5	M	–	–	–	**95***	–	**31**	**31**
SK6	?	–	–	–	–	–	–	–
SK7	?	–	–	–	–	–	–	–
SK8	?	–	–	–	–	–	–	–
SK9	?F	–	–	–	–	–	–	**31.5**
SK11	?	–	–	–	–	–	–	–
SK12	?	–	–	–	–	–	–	–
SK13	?	–	–	–	–	–	–	–
SK15	?	–	–	–	–	–	–	–
SK16	NA	–	–	–	–	–	–	–
SK19	M	–	–	–	–	–	**29**	–
SK20	?	–	–	–	–	–	–	–
SK23	?F	–	–	–	–	–	–	–
SK24	?	–	–	–	–	–	–	**27**
SK25	M	–	–	–	–	–	**35**	–
SK26	?	–	–	–	–	–	**35**	**34**
SK27	?	–	–	–	–	–	–	–
SK29	?	–	–	–	–	–	–	–
SK30	F	–	–	–	–	–	**31**	–
SK32	?	–	–	–	–	–	–	–
SK33	?	–	–	–	–	–	–	–
SK34	?	–	–	–	–	–	–	–

SK	SEX	Max Length	Max Breadth	Basion to Bregma	Bigoneal Width	Bicondylar Width	Left Minimum Ramus Breadth	Right Minimum Ramus Breadth
SK35	?	–	–	–	–	–	–	–
SK36	?M	–	–	–	–	–	–	**31**
SK39	NA	–	–	–	–	–	–	–
SK40	?	–	–	–	–	–	–	–
SK41	?	–	–	–	–	–	**31**	**30**
SK42	?	–	–	–	–	–	–	–
SK44	?M	–	–	–	–	–	–	–
SK46	?	–	–	–	–	–	–	–
SK47	?	–	–	–	–	–	–	–
SK49	?	–	–	–	–	–	–	–
SK50	?	–	–	–	–	–	–	–
SK52	?	–	–	–	–	–	–	–
SK53	?	–	–	–	–	–	–	–
SK54	?	–	–	–	–	–	–	–
SK58	?	–	–	–	–	–	–	–
SK59	?	–	–	–	–	–	–	–
SK60	?	–	–	–	–	–	–	–
SK61	F	–	–	–	**91***	–	–	–
SK62	?	–	–	–	–	–	–	–
SK63	?F	–	–	–	**96.5***	–	**29**	**31**
SK64	?	–	–	–	–	–	–	–
SK65	?	–	–	–	–	–	–	**32**
SK66	?M	–	–	–	–	–	**31**	–
SK67	?	–	–	–	–	–	–	–
SK69	?	–	–	–	–	–	–	–
SK71	?	–	–	–	–	–	–	–
SK72	?F	–	–	–	–	–	–	–
SK73	?	–	–	–	–	–	–	–
SK74	?	–	–	–	–	–	–	–
SK77	?	–	–	–	–	–	–	–

SK	SEX	Max Length	Max Breadth	Basion to Bregma	Bigoneal Width	Bicondylar Width	Left Minimum Ramus Breadth	Right Minimum Ramus Breadth
SK78	?	–	–	–	–	–	–	–
SK79	?	–	–	–	–	–	–	–
SK80	?	–	–	–	–	–	–	–
SK81	?	–	–	–	–	–	–	–

6.3 Postcranial Metrics (Left)

Figures are millimetres. – = Unobservable

SK	SEX	Left ClL	Left GlL	Left GlB	Left HuL	Left HuHd	Left HuE	Left RaL	Left RaHd	Left UlL	Left FeL	Left FeHd	Left FeD1 (a-p)	Left FeD (m-l)	Left FeE	Left TiL	Left TiD1 (a-p)	Left TiD2 (m-l)	Left TiE	Left FiL
SK1	NA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK2	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK3	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK4	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK5	M	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK6	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK7	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK8	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK9	?F	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK11	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK12	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK13	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK15	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	**24.0**	**20.0**	–	–
SK16	NA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK19	M	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

SK	SEX	Left ClL	Left GlL	Left GlB	Left HuL	Left HuHd	Left HuE	Left RaL	Left RaHd	Left UlL	Left FeL	Left FeHd	Left FeD1 (a-p)	Left FeD (m-l)	Left FeE	Left TiL	Left TiD1 (a-p)	Left TiD2 (m-l)	Left TiE	Left FiL
SK20	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK23	?F	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK24	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK25	M	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK26	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK27	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK29	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK30	F	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK32	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK33	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK34	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK35	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK36	?M	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK39	NA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK40	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK41	?	–	–	–	–	–	–	–	–	–	–	–	**26.0**	**24.0**	–	–	**29.5**	**20.0**	–	–
SK42	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK44	?M	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK46	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK47	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK49	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK50	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK52	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK53	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK54	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK58	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK59	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK60	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

SK	SEX	Left ClL	Left GlL	Left GlB	Left HuL	Left HuHd	Left HuE	Left RaL	Left RaHd	Left UlL	Left FeL	Left FeHd	Left FeD1 (a-p)	Left FeD (m-l)	Left FeE	Left TiL	Left TiD1 (a-p)	Left TiD2 (m-l)	Left TiE	Left FiL
SK61	F	–	–	–	–	–	–	–	–	–	–	–	**24.0**	**23.0**	–	–	–	–	–	–
SK62	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK63	?F	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK64	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK65	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK66	?M	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK67	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK69	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK71	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK72	?F	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK73	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK74	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK77	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK78	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK79	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK80	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK81	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

6.4 Postcranial Metrics (Right)

Figures are millimetres. – = Unobservable

SK	SEX	Right ClL	Right GlL	Right GlB	Right HuL	Right HuHd	Right HuE	Right RaL	Right RaHd	Right UlL	Right FeL	Right FeHd	Right FeD1 (a-p)	Right FeD (m-l)	Right FeE	Right TiL	Right TiD1 (a-p)	Right TiD2 (m-l)	Right TiE	Right FiL
SK1	NA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK2	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK3	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK4	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK5	M	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK6	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	**23.0**	**18.0**	–	–
SK7	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK8	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK9	?F	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK11	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK12	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK13	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	**28.0**	**19.0**	–	–
SK15	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK16	NA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK19	M	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK20	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK23	?F	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK24	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK25	M	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	**32.0**	**23.5**	–	–
SK26	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK27	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK29	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK30	F	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK32	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

SK	SEX	Right ClL	Right GlL	Right GlB	Right HuL	Right HuHd	Right HuE	Right RaL	Right RaHd	Right UlL	Right FeL	Right FeHd	Right FeD1 (a-p)	Right FeD (m-l)	Right FeE	Right TiL	Right TiD1 (a-p)	Right TiD2 (m-l)	Right TiE	Right FiL
SK33	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK34	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK35	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK36	?M	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK39	NA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK40	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK41	?	–	–	–	–	–	–	–	–	–	–	–	**25.0**	**22.5**	–	–	–	–	–	–
SK42	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK44	?M	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK46	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK47	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK49	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK50	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK52	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK53	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK54	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK58	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK59	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK60	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK61	F	–	–	–	–	–	–	–	–	–	–	–	**24.0**	**22.5**	–	–	–	–	–	–
SK62	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK63	?F	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK64	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK65	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK66	?M	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK67	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK69	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

SK	SEX	Right ClL	Right GlL	Right GlB	Right HuL	Right HuHd	Right HuE	Right RaL	Right RaHd	Right UlL	Right FeL	Right FeHd	Right FeD1 (a-p)	Right FeD (m-l)	Right FeE	Right TiL	Right TiD1 (a-p)	Right TiD2 (m-l)	Right TiE	Right FiL
SK71	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK72	?F	–	–	–	–	–	–	–	–	–	–	–	23.0	20.0	–	–	–	–	–	–
SK73	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK74	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK77	?	–	–	–	–	–	–	–	–	–	–	–	24.0	25.0	–	–	–	–	–	–
SK78	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK79	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK80	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK81	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

6.5 Cranial non-metrics

P=Present, 0 = Absent, – = Unobservable

SK	SEX	Ossicle at Lambda	Left Ossicles in Lambdoid	Right Ossicles in Lambdoid	Ossicle at Bregma	Left Ossicles in Coronal	Right Ossicles in Coronal	Metopic suture	Left Auditory Torus	Right Auditory Torus	Left Palatine Torus	Right Palatine Torus	Left Maxillary Torus	Right Maxillary Torus	Left Mandibular Torus	Right Mandibular Torus
SK1	NA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK2	?	–	–	–	–	–	–	–	0	0	–	–	–	–	0	0

SK	SEX	Ossicle at Lambda	Left Ossicles in Lambdoid	Right Ossicles in Lambdoid	Ossicle at Bregma	Left Ossicles in Coronal	Right Ossicles in Coronal	Metopic suture	Left Auditory Torus	Right Auditory Torus	Left Palatine Torus	Right Palatine Torus	Left Maxillary Torus	Right Maxillary Torus	Left Mandibular Torus	Right Mandibular Torus
SK3	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK4	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK5	M	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK6	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK7	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK8	?	–	–	–	–	–	–	–	–	0	–	–	–	–	–	–
SK9	?F	–	–	–	–	–	–	0	0	0	–	–	–	–	0	0
SK11	?	–	–	–	–	–	–	0	0	–	–	–	–	–	–	–
SK12	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK13	?	–	–	–	–	–	–	–	–	–	–	–	–	–	0	0
SK15	?	–	–	–	–	–	–	–	0	0	–	–	–	–	0	0
SK16	NA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK19	M	–	–	–	–	–	–	–	0	–	–	–	–	–	P	P
SK20	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK23	?F	–	–	–	–	–	–	–	0	–	–	–	–	–	0	0
SK24	?	–	–	–	–	–	–	–	–	–	–	–	–	–	0	0
SK25	M	–	–	–	–	–	–	0	0	0	–	–	0	0	P	P
SK26	?	–	–	–	–	–	–	–	0	0	0	–	0	0	0	0
SK27	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK29	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK30	F	–	–	–	–	–	–	–	0	0	–	–	–	–	0	–
SK32	?	–	–	–	–	–	–	–	0	–	0	0	0	–	0	0
SK33	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

SK	SEX	Ossicle at Lambda	Left Ossicles in Lambdoid	Right Ossicles in Lambdoid	Ossicle at Bregma	Left Ossicles in Coronal	Right Ossicles in Coronal	Metopic suture	Left Auditory Torus	Right Auditory Torus	Left Palatine Torus	Right Palatine Torus	Left Maxillary Torus	Right Maxillary Torus	Left Mandibular Torus	Right Mandibular Torus
SK34	?	–	–	–	–	–	–	–	–	0	–	–	–	–	–	–
SK35	?	–	–	–	–	–	–	–	0	0	–	–	–	–	–	–
SK36	?M	–	–	P	–	–	–	–	0	0	–	–	–	–	0	0
SK39	NA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK40	?	0	–	–	0	–	–	0	–	–	–	–	–	–	–	–
SK41	?	–	–	–	–	–	–	–	–	–	–	–	0	0	–	P
SK42	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK44	?M	–	–	–	–	–	–	–	–	–	–	–	–	–	–	P
SK46	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK47	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK49	?	–	–	–	–	–	–	0	–	0	–	–	–	–	–	–
SK50	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK52	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK53	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK54	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK58	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK59	?	–	–	–	–	–	–	–	0	0	–	–	–	–	–	–
SK60	?	0	–	–	0	–	–	0	0	0	–	–	–	–	–	–
SK61	F	–	–	–	–	–	–	P	0	0	0	0	0	0	0	0
SK62	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK63	?F	0	–	–	0	–	0	0	0	0	0	0	0	0	P	P
SK64	?	–	–	–	–	–	–	–	–	0	–	–	–	–	–	–
SK65	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

SK	SEX	Ossicle at Lambda	Left Ossicles in Lambdoid	Right Ossicles in Lambdoid	Ossicle at Bregma	Left Ossicles in Coronal	Right Ossicles in Coronal	Metopic suture	Left Auditory Torus	Right Auditory Torus	Left Palatine Torus	Right Palatine Torus	Left Maxillary Torus	Right Maxillary Torus	Left Mandibular Torus	Right Mandibular Torus
SK66	?M	–	–	–	–	–	–	–	0	0	–	–	–	–	0	–
SK67	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK69	?	–	–	–	–	–	–	–	–	0	–	–	–	–	–	–
SK71	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK72	?F	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK73	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK74	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK77	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK78	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK79	?	–	–	–	–	–	–	–	0	0	0	0	–	–	0	0
SK80	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK81	?	–	–	–	–	–	–	–	0	–	–	–	–	–	0	0

6.6 Postcranial non-metrics

P=Present, 0 = Absent, – = Unobservable

SK	SEX	Sternal Foramen	Left Septal Aperture	Right Septal Aperture	Left Supracondyloid Process	Right Supracondyloid Process	Left Poirier's Facet	Right Poirier's Facet	Left Hypotrochanteric Fossa	Right Hypotrochanteric Fossa	Left Third Trochanter	Right Third Trochanter	Left Vastus Notch	Right Vastus Notch	Left Vastus Fossa	Right Vastus Fossa	Left Emarginate Patella	Right Emarginate Patella	Left Med. Tib. Sq Facet	Right Med. Tib. Sq Facet	Left Lat. Tib. Sq. Facet	Right Lat. Tib. Sq. Facet
SK1	NA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK2	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK3	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK4	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK5	M	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK6	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK7	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK8	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK9	?F	–	–	–	–	–	–	–	0	0	–	–	–	–	–	–	–	–	–	–	–	–
SK11	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK12	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK13	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK15	?	–	–	–	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK16	NA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK19	M	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK20	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK23	?F	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK24	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK25	M	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

SK	SEX	Sternal Foramen	Left Septal Aperture	Right Septal Aperture	Left Supracondyloid Process	Right Supracondyloid Process	Left Poirier's Facet	Right Poirier's Facet	Left Hypotrochanteric Fossa	Right Hypotrochanteric Fossa	Left Third Trochanter	Right Third Trochanter	Left Vastus Notch	Right Vastus Notch	Left Vastus Fossa	Right Vastus Fossa	Left Emarginate Patella	Right Emarginate Patella	Left Med. Tib. Sq Facet	Right Med. Tib. Sq Facet	Left Lat. Tib. Sq. Facet	Right Lat. Tib. Sq. Facet
SK26	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK27	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK29	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK30	F	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK32	?	–	–	–	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK33	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK34	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK35	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK36	?M	–	–	–	0	0	–	–	0	0	0	0	–	–	–	–	–	–	–	–	–	–
SK39	NA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK40	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK41	?	–	–	–	0	0	–	–	0	0	–	–	–	–	–	–	–	–	–	–	–	–
SK42	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK44	?M	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK46	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK47	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK49	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK50	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK52	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK53	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK54	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK58	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

SK	SEX	Sternal Foramen	Left Septal Aperture	Right Septal Aperture	Left Supracondyloid Process	Right Supracondyloid Process	Left Poirier's Facet	Right Poirier's Facet	Left Hypotrochanteric Fossa	Right Hypotrochanteric Fossa	Left Third Trochanter	Right Third Trochanter	Left Vastus Notch	Right Vastus Notch	Left Vastus Fossa	Right Vastus Fossa	Left Emarginate Patella	Right Emarginate Patella	Left Med. Tib. Sq Facet	Right Med. Tib. Sq Facet	Left Lat. Tib. Sq. Facet	Right Lat. Tib. Sq. Facet
SK59	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK60	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK61	F	–	–	–	–	–	–	–	0	0	–	–	–	–	–	–	–	–	–	–	–	–
SK62	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK63	?F	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK64	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK65	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK66	?M	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK67	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK69	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK71	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK72	?F	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK73	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK74	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK77	?	–	–	–	–	–	–	–	0	0	–	–	–	–	–	–	–	–	–	–	–	–
SK78	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK79	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK80	?	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK81	?	–	–	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

6.7 Cribra Orbitalia

Orbit: 0= Absent, 1 = Present. Cribra: 0= No pathology, 1= Cribra present. Type: 1=Mild, 2=Moderate, 3=Severe, 4=Healing.

SK	**Age Cat/Sex Cat**	L Orbit	R Orbit	**L Cribra**	**R Cribra**	L Type	R Type
SK1	Non-Adult	0	0	–	–	–	–
SK2	Adult	0	0	–	–	–	–
SK3	Adult	0	0	–	–	–	–
SK4	Adult	0	0	–	–	–	–
SK5	M	0	0	–	–	–	–
SK6	Adult	0	0	–	–	–	–
SK7	Adult	0	0	–	–	–	–
SK8	Adult	0	0	–	–	–	–
SK9	?F	0	1	–	**0**	–	–
SK11	Adult	0	0	–	–	–	–
SK12	Adult	0	0	–	–	–	–
SK13	Adult	0	0	–	–	–	–
SK15	Adult	0	0	–	–	–	–
SK16	ADO	0	0	–	–	–	–
SK19	M	0	0	–	–	–	–
SK20	Adult	0	0	–	–	–	–
SK23	?F	0	0	–	–	–	–
SK24	Adult	0	0	–	–	–	–
SK25	M	1	0	**0**	–	–	–
SK26	Adult	0	0	–	–	–	–
SK27	Adult	0	0	–	–	–	–
SK29	Adult	0	0	–	–	–	–
SK30	F	0	0	–	–	–	–
SK32	Adult	0	0	–	–	–	–
SK33	Adult	0	0	–	–	–	–
SK34	Adult	0	0	–	–	–	–
SK35	Adult	0	0	–	–	–	–
SK36	?M	0	0	–	–	–	–

SK	Age Cat/Sex Cat	L Orbit	R Orbit	L Cribra	R Cribra	L Type	R Type
SK39	MC	0	0	–	–	–	–
SK40	Adult	0	0	–	–	–	–
SK41	Adult	1	1	**0**	**0**	–	–
SK42	Adult	0	0	–	–	–	–
SK44	?M	1	0	**1**	–	**1**	–
SK46	Adult	0	0	–	–	–	–
SK47	Adult	0	0	–	–	–	–
SK49	Adult	0	0	–	–	–	–
SK50	Adult	1	0	**1**	–	**4**	–
SK52	Adult	0	0	–	–	–	–
SK53	Adult	0	0	–	–	–	–
SK54	Adult	0	0	–	–	–	–
SK58	Adult	0	0	–	–	–	–
SK59	Adult	0	0	–	–	–	–
SK60	Adult	0	1	–	**1**	–	**1**
SK61	F	1	0	**0**	–	–	–
SK62	Adult	0	0	–	–	–	–
SK63	?F	0	1	–	**0**	–	–
SK64	Adult	0	0	–	–	–	–
SK65	Adult	1	1	**0**	**0**	–	–
SK66	?M	0	0	–	–	–	–
SK67	Adult	0	0	–	–	–	–
SK69	Adult	0	0	–	–	–	–
SK71	Adult	0	0	–	–	–	–
SK72	?F	0	0	–	–	–	–
SK73	Adult	0	0	–	–	–	–
SK74	Adult	0	0	–	–	–	–
SK77	Adult	0	0	–	–	–	–
SK78	Adult	0	0	–	–	–	–
SK79	Adult	1	0	**0**	–	–	–
SK80	Adult	0	0	–	–	–	–
SK81	Adult	0	0	–	–	–	–

6.8 Dental Pathology

AM= Antemortem, Con= Congenital, DEH= Dental enamel hypoplasia, Periodontal= Periodontal disease.

SK	Sex	Age Cat	No. of Positions AM Loss	No. Lost AM	No. Con Positions	No. Con Absent	No of Teeth (calculus)	No Affected (Calculus)	No of Teeth (caries)	No Affected (Caries)	No of Positions (abscess)	No Affected (Abscess)	No of Teeth (DEH)	No Affected (DEH)	No of Positions (Periodontal)	No Affected (Periodontal)
SK1	NA	EC	0	0	0	0	7	0	7	0	0	0	14	0	0	0
SK2	?	Adult	0	0	0	0	2	1	2	0	0	0	2	2	0	0
SK3	?	EMA	19	0	2	0	19	19	19	1	0	0	19	7	0	0
SK4	?	YA	17	0	4	0	17	15	17	0	0	0	17	7	0	0
SK5	M	EMA	31	0	4	0	31	14	31	0	20	0	31	16	0	0
SK6	?	EMA	10	0	2	0	10	6	10	0	0	0	9	0	0	0
SK7	?	EMA	12	2	2	0	9	8	9	0	3	0	9	1	3	3
SK8	?	EMA	12	0	2	0	12	8	12	0	0	0	12	5	0	0
SK9	?F	LMA	28	0	4	0	28	24	28	0	13	0	28	5	4	3
SK11	?	EMA	20	0	2	0	20	16	20	1	0	0	18	5	0	0
SK12	?	EMA	13	0	1	0	13	5	13	0	0	0	13	6	0	0
SK13	?	LMA	23	7	2	0	14	14	14	1	16	0	11	6	0	0
SK15	?	YA	24	0	3	1	23	17	23	0	10	0	23	4	0	0
SK16	?	ADO	17	0	2	0	16	6	16	0	2	0	18	9	1	0
SK19	Male	Adult	18	5	3	0	9	7	9	1	12	0	6	1	0	0
SK20	?	LMA	9	0	2	0	9	6	9	1	0	0	5	2	0	0
SK23	?F	YA	22	0	3	0	22	21	22	0	12	0	20	10	1	0

SK	Sex	Age Cat	No. of Positions AM Loss	No. Lost AM	No. Con Positions	No. Con Absent	No of Teeth (calculus)	No Affected (Calculus)	No of Teeth (caries)	No Affected (Caries)	No of Positions (abscess)	No Affected (Abscess)	No of Teeth (DEH)	No Affected (DEH)	No of Positions (Periodontal)	No Affected (Periodontal)
SK24	?	EMA	22	0	4	0	21	16	21	4	13	0	21	6	3	0
SK25	M	LMA	25	1	4	0	20	20	20	4	23	1	0	2	8	8
SK26	?	EMA	25	0	4	1	23	10	23	0	23	0	23	8	2	0
SK27	?	Adult	2	0	0	0	2	1	2	0	0	0	2	0	0	0
SK29	?	Adult	1	0	0	0	1	0	1	0	0	0	1	0	0	0
SK30	F	EMA	24	0	4	0	30	21	30	1	13	0	29	4	8	8
SK32	?	EMA	27	0	3	0	21	4	21	1	19	0	20	12	3	3
SK33	?	Adult	2	0	0	0	2	2	2	0	0	0	2	0	0	0
SK34	?	EMA	6	0	2	0	6	6	6	0	0	0	6	2	0	0
SK35	?	OA	28	0	3	0	28	25	28	4	0	0	21	12	0	0
SK36	?M	YA	26	0	4	1	20	2	20	0	16	0	20	4	0	0
SK39	NA	MC	10	0	0	0	12	5	12	2	0	0	27	12	0	0
SK41	?M	YA-EMA	26	0	4	1	22	20	22	2	16	0	22	9	1	0
SK44	?F	EMA	16	1	2	0	15	15	15	1	6	0	15	6	1	1
SK46	?	YA	26	0	3	0	26	21	26	2	0	0	26	9	0	0
SK47	?	Adult	3	0	1	0	3	2	3	0	0	0	3	1	0	0
SK49	?	EMA	20	0	2	0	16	14	16	0	7	0	14	6	0	0
SK50	?	LMA	8	0	0	0	8	5	8	0	0	0	8	3	0	0
SK52	?	Adult	2	0	0	0	2	2	2	1	0	0	1	0	0	0
SK58	?	Adult	2	0	0	0	0	0	0	0	0	0	0	0	0	0

SK	Sex	Age Cat	No. of Positions AM Loss	No. Lost AM	No. Con Positions	No. Con Absent	No of Teeth (calculus)	No Affected (Calculus)	No of Teeth (caries)	No Affected (Caries)	No of Positions (abscess)	No Affected (Abscess)	No of Teeth (DEH)	No Affected (DEH)	No of Positions (Periodontal)	No Affected (Periodontal)
SK60	?	Adult	6	5	0	0	1	1	1	0	5	0	1	0	0	0
SK61	F	EMA	30	0	4	0	30	13	30	1	24	0	21	13	3	0
SK63	?F	EMA	29	0	4	0	27	25	27	2	27	0	26	8	7	5
SK64	?	LMA	24	0	2	0	24	6	24	2	0	0	24	9	0	0
SK65	?	YA	24	0	3	3	24	4	24	0	14	0	24	6	2	0
SK66	?M	Adult	9	7	2	0	2	1	2	0	8	0	0	0	1	1
SK67	?	Adult	24	0	3	0	24	6	24	0	3	0	24	9	0	0
SK69	?	Adult	11	0	1	0	9	8	9	3	0	0	6	1	0	0
SK73	?	EMA	13	0	2	0	13	11	13	0	1	0	12	4	0	0
SK74	?	Adult	1	0	0	0	1	0	1	0	0	0	1	0	0	0
SK79	M	OA	11	10	2	0	0	0	0	0	11	0	0	0	0	0
SK78	?	Adult	1	0	0	0	1	1	1	0	0	0	1	0	0	0
SK80	?	Adult	2	0	0	0	2	2	2	0	0	0	2	2	0	0
SK81	F	YA-EMA	22	0	4	0	17	17	17	0	14	0	17	4	0	0

6.9 Vertebral DJD

OPS=Osteophytes, PO=Porosity, BE=Eburnation.

SK	C1 DENS	C1 DENS OPS	C1 DENS PO	C1 DENS EB	C2 DENS	C2 DENS OPS	C2 DENS PO	C2 DENS EB	CERVICAL CENTRA	CERVICAL CENTRA OPS	CERVICAL CENTRA PO	CERVICAL CENTRA EB	CERVICAL FACETS	CERVICAL FACETS OPS	CERVICAL FACETS PO	CERVICAL FACETS EB	THORACIC CENTRA	THORACIC CENTRA OPS	THORACIC CENTRA PO	THORACIC CENTRA EB	THORACIC CENTRA SCHM	THORACIC FACETS	THORACIC FACETS OPS	THORACIC FACETS PO	THORACIC FACETS EB	LUMBAR CENTRA	LUMBAR CENTRA OPS	LUMBAR CENTRA PO	LUMBAR CENTRA EB	LUMBAR CENTRA SCHM	LUMBAR FACETS	LUMBAR FACETS OPS	LUMBAR FACETS PO	LUMBAR FACETS EB	S1 CENTRA	S1 CENTRA OPS	S1 CENTRA PO	S1 CENTRA EB	S1 CENTRA SCHM	S1 FACETS	S1 FACETS OPS	S1 FACETS PO	S1 FACETS EB
SK1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK2	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK3	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK4	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK5	1	0	0	0	1	0	0	0	1	0	0	0	2	0	0	0	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK6	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK7	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK8	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK9	0	–	–	–	1	0	0	0	0	–	–	–	1	0	0	0	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK11	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK12	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK13	0	–	–	–	0	–	–	–	0	–	–	–	1	0	0	0	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK15	0	–	–	–	0	–	–	–	0	–	–	–	2	0	0	0	0	–	–	–	–	0	–	–	–	0	–	–	–	–	3	0	0	0	0	–	–	–	–	0	–	–	–
SK16	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK19	0	–	–	–	0	–	–	–	0	–	–	–	2	1	1	0	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK20	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK23	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK24	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–

SK	C1 DENS	C1 DENS OPS	C1 DENS PO	C1 DENS EB	C2 DENS	C2 DENS OPS	C2 DENS PO	C2 DENS EB	CERVICAL CENTRA	CERVICAL CENTRA OPS	CERVICAL CENTRA PO	CERVICAL CENTRA EB	CERVICAL FACETS	CERVICAL FACETS OPS	CERVICAL FACETS PO	CERVICAL FACETS EB	THORACIC CENTRA	THORACIC CENTRA OPS	THORACIC CENTRA PO	THORACIC CENTRA EB	THORACIC CENTRA SCHM	THORACIC FACETS	THORACIC FACETS OPS	THORACIC FACETS PO	THORACIC FACETS EB	LUMBAR CENTRA	LUMBAR CENTRA OPS	LUMBAR CENTRA PO	LUMBAR CENTRA EB	LUMBAR CENTRA SCHM	LUMBAR FACETS	LUMBAR FACETS OPS	LUMBAR FACETS PO	LUMBAR FACETS EB	S1 CENTRA	S1 CENTRA OPS	S1 CENTRA PO	S1 CENTRA EB	S1 CENTRA SCHM	S1 FACETS	S1 FACETS OPS	S1 FACETS PO	S1 FACETS EB
SK25	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK26	0	–	–	–	1	0	0	0	0	–	–	–	2	0	0	0	0	–	–	–	–	3	0	0	0	0	–	–	–	–	2	1	–	–	0	–	–	–	–	0	–	–	–
SK27	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK29	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK30	1	0	0	0	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK32	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK33	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK34	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK35	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK36	1	0	0	0	1	0	0	0	1	0	0	0	11	0	0	0	0	–	–	–	–	6	0	0	0	0	–	–	–	–	2	0	0	0	0	–	–	–	–	0	–	–	–
SK39	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK40	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK41	0	–	–	–	0	–	–	–	0	–	–	–	2	0	0	0	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK42	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK44	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK46	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK47	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK49	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK50	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK52	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK53	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–

SK	C1 DENS	C1 DENS OPS	C1 DENS PO	C1 DENS EB	C2 DENS	C2 DENS OPS	C2 DENS PO	C2 DENS EB	CERVICAL CENTRA	CERVICAL CENTRA OPS	CERVICAL CENTRA PO	CERVICAL CENTRA EB	CERVICAL FACETS	CERVICAL FACETS OPS	CERVICAL FACETS PO	CERVICAL FACETS EB	THORACIC CENTRA	THORACIC CENTRA OPS	THORACIC CENTRA PO	THORACIC CENTRA EB	THORACIC CENTRA SCHM	THORACIC FACETS	THORACIC FACETS OPS	THORACIC FACETS PO	THORACIC FACETS EB	LUMBAR CENTRA	LUMBAR CENTRA OPS	LUMBAR CENTRA PO	LUMBAR CENTRA EB	LUMBAR CENTRA SCHM	LUMBAR FACETS	LUMBAR FACETS OPS	LUMBAR FACETS PO	LUMBAR FACETS EB	S1 CENTRA	S1 CENTRA OPS	S1 CENTRA PO	S1 CENTRA EB	S1 CENTRA SCHM	S1 FACETS	S1 FACETS OPS	S1 FACETS PO	S1 FACETS EB
SK54	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK58	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK59	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK60	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK61	0	–	–	–	0	0	0	0	0	–	–	–	8	2	0	0	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK62	0	–	–	–	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK63	1	0	0	0	1	0	0	0	5	0	0	0	12	0	0	0	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK64	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK65	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK66	1	1	1	0	0	–	–	–	0	–	–	–	4	2	2	1	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK67	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK69	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK71	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK72	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	4	0	0	0	0	–	–	–	–	0	–	–	–
SK73	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK74	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK77	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	1	0	0	0	0	–	–	–	–	0	–	–	–
SK78	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK79	1	1	1	1	1	1	1	1	0	–	–	–	16	3	3	0	0	–	–	–	–	3	1	0	0	0	–	–	–	–	4	0	0	0	0	–	–	–	–	0	–	–	–
SK80	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–	0	–	–	–	–	0	–	–	–
SK81	0	–	–	–	1	0	0	0	0	–	–	–	8	0	0	0	0	–	–	–	–	1	0	0	0	0	–	–	–	–	7	0	0	0	0	–	–	–	–	0	–	–	–

6.10 Extraspinal DJD (Left)

OPS=Osteophytes, PO=Porosity, BE=Eburnation.

SK	Sex	L. TMJ	OPS	PO	EB	L. Glenohumeral	OPS	PO	EB	L. Acromioclavicular	OPS	PO	EB	L. Sternoclavicular	OPS	PO	EB	L. Elbow	OPS	PO	EB	L. Wrist	OPS	PO	EB	L. Hand (McPh, IP)	OPS	PO	EB	L. Hip (fem-acetab)	OPS	PO	EB	L. Sacroiliac	OPS	PO	EB	L. Knee	OPS	PO	EB	L. Ankle	OPS	PO	EB	L. Foot (MtPh, IP)	OPS	PO	EB
SK1	NA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK2	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK3	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK4	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK5	M	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK6	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK7	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK8	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK9	?F	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK11	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK12	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK13	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK15	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK16	NA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK19	M	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK20	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK23	?F	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK24	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–

SK	Sex	L. TMJ	OPS	PO	EB	L. Glenohumeral	OPS	PO	EB	L. Acromioclavicular	OPS	PO	EB	L. Sternoclavicular	OPS	PO	EB	L. Elbow	OPS	PO	EB	L. Wrist	OPS	PO	EB	L. Hand (McPh, IP)	OPS	PO	EB	L. Hip (fem-acetab)	OPS	PO	EB	L. Sacroiliac	OPS	PO	EB	L. Knee	OPS	PO	EB	L. Ankle	OPS	PO	EB	L. Foot (MtPh, IP)	OPS	PO	EB
SK25	M	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK26	?	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK27	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK29	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK30	F	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK32	?	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK33	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK34	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK35	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK36	?M	0				0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK39	NA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK40	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK41	?	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK42	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK44	?M	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK46	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK47	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK49	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK50	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK52	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK53	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK54	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK58	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–

SK	Sex	L. TMJ	OPS	PO	EB	L. Glenohumeral	OPS	PO	EB	L. Acromioclavicular	OPS	PO	EB	L. Sternoclavicular	OPS	PO	EB	L. Elbow	OPS	PO	EB	L. Wrist	OPS	PO	EB	L. Hand (McPh, IP)	OPS	PO	EB	L. Hip (fem-acetab)	OPS	PO	EB	L. Sacroiliac	OPS	PO	EB	L. Knee	OPS	PO	EB	L. Ankle	OPS	PO	EB	L. Foot (MtPh, IP)	OPS	PO	EB
SK59	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK60	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK61	F	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK62	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK63	?F	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK64	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK65	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK66	?M	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK67	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK69	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK71	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK72	?F	0	–	–	–	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK73	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK74	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK77	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK78	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK79	?	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK80	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK81	?	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–

6.11 Extraspinal DJD (Right)

OPS=Osteophytes, PO=Porosity, BE=Eburnation.

SK	Sex	R. TMJ	OPS	PO	EB	R. Glenohumeral	OPS	PO	EB	R. Acromioclavicular	OPS	PO	EB	R. Sternoclavicular	OPS	PO	EB	R. Elbow	OPS	PO	EB	R. Wrist	OPS	PO	EB	R. Hand (McPh, IP)	OPS	PO	EB	R. Hip (fem-acetab)	OPS	PO	EB	R. Sacroiliac	OPS	PO	EB	R. Knee	OPS	PO	EB	R. Ankle	OPS	PO	EB	R. Foot (MtPh, IP)	OPS	PO	EB
SK1	NA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK2	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK3	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK4	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK5	M	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK6	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK7	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK8	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK9	?F	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK11	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK12	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK13	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK15	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK16	NA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK19	M	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK20	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK23	?F	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK24	?	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK25	M	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–

SK	Sex	R. TMJ	OPS	PO	EB	R. Glenohumeral	OPS	PO	EB	R. Acromioclavicular	OPS	PO	EB	R. Sternoclavicular	OPS	PO	EB	R. Elbow	OPS	PO	EB	R. Wrist	OPS	PO	EB	R. Hand (McPh, IP)	OPS	PO	EB	R. Hip (fem-acetab)	OPS	PO	EB	R. Sacroiliac	OPS	PO	EB	R. Knee	OPS	PO	EB	R. Ankle	OPS	PO	EB	R. Foot (MtPh, IP)	OPS	PO	EB
SK26	?	0	–	–	–	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK27	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK29	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK30	F	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK32	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK33	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK34	?	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK35	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK36	?M	1	0	0	0	0				0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK39	NA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SK40	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK41	?	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK42	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK44	?M	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK46	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK47	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK49	?	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK50	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK52	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK53	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK54	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK58	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK59	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–

SK	Sex	R. TMJ	OPS	PO	EB	R. Glenohumeral	OPS	PO	EB	R. Acromioclavicular	OPS	PO	EB	R. Sternoclavicular	OPS	PO	EB	R. Elbow	OPS	PO	EB	R. Wrist	OPS	PO	EB	R. Hand (McPh, IP)	OPS	PO	EB	R. Hip (fem-acetab)	OPS	PO	EB	R. Sacroiliac	OPS	PO	EB	R. Knee	OPS	PO	EB	R. Ankle	OPS	PO	EB	R. Foot (MtPh, IP)	OPS	PO	EB
SK60	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK61	F	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK62	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK63	?F	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK64	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK65	?	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK66	?M	0	–	–	–	0	–	–	–	1	0	1	1	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK67	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK69	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK71	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK72	?F	0	–	–	–	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK73	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK74	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK77	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK78	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK79	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK80	?	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–
SK81	?	1	0	0	0	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–	0	–	–	–

6.12 Burnt bone

OFO=Of faunal origin, OUO= Of Unknown origin, OHO=Of human origin.

Feature	No. Frags	Size Range	Origin	Colour
115	76	3 – 13mm	OUO	White
135	35	1.5 – 23mm	OUO	White
148	75	6 – 38mm	11 OFO (tooth frags), 64 OUO	Grey – White
852	8	4 – 10mm	OUO	White

6.13 Disarticulated Remains

DSK10 (assoc. SK9)
OTHER: 12 frags OHO

DSK14 (assoc. SK13)
ADULT: L Temporal petrous portion. R Temporal petrous portion. 2 Skull frags. Tooth 23 (DEH), crown only. Tooth 24 (DEH), crown only. Tooth 25 (DEH), crown only. Tooth 26, crown only. Tooth 27 (DEH), crown only. Tooth 36 (calc). Tooth 37 (calc). Tooth 47 (calc).

DSK17 (assoc. SK13)
OTHER: 17 frags OHO. Appear to have been from lower limb longbones.

DSK18 (Cut 765, Fill 766)
ADULT: 11 Cranial vault frags. L Temporal petrous portion frag. Humerus shaft frag. Femur shaft frag.

OTHER: 23 frags OHO.

DSK21 (Cut 284, Fill 283)
ADULT: 18 upper limb (?) shaft frags

DSK28 (Cut 162)
ADULT: ?R Tibia shaft segment.

DSK31 (assoc. SK30)
NON-ADULT: Tooth 85 (calc). Tooth 41 (Rc). Tooth 42 (Root broken). Tooth 43 (R½). Tooth 44 (R⅓). Tooth 32 (Rc).

DSK43 (disarticulated remains within a grave cut, some of which may belong to one individual)
ADULT: Skull vault frag including frontal (R half). R parietal and superior portion of occipital. 20 Cranial vault frags. L Temporal frag with petrous portion. R Temporal frag with petrous portion. Mandible (anterior third, inferior half). Tooth 22. Tooth 23. Tooth 24 (calc). Tooth 25. Tooth 26. Tooth 14. Tooth 15. Tooth 16. Tooth 17. Tooth 18. Tooth 13/23. Tooth 32 (DEH). Tooth 33 (DEH). Tooth 34. Tooth 35. Tooth 36. Tooth 37. Tooth 47. L Humerus (distal half of shaft). R Femur (prox two-thirds of shaft). L Femur (prox two-thirds of shaft). R Tibia shaft frag.

DSK45 (Cut 816, Fill 817)
ADULT: Tooth 41 (calc & DEH). Tooth 43 (calc). Tooth 46 (caries). Tooth 47 (calc & Caries). Tooth 48 (calc). Tooth 33 (calc & DEH). Tooth 36 (calc & caries). Tooth 37 (calc). Tooth 38 (calc & caries). Humerus (distal third of shaft). L Femur (prox two thirds of shaft). R Femur (prox third of shaft).

OTHER: 35 frags OHO. 4 frags OFO.

DSK48 (assoc. SK44)
OTHER: 2 small frags OHO.

DSK51 (assoc. SK51)

OTHER: 5 small frags OHO.

DSK55 (Grid E15)
OTHER:

22 frags OHO.

DSK56 (Grid E11)
ADULT: 10 Cranial vault frags. R Temporal frag with mastoid process. R Parietal frag. L Temporal petrous portion frag. Occipital frag.

DSK57 (assoc. SK49)
ADULT: Femur shaft frag.

OTHER: 5 small frags OHO.

DSK68 (Grid E13)
OTHER: 3 small frags OUO.

DSK70 (assoc. SK69 & SK71)
OTHER: 2 small frags OHO.

DSK75 (assoc. SK73 & SK74)
ADULT: Tooth 43 (caries) Tooth 44. Tooth 45 (caries). Tooth 33 (caries). Tooth 34. Tooth 35. Tooth 36 (caries). Tooth 37. L Humerus (distal two thirds of shaft). L Ilium frag (with small portion auricular surface). 3 Femur shaft frags. 3 Tibia shaft frags.

OTHER: 45 frags OHO.

DSK76 (assoc. SK 69 & SK71)
ADULT: 2 longbone shaft frags.

DSK82 (Grid E10)
ADULT:

6 Cranial vault frags. Temporal mastoid frag. L Temporal petrous portion frag. Tooth 16. Tooth 17. Tooth 18. (Teeth 16-18 combined: 26-35 years). Tooth 27 (calc). Tooth 36 (calc).

DSK assoc. with SK41
ADULT: 1 unidentified tooth root (worn).

OTHER: Small frags OHO.

DSK assoc with SK79
There was an extra set of teeth apparent in the remains of SK79. The mandible that was chosen as the one most likely to belong to SK79 was the one exhibiting adentulousness. It was thought that this was the more likely specimen, intimating greater age consistent with degeneration seen in the spine, rather than the dental set whose age was estimated to be 26 – 35 years. The dental chart illustrating this dental set can be seen listed as SK79 (assoc. DSK)

6.14 Samples

Sample 304 (SK9)
3 small frags burnt bone OUO.

Sample 294 (SK11)
1 Cranial vault frag.

Sample 314 (SK13)
Tooth 16. Tooth 31. 1 unidentified tooth root.

Sample 312 (SK23)
Tooth 27.

Sample 233 (SK32)
Tooth 23. Tooth 25.

Sample 338 (SK35)
Tooth 13.

Sample 337 (SK35)
Tooth 11. Tooth 12.

Sample 344 (SK39)
Tooth 27.

Sample 348 (SK41)
1 Mandibular (?first) molar root. 1 Unidentified tooth root (worn).

(Not included in SK41 dental set)

Sample 232 (SK46)
Tooth 36. Non-adult tooth 47 (R¼). 1 Tooth OFO.

Sample 366 (SK49)
Tooth 46. Tooth 11.

(Not included in SK49 dental set)

Sample 380 (SK65)
Tooth 15. Tooth 27. Tooth 28.

Sample 382 (SK67)
12 Cranial vault frags.

7 Catalogue

SKELETON:	SK1						**Sex:**								NA					
Age:	3.1 - 3.2 years						**Age Category:**								EC					
Stature:	NA																			
Dentition:																				
				–	–	–	–	–	–	–	–	–	–							
				55	**54**	**53**	–	–	–	–	–	–	**65**							
				85	**84**	**83**	–	–	–	–	–	–	**75**							
				–	–	–	–	–	–	–	–	–	–							
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–				
	–	–	–	*	*	**13**	**12**	**11**	**21**	–	–	*	*	**26**	–	–				
	–	–	**46**	–	–	–	–	–	–	–	–	–	–	**36**	–	–				
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–				

Non-Metrics			
Expressed:	NA	**Pathology:**	None
Preservation:	Poor	**Completeness:**	<2%
Fragmentation	Moderate	**Grave MNI:**	1
Associated Material:	None		
Group:	1		
Other:	None		

SKELETON:	SK2	**Sex:**	Unknown
Age:	Adult	**Age Category:**	Adult
Stature:	NA		
Dentition:			

–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	**43**	–	–	–	–	–	–	**35**	–	–	–
					H							H			
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Non-Metrics			
Expressed:	None	**Pathology:**	Dental
Preservation:	Fair	**Completeness:**	5%
Fragmentation	Moderate	**Grave MNI:**	2 (Poss double burial: SK4)
Associated Material:	None		
Group:	1		
Other:	None		

SKELETON:	SK3	**Sex:**	Unknown
Age:	26 - 35 years	**Age Category:**	EMA
Stature:	NA		
Dentition:			

–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	H	H		H		H		H					H	H	
														dc	
18	**17**	**16**	**–**	**14**	**13**	**12**	**11**	**21**	**–**	**23**	**–**	**25**	**26**	**27**	**–**
48	**47**	**46**	**45**	**44**	–	–	–	–	–	–	–	–	**36**	**37**	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Non-Metrics			
Expressed:	NA	**Pathology:**	Dental
Preservation:	Fair	**Completeness:**	15%
Fragmentation	Moderate	**Grave MNI:**	1
Associated Material:	None		
Group:	1		
Other:			

SKELETON:	SK4					**Sex:**							Unknown			
Age:	18 - 25 years					**Age Category:**							YA			
Stature:	NA															
Dentition:																
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
						H										
	18	**17**	**16**	–	–	**13**	–	–	–	–	–	–	–	**26**	**27**	**28**
	48	**47**	**46**	**45**	–	**43**	–	–	–	–	–	**34**	**35**	**36**	**37**	**38**
	H	H	H									H	H		H	
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Non-Metrics																
Expressed:	NA					**Pathology:**							Dental			
Preservation:	Poor					**Completeness:**							5%			
Fragmentation	Severe					**Grave MNI:**							2			
Associated Material:	Non-adult tooth 36 (CRc)															
Group:	1															
Other:	None															

SKELETON:	SK5					**Sex:**									Male	
Age:	26 - 35 years					**Age Category:**									EMA	
Stature:	NA															
Dentition:																
	–	–	–	–	–	–	–	–	–	–	–			–		
			H	H		H	H		H	H	H					
	18	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**21**	**22**	**23**	**24**	**25**	–	**27**	**28**
	48	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**
	H				H	H	H	H	H	H	H		H			
Non-Metrics																
Expressed:	None					**Pathology:**							Dental			
Preservation:	Poor					**Completeness:**							20%			
Fragmentation	Moderate					**Grave MNI:**							1			
Associated Material:	None															
Group:	1															
Other:	None															

SKELETON:	SK6					**Sex:**							Unknown			
Age:	26 - 35 years					**Age Category:**							EMA			
Stature:	NA															
Dentition:																
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	18	–	–	–	**14**	–	–	–	–	–	–	–	–	**26**	**27**	**28**
	–	**47**	**46**	–	**44**	–	–	–	–	–	–	–	–	**36**	**37**	–
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Non-Metrics																
Expressed:	NA					**Pathology:**							Dental			
Preservation:	Poor					**Completeness:**							5%			
Fragmentation	Moderate					**Grave MNI:**							2 (Poss double burial: SK7)			
Associated Material:	None															
Group:	2															
Other:	None															

SKELETON:	SK7					**Sex:**							Unknown			
Age:	26 - 35 years					**Age Category:**							EMA			
Stature:	NA															
Dentition:																
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
																H
	–	–	–	–	–	–	–	**11**	–	–	–	–	–	**26**	**27**	**28**
	–	**47**	**46**	–	–	–	–	–	–	–	**/**	**X**	**X**	**36**	**37**	**38**
														Pd	Pd	Pd
									–	–						
Non-Metrics																
Expressed:	NA					**Pathology:**							Dental			
Preservation:	Fair					**Completeness:**							5%			
Fragmentation	Moderate					**Grave MNI:**							2 (Poss double burial: SK6)			
Associated Material:	2															
Group:	2															
Other:	None															

SKELETON:	SK8					**Sex:**							Unknown			
Age:	36 - 35 years					**Age Category:**							EMA			
Stature:	NA															
Dentition:																
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
									H	H	H	H	H			
	–	–	–	–	–	–	–	–	**21**	**22**	**23**	**24**	**25**	**26**	–	**28**
	–	–	–	–	–	–	–	–	–	–	–	**34**	**35**	**36**	**37**	**38**
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Non-Metrics																
Expressed:	None					**Pathology:**							Dental			
Preservation:	Poor					**Completeness:**							5%			
Fragmentation	Severe					**Grave MNI:**							1			
Associated Material:	None															
Group:	1															
Other:	None															

SKELETON:	SK9					**Sex:**							?Female			
Age:	36 - 45 years					**Age Category:**							LMA			
Stature:	NA															
Dentition:																
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		H														
	18	**17**	**16**	**15**	–	**13**	**12**	–	**21**	–	**23**	**24**	**25**	**26**	**27**	**28**
	48	**47**	**46**	**45**	**44**	**43**	**42**	**41**	–	**32**	**33**	**34**	**35**	**36**	**37**	**38**
	H	H	H	Pd	Pd		H								Pd	
							–	–	–							
Non-Metrics																
Expressed:	None					**Pathology:**							None			
Preservation:	Fair					**Completeness:**							20%			
Fragmentation	Moderate					**Grave MNI:**										
Associated Material:	DSK10															
Group:	1															
Other:	None															

SKELETON:	SK11					**Sex:**						Unknown				
Age:	26 - 35 years					**Age Category:**						EMA				
Stature:	NA															
Dentition:																
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		H													dc	
	–	**17**	–	–	–	**13**	–	**11**	**21**	**22**	–	**24**	**25**	**26**	**27**	–
	48	**47**	**46**	**45**	**44**	–	–	–	–	–	**33**	**34**	**35**	**36**	**37**	**38**
											H		H			
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Non-Metrics																
Expressed:	None					**Pathology:**						Dental				
Preservation:	Poor					**Completeness:**						15%				
Fragmentation	Moderate					**Grave MNI:**						1				
Associated Material:	None															
Group:	1															
Other:	None															

SKELETON:	SK12					**Sex:**						?				
Age:	26 - 35 years					**Age Category:**						EMA				
Stature:	NA															
Dentition:																
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
			H			H						H	H	H	H	
	–	**17**	**16**	**15**	**14**	**13**	–	**11**	**21**	–	**23**	**24**	**25**	**26**	**27**	**28**
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Non-Metrics																
Expressed:	NA					**Pathology:**						Dental				
Preservation:	Poor					**Completeness:**						5%				
Fragmentation	Severe					**Grave MNI:**						1				
Associated Material:	None															
Group:	3															
Other:	None															

SKELETON:	SK13	**Sex:**	Unknown
Age:	36 - 45 years	**Age Category:**	LMA
Stature:	NA		
Dentition:			

–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
								H					H		
–	**17**	**16**	**15**	**14**	**–**	**–**	**–**	**21**	**–**	**–**	**24**	**25**	**26**	**27**	**–**
X	**X**	**X**	**45**	**/**	**43**	**42**	**–**	**–**	**32**	**33**	**/**	**X**	**X**	**X**	**X**
					mdc										
					H	H			H	H					

Non-Metrics			
Expressed:	None	**Pathology:**	Dental
Preservation:	Fair	**Completeness:**	15%
Fragmentation	Moderate	**Grave MNI:**	
Associated Material:	DSK14		
Group:	1		
Other:	None		

SKELETON:	SK15	**Sex:**	Unknown
Age:	18 - 25 years	**Age Category:**	YA
Stature:	NA		
Dentition:			

–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	H														
18	**17**	**16**	**15**	**–**	**–**	**–**	**11**	**21**	**–**	**–**	**–**	**–**	**26**	**27**	**–**
48	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**con**
				H	H					H					
					–	–	–	–	–						

Non-Metrics			
Expressed:	None	**Pathology:**	Dental
Preservation:	Fair	**Completeness:**	20%
Fragmentation	Moderate	**Grave MNI:**	1
Associated Material:	None		
Group:	1		
Other:			

SKELETON:	SK16					**Sex:**						NA				
Age:	~15 years					**Age Category:**						Adolescent				
Stature:	NA															
Dentition:																
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	H	H	H	H		H								H		H
	18	**17**	**16**	**15**	**14**	**13**	**–**	**11**	**–**	**–**	**–**	**–**	**–**	**26**	**–**	**28**
	UE	**47**	**46**	**45**	**44**	**43**	**–**	**–**	**–**	**–**	**–**	**34**	**–**	**36**	**37**	**–**
						H						H				
				–	–	–	–	–	–	–	–	–	–	–	–	–
Non-Metrics																
Expressed:	NA					**Pathology:**						Dental				
Preservation:	Poor					**Completeness:**						5%				
Fragmentation	Severe					**Grave MNI:**						1				
Associated Material:	None															
Group:	1															
Other:																

SKELETON:	SK19					**Sex:**								Male		
Age:	Adult					**Age Category:**								Adult		
Stature:	NA															
Dentition:																
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
									H							
	18	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**21**	**–**	**–**	**24**	**25**	**–**	**27**	**–**
	X	**X**	**X**	**45**	**44**	**/**	**–**	**–**	**–**	**32**	**/**	**34**	**/**	**X**	**X**	**/**
							–	–	–	–						
Non-Metrics	Bilateral		mandibular													
Expressed:	torus					**Pathology:**						Dental				
Preservation:	Fair					**Completeness:**						10%				
Fragmentation	Severe					**Grave MNI:**						1				
Associated Material:	None															
Group:	1															
Other:																

SKELETON:	SK20	**Sex:**	Unknown
Age:	36 - 45 years	**Age Category:**	
Stature:	NA		
Dentition:			

–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
18	–	–	–	–	**13**	–	–	–	–	–	–	–	**26**	**27**	**28**
–	–	–	–	–	**43**	–	–	–	–	–	–	**35**	**36**	**37**	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Non-Metrics			
Expressed:	NA	**Pathology:**	Dental
Preservation:	Poor	**Completeness:**	<2%
Fragmentation	Moderate	**Grave MNI:**	1
Associated Material:	None		
Group:	1		
Other:			

SKELETON:	SK23	**Sex:**	?Female
Age:	18 - 25 years	**Age Category:**	YA
Stature:	NA		
Dentition:			

–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
											H			H	H
–	**17**	**16**	–	–	–	–	–	**21**	–	**23**	**24**	**25**	**26**	**27**	**28**
48	**47**	**46**	**45**	**44**	**43**	**42**	–	–	–	**33**	**34**	**35**	**36**	**37**	**38**
	H		H	H	H	H				H		H			
						–	–	–	–	–					

Non-Metrics			
Expressed:	None	**Pathology:**	Dental
Preservation:	Poor	**Completeness:**	15%
Fragmentation	Moderate	**Grave MNI:**	1
Associated Material:	None		
Group:	1		
Other:			

SKELETON:	SK24	**Sex:**	Unknown
Age:	26 - 35 years	**Age Category:**	EMA
Stature:	NA		
Dentition:			

			–	–	–	–	–	–	–	–	–	–	–	–	–
		H	H										H	H	H
mc															mc
18	**17**	**16**	**15**	**–**	**13**	**–**	**–**	**–**	**–**	**–**	**24**	**25**	**26**	**27**	**28**
48	**47**	**46**	**45**	**44**	**43**	**42**	**–**	**–**	**–**	**–**	**34**	**35**	**36**	**37**	**38**
					dc						mc				
						H									
							–	–	–	–	–				

Non-Metrics Expressed:	None	**Pathology:**	Dental
Preservation:	Poor	**Completeness:**	15%
Fragmentation	Moderate	**Grave MNI:**	1
Associated Material:	None		
Group:	1		
Other:			

SKELETON:	SK25	**Sex:**	Male
Age:	36 - 45 years	**Age Category:**	EMA
Stature:	NA		
Dentition:			

						–	–	–	–						
Pd	Pd			H							H				
														dc	mc
18	**17**	**16**	**15**	**14**	**13**	**–**	**–**	**–**	**–**	**23**	**24**	**25**	**26**	**27**	**28**
48	**47**	**X**	**45**	/	/	/	**–**	**–**	**–**	/	**34**	**35**	**36**	**37**	**38**
											doc	moc			
Pd	Pd											Pd	Pd	Pd	Pd
							–	–	–						

Non-Metrics Expressed:	Bilateral mandibular torus	**Pathology:**	Dental
Preservation:	Fair	**Completeness:**	45%
Fragmentation	Moderate	**Grave MNI:**	1
Associated Material:	None		
Group:	1		
Other:			

SKELETON:	SK26						**Sex:**								Unknown			
Age:	26 - 35 years						**Age Category:**								EMA			
Stature:	NA																	
Dentition:																		
				–	–	–	–	–	–	–	–							
														H		Pd	Pd	
	18	**17**	**16**	**–**	**–**	**–**	**–**	**–**	**–**	**22**	**–**	**24**	**25**	**26**	**27**	**28**		
	con	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**/**	**32**	**33**	**34**	**35**	**36**	**37**	**38**		
			H		H	H	H					H	H			H		
Non-Metrics																		
Expressed:	None						**Pathology:**								Dental, Spinal DJD.			
Preservation:	Fair						**Completeness:**								20%			
Fragmentation	Moderate						**Grave MNI:**								1			
Associated Material:	None																	
Group:	1																	
Other:																		

SKELETON:	SK27						**Sex:**								Unknown			
Age:	Adult						**Age Category:**								Adult			
Stature:	NA																	
Dentition:																		
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		
	–	–	–	–	–	–	**12**	–	–	–	–	–	–	**26**	–	–		
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		
Non-Metrics																		
Expressed:	NA						**Pathology:**								Dental			
Preservation:	Poor						**Completeness:**								2%			
Fragmentation	Severe						**Grave MNI:**								1			
Associated Material:	None																	
Group:																		
Other:																		

SKELETON:	SK29	**Sex:**	Unknown
Age:	Adult	**Age Category:**	Adult
Stature:	NA		
Dentition:			

–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	**37**	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Non-Metrics			
Expressed:	NA	**Pathology:**	None
Preservation:	Fair	**Completeness:**	<2%
Fragmentation	Severe	**Grave MNI:**	1
Associated Material:	None		
Group:	3		
Other:			

SKELETON:	SK30	**Sex:**	Female
Age:	26 - 35 years	**Age Category:**	EMA
Stature:	NA		
Dentition:			

–	–	–	–	–	–	–	–	–	–	–	–	–	–		
													Pd	Pd	Pd
							H								
18	**17**	**16**	**15**	**14**	**13**	**/**	**11**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**
48	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**31**	**/**	**33**	**34**	**35**	**36**	**37**	**38**
							oc								
Pd	Pd	Pd		H						H	H	Pd		Pd	
			–	–	–	–	–	–							

Non-Metrics			
Expressed:	None	**Pathology:**	Dental
Preservation:	Fair	**Completeness:**	10%
Fragmentation	Moderate	**Grave MNI:**	2
Associated Material:	DSK31		
Group:	Unknown		
Other:			

SKELETON:	SK32					**Sex:**							Unknown			
Age:	26 - 35 years					**Age Category:**							EMA			
Stature:	NA															
Dentition:																
	–	–	–	–	–	–	–	–								
		H				H							H	H	H	H
														bc	Pd	Pd
	–	**17**	–	–	**14**	**13**	**12**	**11**	**/**	**/**	**23**	**/**	**25**	**26**	**27**	**28**
	48	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**–**	**–**	**33**	**34**	**35**	**36**	**37**	**38**
						H	H				H		H	H		H
														Pd		
						–	–	–	–	–						
Non-Metrics																
Expressed:	None					**Pathology:**							Dental			
Preservation:	Poor					**Completeness:**							15%			
Fragmentation	Moderate					**Grave MNI:**							1			
Associated Material:	None															
Group:	3															
Other:																

SKELETON:	SK33					**Sex:**							Unknown			
Age:	Adult					**Age Category:**							Adult			
Stature:	NA															
Dentition:																
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	–	–	**16**	–	–	–	–	–	–	–	–	–	–	**26**	–	–
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Non-Metrics																
Expressed:	NA					**Pathology:**							Dental			
Preservation:	Poor					**Completeness:**							<2%			
Fragmentation	Severe					**Grave MNI:**							1			
Associated Material:	None															
Group:	Unknown															
Other:																

SKELETON:	SK34	**Sex:**	Unknown
Age:	26 - 35 years	**Age Category:**	EMA
Stature:	NA		
Dentition:			

–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	H													H	
–	**17**	–	–	–	–	–	–	–	–	–	–	–	**26**	**27**	**28**
–	–	–	–	–	–	–	–	–	–	–	–	–	–	**37**	**38**
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Non-Metrics			
Expressed:	None	**Pathology:**	Dental
Preservation:	Fair	**Completeness:**	10%
Fragmentation	Moderate	**Grave MNI:**	1
Associated Material:	None		
Group:	2		
Other:			

SKELETON:	SK35	**Sex:**	Unknown
Fragmentation	45+ years	**Age Category:**	OA
Stature:	NA		
Dentition:			

–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		H		H	H							H			H
mc	oc	dc													
18	**17**	**16**	**15**	**14**	**13**	**12**	**11**	–	–	–	**24**	**25**	**26**	**27**	**28**
48	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	–
		bc													
	H				H	H				H	H	H		H	
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Non-Metrics			
Expressed:	None	**Pathology:**	Dental
Preservation:	Poor	**Completeness:**	5%
Fragmentation	Moderate	**Grave MNI:**	1
Associated Material:	None		
Group:	1		
Other:			

SKELETON:	SK36
Age:	18 - 25 years
Stature:	NA
Dentition:	

						–	–	–	–	–	–	–	–	–			
/	/	16	15	14	–	–	–	–	–	23	24	25	26	/	/		
con	47	46	45	44	43	42	/	–	32	33	34	35	36	37	38		
						H			H	H				H			
								–	–	–	–						

Non-Metrics	
Expressed:	R Lambdoid ossicle
Preservation:	Fair
Fragmentation	Moderate
Associated Material:	DSK38
Group:	2
Other:	

Sex:	?Male
Age Category:	YA
Pathology:	Dental, Spinal DJD
Completeness:	55%
Grave MNI:	

SKELETON:	SK39				**Sex:**									NA		
Age:	5.8 - 7.6 years				**Age Category:**									MC		
Stature:	NA															
Dentition:																

–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
				H	H	H	H			H	H		H		
–	–	**16**	**UE**	**UE**	**UE**	**UE**	**E**	–	–	**UE**	**UE**	**UE**	**26**	**UE**	–
–	**UE**	**46**	**UE**	**UE**	**UE**	–	–	–	**E**	**UE**	**UE**	**UE**	**36**	–	–
				H					H	H	H				
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

SK39 (contd)

–	–	–	–	–	–	–	–	–	–	
mc	dc									
55	**54**	–	–	–	–	–	–	–	**65**	
–	**84**	–	–	–	–	–	–	**74**	**75**	
–	–	–	–	–	–	–	–	–	–	

Non-Metrics Expressed:	NA	**Pathology:**	Dental
Preservation:	Fair	**Completeness:**	<2%
Fragmentation	Severe	**Grave MNI:**	1
Associated Material:	None		
Group:	1		
Other:			

SKELETON:	SK40	**Sex:**	Unnown
Age:	Adult	**Age Category:**	Adult
Stature:	NA		
Dentition:	None		
Non-Metrics Expressed:	None	**Pathology:**	None
Preservation:	Fair	**Completeness:**	5%
Fragmentation	Moderate	**Grave MNI:**	1
Associated Material:	None		
Group:	2		
Other:			

SKELETON:	SK41	**Sex:**	?Male
Age:	18 - 35 years	**Age Category:**	YA - EMA
Stature:	NA		
Dentition:			

–	–	–					–						–	–	–
	H		H	H								H		H	
			dc												oc
18	**17**	**–**	**15**	**14**	**13**	**/**	**11**	**/**	**/**	**23**	**24**	**25**	**26**	**27**	**28**
48	**47**	**46**	**45**	**44**	**43**	**42**	**–**	**–**	**–**	**–**	**–**	**35**	**36**	**37**	**con**
		H	H	H	H										
							–	–	–	–	–				

Non-Metrics Expressed:	R Mandibular torus. L was unobservable.	**Pathology:**	Dental
Preservation:	Fair	**Completeness:**	50%
Fragmentation	Moderate	**Grave MNI:**	2
Associated Material:	None		
Group:	2		
Other:			

SKELETON:	SK42	**Sex:**	Unknown
Age:	Adult	**Age Category:**	Adult
Stature:	NA		
Dentition:	None		
Non-Metrics Expressed:	NA	**Pathology:**	None
Preservation:	Fair	**Completeness:**	<5%
Fragmentation	Moderate	**Grave MNI:**	1
Associated Material:	None		
Group:	Unknown		
Other:			

SKELETON:	DSK43	**Sex:**	Unknown
Age:	Adult	**Age Category:**	Adult
Stature:	NA		
Dentition:	NA		
Non-Metrics Expressed:		**Pathology:**	None
Preservation:	Fair	**Completeness:**	NA
Fragmentation	Moderate	**Grave MNI:**	1
Associated Material:	None		
Group:	3		
Other:			

SKELETON:	SK44						**Sex:**						?Male			
Age:	26 - 35 years						**Age Category:**						EMA			
Stature:	NA															
Dentition:																
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	–	–	–	**15**	–	–	–	–	–	**22**	**23**	–	–	**26**	–	–
	48	**47**	**46**	**45**	**44**	**43**	–	–	–	**32**	**33**	–	**35**	**X**	**37**	**38**
			mc	H		H				H	H		H		H	
	–			–	–	–	–	–	–	–	–	–	–			
Non-Metrics Expressed:	R Mandibular torus. L was unobservable.						**Pathology:**						Dental, Orbitalia.			Cribra
Preservation:	Poor						**Completeness:**						10%			
Fragmentation	Moderate						**Grave MNI:**						1			
Associated Material:	DSK48															
Group:	1															
Other:																

SKELETON:	SK46						**Sex:**						Unknown			
Age:	18 - 25 years						**Age Category:**						YA			
Stature:	NA															
Dentition:																
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	H	H			H	H			H	H					H	
															dc	mc
	18	**17**	**16**	–	**14**	**13**	–	**11**	**21**	**22**	**23**	**24**	–	**26**	**27**	**28**
	48	**47**	**46**	**45**	**44**	**43**	–	–	**31**	**32**	**33**	**34**	**35**	**36**	**37**	–
						H									H	
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Non-Metrics Expressed:	NA						**Pathology:**						Dental			
Preservation:	Fair						**Completeness:**						5%			
Fragmentation	Moderate						**Grave MNI:**						3			
Associated Material:	None															
Group:	Unknown															
Other:																

SKELETON:	SK47	**Sex:**	Unknown
Age:	Adult	**Age Category:**	Adult
Stature:	NA		
Dentition:			

–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
18	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	**47**	**46**	–	–	–	–	–	–	–	–	–	–	–	–	–
	H														
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Non-Metrics			
Expressed:	NA	**Pathology:**	Dental
Preservation:	Poor	**Completeness:**	10%
Fragmentation	Moderate	**Grave MNI:**	1
Associated Material:	None		
Group:	3		
Other:			

SKELETON:	SK49	**Sex:**	Unknown
Age:	26 - 35 years	**Age Category:**	EMA
Stature:	NA		
Dentition:			

–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		H						H		H			H		
–	–	**16**	–	–	**13**	–	–	**21**	–	**23**	–	**25**	**26**	**27**	**28**
48	**47**	**46**	**45**	**44**	**43**	/	/	/	/	–	–	–	**36**	**37**	–
			H	H											
–	–	–								–	–	–	–	–	–

Non-Metrics			
Expressed:	None	**Pathology:**	Dental
Preservation:	Poor	**Completeness:**	10%
Fragmentation	Severe	**Grave MNI:**	2
Associated Material:	DSK57		
Group:	3		
Other:			

–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
	H															
–	**17**	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
–	**47**	**46**	**45**	**44**	–	–	–	–	–	**33**	–	–	**36**	**37**	–	
				H						H						
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	

SKELETON: SK50
Sex: Unknown
Age: 36 - 45 years
Age Category: LMA
Stature: NA
Dentition:

Non-Metrics
Expressed: NA
Pathology: Dental, Cribra Orbitalia.
Preservation: Fair
Completeness: 15%
Fragmentation Moderate
Grave MNI: 1
Associated Material: DSK51
Group: 2
Other:

–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
													mc			
–	–	–	–	–	–	–	–	–	–	–	–	–	**26**	–	–	
–	–	–	–	–	–	–	–	**31**	–	–	–	–	–	–	–	
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	

SKELETON: SK52
Sex: Unknown
Age: Adult
Age Category: Adult
Stature: NA
Dentition:

Non-Metrics
Expressed: NA
Pathology: Dental
Preservation: Fair
Completeness: <2%
Fragmentation Moderate
Grave MNI: 1
Associated Material: None
Group: 2
Other:

SKELETON:	SK53	**Sex:**	Unknown
Age:	Adult	**Age Category:**	Adult
Stature:	NA		
Dentition:			
Non-Metrics			
Expressed:	NA	**Pathology:**	None
Preservation:	Poor	**Completeness:**	<2%
Fragmentation	Severe	**Grave MNI:**	1
Associated Material:	None		
Group:	2		
Other:			

SKELETON:	SK54	**Sex:**	Unknown
Age:	Adult	**Age Category:**	Adult
Stature:	NA		
Dentition:			
Non-Metrics			
Expressed:	NA	**Pathology:**	None
Preservation:	Fair	**Completeness:**	15%
Fragmentation	Moderate	**Grave MNI:**	1
Associated Material:	None		
Group:	Unknown		
Other:			

SKELETON:	SK58	**Sex:**	Unknown
Age:	Adult	**Age Category:**	Adult
Stature:	NA		
Dentition:	NA		
Non-Metrics			
Expressed:	NA	**Pathology:**	None
Preservation:	Poor	**Completeness:**	<1%
Fragmentation	Severe	**Grave MNI:**	1
Associated Material:	None		
Group:	1		
Other:			

SKELETON:	SK59	**Sex:**	Unknown
Age:	Adult	**Age Category:**	Adult
Stature:	NA		
Dentition:			
Non-Metrics			
Expressed:	None	**Pathology:**	None
Preservation:	Moderate	**Completeness:**	5%
Fragmentation	Moderate	**Grave MNI:**	1
Associated Material:	None		
Group:	2		
Other:			

SKELETON:	SK60	**Sex:**	Unknown
Age:	Adult	**Age Category:**	Adult
Stature:	NA		
Dentition:			

–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	**X**	**X**	**X**	**X**	**X**	–	–	–	–	–	**34**	–	–	–	–
–						–	–	–	–	–	–	–	–	–	–

Non-Metrics			
Expressed:	None	**Pathology:**	Dental, Cribra Orbitalia.
Preservation:	Fair	**Completeness:**	5%
Fragmentation	Moderate	**Grave MNI:**	1
Associated Material:	None		
Group:	2		
Other:			

SKELETON:	SK61	**Sex:**	Female
Age:	26 - 35 years	**Age Category:**	EM
Stature:	NA		
Dentition:			

						–	–	–	–	–					
H	H			H	H					H		H		H	H
															mc
18	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**–**	**–**	**23**	**24**	**25**	**26**	**27**	**28**
48	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**
			H	H	H					H	H				

Non-Metrics			
Expressed:	Metopic suture	**Pathology:**	Dental, Spinal DJD.
Preservation:	Fair	**Completeness:**	45%
Fragmentation	Moderate	**Grave MNI:**	1
Associated Material:	None		
Group:	2		
Other:			

SKELETON:	SK62	**Sex:**	Unknown
Age:	Adult	**Age Category:**	Adult
Stature:	NA		
Dentition:			
Non-Metrics Expressed:		**Pathology:**	None
Preservation:	Poor	**Completeness:**	5%
Fragmentation	Moderate	**Grave MNI:**	1
Associated Material:	None		
Group:	1		
Other:			

SKELETON:	SK63	**Sex:**	?Female
Age:	26 - 35 years	**Age Category:**	EMA
Stature:	NA		
Dentition:			

							–	–	–	–					
	H													H	H
	Pd													dc	mc
/	**17**	**16**	/	**14**	**13**	**12**	–	–	**22**	–	**24**	**25**	**26**	**27**	**28**
48	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**
	H	H		H							H			H	
	Pd	Pd											Pd	Pd	

Non-Metrics Expressed:	Bilateral mandibular torus	**Pathology:**	Dental
Preservation:	Poor	**Completeness:**	20%
Fragmentation	Moderate	**Grave MNI:**	1
Associated Material:	None		
Group:	2		
Other:			

SKELETON:	SK64	**Sex:**	Unknown
Age:	36 - 45 years	**Age Category:**	LMA
Stature:	NA		
Dentition:			

–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
H				H	H	H						H	H		
mc															
18	**17**	**16**	**–**	**14**	**13**	**12**	**11**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**
–	**47**	**46**	**45**	**–**	**–**	**–**	**–**	**31**	**32**	**–**	**34**	**35**	**36**	**37**	**–**
								dc							
			H					H	H						
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Non-Metrics			
Expressed:	None	**Pathology:**	Dental
Preservation:	Fair	**Completeness:**	5%
Fragmentation	Moderate	**Grave MNI:**	1
Associated Material:	None		
Group:	1		
Other:			

SKELETON:	SK65	**Sex:**	Unknown
Age:	18 - 25 years	**Age Category:**	YA
Stature:	NA		
Dentition:			

						–	–	–	–	–	–	–	–	–	–
												H			
con	**17**	**16**	**15**	**14**	**13**	**12**	**–**	**–**	**–**	**–**	**–**	**25**	**26**	**27**	**–**
con	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**con**
			H		H							H	H	H	
							–	–							

Non-Metrics			
Expressed:	NA	**Pathology:**	Dental
Preservation:	Fair	**Completeness:**	20%
Fragmentation	Moderate	**Grave MNI:**	1
Associated Material:	None		
Group:	1		
Other:			

SKELETON:	SK66					**Sex:**								?Male		
Age:	Adult					**Age Category:**								Adult		
Stature:	NA															
Dentition:																
	–	–	–	–	–	–	–	–	–	–	–			–	–	
													Pd			
	18	–	–	–	–	–	–	–	–	–	–	**X**	**X**	**26**	–	–
	48	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**31**	**32**	**33**	**X**	**X**	**X**	**X**	**X**
	–	–	–	–	–	–	–	–	–	–	–					
Non-Metrics												Dental, Postaxial				
Expressed:	None					**Pathology:**						DJD, Spinal DJD				
Preservation:	Fair					**Completeness:**						10%				
Fragmentation	Moderate					**Grave MNI:**						1				
Associated Material:	None															
Group:	2															
Other:																

SKELETON:	SK67					**Sex:**								Unknown		
Age:	18 - 25 years					**Age Category:**								YA		
Stature:	NA															
Dentition:																
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
					H	H	H					H				
	18	**17**	**16**	–	**14**	**13**	**12**	–	–	–	–	**24**	**25**	**26**	**27**	**28**
	–	**47**	**46**	**45**	**44**	**43**	**42**	–	**31**	–	**33**	**34**	**35**	**36**	**37**	**38**
				H	H	H					H	H				
	–	–	–	–			–	–	–	–	–	–	–	–		–
Non-Metrics																
Expressed:	NA					**Pathology:**						Dental				
Preservation:	Fair					**Completeness:**						5%				
Fragmentation	Moderate					**Grave MNI:**						1				
Associated Material:	None															
Group:	Unknown															
Other:																

SKELETON:	SK69	**Sex:**	Unknown
Age:	Adult	**Age Category:**	Adult
Stature:	NA		
Dentition:			

–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
				dc						H					
–	–	–	–	**14**	–	–	**11**	**21**	**22**	**23**	**24**	–	**26**	–	–
–	–	–	–	–	–	–	–	–	–	**33**	**34**	–	**36**	–	**38**
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Non-Metrics			
Expressed:	None	**Pathology:**	Dental
Preservation:	Poor	**Completeness:**	5%
Fragmentation	Moderate	**Grave MNI:**	1
Associated Material:	DSK70 (also assoc SK71)		
Group:	1		
Other:			

SKELETON:	SK71	**Sex:**	Unknown
Age:	Adult	**Age Category:**	Adult
Stature:	NA		
Dentition:	None		
Non-Metrics			
Expressed:	NA	**Pathology:**	None
Preservation:	Moderate	**Completeness:**	15%
Fragmentation	Fair	**Grave MNI:**	1
Associated Material:	DSK70 (also assoc SK69). DSK76 (also assoc SK79)		
Group:	1		
Other:			

SKELETON:	SK72	**Sex:**	?Female
Age:	Adult	**Age Category:**	Adult
Stature:	NA		
Dentition:	None		
Non-Metrics			
Expressed:	NA	**Pathology:**	None
Preservation:	Poor	**Completeness:**	15%
Fragmentation	Moderate	**Grave MNI:**	1
Associated Material:	None		
Group:	Unknown		
Other:			

SKELETON:	SK73	**Sex:**	Unknown
Age:	26 - 35 years	**Age Category:**	EMA
Stature:	NA		
Dentition:			

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	H									H				H	
18	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**
48	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**
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Non-Metrics			
Expressed:	NA	**Pathology:**	Dental
Preservation:	Fair	**Completeness:**	10%
Fragmentation	Severe	**Grave MNI:**	2
Associated Material:	DSK75 (also assoc SK74)		
Group:	2		
Other:			

SKELETON:	SK74	**Sex:**	Unknown
Age:	Adult	**Age Category:**	Adult
Stature:	NA		
Dentition:			

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–	–	–	–	–	**13**	–	–	–	–	–	–	–	–	–	–
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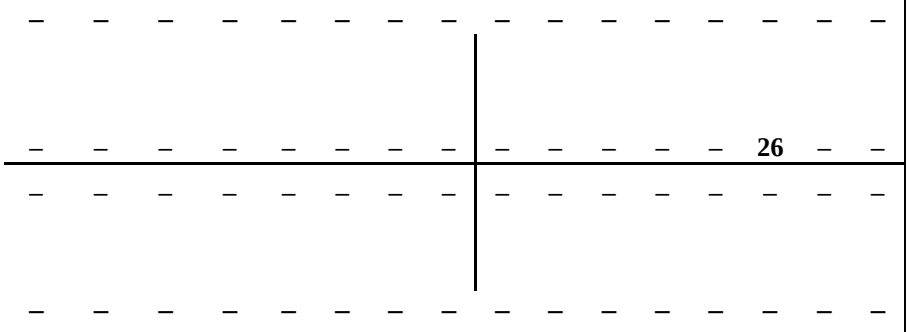
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Non-Metrics			
Expressed:	NA	**Pathology:**	None
Preservation:	Poor	**Completeness:**	<2%
Fragmentation	Severe	**Grave MNI:**	2
Associated Material:	DSK75 (also assoc SK73)		
Group:	2		
Other:			

SKELETON:	SK77	**Sex:**	Unknown
Age:	Adult	**Age Category:**	Adult
Stature:	NA		
Dentition:			
Non-Metrics			
Expressed:	None	**Pathology:**	None
Preservation:	Fair	**Completeness:**	15%
Fragmentation	Moderate	**Grave MNI:**	1
Associated Material:	None		
Group:	1		
Other:			

SKELETON:	SK78	**Sex:**	Unknown
Age:	Adult	**Age Category:**	Adult
Stature:	NA		
Dentition:			



Non-Metrics			
Expressed:	NA	**Pathology:**	Dental
Preservation:	Poor	**Completeness:**	<1%
Fragmentation	Severe	**Grave MNI:**	1
Associated Material:	None		
Group:	1		
Other:			

SKELETON:	SK79					**Sex:**						Male				
Age:	45+ years					**Age Category:**						OA				
Stature:	NA															
Dentition:																
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	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	X	**X**	**X**	**X**	**X**	–	–	–	–	–	/	**X**	**X**	**X**	**X**	**X**
						–	–	–	–	–						
(SK79 assoc. DSK)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	18	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	–	**47**	**46**	**45**	**44**	**43**	**42**	–	–	**32**	**33**	**34**	**35**	**36**	**37**	**38**
	–	–	–			–	–	–	–	–	–	–	–			
Non-Metrics																
Expressed:	None					**Pathology:**						Dental				
Preservation:	Fair					**Completeness:**						25%				
Fragmentation	Moderate					**Grave MNI:**						2				
Associated Material:	None															
Group:	4															
Other:																

SKELETON:	SK80					**Sex:**						Unknown				
Age:	Adult					**Age Category:**						Adult				
Stature:	NA															
Dentition:																
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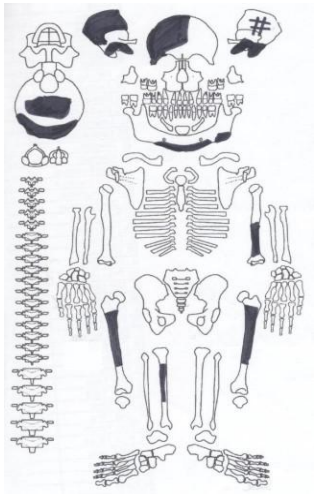
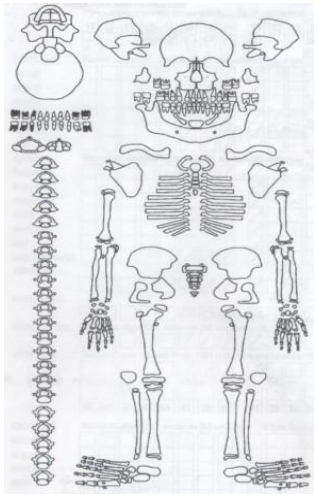
	–	–	–	–	–	**43**	–	–	–	–	**33**	–	–	–	–	–
						H					H					
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Non-Metrics																
Expressed:	NA					**Pathology:**						Dental				
Preservation:	Fair					**Completeness:**						<5%				
Fragmentation	Moderate					**Grave MNI:**										
Associated Material:	None															
Group:	Unknown															
Other:																

SKELETON:	SK81						**Sex:**								Female	
Age:	18 - 35 years						**Age Category:**								YA - EMA	
Stature:	NA															
Dentition:																
	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	18	**17**	**–**	**–**	**–**	**13**	**–**	**–**	**–**	**–**	**–**	**24**	**–**	**26**	**27**	**28**
	48	**47**	**46**	**45**	**/**	**43**	**/**	**41**	**–**	**/**	**/**	**/**	**35**	**36**	**37**	**38**
								–	–							
Non-Metrics																
Expressed:	None						**Pathology:**					None				
Preservation:	Fair						**Completeness:**					40%				
Fragmentation	Moderate						**Grave MNI:**					1				
Associated Material:	None															
Group:	4															
Other:																

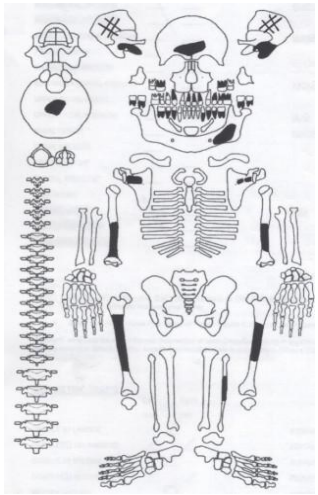
8 Visual Inventory



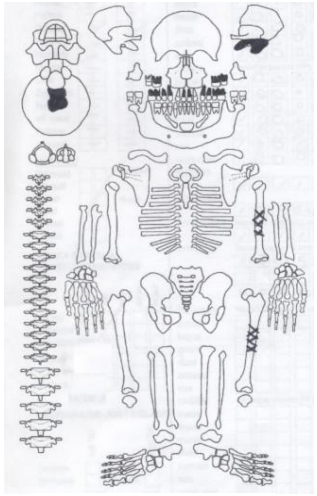
Bushfield_DSK43



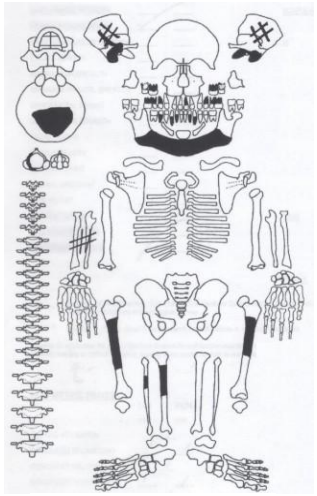
Bushfield_SK1



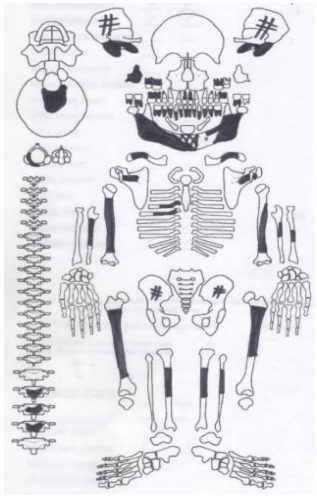
Bushfield_SK11



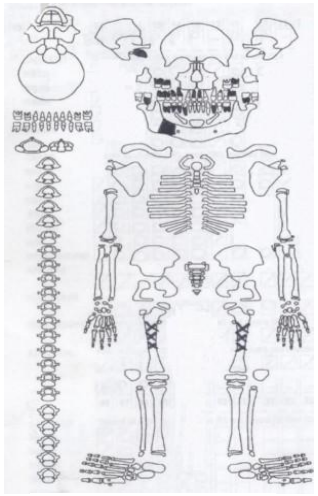
Bushfield_SK12



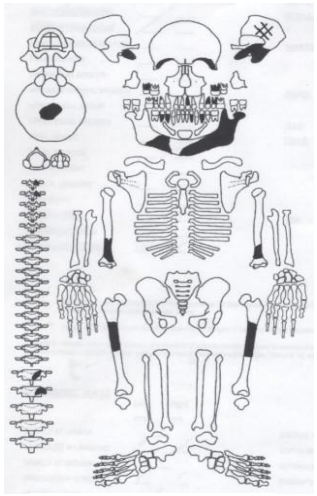
Bushfield_SK13



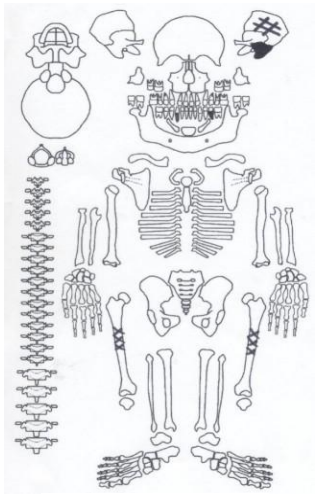
Bushfield_SK15



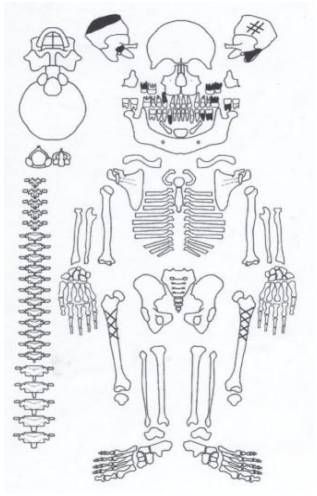
Bushfield_SK16



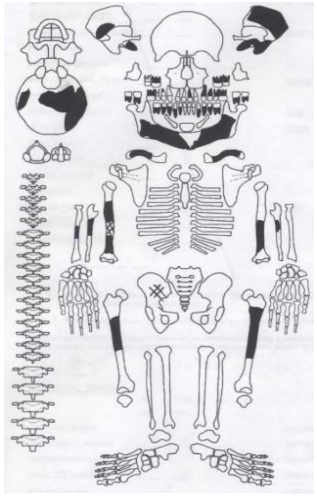
Bushfield_SK19



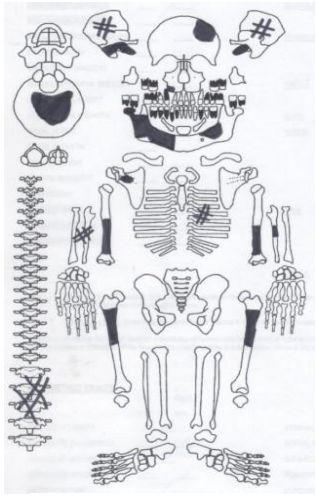
Bushfield_SK2



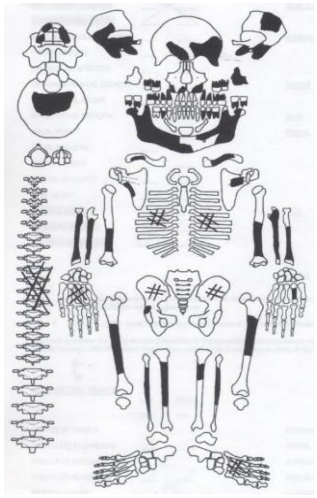
Bushfield_SK20



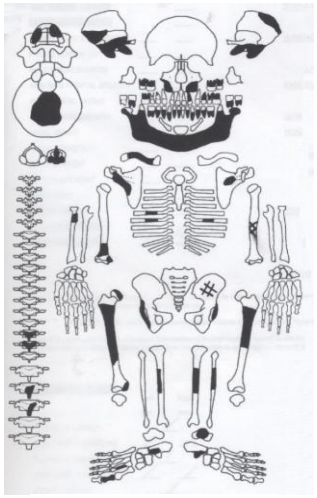
Bushfield_SK23



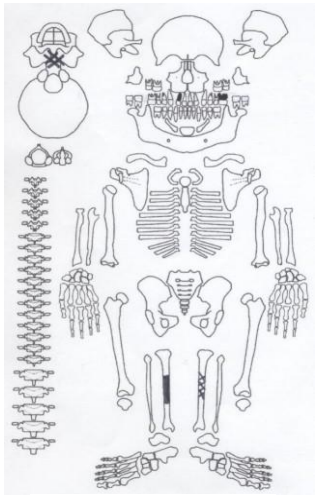
Bushfield_SK24



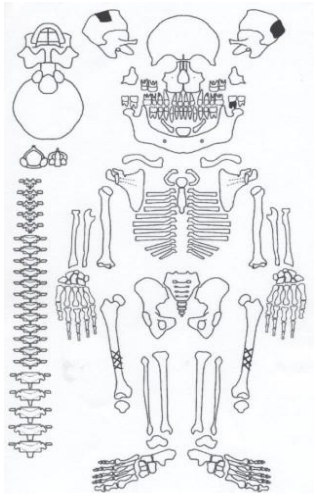
Bushfield_SK25



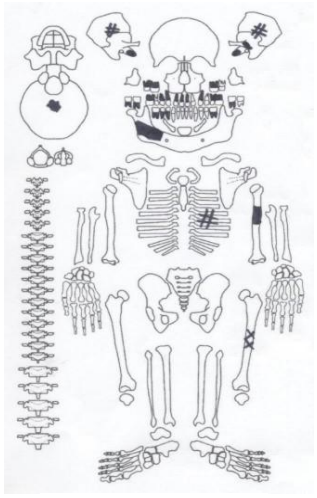
Bushfield_SK26



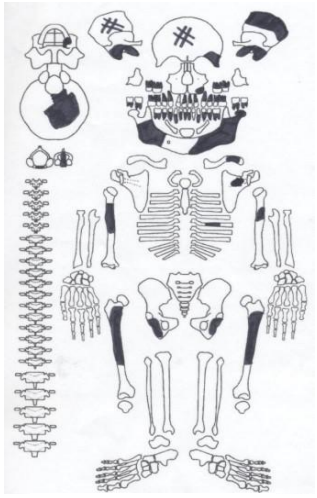
Bushfield_SK27



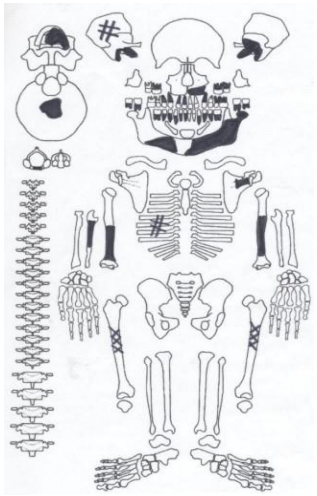
Bushfield_SK29



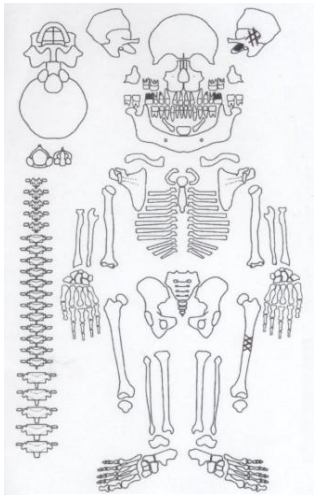
Bushfield_SK3



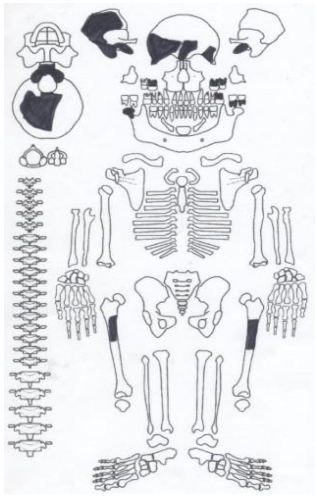
Bushfield_SK30



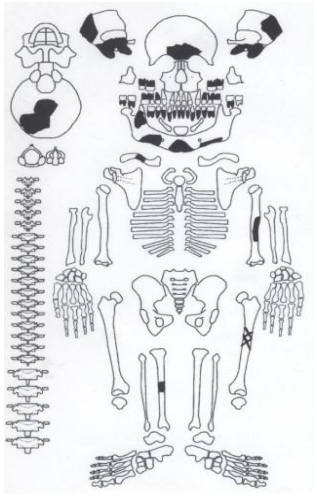
Bushfield_SK32



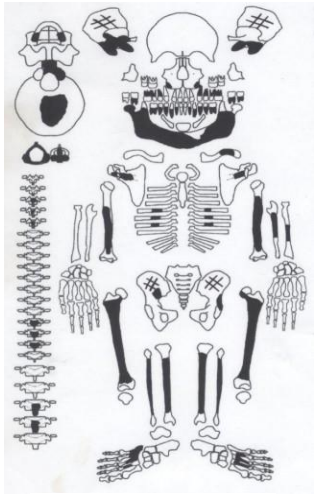
Bushfield_SK33



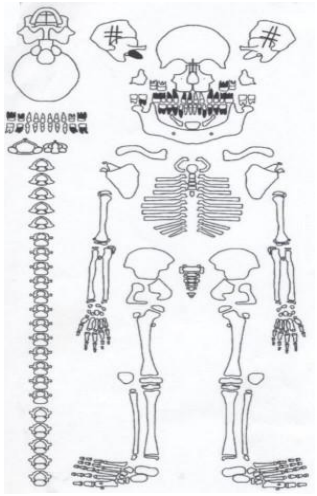
Bushfield_SK34



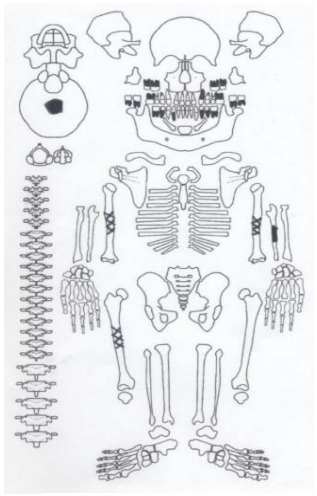
Bushfield_SK35



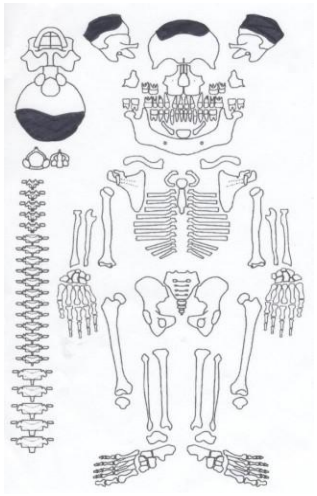
Bushfield_SK36



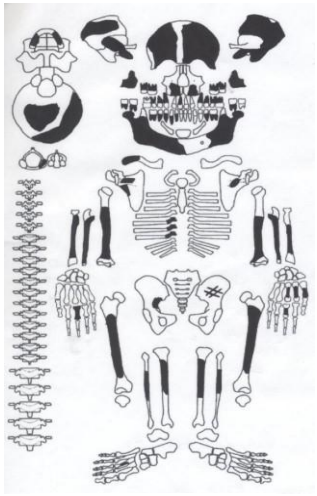
Bushfield_SK39



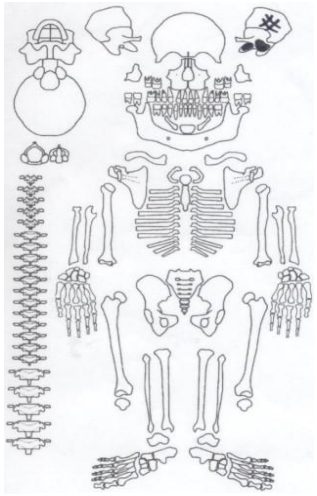
Bushfield_SK4



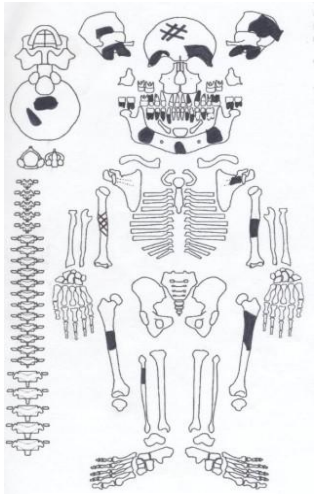
Bushfield_SK40



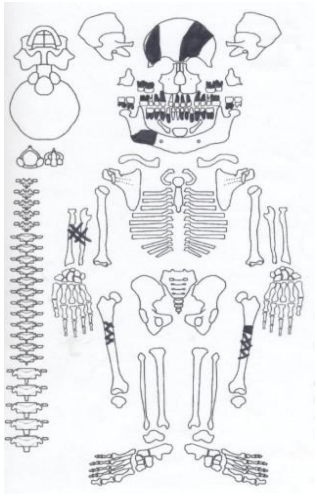
Bushfield_SK41



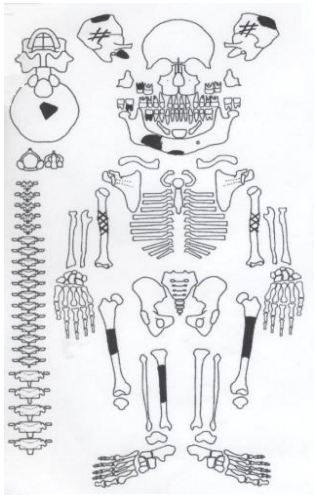
Bushfield_SK42



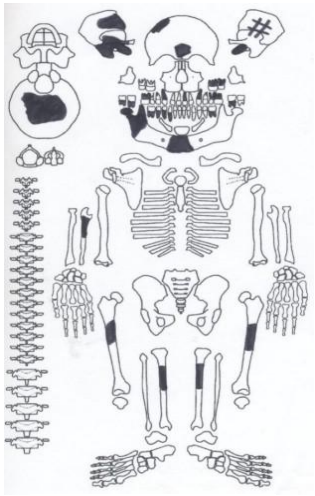
Bushfield_SK44



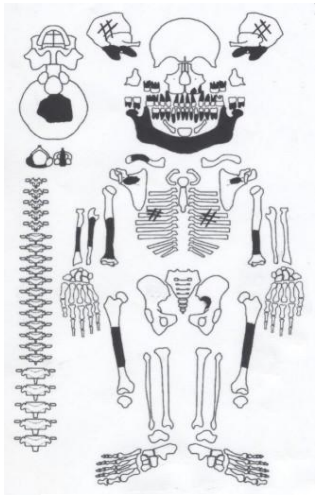
Bushfield_SK46



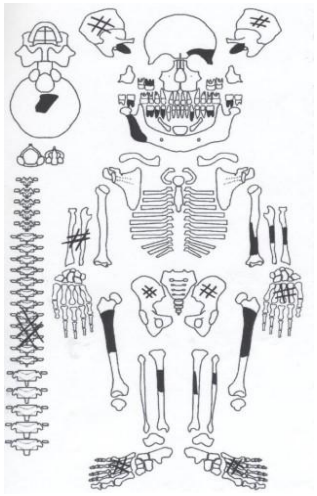
Bushfield_SK47



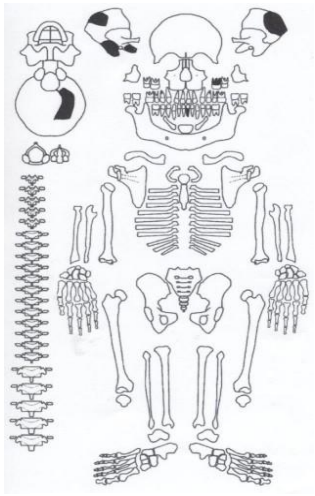
Bushfield_SK49



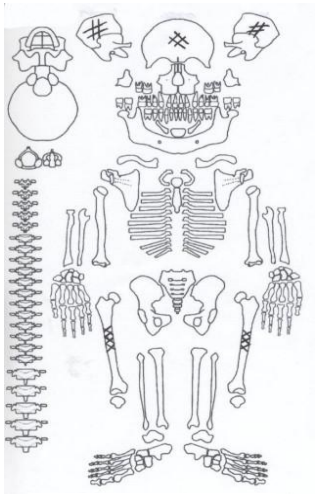
Bushfield_SK5



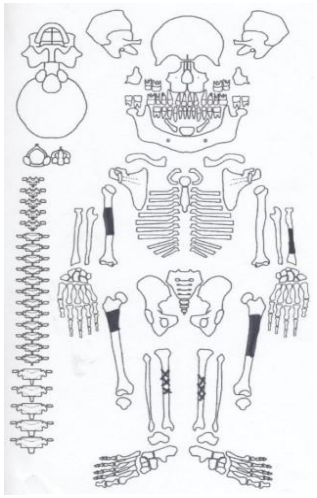
Bushfield_SK50



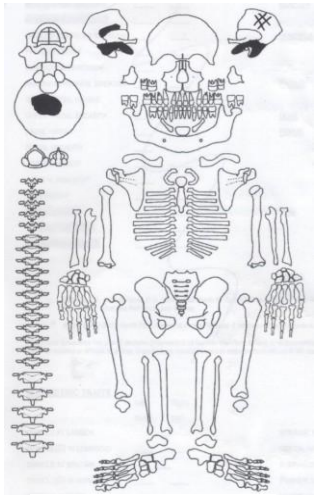
Bushfield_SK52



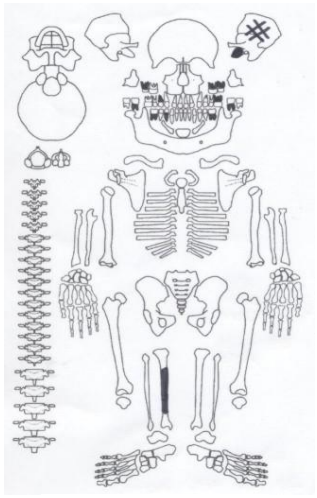
Bushfield_SK53



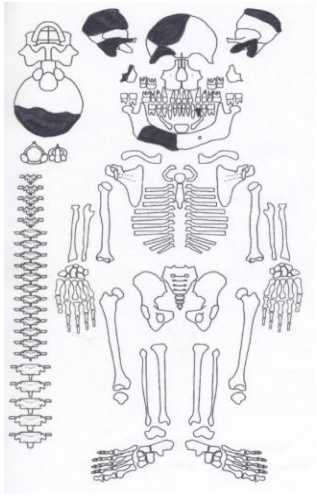
Bushfield_SK54



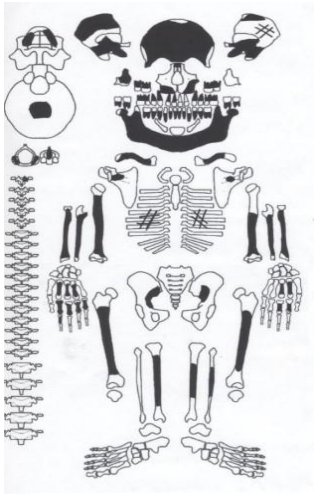
Bushfield_SK59



Bushfield_SK6



Bushfield_SK60



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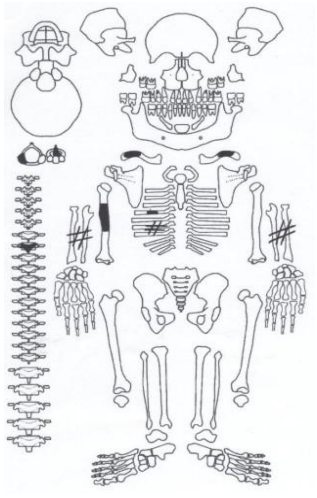
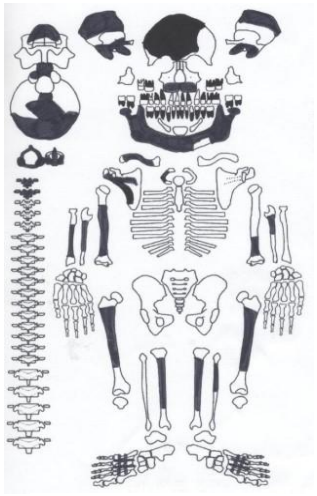


Bushfield_SK62



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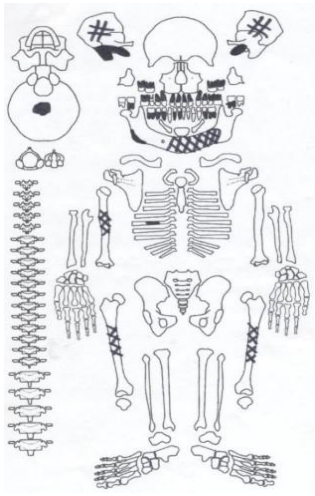

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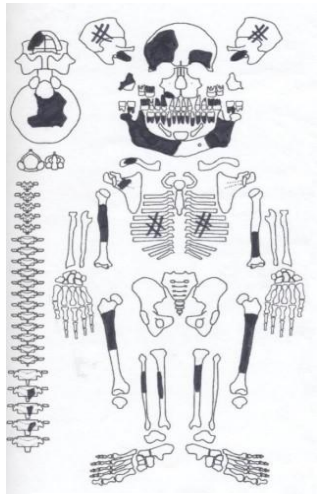

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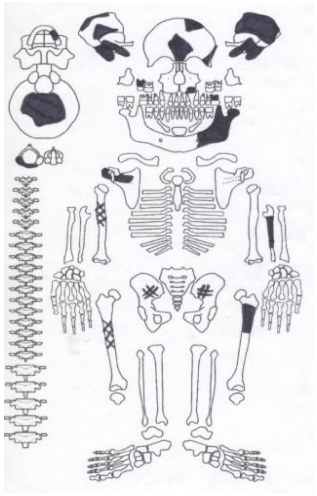

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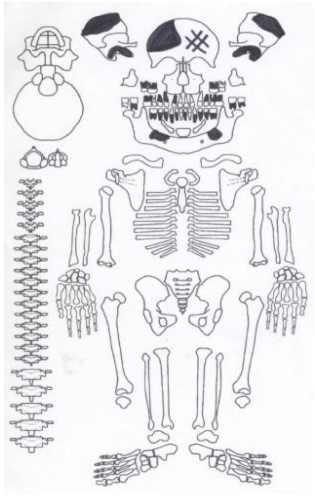

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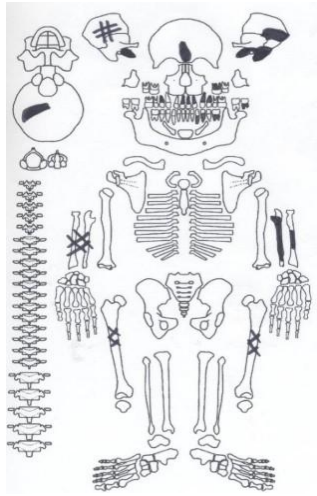
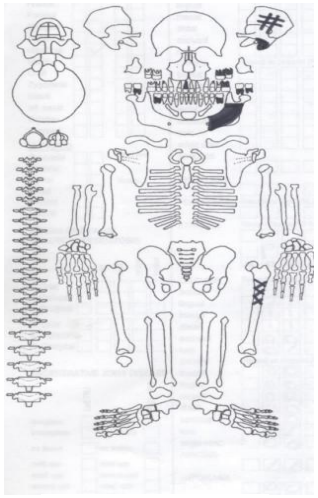


Bushfield_SK69



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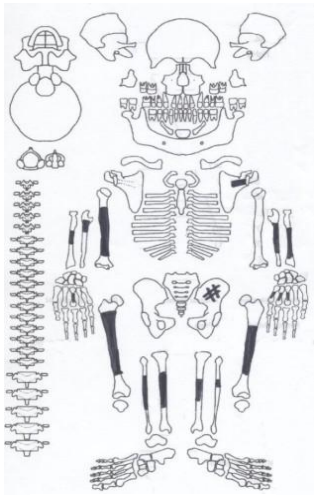

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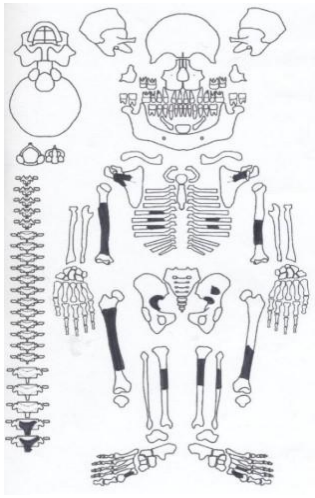
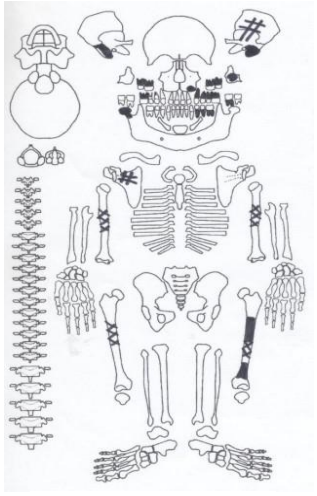


Bushfield_SK72



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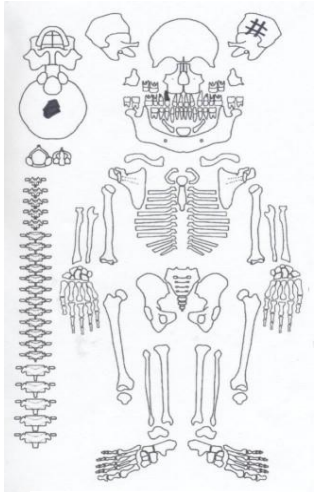
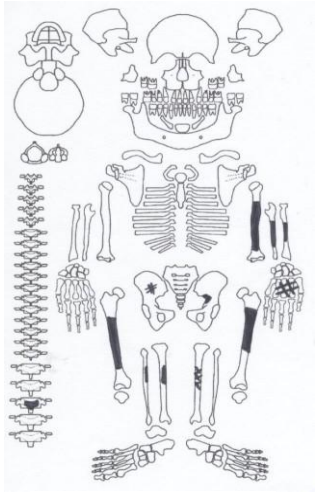


Bushfield_SK74



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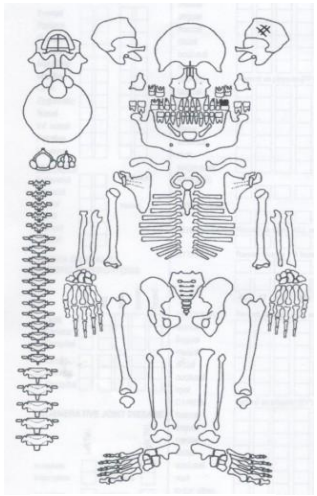
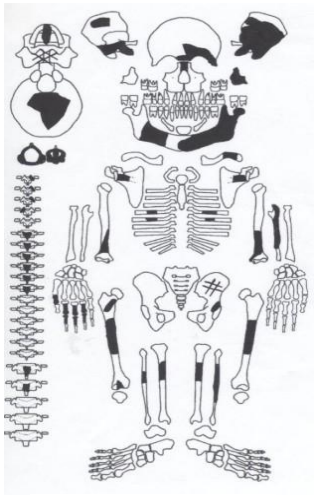
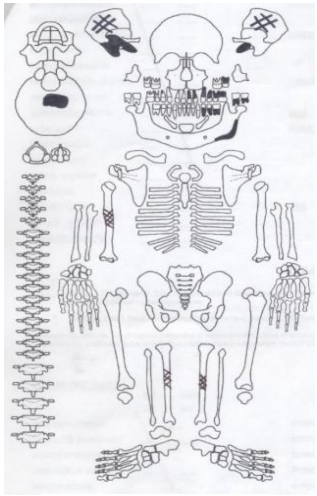


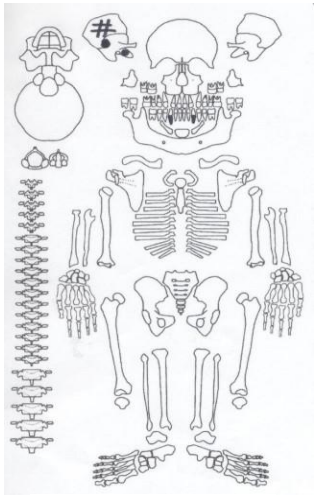
Bushfield_SK78



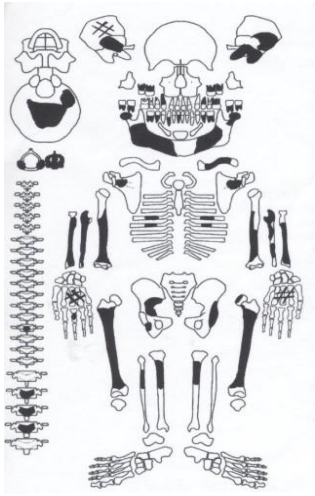
Bushfield_SK79



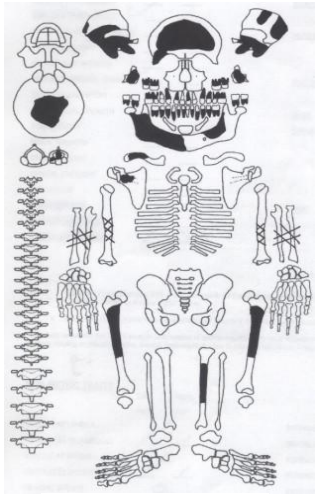
Bushfield_SK8



Bushfield_SK80



Bushfield_SK81



Bushfield_SK9

8.12 Appendix 12: Glass Bead Analysis

M7/M8 Portlaoise to Cullahill CONTRACT 2 by Cecily Cropper

This is purely a catalogue as none of the beads could give significant information.

Derrinsallagh 3

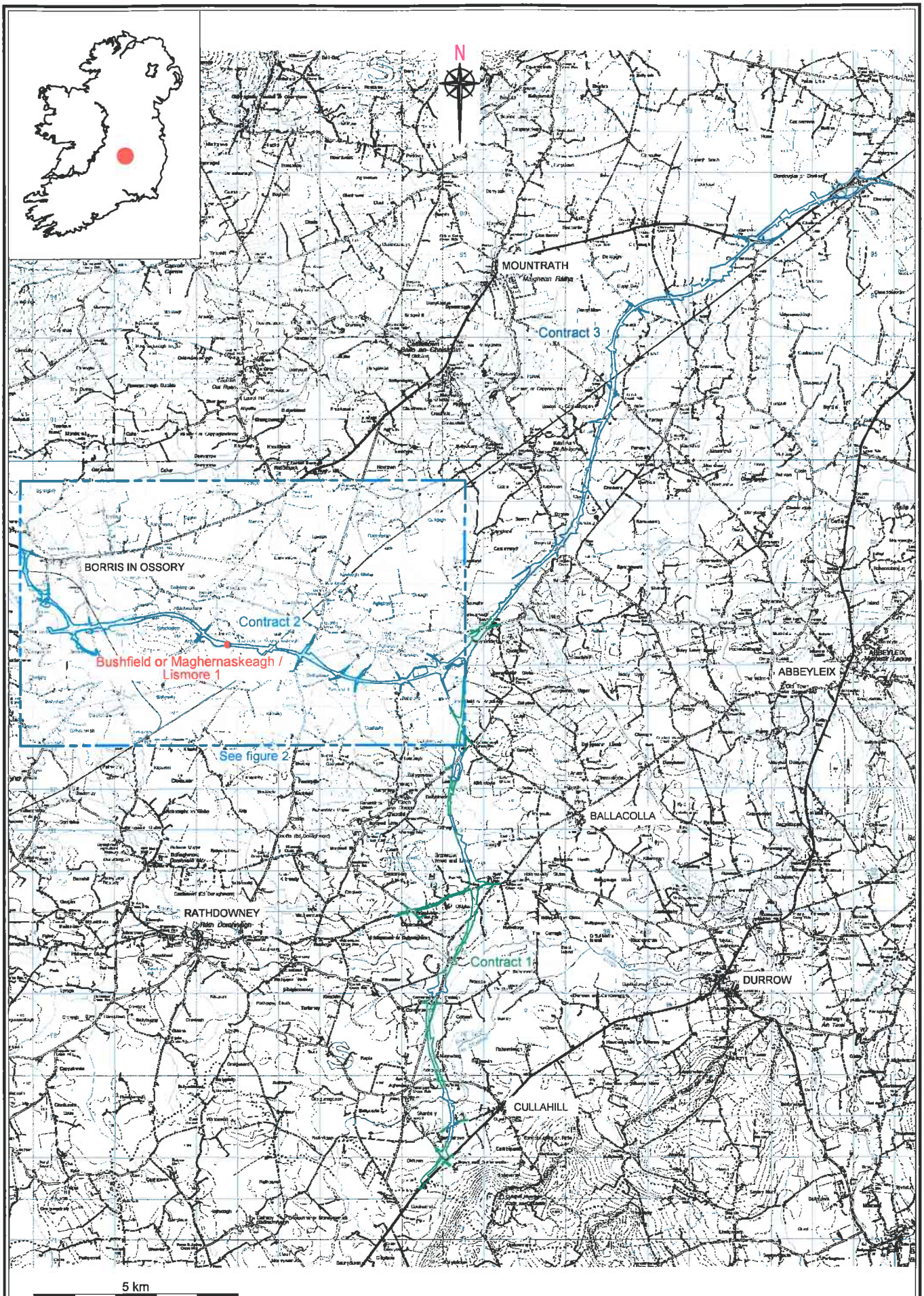
E2179:758:1 Fragment of globular, translucent pale blue glass bead. Approx D: 9mm. Approx PD: 5mm. H: 6mm.

Derryvorrigan 1

E2193:377:1 Annular translucent blue glass bead. D: 7mm. PD: 3-3.5mm. H: 2mm.

Bushfield/Lismore 1

E2220:148:2 Fragment of annular opaque blue glass bead, undergoing loss of glassy state. D: 11mm. PD: 3mm. H: 3.5mm.



Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1: 125,000 A4
	Issued for: Archaeological excavation report	Date: Apr '09
	Client: Laois County Council	Origin: ACS Ltd
		Drawing no.: 05_09_C10001

Figure 1: Location of M7/M8 Motorway Scheme showing location of Bushfield or Maghernaskeagh/Lismore 1.

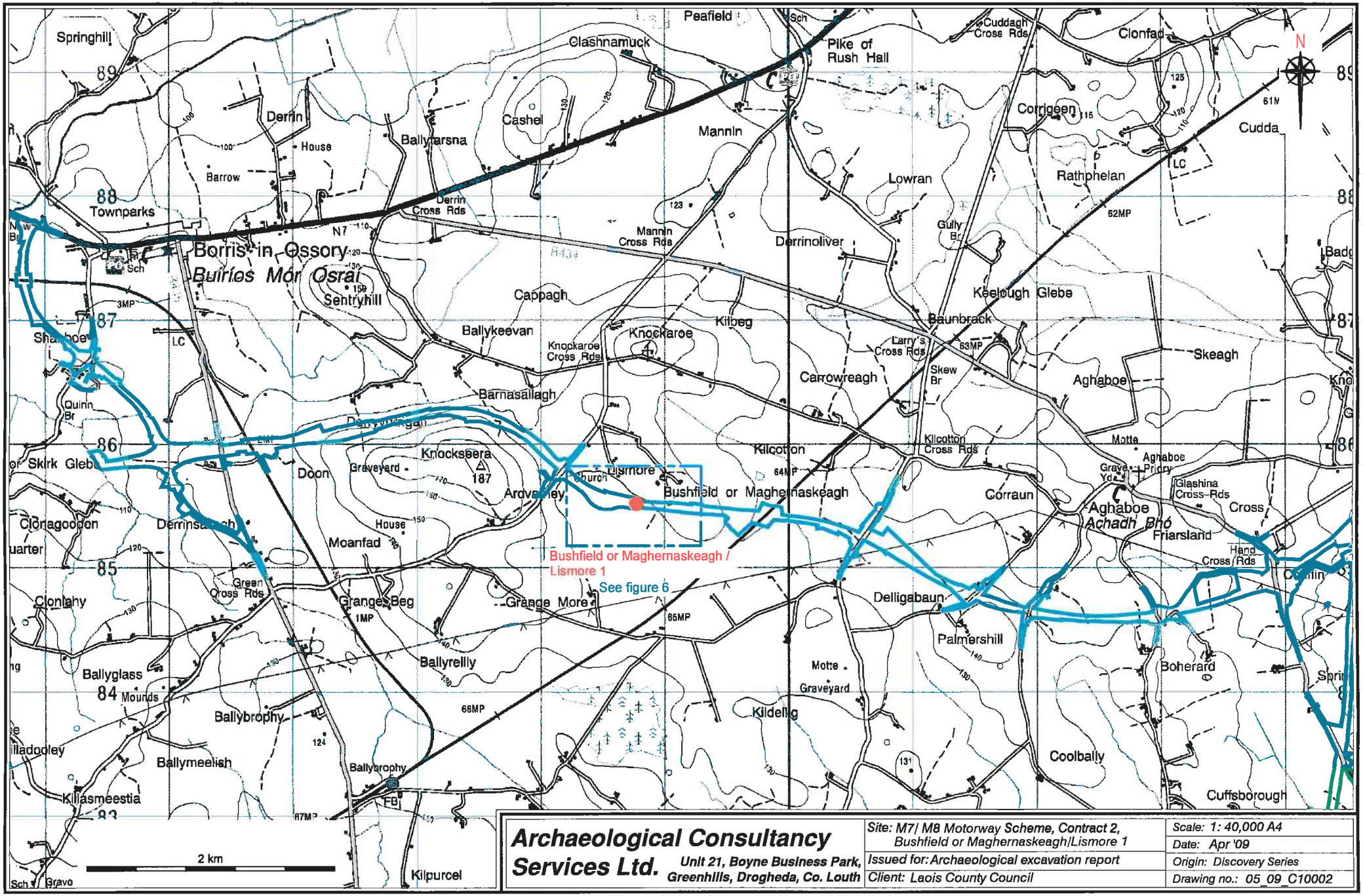


Figure 2: Location of Contract 2 showing Bushfield or Maghernaskeagh/Lismore 1.

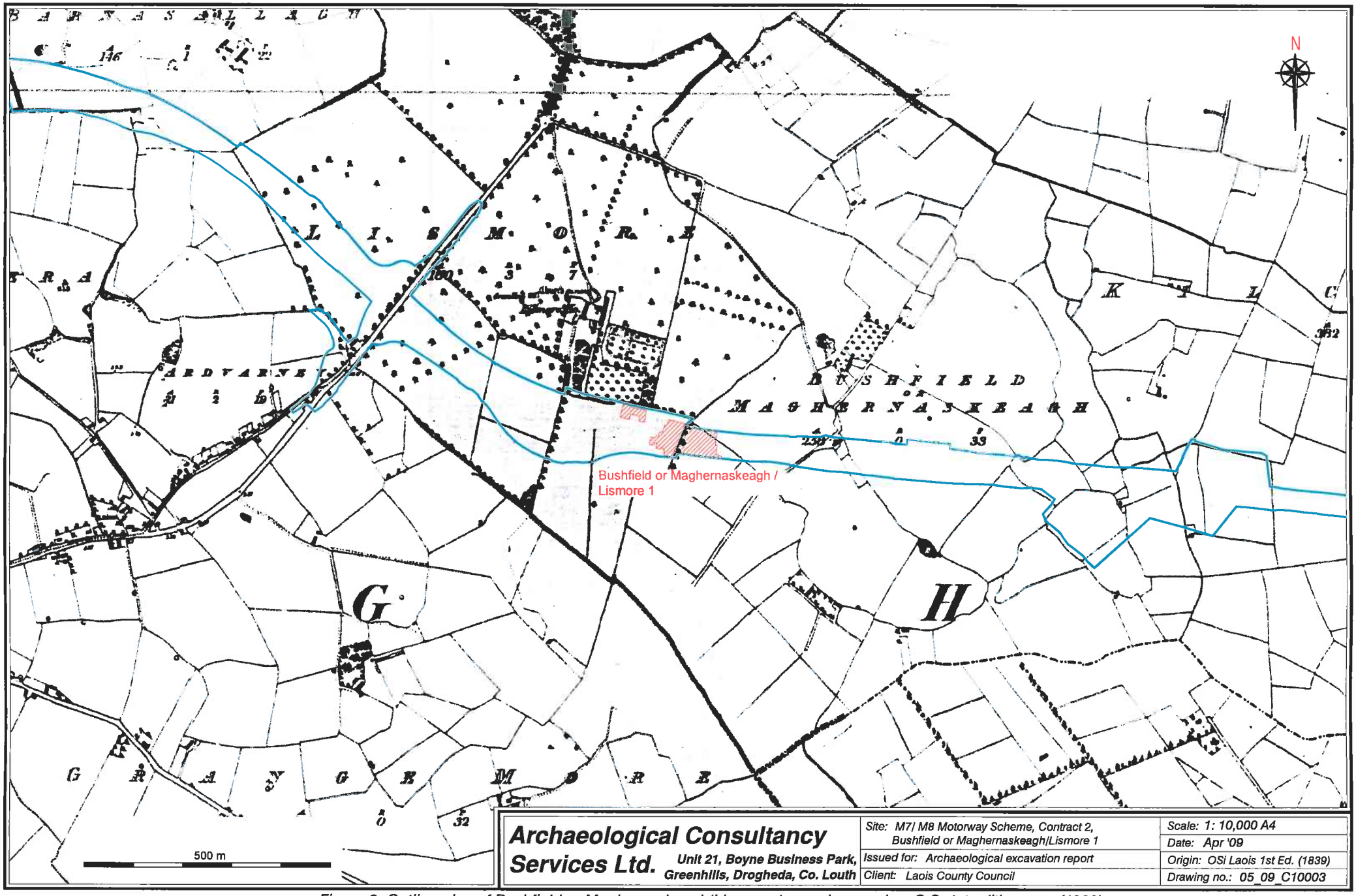


Figure 3: Outline plan of Bushfield or Maghernaskeagh/Lismore 1 superimposed on O.S. 1st edition map (1839).

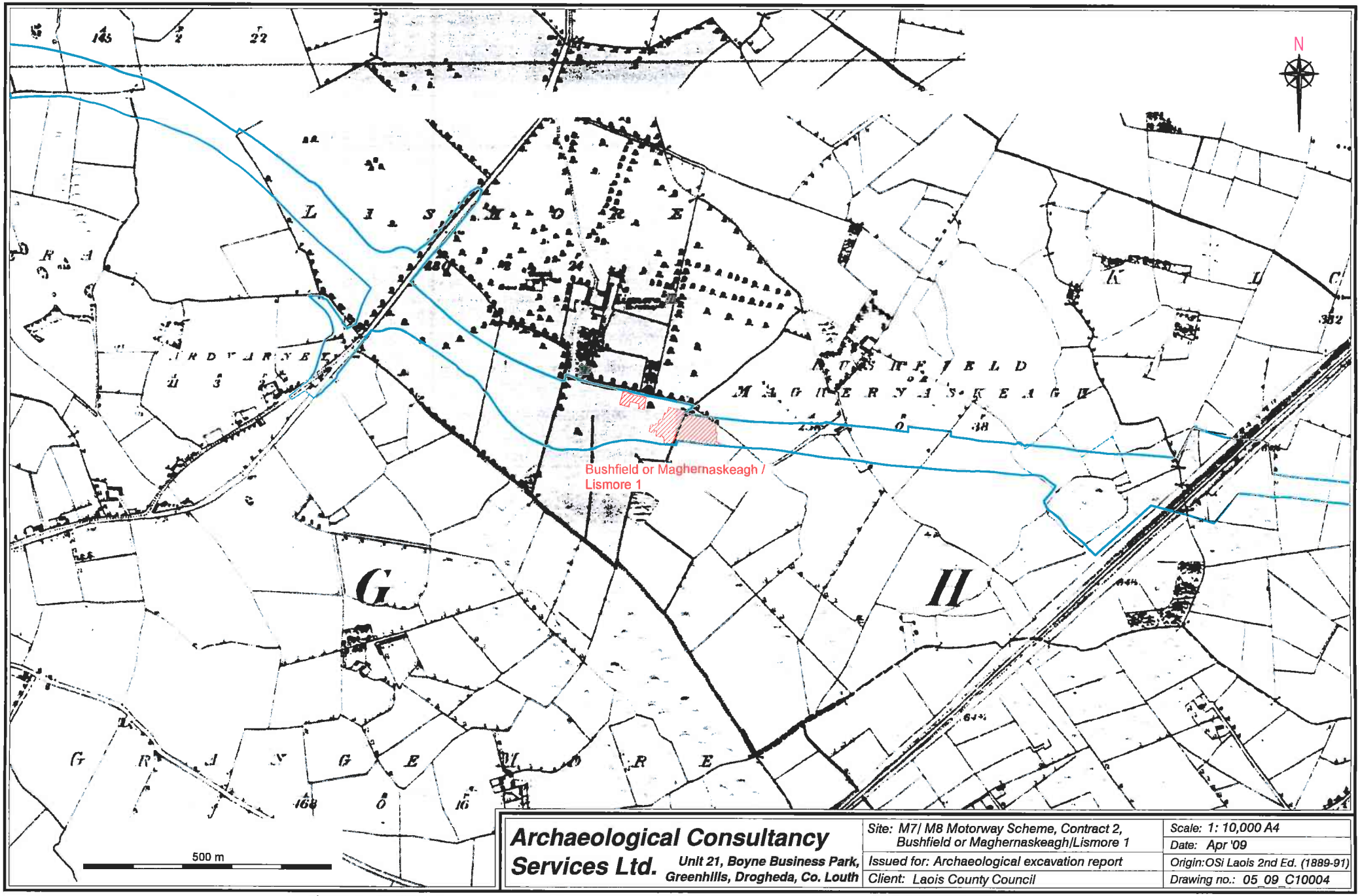


Figure 4: Outline plan of Bushfield or Maghernaskeagh/Lismore 1 superimposed on O.S. 2nd edition map (1889-91).

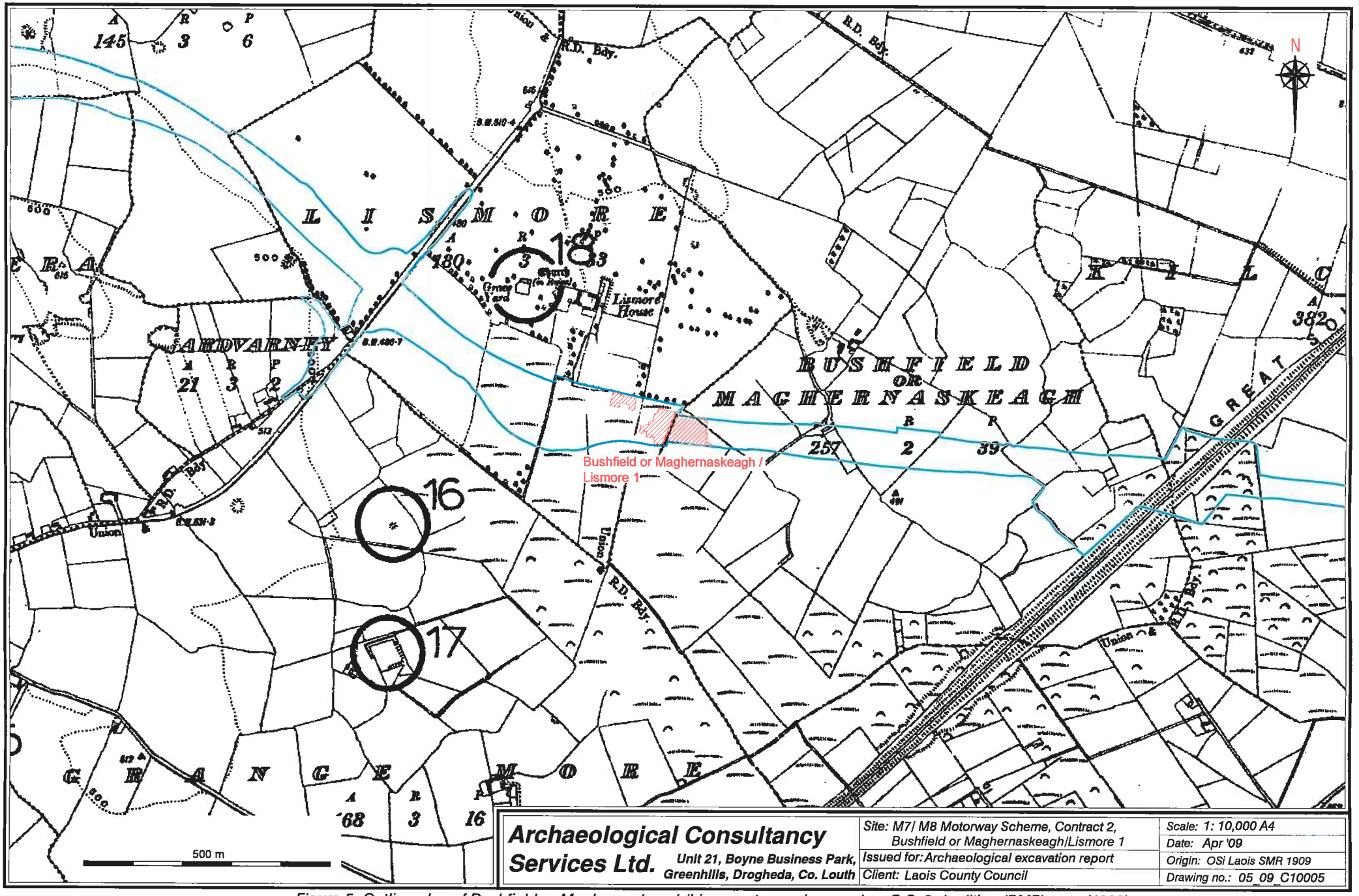


Figure 5: Outline plan of Bushfield or Maghernaskeagh/Lismore 1 superimposed on O.S. 3rd edition (RMP) map (1909).

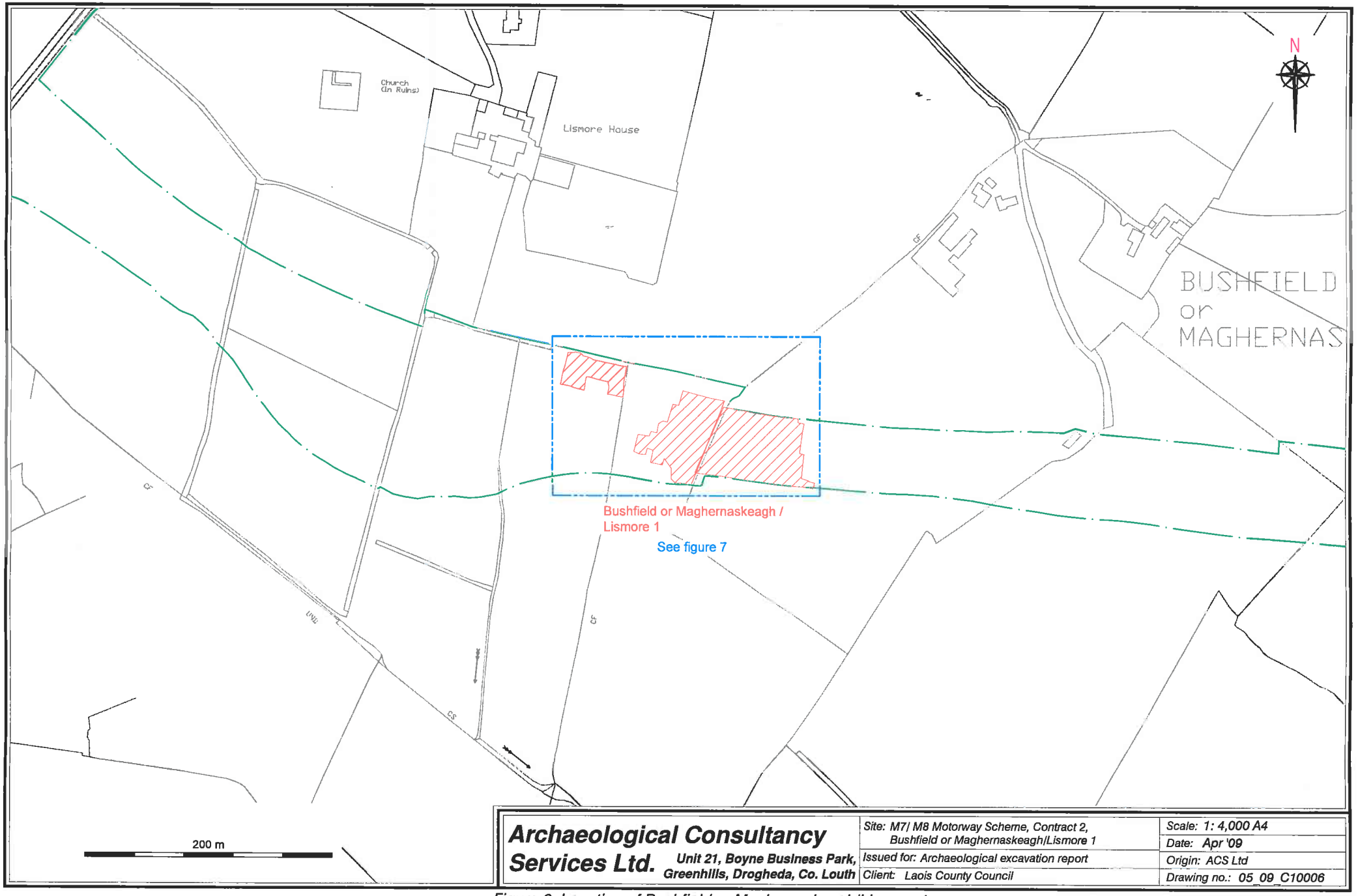


Figure 6: Location of Bushfield or Maghernaskeagh/Lismore 1.

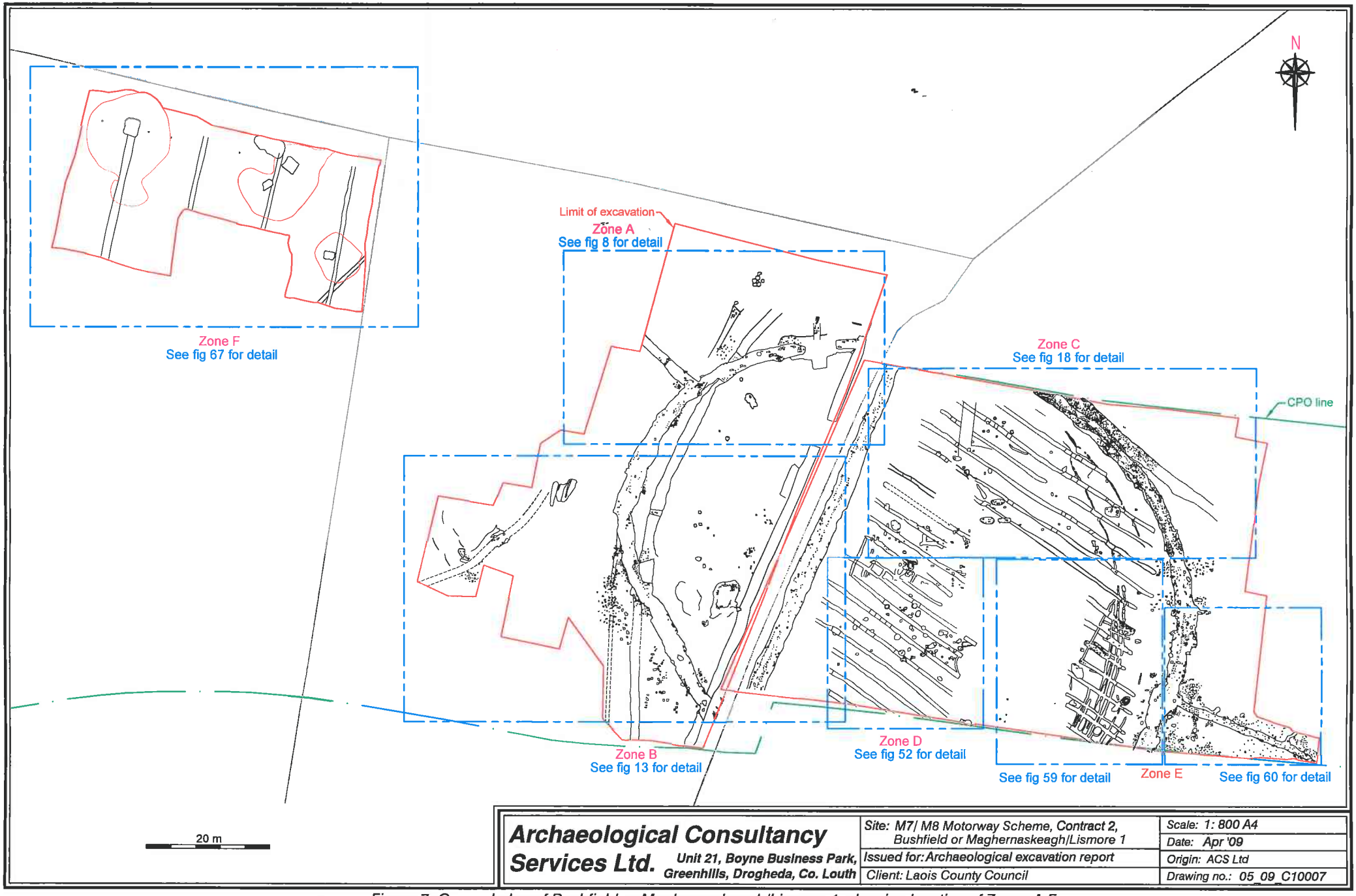


Figure 7: General plan of Bushfield or Maghernaskeagh/Lismore 1, showing location of Zones A-F.

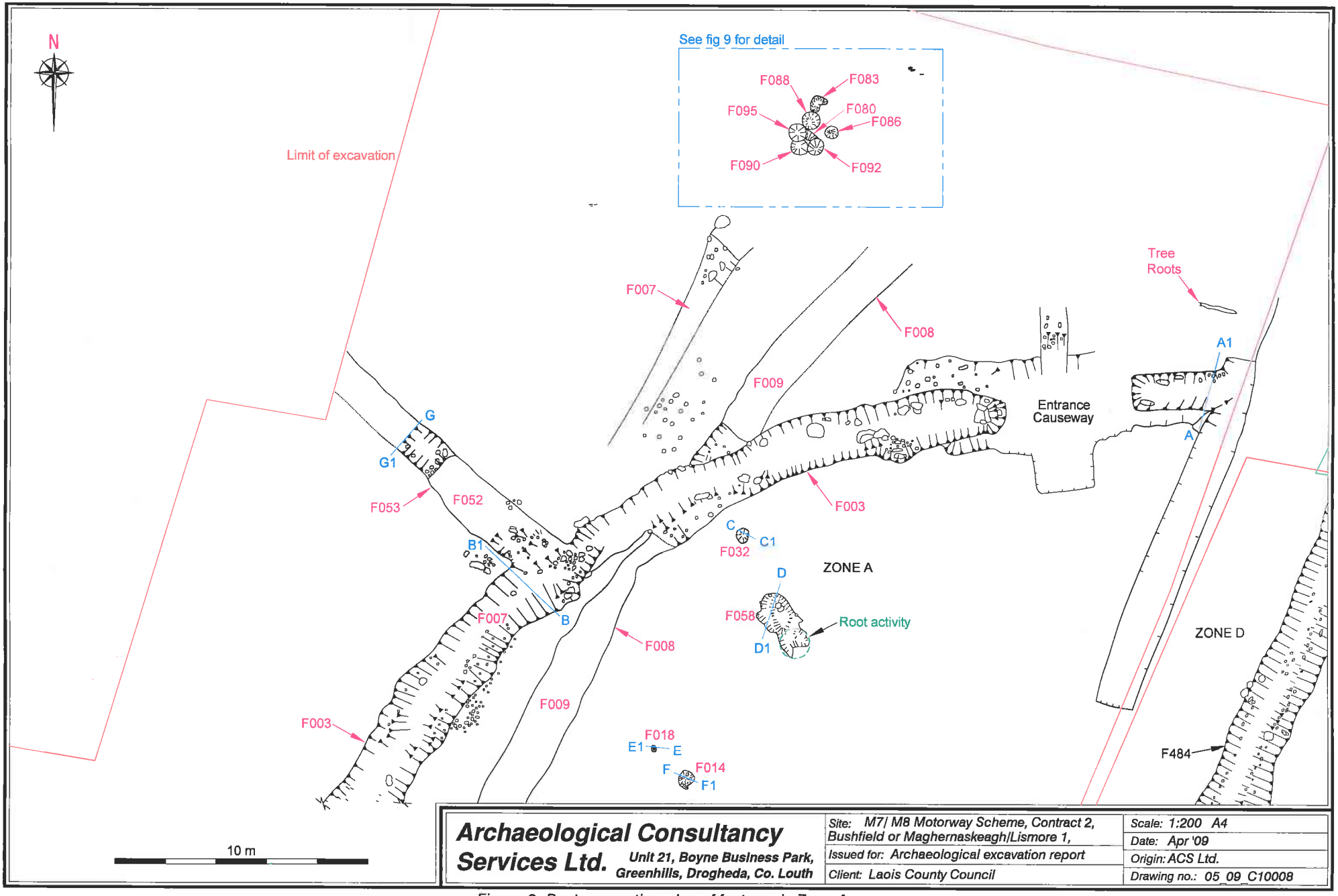
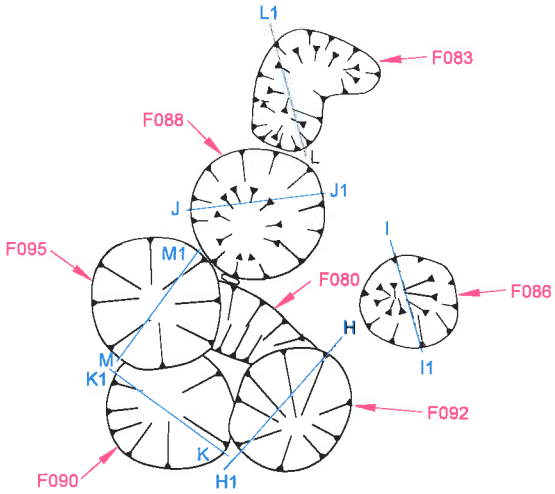
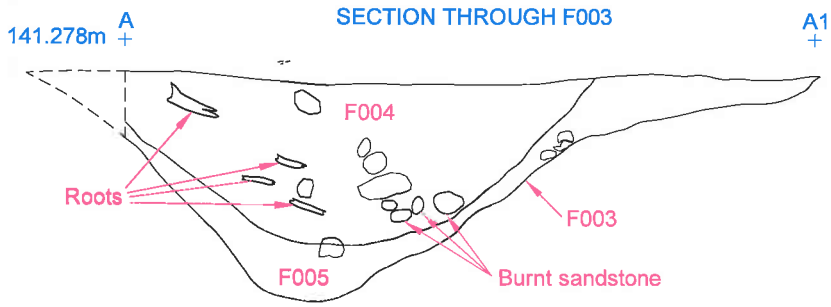


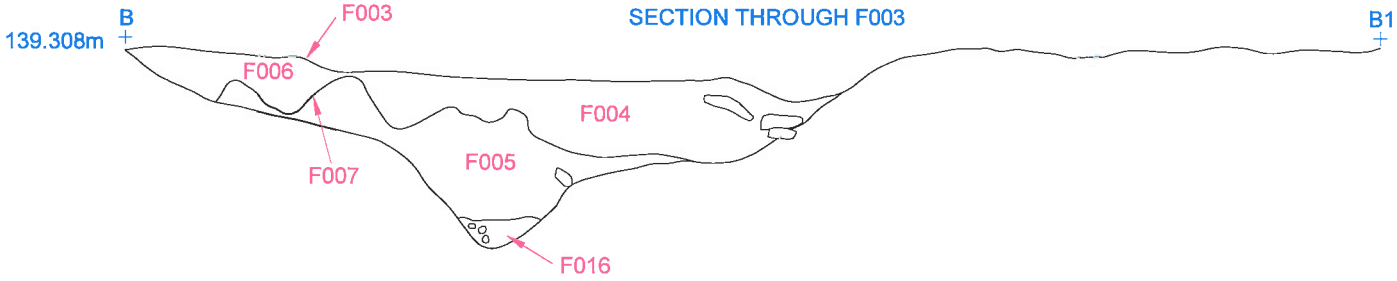
Figure 8: Post-excavation plan of features in Zone A.



Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:40 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10009

Figure 9: Enlarged post-excavation plan of bowl furnaces F086, F088, F090, F092 and F095 in Zone A.

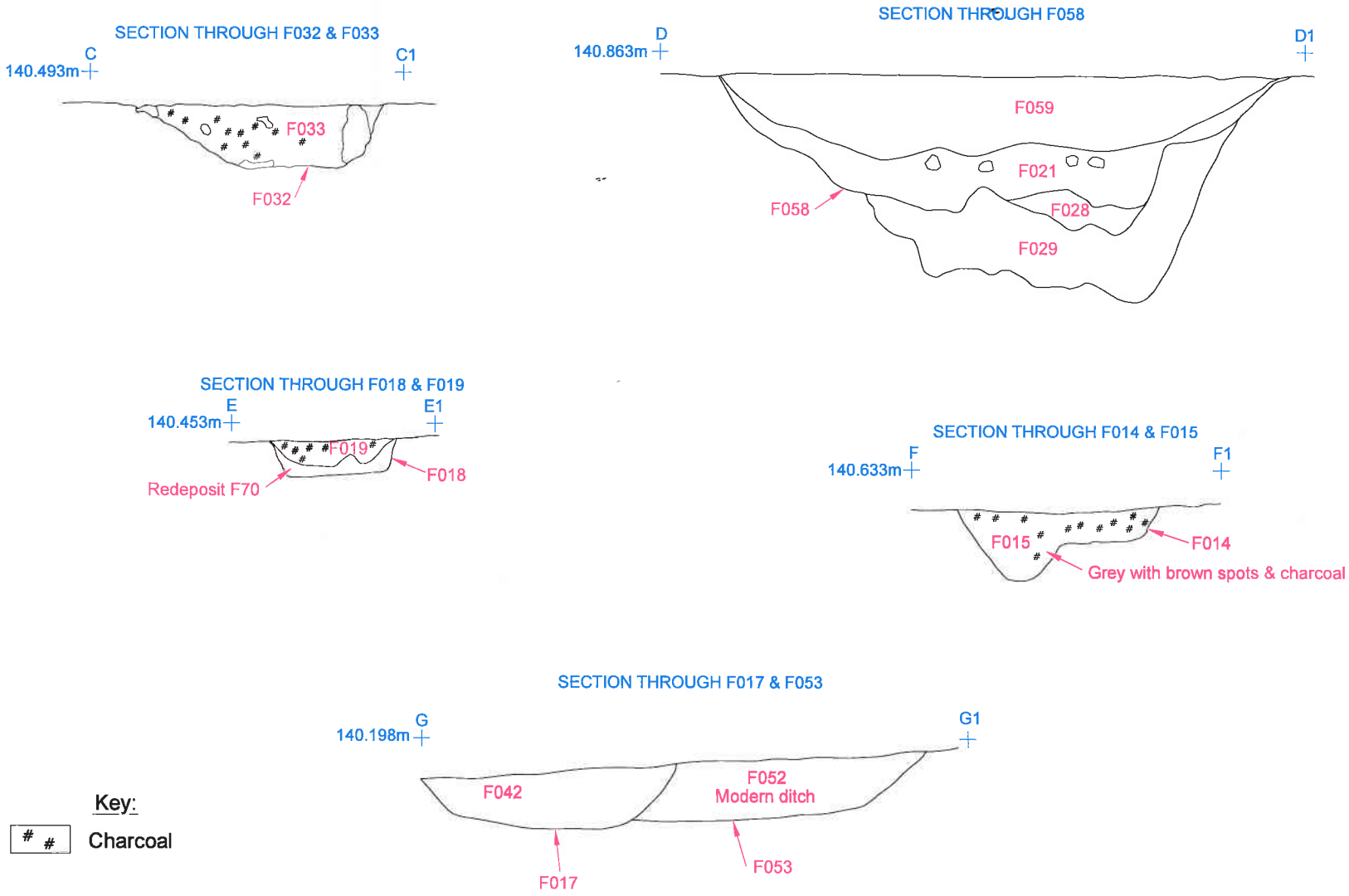




1 m

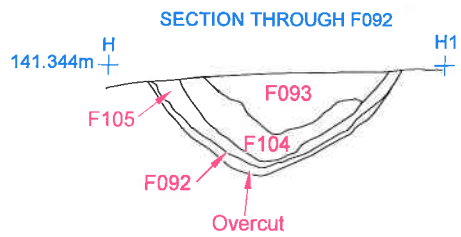
Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:30 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10010

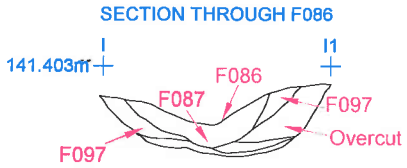
Figure 10: Sections A-A1 and B-B1 of enclosure ditch F003 in Zone A.

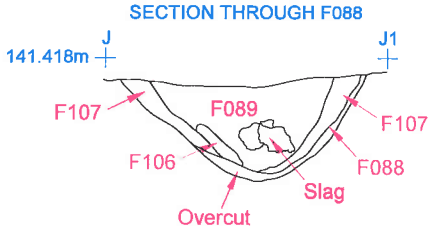


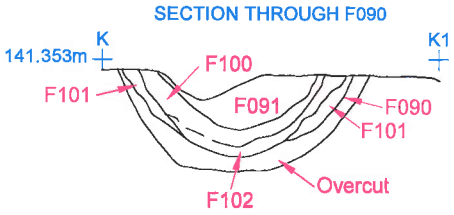
Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:20 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10011

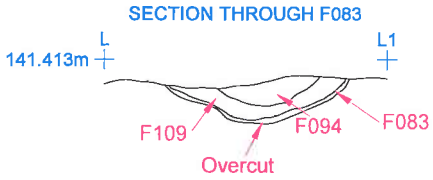
Figure 11: Sections of pits F014, F018, F032 and F058, and drain F017/F053 in Zone A.

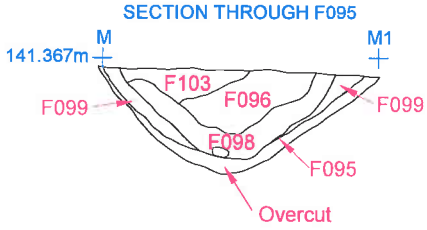












1 m

Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:20 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10012

Figure 12: Sections of bowl furnaces F086, F088, F090, F092 and F095 in Zone A.

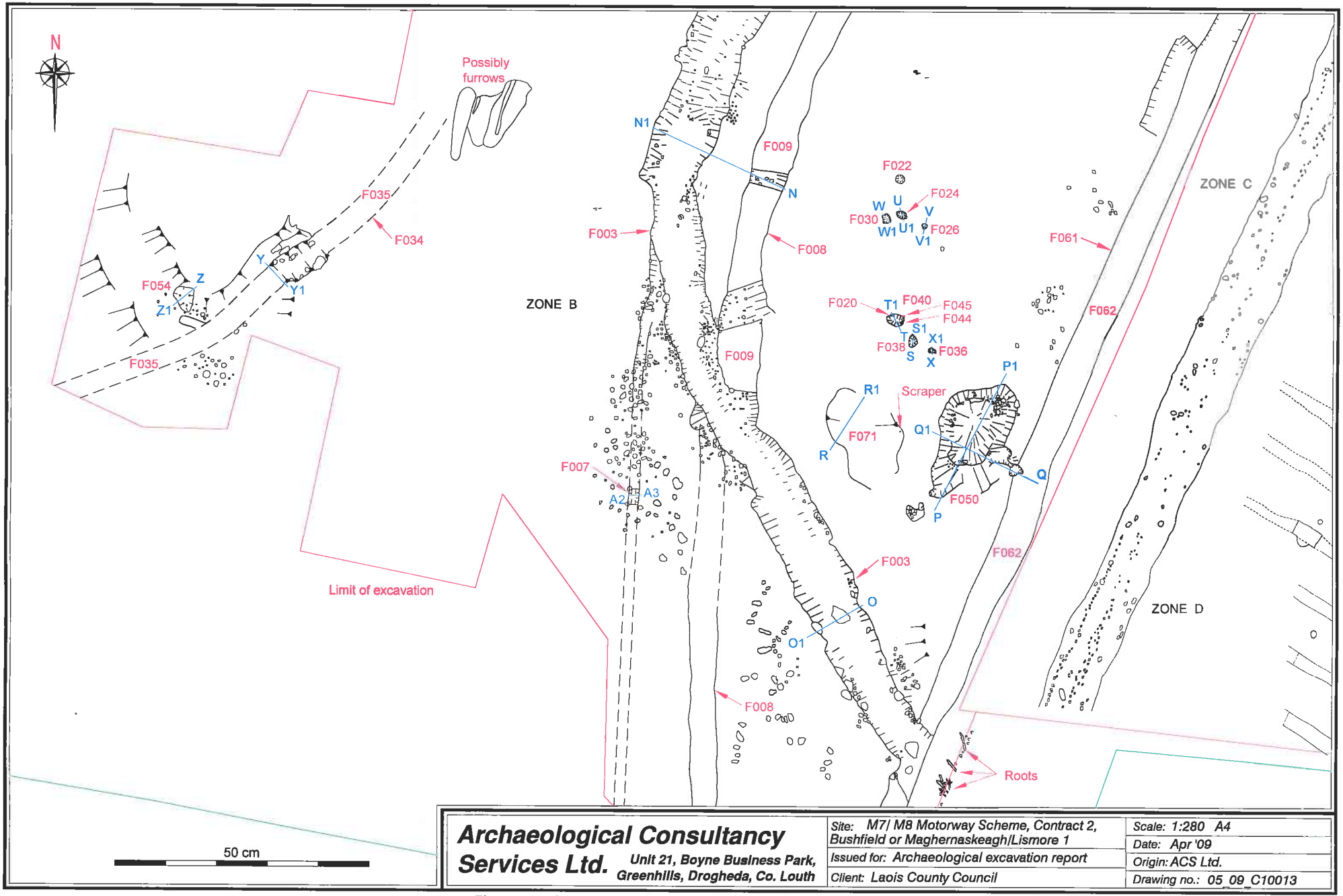
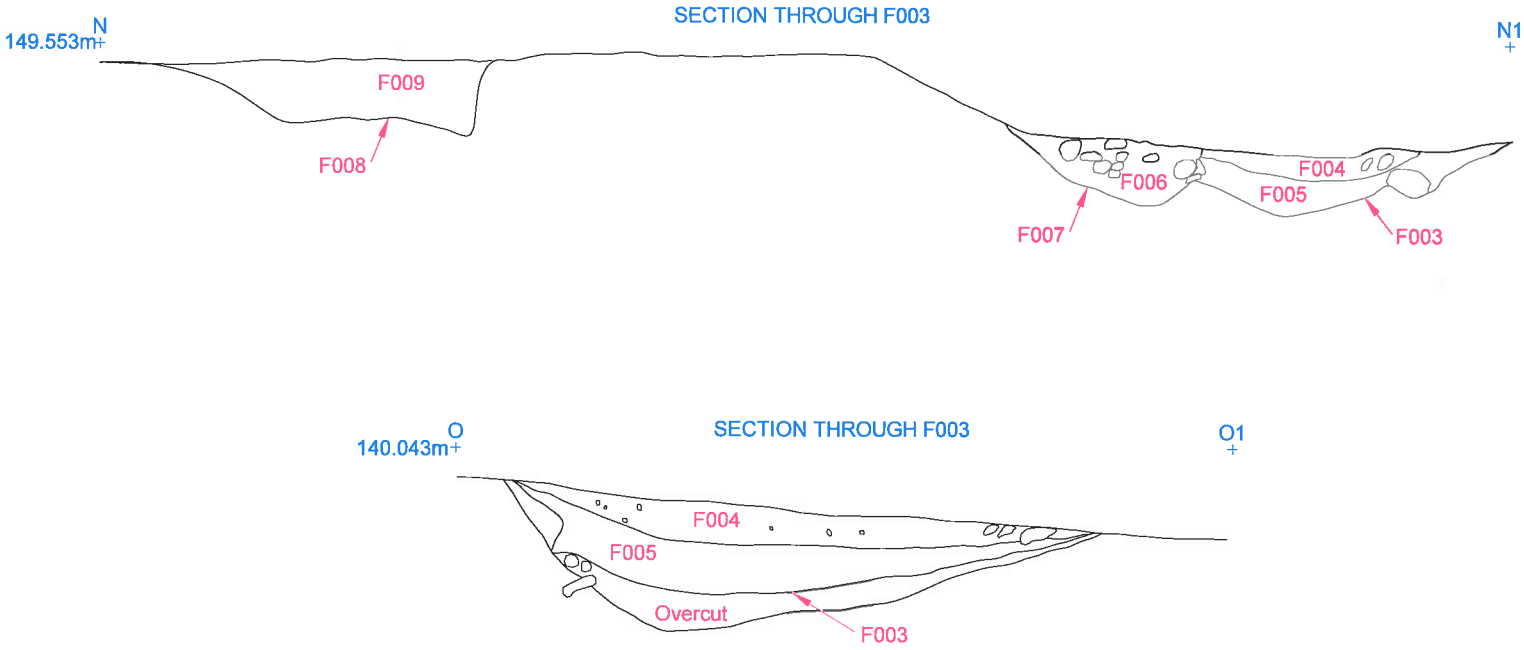
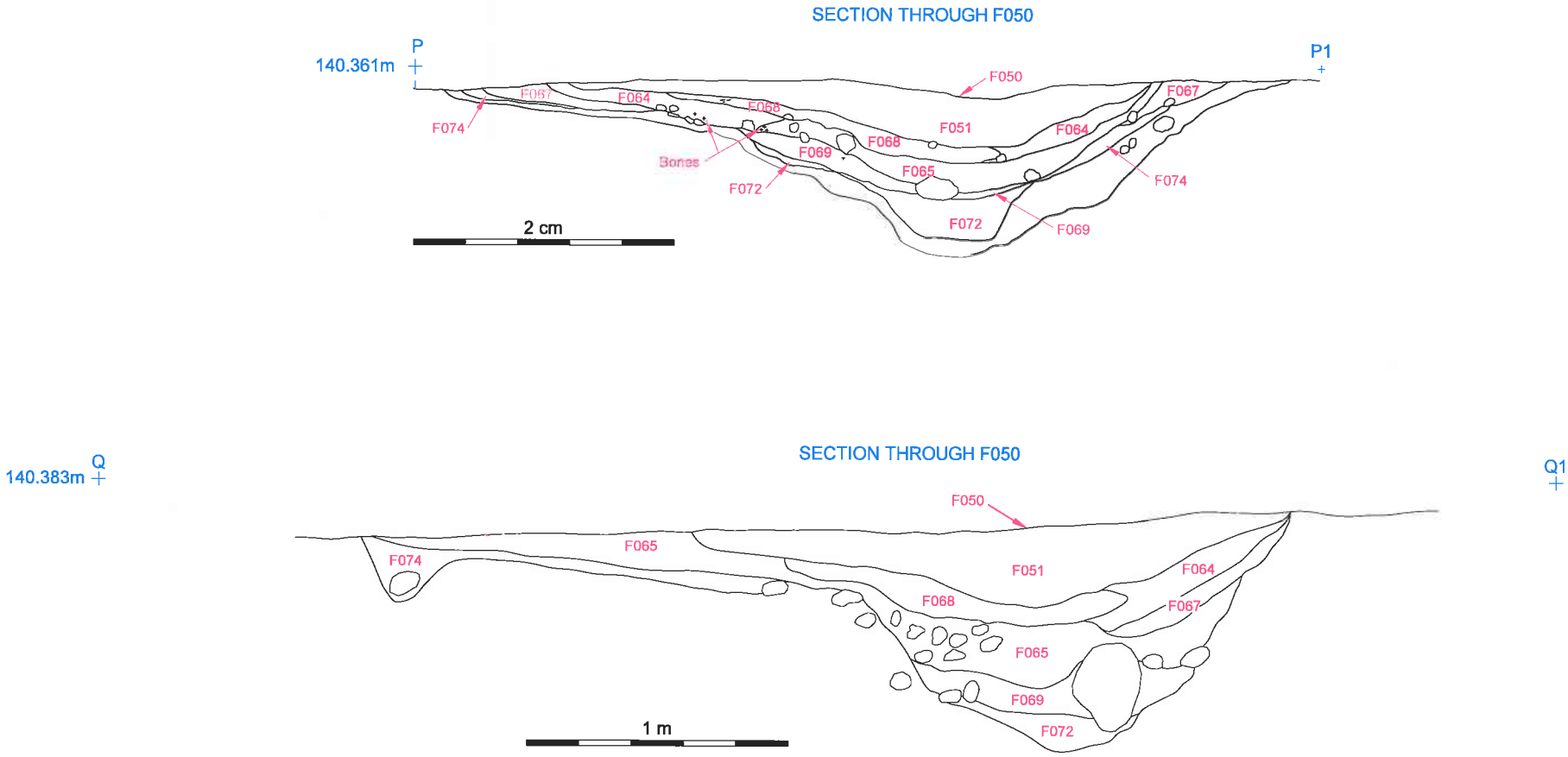


Figure 13: Post-excavation plan of features in Zone B.



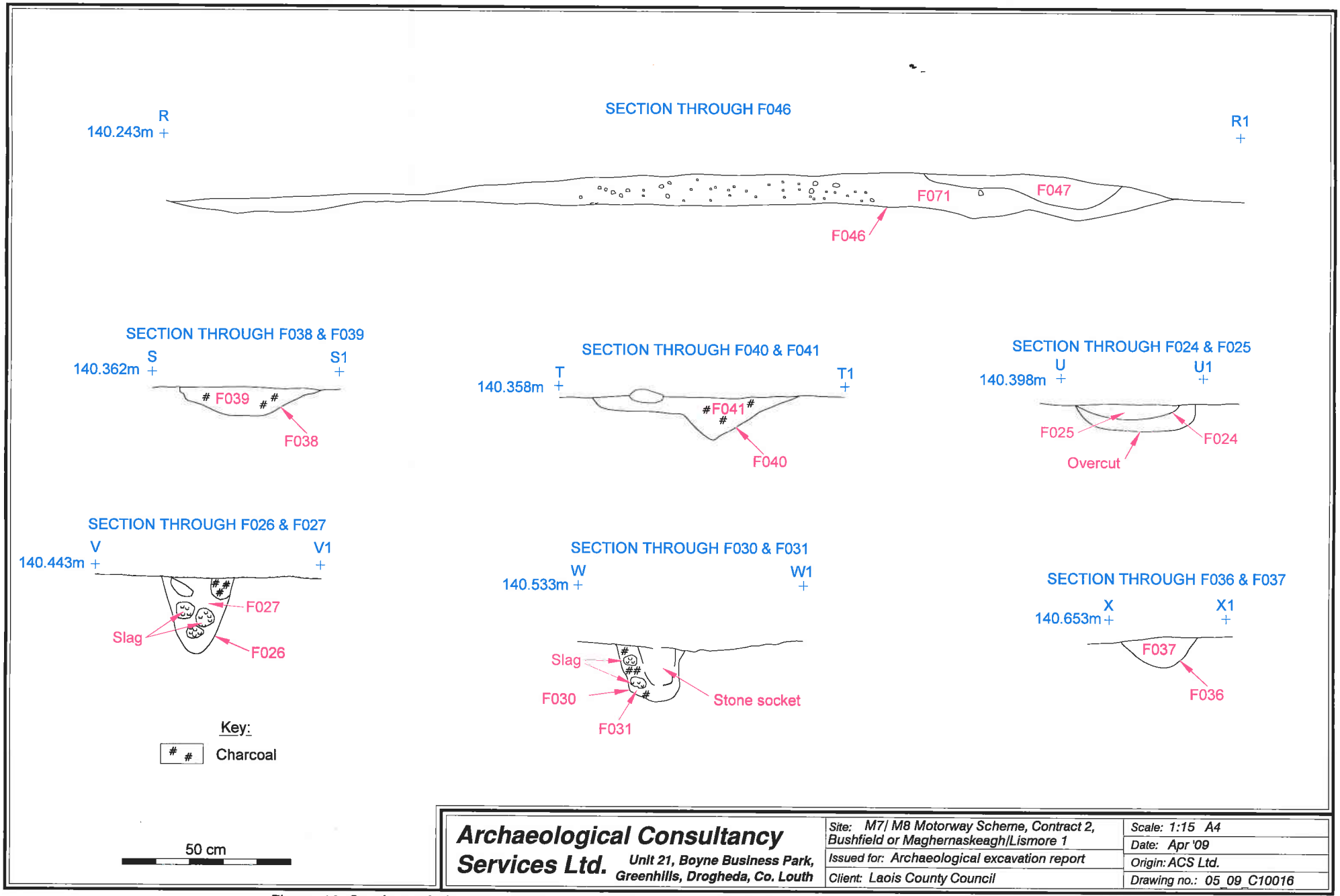
Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:40 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10014

Figure 14: Sections N-N1 and O-O1 of enclosure ditch F003 in Zone B, and section of field ditch F008.



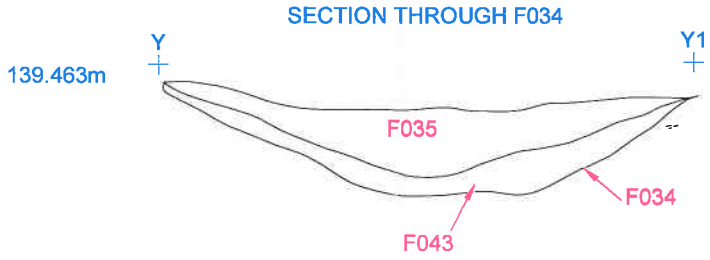
Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: As scalebars
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10015

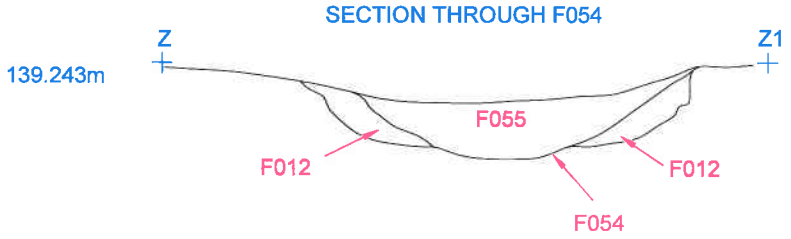
Figure 15: Two sections of large pit F050 in Zone B.

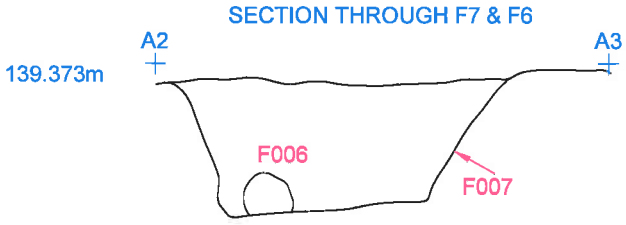


Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:15 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10016

Figure 16: Sections of pits F024, F026, F030, F036, F038 and F040, deposit F047 and spread F071 in Zone B.







1 m

Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:20 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10017

Figure 17: Sections of pit F054, and drains F034 and F007 in Zone B.

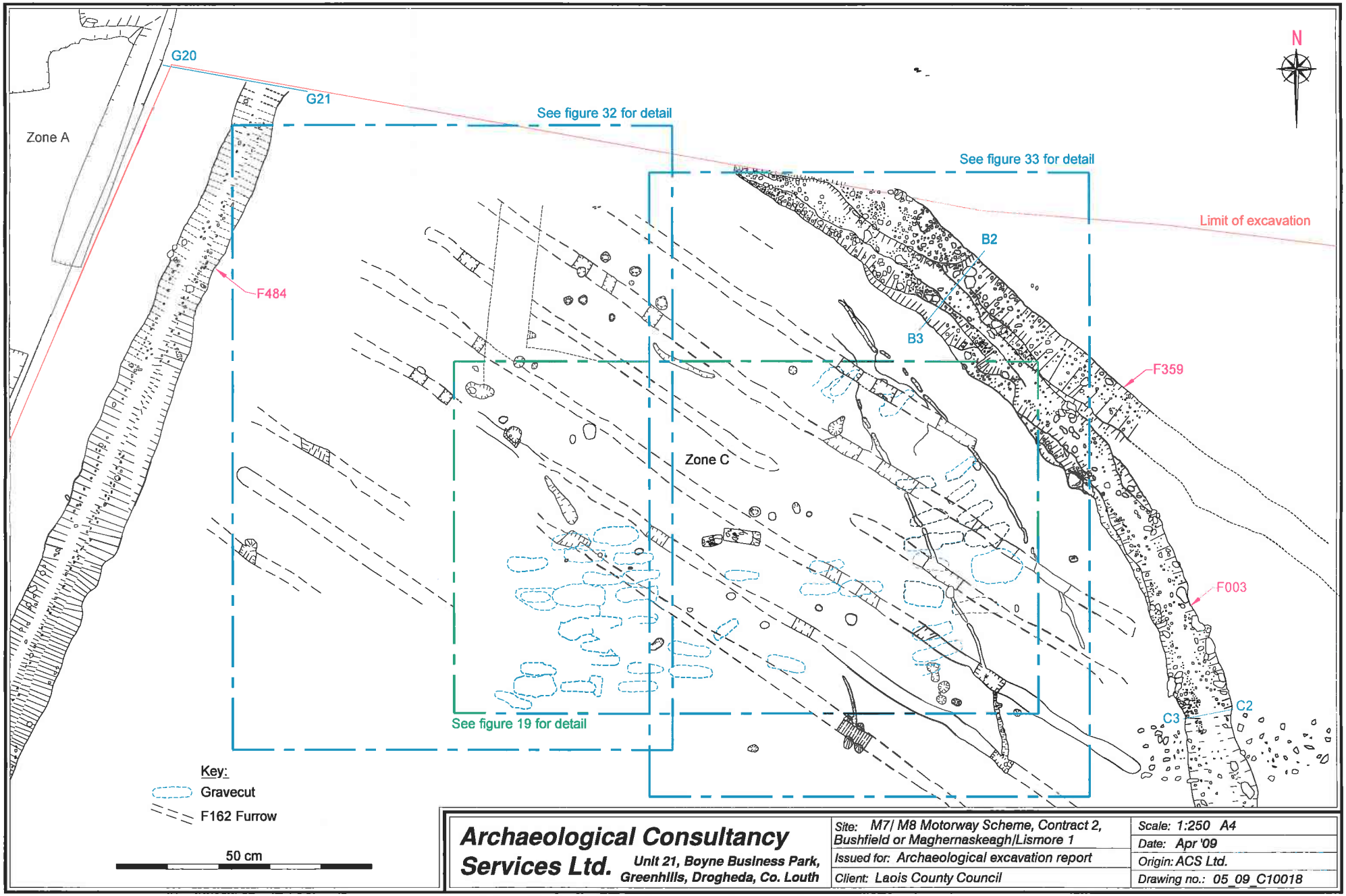
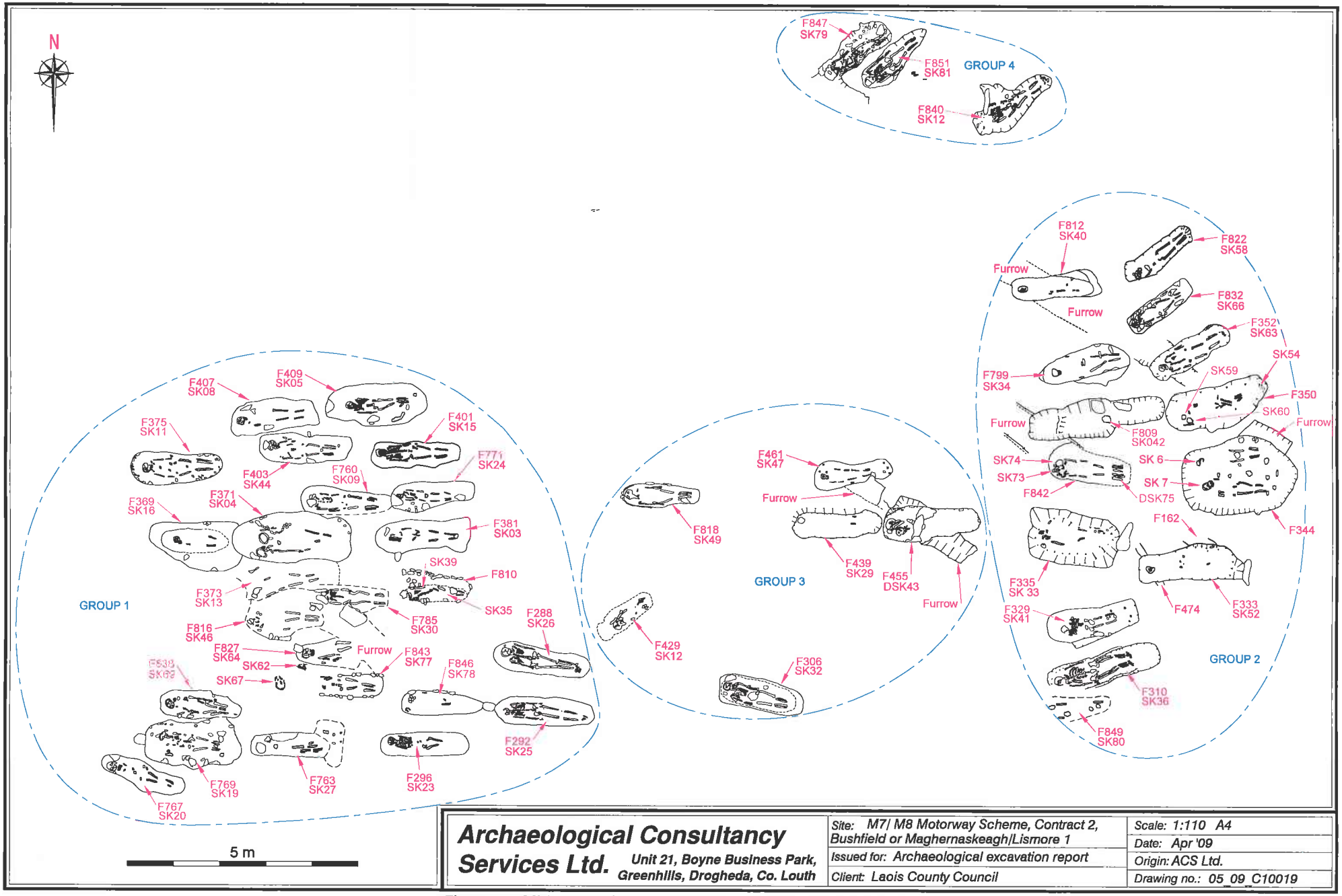


Figure 18: Post-excavation plan of features in Zone C.



Archaeological Consultancy Services Ltd. *Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth*	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:110 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10019

Figure 19: Mid-excavation plan of Zone C burials, Groups 1-4.

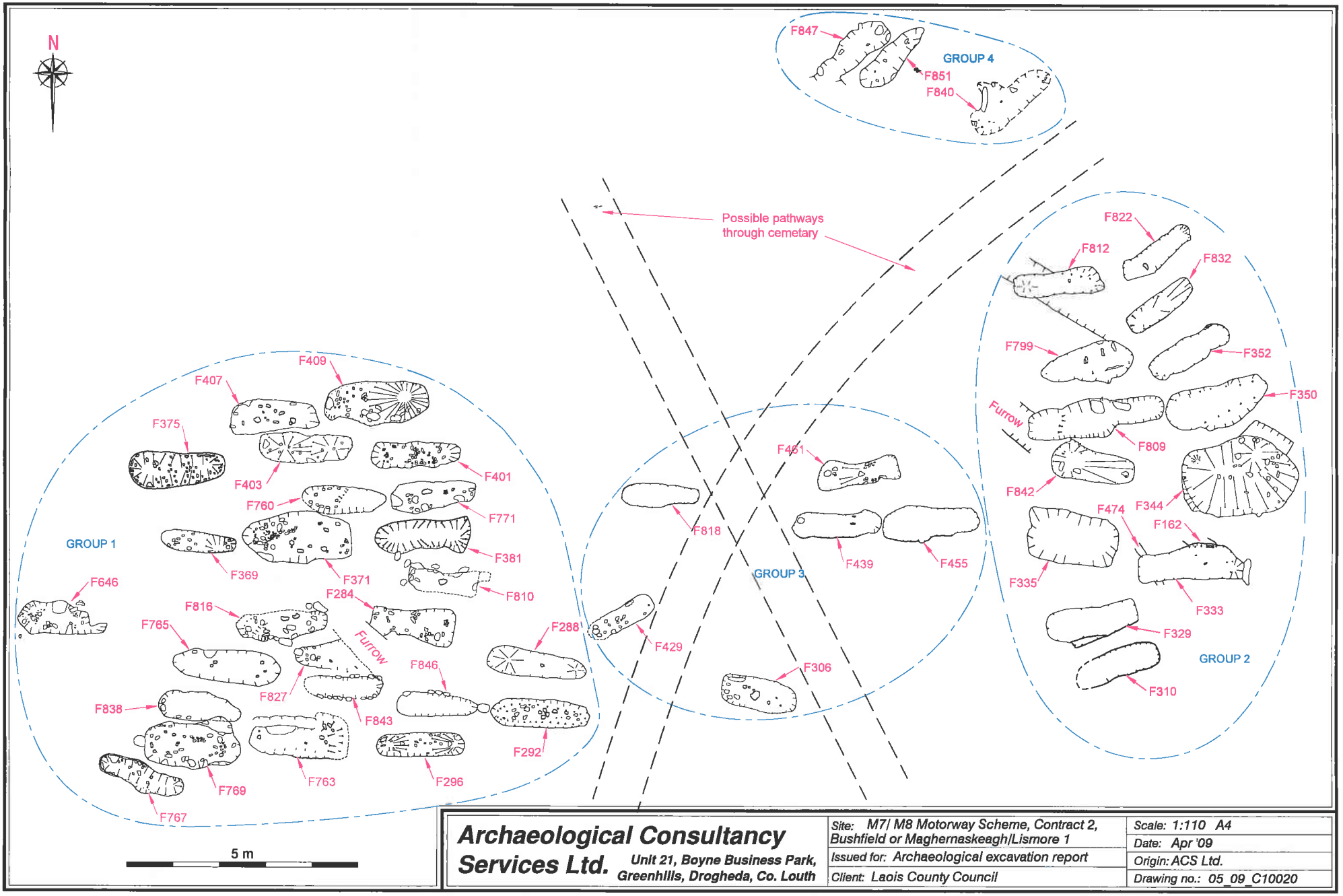


Figure 20: Post-excavation plan of Zone C burials, Groups 1-4.

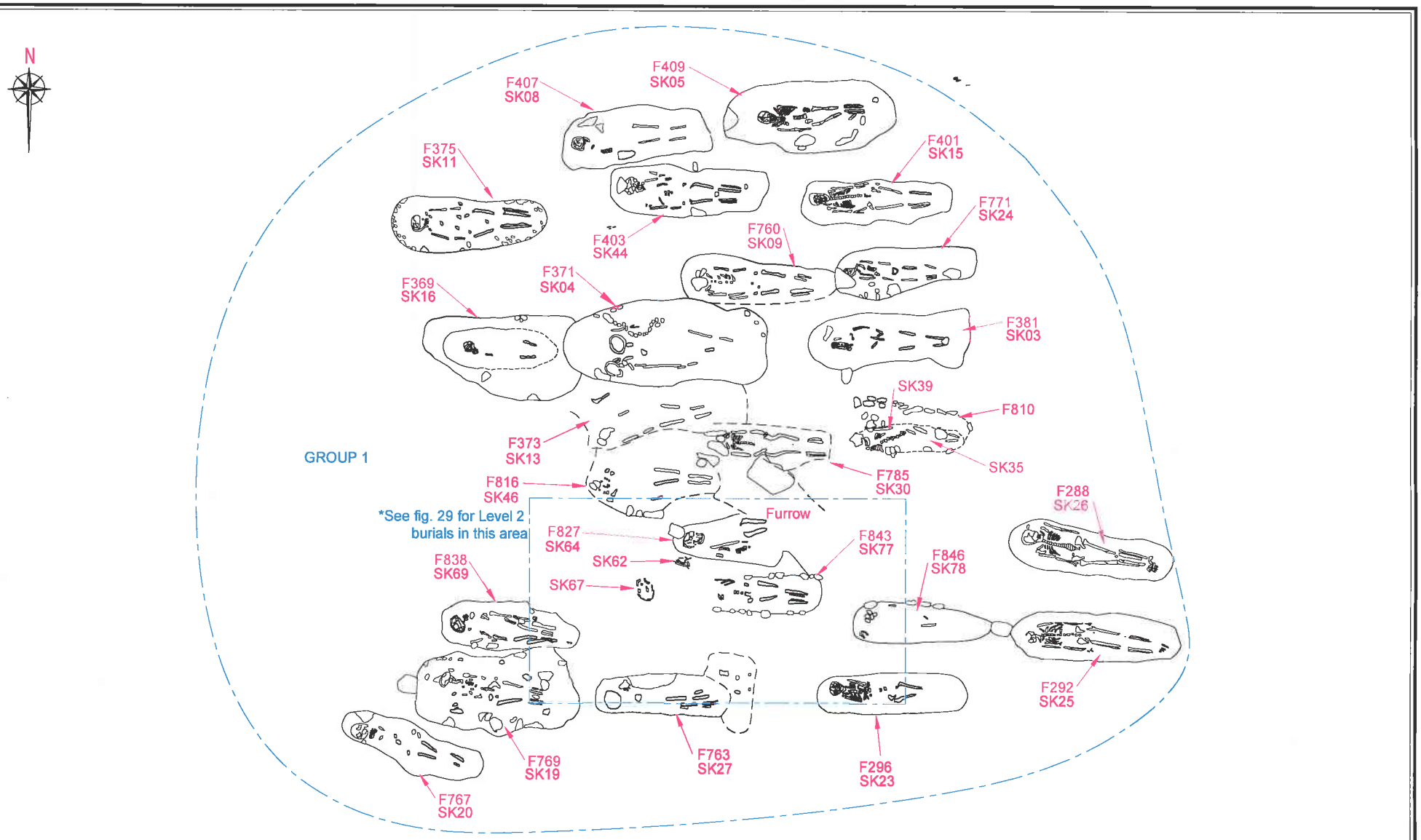
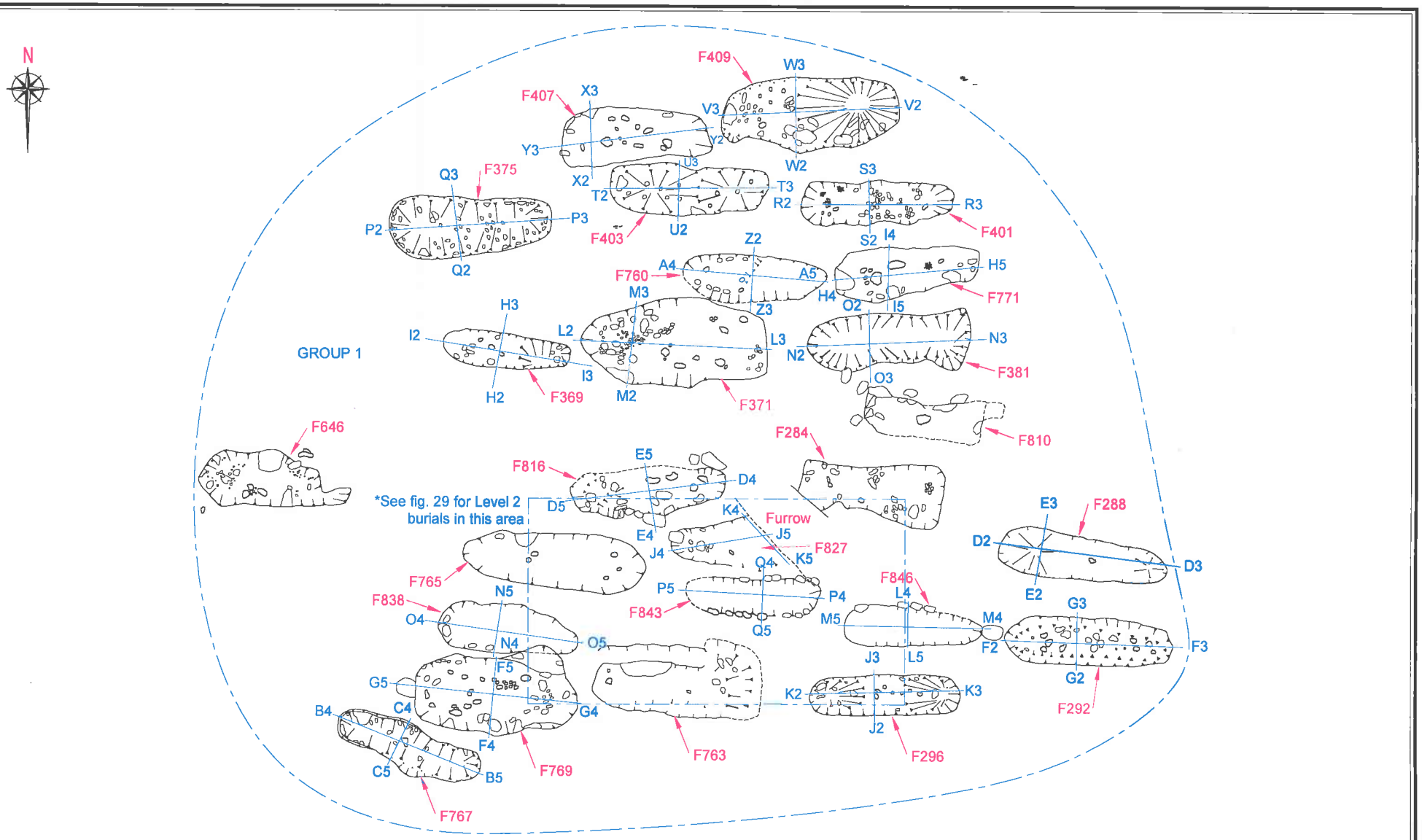
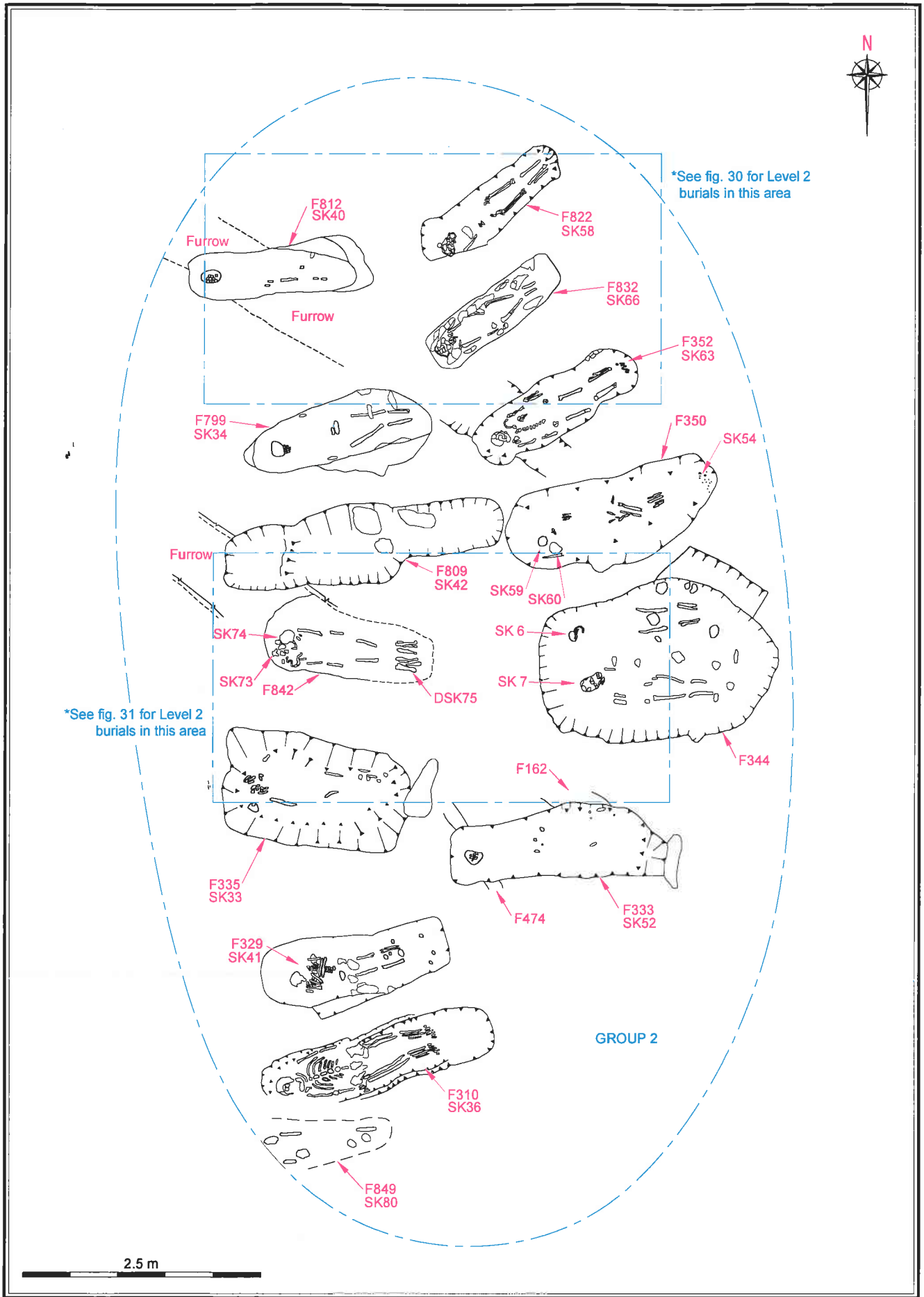


Figure 21: Enlarged mid-excavation plan, Zone C burials, Group 1.



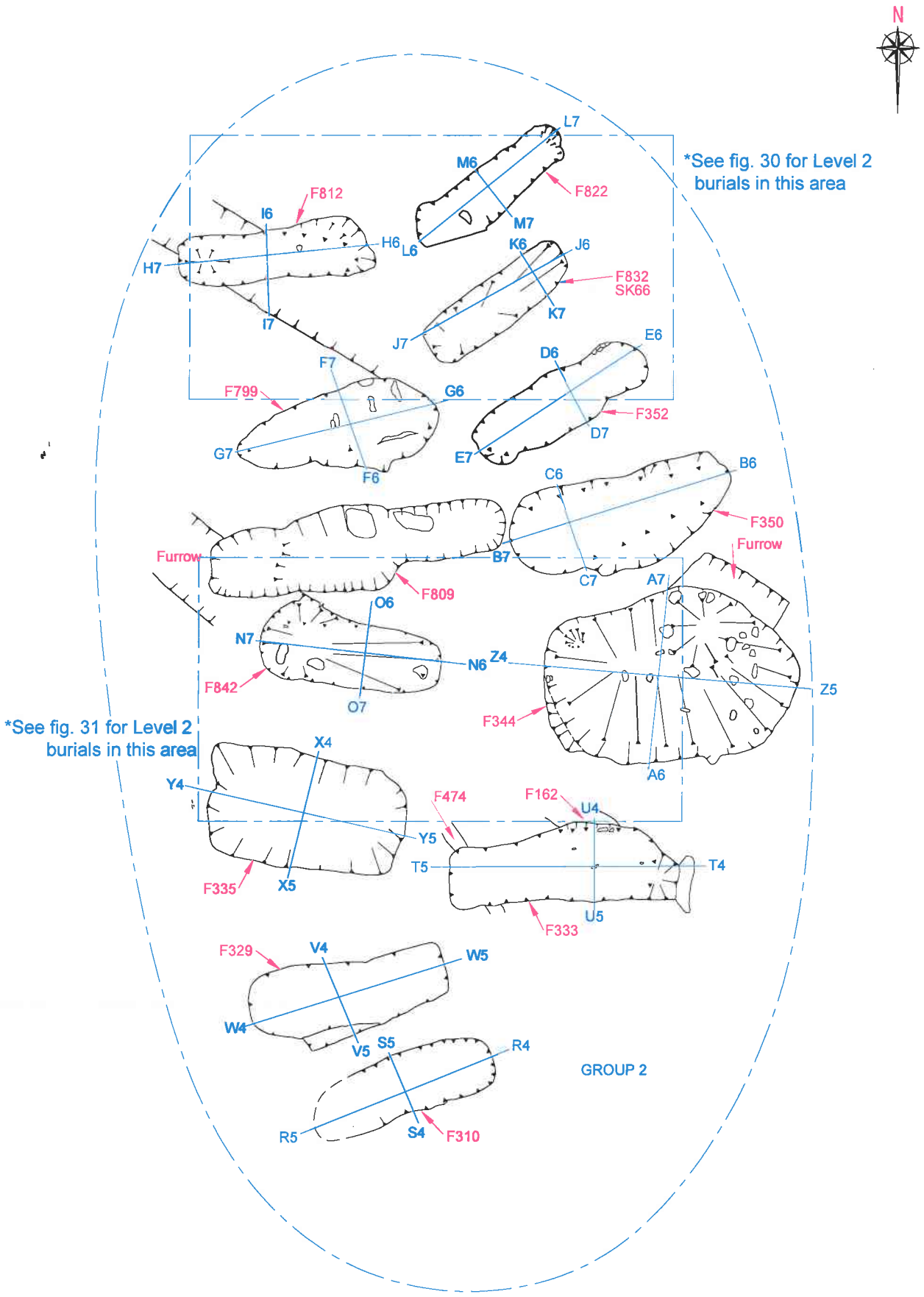
Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:70 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10022

Figure 22: Enlarged post-excavation plan, Zone C burials, Group 1.



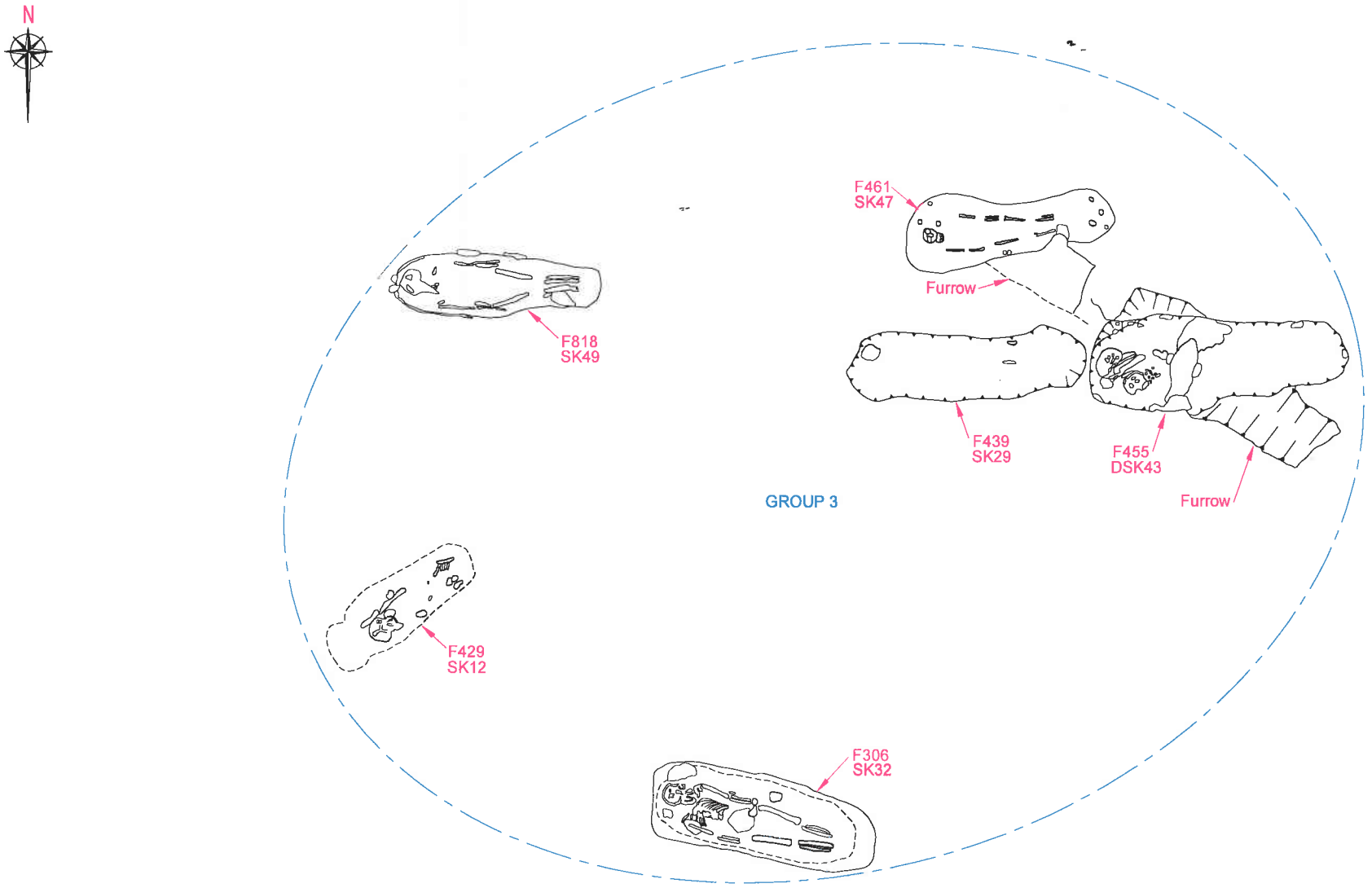
Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:55 A4
	Issued for: Archaeological excavation report	Date: Apr '09
	Client: Laois County Council	Origin: ACS Ltd.
		Drawing no.: 05_09_C10023

Figure 23: Enlarged mid-excavation plan, Zone C burials, Group 2.



Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:55 A4
	Issued for: Archaeological excavation report	Date: Apr '09
	Client: Laois County Council	Origin: ACS Ltd.
		Drawing no.: 05_09_C10024

Figure 24: Enlarged post-excavation plan, Zone C burials, Group 2.



Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:50 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10025

Figure 25: Enlarged mid-excavation plan, Zone C burials, Group 3.

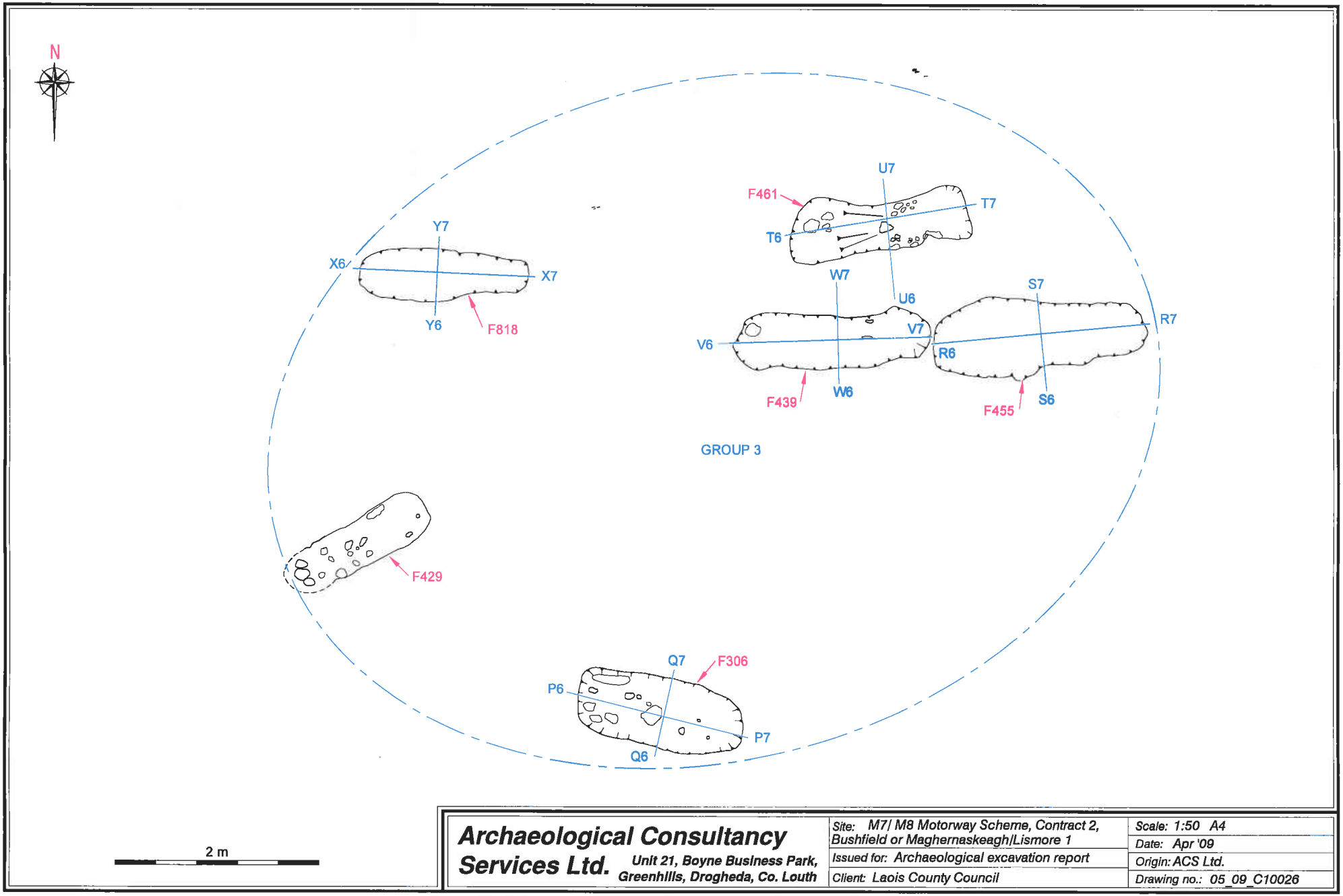


Figure 26: Enlarged post-excavation plan, Zone C burials, Group 3.

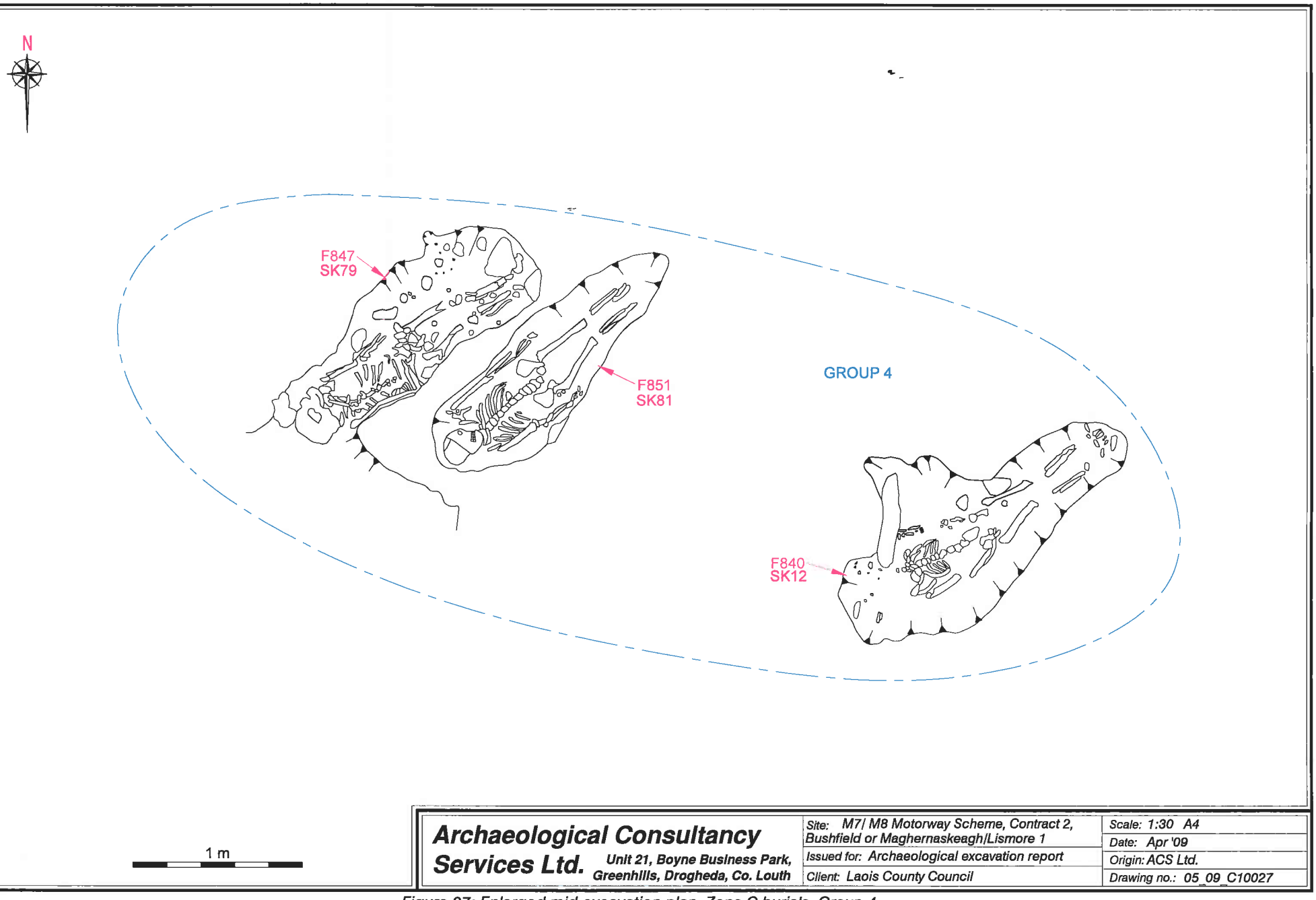
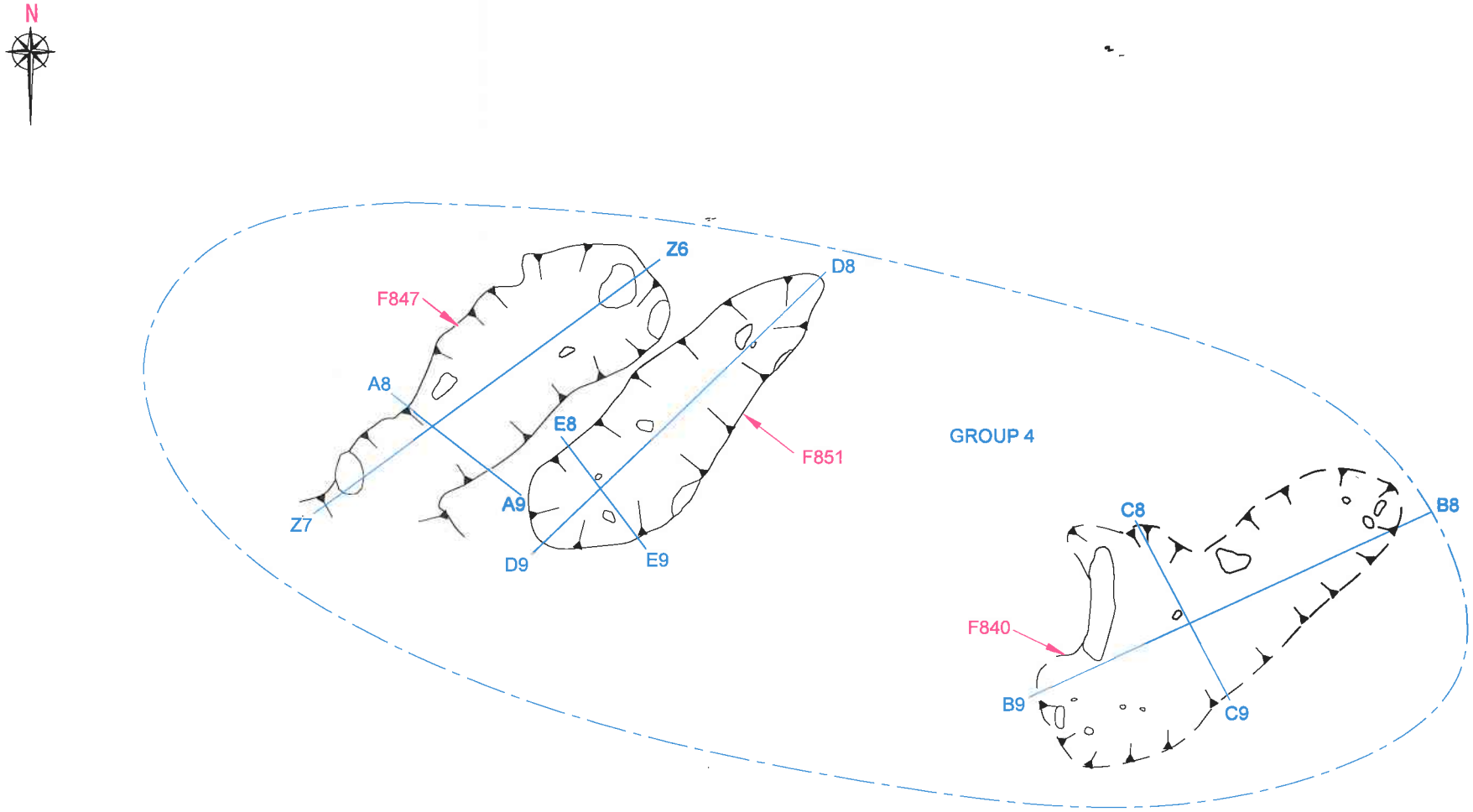
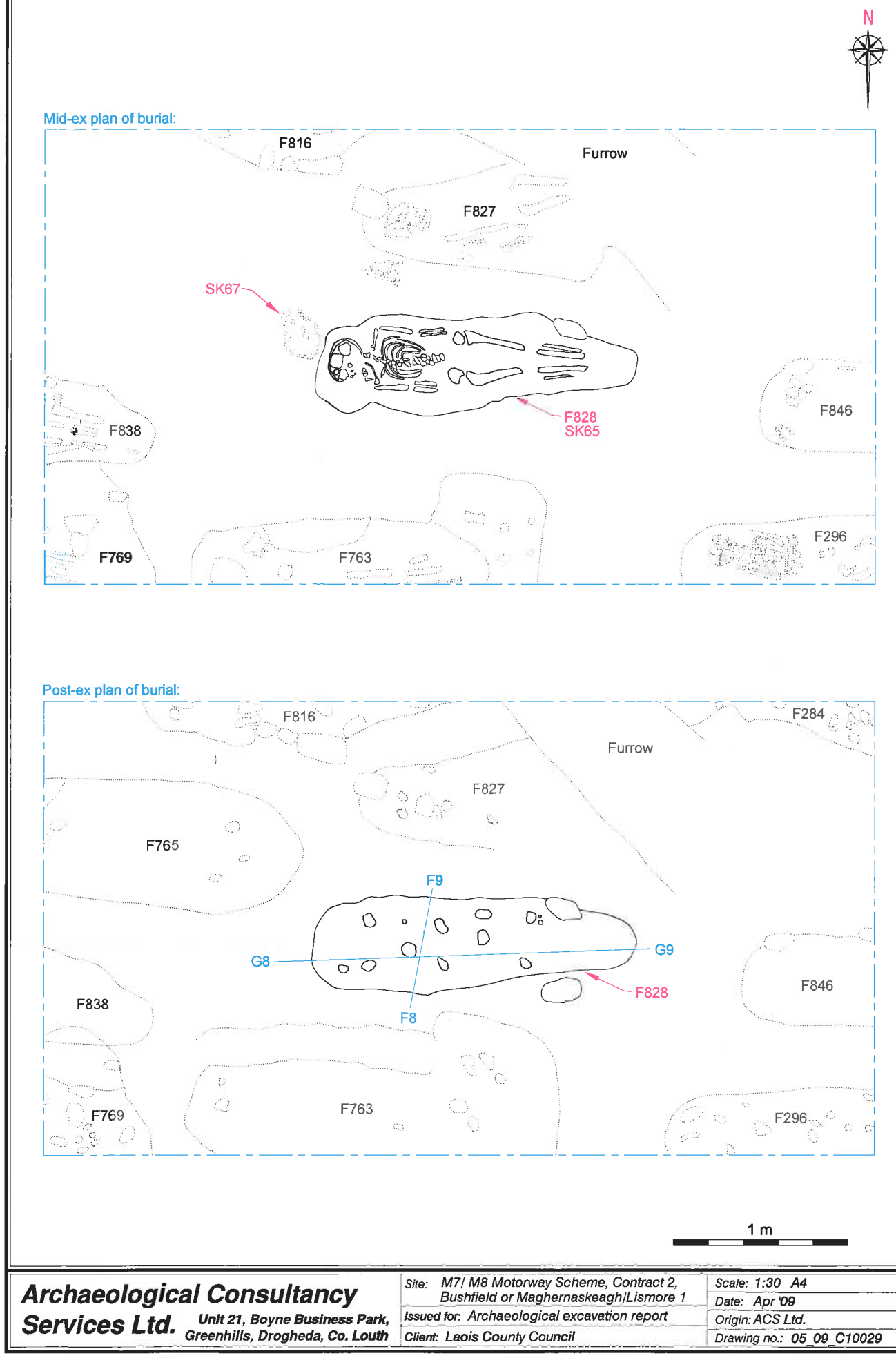


Figure 27: Enlarged mid-excavation plan, Zone C burials, Group 4.



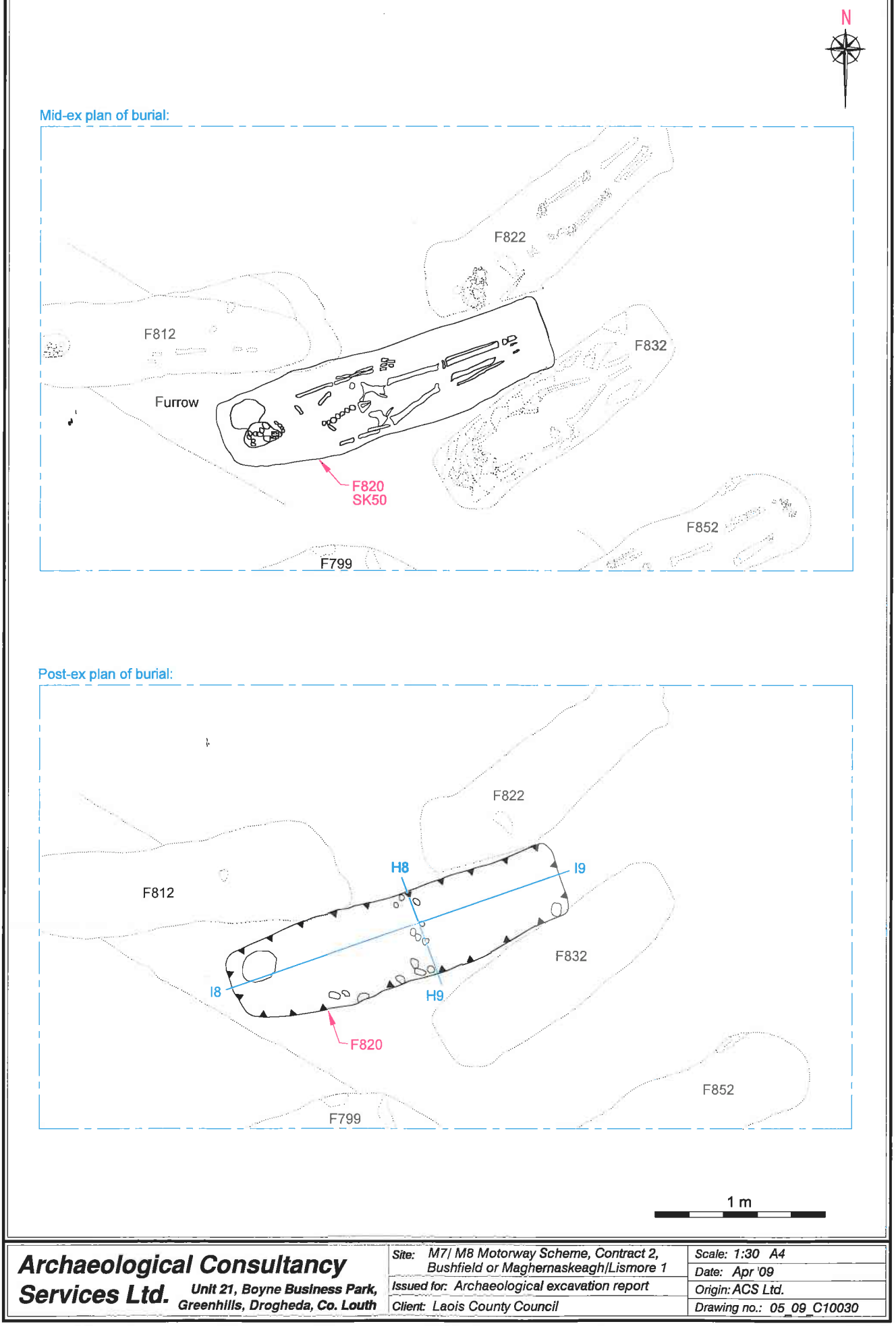
Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:30 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10028

Figure 28: Enlarged post-excavation plan, Zone C burials, Group 4.



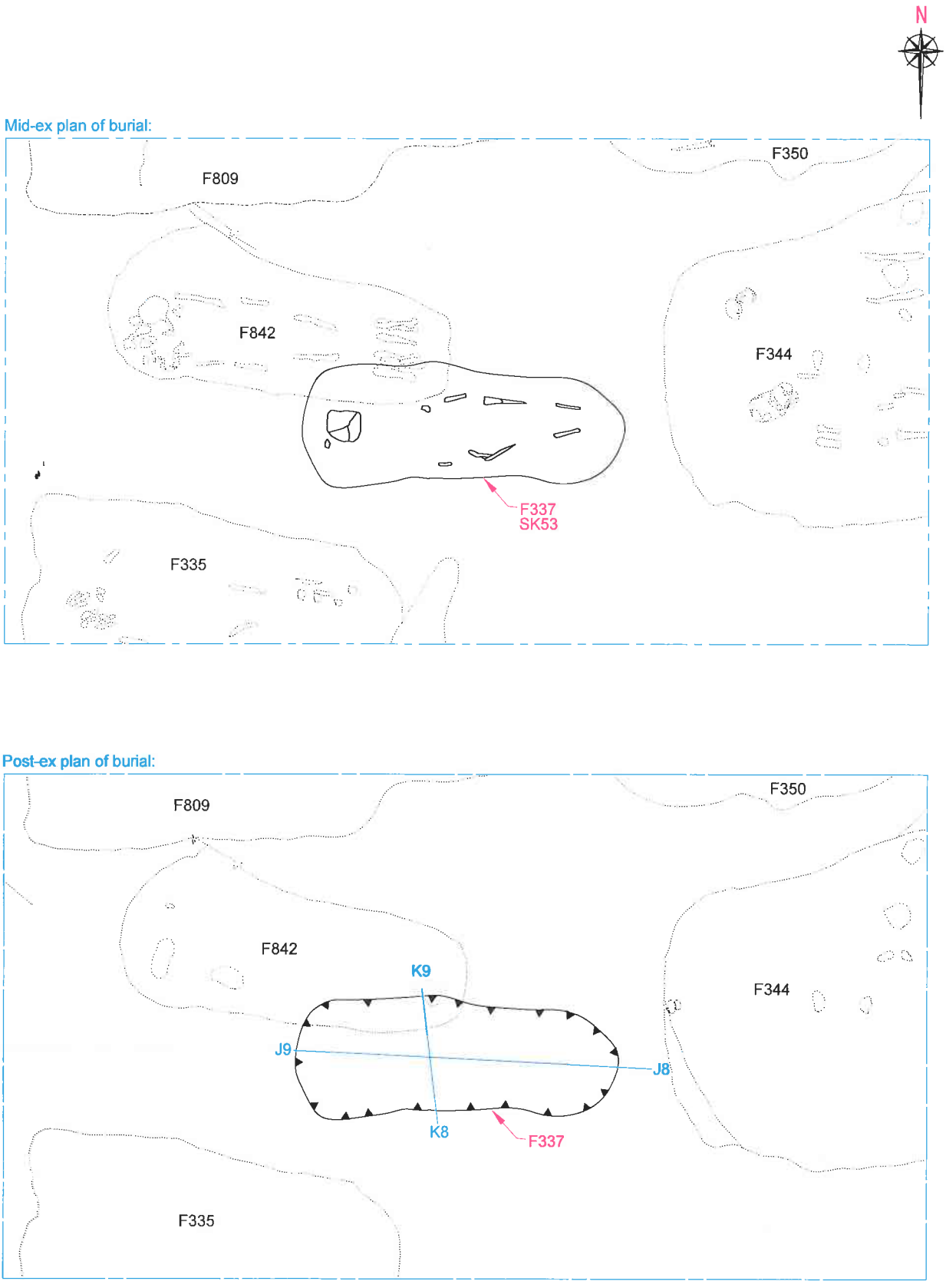
Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:30 A4
	Issued for: Archaeological excavation report	Date: Apr '09
	Client: Laois County Council	Origin: ACS Ltd.
		Drawing no.: 05_09_C10029

Figure 29: Mid and post-excavation plans of Zone C burial F828, Group 1, Level 2 (overlying grave F843).



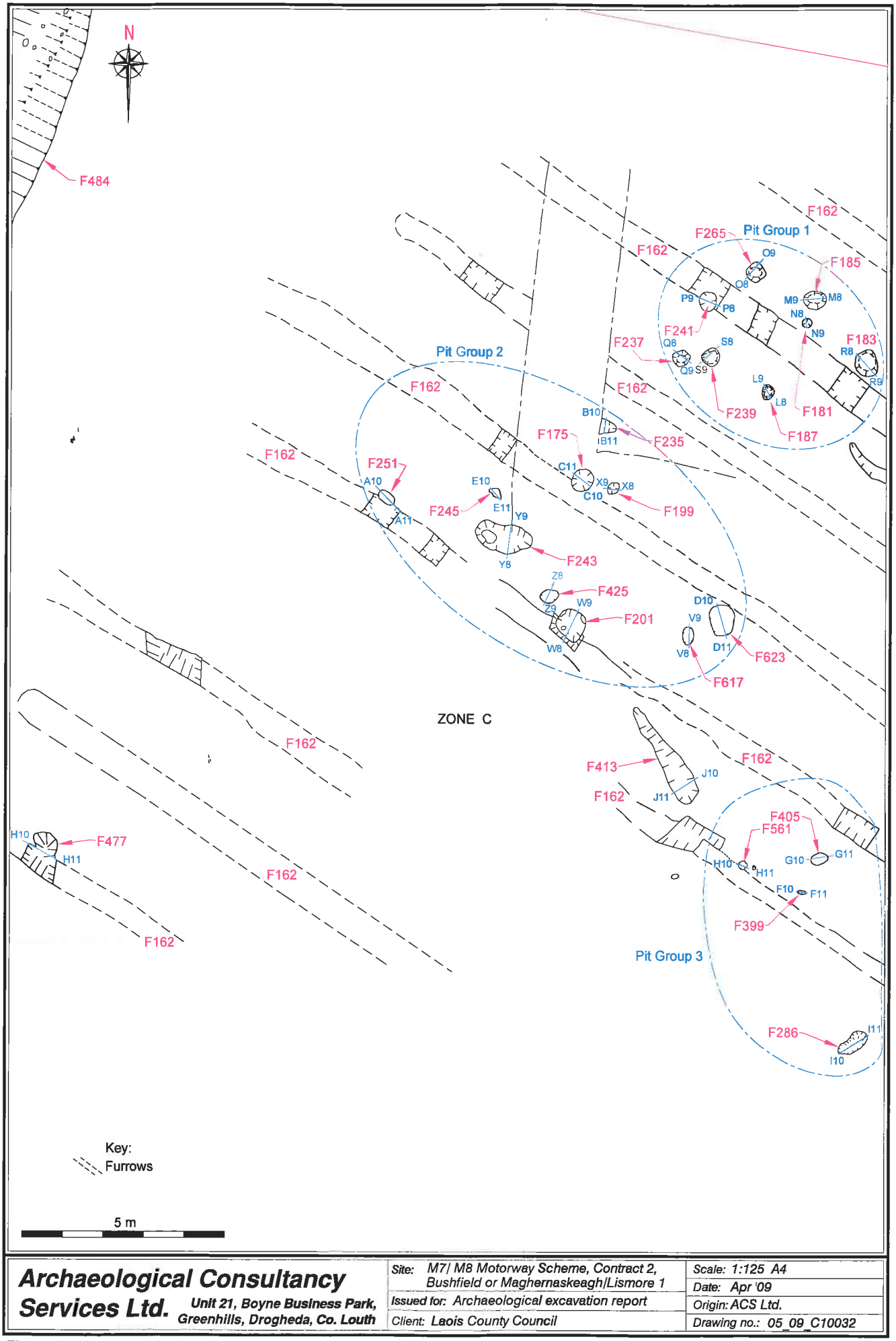
Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:30 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10030

Figure 30: Mid and post-excavation plans of Zone C burial F820, Group 2, Level 2 (truncates south-west end of grave F822).



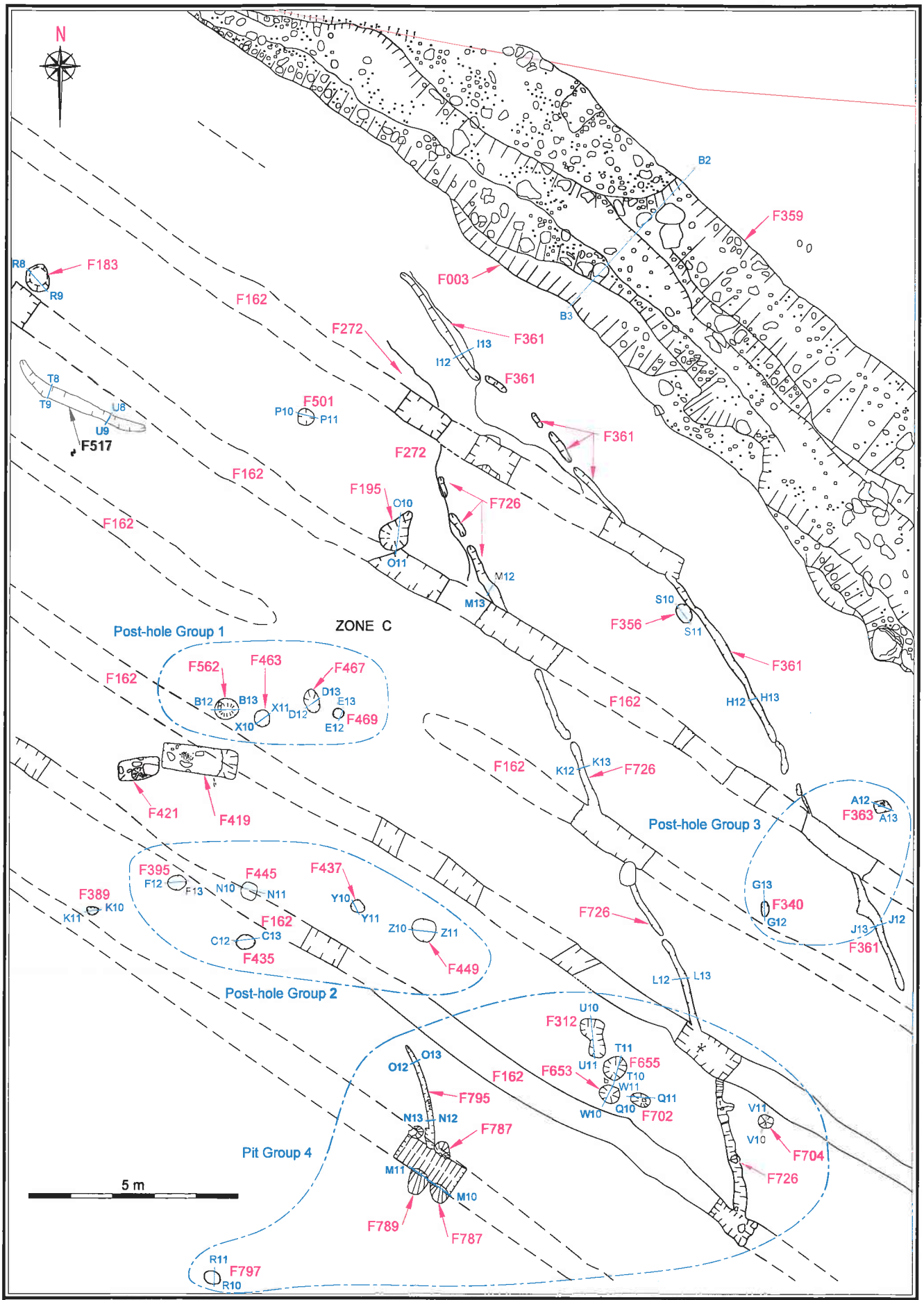
Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeegh/Lismore 1	Scale: 1:30 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10031

Figure 31: Mid and post-excavation plans of Zone C burial F337, Group 2, Level 2 (overlies eastern end of grave F842).



Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:125 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10032

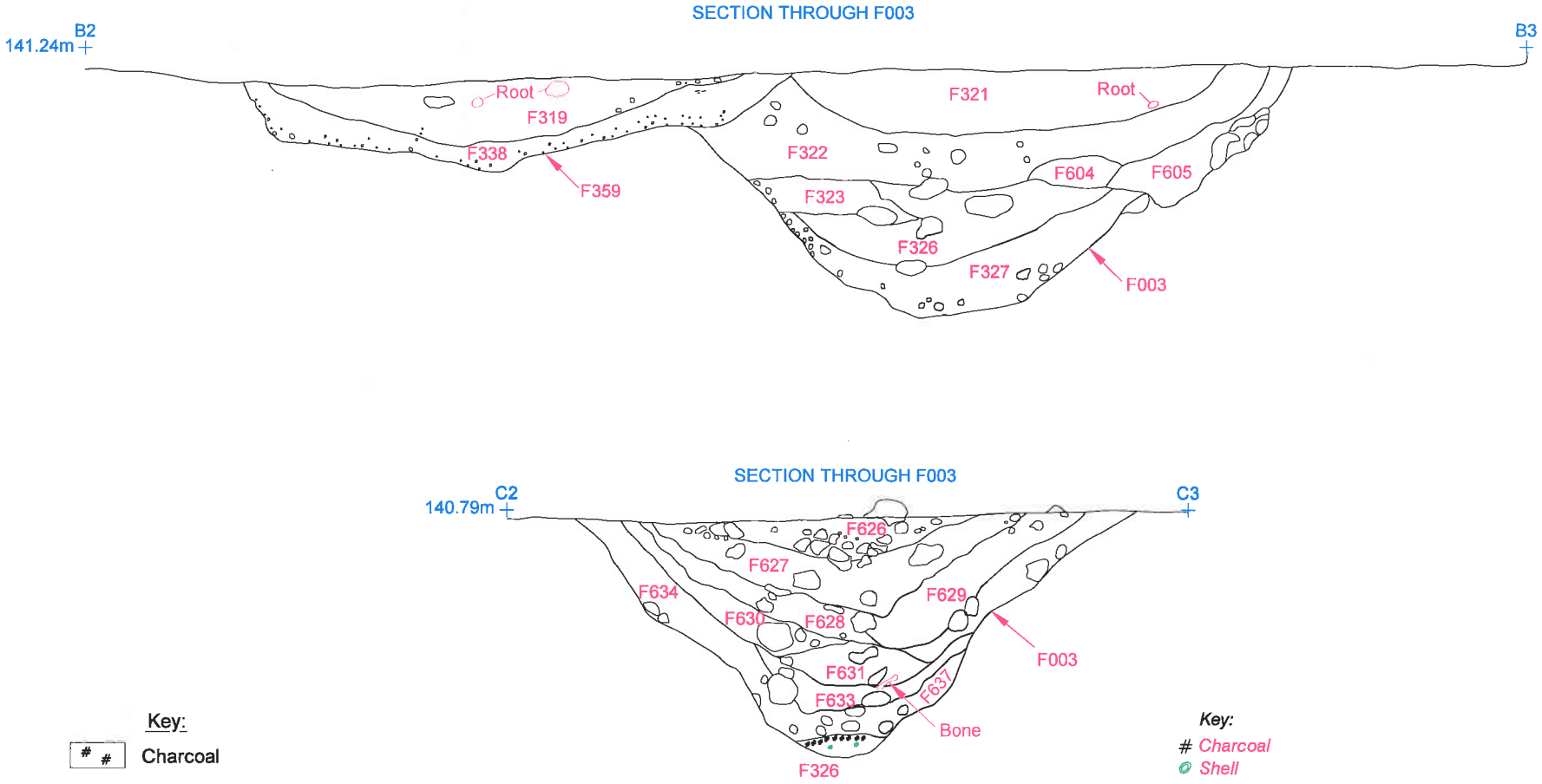
Figure 32: Enlarged post-excavation plan of non-burial features in western half of Zone C, including Pit Groups 1, 2 and 3.



Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth

Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:125 A4
Issued for: Archaeological excavation report	Date: Apr '09
Client: Laois County Council	Origin: ACS Ltd.
	Drawing no.: 05_09_C10033

Figure 33: Enlarged post-excavation plan of non-burial features in eastern half of Zone C, including Post-hole Groups 1, 2 and 3 and Pit Group 4.



Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:25 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10034

Figure 34: Sections B2-B3 and C2-C3 of enclosure ditch F003 in Zone C.

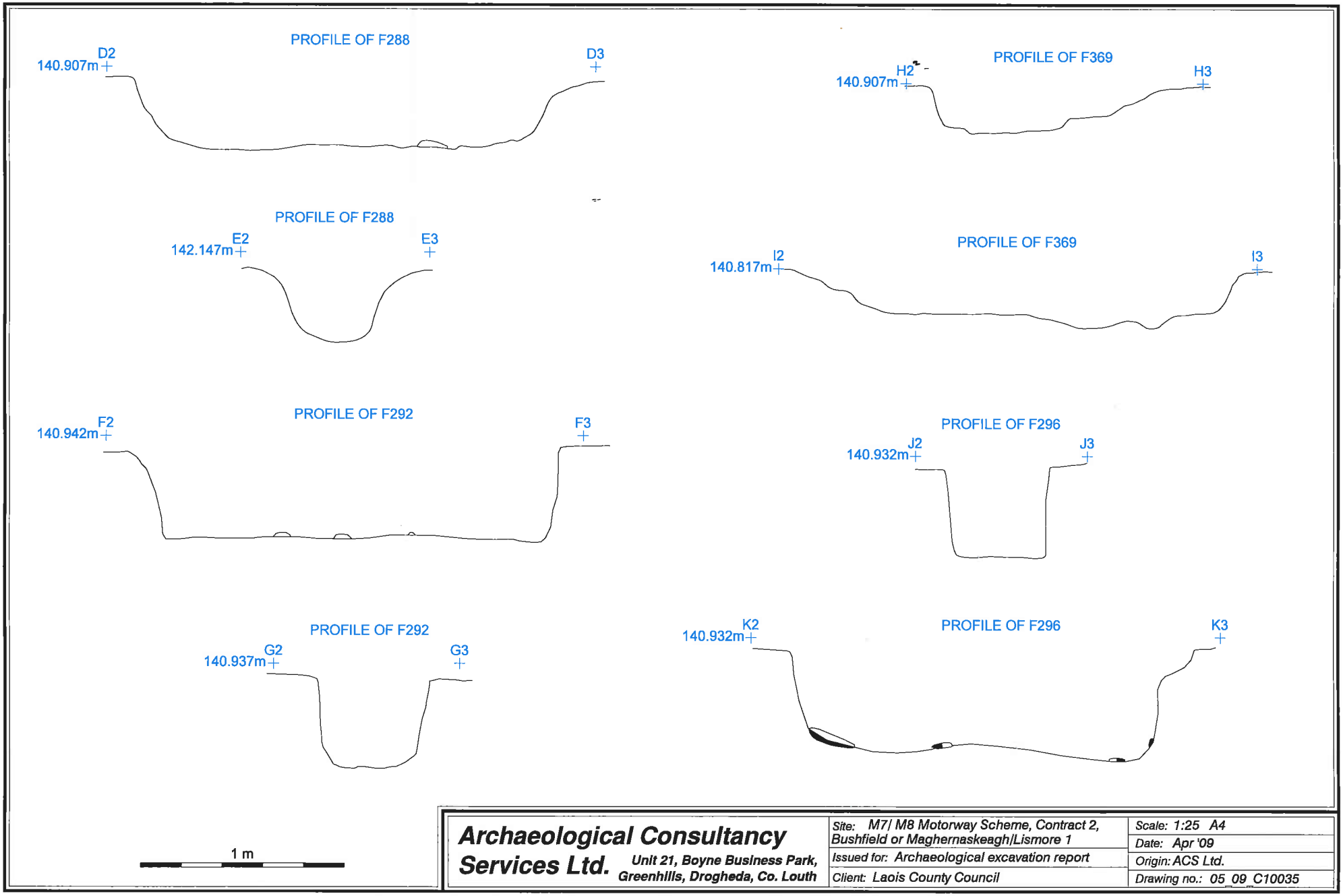


Figure 35: Zone C burials, Group 1, profiles of graves F288, F292, F296 and F369.

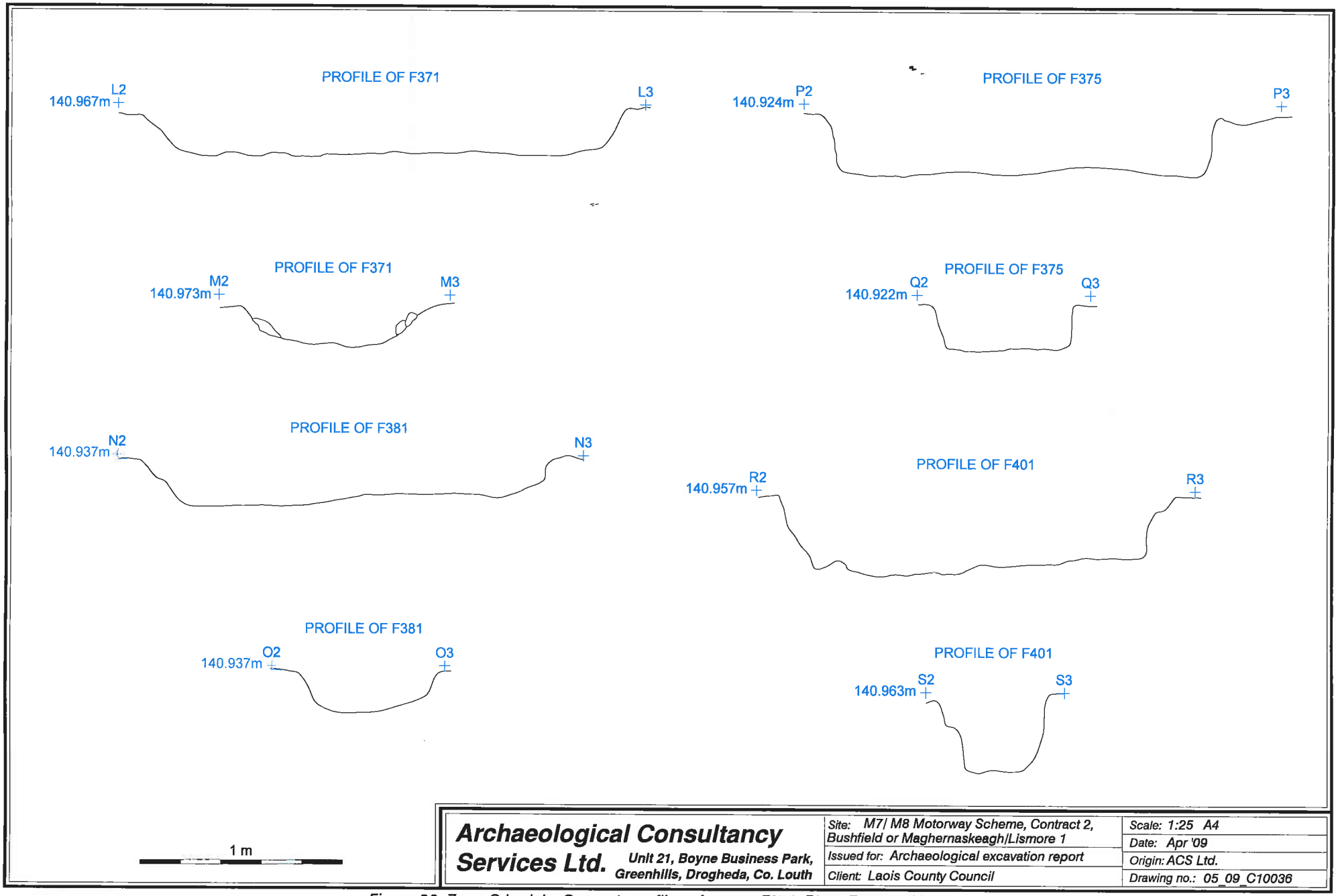


Figure 36: Zone C burials, Group 1, profiles of graves F371, F375, F381 and F401.

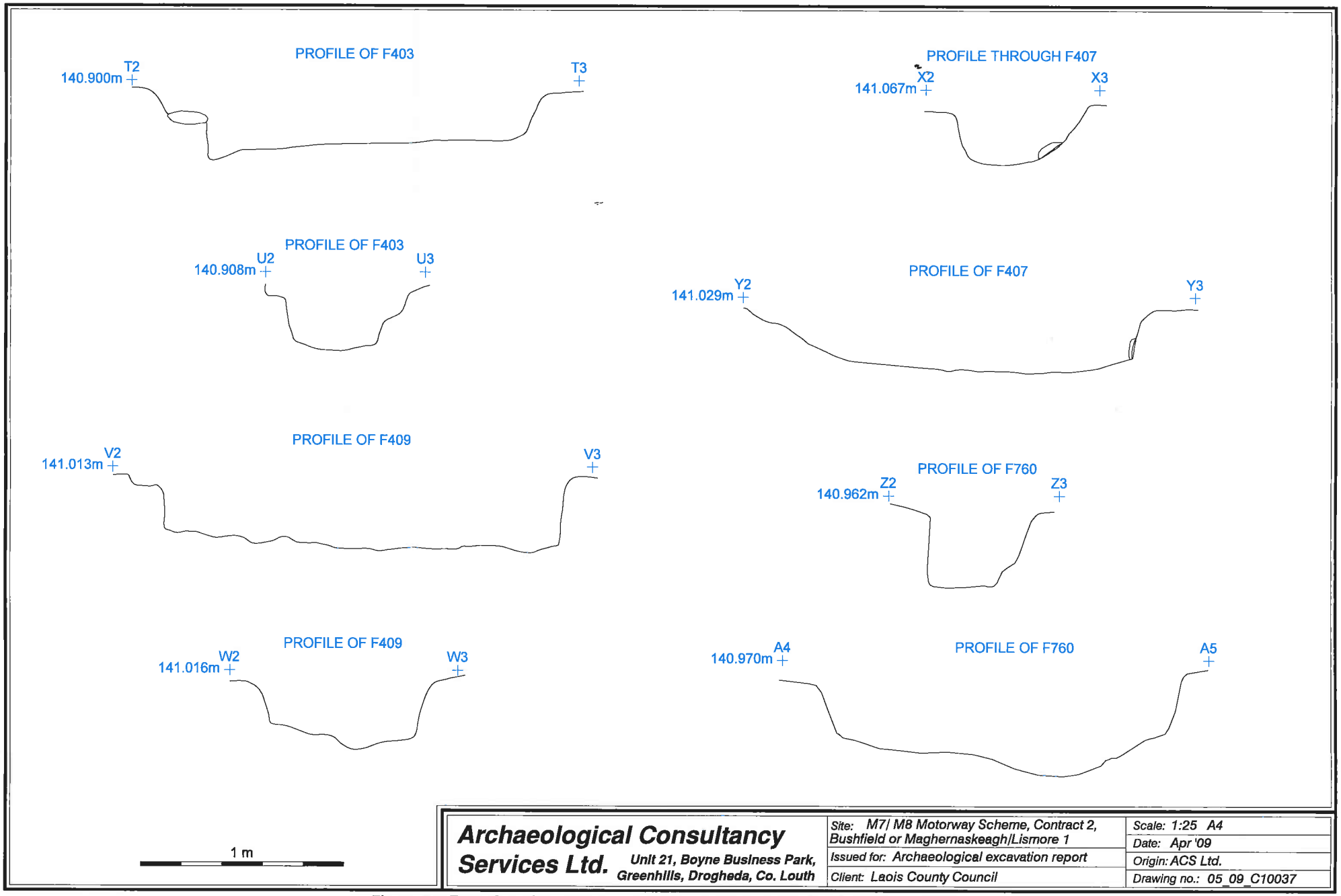


Figure 37: Zone C burials, Group 1, profiles of graves F403, F407, F409 and F760.

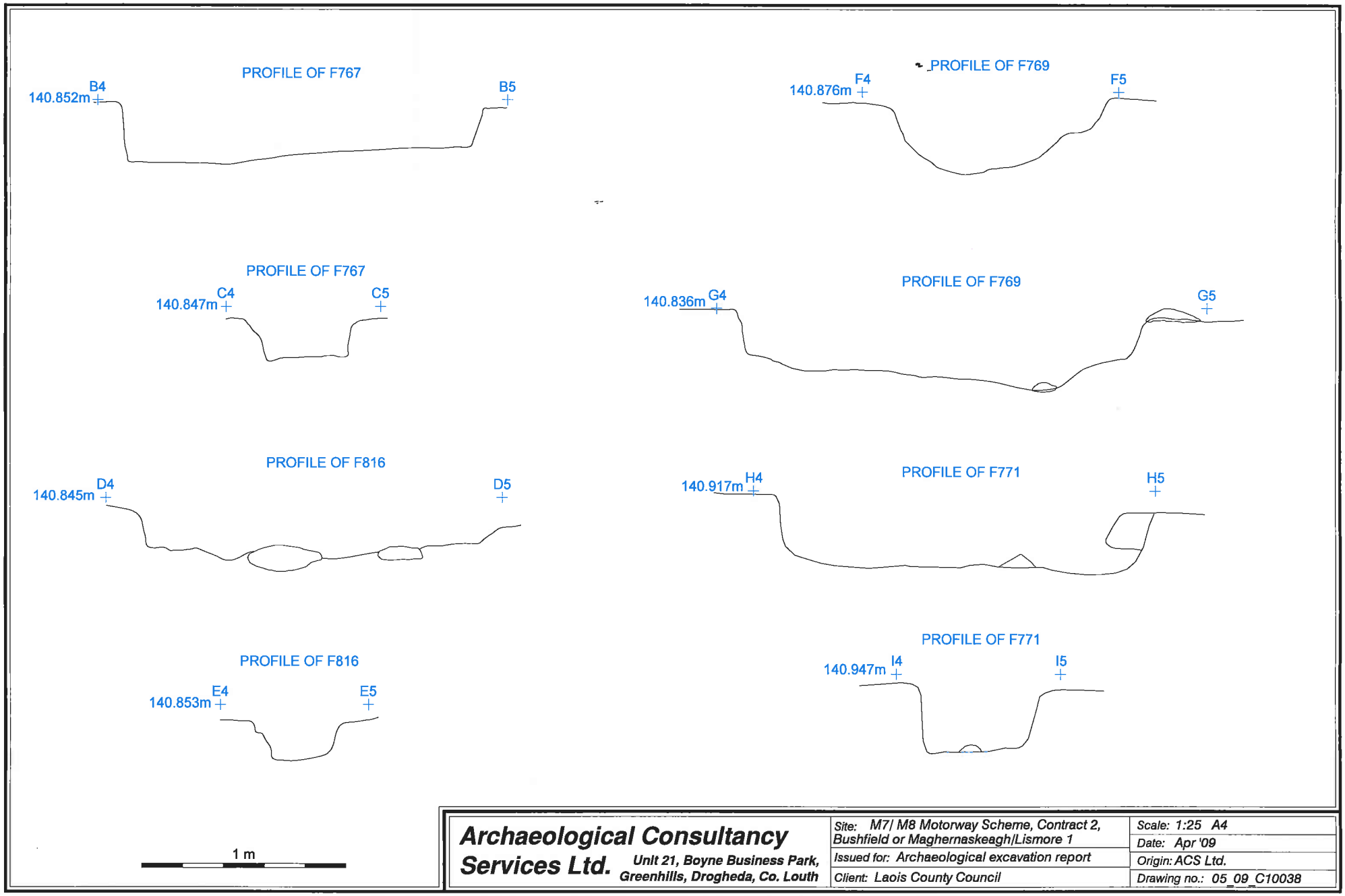


Figure 38: Zone C burials, Group 1, profiles of graves F767, F769, F771 and F816.

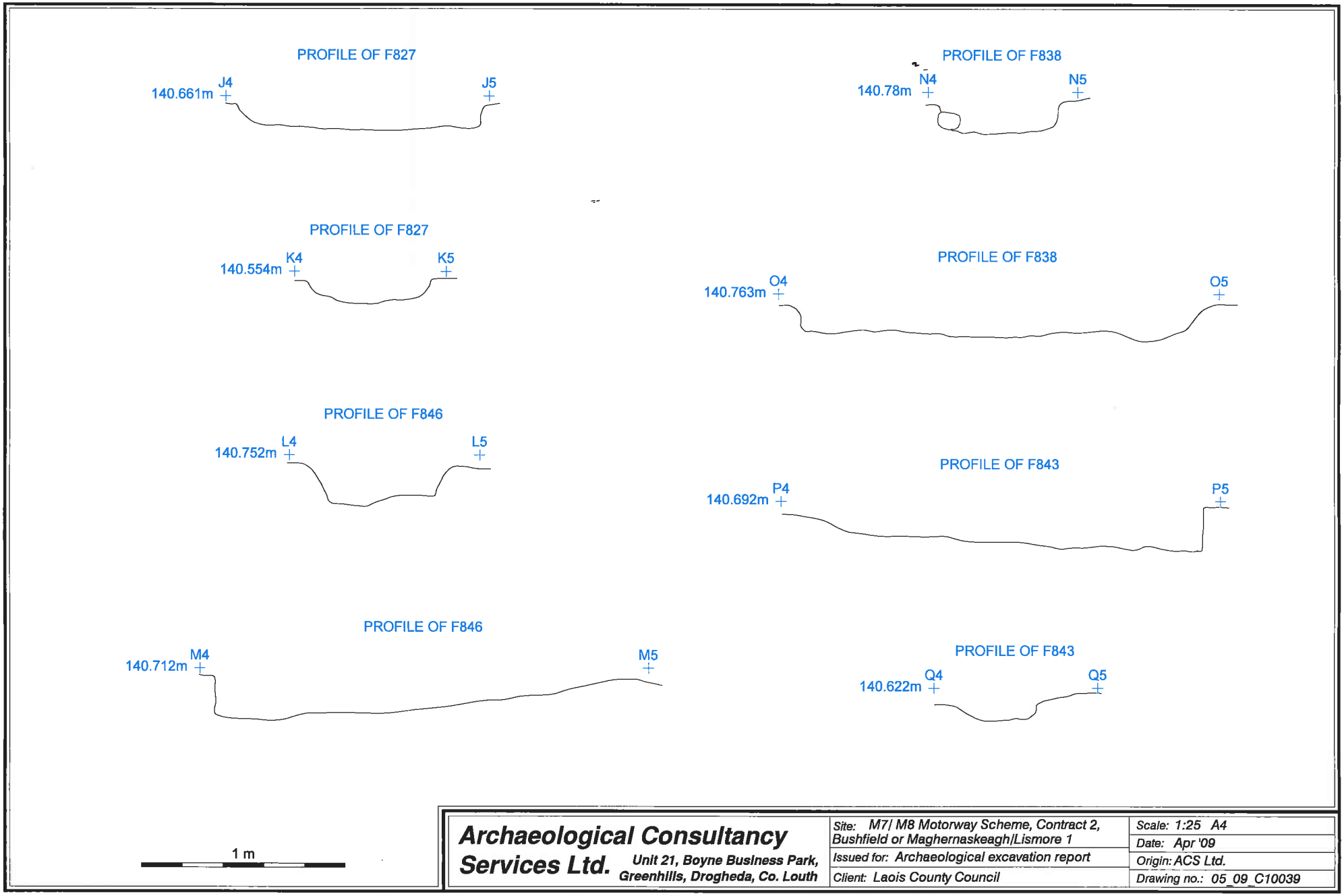


Figure 39: Zone C burials, Group 1, profiles of graves F827, F838, F843 and F846.

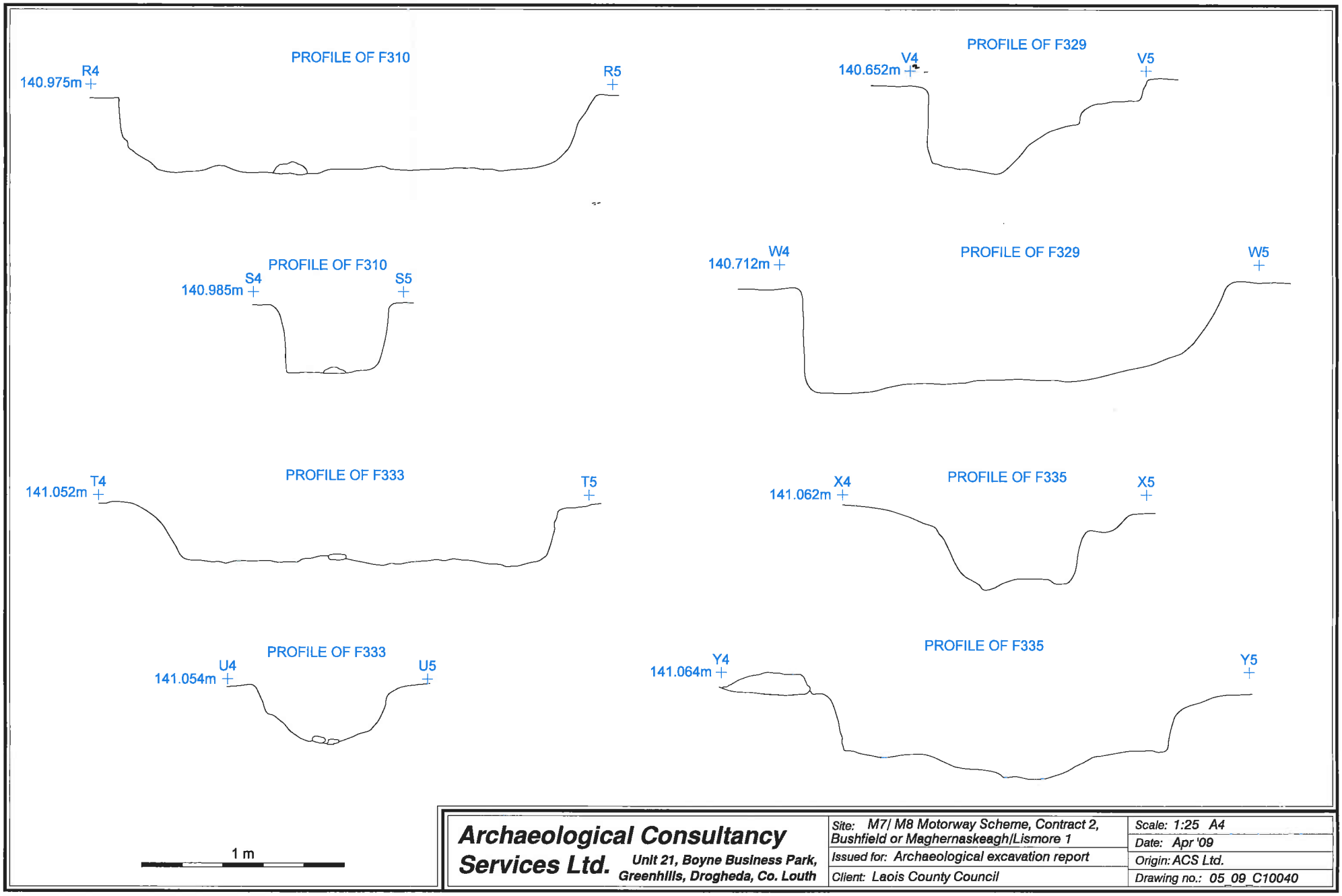


Figure 40: Zone C burials, Group 2, profiles of graves F310, F329, F333 and F335.

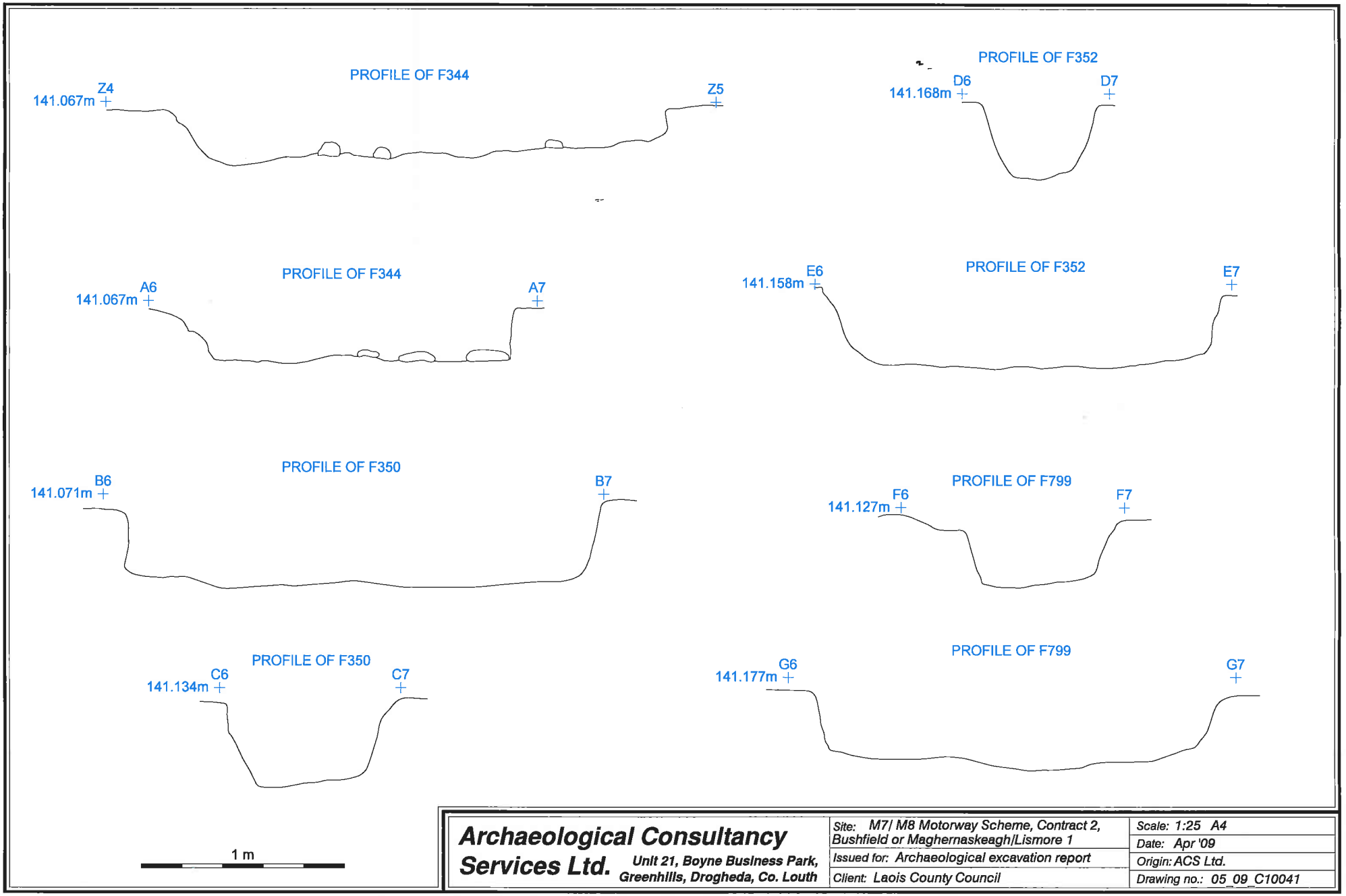


Figure 41: Zone C burials, Group 2, profiles of graves F344, F350, F352 and F799.

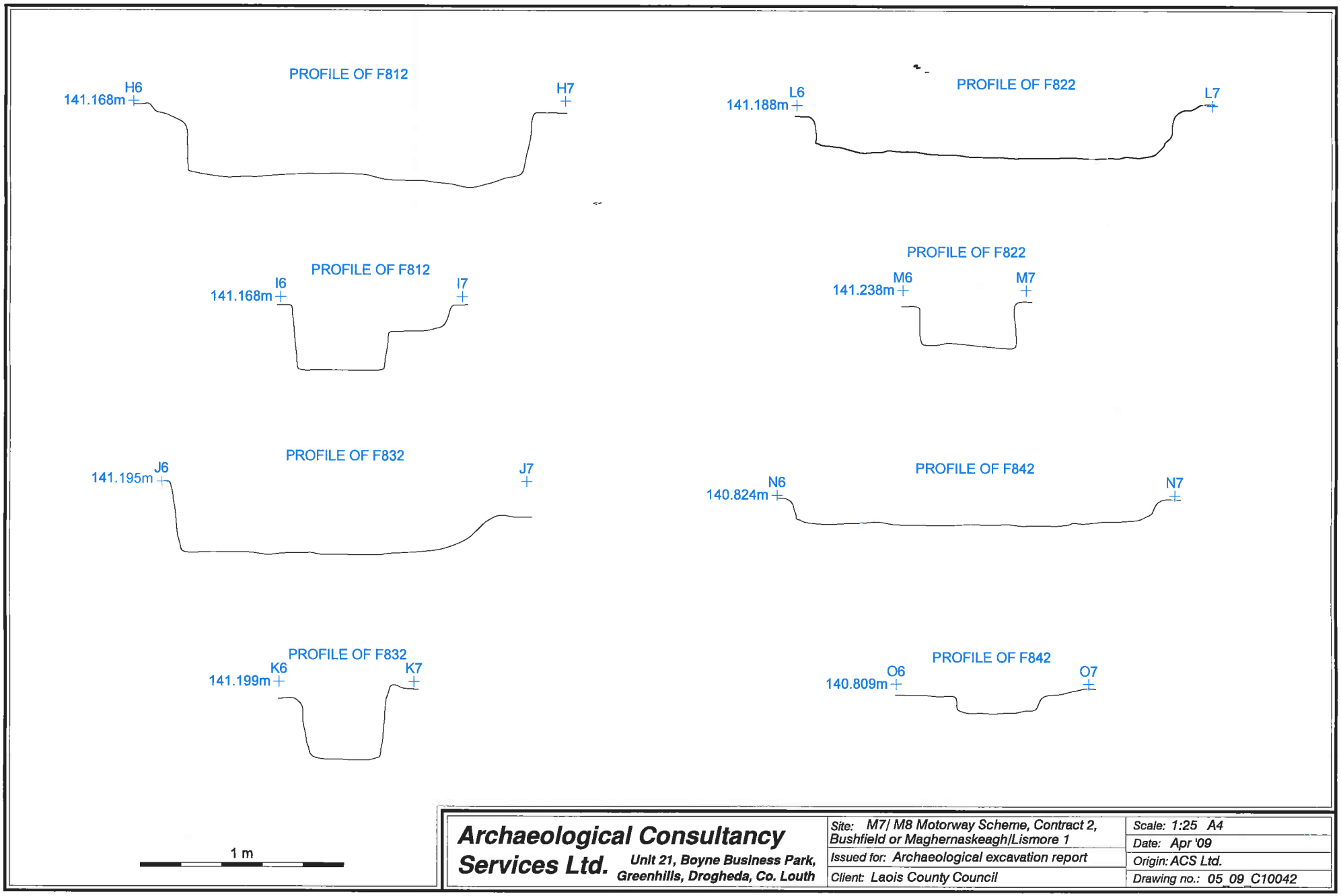


Figure 42: Zone C burials, Group 2, profiles of graves F812, F822, F832 and F842.

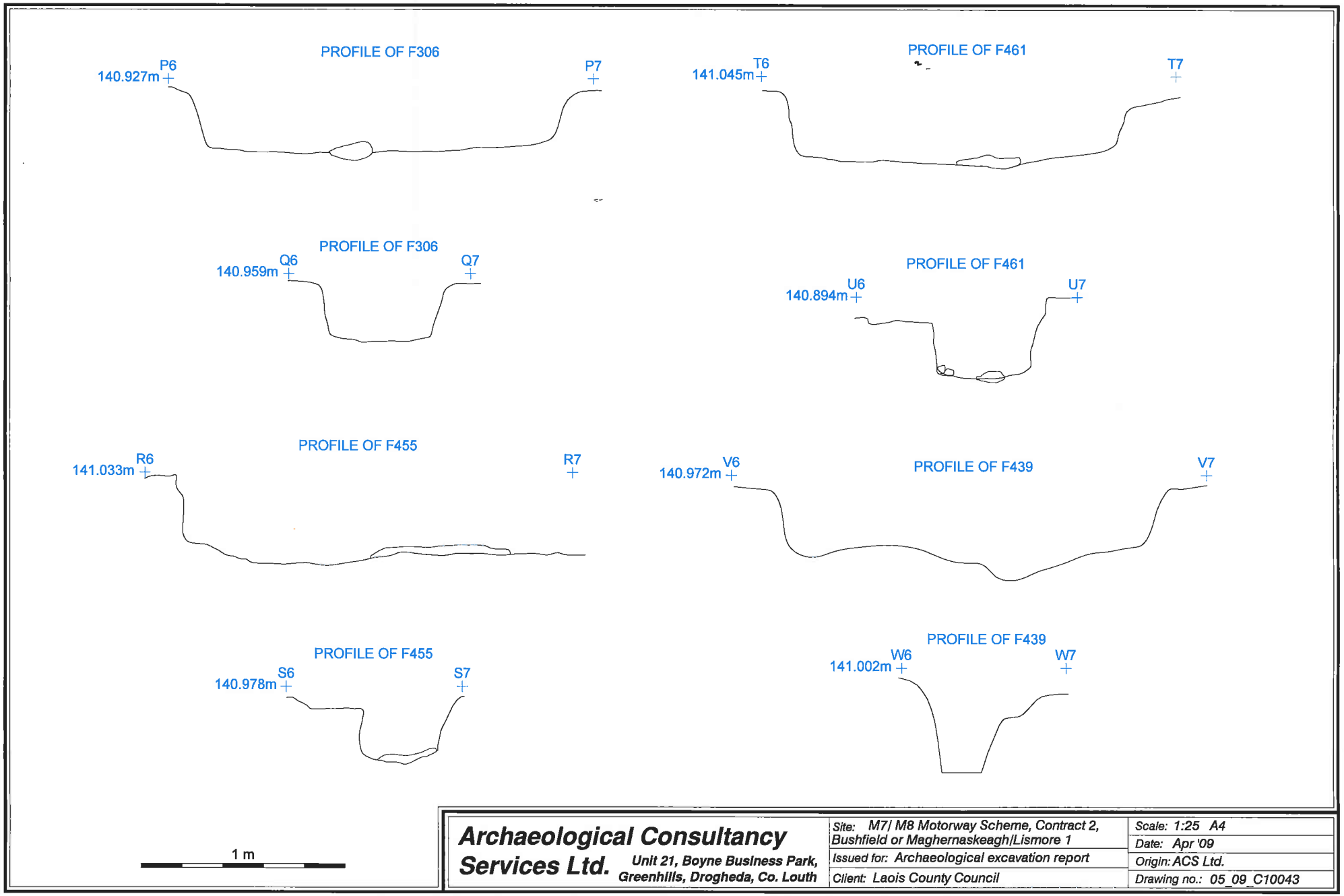


Figure 43: Zone C burials, Group 3, profiles of graves F306, F439, F455 and F461.

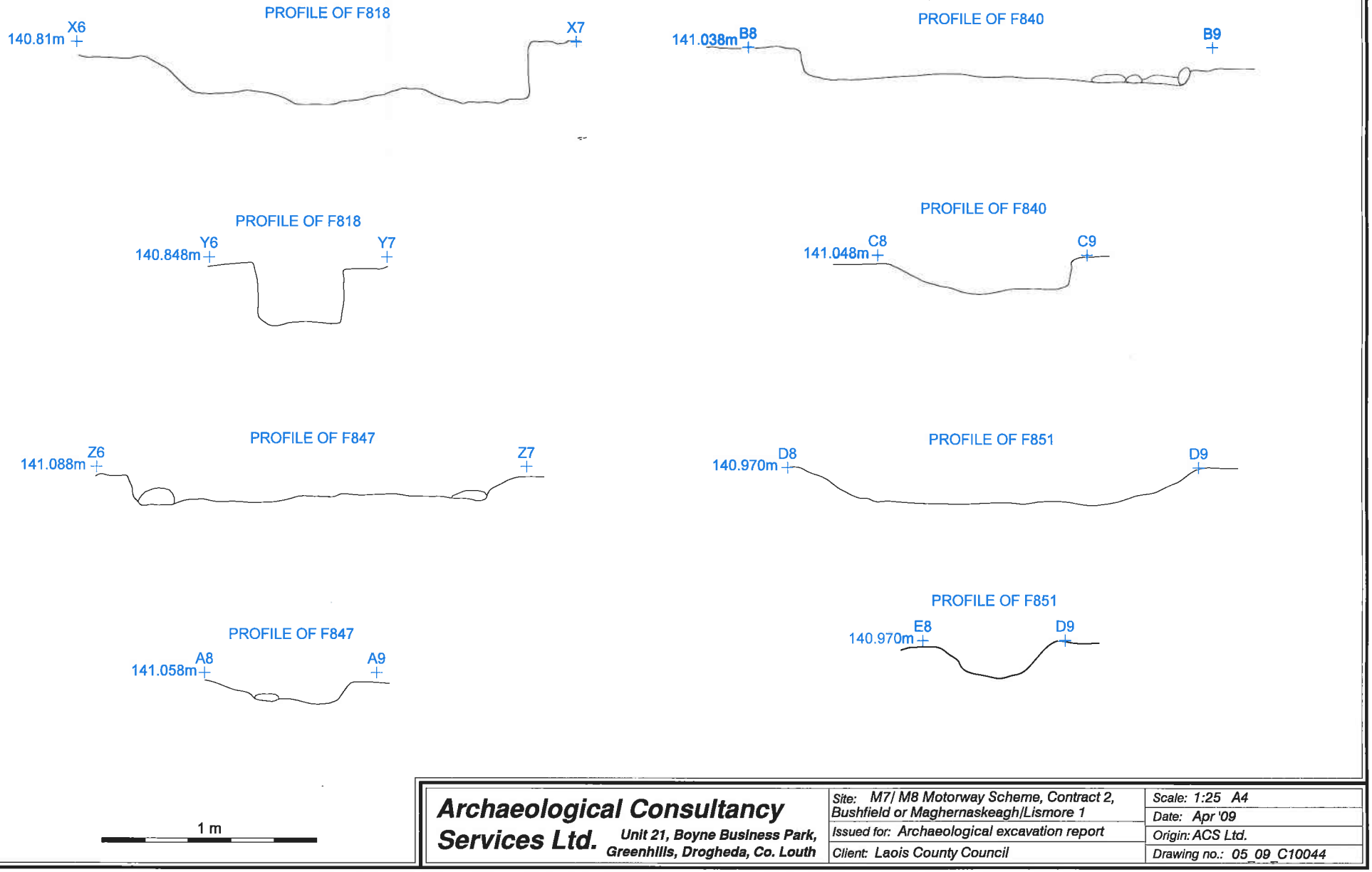


Figure 44: Profiles of Zone C burials: F818 (Group 3) and F840, F847 and F851 (Group 4).

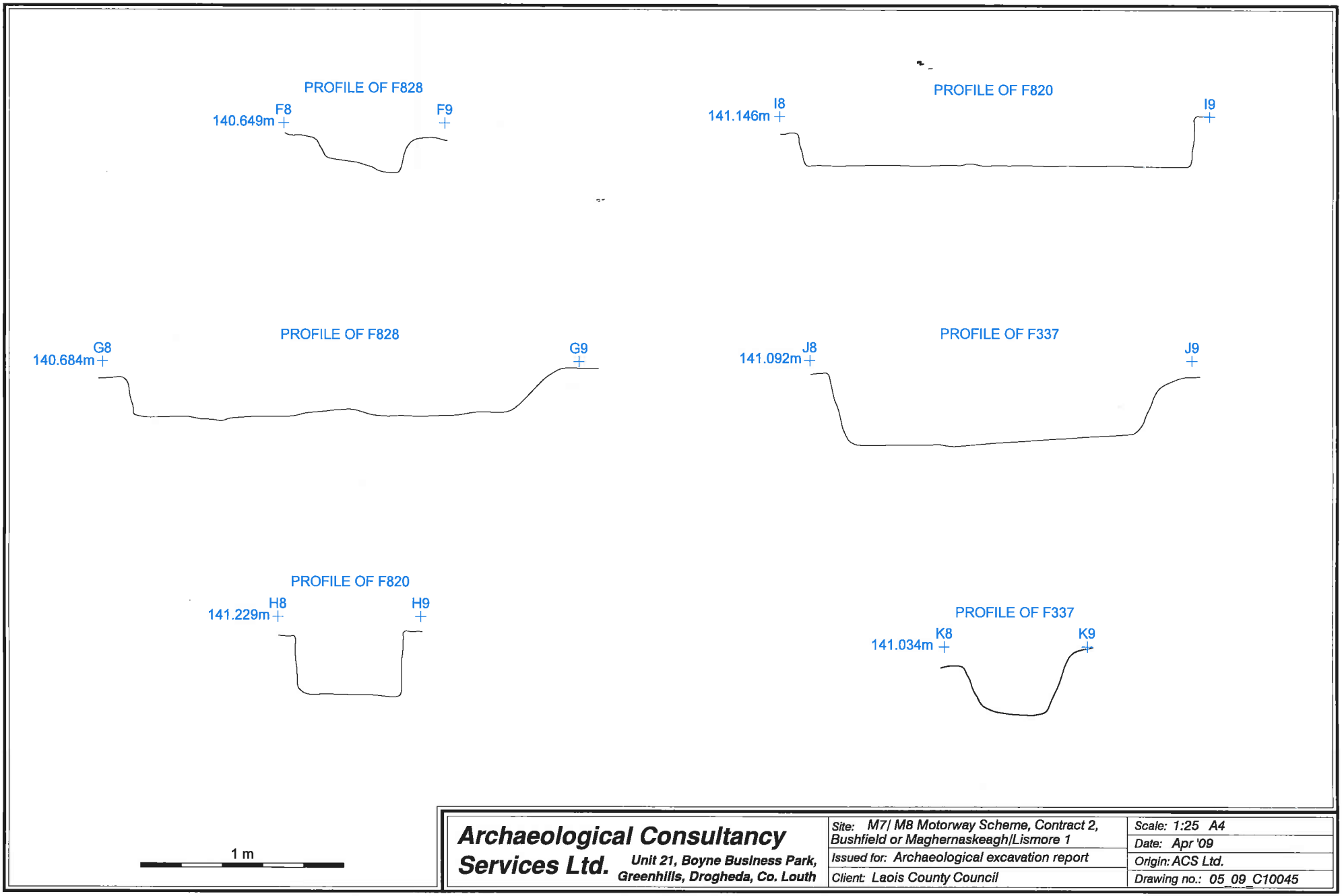
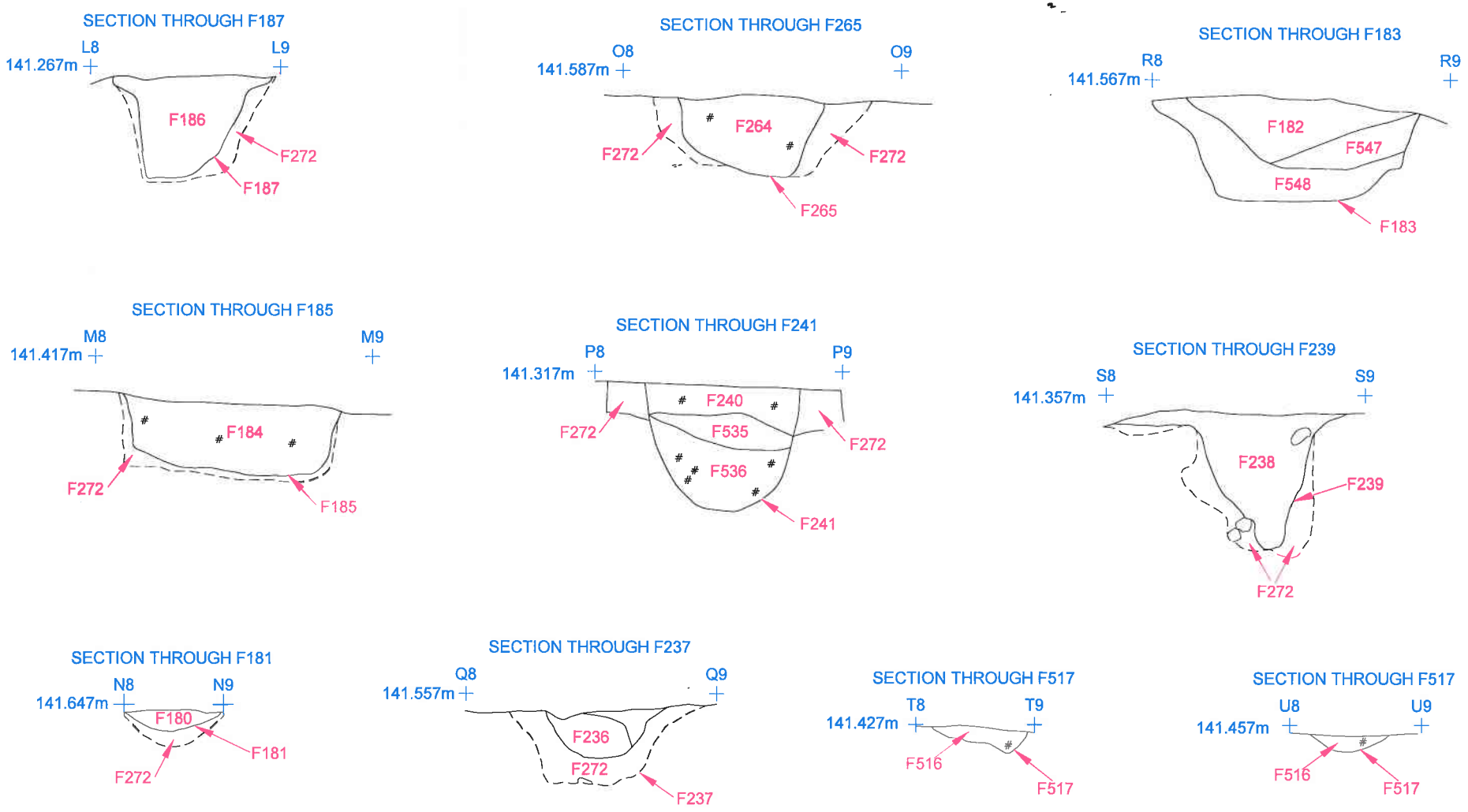
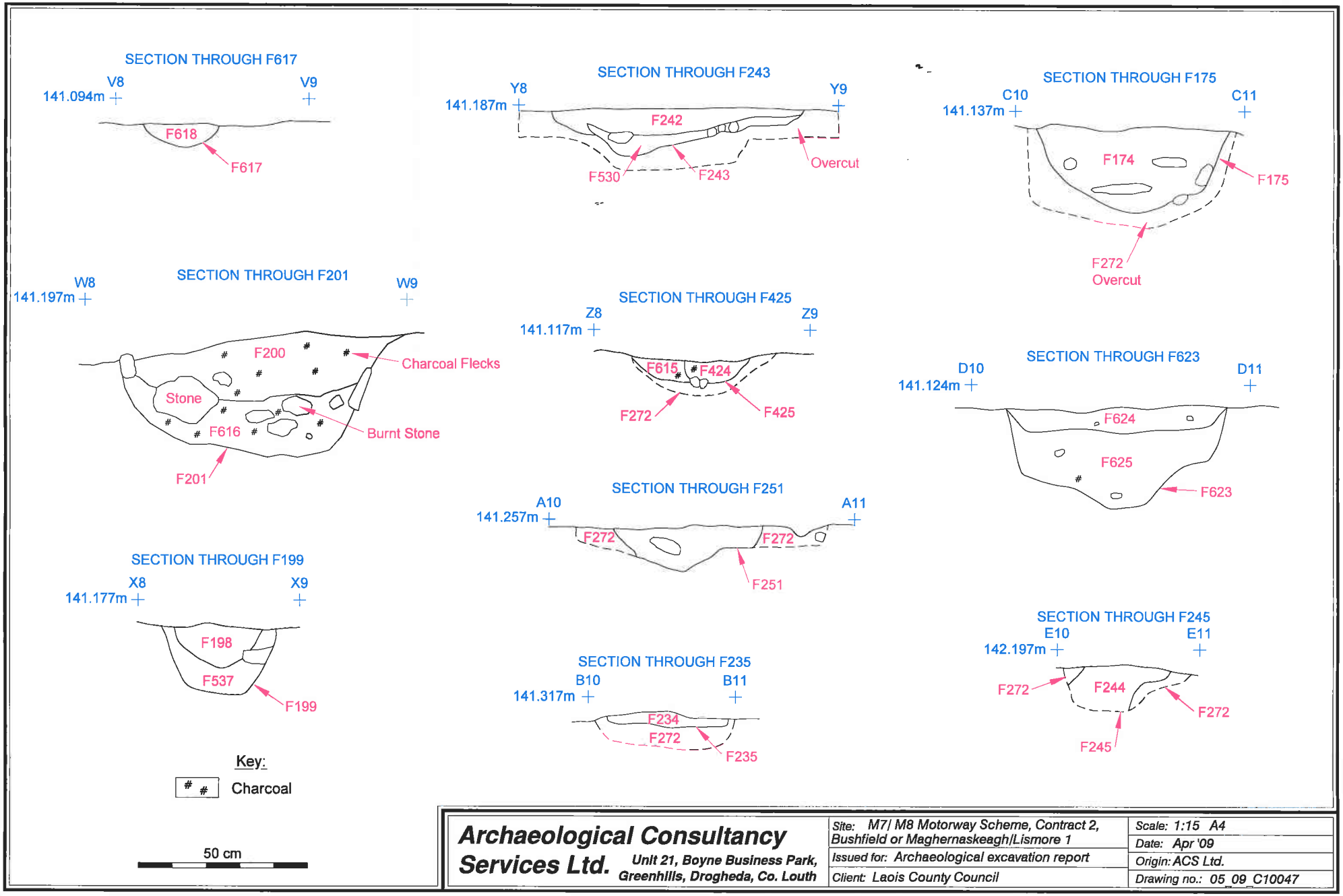


Figure 45: Profiles of Level 2 burials, Zone C, F828 (Group 1), F820 and F337 (Group 2).



Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:15 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10046

Figure 46: Zone C sections, pit group 1: F181, F183, F185, F187, F237, F239, F241, F265 and F517.



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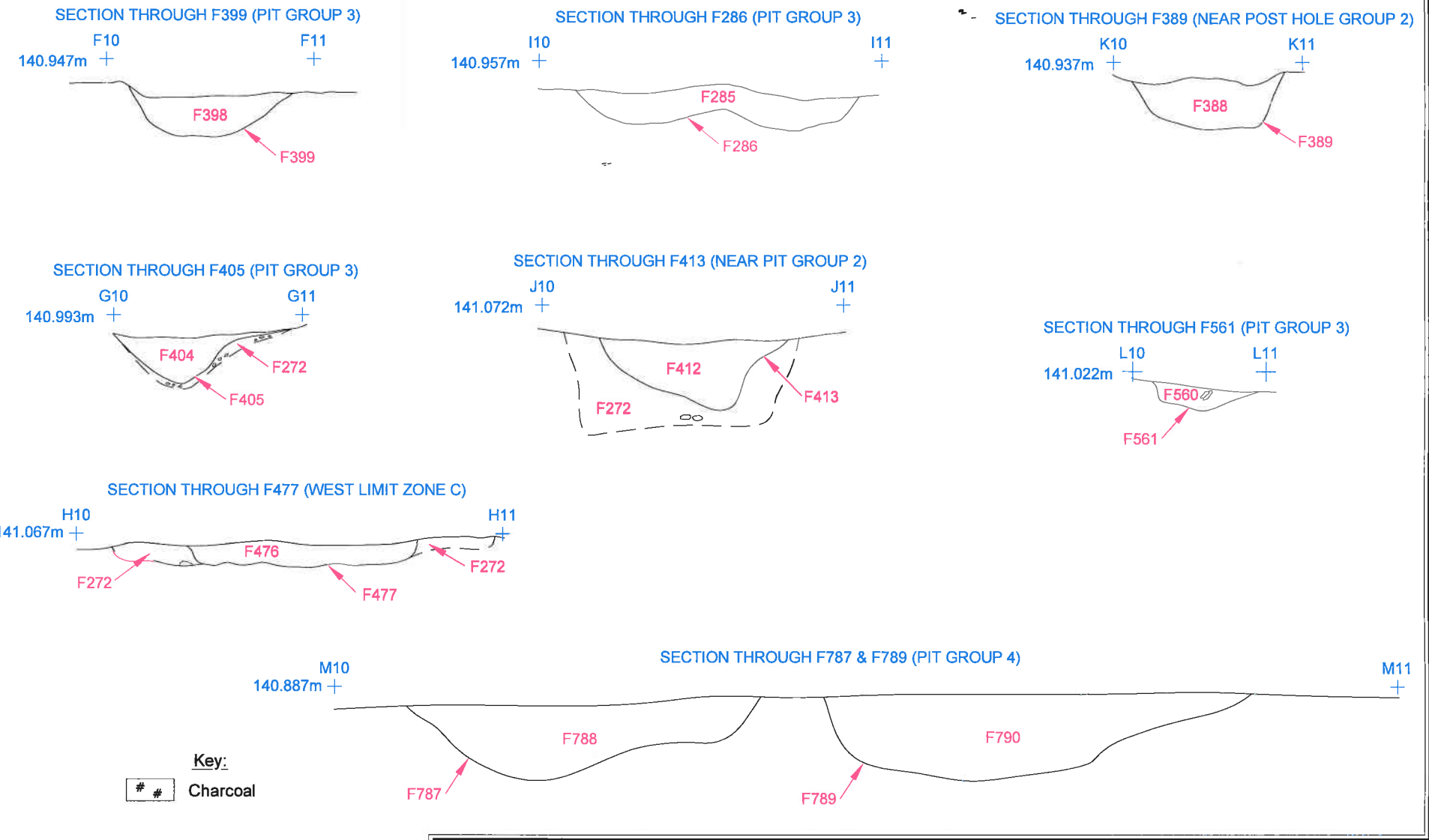
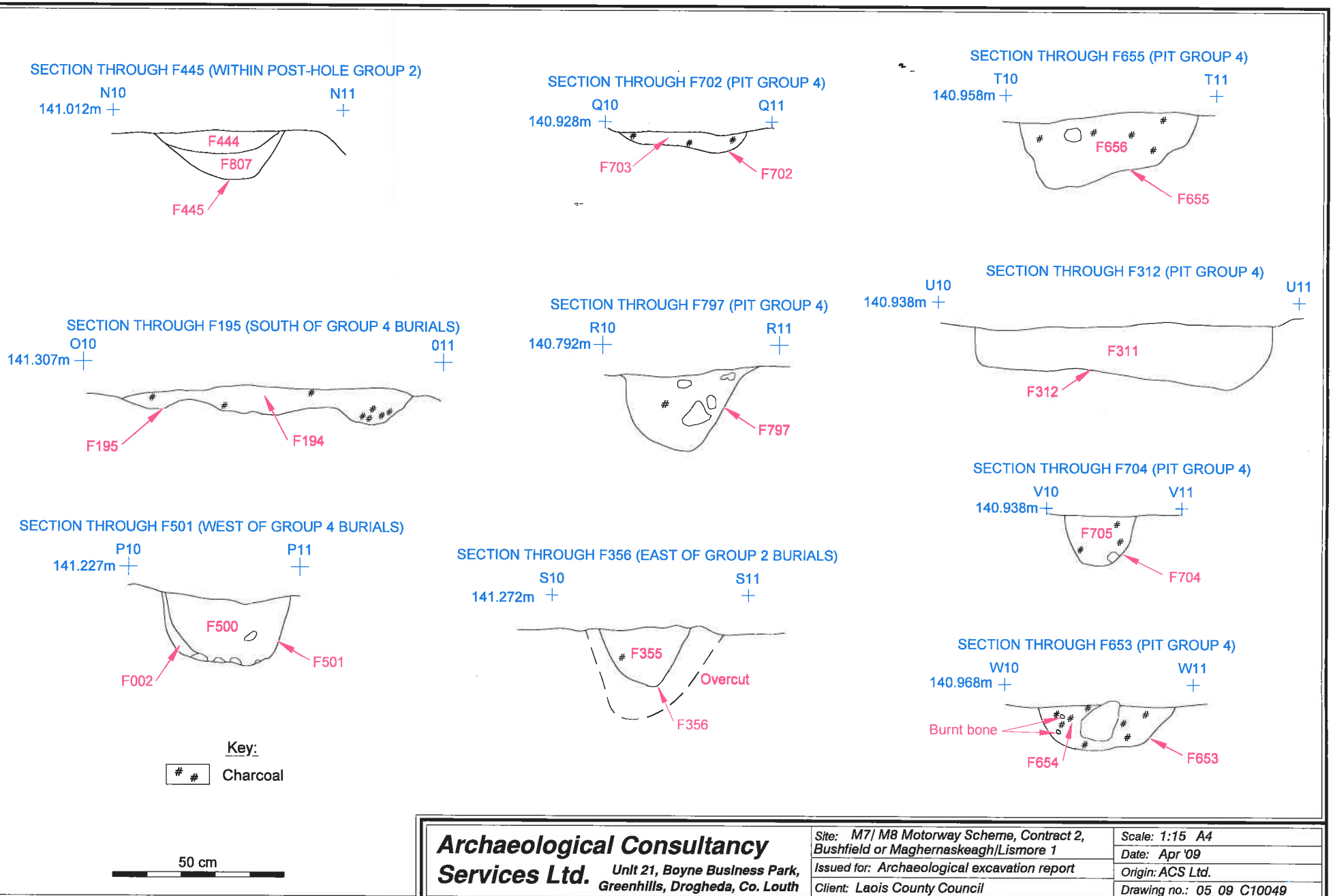
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10047

Figure 47: Zone C sections, pit group 2: F175, F199, F201, F235, F243, F245, F251, F425, F617 and F623.



Archaeological Consultancy Services Ltd. *Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth*	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:15 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10048

Figure 48: Zone C sections: Pit Group 3 (F399, F405, F286, F561), Pit Group 4 (F787 and F789) and pits F389, F413 and F477.



Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:15 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10049

Figure 49: Zone C sections: Pit Group 4 (F702, F655, F797, F312, F704, F653) and pits F445, F195, F501, F356.

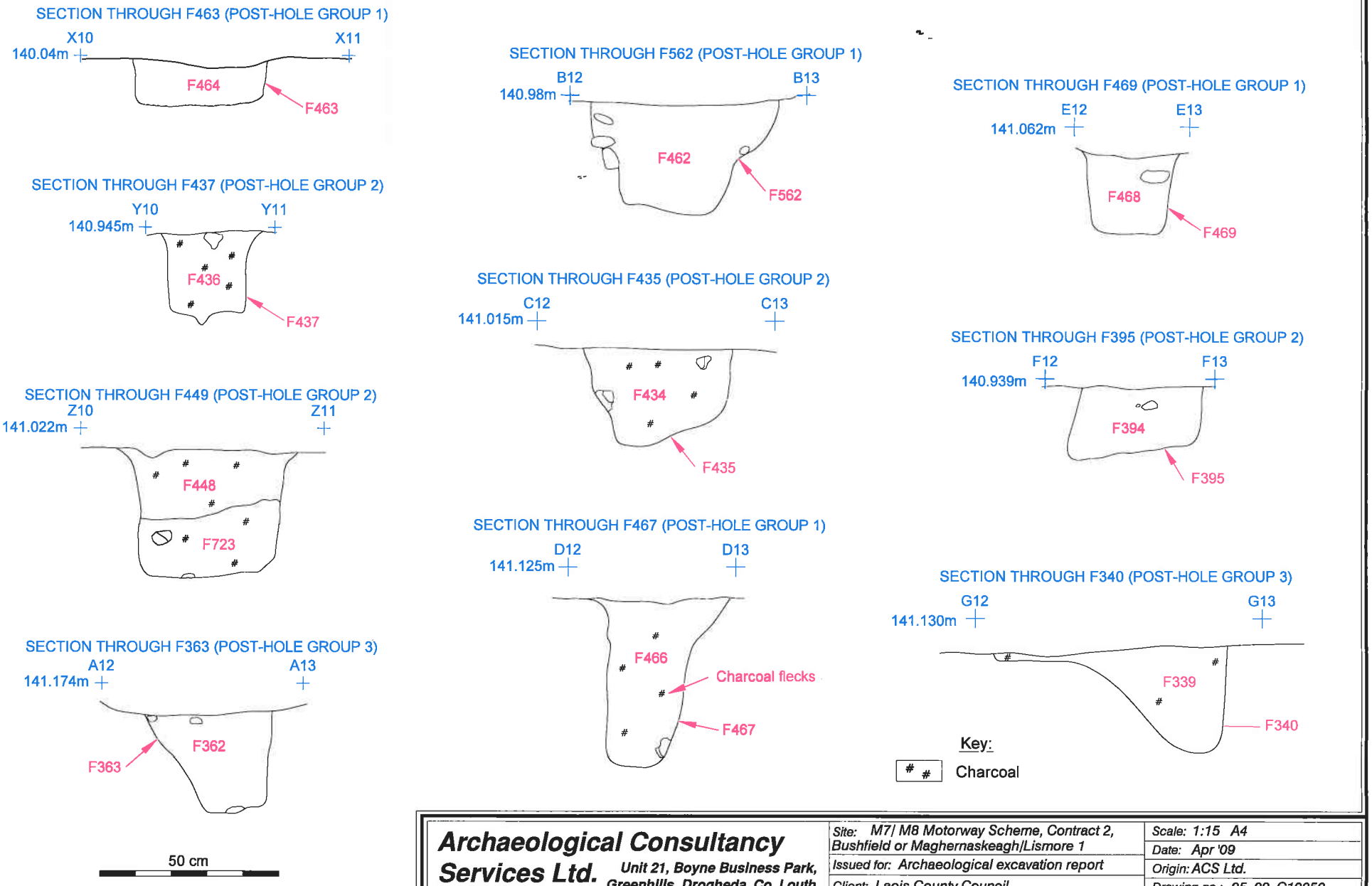


Figure 50: Zone C sections: Post-hole Group 1 (F463, F562, F467, F469), Post-hole Group 2 (F437, F449, F435, F395), Post-hole Group 3 (F363 and F340).

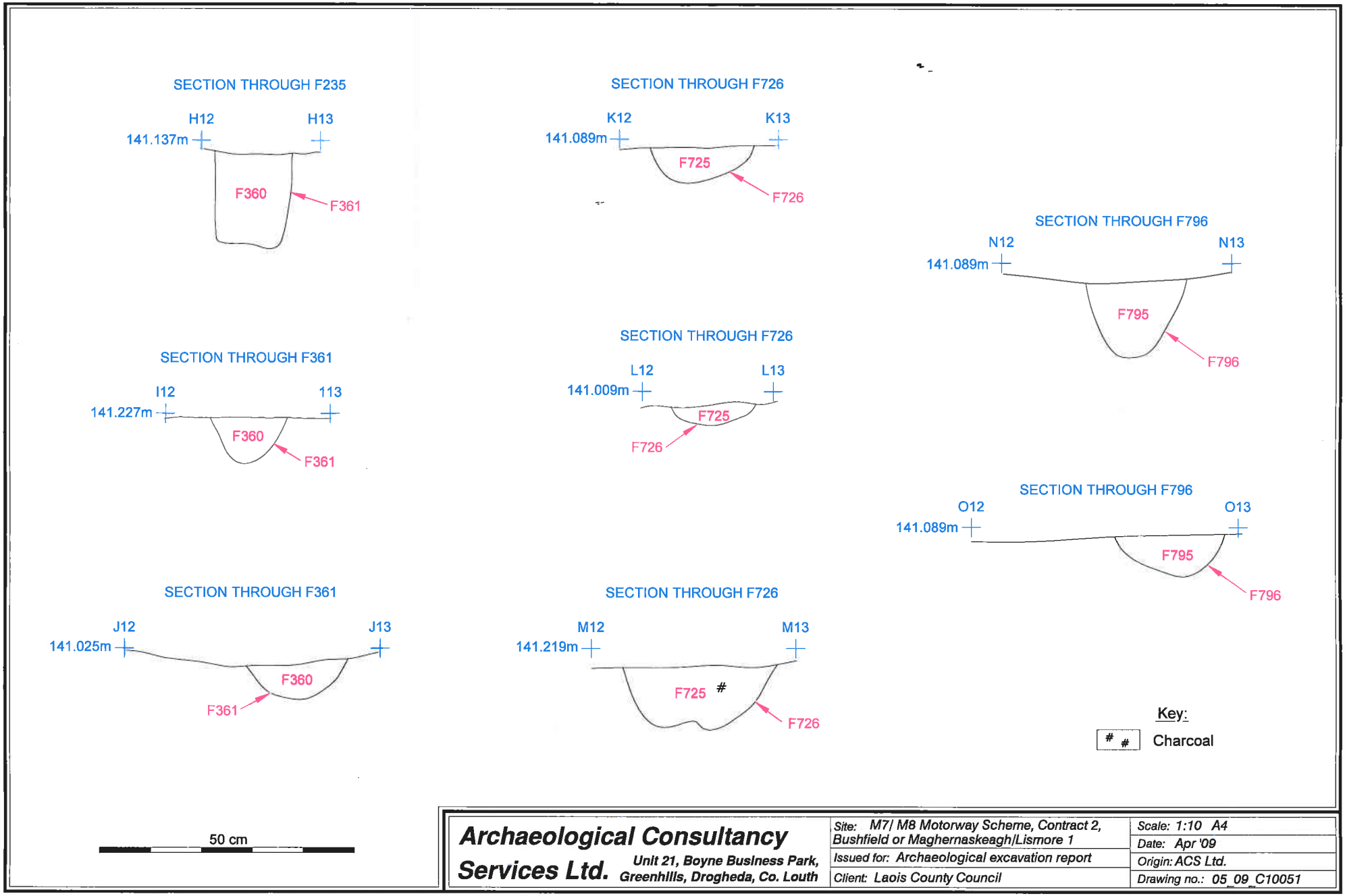
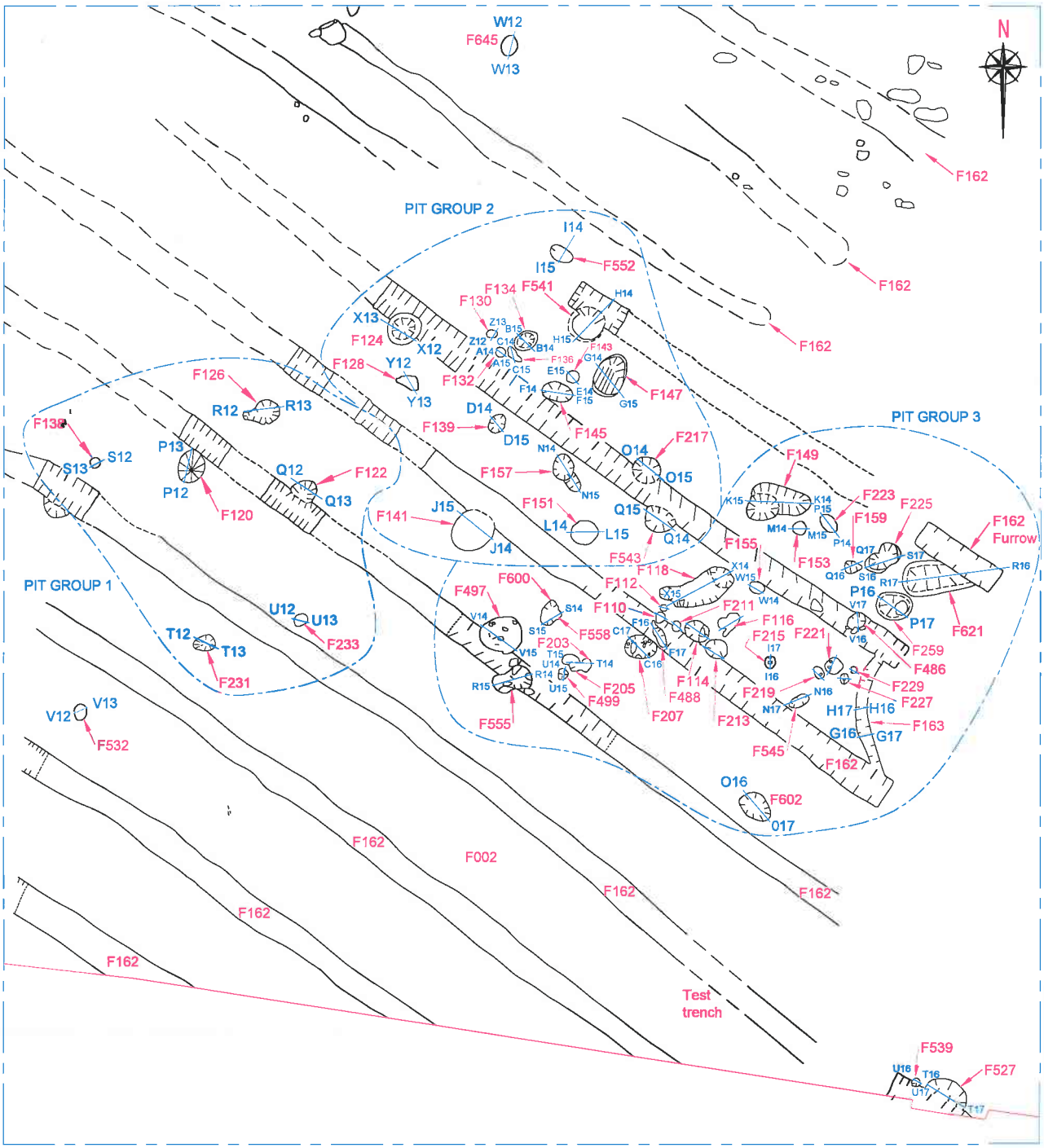


Figure 51: Zone C sections, linear features: F361, F726 and F796.



Note:
Section points for the **following features** have not been **included in the above plan** but **do appear** in the subsequent section drawings...
Section through F110.....Y14-Y15
Section through F112.....Z14-Z15
Section through F114.....A16-A17
Section through F116.....B16-B17
Section through F211.....D16-D17
Section through F213.....E16-E17
Section through F219.....J16-J17
Section through F221.....K16-K17
Section through F227.....L16-L17
Section through F229.....M16-M17

5 m

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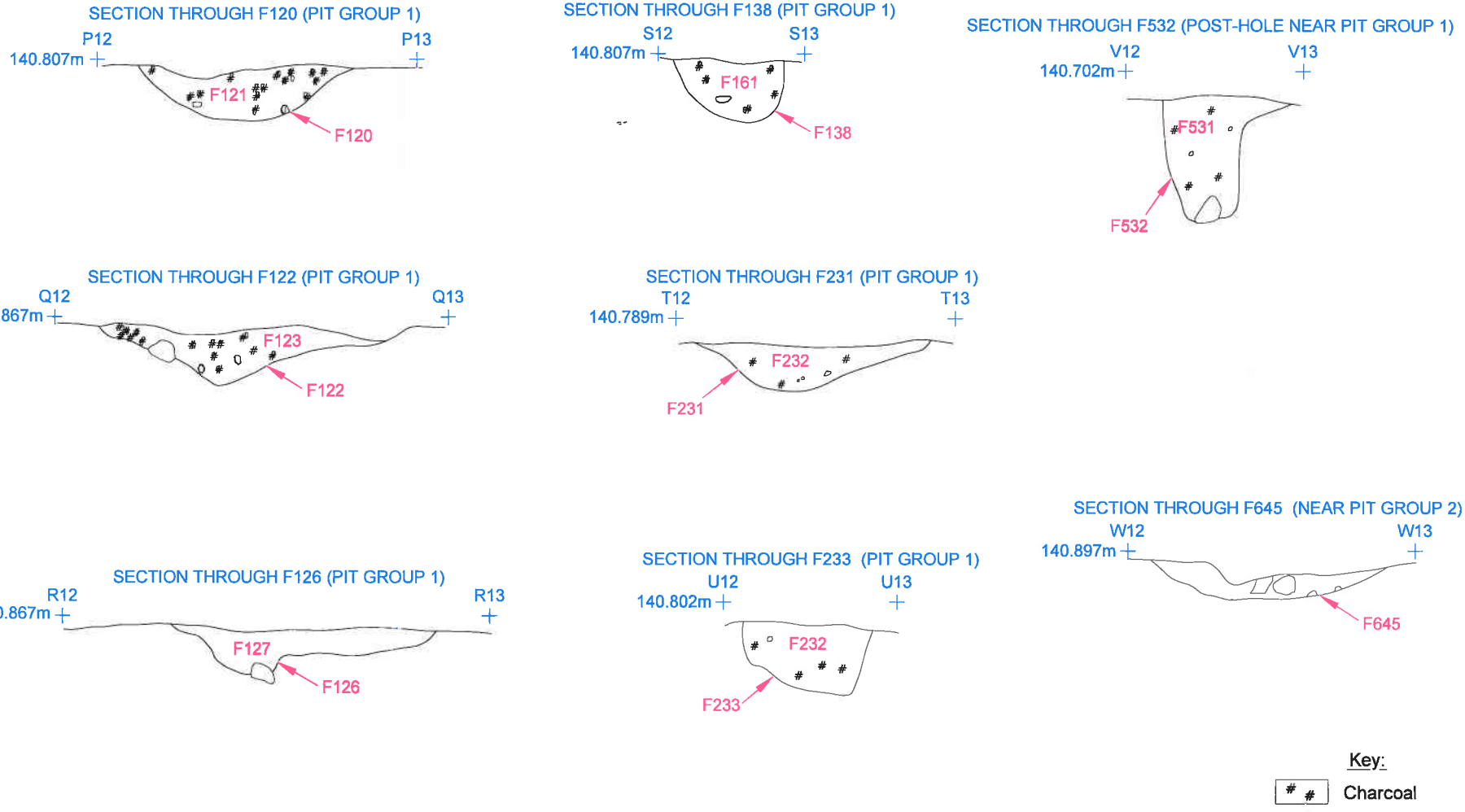
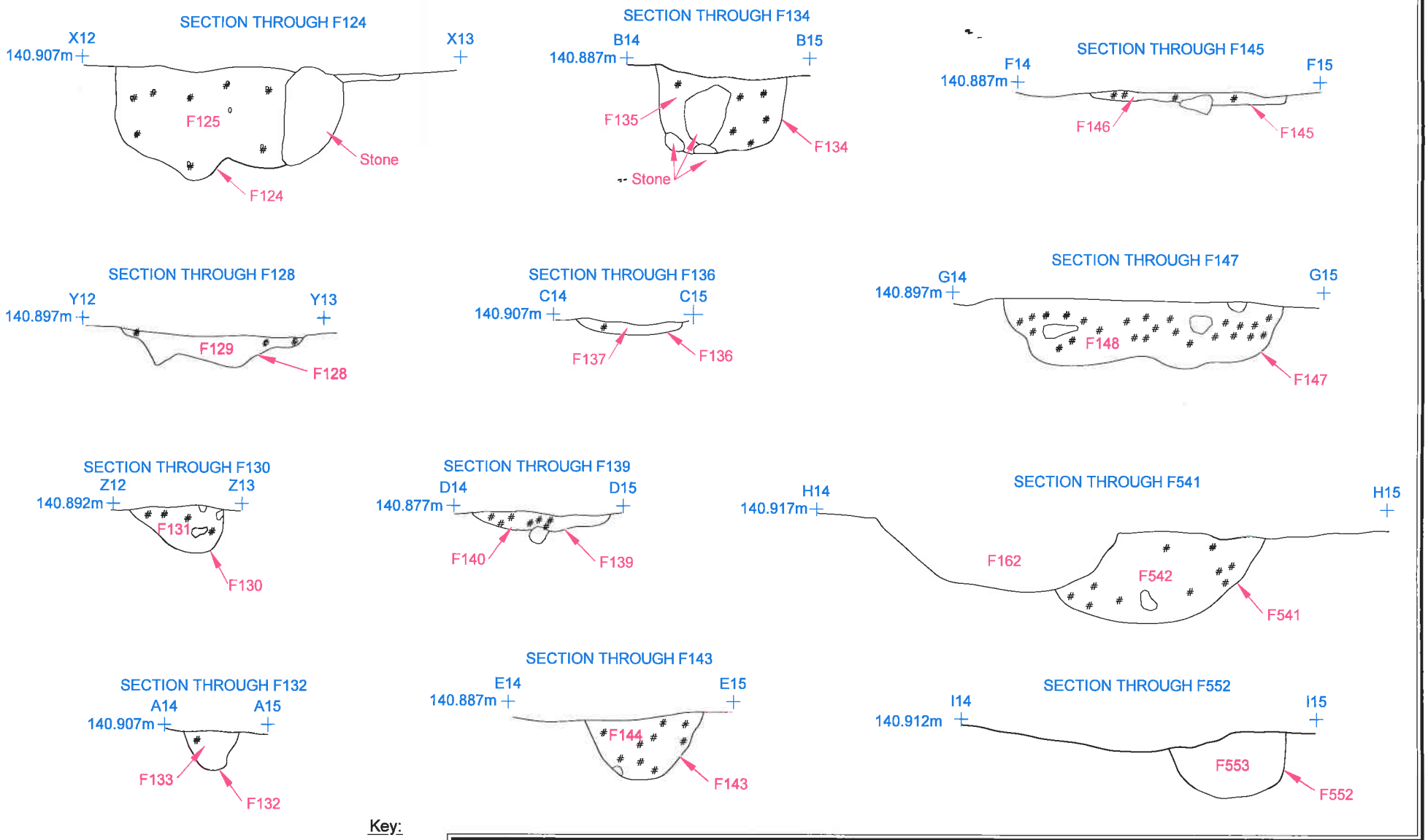
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10052

Figure 52: Post-excavation plan of features in Zone D.



Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:15 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10053

Figure 53: Zone D sections: Pit Group 1 (F120, F122, F126, F138, F231, F233), post-hole F532, and pit F645.



Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:15 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10054

Figure 54: Zone D sections, Pit Group 2: F124, F128, F130, F132, F134, F136, F139, F143, F145, F147, F541 and F552.

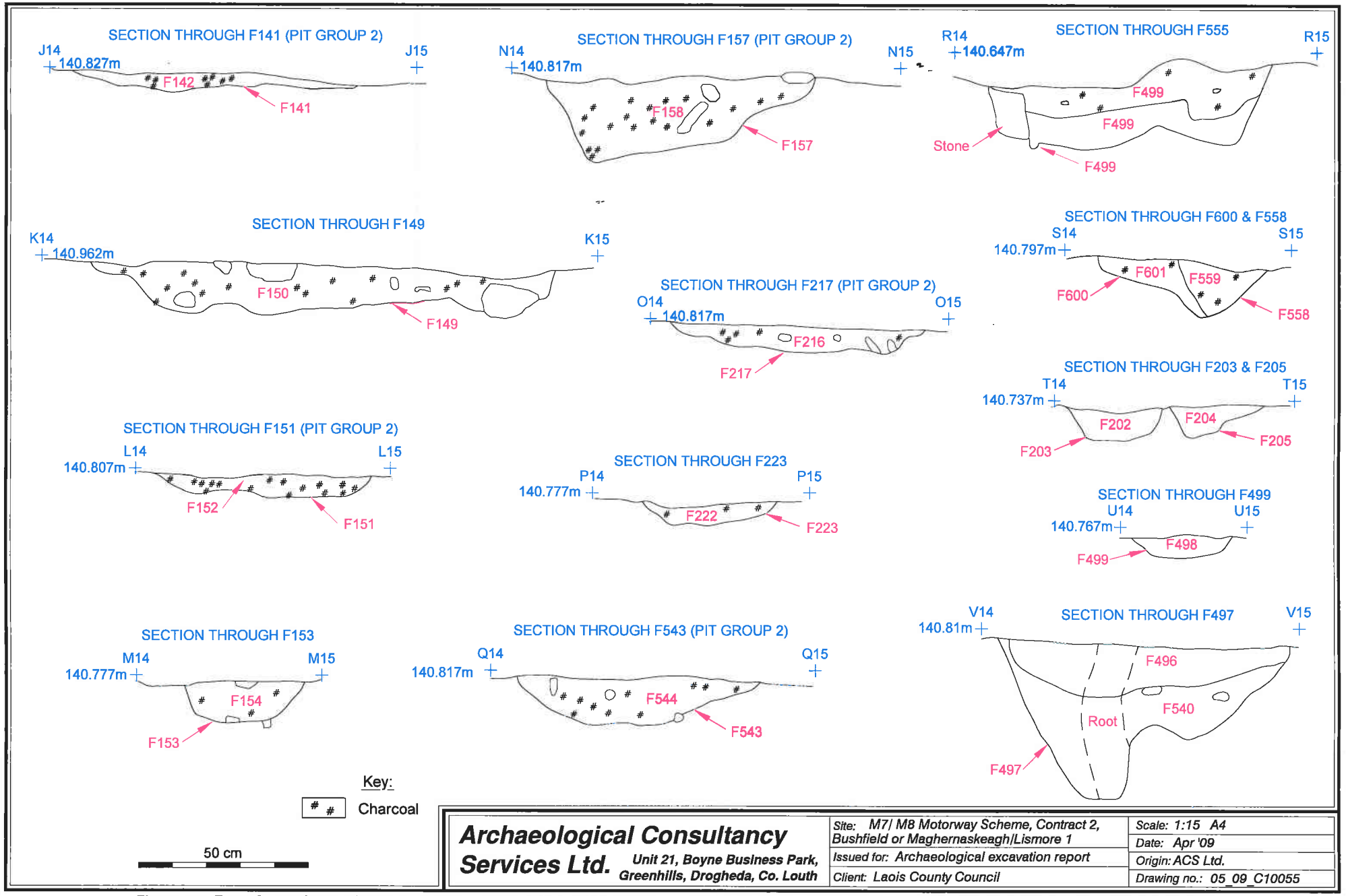


Figure 55: Zone D sections: Pit Group 2 (F141, F151, F157, F217, F543), Pit Group 3 (F149, F153, F223, F555, F558/F600, F203, F205, F499, F497).

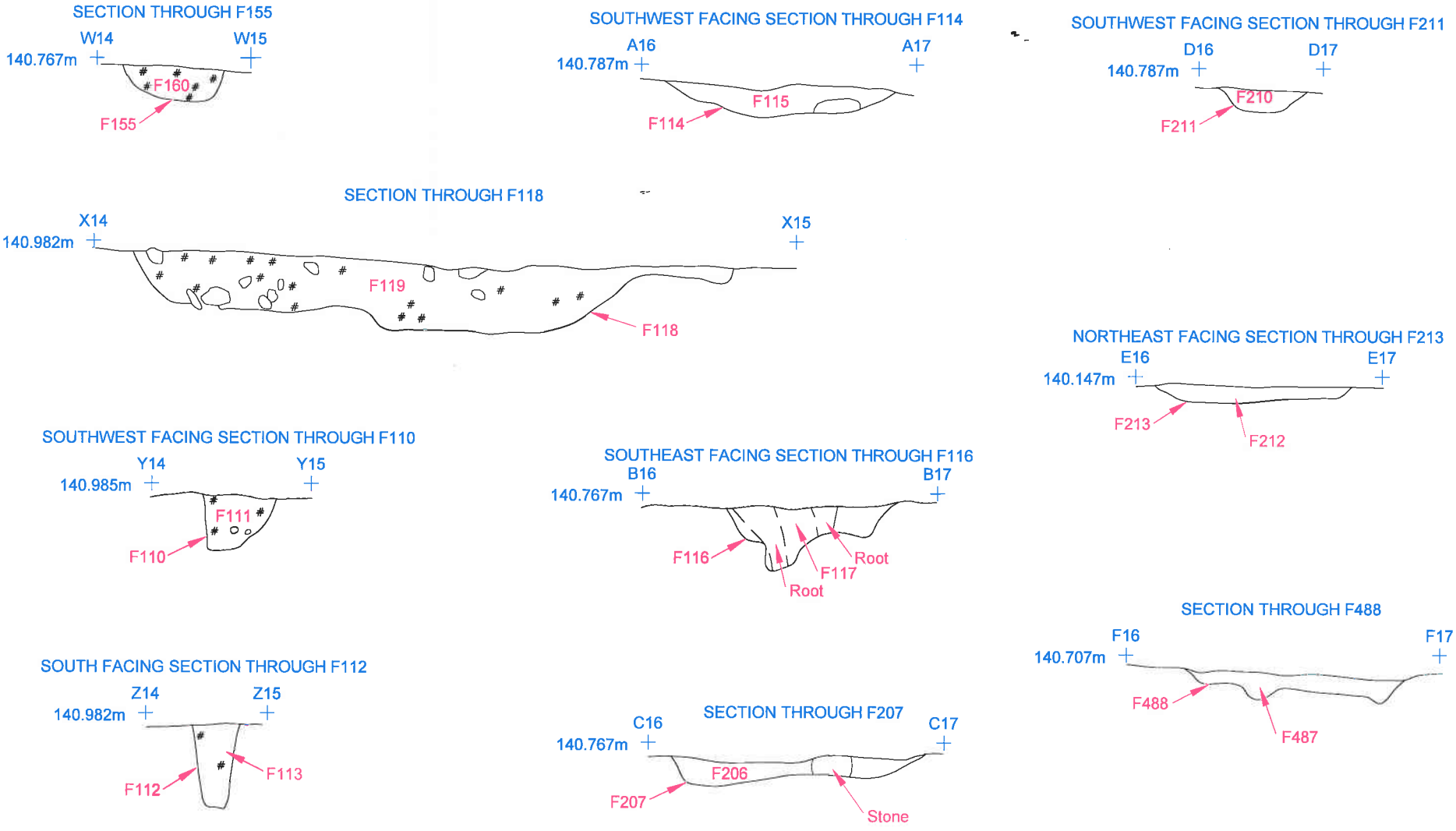


Figure 56: Zone D sections, Pit Group 3: F110, F114, F116, F118, F155, F207, F211, F213, F488, and stake-hole F112.

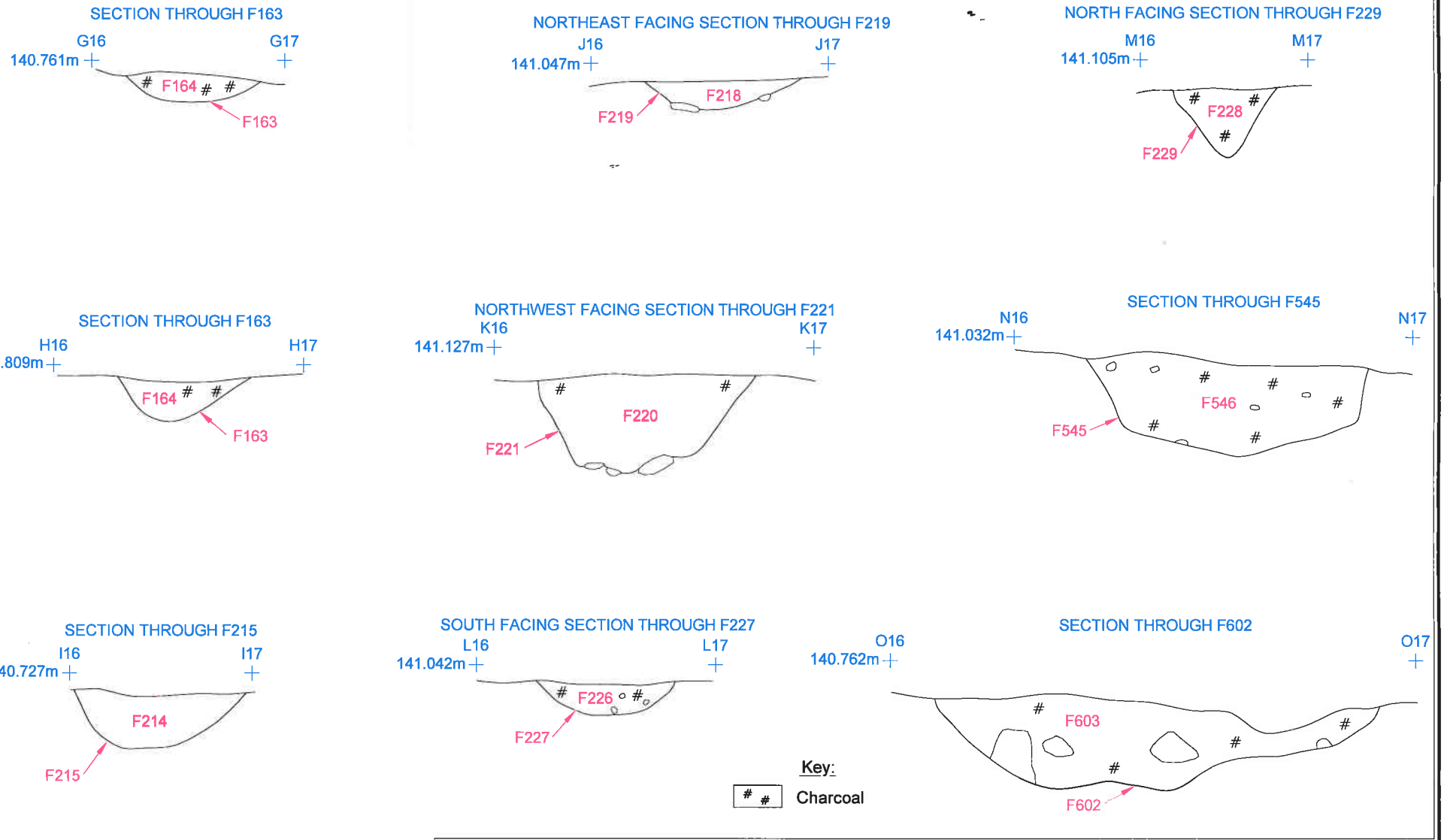
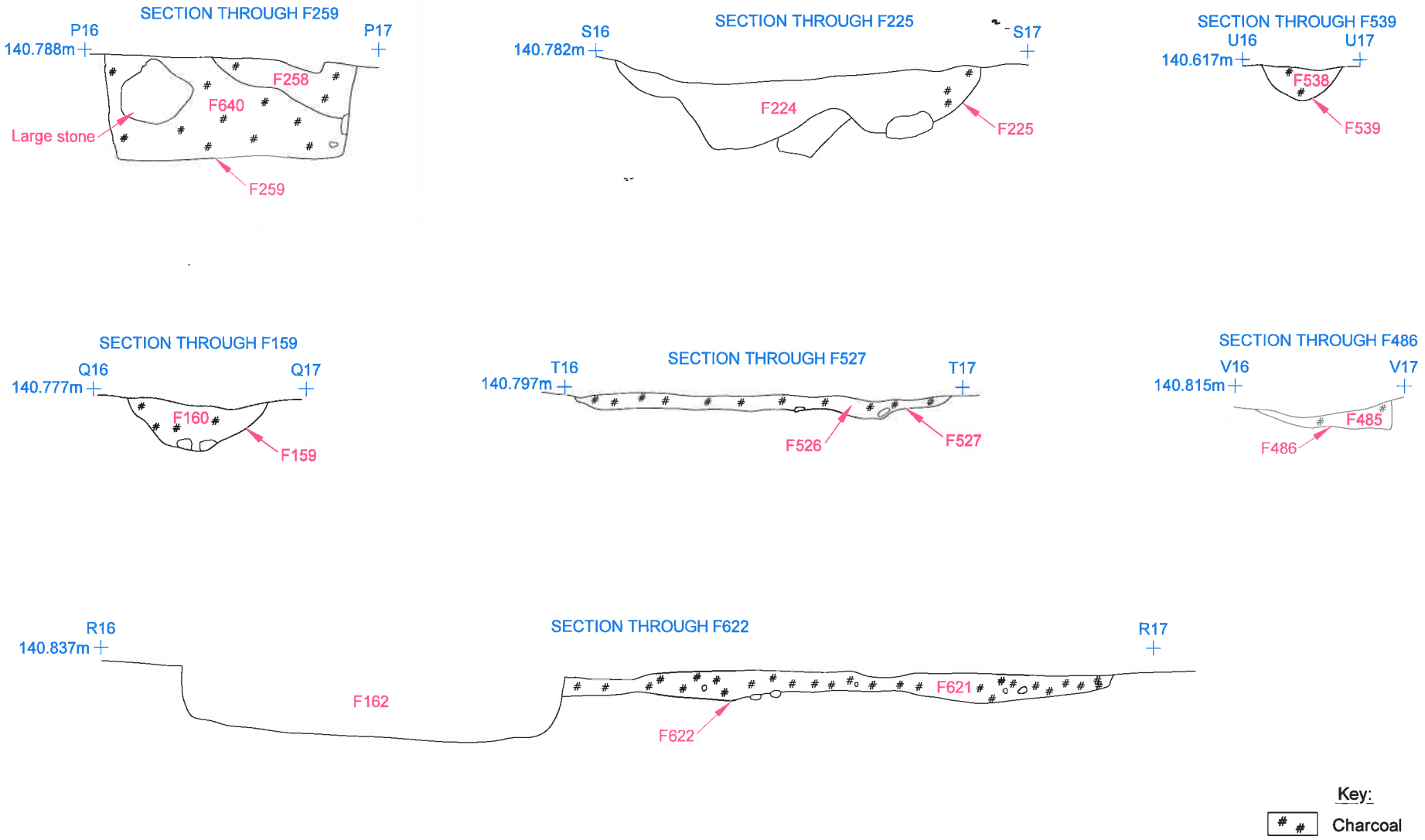
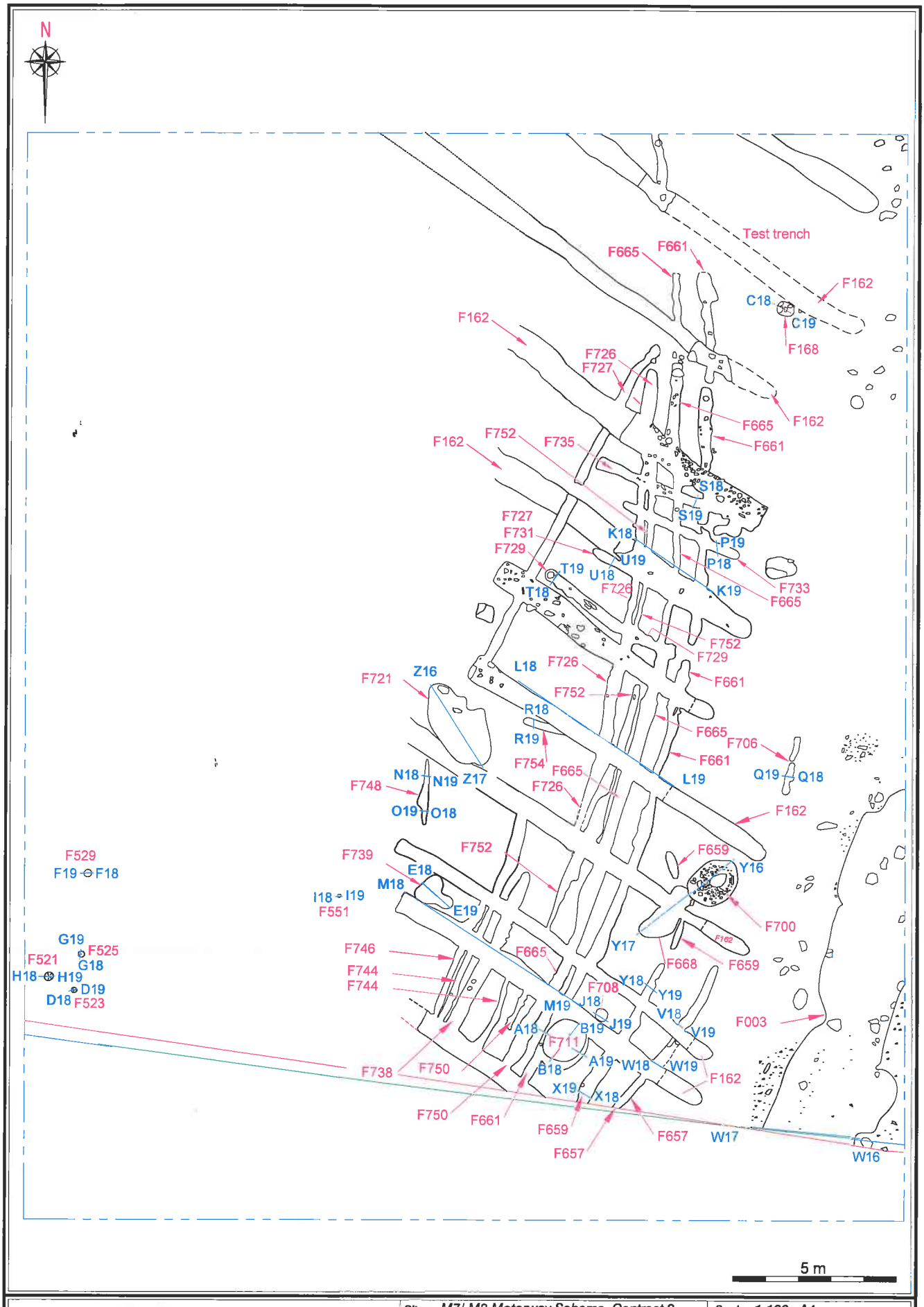


Figure 57: Zone D sections, Pit Group 3: F215, F219, F221, F227, F229, F545, F602, and ring-gully F163.



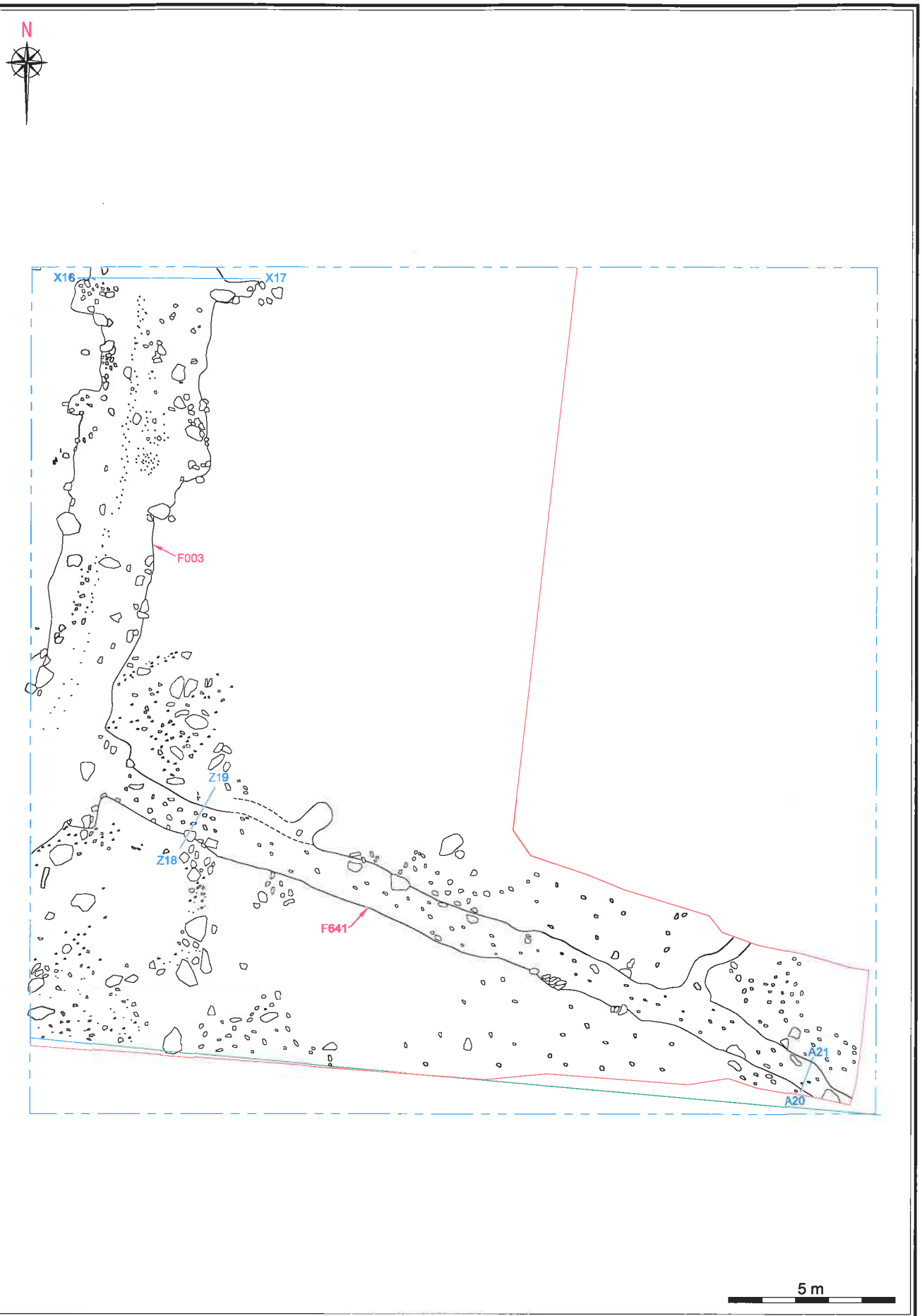
Archaeological Consultancy Services Ltd. *Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth*	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:15 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10058

Figure 58: Zone D sections: Pit Group 3 (F159, F225, F259, F486, F622), pits F527 and F539.



Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:160 A4
	Issued for: Archaeological excavation report	Date: Apr '09
	Client: Laois County Council	Origin: ACS Ltd.
		Drawing no.: 05_09_C10059

Figure 59: Post-excavation plan of features in Zone E.



Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:160 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10060

Figure 60: Post-excavation plan of ditch F641, Zone E.

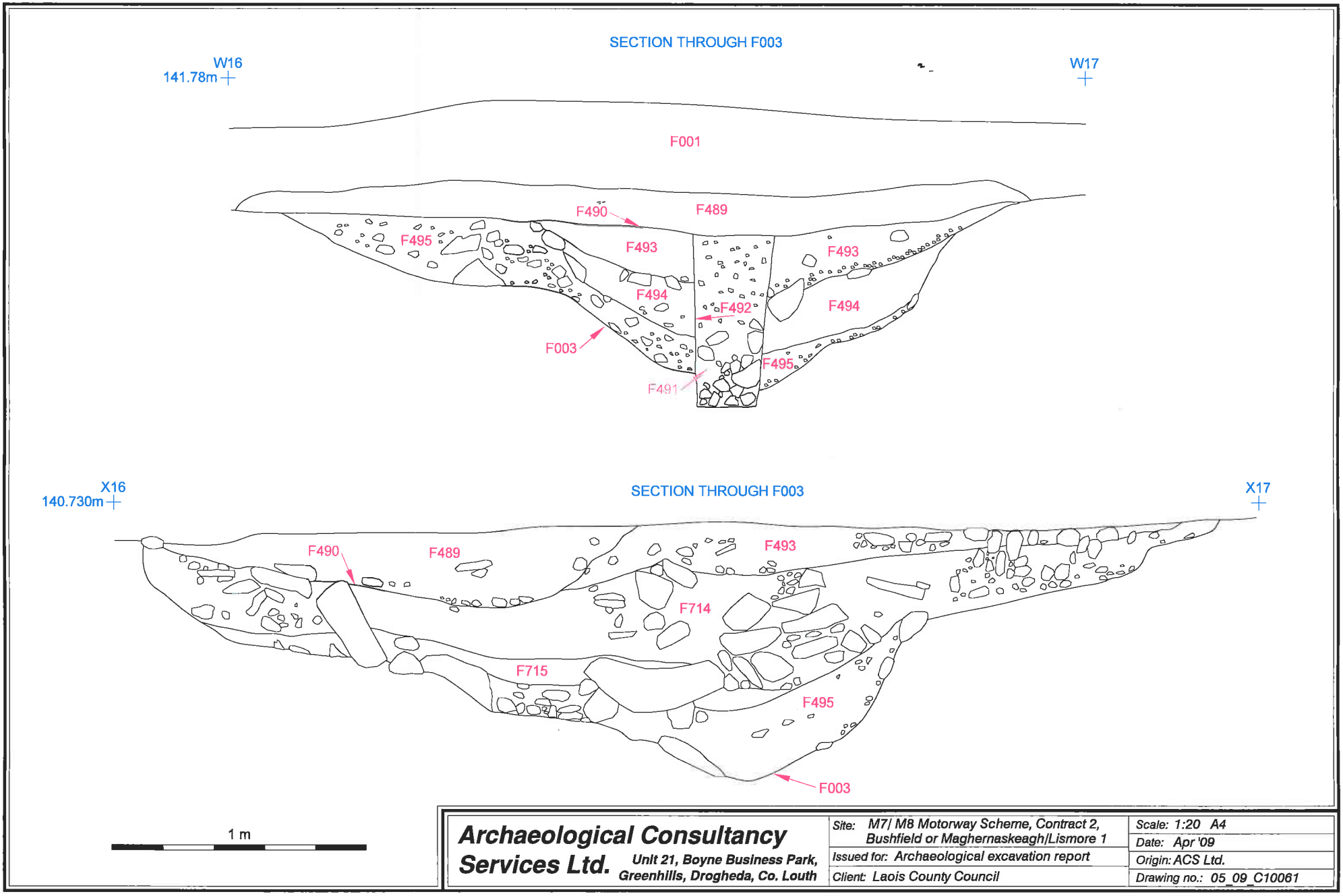


Figure 61: Sections W16-W17 and X16-X17 of enclosure ditch F003 in Zone E.

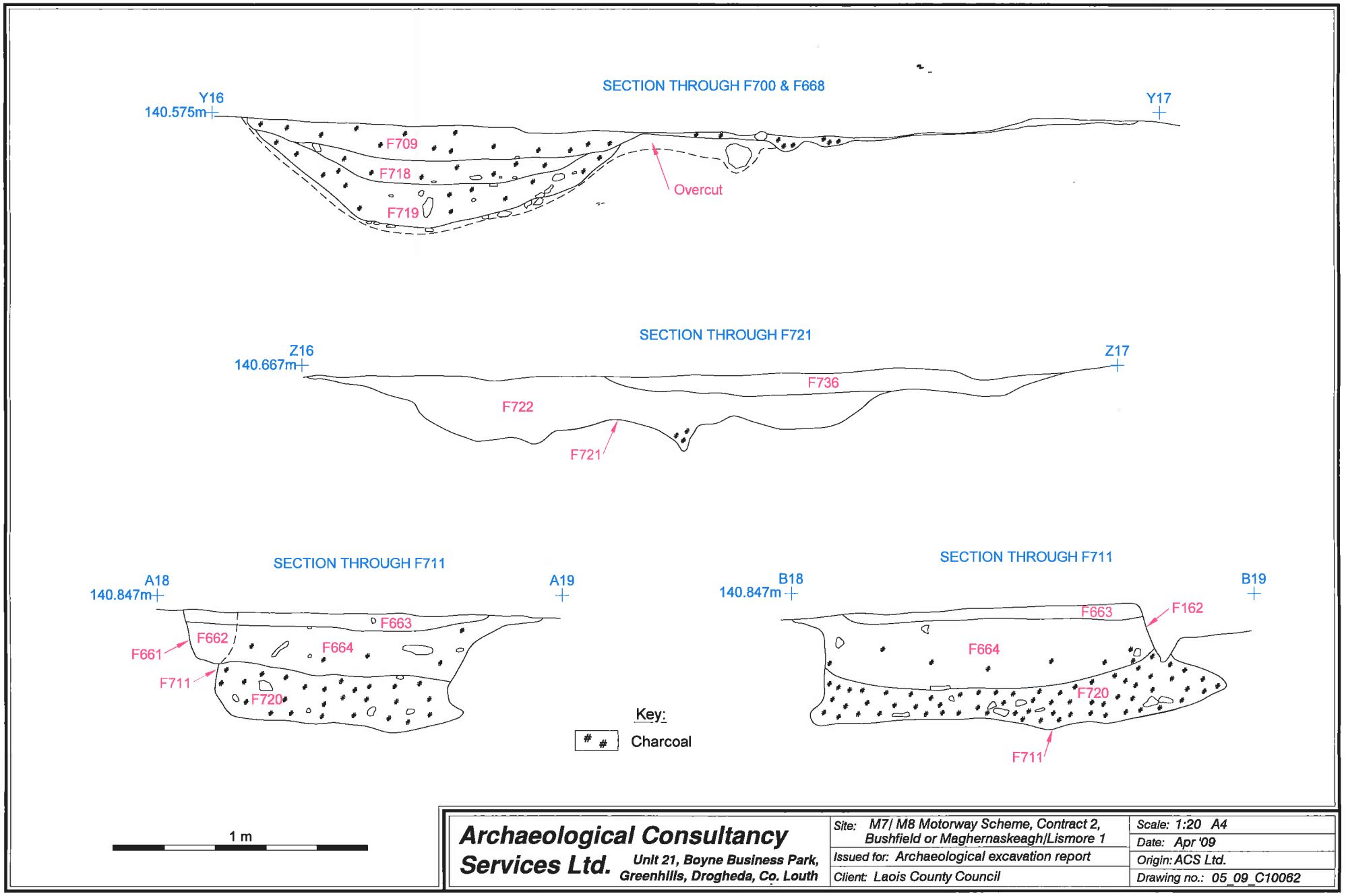
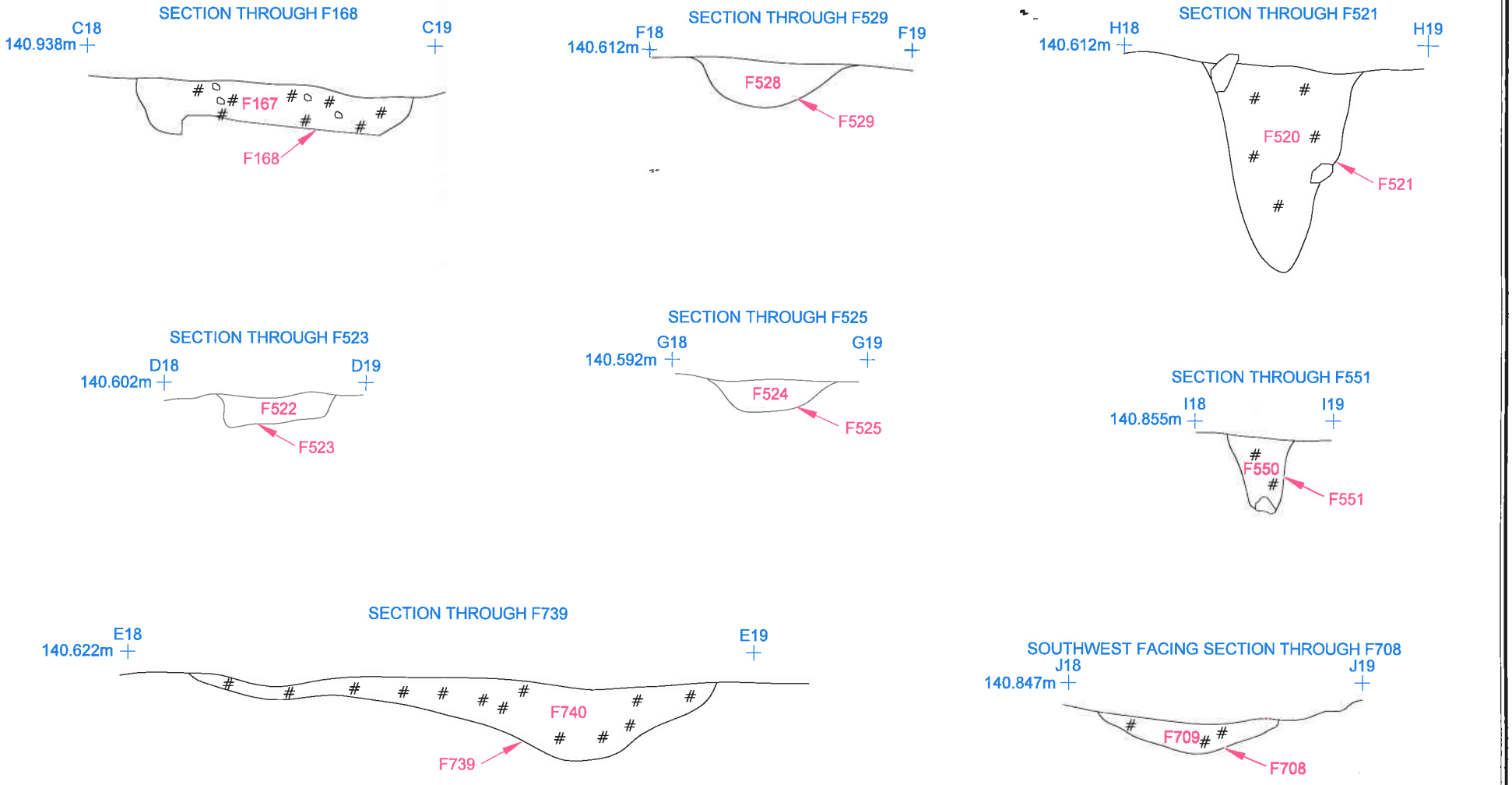


Figure 62: Zone E sections: large pits F700, F711 and F721.



Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:10 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10063

Figure 63: Zone E sections, stake-hole F551, and pits F168, F521, F523, F525, F529, F668, F708 and F739.

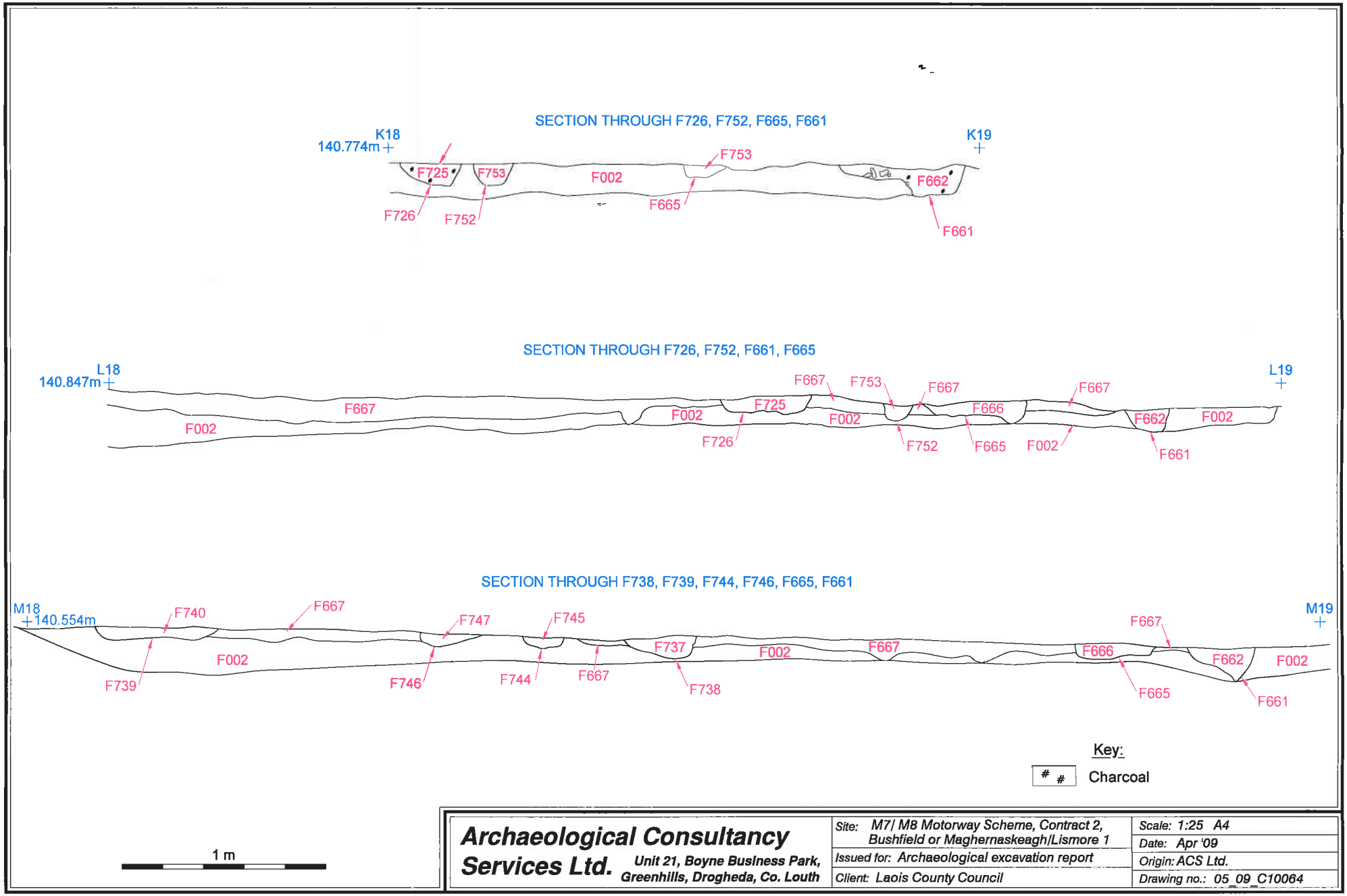


Figure 64: Zone E sections, linear features F661, F665, F726, F738, F744, F746, F752, and pit F739.

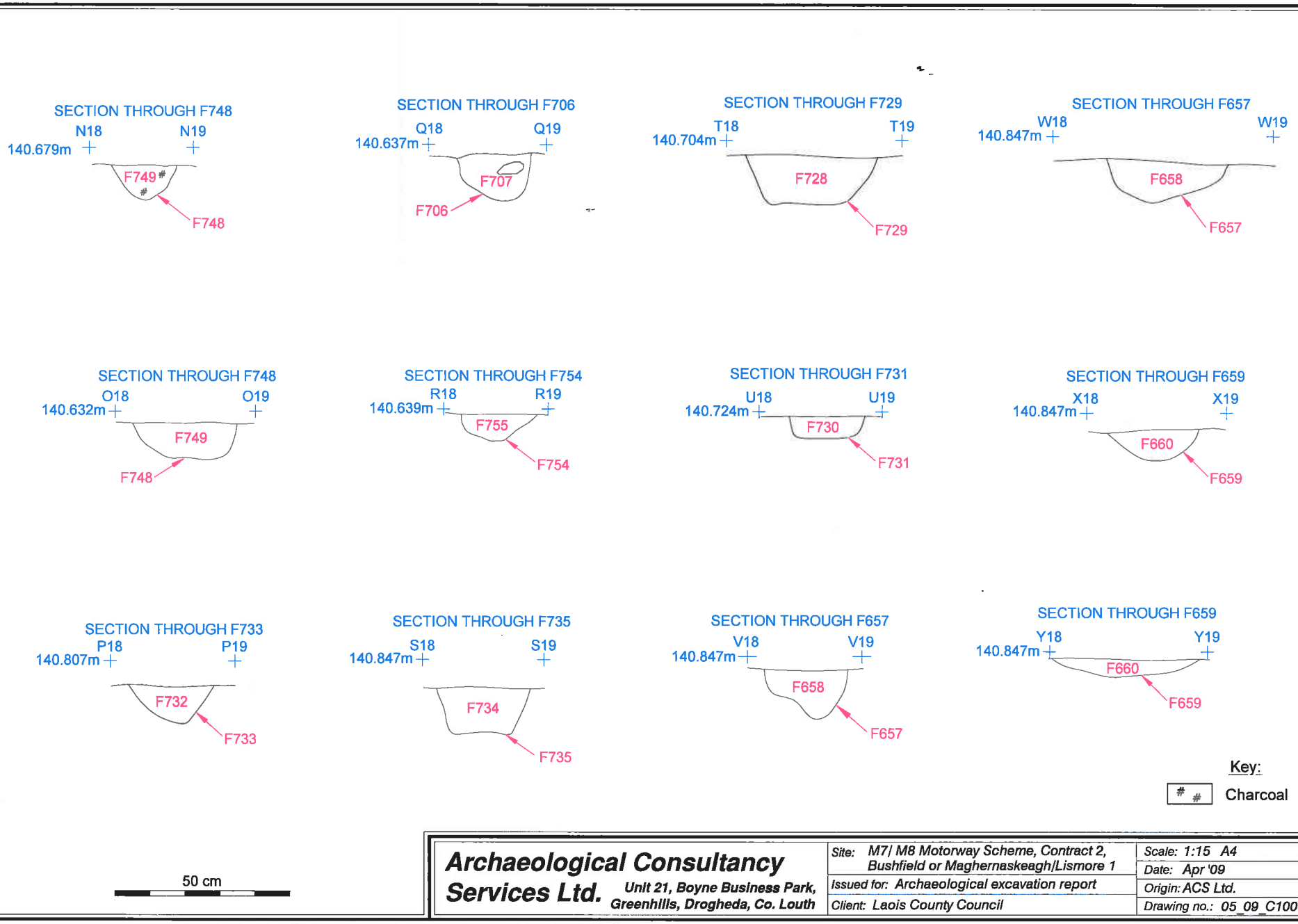
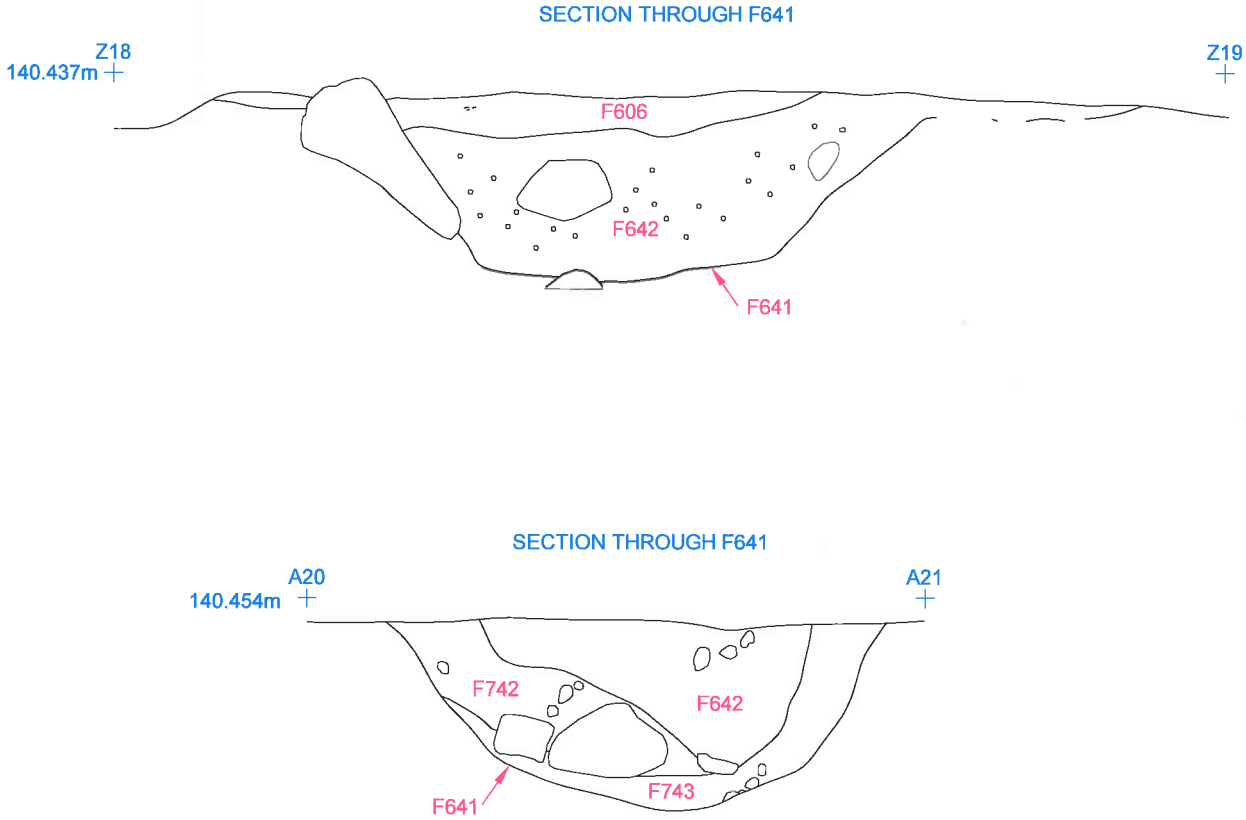


Figure 65: Zone E sections: linear features F657, F659, F706, F729, F731, F733, F735, F748 and F754.



50 cm

Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth

Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:15 A4
	Date: Apr '09
Issued for: Archaeological excavation report	Origin: ACS Ltd.
Client: Laois County Council	Drawing no.: 05_09_C10066

Figure 66: Zone E, two sections of ditch F641.

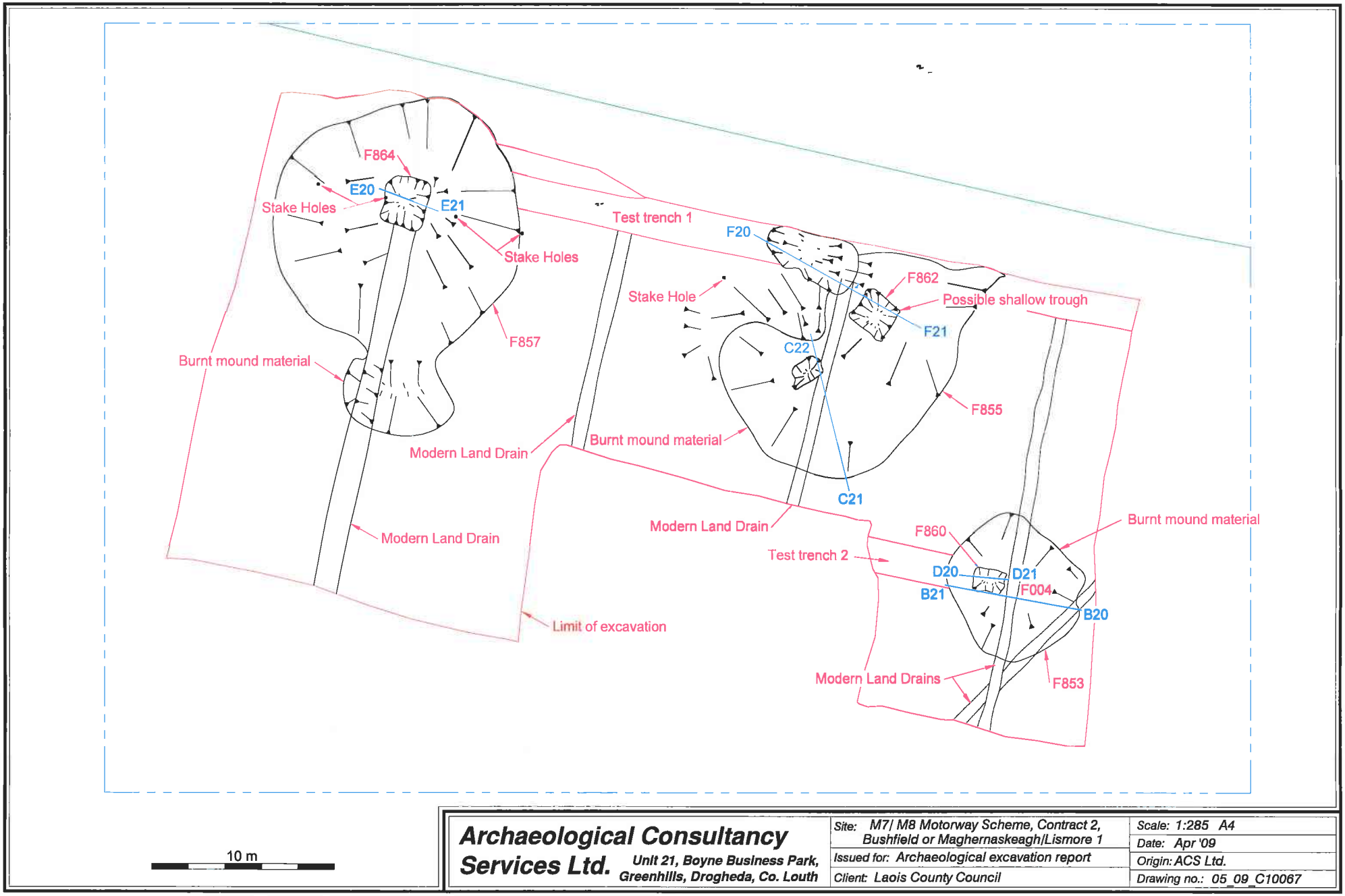


Figure 67: Zone F: Outline plan of burnt spreads F853, F855 and F857, and post-excavation plan of troughs F860, F862 and F864.

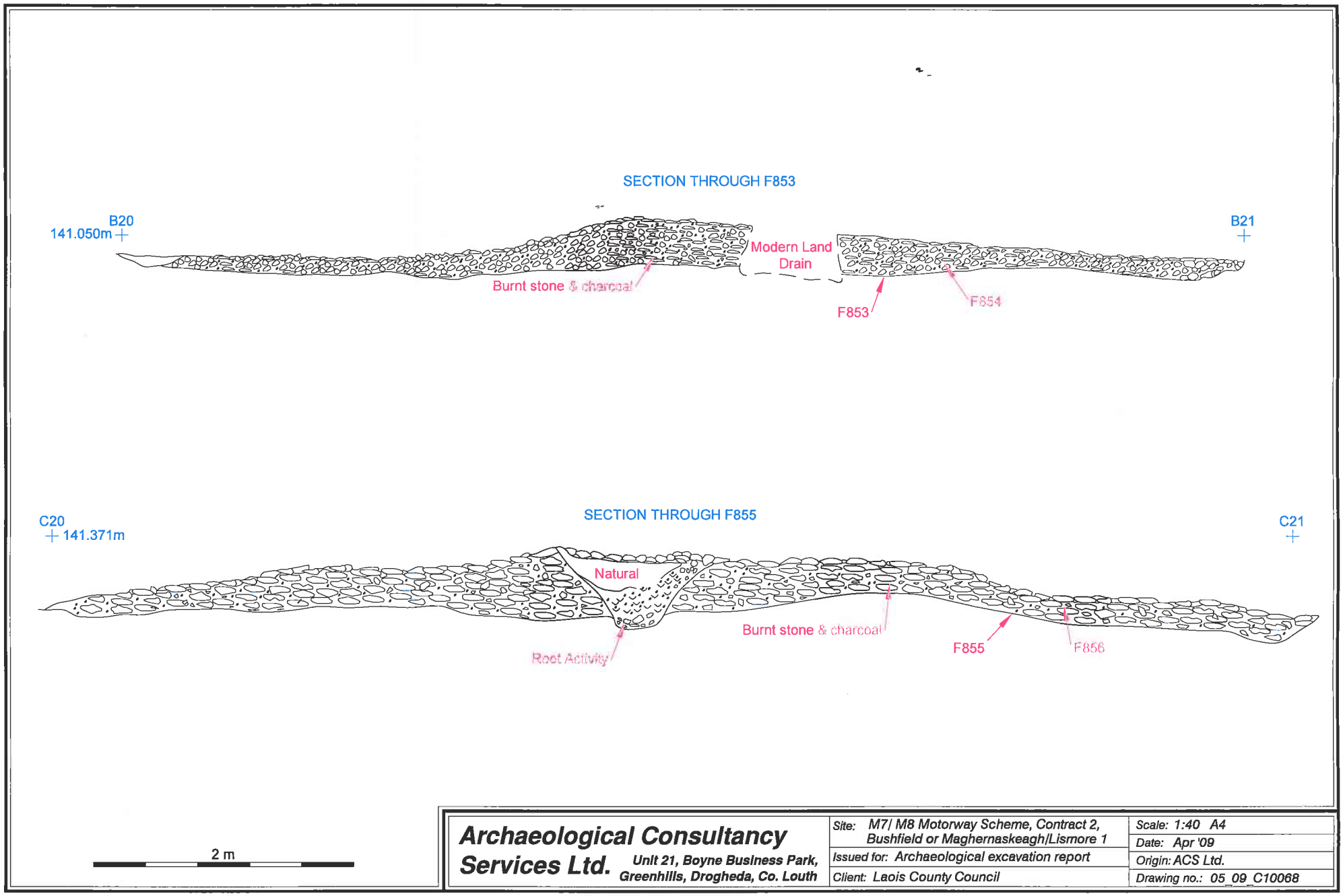


Figure 68: Zone F sections: burnt spreads F853, F855 and F857.

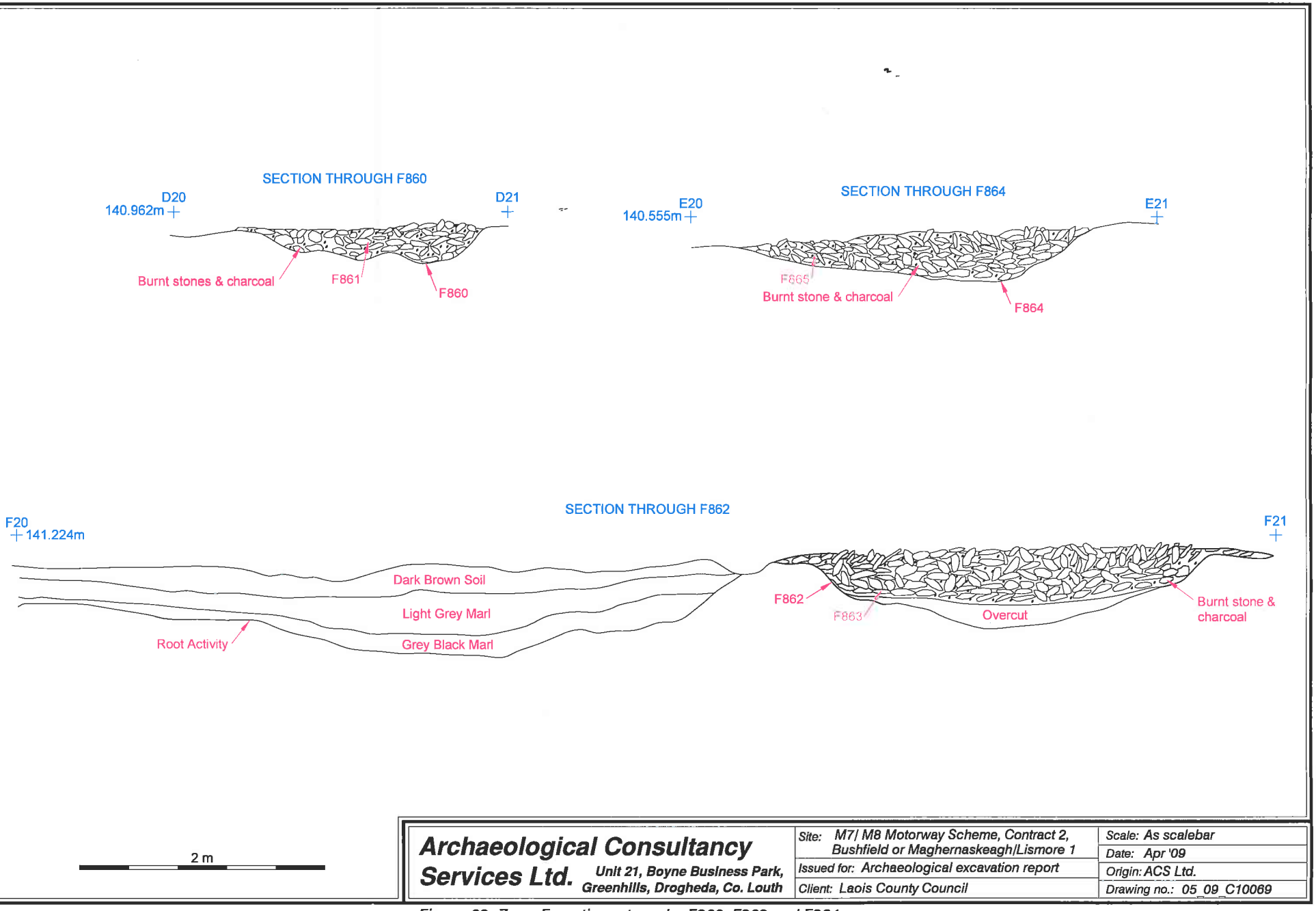
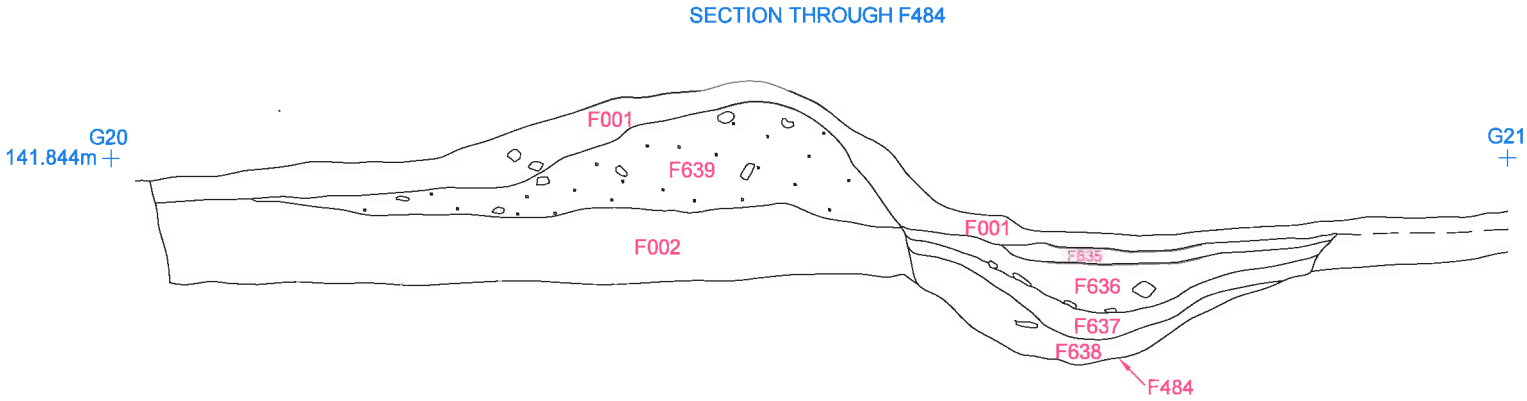


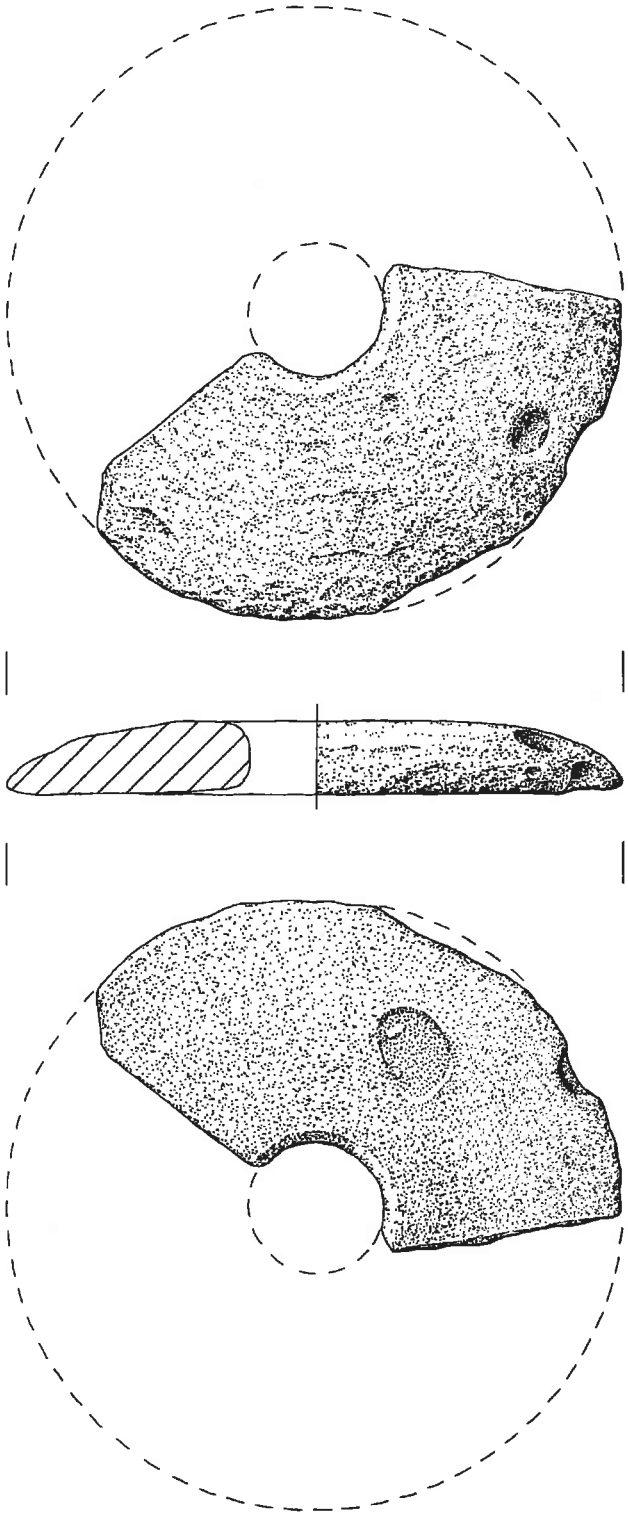
Figure 69: Zone F sections: troughs F860, F862 and F864.



2 m

Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:40 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10070

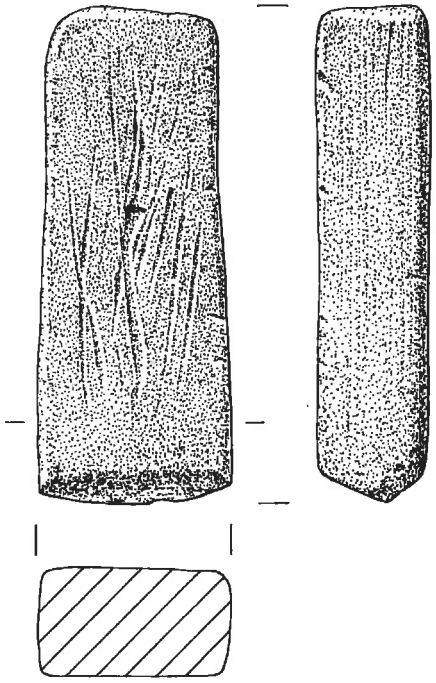
Figure 70: Bushfield or Maghernaskeagh/Lismore townland boundary, section of bank F639 and ditch F484.



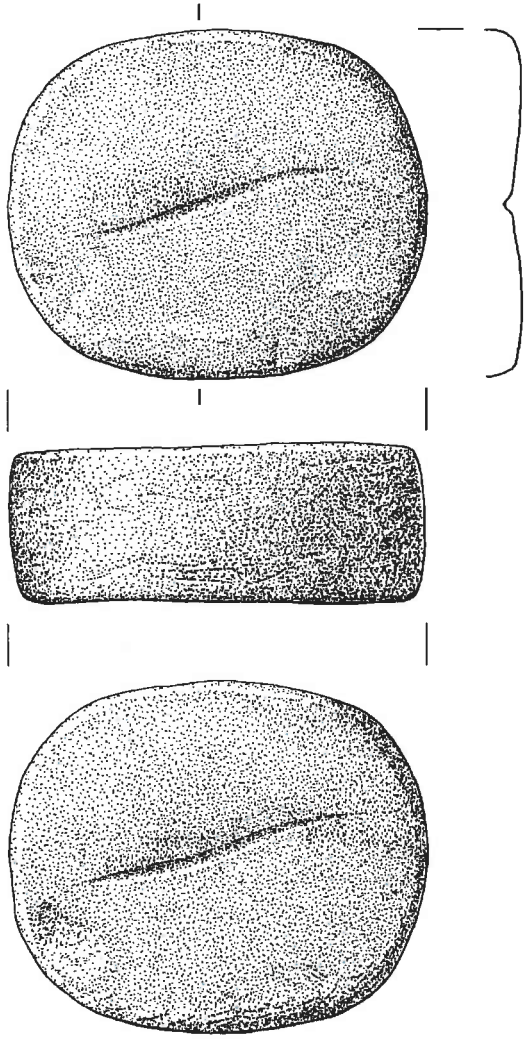
20 cm

Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:5 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10071

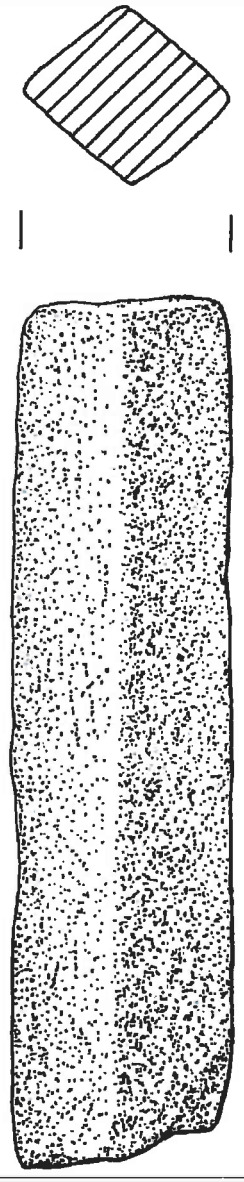
Figure 71: Drawing of quernstone fragment from ditch F003 in Zone B (E2220:5:4).



E2220:72:1 Sharpening stone



E2220:72:2 Sharpening stone

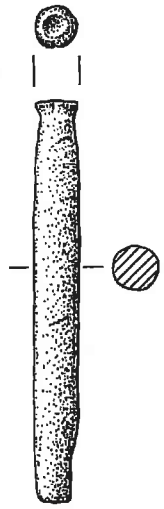


E2220:326:1
Grinding stone

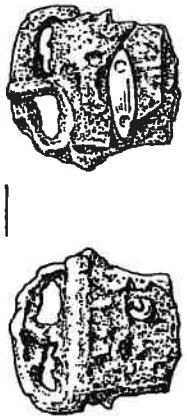
5 cm

Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:1.25 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10072

Figure 72: Drawings of sharpening stones (E2220:72:1 and E2220:72:2) from pit F050 in Zone B, and grinding stone (E2220:326:1) from ditch F003 (Zone C).



E2220:35:1 Lignite stylus

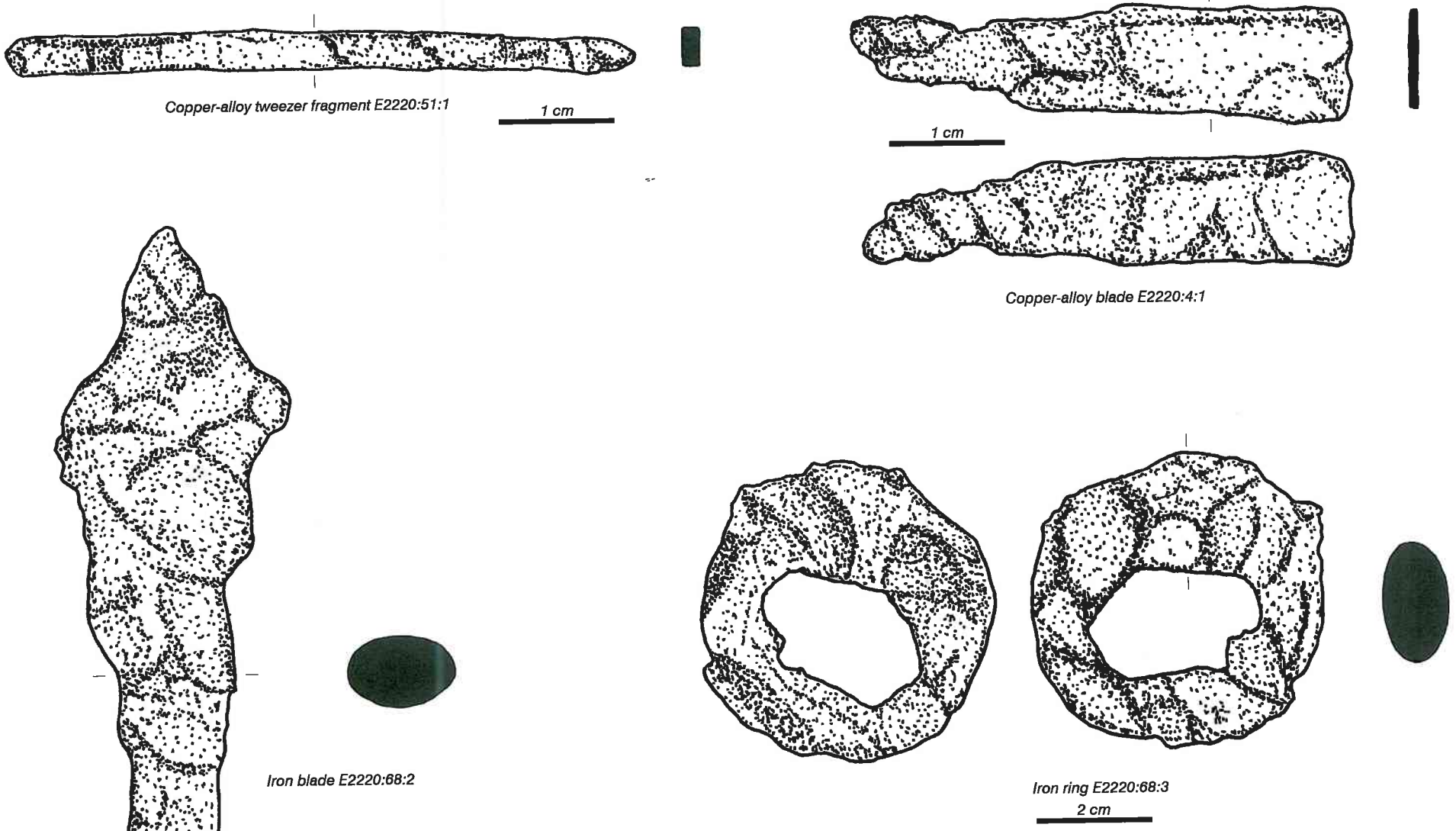


E2220:820:1 Iron clasp

5 cm

Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:1 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10073

Figure 73: Drawings of lignite stylus (E2220:35:1) from ditch F034 (Zone B) and iron clasp from burial SK50 (E2220:820:1) in Zone C.



Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: As scalebars
	Issued for: Archaeological excavation report	Date: Apr '09
	Client: Laois County Council	Origin: ACS Ltd.
		Drawing no.: 05_09_C10074

Figure 74: Finds illustrations

Plate 1: General view of ongoing work on the Lismore side of the townland boundary (Zones A and B), facing east (05_09_CP0024_05)

Plate 2: Enclosure ditch F003, post-excavation (Zone A and B), facing south-west (05_09_CP0030_20)

Plate 3: Enclosure ditch F003, post-excavation (Zone B), facing south-east (05_09_CP0030_21)

Plate 4: Enclosure entrance (Zone A), facing south (05_09_CP0026_19)

Plate 5: Western terminal of enclosure ditch F003 (Zone A), post-excavation, facing west (05_09_CP0028_07)

Plate 6: Bowl furnace group, F086, F088, F090 etc (Zone A), pre-excavation, facing north-east (05_09_CP0049_13)

Plate 7: Bowl furnace group, F086, F088, F090 etc (Zone A), post-excavation, facing north-north-west (05_09_CP0052_23)

Plate 8: Deposit F051 (Zone B), pre-excavation, facing south-east (05_09_CP0017_13)

Plate 9: Ongoing excavation of pit F050 (Zone B), facing south-south-west (05_09_CP0024_20)

Plate 10: Pit F050 (Zone B), post-excavation, facing south (05_09_CP0026_15)

Plate 11: Elevated post-excavation view of the site on the Bushfield side of the townland boundary (Zones C, D and E), facing south-west (05_09_Hawkeye_Bushfield/Lismore 1, 27 July 06, 058)

Plate 12: Enclosure ditch F003 (Zone C), post-excavation, facing north-west (05_09_CP1010_21)

Plate 13: Enclosure ditch F003 (Zone E), post-excavation, facing south (05_09_CP1008_01)

Plate 14: Grave F409/SK5 (Zone C burials, Group 1), mid-excavation, facing west (05_09_CP1006_21)

Plate 15: Grave F771/SK24 (Zone C burials, Group 1), mid-excavation, facing west (05_09_CP1014_16)

Plate 16: Grave F809, fill F808 (Zone C burials, Group 2), pre-excavation, truncated by linear feature F726, facing north (05_09_CP1019_05)

Plate 17: Grave F822/SK58 (Zone C burials, Group 2), mid-excavation, facing west (05_09_CP1021_20)

Plate 18: Grave F832/SK65 (Zone C burials, Group 2), mid-excavation, facing west (05_09_CP1022_16)

Plate 19: Grave F461/SK47 (Zone C burials, Group 3), mid-excavation, facing west (05_09_CP1020_07)

Plate 20: Grave F840/SK72 (Zone C burials, Group 4), mid-excavation, facing west (05_09_CP1023_05)

Plate 21: Grave F828/SK65 (Zone C burials, Group 1, Level 2), mid-excavation, facing west (05_09_CP1022_20)

Plate 22: Grave F820/SK50 (Zone C burials, Group 2, Level 2), mid-excavation, facing west (05_09_CP1021_10)

Plate 23: General view of Group 1 burials (Zone C), post-excavation, facing north-west (05_09_CP1017_18)

Plate 24: Pit F187 (Zone C, pit group 1), post-excavation, facing south-east (05_09_CP0096_21)

Plate 25: Pit F239 (Zone C, pit group 1), post-excavation, facing north-west (05_09_CP0096_20)

Plate 26: Pit F175 (Zone C, pit group 2), post-excavation, facing north (05_09_CP0096_24)

Plate 27: Pit F201 (Zone C, pit group 2), mid-excavation, facing north-west (05_09_CP1000_04)

Plate 28: Pit F399 (Zone C, between Group 1 graves F401 and F771), mid-excavation, facing south (05_09_CP1015_13)

Plate 29: Post-hole F449 (Zone C), post-excavation, facing north (05_09_CP1008_19)

Plate 30: Pit F120 (Zone D), post-excavation, facing west (05_09_CP0097_19)

Plate 31: Pit F124 (Zone D), post-excavation, facing south (05_09_CP0097_11)

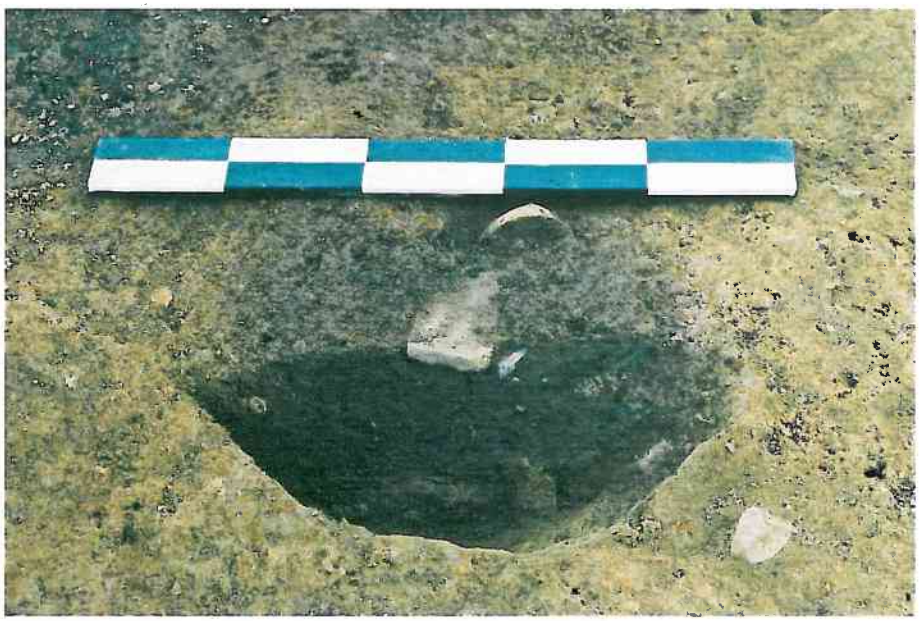


Plate 32: Pit F153 (Zone D), mid-excavation, facing north (05_09_CP0099_04)

Plate 33: Pit F259 (Zone D), post-excavation, facing south-east (05_09_CP1003_09)

Plate 34: Ring-gully F163 (Zone D), post-excavation, facing west (05_09_CP0098_17)

Plate 35: Pit F700 (Zone E), post-excavation, facing north-east (05_09_CP1009_06)

Plate 36: Pit F711 (Zone E), post-excavation, facing east-south-east (05_09_CP1009_07)

Plate 37: Post-hole F521 (Zone E), post-excavation, facing east (05_09_CP0097_15)

Plate 38: Pit F168 (Zone E), post-excavation, facing north (05_09_CP1007_21)

Plate 39: Elevated post-excavation view of features in Zone E, facing south-west (05_09_Hawkeye_Bushfield/Lismore1, 27 July 06, 036)

Plate 40: Linear features F735 and F733, F665 and F661 (Zone E), post-excavation, facing north (05_09_CP1011_16)

Plate 41: Linear features F746, F744, F738, F726, F752, F750/F665, facing north (05_09_CP1011_27)

Plate 42: Burnt spread F858 (Zone F), pre-excavation, facing north (05_09_CP1025_08)

Plate 43: Fragment of rotary quernstone (quartzite), from enclosure ditch F003 in Zone B (E2220:5:4_003)

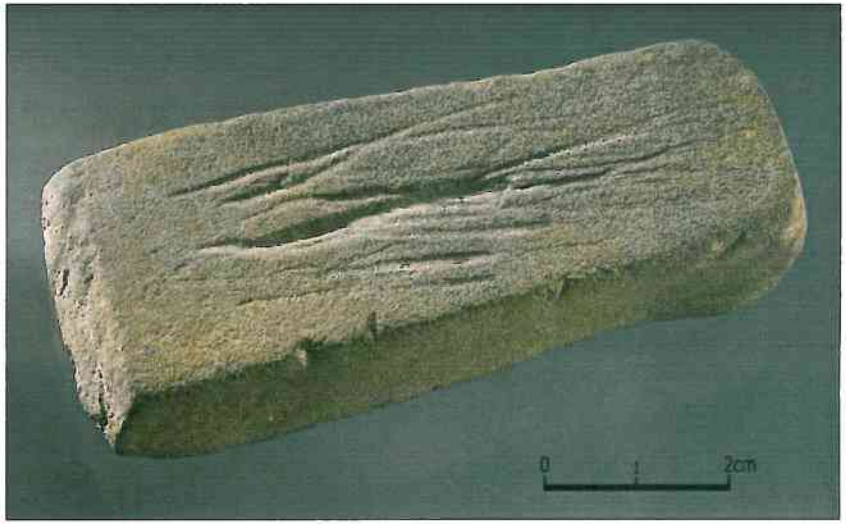


Plate 44: Sharpening stone (quartzite) from pit F050 in Zone B (E2220:72:1_stone-1)

Plate 45: Sharpening stone (quartz) from pit F050 in Zone B (E2220:72:2_stone 002)

Plate 46: Photo of copper-alloy blade E220:4:1 (05_09_S1101)

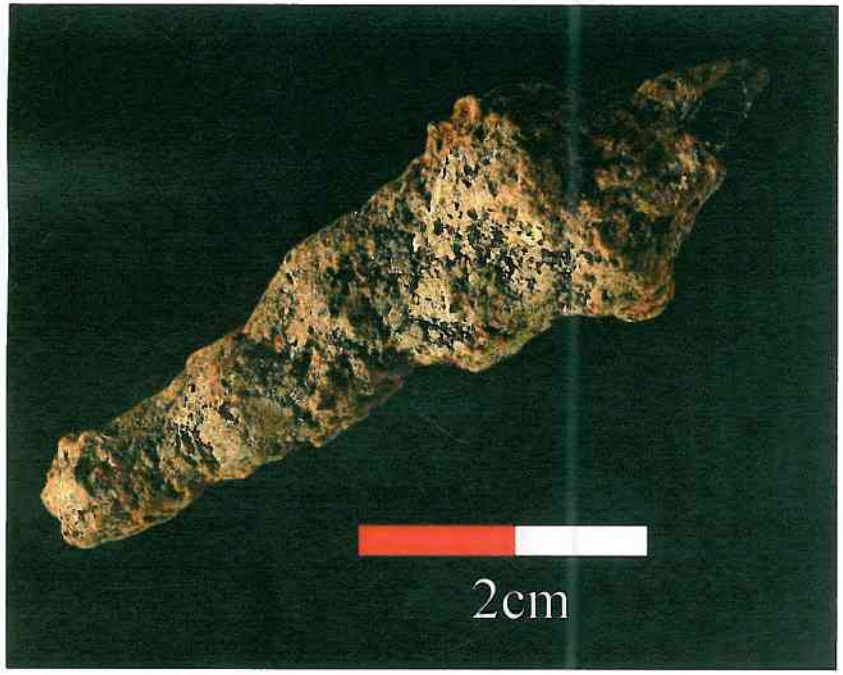
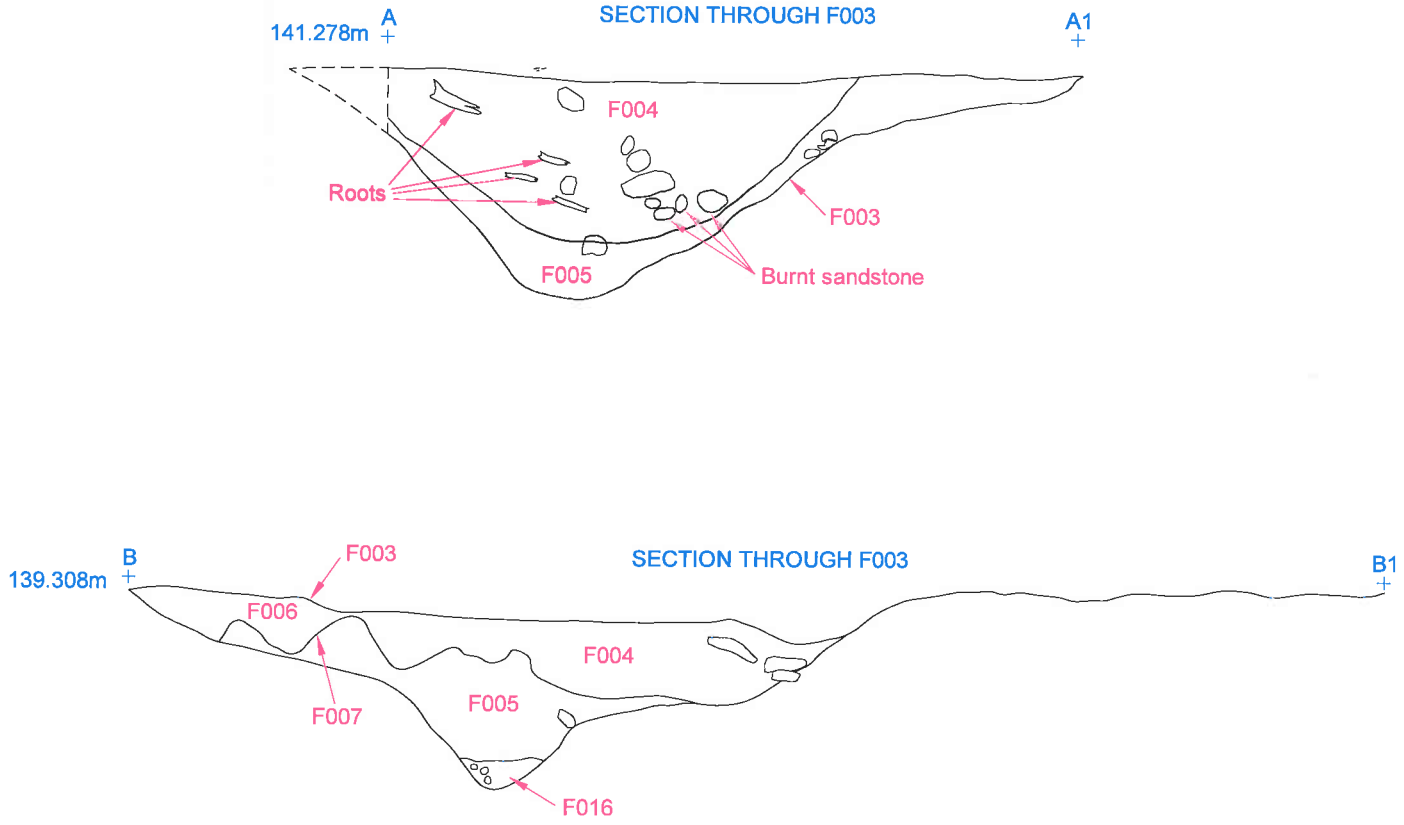


Plate 48: Photo of iron blade E220:68:2 (05_09_S1105)

Plate 47: Photo of copper-alloy tweezers fragment E220:51:1 (05_09_S1103)

Plate 49: Photo of iron ring E220:68:3 (05_09_S1107)



Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:30 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10010

Figure 10: Sections A-A1 and B-B1 of enclosure ditch F003 in Zone A.

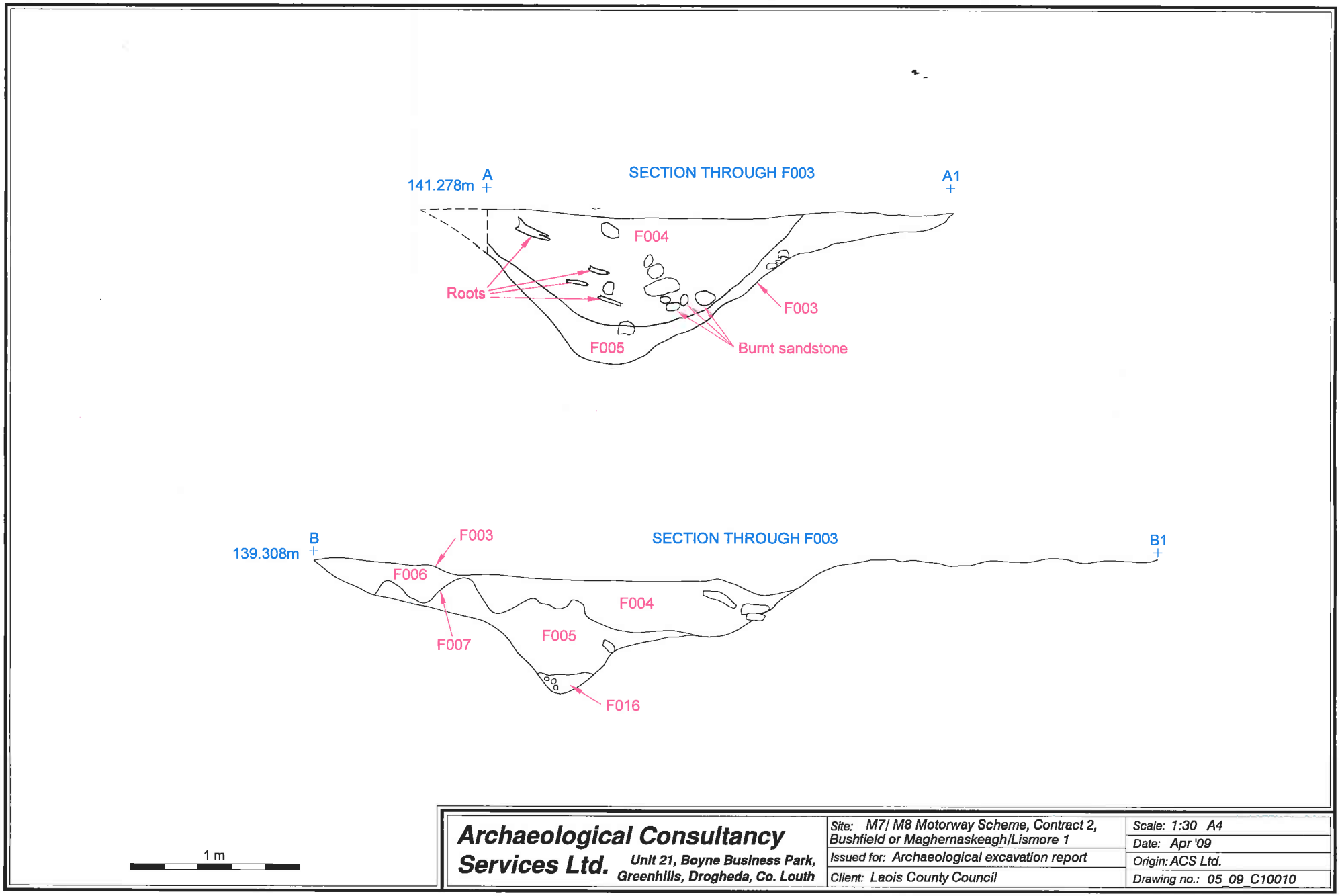
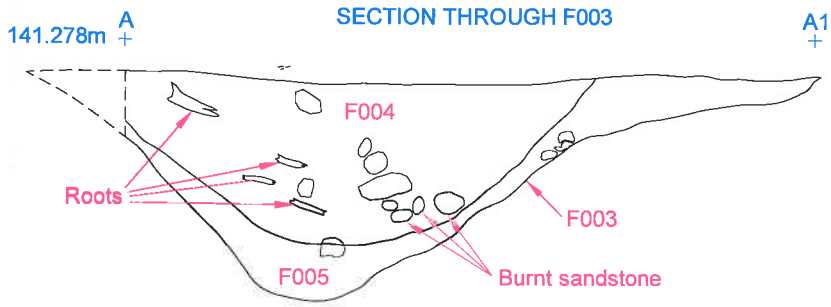
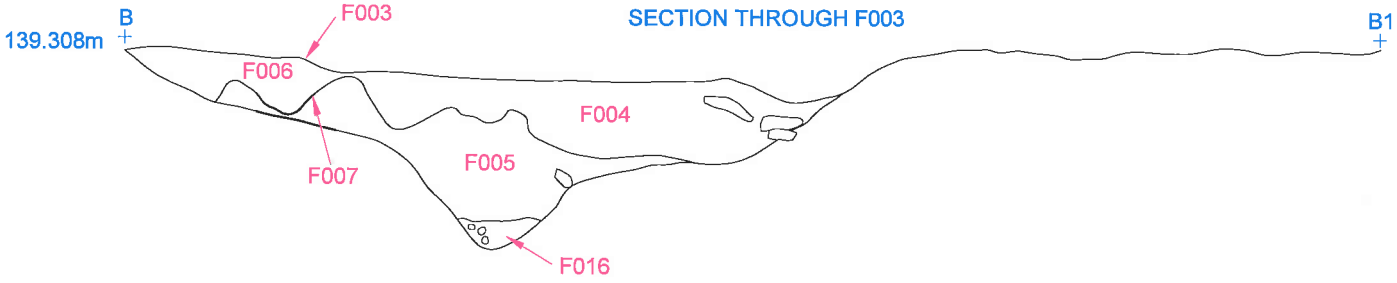


Figure 10: Sections A-A1 and B-B1 of enclosure ditch F003 in Zone A.

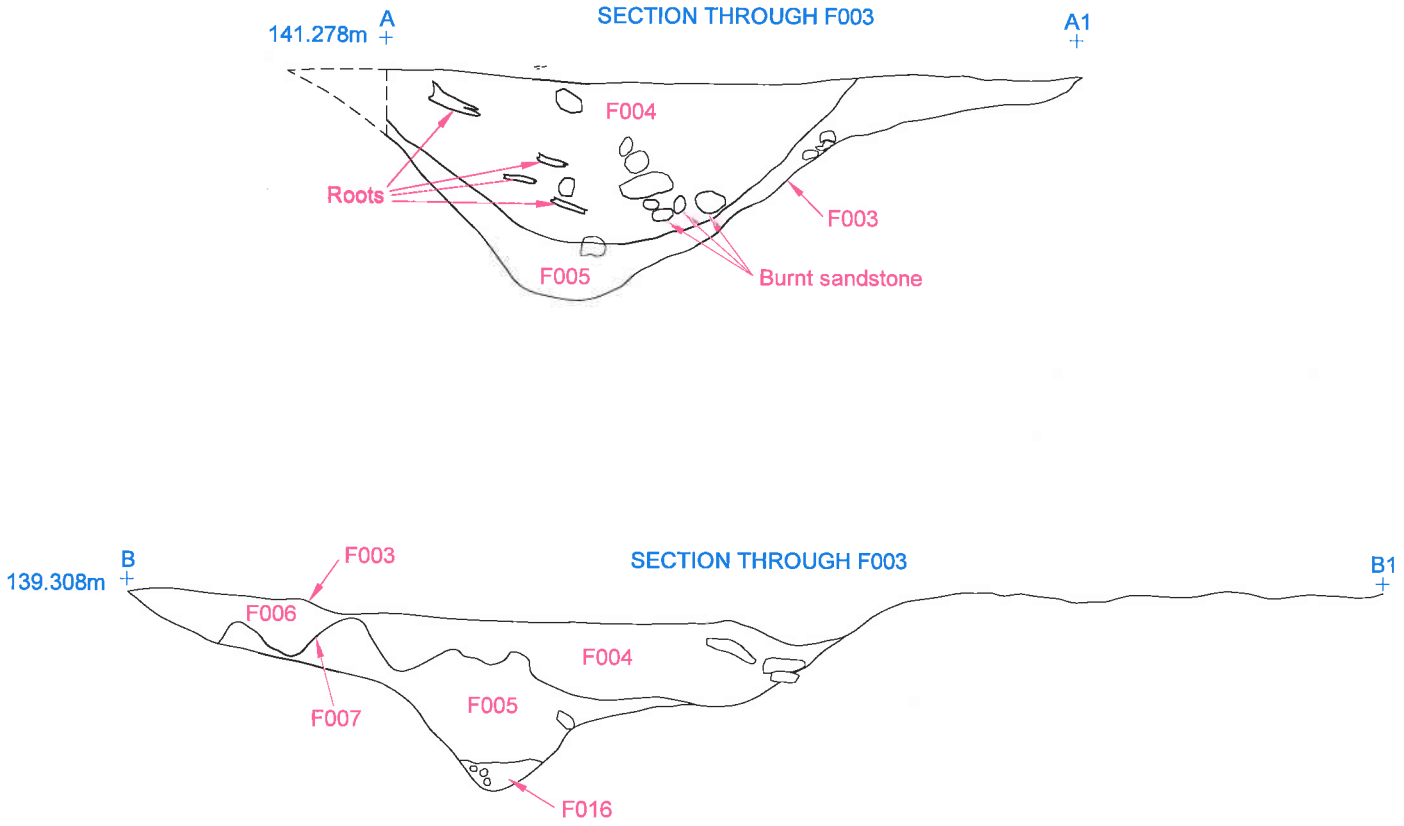




1 m

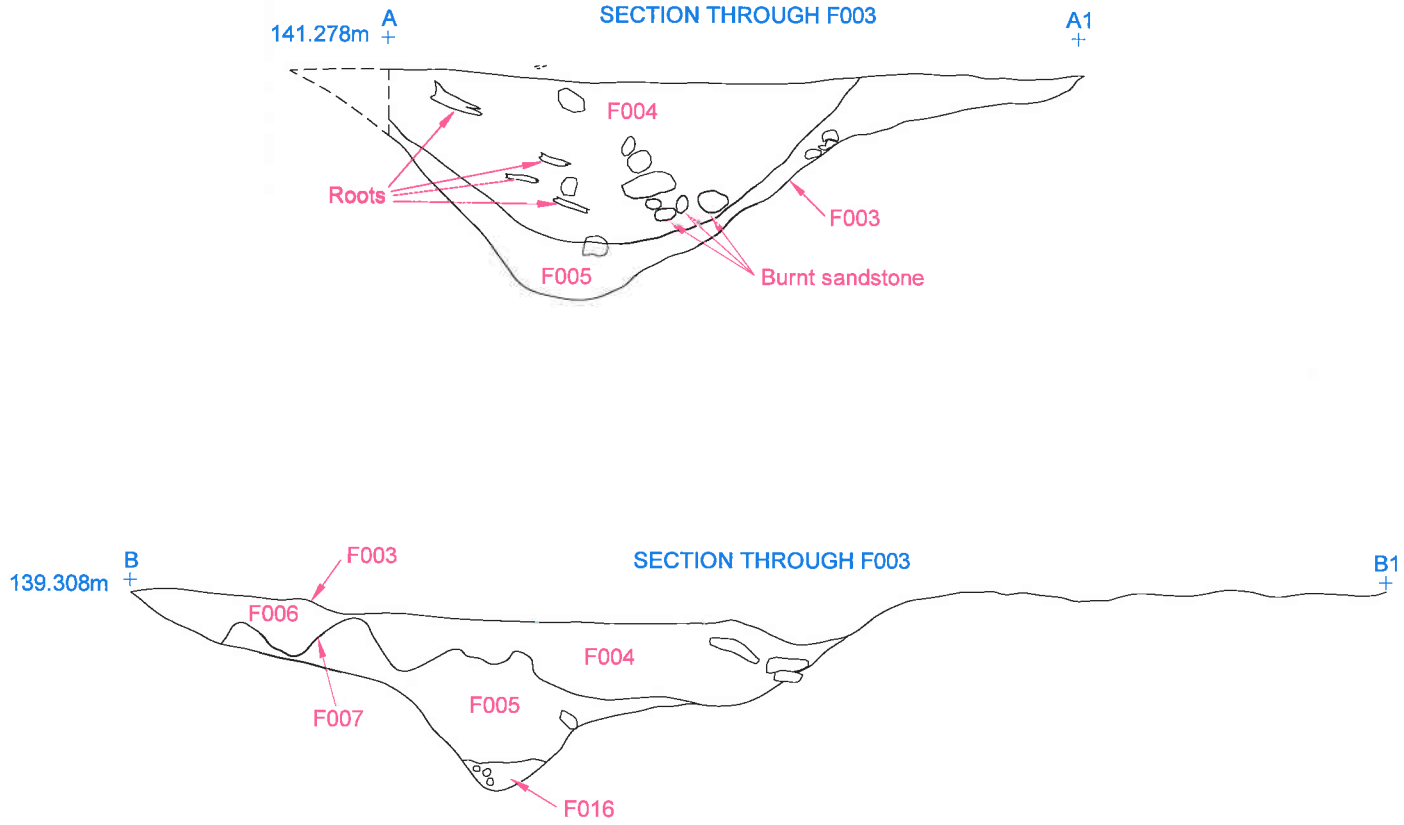
Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:30 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10010

Figure 10: Sections A-A1 and B-B1 of enclosure ditch F003 in Zone A.



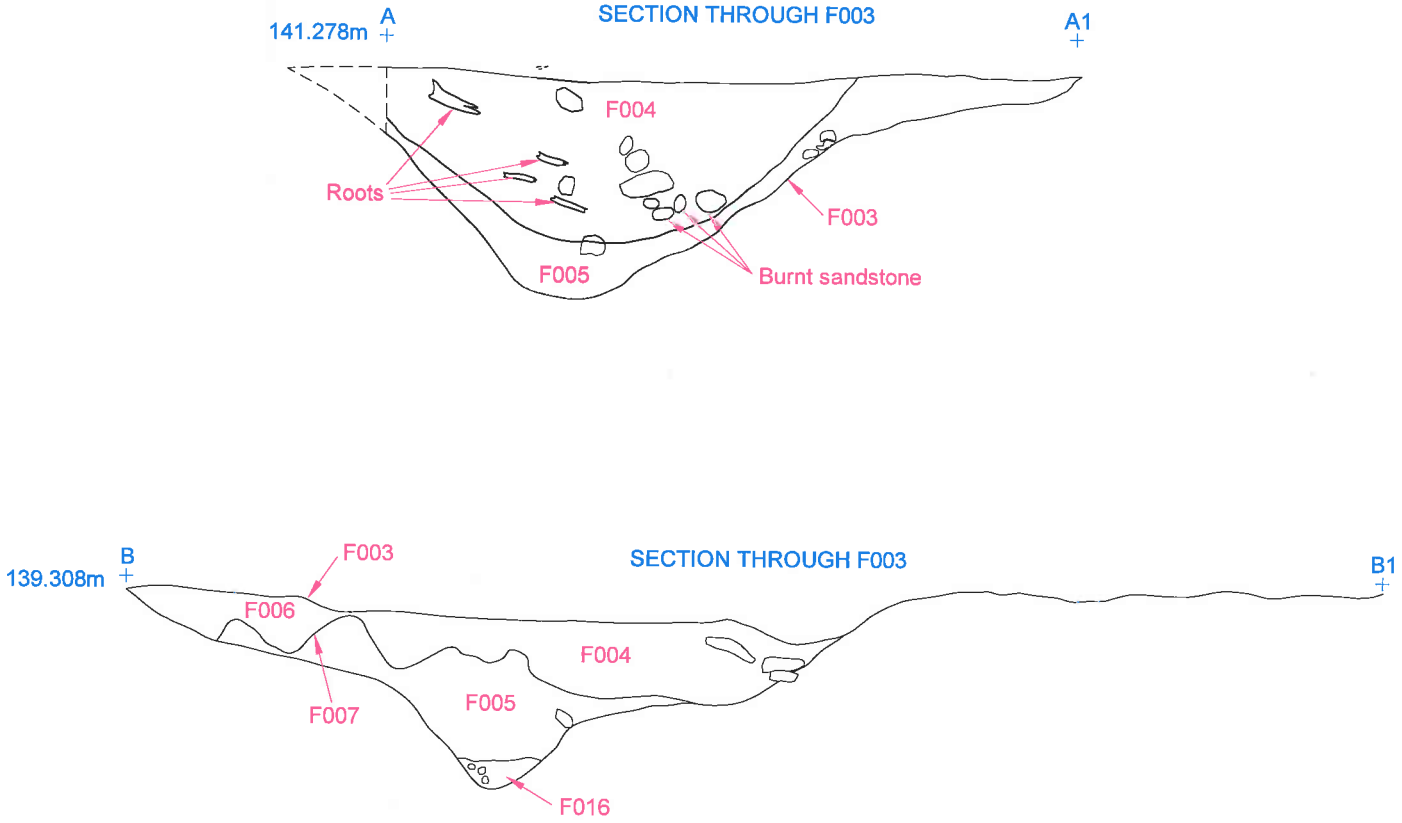
Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:30 A4
	Issued for: Archaeological excavation report	Date: Apr '09
	Client: Laois County Council	Origin: ACS Ltd.
		Drawing no.: 05_09_C10010

Figure 10: Sections A-A1 and B-B1 of enclosure ditch F003 in Zone A.



Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:30 A4
		Date: Apr '09
	Issued for: Archaeological excavation report	Origin: ACS Ltd.
	Client: Laois County Council	Drawing no.: 05_09_C10010

Figure 10: Sections A-A1 and B-B1 of enclosure ditch F003 in Zone A.



Archaeological Consultancy Services Ltd. Unit 21, Boyne Business Park, Greenhills, Drogheda, Co. Louth	Site: M7/ M8 Motorway Scheme, Contract 2, Bushfield or Maghernaskeagh/Lismore 1	Scale: 1:30 A4
		Date: Apr '09
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	Client: Laois County Council	Drawing no.: 05_09_C10010

Figure 10: Sections A-A1 and B-B1 of enclosure ditch F003 in Zone A.